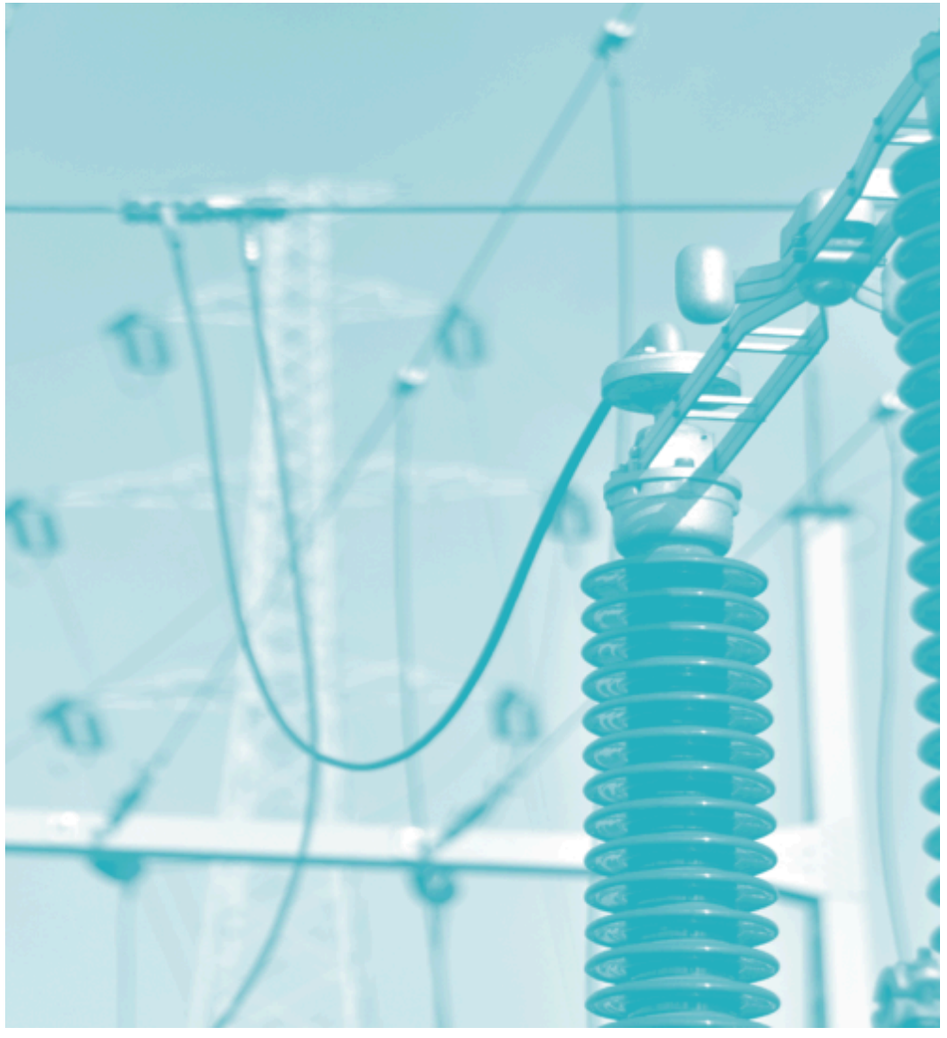


Energy Market Monitoring Report

June 2024

SEM committee

Market Results

Summary Dashboard

SEM committee

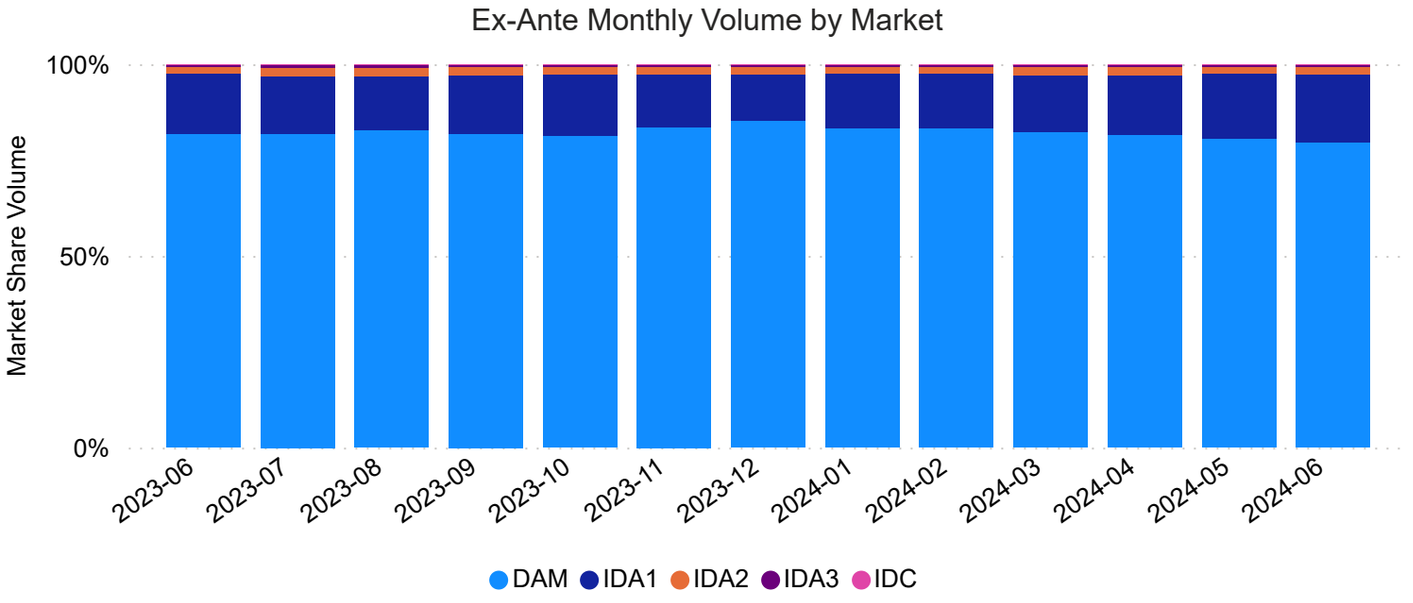
Monthly Averages	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24
DAM (€/MWh)	117.11	96.24	106.46	111.62	125.54	122.9	88.97	99.9	84.6	86.67	88.52	107.75	107.74
% Change from previous month	11%	-18%	11%	5%	12%	-2%	-28%	12%	-15%	2%	2%	22%	0%
% Change from previous year	-36%	-64%	-73%	-61%	-8%	-14%	-68%	-38%	-47%	-40%	-30%	2%	-8%
Actual System Demand (MW)	4189	4101	4185	4335	4516	4873	4862	5151	4946	4833	4610	4356	4193
% Change from previous month	-2%	-2%	2%	4%	4%	8%	0%	6%	-4%	-2%	-5%	-6%	-4%
% Change from previous year	0%	0%	2%	3%	4%	5%	0%	5%	3%	0%	3%	2%	0%
Actual Wind Generation (MW)	878	1316	1401	1384	1363	1811	2446	1854	2000	2072	1496	894	1072
% Change from previous month	-1%	50%	6%	-1%	-2%	33%	35%	-24%	8%	4%	-28%	-40%	20%
% Change from previous year	-22%	54%	71%	28%	-33%	-19%	49%	-7%	-1%	19%	-3%	1%	22%
Gas Price p/therm	77.87	70.76	82.87	91.52	104.88	104.97	84.2	74.87	63.37	68.18	71.69	76.69	81.51
% Change from previous month	8%	-9%	17%	10%	15%	0%	-20%	-11%	-15%	8%	5%	7%	6%
% Change from previous year	-44%	-68%	-77%	-61%	3%	-19%	-68%	-52%	-53%	-39%	-29%	6%	5%
Carbon Price (€/Tonne)	85.51	86.57	84.61	82.09	81.10	76.25	71.79	65.52	55.79	57.94	63.25	70.90	68.29
% Change from previous month	2%	1%	-2%	-3%	-1%	-6%	-6%	-9%	-15%	4%	9%	12%	-4%
% Change from previous year	2%	6%	-4%	17%	15%	1%	-16%	-18%	-39%	-35%	-30%	-16%	-20%
Coal Price ($/tonne)	112.56	111.02	115.57	120.40	131.80	122.16	118.31	107.65	96.84	111.78	118.13	106.15	109.54
% Change from previous month	-6%	-1%	4%	4%	9%	-7%	-3%	-9%	-10%	15%	6%	-10%	3%
% Change from previous year	-67%	-71%	-67%	-65%	-52%	-43%	-51%	-38%	-29%	-17%	-14%	-11%	-3%
EWIC % Import Periods	77.72%	67.11%	68.11%	73.75%	86.90%	68.78%	56.38%	69.76%	69.10%	63.78%	81.94%	84.98%	85.90%
EWIC % Export Periods	4.06%	9.21%	11.96%	8.89%	2.99%	9.11%	20.36%	14.78%	11.00%	11.32%	4.86%	0.67%	3.72%
EWIC % Not Flow Periods	18.22%	22.68%	19.93%	17.36%	10.11%	22.11%	23.25%	15.46%	19.90%	24.90%	13.19%	14.35%	10.38%
Moyle % Import Periods	92.22%	84.04%	75.24%	83.33%	92.31%	83.47%	67.81%	78.16%	79.59%	79.00%	87.40%	94.96%	92.47%
Moyle % Export Periods	7.67%	15.89%	20.33%	16.60%	7.66%	16.50%	32.16%	21.81%	20.34%	20.83%	12.50%	5.27%	7.53%
Moyle % Not Flow Periods	0.10%	0.07%	4.44%	0.07%	0.03%	0.03%	0.03%	0.03%	0.07%	0.17%	0.10%	0.03%	0.00%

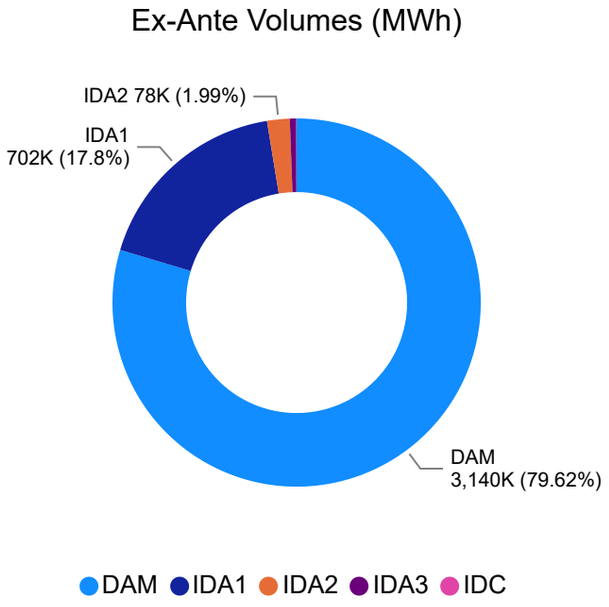
Market Volumes
June 2024

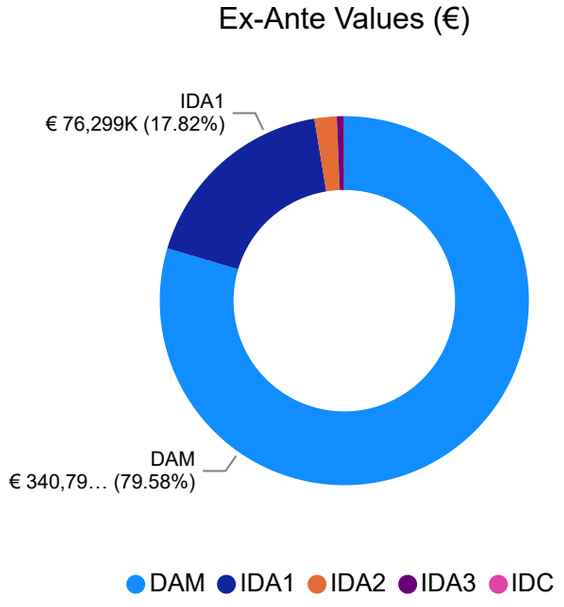
Daily Average Volume	MWh
DAM	104,679
IDA1	23,408
IDA2	2,612
IDA3	741
IDC	48

Total Monthly Volume	MWh
DAM	3,140,379
IDA1	702,231
IDA2	78,366
IDA3	22,223
IDC	1,097
Total	**3,944,295**

Total Market Value	€
DAM	€ 340,798,281
IDA1	€ 76,299,483
IDA2	€ 8,343,516
IDA3	€ 2,670,697
IDC	€ 116,259
Total	**€ 428,228,237**







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 June 2024

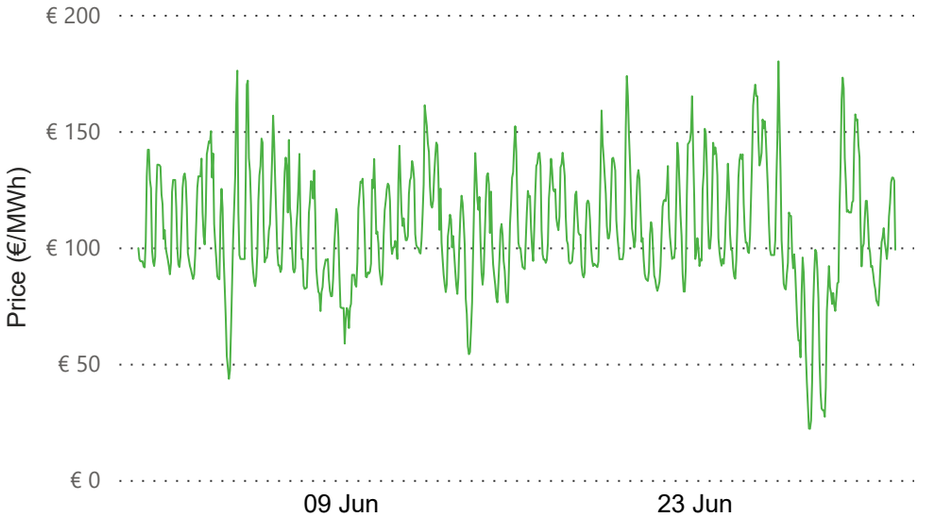
€ 107.74
Average DAM Price

€ 22.00
Min DAM Price

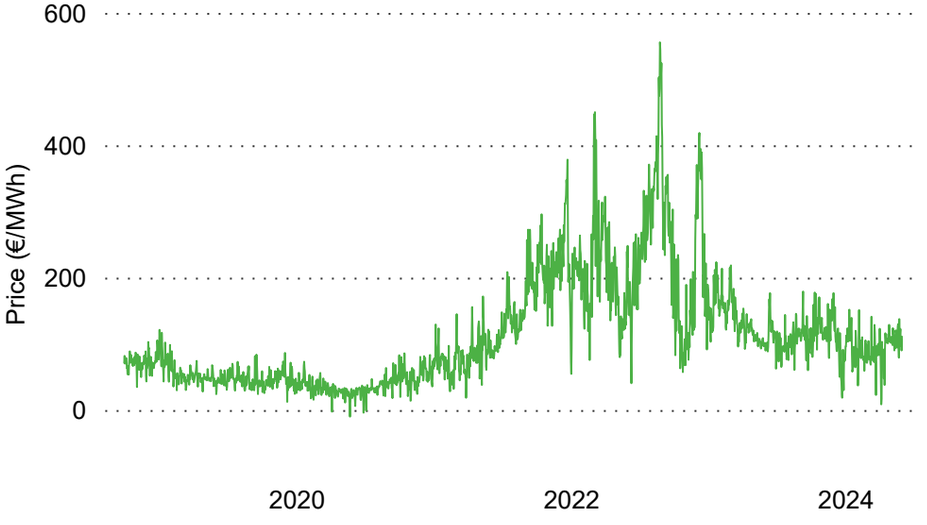
€ 180.00
Max DAM Price

The most frequent price range for May was between €90 and €120

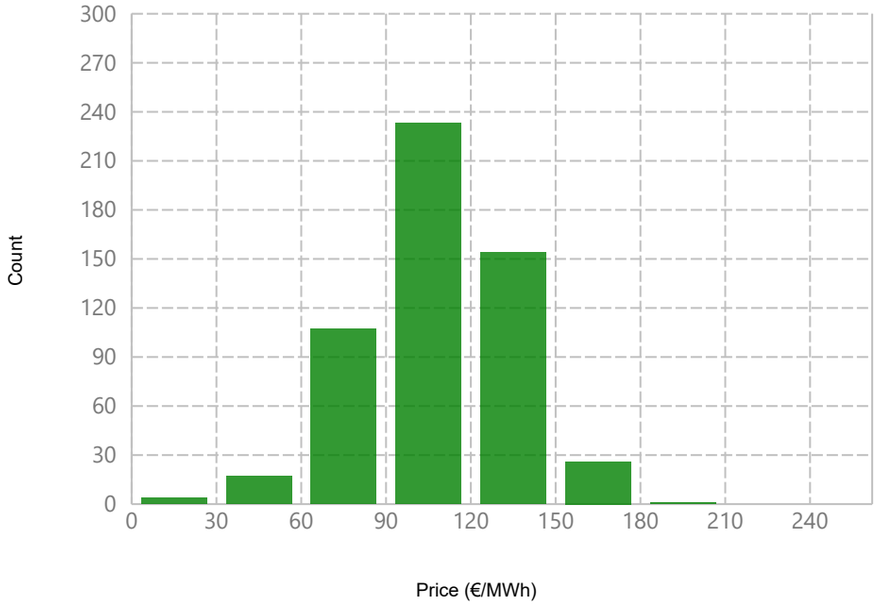
DAM Prices



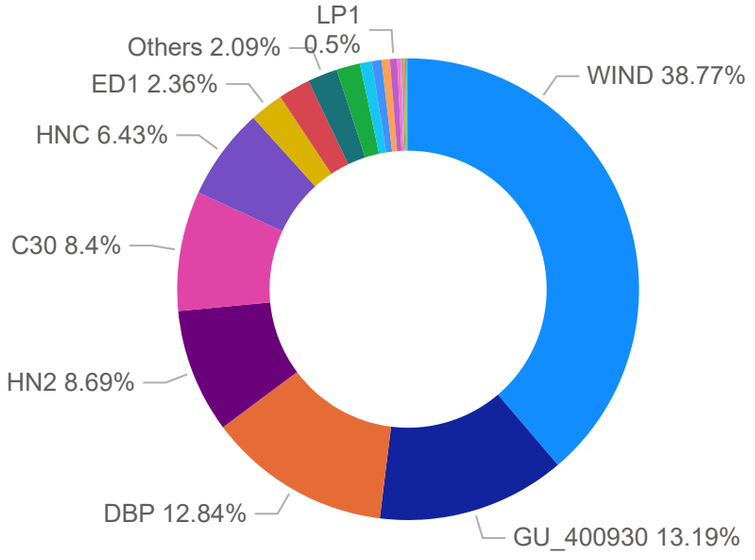
Historic Daily Average DAM Prices



Histogram of DAM Prices



DAM Sell Side Generator Order Results



Intraday Market June 2024

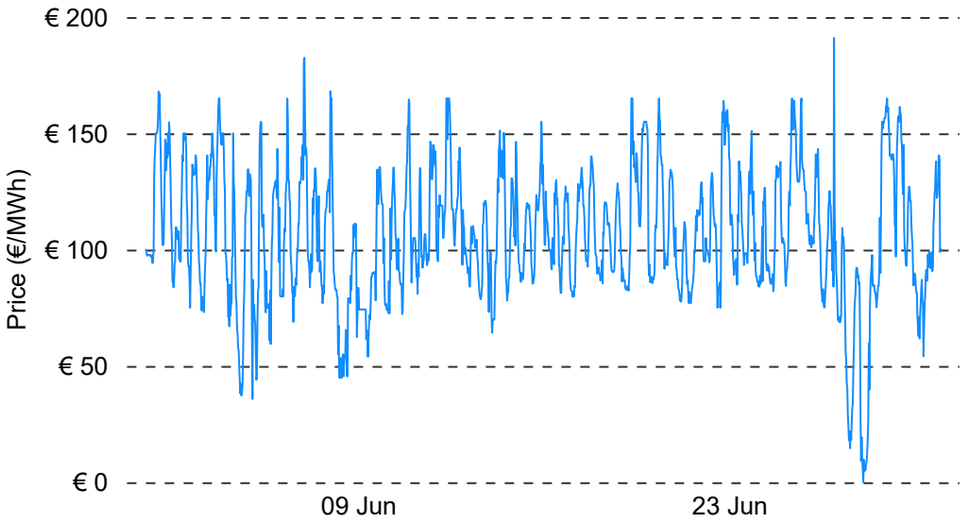
€ 106.20
Average IDA1 Price

€ 0.00
Min IDA1 Price

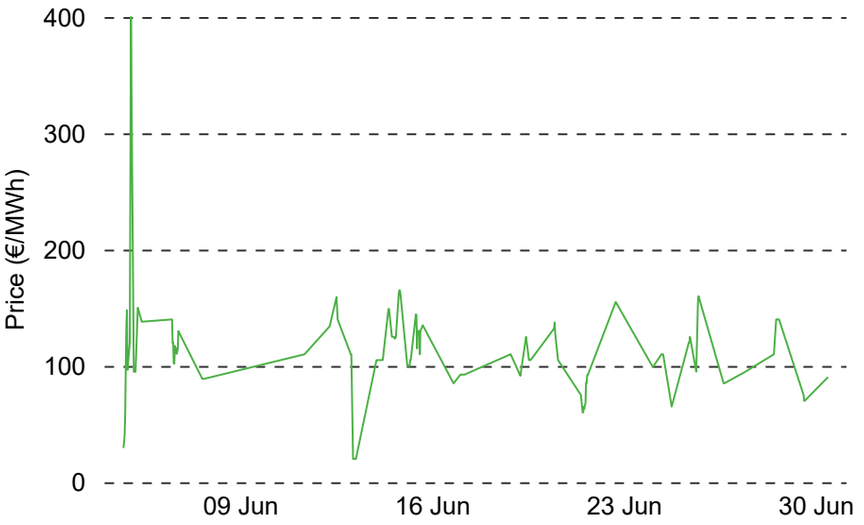
€ 191.00
Max IDA1 Price

The most frequent price range for May was between €90 and €120

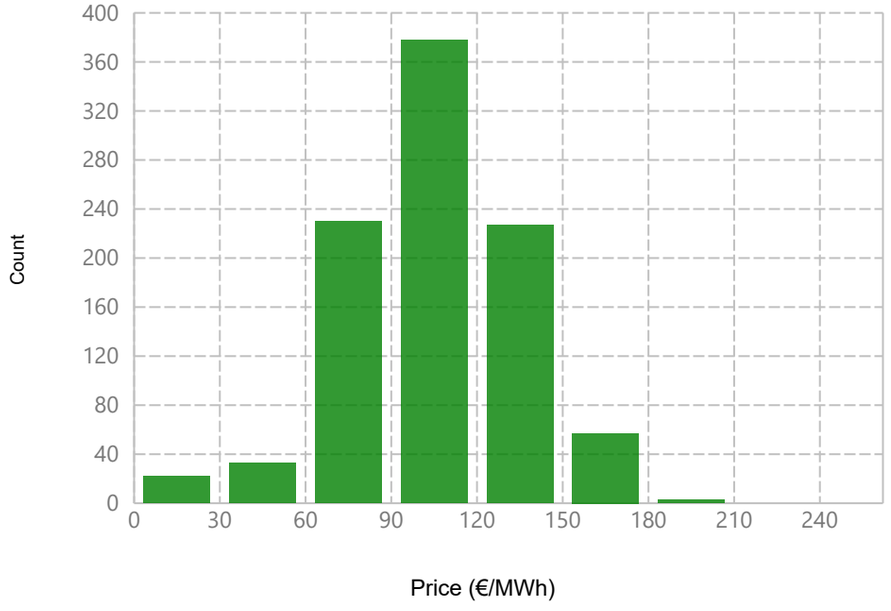
IDA 1 Prices



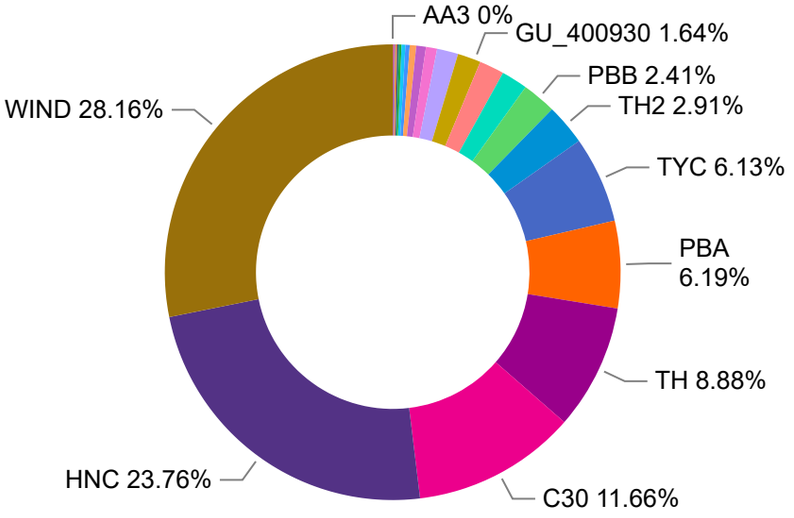
IDC Prices



Histogram of IDA1 Prices



IDA1 Sell Order Results By Market Participant



Intraday Market June 2024

SEM Day Ahead Price

€ 107.74
Average Price

€ 22.00
Min Price

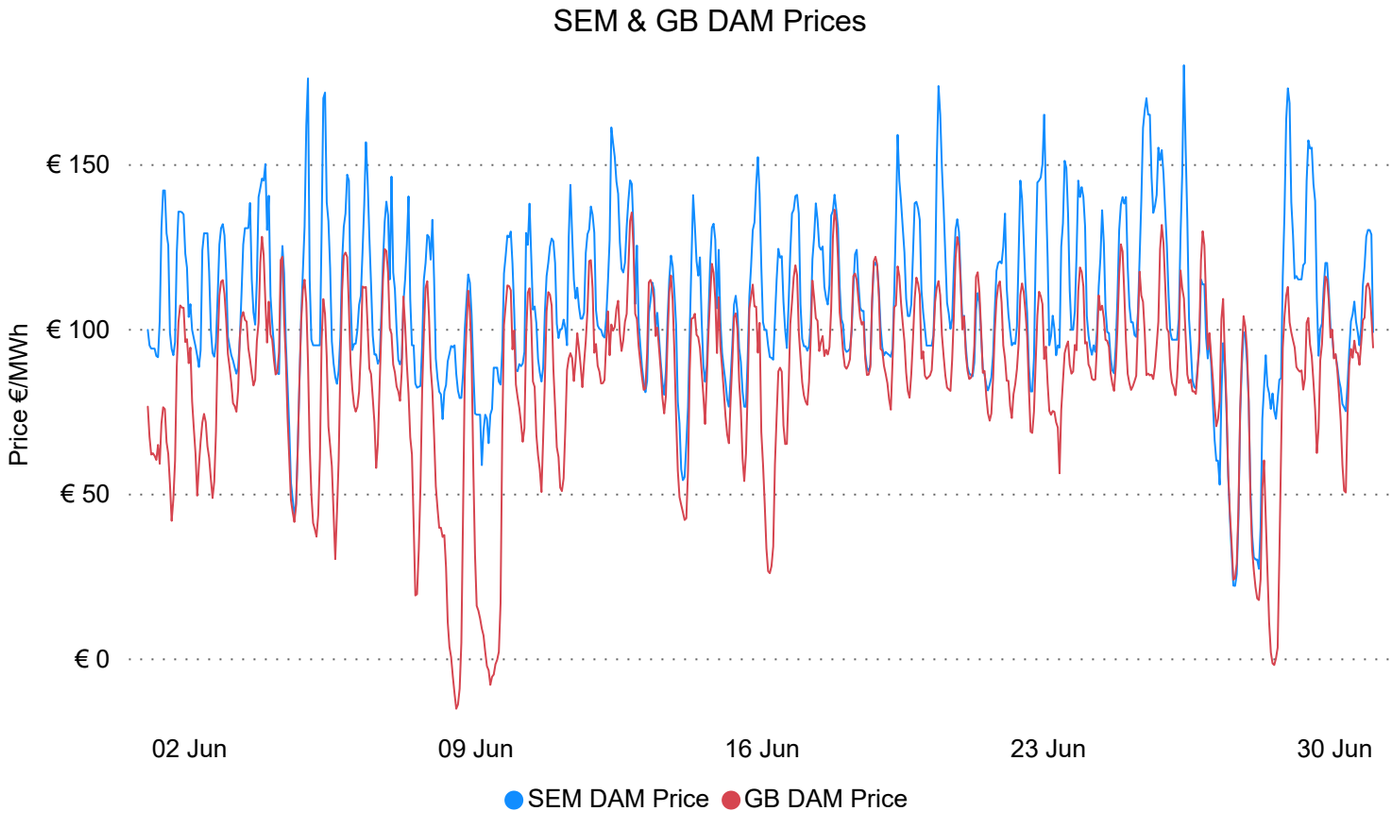
€ 180.00
Max Price

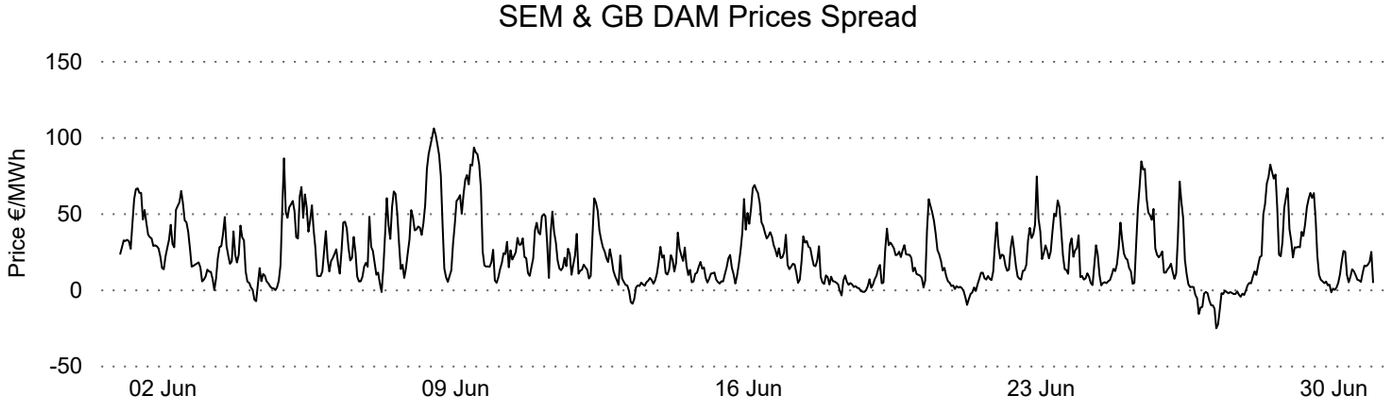
GB Day Ahead Price

€ 84.27
Average Price

-€ 15.29
Min Price

€ 136.17
Max Price





SEM committee

SEM-GB Price Differential

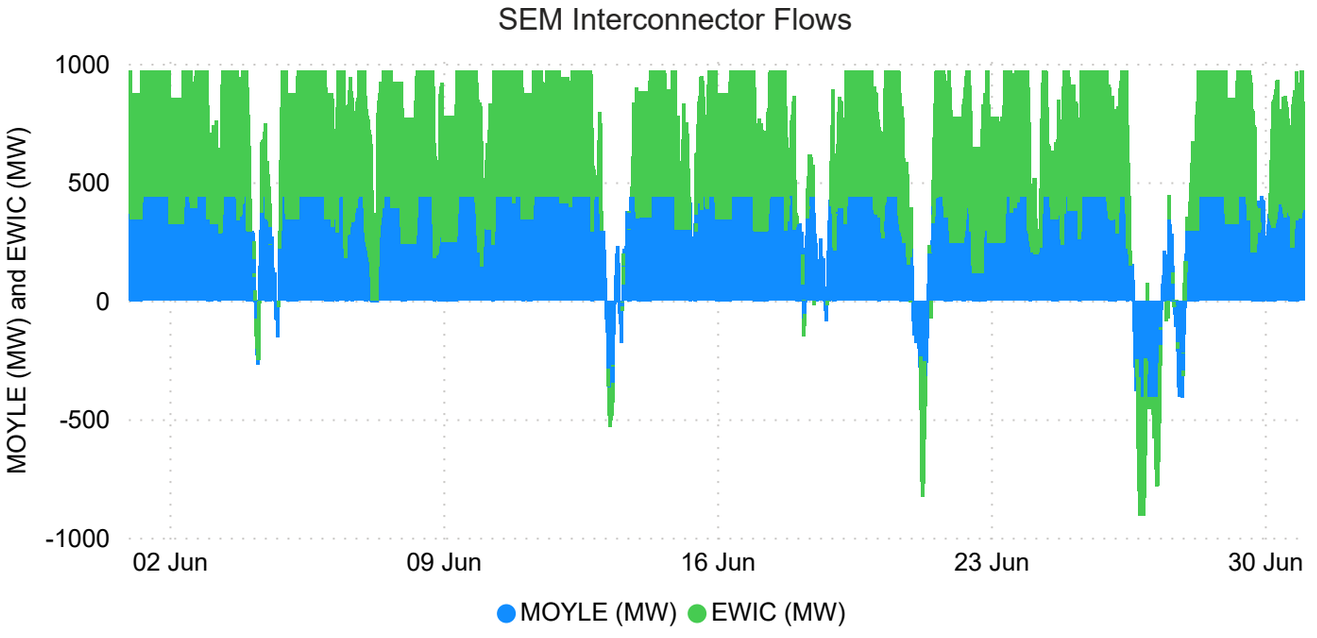
The charts show that the SEM and GB prices appear to follow the same general trend. Significant spreads can be observed on several occasions. The MMU has investigated the underlying reasons for these spreads and the findings are consistent with those discussed with the SEMC previously.

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 June 2024

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

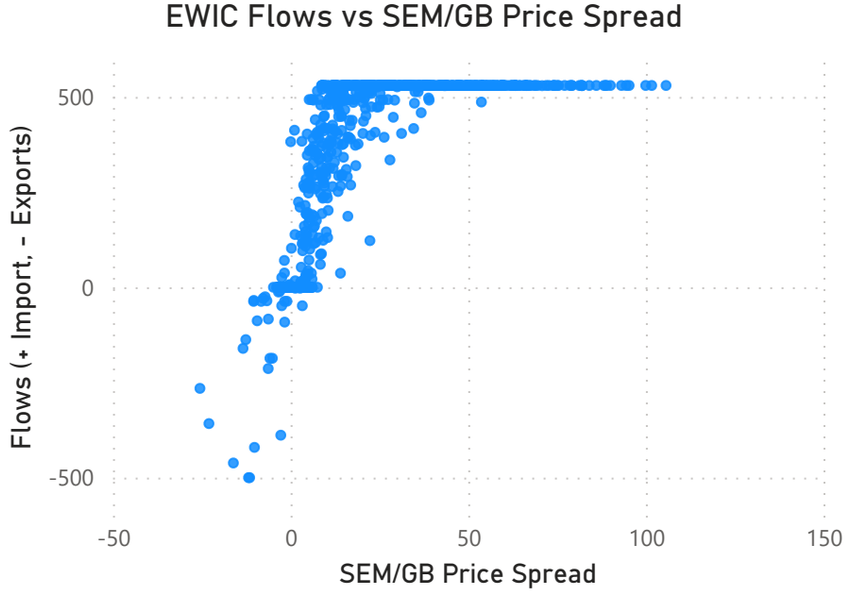
Moyle	EWIC
5th 07:00- 23:00	6th 05:00 - 23:00
6th 06:00 - 23:00	11th 10:00 - 22:00
10th 07:00 - 23:00	12th 06:00 - 12:00
12th 04:00 - 22:00	14th 07:00 - 23:59
19th 06:00 - 21:00	15th 00:00 - 23:59
20th 07:00 - 12:00	16th 00:00 - 23:59
25th 05:00 - 22:00	17th 00:00 - 23:59
26th 06:00 - 11:00	18th 00:00 - 22:00
	19th 06:00 - 20:00
	20th 06:00 - 11:00
	23rd 07:00 - 22:00
	24th 07:00 -10:00
	25th 00:00 -23:00
	29th 06:00 -13:00

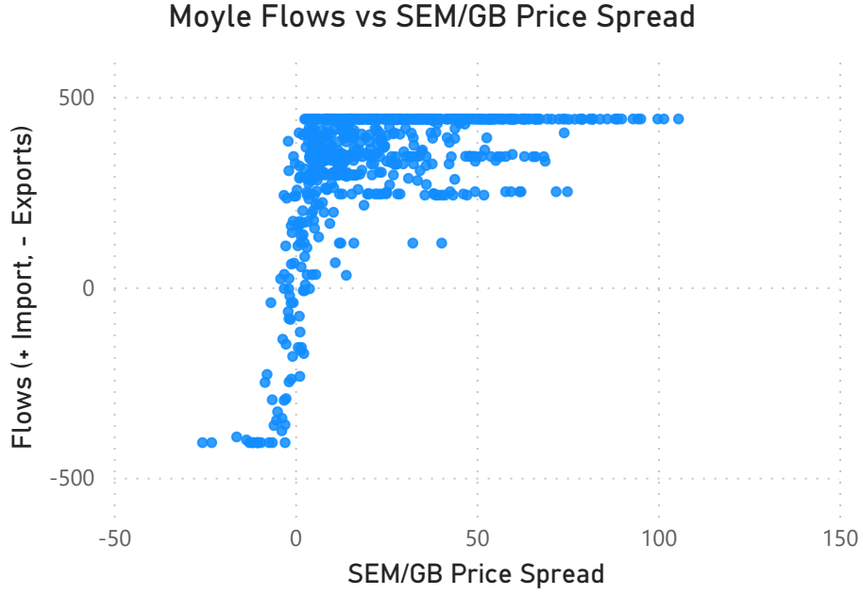


Interconnector Flows

In June, the SEM Interconnectors primarily 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 imports volumes were slightly higher than Moyle and exports were lower than that of Moyle.

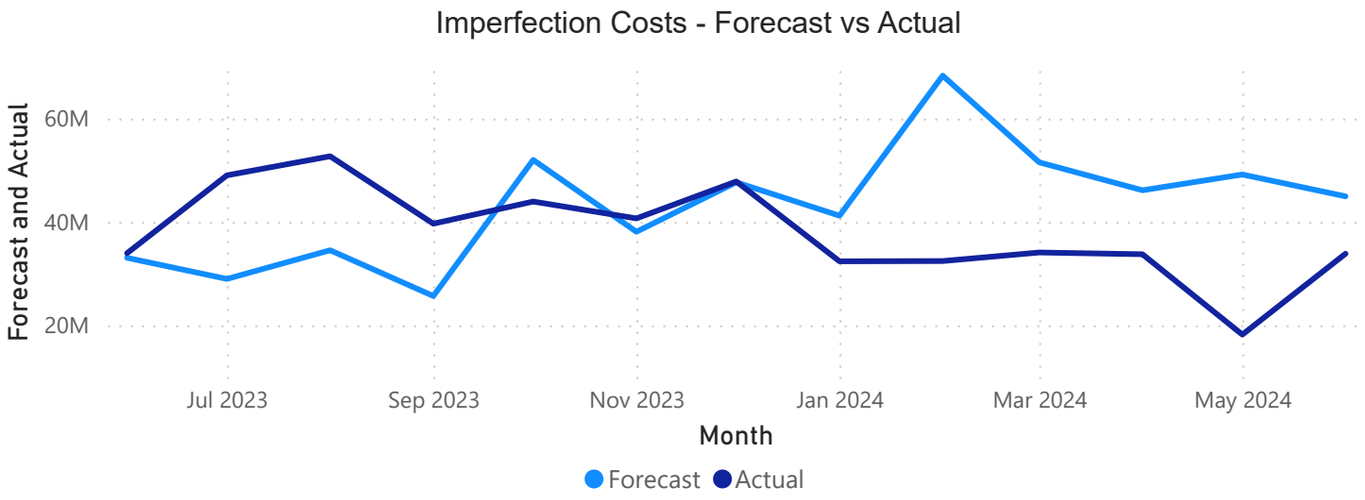




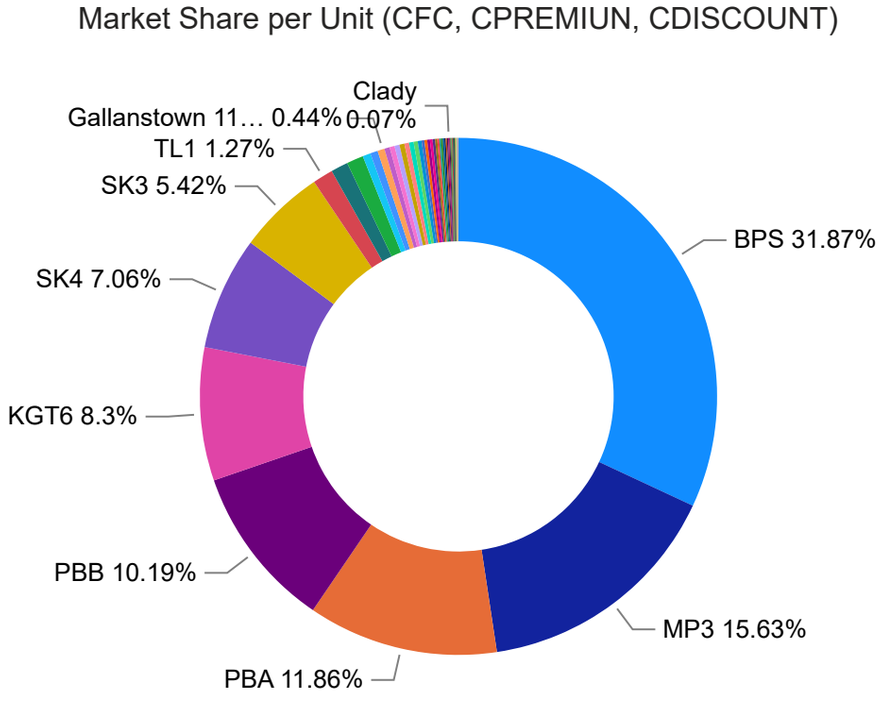
Balancing Market June 2024

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 €
CABBPO	14,602.57
CAOOPO	-118,168.66
CCURL	-655,785.21
CDISCOUNT	13,803,507.60
CFC	8,866,619.87
CPREMIUM	12,422,545.14
CTEST	-13,229.35
CUNIMB	-455,035.65
Total	**33,865,056.31**



Constraints Payments

This charts illustrates the distribution of selected Constraint Payments, to specific power plants. As it can be seen, BPS (EP Ballylumford Ltd) was the largest receiver of these payments this month followed by MoneyPoint 3 and Poolbeg A. The distribution of Constraint Payment has not changed substantially in the last few months.

The MMU would note that the new EP Kilroot GT6 is now fully available on the system and has received significant constraint payments in June.

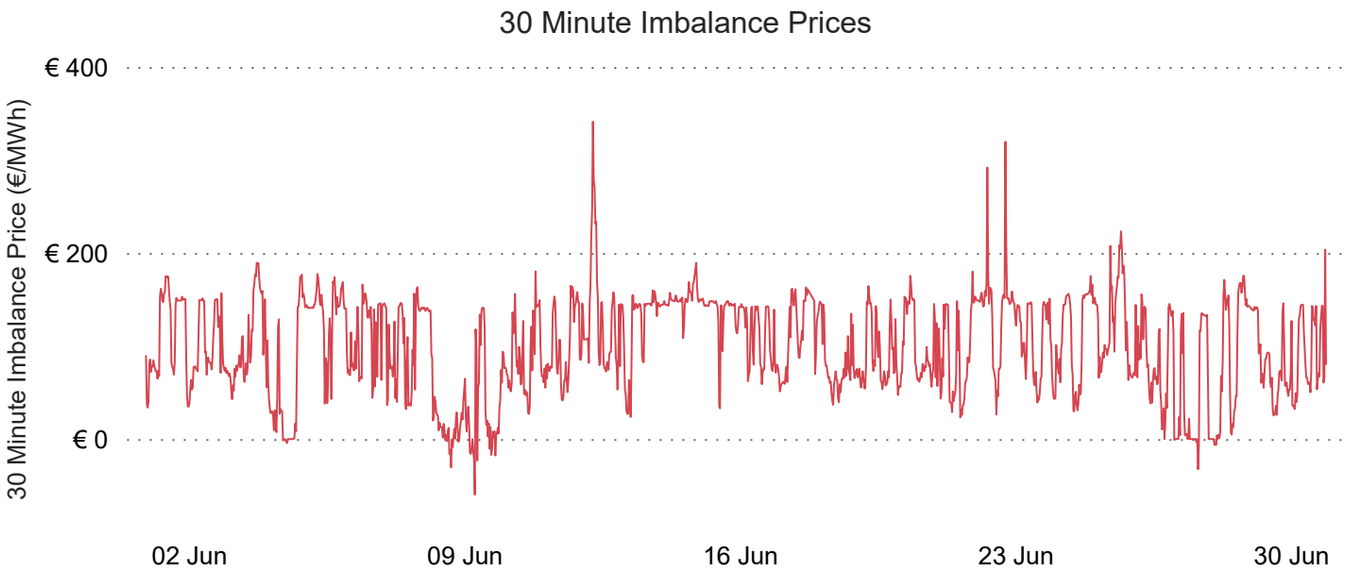
Balancing Market June 2024

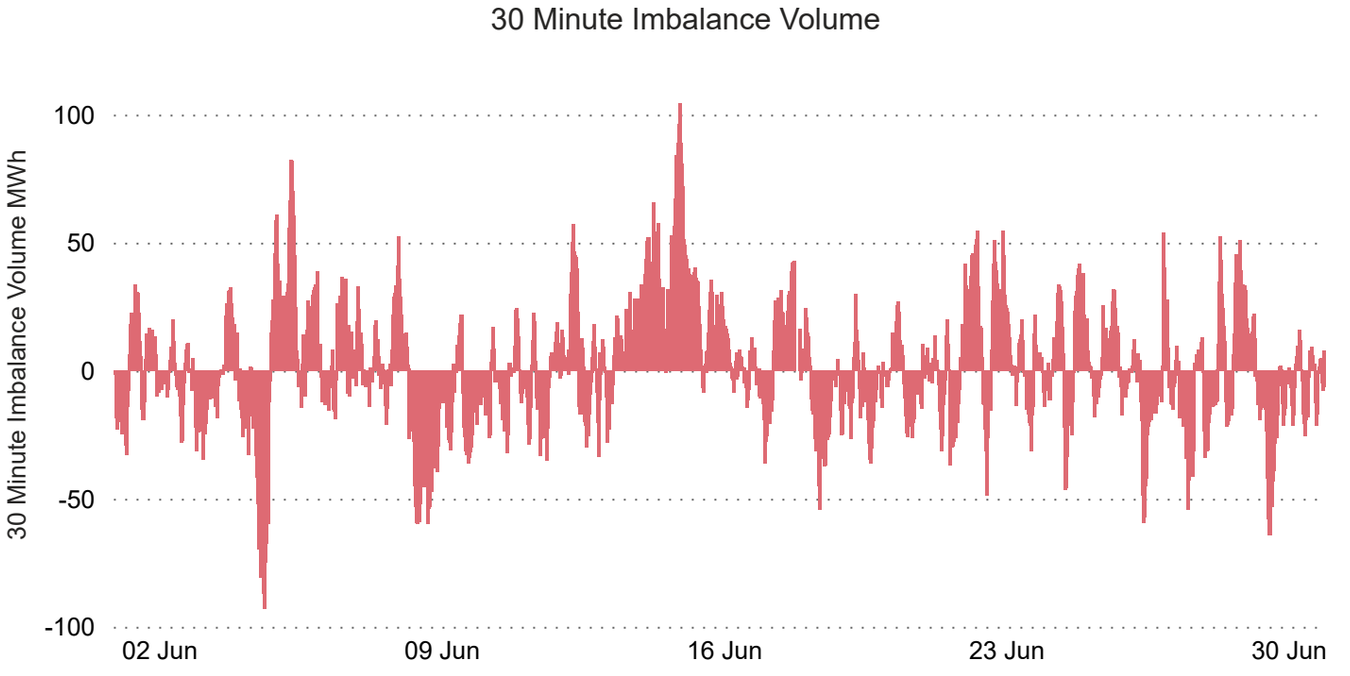
30 Minutes Imbalance Price

€ 99.01
Average Price

-€ 59.73
Lowest Price

€ 341.12
Highest Price





Imbalance Price & Volumes

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

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

Demand and Generation Mix

Demand June 2024

SEM Demand

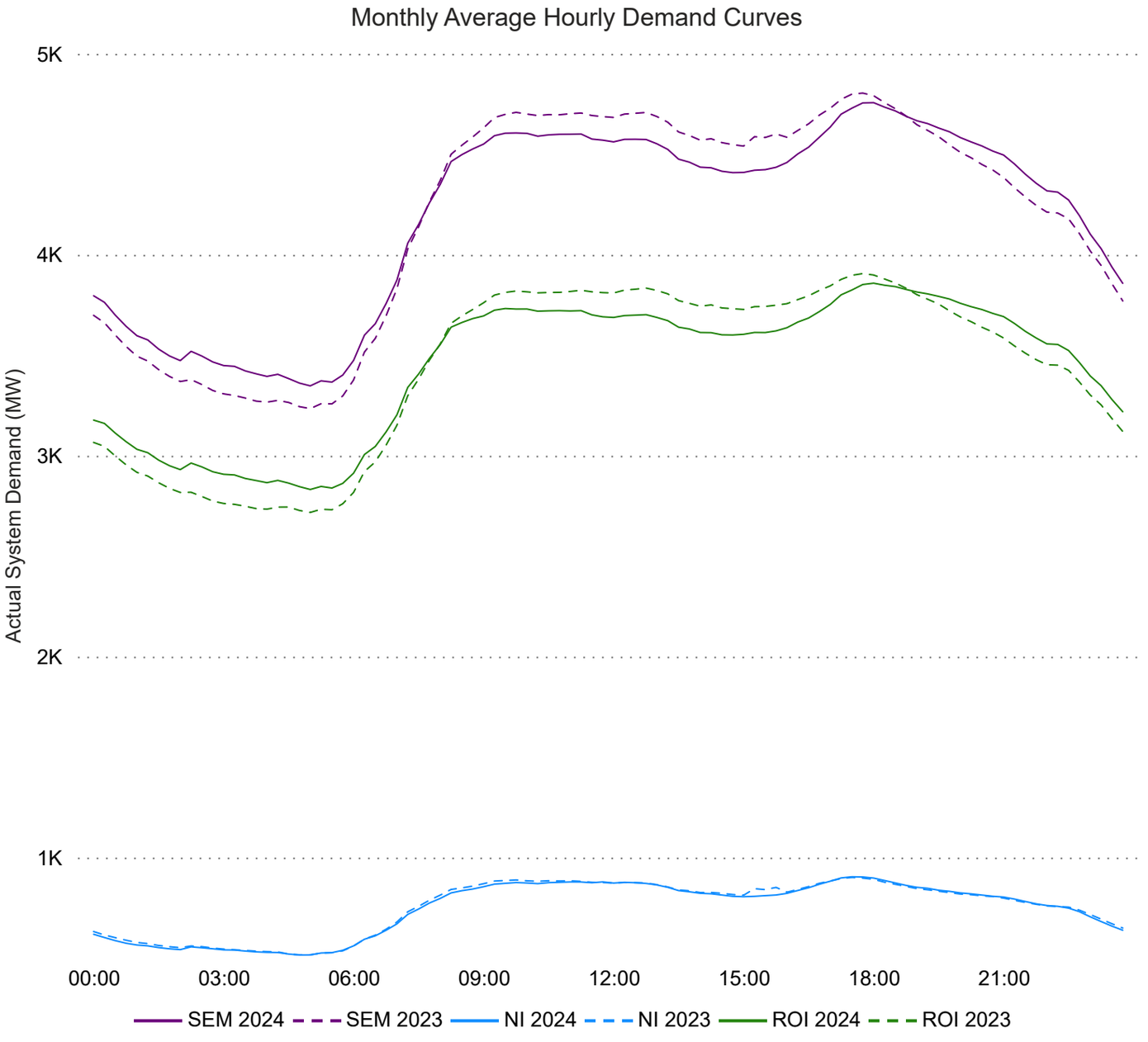
4,193.48 SEM Average 2024	4,188.50 SEM Average 2023
3,347.80 SEM Min 2024	3,234.67 SEM Min 2023
4,757.30 SEM Max 2024	4,804.83 SEM Max 2023

NI Demand

745.74 NI Average 2024	750.94 NI Average 2023
515.30 NI Min 2024	516.70 NI Min 2023
904.77 NI Max 2024	901.60 NI Max 2023

ROI Demand

3,447.75 ROI Average 2024	3,437.56 ROI Average 2023
2,832.13 ROI Min 2024	2,717.90 ROI Min 2023
3,858.83 ROI Max 2024	3,906.57 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 for ROI during the daylight period has decreased significantly compared to last year, while demand outside those hours has increased. Overall, the monthly average has only shown a slight increase of 0.29% from the previous year.

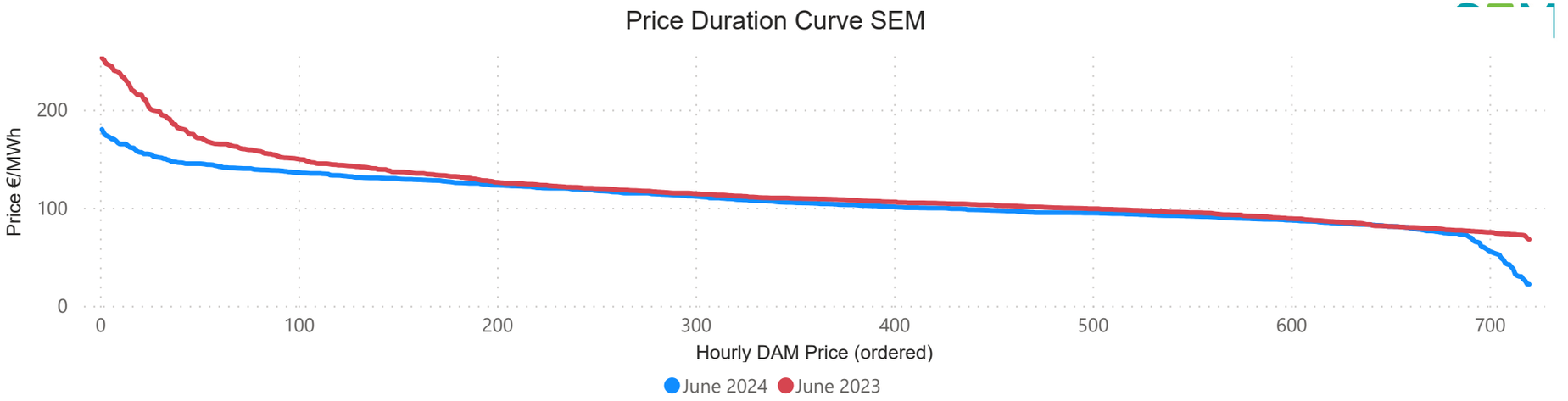
Demand in the SEM as a whole is up by 0.11% relative to the same period last year.

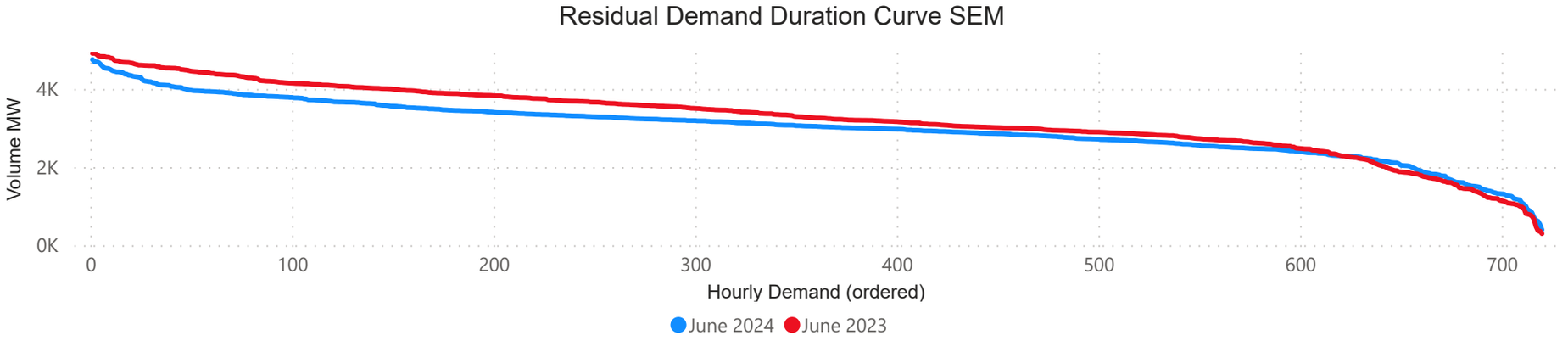
Duration Curves June 2024

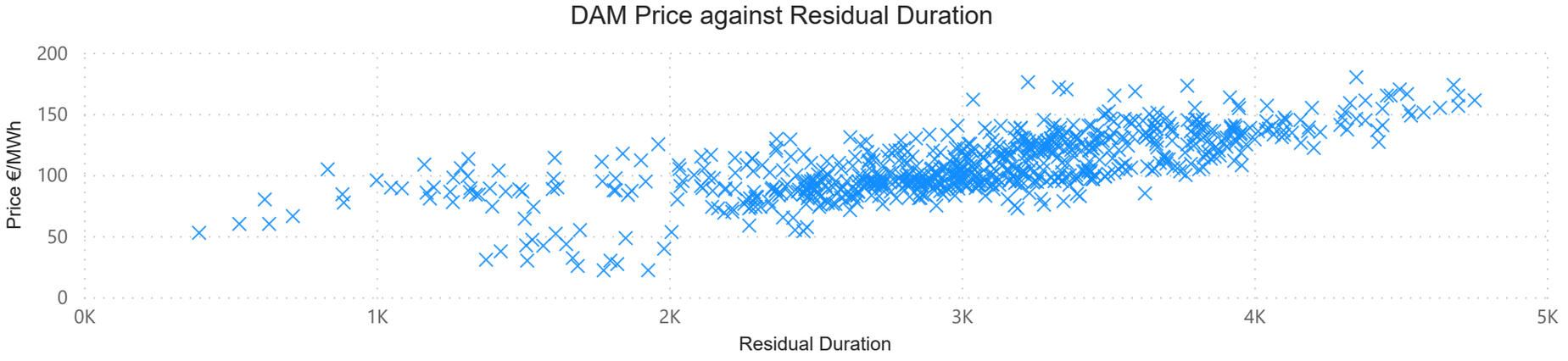
Price Duration
The price duration curve shows the hourly DAM prices across the month ordered from the largest to the smallest.

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.



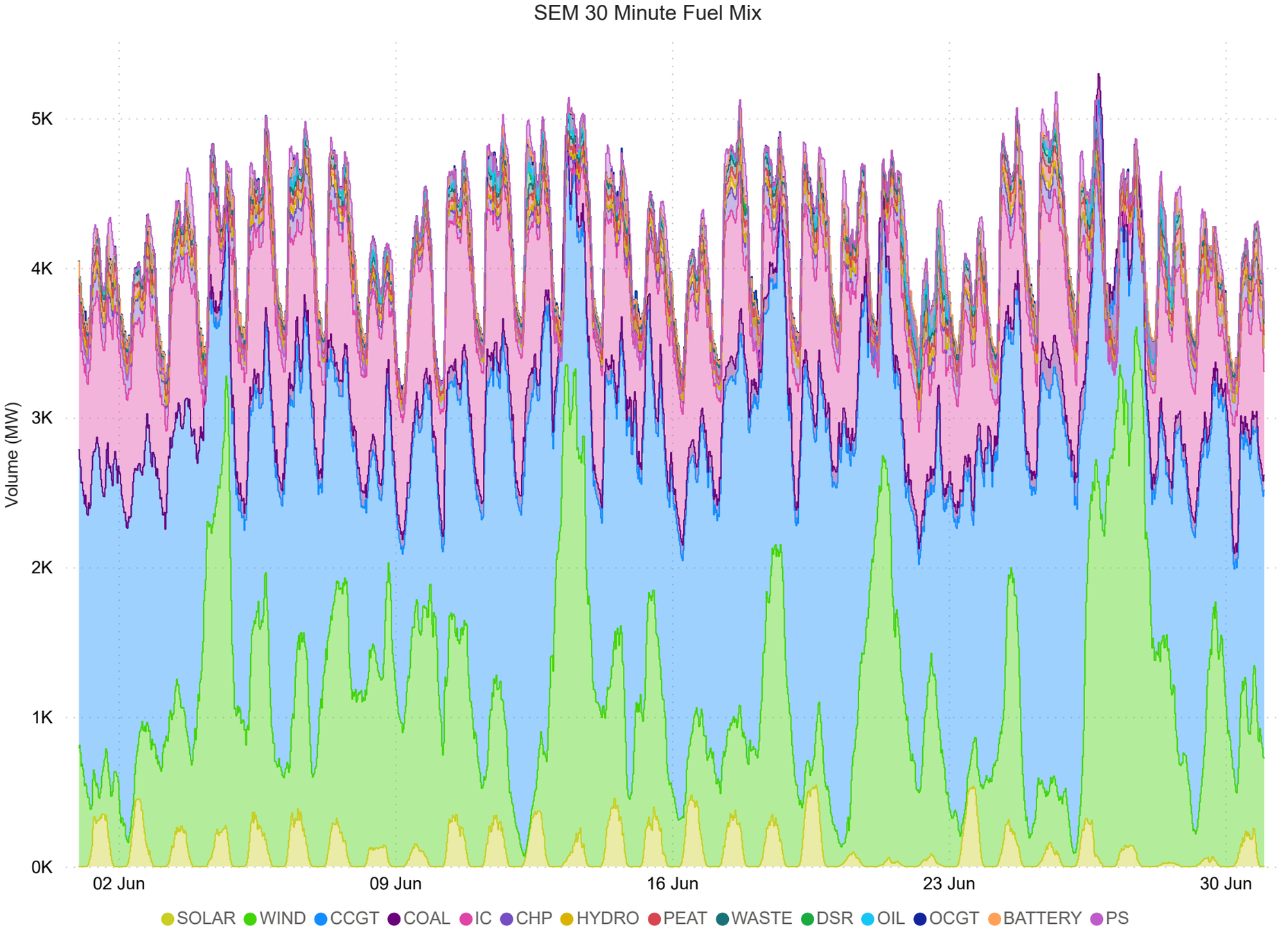




Fuel Mix
June 2024

Fuel Type	Avg Monthly	Per. Monthly
CCGT	1832	44.2%
WIND	1072	25.9%
INTERCONNECTORS	710	17.1%
CHP	125	3.0%
SOLAR	107	2.6%
COAL	100	2.4%
WASTE	76	1.8%
PEAT	67	1.6%
DSR	31	0.7%
OCGT	24	0.6%
HYDRO	19	0.5%
OIL	1	0.0%
BATTERY	-4	-0.1%
PUMPED STORAGE	-15	-0.4%

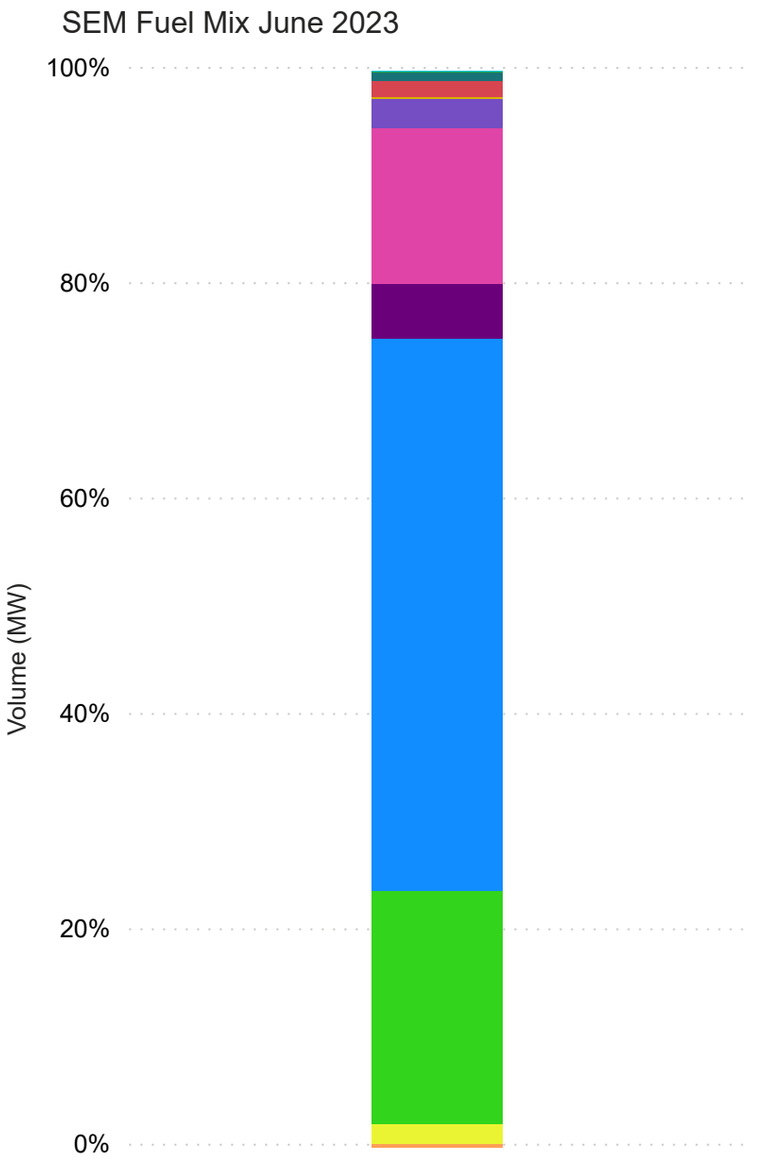
Fuel Type	Max Monthly	Min Monthly
WIND	3516	12
CCGT	3013	784
INTERCONNECTORS	979	-901
SOLAR	545	0
PUMPED STORAGE	293	-302
COAL	254	0
OCGT	194	0
DSR	172	0
CHP	164	58
PEAT	105	41
HYDRO	84	0
WASTE	81	36
OIL	71	0
BATTERY	65	-90

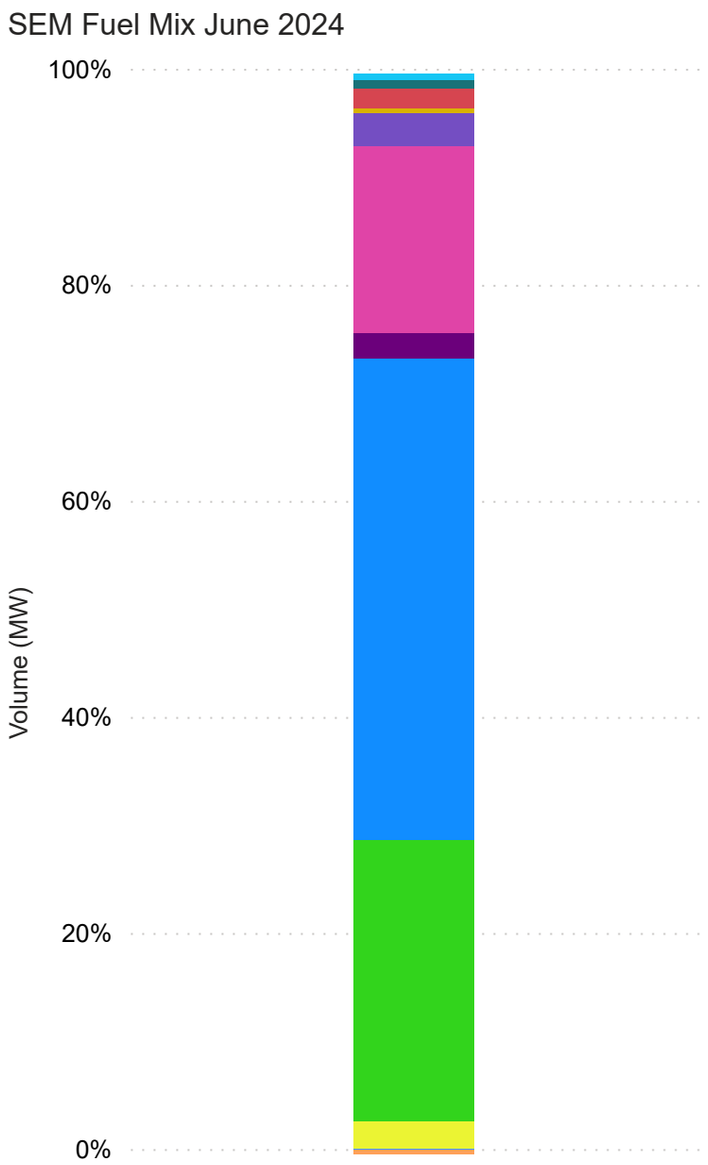


Fuel Mix Comparison June 2023 & 2024

SEM committee

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





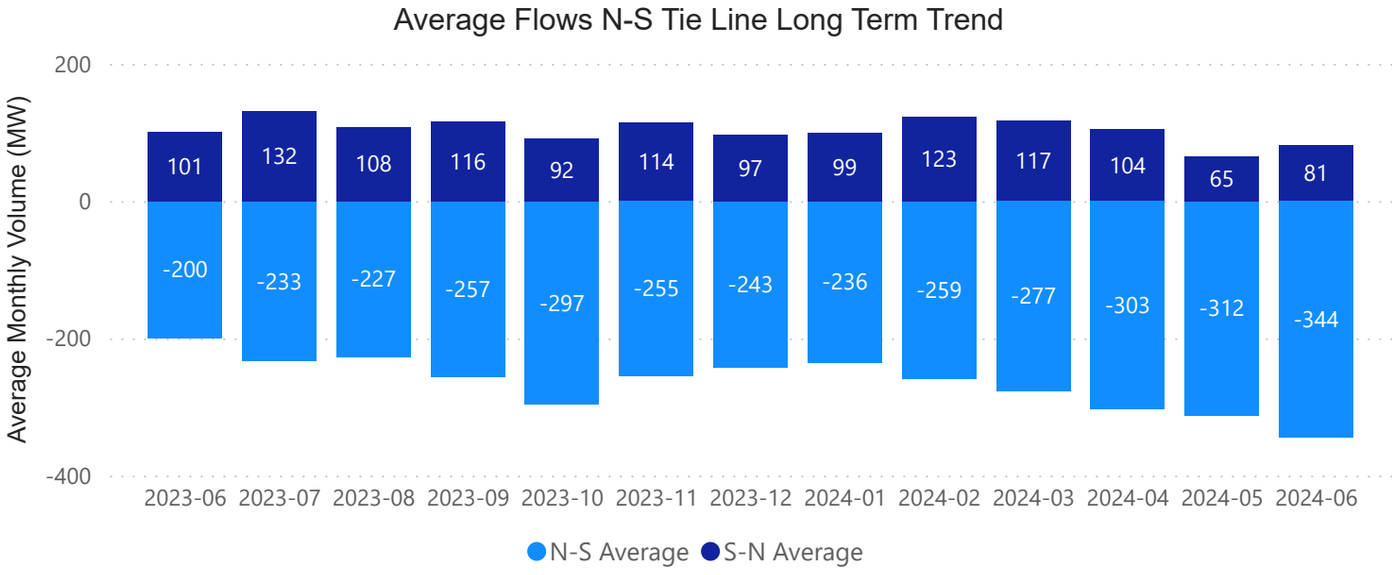
North-South Tie Line June 2024

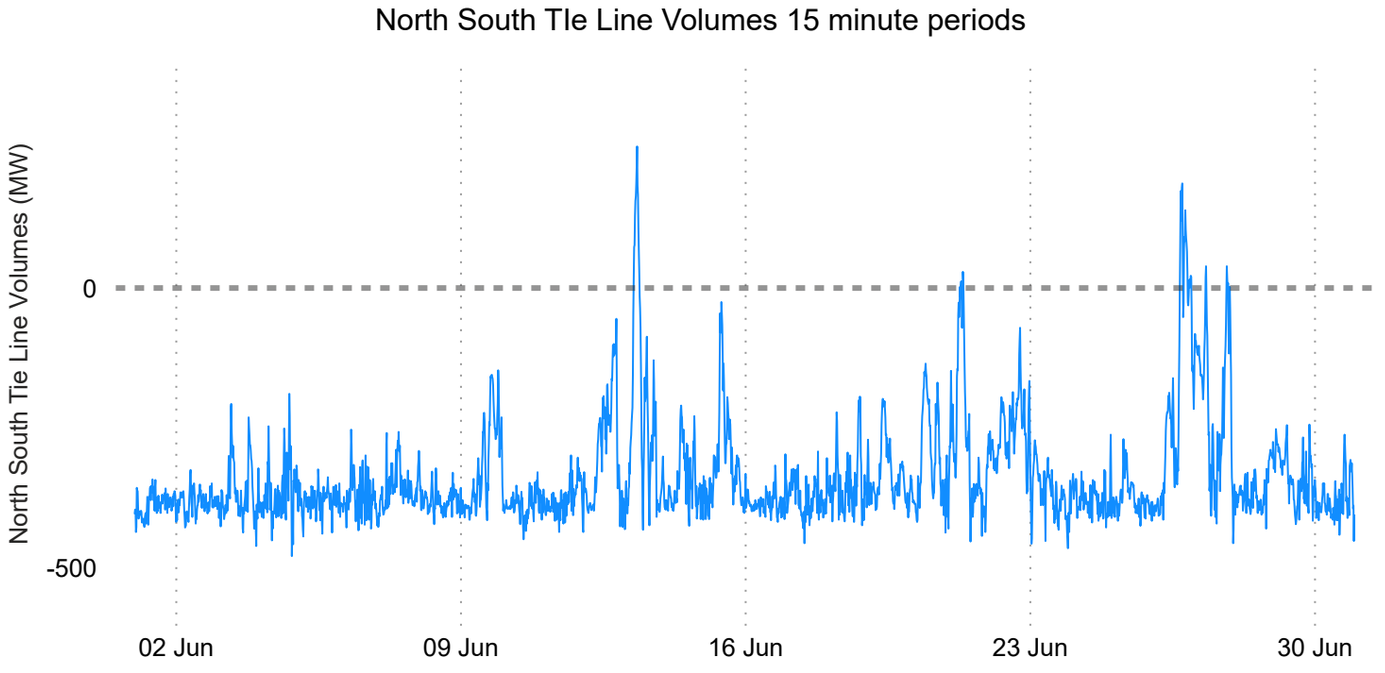
Average Flow NI to ROI (MW)
-344.36

Average Flow ROI to NI (MW)
81.04

Average Net Flow NI to ROI (MW)
-337.19

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





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.

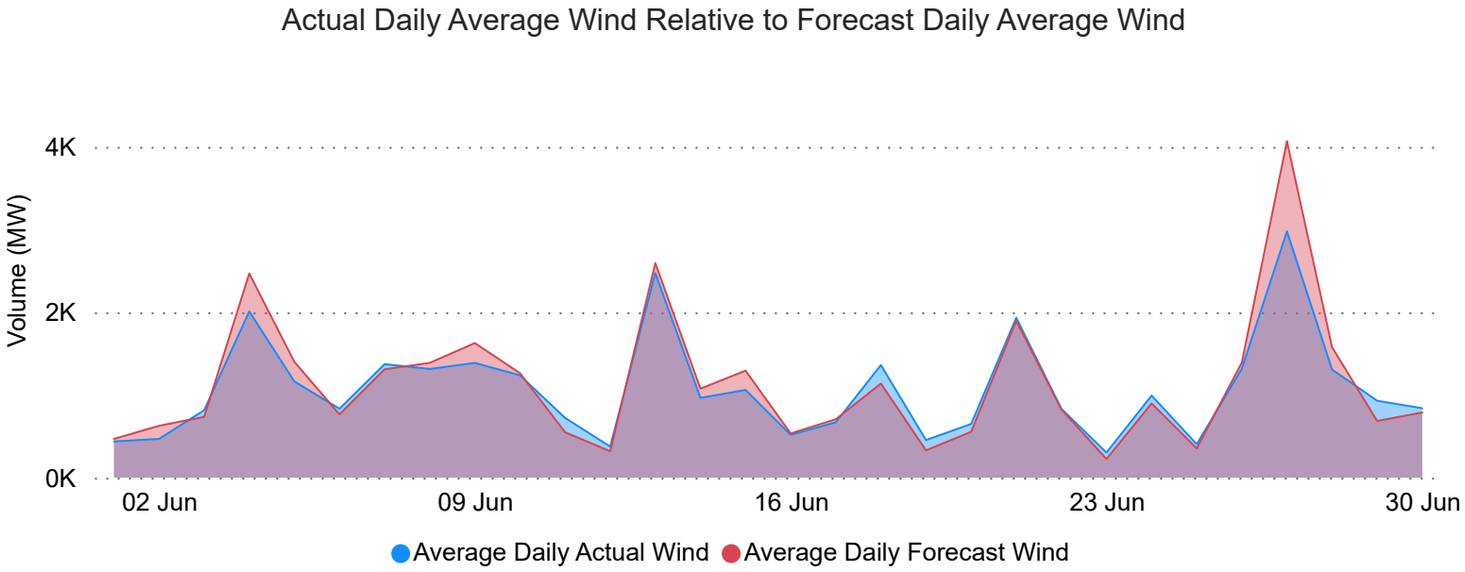
Wind Generation June 2024

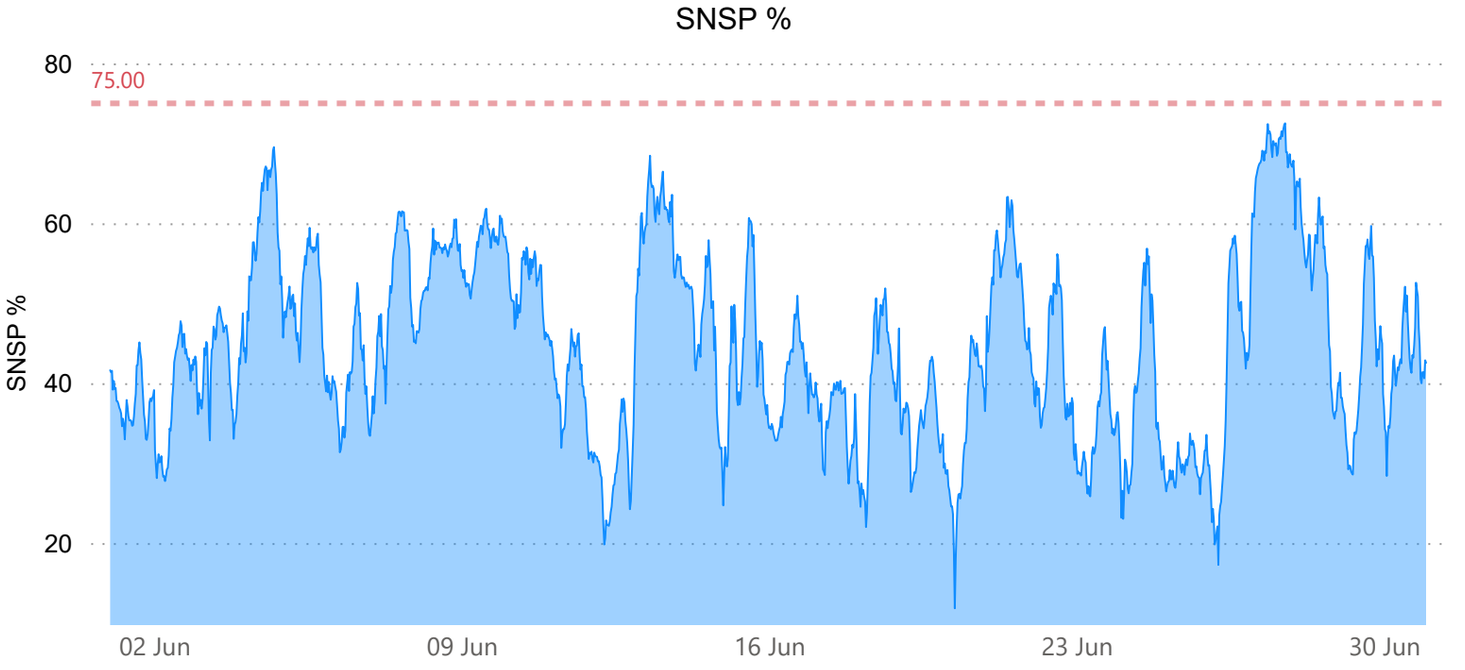
Average Daily Actual Wind (MW)
1,072

Average Daily Forecast Wind (MW)
1,129

Min SNSP%
11.84

Max SNSP%
72.51





Wind Generation

Wind generation increased by 20% from May-2024 (the lowest point of the year) and by 22% when compared to 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 June 2024

CO2 Intensity (gCO2/kWh)

237.65
Average

135
Lowest

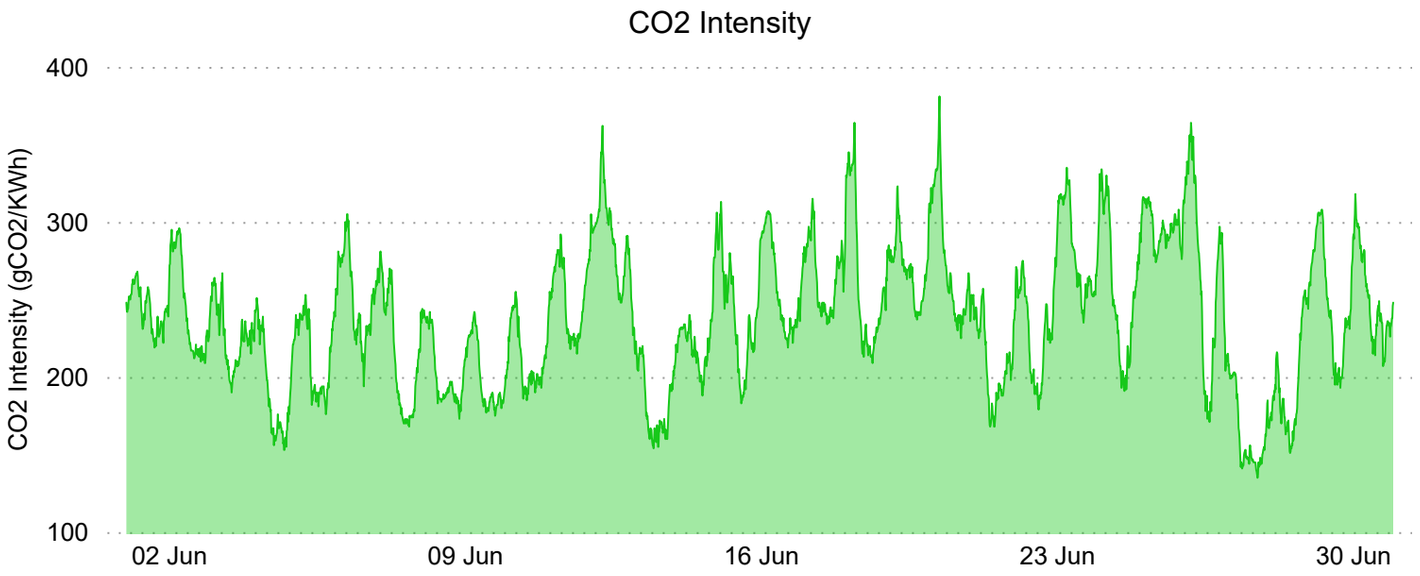
381
Highest

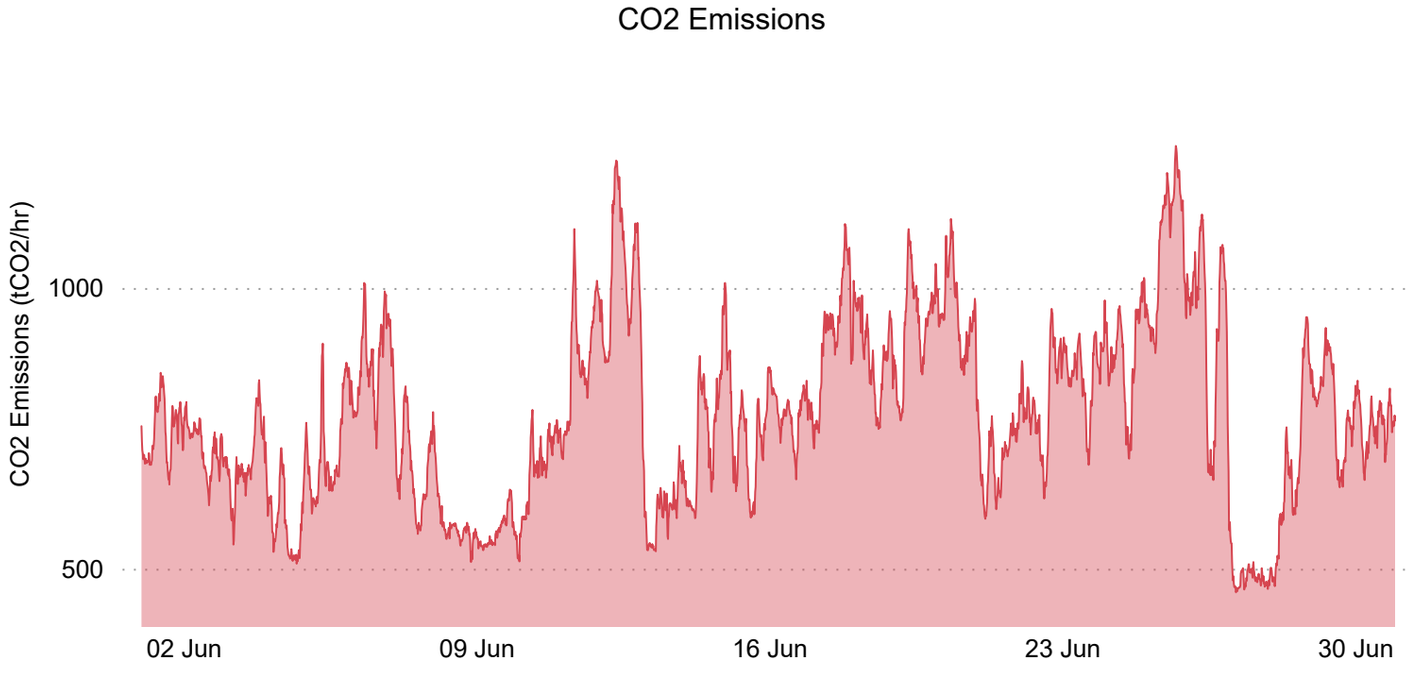
CO2 Emissions (tCO2/hr)

774
Average

458
Lowest

1253
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.

CO2 emissions have dropped in recent months when compared with 2023 levels. This can be attributed to the following factors:

- the elimination of peat generation
- increased solar generation
- continued increased reliance on imports

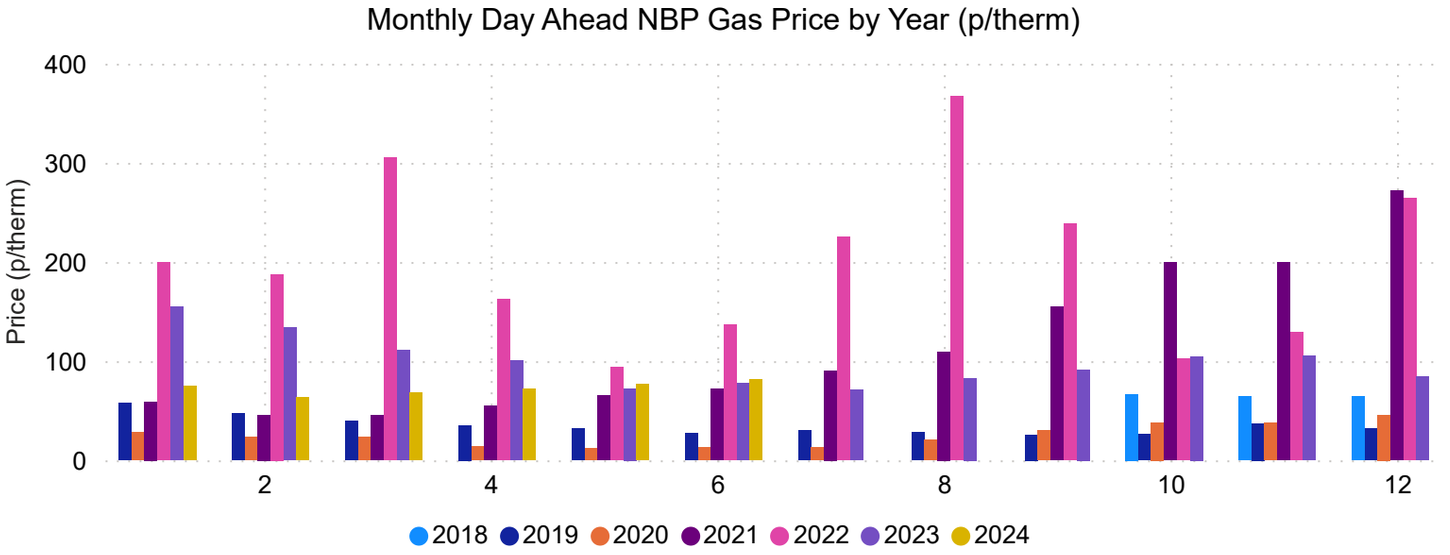
Fuel Costs and Spreads

Gas Price June 2024

81.51
Monthly Average (p/therm)

78.05
Monthly Low (p/therm)

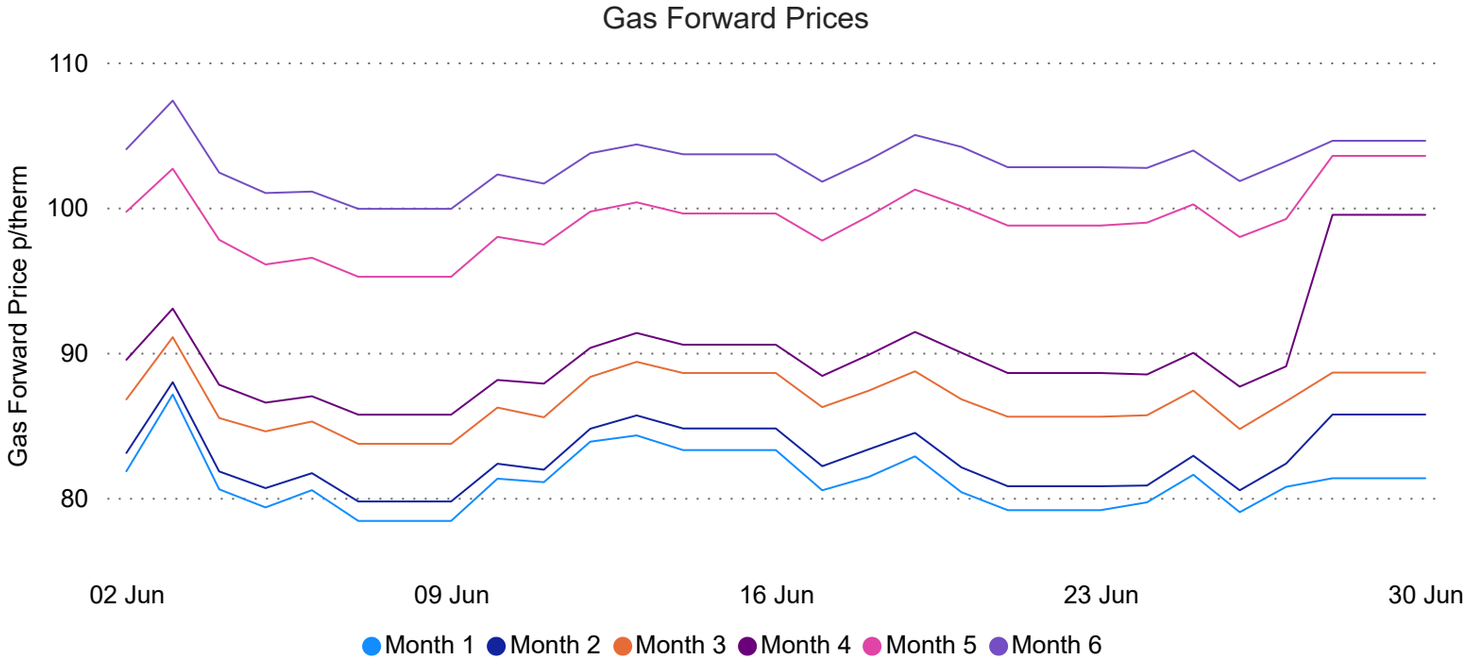
87.75
Monthly High (p/therm)



Gas Prices

Gas prices have experienced a 6% increase compared to the previous month, rising from 76.69p to 81.51p.

Again this month, a 5% increase in gas prices was observed (from 77.89p to 81.51p) from the same period last year.



Gas Forward Prices

Gas forward prices have decreased from last month as long-term supply issues ease.

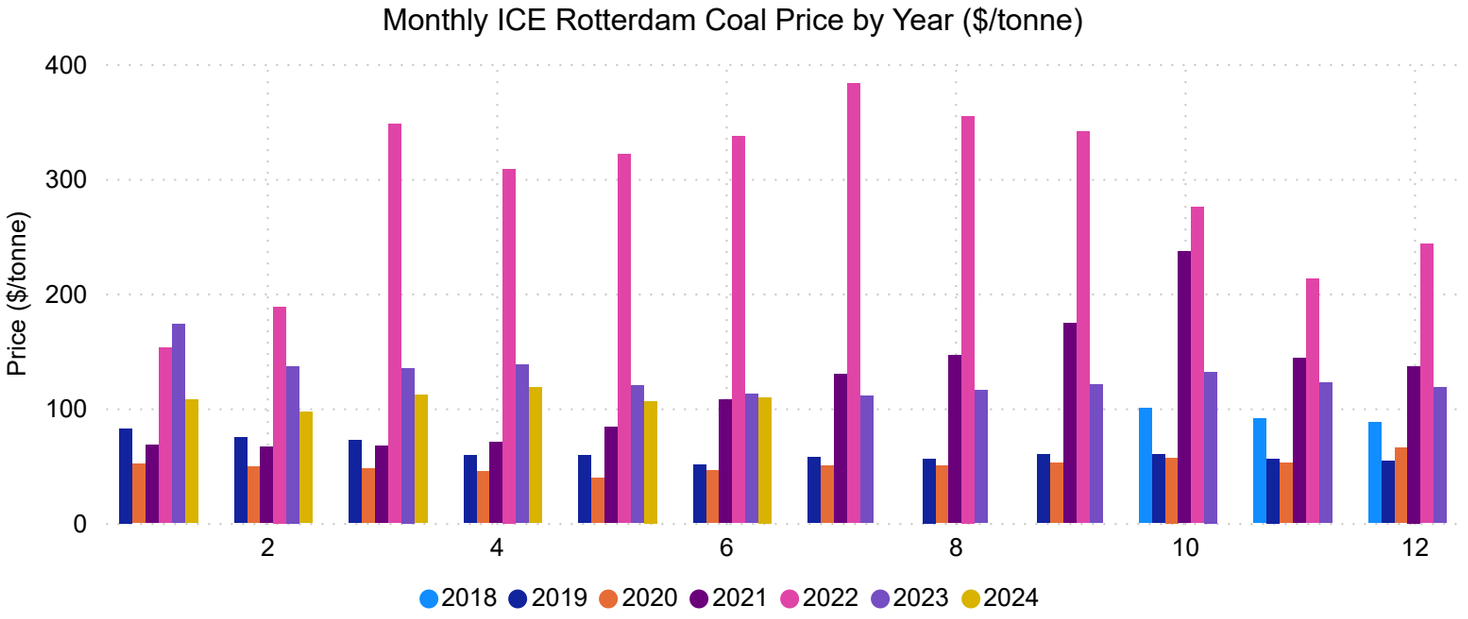
Coal Price June 2024

Coal Prices Per Tonne

$109.54
Monthly Average

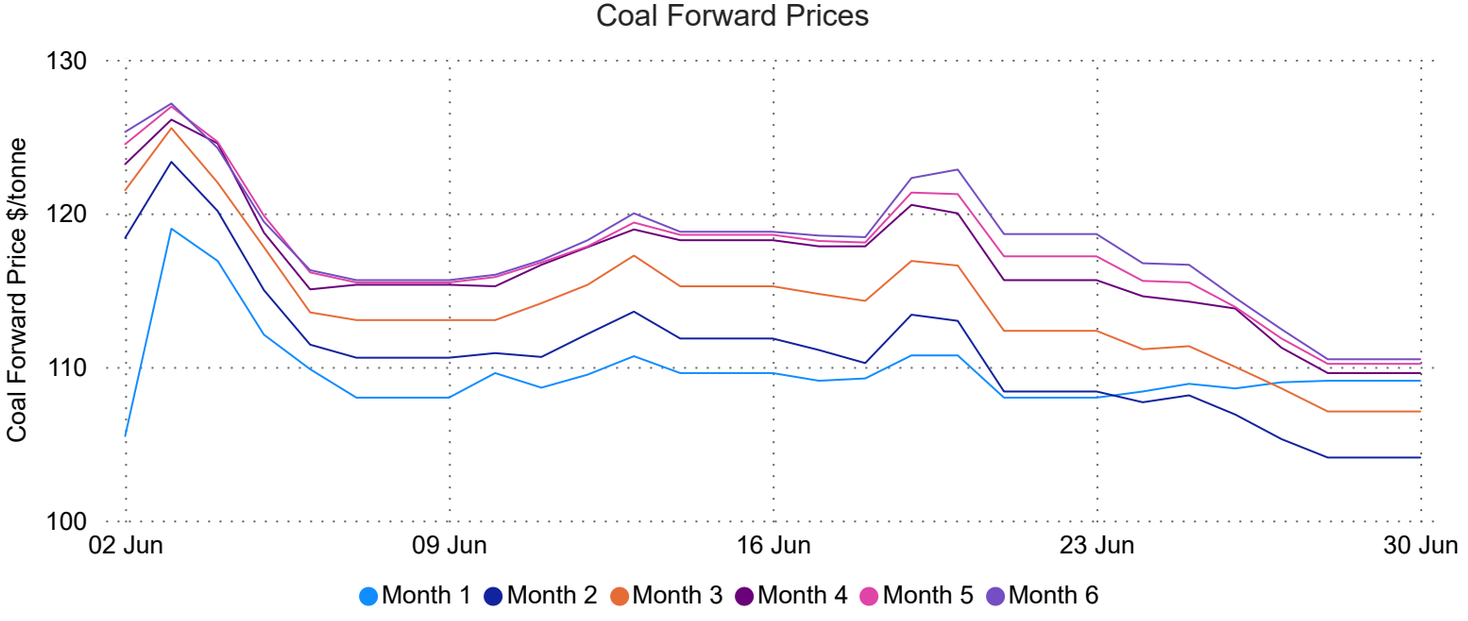
$105.50
Monthly Low

$119.00
Monthly High



Coal Prices

Coal prices were lower compared to the previous month at $109.54/tonne (3% decrease from the last month).



Coal Forward Prices

Coal forward prices demonstrate a small decrease during the month.

Carbon Price June 2024

EU Carbon Prices (€/tonne)

€ 68.29
Monthly Average

€ 65.20
Monthly Low

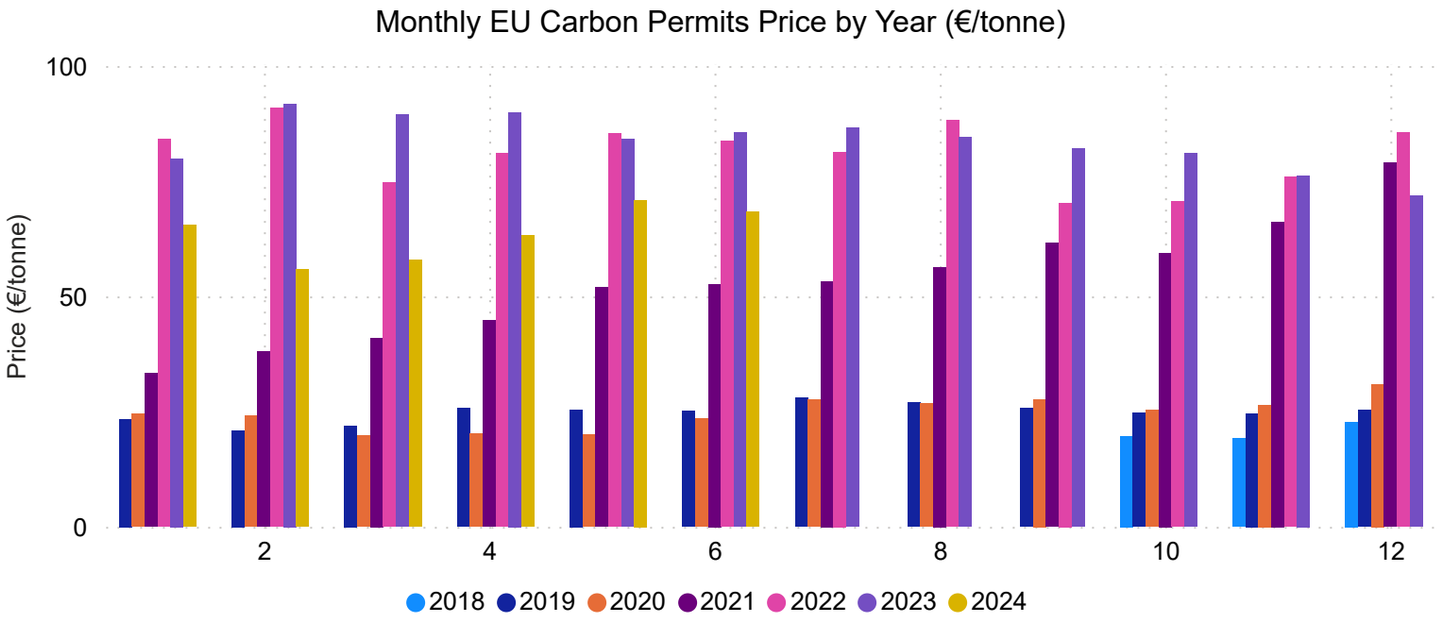
€ 72.87
Monthly High

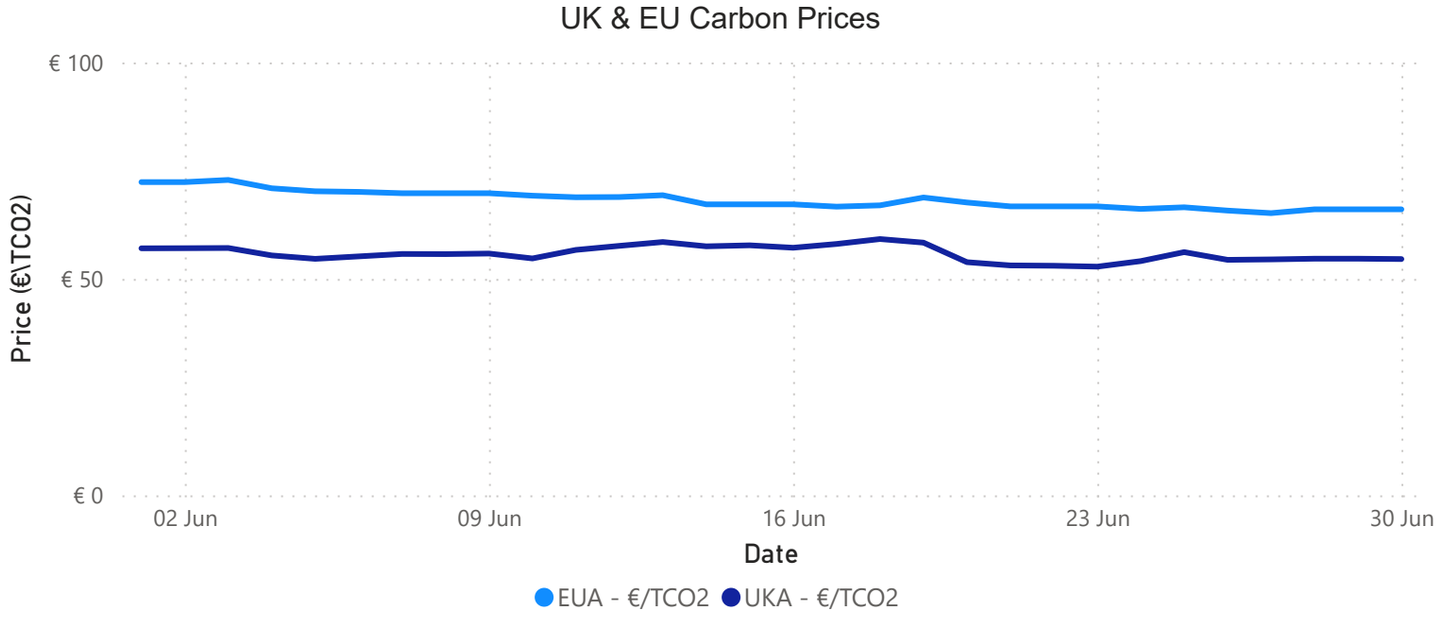
UK Carbon Prices (€/tonne)

€ 55.86
Monthly Average

€ 52.84
Monthly Low

€ 59.21
Monthly High





Carbon Prices

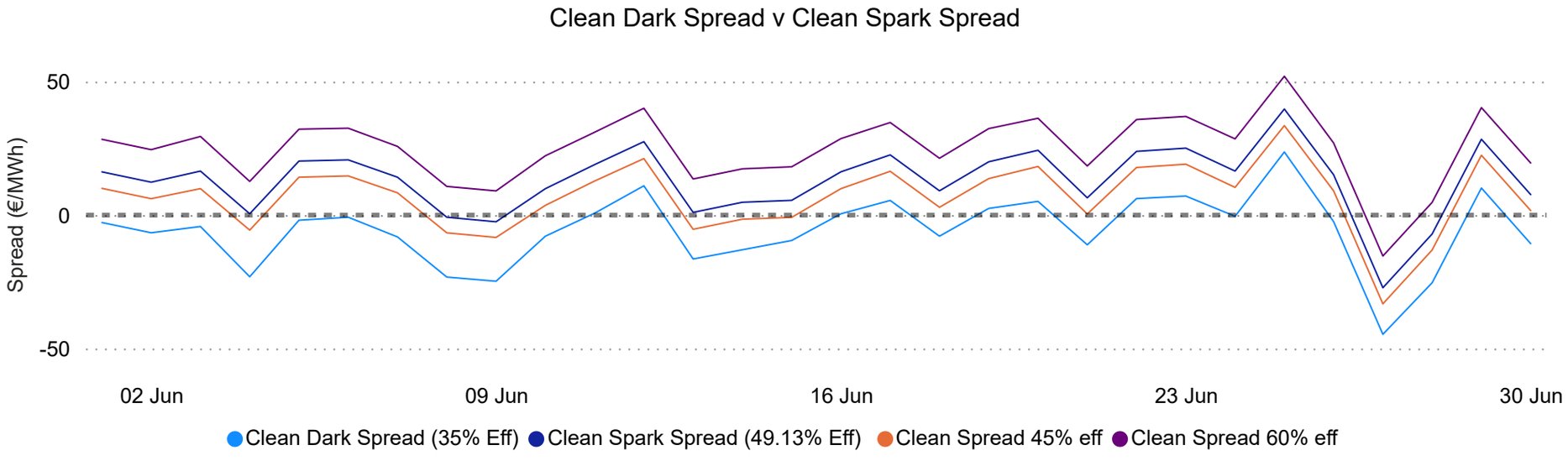
Carbon has decreased relative to the previous month by 4%.

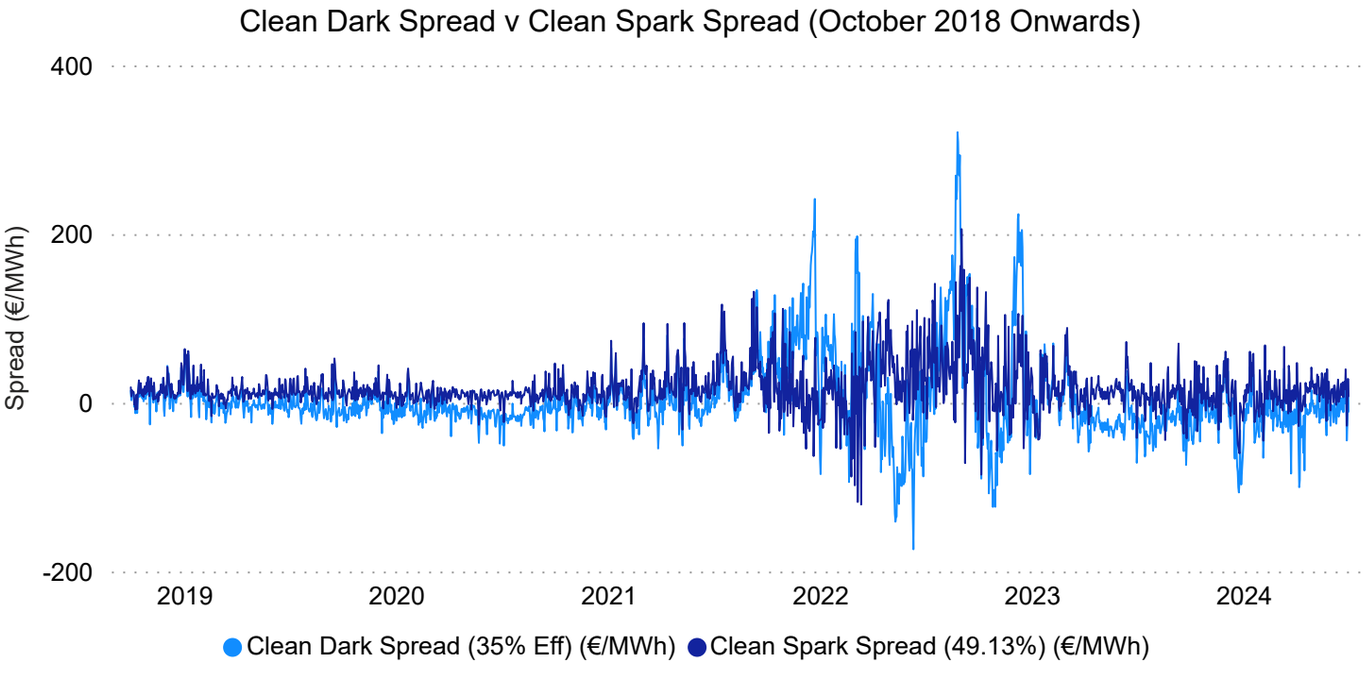
EU emission allowance prices have been trading lower for much of this year, alongside gas and power. We believe this pressure is likely to persist. EUA prices have been weighed down by a combination of bearish factors, including a sluggish industrial recovery, strong renewables output and limited power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

Spark Spreads June 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 Dark Spread has been negative for most of the month with a few periods of positive spread which corresponds to lower wind and higher prices.

Clean Spark Spread was generally positive for the whole month with a fall on 27th when the wind increases for a sustained period.