GIST IMPACT

September 2025

Avoided Impacts, Real Returns: Reframing the Value of Clean Energy

Spotlight Insights Report

Table of Contents

About GIST Impact

GIST Impact is a market-leading sustainability data and analytics provider that helps companies and investors to measure and value their environmental and social impacts, risks and opportunities.

Powered by a global team of experts, machine learning models, and robust scientific research, GIST Impact delivers precise, location-specific impact data covering over 18,500+ companies, and is the chosen partner for some of the world's largest corporations and investors representing over $8 trillion in assets under management.

Our methodologies are available on request and are steeped in the latest available, peer-reviewed science – aligned with our focus on data accessibility, traceability, and transparency.

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FStech awards 2025 WINNER

Environmental Finance Sustainable Investment Awards 2024 Winner ESG Data Provider of the year, EMEA

1. Introduction

The real story of the clean energy transition lies not only in reduced footprints, but in the avoided impacts - the emissions never released, the harm never done - that must now be made visible, measurable, and actionable.

For too long, the story has stopped at lower emissions and reduced footprints. But what if we reframed that story to focus not only on what happened, but what didn't happen? Today, most reporting by clean energy providers remains far too narrow - focused on what was emitted, rather than broadening the lens to also include what was avoided by virtue of their existence. This is where impact data, and especially monetised impact savings, comes in.

Impact data - and more specifically data on impact savings (i.e. avoided impacts) - gives clean energy providers, investors, and transition advocates a powerful tool to reveal the true value of renewable energy. When we measure impact savings - emissions that never entered the atmosphere, pollutants that never touched vital ecosystems, social and economic harms that never materialised - we open up a new dimension through which to look at the performance and long-term value creation of a clean energy provider.

By putting a tangible financial value on impact savings, which is science-based and data-led, clean energy providers have the ability to demonstrate the full benefit of their business model, and unlock new communication opportunities like never before.
This report unpacks how impact savings can transform how we understand, communicate, and position clean energy. To illustrate this point, we explore the avoided environmental costs of wind energy in the UK if the same electricity were produced using fossil fuels, and discuss wind energy's avoided impacts against the standard UK grid mix of 2024.

The result of our analysis represents a critical shift - a new dawn in how we understand the true value of clean energy. Global energy demand keeps climbing, climate targets are tightening, nature-related risks are in sharper focus, and regulation is evolving by the day. The providers that can clearly demonstrate their net-positive contributions will stand out. Our analysis is more than an accounting exercise. It's a chance for clean energy providers to reclaim their narrative, turn their impact into competitive advantage, and inspire action, investment, and trust.

It's time to talk about what didn't happen.

2. The UK's Energy Transition

The global energy landscape is at an inflection point. Energy systems are being restructured under the pressure of increasing demand, rapidly intensifying climate targets, rising nature-related risks, turbulent geopolitical climates, and ever-evolving regulatory expectations.

Alongside these pressures though, lies a major strategic, yet largely untapped opportunity to shape how the clean energy transition creates new forms of value. As the energy transition accelerates, especially in mature markets like the UK, the key question is not only how energy is produced, but what damage is being avoided in the process - and how that reshapes the value proposition of clean energy providers in a decarbonising world.

2.1 Framing the Gap: Measuring What Didn't Happen

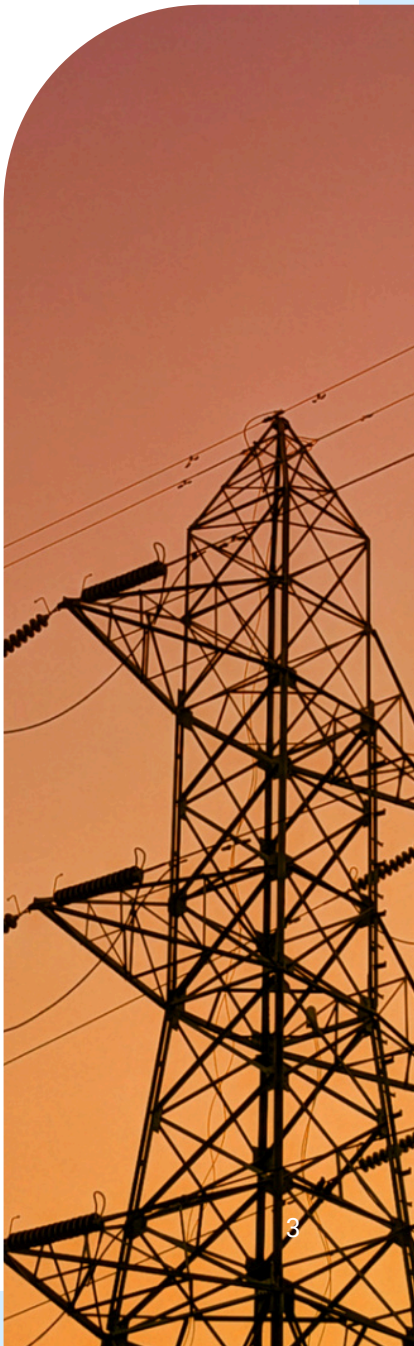
Most sustainability disclosures in the energy sector, even among clean energy leaders, have focused predominantly on emissions produced (i.e. Scope 1, 2, and increasingly Scope 3).

Yet, there remains an under-explored narrative: the lack of emphasis on emissions avoided by displacing fossil-based energy, and the positives this creates for wider society. In today's regulatory and investor landscape, where the line between compliance and leadership is often drawn by the ability to measure and tell the full story, there is an urgent need to move beyond reporting on outputs to demonstrating real impacts.

We need to elevate the role of impact savings and its ability to capture the positive effects of clean energy - not only in the electricity it generates, but also in the emissions, pollution, and resource use it prevents by reducing reliance on carbon-intensive systems.

This reframing offers a richer view of performance - one that aligns operational delivery with systems-level impact.

The scenarios in this analysis are hypothetical and illustrate the potential scale of environmental impact savings under specific counterfactual conditions. The results should be seen as indicative estimates rather than precise forecasts, but they provide a useful picture of the benefits renewable energy can deliver.



2.2 The UK: A Living Transition Laboratory

The UK offers a compelling case study in the systemic shift toward renewables - one that illustrates the interplay between long-term policy, market reforms, and innovation in delivery models.

Over the past three decades, the UK has moved from a coal-reliant power mix to one that's increasingly dominated by low-carbon sources - especially offshore and onshore wind, biomass, solar, and hydro. This transition was neither accidental nor short-term. It emerged through a layered policy evolution, starting with the Electricity Act of 1989 (market liberalisation), through to the Renewables Obligation (2002–2017) and the Contracts for Difference (CfD) framework that enabled offshore wind to scale rapidly in cost-effective ways. Landmark commitments like the Climate Change Act (2008) and the Net Zero Target (2019) have since institutionalised long-term decarbonisation pathways.

More recently, geopolitical instability and energy security concerns (e.g., the 2022 British Energy Security Strategy) have reinforced the case for accelerating renewables, setting new targets such as 50 GW of offshore wind capacity by 2030 - which is enough energy to power every home in the UK. The interplay of policy, market corrections (e.g., CfD AR6 pricing reform), and public participation (e.g., rooftop solar enabled by the Feed-in Tariff) reflects a mature, adaptive policy ecosystem.

Each renewable source in the UK has played a distinct role in the transition. At a glance:

Offshore wind has become the flagship — with the UK's extensive coastline, intense wind patterns, and strong policy support.

Onshore wind remains a key contributor in Scotland and Wales, facing planning and regulatory constraints.

Solar PV experienced significant uptake in the 2010s, particularly at residential and small commercial scales.

Hydro and biomass offer dispatchable, complementary capacity, enhancing grid resilience and diversification.

The UK's journey is not just about generation capacity - it reflects a broader reconfiguration of economic, environmental, and social systems. It demonstrates how renewables can serve as catalysts for regional development, job creation, and innovation, while simultaneously reducing dependency on imported fossil fuels and exposure to their associated volatility.

2.3 The Need For Reframed Metrics

As the global energy transition accelerates, especially in key markets like the UK, clean energy providers are not merely infrastructure companies. Whether they intend to be or not, they are stewards of systemic change.

Capturing and communicating the full impact of their business model requires a new approach - one that is not only confined to carbon metrics but rather one that reflects the “opportunity footprint” of a cleaner energy system for all.

By broadening the lens from “what is generated” to “what is avoided”, clean energy providers can demonstrate differentiated value to regulators, investors, customers, and society at large. This is no longer just about reporting, it’s about reshaping how we convey impact, and redefining performance in an age of transformation.

To fully appreciate the systemic value of renewables, it is crucial to examine their measurable impact. The UK’s journey offers clear evidence - and we deep dive into this in the following section.

3. Bringing ‘Impact Savings’ to Life

In this section, we aim to bring the concept of impact savings to life using the UK as an example, and analysing its wind-based electricity generation as a case study. The objective is to showcase how renewable energy - beyond the narrow scope of emissions reductions - generates broader, and quantifiable, impact savings by avoiding environmental damage at scale.

By comparing wind energy against the remaining sources in the UK’s grid mix, we offer a glimpse of the kind of insights that can be uncovered using this approach.

3.1 Setting The Scene

The UK closed its last coal-fired power plant at Ratcliffe-on-Soar in Nottinghamshire in September 2024, marking the end of 142 years of using coal to produce electricity. With this significant milestone reached, the UK became the first G7 country to completely stop using coal power for its energy grid.

Around this time, the share of renewable energy has increased significantly. As a result, the UK’s electricity in 2024 was the cleanest it has ever been. The carbon intensity of power generation came down to just 124 gCO_2/kWh, which is a 70% drop compared to 2014. By looking more closely at the UK grid mix, we are able to get a better idea of which renewable sources have made this remarkable transition possible. Figure 1 below illustrates electricity generation from wind has played the biggest role in driving this change.

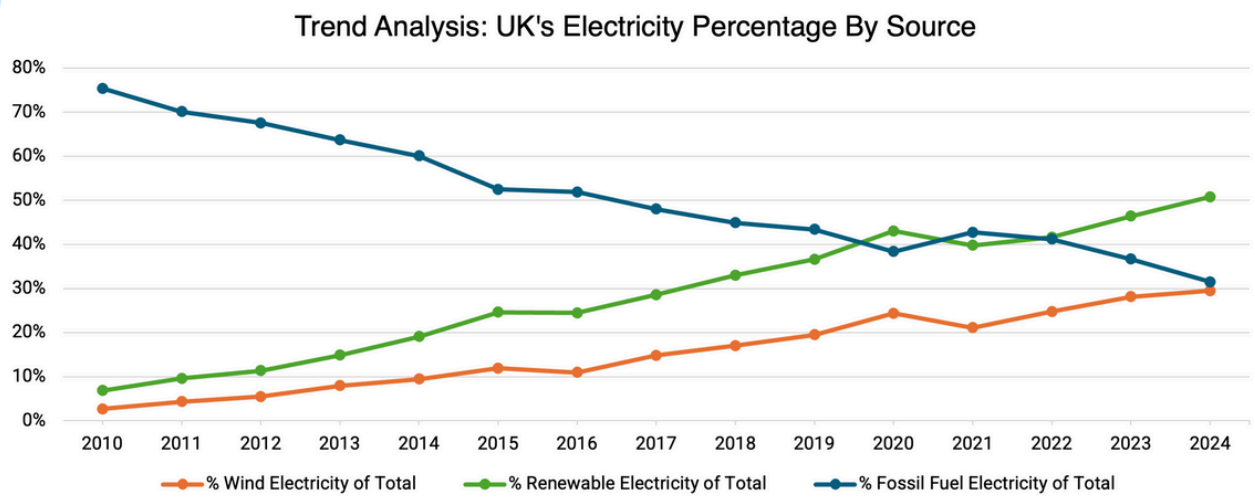


Figure 1. Source: UK Government, processed by GIST Impact 2025

The trend shown in Figure 1 illustrates that fossil fuel-based electricity generation in the UK has fallen from 75% of the total energy mix (288 TWh) in 2010 to just 31% (90 TWh) in 2024. This reflects a decrease of about 69% in fossil fuel-based power generation over this period, highlighting the success of the UK's green energy transition.

This steady fall in fossil fuels has been made possible by the continuous rise in the share of renewables. Renewable electricity generation increased from 7% of the total energy mix (26 TWh) in 2010 to 51% (145 TWh) in 2024, which is a rise of about 458% compared to 2010.

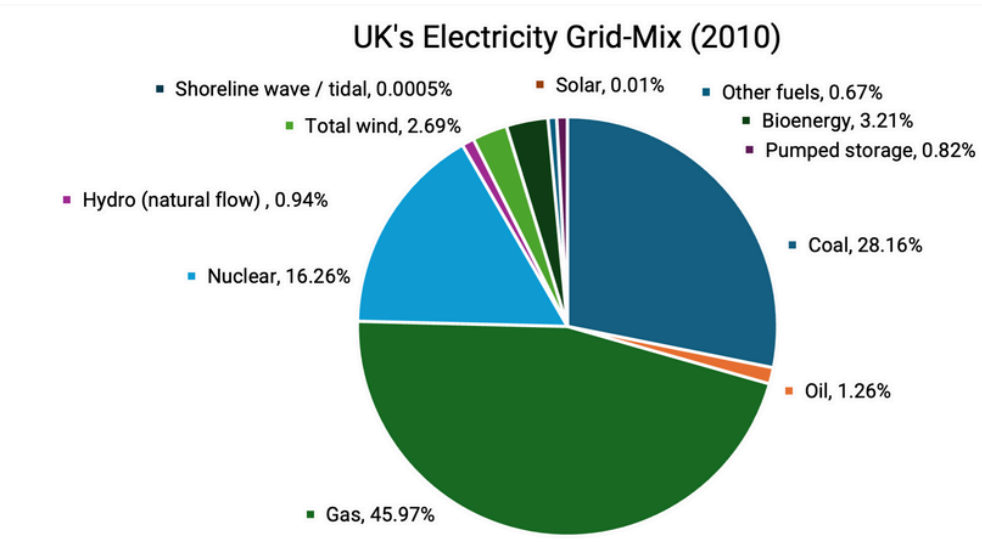


Figure 2. Source: UK Government, processed by GIST Impact 2025

By looking more closely at which renewable source contributed the most to this transition, it is clear that wind energy has played the key role. Wind power's share grew from 3% of the total energy mix (10 TWh) in 2010 to 29% (84 TWh) in 2024 - an increase of about 740%. In fact, in 2024, wind energy generated almost as much electricity as gas, which contributed 30% (86 TWh). In comparison, other fossil fuels - coal and oil - generated only 1.9 TWh and 1.5 TWh respectively.

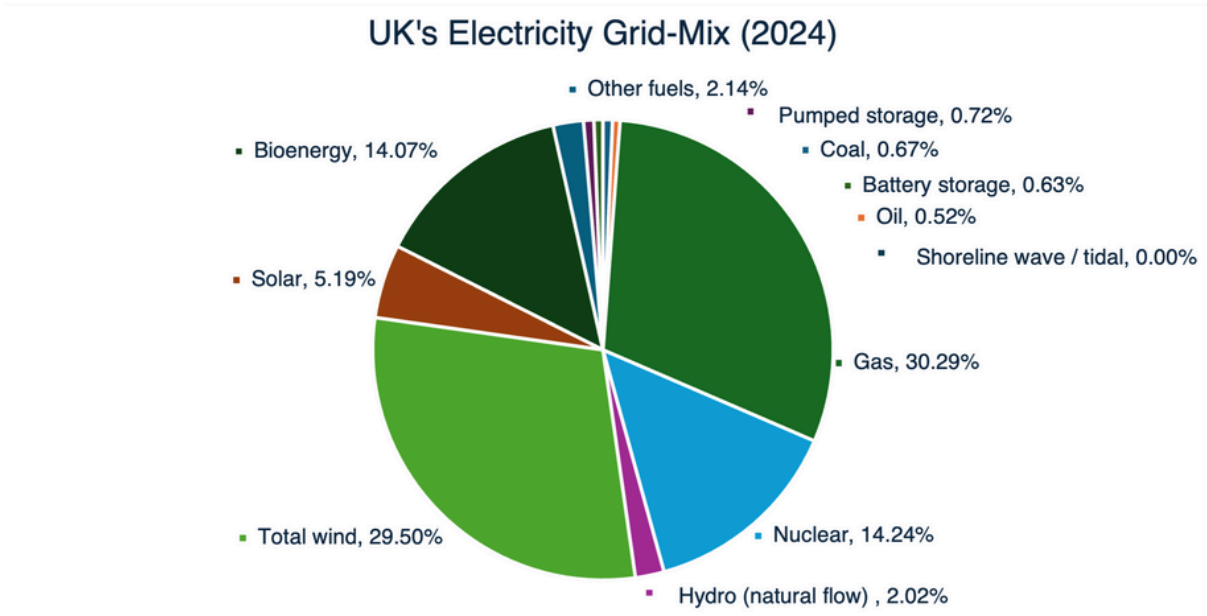


Figure 3. Source: UK Government, processed by GIST Impact 2025

Based on the UK's electricity grid mix in 2024, shown in Figure 2, indicates that 2024 was the cleanest year for the UK in terms of renewable electricity, with wind energy playing the most significant role. As a result, we decided to conduct an analysis on the holistic value of this shift - specifically looking at the environmental benefits of replacing fossil fuel-based electricity with the wind generated electricity in 2024. A detailed explanation of how we did this can be found in the following section.

3.2 Calculating Impact Savings

A useful starting point for understanding impact savings is the concept of *impact valuation*. Impact valuation is the process of quantifying the environmental and social consequences of business activities in monetary terms. Unlike traditional financial metrics, it seeks to capture the value created or destroyed for society and the environment, making visible the real effects of a business' activities that are otherwise overlooked.

For example, the valuation of air pollution often reflects the costs to human health, such as medical expenses and lost productivity, while greenhouse gas emissions are typically measured using the social cost of carbon, which incorporates climate-related damages such as extreme weather events or reduced agricultural yields.

A principle behind impact valuation is that of *economic externalities* - the costs or benefits of business activities that are borne by society rather than the organisation itself. Pollution, resource depletion, health impacts, and social inequalities are classic examples of negative externalities, while cleaner air, job creation, or biodiversity preservation are examples of positive externalities. These effects are real and measurable, yet they frequently remain outside standard financial accounts and corporate disclosures.

Understanding these externalities - and the impact savings that come from avoiding or reducing them - is critical. It enables businesses and investors to make better-informed strategic choices, identify areas of value creation, and manage risks more effectively. Beyond risk and opportunity, impact valuation supports a more holistic understanding of sustainable success, aligning financial performance with broader societal and environmental outcomes.

To make impact valuation more tangible, we will compare a fossil fuel - natural gas - on a one-to-one basis with a renewable energy source - wind. In doing so, the different impact intensities will illustrate the broader societal costs of these energy sources across different environmental drivers - highlighting how the externalities of different energy sources impact society.

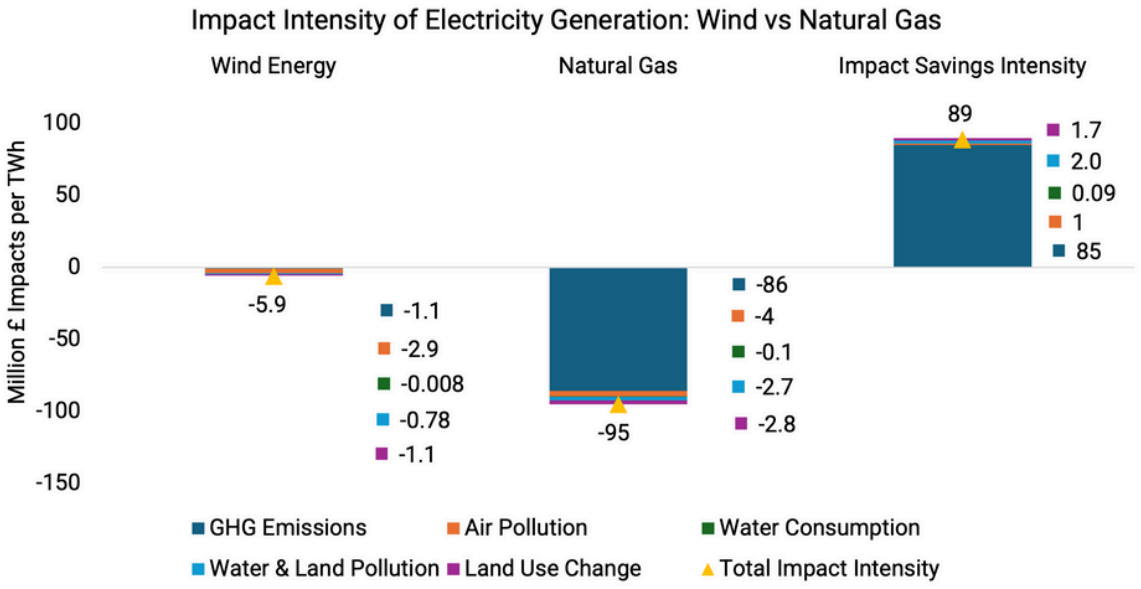


Figure 4. Source: Input data from GaBi, and country-level valuation factor from GIST Impact. Processed by GIST Impact 2025

As shown in Figure 4, the impact intensity - a metric that quantifies the environmental or social effect of each unit of output - of natural gas electricity is significantly higher than that of wind across all environmental drivers. For every unit of electricity generated, natural gas creates impacts around £95 million per TWh, compared to just £5.9 million per TWh for wind. This results in total avoided impacts, or savings, of almost £89 million per TWh when wind is used to generate electricity instead of natural gas.

The maximum savings come from greenhouse gas emissions, where the avoided impacts reach about £85 million per TWh, showing the strong climate benefit of wind energy over gas. Significant savings are also seen in water and land pollution (£2 million per TWh) and land use change (£1.7 million per TWh). Even in categories where absolute values are smaller, like air pollution (£0.9 million per TWh) and water consumption (£0.09 million per TWh), wind still out-performs gas.

Overall, this comparison makes it clear that wind energy is not only low-carbon but also far less damaging across multiple environmental drivers when measured in terms of impact intensity (a per-unit-of-electricity basis). If you're curious about how we do this calculation, read on.

3.3 Our Methodology

This section provides a high-level overview that lifts the lid on our methodology and its various stages, showing how we go about calculating impact intensity, and corresponding impact savings.

1

Data sources

- **Life cycle inventory (LCI) data** for different environmental drivers (GHG emissions, air pollution, water consumption, water and land pollution, and land use change) were obtained from the GaBi database. The data is provided on a per unit of electricity generated basis.
- **Monetary valuation factors** were applied to translate the biophysical data into monetary terms (Million £). These valuation factors are proprietary to GIST Impact, except for the GHG emissions value factor, which is taken from the average 2024 estimate of the International Foundation for Valuing Impacts (IFVI).
- **A valuation factor** is a metric or multiplier used to translate a measured impact into a quantifiable value - think of it as the “price tag” applied to a unit of impact to express its total value.

2

Impact intensity calculation

- The cradle-to-gate inventory data from GaBi was multiplied with the relevant UK-specific monetary valuation factors to calculate impacts in £ per TWh of electricity.
- This provided the impact intensity of wind and fossil fuel-based electricity across all drivers.

3

Impact savings intensity

- For each driver, the impact intensity of wind was subtracted from that of the fossil fuel or the UK grid mix being compared.
- The difference between these figures gives us the **impact savings intensity,** showing the avoided environmental costs per TWh of electricity.

4

Absolute impacts and savings

- To estimate absolute impacts and savings, the impact intensities calculated in steps 2 and 3 were multiplied by the relevant electricity generation values (e.g., 84 TWh of wind in 2024, or fossil fuel contributions in the grid mix).
- This approach allows consistent calculation of **absolute impacts** and **absolute impact savings** under the grid replacement scenario.

It's important to note that our analysis followed a cradle-to-gate life cycle approach - covering all stages from fuel extraction and processing up to electricity generation.

3.4 Grid-Mix Replacement

Now that we've walked through key concepts and our underlying methodology, we're taking it up a notch and shifting to a more holistic analysis to better demonstrate the environmental benefits of wind energy beyond simple comparisons with individual fuel types (such as natural gas in the previous section). To do so, we estimate the impact savings associated with wind power by comparing the 84 TWh of electricity generated by wind in the UK in 2024 with a counterfactual situation in which this electricity was instead generated using the overall UK electricity grid mix for the same year.

Counterfactual scenarios explore what would have been true and what would have happened under different circumstances. A counterfactual provides the benchmark for measuring the impact of something that has not happened.

This approach assumes that, had wind energy not contributed the 84 TWh of electricity, the equivalent amount of electricity would have been produced by the other energy sources in the grid in the same proportions as they appear in the actual 2024 electricity mix. This includes contributions from natural gas, oil, nuclear, solar, bioenergy, hydro, and the residual share of wind. By following this approach, we can more accurately attribute impact savings to wind power, based on indicative displacement within the energy system.

The graph below shows how much environmental damage was avoided due to wind energy in 2024. The impact savings are shown across key areas like greenhouse gas emissions, air pollution, water use, water and land pollution, and land use change.

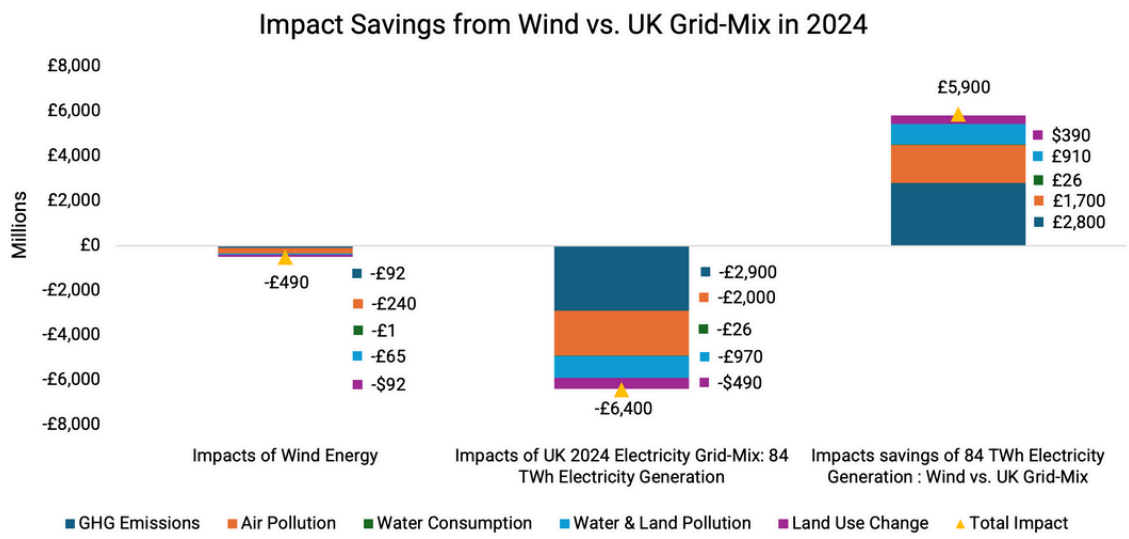


Figure 5. Source: Input data from GaBi and UK Government. Country-level valuation factors from GIST Impact (Except GHG emissions SCC from IFVI). Processed by GIST Impact 2025

As illustrated in the graph, the total environmental impact savings from wind energy in 2024, when compared to a situation where the same electricity was generated by the UK grid mix, is estimated at £5,900 million. This analysis provides a broader system-level view of the role of wind in the UK. It helps us understand what the environmental impacts would have been if the same amount of electricity had come from the rest of the grid instead of wind.

This is based on a **cradle to gate life cycle analysis**, which means the savings include all stages of electricity generation, starting from fuel extraction and processing to the point where electricity is generated and ready to be integrated into the grid.

Looking at the results of the impact savings analysis (Figure 5):

The largest savings come from greenhouse gas emissions, estimated at £2,800 million. This highlights the major climate benefit of using wind instead of other grid sources that still rely heavily on fossil fuels, especially gas.

The second highest saving is from air pollution, with avoided impacts worth £1,700 million. These savings come from avoiding the release of harmful air pollutants and particles into the air, which would have affected both human health and the environment.

Water and land pollution savings are around £910 million, showing the benefit of avoiding wastewater-related pollutants that could have entered rivers, soil, or the sea from other sources of electricity.

Land use change savings are estimated at £390 million, reflecting that wind, especially offshore wind, uses much less land compared to sources like solar or coal-based electricity generation.

Even though water consumption savings are relatively small, at £26 million, they still highlight wind's advantage, as it uses very little water compared to other energy sources in the UK grid based on their share in electricity generation.

Overall, this cradle to gate analysis shows that wind energy helps avoid a wide range of environmental impacts. It reduces not just emissions, but also pollution, water use, and land disturbance when compared to the rest of the grid.

4. Use Cases

By providing a fresh perspective on the true value of clean energy, we're motivating for a more complete story of what renewable energy can really deliver - a story that's backed up by science, traceable data, and holistic economics.

If you're a clean energy provider

Clean energy prevents harm - that's value. Strengthen your proposition by quantifying what your clean energy avoids. Use business model impacts to show investors and stakeholders the harm your clean energy prevents - and put a credible monetary value on it to prove your wider economic benefit.

If you work with clean energy providers

If you're an advisor, investor, consultant or auditor, help companies turn avoided impacts into clear, decision-ready numbers that speak to boards, shareholders and regulators. This builds trust and opens doors to capital, partnerships and policy influence.

If you shape the conversation

Journalists, marketeers, and comms leads - business model impacts are your secret weapon. Show the emissions that didn't happen, the ecosystems protected, the social benefits gained. This reframing cuts through noise and makes storytelling more tangible.

If you're a policymaker or regulator

Redesign policy and reporting to account for avoided impacts. Clean energy stops harm before it happens - that's a benefit worth recognising, measuring and incentivising. Quantifying these savings drives accountability, attracts capital and aligns incentives with true positive impact.

For all the above, GIST Impact is here to support. Let's move beyond the narrow scope of tick-box compliance. Let's reframe performance. Let's communicate not just what clean energy does, but what it makes possible.

5. Conclusion

Behind every avoided tonne of CO_2, every cleaner breath of air, every litre of water and wildlife habitat saved, lies a quieter triumph: a proof point that clean energy systems can be both productive and regenerative. This is the story rarely told - not of what was emitted, but of what was prevented; not just of outputs, but of outcomes that change the trajectory of people, ecosystems, and economies.

The renewable energy transition is more than a shift in kilowatt-hours and emissions metrics, it is a redefinition of value in the 21st century. The UK's clean energy journey shows us what's possible when policy, innovation, and purpose align - not just in decarbonising the grid, but in revealing the deeper, systemic impacts of doing so - the impact savings.

This report shows how rigorous data and science-backed insights can unlock powerful new narratives - it's up to clean energy providers to decide whether this potential stays in the shadows or is used to its fullest advantage.

This is an invitation - to providers, regulators, investors, and society - to lean in, listen better, measure smarter, and tell the story of impact savings.

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