PHILIPLEE

Powering Growth: Opportunities for Carbon-Free Electricity in Ireland

1. Introduction

The global energy landscape is undergoing a profound transformation, driven by the urgent need to decarbonise electricity systems and the growing demand for credible, transparent climate action. At the heart of this shift is the move towards "granular" Scope 2 accounting and 24/7 carbon-free electricity ("**CFE**") procurement, which creates commercial opportunities for developers, investors and traders. This transformation is creating new revenue streams, enhanced asset value and a competitive edge in a market that is increasingly rewarding those who can deliver verifiable, time and location matched CFE.

2. The Changing Economics of Electricity

The global electricity system, including in Ireland, is transitioning from an operating-expense model dominated by fuel costs to a capital-expense model focused on upfront investments in assets like solar panels, wind turbines and batteries. Once installed, these assets produce electricity at near zero marginal cost, fundamentally changing the economics of supply and demand.

As the cost of CFE generation falls, the commercial focus is moving to optimising the timing, location and reliability of delivery. This drives interest in granular Scope 2 accounting and 24/7 CFE procurement to align corporate demand with a decarbonised grid. Voluntary procurement of CFE accelerates sector-wide decarbonisation by pushing clean energy technologies down "experience curves" thereby reducing future costs and encouraging adoption of CFE technologies by other consumers. Granular Scope 2 accounting and 24/7 CFE procurement offers a powerful mechanism for aligning corporate demand with a decarbonised grid and, crucially, for monetising the value of flexibility, storage and innovative trading strategies.

3. Scope 2 Emissions

The Greenhouse Gas Protocol's Scope 2 Guidance underpins a wide array of voluntary and regulatory climate disclosure frameworks, including RE100, the Science Based Targets initiative and the EU's Corporate Sustainability Reporting Directive. The Scope 2 Guidance defines "Scope 2 emissions" as indirect greenhouse gas emissions from the consumption of purchased or acquired electricity, steam, heat or cooling.

Under the Scope 2 Guidance, organisations must report their Scope 2 emissions from purchased electricity using either a location-based method (reflecting grid-average emissions) or a market-based method (reflecting specific procurement choices, such as power purchase agreements or Guarantees of Origin).

However, a key critique of the current market-based approach is its lack of temporal and geographic alignment. For example, a company in Ireland might claim to be "100% renewable" by purchasing Guarantees of Origin from a solar project in Spain, even while consuming fossil-intensive electricity from the Irish grid during periods when local renewables are unavailable. This disconnect may undermine the credibility of corporate Scope 2 claims and could fail to incentivise the development of new CFE technologies.

Granular Scope 2 accounting involves matching CFE generation and use in the same hour and geographic area. This ensures CFE claims are both time-specific and locally relevant, driving real emissions reductions. The Scope 2 Guidance is under review and the released updated drafts indicate a move towards more granular Scope 2 accounting. A move towards granular matching, where clean energy consumption is matched with generation in real time and in the same location, creates a premium market for truly verifiable CFE, rewarding those who can deliver carbon-free electrons at the right time and place. Empirical research supports the benefits of 24/7 CFE procurement. A study by Tsinghua and Princeton Universities found that hourly matching reduces system-level emissions and accelerates the adoption of CFE technologies such as battery energy storage systems ("**BESS**").

4. EirGrid Pilot

In July, Ireland reached a significant milestone in granular energy certification with a successful pilot of hourly Guarantees of Origin, conducted by Grexel in partnership with EirGrid and other stakeholders. This pilot proved it is both technically and operationally feasible to issue and track Guarantees of Origin on an hourly basis, enabling consumers to match electricity use with CFE generation in real time.

The standard Guarantee of Origin in Ireland is currently issued for each one megawatt hour of renewable electricity produced and does not universally include an hourly timestamp. However, Article 19 of the Renewable Energy Directive specifically allows for more granularity for Guarantees of Origin by permitting division into fractional units that are multiples of one megawatt hour. Further, voluntary standards such as EnergyTag and RE100 are now encouraging more granular tracking. Should Scope 2 reporting shift towards hourly accounting, certification bodies will need the ability to issue matching certificates. EirGrid's pilot lays the groundwork for robust, auditable 24/7 CFE claims.

5. Carbon Removals and Carbon Farming

In 2024 the EU approved a certification regulation for permanent carbon removals, carbon farming and carbon storage in products ("**CRCF**"), which is designed to establish a robust system for certifying carbon removals. The CRCF covers a range of activities, including Direct Air Carbon Capture and Storage ("**DACCS**") and Biogenic Carbon Capture and Storage ("**BioCCS**"), which involves the capture of atmospheric or biogenic CO_2 and its permanent geological storage. The CRCF is designed to support the issuance of certified carbon removal units, which can be used in both compliance and voluntary markets, helping to advance the EU's goal of climate neutrality.

The CRCF is currently in the advanced stages of regulatory development, with methodologies already drafted and subject to public consultation. The draft methodologies for DACCS and BioCCS require temporal correlation between renewable electricity generation and its consumption by carbon removal operations. Specifically, the methodologies permit annual matching of CFE generation and consumption up to 31 December 2029. From 1 January 2030 onwards, this requirement becomes more stringent, mandating sub-annual matching. The regulatory requirement for temporal correlation requires DACCS and BioCCS operators to source increasingly granular CFE, creating additional demand for CFE technologies and assets within the EU.

6. Unlocking Value in Granular CFE

A 24/7 power purchase agreement ("**24/7 PPA**") is a contractual arrangement for the procurement of CFE, under which the buyer's consumption is matched with renewable generation on an hourly, year-round basis. This approach ensures that every unit of electricity consumed is time-matched with clean energy, in contrast to traditional PPAs that typically match supply and demand on an annual basis.

Major technology companies and members of initiatives such as the United Nations' 24/7 Carbon-Free Energy Compact are setting ambitious 24/7 CFE targets. The RE100 initiative, comprising over 440 corporates, is also driving demand for more credible decarbonisation through 24/7 PPAs. Some corporate buyers, particularly those with ambitious decarbonisation targets or exposure to regulatory scrutiny, are willing to pay a premium for the enhanced credibility and impact of 24/7 CFE.

The delivery of 24/7 PPAs relies on a combination of firming mechanisms to ensure continuous CFE supply. These mechanisms include portfolio hedging, deployment of long duration energy storage, co-located BESS and demand response strategies. Unlike pay-as-produced PPAs, which only guarantee delivery when renewable resources are available, 24/7 PPAs require the seller or intermediary to manage output risk and deliver a firm, time-matched CFE product. This is achieved through aggregation of diverse renewable assets, sophisticated trading and risk management strategies.

Developers and intermediaries with large, diversified portfolios are best positioned to offer 24/7 PPAs, leveraging their ability to aggregate generation from multiple sources and manage output risk. Utilities, aggregators and specialist service providers are increasingly active in this space. The emergence of traders and optimisers offering 24/7 products and the development of BESS revenue models, such as tolling, floor and fully merchant arrangements, expands the routes-to-market for CFE developers. Lenders will be focused on the allocation of output and balancing risk in 24/7 PPAs. There is a clear preference by lenders for structures that provide predictable cash flows and minimise exposure to electricity market volatility.

The challenges of implementing 24/7 PPAs are region-specific. In Ireland, the limited availability of flexible, dispatchable resources, the issue of "dispatch down" where renewable generation, primarily wind and increasingly solar, is reduced below its available output due to system constraints or curtailment, and the relative scarcity of hydroelectric capacity compared to the Nordics, necessitate greater reliance on storage and demand-side solutions to achieve a 24/7 CFE supply.

The cost of 24/7 PPAs remains a key consideration. Corporate buyers must assess their willingness to pay a premium for enhanced credibility and decarbonisation impact, particularly in markets like Ireland with surging demand from data centres and evolving regulations. The recent introduction of private wire policy in Ireland and the question of whether Guarantees of Origin will be issued for private wire projects is particularly important, as these arrangements can provide corporate buyers with direct access to CFE, while offering developers a stable, long-term offtake for new projects.

7. Conclusion

The shift towards granular Scope 2 accounting and 24/7 CFE procurement is gaining momentum, driven by evolving regulation in the EU. With initiatives such as EirGrid's pilot of hourly certification, Ireland is well positioned to take advantage of the economic opportunity created by demand for CFE. These developments will enable greater transparency in Scope 2 reporting and support the emergence of new commercial instruments, including 24/7 PPAs, which align clean energy supply with real-time consumption.

For developers, investors and traders, the commercial opportunities are significant. By investing in flexibility and storage, and developing sophisticated aggregation and trading capabilities, market participants can position themselves at the forefront of the transition to CFE.

PHILIPLEE

Contact Our Energy Group

Niall Donnelly
PARTNER
+353 (0) 1 237 3700
ndonnelly@philiplee.ie
Niall Donnelly

Lev Gantly
PARTNER
+353 (0) 1 237 3700
lgantly@philiplee.ie
Lev Gantly

Max Bail
ASSOCIATE
+353 (0) 1 237 3700
mbail@philiplee.ie
Max Bail