

## **Beyond power and water usage effectiveness: Building a more complete EU data centre labelling framework**

We welcome the European Commission's initiative to simplify and harmonise data centre policies across the EU. A standardised labelling framework is an important step towards greater transparency - helping operators, investors and policymakers to identify high-performing facilities and the efficiency improvements still needed. The framework should build on key indicators already used in the EU data centre reporting framework: Power Usage Effectiveness (PUE), Water Usage Effectiveness (WUE), Energy Reuse Factor (ERF), and Renewable Energy Factor (REF).

However, as these indicators alone cannot fully capture efficiency and sustainability, it should therefore also include additional criteria that reflect wider system value, including grid friendliness and heat export, and environmental footprint more in detail. Combining existing indicators with the proposed additional criteria would foster a data centre ecosystem that is efficient at facility level and aligned with the needs of a decarbonised, resilient European energy system.

### **1. Grid Integration and Flexibility**

Data centre load profiles vary from constant baseload to highly variable demand with peaks during high utilisation. This is increasingly relevant giving rising electricity demand and growing pressure on grid infrastructure and stability. Smart on-site energy management (e.g., high-efficiency generation, battery electrical storage systems, capacitors) can help manage load variability, support frequency response, enhance grid resilience and contribute to security of supply. The framework should therefore recognise the value of smart on-site energy management for the electricity grid and power system in terms of electricity draw profile (e.g., reduced demand fluctuations and peaks). Technical adaptability should be explicitly recognised as a marker of higher energy performance. Data centres that can adjust the timing of computational workloads to align with periods of high renewable electricity availability should be classified as having a higher energy standard. Similarly, facilities capable of temporarily pausing or reducing non-critical workloads during periods of low renewable supply or grid congestion provide clear system benefits and should be rewarded accordingly. Such flexibility supports renewable integration, reduces pressure on network infrastructure, and enhances overall system stability.

### **2. Cooling Strategies, Heat reuse and Export**

Cooling strategies have a significant impact on both efficiency and decarbonisation potential and should be addressed explicitly within the framework. While some solutions may appear efficient at first glance, their system implications are critical. For example, data centres that rely on absorption chillers powered by waste heat from on-site fossil-fueled power generation may achieve low electrical cooling demand, but they can also become locked into continued operation of fossil-based equipment. In such cases, the cooling system depends on ongoing thermal output from power generation, making it difficult to transition to green electricity from the grid without losing cooling capability. Avoiding unnecessary chilling demand through direct cooling solutions—such as ambient air cooling or open-water cooling - offers greater long-term flexibility and decarbonisation potential. Where feasible, combining such approaches with productive use of waste heat delivers the highest system value.

Within this framework, PUE and WUE should be applied in a way that captures improvements in overall system efficiency through waste heat recovery (WHR), re-electrification (e.g., Organic Rankine Cycle), and internal use. To avoid unintended efficiency penalties, heat export for secondary use (e.g., district heating, industrial processes) must be recognised in alignment with the Energy Reuse Factor (ERF). However, the framework should go beyond mere volume and focus on the quality and efficiency of heat recovery. While implementing auxiliary systems like turbomachinery-driven heat pumps to enhance temperatures is valuable, the associated energy consumption and capital intensity must be reflected in the performance assessment.

The highest system value is achieved through the direct delivery of waste heat, displacing the emission footprint of energy that would otherwise be required. To provide clarity, the framework should define indicative performance levels:

- **Level 1 (Lowest):** Mechanical chilling with heat rejected to ambient, powered by on-site fossil-fuel generation.
- **Level 2 (Low):** Absorption chilling with heat rejected to ambient, using waste heat from on-site fossil-fuel generation.
- **Level 3 (Moderate):** Mechanical chilling powered by renewable electricity.
- **Level 4 (Good):** Direct cooling (ambient air/water) with minimal auxiliary energy use.
- **Level 5 (Very Good):** Waste heat captured for secondary use with the assistance of a heat pump.
- **Level 6 (Best):** Direct utilisation of waste heat for district heating or industrial processes with no additional energy input (e.g., no heat pump required).

### 3. Environmental Footprint

The Renewable Energy Factor (REF) captures only the share of renewable energy, neglecting the emission intensities, which can vary significantly. We encourage the Commission to consider CO<sub>2</sub> intensity (g/kWh) directly - covering renewable generation, on-site generation and grid electricity - for a more holistic and fair assessment.

### 4. Fuel Flexibility and Energy Security

Finally, the ability to shift fully or partially to renewable fuels should be positively recognised. Data centers equipped to operate their on-site power systems for extended periods - such as several weeks - using renewable fuels supplied via storage or pipelines can play a valuable role in system resilience. This capability is particularly beneficial for centres that normally rely on green grid electricity, as it strengthens security of supply while preserving long-term decarbonisation pathways.

### 5. Criticality of Speed and Clarity

Beyond technical aspects, speed and clarity in setting up this framework are critical to send a market signal for high-efficiency on-site power generation, combined heat and power (CHP) and WHR. A lack of either risk (1) delaying investments in new EU data centres, presenting a security of data supply issue as AI is “outsourced” abroad, and (2) turning to less efficient on-site power generation options (e.g., gas-fired boilers, gas engines) as in the US due to GT OEM order backlogs.

By incorporating these elements, the labelling framework can more accurately reflect real-world energy performance, promote flexible and future-proof solutions, and encourage data centers to act as active contributors to a resilient, low-carbon European energy system.