Sunbird

Top 30 Data Center Sustainability Metrics

In the last decade, global internet traffic increased ten-fold and data center storage capacity increased by a factor of 25.

To grow capacity sustainability, green data centers and cloud operators are making incredible advancements in energy efficiency. They are deploying state-of-the-art hyper-efficient equipment and cooling technology, generating renewable energy onsite, and pursuing other innovations like building data centers underground and underwater, developing artificial intelligence that can predict environmental conditions and optimize operations, and reusing waste heat to cool nearby homes and buildings.

Modern data centers are complex, and there are many ways to measure sustainability. Here are some of the most common data center sustainability metrics data center managers use to track their efficiency.

KPI 1 Air Economizer Utilization Factor (AEUF)

CALCULATION: Time Air Economizer in Use / Total Time
MEASURES: How often outside air is used for free cooling
UNIT: Percentage
GOAL: Maximize

KPI 2 Airflow Efficiency

CALCULATION: Fan Power / Airflow
MEASURES: How efficiently air moves from the supply to the return
UNIT: W / cfm
GOAL: Minimize

KPI 3 Cabinets Compliant with ASHRAE Standards

CALCULATION: Racks in ASHRAE Recommended Range / Total Racks
MEASURES: How much progress is made towards ideal environmental conditions
UNIT: Percentage
GOAL: Maximize

KPI 4 Carbon Usage Effectiveness (CUE)

CALCULATION: CO^2 Emissions / IT Energy
MEASURES: What the overall sustainability of a data center is
UNIT: kg CO^2 / kWh
GOAL: Maximize

KPI 5 CO^2 Savings

CALCULATION: Possible CO^2 Emissions / Actual CO^2 Emissions
MEASURES: How many CO^2 emissions were avoided due to efficiency efforts
UNIT: Ratio
GOAL: Maximize

KPI 6 Cooling Capacity Factor (CCF)

CALCULATION: Cooling Capacity / Critical Load
MEASURES: What the overall efficiency of a data center's cooling system is
UNIT: Ratio
GOAL: Minimize

KPI 7 Data Center Infrastructure Efficiency (DCiE)

CALCULATION: IT Energy / Facility Energy
MEASURES: How much of total facility energy is used by IT equipment
UNIT: Percentage
GOAL: Maximize

KPI 8 Data Center Performance Efficiency (DCPE)

CALCULATION: Useful Work / Facility Energy
MEASURES: How efficiently the data center is performing work
UNIT: Work / kWh
GOAL: Maximize

KPI 9 Data Center Performance Per Energy (DPPE)

CALCULATION: Work / (Total Energy - Green Energy)
MEASURES: Energy efficiency of the entire data center including both IT equipment and infrastructure
UNIT: Ratio
GOAL: Maximize

KPI 10 Data Center Power Density (DCPD)

CALCULATION: Rack Power Consumption / Rack
MEASURES: How rack power consumption compares to rack power capacity
UNIT: kW / Rack
GOAL: Maximize

KPI 11 Data Center Space Efficiency (DCSE)

CALCULATION: RU Space Utilization x Floor Space Utilization
MEASURES: How efficiently data center space is used
UNIT: Percentage
GOAL: Maximize

KPI 12 Delta-T Per Cabinet

CALCULATION: Exhaust Temperature - Intake Temperature
MEASURES: How effective airflow is at cooling equipment
UNIT: °C or °F
GOAL: Optimize

KPI 13 Deployed Hardware Utilization Efficiency (DH-UE)

CALCULATION: Minimum Systems to Handle Peak Load / Total Systems
MEASURES: How efficiently servers and storage systems are utilized
UNIT: Percentage
GOAL: Maximize

KPI 14 Deployed Hardware Utilization Ratio (DH-UR)

CALCULATION: Servers Running Live Applications / Total Servers
MEASURES: How much power is wasted by idle systems
UNIT: Percentage
GOAL: Maximize

KPI 15 Energy Reuse Effectiveness (ERE)

CALCULATION: (Total Energy - Reused Energy) / IT Energy
MEASURES: What the overall energy efficiency is if energy is being reused outside the data center
UNIT: Ratio
GOAL: Minimize

KPI 16 Energy Reuse Factor (ERF)

CALCULATION: Reused Energy / Total Energy
MEASURES: How much energy in the data center is reused elsewhere in the facility
UNIT: Percentage
GOAL: Maximize

KPI 17 Fixed to Variable Energy Ratio (FVER)

CALCULATION: Fixed Energy / Variable Energy
MEASURES: How much energy can be targeted for reduction or elimination
UNIT: Ratio
GOAL: Minimize

KPI 18 Green Energy Coefficient (GEC)

CALCULATION: Green Energy / Total Energy
MEASURES: How much renewable energy was generated onsite
UNIT: Percentage
GOAL: Maximize

KPI 19 Grid Utilization Factor (GUF)

CALCULATION: Time Locally Generated Energy Covers Energy Demand / Total Time
MEASURES: How often the data center is powered by energy generated onsite
UNIT: Percentage
GOAL: Maximize

KPI 20 HVAC System Effectiveness (HSE)

CALCULATION: IT Energy / HVAC Energy
MEASURES: What the overall efficiency of a data center's cooling system is
UNIT: Ratio
GOAL: Maximize

KPI 21 IT Equipment Energy Efficiency (ITEE)

CALCULATION: IT Capacity / IT Energy
MEASURES: What the efficiency of power capacity utilization by IT devices is
UNIT: Ratio
GOAL: Maximize

KPI 22 Power Usage Effectiveness (PUE)

CALCULATION: Facility Energy / IT Energy
MEASURES: How much total facility power is devoted to IT equipment
UNIT: Ratio
GOAL: Minimize

KPI 23 Space, Wattage, and Performance (SWaP)

CALCULATION: Performance / (Space x Watts)
MEASURES: How efficient servers are within the constraints of space and power
UNIT: Ratio
GOAL: Maximize

KPI 24 Stranded Power Capacity Per Rack

CALCULATION: Budgeted Rack Power - Actual Rack Power
MEASURES: How much additional equipment can be deployed in existing cabinet resources
UNIT: kW / Rack
GOAL: Minimize

KPI 25 Technology Carbon Efficiency (TCE)

CALCULATION: CO2 Emissions / Facility Energy
MEASURES: How clean the energy consumed by a data center is
UNIT: bs CO^2 / kWh
GOAL: Minimize

KPI 26 Temperature Per Cabinet

CALCULATION: None
MEASURES: If equipment is being inefficiently overcooled
UNIT: °C or °F
GOAL: Optimize

KPI 27 UPS Energy Efficiency (UPEE)

CALCULATION: Input Powering the Load and Connected Systems / Total Input Power
MEASURES: How much energy is wasted running a UPS
UNIT: Percentage
GOAL: Maximize

KPI 28 UPS Power Factor (UPF)

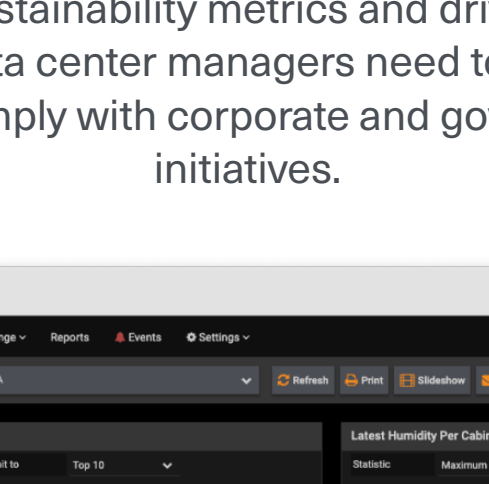
CALCULATION: Actual Energy Consumed / Apparent Power
MEASURES: How efficiently a UPS uses power
UNIT: Ratio
GOAL: Maximize

KPI 29 Water Economizer Utilization Factor (WEUF)

CALCULATION: Time Water Economizer in Use / Total Time
MEASURES: How often indirect water cooling is used
UNIT: Percentage
GOAL: Maximize

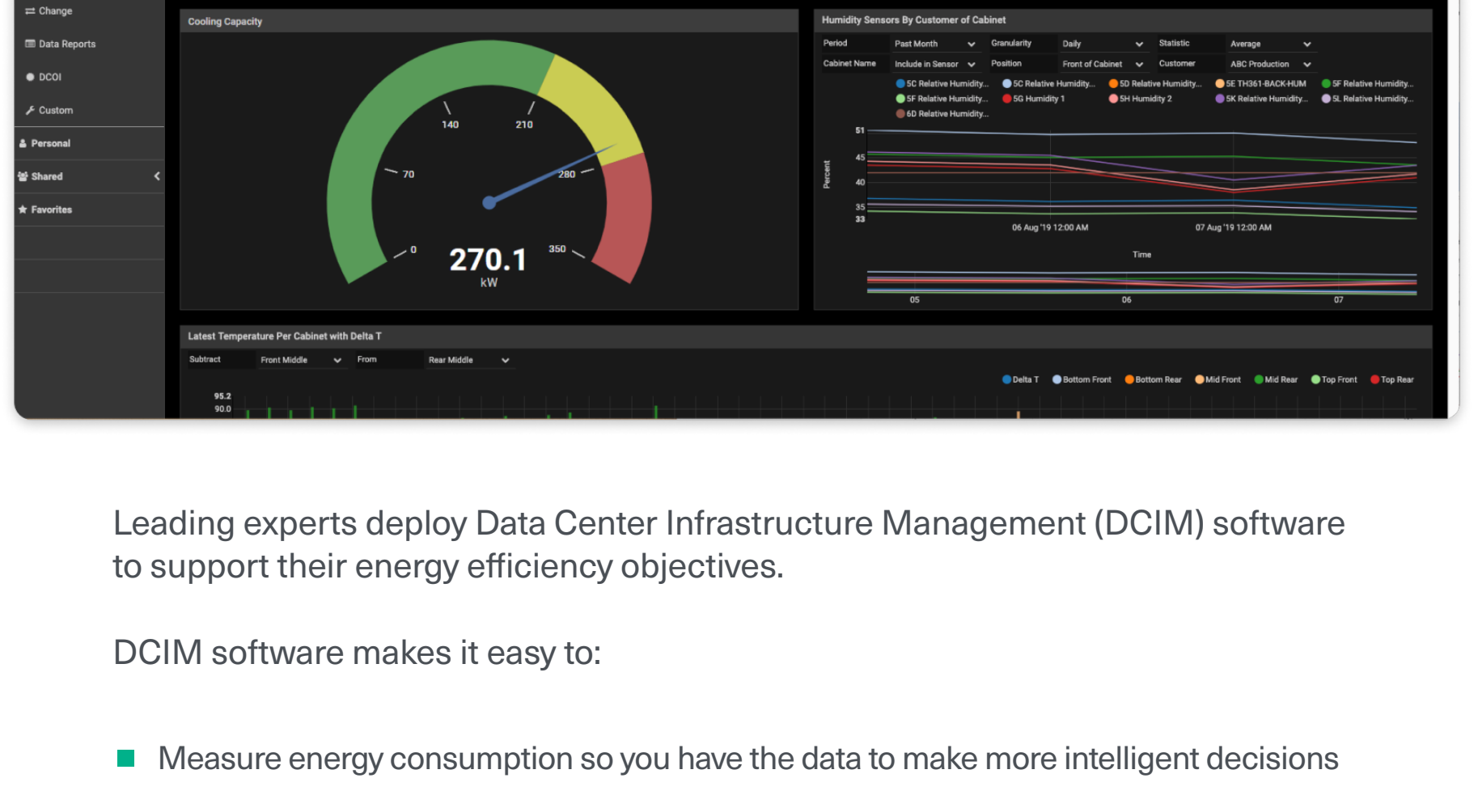
KPI 30 Water Usage Effectiveness (WUE)

CALCULATION: Water Usage / IT Energy
MEASURES: How efficiently water is being used in the data center
UNIT: Ratio
GOAL: Minimize



Drive Sustainability in Your Data Center with DCIM Software

Measuring data center sustainability metrics and driving energy efficiency isn't just for hyperscalers. All data center managers need to improve efficiency, reduce operating costs, and comply with corporate and governmental sustainability initiatives.



Leading experts deploy Data Center Infrastructure Management (DCIM) software to support their energy efficiency objectives.

DCIM software makes it easy to:

- Measure energy consumption so you have the data to make more intelligent decisions
- Get real-time charts and reports on energy metrics like PUE
- Create billback reports to facilitate more energy-efficient behaviors from customers
- Avoid overcooling and wasting energy without sacrificing performance
- Identify power-hungry equipment that should be replaced
- Design your physical infrastructure for optimal efficiency
- Intelligently consolidate and virtualize resources

Take a free test drive of the world's best DCIM software to see how you can improve sustainability in your data center.

Try it free

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