



Carbon-Free Energy

WHAT?

24/7 Carbon-Free Energy (CFE) is an initiative that incentivises purchasing renewable energy to **decarbonise the energy system more rapidly**, meaning:



End-users intend to match their electricity consumption **with carbon-free electricity sources, 24 hours a day, 7 days a week (24/7)**



It is a transformative approach to energy procurement & policy design **and the end state of a fully decarbonised electricity system**

HOW?

24/7 Carbon Free Energy can be implemented through:



Hourly renewables

Electricity consumption in hours with carbon-free electricity



Local renewables

Renewable energy is procured from local or regional sources



More renewables

Additional renewable energy sources are added to the system

WHY?



Globally, the decarbonisation of the electricity system can eliminate nearly 50% of greenhouse gases (GHG) emissions

Currently, while pursuing 100% renewable energy, **unintended greenhouse gases** can be emitted because two important questions are not being addressed:



WHEN?

Is the carbon-free energy consumed at the same time it is generated?



WHERE?

Is the consumed energy generated from local sources?

FOR EXAMPLE:

Let's imagine a data centre **based in Ireland** with electricity demand throughout the day and night.

If the centre's electricity use is matched with **Greek solar energy** on an **annual basis**, it can be claimed that the electricity consumption is based on 100% renewables.



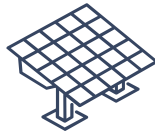
In reality, the **daily demand** of this data centre (e.g. at night) will be met by **local energy production and imports**, which might include fossil fuels and generate GHG emissions.

IMPLEMENTATION AND IMPACTS ON THE ENERGY SYSTEM

Transmission System Operators (TSOs) play a vital role for 24/7 CFE and the overall energy system decarbonisation by:



Enabling the **integration and transportation** of large shares of renewable energy from generation sites to consumption centres



Helping overcome **operational challenges** attributable to adding more renewables to the energy system



Maintaining power system and electricity **grid security and reliability** in the face of insecurities, such as extreme weather events

Implementing 24/7 CFE successfully requires a **coordinated approach**, including:



Grid expansion and reinforcement to minimise congestion



Inclusion of demand in infrastructure planning and modelling



Demand flexibility & storage to improve renewables' potential



Direct electrification of consumption and additional renewables



Policy mechanisms that enable granular energy certificates



Granular energy tracking tools and reporting methodologies for end-users

A coordinated implementation of 24/7 CFE supports a **speedy, optimised and cost-effective decarbonisation** of the energy system through:



Reducing system emissions, costs and renewable curtailment



Incentivising renewable energy deployment, innovation and flexibility