



Energy Market Monitoring Report

February 2024



Market Results

Summary Dashboard

Monthly Averages	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24
DAM (€/MWh)	159.19	145.25	125.57	105.19	117.11	96.24	106.46	111.62	125.54	122.9	88.97	99.9	84.6
% Change from previous month	-2%	-9%	-14%	-16%	11%	-18%	11%	5%	12%	-2%	-28%	12%	-15%
% Change from previous year	-9%	-50%	-42%	-27%	-36%	-64%	-73%	-61%	-8%	-14%	-68%	-38%	-47%
Actual System Demand (MW)	4782	4833	4469	4276	4189	4101	4185	4335	4516	4873	4862	5151	4946
% Change from previous month	-2%	1%	-8%	-4%	-2%	-2%	2%	4%	4%	8%	0%	6%	-4%
% Change from previous year	-1%	3%	1%	2%	0%	0%	2%	3%	4%	5%	0%	5%	3%
Actual Wind Generation (MW)	2026	1748	1545	884	878	1316	1401	1384	1363	1811	2446	1854	2000
% Change from previous month	2%	-14%	-12%	-43%	-1%	50%	6%	-1%	-2%	33%	35%	-24%	8%
% Change from previous year	-27%	12%	8%	-38%	-22%	54%	71%	28%	-33%	-19%	49%	-7%	-1%
Gas Price p/therm	133.65	110.96	100.32	72.41	77.87	70.76	82.87	91.52	104.88	104.97	84.2	74.87	63.37
% Change from previous month	-14%	-17%	-10%	-28%	8%	-9%	17%	10%	15%	0%	-20%	-11%	-15%
% Change from previous year	-29%	-64%	-38%	-24%	-44%	-68%	-77%	-61%	3%	-19%	-68%	-52%	-53%
Carbon Price (€/Tonne)	91.82	89.41	89.98	84.18	85.51	86.57	84.61	82.09	81.10	76.25	71.79	65.52	55.79
% Change from previous month	15%	-3%	1%	-6%	2%	1%	-2%	-3%	-1%	-6%	-6%	-9%	-15%
% Change from previous year	1%	20%	11%	-1%	2%	6%	-4%	17%	15%	1%	-16%	-18%	-39%
Coal Price (\$/tonne)	136.71	134.95	137.83	119.57	112.56	111.02	115.57	120.40	131.80	122.16	118.31	107.65	96.84
% Change from previous month	-21%	-1%	2%	-13%	-6%	-1%	4%	4%	9%	-7%	-3%	-9%	-10%
% Change from previous year	-27%	-61%	-55%	-63%	-67%	-71%	-67%	-65%	-52%	-43%	-51%	-38%	-29%
EWIC % Import Periods	38.91%	50.00%	50.56%	75.86%	77.72%	67.11%	68.11%	73.75%	86.90%	68.78%	56.38%	69.76%	68.43%
EWIC % Export Periods	27.19%	16.47%	13.65%	8.28%	4.06%	9.21%	11.96%	8.89%	2.99%	9.11%	20.36%	14.78%	13.68%
EWIC % Not Flow Periods	33.89%	23.86%	30.80%	15.88%	18.22%	22.68%	19.93%	17.36%	10.11%	22.11%	23.25%	15.46%	18.08%
Moyle % Import Periods	53.65%	64.68%	77.50%	85.42%	92.22%	84.04%	75.24%	83.33%	92.31%	83.47%	67.81%	78.16%	68.43%
Moyle % Export Periods	46.02%	25.50%	27.43%	14.58%	7.67%	15.89%	20.33%	16.60%	7.66%	16.50%	32.16%	21.81%	13.69%
Moyle % Not Flow Periods	0.33%	0.13%	0.07%	0.00%	0.10%	0.07%	4.44%	0.07%	0.03%	0.03%	0.03%	0.03%	0.10%

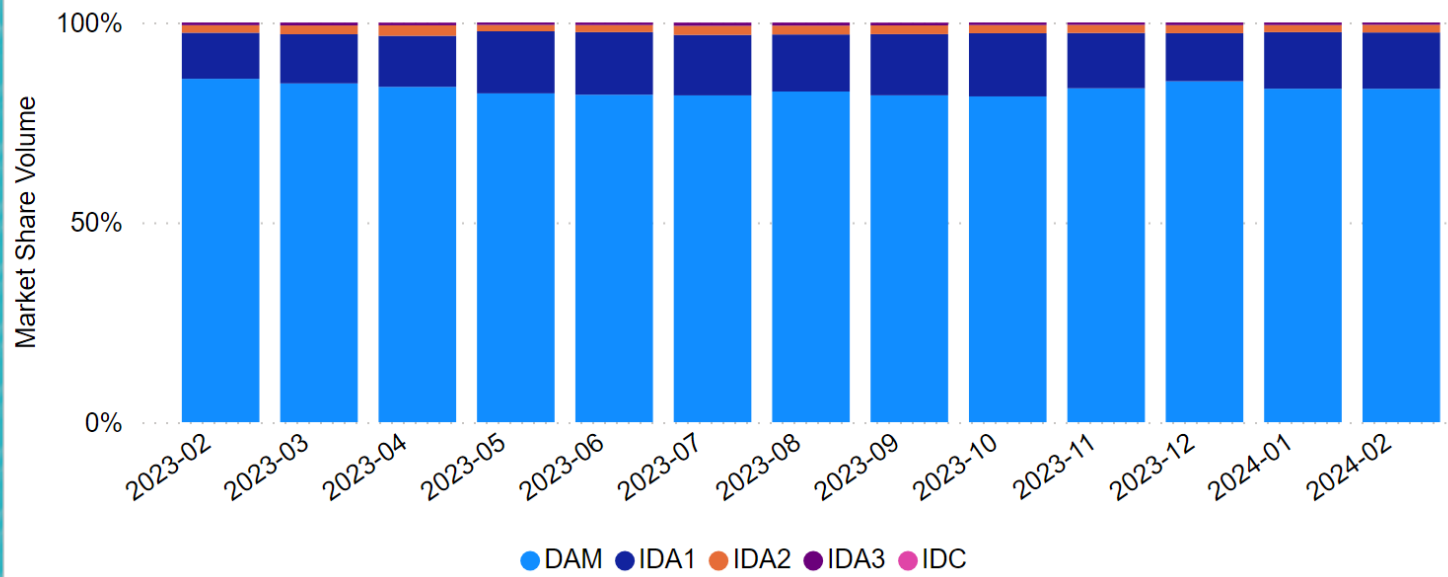
Market Volumes February 2024

Daily Average Volume	MWh
DAM	122,282
IDA1	20,891
IDA2	2,921
IDA3	868
IDC	33

Total Monthly Volume	MWh
DAM	3,546,184
IDA1	605,847
IDA2	84,708
IDA3	25,186
IDC	763
Total	4,262,688

Total Market Value	€
DAM	€ 309,625,546
IDA1	€ 55,115,649
IDA2	€ 7,666,633
IDA3	€ 2,679,975
IDC	€ 80,491
Total	€ 375,168,294

Ex-Ante Monthly Volume by Market



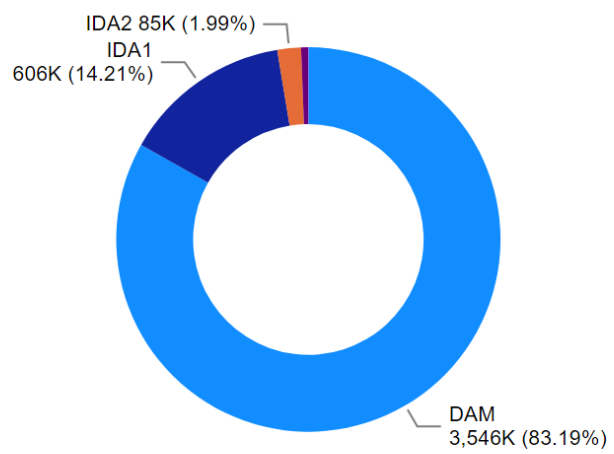
Market Volumes and Values

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.

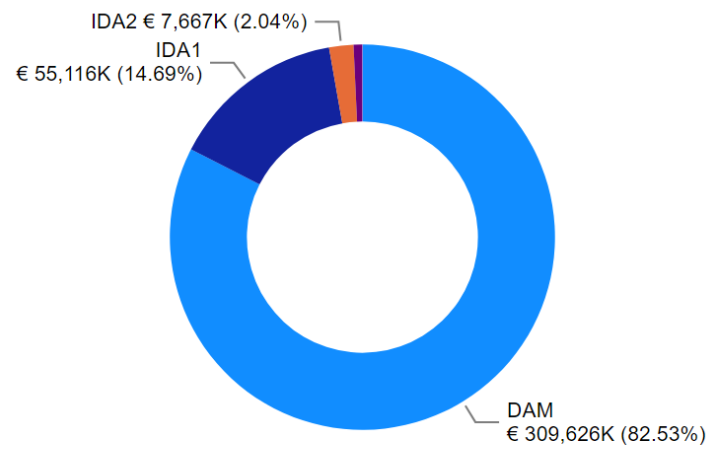
Generally, in power markets, market participants will prefer to lock their positions well ahead of delivery time given the increased volatility in prices closer to real time.

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 Volumes (MWh)



Ex-Ante Values (€)



● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

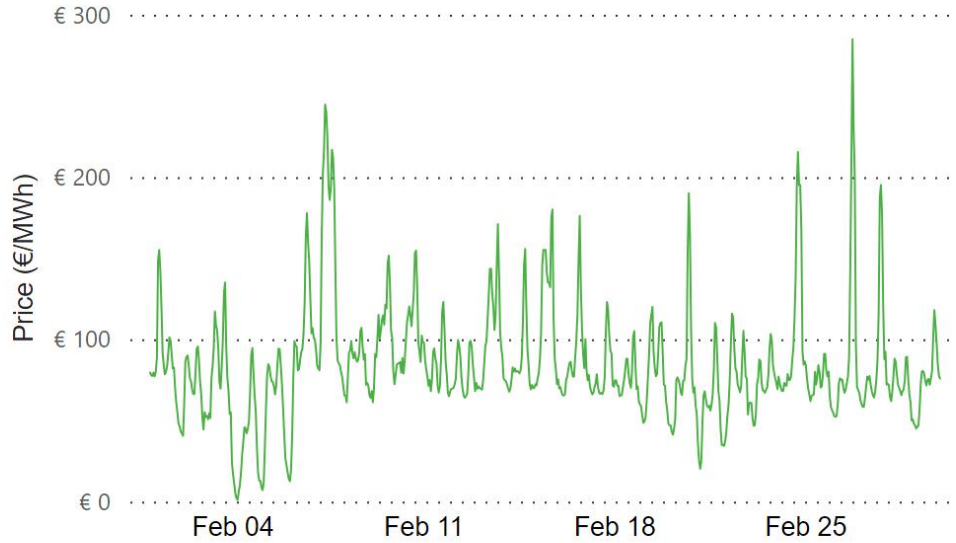
● DAM ● IDA1 ● IDA2 ● IDA3 ● IDC

Day Ahead Market February 2024

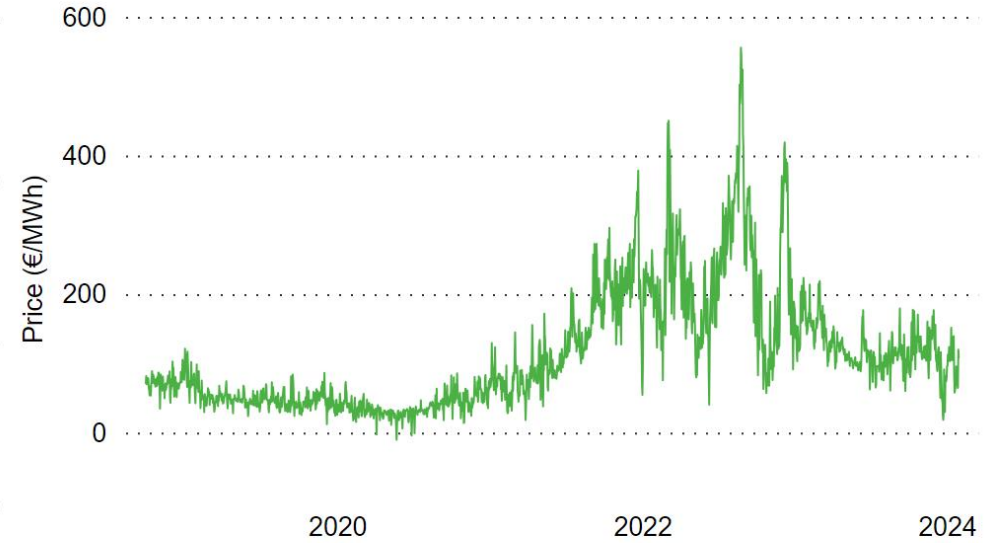
€ 84.61
Average DAM Price
€ 1.00
Min DAM Price
€ 285.00
Max DAM Price

The most frequent price range for February was between €40 and €80

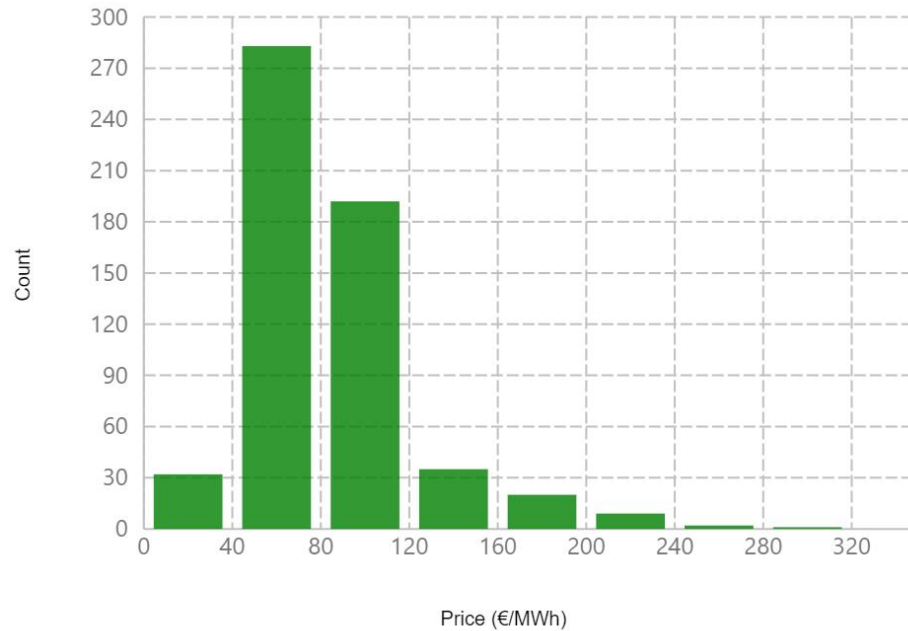
DAM Prices



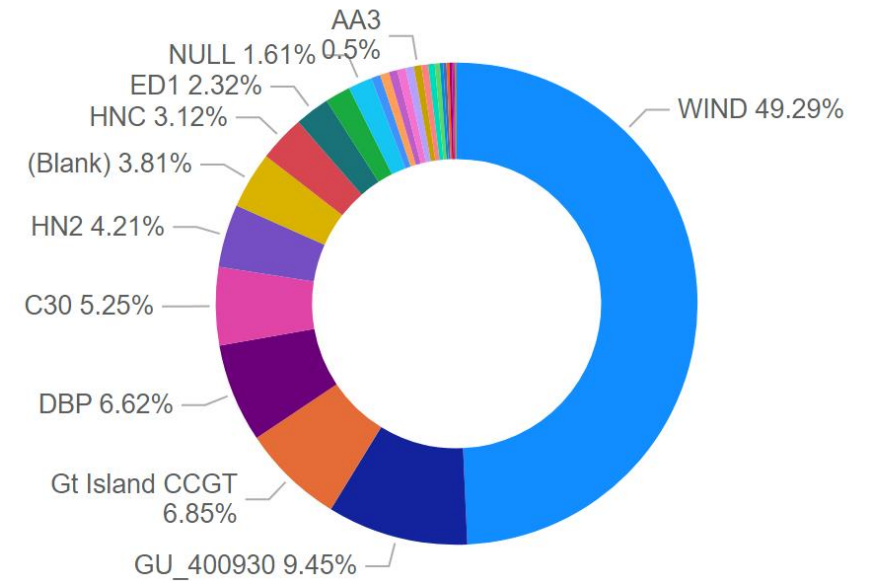
Historic Daily Average DAM Prices



Histogram of DAM Prices



DAM Sell Side Generator Order Results

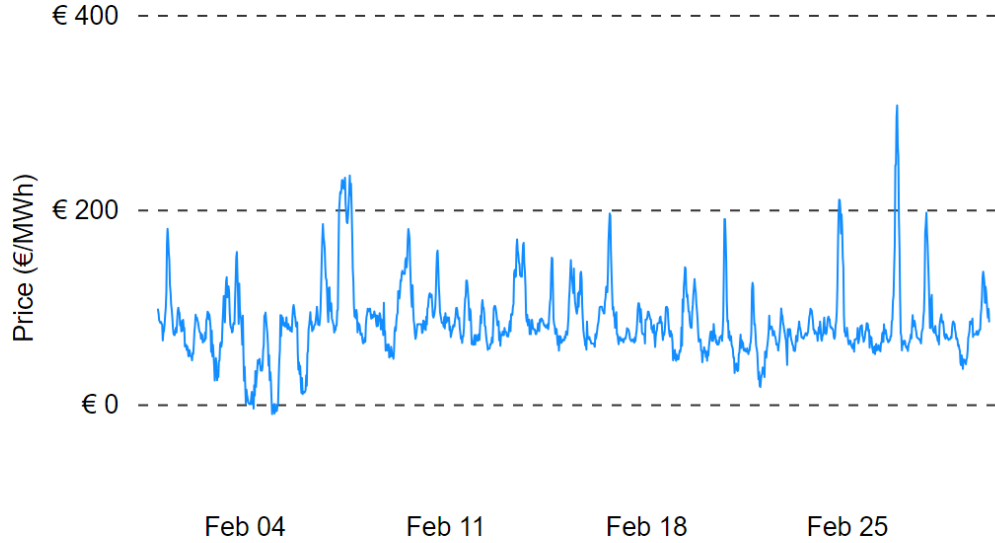


Intraday Market February 2024

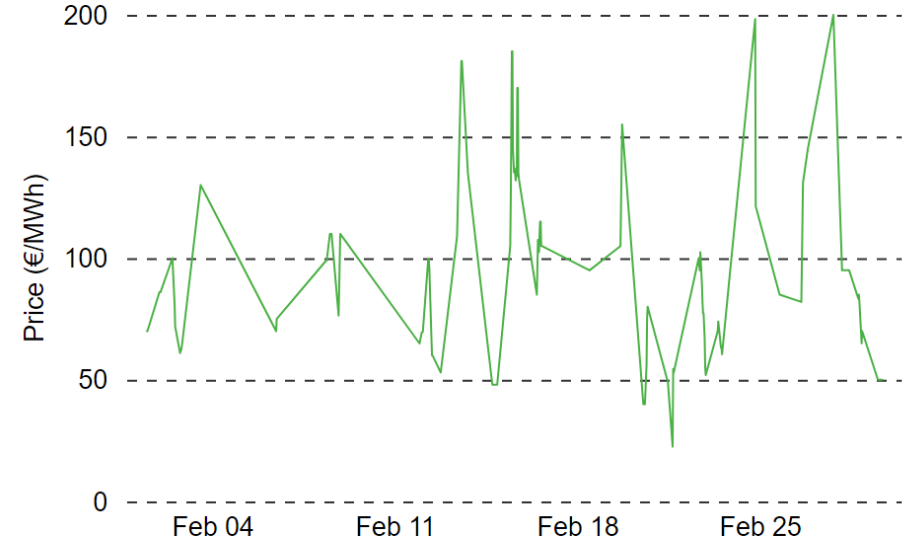
€ 83.33
Average IDA1 Price
-€ 10.25
Min IDA1 Price
€ 307.00
Max IDA1 Price

The most frequent price range for February was between €50 and €100

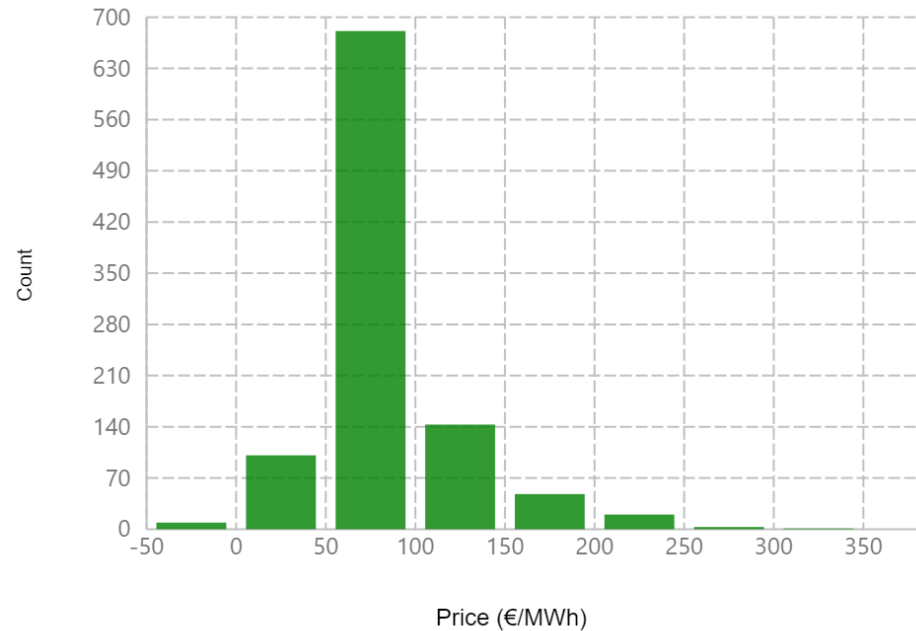
IDA 1 Prices



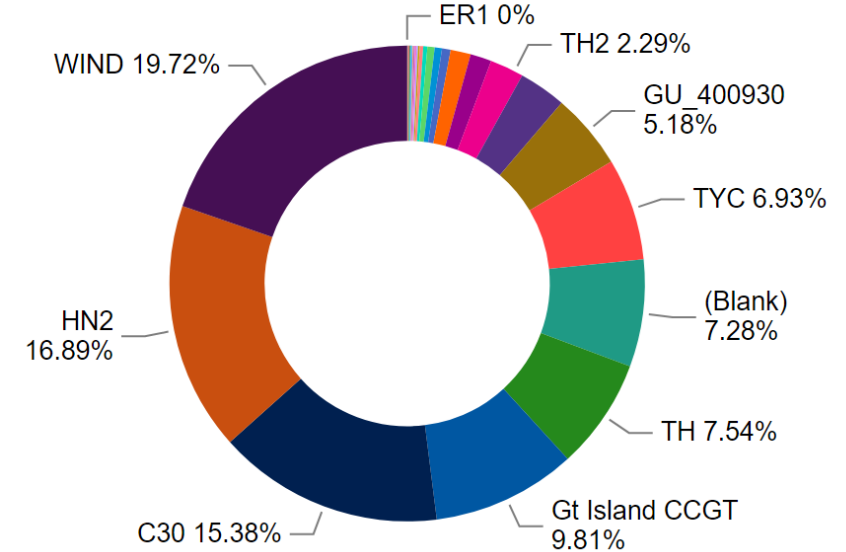
IDC Prices



Histogram of IDA1 Prices



IDA1 Sell Order Results By Market Participant



Intraday Market February 2024

SEM Day Ahead Price

€ 84.63
Average Price

€ 1.00
Min Price

€ 285.00
Max Price

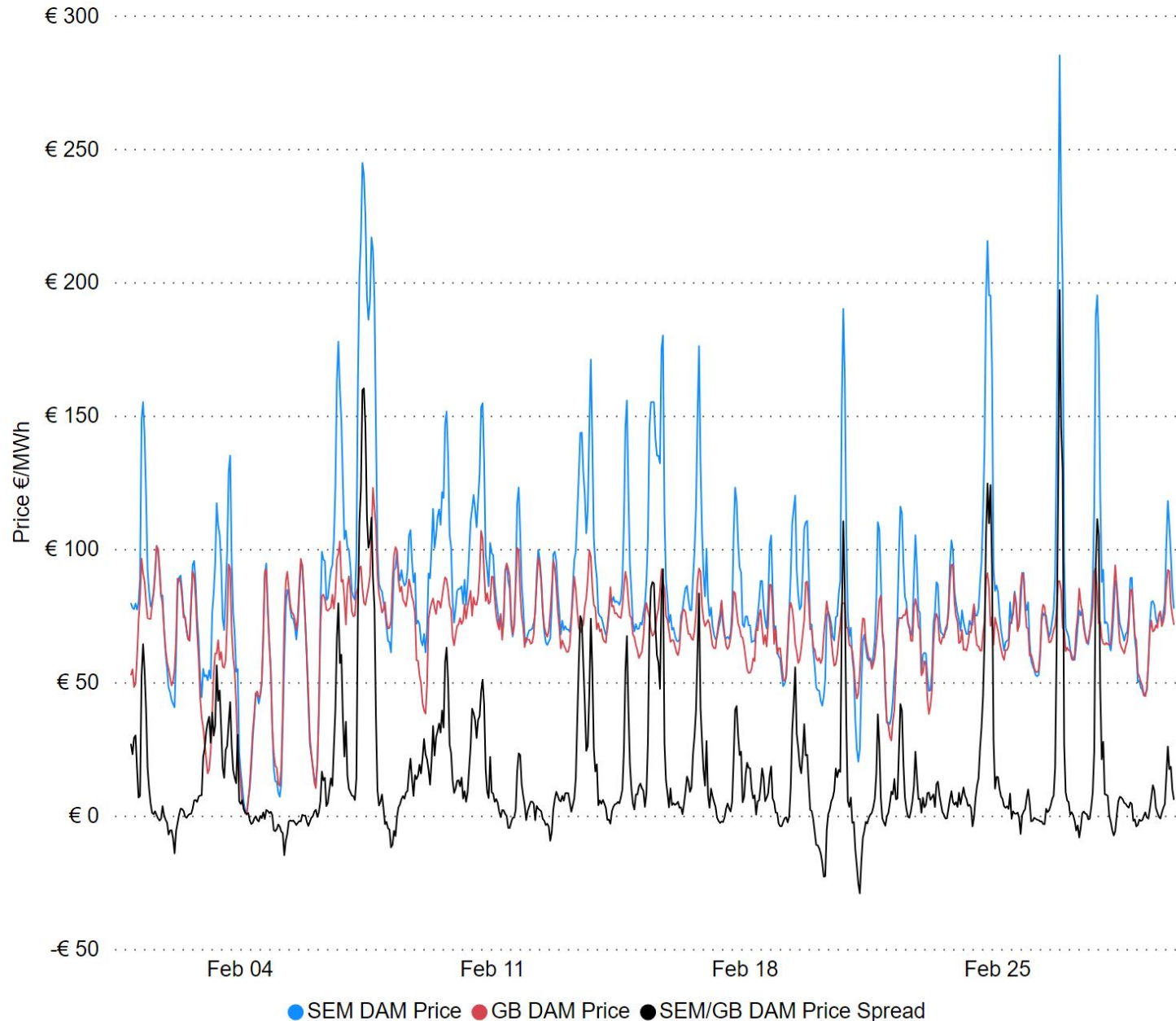
GB Day Ahead Price

€ 69.52
Average Price

€ 0.35
Min Price

€ 122.88
Max Price

SEM & GB DAM Prices



SEM-GB Price Differential

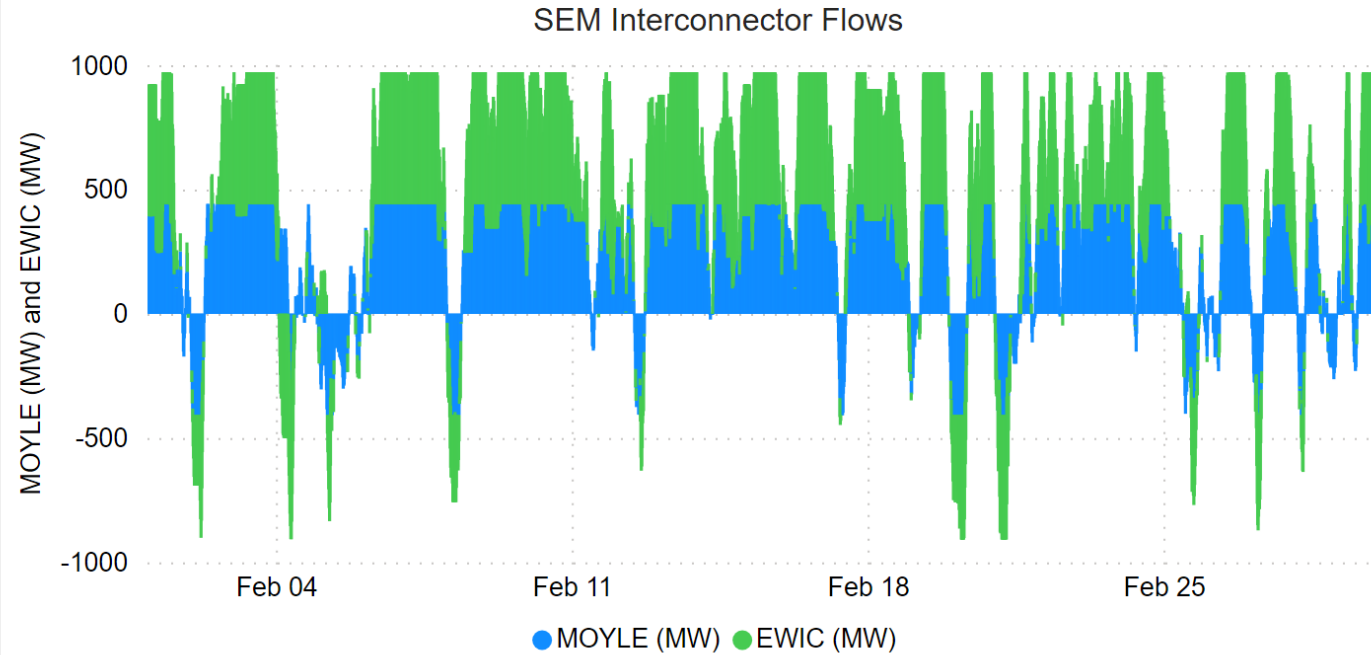
The charts show that the SEM and GB prices appear to follow the same general trend. Significant spreads can be observed on several occasions. The MMU has investigated the underlying reasons for these spreads and the findings are consistent with those discussed with the SEMC previously.

Basically, the periods of significant spread 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 February 2024

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

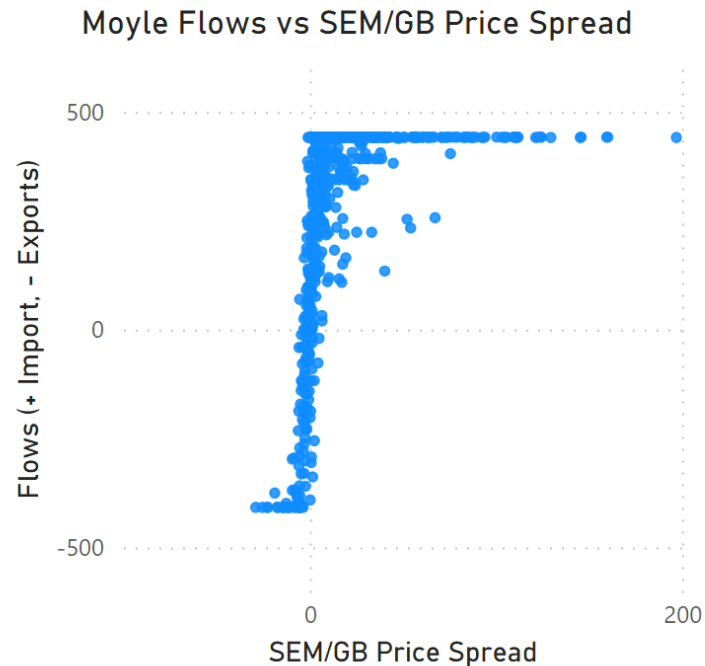
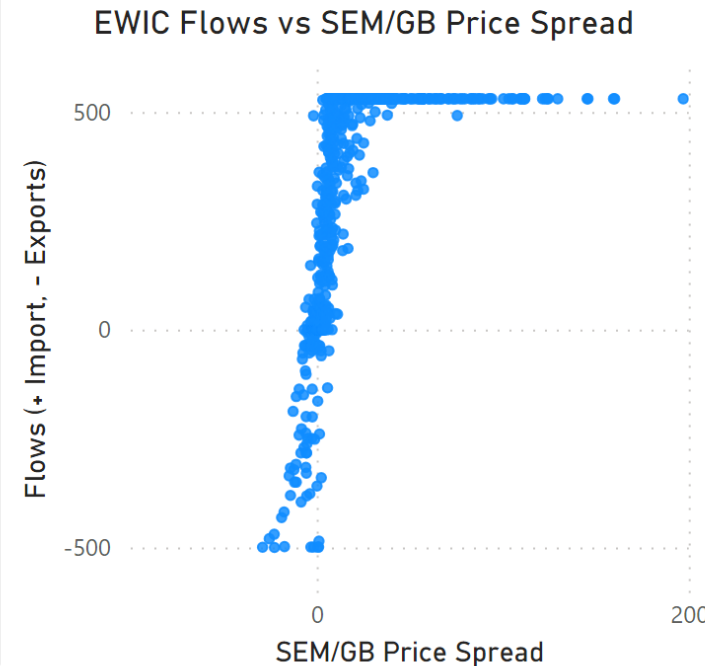
Moyle	EWIC
1st 06:00-13:00	1st 06:00 - 11:00
3rd 09:00 - 20:00	6th 15:00 - 23:00
6th 07:00 - 00:00	7th 06:00 - 22:00
7th 06:00 - 23:00	9th 10:00 - 21:00
8th 11:00 - 15:00	10th 09:00 - 20:00
9th 09:00 - 23:00	13th 07:00 - 15:00
10th 07:00 - 22:00	15th 07:00 - 22:00
13th 07:00 - 23:00	16th 09:00 - 23:00
14th 15:00 - 21:00	24th 16:00 - 20:00
15th 07:00 - 23:00	26th 14:00 - 23:00
16th 07:00 - 22:00	27th 18:00 - 22:00
20th 17:00 - 21:00	
24th 09:00 - 22:00	
26th 13:00 - 23:00	
27th 17:00 - 23:00	
29th 10:00 - 14:00	



Interconnector Flows

In February, the SEM Interconnectors have imported significantly more power from GB than it has exported. 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.

Moyle imports volumes were slightly higher than EWIC and exports were higher aswell. Typically, Moyle losses are lower than EWIC's and hence it can allocate capacity under a lower price spread between SEM and GB.



February 2024

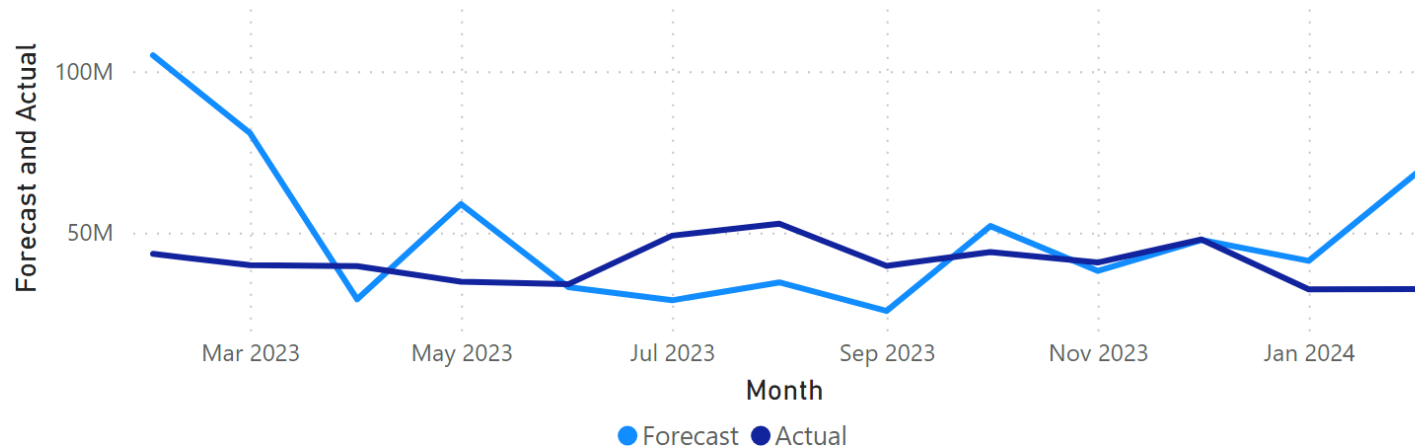
Moyle Imports	791
EWIC Imports	685
Moyle Exports	-210
EWIC Exports	-137
SEM Imports	1476
SEM Exports	-347
SEM Net Import/Export	1129

Balancing Market February 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.

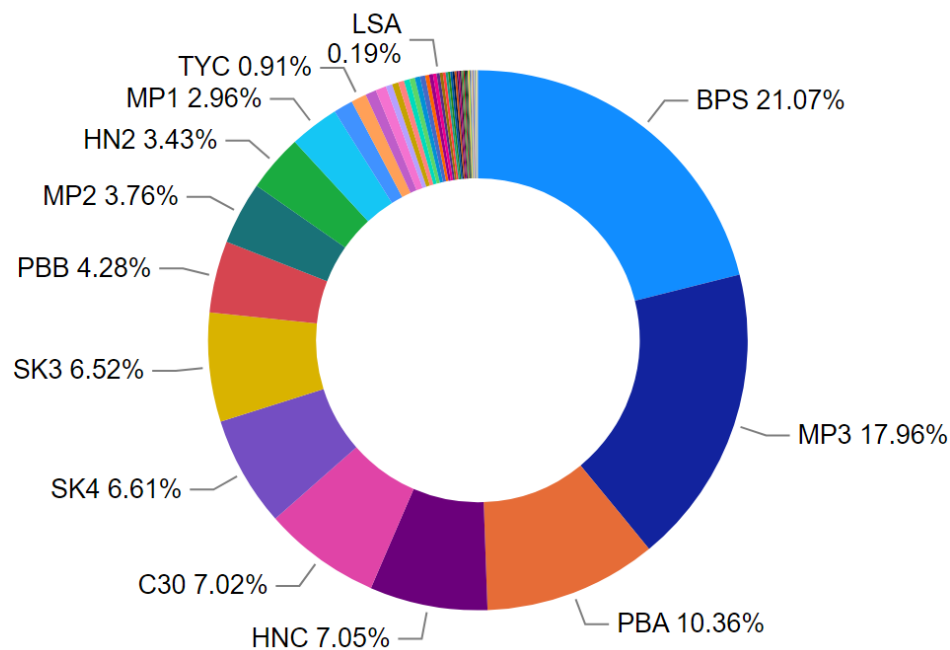
Generators can be constrained 'on' or 'up' if the market schedule indicated they were to be run at lower levels than actually happened. Or they could be constrained 'down' or 'off' if they were to be run at a higher level than happened in reality. There is always an overall net cost to the system associated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

Imperfection Costs - Forecast vs Actual



Determinant Name	Value €
CABBPO	3,264.95
CAOPO	-322,140.68
CCURL	-674,155.74
CDISCOUNT	10,937,880.01
CFC	9,246,517.58
CPREMIUM	13,662,732.73
CTEST	0.00
CUNIMB	-412,408.55
Total	32,441,690.30

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, BPS (EP Ballylumpford Ltd) was the largest receiver of these payments in February followed by MoneyPoint 3 and Poolbeg A. The distribution of Constraint Payment has not changed substantially in the last few months and years This is something that the MMU is monitoring to determine whether the balancing market is working as designed.

Balancing Market February 2024

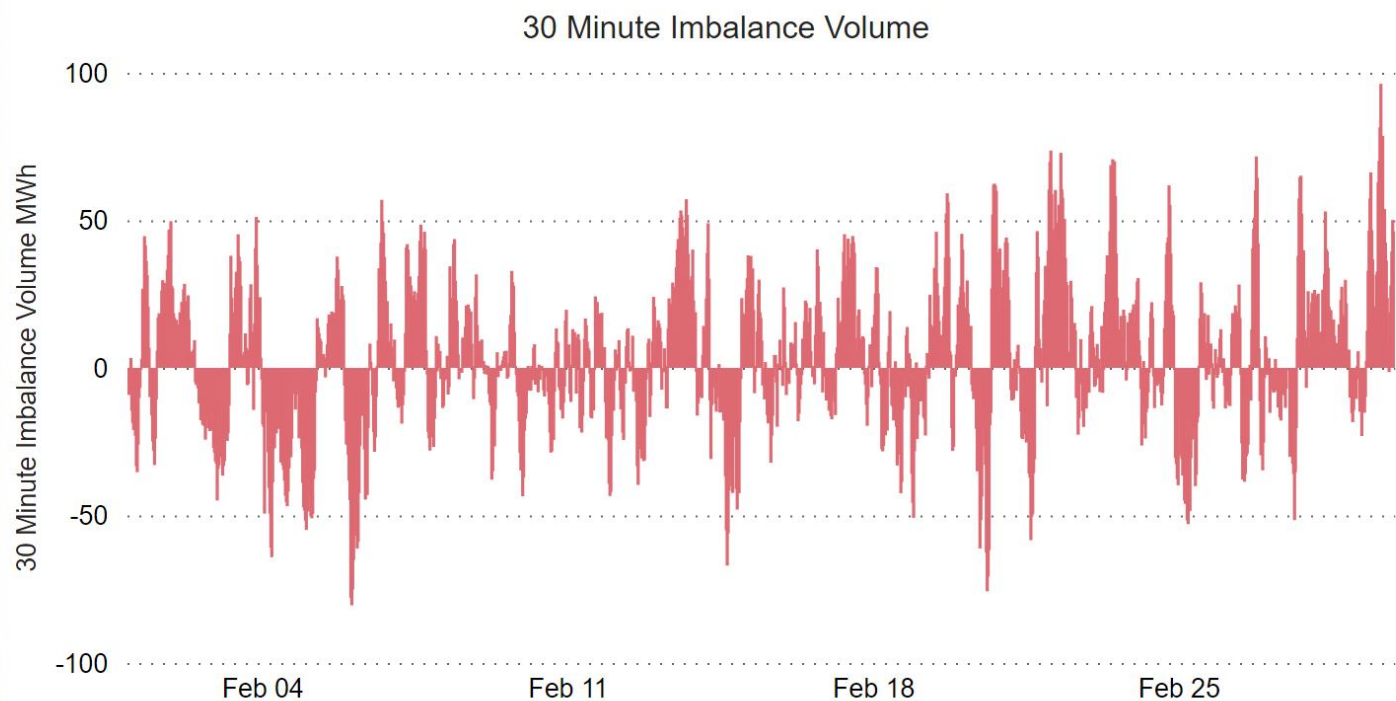
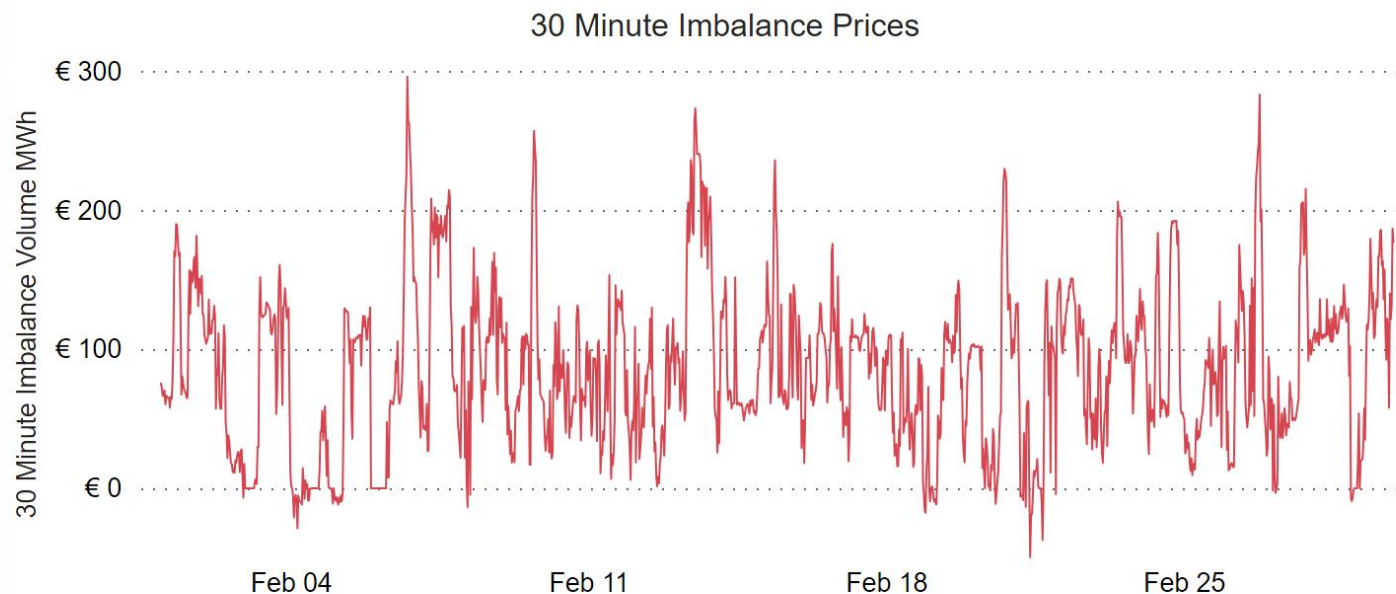
30 Minutes Imbalance Price

€ 85.26
Average Price
-€ 49.48
Lowest Price
€ 295.82
Highest Price

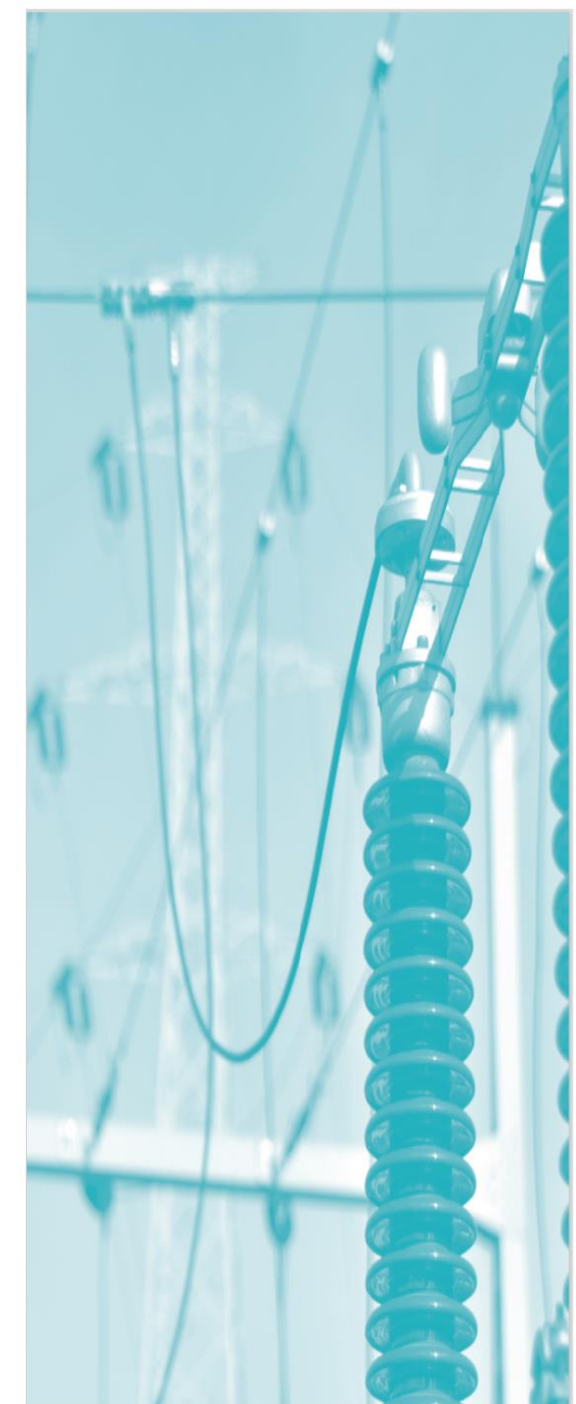
Imbalance Price & Volumes

The Balance (BM) Prices in February are slightly higher than the Day Ahead Prices. Additionally, the Balancing Market prices has exhibited a must higher range of prices indicating a higher level of volatility compared to Day Ahead Market Prices. This is an expected characteristic of the Balance Prices.

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



Demand and Generation Mix



Demand February 2024

SEM Demand

4,945.52 SEM Average 2023	4,795.09 SEM Average 2022
3,787.67 SEM Min 2023	3,629.14 SEM Min 2022
6,041.03 SEM Max 2023	5,880.07 SEM Max 2022

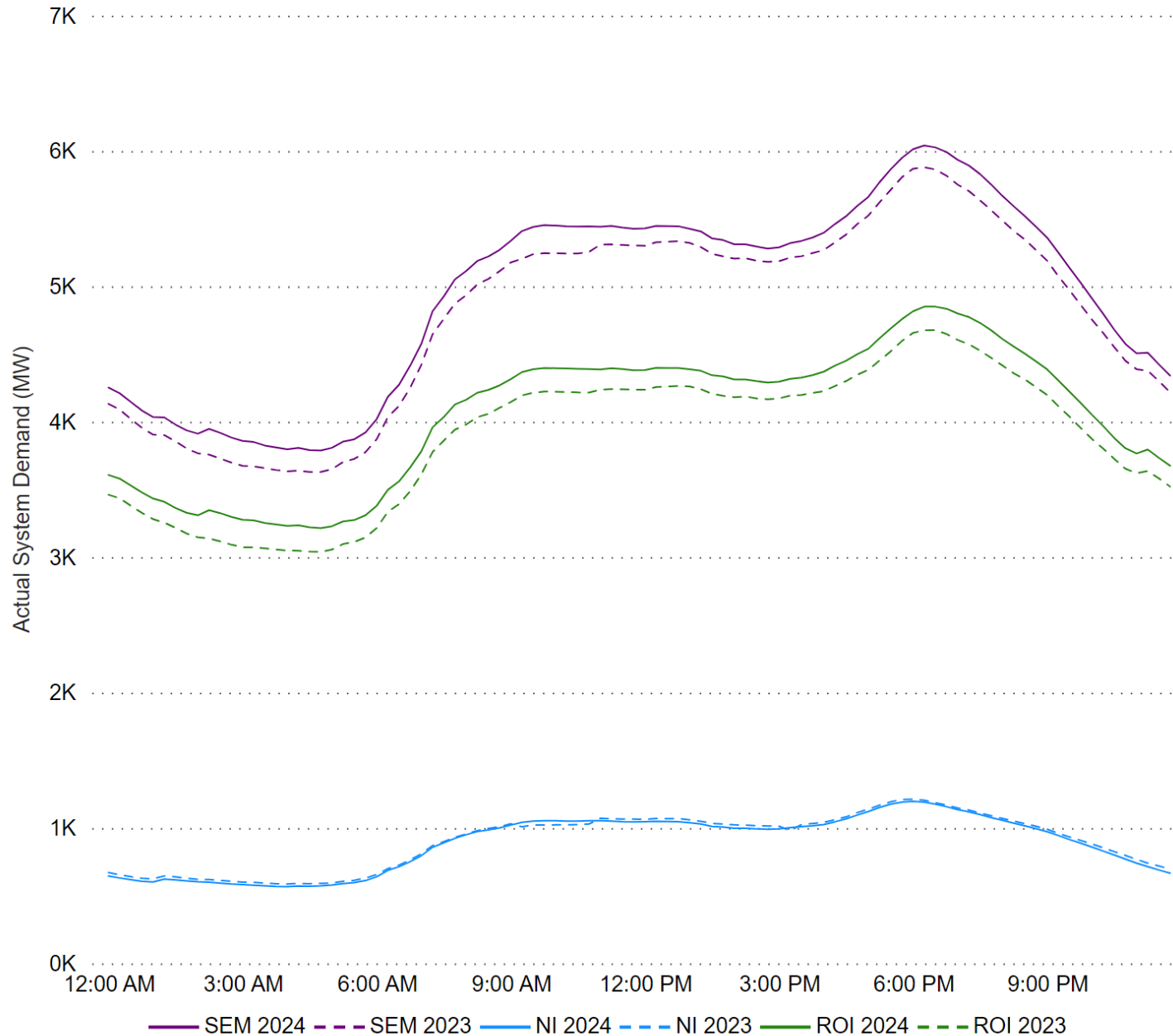
NI Demand

887.72 NI Average 2023	902.01 NI Average 2022
566.13 NI Min 2023	585.54 NI Min 2022
1,196.93 NI Max 2023	1,212.68 NI Max 2022

ROI Demand

4,057.77 ROI Average 2023	3,892.54 ROI Average 2022
3,215.07 ROI Min 2023	3,038.79 ROI Min 2022
4,850.60 ROI Max 2023	4,677.25 ROI Max 2022

Monthly Average Hourly Demand Curves



SEM Demand

The graph shows a decrease in demand within NI, with the monthly average level falling by 4% compared to the same period last year.

ROI's demand is consistently above its monthly average level from last year and has risen on average by 4.3%.

Demand in the SEM as a whole is up by 2.9% relative to the same period last year.

Duration Curves February 2024

Price Duration

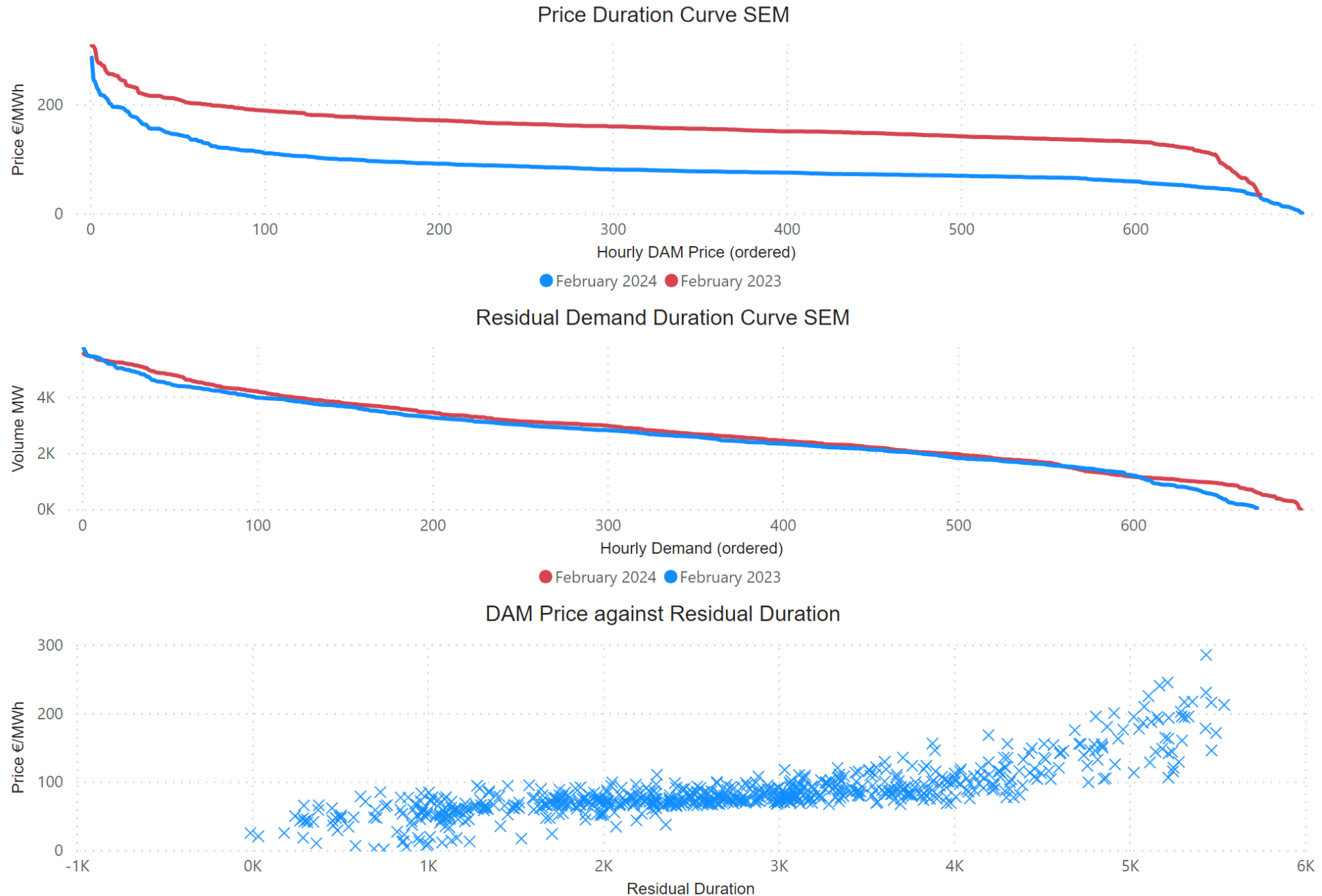
The price duration curve shows the hourly DAM prices across the month ordered from the largest to the smallest.

Residual Duration

The residual demand curve shows the ordered hourly demand level across the month which can't be met by renewable generation. Therefore, it shows the demand and frequency that conventional fossil fuel generators will be required to meet across the month.

Price against Residual Duration

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

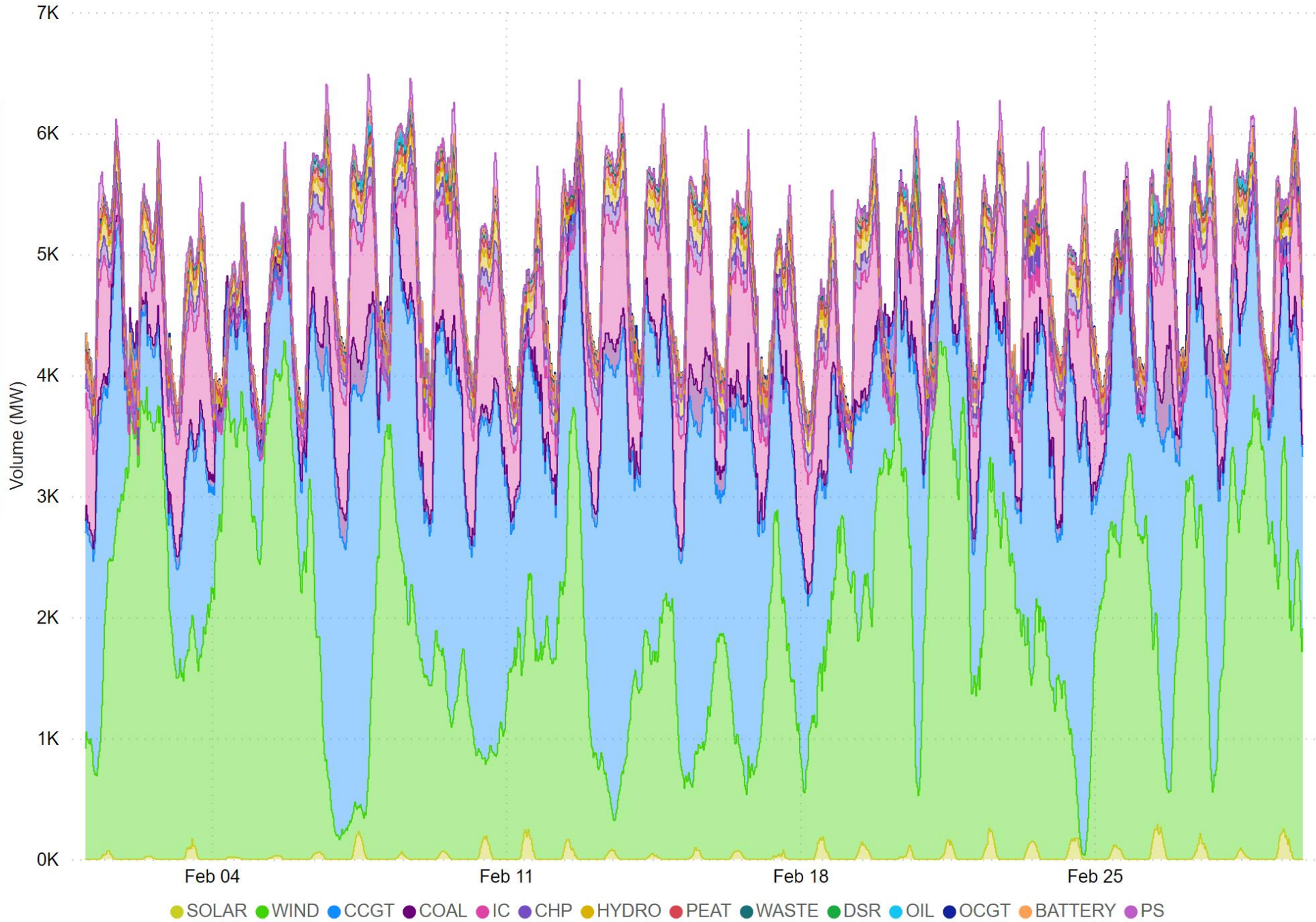


Fuel Mix February 2024

Fuel Type	Monthly Average	Monthly %
CCGT	1,776	36.1%
WIND	2032	41.3%
INTERCONNECTOR	488	9.9%
COAL	138	2.8%
HYDRO	155	3.1%
CHP	142	2.9%
PEAT	77	1.5%
WASTE	72	1.4%
SOLAR	27	0.5%
DSR	22	0.45%
OIL	0	0.0%
OCGT	7	0.16%
Battery	-5	-0.1%
PUMPED STORAGE	-15	-0.3%

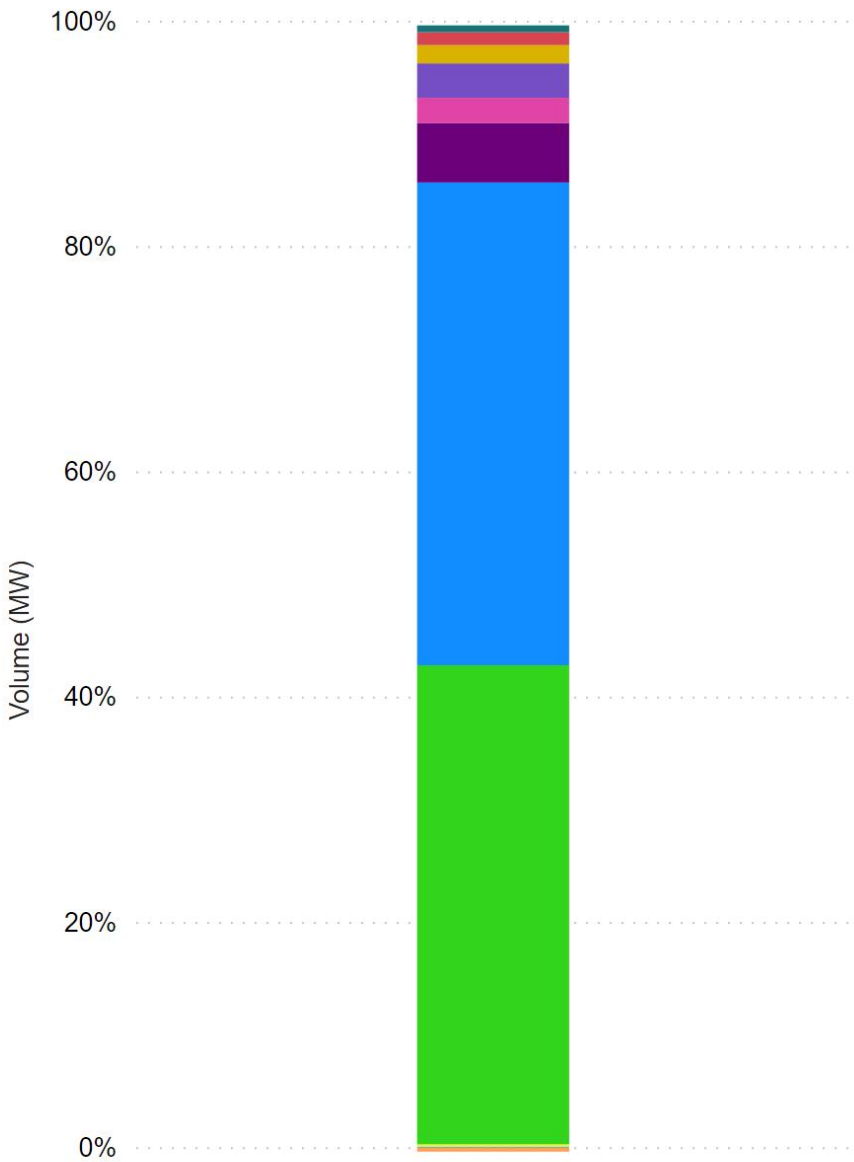
Fuel Type	Max	Min
CCGT	3,688	351
WIND	4,284	37
INTERCONNECTOR	978	-899
COAL	687	76
HYDRO	200	98
CHP	165	74
PEAT	106	35
WASTE	81	44
SOLAR	288	0
DSR	76	0
OIL	86	0
OCGT	213	0
BATTERY	190	-124
PUMPED STORAGE	291	-302

SEM 30 Minute Fuel Mix

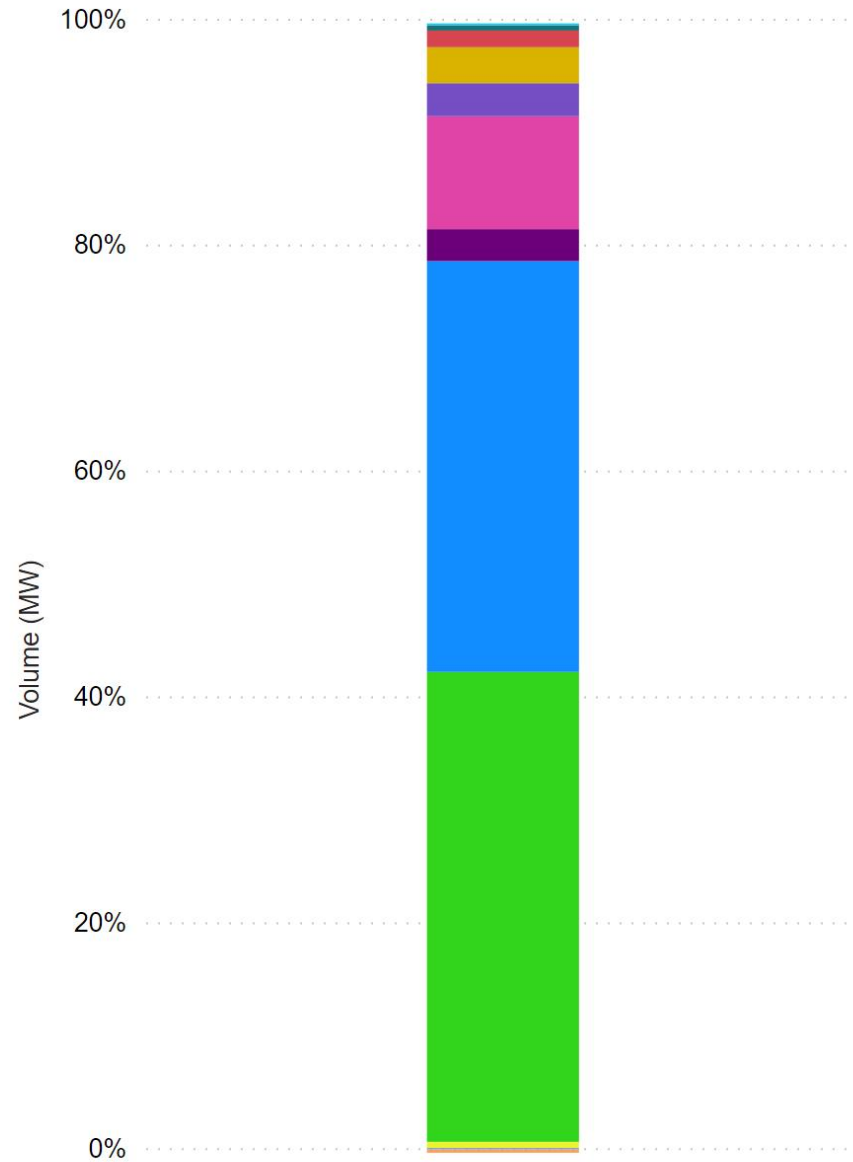


Fuel Mix Comparison February 2023 & 2024

SEM Fuel Mix February 2023



SEM Fuel Mix February 2024



North-South Tie Line February 2024

Average Flow NI to ROI (MW)

-259.45

Average Flow ROI to NI (MW)

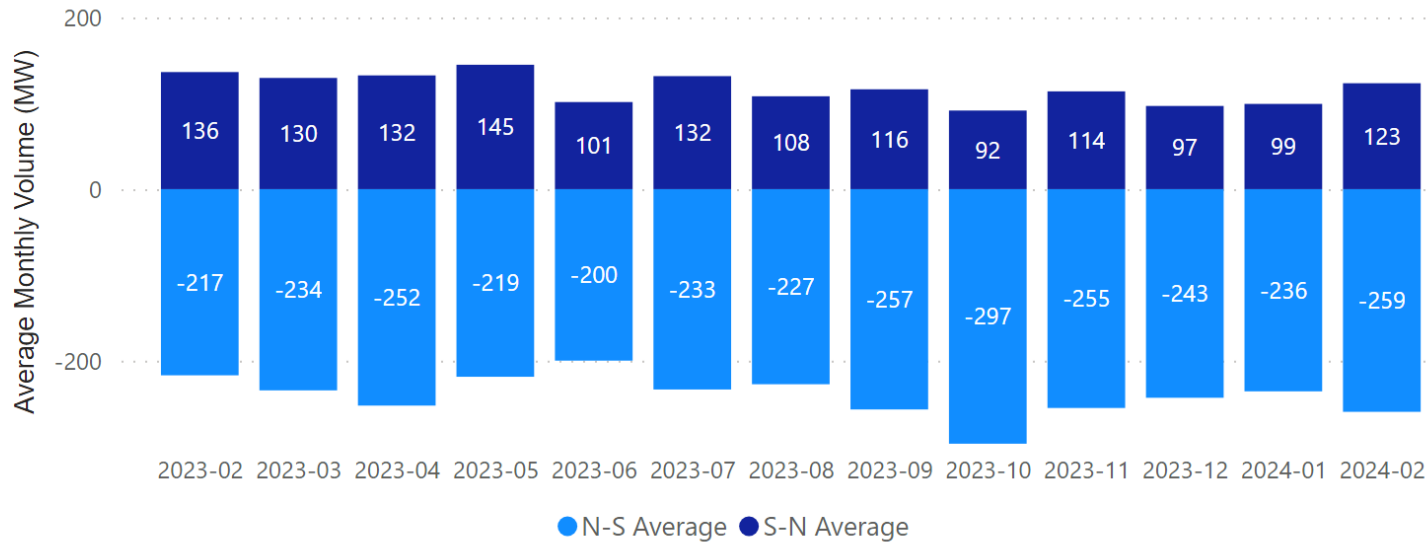
123.36

Average Net Flow NI to ROI (MW)

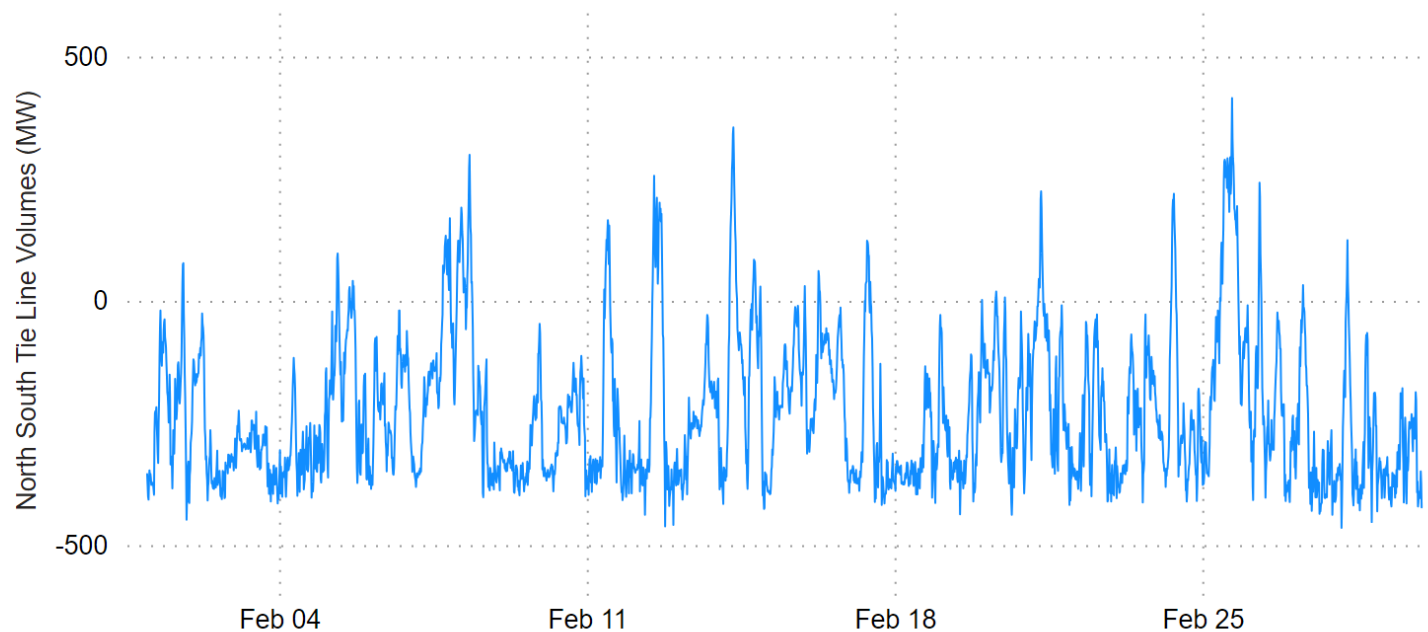
-229.82

-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 in January. 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 February 2024

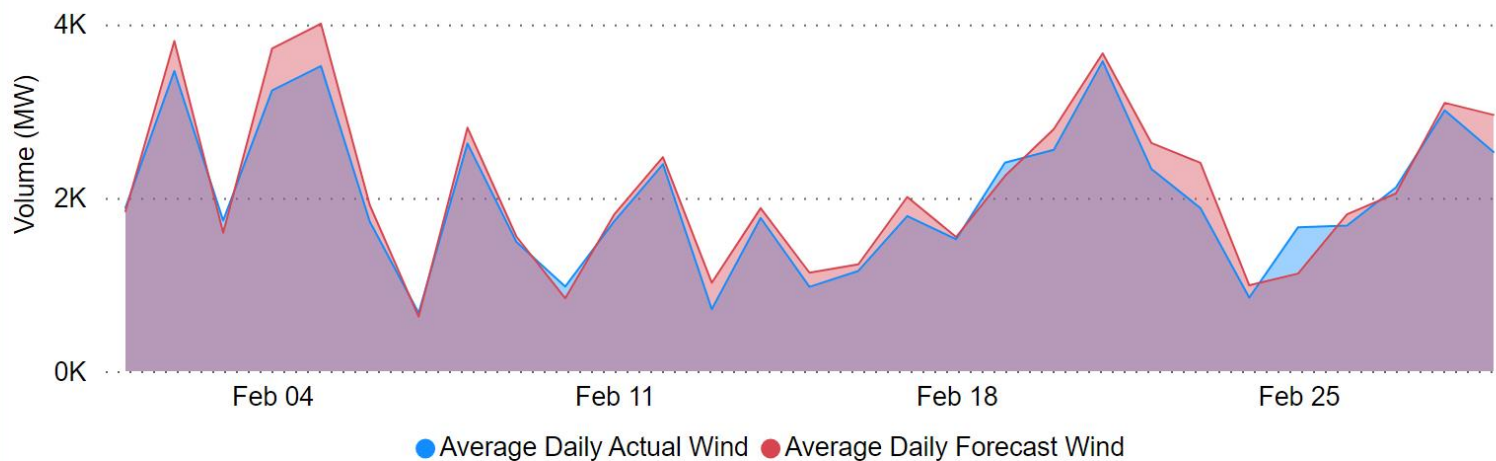
Average Daily Actual Wind (MW)
2,000

Average Daily Forecast Wind (MW)
2,125

Min SNSP %
17.01

Max SNSP %
75.99

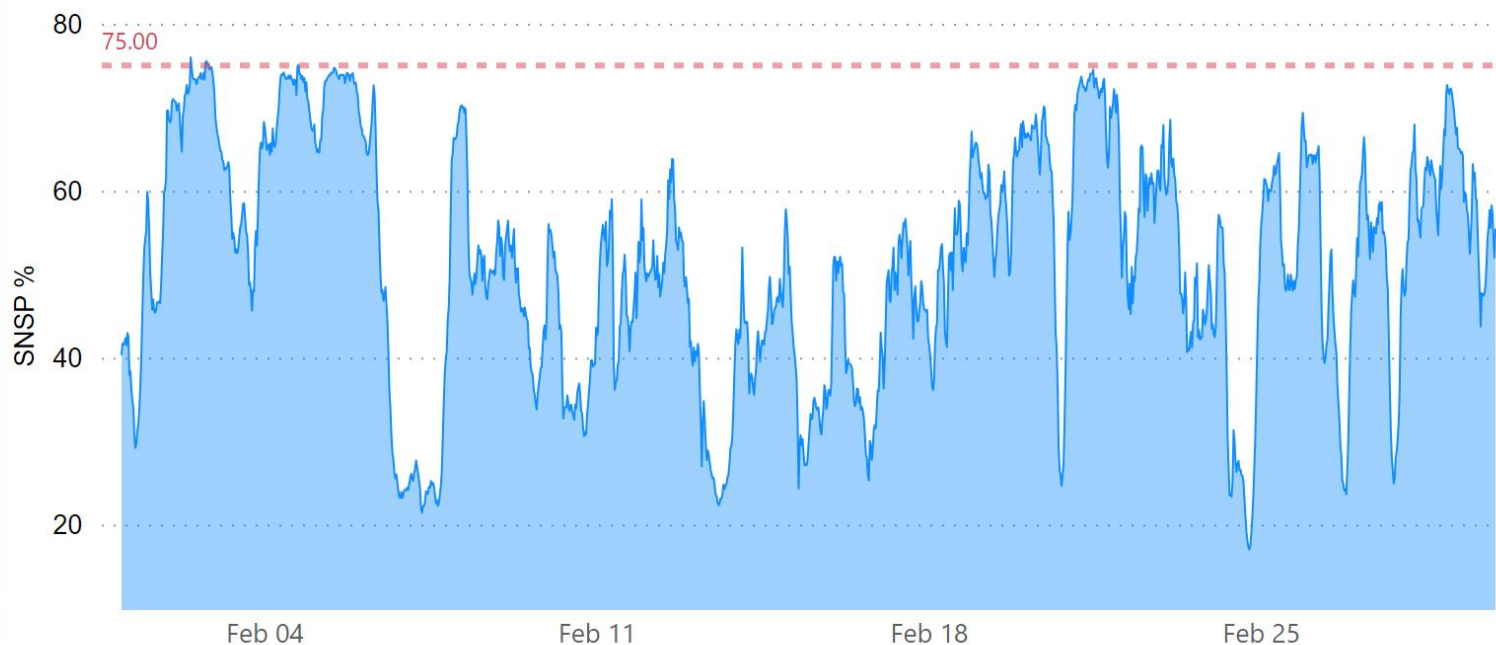
Actual Daily Average Wind Relative to Forecast Daily Average Wind



Wind Generation

Wind generation was considerably higher compared to the previous month and would be classed as medium intensity month. The chart shows 8 days with wind levels averaging below 2 GWs.

SNSP %



SNSP

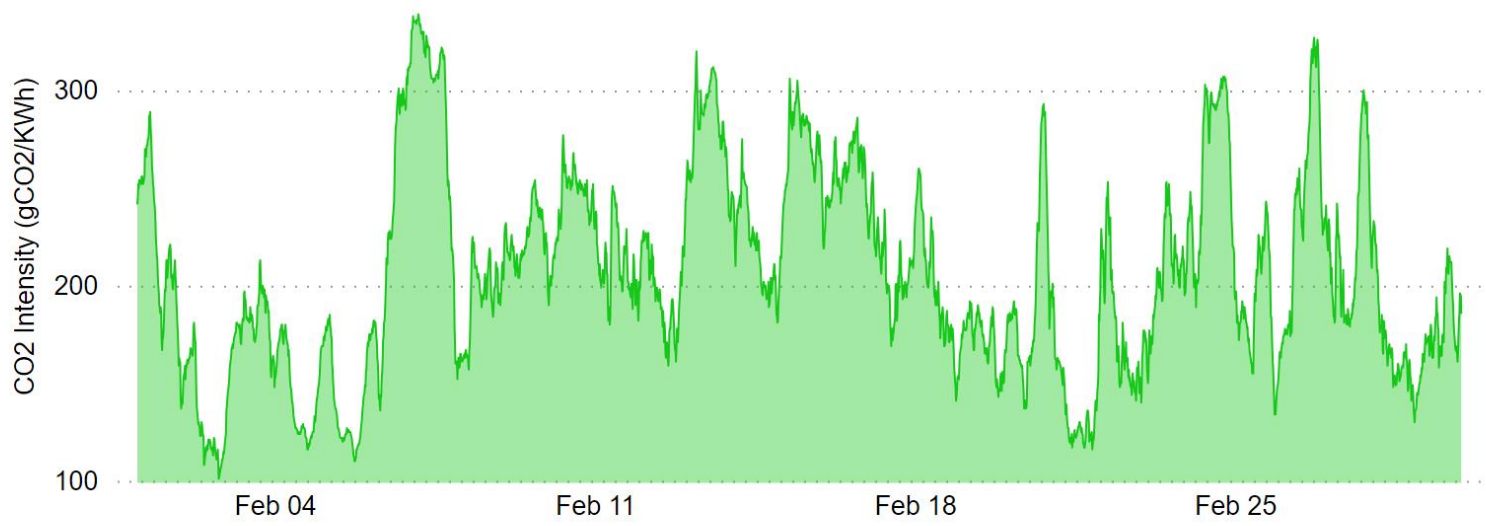
SNSP is closely linked to wind generation and as such follows the same trend across the month. The highest SNSP level was on 2nd February 11:00 which corresponds to peak actual wind levels for the month.

CO₂ February 2024

CO2 Intensity (gCO₂/kWh)
 207.66
 Average
 101
 Lowest
 339
 Highest

CO2 Emissions (tCO₂/hr)
 873
 Average
 450
 Lowest
 1674
 Highest

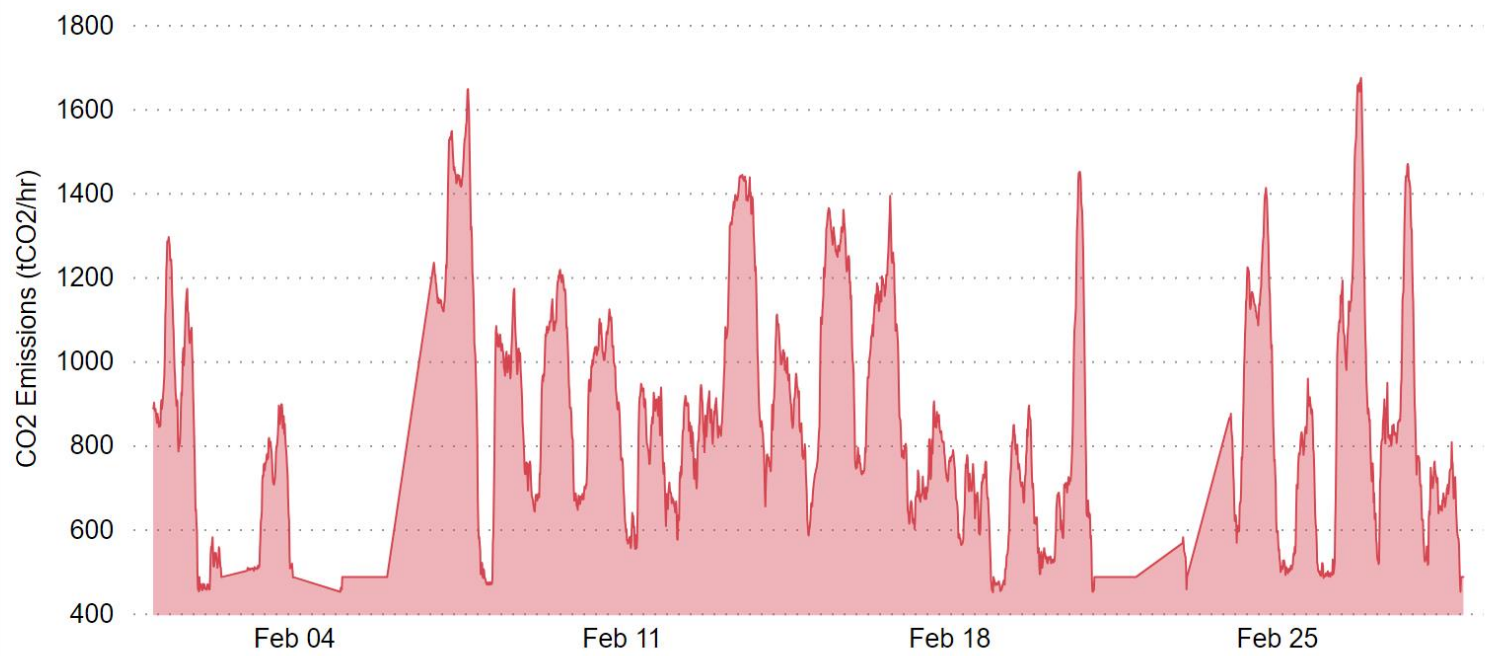
CO2 Intensity



CO₂ Intensity

CO2 Intensity should be negatively correlated with the volume of wind output on the system. This is most evident around 2nd - 6th February with low CO2 intensity correlating to high wind levels. Peak CO2 Intensity occurred the 7th February at 02:45.

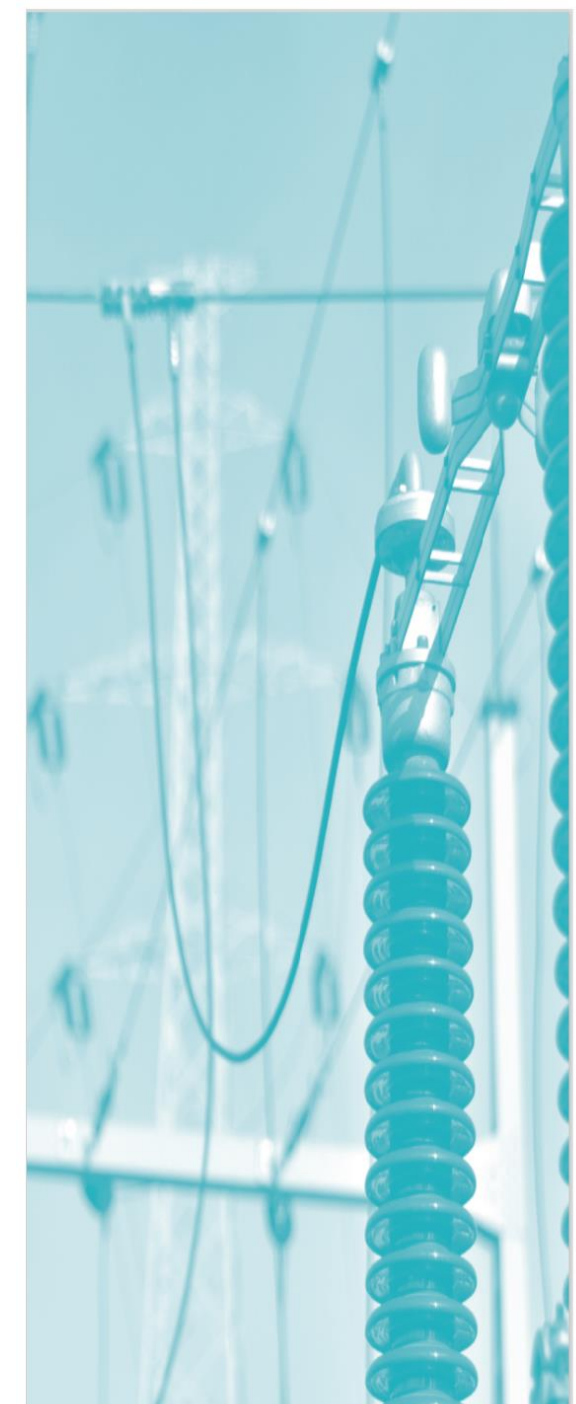
CO2 Emissions



CO₂ Emissions

CO2 intensity is directly related to emissions and therefore follows the same trends as CO2 intensity levels over the course of the month.

Fuel Costs and Spreads



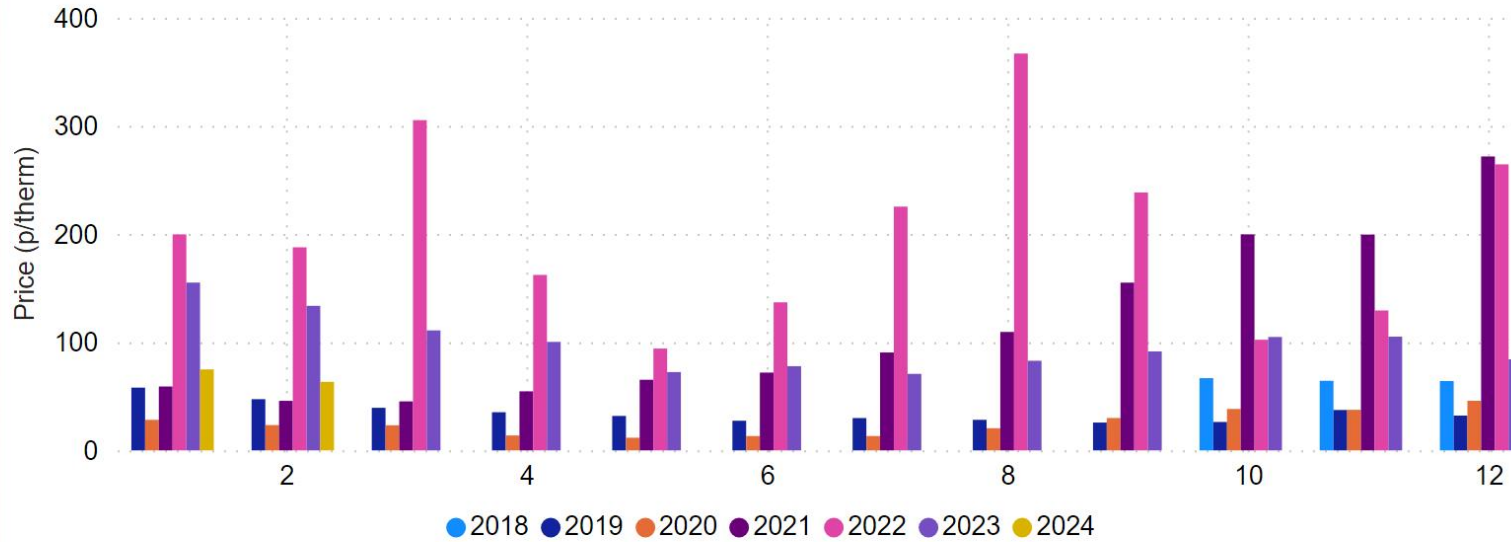
Gas Price February 2024

63.37
Monthly Average (p/therm)

55.90
Monthly Low (p/therm)

71.90
Monthly High (p/therm)

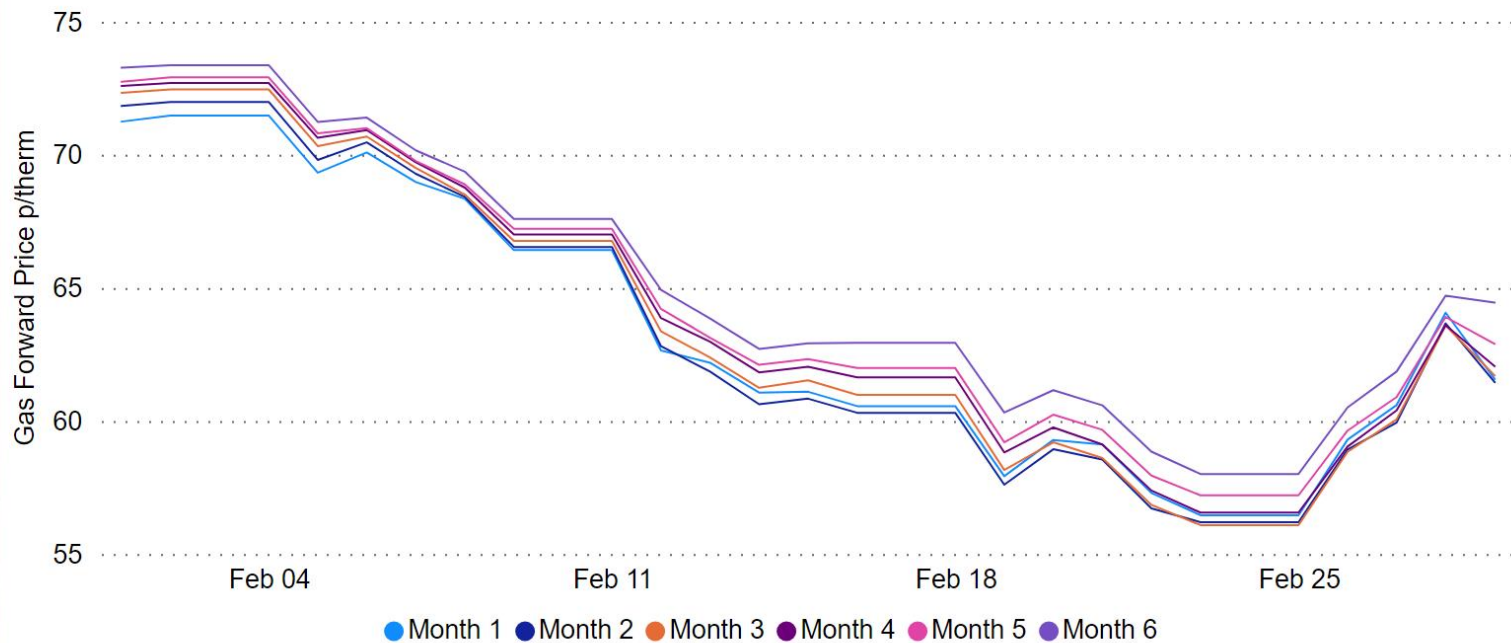
Monthly Day Ahead NBP Gas Price by Year (p/therm)



Gas Prices

Gas prices has dropped 15% compared to the previous month from 74.87p to 63.37p.

Gas Forward Prices



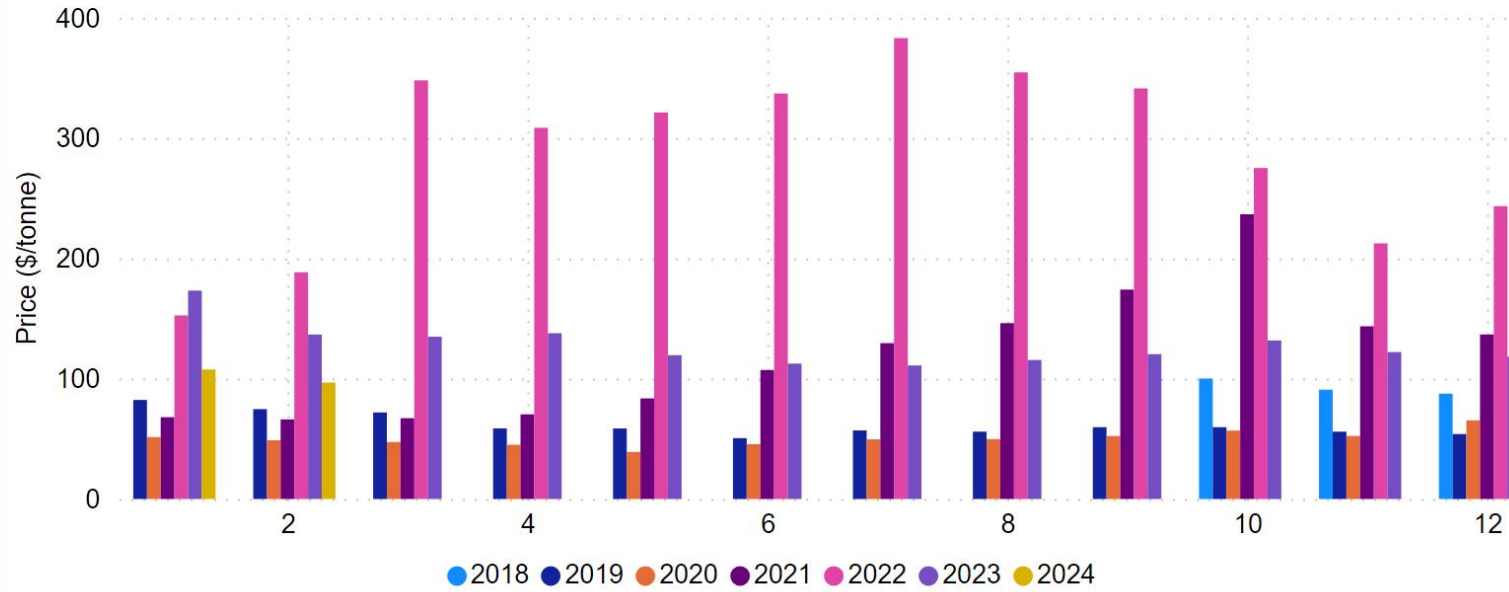
Gas Forward Prices

Similarly, Gas forward prices decreased further from January-24.

Coal Price February 2024

Coal Prices Per Tonne
 \$96.84
 Monthly Average
 \$93.80
 Monthly Low
 \$104.50
 Monthly High

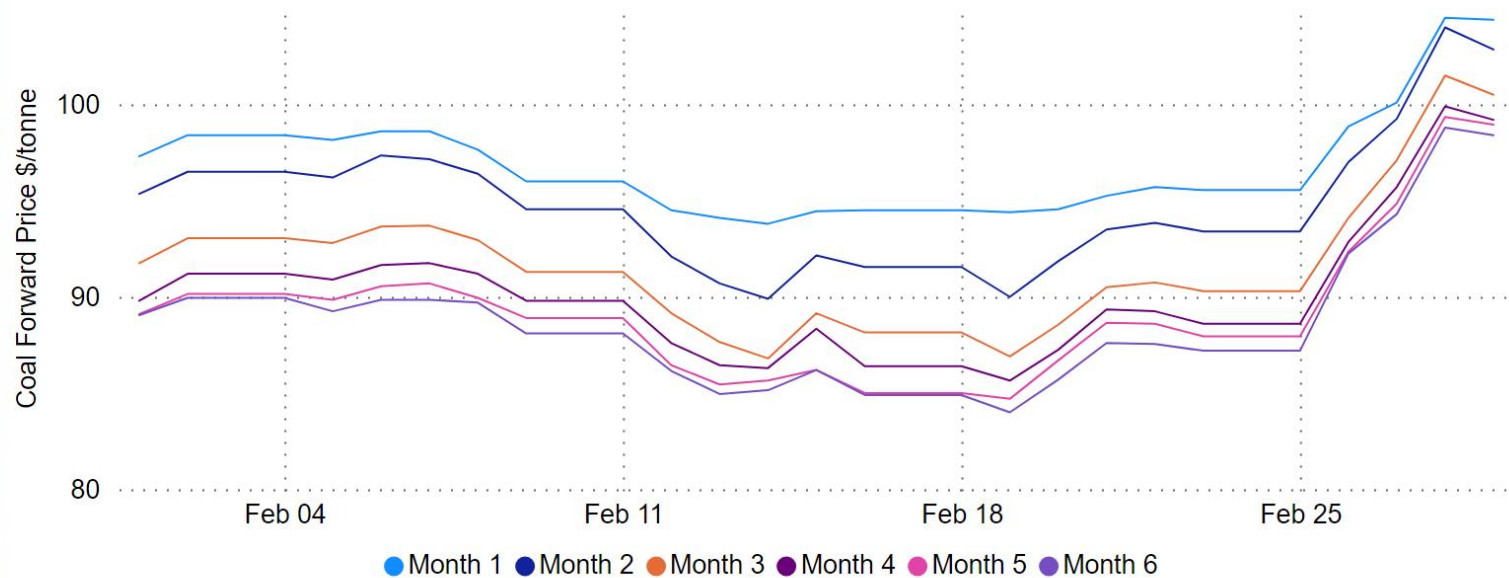
Monthly ICE Rotterdam Coal Price by Year (\$/tonne)



Coal Prices

Coal prices were lower compared to the previous month at \$96.84/tonne.

Coal Forward Prices



Coal Forward Prices

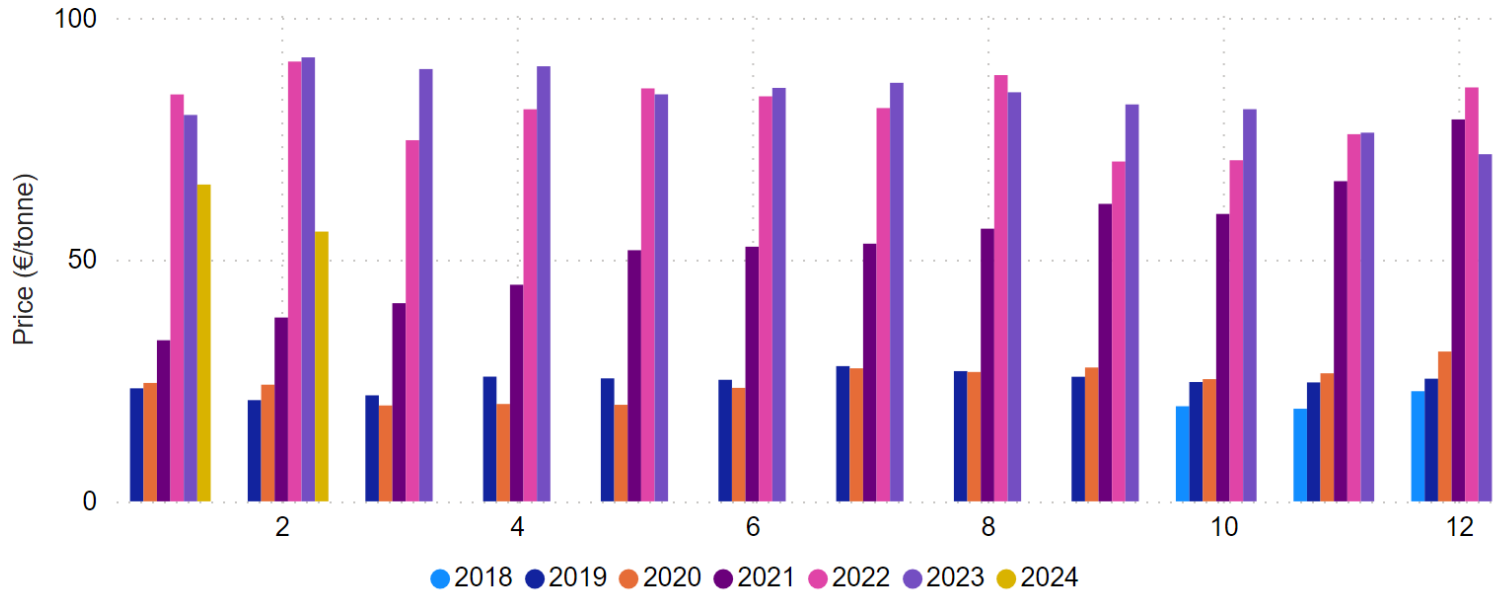
Coal forward prices demonstrate a small general decrease during the month.

Carbon Price February 2024

EU Carbon Prices (€/tonne)
 € 55.79
 Monthly Average
 € 50.65
 Monthly Low
 € 61.57
 Monthly High

UK Carbon Prices (€/tonne)
 € 39.54
 Monthly Average
 € 37.38
 Monthly Low
 € 42.81
 Monthly High

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

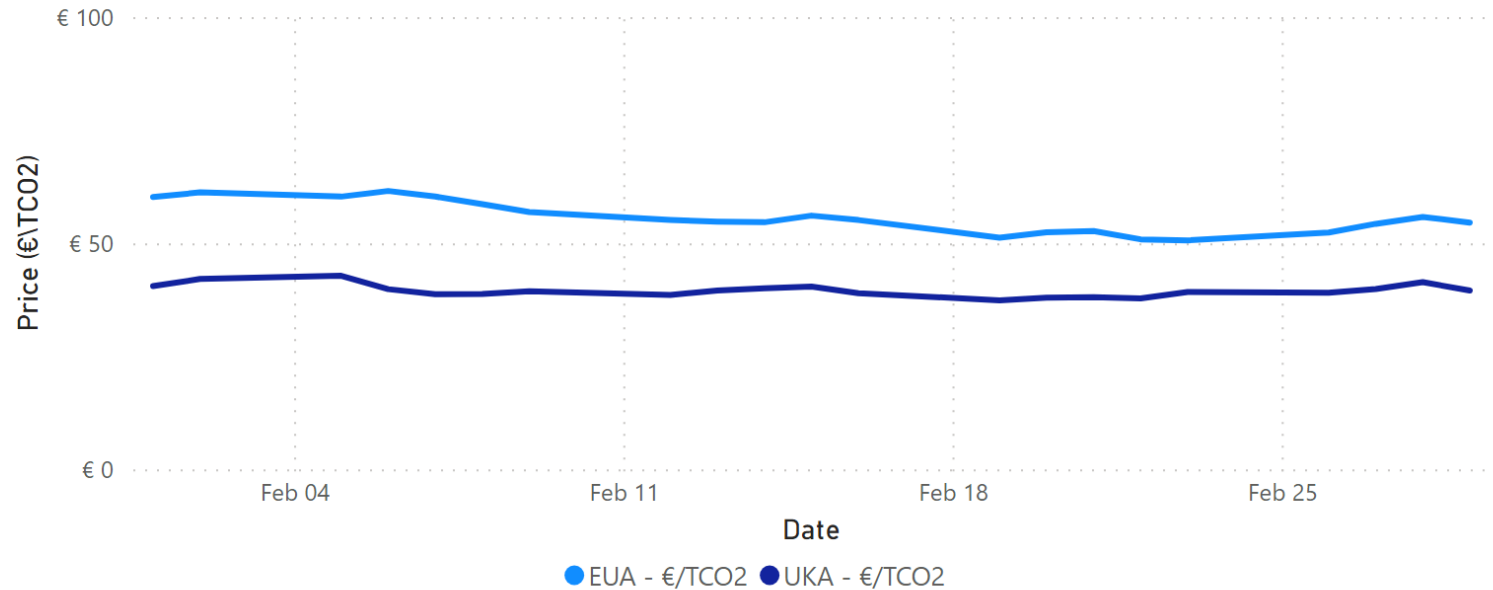


Carbon Prices

Carbon has fallen relative to the previous month by 14%.

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.

UK & EU Carbon Prices

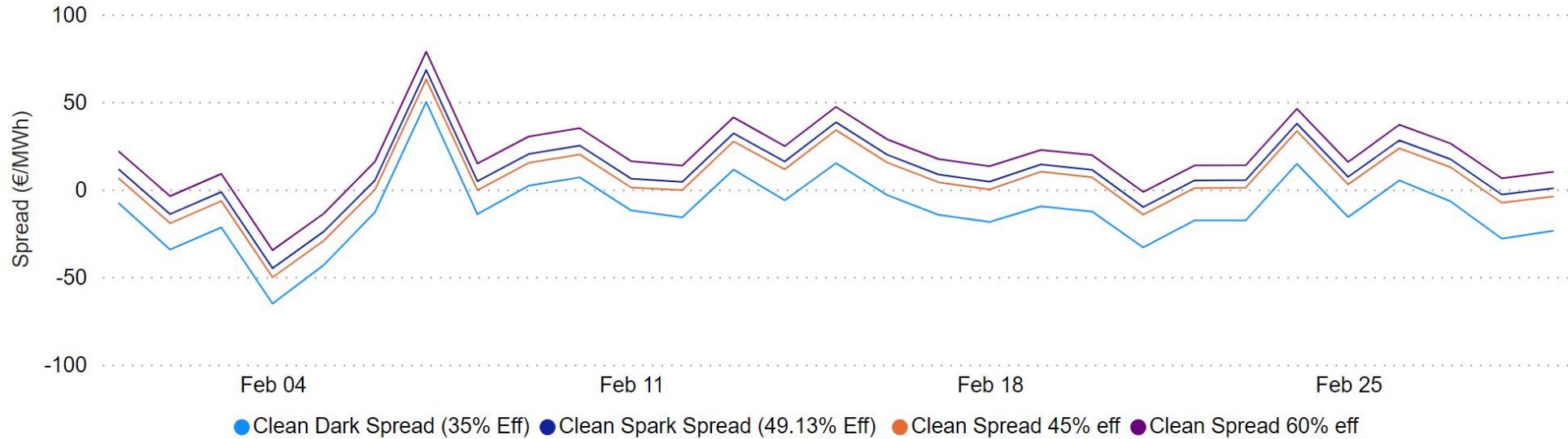


Spark Spreads February 2024

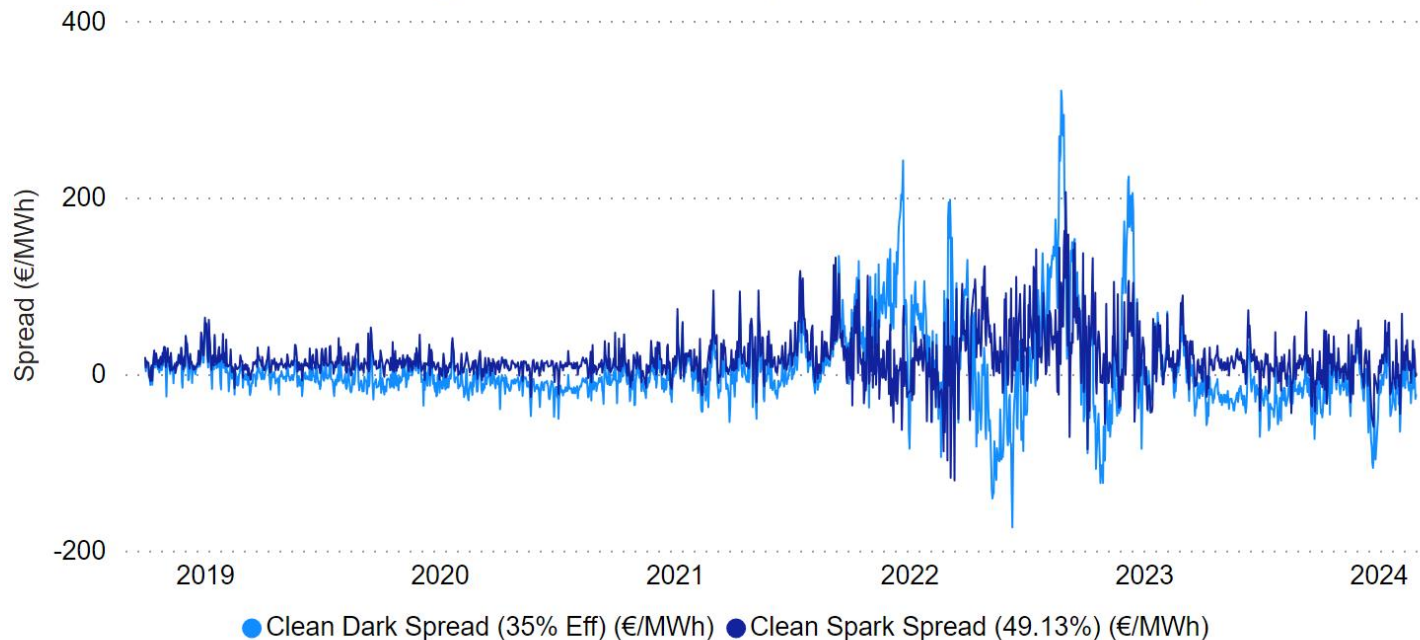
Clean Dark Spread measure the profitability of coal fired power generation based on the variable cost of inputs (coal and carbon credits) and the value of the output (electricity).

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

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 almost complete month except few instances of positive spread. This corresponds to lower wind and higher prices. Clean Spark Spread was generally positive for the whole month with a big fall between 3rd- 6th when the wind increases for a sustained period.