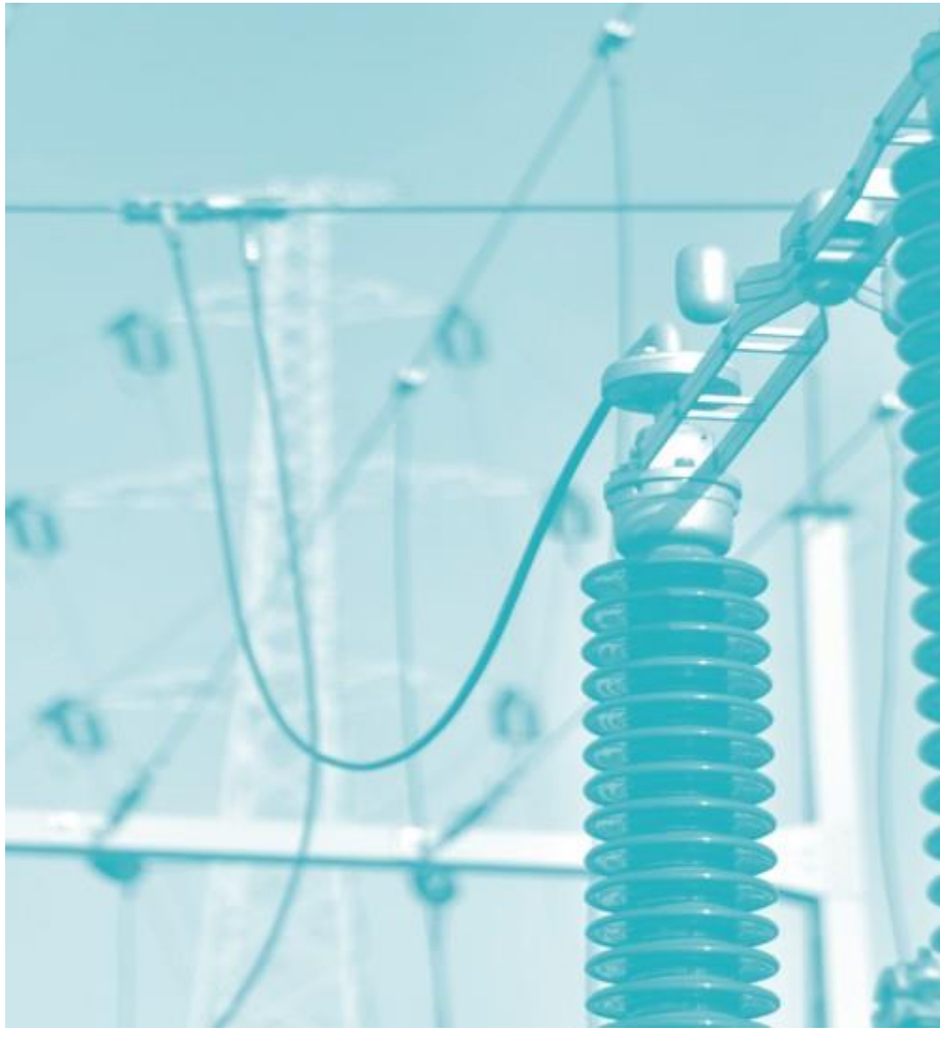
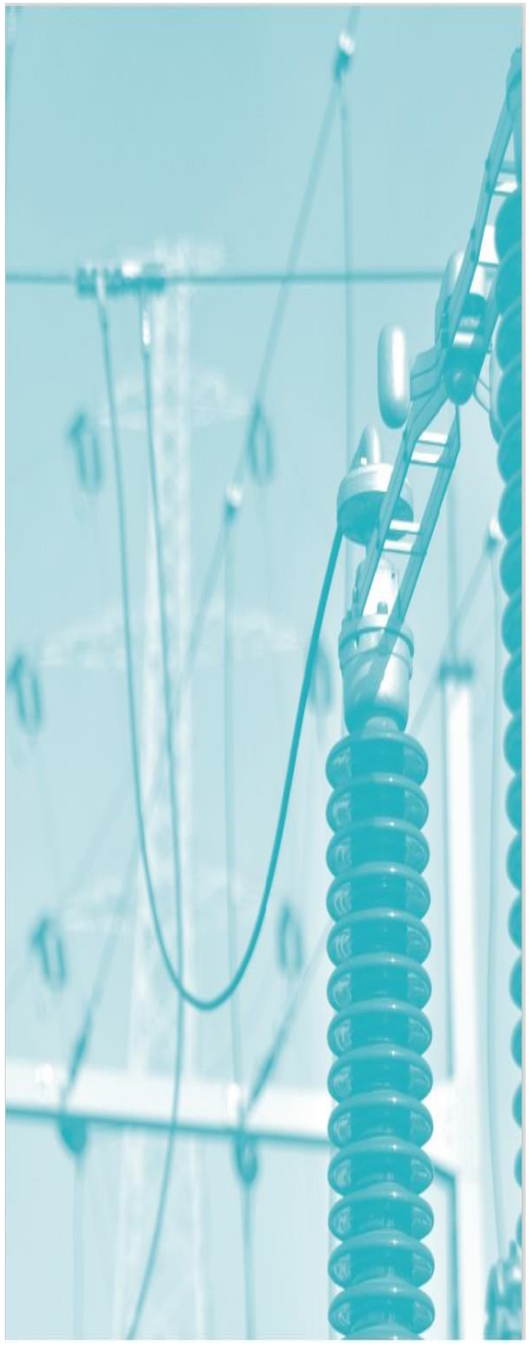


Energy Market Monitoring Report

August 2024

SEM committee



Market Results

Summary Dashboard

SEM committee

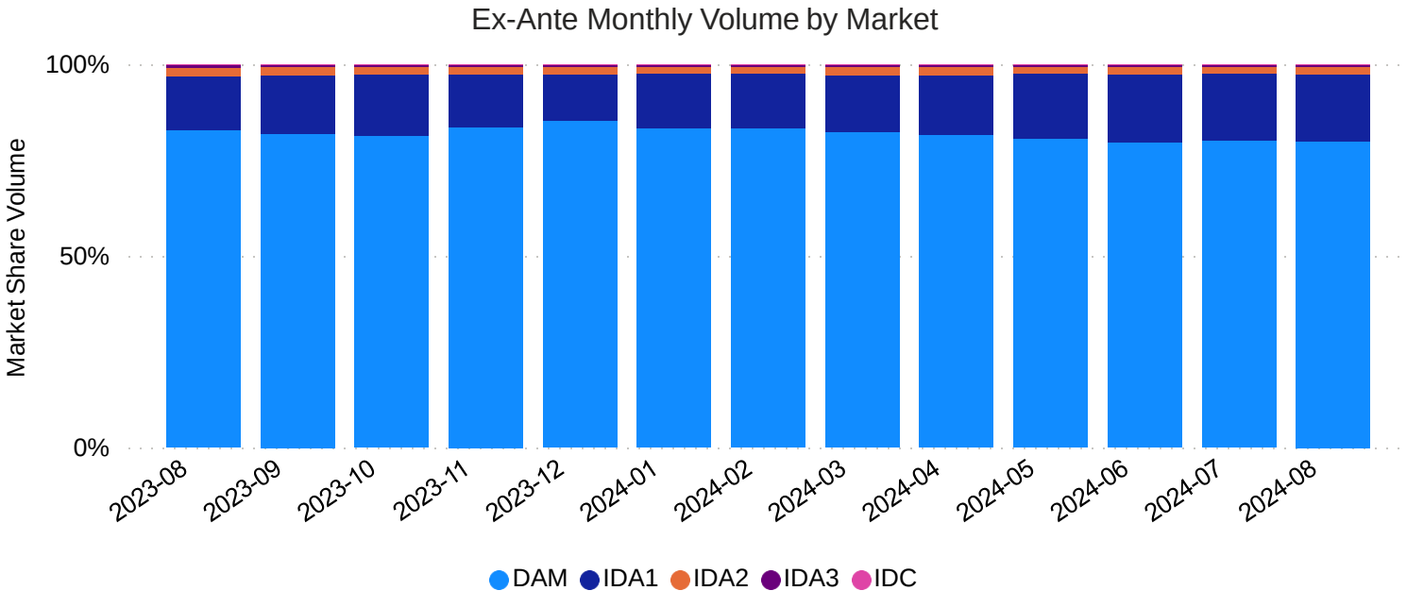
Monthly Averages	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24
DAM (€/MWh)	96.24	106.46	111.62	125.54	122.9	88.97	99.9	84.6	86.67	88.52	107.75	107.74	110.94	100.44
% Change from previous month	-18%	11%	5%	12%	-2%	-28%	12%	-15%	2%	2%	22%	0%	3%	-9%
% Change from previous year	-64%	-73%	-61%	-8%	-14%	-68%	-38%	-47%	-40%	-30%	2%	-8%	15%	-6%
Actual System Demand (MW)	4101	4185	4335	4516	4873	4862	5151	4946	4833	4610	4356	4193	4279	4255
% Change from previous month	-2%	2%	4%	4%	8%	0%	6%	-4%	-2%	-5%	-6%	-4%	2%	-1%
% Change from previous year	0%	2%	3%	4%	5%	0%	5%	3%	0%	3%	2%	0%	4%	2%
Actual Wind Generation (MW)	1316	1401	1384	1363	1811	2446	1854	2000	2072	1496	894	1072	883	1437
% Change from previous month	50%	6%	-1%	-2%	33%	35%	-24%	8%	4%	-28%	-40%	20%	-18%	63%
% Change from previous year	54%	71%	28%	-33%	-19%	49%	-7%	-1%	19%	-3%	1%	22%	-33%	3%
Gas Price p/therm	70.76	82.87	91.52	104.88	104.97	84.2	74.87	63.37	68.18	71.69	76.69	81.51	75.07	84.71
% Change from previous month	-9%	17%	10%	15%	0%	-20%	-11%	-15%	8%	5%	7%	6%	-8%	13%
% Change from previous year	-68%	-77%	-61%	3%	-19%	-68%	-52%	-53%	-39%	-29%	6%	5%	6%	2%
Carbon Price (€/Tonne)	86.57	84.61	82.09	81.10	76.25	71.79	65.52	55.79	57.94	63.25	70.90	68.29	67.00	70.12
% Change from previous month	1%	-2%	-3%	-1%	-6%	-6%	-9%	-15%	4%	9%	12%	-4%	-2%	5%
% Change from previous year	6%	-4%	17%	15%	1%	-16%	-18%	-39%	-35%	-30%	-16%	-20%	-23%	-17%
Coal Price ($/tonne)	111.02	115.57	120.40	131.80	122.16	118.31	107.65	96.84	111.78	118.13	106.15	109.54	105.93	121.36
% Change from previous month	-1%	4%	4%	9%	-7%	-3%	-9%	-10%	15%	6%	-10%	3%	-3%	15%
% Change from previous year	-71%	-67%	-65%	-52%	-43%	-51%	-38%	-29%	-17%	-14%	-11%	-3%	-5%	5%
EWIC % Import Periods	67.11%	68.11%	73.75%	86.90%	68.78%	56.38%	69.76%	69.10%	63.78%	81.94%	84.98%	85.90%	94.59%	85.29%
EWIC % Export Periods	9.21%	11.96%	8.89%	2.99%	9.11%	20.36%	14.78%	11.00%	11.32%	4.86%	0.67%	3.72%	1.11%	7.56%
EWIC % Not Flow Periods	22.68%	19.93%	17.36%	10.11%	22.11%	23.25%	15.46%	19.90%	24.90%	13.19%	14.35%	10.38%	4.30%	7.15%
Moyle % Import Periods	84.04%	75.24%	83.33%	92.31%	83.47%	67.81%	78.16%	79.59%	79.00%	87.40%	94.96%	92.47%	96.77%	80.71%
Moyle % Export Periods	15.89%	20.33%	16.60%	7.66%	16.50%	32.16%	21.81%	20.34%	20.83%	12.50%	5.27%	7.53%	3.23%	10.44%
Moyle % Not Flow Periods	0.07%	4.44%	0.07%	0.03%	0.03%	0.03%	0.03%	0.07%	0.17%	0.10%	0.03%	0.00%	0.00%	8.84%

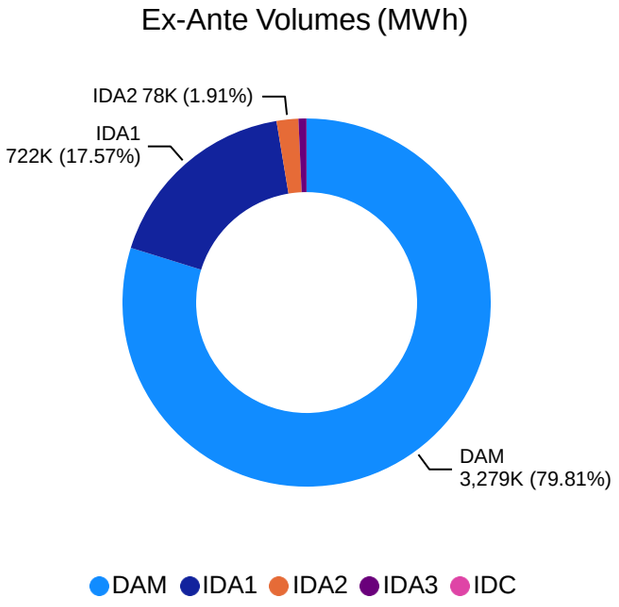
Market Volumes August 2024

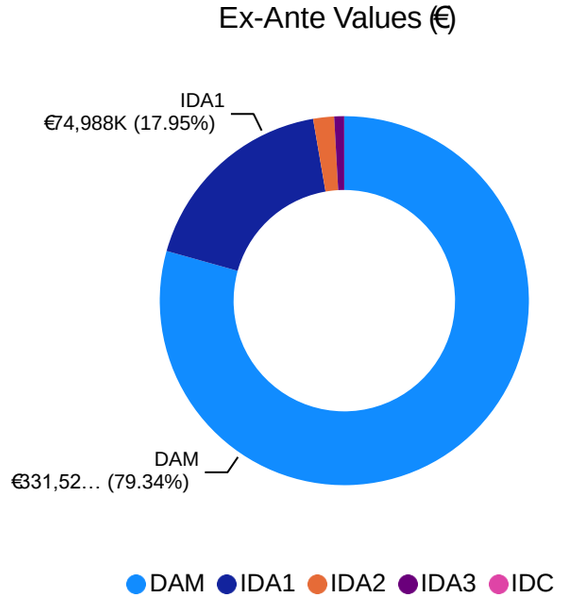
Daily Average Volume	MWh
DAM	105,766
IDA1	23,289
IDA2	2,528
IDA3	926
IDC	23

Total Monthly Volume	MWh
DAM	3,278,748
IDA1	721,950
IDA2	78,373
IDA3	28,717
IDC	480
Total	**4,108,268**

Total Market Value	€
DAM	[illegible]
IDA1	[illegible]
IDA2	[illegible]
IDA3	[illegible]
IDC	€37,575
Total	**€ 417,839,329**







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 August 2024

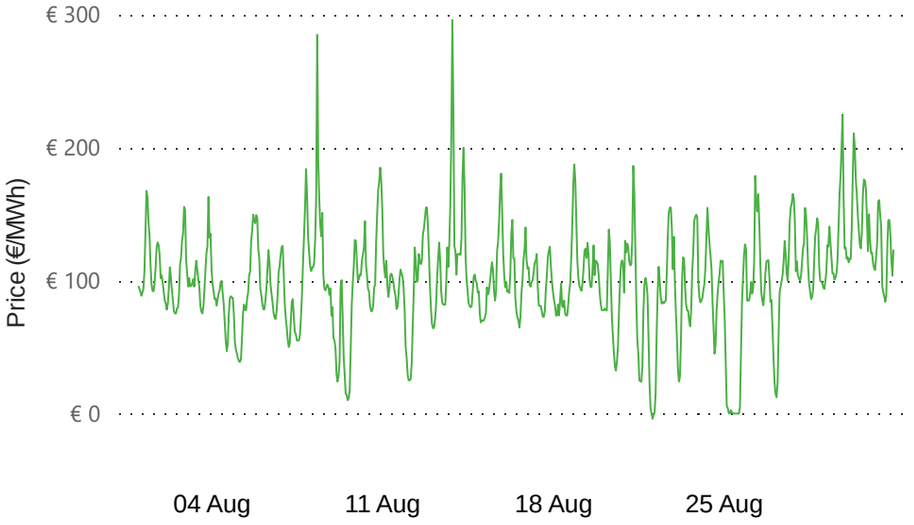
€84
Average DAM Price

€392
Min DAM Price

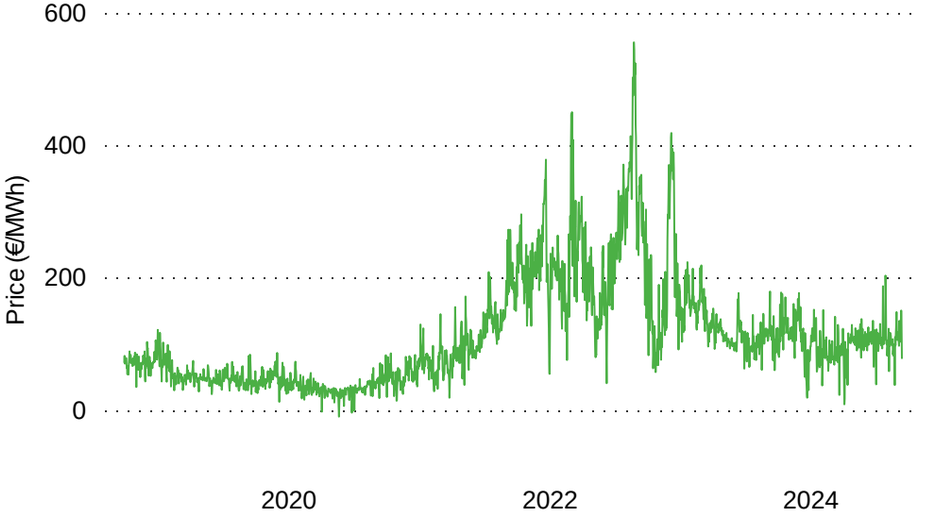
€0
Max DAM Price

The most frequent price range for July was between €50 and €150

DAM Prices

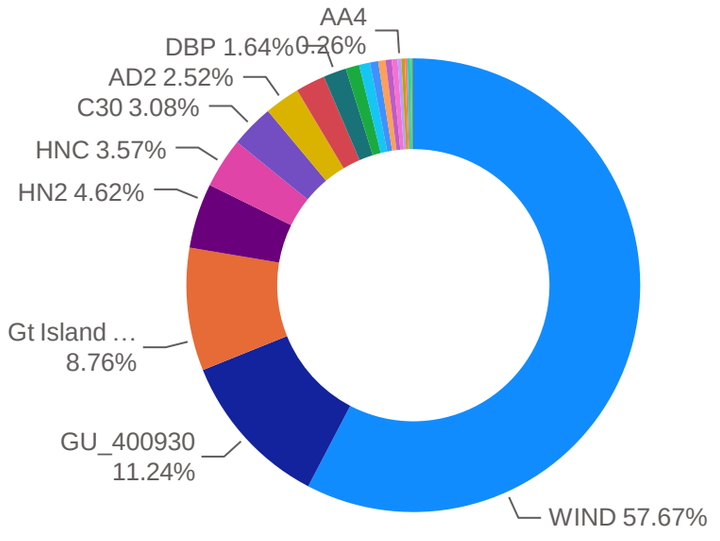


Historic Daily Average DAM Prices



Histogram of DAM Prices

DAM Sell Side Generator Order Results



Intraday Market August 2024

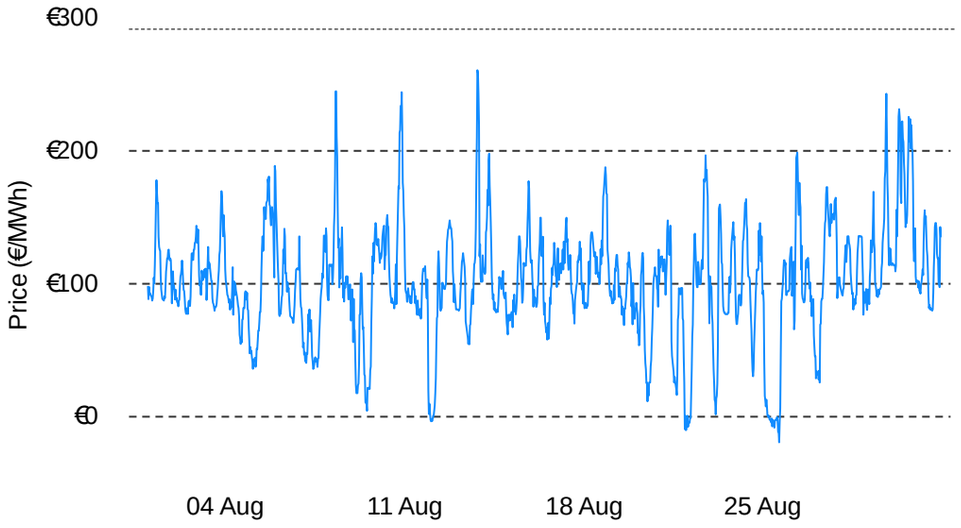
Average IDA1 Price

Min IDA1 Price

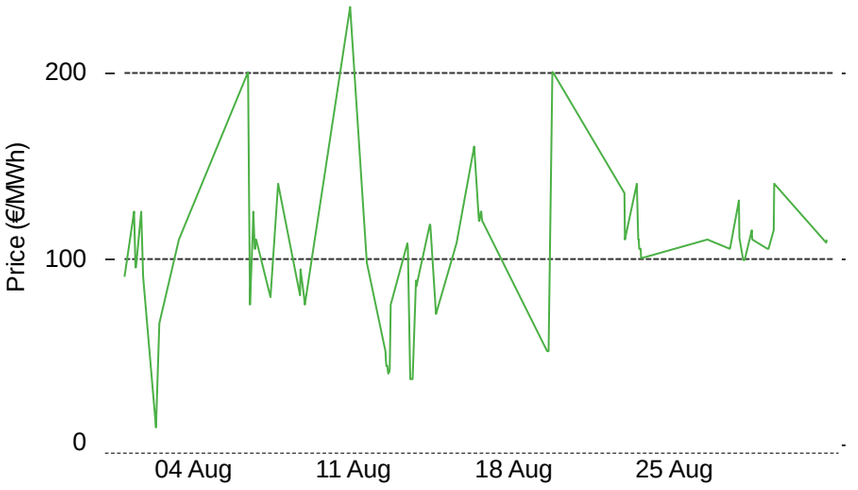
Max IDA1 Price

The most frequent price range for July was between €50 and €100 followed by €100 and €150

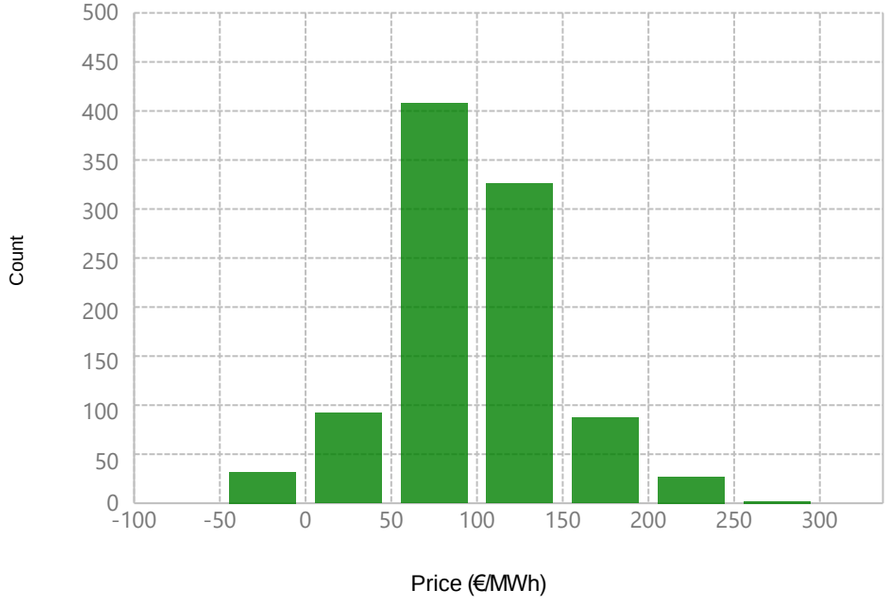
IDA 1 Prices



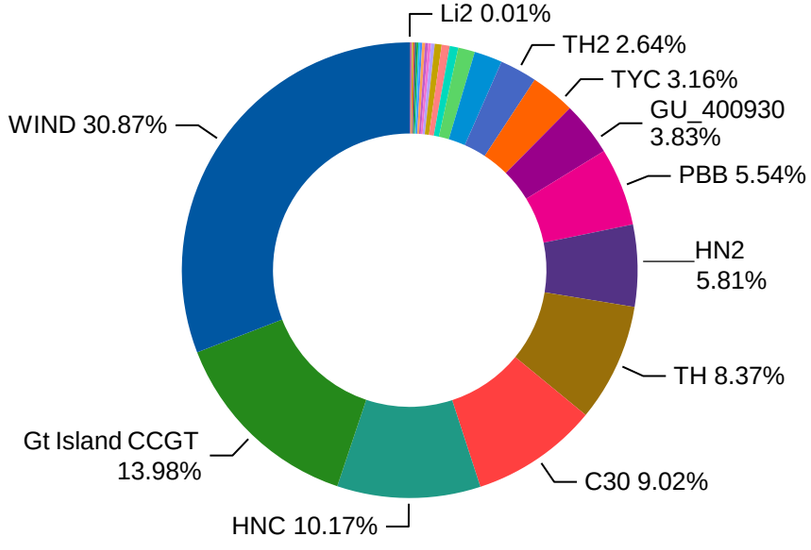
IDC Prices



Histogram of IDA1 Prices



IDA1 Sell Order Results By Market Participant



Intraday Market August 2024

SEM Day Ahead Price

€[illegible]

Average Price

€[illegible]

Min Price

€[illegible]

Max Price

GB Day Ahead Price

€[illegible]

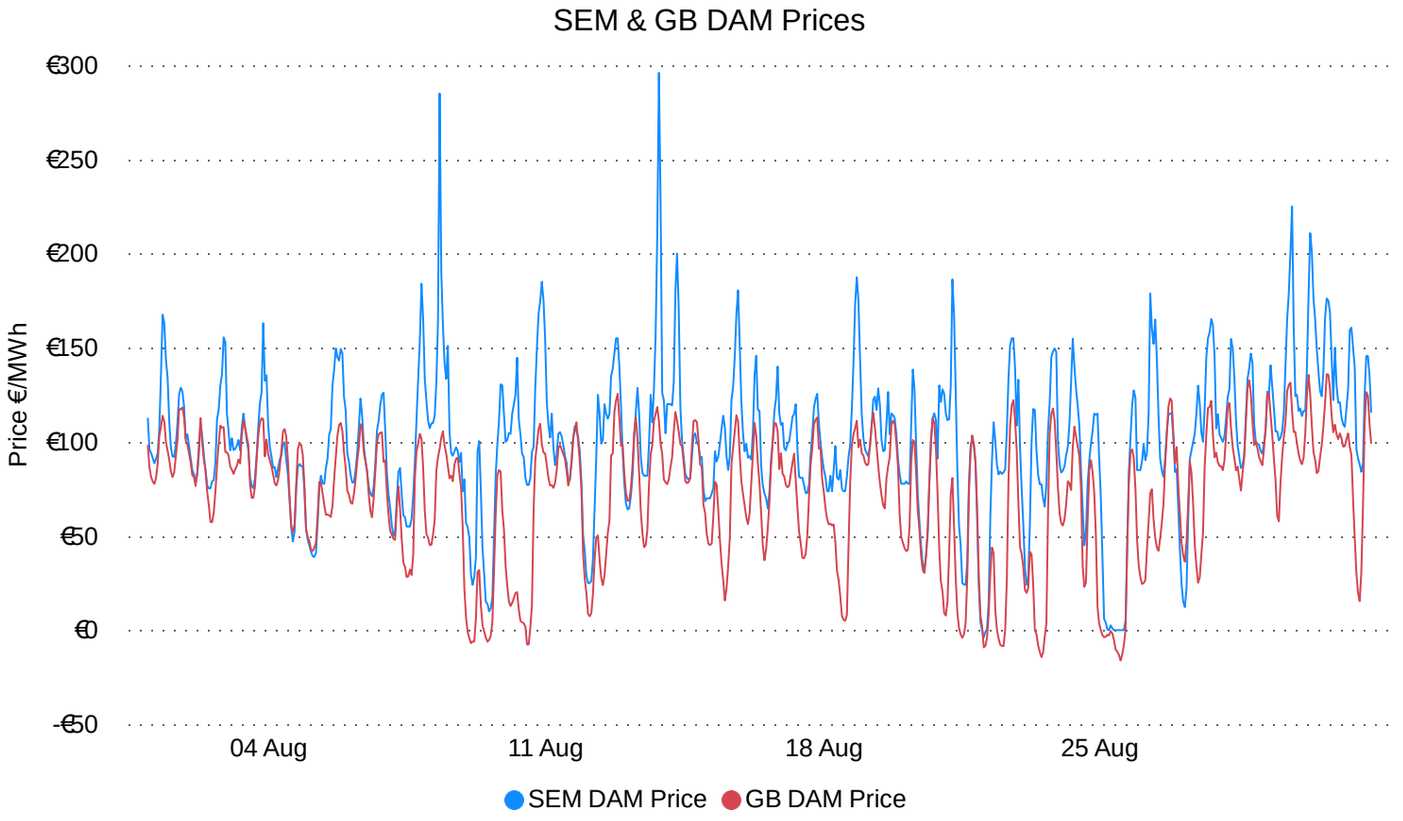
Average Price

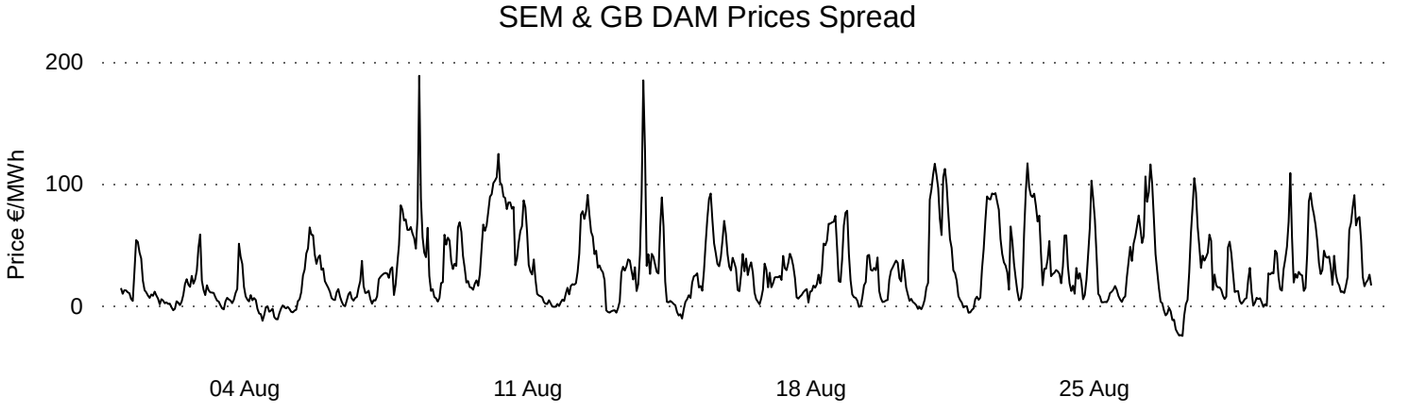
€[illegible]

Min Price

€[illegible]

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

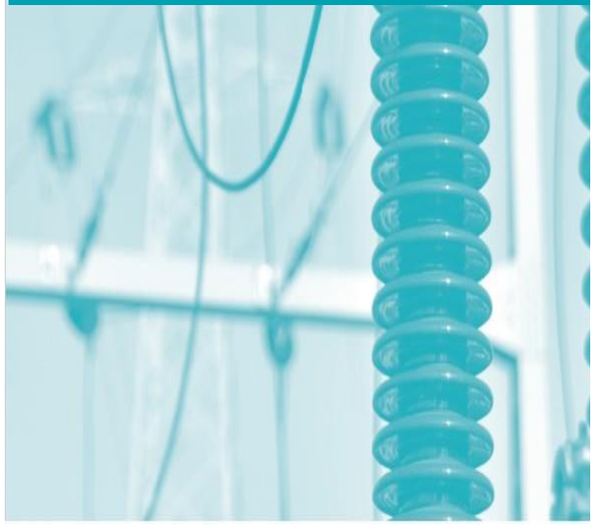
Basically, the periods of significant spreads between the two markets are generally correlated with period of very low wind. Due to a different fuel mix across both regions, the effects of low wind are felt more intensively in the SEM than in GB.

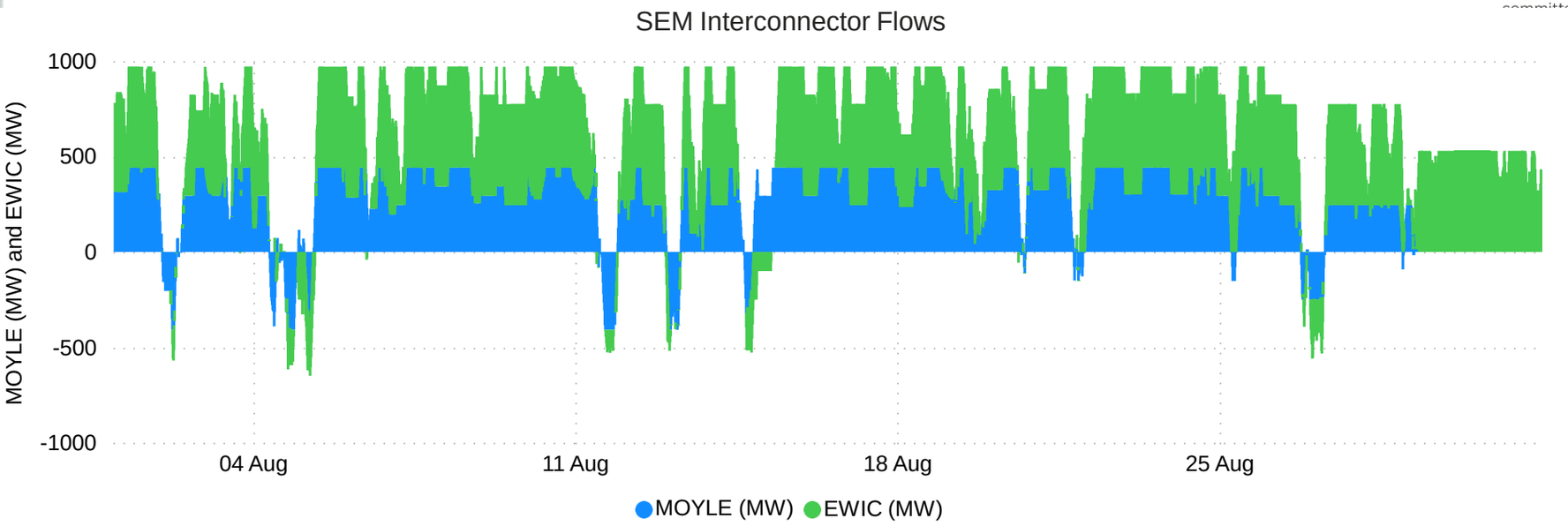
SEM Interconnectors August 2024

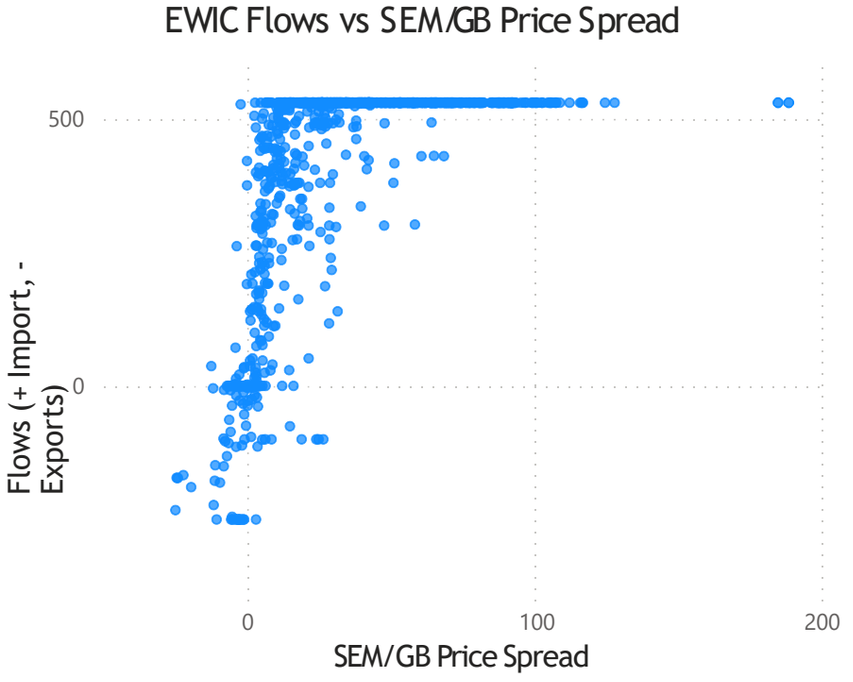
Interconnector Flows

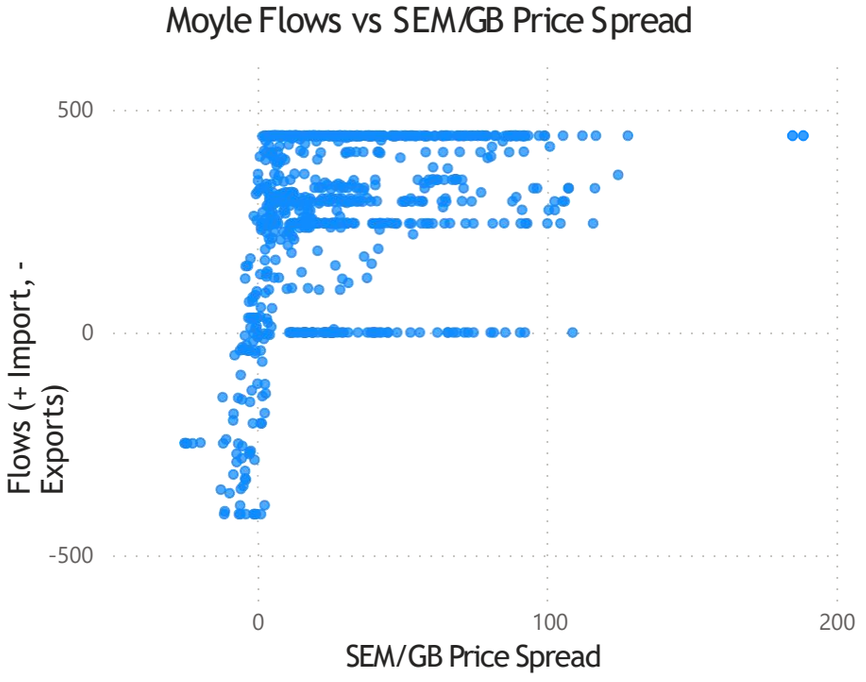
In August, the SEM Interconnectors mostly imported power from GB, with only minimal exports. This reflects the predominantly higher prices in the SEM compared with GB. There were also a substantial number of events when interconnection capacity is curtailed by the TSO in the SEM GB direction.

EWIC import volumes were slightly higher than Moyle again this month.





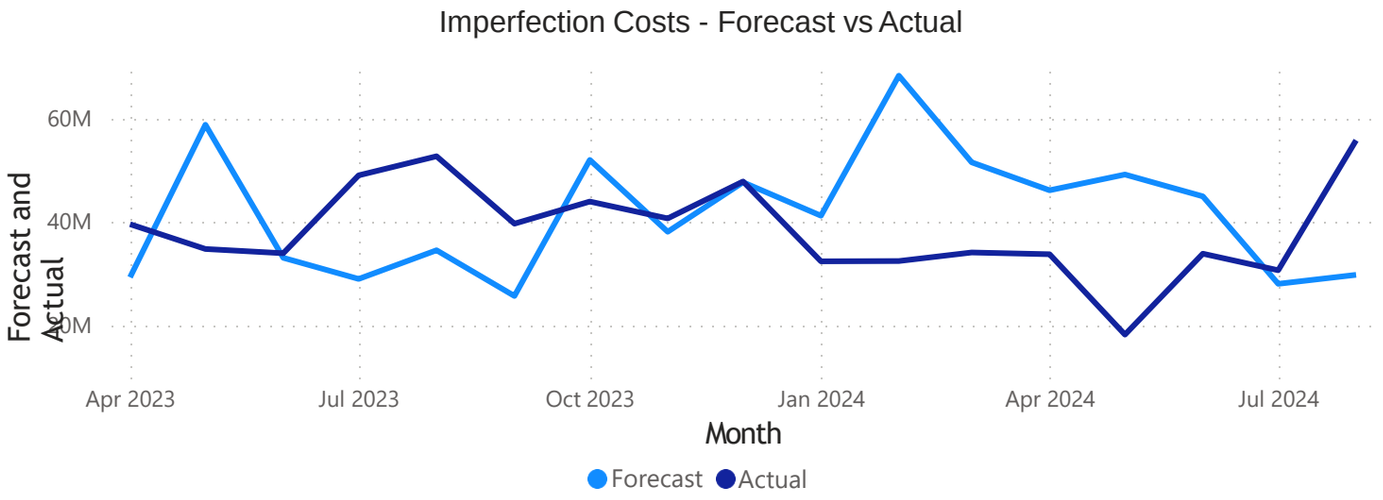




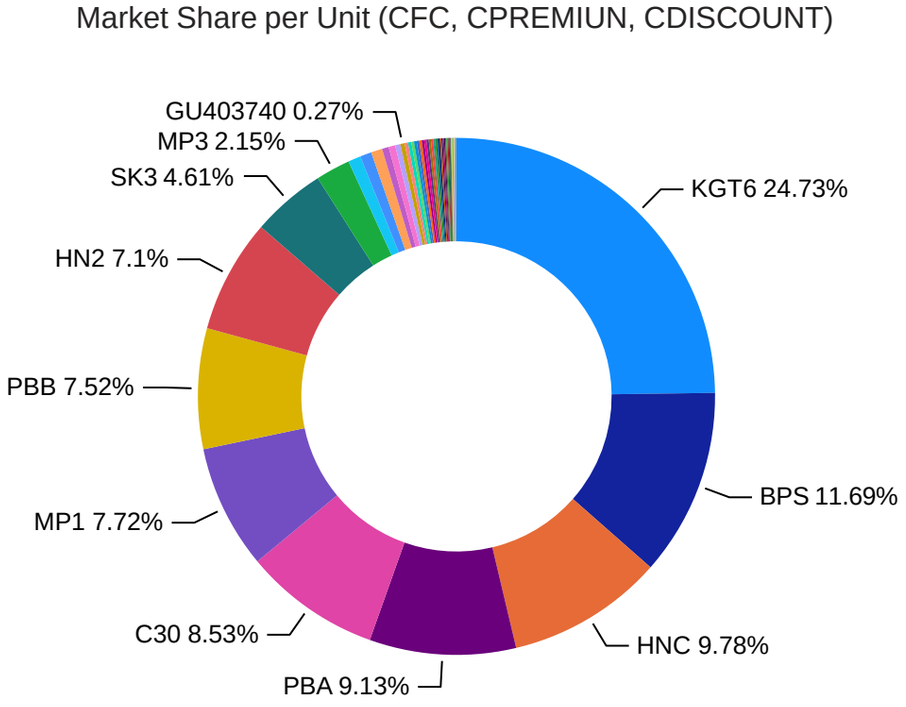
Balancing Market August 2024

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.



Determinant Name	Value €
CUNIMB	-888,972.80
CTEST	-107,287.74
CPREMIUM	23,056,852.99
CIMB	-3,390,545.45
CFC	15,210,254.32
CDISCOUNT	25,610,179.70
CCURL	-339,949.12
CAOOPO	-139,356.96
CABBPO	38,297.67
Total	**59,049,472.62**



Constraints Payments

This charts illustrates the distribution of selected Constraint Payments, to specific power plants.

As it can be seen, Kilroot OCGT (KGT6) was the largest receiver of these payments in August followed by BPS (EP Ballylumford Ltd). The MMU are continuing to monitor Balancing Market outcomes.

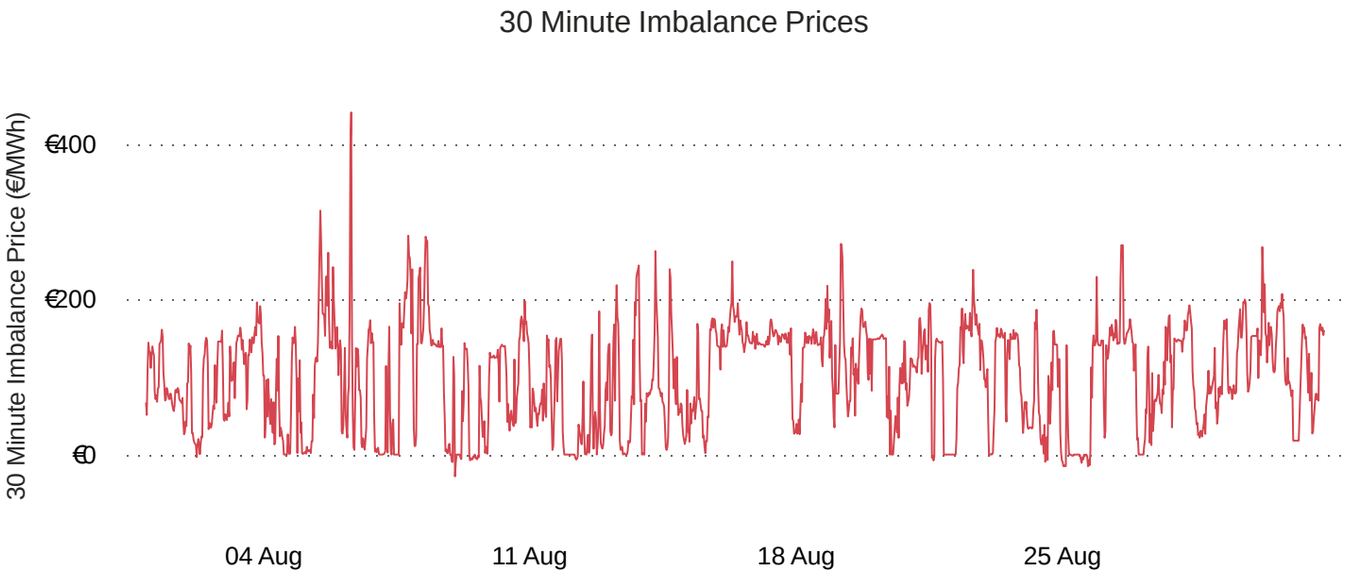
Balancing Market August 2024

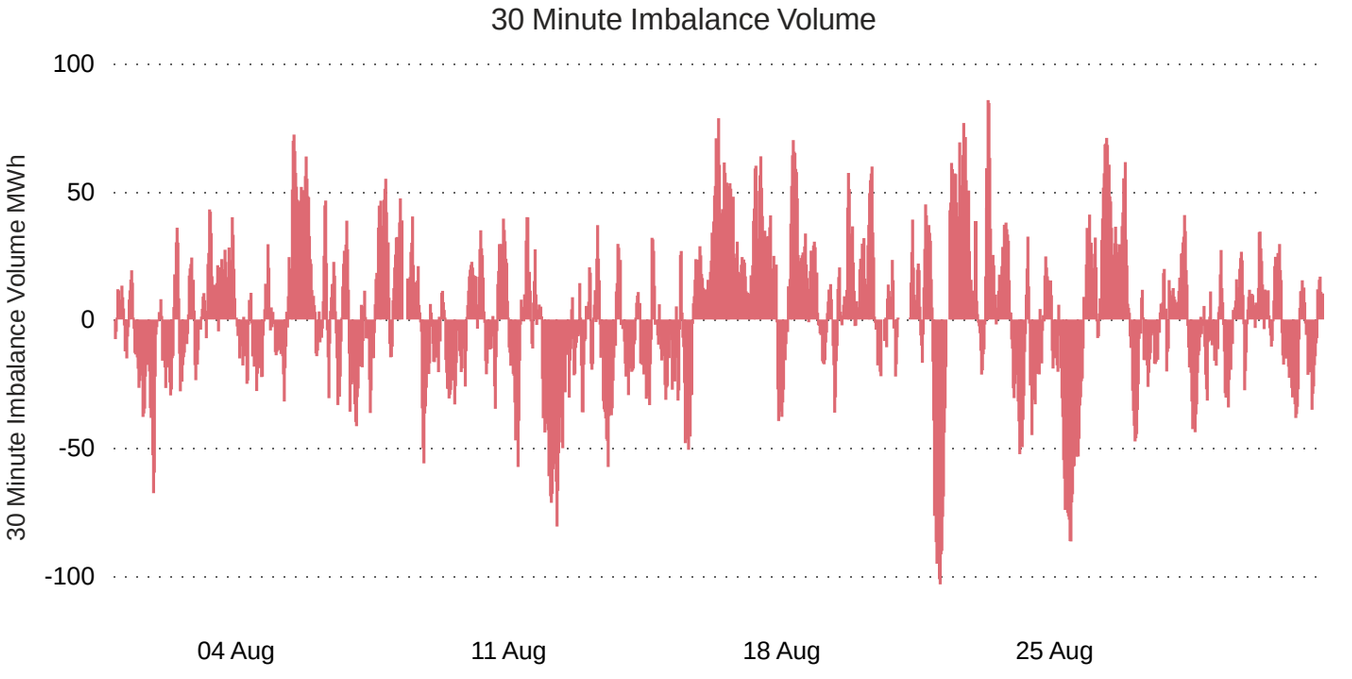
30 Minutes Imbalance Price

€93
Average Price

€2813
Lowest Price

€4873
Highest Price

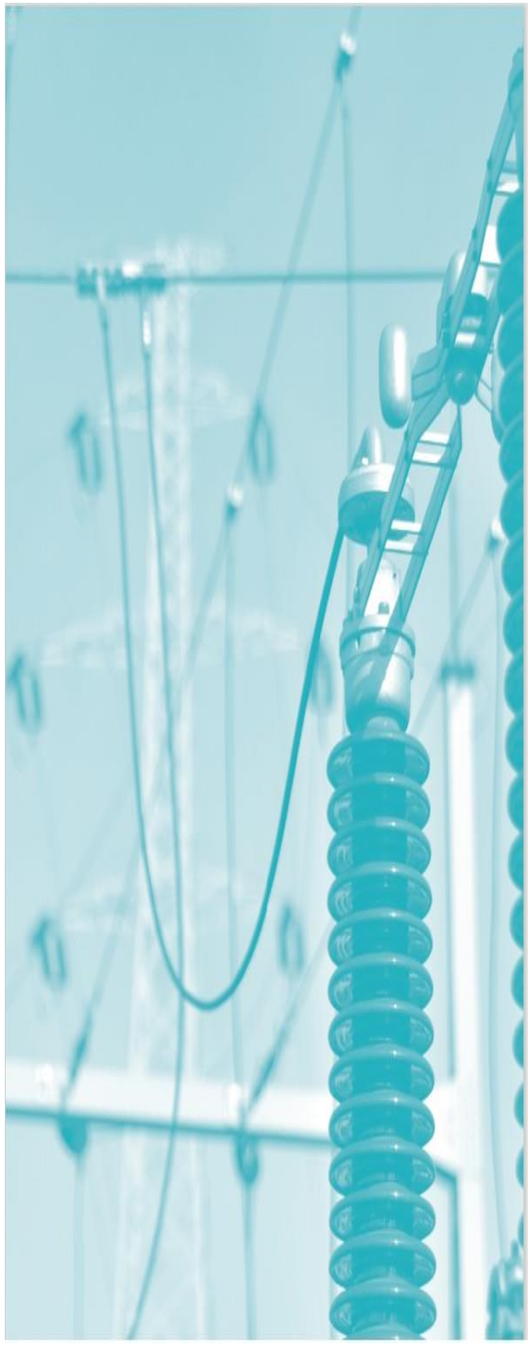




Imbalance Price & Volumes

The average Imbalance (BM) Price this month is slightly lower 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 August 2024

SEM Demand

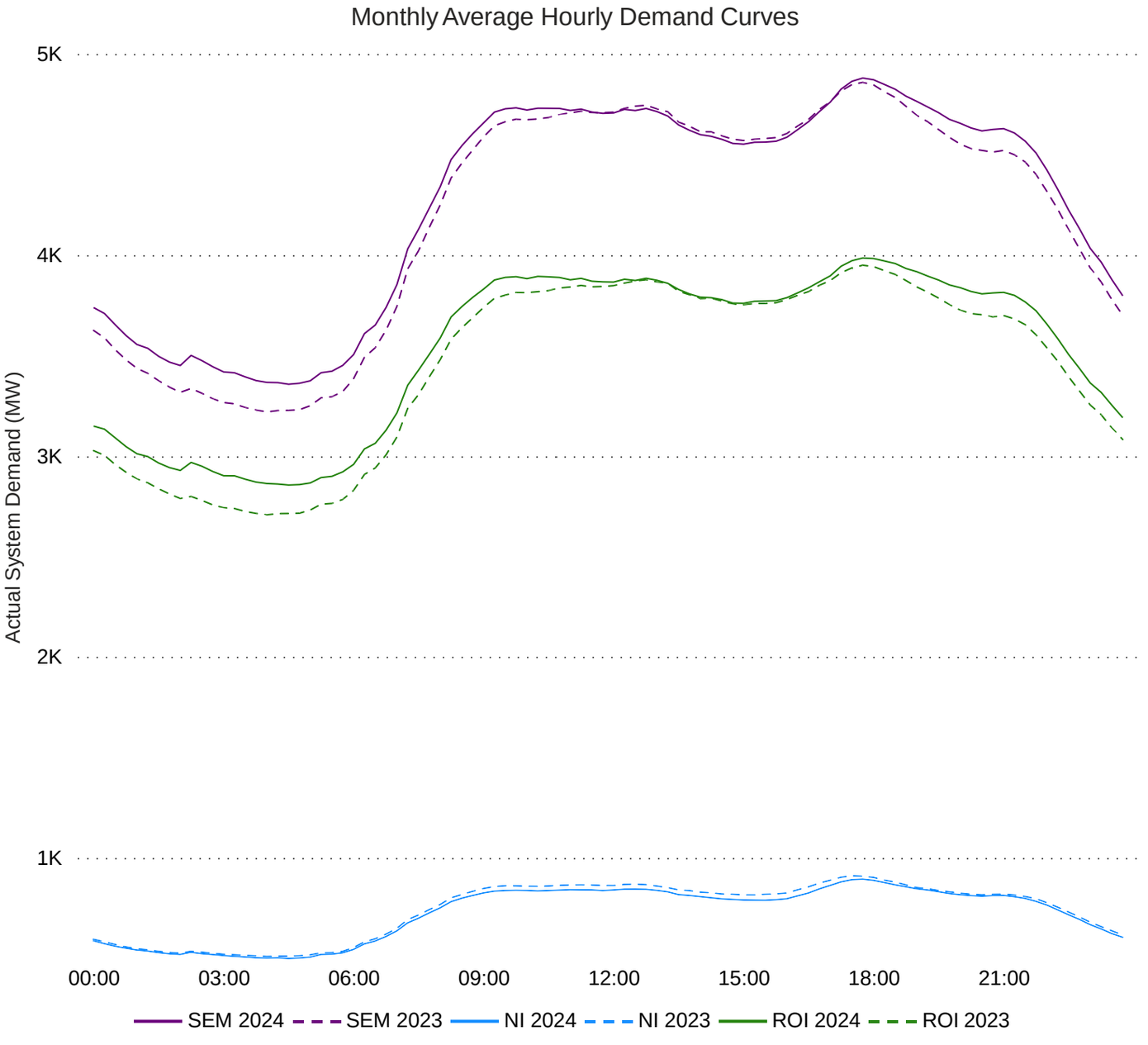
4,254.95 SEM Average 2024	4,184.51 SEM Average 2023
3,356.90 SEM Min 2024	3,219.03 SEM Min 2023
4,879.81 SEM Max 2024	4,858.35 SEM Max 2023

NI Demand

724.54 NI Average 2024	739.93 NI Average 2023
501.32 NI Min 2024	511.65 NI Min 2023
894.94 NI Max 2024	911.61 NI Max 2023

ROI Demand

3,530.41 ROI Average 2024	3,444.59 ROI Average 2023
2,855.65 ROI Min 2024	2,707.32 ROI Min 2023
3,984.87 ROI Max 2024	3,948.81 ROI Max 2023



SEM Demand

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

The demand in ROI during the daylight period has remained steady as of last year, while demand outside those hours has increased. This may be due to embedded generation. Overall, the monthly average has shown a increase of 2.49% from the previous year.

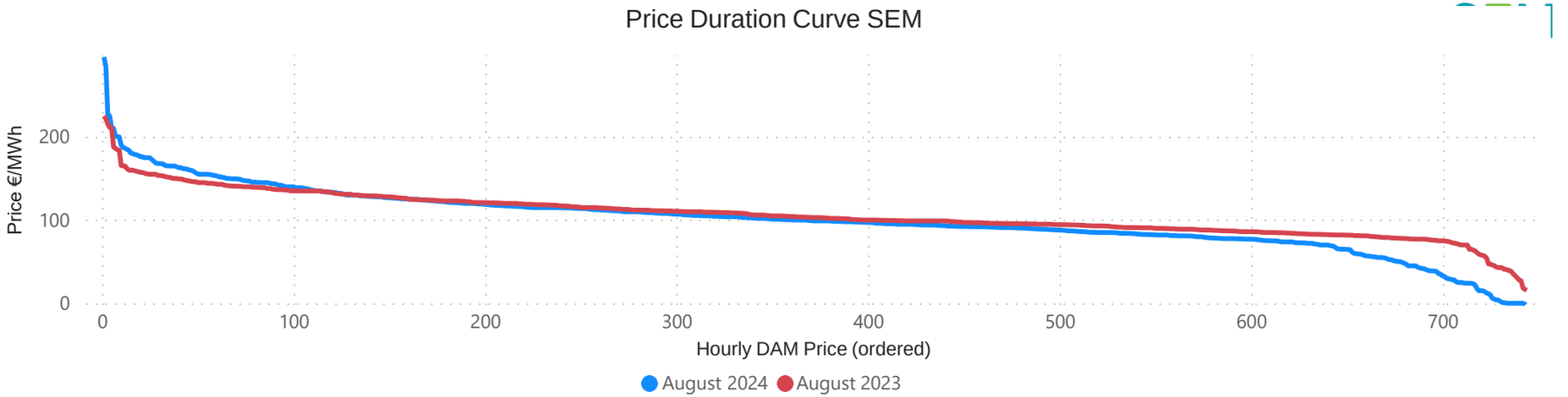
Demand in the SEM as a whole is up by 1.68% relative to the same period last year.

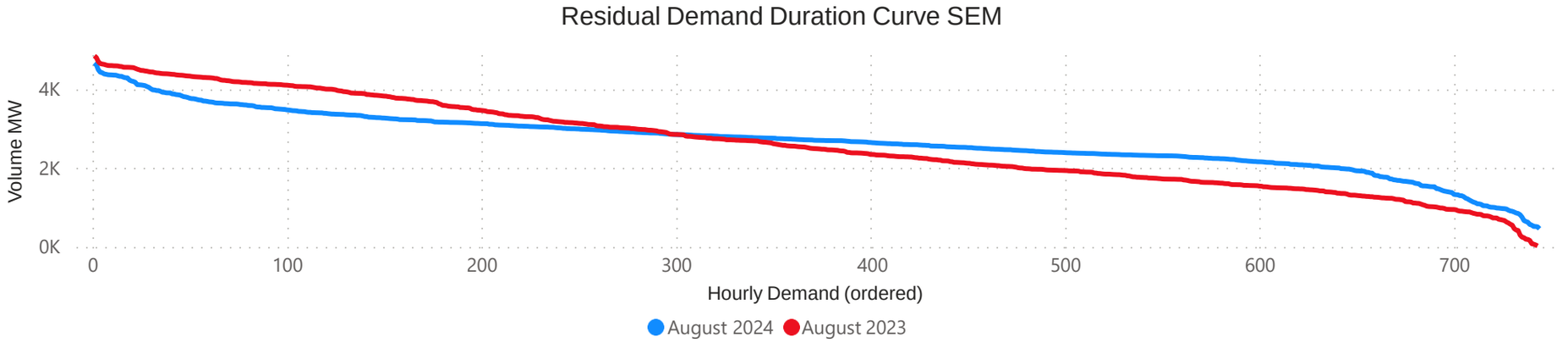
Duration Curves August 2024

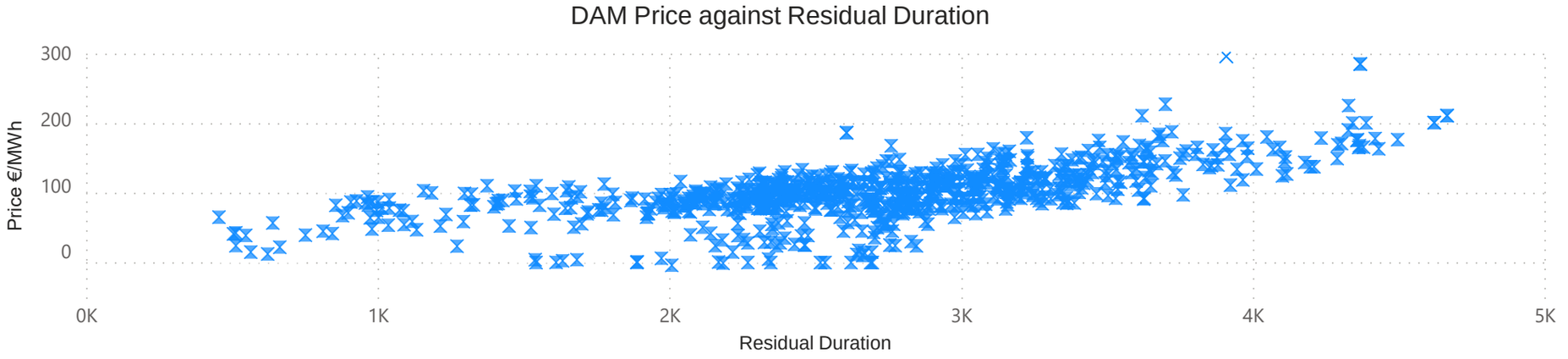
Price Duration
The price duration curve shows the hourly DAM prices across the month ordered from the largest to the smallest.

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.



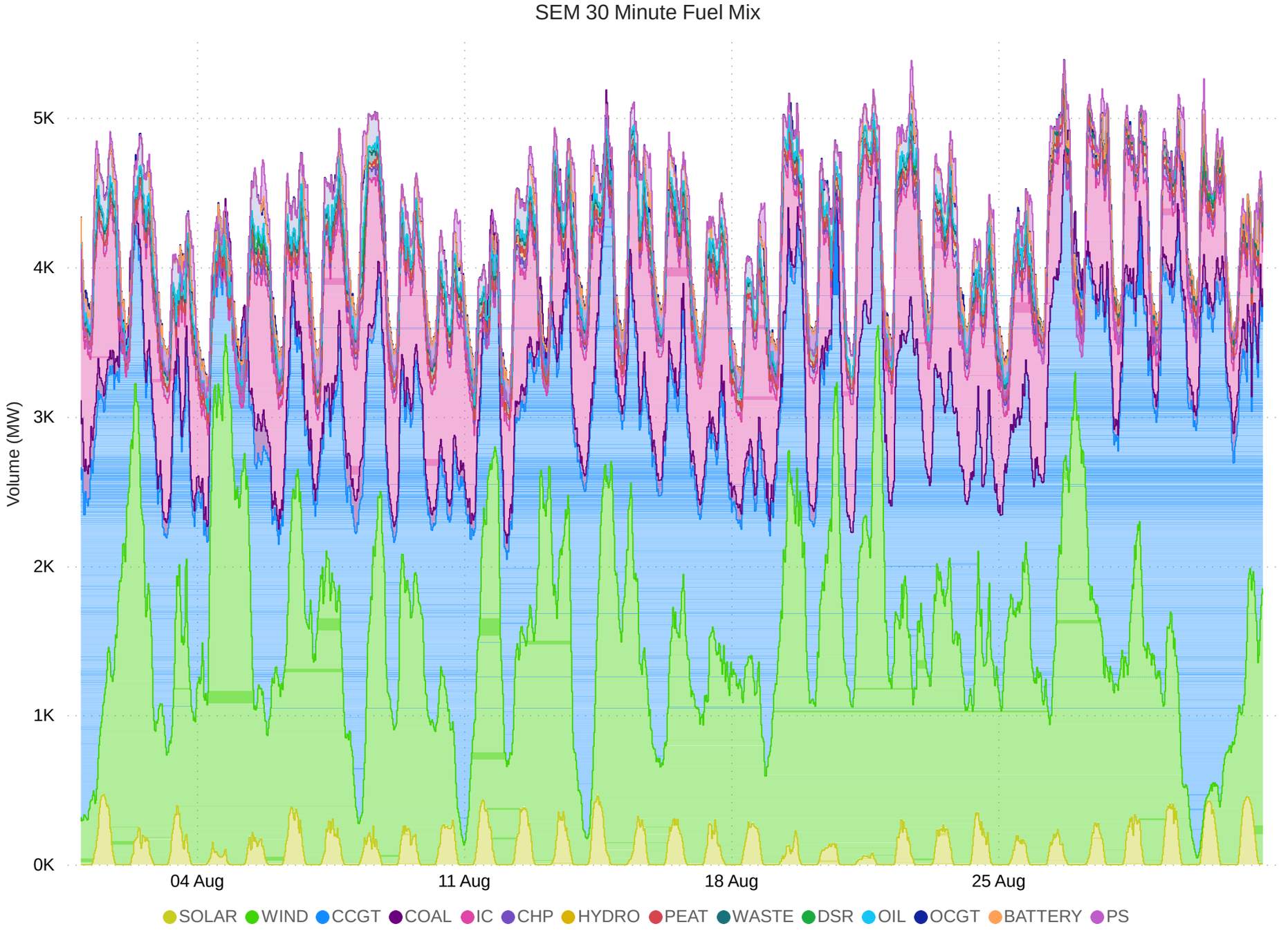




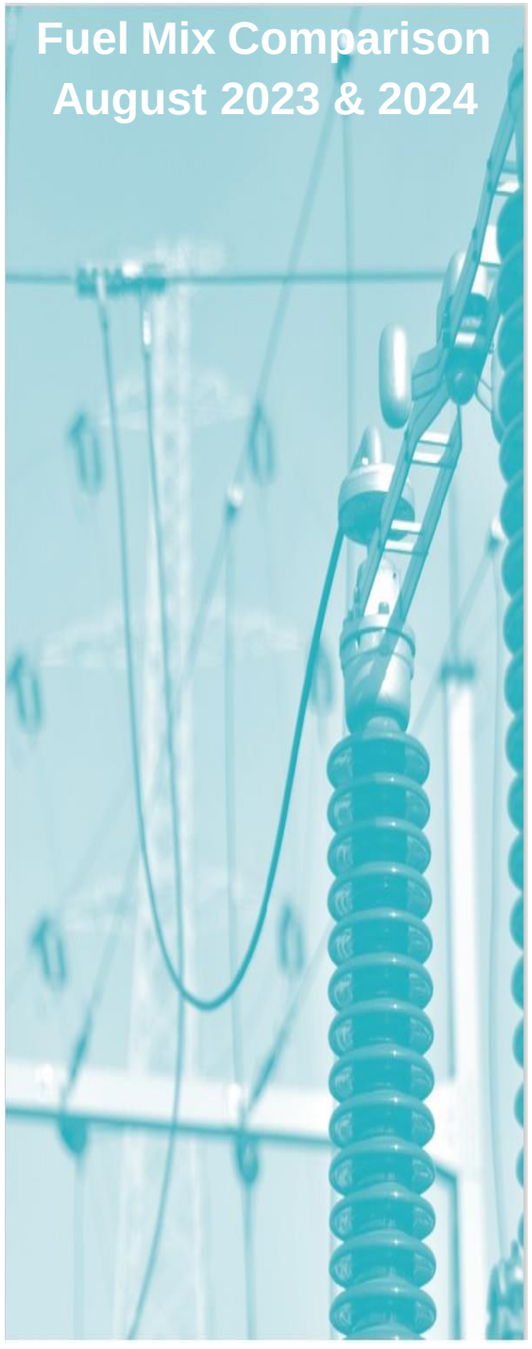
Fuel Mix
August 2024

Fuel Type	Avg Monthly	Per. Monthly
CCGT	1610	38.4%
WIND	1435	34.3%
INTERCONNECTORS	629	15.0%
OCGT	132	3.1%
SOLAR	99	2.4%
COAL	94	2.2%
CHP	75	1.8%
WASTE	75	1.8%
HYDRO	38	0.9%
DSR	24	0.6%
OIL	2	0.1%
PEAT	0	0.0%
BATTERY	-6	-0.1%
PUMPED STORAGE	-17	-0.4%

Fuel Type	Max Monthly	Min Monthly
WIND	3609	3
CCGT	3511	78
INTERCONNECTORS	977	-63
SOLAR	470	0
COAL	446	0
OCGT	420	0
PUMPED STORAGE	291	-30
BATTERY	161	-93
OIL	15	0
DSR	151	0
HYDRO	119	0
CHP	79	69
WASTE	79	16
PEAT	0	0

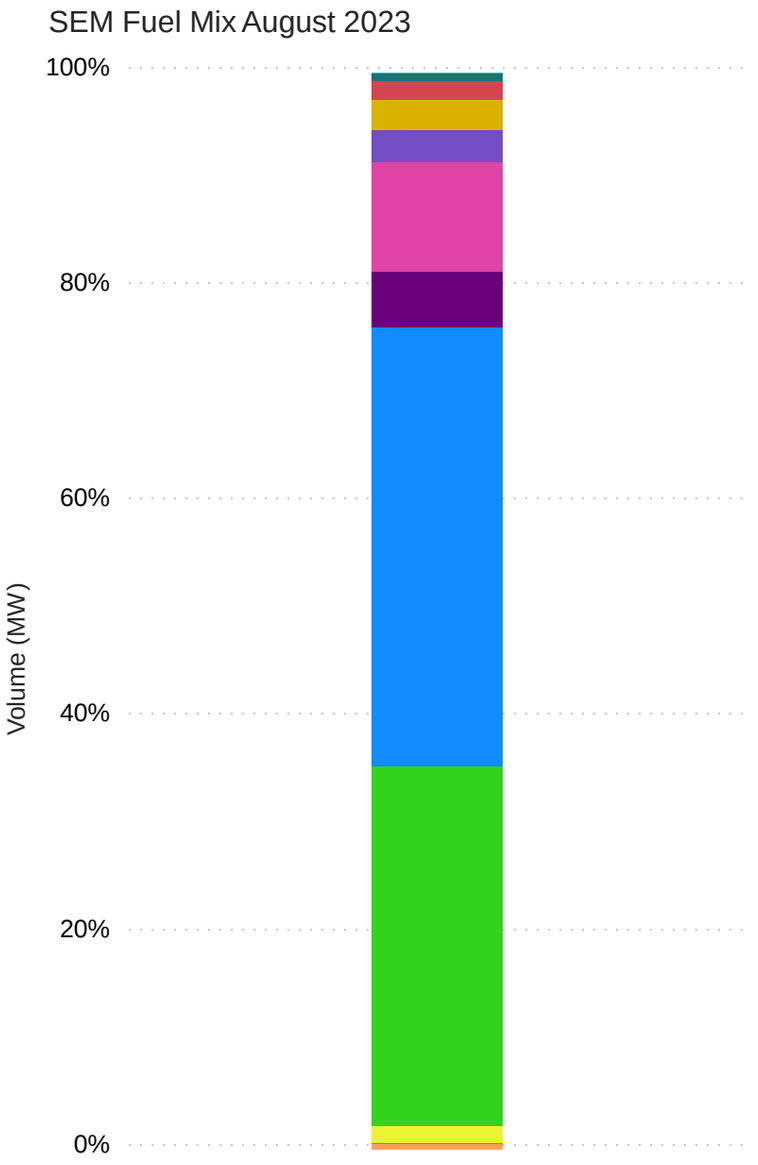


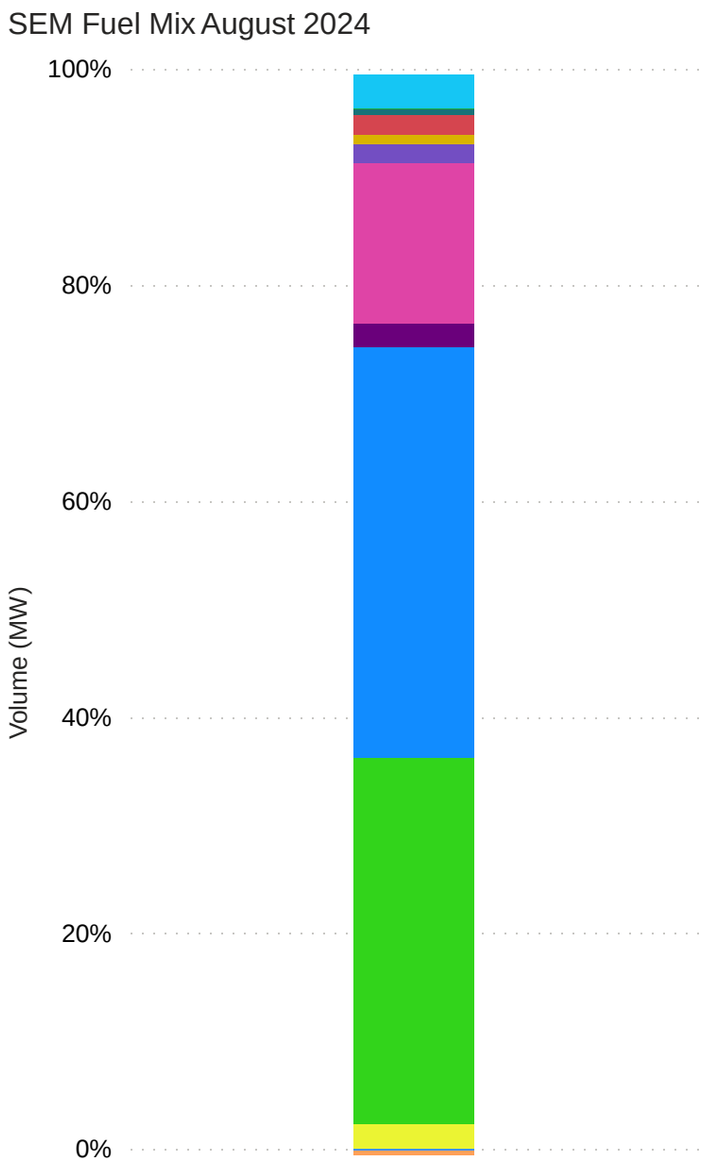
Fuel Mix Comparison August 2023 & 2024



SEM committee

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





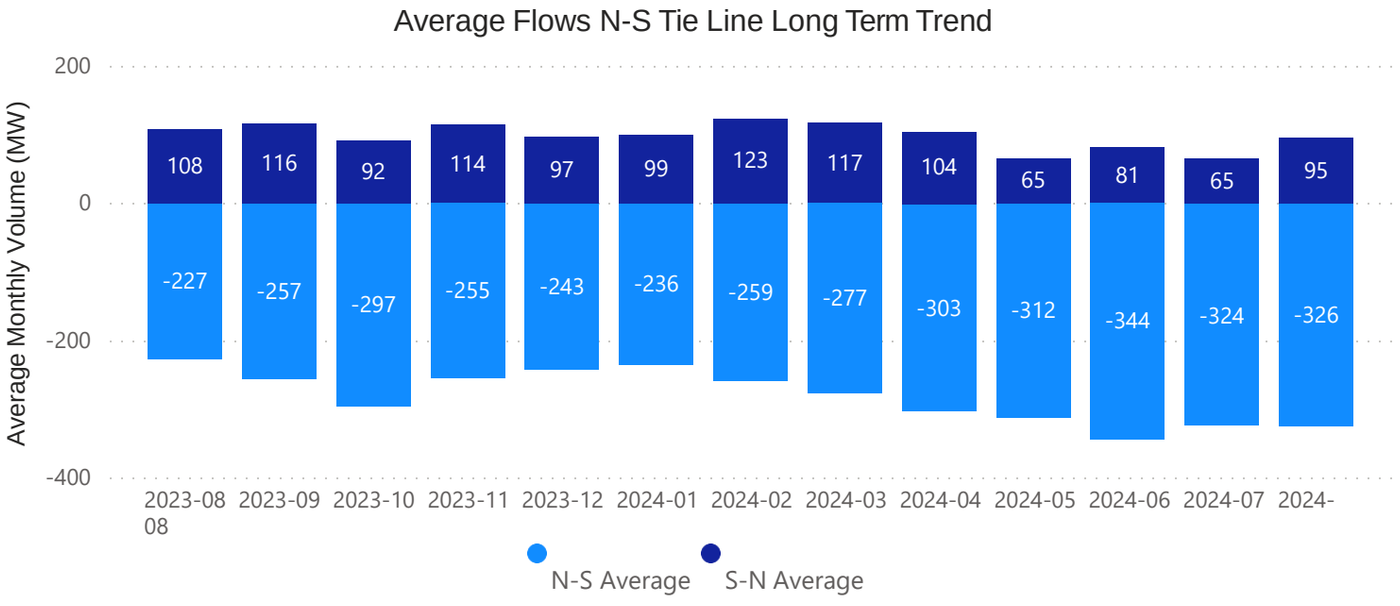
North-South Tie Line August 2024

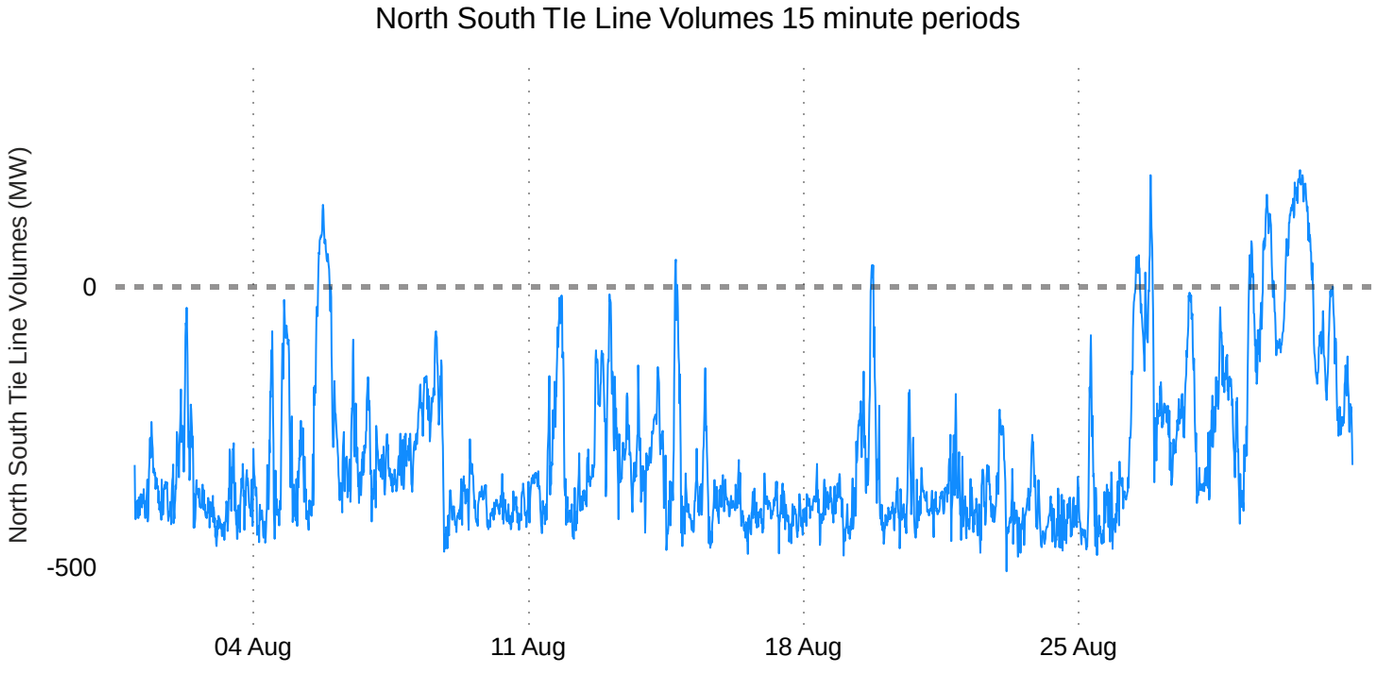
Average Flow NI to ROI (MW)
-325.59

Average Flow ROI to NI (MW)
95.33

Average Net Flow NI to ROI (MW)
-302.15

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





North South Tie Line

Again 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.

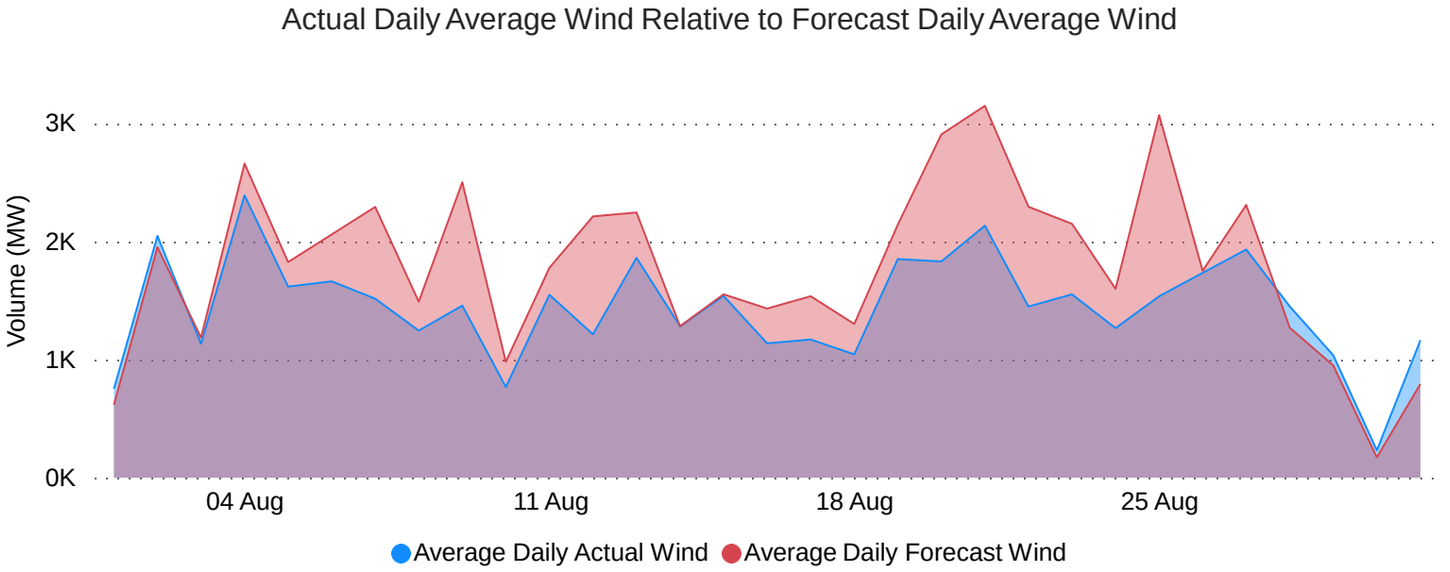
Wind Generation August 2024

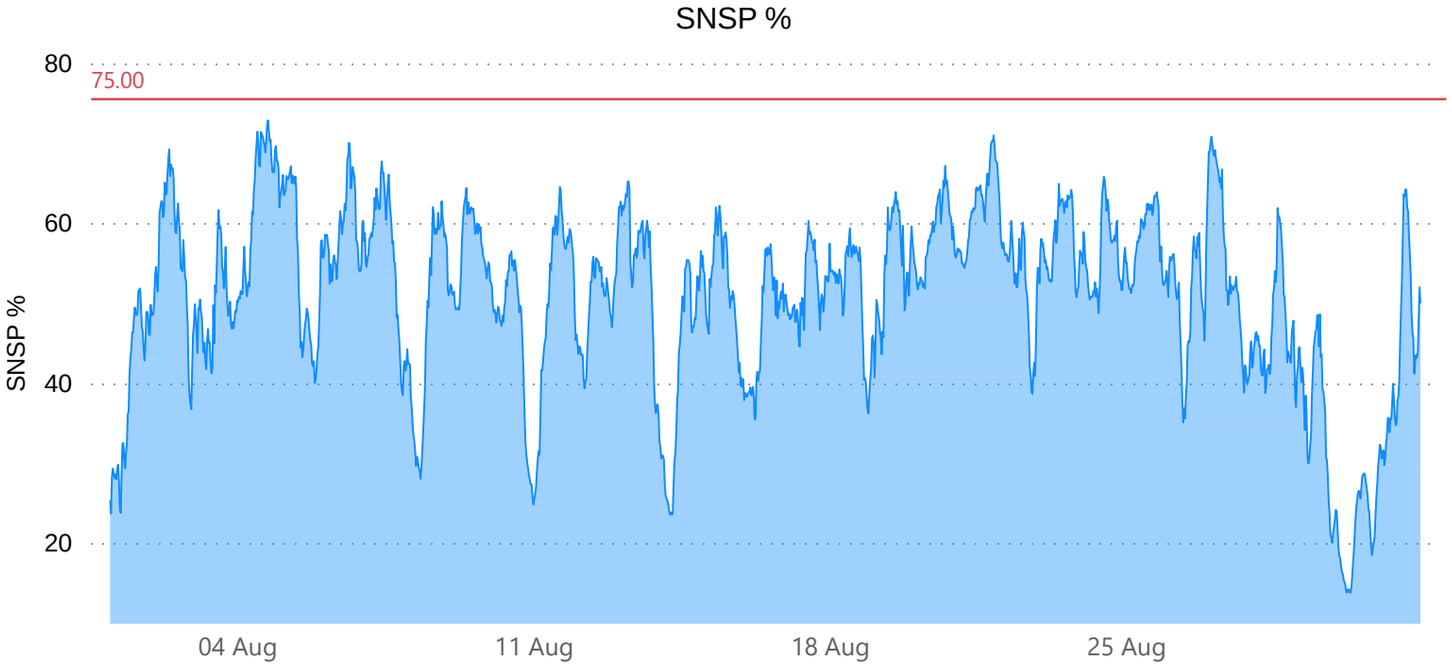
Average Daily Actual Wind (MW)
1,437

Average Daily Forecast Wind (MW)
1,788

Min SNSP%
13.81

Max SNSP%
72.88





Wind Generation

Wind generation increased by 63% from last month's lowest mark of the year, reflecting a trend consistent with the same period last year.
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SNSP

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

CO_2 August 2024

CO2 Intensity (gCO2/kWh)

187.97
Average

97
Lowest

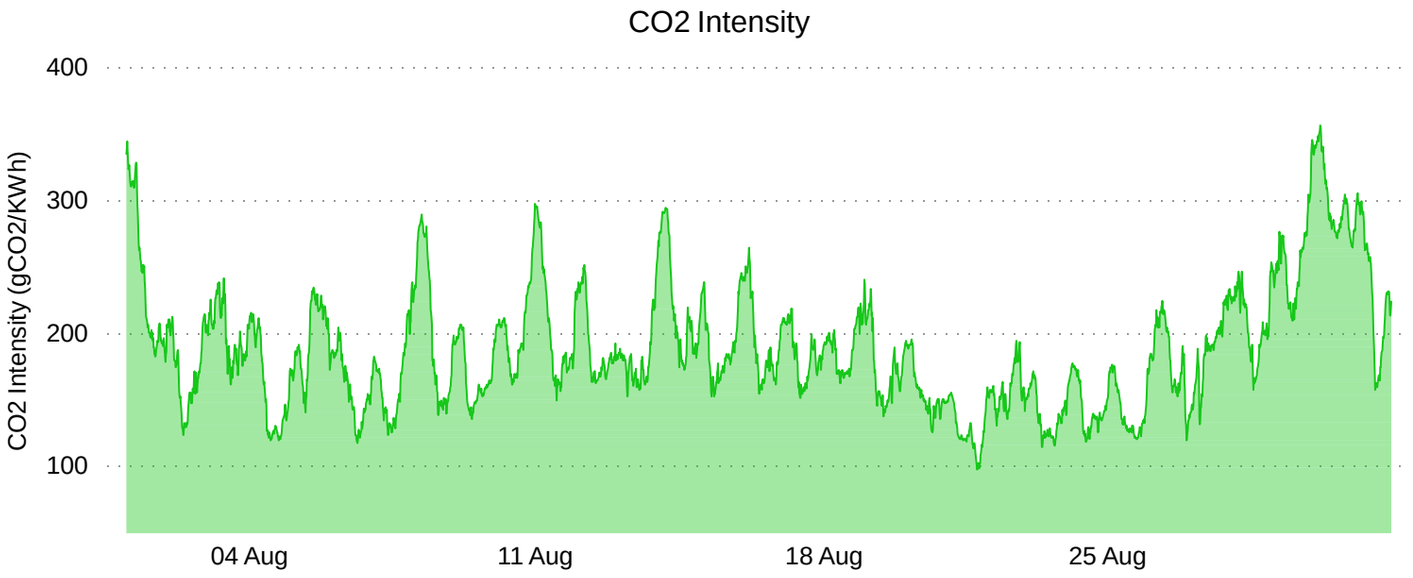
356
Highest

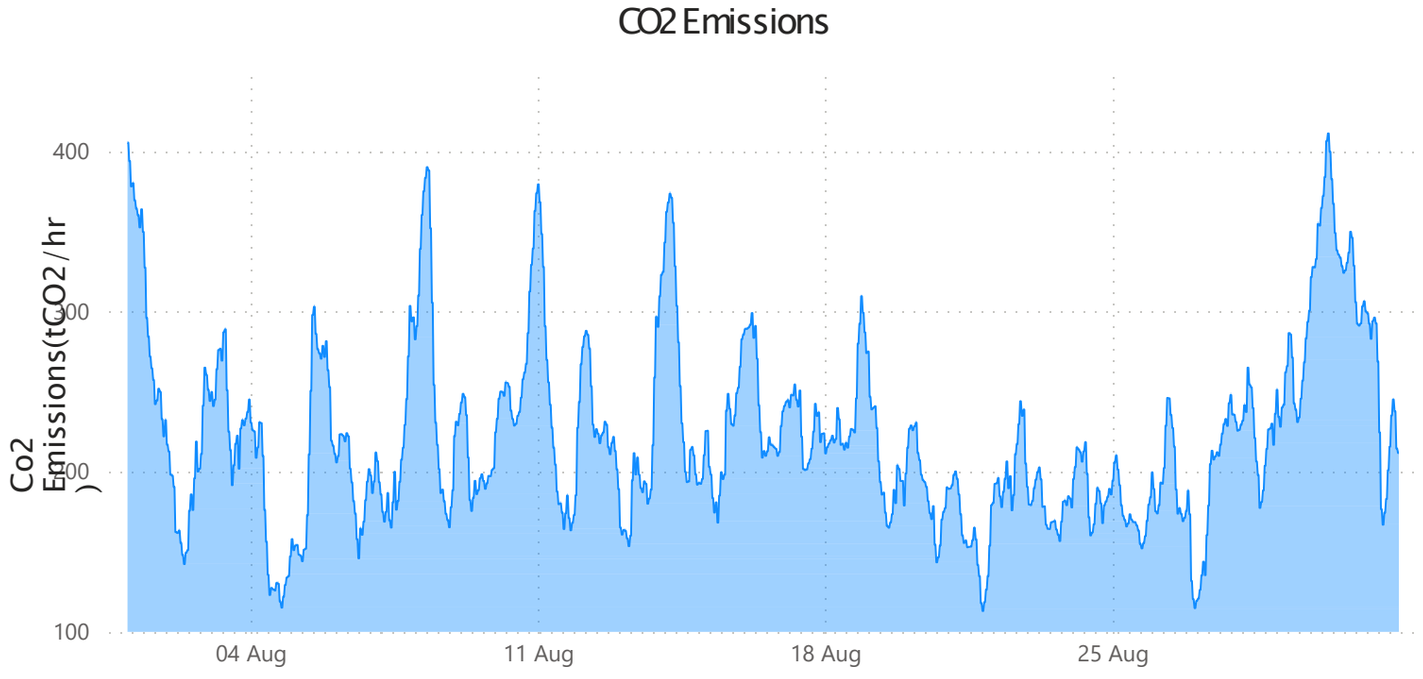
CO2 Emissions (tCO2/hr)

678
Average

452
Lowest

1262
Highest



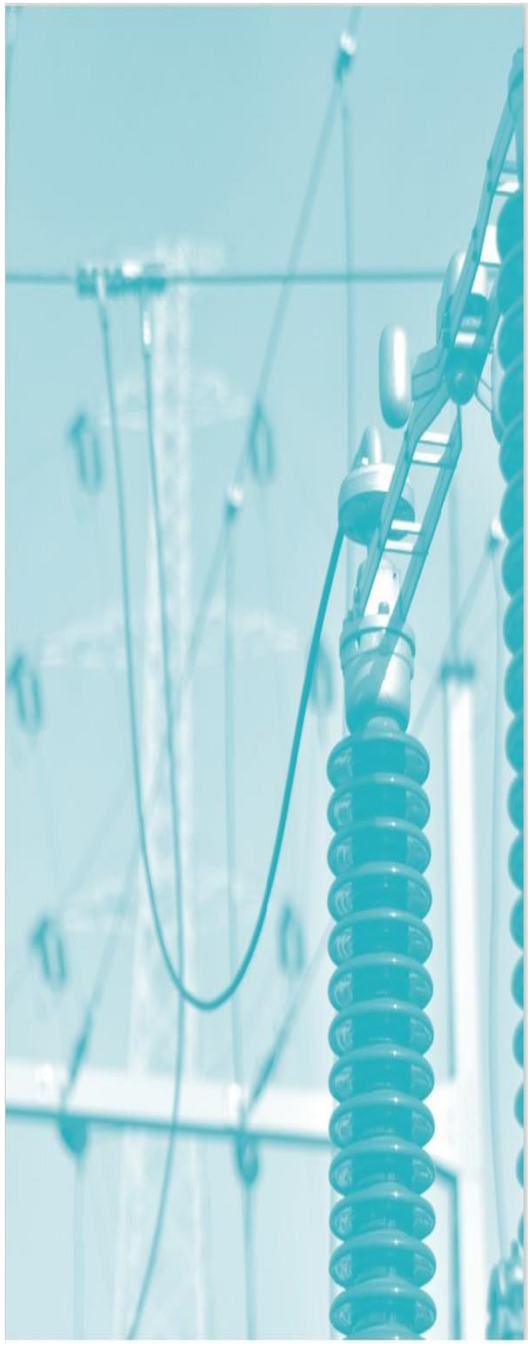


CO_2 Intensity

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.



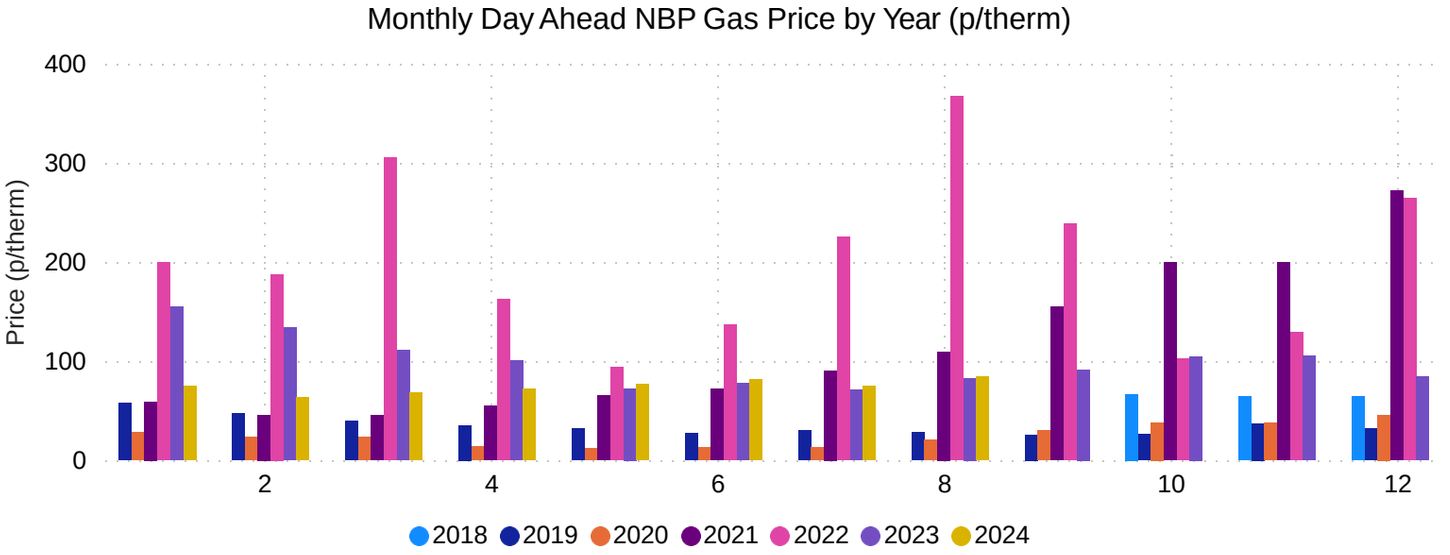
Fuel Costs and Spreads

Gas Price August 2024

84.71
Monthly Average (p/therm)

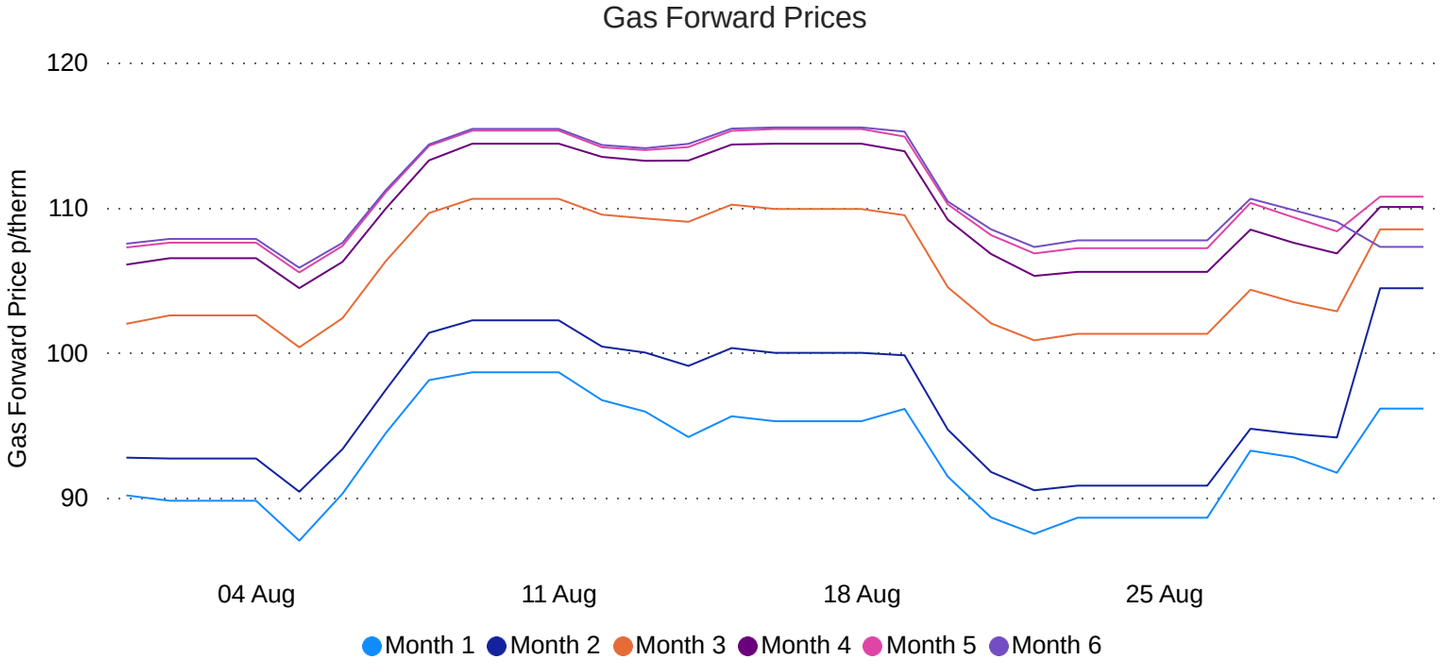
77.75
Monthly Low (p/therm)

94.05
Monthly High (p/therm)



Gas Prices

Gas prices have experienced a 13% increase compared to the previous month rising from 75.07p/therm to 84.71p/therm.



Gas Forward Prices

Gas forward prices have increased this month due to expected outages in Norwegian gas fields.

Forward gas prices are considerably lower than the prices seen over the past few years.

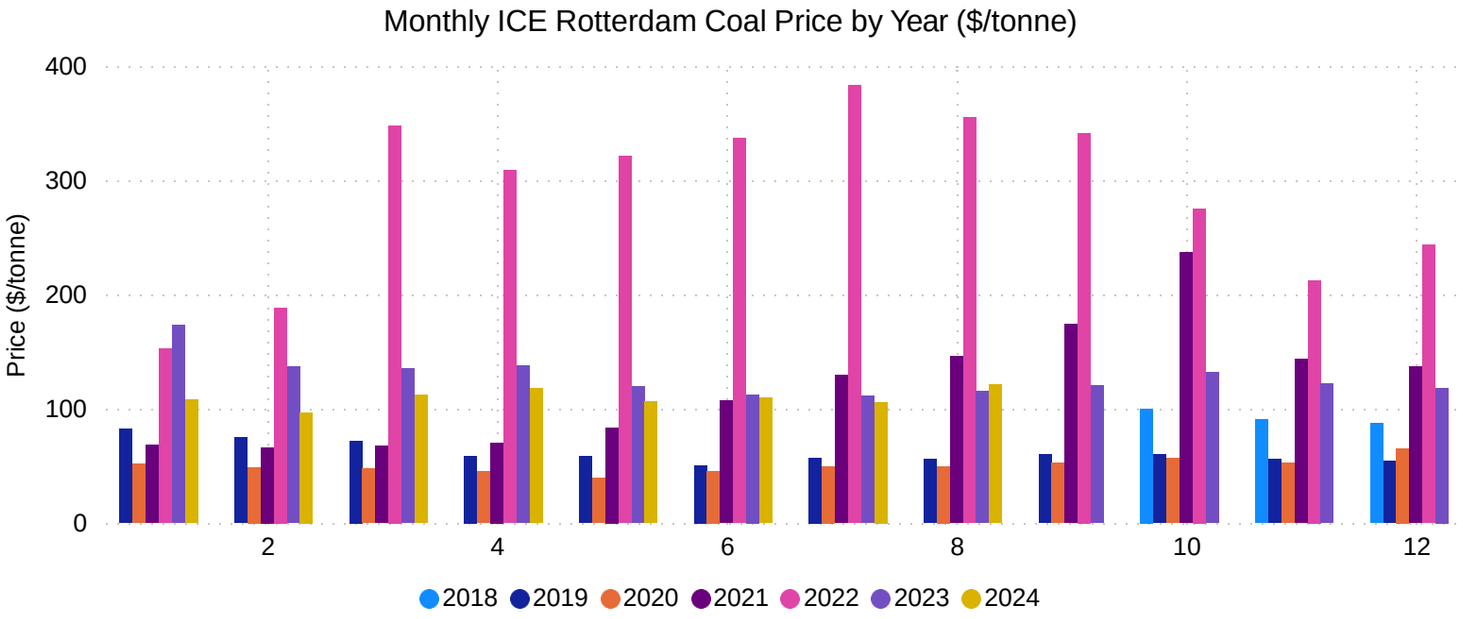
Coal Price August 2024

Coal Prices Per Tonne

$121.36
Monthly Average

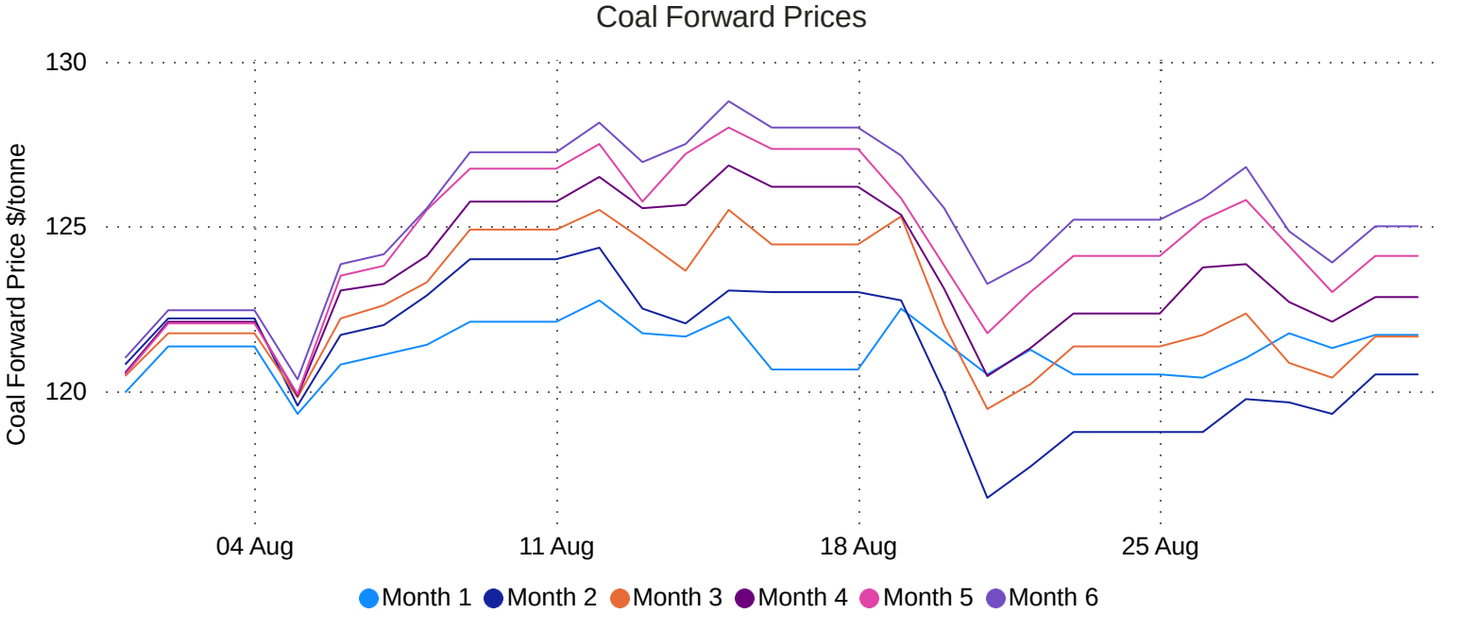
$119.30
Monthly Low

$122.75
Monthly High



Coal Prices

Coal prices were higher compared to the previous month at $121.36/tonne (15% increase from the last month).



Coal Forward Prices

Coal forward prices demonstrated an increase during August.

Carbon Price August 2024

EU Carbon Prices (€/tonne)

€72
Monthly Average

€63
Monthly Low

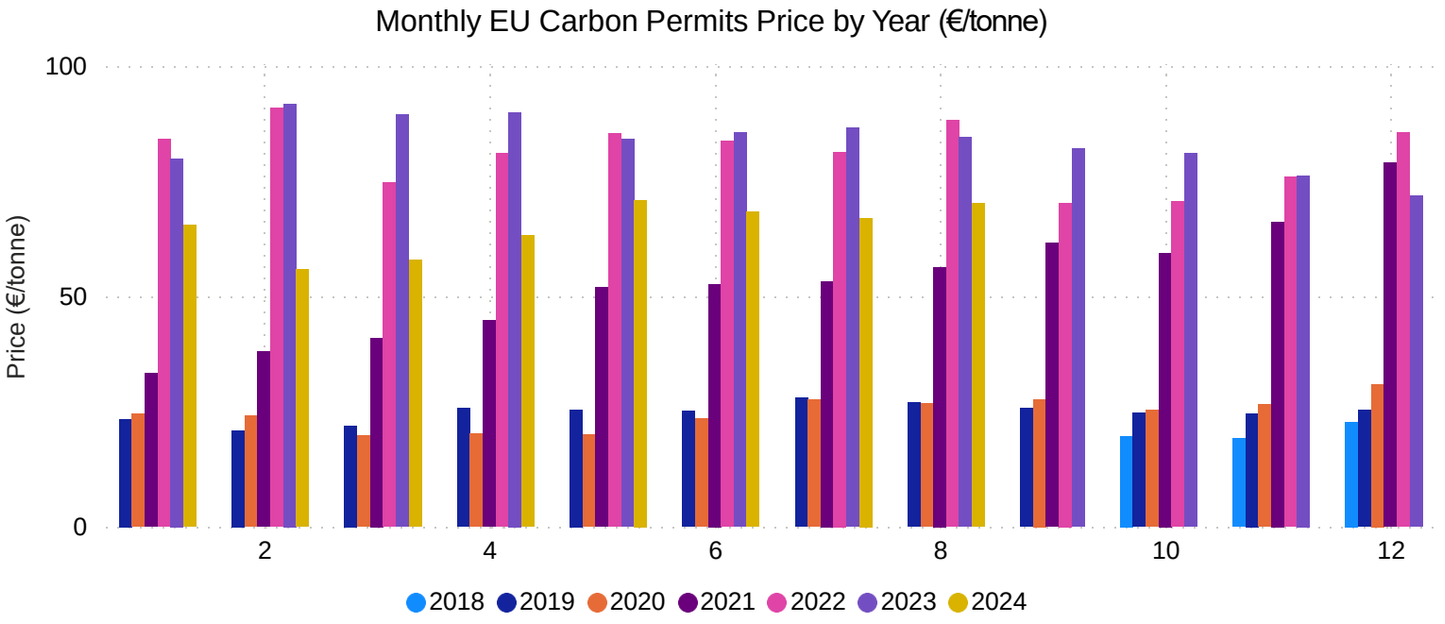
€74
Monthly High

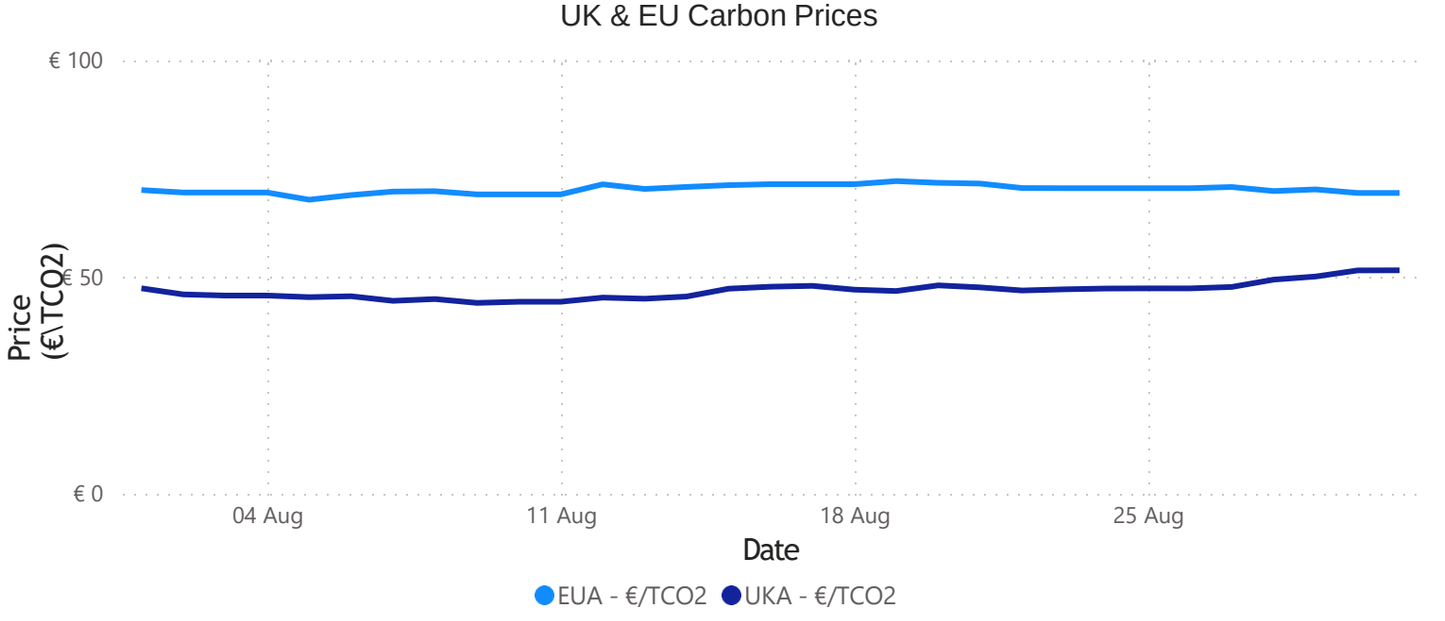
UK Carbon Prices (€/tonne)

€63
Monthly Average

€49
Monthly Low

€65
Monthly High





Carbon Prices

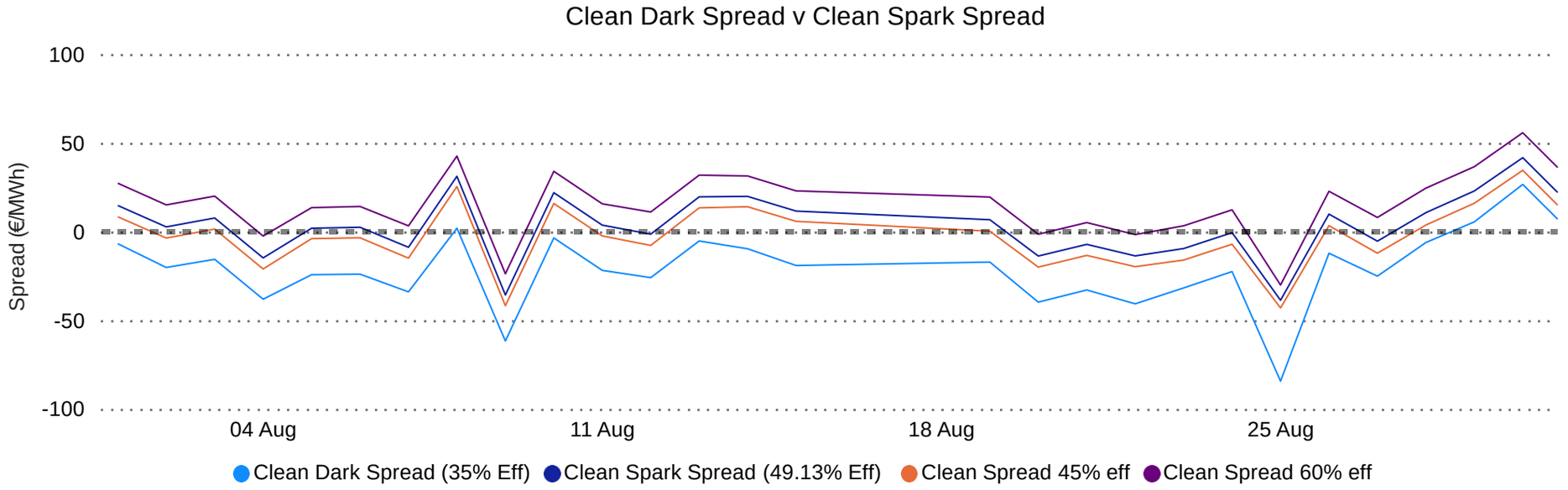
Carbon has increased relative to the previous month by 5%.

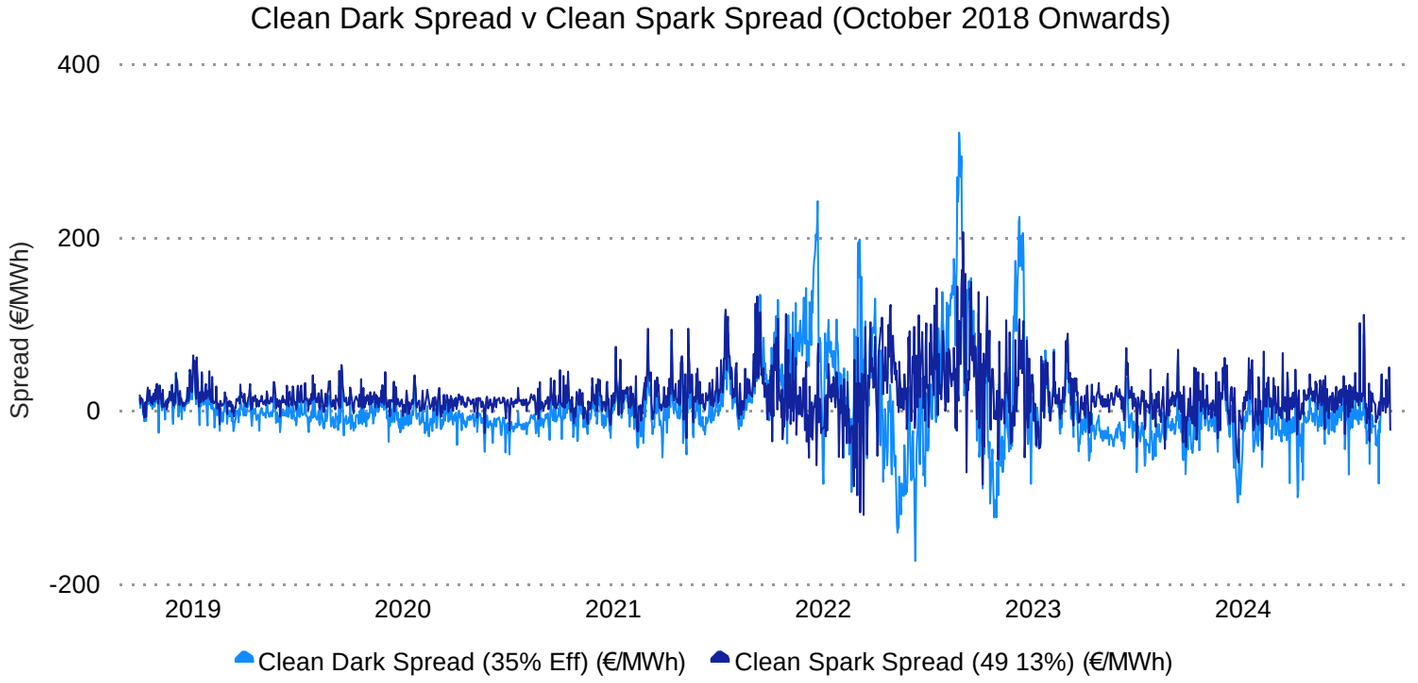
EU emission allowance prices have been trading lower for much of this year, alongside gas and power. We believe this pressure is likely to persist. EUA prices have been weighed down by a combination of bearish factors, including a sluggish industrial recovery, strong renewables output and limited power demand from mild weather.

Spark Spreads August 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 Cl Spark Spread

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

Clean Dark Spread has been negative for most of the month with a positive spread on 30th which corresponds to lower wi and higher prices. Clean Spark Spread was generally positive the whole month with a fall on when the wind increases for a sustained period.