

AI for environmental sustainability DCs and Sustainability

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The JRC and Data Centres

- The JRC has been managing the EU CoC for DCs for many years
- More than 300 DCs
- Yearly Best Practices for DCs
- Average PUE of < 1.80

<u>Best Practices</u>

EU CoC







European Commission

Data Centres and Sustainability

- ENERGY
- WATER
- WASTE
- EMBEDED CARBON
- SOCIO-ECONOMIC IMPACTS
- MEASURING SUSTAINABILITY
- DCs and the SDGs



Energy and DCs

- Energy intensive industry (0.8% of electricity demand)
- Since 2010, the number of internet users worldwide has doubled while global internet traffic has grown 12-fold, or around 30% per year
- Demand for data and digital services is expected to continue its exponential growth

9.000 terawatt hours (TWh) ENERGY FORECAST 20.9% of projected electricity demand Widely cited forecasts suggest that the total electricity demand of information and communications technology (ICT) will accelerate in the 2020s, and that data centres will take a larger slice. Networks (wireless and wired) Production of ICT Consumer devices (televisions, computers, mobile phones) Data centres 2012 2014 2016 2018 2020 2022 2024 2026 2028 2030 2010

The chart above is an 'expected case' projection from Anders Andrae, a specialist in sustainable ICT. In his 'best case' scenario, ICT grows to only 8% of total electricity demand by 2030, rather than to 21%.





Energy and DCs

- Decline of RES prices
- Electricty up to 70% of DC costs
- Large ICT players also large RES buyers
- Onsite and through PPAs
- Opportunity to add flexibility to the grid

2019 TOP 10 LARGE ENERGY BUYERS





Water Consumption

- Water consumption to increase by 55% between 2000 and 2050_№ ICT plays its part
- In DCs: Water used in electricity generation and for cooling
- Most water used in DCs from potable sources
- DCs often are placed in highly populated areas with high hydric stress.
- DCs need a water expert on top of energy experts





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Waste

- *E-Waste*: 21% increase in 5 years worldwide
- In DCs: Components need replacement
- 99% of common metals and polymers
- 1% of critical raw materials





Waste heat

- Not all waste is bad
- Energy intensity of DCs originates waste heat
- Can be used in heating the offices part of DC
- Can be injected in the district heating grid.
- e.g. Stockholm aims to have 10% of heat from DCs by 2035





Embeded carbon of DCs

Cement, Steel, Aluminium are heavily energy intensive and carbon intensive

Carbon needs to be considered in the first stages of development



Socio-Economic impacts of DCs

- Big ICT companies have been trying to accomodate local concerns of the installation of facilities
- DCs may have only short-term influence in the communities (construction phase)
- Communities usually benefits of the installation of DCs in the long term
- Broader supply chain also benefits with the construction and operation and maintenance stages
- Little information on smaller DCs



Measuring DC Sustainability

Acronym Full Name - CO2 Savings Ratio Maximize 1.0 Facility APC Adaptability Power Curve CUE Carbon Usage Effectiveness Maximize 0.0 Facility CADE Corporate Average Data Center Eff EDE Electronics Disposal Efficiency Percentage Maximize 0.0 Facility CADE Compute Power Efficiency ERE Electronics Disposal Efficiency Percentage Maximize 0.0 Facility DCA DotA Genter Compute Efficiency ERF Energy Reuse Effectiveness Percentage Maxim 0.0 Facility DCA Data Center Instructure Efficiency GUE Green Energy Coefficient Percentage Maxim 0.0 Facility DCIE Data Center Portomance Efficiency Omega Water Usage Energy / ω Ratio Minimize 0.0 Facility DCYPD Data Center Performance Efficiency TCE TCE<		Act	ronym	Full Name			Unit		Objective	Optimal	Category	
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DCs and the SDGs







DCs and the SDGs – Direct impacts



Highly energy intensive industry = water intensive Location in less hydro stress areas, free cooling, non-potable water. Use of Water Usage Effectiveness indicator by professionals



Use of renewables onsite (PV) and PPAs



Edge DCs being smaller and nearer cities can increase the potential of the IoT making cities more sustainable and resilient



DCs and the SDGs – Direct impacts



Full lifecycle has to be considered. Embebed carbon from the early stages.

DCs actually help science in acting on the data collected by sensors and processed by DCs



Rejected water from cooling hyperscale DCs can influence biodiversity. High consumption can impact in the amount of water available.



Ideally DCs should be installed in brownfield. If not, prior EIA should be had in consideration to minimize the impact of the installation of DCs in nearby habitats or fighting desertification



Conclusion

DC industry does not excuse itself from its responsibilities in the different sustainability dimensions. Contributes to society and minimizes its impact.

Every year the efficiency values are being improved (PUE)

SDGs and other sustainability targets can only be achieved by daily concerted action on the whole stages of DCs life.

DCs have an importante role in the energy transition through RES production.



European Commission

Thank you!

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