Cutting Carbon, Cutting Bills

Analysis of savings in gas consumption delivered by wind farms in 2024

January 2025

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While wholesale electricity prices remained high through 2024, wind generation in Ireland and Northern Ireland played a significant role in reducing the impact on consumer bills

Context of our Study

- Throughout early 2024, gas prices are significantly lower than those seen in early 2023. As a result, power prices have also fallen, however they still remain above historic norms keeping electricity prices relatively high – the average wholesale price for 2024 was still more than double the 2019 level. Towards the end of 2024, power prices are substantially higher than they were at the end of 2023, as the price of gas rose on international markets.
- Historically, Ireland and Northern Ireland have relied on fossil fuel-fired generation for electricity, exposing end consumers to movements in the price of imported commodities.
- However, investment in renewable generation technologies has resulted in a steady increase in zero-carbon electricity over the last two decades, dominated by wind power. Ireland and Northern Ireland have among the highest penetration of intermittent renewable generation (wind and solar) in Europe, with wind generation supplying around 34% of electricity supply in 2024[1].
- Wind generation can displace gas-fired generation from the day-ahead wholesale electricity market with low-cost renewable electricity, avoiding the cost of fossil gas and carbon credits.
- In this study we have explored the savings for consumers and operators in the Single Electricity Market (SEM), the unified power system that spans Ireland and Northern Ireland, by this displacement in 2024.
- This study has focused on cost savings unlocked over 2024 and does not quantify the cost savings in previous years or avoided CO_2 emissions, noting a similar study was carried out last year focusing on 2023. We have also recently explored how renewable energy helps Irish electricity consumers in our *Good for your pocket*[2] study.

[1] Energy in Ireland, SEAI (2024)
[2] Good for your Pocket, prepared by Baringa for Wind Energy Ireland (2025)

Methodology and Assumptions

- In our estimation of the fossil gas and carbon savings for consumers and operators in the SEM, we have used historical data at an hourly granularity:
  - Outturn wind generation data, sourced from EirGrid;
  - Outturn electricity demand in Ireland and Northern Ireland, sourced from EirGrid;
  - Day-ahead wholesale NBP[3] gas prices, sourced from Argus; and
  - Traded daily EUA[4] carbon prices, sourced from Argus.
- We have assumed an average higher heating value (HHV) efficiency of 49.1% for the fossil gas-fired fleet across the SEM, consistent with EirGrid and SONI.
- We have assumed a marginal 'fuel' cost for wind generation of 0 €/MWh.
- Based on these assumptions we have calculated the volume of gas and carbon credits that would be required to 'replace' the historical outturn wind generation in the day-ahead schedule at an hourly granularity.
- We have allocated the fuel and carbon cost savings to Ireland and Northern Ireland on a demand-weighted basis, in line with the treatment of electricity cost components on end consumer bills.
- Our methodology assumes that wind power displaces exclusively fossil gas-fired generation. Although fossil gas is dominant in the SEM, other technologies such as coal and oil-fired assets may be displaced by wind generation, with different savings.

[3] National Balancing Point, a virtual trading hub for fossil gas based in the United Kingdom.
[4] European Union Allowances, carbon credits used within the EU Emissions Trading System (EU ETS).

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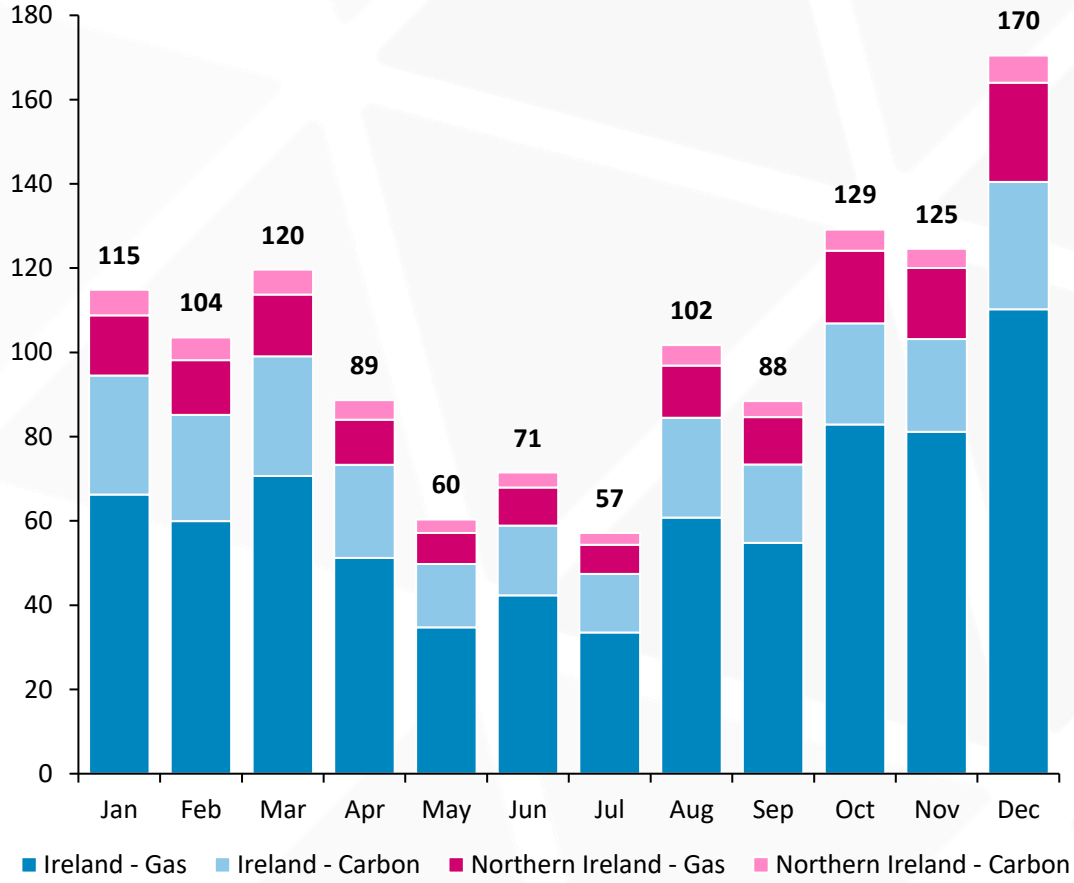
Wind generation in Ireland and Northern Ireland displaced a total of €1.2 billion worth of gas and carbon credits in the wholesale market

Results of our Analysis

- Our analysis reveals that a total of 13.2 terawatt-hours[1] (TWh) of outturn wind generation was able to displace a total of almost €1.2 billion worth of fossil gas and carbon in 2024.
- Around 2.1 billion cubic meters (bcm) of fossil gas was displaced in Ireland at a total avoided cost of €748 million. A further £133 million (€157 million) of gas was displaced in Northern Ireland, totalling over 0.4 bcm in volume.
- The resulting reduction in emissions equates to 4.1 and 0.9 million tonnes of CO2 emissions for Ireland and Northern Ireland respectively.
- In addition, €268 million and £48 million (€56 million) worth of carbon credits were displaced from the wholesale market in Ireland and Northern Ireland respectively.
- March saw the greatest monthly wind generation, with a total cost saving of €120 million across the island. High fossil gas prices at the end of the year resulted in the greatest monthly saving from wind power in December, totalling €170 million.

Monthly Cost Savings | January – December 2024

€m, nominal

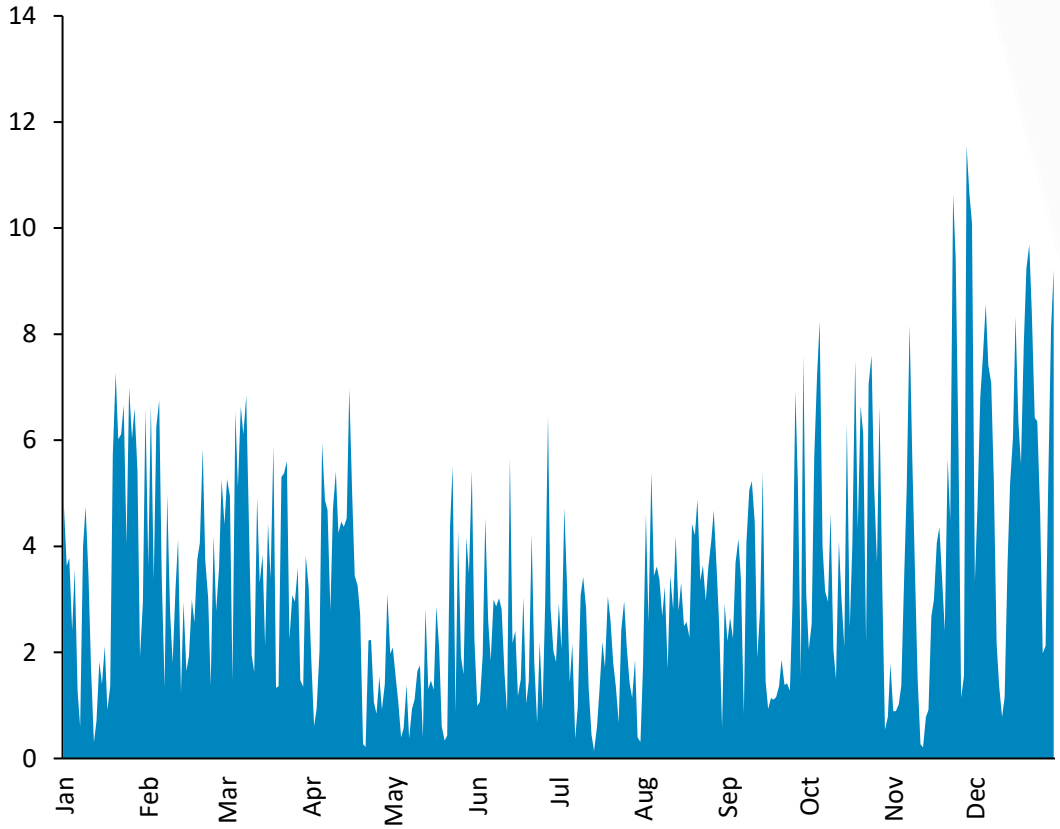


[1] A terawatt-hour is equal to 1,000 gigawatt-hours (GWh), or 1,000,000 megawatt-hours (MWh).

Wind generation in Ireland and Northern Ireland displaced a total of €1.2 billion worth of fossil gas and carbon credits in the wholesale market

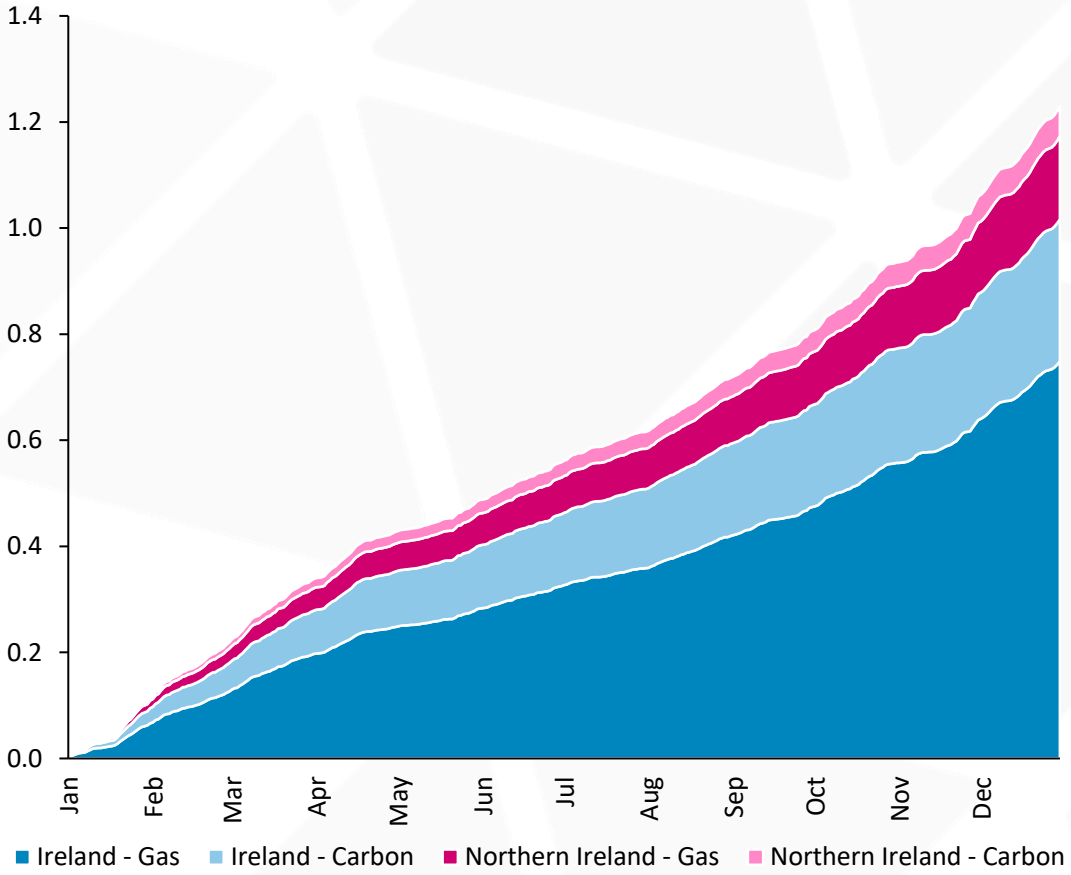
Daily Total Savings | January – December 2024

€m, nominal



Cumulative Savings | January – December 2024

€b, nominal



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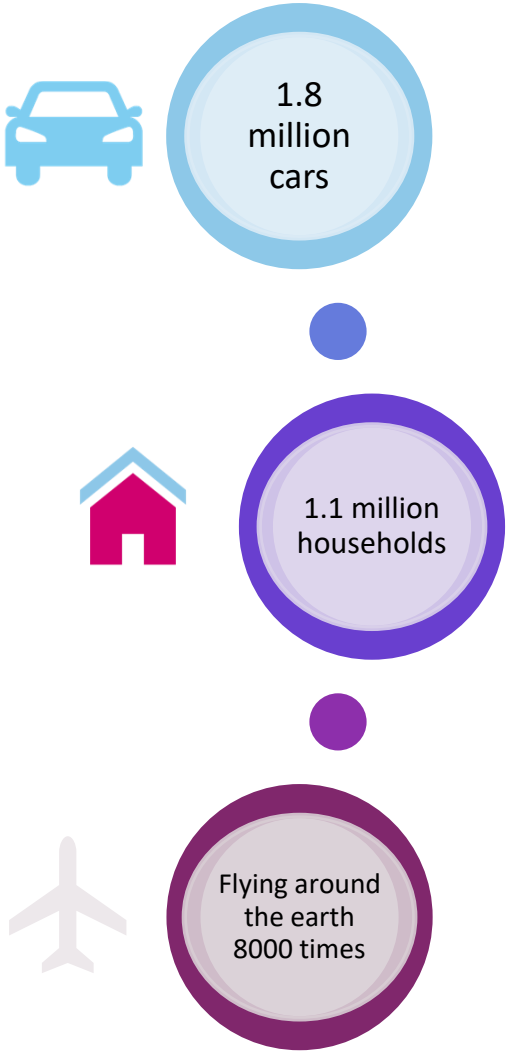
Key Results of our Analysis	Unit	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Day-Ahead Market Costs													
Wholesale power price	*€/MWh*	100	85	87	89	108	108	111	100	113	124	146	140
NBP gas price	*€/MWh*	30	25	27	29	30	33	30	34	35	40	45	46
EUA carbon price	*€/t*	68	58	60	66	73	70	68	71	66	64	67	68
Day-Ahead Market Schedule													
All-island wind generation	*GWh*	1,380	1,415	1,544	1,078	665	772	657	1,070	909	1,220	1,044	1,446
Ireland demand	*GWh*	3,142	2,824	2,976	2,732	2,665	2,484	2,639	2,628	2,661	2,874	3,010	3,088
Northern Ireland demand	*GWh*	699	624	635	586	577	537	547	539	556	616	652	659
Avoided Costs in Ireland													
Displaced gas cost	*€m*	66	60	71	51	35	42	33	61	55	83	81	110
Displaced carbon cost	*€m*	28	25	28	22	15	17	14	24	19	24	22	30
Total cost saving	*€m*	94	85	99	73	50	59	47	85	73	107	103	140
Avoided Costs in Northern Ireland													
Displaced gas cost	*€m*	14	13	15	11	7	9	7	12	11	17	17	24
Displaced carbon cost	*€m*	6	5	6	5	3	4	3	5	4	5	5	6
Total cost saving	*€m*	20	18	21	15	11	13	10	17	15	22	21	30
Displaced gas cost	*£m*	12	11	13	9	6	8	6	11	9	14	14	19
Displaced carbon cost	*£m*	5	5	5	4	3	3	2	4	3	4	4	5
Total cost saving	*£m*	17	16	18	13	9	11	8	15	13	19	18	25
Avoided Emissions in Ireland													
Avoided Emissions	*kt*	425	436	479	334	205	238	204	333	283	378	324	446
Avoided Emissions in Northern Ireland													
Avoided Emissions	*kt*	91	94	99	70	44	51	42	68	58	79	67	95

These carbon savings have a real impact on Ireland's measures to combat climate change – here is what they are equivalent to:



The annual emissions of 1.8 million cars across Ireland and Northern Ireland, considering the average car in Ireland produces 2.75 tonnes of CO_2 per year

The annual emissions of 1.1 million households across Ireland and Northern Ireland, considering an average household emissions of 4.6 tonnes annually

The CO_2 released by flying around the Earth more than 8000 times, considering an emissions of 24 kg per mile of passenger flight

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Commissioned by Wind Energy Ireland


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