How to Apply for EDGE Certification for Data Centers

I.   INTRODUCTION

The EDGE green building certification program is piloting the certification of data centers as green, in line with the standard EDGE certification offering. The current pilot phase is open until the end of 2024.

II.   ELIGIBILITY REQUIREMENTS

Any data center globally, new or existing, is eligible to apply. There are two requirements for data centers to be eligible for EDGE certification:

1. The datacenter must achieve a minimum of 20 percent savings in Water and Embodied Energy in Materials as per the EDGE standard.
    The Power Usage Effectiveness (PUE) of the data center must be at least 20% better than the baseline PUE, where

$$PUE = \frac{Total\ annual\ energy\ entering\ the\ data\ center\ measured\ at\ its\ boundary}{Annual\ energy\ used\ by\ the\ IT\ equipment\ inside\ the\ datacenter}$$

EDGE utilizes the PUE (power usage effectiveness) as the energy baseline for data centers. PUE is a metric defined by The Green Grid that describes how efficiently a data center uses energy. It is a ratio of the total amount of energy used by a facility to the energy delivered to IT equipment.

The baseline PUE values used in EDGE are shown in the table below. These values are subject to change after the pilot phase.

Table 1: Baseline and Target PUE per Climate Type.

Climate Type	Baseline PUE	Target PUE for EDGE Certified (20% improved)	Target PUE for EDGE Advanced (40% improved)	Target PUE for EDGE Zero Carbon Certification
Hot & Humid Climate (ASHRAE Climate Zones 1A, 2A, 3A)	1.95	1.56	1.17 (1.36 excluding offsite renewable energy)	1.17 (1.36 excluding offsite renewable energy)
Other Climate Zones	1.81	1.45	1.09 (1.27 excluding offsite renewable energy)	1.09 (1.27 excluding offsite renewable energy)

Data centers with 20% improvement in PUE will achieve EDGE Certified status and data centers with 40% improvement in PUE will achieve EDGE Advanced status.

III. GUIDANCE FOR CALCULATIONS AND SUBMISSION

The data center project can use the following guidelines to show compliance with the EDGE standard:

A. For projects applying using EDGE App version 2.1.5, the project must use the Light Industrial model in the Retail typology. For projects applying using EDGE App version 3, use Mixed Use building type.

B. Onsite renewable energy can count toward contribution to PUE.

$PUE_{onsite\ RE}$, which includes onsite renewable energy, should be calculated with the following equation for onsite renewable energy:

$$PUE_{onsite\ RE} = \frac{Total\ annual\ energy\ entering\ the\ data\ center - annual\ onsite\ renewable\ energy\ production}{Annual\ energy\ used\ by\ IT\ equipment\ inside\ the\ data\ center}$$

C. PUE_{RE}, which includes renewable energy, should be calculated with the following equation for onsite and offsite renewable energy:

$$PUE_{RE} = \frac{Total\ annual\ energy\ entering\ the\ data\ center - annual\ onsite\ renewable\ energy - annual\ offsite\ renewable\ energy}{Annual\ energy\ used\ by\ IT\ equipment\ inside\ the\ data\ center}$$

Offsite renewable energy can count toward contribution to PUE only for EDGE Advanced certification and EDGE Zero Carbon for a maximum of 10% with respect to the PUE baseline, see Table 1.

D. The total improvement in PUE can be modeled using "RTE31 - Other Renewable Energy for Electricity Generation" for EDGE App version 2.1.5 and "EEM34 – Other Energy Saving Measures" App version 3.

    a. Perform annual PUE calculations or simulations if the project is in design stage.

    b. Enter the percentage improvement in PUE compared to the baseline as the input for the measure RTE31 or EEM34 in EDGE. Savings to be reported are calculated as follows:

$$1 - (PUE_{improved\ case} / PUE_{baseline})$$

    c. Select applicable energy efficiency measures and use RTE31 or EEM34 (if necessary) to match the overall energy savings stated in the PUE report. Water and Materials tabs are completed as any other project.

    d. In the EDGE app under the Design tab modify the detail loads input calculator to reflect the IT equipment load as close as possible to the PUE report results.

    e. Upload evidence and external calculations in the measure documentation of all selected measures.

f. The project's EDGE Auditor should send a copy of the PUE report to IFC (edge@ifc.org) for review and approval before recommending the project for certification.

E. PUE should be calculated using PUE Category 2 as defined by "ISO/IEC 30134-2:2016 Information technology — Data centers — Key performance indicators — Part 2: Power usage effectiveness (PUE)".
   g. Readings must be made as total kWh over a 12-month period.
   h. All fuel types serving the data center must be converted to equivalent kWh.

F. The PUE report should include details of all the inputs and assumptions that were used in the simulation:
   i. Weather file
   j. Building construction and fenestration details (U-values, SRI, WWR, etc.)
   k. Lighting power densities
   l. Occupancy, lighting, and equipment profiles
   m. Indoor temperature and humidity set points
   n. HVAC systems details (capacity, efficiency, part load performance etc.)
G. The post-construction evidence needed should include:
   a. As-built drawings showing envelope and fenestration details and calculations of:
      i. Glass: U-value (W/m2 K), SHGC, VT(Factor).
      ii. Floors: U-value (W/m2 K), Weighted Average U-value (W/m2 K), if applicable
      iii. Roofs: Roof Assembly U-value (W/m2 K), Weighted Average Roof U-value (W/m2 K), if applicable
      iv. Exterior Walls: U-value (W/m2 K), Weighted Average Roof U-value (W/m2 K), if applicable
      v. Window-to-wall ratio: Average WWR (%)
   b. As-built drawings and data sheet showing room loads per areas, include occupancy and lighting power density assumptions.
   c. As-built load schedule showing, including (when applicable): model, quantities, power input, electrical characteristics, capacity, location, COP. Examples of equipment include:
      i. FCUs
      ii. Make up air units
      iii. Air handling units
      iv. Air conditioning units
      v. Chillers
      vi. Water pumps
      vii. Chilled water coils
      viii. Fans and blowers
      ix. Fuel oil bulk storage tank
      x. Air separator
      xi. Expansion tank
   d. As-built PUE calculation table showing:
      i. Annual energy used by the IT equipment inside the datacenter (kWh). Proof that it is the same as the total IT demand load calculated for capacity planning.
      ii. The annual facility load calculation (kWh). Include a facility load breakdown, for example:
         1. Lighting
         2. Cooling system (e.g., SPLCs)
         3. Chillers

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4. Chilled water pumps
5. Condenser water pumps
6. Coil/Fan Walls
7. AHUs/FCUs/CUs
8. Fans
9. PDUs and transformers
10. Transformers
11. General losses (transformer, distribution, generator, UPS, switches, etc.)

IV. QUESTIONS

For questions, reach out to your respective certifier or email edge@ifc.org.