



From 100% renewables to real-time reality



Is this the next phase of
corporate energy leadership?

January 2026

Executive summary



UK electricity demand is set to double by 2050¹ as transport, heating, industry, and rapid growth of AI-driven infrastructure electrify. At the same time, the UK electricity system is shifting towards intermittent renewables, making when electricity is consumed as critical as how much.

For over a decade, organisations have supported UK renewables expansion by annually matching their electricity consumption with attribute certificates such as Renewable Energy Guarantees of Origin (REGOs), helping scale wind and solar. However, annual matching misses real-time grid dynamics, where fossil generation often fills gaps in high demand or low renewable hours, masking emissions hotspots and limiting cost and carbon reduction opportunities.

A new phase in the energy transition is emerging real-time clean electricity, internationally referred to as 24/7 carbon-free energy. Real-time clean electricity focuses on matching consumption with clean generation on an hourly basis. This approach unlocks operational and financial opportunities, strengthens credibility - thereby reducing greenwashing risk - and targets emissions reductions where they matter most.

Against this backdrop, the operating landscape is complex. The grid is decarbonising rapidly but unevenly, compounded by rising demand, network constraints, and curtailment of renewables when grid capacity is exceeded. The regulatory environment is also evolving. Proposed changes in accounting standards, reporting requirements, and the establishment of Great British Energy signal renewed emphasis on clean generation, resilience, and UK energy security. Together, these developments are influencing how organisations make electricity decisions.

PwC has already begun this journey, as part of our decarbonisation and energy management strategy, with real-time matched electricity covering a substantial proportion of our UK operations. A key pillar of our sustainability strategy is to strive for 90% real-time matched electricity by 2030, ensuring we embrace credible additionality in how we source and scale new carbon-free generation.

This paper outlines the relevance of the transition to real-time clean electricity. Recognising that suitability varies by organisational context, we share our insights and experiences to date, to help others navigate and accelerate their journey.

¹ <https://www.neso.energy/future-energy/future-energy-scenarios>

What is real-time matching?

A UK snapshot

The [National Energy System Operator](#) (NESO) offers a live insight into Great Britain's energy mix in 30-minute intervals. In real time, the UK's renewable share of electricity generation in 2025 ranged from as low as 2% in January to as high as 75% in March.

What does 24/7 CFE mean?

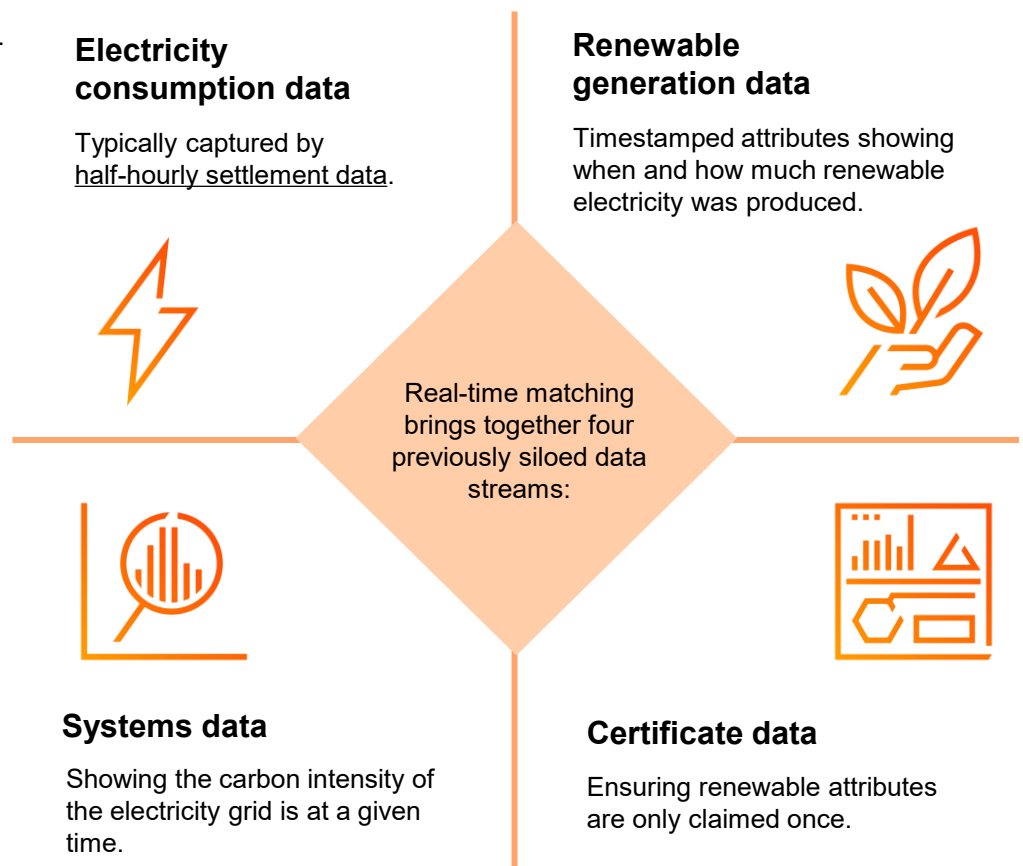
24/7 Carbon-Free Energy (CFE) and real-time matching are terms used interchangeably. It means operating on 100% carbon free 24 hours per day, 7 days a week.

Real-time clean electricity matching aligns electricity consumption with clean generation in the same hour that it is produced. By operating on an hourly basis, it reflects the true source of energy powering the UK electricity grid in that time period. This differs from annualised "100% renewable electricity" claims that rely on REGO matching, which are based on netting consumption and renewable generation over a year rather than matching them in real time.

The annual approach, widely adopted and supported by corporate demand has created market certainty and unlocked project finance enabling large-scale deployment of wind and solar across the UK and beyond. And it remains an important enabler of the energy transition.

However, annual matching smooths over when electricity is generated and consumed, obscuring periods where fossil-fuelled generation still meets the grid's needs during high-demand or low-renewable hours.

Advances in metering, digital platforms and data availability are now enabling a more granular, real-time approach. Rather than producing a single annual claim, real-time matching provides visibility into how electricity consumption and clean generation align or diverge - hour by hour.



Are 100% renewable electricity claims greenwashing?

Annual renewable electricity claims backed by REGOs play a vital and legitimate role in certifying renewable generation. But because REGOs are matched on an annual basis, they don't always reflect when electricity is generated versus when it's used, nor do they guarantee delivery at the time of consumption.

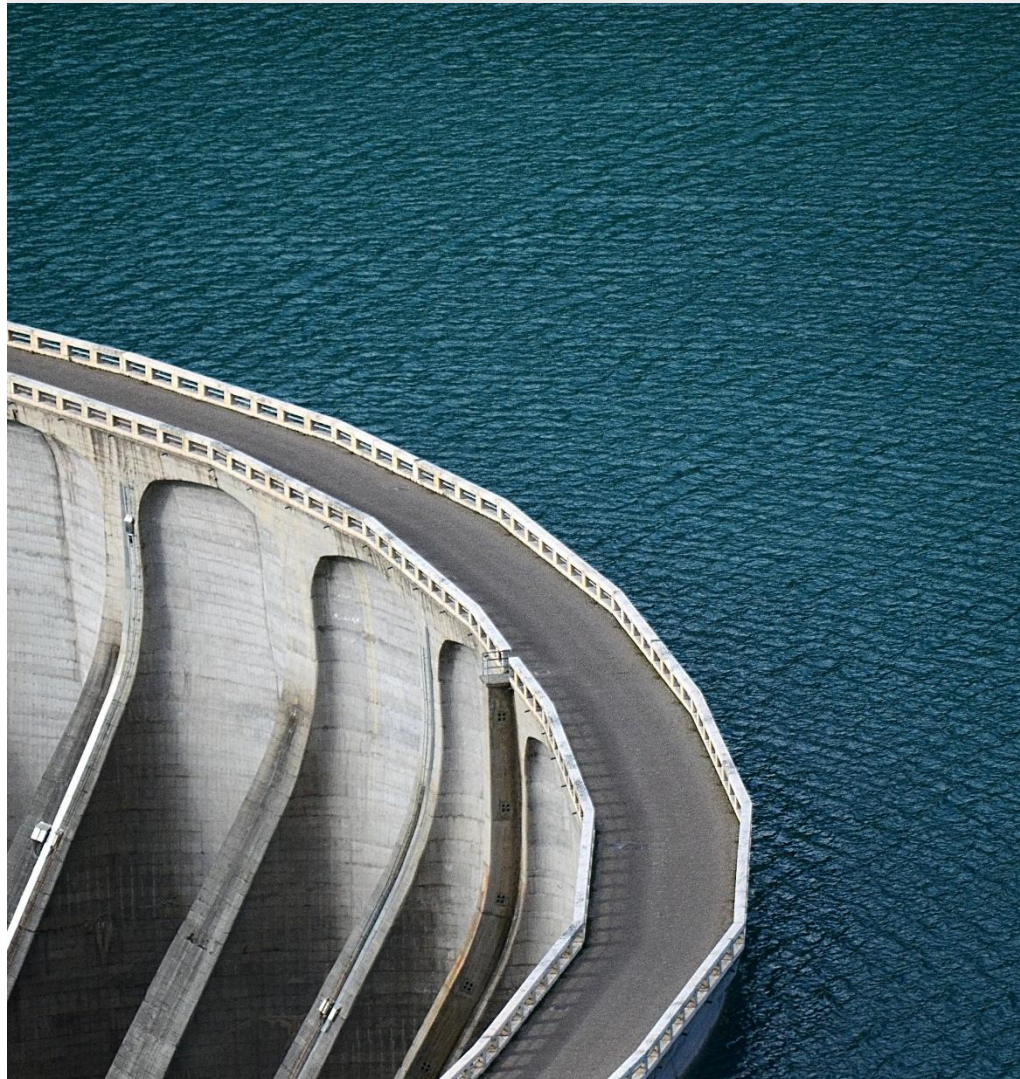
Real-time matching does not replace the annual system but presents a significant enhancement. By complementing annual claims with real-time matching, where viable, organisations can strengthen transparency, credibility and impact, in their renewable electricity strategies.

Together, these datasets offer greater visibility into:

- 01** How much electricity consumption can be credibly matched with renewable generation in real time; and
- 02** How fluctuations in renewable output, driven by wind and sunlight, create "cleaner" and "less clean" hours across days, weeks, and seasons.

While achieving 100% carbon-free electricity in every hour remains challenging in today's system, real-time matching provides the critical insights to understand where the opportunities exist to increase renewable consumption and deliver the greatest impact.

We explore the practical steps to address them in the following sections.



The case for real-time matching, now



On a macro level, it:

Minimises the need to intentionally curtail excess renewable generation that the grid cannot use or store, which ensures better use of existing clean capacity, preventing energy loss and associated costs.

Drives investment into different forms of renewable energy sources and innovative storage solutions, supporting job creation and tangibly accelerating the UK towards a net zero economy.

Supports long-term energy security, shifting from imported fossil fuels to domestic renewable sources, thereby reducing vulnerability to global price shocks and geopolitical instability.

On an organisational level, it:

Enhances operational efficiency and energy management, by shifting energy intensive loads out of 'high carbon' hours, supporting scope 2 emissions reduction and subsequent cost savings.

Futureproofs against evolving regulatory requirements, such as the GHG Protocol and SBTi, that are signalling a shift away from annual matching, whilst demonstrating reputational leadership.

Enables better financial and strategic planning with lower and more stable energy bills.

Anticipating the challenges

We are already looking ahead to the implementation challenges. We see three priority areas:



Cost and procurement complexity

Today, real-time matched electricity contracts can carry a premium over standard green tariffs, reflecting the cost of covering harder-to-match hours and the complexity of assembling portfolios of generation, storage and certificates. While we anticipate some cost reductions as market demand grows, our roadmap acknowledges that as real-time coverage approaches 90%, we will need to carefully reevaluate the cost-to-return ratio in the context of market conditions at that time. Early experience in the US, where auctions of hourly granular certificates have begun, shows emerging price discovery - some hours command a premium, while others are cheaper. We are also exploring collective procurement models and consortium approaches to share risk, manage costs and scale credible additionality in our supply.



Intermittency and seasonal gaps

Certain periods - particularly still winter evenings - are intrinsically difficult to match with renewables in the UK system. We expect diminishing returns as we target higher matching levels, with the final 10–20% of hours proving the most challenging. Addressing this will require a combination of demand flexibility, storage, and geographic diversification.



Data reporting

Handling half-hourly data across over a dozen sites, reconciling certificates and integrating this information into carbon reporting systems requires robust digital infrastructure. We are addressing this through partnerships with specialist platforms, API integrations, and active participation in emerging standards discussions, including those linked to the GHG Protocol Scope 2 revision. A key insight is that the same data used for reporting also enables cost optimisation and operational improvement – turning granular data from a compliance burden into a management tool.

Calibrating ambition to commercial value

The commercial case for pursuing real-time clean electricity lies in how it can support each organisation's specific operations, load profile, flexibility, risk appetite and market exposure; factors that vary significantly across different businesses and geographical regions. For some, shifting consumption toward cleaner hours can unlock near-term value through reduced exposure to peak prices, improved operational efficiency and enhanced resilience. For others, particularly where demand is less flexible, or data and market access are limited, progress may require targeted investment in data, contracts or infrastructure. This reinforces the importance of setting a clear ambition firmly aligned to business strategy. Real-time matching is not an all-or-nothing decision. Organisations can focus on the hours, sites and actions that deliver the greatest combined carbon and commercial value, using granular insights to make informed trade-offs rather than pursuing perfection from day one.

Our learnings, your six practical steps



45%

On average, grid data shows that only 40–45%² of UK electricity demand is met by renewables on an hourly basis.

Our own consumption data shows that about one-third of our electricity is not matched to renewables in real time.

Whilst we exceed the national average, there remains opportunity to strengthen our real-time alignment with renewables.

We're committed to integrating real-time clean electricity across our UK operations, and expanding hourly matched supply is a key priority of our 2030 corporate sustainability strategy. All 19 UK offices use annually matched renewable electricity backed by REGOs. Achieving this required close engagement with landlords, facilities managers, managing agents, and co-occupiers of multi-let buildings, who share responsibility for the associated costs. This collaboration laid the groundwork for our hourly matching aspirations.

Since 2023 we have collaborated with our energy supplier to map our consumption against renewable generation hour-by-hour. This visibility revealed patterns and constraints hidden in annual data and is reshaping how we approach our energy strategy, operations, and flexibility, including the diversification of our renewable electricity sources within our energy mix.

Whilst early in our journey, we're sharing pragmatic, "no-regret" steps that any organisation could consider to prepare for a carbon-free future.

01

Understand your electricity impact – hour by hour

Move beyond annual averages by using half-hourly carbon-intensity data to understand when electricity consumption is genuinely low-carbon and when it is not. This insight reframes electricity from a static utility cost into a dynamic operational variable that can be actively managed.

Using [opensource hourly carbon-intensity data](https://www.neso.energy/future-energy/future-energy-scenarios) from the NESO, organisations can identify high-impact periods such as winter evening peaks and target those hours first for action.

² January 2026 12-month average sourced from: <https://www.neso.energy/future-energy/future-energy-scenarios>

**02****Map, optimise and shift your flexible demand**

Once visibility is established, the next step is to understand which loads can move or be reduced without operational impact. In most organisations, a meaningful share of electricity demand (often 20–30%)³ can be shifted by one to two hours or have overall running hours reduced through smarter scheduling rather than capital investment. Flexibility is usually distributed across many small loads, not concentrated in a single asset, which makes coordination more important than scale. The goal is to avoid simply pushing consumption into periods with low renewable output (such as some night-time hours) and instead minimise use in carbon-intensive periods and concentrate consumption into times with higher renewable availability.

Analysis of half-hourly settlement data can highlight opportunities to reschedule HVAC pre-heating, hot-water systems or batch IT processes with no impact on service or comfort.

03**Reduce consumption through smarter controls**

Reducing demand remains one of the most effective and lowest-cost levers available. Optimising building controls – including lighting schedules, occupancy sensors, and daylight-responsive dimming can cut overall electricity use while also improving real-time matching outcomes.

A smart lighting system that dims or switches off automatically when daylight is sufficient, and turns lights off within 20 minutes of an office being vacated, can eliminate thousands of unnecessary running hours each year - cutting costs, reducing emissions, and improving alignment with cleaner, renewable power without compromising comfort.

³ Estimates of technically feasible demand-side flexibility, across buildings and industrial loads, often lie in the 20-30 % range of total electricity demand under modern demand-response frameworks.

**04****Deploy generation and storage where it adds system value**

Consider on-site generation, building-scale batteries, electric vehicle fleets, and device-level storage. Charge during low-carbon hours and discharge during peak periods or when the grid's carbon intensity is high.

Each 200 kWh building-scale battery charged during low-carbon hours and discharged during evening peaks can avoid around 10-15 tonnes⁴ of CO₂ per year while reducing exposure to peak prices.

05**Engage suppliers and landlords early**

Real-time matching depends on data access, contract design and collaboration. Share your ambitions and data needs; suppliers innovate when they see clear demand.

Contracting discussions revealed that not all suppliers can support hourly matching today. By asking suppliers about 24/7 tariffs, data frequency and certificate granularity, organisations can identify viable pathways and avoid locking themselves into contracts that limit future progress.

06**Build integrated governance and KPIs**

Treat real-time electricity as an operational capability, not just a procurement choice. Accountability must sit across estates, sustainability, procurement, finance and digital teams.

We've established a cross-functional working group to set targets, drive action and monitor progress, alongside traditional energy and carbon KPIs.

⁴ Avoided emissions from 200 kWh/day of battery time-shifting are estimated at ~10–15 tCO₂/year, based on typical carbon intensity displacement when renewable energy replaces fossil generation.

Our next steps



We aspire to power our offices with over 90% carbon-free electricity in real time by 2030.

We're committed to accelerating the adoption of real-time clean electricity across our UK operations and using our own journey to help others move faster. Our goal is to demonstrate a practical, scalable pathway that improves the carbon integrity of electricity consumption hour by hour. This is how we'll achieve it:

Report our hourly (temporal) clean electricity performance alongside traditional market-based and location-based Scope 2 metrics from FY26, using recognised methodologies and granular certificates, and clearly setting out our improvement roadmap.

Maintain our 100% renewable electricity coverage on an annual basis, while transitioning to 100% renewable energy consumption.

Expand real-time clean electricity across UK operations by prioritising high-use sites, integrating metering, increasing demand flexibility, and enhancing our supply portfolio through PPAs, on-site generation, storage and granular certificates, ensuring we embed strong additionality as coverage grows.

Use our experience to support clients across strategy, procurement, data, implementation and assurance – turning pilots into scalable programmes and helping organisations navigate emerging regulation and market change.

Work with industry, system operators and policymakers to shape credible standards, registries and market reforms that enable interoperable, high-integrity real-time matching at scale.

Further details

For information on our corporate sustainability agenda, visit:

<https://www.pwc.co.uk/who-we-are/our-purpose/our-corporate-sustainability-strategy.html>



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