

Topic 1: Assessment of the sustainability of data centres in EU and of the respective reporting scheme



Data assessment - Introduction

How we use the data

- All data points are anonymised to ensure privacy and are used solely for analytical purposes.
- No individual or company-specific information is disclosed, including names or detailed geographical locations.
- Only selected indicators are made available to the study team based on priority and confidentiality assessment.

Disclaimer

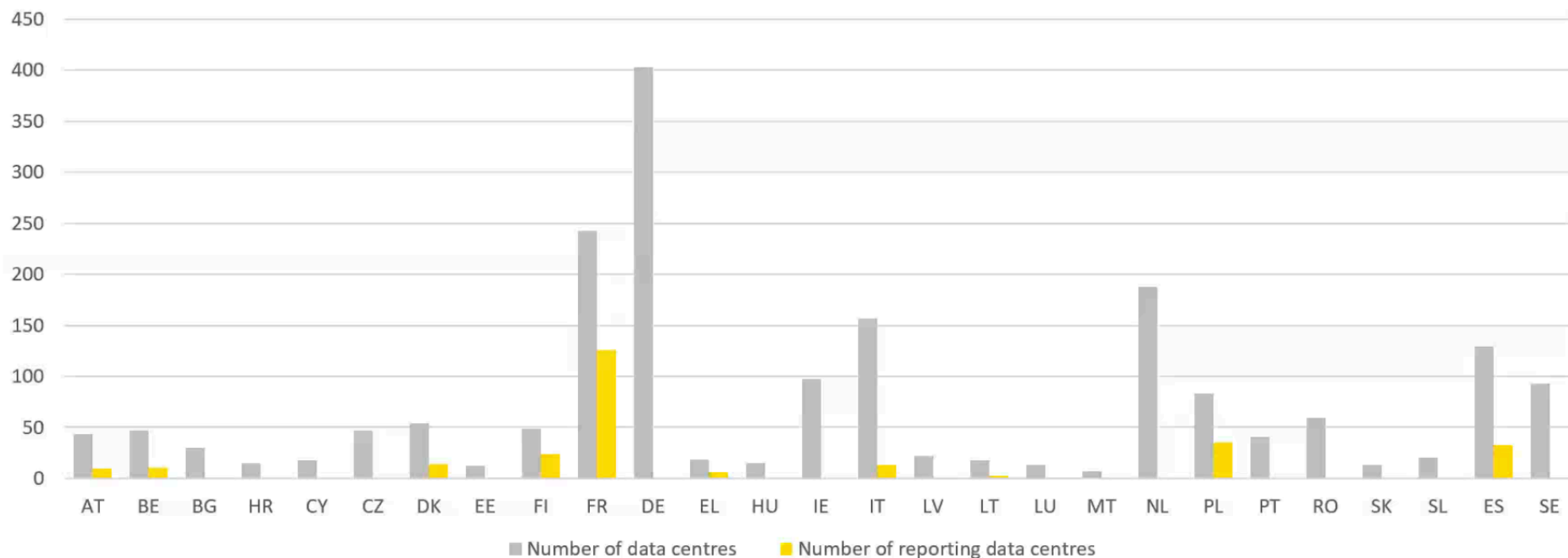
- The focus is on data centres with installed capacity higher than 500 kW, as participation in the reporting scheme is mandatory for them.
- Data from the first reporting period is still expected to be received so the preliminary results may change.

Benchmark Source

- The primary benchmark source used is datacentermap.com.
- This source is not complete and fully representative of reality; total number of data centers will be further complemented with additional data.

Data completeness assessment

Reported vs. actual number of data centres per EU Member State



Source on the number of data centres: [Data Centers - Database](#)

Note: Source is non-exhaustive and to be complemented with additional data. Only figures from the first reporting period thus far are considered, with more figures expected to be received so the results may change.

Data quality assessment

Indicators	Unit	% of realistic inputs reported*
Installed IT power demand	kW	N/A
Data centre computer room floor area	m ²	N/A
Total energy consumption	kWh	N/A
Total energy consumption from back-up generators	kWh	100%
Total energy consumption of IT equipment	kWh	92%
Total water input	m ³	N/A
Waste heat reused	kWh	N/A
Average waste heat temperature	°C	75%
Cooling degree days	days	N/A
Total renewable energy consumption	kWh	100%
Total renewable energy consumption from Guarantees of Origin	kWh	97%
Total renewable energy consumption from Power Purchasing Agreements	kWh	99%
Total renewable energy consumption from on-site renewables	kWh	100%

*: The reported inputs for each indicator were checked in terms of whether it is realistic. For example, Total IT Energy Consumption and Total Renewable Energy Consumption are benchmarked with Total Energy Consumption and when the inputs were not realistic, they were denoted in the analysis.

Plausibility check: IT installed power vs. computer room floor area

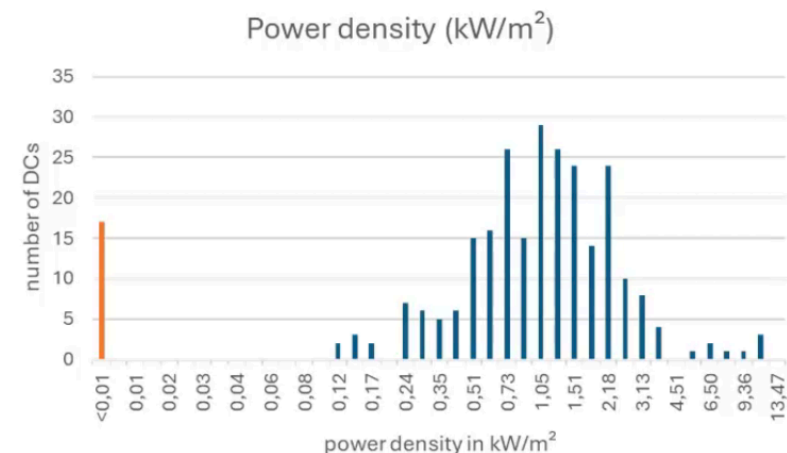
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$$\text{Power density} = \frac{\text{IT POWER DEMAND INSTALLED}}{\text{TOTAL COMPUTER ROOM FLOOR AREA}}$$

Realistic range: 0,02 - 200 kW/m²

Explanation: The data centre it capacity (kW/MW) usually scales with the size of the computer room floor area. Variations are possible due to a more dense design, specific IT hardware or low utilization in the first years of a data centre.

Possible warning: Please double check the entered value of installed „IT power demand installed“ and „Total computer room floor area“, one of their values seems to be outside of the expected range



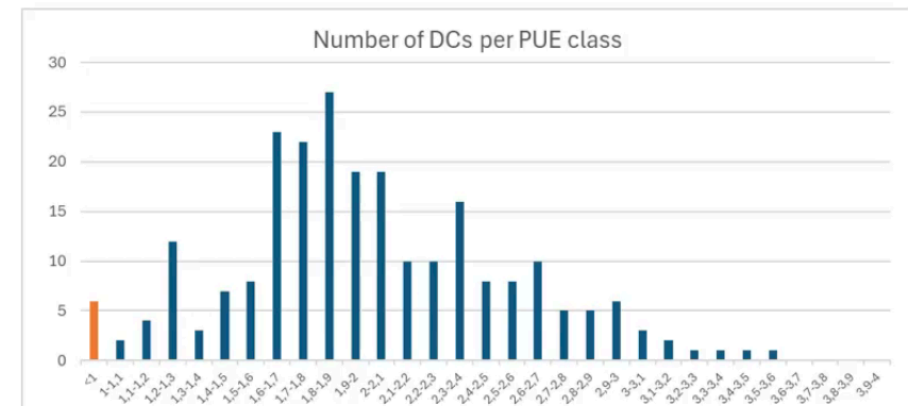
TOTAL ENERGY-CONSUMPTION vs. TOTAL ENERGY IT EQUIP CONSUMPTION

$$PUE = \frac{\text{TOTAL ENERGY-CONSUMPTION}}{\text{TOTAL ENERGY IT EQUIP CONSUMPTION}}$$

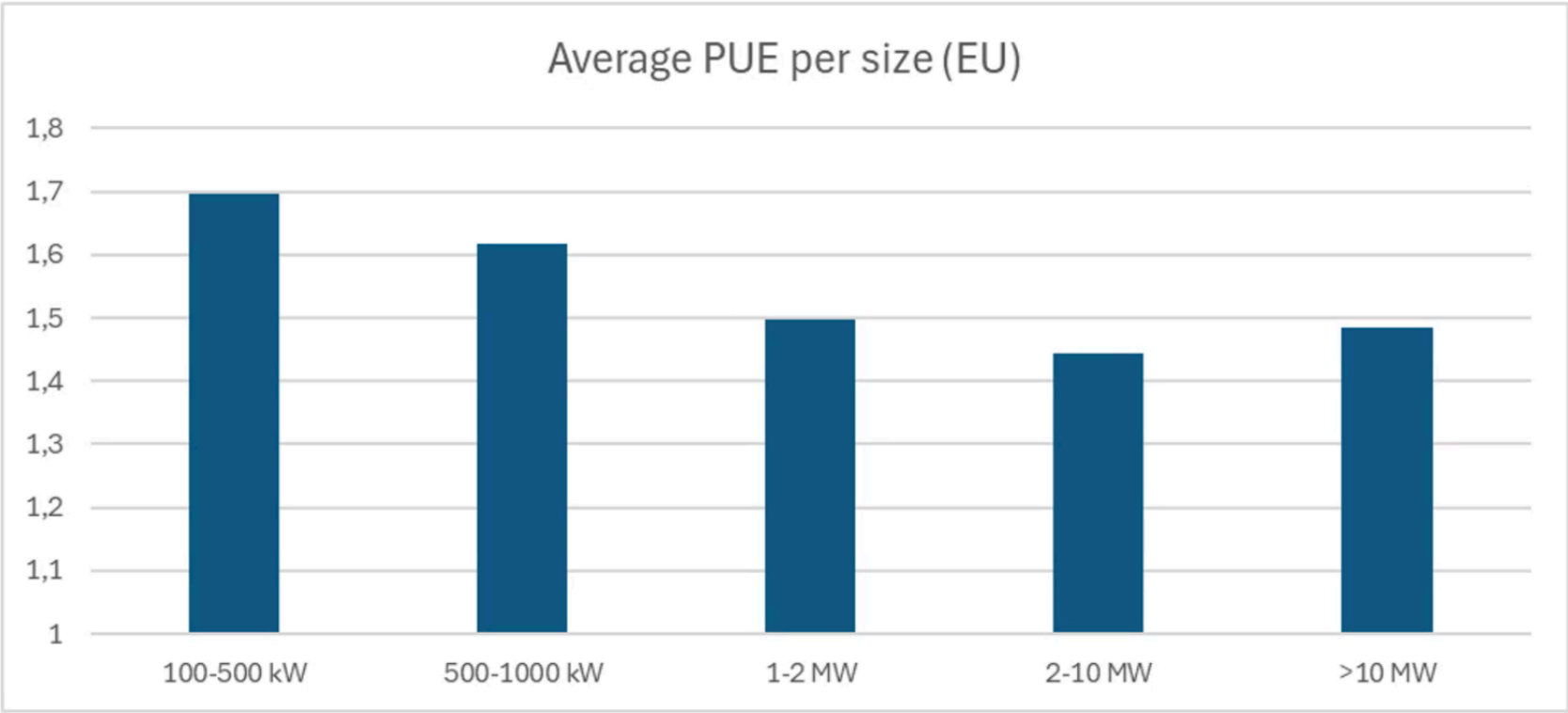
Realistic range: 1-10

Explanation: A value below 1 is technically impossible by the definition of the PUE. A value above 10 means the DC infrastructure (cooling etc.) consumes more than 9 times the energy the IT consumes.

Possible warning: „Total energy consumption“ and „Total energy IT equip consumption“ - one of the values seems to be outside of the expected range. Please double check the entered values

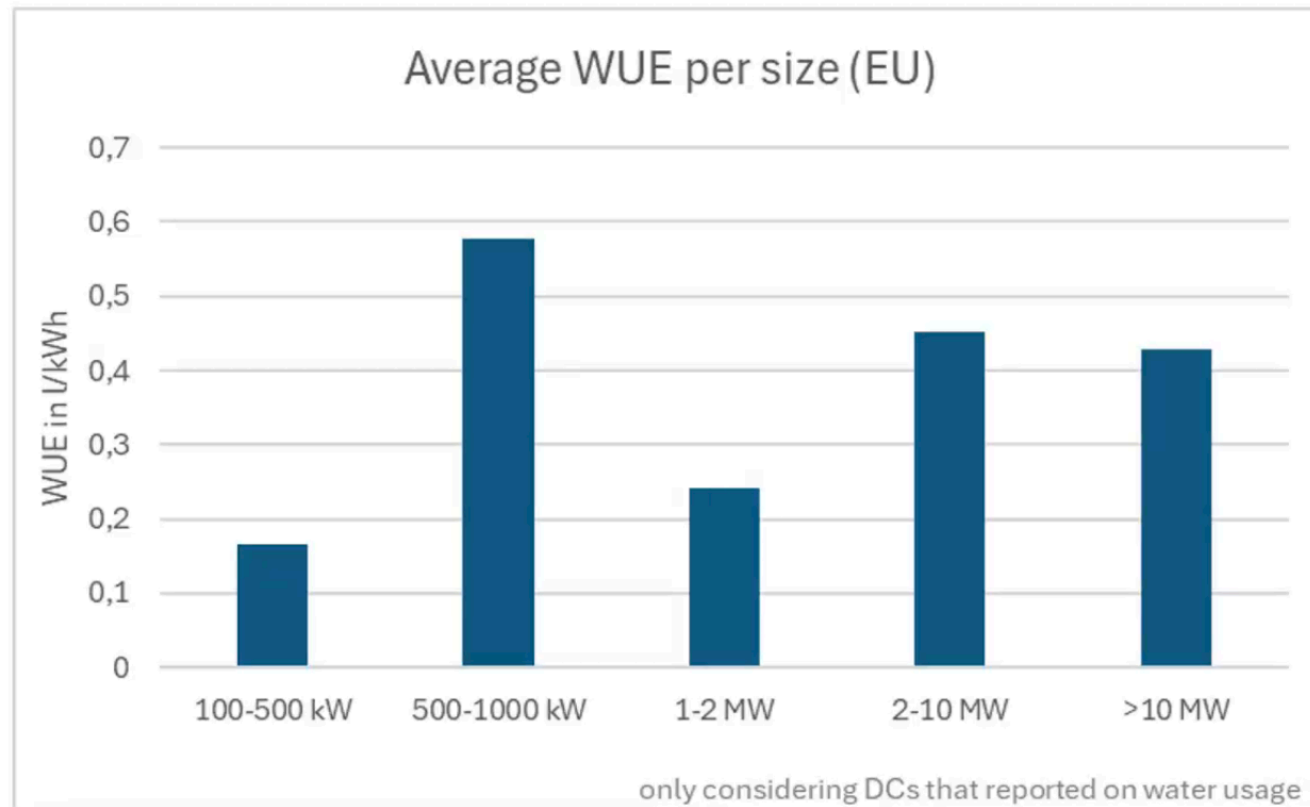


PUE depending on size of data centres



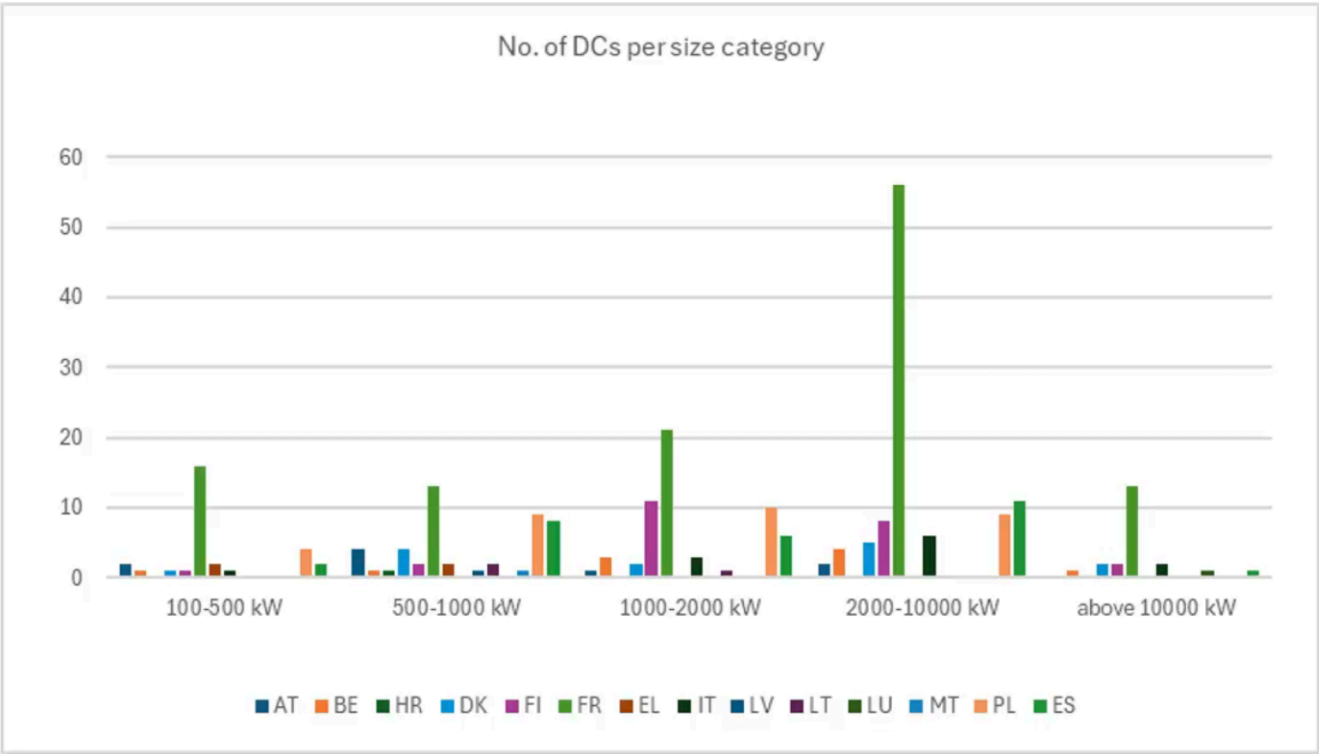
NOTE: Preliminary Results. Only figures from the first reporting period thus far are considered, with more figures expected to be received so the results may change.

Data centres in the EU - WUE



NOTE: Preliminary Results. Only figures from the first reporting period thus far are considered, with more figures expected to be received so the results may change.

Number of DCs per size category



NOTE: Preliminary Results. Only figures from the first reporting period thus far are considered, with more figures expected to be received so the results may change.

Topic 2: The needs and ways to implement an EU-wide rating scheme for data centres



European
Commission



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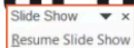


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General approach



1. Trust in market actors and market mechanisms

Data centres are very heterogeneous and some established sustainability related indicators are at least partially outside the control of the operator.

2. Transparency is key to the functioning of market mechanisms

Data centres are very heterogeneous and some established sustainability indicators may be (at least partially) outside the control of the operator.

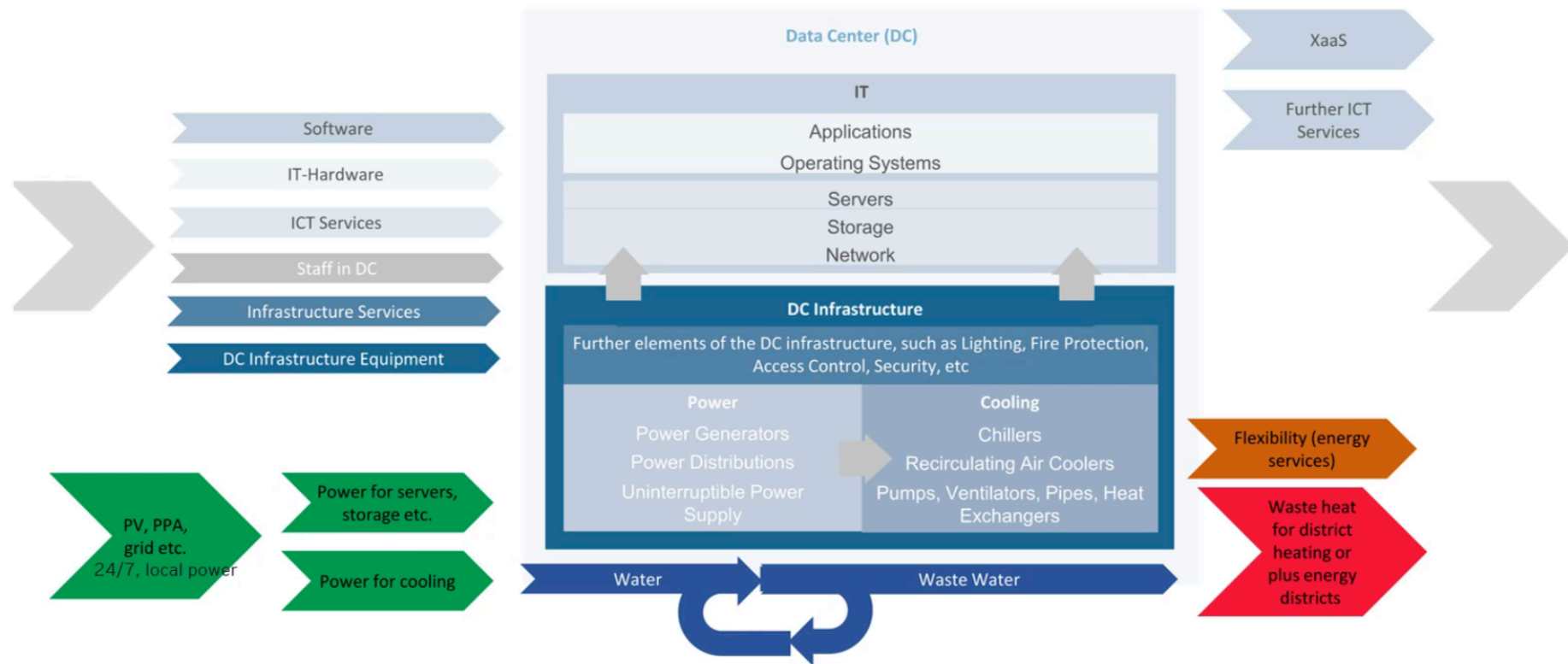
3. 2-step introduction of the rating scheme

Using the data already covered and defined by the EED reporting to enable an early introduction of a first version of the rating scheme. Additional information can be provided on a voluntary basis to allow more ambitious companies to differentiate.

4. The rating scheme is not intended for end-users

The rating scheme should enable corporate/professional customers to consider sustainability when considering on which data centre to run their services (besides many other factors). We expect them to be able to deal with more complexity than a single scale (e.g. 1-100) to check if their own priorities in terms of sustainability are met, using standardised and fair indicators.

Generic concept of a data centre and it's interaction with energy and ressources



Name and relevant information (context) on the data centre

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Origin of energy and resources

Upstream sustainability impacts
of data centre operations

Efficient use of energy and resources

How efficient are the energy and
ressources used in the data
centre?

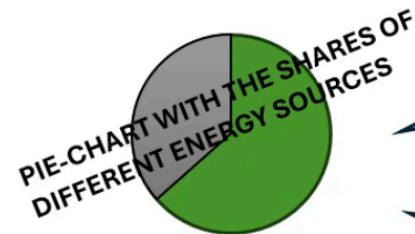
Other sustainability actions and data centre circularity measures

What other sustainability
measures are being applied and
what are the downstream
impacts?

Name and relevant information (context) on the data centre

Origin of energy and resources

Total energy consumption : [Total energy consumption]



Renewable Energy Factor (REF): [Renewable Energy Factor]

Emission factor

Market based: [calculated emission factor] g/kWh

Location based: [calculated emission factor] g/kWh

Carbon footprint of power

Market based: [market based emissions - t/a]

Location based: [location based emissions - t/a]

Main water source, water availability

[Rainwater, potable water...]

Focus on the origin of the energy – in many cases the most important metric regarding climate impact during the operational phase

Suggestion to look a bit closer to carbon free sources, compared to the current reporting - comparable to the hydrogen delegated act (hourly, location),

Besides power, also the source of water should be disclosed

Other sustainability actions and data centre circularity measures

What other sustainability measures are being applied and what are the downstream impacts?

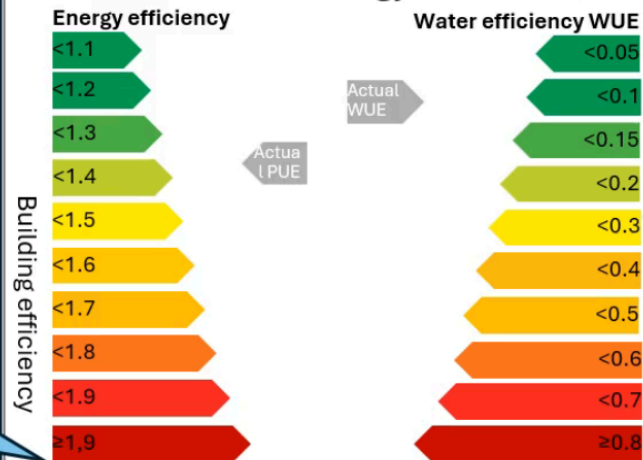
Name and relevant information (context) on the data centre

Origin of energy and resources

Upstream sustainability impacts
of data centre operations

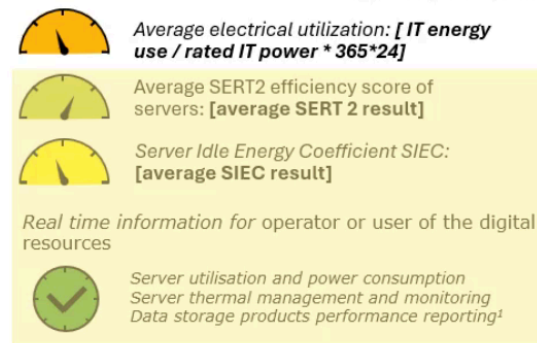
PUE in a colored scale to make
clear: higher numbers are worse –
but giving important context on
location, climate, PUE category
and TIER level

Efficient use of energy and resources



WUE unit: m³/MWh
Location: [Location of the data centre], cooling degree days: [CDD]
PUE category: [1, 2, 3]
Availability Level: [TIER LEVEL]

ICT efficiency and utilization



Other sustainability actions and data centre circularity measures

WUE: Strengthen the focus on
water efficiency by putting WUE on
a similar central scale

Voluntary/long term:
Metrics on the ICT efficiency and
utilization

Name and relevant information (context) on the data centre

Origin of energy and resources

Upstream sustainability impact of data centre operations

heat reuse:
Separating the readiness to use heat and the actual ERF to represent willingness of DCs independently from actual offtakers

Grid function: Generic as in the current reporting regarding EED; but could be specified more detailed in the long term

Additional pre-defined sustainability feature, to reflect the wider sustainability ambitions of individual companies

and

and

Other sustainability actions and data centre circularity measures



Heat-reuse-ready and offering heat? [YES/NO]



Heat reused in reference year ERF: [ERF]%



Grid function: [peak-demand, frequency response, other]

Bonus: Further voluntary information on sustainability actions



Other heat reuse actions (excluded in ERF) [[YES/NO, kWh/a]



No evaporative cooling



Hardware circularity/ e-waste program



Refrigerant with low GWP



Liquid cooling >50%



+many more



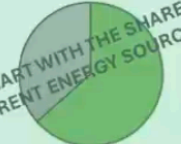
Brownfield approach (no green areas used)



Water stewardship program

¹See ENERGY STAR® requirements

Bureaucracy?

Datacentre: [Data centre name]		Type: [Type of data centre]
Operator: [Owner and operator of the data centre]		Start of operation: [Year and month of entry into operation] Reference Year: [Year, on which the data below refers to] Size: [MW]
Origin of energy and resources Total energy consumption: [Total energy consumption]  Renewable Energy Factor (REF): [Renewable Energy Factor]	Efficient use of energy and resources <div> Energy efficiency Building efficiency: [1.1 to 1.9] Water efficiency WUE: [0.05 to 0.8] WUE unit: m³/MWh Location: [Location of the data centre], cooling degree days: [CDD] PUE category: [1, 2, 3] Availability Level: [TIER LEVEL] </div> <div> ICT efficiency and utilization Average electrical utilization: [IT energy use / rated IT power * 365*24] Average SERT2 efficiency score of servers: [average SERT 2 result] Server Idle Energy Coefficient SIEC: [average SIEC result] Real time information for operator or user of the digital resources Server utilisation and power consumption Server thermal management and monitoring Data storage products performance reporting </div>	Other sustainability actions and data centre circularity measures <input checked="" type="checkbox"/> Heat-reuse-ready and offering heat? [YES/NO] <input type="checkbox"/> Heat reused in reference year ERF: [ERF]% Grid function: [peak-demand, frequency response, other] Bonus: Further voluntary information on sustainability actions <input type="checkbox"/> Other heat reuse actions (excluded in ERF) [YES/NO, kWh/a] <input type="checkbox"/> No evaporative cooling <input type="checkbox"/> Hardware circularity/ e-waste program <input type="checkbox"/> Refrigerant with low GWP <input type="checkbox"/> Liquid cooling >50% <input type="checkbox"/> +many more <input type="checkbox"/> Water stewardship program <input type="checkbox"/> Brownfield approach (no green areas used)
Emission factor Market based: [calculated emission factor] g/kWh Location based: [calculated emission factor] g/kWh Carbon footprint of power Market based: [market based emissions - t/a] Location based: [location based emissions - t/a] Main water source, water availability [Rainwater, potable water...]		

This information can be taken from the current reporting requirements

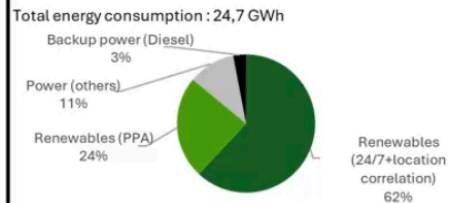
This is voluntary information in the first phase and can be used to show the individual ambition

How it could practically look like

Datacentre: Munich 3 Operator: ColobyteXY

Type: Colocation (Multi-Tenant),
First year of operation: 2018
Reference Year: 11/2018
Size: 5 MW

Origin of energy and resources



Renewable Energy Factor: REF: 0,68

Emission factor

Market based: 32 g/kWh
Location based: 237 g/kWh

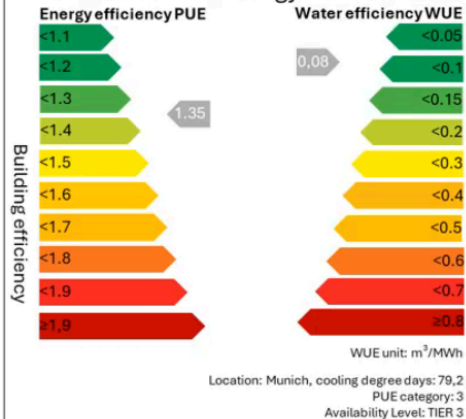
Carbon footprint of power

Market based: 790 t/a
Location based: 5850 t/a

Main water source, water availability

Rainwater

Efficient use of energy and resources



Other sustainability actions and data centre circularity measures

☒ Heat-reuse-ready and offering heat? **Yes**

Heat reused in reference year ERF: **12%**

Grid function: Frequency response

Bonus: Further voluntary information on sustainability actions

Pre-heating the emergency power system

No evaporative cooling

Hardware circularity program/avoidance of e-waste

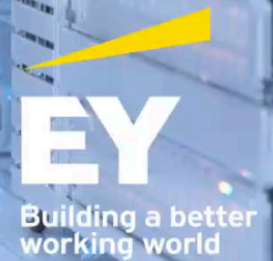
Refrigerant with low GWP

Brownfield approach (no green areas used)

This was just one iteration, not the end of the discussion

If you have specific feedback to the proposed rating scheme which you think we haven't taken into consideration, feel free to send an e-Mail (eudcear@be.ey.com)

Recap of the workshop, next steps and closing remarks



Next steps

