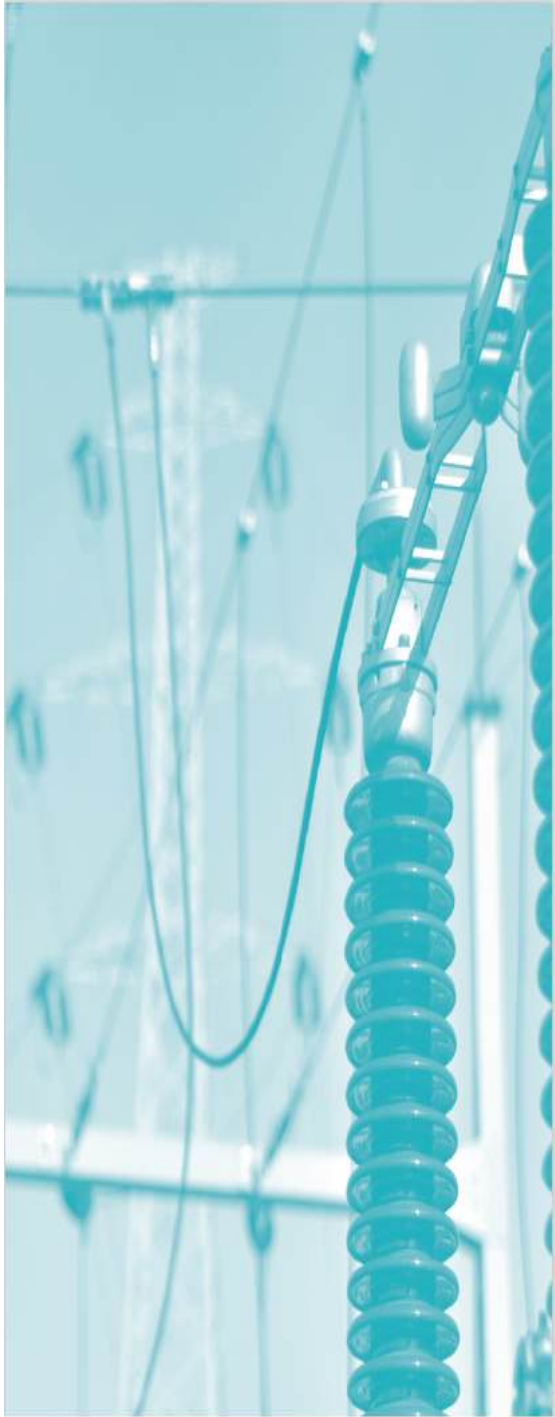


Energy Market Monitoring Report

October 2024



Market Results

Summary Dashboard

Monthly Averages	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24
DAM (€/MWh)	125.54	122.9	88.97	99.9	84.6	86.67	88.52	107.75	107.74	110.94	100.44	112.73	122.9
% Change from previous month	12%	-2%	-28%	12%	-15%	2%	2%	22%	0%	3%	-9%	12%	9%
% Change from previous year	-8%	-14%	-68%	-38%	-47%	-40%	-30%	2%	-8%	15%	-6%	1%	-2%
Actual System Demand (MW)	4516	4873	4862	5151	4946	4833	4610	4356	4193	4279	4255	4467.76	4671
% Change from previous month	4%	8%	0%	6%	-4%	-2%	-5%	-6%	-4%	2%	-1%	5%	5%
% Change from previous year	4%	5%	0%	5%	3%	0%	3%	2%	0%	4%	2%	3%	3%
Actual Wind Generation (MW)	1363	1811	2446	1854	2000	2072	1496	894	1072	883	1437	1263	1668
% Change from previous month	-2%	33%	35%	-24%	8%	4%	-28%	-40%	20%	-18%	63%	-12%	32%
% Change from previous year	-33%	-19%	49%	-7%	-1%	19%	-3%	1%	22%	-33%	3%	-9%	22%
Gas Price p/therm	104.88	104.97	84.2	74.87	63.37	68.18	71.69	76.69	81.51	75.07	84.71	86.94	99.04
% Change from previous month	15%	0%	-20%	-11%	-15%	8%	5%	7%	6%	-8%	13%	3%	14%
% Change from previous year	3%	-19%	-68%	-52%	-53%	-39%	-29%	6%	5%	6%	2%	-5%	-6%
Carbon Price (€/Tonne)	81.10	76.25	71.79	65.52	55.79	57.94	63.25	70.90	68.29	67.00	70.12	64.86	63.51
% Change from previous month	-1%	-6%	-6%	-9%	-15%	4%	9%	12%	-4%	-2%	5%	-8%	-2%
% Change from previous year	15%	1%	-16%	-18%	-39%	-35%	-30%	-16%	-20%	-23%	-17%	-21%	-22%
Coal Price (\$/tonne)	131.80	122.16	118.31	107.65	96.84	111.78	118.13	106.15	109.54	105.93	121.36	114.96	119.65
% Change from previous month	9%	-7%	-3%	-9%	-10%	15%	6%	-10%	3%	-3%	15%	-5%	4%
% Change from previous year	-52%	-43%	-51%	-38%	-29%	-17%	-14%	-11%	-3%	-5%	5%	-5%	-9%
EWIC % Import Periods	86.90%	68.78%	56.38%	69.76%	69.10%	63.78%	81.94%	84.98%	85.90%	94.59%	85.29%	81.53%	71.32%
EWIC % Export Periods	2.99%	9.11%	20.36%	14.78%	11.00%	11.32%	4.86%	0.67%	3.72%	1.11%	7.56%	5.52%	10.31%
EWIC % Not Flow Periods	10.11%	22.11%	23.25%	15.46%	19.90%	24.90%	13.19%	14.35%	10.38%	4.30%	7.15%	12.95%	18.37%
Moyle % Import Periods	92.31%	83.47%	67.81%	78.16%	79.59%	79.00%	87.40%	94.96%	92.47%	96.77%	80.71%	91.98%	81.08%
Moyle % Export Periods	7.66%	16.50%	32.16%	21.81%	20.34%	20.83%	12.50%	5.27%	7.53%	3.23%	10.44%	7.60%	18.65%
Moyle % Not Flow Periods	0.03%	0.03%	0.03%	0.03%	0.07%	0.17%	0.10%	0.03%	0.00%	0.00%	8.84%	0.42%	0.28%

Market Volumes October 2024

Daily Average Volume MWh

DAM	116,739
IDA1	21,774
IDA2	2,759
IDA3	838
IDC	28

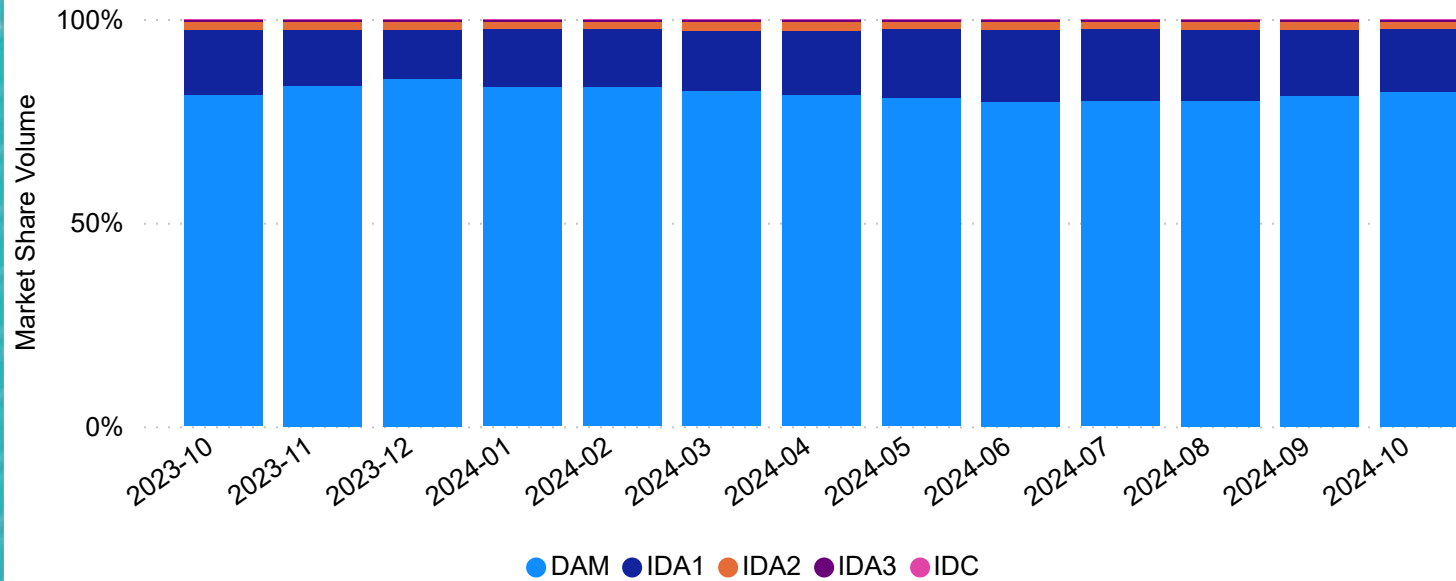
Total Monthly Volume MWh

DAM	3,502,173
IDA1	653,221
IDA2	82,780
IDA3	25,129
IDC	611
Total	4,263,914

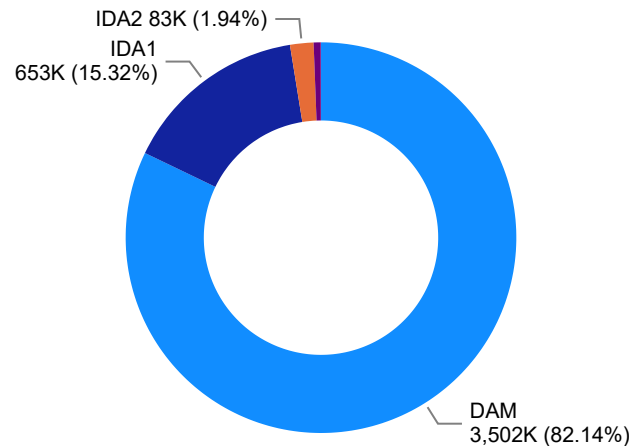
Total Market Value €

DAM	€ 441,191,182
IDA1	€ 84,873,622
IDA2	€ 10,994,532
IDA3	€ 4,006,097
IDC	€ 98,612
Total	€ 541,164,045

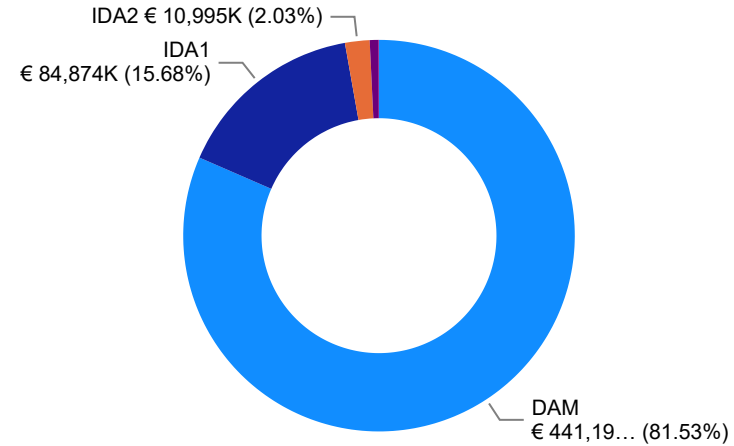
Ex-Ante Monthly Volume by Market



Ex-Ante Volumes (MWh)



Ex-Ante Values (€)



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.

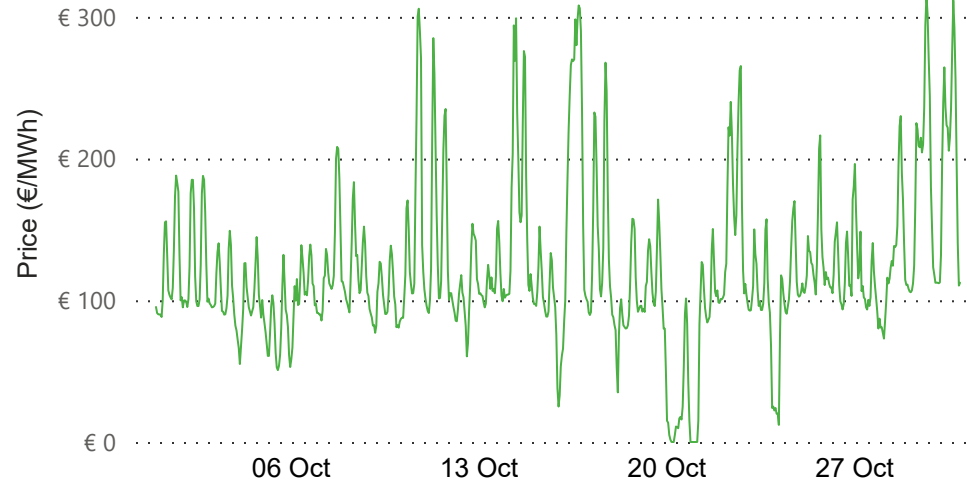
Another important factor is associated with the TSO dispatch arrangements. The vast majority of wind generation in the SEM is cleared at the Day Ahead stage. That might also explain to some extent the additional volumes cleared in this market.

Day Ahead Market October 2024

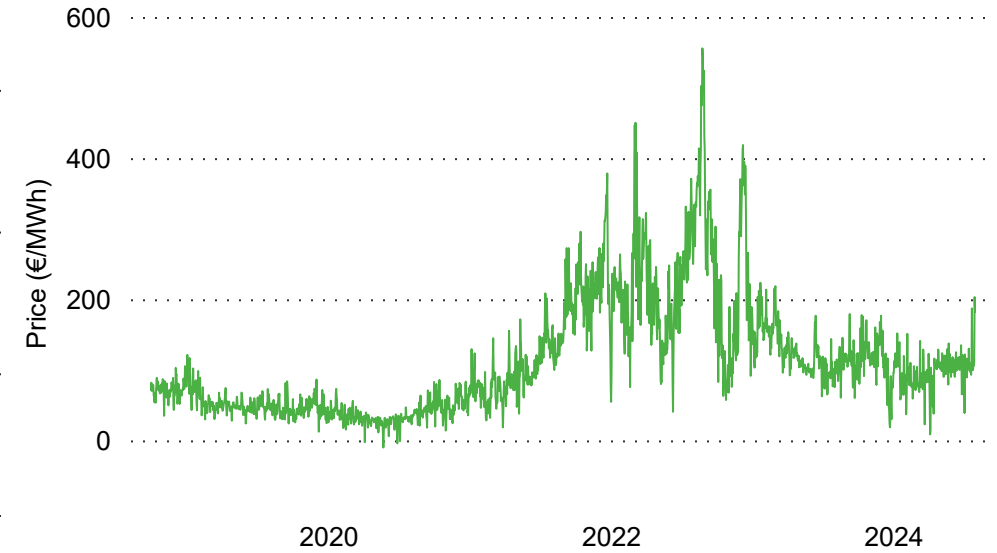
€ 122.79
Average DAM Price
€ 0.00
Min DAM Price
€ 315.00
Max DAM Price

The most frequent price range for October was between €100 and €150

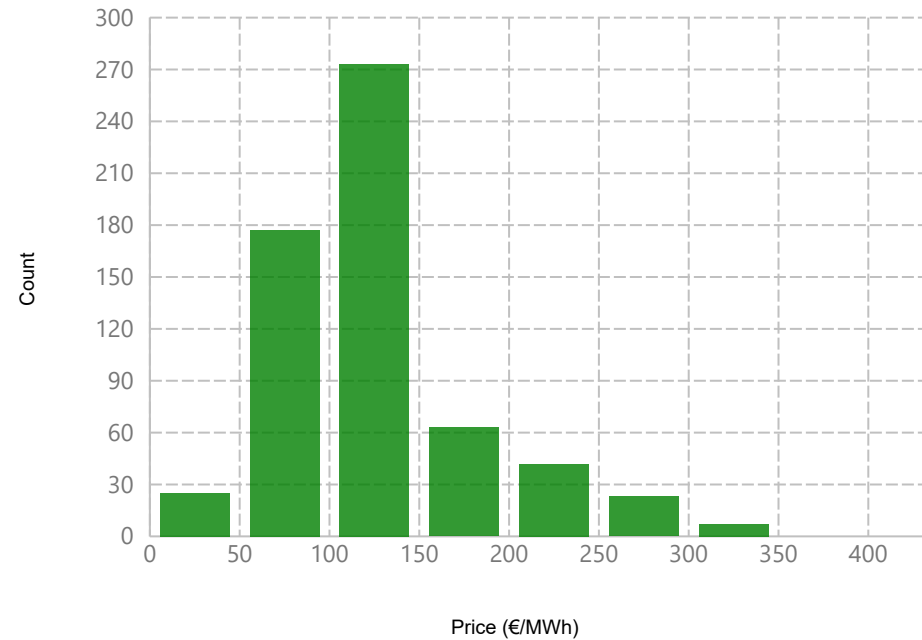
DAM Prices



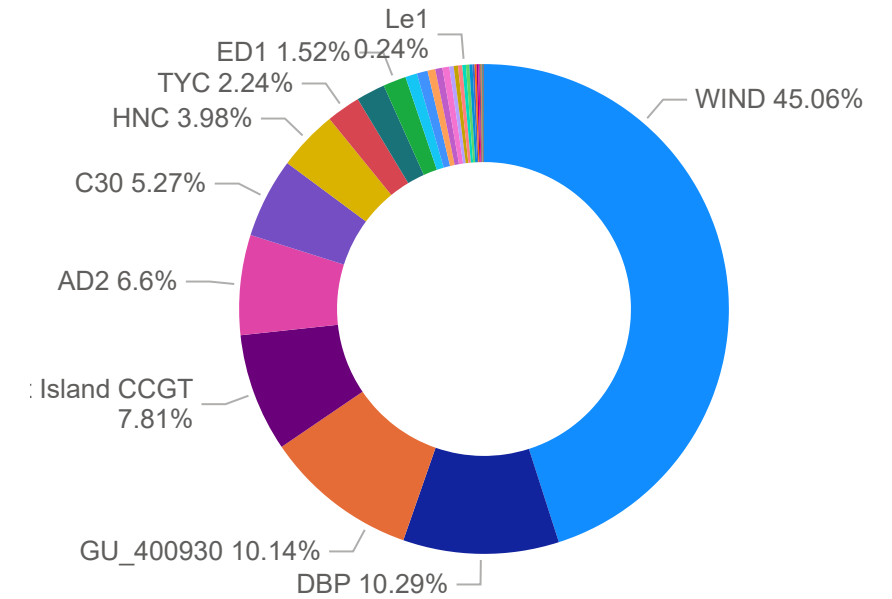
Historic Daily Average DAM Prices



Histogram of DAM Prices



DAM Sell Side Generator Order Results



Intraday Market October 2024

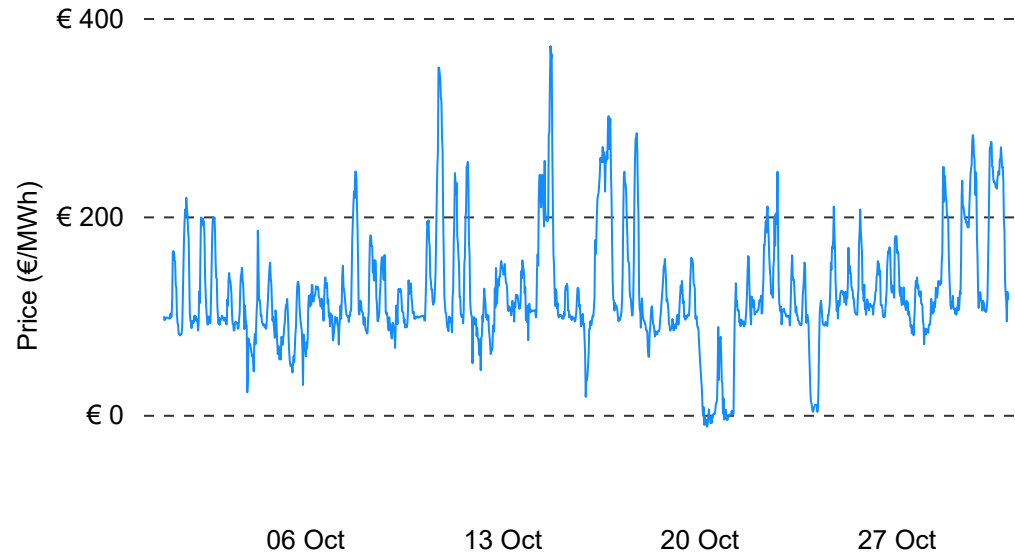
€ 122.10
Average IDA1 Price

-€ 12.02
Min IDA1 Price

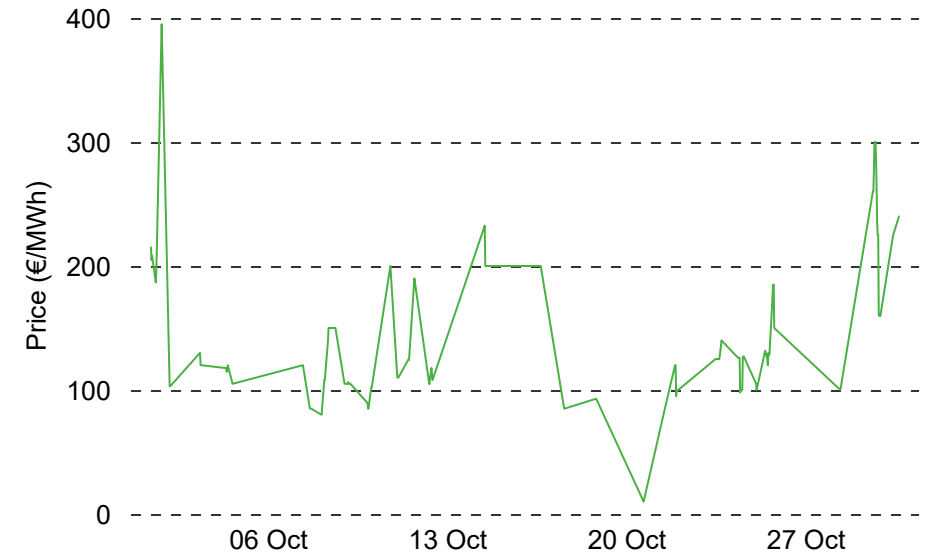
€ 371.75
Max IDA1 Price

The most frequent price range for October was between €60 and €120.

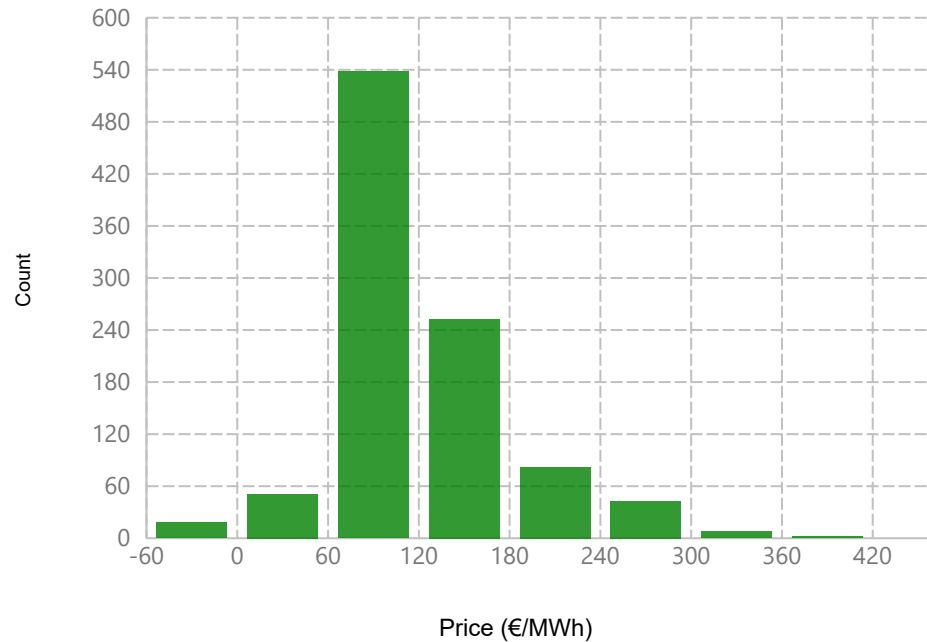
IDA 1 Prices



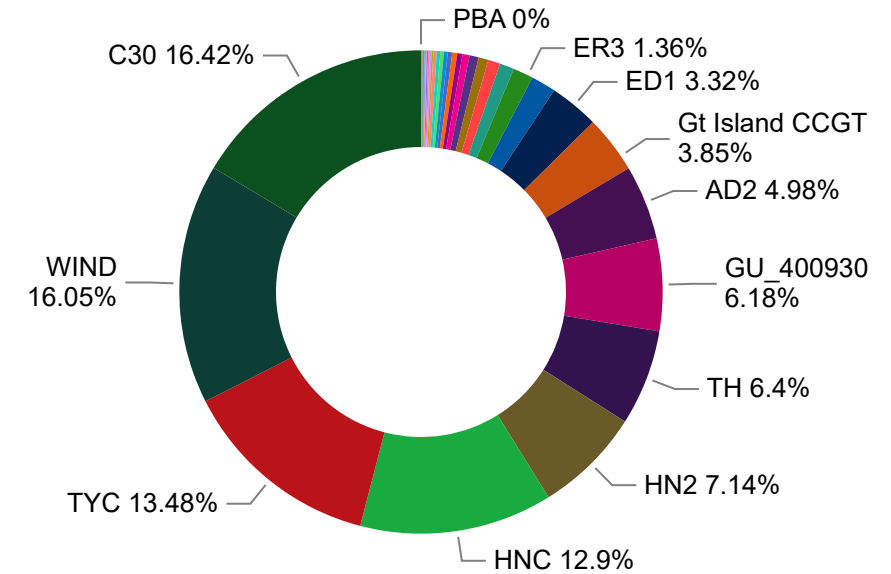
IDC Prices



Histogram of IDA1 Prices



IDA1 Sell Order Results By Market Participant



SEM vs GB DAM October 2024

SEM Day Ahead Price

€ 122.79

Average DAM Price

€ 0.00

Min DAM Price

€ 315.00

Max DAM Price

GB Day Ahead Price

€ 100.56

Average Price

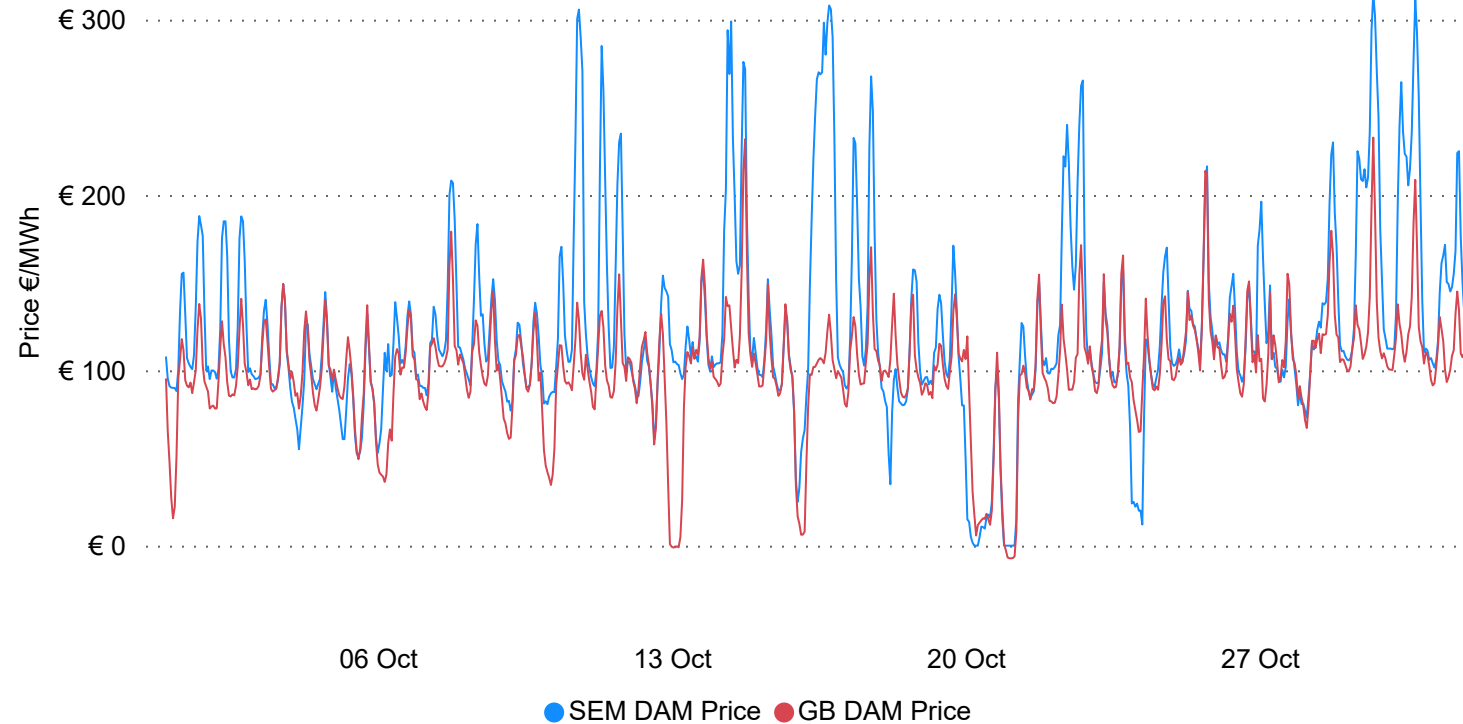
-€ 7.19

Min Price

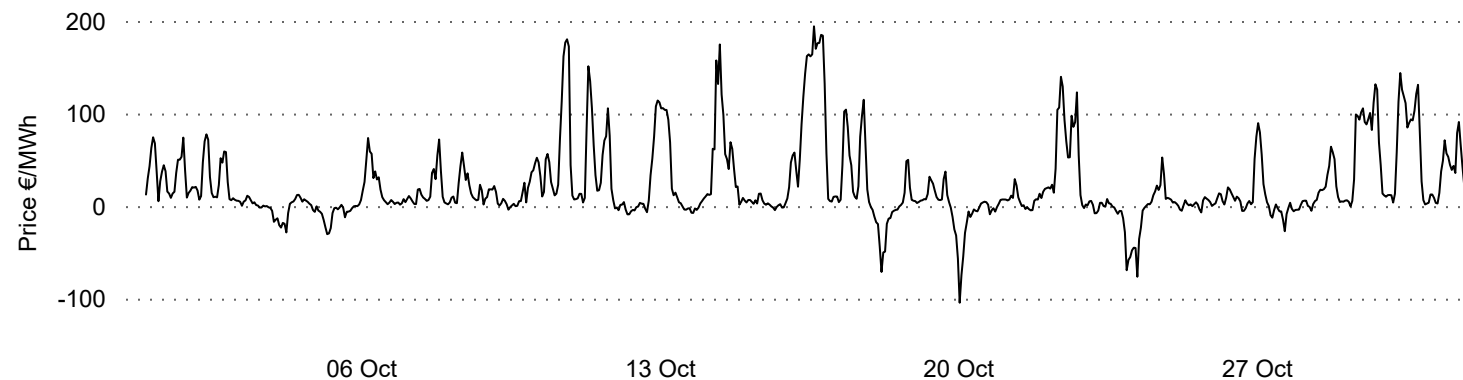
€ 232.74

Max Price

SEM & GB DAM Prices



SEM & GB DAM Prices Spread



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. The MMU has investigated the underlying reasons for these spreads and the findings are consistent with those discussed with the SEMC previously.

Basically, the periods of significant spreads between the two markets are generally correlated with period of very low wind. 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 will continue to investigate this matter further and come back to the SEMC in the foreseeable future with more information on this front.

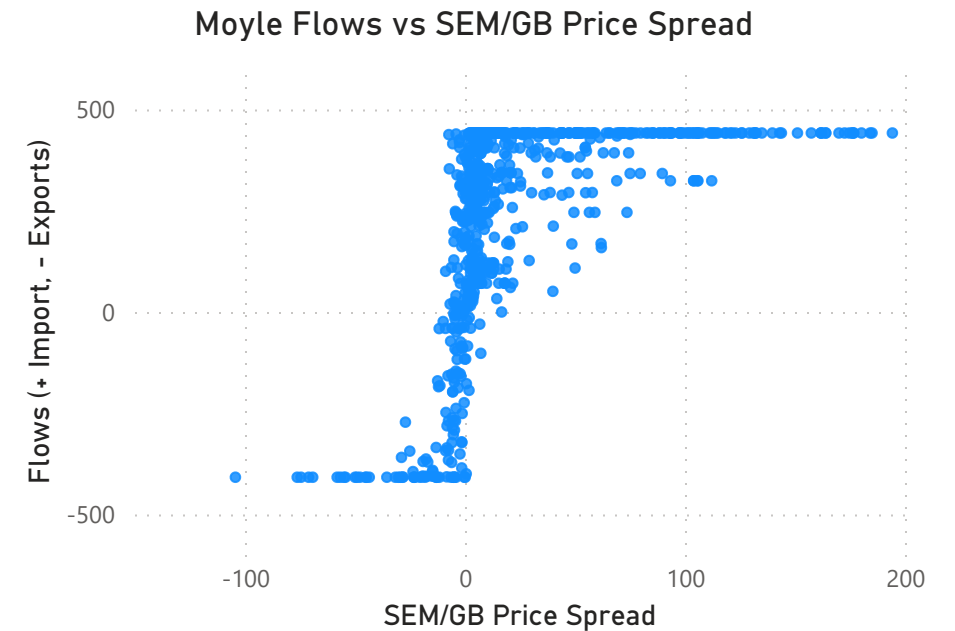
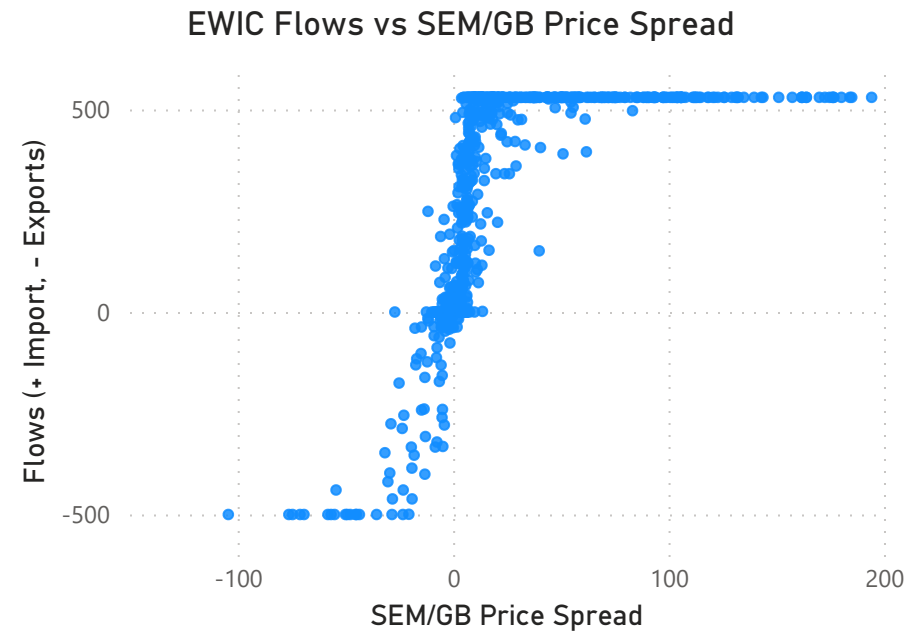
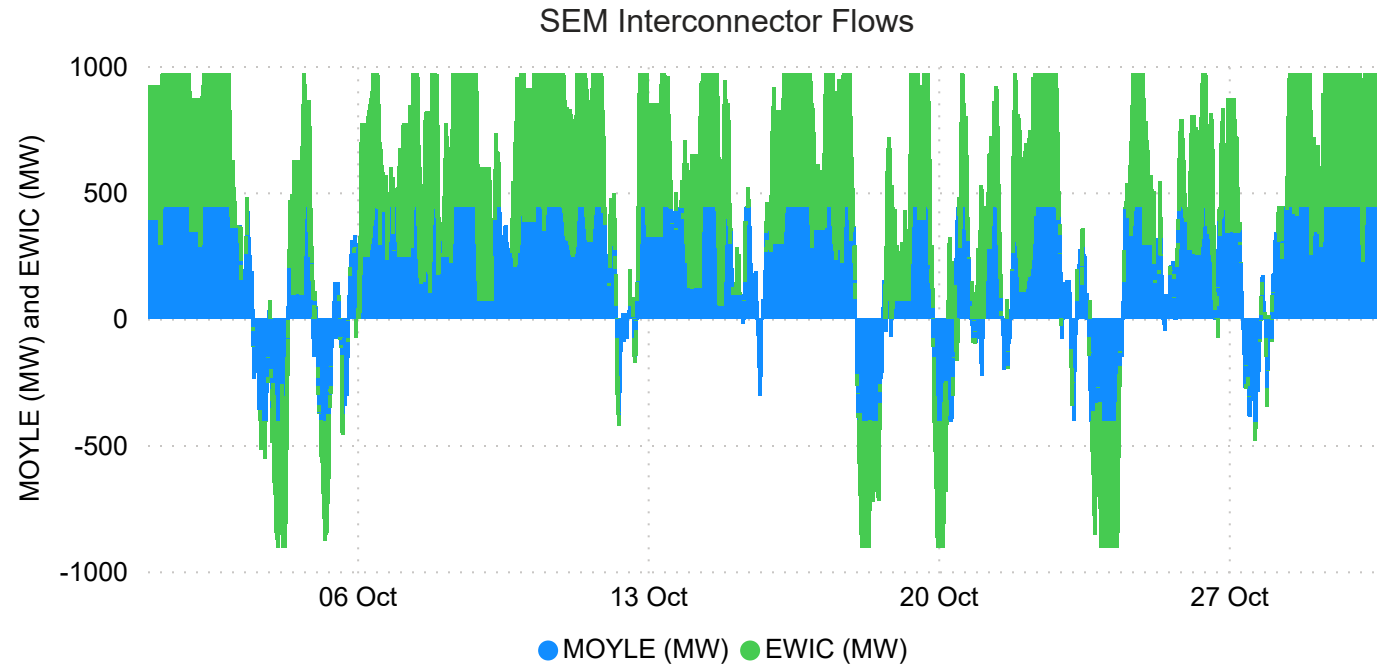
SEM Interconnectors October 2024

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

Moyle	EWIC
5th 23:05 - 23:59	4th 06:00 - 21:00
6th 00:00 - 00:28	5th 05:00 - 21:00
30th 14:28 - 16:30	

Interconnector Flows

In October, 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 also a substantial number of events when interconnection capacity is curtailed by the TSO in the SEM GB direction.

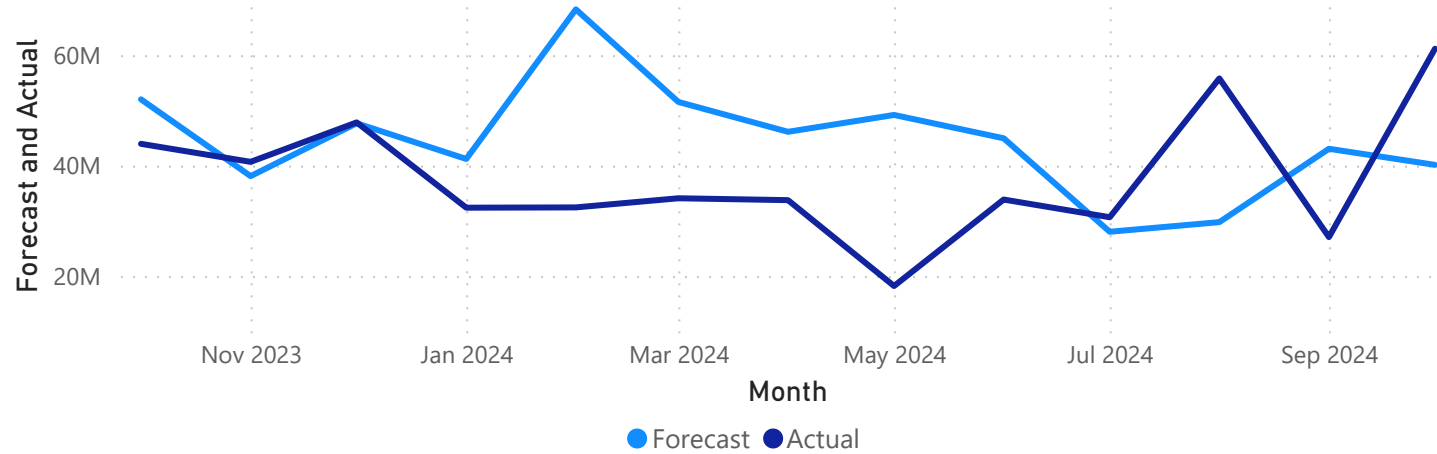


Balancing Market October 2024

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.

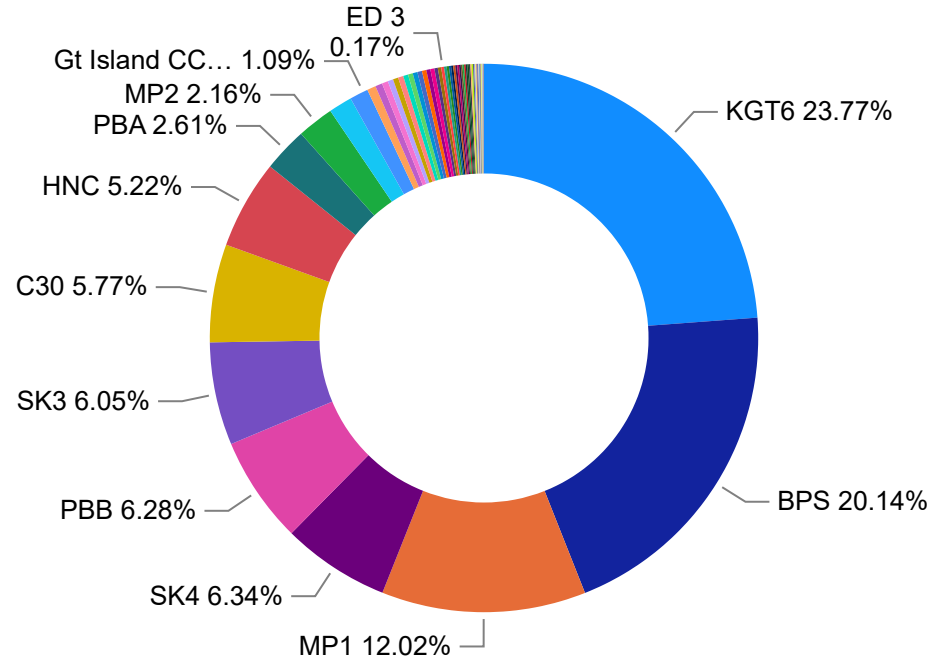
Generators can be constrained 'on' or 'up' if the market schedule indicated they were to be run at lower levels than actually happened. Or they could be constrained 'down' or 'off' if they were to be run at a higher level than happened in reality. There is always an overall net cost to the system associated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

Imperfection Costs - Forecast vs Actual



Determinant Name	Value €
CABBPO	21,733.92
CAOOPO	-407,709.54
CCURL	-766,954.93
CDISCOUNT	20,502,713.78
CFC	22,274,311.65
CPREMIUM	20,416,442.90
CTEST	-45,958.52
CUNIMB	-820,906.13
Total	61,173,673.13

Market Share per Unit (CFC, CPREMIUN, CDISCOUNT)



Constraints Payments

This charts 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 again in October followed by BPS (EP Ballylumford) and Moneypoint 1.

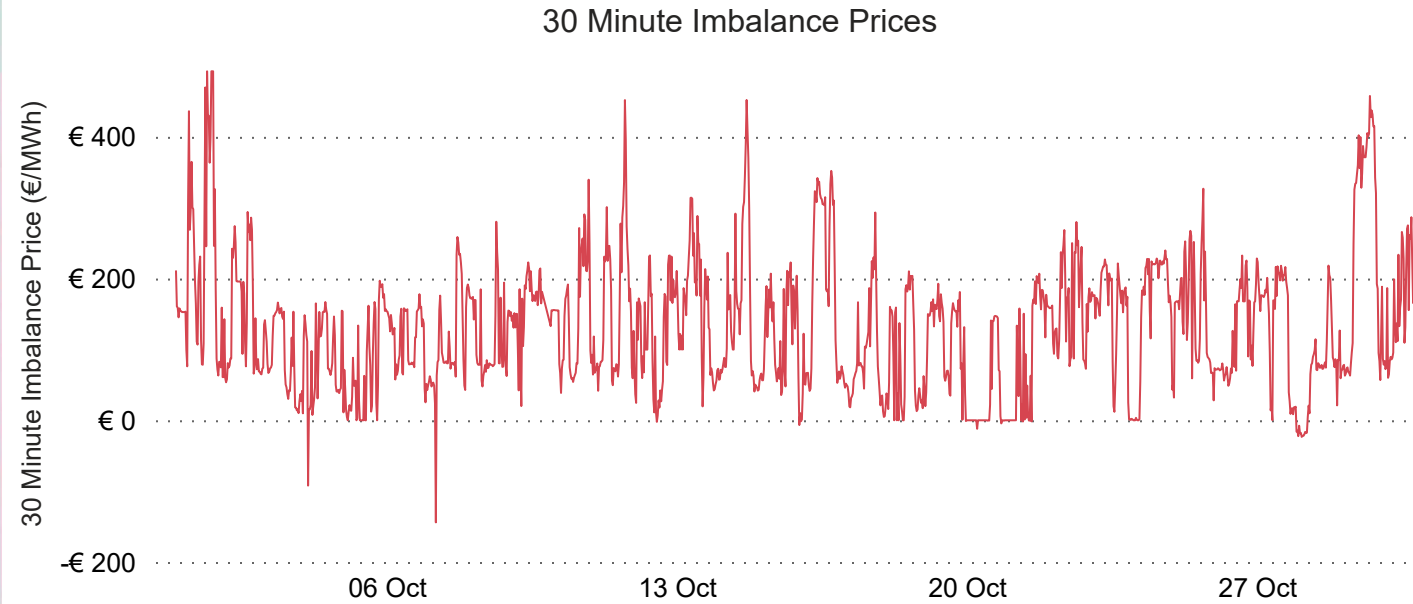
October marks the start of the gas year, thus payments are higher than forecast this month due to NI generating units recovering costs associated with Gas Transmission Exit Capacity.

Balancing Market October 2024

30 Minutes Imbalance Price

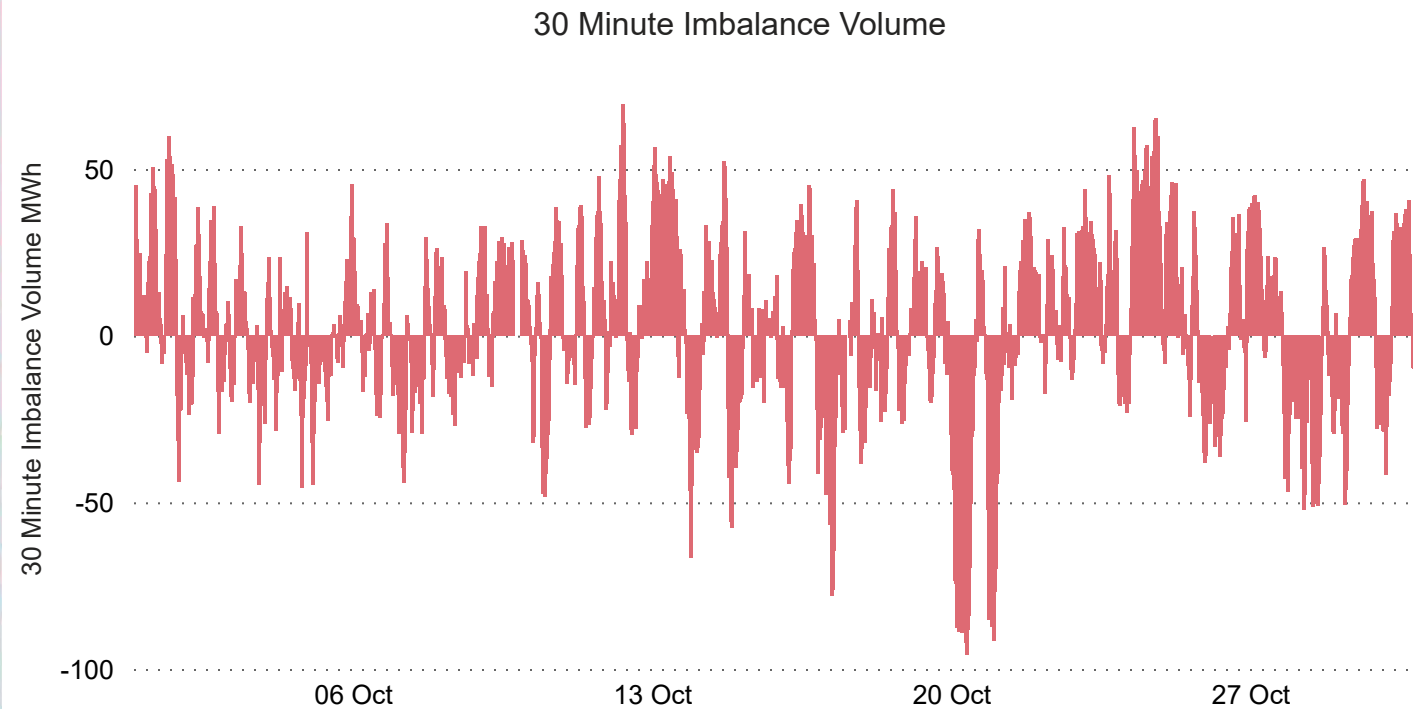
€ 130.66
Average Price
-€ 144.09
Lowest Price
€ 492.53
Highest Price

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 October 2024

SEM Demand

4,670.91	4,508.92
SEM Average 2024	SEM Average 2023
3,608.88	3,416.10
SEM Min 2024	SEM Min 2023
5,539.81	5,388.17
SEM Max 2024	SEM Max 2023

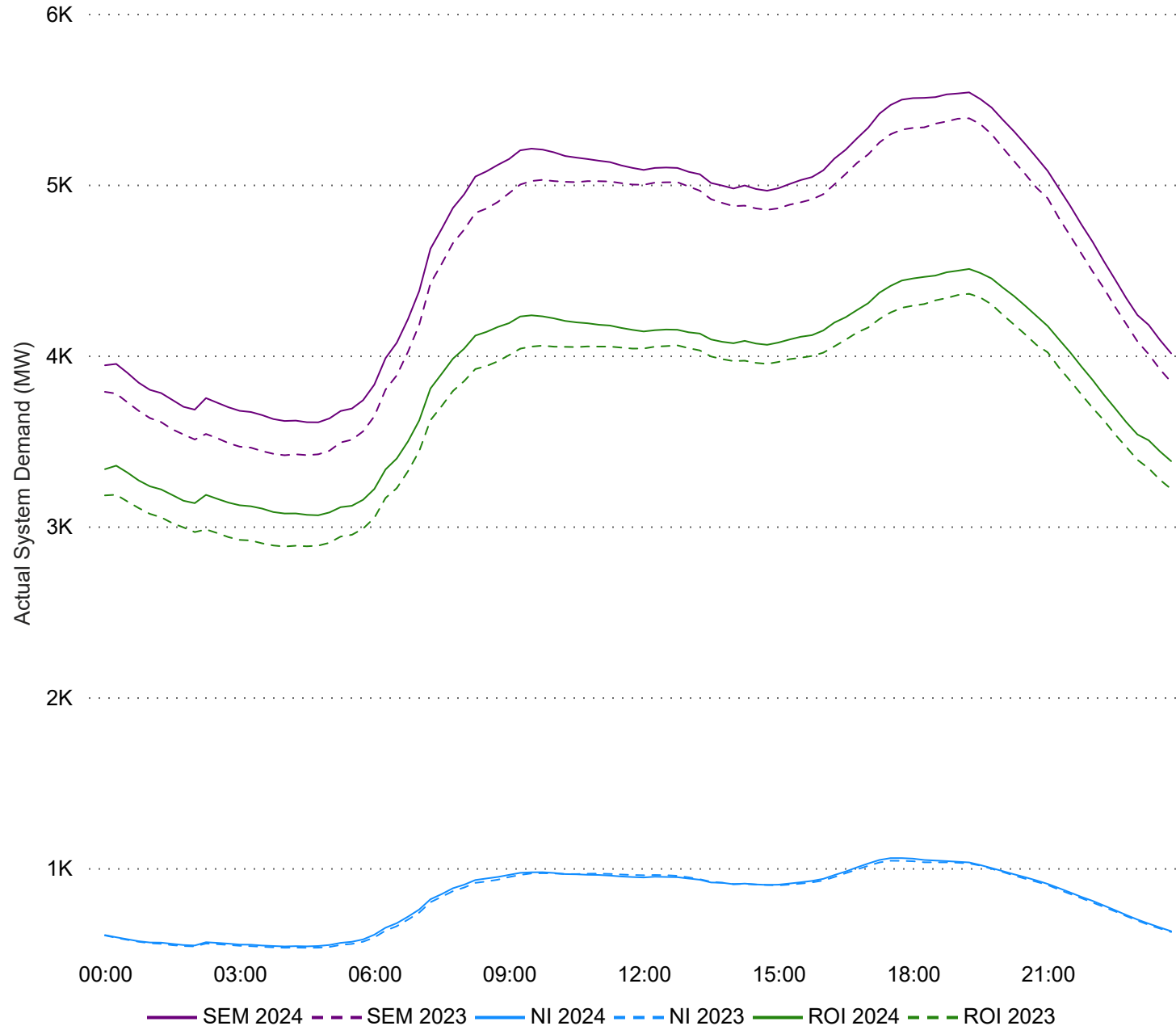
NI Demand

821.33	814.81
NI Average 2024	NI Average 2023
541.44	533.80
NI Min 2024	NI Min 2023
1,058.63	1,043.13
NI Max 2024	NI Max 2023

ROI Demand

3,849.58	3,694.12
ROI Average 2024	ROI Average 2023
3,064.78	2,881.97
ROI Min 2024	ROI Min 2023
4,506.44	4,361.00
ROI Max 2024	ROI Max 2023

Monthly Average Hourly Demand Curves



SEM Demand

The graph illustrates a steady demand within NI, with no significant deviation (0.8%) compared to the corresponding period in the previous year.

The demand for ROI during the month has shown an increase of 4.2% relative to the same period last year.

Demand in the SEM as a whole is up by 3.59% compared to the same period last year.

Duration Curves October 2024

Price Duration

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

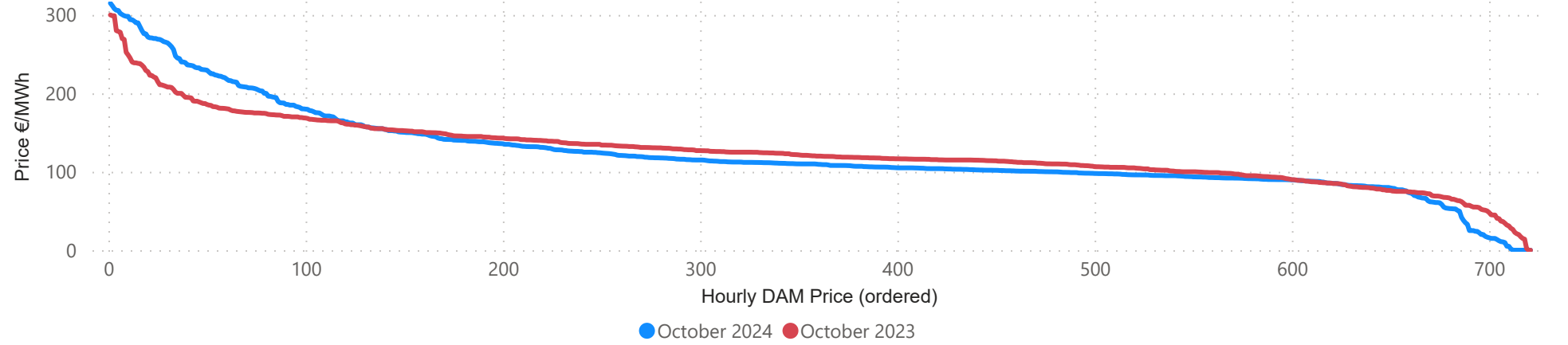
Residual Duration

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

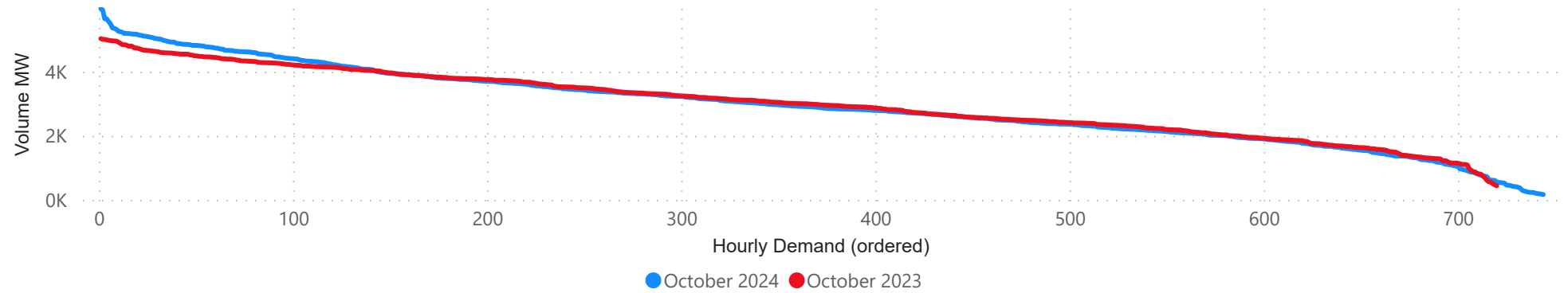
Price against Residual Duration

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

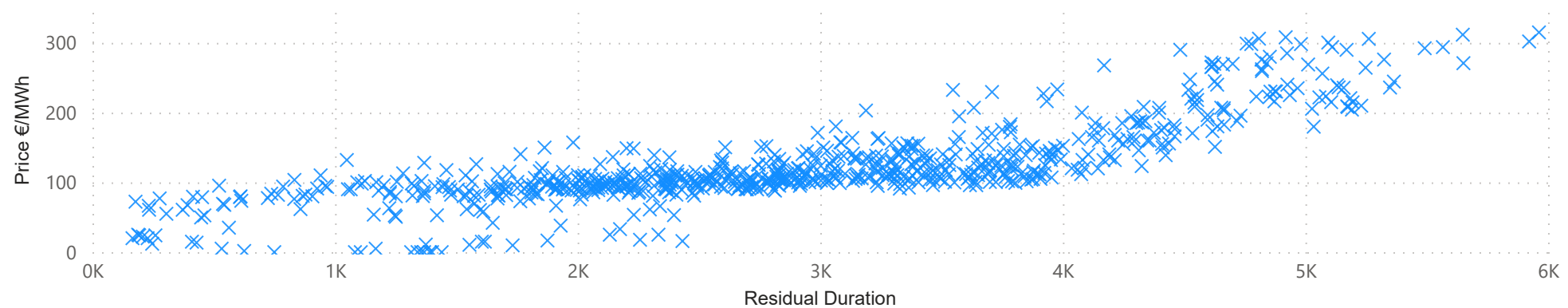
Price Duration Curve SEM



Residual Demand Duration Curve SEM



DAM Price against Residual Duration



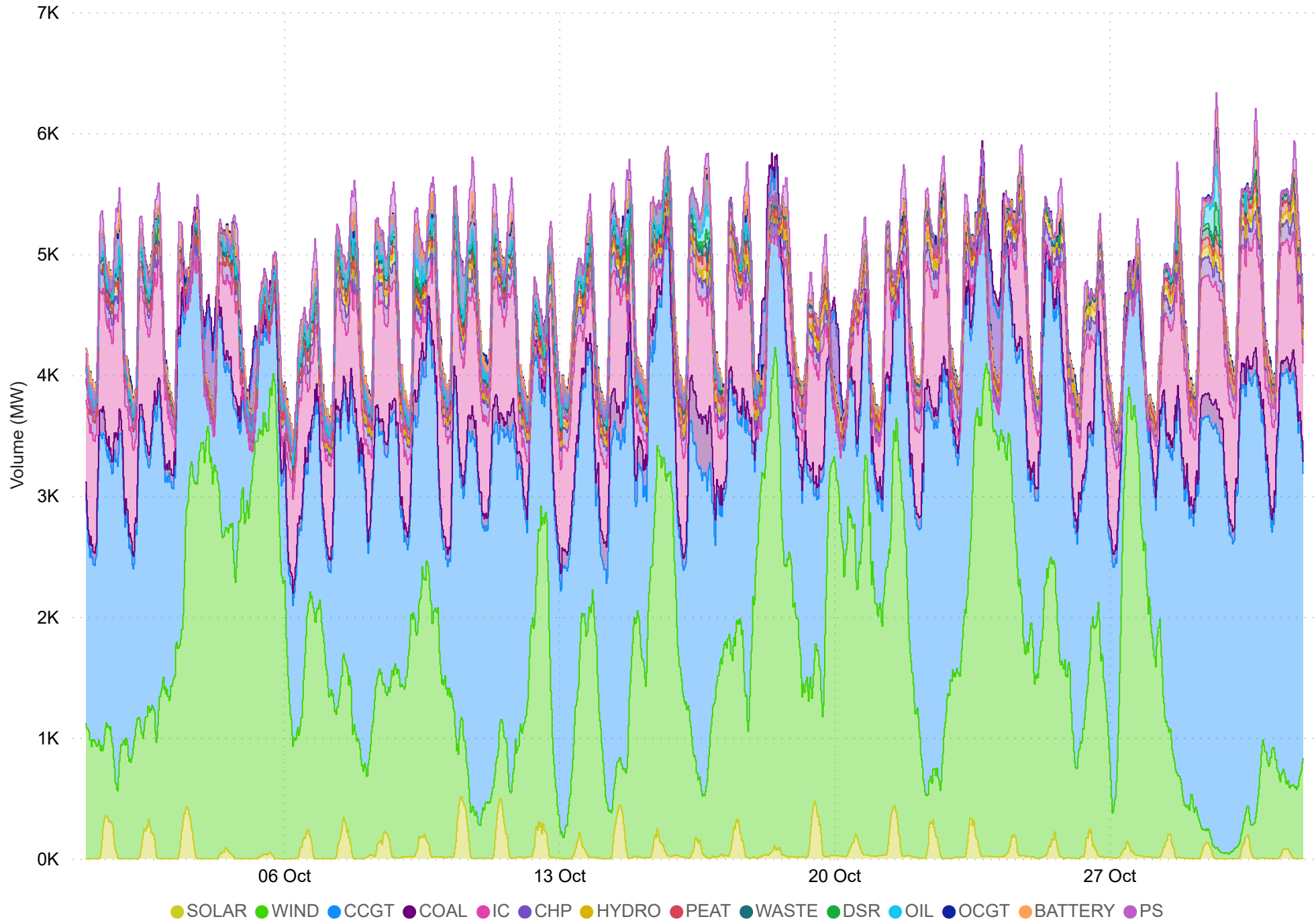


Fuel Mix October 2024

Fuel Type	Avg Monthly	Per. Monthly
CCGT	1906	40.9%
WIND	1639	35.2%
INTERCONNECTORS	498	10.7%
CHP	141	3.0%
COAL	129	2.8%
OCGT	82	1.8%
SOLAR	69	1.5%
WASTE	69	1.5%
HYDRO	60	1.3%
PEAT	52	1.1%
DSR	33	0.7%
OIL	8	0.2%
BATTERY	-6	-0.1%
PUMPED STORAGE	-20	-0.4%

Fuel Type	Max Monthly	Min Monthly
WIND	4140	37
CCGT	3713	720
INTERCONNECTORS	984	-905
SOLAR	515	0
COAL	475	88
OCGT	405	0
OIL	331	0
PUMPED STORAGE	289	-230
BATTERY	207	-188
DSR	203	0
CHP	163	75
HYDRO	135	1
PEAT	119	0
WASTE	80	0

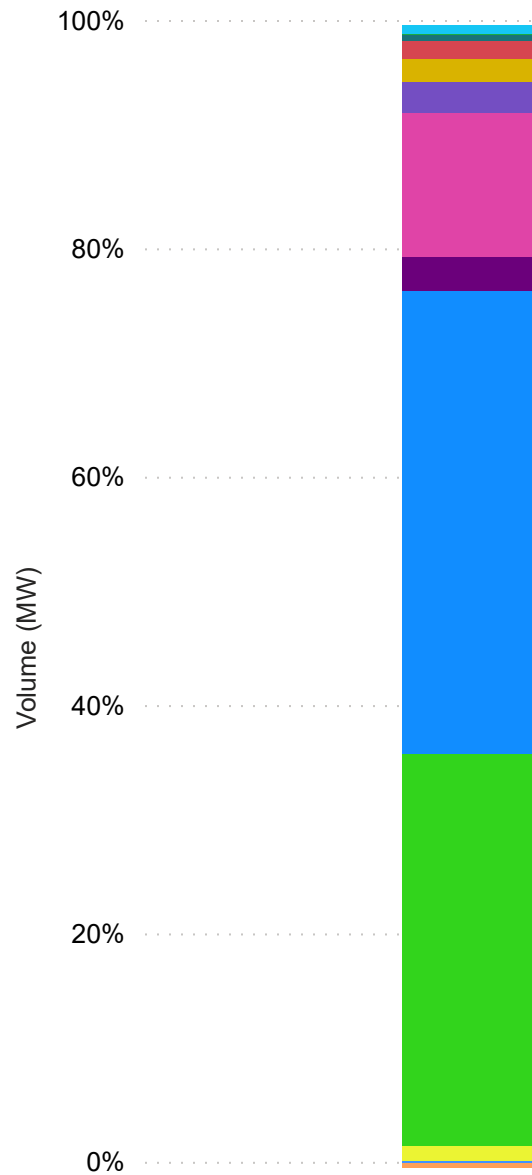
SEM 30 Minute Fuel Mix



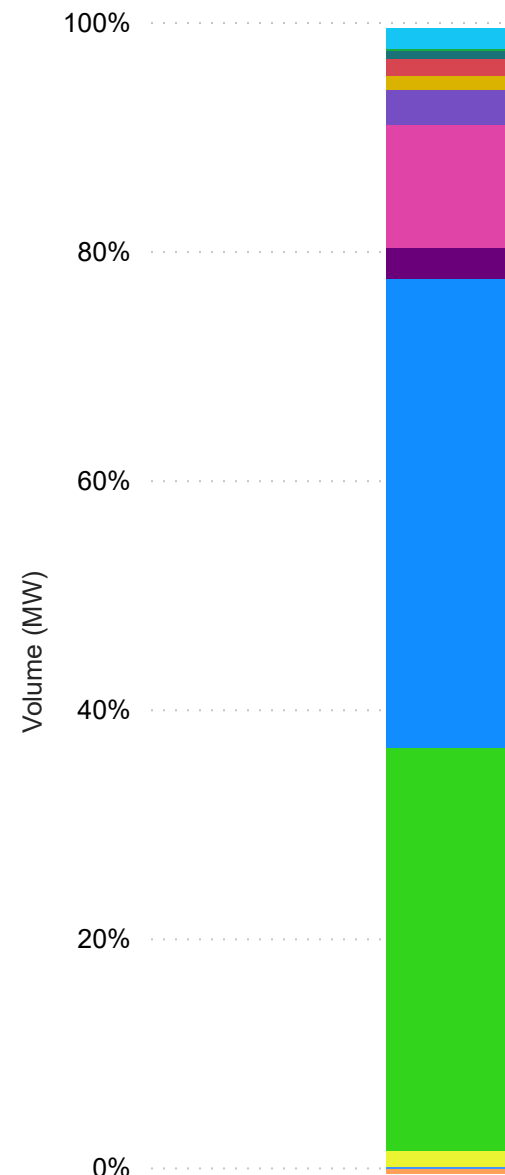
Fuel Mix Comparison October 2023 & 2024

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

SEM Fuel Mix October 2023



SEM Fuel Mix October 2024



North-South Tie Line October 2024

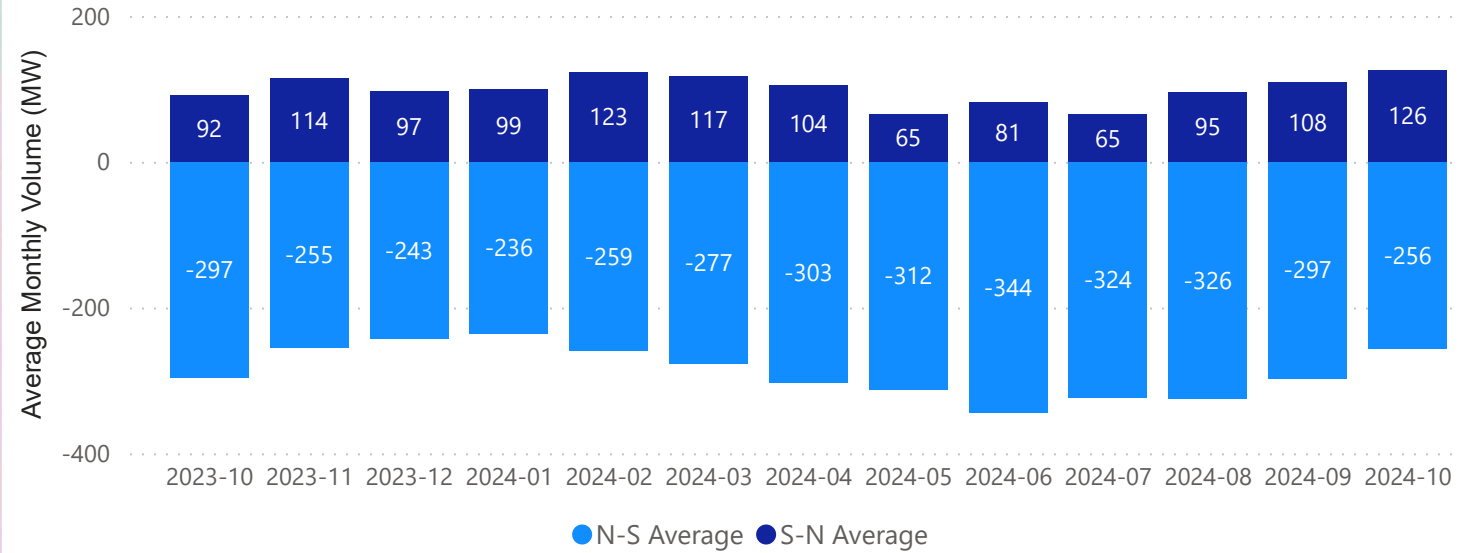
Average Flow NI to ROI (MW)
-256.71

Average Flow ROI to NI (MW)
125.63

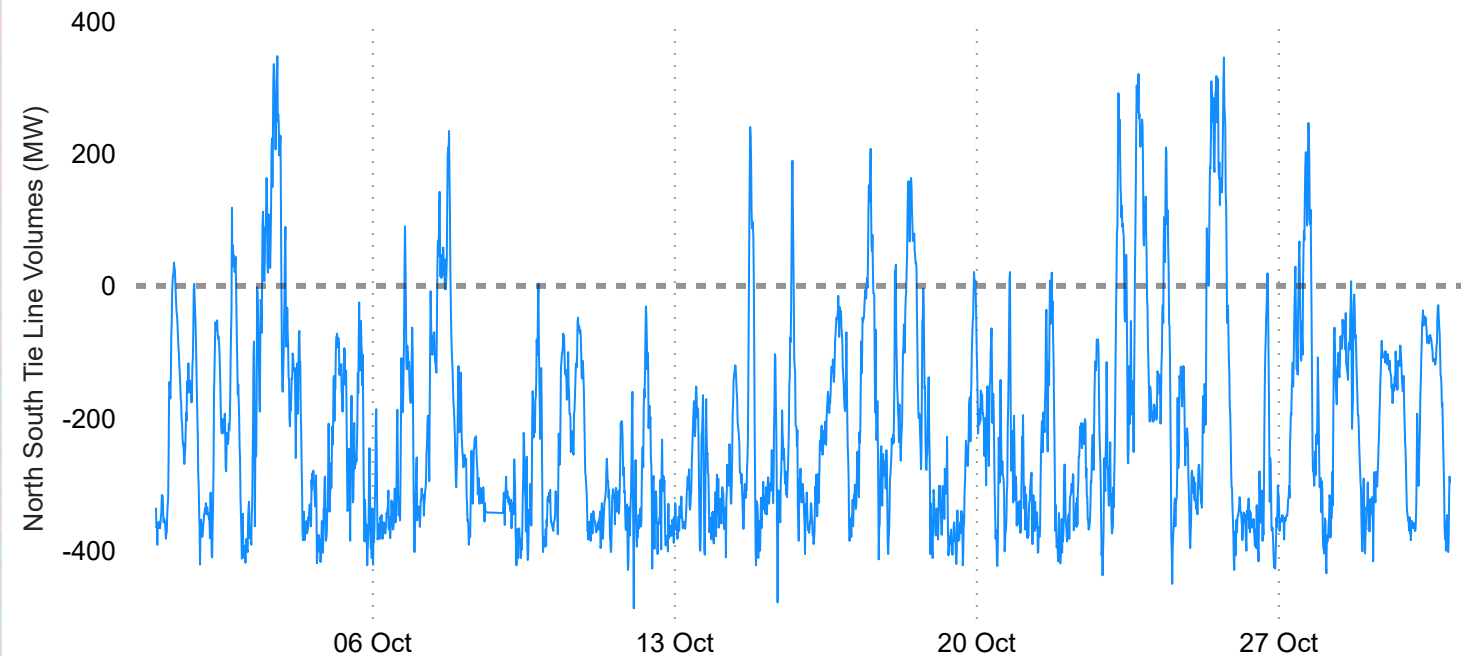
Average Net Flow NI to ROI (MW)
-217.73

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

Average Flows N-S Tie Line Long Term Trend



North South Tie Line Volumes 15 minute periods



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 constrains in the system. Exporting power southwards is a mechanism to avoid wind curtailment.

- The Moyle Interconnector, due to it's 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 constrains. 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.

Wind Generation October 2024

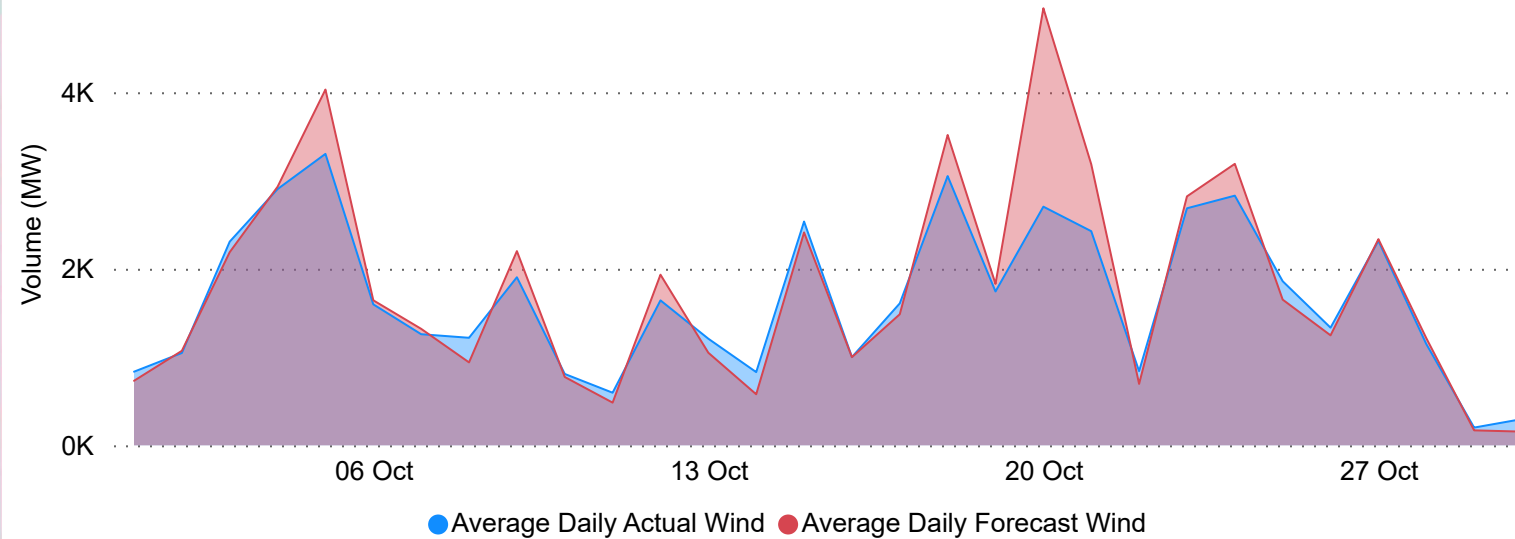
Average Daily Actual Wind (MW)
1,668

Average Daily Forecast Wind (MW)
1,791

Min SNSP%
13.37

Max SNSP%
75.78

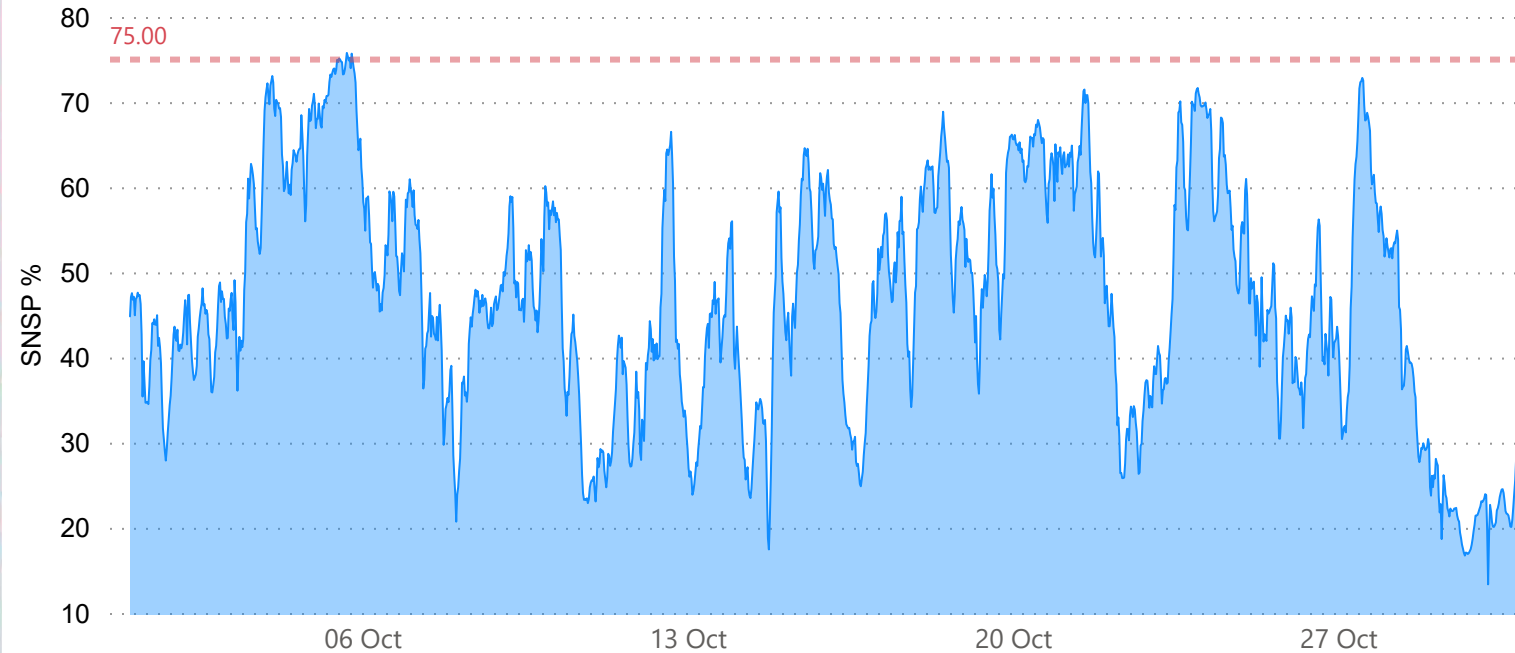
Actual Daily Average Wind Relative to Forecast Daily Average Wind



Wind Generation

Wind generation increased 32% compared to previous month and 22% from the same period last year.

SNSP %



SNSP

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

CO₂ October 2024

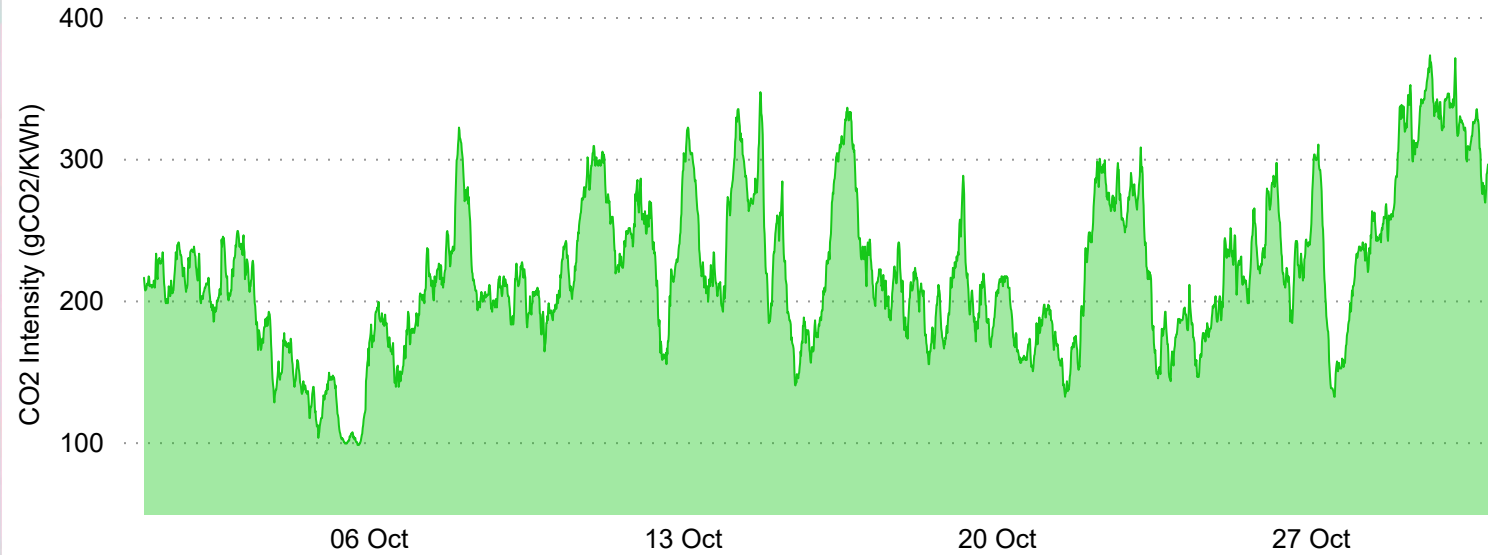
CO₂ Intensity (gCO₂/kWh)

218.93
Average
98
Lowest
373
Highest

CO₂ Emissions (tCO₂/hr)

879
Average
451
Lowest
1775
Highest

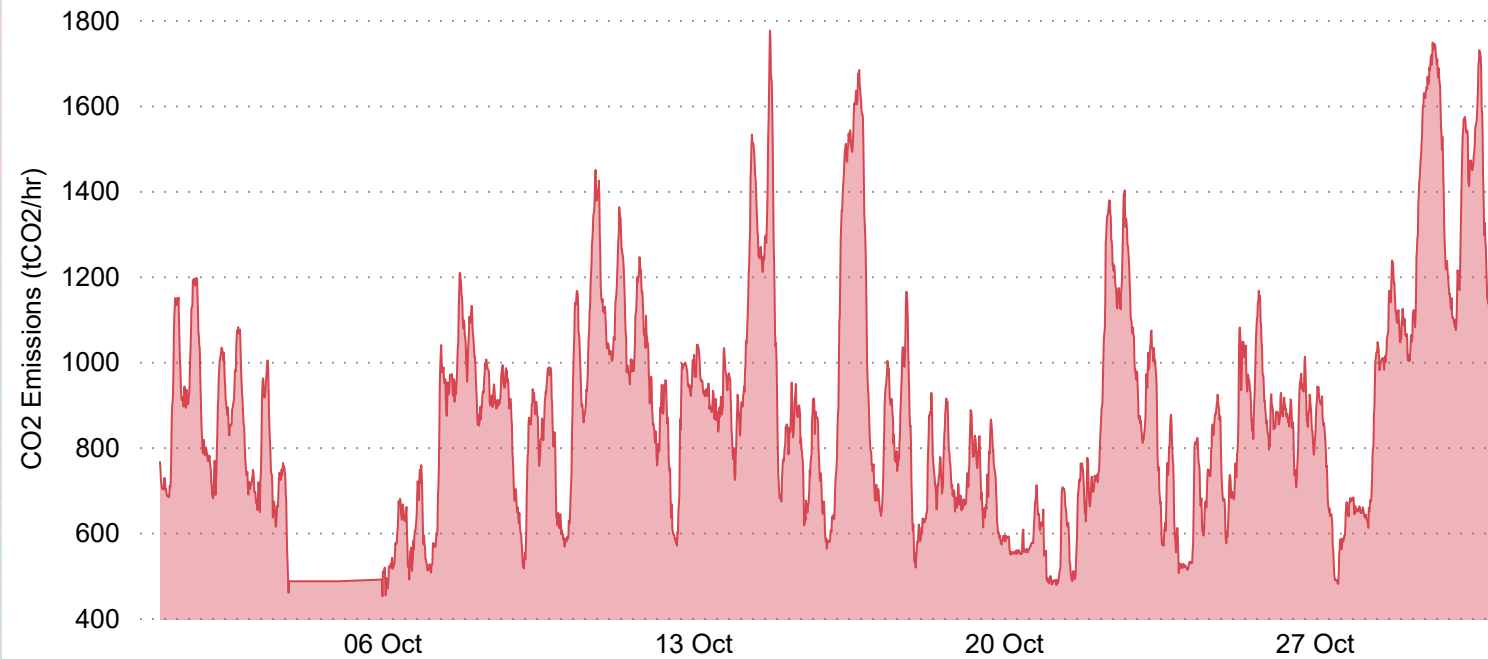
CO₂ Intensity



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

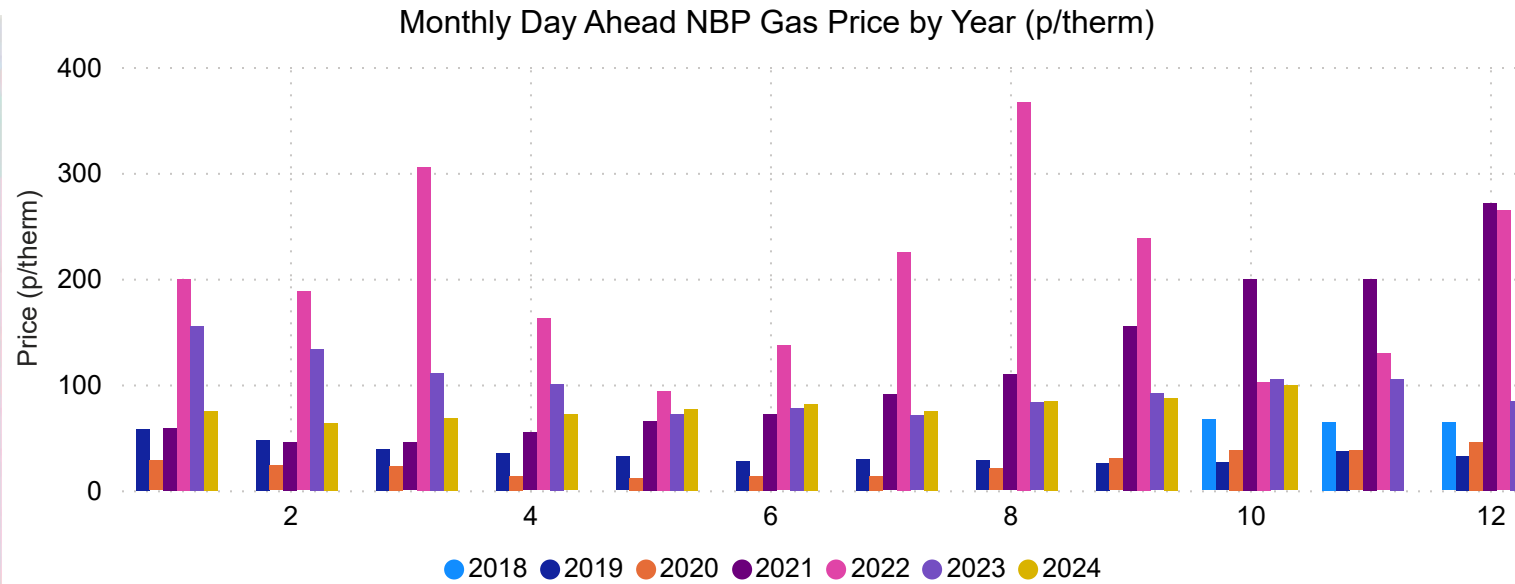
CO₂ emissions i.e. the estimated total CO₂ emissions from all large power stations, follows the same trends as CO₂ intensity levels over the course of the month.

Fuel Costs and Spreads



Gas Price October 2024

99.04
Monthly Average (p/therm)
93.50
Monthly Low (p/therm)
108.50
Monthly High (p/therm)

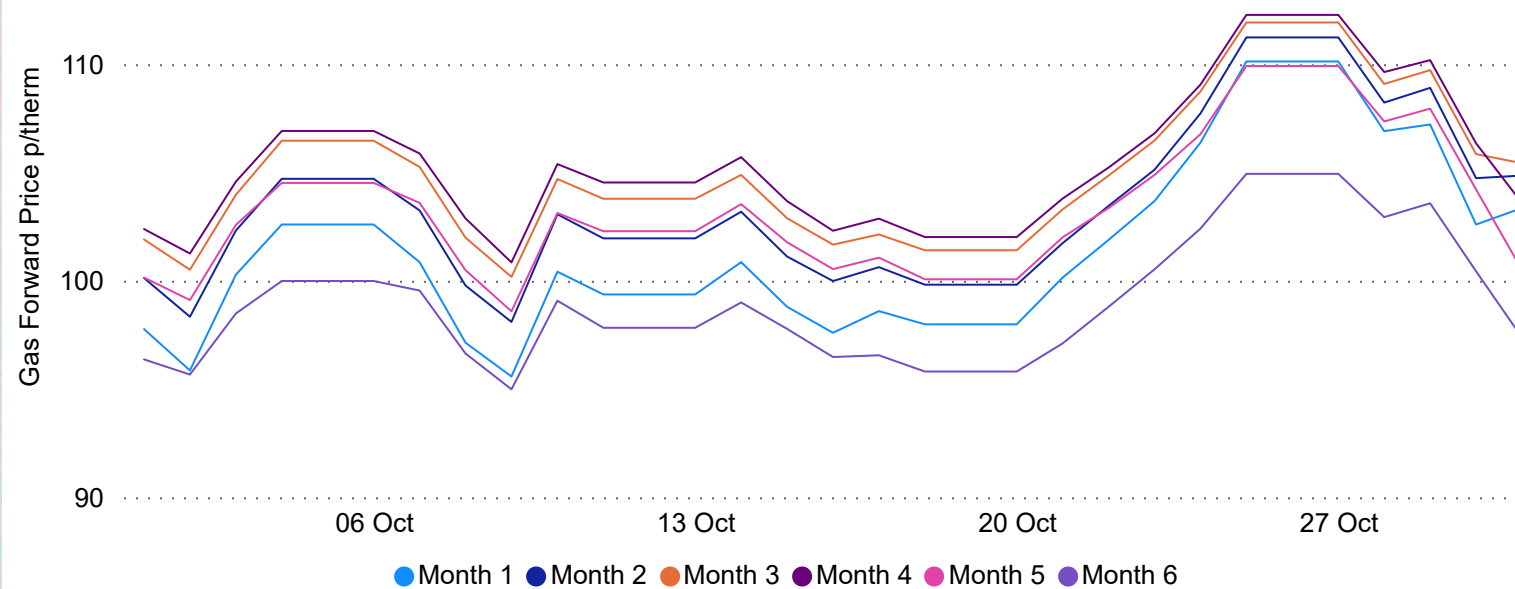


Gas Prices

Gas prices have experienced a massive 14% increase compared to the previous month, increasing from 86.96p to 99.04p.

The market is expected to remain volatile, with potential impacts from weather conditions and geopolitical developments affecting the supply and demand dynamic.

Gas Forward Prices

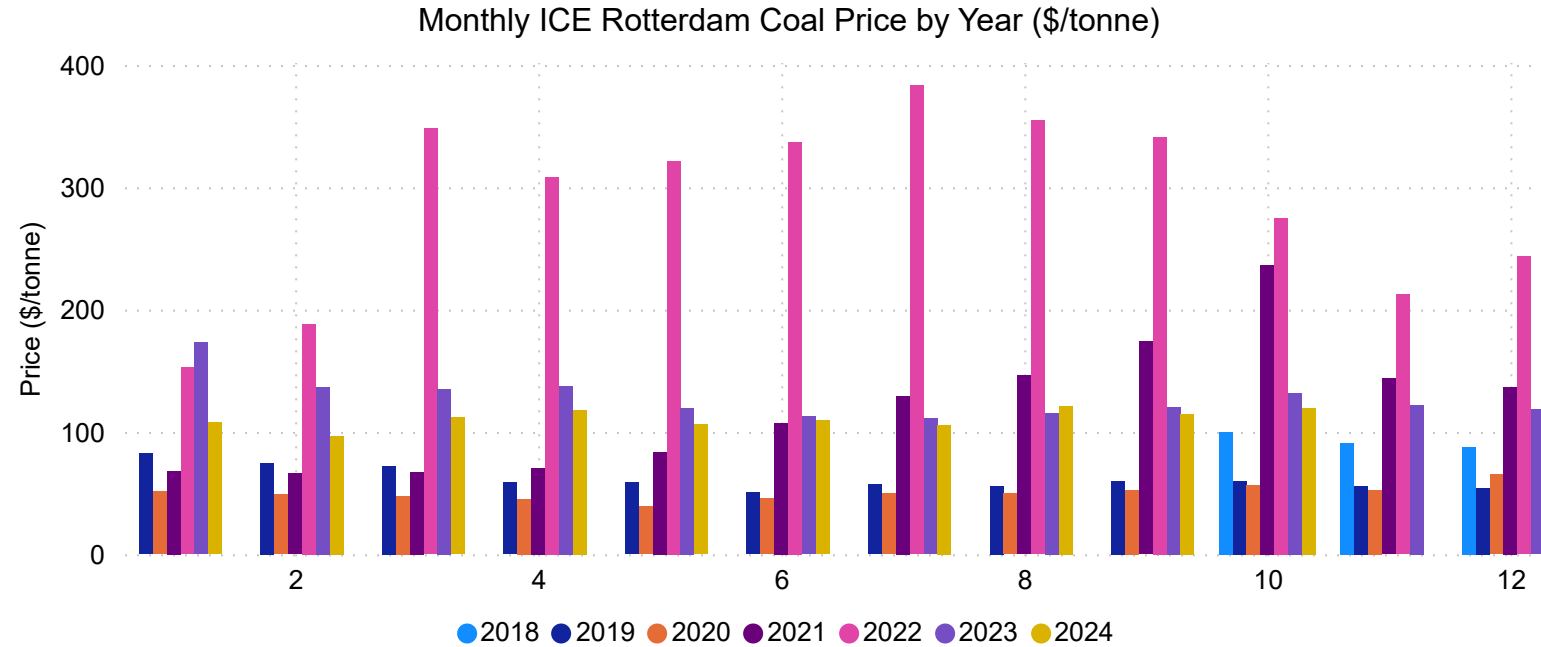


Gas Forward Prices

Forward curves increased due to potential supply issues as the Russian Transit agreement concludes at the end of the year.

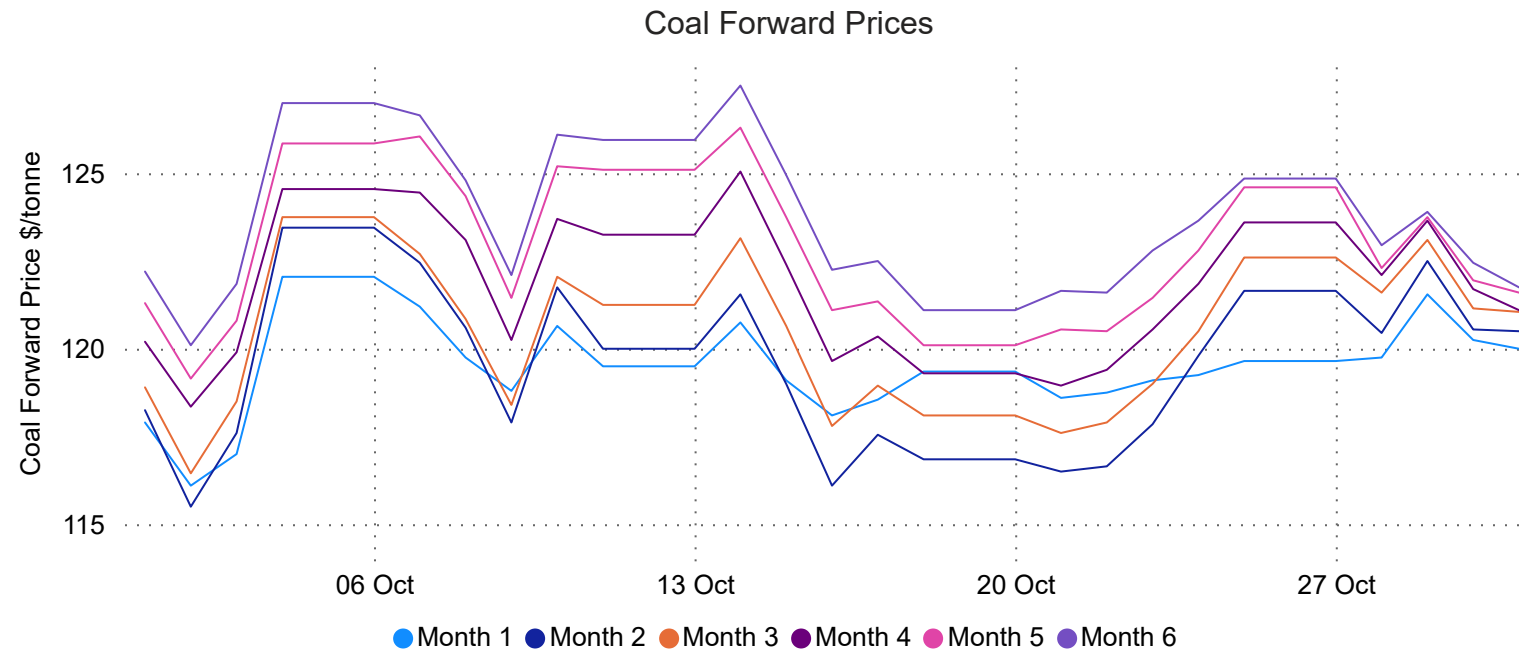
Coal Price October 2024

Coal Prices Per Tonne
 \$119.65
 Monthly Average
 \$116.10
 Monthly Low
 \$122.05
 Monthly High



Coal Prices

Coal prices were lower compared to the previous month at \$119.65/tonne (4% increase from the last month).



Coal Forward Prices

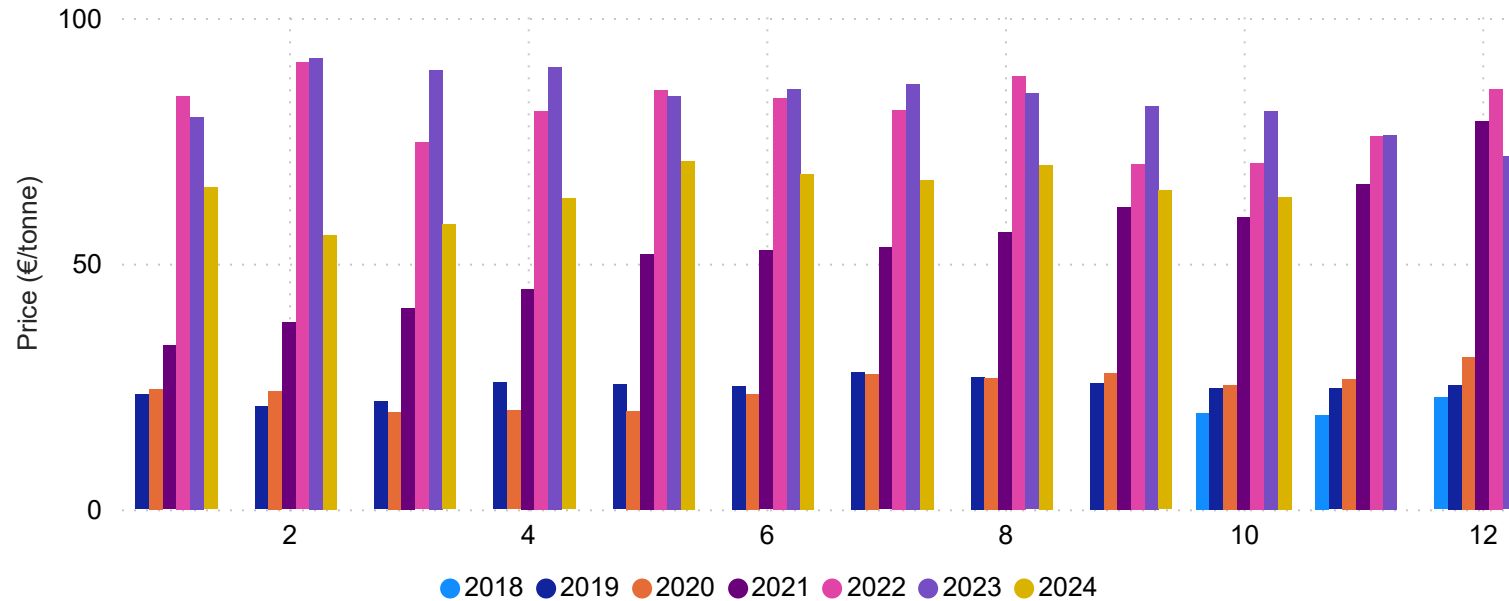
Coal forward prices demonstrate a decrease at the end of the month.

Carbon Price October 2024

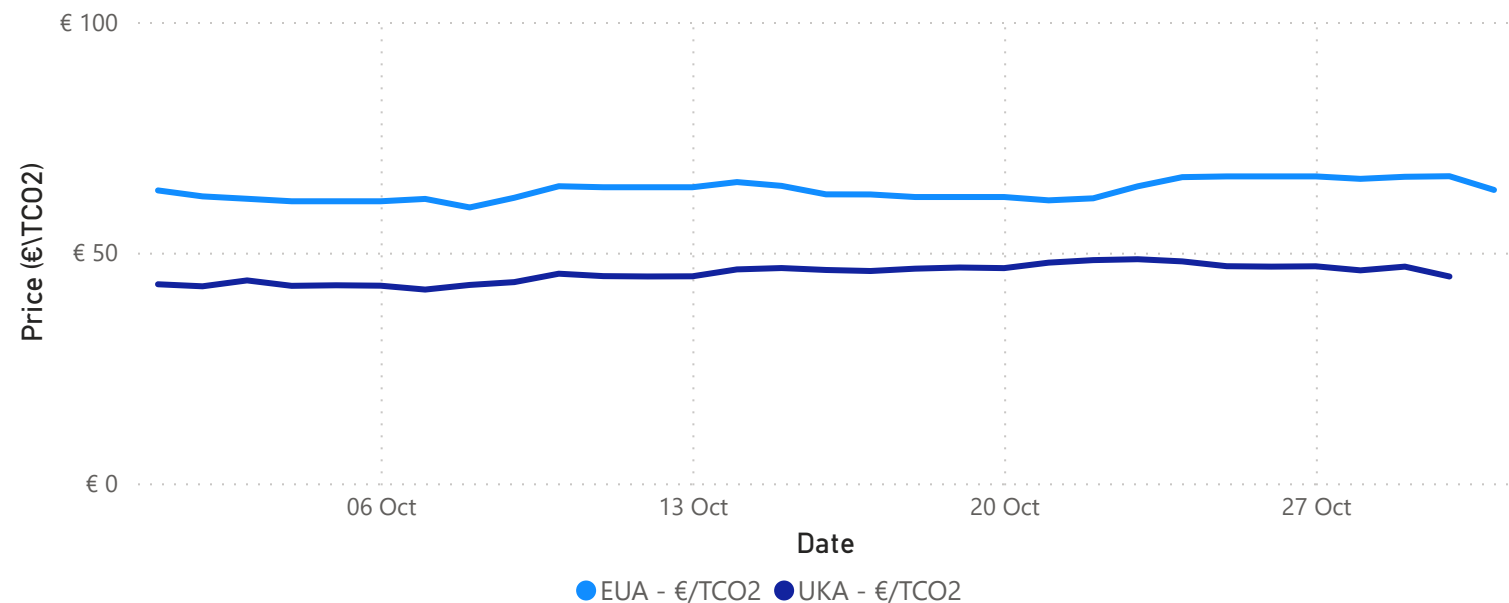
EU Carbon Prices (€/tonne)
 € 63.51
 Monthly Average
 € 59.80
 Monthly Low
 € 66.57
 Monthly High

UK Carbon Prices (€/tonne)
 € 45.48
 Monthly Average
 € 42.00
 Monthly Low
 € 48.58
 Monthly High

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



UK & EU Carbon Prices



Carbon Prices

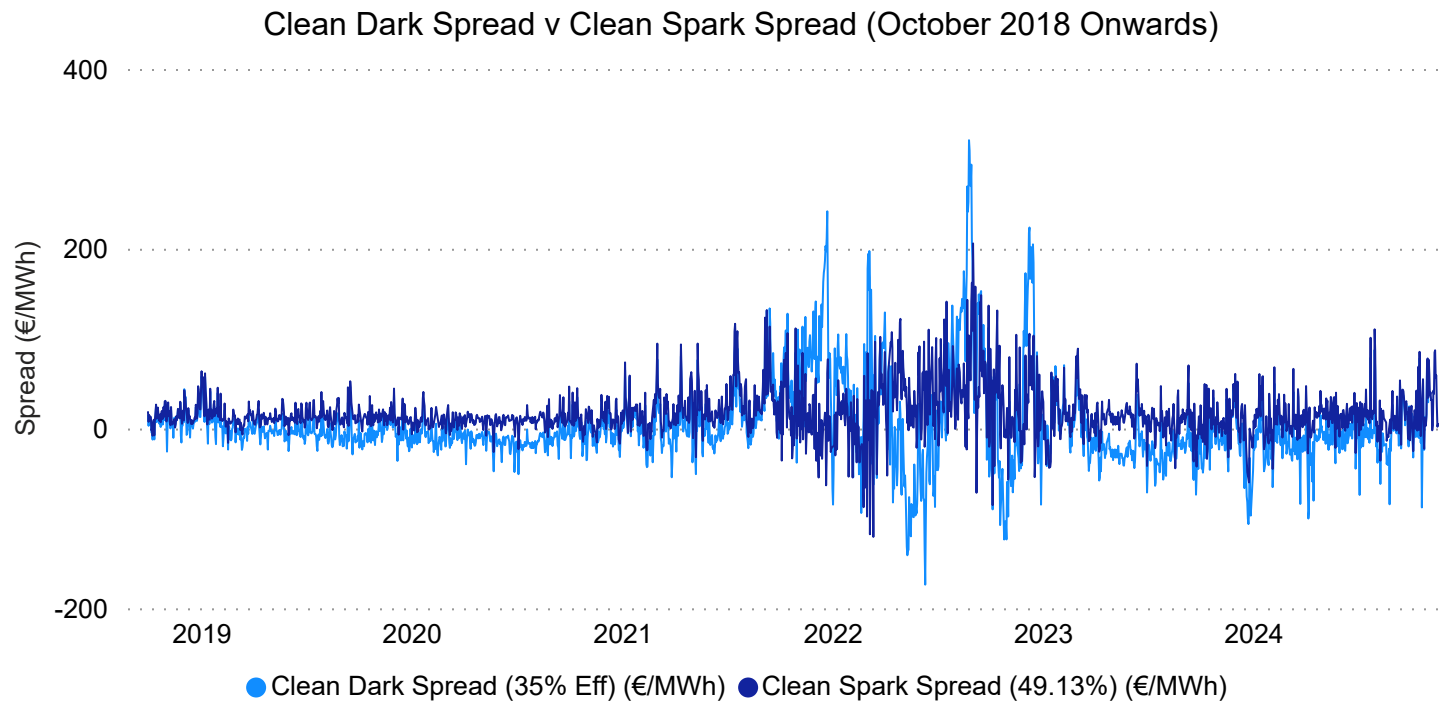
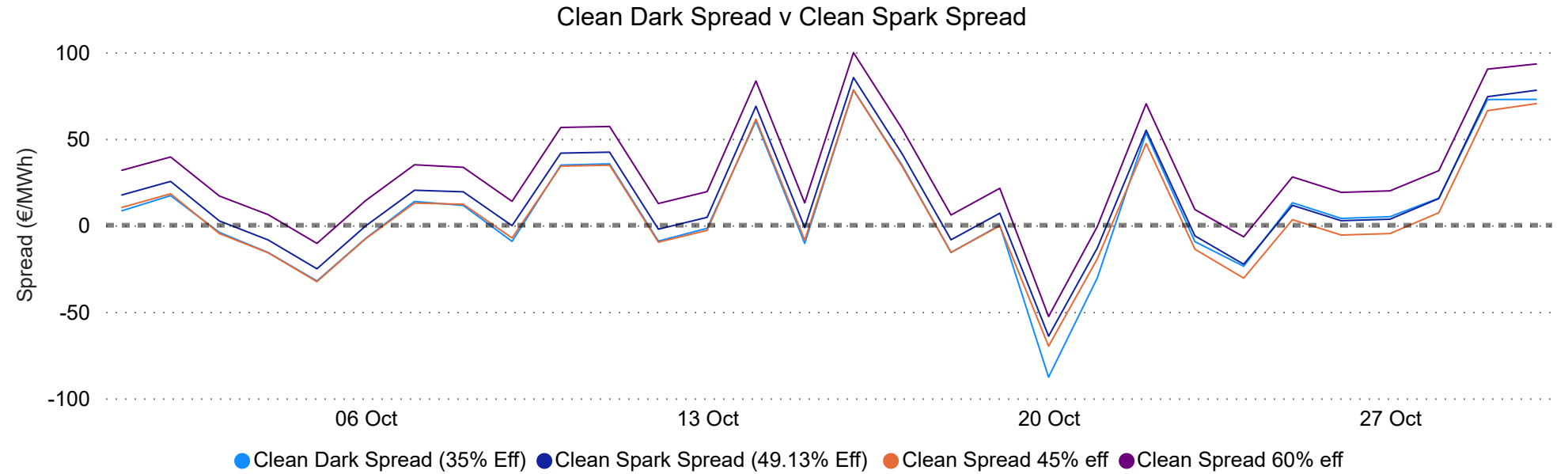
Carbon has decreased relative to the previous month by 2%.

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 October.

Spark Spreads October 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 vs Clean Spark Spread

Gas was more profitable than coal for the duration of the month. The spread between them was generally consistent across the month.

Clean Spark Spread was generally positive with a few decreases when the wind increased for a sustained period.