

TGG - ITI Survey on US EPA Score for Data Center Energy Efficiency

Learn more about this project:

<https://www.thegreengrid.org/en/us-epa-energy-star-score-data-centers>

TGG works globally to create metrics, tools, provide technical expertise, and advocate for the optimization of energy and resource efficiency. The Green Grid (TGG) has partnered with the U.S. Environmental Protection Agency (EPA) to conduct a new survey of data center energy and water use to allow for an update to the U.S. EPA's 1-100 ENERGY STAR score for data centers. The Green Grid (TGG) will be creating, administering, and collecting responses from the voluntary survey. **Survey data will be anonymized** before any TGG member companies or the US EPA can access it. TGG will also use your anonymized responses to support our work to continue to improve Data Center ecosystems which help enable a low carbon economy.

IMPORTANT INFORMATION - READ BEFORE BEGINNING THIS SURVEY

Please note that this submission does not require a certified engineer to validate the survey. The data collection effort will focus on **stand-alone data centers and data centers embedded in larger buildings** (e.g. office buildings) that have sub metering capability to isolate and measure the energy used for data center operations. **This survey can also be used to submit data for dedicated Edge/Telecom data centers.**

- Please create and **submit one survey response per each data center facility** (Edge/Telecom may be submitted as a group). When completing the survey, report values that were valid for at least 12 consecutive months within the period from January 1, 2022 to December 31st, 2022.

- The facility must have been in normal operation for at least 12 months. Data centers in ramp-up or ramp-down phases, should not be included.

- If data elements change over time (e.g. the number of racks, UPS utilization), provide the average of that element over the 12 month data collection period.

Cloud service providers which do not own or operate the data center and want to complete this survey must occupy 100% of that dedicated facility.

- For **Telecom / Edge data center providers**, there are three options under which you can submit this survey, you can choose to 1. submit one survey per each container/building; 2. submit an average of a number of containers/buildings in the same climate zone; or 3. Submit an average of a number of containers/buildings across multiple climate zones (specifying the number of buildings included for option 2 and 3).

Red Text in the form means: there is an action expected on side of the user of the form (completer); a selection from a drop-down menu or response in free text form.

- If you have any specific questions about the items listed below, or difficulty assessing data during this data collection period, please send an email to [TGG EPA-SURVEY@thegreengrid.org](mailto:TGG-EPA-SURVEY@thegreengrid.org)

Section 1 - Respondent, Building and Facility Information

1.1 Please provide point of contact information (We will only use this information only if there are questions or clarifications related to your responses).

Name: John Doe

email: John.Doe@XYZDataCenters.com

Phone number: 800-555-1212

1.2 Please identify the type of respondent - Please select only one answer from the list that applies to your organization's Data Center facility.

Co-Location Provider (Landlord)

Comments: →

If "Other, Please explain: →

1.3 Data Center Type(s) – Please select all that apply.

	Comments: ↓
<input checked="" type="checkbox"/> Traditional enterprise	Private Suites or Cages
<input type="checkbox"/> On Demand Managed Service and Cloud [e.g., SaaS, PaaS, IaaS]	
<input type="checkbox"/> Hosting [e.g., Managed service, Cloud, etc.]	
<input checked="" type="checkbox"/> Internet/Social media	We support up to 10kW per cabinet
<input type="checkbox"/> Hyperscale	
<input type="checkbox"/> Hybrid	
<input type="checkbox"/> High-performance computer center	
<input type="checkbox"/> Telecom / Edge	

1.4 Building Type - Please select from the drop down below

Stand-alone (Dedicated)

If "Other", Please explain: →

Year Constructed (YYYY): 2007

1.5 Building Physical / Operational Characteristics

Data Center Name / ID: Please provide a unique name or number for each data center.	Example DC
ZIP Code: Please provide the five-digit zip code for each data center's location.	21045
Data Center Facility Square Footage [SQF]: Please provide the square footage of the data center space, including all space that directly supports the operation of the data center, including mechanical, electrical, and other related support areas. This is applicable to embedded and Stand alone Data Centers. In an "embedded data center" the data center square footage should equal the computer room square footage.	15,000
Computer Room Square Footage [SQF]: Please provide the square footage of the data center computer room (white space) containing the IT equipment.	10,000
Building Earned Energy Star? [Yes/No]: Please select whether the building that houses the data center has earned the ENERGY STAR.	No
Building LEED Label? [Yes/No]: Please select whether the building has received USGBC's LEED certification.	No
Annualized Average Total Power Draw [kW]: Enter the average total facility demand, including IT	900
Annualized Average IT Power Draw [kW]: Enter the average IT demand.	600
Resiliency Level: Select one of the four levels of resiliency from the drop down menu using recognized references or standards such as ANSI/TIA-942, ANSI/BICSI 002, ISO/IEC 22237 series or equivalent) or closest relevant equivalent level that describes the resiliency of your data center facility. [1 = Lowest to 4 = Highest]	Level 3
Number of Racks: Provide the number of racks that are usually in operation.	250
What is your organization's average % server utilization at your data center [%]	30%

What is your organization's Virtualization Ratio for your data centers (Average number of virtualized machines (VMs) per physical server)?	N/A Unknown
Average UPS Utilization [%]: Please enter the amount of critical load compared to the critical capacity of the UPS system as a percentage.	60%
Installed Operational Critical IT Capacity [kW]: Enter the current installed operational IT critical load capacity (Total UPS capacity including redundancy).	1,500
Critical IT power load design capacity? [kW]	1,000
Facility actual highest peak load demand as a percentage of design Total Load (past 12 months). [0 - 100%]	90%
Total Capacity for Cooling [kW]: Please provide the data center's total capacity for cooling (Including redundancy).	1,200

Facility Utility Data - There are two options to submit your utility data in the following section: **Option 1:**
 If you already have your data in the US EPA ENERGY STAR Portfolio Manager, submit it using you ENERGY STAR Portfolio Manager Property ID Number.
 If you decide to use Option 1, simply provide your Portfolio Manager Property ID number in the field below. Then proceed down to the next sections to complete the survey. Please be aware that providing the Portfolio Manager ID gives the US EPA permission to pull only your property's utility data from its database to provide to The Green Grid, and will solely be used for the purposes of this survey. This data will not be disclosed publicly, or shared with any parties other than The Green Grid survey team staff.
Option 2: Submit via filling out the tables below.

Option 1: ENERGY STAR Portfolio Manager Property ID: _____

Option 2: Facility Utility Data - Please complete tables below as appropriate **Numbers**
 and dates on the table are for example purposes only. Please delete and enter actual data.

Meter ID (If available)	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Electricity Consumption [kWh]	Please enter the Data Center facility electricity consumption. If you do not have kWh metering please use average kW and multiply by 8,760.
Example: Electric 45389	02/21/2023	03/20/2023	3,283,686	
	01/21/2023	02/20/2023	3,265,200	
	12/21/2022	01/20/2023	3,102,000	
	11/21/2022	12/20/2022	3,101,900	
	10/21/2022	11/20/2022	3,101,800	
	09/21/2022	10/20/2022	3,101,700	
	08/21/2022	09/20/2022	3,101,600	
	07/21/2022	08/20/2022	3,101,500	
	06/21/2022	07/20/2022	3,101,400	
	05/21/2022	06/20/2022	3,101,300	
	04/21/2022	05/20/2022	3,101,200	
03/21/2022	04/20/2022	3,101,100		

IT Measurement

Total IT Energy from Output of UPS Meter [kWh]	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Total IT Energy from Input of the PDU Meter (kWh) <i>If Available</i>	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)
1,824,270	02/21/2023	03/20/2023	1,806,028	02/21/2023	03/20/2023
1,814,000	01/21/2023	02/20/2023	1,795,860	01/21/2023	02/20/2023
1,723,300	12/21/2022	01/20/2023	1,706,067	12/21/2022	01/20/2023
1,723,278	11/21/2022	12/20/2022	1,706,045	11/21/2022	12/20/2022
1,723,222	10/21/2022	11/20/2022	1,705,990	10/21/2022	11/20/2022
1,723,168	09/21/2022	10/20/2022	1,705,936	09/21/2022	10/20/2022
1,723,111	08/21/2022	09/20/2022	1,705,880	08/21/2022	09/20/2022
1,723,056	07/21/2022	08/20/2022	1,705,825	07/21/2022	08/20/2022
1,723,000	06/21/2022	07/20/2022	1,705,770	06/21/2022	07/20/2022
1,722,944	05/21/2022	06/20/2022	1,705,715	05/21/2022	06/20/2022
1,722,889	04/21/2022	05/20/2022	1,705,660	04/21/2022	05/20/2022
1,722,833	03/21/2022	04/20/2022	1,705,605	03/21/2022	04/20/2022

Natural Gas Data

Meter ID. (If Available)	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Natural Gas Consumption <i>Please select the UOM</i>
Gas 2624	02/05/2023	03/04/2023	7,715
	01/05/2023	02/04/2023	8,000
	12/05/2022	01/04/2023	2,700
	11/05/2022	12/04/2022	2,500
	10/05/2022	11/04/2022	2,300
	09/05/2022	10/04/2022	2,200
	08/05/2022	09/04/2022	1,800
	07/05/2022	08/04/2022	1,750
	06/05/2022	07/04/2022	1,900
	05/05/2022	06/04/2022	2,100
	04/05/2022	05/04/2022	2,400
03/05/2022	04/04/2022	2,600	

Other Energy Sources

Fuel Type/ Other Energy Source	Meter ID. (If Available)	Start Date (MM/DD/YYYY)	End Date (MM/DD/YYYY)	Energy Consumption	Energy Units
<i>Please select Fuel Type or other Energy Source</i>		02/05/2023	03/04/2023		
		01/05/2023	02/04/2023		
		12/05/2022	01/04/2023		
		11/05/2022	12/04/2022		
		10/05/2022	11/04/2022		
		09/05/2022	10/04/2022		
		08/05/2022	09/04/2022		
		07/05/2022	08/04/2022		
		06/05/2022	07/04/2022		
		05/05/2022	06/04/2022		
		04/05/2022	05/04/2022		
	03/05/2022	04/04/2022			

2. Cooling Systems

2.1 - What is the primary and secondary methods of cooling for your facility?

Primary. →	Secondary (Check as necessary)
<input checked="" type="checkbox"/> Mechanical Cooling →	<input checked="" type="checkbox"/> w/Economizing → <small>Note: Please use the Economizing Section (2.2.2) to provide details.</small>
<input type="checkbox"/> Indirect Air Cooling →	<input type="checkbox"/> w/Adiabatic Cooling → <input type="checkbox"/> Mechanical DX Trim (Less than 100% DX Capacity)
<input type="checkbox"/> Direct Fresh Air Cooling →	<input type="checkbox"/> w/Adiabatic Cooling → <input type="checkbox"/> Mechanical DX Trim (Less than 100% DX Capacity)
<input type="checkbox"/> Body of Water →	<input type="checkbox"/> w/Mechanical Cooling
<input type="checkbox"/> Other Please specify: →	

2.2 - If Mechanical Cooling is the primary technology used, please complete this section.

2.2.1 - What type of cooling technologies do you have within your data center?

Indoor Chiller Plant with Evaporative Cooling Tower
 Outdoor Packaged Air-Cooled Chiller
 CRAC Air-Cooled DX
 CRAC Liquid-Cooled DX (Water or Glycol)
 CRAC Pumped Refrigerant
 Rooftop DX unit

2.2.2 - What type of economizer (non-mechanical) cooling is used, if applicable?

Indirect Air Side cooling
 Direct Air cooling
 Adiabatic pre-cooling
 Fluid Cooler
 Heat Exchanger - Evaporative Cooling tower
 Heat Exchanger - Body of Water
 Heat Exchanger - Geothermal
 Thermal Energy Storage

2.3 - What percentage of the annualized* hours is non-mechanical cooling used? (*percentage of 8,760 hours)	30.00	%
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2.4 - Provide the Heat rejection / economization system used:

Chill Water – (Evaporative Cooling Tower) <input checked="" type="checkbox"/> HX to Evaporative Cooling Tower <input type="checkbox"/> HX to Air Cooled Condenser <input type="checkbox"/> HX to Body of Water <input type="checkbox"/> HX to Geothermal <input type="checkbox"/> Thermal Energy Storage	CRAC - DX Based <input type="checkbox"/> Air cooled condenser <input type="checkbox"/> Economizer Pre-cooling coil <input type="checkbox"/> Pumped Refrigerant <input type="checkbox"/> Other
Describe: →	

2.5 - Air Flow Management:

2.5.1 - What type of computer room supply air distribution is used within your data center?

Raised floor (Under floor Plenum)
 Flooded open room (including fan wall)
 Ducted overhead

2.5.2 - Supplemental cooling (close coupled Cooling)

Above cabinet cooling units
 Row integrated cooling units
 Rear door HX units

2.5.3 - What type of computer room hot air return do you use within your data center?

Open room return
 Ceiling plenum return
 Ducted overhead

2.5.4 - What type of containment do you use / percentage of use of containment (0-100 %)

Hot aisle containment **% Percentage**
 Cold aisle containment
 Vertical heat collars integrated with ITE cabinets (e.g., Chimney cabinets)
 Overhead Cabling (instead of underfloor)
 Other: **Describe:** →

2.5.5- If a raised floor is used for cold air distribution, what percentage [%] of floor openings have some form of sealing? (0-100 %)	50.00%	%
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2.5.6 - Match Floor tiles to ITE cabinet CFM requirements

- Using CFM Modeling
 Manual calculations (CFM/kW)
 Static Pressure Control
 Responding to hot spots

2.5.7 - Cooling System Temperature Control Schemes

- Centralized
 Distributed
 Supply
 Return

2.6 - Does your site use Liquid Cooling? YES NO

2.6.1 - If NO, when (how many years) would you plan to pilot or deploy? 1 Year 2 Years 3+ Years

2.6.2 - If YES, Please provide the percent Liquid Cooling Load of the ITE total [%]: %

2.6.3 - Liquid Cooled (ITE):

- Liquid-to-liquid or liquid-to-air exchanger within ITE
 Component Liquid Immersion
 Direct-to-chip liquid (Cold plate)
 Full Immersion (Tank)

2.6.3.1 - Liquid Cooling Heat Rejection (for existing / add-on):

- Chilled Water
 Condenser Water
 Separate System (dry-cooler, other)

2.6.3.2 - Liquid Cooling systems for Air-Cooled ITE

- Rear door heat exchanger cabinet system
 Aisle based cooling: In-Row, Overhead
 Enclosed Cabinet

3 - Cabinet Power Density:

Average Cabinet [kW]	7.00
Ratio of Lowest to Highest Cabinet	2.50

4 - Does your data center have or practice any of the following capabilities?

- Peak shaving
 Energy storage
 Demand response
 Thermal storage
 Co-generation

5. - Operating Set Points

	Comments:
<input checked="" type="checkbox"/> ASHRAE Temps : Recommended or Allowable Ranges	Recommended with A1 Allowable during cooling system Maintenance or Failure
<input checked="" type="checkbox"/> ASHRAE Humidity Recommended or Allowable ranges (currently 5th edition or later) <input checked="" type="checkbox"/> Recommended <input type="checkbox"/> Allowable	Recommended with Allowable excursions during cooling system Maintenance or failure
<input type="checkbox"/> Dew point Control	

6. - Sustainability

6.1 Provide your annualized average WUE _{site} for your data center. [Liters/kWh]	1.50
6.2 Provide your annualized average WUE _{source} for your data center. [Liters/kWh]	Unknown
6.3 Provide your annualized average CUE for your data center. [KgCO2/kWh]	Unknown
6.4 Provide your annualized average ERF for your data center. (0 - 1)	0.00
6.5 What percentage of your total annual Data Center electricity consumption comes from renewable sources? [%]	20.00%
6.5.1 Of the total amount of renewable electricity consumption of your data center, how much of that renewable electricity was received as part of the grid-mix (as opposed to direct purchases by your organization)? [%]	100.00%

6.5.2 What percentage of your total annual Data Center electricity consumption is supported by bundled renewable electricity certificates (Bundled RECs) [%]	0.00%
6.5.3 Of the total amount of renewable electricity consumption of your data center, how much of that renewable electricity was generated on-site? [%]	0.00%