



Energy Market Monitoring Report

December 2024



Market Results

Summary Dashboard

Monthly Averages	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
DAM (€/MWh)	88.97	99.9	84.6	86.67	88.52	107.75	107.74	110.94	100.44	112.73	122.9	146.14	136.99
% Change from previous month	-28%	12%	-15%	2%	2%	22%	0%	3%	-9%	12%	9%	19%	-6%
% Change from previous year	-68%	-38%	-47%	-40%	-30%	2%	-8%	15%	-6%	1%	-2%	19%	54%
Actual System Demand (MW)	4862	5151	4946	4833	4610	4356	4193	4279	4255	4467.76	4671	5085	5020
% Change from previous month	0%	6%	-4%	-2%	-5%	-6%	-4%	2%	-1%	5%	5%	9%	-1%
% Change from previous year	0%	5%	3%	0%	3%	2%	0%	4%	2%	3%	3%	4%	3%
Actual Wind Generation (MW)	2446	1854	2000	2072	1496	894	1072	883	1437	1263	1668	1448	2040
% Change from previous month	35%	-24%	8%	4%	-28%	-40%	20%	-18%	63%	-12%	32%	-13%	41%
% Change from previous year	49%	-7%	-1%	19%	-3%	1%	22%	-33%	3%	-9%	22%	-20%	-17%
Gas Price p/therm	84.2	74.87	63.37	68.18	71.69	76.69	81.51	75.07	84.71	86.94	99.04	111	111.22
% Change from previous month	-20%	-11%	-15%	8%	5%	7%	6%	-8%	13%	3%	14%	12%	0%
% Change from previous year	-68%	-52%	-53%	-39%	-29%	6%	5%	6%	2%	-5%	-6%	6%	32%
Carbon Price (€/Tonne)	71.79	65.52	55.79	57.94	63.25	70.90	68.29	67.00	70.12	64.86	63.51	67.15	67.05
% Change from previous month	-6%	-9%	-15%	4%	9%	12%	-4%	-2%	5%	-8%	-2%	6%	0%
% Change from previous year	-16%	-18%	-39%	-35%	-30%	-16%	-20%	-23%	-17%	-21%	-22%	-12%	-7%
Coal Price (\$/tonne)	118.31	107.65	96.84	111.78	118.13	106.15	109.54	105.93	121.36	114.96	119.65	120.84	113.32
% Change from previous month	-3%	-9%	-10%	15%	6%	-10%	3%	-3%	15%	-5%	4%	1%	-6%
% Change from previous year	-51%	-38%	-29%	-17%	-14%	-11%	-3%	-5%	5%	-5%	-9%	-1%	-4%
EWIC % Import Periods	56.38%	69.76%	69.10%	63.78%	81.94%	84.98%	85.90%	94.59%	85.29%	81.53%	71.32%	78.30%	67.64%
EWIC % Export Periods	20.36%	14.78%	11.00%	11.32%	4.86%	0.67%	3.72%	1.11%	7.56%	5.52%	10.31%	9.03%	11.49%
EWIC % Not Flow Periods	23.25%	15.46%	19.90%	24.90%	13.19%	14.35%	10.38%	4.30%	7.15%	12.95%	18.37%	12.67%	20.87%
Moyle % Import Periods	67.81%	78.16%	79.59%	79.00%	87.40%	94.96%	92.47%	96.77%	80.71%	91.98%	81.08%	82.47%	81.55%
Moyle % Export Periods	32.16%	21.81%	20.34%	20.83%	12.50%	5.27%	7.53%	3.23%	10.44%	7.60%	18.65%	17.50%	18.41%
Moyle % Not Flow Periods	0.03%	0.03%	0.07%	0.17%	0.10%	0.03%	0.00%	0.00%	8.84%	0.42%	0.28%	0.03%	0.03%

Market Volumes December 2024

Daily Average Volume MWh

DAM	125,509
IDA1	19,177
IDA2	2,594
IDA3	803
IDC	32

Total Monthly Volume MWh

DAM	3,890,779
IDA1	594,488
IDA2	80,410
IDA3	24,898
IDC	728
Total	4,591,303

Total Market Value €

DAM	€ 563,333,907
IDA1	€ 91,178,428
IDA2	€ 12,584,489
IDA3	€ 4,254,695
IDC	€ 115,763
Total	€ 671,467,282

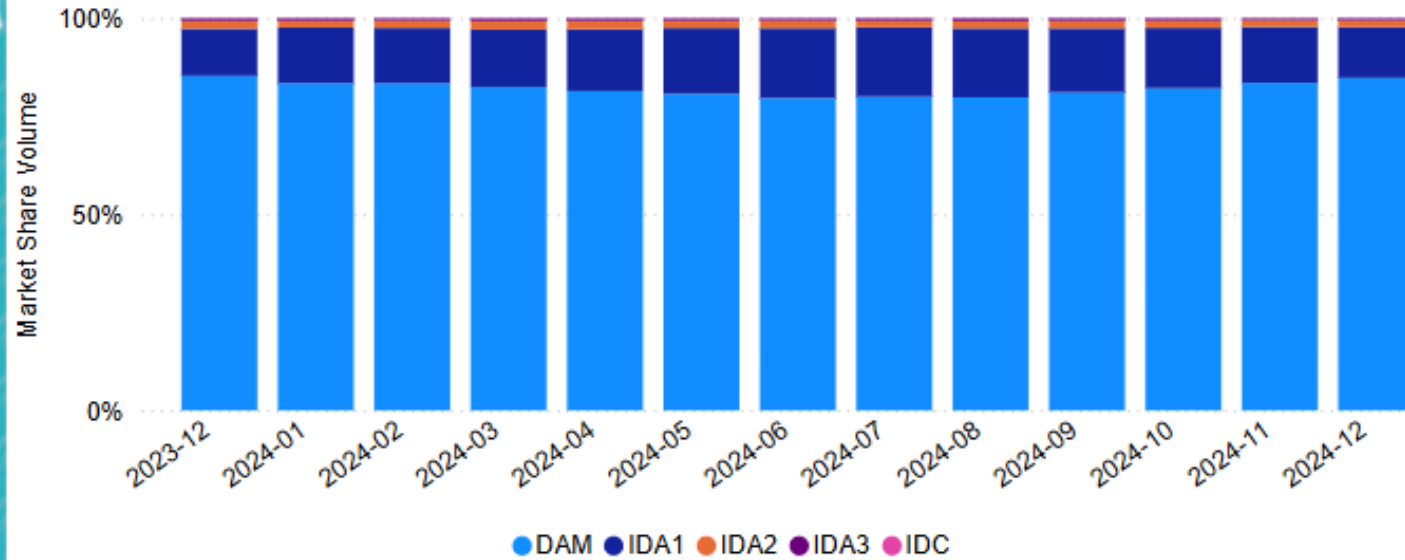
Market Volumes and Values

The Day Ahead Market is, by far, the largest market in the SEM, circa 80-85% of all transactions are cleared in this market. The distribution of volumes across the SEM markets have been broadly constant since the introduction of these trading arrangements in October 2018.

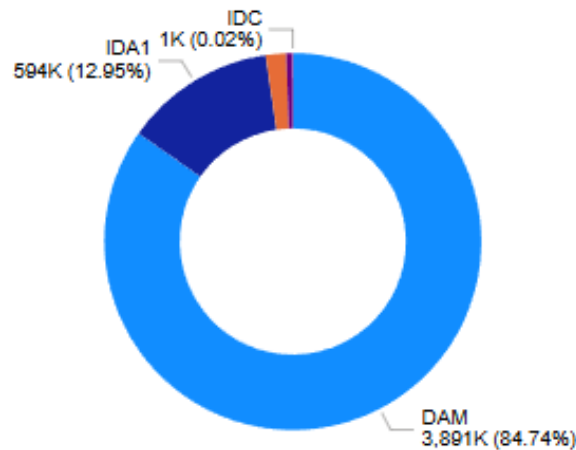
Generally, in power markets, market participants will prefer to lock their positions well ahead of delivery time given the increased volatility in prices closer to real time.

Another important factor is associated with the TSO dispatch arrangements. The vast majority of wind generation in the SEM is cleared at the Day Ahead stage. That might also explain to some extent the additional volumes cleared in this market.

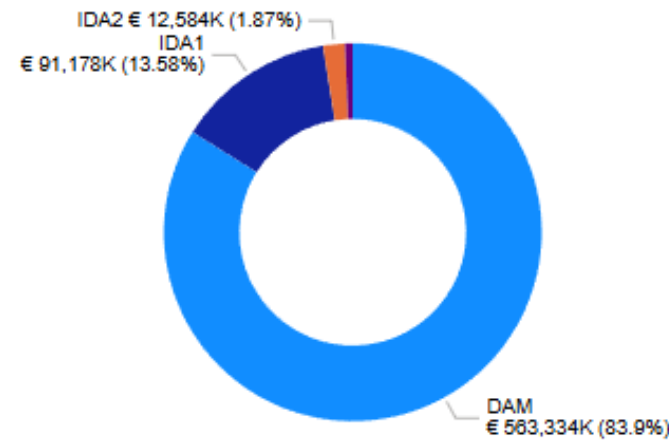
Ex-Ante Monthly Volume by Market



Ex-Ante Volumes (MWh)



Ex-Ante Values (€)



● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

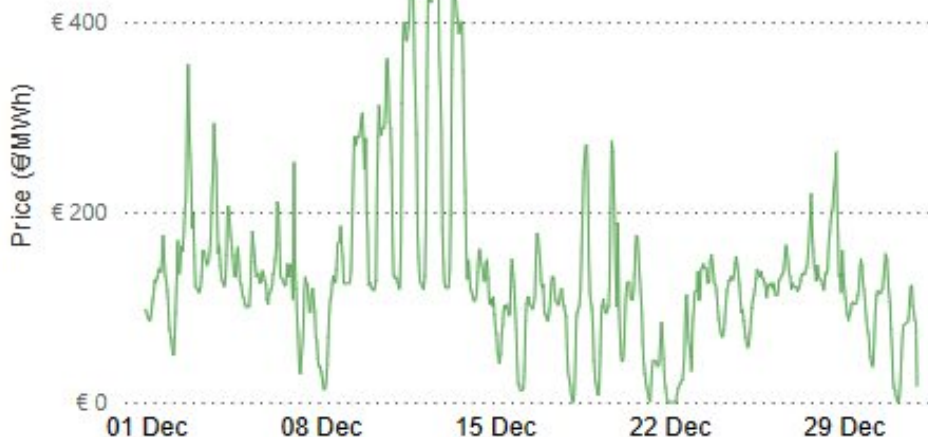
● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

Day Ahead Market December 2024

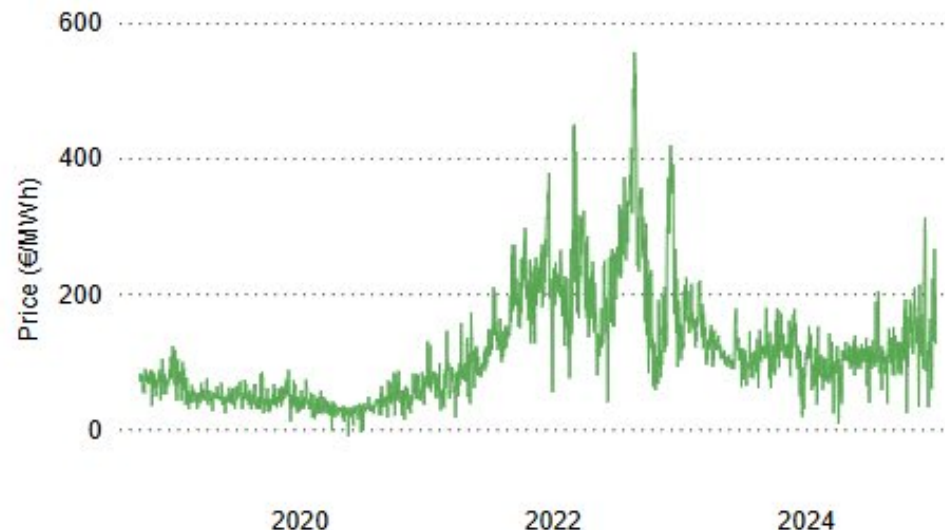
€ 136.99
Average DAM Price
€ 0.00
Min DAM Price
€ 499.99
Max DAM Price

The most frequent price range for December was between €70 and €140.

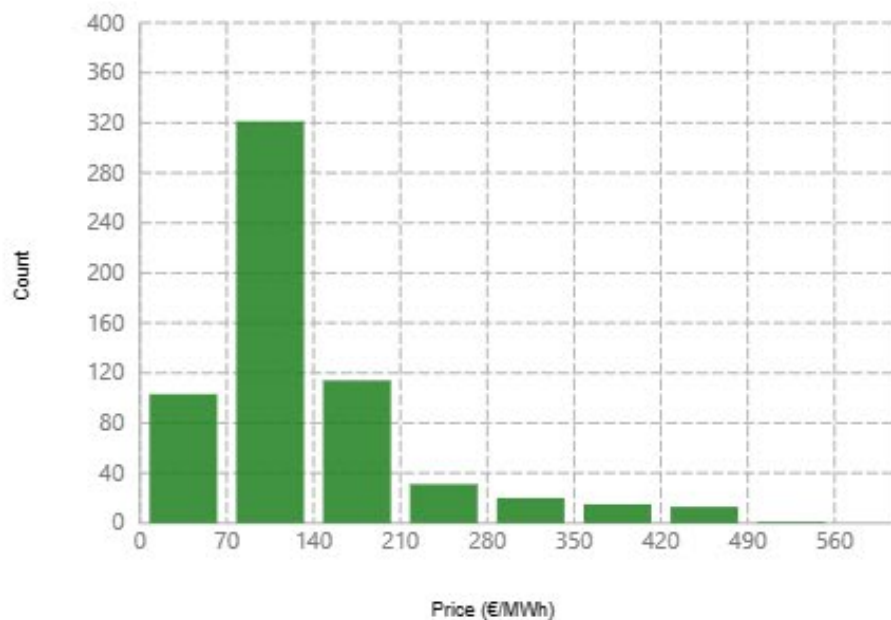
DAM Prices



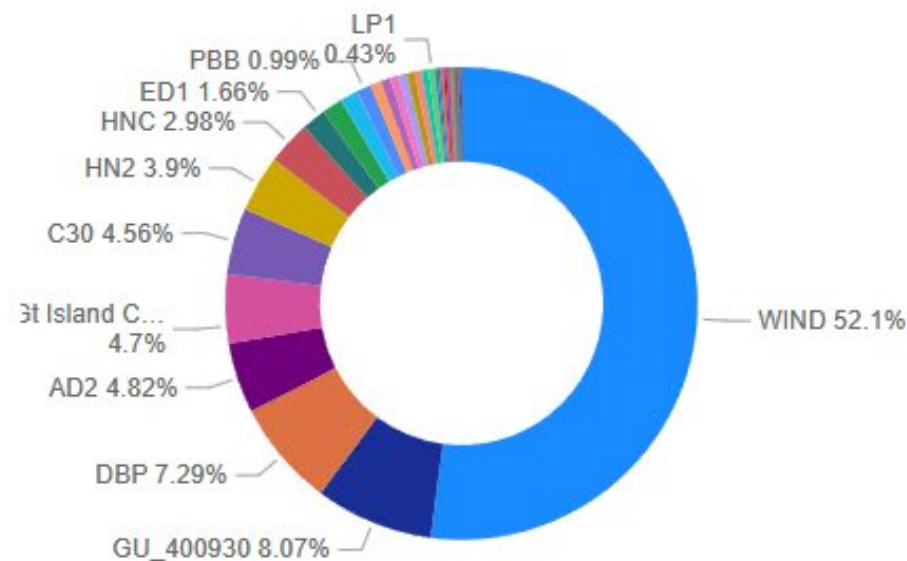
Historic Daily Average DAM Prices



Histogram of DAM Prices



DAM Sell Side Generator Order Results



Intraday Market December 2024

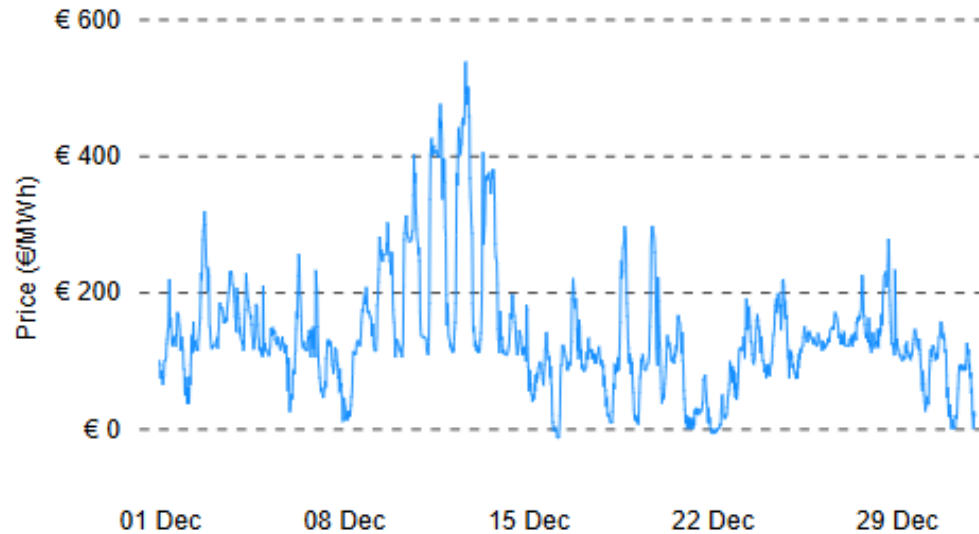
€ 136.37
Average IDA1 Price

-€ 13.74
Min IDA1 Price

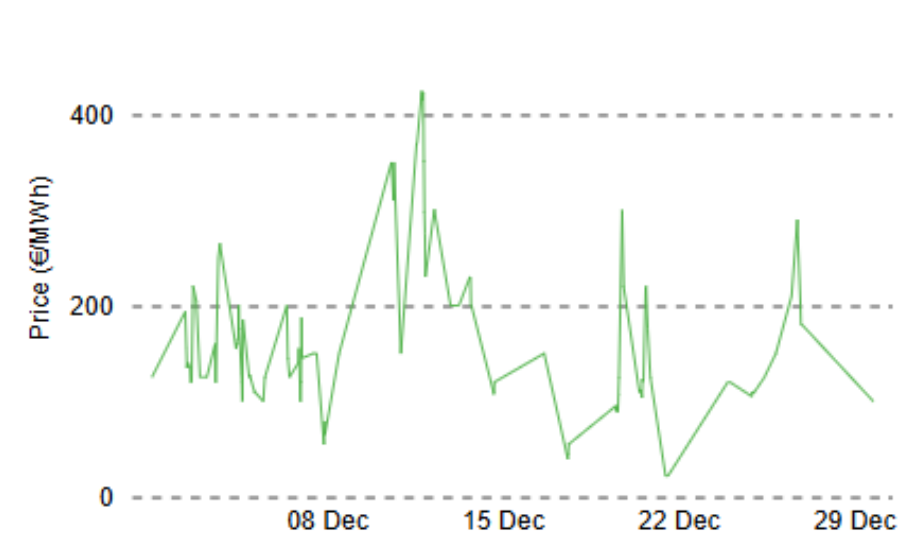
€ 536.91
Max IDA1 Price

The most frequent price range for October was between €80 and €160.

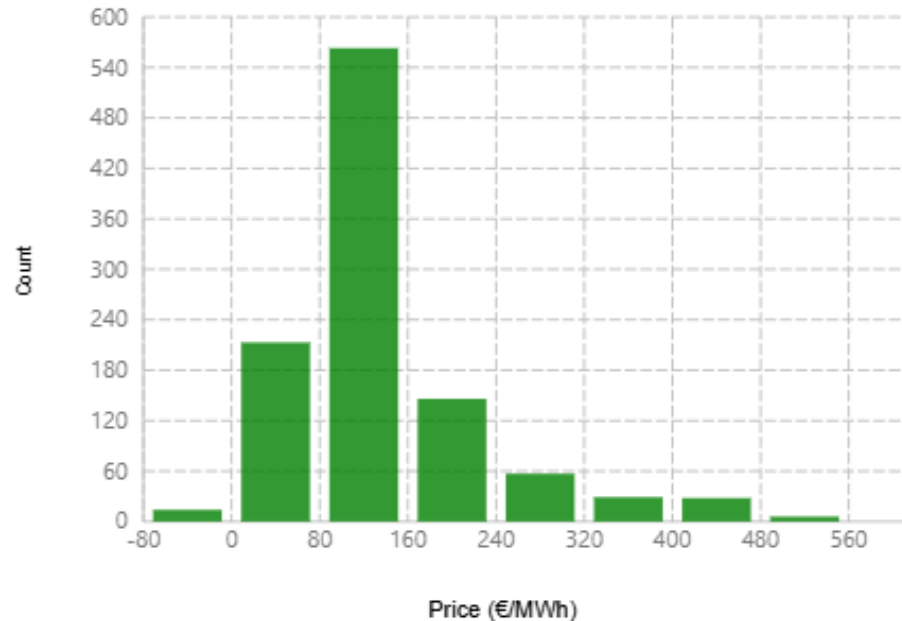
IDA 1 Prices



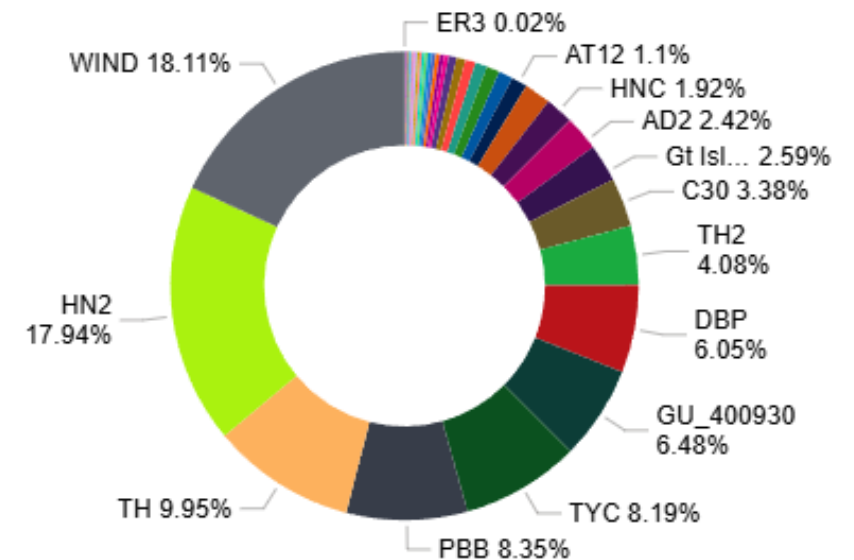
IDC Prices



Histogram of IDA1 Prices



IDA1 Sell Order Results By Market Participant



SEM vs GB DAM December 2024

SEM Day Ahead Price

€ 136.99

Average DAM Price

€ 0.00

Min DAM Price

€ 499.99

Max DAM Price

GB Day Ahead Price

€ 109.39

Average Price

-€ 2.57

Min Price

€ 582.21

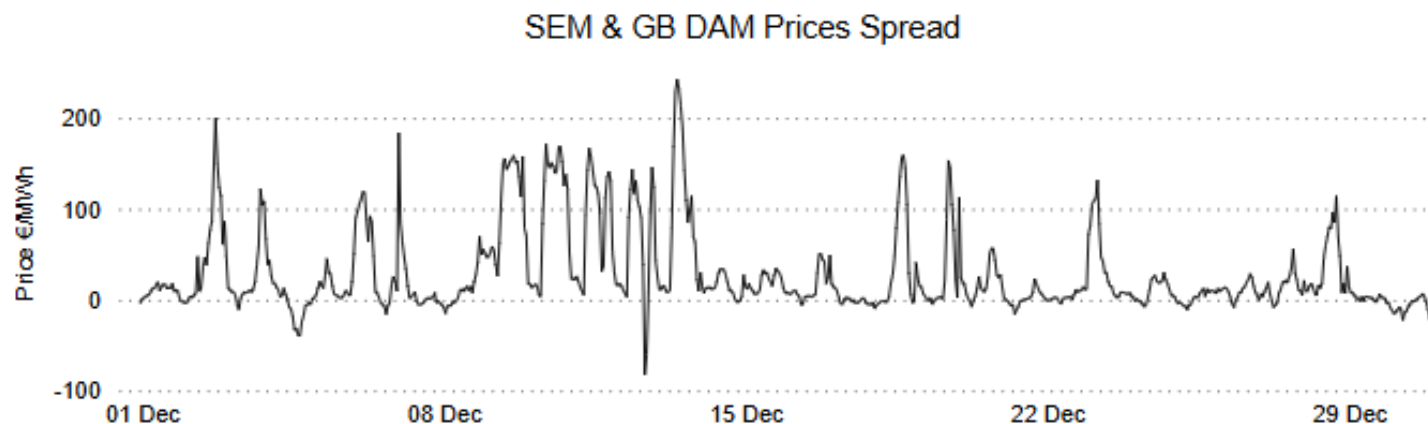
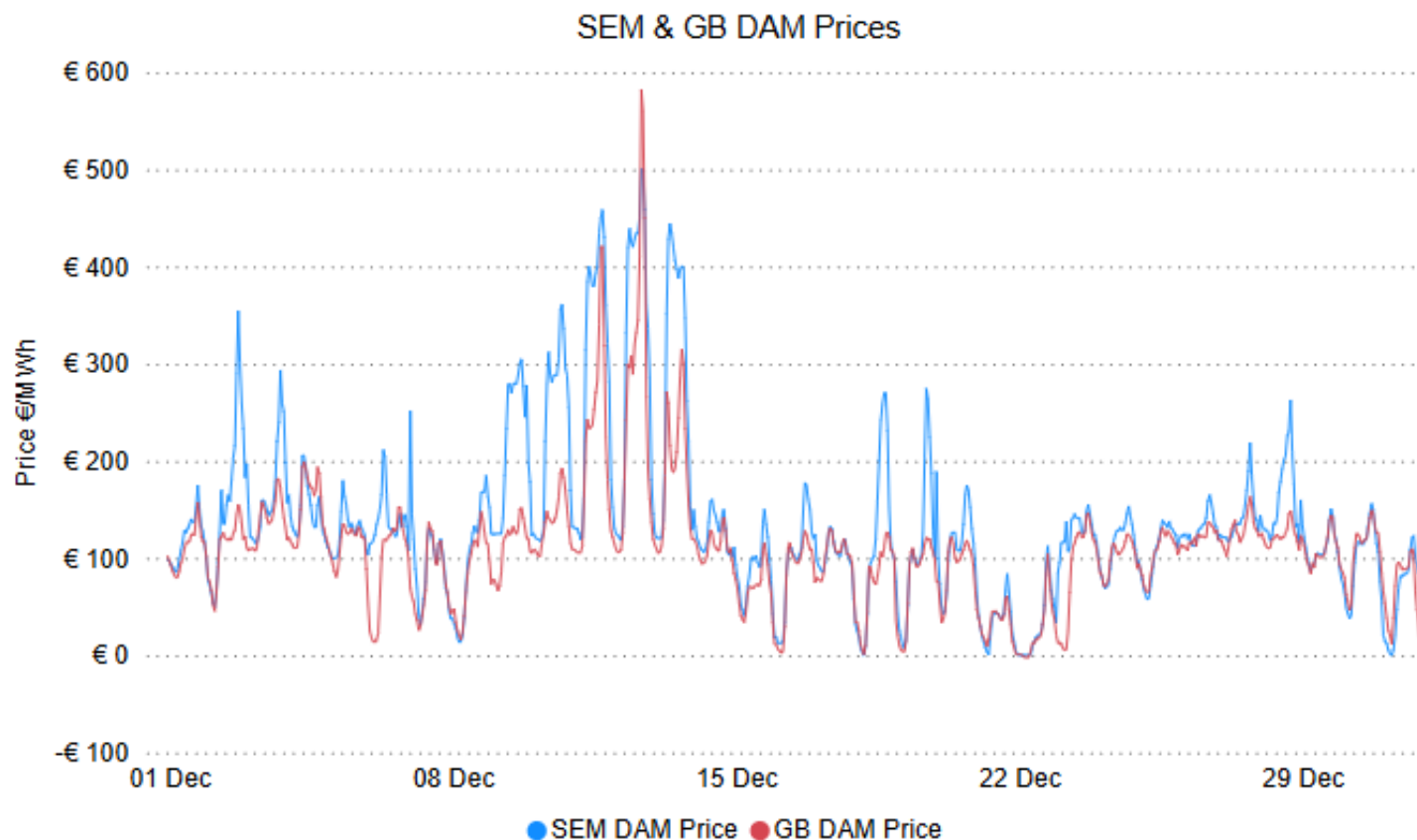
Max Price

SEM-GB Price Differential

The charts show that the SEM and GB prices appear to follow the same general trend. Significant spreads can be observed on several occasions.

Basically, the periods of significant spreads between the two markets are generally correlated with period of very low wind. For instance, wind flow between 8th and 14th December was very low, resulting in elevated prices during this period. Due to the prevailing fuel mix across both regions, the effects of low wind are felt more intensively in the SEM than in GB.

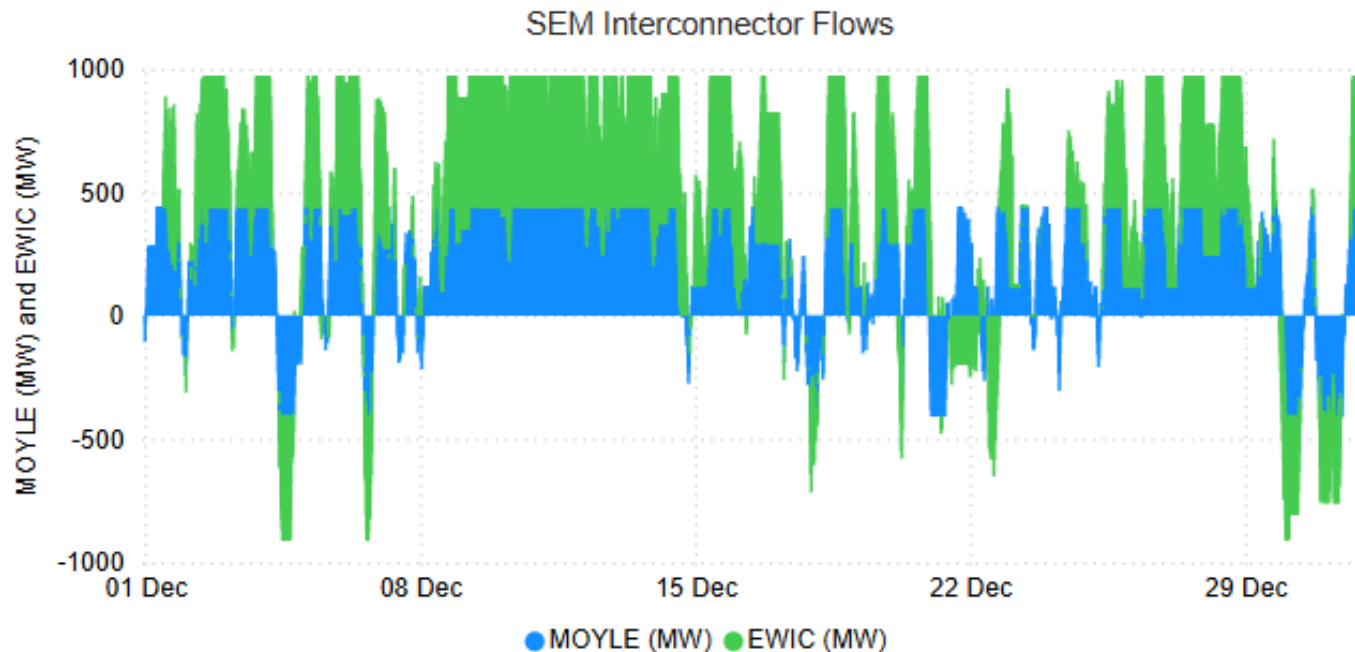
The MMU is investigating this matter further and will come back to the SEMC in the foreseeable future with more information on this front.



SEM Interconnectors December 2024

Events of capacity curtailment (by the SEM TSO) in the direction SEM to GB.

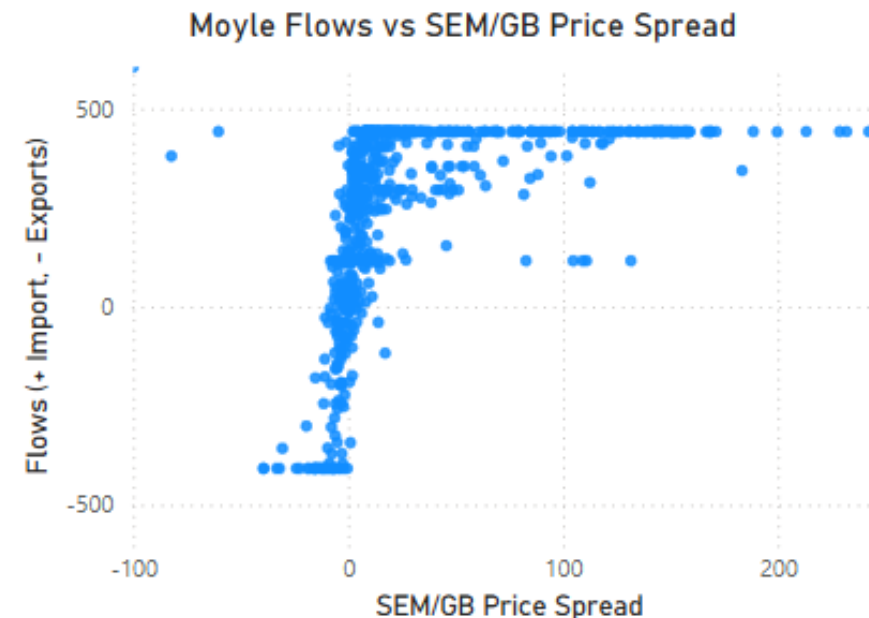
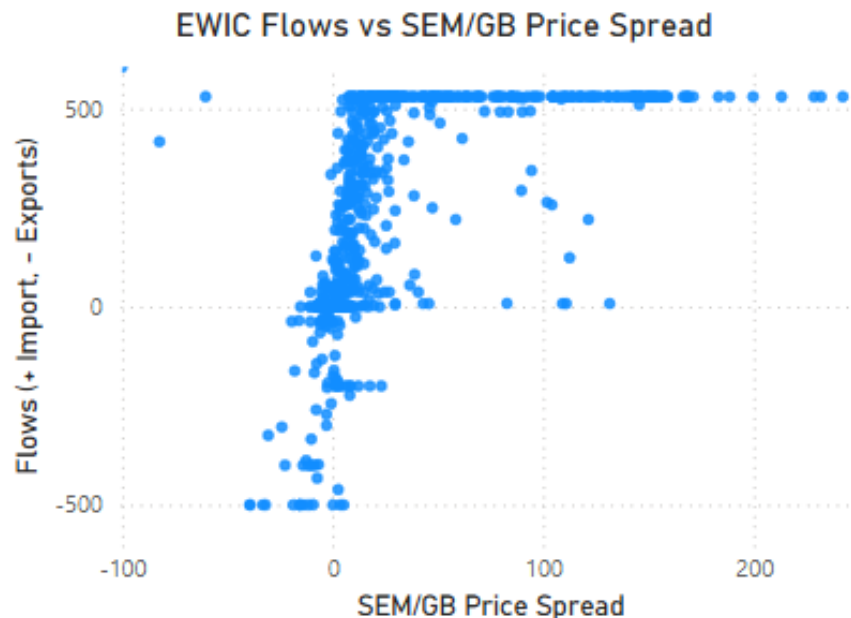
Moyle	EWIC
11/12 14:00 - 22:00	01/12 00:00 - 11:00
12/12 14:00 - 21:00	11/12 14:00 - 22:00
	12/12 13:00 - 20:00



Interconnector Flows

In December, the SEM Interconnectors mostly imported power from GB, with only minimal exports. This reflects the predominantly higher prices in the SEM compared with GB.

There were number of periods in December when Moyle was not fully exporting due to lower volumes traded in IDA1 and IDA2 markets.

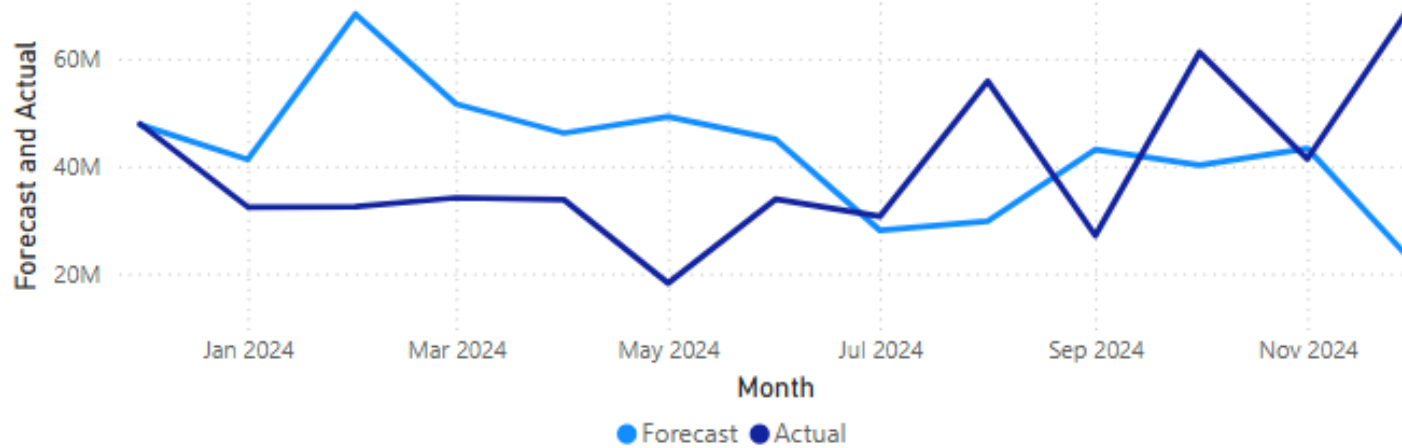


Balancing Market December 2024

Where power stations are run differently from the market schedule, it is termed "constraint". Subject to the Trading and Settlement Code and Firm Access, Constraint payments keep generators financially neutral for the difference between the market schedule and what actually happened when generating units were dispatched.

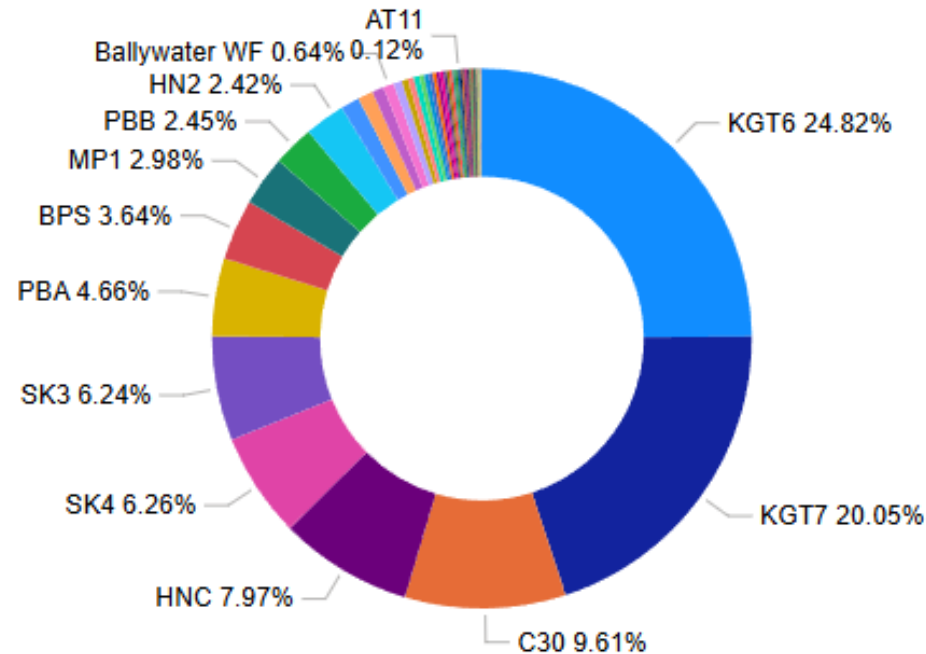
Generators can be constrained 'on' or 'up' if the market schedule indicated they were to be run at lower levels than actually happened. Or they could be constrained 'down' or 'off' if they were to be run at a higher level than happened in reality. There is always an overall net cost to the system associated with constraints.

Imperfection Costs - Forecast vs Actual



Determinant Name	Value €
CABBPO	64,827.66
CAOPO	-276,005.12
CCURL	-891,267.42
CDISCOUNT	20,811,109.39
CFC	27,829,320.67
CPREMIUM	23,566,634.85
CTEST	-32,424.35
CUNIMB	-1,118,834.42
Total	69,953,361.25

Market Share per Unit (CFC, CPREMIUN, CDISCOUNT)



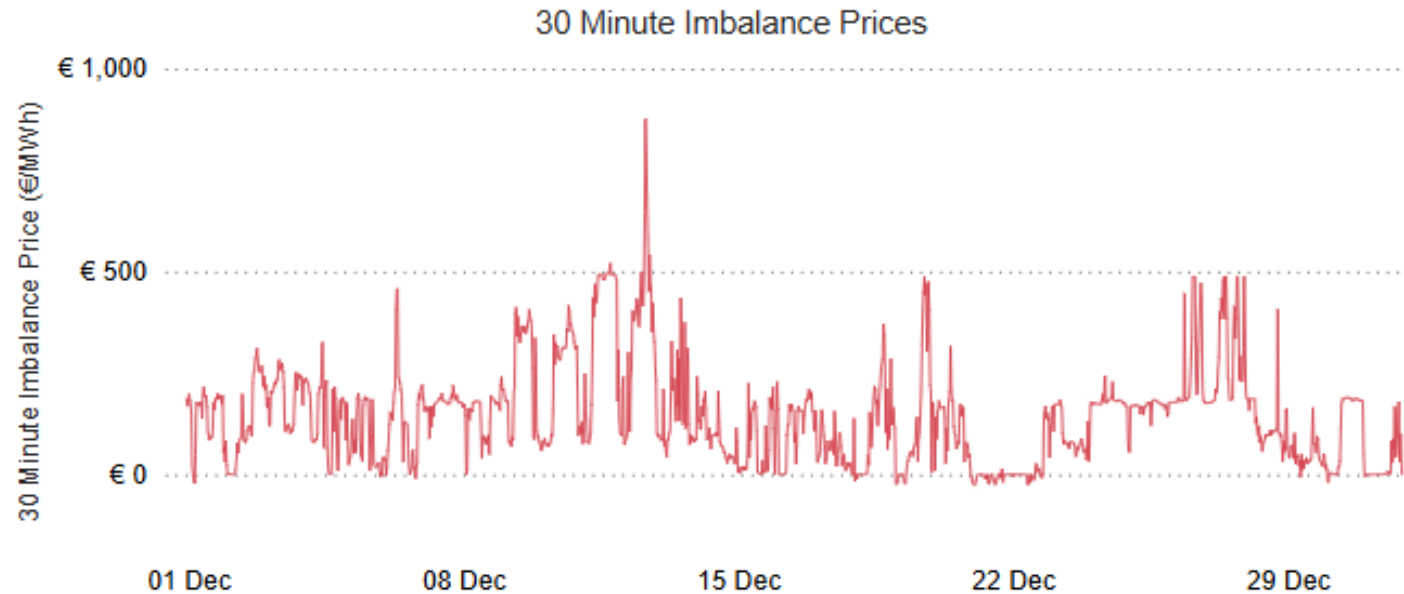
Constraints Payments

This chart illustrates the distribution of selected Constraint Payments, to specific power plants. As it can be seen, KGT6 (EP Killroot Ltd) was the largest receiver of these payments in December followed by KGT7 (EP Killroot Ltd).

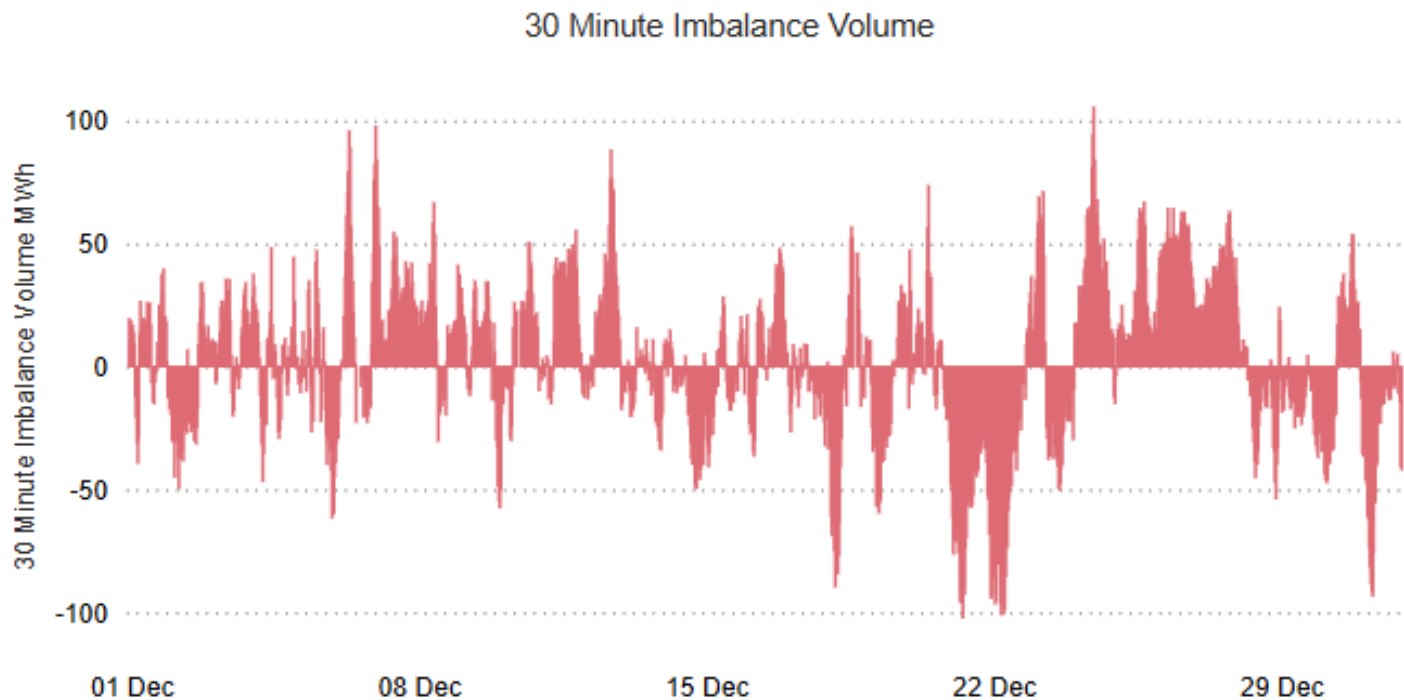
Balancing Market December 2024

30 Minutes Imbalance Price
€ 144.47
Average Price
-€ 26.03
Lowest Price
€ 874.25
Highest Price

Imbalance Price & Volumes

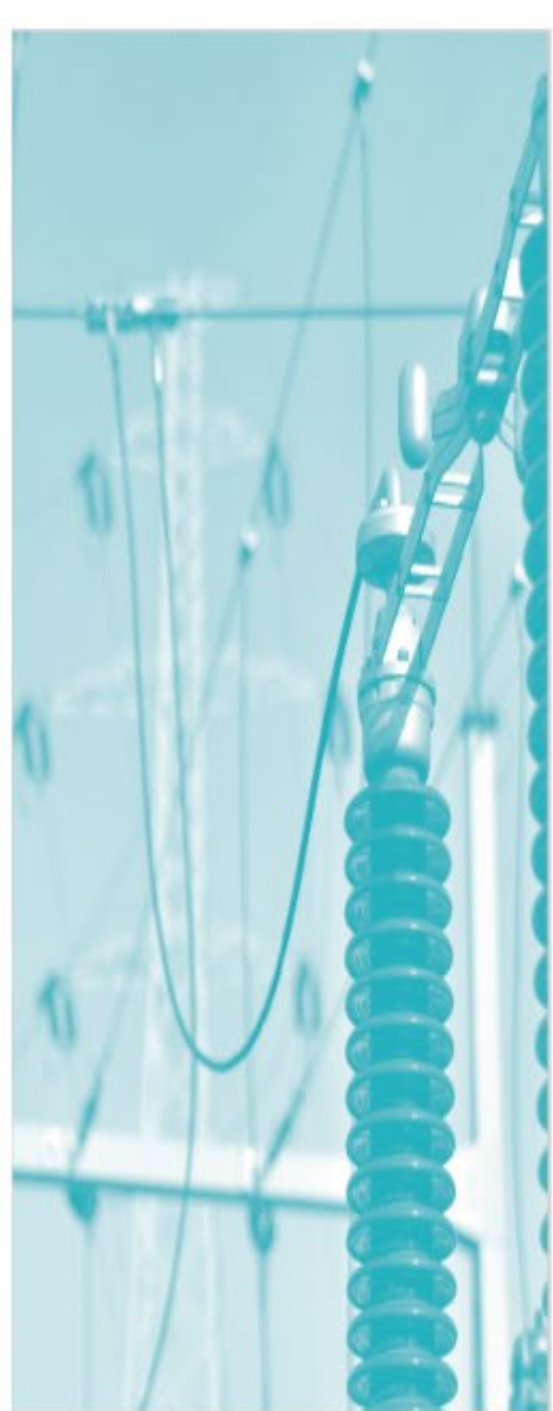


The average Imbalance (BM) Price this month is higher than the Day Ahead Price. Additionally, the Balancing Market prices has exhibited a much higher range of prices indicating a higher level of volatility compared to Day Ahead Market Prices. This is an expected characteristic of the Balancing Market.



There were no Reliability Options events this month as the Balancing Market prices have not breached the PSTR level.

Demand and Generation Mix



Demand December 2024

SEM Demand

5,020.18	4,863.71
SEM Average 2024	SEM Average 2023
3,824.74	3,670.58
SEM Min 2024	SEM Min 2023
6,166.10	6,015.06
SEM Max 2024	SEM Max 2023

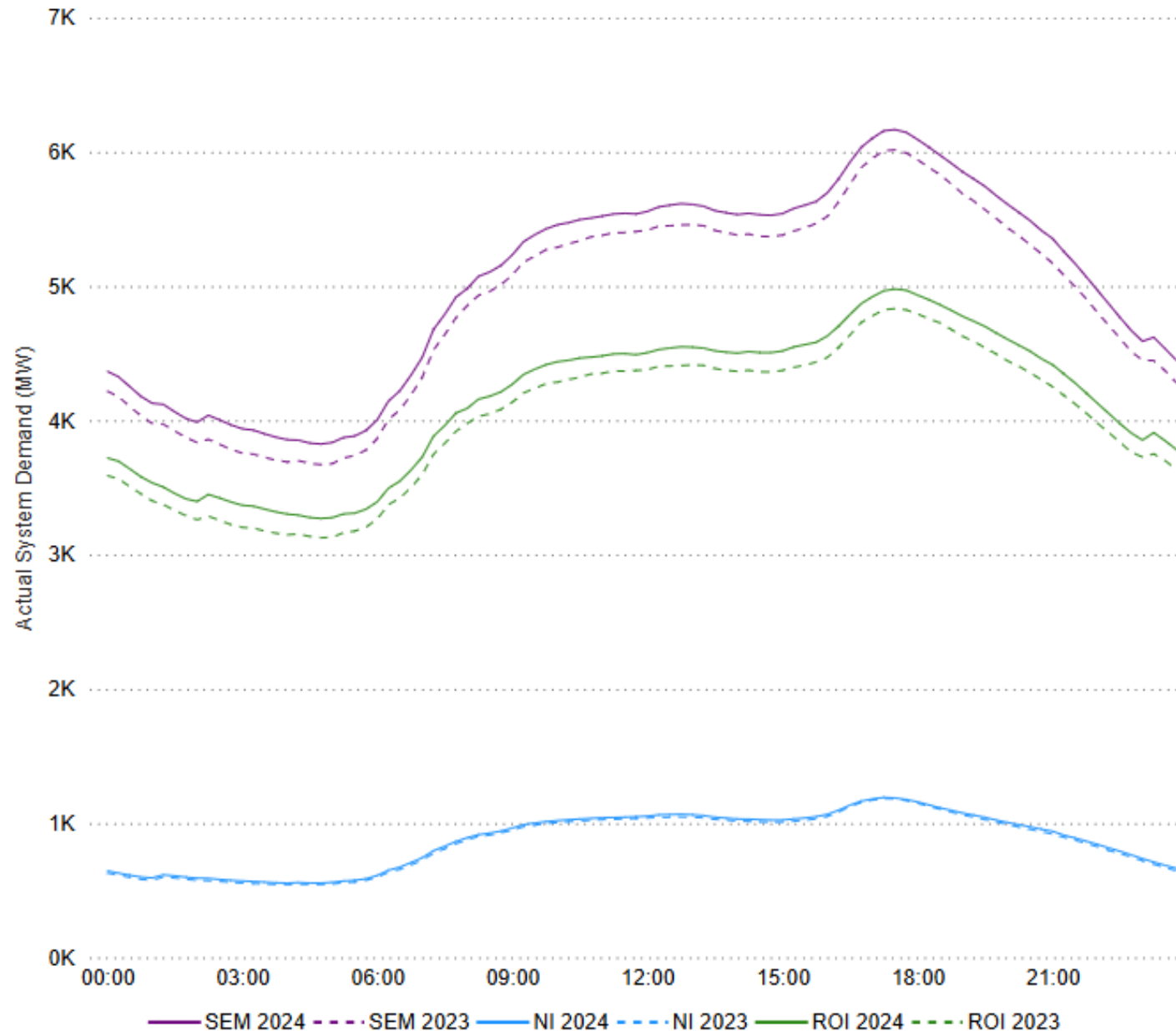
NI Demand

874.42	859.68
NI Average 2024	NI Average 2023
553.94	542.55
NI Min 2024	NI Min 2023
1,191.52	1,183.74
NI Max 2024	NI Max 2023

ROI Demand

4,145.76	4,004.05
ROI Average 2024	ROI Average 2023
3,270.19	3,126.48
ROI Min 2024	ROI Min 2023
4,978.65	4,832.81
ROI Max 2024	ROI Max 2023

Monthly Average Hourly Demand Curves



SEM Demand

The graph illustrates a steady demand within NI, with only increase of 1.71% compared to the same period in the previous year.

The demand for ROI during the month has shown an increase of 3.54% relative to the same period last year.

Demand in the SEM as a whole is up by 3.22% compared to the same period last year.

Duration Curves December 2024

Price Duration

The price duration curve shows the hourly DAM prices across the month ordered from the largest to the smallest.

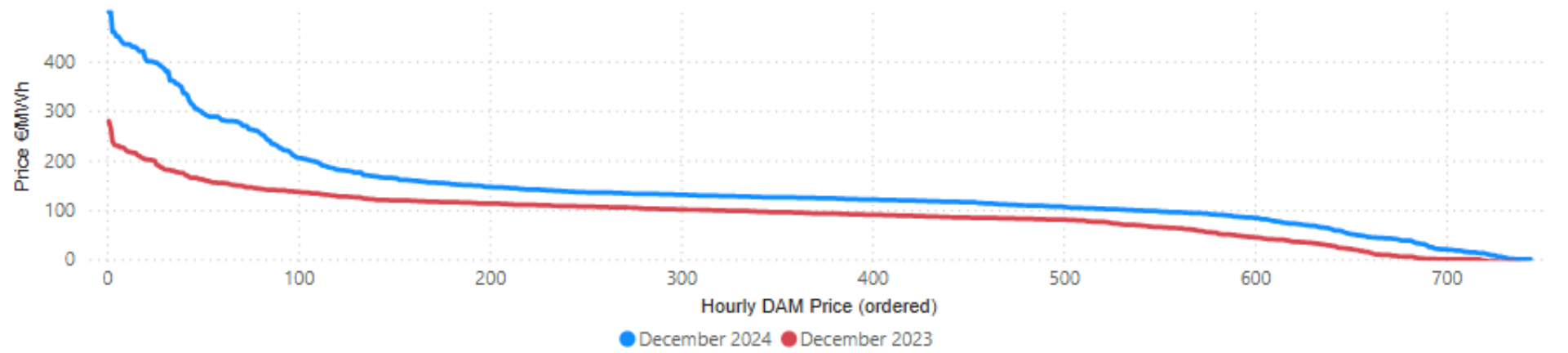
Residual Duration

The residual demand curve shows the ordered hourly demand level across the month which can't be met by renewable generation.

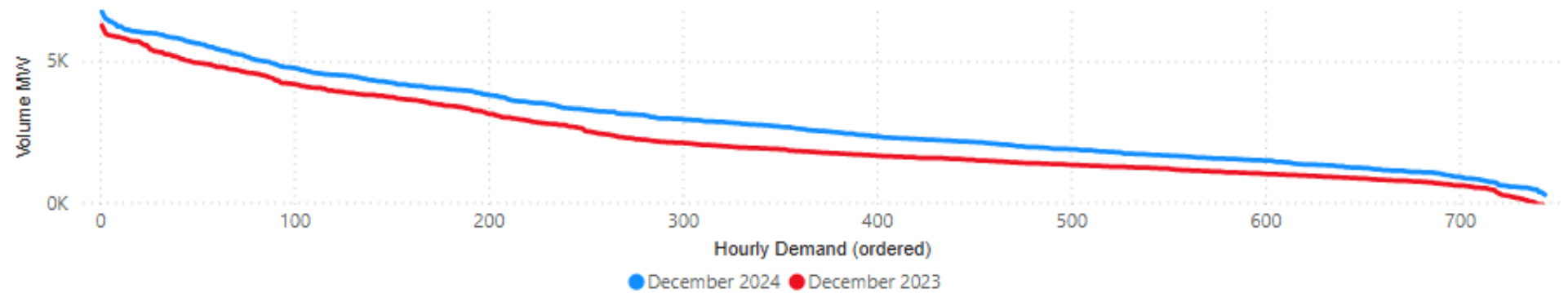
Price against Residual Duration

Shows the residual duration for each period relative to the DAM price for that period.

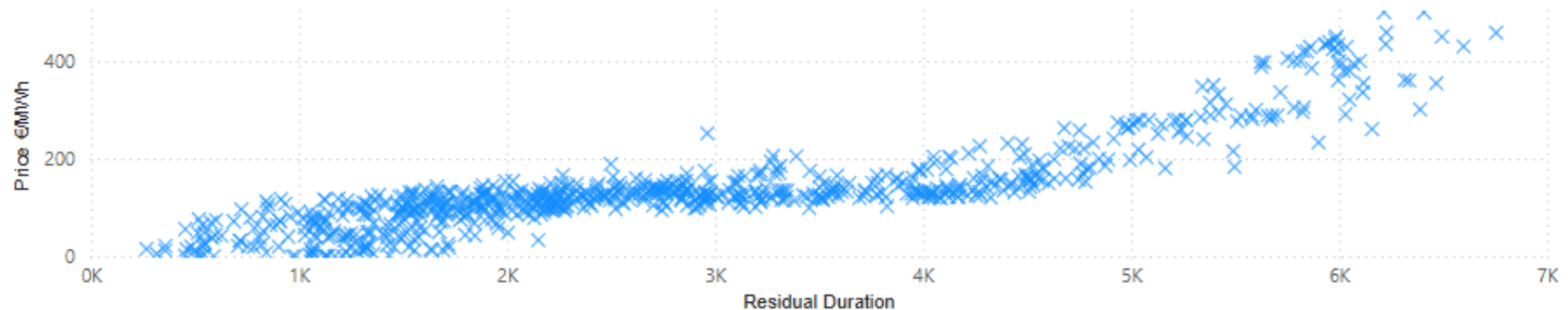
Price Duration Curve SEM



Residual Demand Duration Curve SEM



DAM Price against Residual Duration



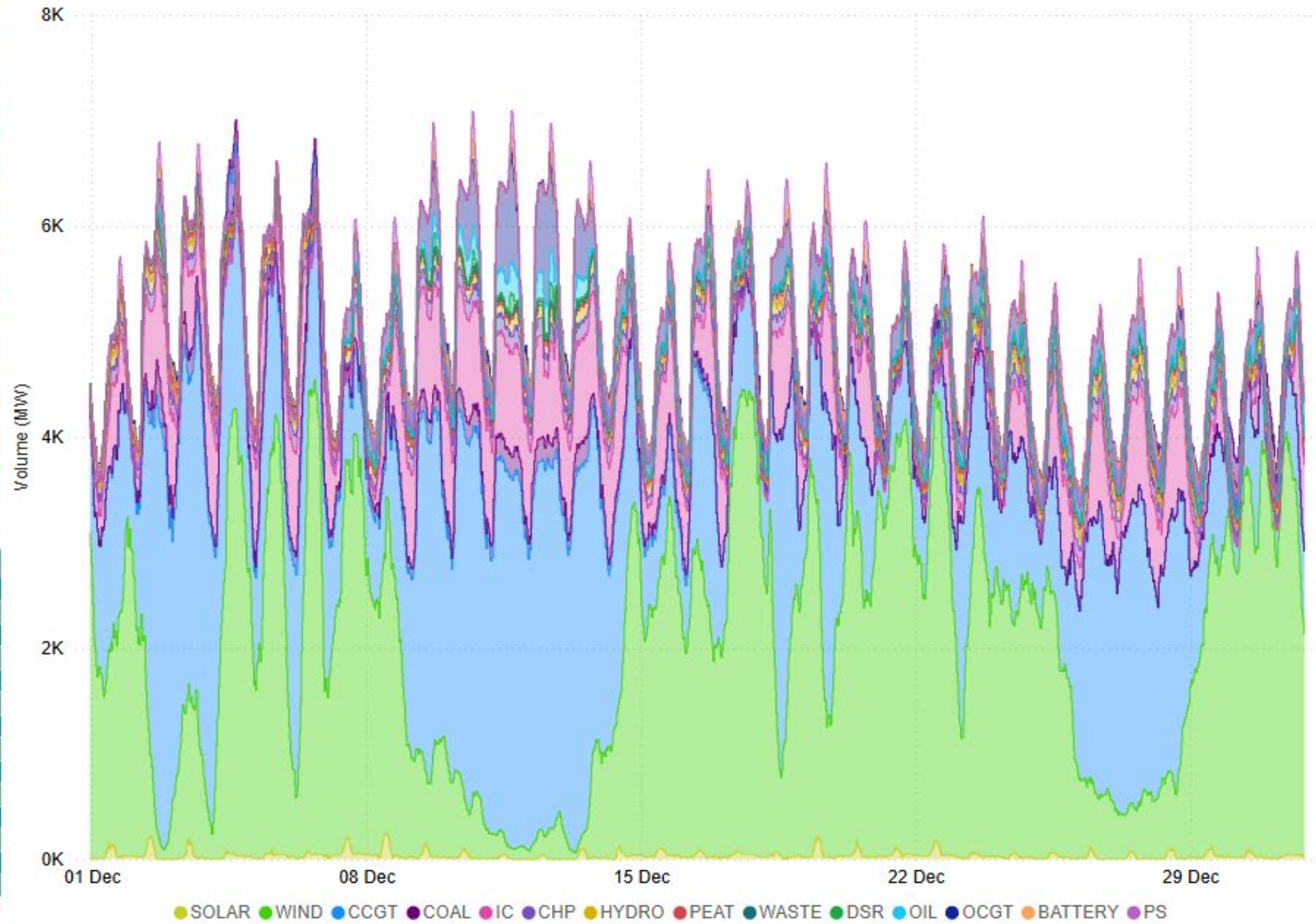


Fuel Mix December 2024

Fuel Type	Avg Monthly	Pec. Monthly
WIND	2041	40.6%
CCGT	1779	35.4%
INTERCONNECTORS	461	9.2%
OCGT	269	5.3%
CHP	138	2.7%
HYDRO	117	2.3%
COAL	70	1.4%
WASTE	54	1.1%
PEAT	47	0.9%
SOLAR	35	0.7%
DSR	20	0.4%
OIL	20	0.4%
BATTERY	-7	-0.1%
PUMPED STORAGE	-16	-0.3%

Fuel Type	Max Monthly	Min Monthly
WIND	4496	62
CCGT	4129	605
OCGT	1109	0
INTERCONNECTORS	1003	-900
COAL	419	0
OIL	319	0
PUMPED STORAGE	289	-227
SOLAR	246	0
BATTERY	243	-201
DSR	191	0
CHP	170	74
HYDRO	169	55
PEAT	115	0
WASTE	80	17

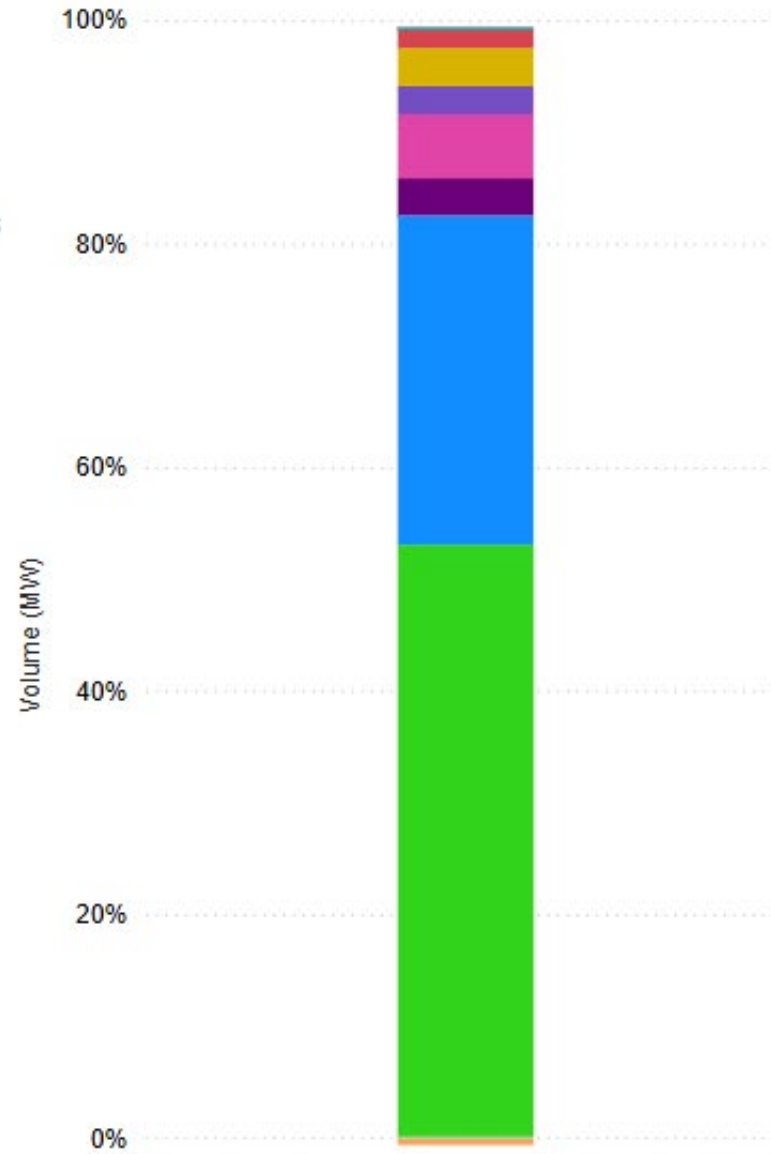
SEM 30 Minute Fuel Mix



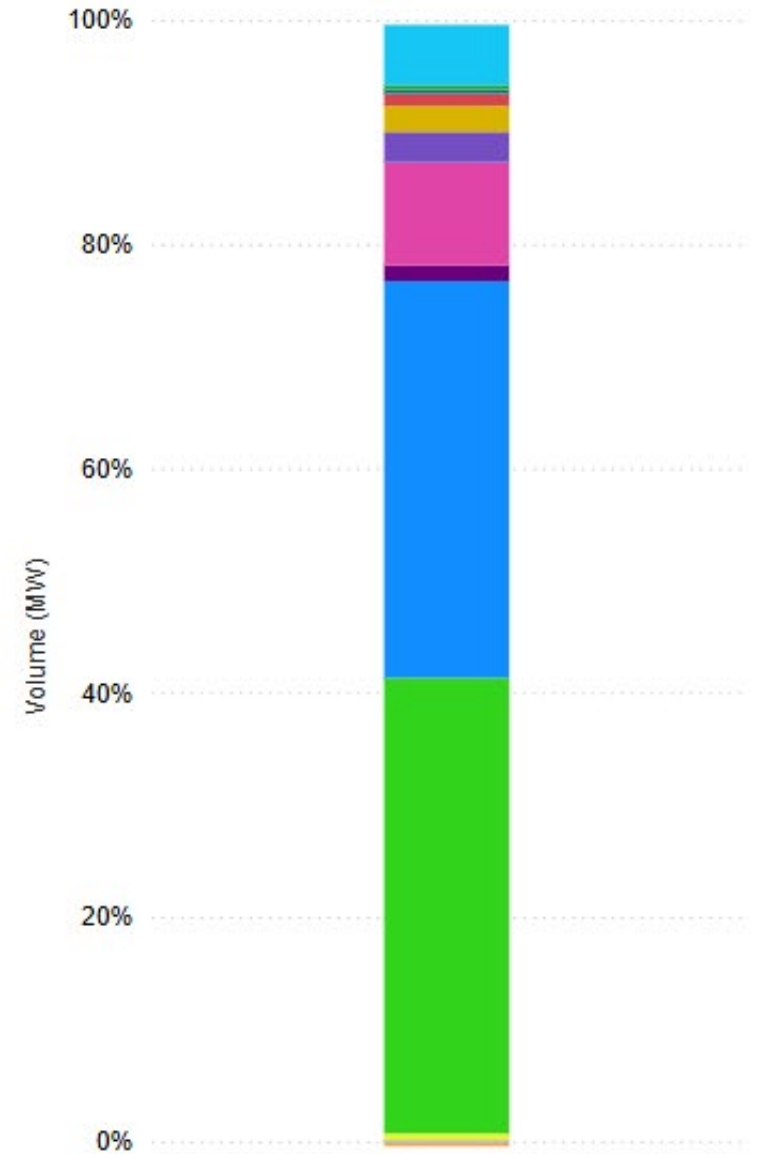
Fuel Mix Comparison December 2023 & 2024

- SOLAR
- WIND
- CCGT
- COAL
- INTERCONNECTORS
- CHP
- HYDRO
- WASTE
- DSR
- OIL
- OCGT
- BATTERY
- PUMPED STORAGE

SEM Fuel Mix December 2023



SEM Fuel Mix December 2024



North-South Tie Line December 2024

Average Flow NI to ROI (MW)

-305.89

Average Flow ROI to NI (MW)

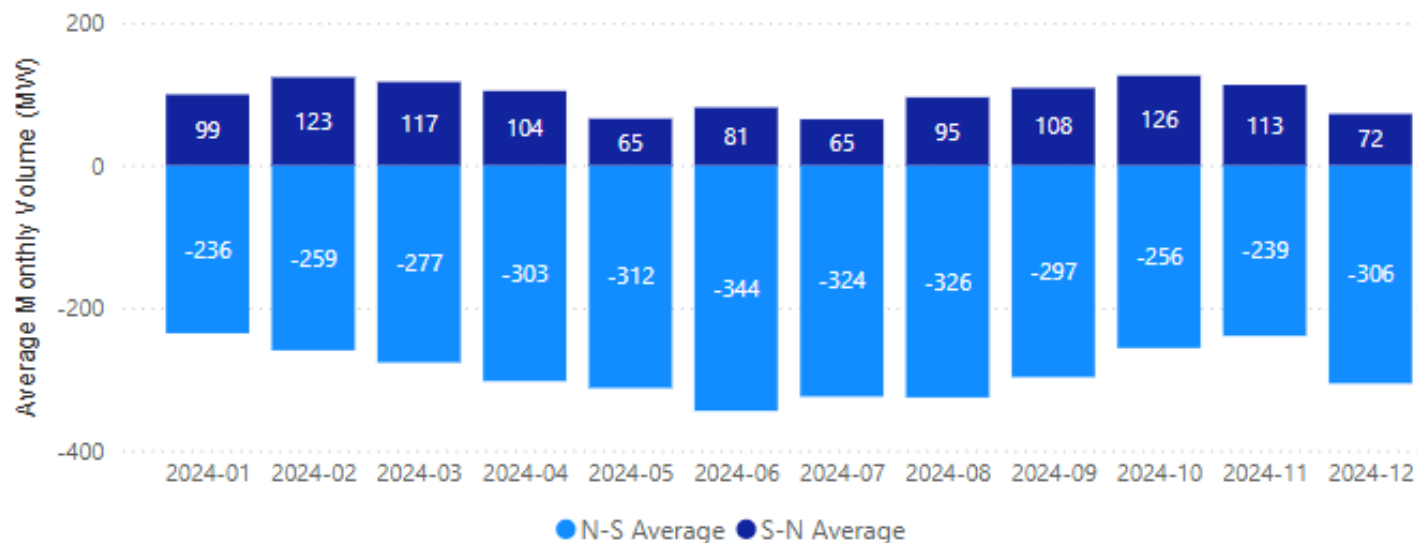
72.02

Average Net Flow NI to ROI (MW)

-289.54

-ve flow NI to ROI
+ve flow ROI to NI

Average Flows N-S Tie Line Long Term Trend



North South Tie Line

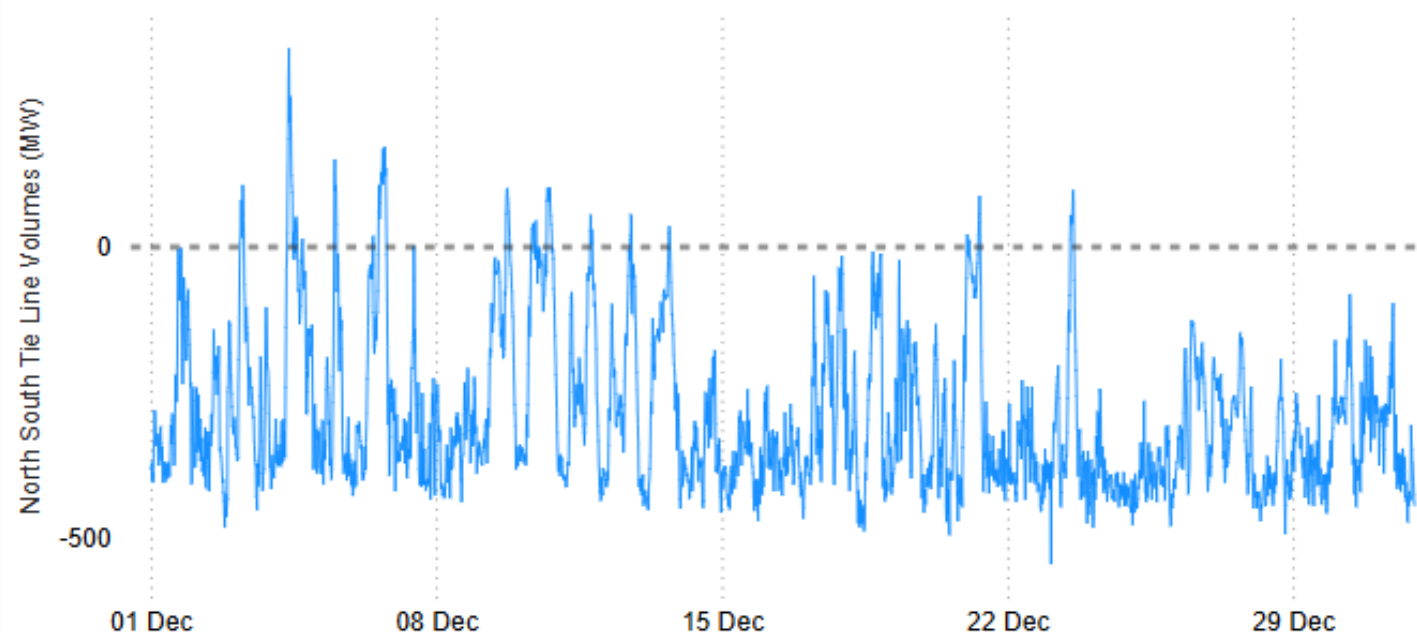
Flows across the N-S Tie Line were predominantly in the North to South direction this month. This has been the long term trend. There are persistence reasons for this trend.

- When the wind penetration is high in NI, a surplus of power can be formed as the TSO must run a minimal number of thermal units in NI to deal with operational constraints in the system. Exporting power southwards is a mechanism to avoid wind curtailment.

- The Moyle Interconnector, due to its lower physical losses, is allocated first for flows in the GB to NI direction. Similar to what happens when the wind penetration is high or demand is low, the interconnector flows compete with the system constraints. In order to not curtail the interconnection capacity with GB, power flows are directed southwards.

- Finally, the demand in ROI has been growing at a faster pace than in NI.

North South Tie Line Volumes 15 minute periods



Wind Generation December 2024

Average Daily Actual Wind (MW)
2,040

Average Daily Forecast Wind (MW)
2,556

Min SNSP %
11.94

Max SNSP %
75.01

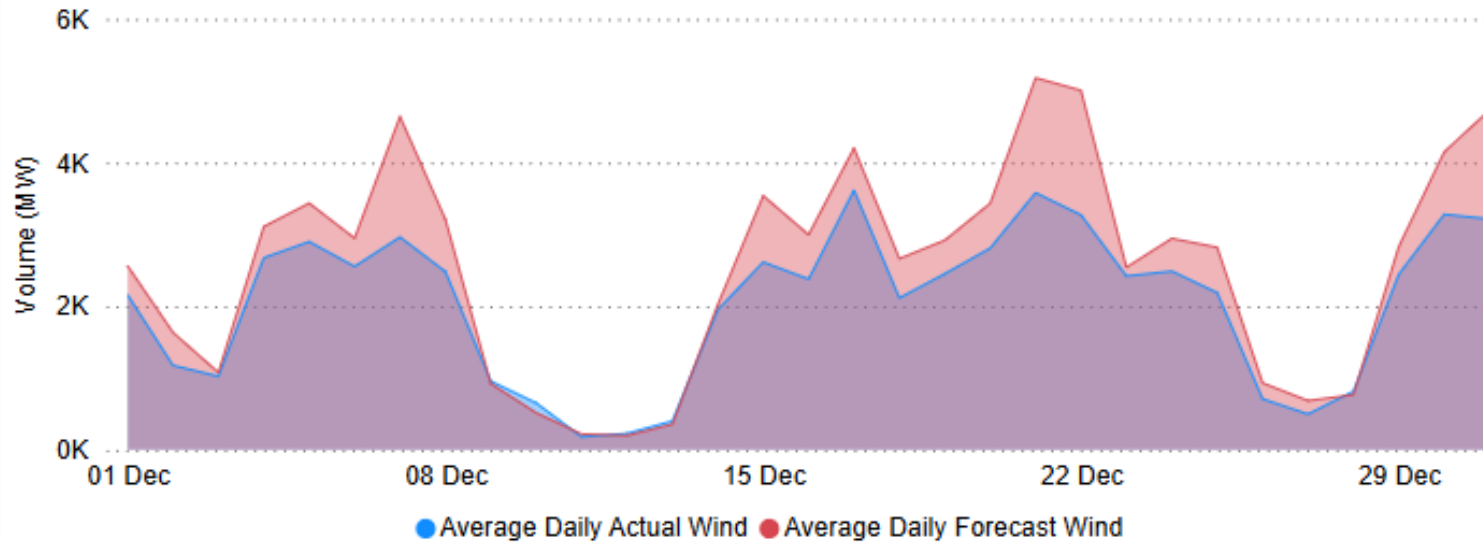
Wind Generation

Wind generation increased 41% compared to previous month and decreased 17% from the same period last year.

SNSP

SNSP is closely linked to wind generation and as such follows the same trend across the month.

Actual Daily Average Wind Relative to Forecast Daily Average Wind



SNSP %



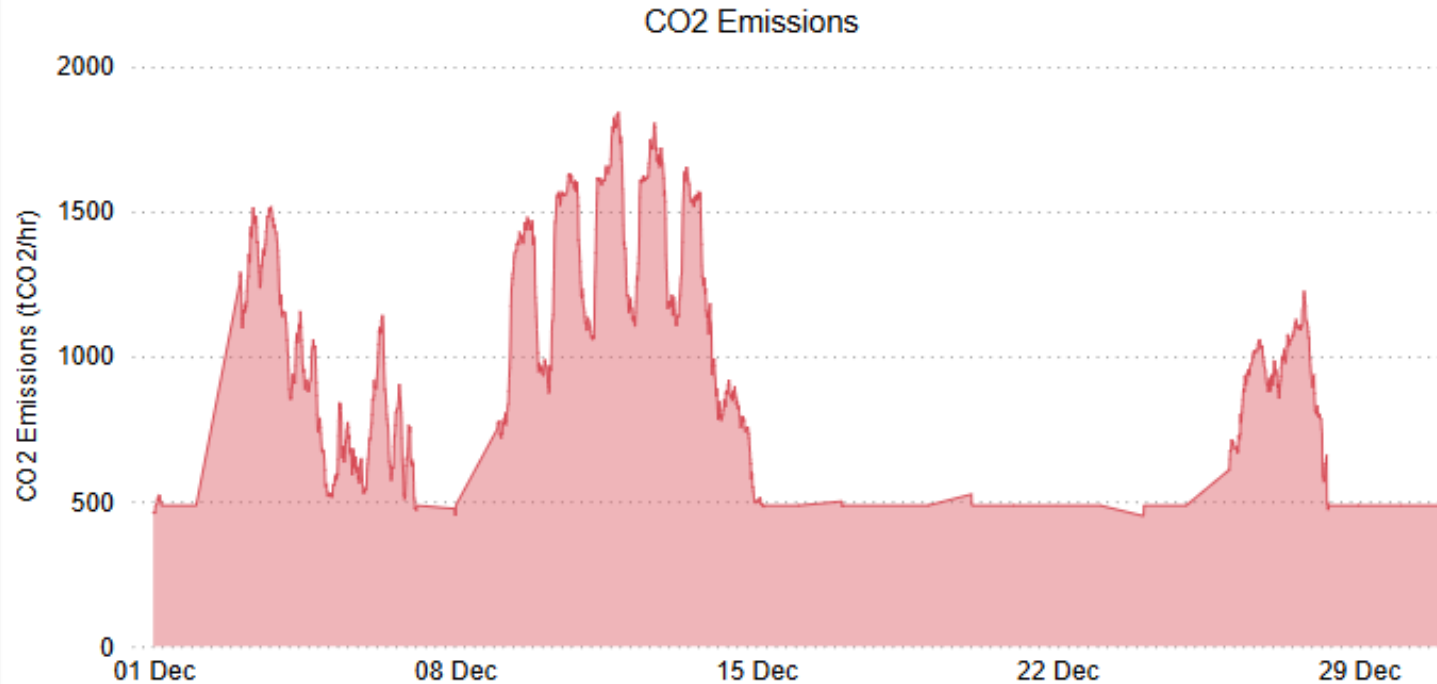
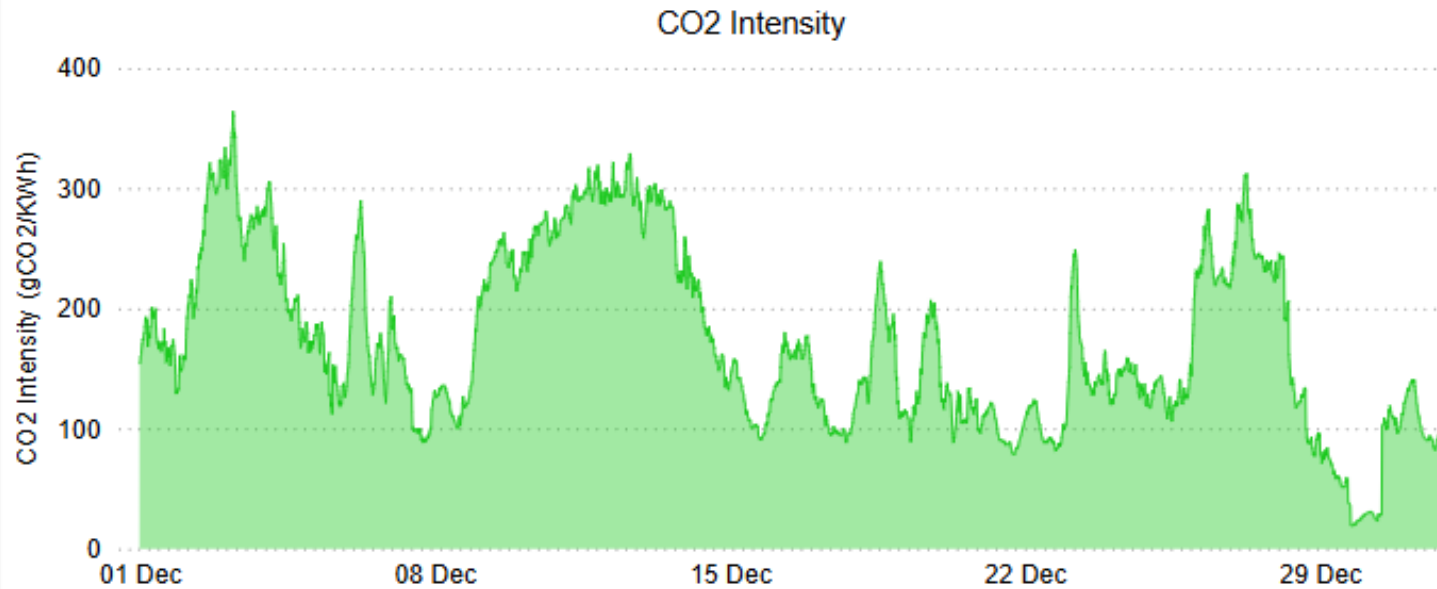
CO₂ December 2024

CO₂ Intensity (gCO₂/kWh)

173.44
Average
19
Lowest
364
Highest

CO₂ Emissions (tCO₂/hr)

1059
Average
450
Lowest
1842
Highest



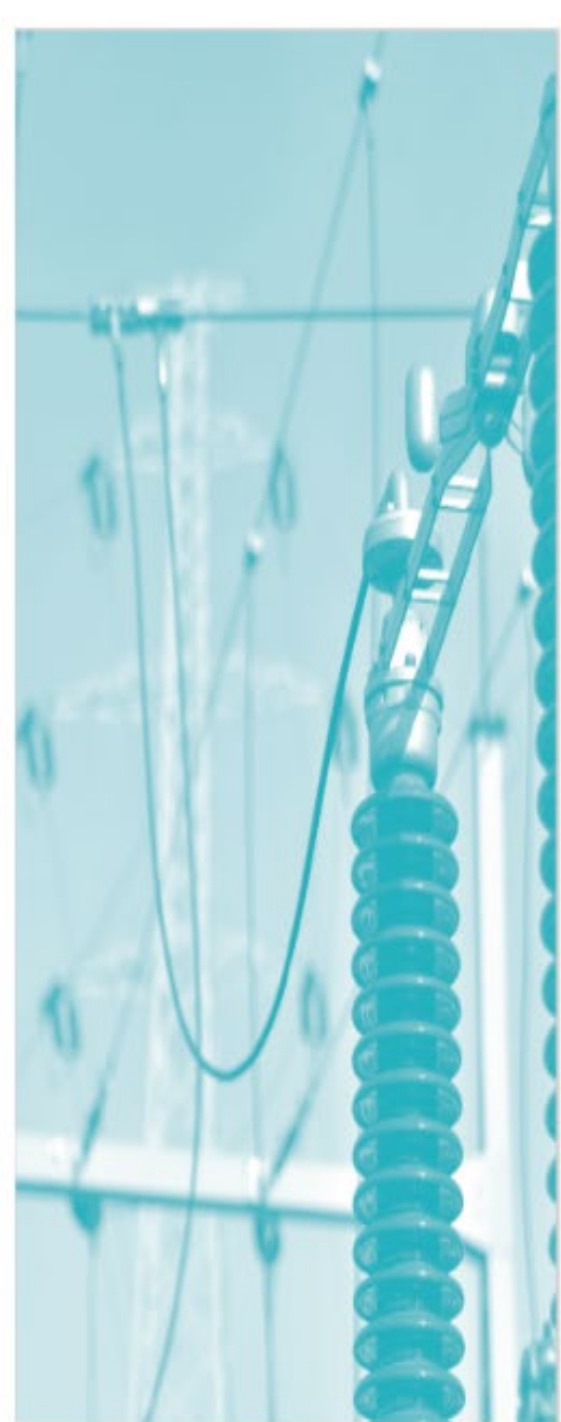
CO₂ Intensity

CO₂ Intensity i.e. how many grams of carbon are emitted for every unit of electricity used, should be negatively correlated with the volume of wind output on the system.

CO₂ Emissions

CO₂ emissions i.e. the estimated total CO₂ emissions from all large power stations, follows the same trends as CO₂ intensity levels over the course of the month.

Fuel Costs and Spreads



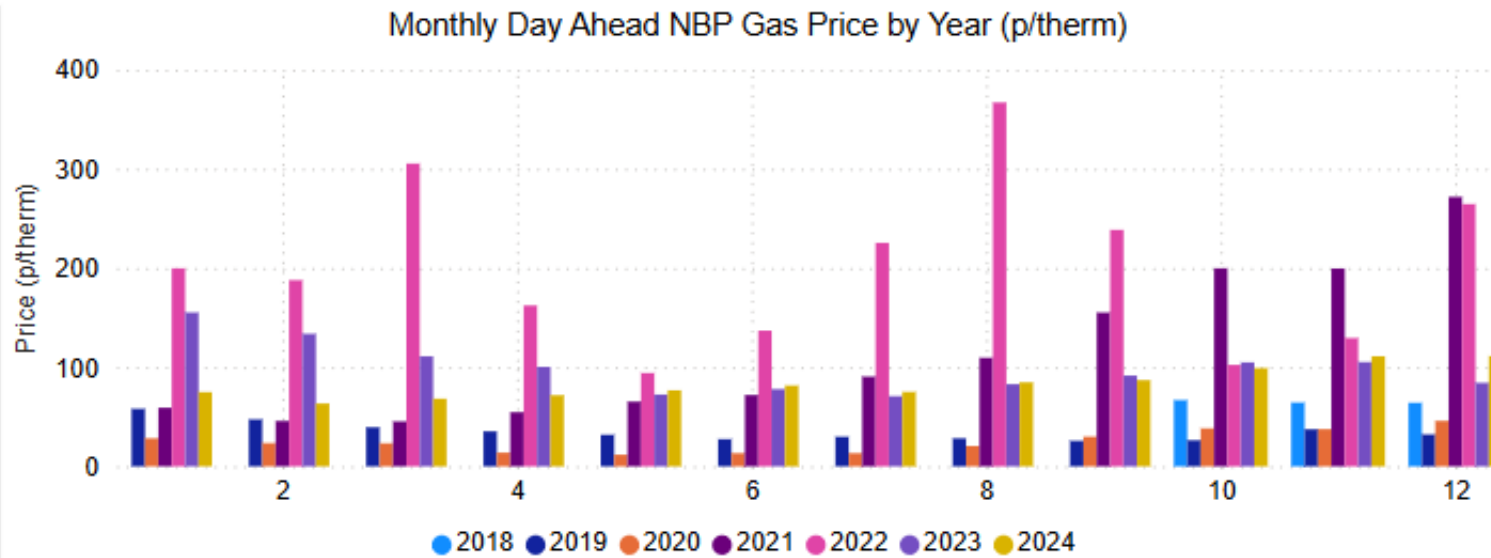
Gas Price December 2024

111.22
Monthly Average (p/therm)
97.55
Monthly Low (p/therm)
122.00
Monthly High (p/therm)

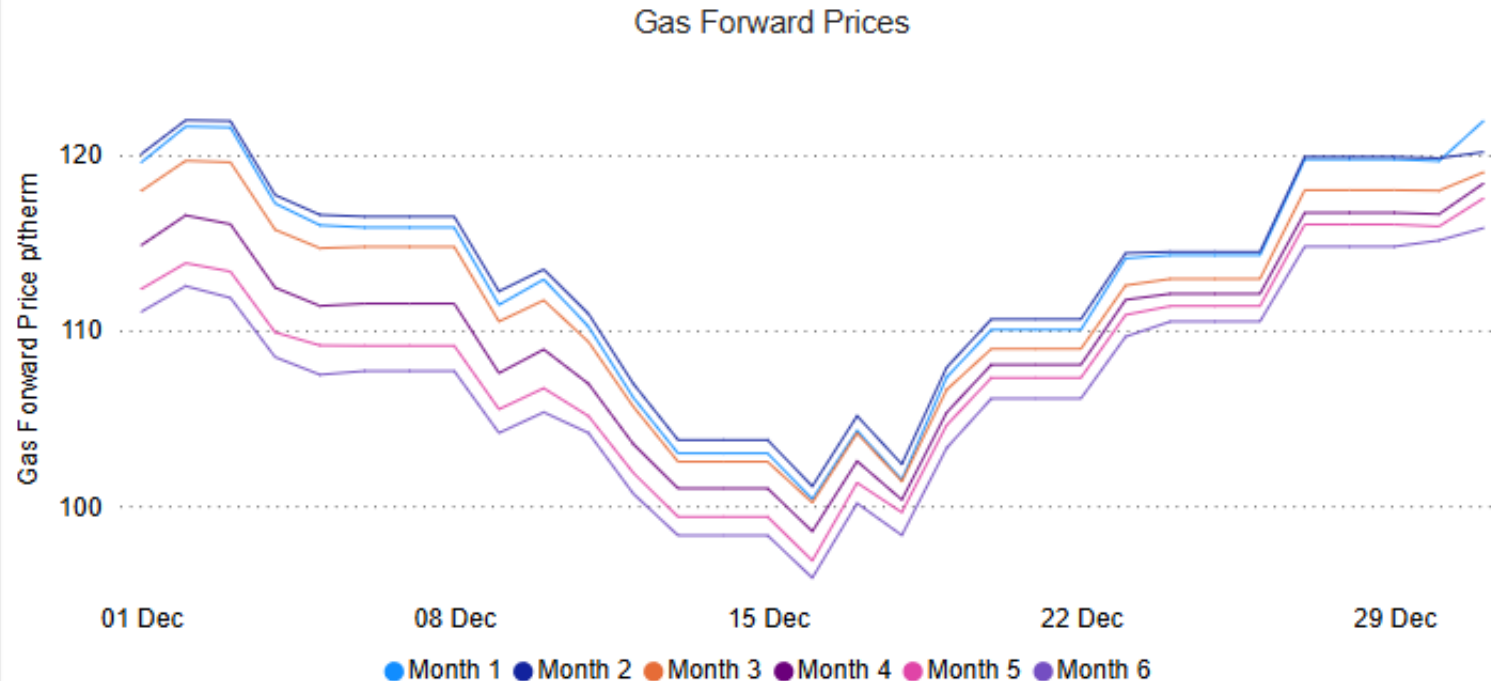
Gas Prices

Gas prices were slightly up from the last month averaging at 111.22p/therm.

Gas prices rallied towards the end of the month to 117.44p/therm as wind levels dropped and temperatures decreased.



Gas Forward Prices



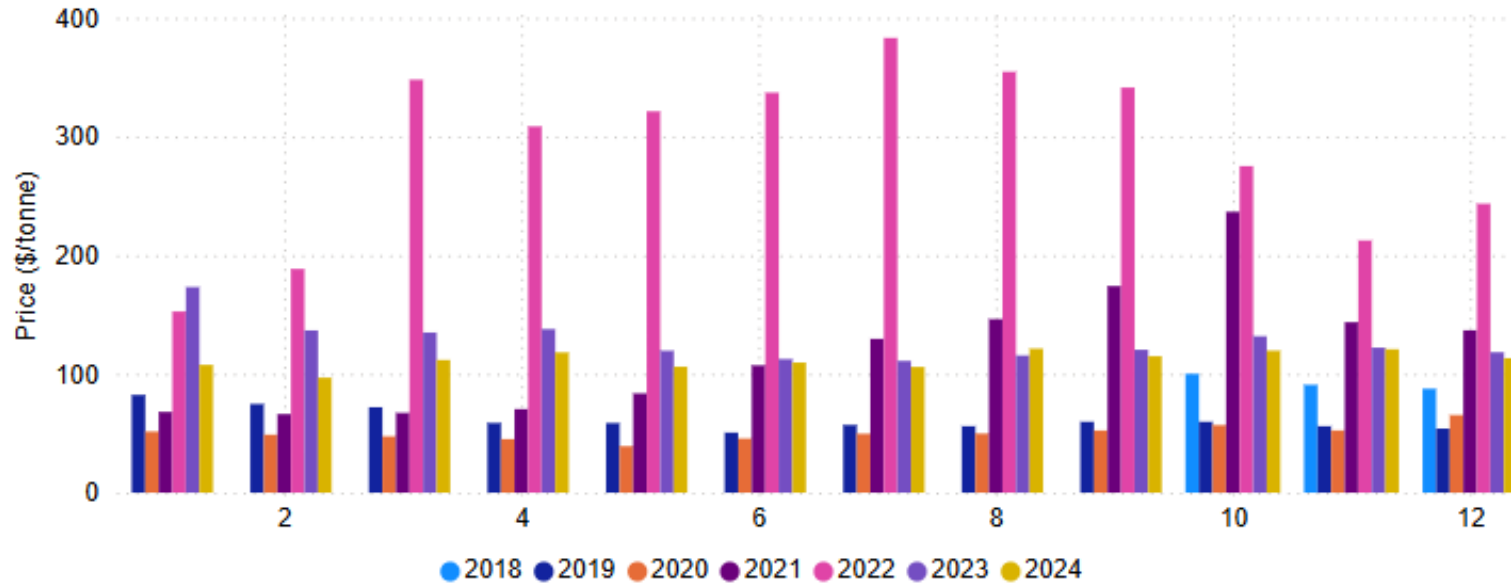
Gas Forward Prices

Forward curves increased at the end of the month due to drop in the temperature.

Coal Price December 2024

Coal Prices Per Tonne
 \$113.32
 Monthly Average
 \$111.30
 Monthly Low
 \$121.55
 Monthly High

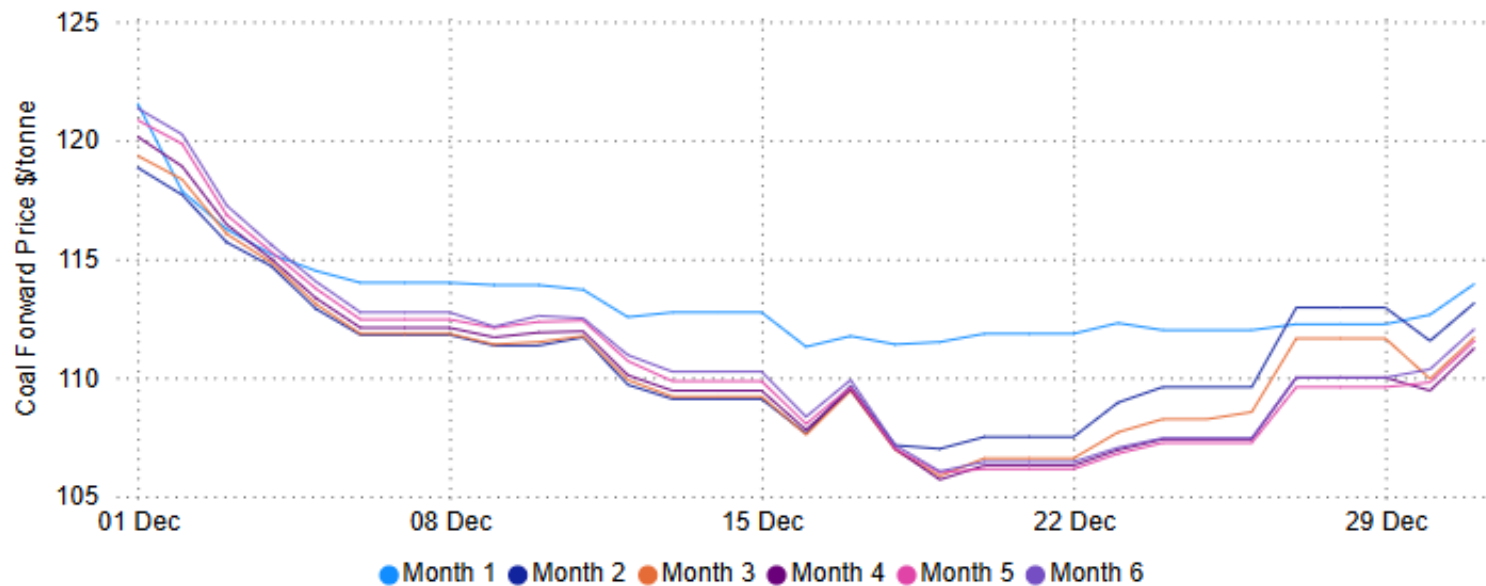
Monthly ICE Rotterdam Coal Price by Year (\$/tonne)



Coal Prices

Coal prices were lower compared to the previous month at \$113.32/tonne (6% decrease from the last month).

Coal Forward Prices



Coal Forward Prices

Coal forward prices demonstrate a decrease at the end of the month.

Carbon Price December 2024

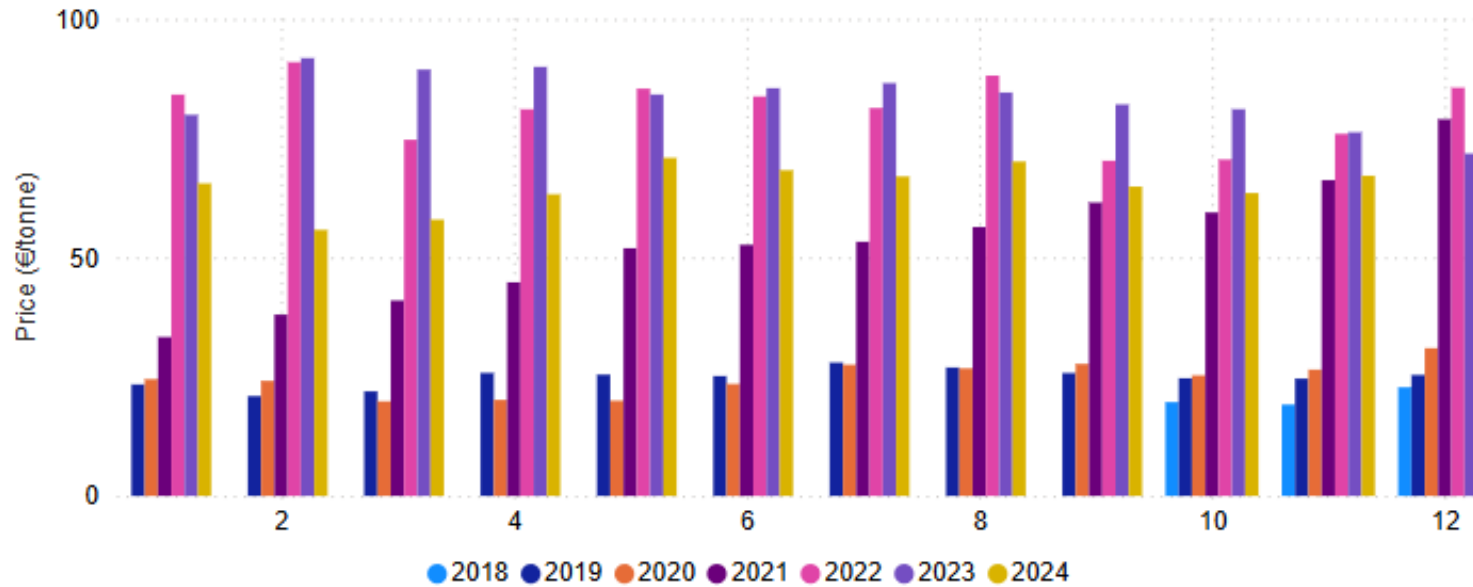
EU Carbon Prices (€/tonne)

€ 67.05
Monthly Average
€ 62.45
Monthly Low
€ 70.65
Monthly High

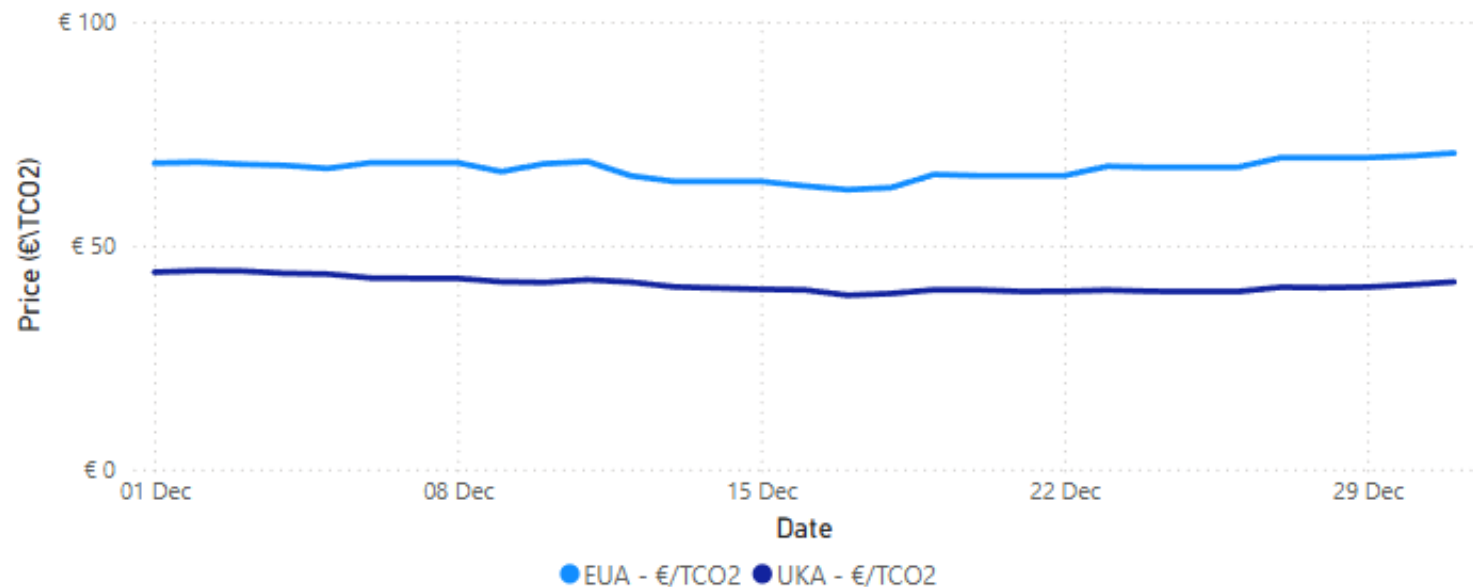
UK Carbon Prices (€/tonne)

€ 41.26
Monthly Average
€ 38.86
Monthly Low
€ 44.35
Monthly High

Monthly EU Carbon Permits Price by Year (€/tonne)



UK & EU Carbon Prices



Carbon Prices

Carbon prices remains steady from the last month averaging at €67.05/tonne.

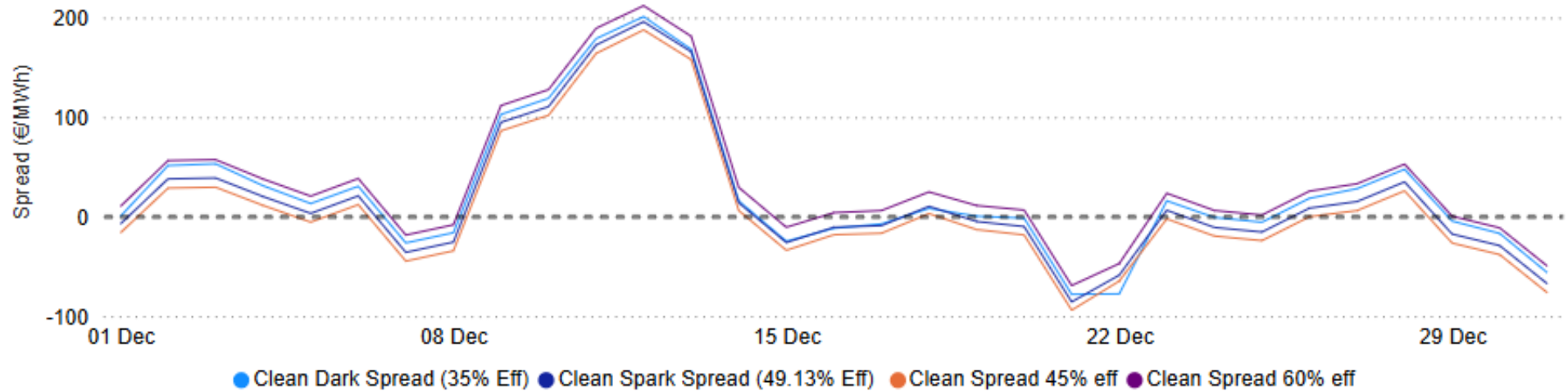
EU emission allowance prices have been trading lower for much of this year, alongside gas and power. We believe this pressure is likely to persist. EUA prices have been weighed down by a combination of bearish factors, including a sluggish industrial recovery, strong renewables output and limited power demand from mild weather. This does not seem to be the case for December.

Spark Spreads December 2024

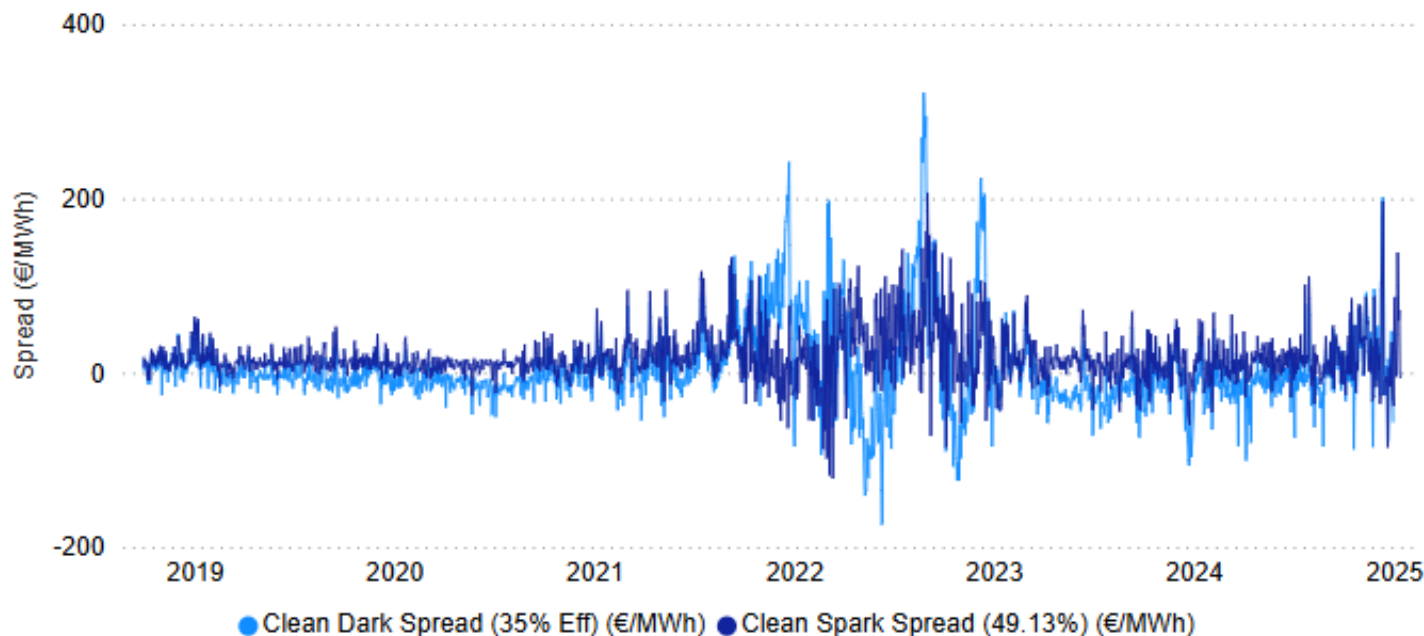
Clean Dark Spread measure the profitability of coal fired power generation based on the variable cost of inputs (coal and carbon credits) and the value of the output (electricity).

Clean Spark Spread is the difference between the price received by a generator for electricity produced and the cost of the natural gas + Carbon needed to produce that electricity.

Clean Dark Spread v Clean Spark Spread



Clean Dark Spread v Clean Spark Spread (October 2018 Onwards)



Clean Dark Spread vs Clean Spark Spread

Spreads were generally consistent across the month.

Clean spark spread was relatively high between 8th and 14th December due to low wind flow during the period.