

Windfall profits in energy markets: acute symptoms of structural problems

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Annex 1: Germany

August – December 2021

Month	Gas Spot Price (market average Euro/MWh)	Gas price - Forward buying (Euro/MWh)	CCGT Output Cost Euro/MWh (Forward buying gas)	Profit/Loss €millions
August	46	18	56	75.5
September	69	21	66	445
October	93	26	78	254
November	83	29	85	583
December	114	36	102	840
Total				1997

Data: <https://transparency.entsoe.eu/dashboard/show> & <https://tradingeconomics.com/commodity/eu-natural-gas>

Table Explanation: The gas spot price is the price of gas on the spot market. This has been averaged for each month, thus showing the trend in gas prices. The gas composite price is a 'construct' based on the (correct) assumption that all gas generators buy their gas ahead of the date on which they use it. The gas composite price is based on buying gas futures 12 months, 9 months, 6 months and 3 months ahead of use.

This approach means that, for example, while spot gas prices in November were around €83/MWh, the real cost of gas for gas generators was around €29/MWh. The CCGT output cost shows the 'real' cost of producing 1 MWh from forward bought gas. The final column shows the profit (or loss) of CCGTs in Germany from generating electricity on the Germany market in the last five months of 2021 at the day-ahead price, using a composite price for the actual cost to the generators for the gas that they use.

For CCGT operators that forward bought their gas when prices were low, the period August to December was profitable.

Month	CCGT (MWh)	CCGT Profit €/TWh	PV (MWh)	Wind-Off (MWh)	Wind-On (MWh)	Total RES (MWh)
August	2,327,476	32	5,278,496	1,904,712	6,152,388	13,335,596
September	3,212,225	138	4,802,810	1,354,066	4,464,539	10,621,415
October	3,081,358	82	3,221,290	2,917,477	10,134,375	16,273,142
November	5,159,629	113	1,114,244	2,526,001	7,779,782	9,150,027
December	5,137,771	163	718,212	2,555,066	9,653,128	12,926,406

Data: <https://transparency.entsoe.eu/dashboard/show>

In terms of generation, gas output per month varied from 2.3 TWh through to a high in November of 5.2 TWh. December was by far the most profitable month, both in terms of profits (€840m) and in terms of selling price per TWh (€163m/TWh). October was less profitable because of the large amount of electricity generated by renewables, which, in turn, depressed wholesale electricity prices.

January – May 2022

Month	Gas Price (market – Euro/MWh)	Gas Composite Price (Euro/MWh)	CCGT Output Cost Euro/MWh	Profit/Loss Euros millions
January	85	45	126	389
February	82	54	144	Minus 0.5
March	127	71	175	510
April	97	63	162	71
May	98	78	191	33
Total				1000

Data: <https://transparency.entsoe.eu/dashboard/show> & <https://tradingeconomics.com/commodity/eu-natural-gas>

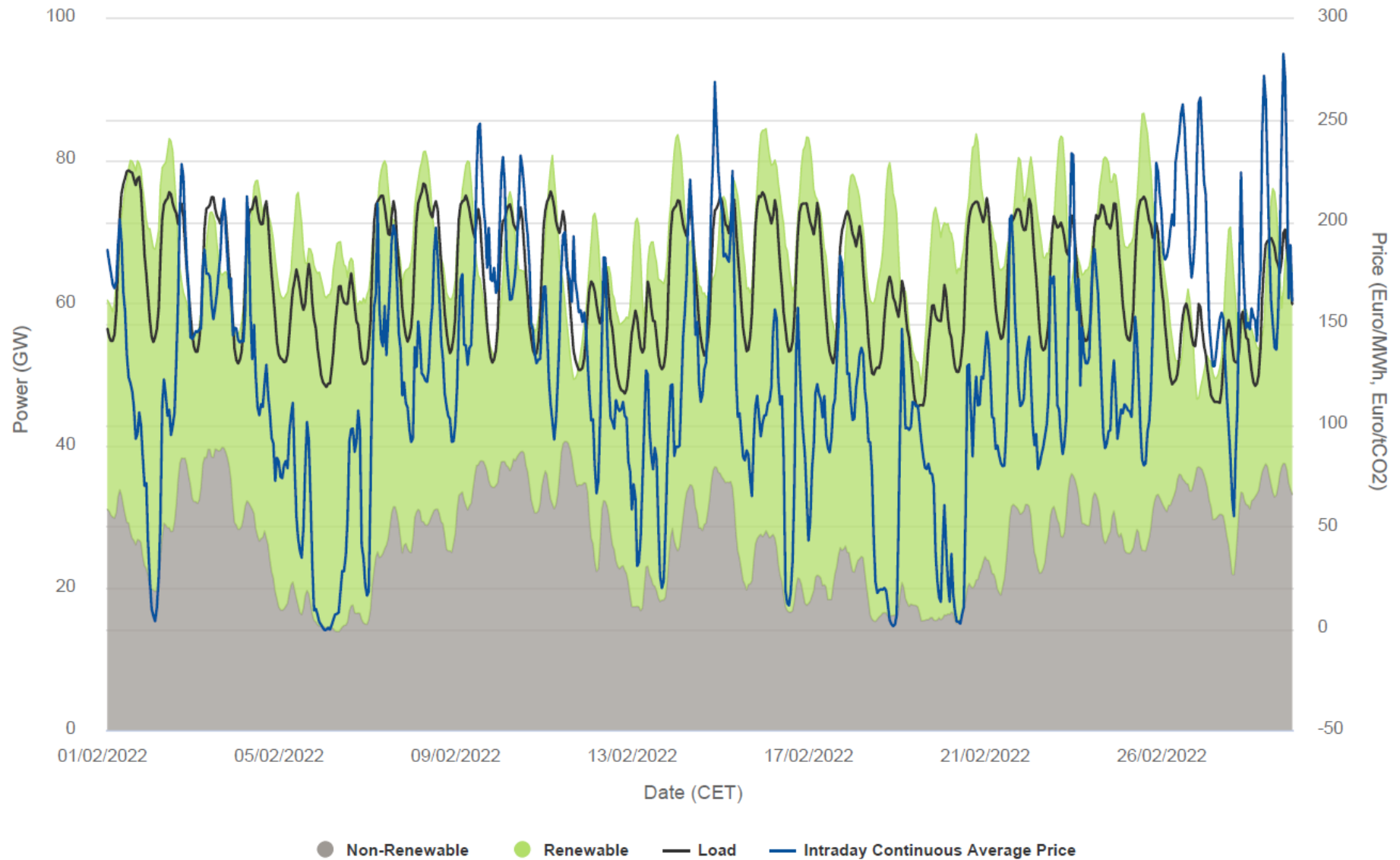
The CCGTs made a profit of €1bn for the period Jan to mid-May 2022, with a loss in February.

Month	CCGT (MWh)	Profit CCGT millions/TWh	PV MWh	Wind-Off MWh	Wind-On MWh	RES Total MWh.
Jan	5,435,820	71	975,168	3,134,838	12,907,695	17,017,701
Feb	3,652,181	-0.13	2,233,266	2,985,711	17,656,591	22,875,568
March	5,034,172	101	5,496,850	1,401,542	6,696,034	13,594,426
April	3,398,298	20	5,590,521	1,916,921	9,422,494	16,929,963
May*	2,058,102	16	3,871,292	594,262	2,444,146	6,910,700

Data: <https://transparency.entsoe.eu/dashboard/show> (*May only up to 22nd)

The above table provides the reason why CCGTs lost money in February, namely that there was very high output from onshore wind and good output from offshore, which in turn drove day-ahead prices down because overall output (renewables and dispatchable generation) was greater than load. In such situations, electricity prices can reach single figures or go negative. In the case of February 2022, prices reached single figures on several occasions. The chart for February 2022 (source: Fraunhofer ISE) shows that day-ahead prices were often below the €144/MWh that the CCGTs needed to make a profit of any sort.

Electricity production and spot prices in Germany in February 2022



Annex 2: Spain

August – December

Month	Gas Spot Price €/MWh	Gas price - Forward buying (Euro/MWh)	CCGT Output Cost €/MWh	Profit/Loss € millions
August	46	18	56	284
September	69	21	66	578
October	93	26	78	766€
November	83	29	85	930
December	114	36	102	1100
Total				3,600

Data: <https://transparency.entsoe.eu/dashboard/show> & <https://tradingeconomics.com/commodity/eu-natural-gas>

This illustrates how electricity prices reacted rapidly to the rise in gas spot prices. The Fraunhofer chart (see next page) for September shows the transition from August, when prices were oscillating between €80 and €125/MWh, to a situation where prices were in the range of €125 to €180/MWh and continuing to rise until December, where a quasi “new normal” of €250 to €300/MWh seemed to be reached (although there was one day with a sustained peak of €400/MWh). Windfall profits were roughly €3,600 million.

Month	CCGT Output MWh	CCGT Profit (millions)/TWh	PV Output MWh	Wind Output MWh	RES Total MWh
August	5,314,836	53	3,070,913	3,557,326	6,628,239
September	6,275,933	92	2,332,765	3,055,884	5,387,649
October	5,737,708	113	2,071,186	4,172,285	6,243,471
November	7,692,579	120	1,487,264	6,265,511	7,752,775
December	6,497,196	169	1,080,286	6,728,569	7,808,855

Data: <https://transparency.entsoe.eu/dashboard/show>

CCGT output for the months August to December varied in the range of 5.5 TWh to 7.7 TWh; however, profits more than doubled. This can easily be seen by calculating profit on

the basis of profit in millions per terawatt hour of generation. The last column shows how, by December, profits on CCGT operations were three times better than in August.

January – May 2022

Month	Gas Price (market – Euro/MWh)	Gas price - Forward buying (Euro/MWh)	CCGT Output Cost Euro/MWh	Profit/Loss Euros millions (Forward buying)
January	85	45	126	625
February	82	54	144	429
March	127	71	175	627
April	97	63	162	205
May	98	78	191	20
Total				2,098

Data: <https://transparency.entsoe.eu/dashboard/show> & <https://tradingeconomics.com/commodity/eu-natural-gas>

The CCGT output cost for the period January to May 2022 varied between €126 and €191/MWh. Profits for the first three months were steady, but then seemed to decline. This may be partly because April had a low power output compared to the other months. May (the data only covers until 22 May) seems to confirm this trend and, in any case, gas spot and gas composite prices appear to have finally almost “caught up” with each other (€98/MWh vs €78/MWh).

Month	CCGT Output MWh	Profit (€millions) / TWh	Wind Output MWh	PV Output MWh	RES Total MWh
January	7,195,423	86	5,284,972	1,664,721	6,949,693
February	6,451,553	66	4,718,522	2,005,751	6,724,273
March	4,822,964	130	5,983,509	1,338,867	7,322,376
April	4,164,547	49	5,396,585	2,888,156	7,284,741
May	3,355,554	6	2,991,625	2,671,048	5,662,673

Data: <https://transparency.entsoe.eu/dashboard/show>

The (windfall) profit per Terawatt hour hit a peak in March and then declined. Overall, CCGT output for the first five months of 2022 was lower than the last five months of 2021. By contrast, windfall profits were €2bn for 2022, compared to €3bn for 2021. This can probably be accounted for by the “catch-up” point made previously.

The chart below is for April 2022 (source: Fraunhofer ISE). Renewables had an impact on pushing prices below €100/MWh more than 10 times. However, absent significant wind and PV, the “new normal” with respect to wholesale prices is still in the range of €180 to €250/MWh.

Electricity production and spot prices in Spain in April 2022

