



## **SEM Monthly Monitoring Report**

**SEM-22-082**

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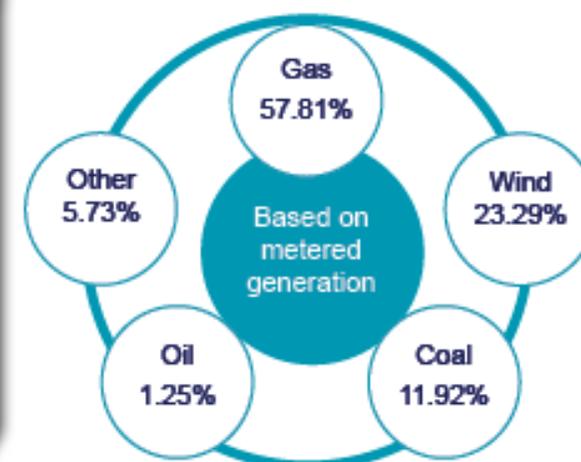
# SEM Monitoring Report

1st September 2022 - 30th September 2022

## Key Highlights

- Average prices in the day-ahead market were €283.25/MWh for September 2022. This is a 45% increase compared to the same period last year and a reduction of 27% compared to August 2022. The gas price reduced by 38% compared to August 2022 but was a 49% increase compared to September 2021. The carbon price increased by 14% compared to the same period last year.
- Actual wind generation saw a year to year increase of 24% and 32% increased compared to August 2022.
- Overall system demand dropped by 1.8% compared to the same period last year.

## Fuel Mix



## Ex Ante Market Share by volume



IDA 1 - 9.94%

IDA 2 - 2.53%

IDA 3 - 0.75%

IDC - 0.06%

## Prices and impact of wind

- In periods of higher wind prices tend to drop
- The highest prices are associated with a lower wind forecast
- Actual wind generation across the month increased by 32% when compared to last month and 24% compared to the same period last year.



Average daily price in DAM  
€283.25/MWh

Lowest average daily price  
€138.97/MWh

Highest average daily price  
€412.28/MWh

Highest prices during morning  
or evening peak demand

## INTRODUCTION

The Single Electricity Market (SEM) is the wholesale electricity market for the island of Ireland. This report, carried out by the SEM Market Monitoring Unit (MMU), provides an overview of the performance of the SEM for the period September 2022. It covers the Day Ahead Market, Intra-Day Markets and the Balancing Market.

The MMU is a joint regulatory unit that is the main monitoring function of the two Regulatory Authorities (RAs), The Commission for Regulation of Utilities (CRU) and The Utility Regulator. The monitoring function of the MMU is carried out alongside that of the Agency for the Cooperation of Energy Regulators (ACER) and is provided for by Regulation (EU) No 1227/2011 of 25 October 2011 on wholesale energy market integrity and transparency (REMIT).

The SEM is composed of separate electricity trading arrangements in a number of different timeframes. This is shown graphically in Figure 1 below.

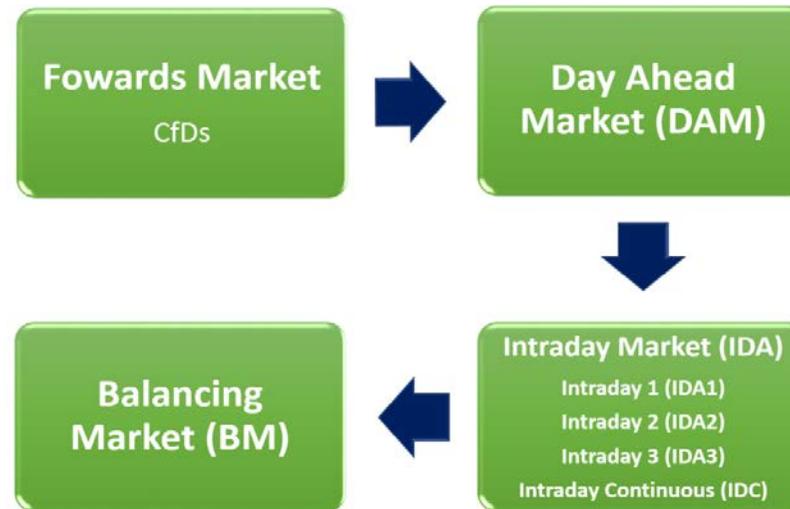


Figure 1 - SEM Energy Market

Trading in the forwards 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.

The DAM is a daily auction that takes place at 11:00 each day. Participation in the DAM is not mandatory. Following the DAM, the Intraday Auctions (IDA) enable participants to adjust their physical positions closer to real time. IDA1 and IDA2 are coupled with the GB market. IDA3 is a local market to the SEM. The Intraday Continuous Market (IDC) also provides market participants with the opportunity to refine their market position and minimise their exposure in the Balancing Market (BM). Through the Balancing Market (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 at all times

## SUMMARY DASHBOARD

The below dashboard outlines the key monthly averages for the period 1 September 2021 to 30 September 2022:

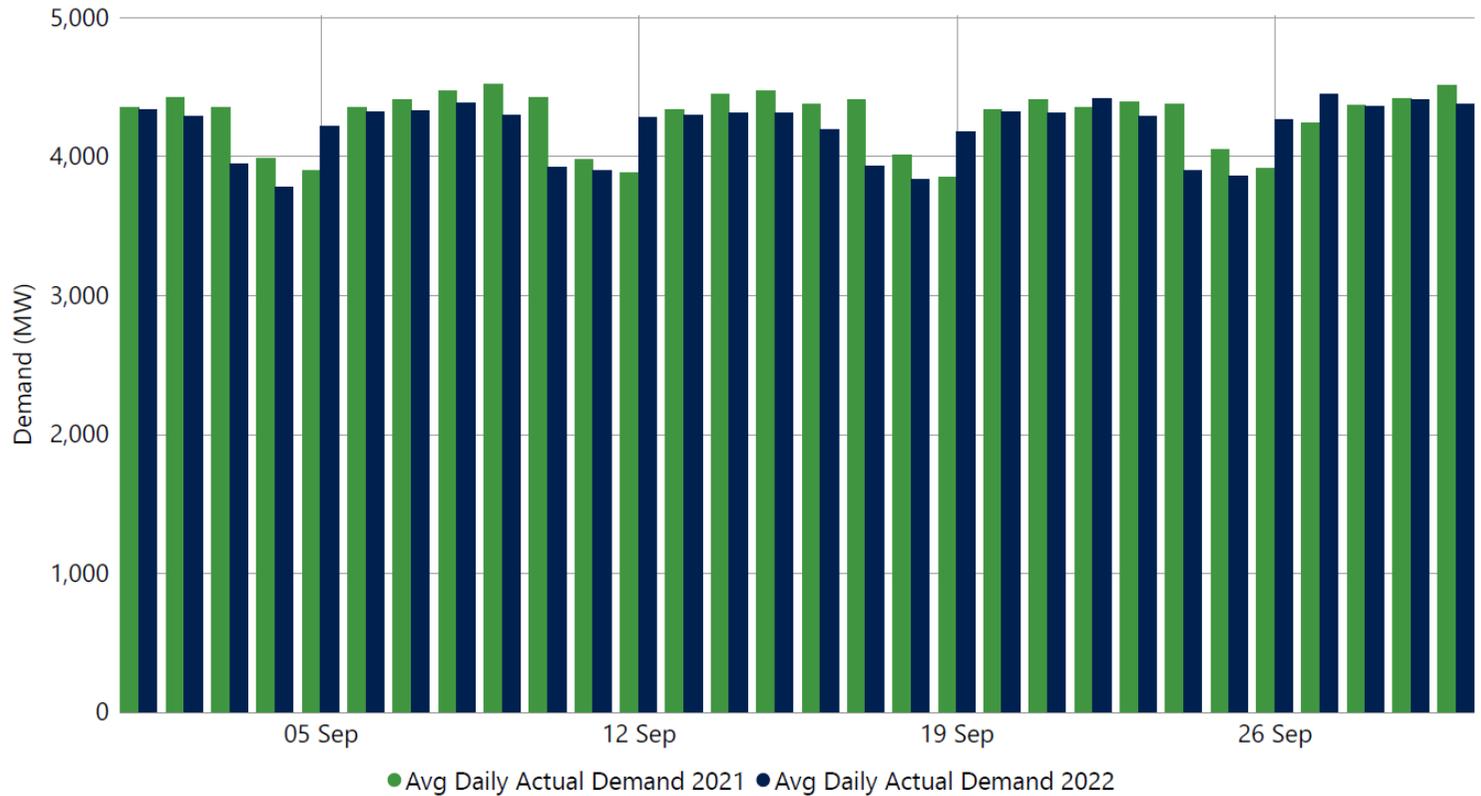
Monthly Averages	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
<b>DAM (€/MWh)</b>	195.54	214.77	204.72	250.40	201.46	175.11	293.25	218.26	143.27	181.84	267.19	387.64	283.25
% Change from previous month	49%	10%	-5%	22%	-20%	-13%	67%	-26%	-34%	27%	47%	45%	-27%
% Change from previous year	341%	346%	347%	326%	157%	204%	302%	155%	48%	91%	86%	195%	45%
<b>Actual System Demand (MW)</b>	4274	4387	4735	4789	4834	4833	4675	4408	4208	4169	4085	4099	4197
% Change from previous month	3%	3%	8%	1%	1%	0%	-3%	-6%	-5%	-1%	-2%	0%	2%
% Change from previous year	5%	2%	5%	2%	2%	3%	4%	3%	0%	2%	-1%	-1%	-2%
<b>Actual Wind Generation (MW)</b>	873	1541	1542	1971	1682	2777	1559	1426	1428	1129	854	817	1081
% Change from previous month	3%	77%	0%	28%	-15%	65%	-44%	-9%	0%	-21%	-24%	-4%	32%
% Change from previous year	-31%	-16%	-13%	-1%	11%	13%	-3%	31%	34%	13%	90%	-3%	24%
<b>Gas Price (€/MWh)</b>	61.80	80.46	80.34	109.16	81.61	76.55	124.91	66.21	38.25	55.33	90.30	147.59	92.16
% Change from previous month	41%	30%	0%	36%	-25%	-6%	63%	-47%	-42%	45%	63%	63%	-38%
% Change from previous year	450%	459%	463%	532%	262%	328%	594%	208%	46%	94%	149%	237%	49%
<b>Carbon Price (€/Tonne)</b>	61.79	59.44	66.22	78.99	84.16	90.96	74.69	81.09	85.41	83.74	81.34	88.20	70.29
% Change from previous month	10%	-4%	11%	19%	7%	8%	-18%	9%	5%	-2%	-3%	8%	-20%
% Change from previous year	123%	135%	150%	155%	149%	138%	81%	77%	63%	59%	52%	56%	14%
<b>Coal Price (€/MWh)</b>	20.70	28.56	17.63	16.94	18.89	23.26	44.28	39.91	42.55	44.66	52.67	49.03	48.20
% Change from previous month	19%	38%	-38%	-4%	12%	23%	90%	-10%	7%	5%	18%	-7%	-2%
% Change from previous year	233%	322%	184%	125%	142%	204%	460%	384%	341%	258%	243%	181%	133%
<b>EWIC % Periods Import</b>	39.20%	39.58%	30.97%	25.77%	17.61%	18.15%	68.75%	0.00%	12.33%	27.16%	33.03%	25.84%	16.25%
<b>EWIC % Periods Export</b>	13.92%	30.07%	31.18%	47.14%	48.19%	59.19%	17.04%	0.00%	23.49%	43.56%	56.52%	51.92%	41.81%
<b>EWIC % Not Flowing</b>	46.88%	30.01%	37.85%	27.08%	34.21%	33.37%	14.21%	100.00%	64.18%	29.28%	10.45%	22.24%	45.28%
<b>Moyle % Periods Import</b>	70.52%	57.00%	50.63%	24.29%	35.65%	27.31%	55.04%	56.33%	38.54%	40.44%	24.90%	31.55%	35.35%
<b>Moyle % Periods Export</b>	29.48%	42.67%	49.38%	75.71%	64.35%	72.69%	44.83%	43.63%	61.46%	59.56%	10.72%	66.26%	63.85%
<b>Moyle % Not Flowing</b>	0.00%	0.00%	0.00%	0.00%	0.00%	7.14%	0.13%	0.00%	0.00%	0.00%	64.38%	2.18%	0.80%

Dashboard 1 – Year Period Key Metrics

# 1. SYSTEM

## 1.1 SYSTEM DEMAND

The system demand graph below represents the electricity production required to meet electricity consumption on a daily average basis.

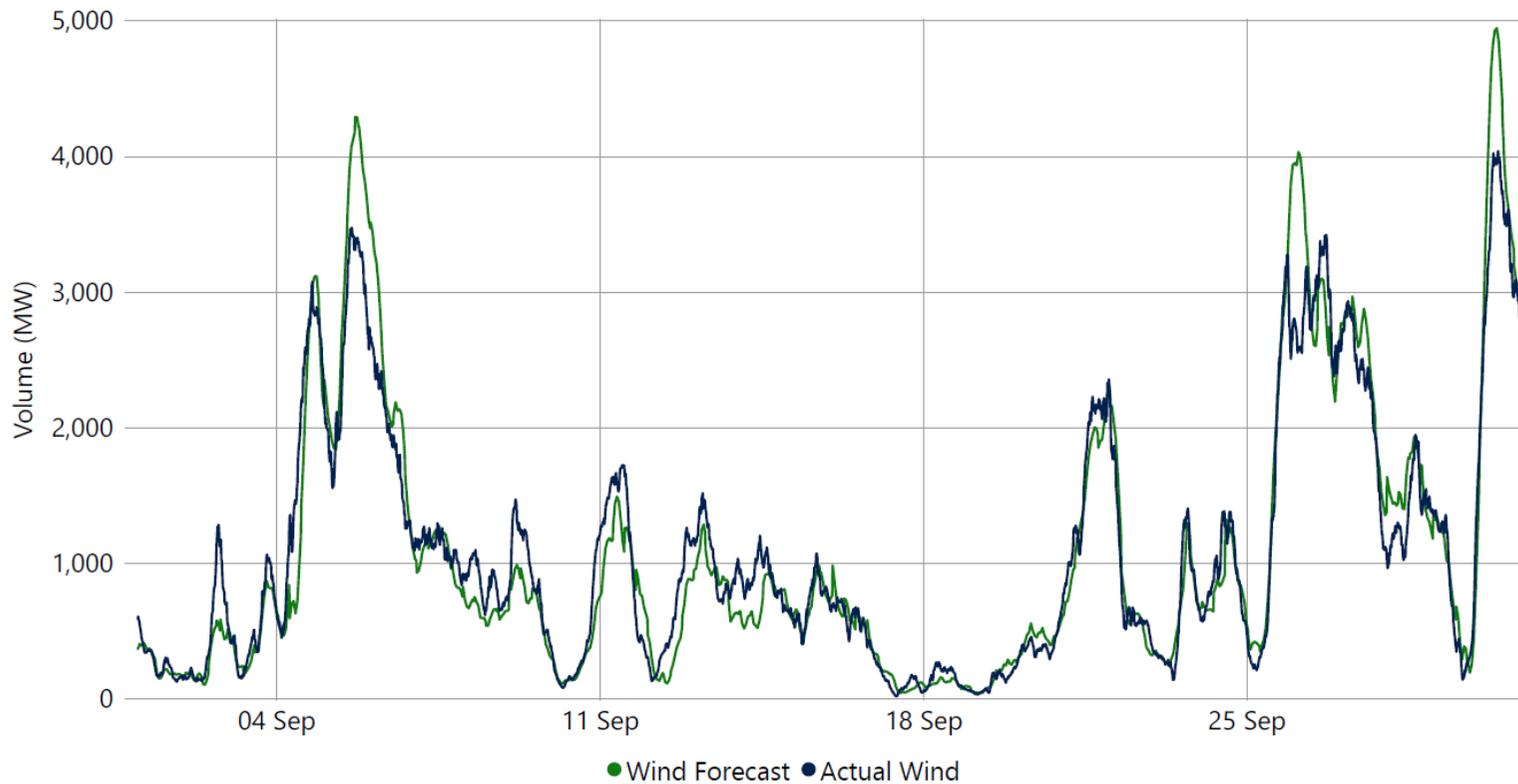


- Actual system demand in September 2022 averaged 4197 MW compared to 4275 MW in September 2021
- This is a 1.82% decrease

**Graph 1 – Actual System Demand Daily Average 2021 against 2022**

## 1.2 WIND GENERATION

Actual wind generation displayed below is the total electricity production of all wind farms on the system against forecast.



**Graph 2 – Forecasted against Actual Wind Generation**

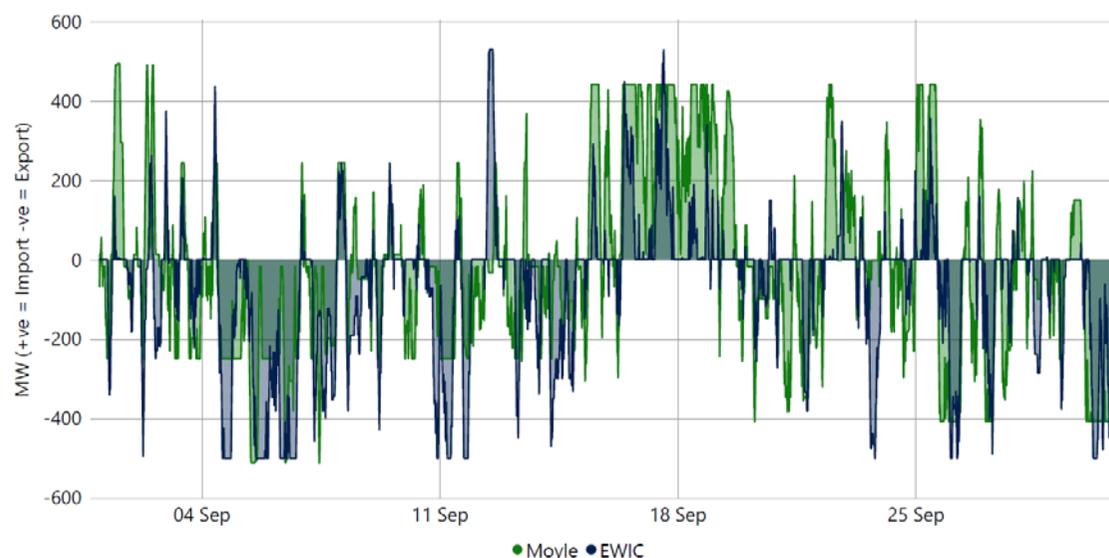
- Actual wind generation across the month averaged 1081 MW compared to 873 MW in the same month last year
- Actual wind generation increased by more than 23% when comparing these two months

## 1.3 INTERCONNECTION

Interconnection between the SEM and the wholesale electricity markets in Great Britain takes place over two interconnectors: 1) between Northern Ireland and Scotland via the Moyle Interconnector; and 2) between Ireland and Wales via the East West Interconnector (EWIC).

### 1.3.1 MOYLE & EWIC

In the graphs below actual flows of each interconnector are shown across the month on a quarter hourly basis. A positive flow (i.e. on the top half of the graph) shows the interconnectors importing from GB, indicating that the intraday SEM prices (IDA1/2) are likely to be higher than the intraday GB prices (IDA1/2). A negative flow (i.e. in the bottom half of the graph) shows that the SEM is exporting, indicating that the SEM price is likely to be lower than GB's.

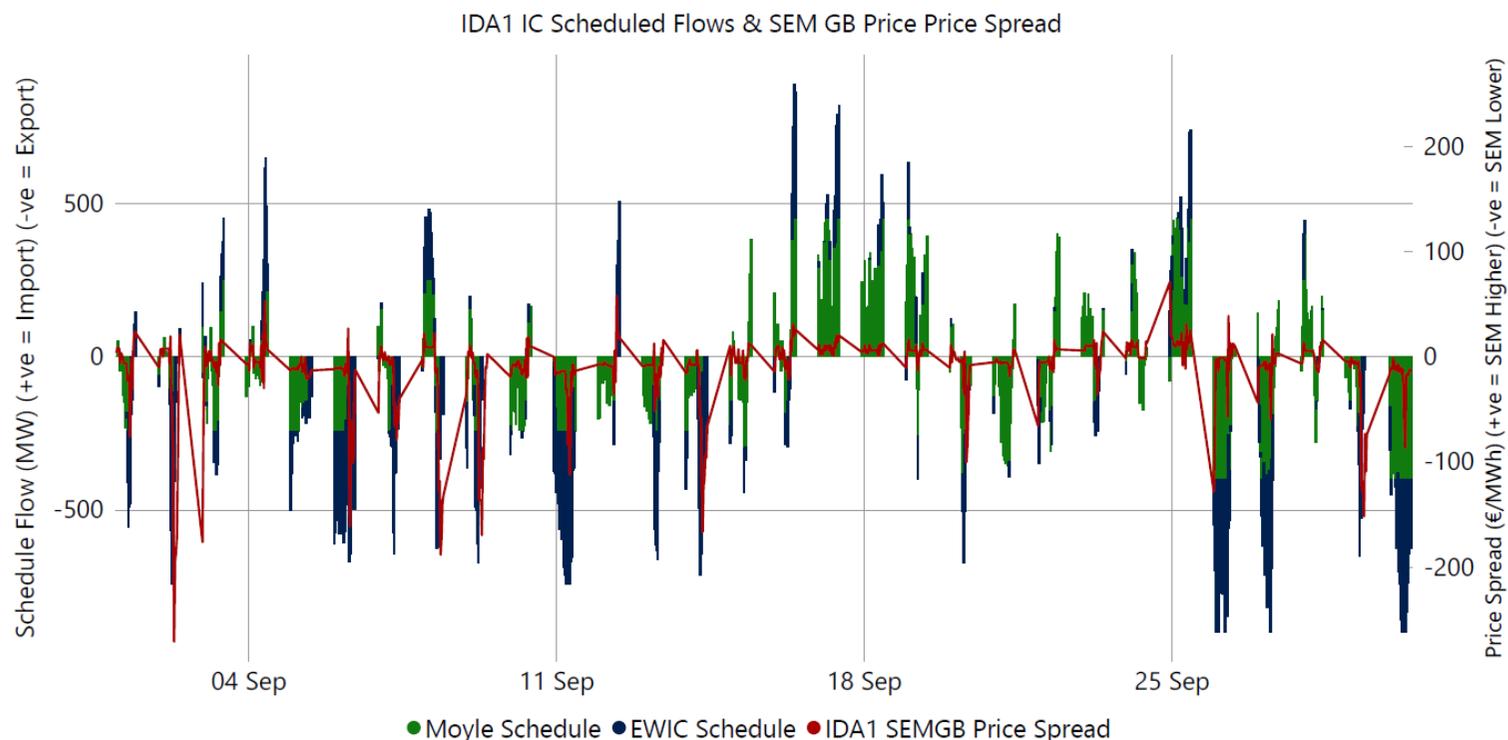


**Graph 3 – Actual Interconnector Flows (15 Minute Intervals)**

Scheduling of the direction and volume on each of the interconnectors is determined by the positive or negative state of the price spread between SEM and GB in the first two intraday auctions. Where the SEM is priced higher than GB the interconnectors should import and where the SEM is priced lower than GB the interconnectors should be exporting.

In the below two graphs the scheduled volumes of the two interconnectors are shown against the SEM and GB intraday price spreads. Flows are shown using the auction schedule of each interconnector at each 30 minute period throughout the day against the SEM GB price spread.

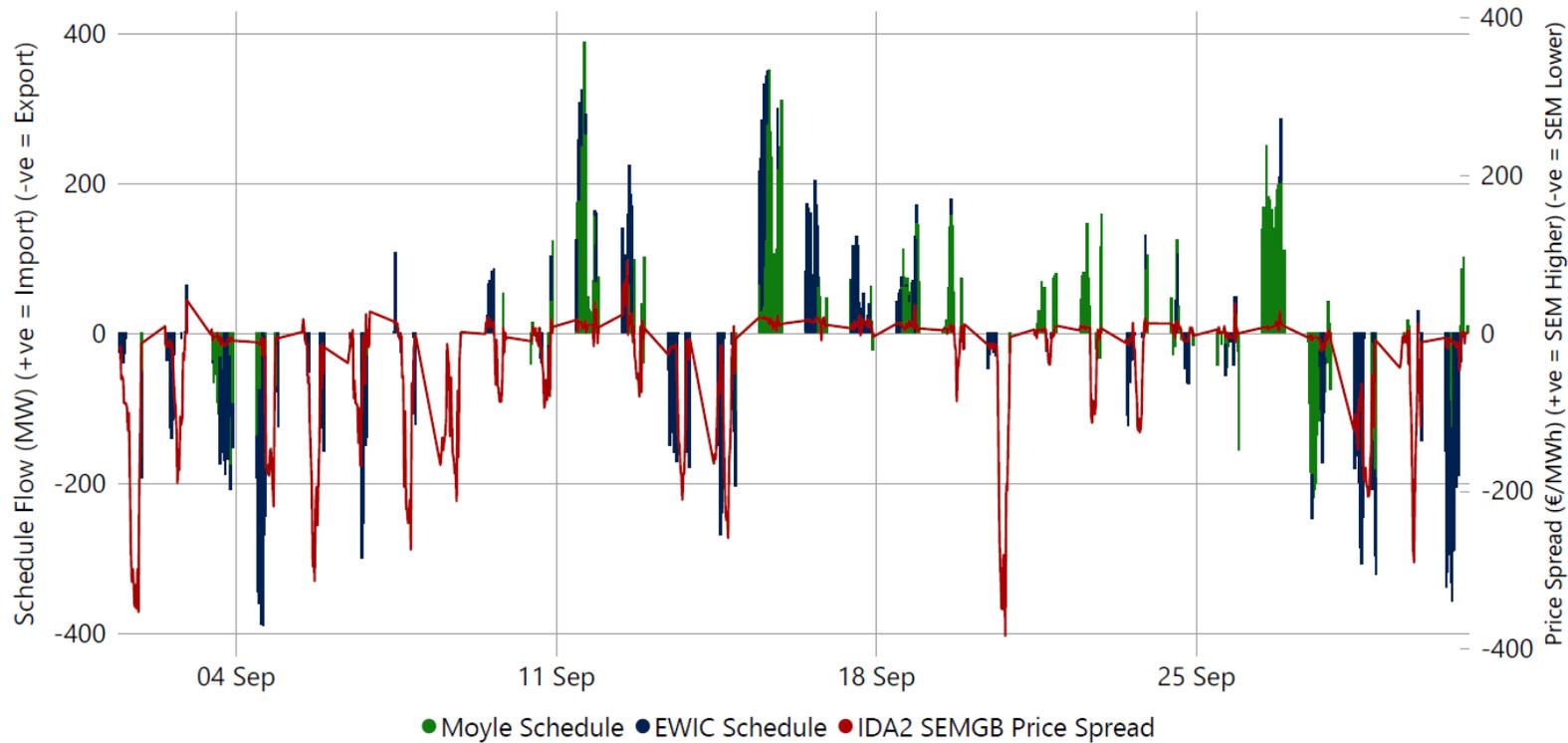
In the below graph, the IDA1 schedule is used for the first 24 half hour trading periods in the day. Here the schedule volume and direction is determined by the SEM GB price spread as a result of this auction (IDA1).



- The monthly average price spread during these auction periods was (-)€11.28/MWh indicating that SEM is priced lower than GB
- Monthly net average of 100 MW export

**Graph 4 – IDA1 Interconnector Schedule against Price Spread (Periods 1-24)**

In the below graph, the IDA2 schedule is used for the second 24 half hour trading periods in the day. Here the auction volume (IDA1 volumes refined with IDA2 volumes) direction is determined by the SEM GB price spread as a result of this auction (IDA2). IDA2 adds to the liquidity in these periods which cover the trading day evening peaks.

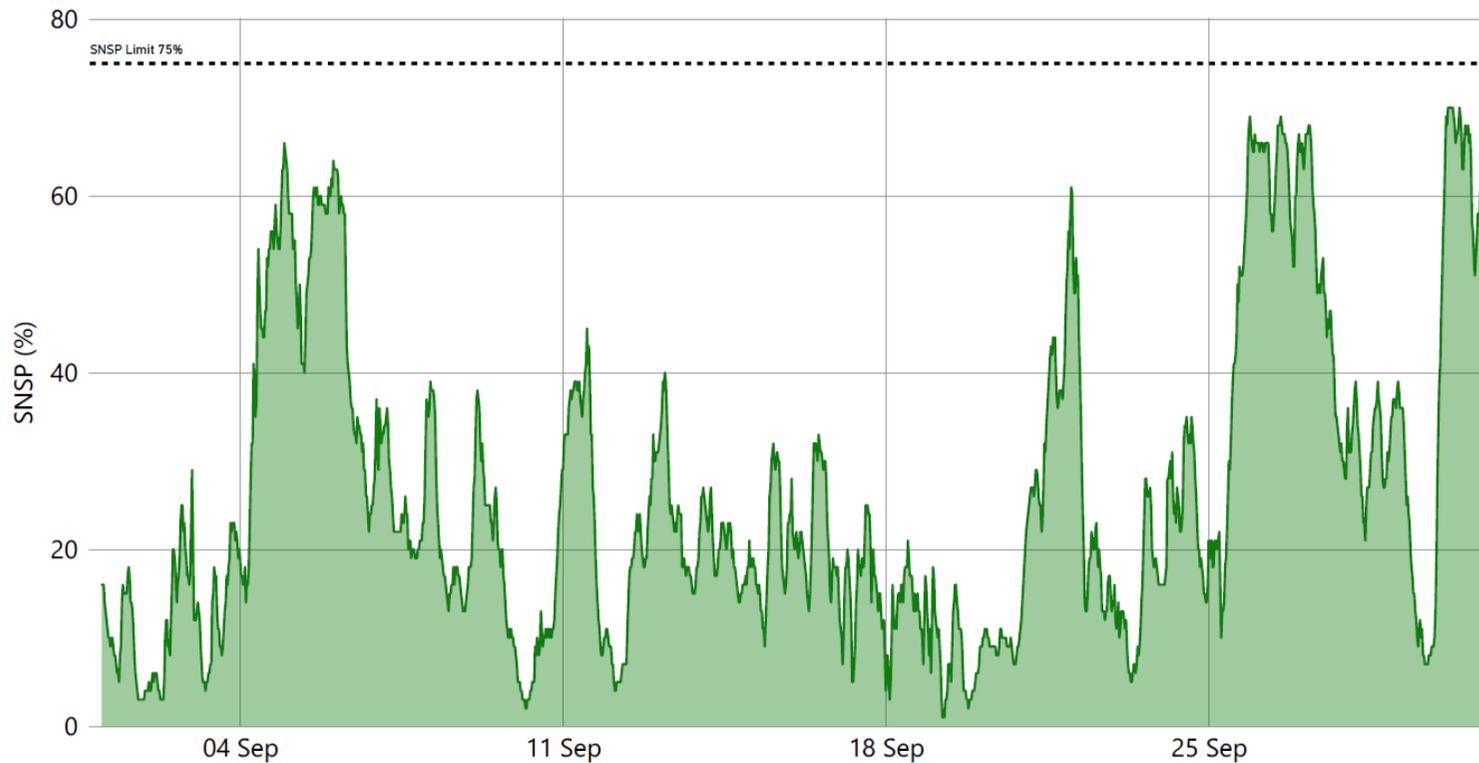


**Graph 5 – IDA2 Interconnector Schedule against Price (Periods 25-48)**

- The monthly average price spread during these auction periods was (-)€41.26/MWh indicating that SEM is priced lower than GB
- Monthly net average was less than 1 MW export

## 1.4 SYSTEM NON-SYNCHRONOUS PENETRATION

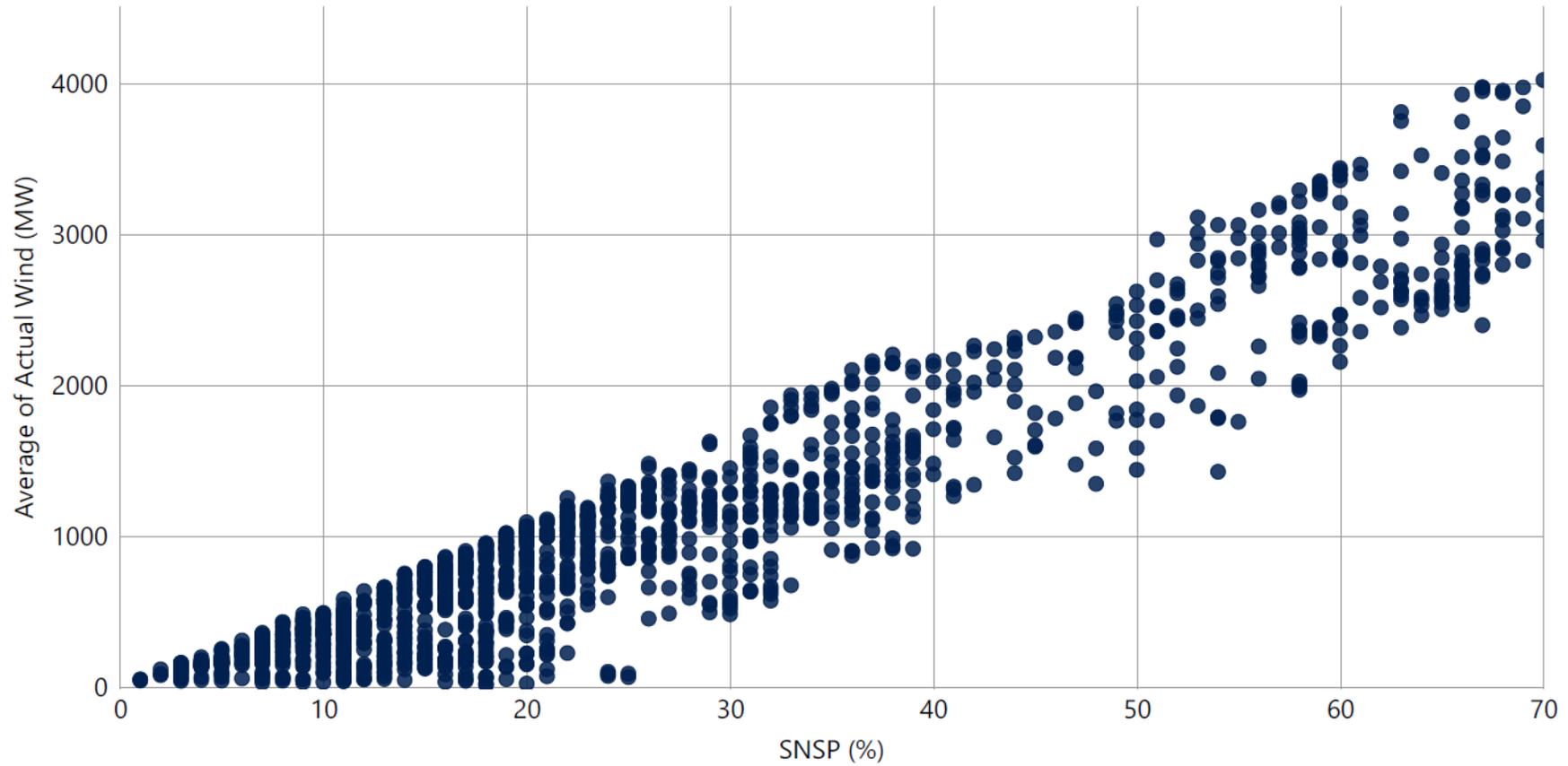
System non-synchronous penetration (SNSP) is a key measure of how much renewable generation is being used at a particular period in the day. The system is not currently capable of utilising 100% of renewable generation on the system and so must have some conventional synchronous generation running at all times. The current SNSP limit is 75%.



Graph 9 – SNSP (Half Hourly Intervals)

- Highest SNSP value of 70.47% was observed at 06:00 on 30 September
- The lowest value of 1.3% seen at 05:30 on 19 September

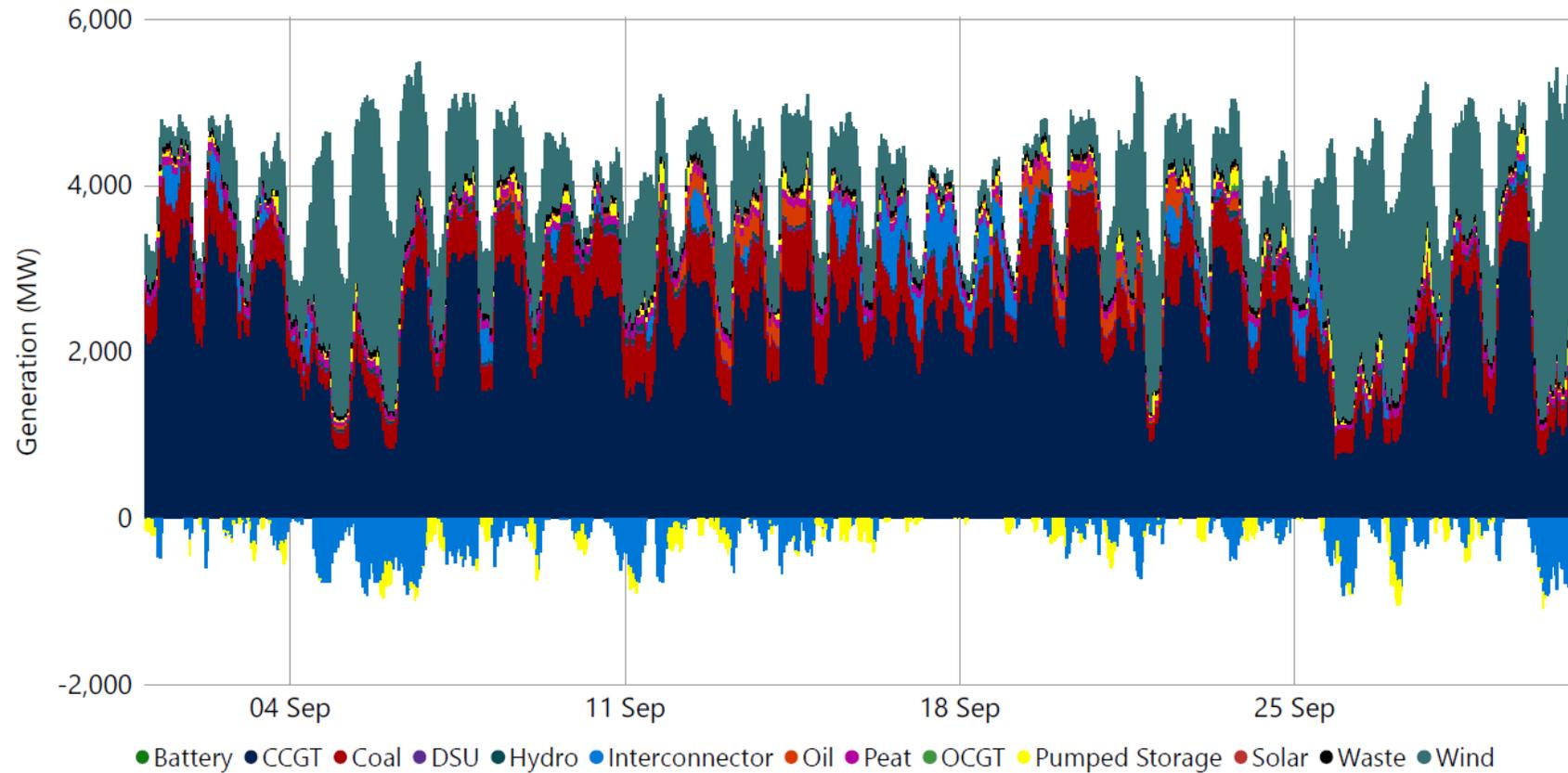
A major contributing factor to high or low SNSP levels is the volume of wind on the system at any given point. Higher wind volumes generally indicate higher levels of SNSP. This correlation is illustrated below.



**Graph 10 – SNSP against Actual Wind Generation**

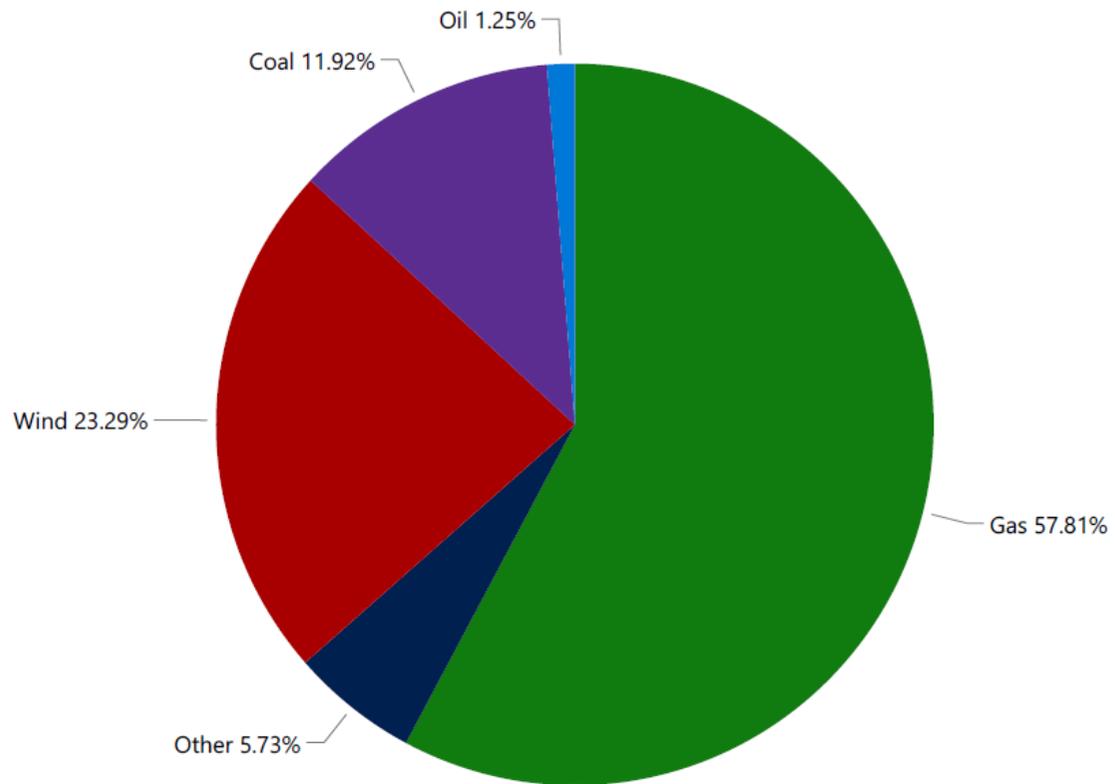
## 1.5 FUEL MIX

Demand across the Island is continuing to be met by a wide portfolio of generation types using a variety of fuels. The below graph provides an hourly summary across the month of the system generation per generator type.



**Graph 11 – Hourly Metered Generation**

The below chart shows how each of the main fuel types contributed to the overall share of generation mix across the month.



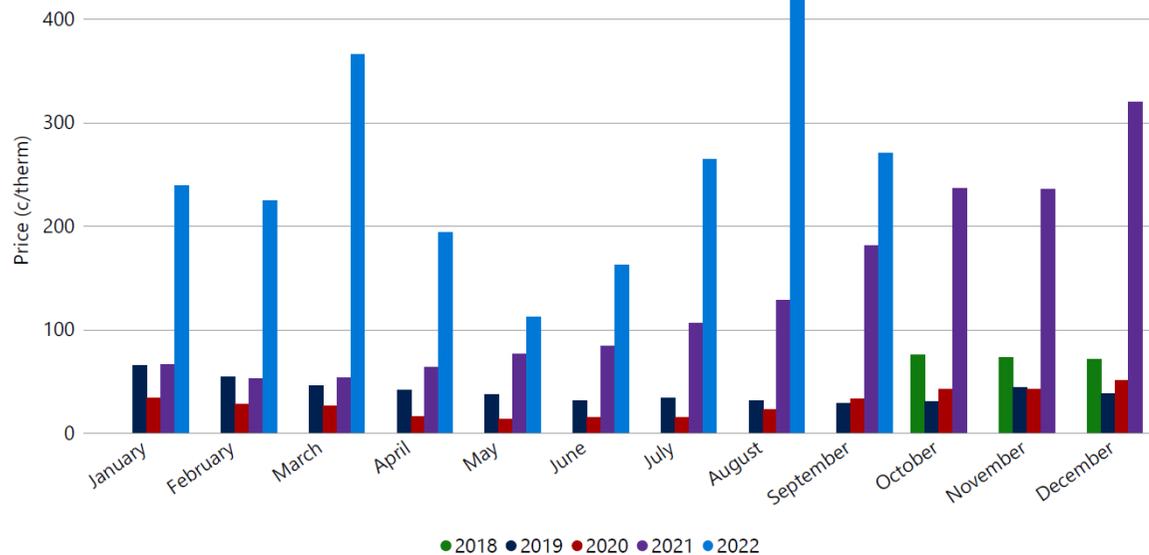
**Chart 1 – Metered Generation Mix % Share**

## 2. INPUT COSTS

A key driver for electricity prices in SEM continues to be the wholesale price of fuel and carbon emissions. In this section, the main input costs for generators in the SEM are analysed from 01 October 2018 (the beginning of the new SEM arrangements) until present. These are Gas, Carbon Emissions, Heavy Fuel Oil (HFO), Coal and Gasoil (Distillate).

### 2.1 GAS

Gas fired units continue to provide the largest portion of generation in the thermal fleet and in doing so will have a large effect of price formation in the majority of trading periods. The price of gas remains extremely volatile with prices continuing to trade significantly above historic price trends.

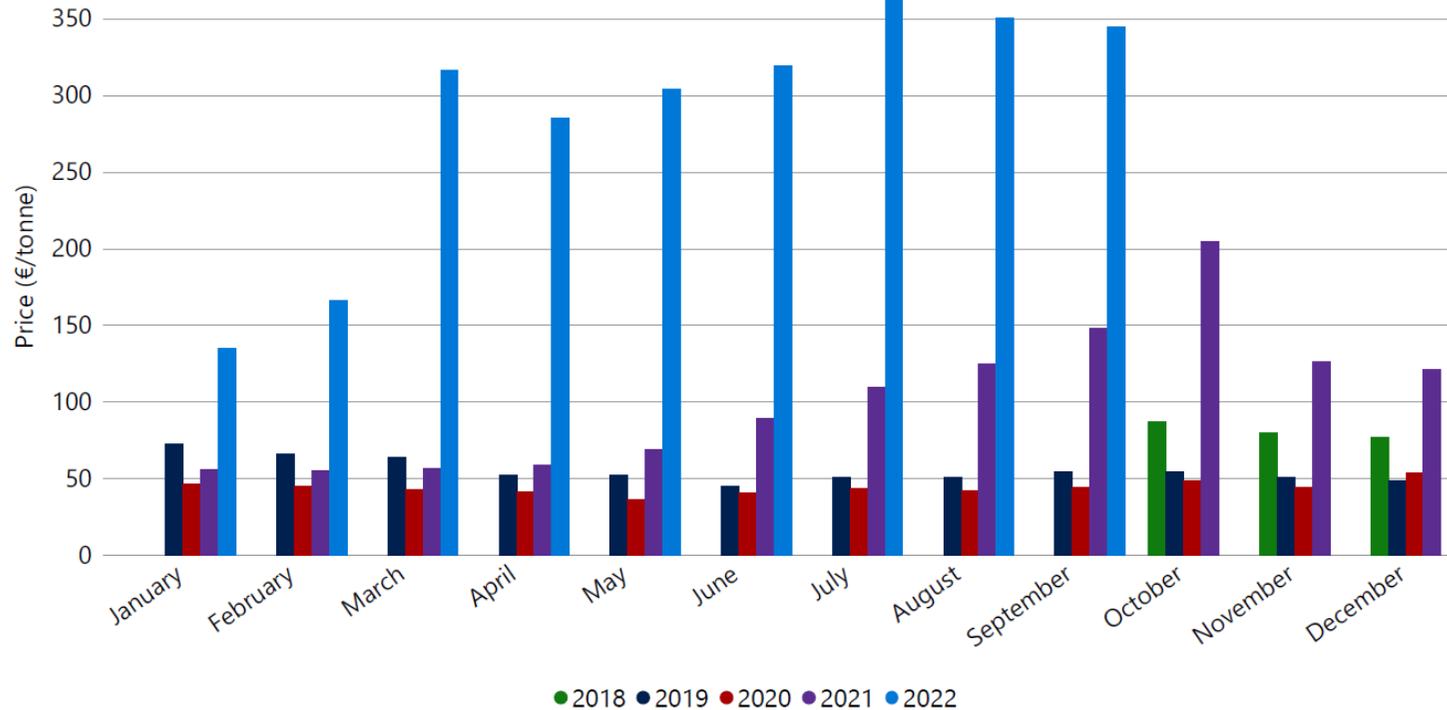


Graph 12 – Average Monthly Gas Price

- An average monthly price in September 2022 was 270.10 c/therm (26% decrease from August 2022).
- The monthly high for September 2022 was 398.18c/therm
- The monthly low for September 2022 was 150.39c/therm
- Gas prices have decreased significantly in September compared to August, but remain consistently higher each month compared to 2021.

## 2.2 COAL

Whilst Coal usually provides a smaller percentage of metered generation than gas it is still a key fuel within the generation fleet.

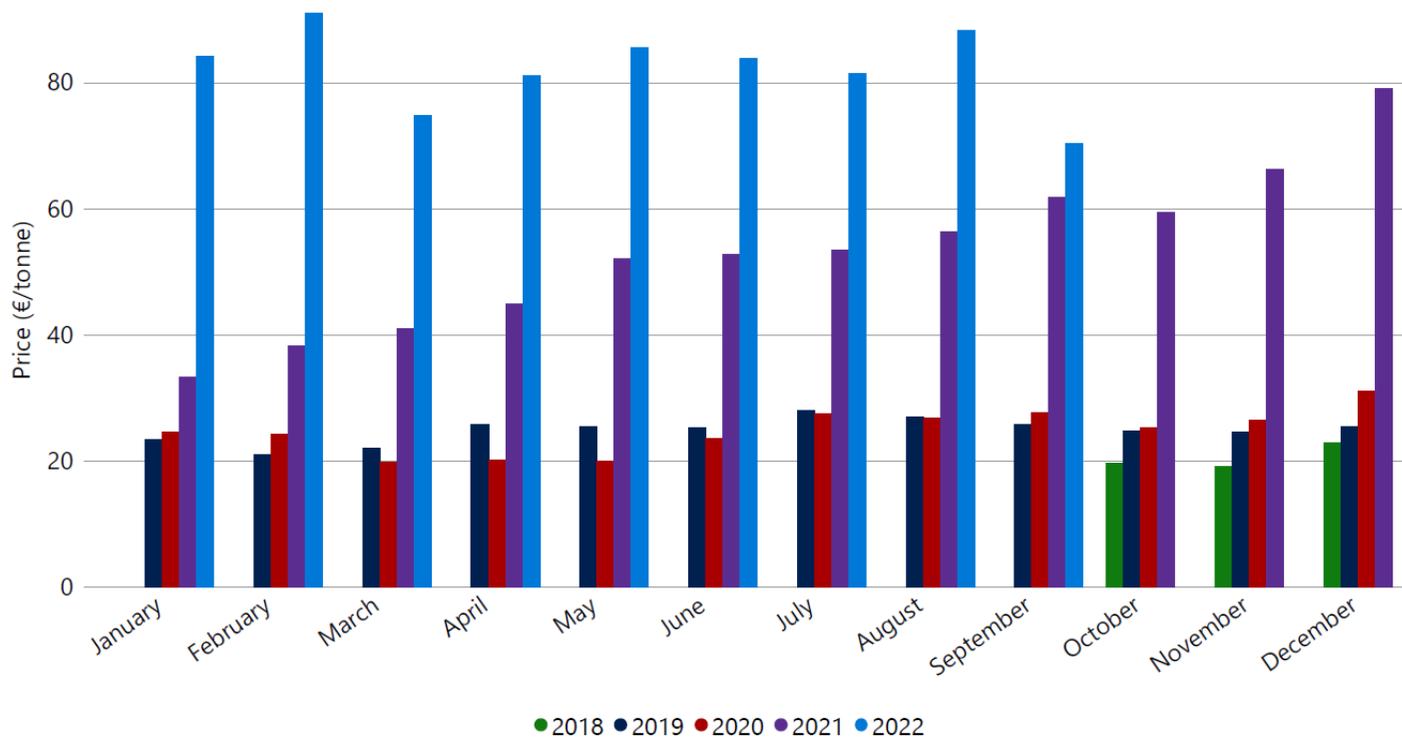


- An average monthly price in September 2022 was €344.31/tonne
- The monthly high for September 2022 was €395.66/tonne
- The monthly low for September 2022 was €323.93/tonne

**Graph 13 – Average Monthly Coal Price**

## 2.3 CARBON

Carbon (CO<sub>2</sub>) emission costs are a key input into the price formation for thermal units.

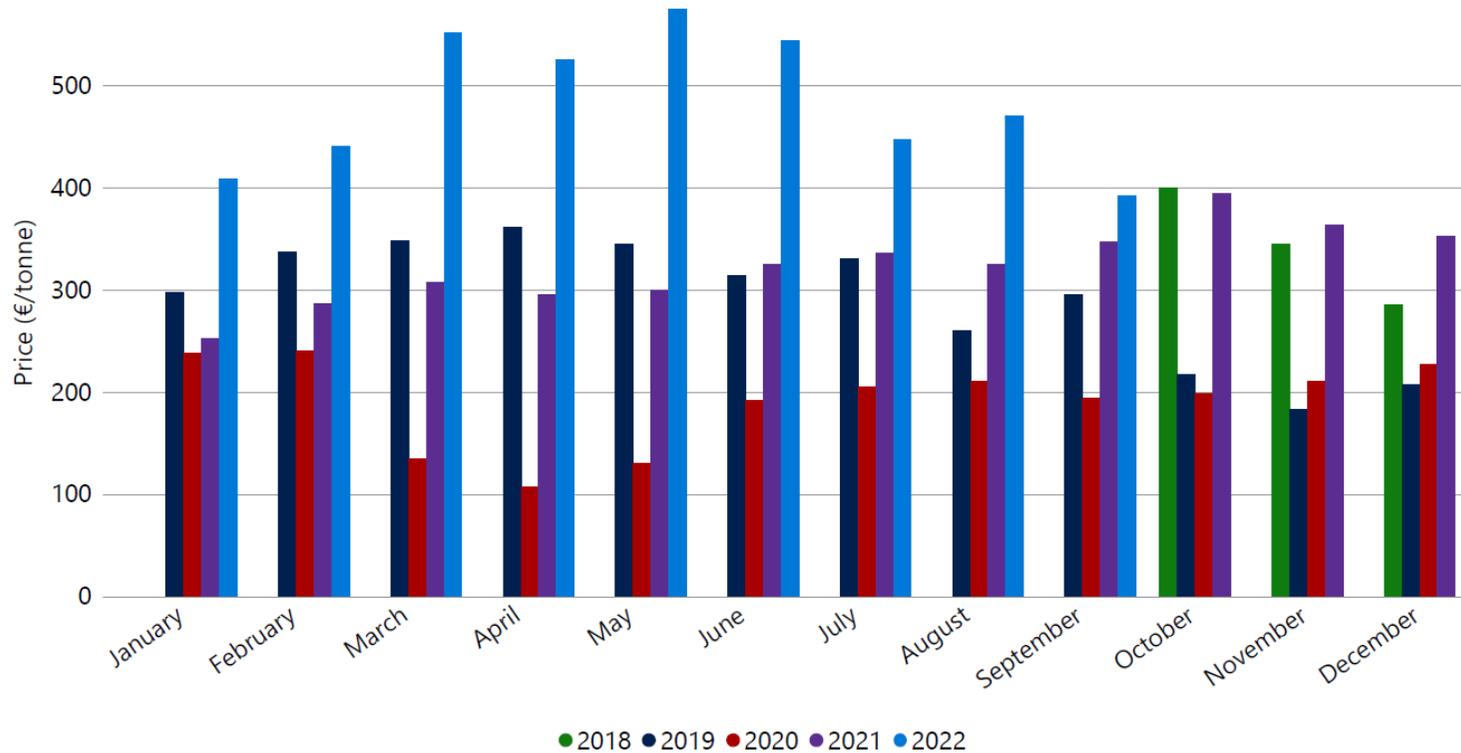


- An average monthly price in September 2022 was €70.29/tonne
- The monthly high for September 2022 was €80.27/tonne
- The monthly low for September 2022 was €64.93/tonne

Graph 14 – Average Monthly Carbon Emissions Price

## 2.4 HEAVY FUEL OIL

Heavy Fuel Oil (HFO) provides fuel for a number of units within the generation fleet.

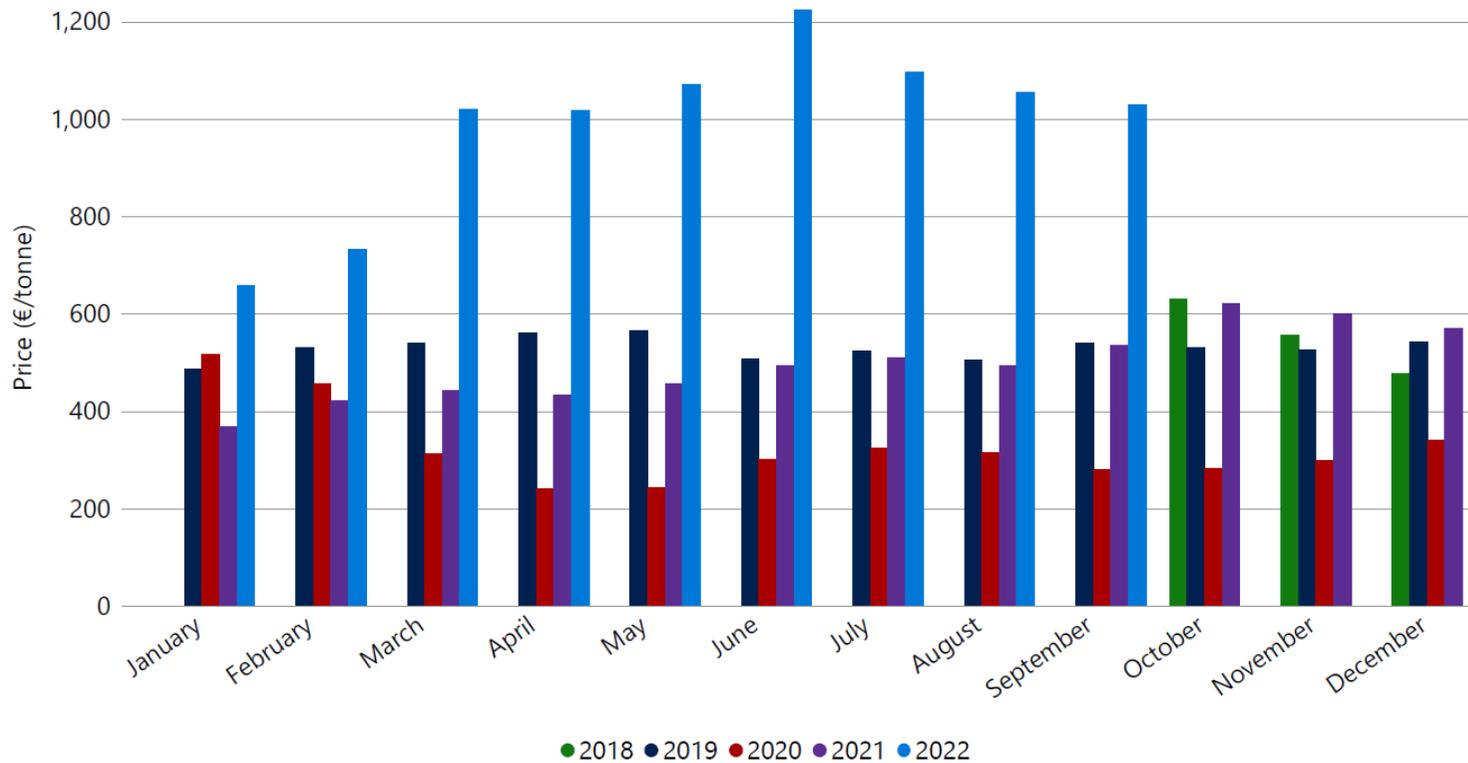


- An average monthly price in September 2022 was €391.82/tonne
- The monthly high for September 2022 was €409.78/tonne
- The monthly low for September 2022 was €377.53/tonne

**Graph 15 – Average Monthly HFO Price**

## 2.5 GASOIL

Gasoil provides fuel for a small number of units within the generation fleet.



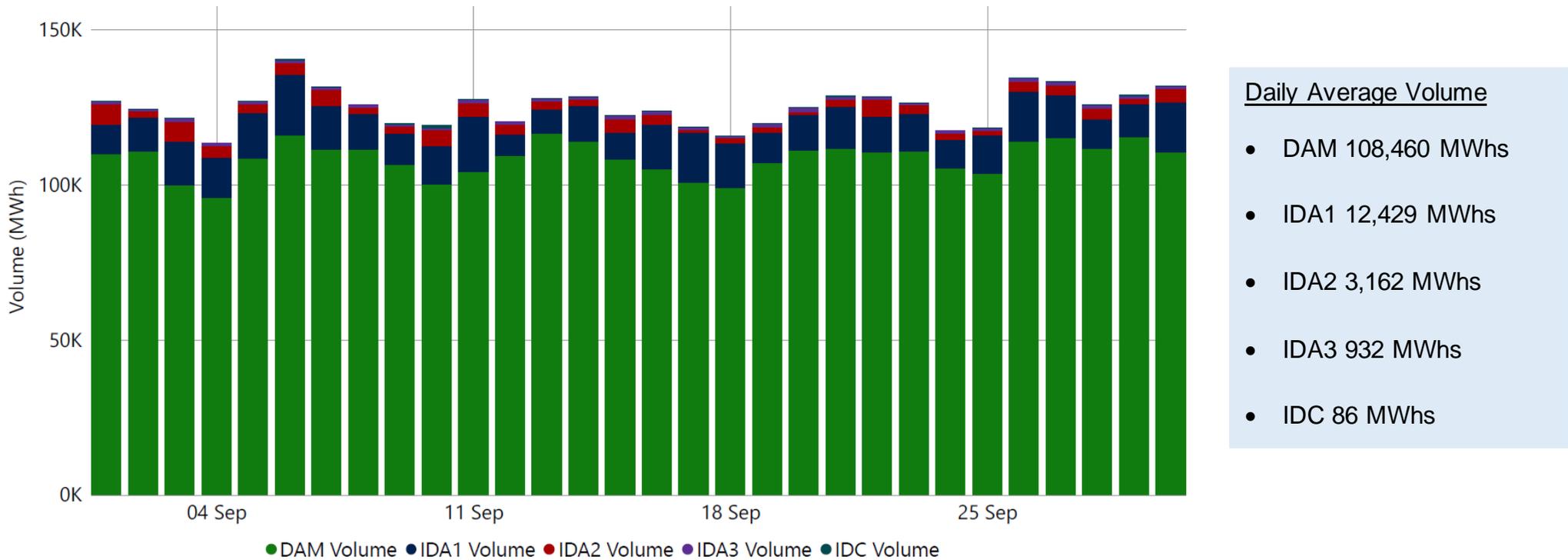
- An average monthly price in September 2022 was €1,029.30/tonne
- The monthly high in September 2022 was €1,151.20/tonne
- The monthly low for September 2022 was €923.99/tonne

**Graph 16 – Average Monthly Gasoil Price**

### 3. MARKET PERFORMANCE

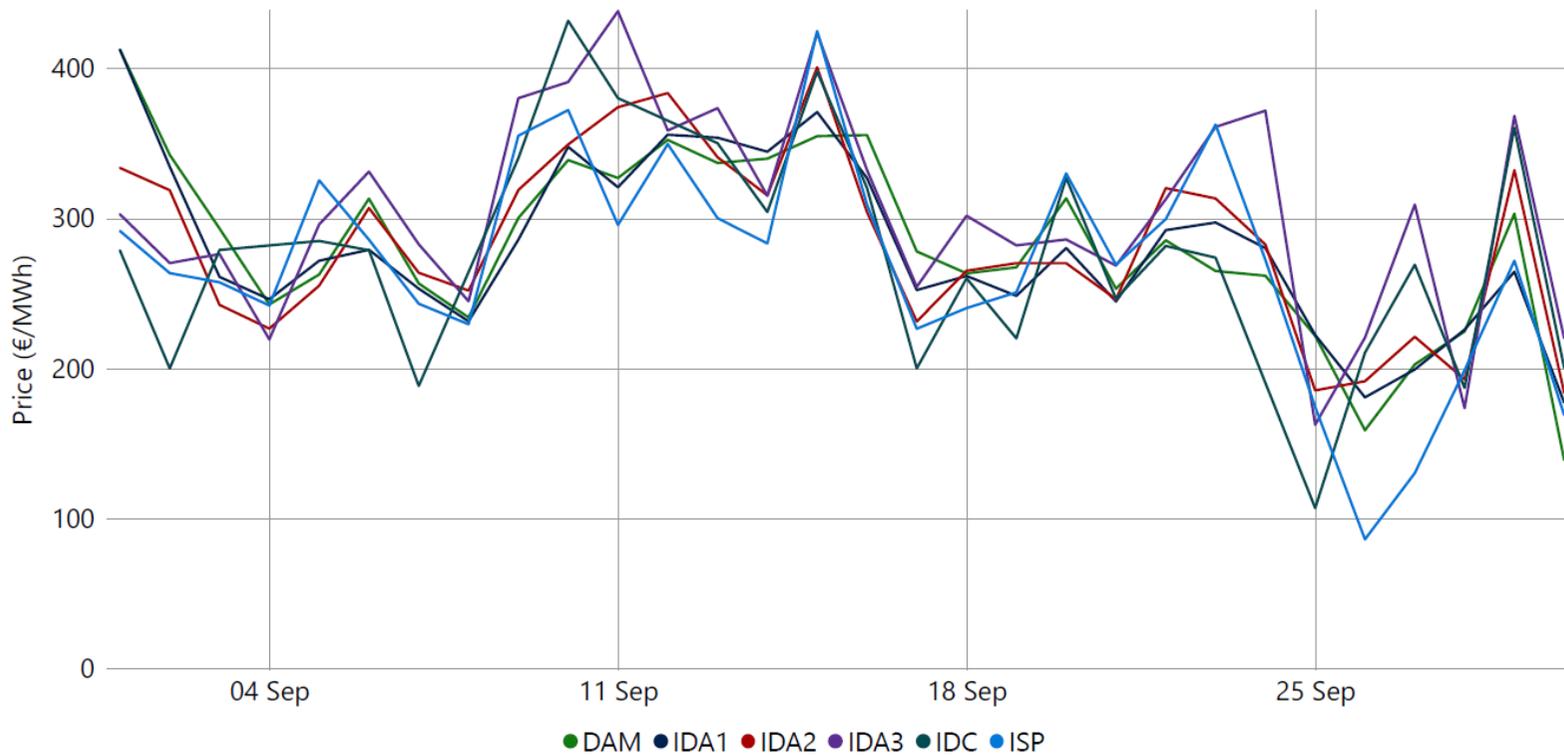
#### 3.1 PRICES & VOLUMES

The graph below shows the daily volumes in each ex-ante market in the SEM during September.



**Graph 17 – Daily Ex-Ante Volumes**

The below graph shows the daily average ex-ante and balancing market prices across September.



**Graph 18 – Daily Ex-Ante and Balancing Market Volumes**

Daily Average Prices

- DAM €283.25/MWh
- IDA1 €280.66/MWh
- IDA2 €282.97/MWh
- IDA3 €304.17/MWh
- IDC €315.04/MWh
- Imbalance Settlement Price (ISP) €270.24/MWh
- All significantly decreased from August 2022

## 3.2 MARKET SHARE

The below charts show the market share for each ex-ante market by volume and value.

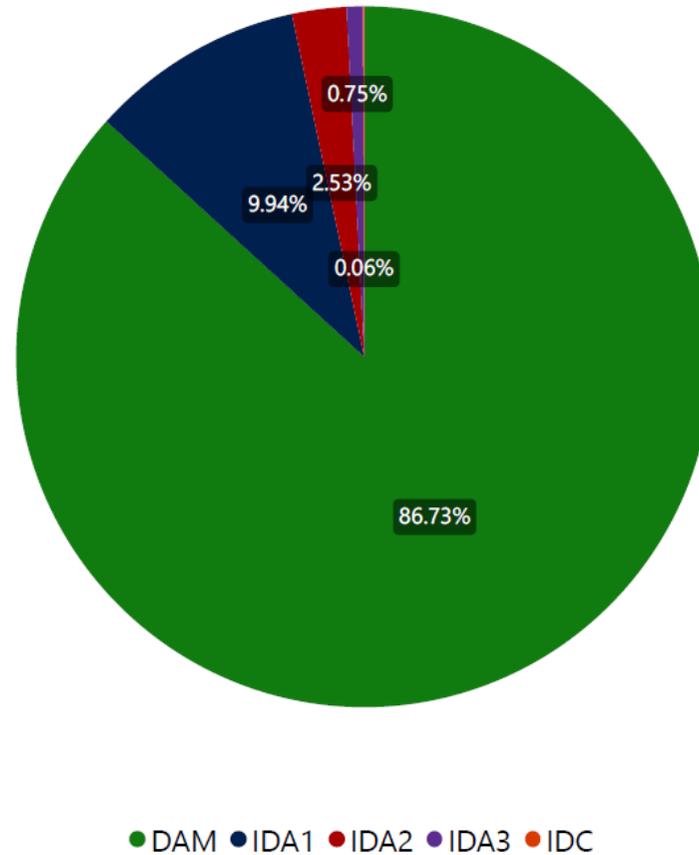
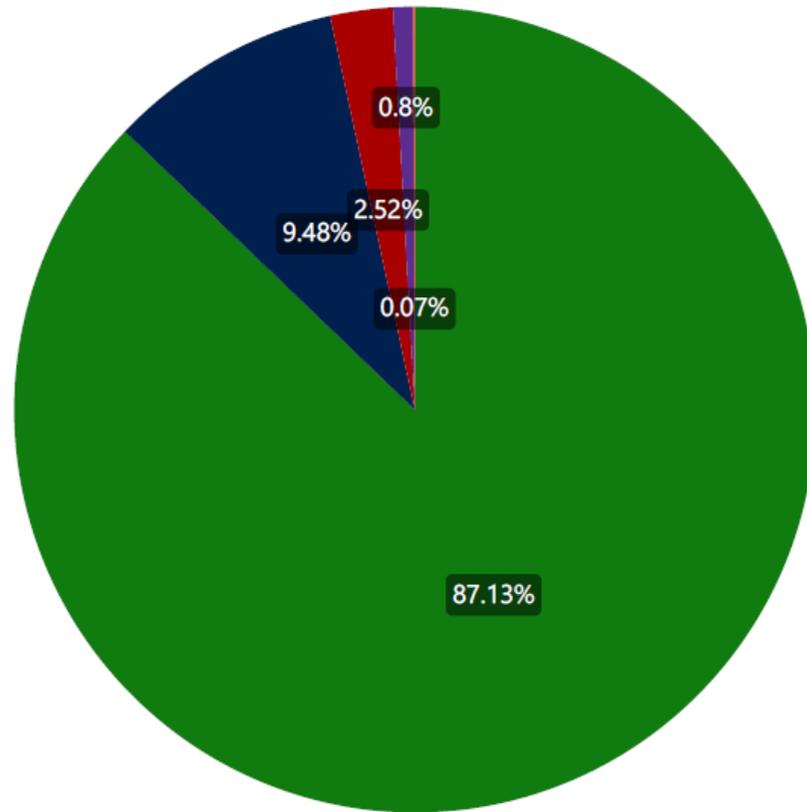


Chart 2 – Ex-Ante Volume Market Share (MWh)



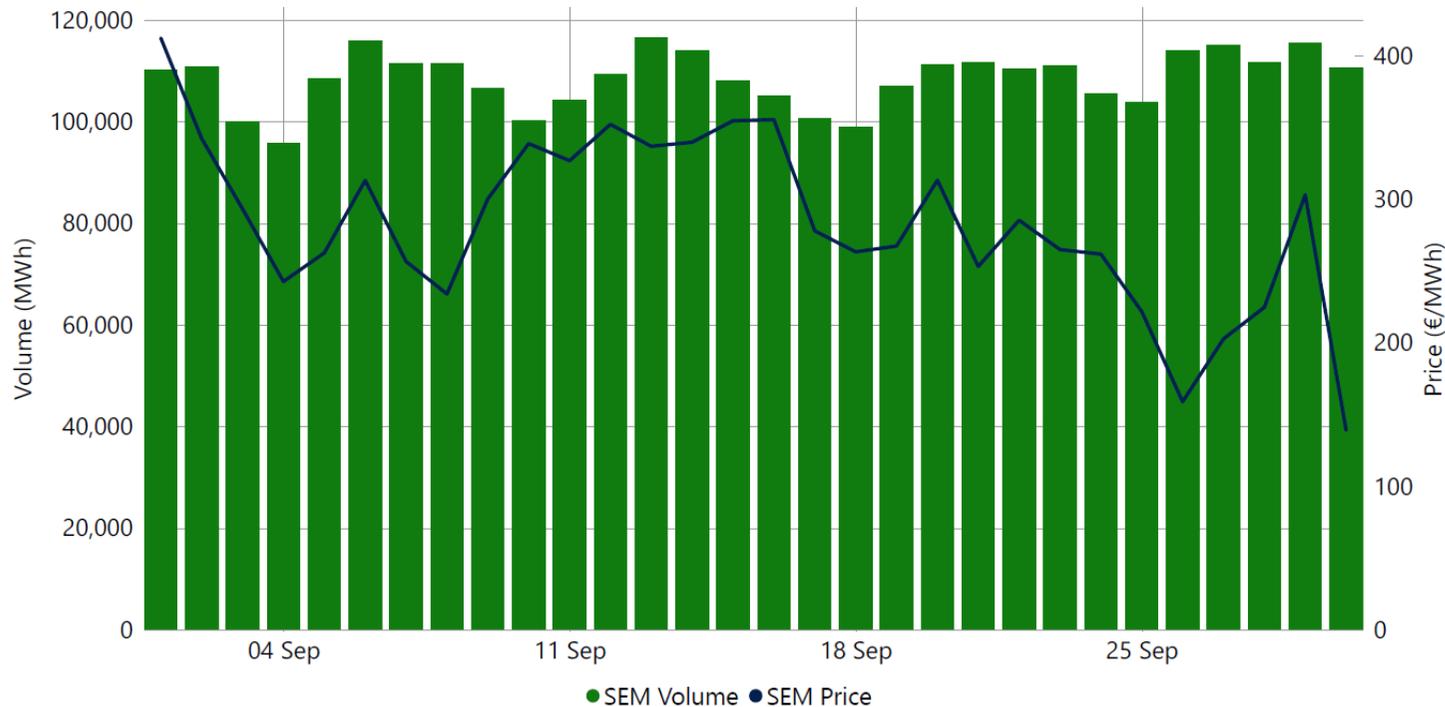
● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

Chart 3 – Ex-Ante Value Market Share (€)

## 4. DAY AHEAD MARKET

### 4.1 PRICES & VOLUMES

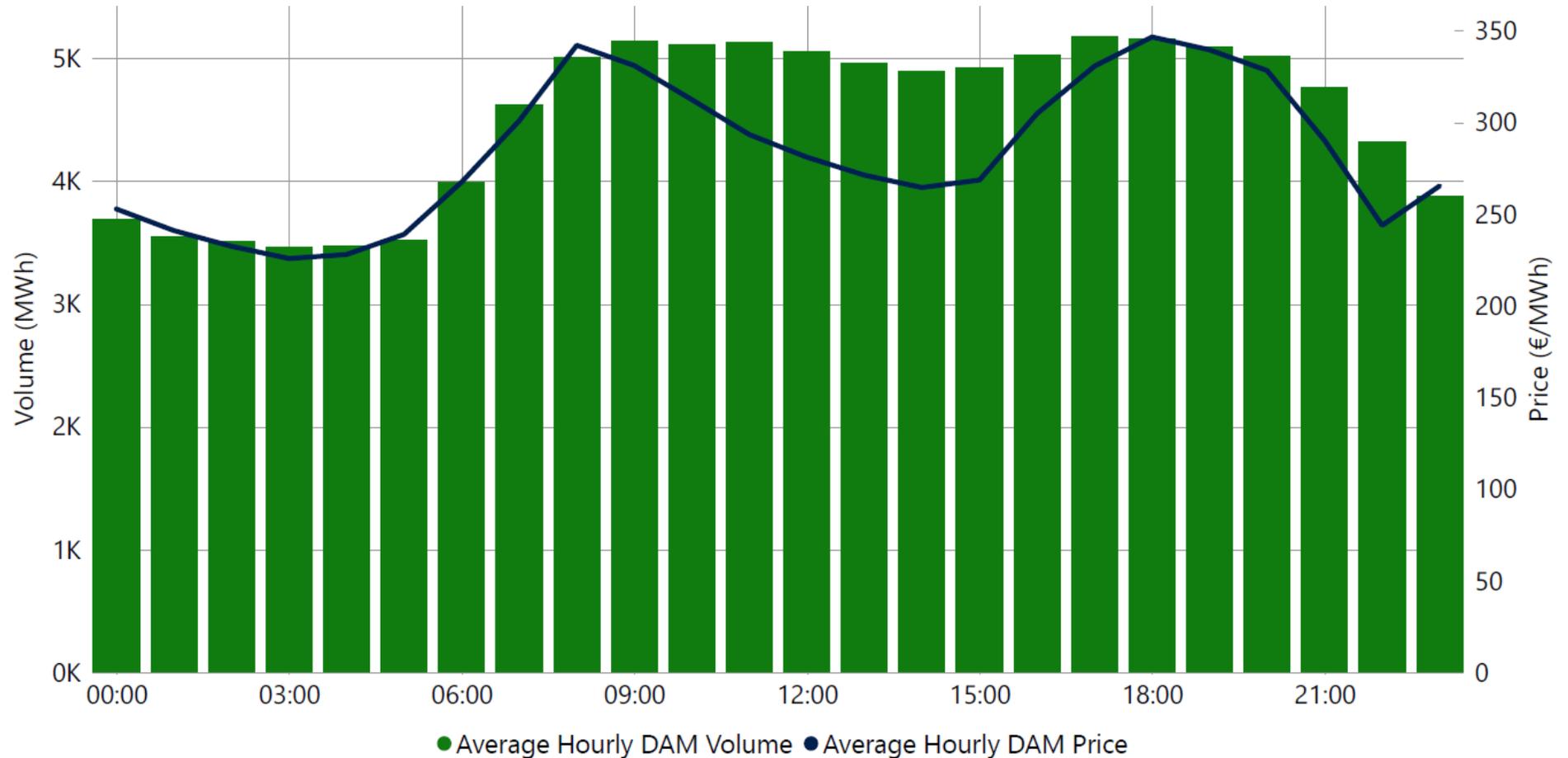
The graph below shows the daily volumes daily and average prices in the Day Ahead Market during September.



Graph 19 – DAM Daily Volume and Price

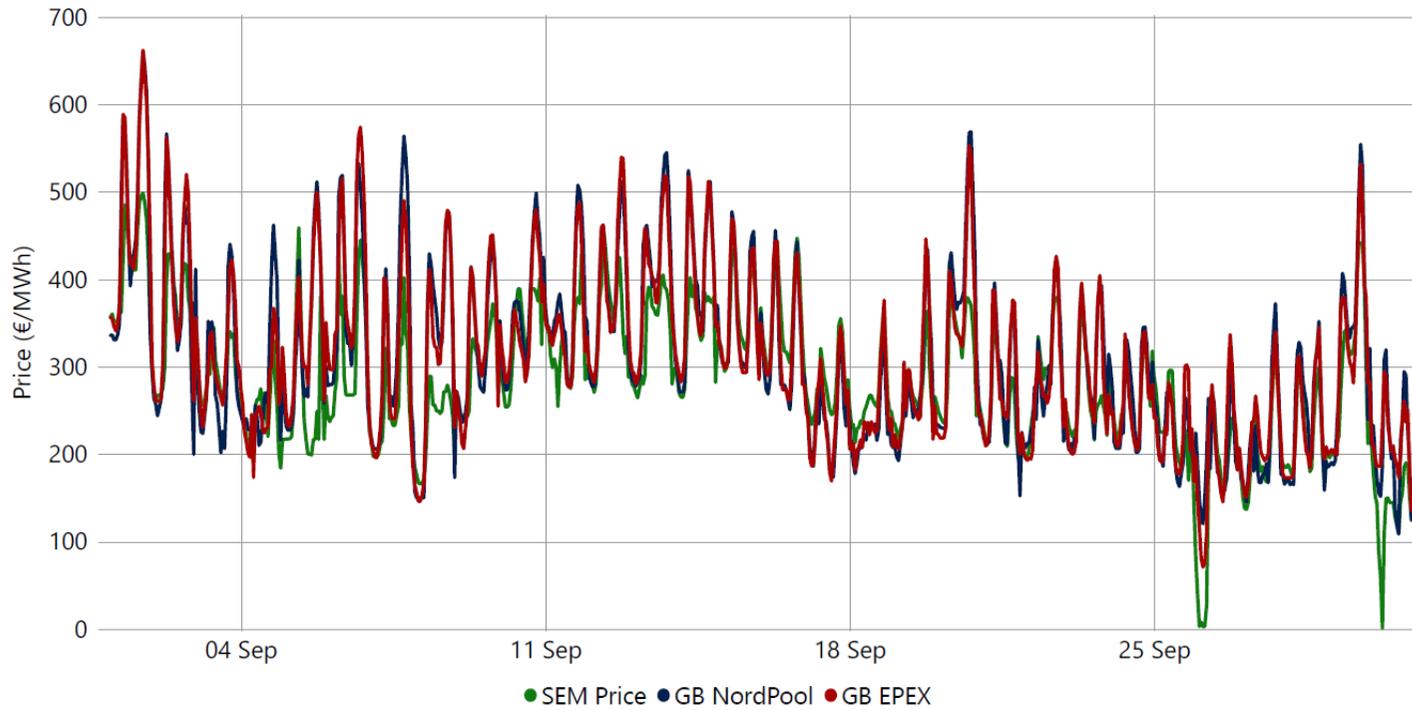
- The average DAM price across September was €283.25/MWh (27% decrease on August 22)
- The highest daily price observed was €412.28/MWh seen on 1 September
- Lowest daily price was observed on 30 September of €138.97/MWh

The highest average volumes generally continue to be traded across peak morning and evening periods where the highest prices are seen.



**Graph 20 – Average Volume and Price per Hourly Period**

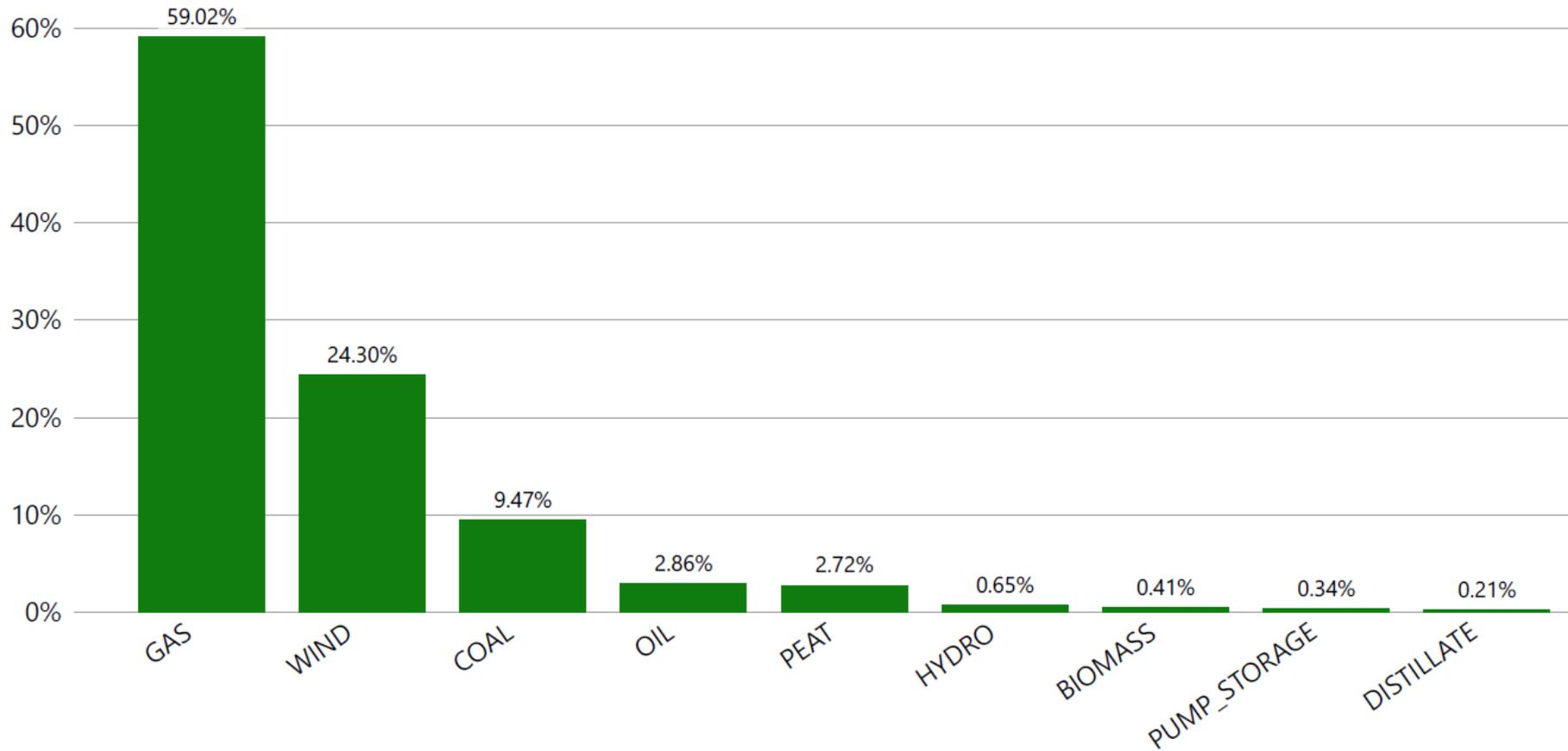
The graph below shows how the SEM DAM prices compare with those in GB.



**Graph 21 – DAM Hourly Prices SEM, GB EPEX & GB NordPool**

- GB EPEX has an average price of €308.56/MWh
- GB NordPool has an average price of €309.98/MWh
- SEM average price was €283.25/MWh
- All DAM market prices have decreased from August 2022

The below graph shows the breakdown of cleared DAM generator sell orders by fuel type.

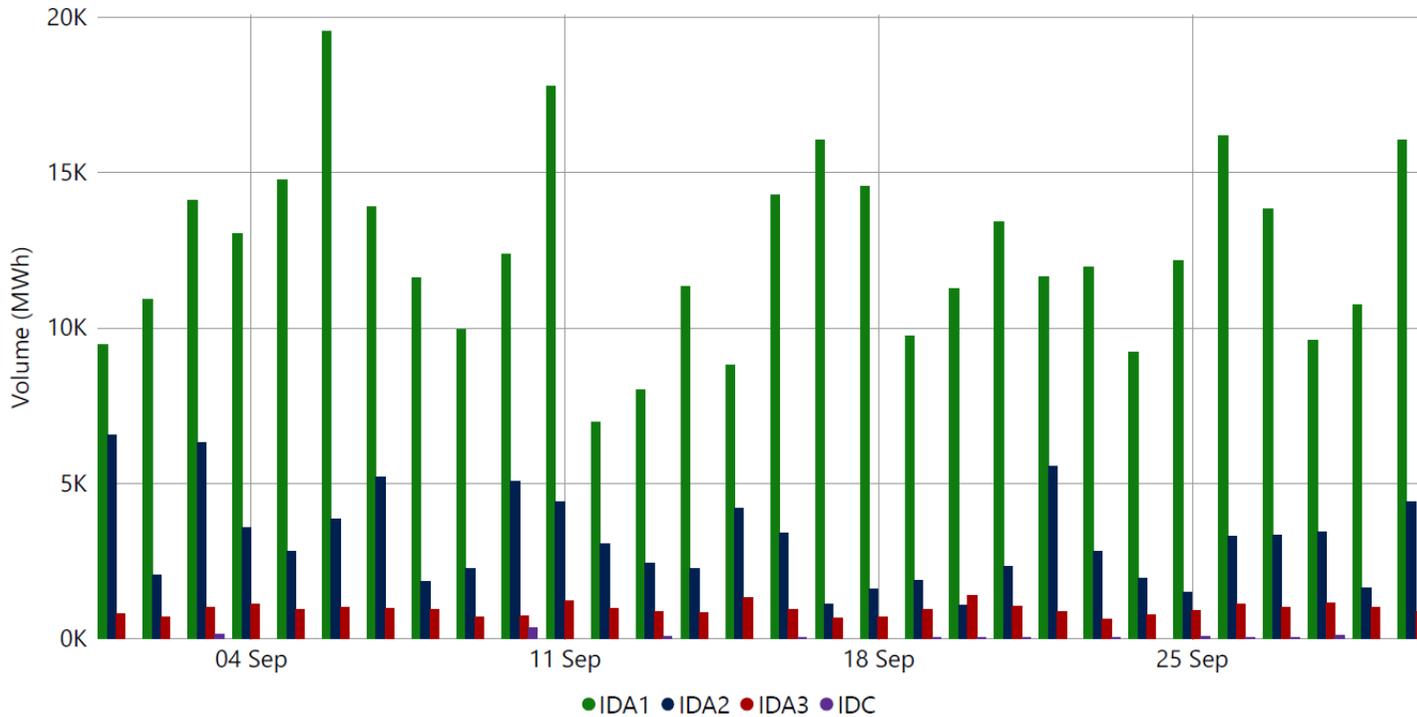


Graph 22 – DAM Generator Sell Order by Fuel Type

## 5. INTRADAY MARKET

### 5.1 PRICES & VOLUMES

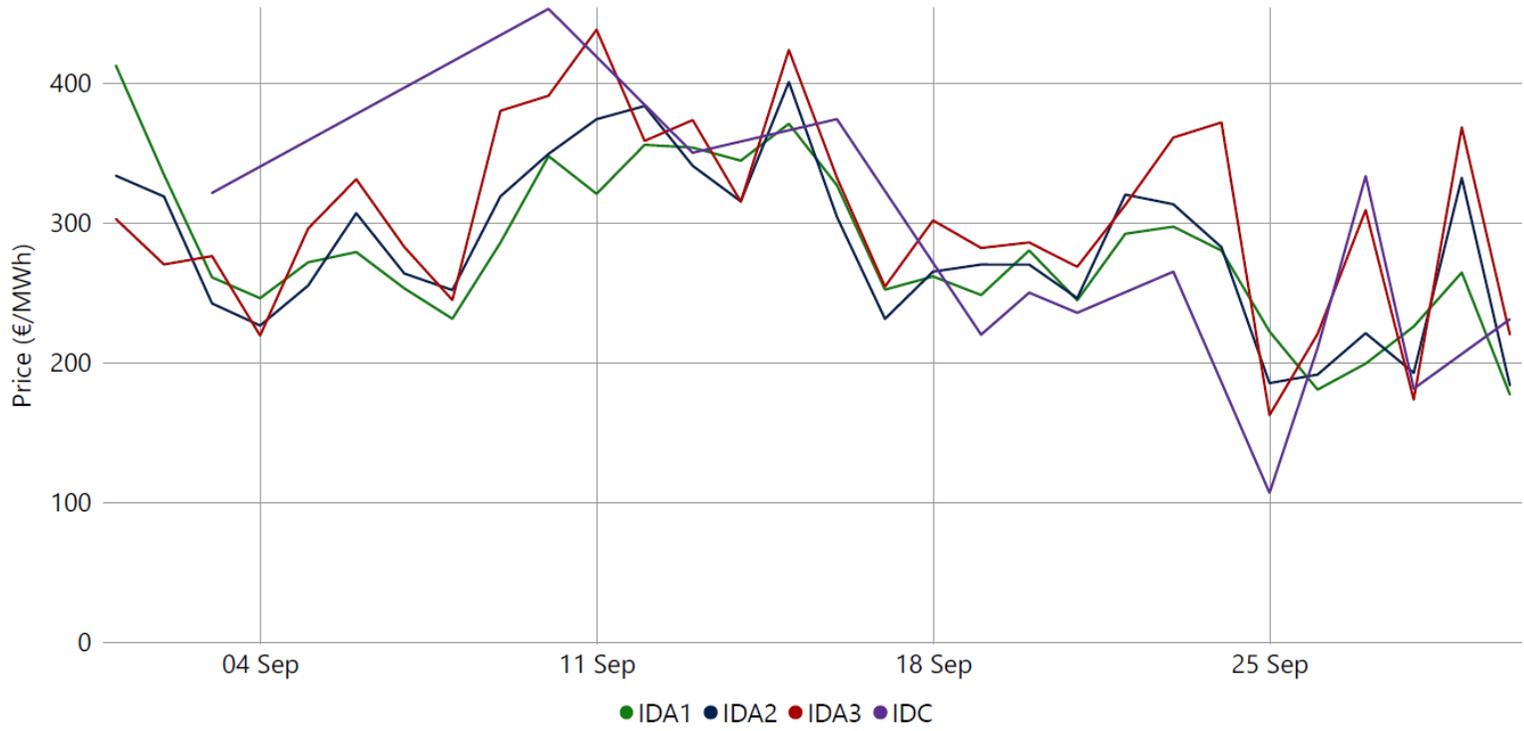
The graph below shows the daily volumes in each intraday auction during September.



Graph 23 – Daily Total Intraday Volumes

- IDA1 in accounted for 9.94% of ex-ante traded volumes
- IDA2 accounted for 2.53%
- IDA3 accounted for 0.75%
- IDC accounted for 0.06%

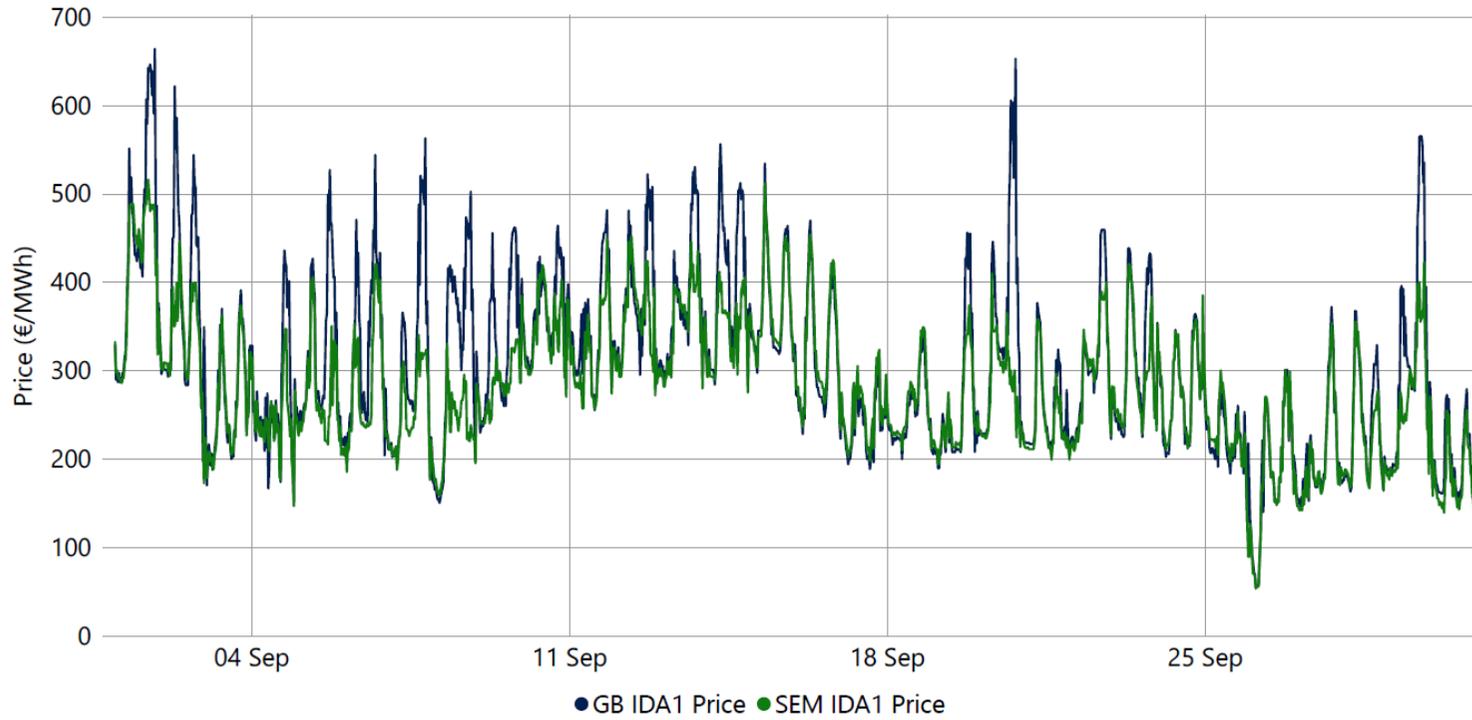
The graphs below shows the daily average prices each intraday auction during September.



- Average Intra-day prices
- IDA1 €280.66/MWh
  - IDA2 €282.97/MWh
  - IDA3 €304.17/MWh
  - IDC €300.01/MWh

**Graph 24 – Daily Average Intraday Prices**

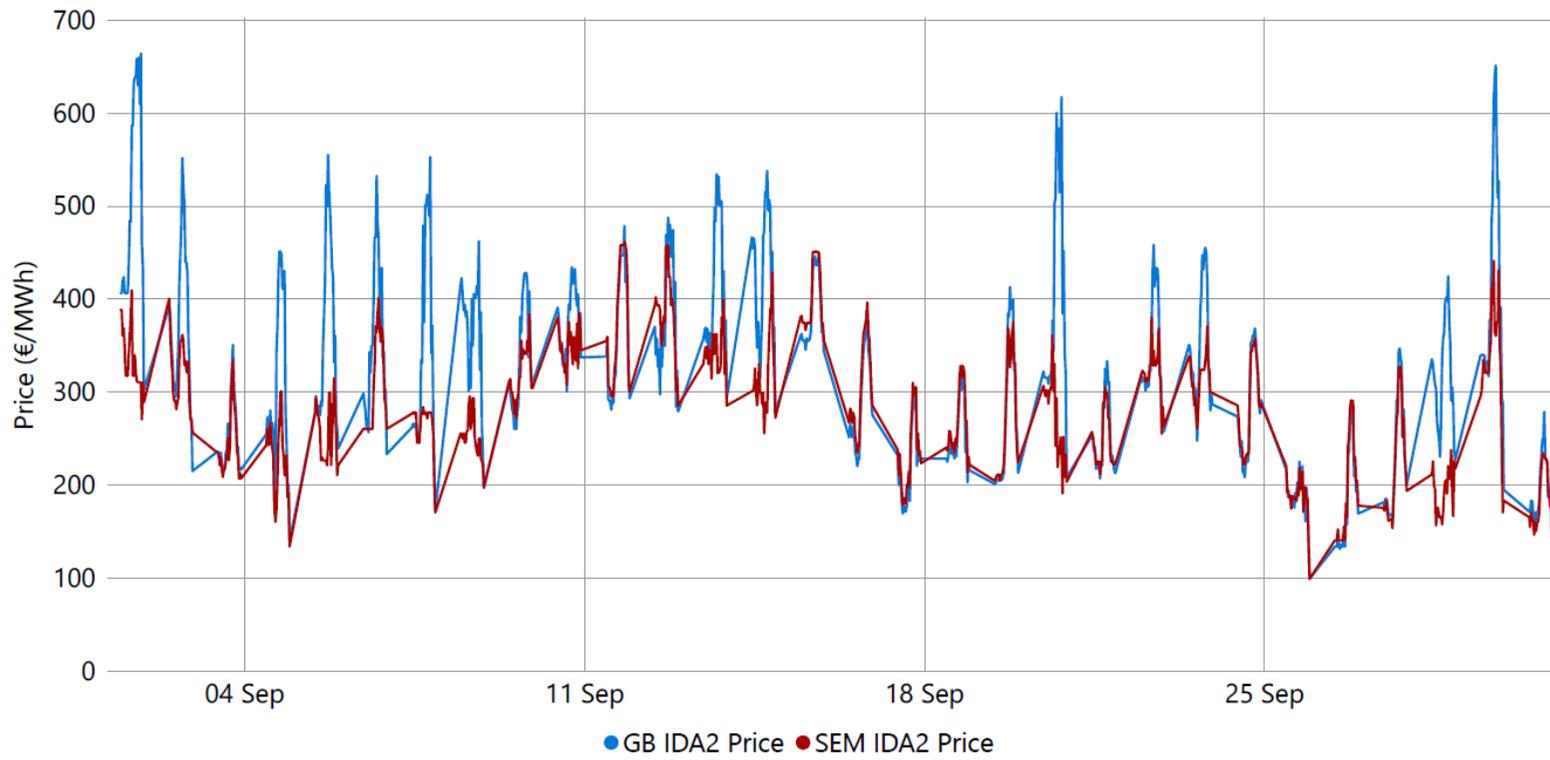
In the below two graphs the IDA1 and IDA2 prices in the SEM can be compared to those in GB across the month.



Average Intra-day prices

- SEM IDA1 €280.66/MWh
- GB IDA1 €302.49/MWh

**Graph 25 – SEM & GB Intraday 1 Prices**



Average Intra-day prices

- SEM IDA2 €282.97/MWh
- GB IDA2 €324.23/MWh

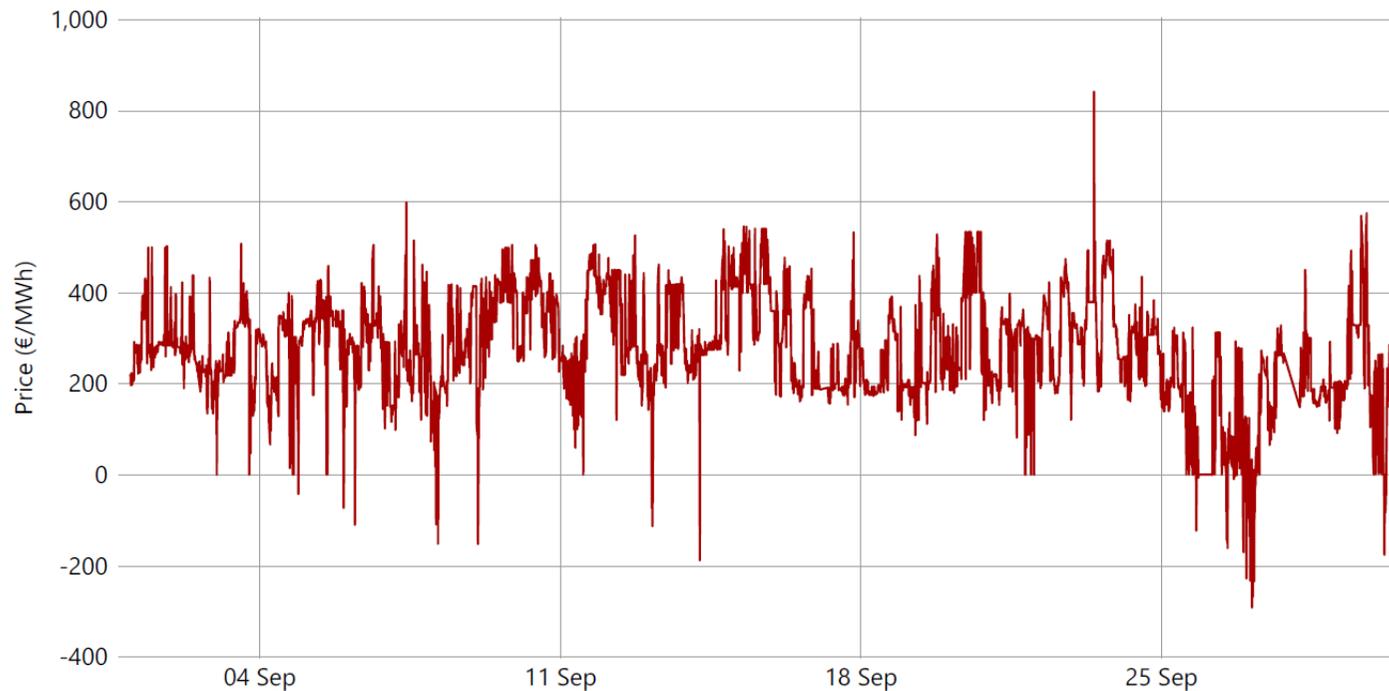
**Graph 26 – SEM & GB Intraday 2 Prices**

## 6. BALANCING MARKET

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.

### 6.1 PRICES & VOLUMES

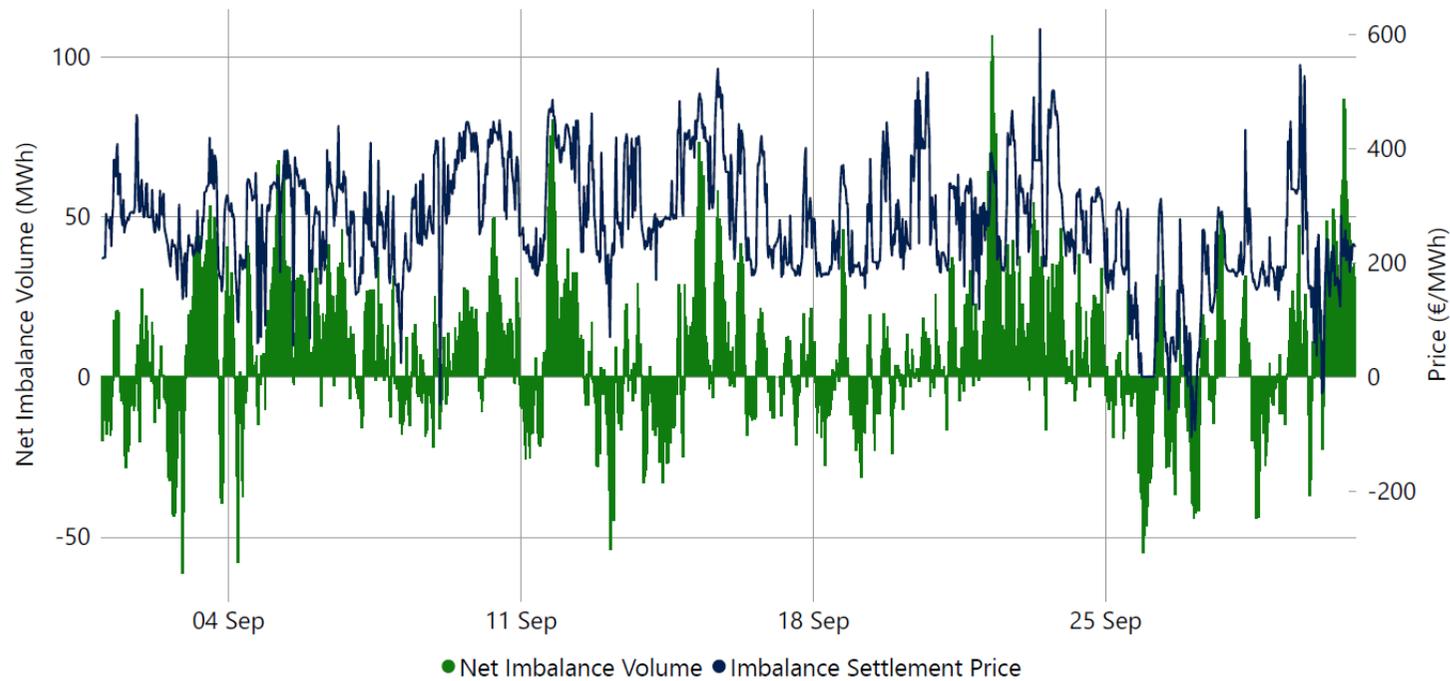
The graph below shows the price for each 5 minute Imbalance Price Period.



**Graph 27 – 5 Minute Imbalance Pricing Period**

- The average 5 minute price across the month was €271.52/MWh
- The highest 5 minute imbalance pricing period was between 10:35 and 10:40 on 23 September with a price of €840.31/MWh
- The lowest price seen was (-) €291.69/MWh seen at 02:55 on 27 September

The graph below shows the price for each 30 minute Imbalance Settlement Period.



**Graph 28 – Imbalance Settlement Price against Net Imbalance Volume**

- The average 30 minute price across the month was €270.28/MWh
- The highest 30 minute imbalance settlement price was at 10:30 on 23 September with a price of €609.34/MWh
- The lowest price seen was (-)€106.15/MWh seen at 01:30 on 27 September

## 7. DIRECTED CONTRATS

### 7.1 UPDATE ON POSTPONEMENT OF ROUND 20

In September 2022, the Regulatory Authorities (RAs – UR and CRU) notified market participants of their decision to postpone Quarterly Directed Contracts (DCs) Round 20 (SEM-22-067). The DC Round 20 was originally scheduled from 20<sup>th</sup> to 22<sup>nd</sup> September and 27<sup>th</sup> to 29<sup>th</sup> September inclusive. The associated Round 20 Supplemental Subscription Window was then scheduled for 6<sup>th</sup> October 2022.

A further update (SEM-22-072) was published on 17<sup>th</sup> October, notifying market participants of the indicative dates for Round 20 which will open on 22<sup>nd</sup> November to 24<sup>th</sup> November and 29<sup>th</sup> November to 1<sup>st</sup> December 2022.