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# EDGE USER GUIDE

Part 1

## - Building Certification Guidance

### Version 3

## Contents

1. Introduction.....	3
2. Glossary .....	4
3. EDGE Certification .....	5
3.1. EDGE Assessment and Certification Definitions.....	5
3.2. EDGE Certification .....	6
3.2.1. EDGE Advanced Certification.....	6
3.2.2. EDGE Zero Carbon Certification.....	6
3.2.3. Eligibility Requirements.....	7
3.2.4. Reporting Timeline .....	7
3.2.5. Documentation Requirements .....	8
3.2.6. Documentation Submission.....	9
3.2.7. Certification Expiration.....	9
3.2.8. Recertification .....	9
3.2.9. Retrofit Projects.....	10
3.3. Project Roles.....	10
3.3.1. Project Team/EDGE Experts .....	10
3.3.2. EDGE Auditors .....	11
3.3.3. EDGE Certifiers .....	11
3.4. EDGE Certification Process .....	11
3.4.1. Documentation Requirements .....	12
3.5. Non-Typical EDGE Projects .....	13
3.5.1. Special Ruling Request (SRR) .....	13
3.5.2. Grouping Multiple Buildings into One Subproject .....	14
3.5.3. Existing Building and Retrofit Projects .....	15
3.5.4. Reporting Equipment Loads from Existing Buildings.....	15
3.5.5. Core & Shell and Partially Unfinished Projects.....	16
3.5.6. Partial Building Projects.....	17
3.5.7. Industrial Buildings .....	17
3.6. Data Centers .....	18
3.6.1. Documentation Submission.....	18
4. Navigating the EDGE App .....	20
4.1. Default Values and User Entries.....	22

4.2. Required Measures .....	23
4.3. Results Bar .....	23
4.4. Saving a Project .....	24
Annex 1: Sampling Methodology .....	25
Annex 2: Core & Shell measures .....	26
Annex 3: Unfinished/Partially finished projects .....	27
Annex 4: Primary Energy Demand (PED) .....	29

## 1. Introduction

EDGE (Excellence in Design for Greater Efficiencies) is a standard, a green building certification and an online app of the International Finance Corporation (IFC). This document is part of a series of documents aimed at the global harmonization of the EDGE buildings certification process.

In these documents, "Must" and "Shall" are used to prescribe obligatory actions. "Can" implies that there is an option or ability to do something, but it is not required. Lastly, "May" grants permission or suggests that an action is permissible, providing flexibility or discretion to the Project team.

The main target group for this document are EDGE experts, EDGE auditors, EDGE Certifiers and anyone interested in learning more about the certification.

The **Part 1 – Building Certification Guidance** document serves as a fundamental policy resource, offering instructions for certification, an overview of the certification procedure, and information on the types of buildings eligible for certification. This key document applies to all projects around the world and shall be used as the primary guide throughout the certification process. It is to be used in conjunction with Parts 2 to 6, which provide specific guidance on utilizing the EDGE App.

Table 1 shows the relative position of this document within the set of EDGE user guides. When officially released, after the period for public comment, these documents shall replace EDGE User Guide Version 3.0.a.

*Table 1: Position of this document within the EDGE V3 modules.*

Module	Overarching	Design	Energy	Water	Materials	Operations
App User Guides	Part 1 – Building Certification Guidance	Part 2 - User Guide - Design Tab	Part 3 – User Guide - Energy Measures	Part 4 – User Guide - Water Measures	Part 5 – User Guide - Materials Measures	Part 6 – User Guide Operations
Building Certification Guidance						
Operations Certification Guidance						
Auditor Guidance		Part 8 – Auditor Guidance				
Methodology	For future release					
Homes Prescriptive Certification Guidance	Check country-specific documentation					
<p>Note 1: The shaded modules are not applicable.</p> <p>Note 2: All guidance and user guide documents are complimentary information to the EDGE protocol documents.</p> <p>Note 3: In the case of any discrepancy, the EDGE protocol document takes precedence</p>						

To share feedback with the EDGE team, please send suggestions along with relevant documentation to [edge@ifc.org](mailto:edge@ifc.org).

## 2. Glossary

AHU	Air Handling Unit
ARI	Air-conditioning and Refrigeration Institute
ASHRAE	American Society of Heating Refrigerating and Air-conditioning Engineers
Btu	British thermal unit
cfm	Cubic feet per minute (ft <sup>3</sup> /min)
COP	Coefficient of Performance
EDGE	Excellence in Design for Greater Efficiencies
EPI	Energy Performance Index (kWh/m <sup>2</sup> /year)
GIA	Gross Internal Area
GJ	Giga Joules
HVAC	Heating, Ventilation and Air-conditioning
ISO	International Organization for Standardization
kW	Kilowatt
kWh	Kilowatt-hour
MJ	Megajoules
ppm	Parts per million
SHGC	Solar Heat Gain Coefficient
sqm	Square Meter
STP	Sewage Treatment Plant
TR	Tonnage of Refrigeration
VLT	Visible Light Transmission
VAV	Variable Air Volume
VFD	Variable Frequency Drive
VSD	Variable Speed Drive
W	Watt
Wh	Watt-hour
WFR	Window-to-Floor Ratio

### 3. EDGE Certification

EDGE certification is a green building certification system that is designed to promote resource-efficient and sustainable building practices. EDGE certification focuses on three key areas: energy, water, and embodied energy in materials. It provides a framework for evaluating and quantifying the environmental impact of a building, taking into account factors such as energy efficiency, water conservation, and the use of sustainable materials.

#### 3.1. EDGE Assessment and Certification Definitions

- A **building** in EDGE is defined as a thermally conditioned (heated and/or cooled) or naturally ventilated structure with at least one full-time equivalent occupant, and a minimum area of 200m<sup>2</sup>, except for residential typologies. A building shall include water use for occupants, lighting and other services related to the use of the building. If two buildings are connected by a thermally conditioned space, then they may be considered as a single building. Notice that certain components of a building may be physically separate yet situated within the *project boundary*. Examples include a cafeteria and individual classrooms of a school that are essential for the functioning of the *building* as a whole. For questions about specific projects that do not fall within these limits, reach out to the EDGE team at [edge@ifc.org](mailto:edge@ifc.org).
- A **building envelope** refers to the combined surface area of all components of a *building* that surround its thermally conditioned spaces. These components separate the interior from the external environment and do not include surfaces adjacent to other buildings.
- A **building footprint** refers to the area of ground that a *building* occupies as defined by its perimeter.
- A **building site** defines both the land parcel and the building(s) situated on it.
- The **project boundary** defines the scope of the EDGE certification, including all services required to support the functionality of the *building*, including the area for on-site renewable energy. The project boundary area may be larger than the *building footprint*.
- **Project:** A Project is defined as the whole *building* or development submitted for EDGE certification with the same certifier and owner. For example, a Project may be a residential *building* with two towers, a mixed-use *building* with offices and retail space, or multiple *buildings* with the same specifications in a city or country. The information in the Project section in EDGE is the top-level information that applies to the whole project.
- **Subproject:** Refers to the portion of the project modeled individually in EDGE. The information contained in the Subproject section applies only to the portion being modeled in that file. For example, a Subproject may be Unit Type 1 in a residential *building*, the retail space in a mixed-use tower, or an individual location for a chain of stores.

If a *building* has more than one use and the secondary use occupies less than 10% of the floor area up to a maximum of 1,000m<sup>2</sup>, the entire building can be certified under the primary use of the building in a single subproject. Otherwise, that portion shall be certified separately. For example, if a 10,000m<sup>2</sup> residential building has a retail portion of 1,200m<sup>2</sup> located within the ground floor, the *building* areas must be certified separately under the Homes and Retail typologies.

For grouping of multiple *buildings* into one subproject, refer to section 3.5.2 Grouping Multiple Buildings into One Subproject.

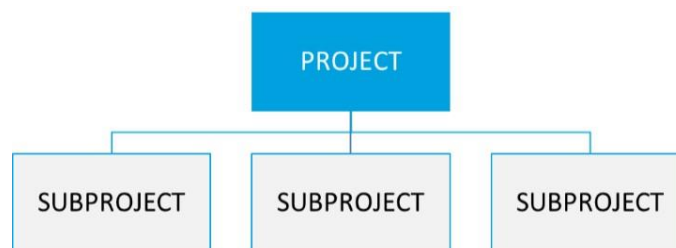


Figure 1. Relationship between project and subprojects.

### 3.2. EDGE Certification

**EDGE certification** is awarded if the required minimum efficiencies of 20% are achieved in the three EDGE categories — Energy, Water, and Materials. A simple pass/fail system indicates whether the *building* project has demonstrated the minimum 20% savings in operational energy, water and embodied energy in materials compared to the base case model. Actual percentage savings for each project can be seen on the EDGE certificate as well as in project case studies on the EDGE website. Beyond EDGE certification, EDGE also offers EDGE Advanced for 40% energy savings, with water and material savings remaining at 20%, as well as EDGE Zero Carbon certification. The entire certification process is conducted online through the EDGE software.

EDGE certification is a one-time award that does not need to be renewed. Recognition is issued automatically at the time of the awarding of a preliminary EDGE certificate and/or final EDGE certification and indicated on the EDGE certificate for such a project; it does not require additional documentation or fees.

#### 3.2.1. EDGE Advanced Certification

**EDGE Advanced** status indicates that an EDGE project has achieved 40% or greater savings in Energy, beyond the minimum EDGE certification requirements. To meet the requirements for water savings and savings in embodied carbon of materials, a minimum of 20% savings over the base case is still necessary.

#### 3.2.2. EDGE Zero Carbon Certification

The **EDGE Zero Carbon certification** provides clients with a pathway to certify that the operations of a *building* are zero carbon. The prioritization for achieving a Zero Carbon project is described in Figure 2: initially, enhance energy efficiency by reducing demand with passive design strategies. Subsequently, fulfil the remaining energy requirements using efficient *building services*. Next, maximize the generation of renewable energy on-site, followed by supplementing with renewable energy generated off-site. Utilizing carbon offsets shall be considered a last resource after all other options have been exhausted.

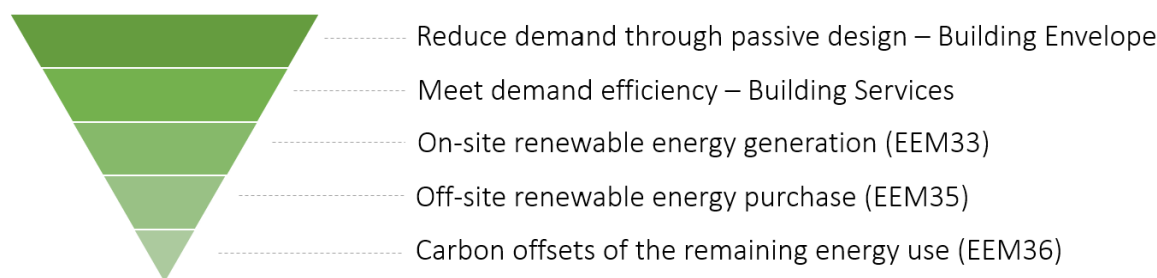


Figure 2: Prioritization of energy efficiency and energy sources to achieve the EDGE Zero Carbon certification.

### 3.2.3. Eligibility Requirements

There are three requirements for projects to be eligible for EDGE Zero Carbon certification:

1. The *building type* must be among those that are included in the EDGE App:
  - a. Residential: Homes & Apartments
  - b. Serviced Apartments
  - c. Hotels & Resorts
  - d. Hospitals
  - e. Industrial
  - f. Offices
  - g. Education
  - h. Retail
  - i. Mixed Use

Note: For residential typologies the entire *subproject* must pursue EDGE Zero Carbon, rather than individual units.

2. A *building* must have been in operation for at least one year at 75 percent of normal occupancy.
3. A *building* must be certified as EDGE Advanced, which requires a minimum of 20 percent savings in water and embodied energy in materials and 40 percent savings in energy:
  - a. For projects already certified EDGE without achieving EDGE Advanced, projects must first re-apply to achieve EDGE Advanced using the latest EDGE version.
  - b. For projects not previously certified with EDGE, EDGE Advanced must first be achieved using the latest EDGE version before EDGE Zero Carbon certification can be pursued.

### 3.2.4. Reporting Timeline

The EDGE Zero Carbon certification timeline is presented in the reporting period must include data from 12 consecutive month. The EDGE Zero Carbon certification must start within 6 months of the last reporting month.

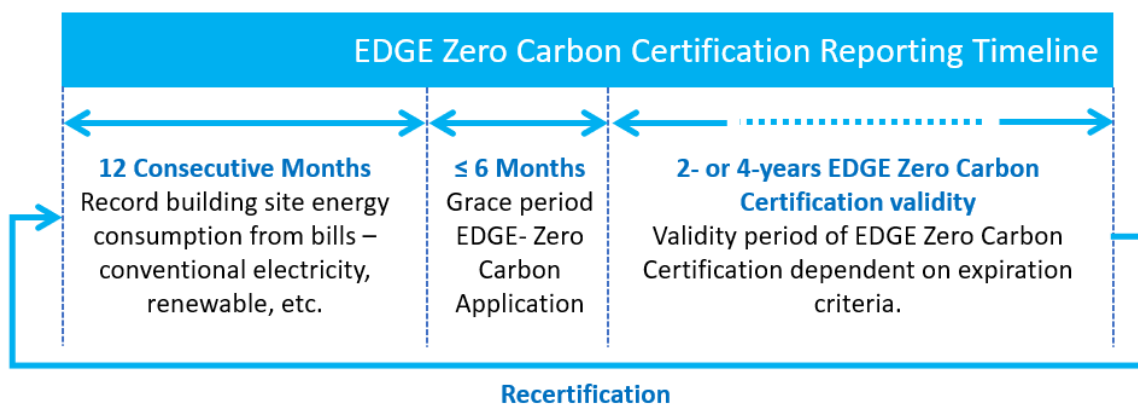


Figure 3. EDGE Zero Carbon Certification Timeline

For example: Reporting period from January 2023 to December 2023 must apply for EDGE Zero Carbon Certification by June 2024.



### 3.2.5. Documentation Requirements

When obtaining EDGE Zero Carbon certification for a project, gather the following information:

- A. **Proof of 40 per cent energy savings from the EDGE baseline:** Download, save and provide a PDF of the EDGE Advanced certificate for the project from your dashboard in the EDGE App that demonstrates EDGE Advanced status. This is a one-time assessment of the asset that will not need to be provided at the time of recertification unless the *building* undergoes substantial changes such as occupancy changes, a significant addition (more than 10 per cent of the Gross Internal Area, or GIA) or a major renovation.
- B. **Reporting period:** The reporting period shall be as per 3.2.4 Reporting Timeline
- C. **Declaration of occupancy:** A signed declaration by the project owner or their authorized representative that the project has been occupied at 75 per cent of expected occupancy for the reporting period.
- D. **Project area:** *Building* plans showing the GIA – air-conditioned and un-air-conditioned – of the *building*, and the total GIA for input into the calculator. The GIA does not include balconies and terraces, exterior areas or site areas. The EDGE project’s PDF report showing the GIA and the project file number will be sufficient for verification.
- E. **Operations Tab – Completed:** All energy use information must be entered into the EDGE Operations Tab. The data entered in the Operations Tab in the EDGE App must have supporting documentation attached.
- F. **Energy bills and meter readings:** Monthly Bills or readings for the reporting period for every source of energy used in the *building*. The bills or meter readings must be for 12 consecutive months.

Supporting documentation shall be submitted for each month, and must include the following, as relevant:

- Conventional Electricity Bills (kWh)
- Onsite Renewable Energy Generated, Consumed and Exported (kWh) – Meter or *Building* Management System Readings. The type of onsite renewable energy (e.g. solar, wind, etc.) must match the EDGE Advanced documentation. See Note 1.
- Offsite Renewable Electricity Bills (kWh). The type of offsite renewable energy (e.g. solar, wind, etc.) shall be highlighted. See Note 2.
- Bills indicating the quantity of diesel used on site (in Liters)
- Bills indicating the quantity of LPG used on site (in kg)
- Bills indicating the quantity of natural gas used on site (in m<sup>3</sup>)

Energy bills must cover twelve continuous months from the intended start date. For electricity produced on-site, documentation may include readings from the BMS, smart monitoring system or renewable system meter (such as the inverter in a solar system).

Note 1: On-site renewable energy systems must be within the *project boundary*. Additionally, the *building* owner must either own the renewable energy system, have a lease for them, or have entered a contract to buy the energy they produce for a minimum duration of 15 years.

Note 2: Off-site electricity purchased with a lower carbon content than the conventional grid, shall comply with ISO 14067 emissions reporting principles including relevance, completeness, consistency, coherence, accuracy, transparency, and avoidance of double counting, among others. Examples of offsite renewable energy options are RECS/I-RECs or Power Purchase Agreements (PPAs).

G. **Purchased carbon offsets:** Carbon offset certificates or proof of purchase of carbon offsets (in tCO<sub>2</sub>e). If applying carbon offsets, they shall be purchased from a provider that:

1. Requires the use of a credible methodology, such as:
  - Gold Standard
  - Verra’s Verified Carbon Standard
  - ACR: Carbon Crediting Program for Offsets
  - Climate Action Reserve

Note: ClimateSEED and UNFCCC Clean Development Mechanism (CDM) have been removed from the list to align with IFC’s Deal Acceptance Criteria for Carbon Markets.

2. Adhere to the ten core carbon principles set by the Integrity Council for Voluntary Carbon Markets (ICVCM), where applicable;
3. Favor Independent Carbon Rating Agencies for quality assessment, and
4. Have a benefit-sharing plan.

### 3.2.6. Documentation Submission

All energy use information must be input into the EDGE Carbon Calculator, which is incorporated into the EDGE App. Supporting documentation shall be uploaded into the EDGE App in the Operations tab.

### 3.2.7. Certification Expiration

The *EDGE Zero Carbon* certificate will display the year of awarding and expiration according to the following:

- For a project that meets the *EDGE Zero Carbon* criteria fully on-site, including the generation of on-site renewable energy, the certificate will expire after four years.
- For a project that meets the *EDGE Zero Carbon* criteria by purchasing off-site renewable electricity and/or carbon offsets, the certificate will expire after two years.
- The *EDGE Zero Carbon* certification is rendered invalid when there is a transfer of ownership of the *building* or the *building* undergoes significant occupancy changes or substantial changes (as defined in section 3.2.5).

### 3.2.8. Recertification

A project that has been previously certified as *EDGE Zero Carbon* can undergo *EDGE Zero Carbon Renewal (ZCR)* to maintain its *EDGE Zero Carbon* status with the following conditions.

- A. Maintain EDGE Advanced certification:
  - If the *building* has not had substantial changes (as defined in 3.2.5) since the last *EDGE Zero Carbon* certification the project owner or their designated representative must provide a signed statement to that effect.
  - If the *building* has had substantial changes (as defined in 3.2.5), the project team must show that the energy savings of the building are 40 percent in the EDGE App. Note that *the EDGE baseline* is revised every few years as construction standards change.
- B. Annual records of performance: The project must submit annual records of information similar to that submitted for the original EDGE Zero Carbon certification (see A to G from Section 3.2.5). For prior years, provide:

- Start date
- Energy bills and meter readings for energy purchased and produced
- Carbon offset certificates

### 3.2.9. Retrofit Projects

**EDGE Zero Carbon** retrofit projects follow the same guidelines as those for new construction and existing *buildings*. However, rather than having achieved *EDGE Advanced*, they have a defined plan to reach the necessary energy efficiency levels within a specified timeframe instead.

For projects that are already purchasing offsite renewable energy and/or carbon offsets, a retrofit project may apply for a **Preliminary EDGE Zero Carbon** certification before achieving post construction EDGE Advanced certificate under the following conditions:

- A preliminary *EDGE Advanced* certificate must be achieved.
- The retrofit project must demonstrate its work plan — via a Preliminary EDGE Advanced certification— on how it will achieve EDGE Advanced when the retrofit is complete.
- The project owner must provide a signed letter that the retrofit measures will be implemented within two years of the award of the Preliminary EDGE Zero Carbon certification, and
- The project must achieve carbon neutrality via the purchase of offsite renewable energy or carbon offsets in the interim when it is certified as a Preliminary EDGE Zero Carbon project.

When a retrofit project that is pending a final (post construction) EDGE Advanced certificate, the **Preliminary EDGE Zero Carbon** certificate will show that:

- The project is pending upgrades, and
- The certificate is valid for two years.

At the end of the two-year period, the project must have achieved final EDGE Advanced certification. If not, the project will lose its **Preliminary EDGE Zero Carbon**. The project will not be eligible to re-apply until it achieves EDGE Advanced status.

## 3.3. Project Roles

### 3.3.1. Project Team/EDGE Experts

In the EDGE certification system, a project owner is the designated owner or owner’s representative responsible for the entire project including providing project documentation, access to the site, and the payment of audit and certification fees. An EDGE Expert is an individual *certified* in the use of EDGE software and certification process; they may be part of the owner’s organization or an independent service provider.

The project owner designates a project team (which may include an EDGE Expert) whose role is to demonstrate that the project complies with the EDGE standard. The project team achieves this by documenting that the overall project and the selected individual measures meet the specifications and minimum performance required by EDGE.

Four distinct user roles for an EDGE project team are available in the EDGE software to represent the typical certification software responsibilities.

1. A *Project Owner* can assign or remove any user role and create/edit/delete projects in the EDGE software.

2. A *Project Admin* is the EDGE Expert or a trained EDGE user who manages the certification flow of the project on behalf of the owner.
3. A *Project Editor* is typically someone from the design team who can edit the project details and documentation.
4. A *Project Viewer* can track the project's progress without the ability to edit.

### 3.3.2. EDGE Auditors

*EDGE Auditors* are EDGE Experts who have been further *accredited* to conduct project audits for EDGE certification. The role of the *EDGE Auditor* is to verify that the design/construction team has interpreted the EDGE requirements correctly and that all compliance requirements have been fulfilled. Depending on the country and the certification provider, an *EDGE Auditor* may be part of the EDGE Certifier's team or hired independently. In either case, the project owner is responsible for the EDGE Auditor fees.

The *EDGE Auditor* reviews the supporting evidence provided by the project team to ensure that it matches the data used in the assessment and performs on-site audits. Auditors must verify 100% of the floor area for a unique design for any *building type*. In the case of repetition in design, an auditor must verify the following at a minimum:

- Homes, Apartments (square root of the number of units) +1, for each type
- Hotels, Resorts, Serviced Apartments (square root of the number of rooms) +1, for each type
- Healthcare (square root of the number of rooms) +1, for each type
- Retail, Industry, Office, Education 40% of similar areas for a project
- Mixed Use Each use type to follow the respective rules from above
- *Multiple buildings* of the same type: (square root of the number of *buildings*) +1, for each type

### 3.3.3. EDGE Certifiers

EDGE Certifiers are licensed by IFC to operate in designated countries. Their role is to oversee EDGE Auditors and issue the EDGE certificates. Information on contacting local certifiers is available on the 'Certify' page at [www.edgebuildings.com](http://www.edgebuildings.com). The project owner is responsible for paying the certification fees to the EDGE Certifier.

## 3.4. EDGE Certification Process

The certification process involves auditing the project documentation submitted by the project team and a site audit, followed by the award of the certificate. Requirements for EDGE compliance, at both the preliminary and post-construction phases, are specified for each measure in this guide, and include such deliverables as design drawings, manufacturers' data sheets, calculations, proof of delivery and photographs.

*Preliminary Certification:* A desktop review of the project is undertaken based on the project's design documentation.

*Post Construction Certification:* A site audit of the project is required for the EDGE Auditor to verify the installation and compliance requirements of all selected measures in EDGE.

All audits shall be conducted by an accredited EDGE Auditor, with certification being awarded by a licensed EDGE certification provider.

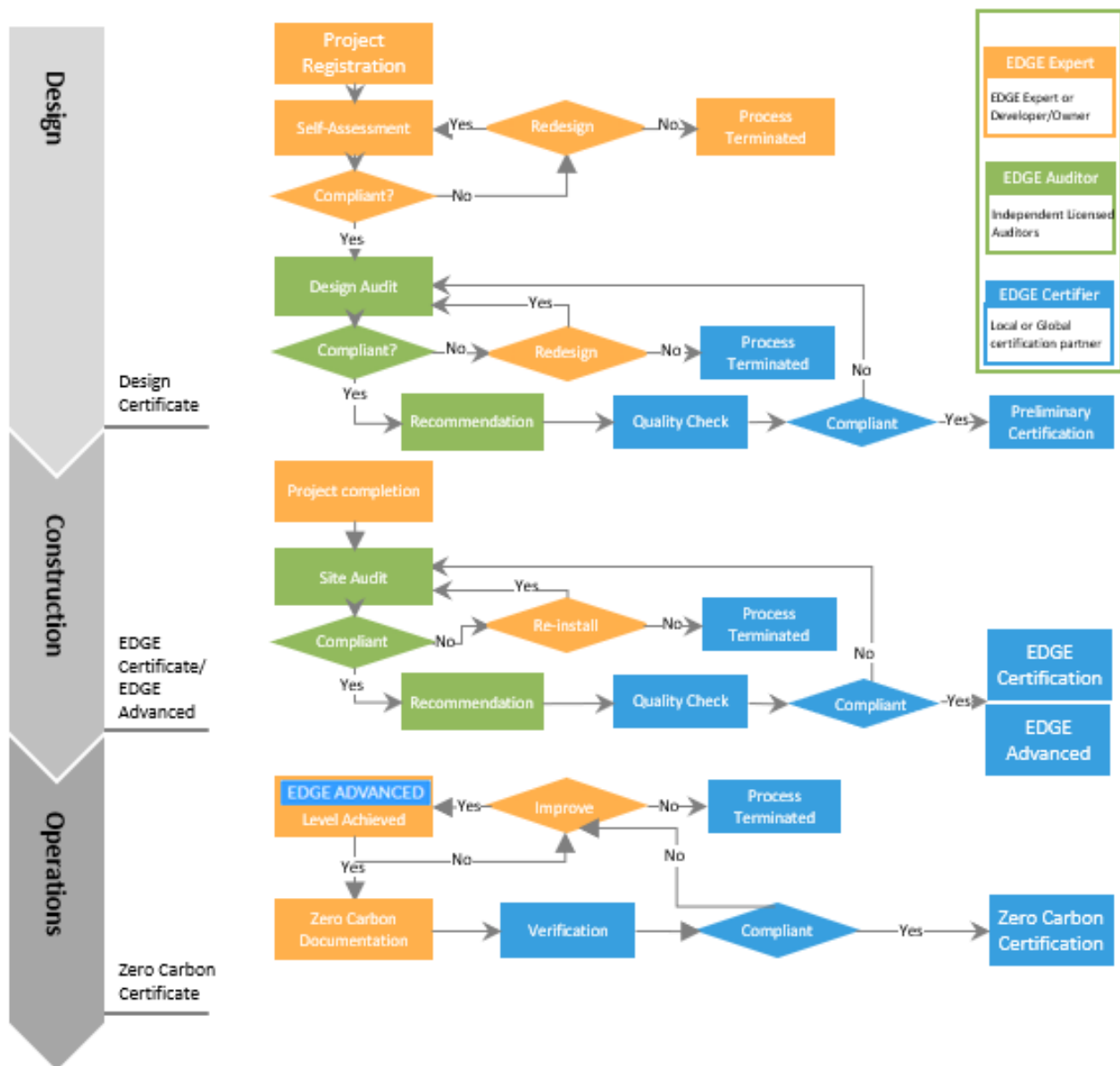


Figure 4. EDGE Certification Process.

To begin the certification process, the project owner/EDGE Expert may request a quote from the local certification provider via the Certify page on the EDGE buildings website; they may also ‘Express Interest’ via the EDGE software to request a quote from the certifier or local auditor(s). Or a project may choose to directly ‘Register’ in the EDGE App.

### 3.4.1. Documentation Requirements

Subproject-level documentation is uploaded to the EDGE App. In general terms, the following documents, where relevant, are required to demonstrate compliance:

- Design documentation showing (intended) compliance with the requirements of the measure.
- Technical justification of the inputs provided in the design tab that creates the base case.
- A brief explanation of the design drawings, relevant system or product specified/installed.
- Calculations that have been used to assess and demonstrate compliance.
- Manufacturer’s data sheets, with the information required to demonstrate compliance highlighted.
- Construction Documentation, such as as-built drawings, BOQs and/or photographs that demonstrate the construction was as per the design documentation.

The documentation required for subsections in the design tab can be found in **Part 2 - User Guide - Design Tab**

The documentation required for individual measures is included in the Compliance Guidance section of each measure in:

- **Part 3 – User Guide - Energy Measures**
- **Part 4 – User Guide - Water Measures**
- **Part 5 – User Guide - Materials Measures**

The operational documentation required for Zero Carbon measures can be found in section 3.2.5

### 3.5. Non-Typical EDGE Projects

#### 3.5.1. Special Ruling Request (SRR)

A Special Ruling Request (SRR) is a mechanism for project teams to request a special ruling on the eligibility of a method or measure that has not been included in the EDGE App, to determine compliance with EDGE. This is applicable for situations where project teams may want to (1) use an alternative method to comply with the intent of an EDGE Measure, or (2) use innovative strategies not included in the available EDGE Measures to reduce resource consumption in Energy, Water or Materials. For example, an SRR would be required for using an alternate tool outside EDGE to calculate the Average Annual Shading Factor (AASF) or to calculate the savings from a cooling system type that is not available in EDGE.

The SRR form formally documents for audit purposes that a project team has received special permission from IFC’s EDGE team to use an out-of-the-norm procedure for claiming measure savings in the EDGE App. Actual compliance with the intent of the measure will still be subject to an audit.

Note that the SRR is a means of formal documentation for audit purposes only. In general, the EDGE User Guides and the Frequently Asked Questions available on the EDGE website serve as a starting point for questions related to the EDGE certification of projects. Further questions about EDGE project measures and certification can be directed to the respective EDGE Certification Provider selected for the project. In addition, the IFC EDGE team is available to help at [edge@ifc.org](mailto:edge@ifc.org).

If a project team has gone through the steps above and still needs documentation of approval for an atypical approach to its project, it can request a Special Ruling Request form from the certifier.

An SRR is project-specific. When the content is universally applicable, it will be added to the User Guide and not require an SRR for compliance anymore.

Note: Projects submitting an SRR shall be registered, i.e. SRRs submitted for projects in self-review will not be assessed.

### 3.5.2. Grouping Multiple Buildings into One Subproject

To group physical *buildings* into a single subproject, the following criteria must be met:

- Construction occurs in a single phase, or the *buildings* are fully constructed.
- A single entity manages and operates the heating, cooling, ventilation, and hot water services.
- The *buildings* operate on the same days and have similar operating hours, with less than a three-hour difference.
- The same or similar systems primarily condition them. While tenants may have their cooling systems, the core and shell of the *building* shall include all areas served.
- All users are expected to utilize all the facilities provided regularly.
- Be the same sub-typology (unless spaces can be modelled in another sub-typology)
- They shall have a standard deviation of up to 2 floors or 10% normalized, whichever is higher.

**Example of standard calculation deviation**

Building A: 5 Floors    Building B: 7 floors    Building C: 3 floors

To calculate standard deviation:

$$\begin{aligned} & \text{Standard dev (floors)} \\ &= \sqrt{\frac{\sum(\text{Number of floor per building} - \text{average floors})^2}{\text{Number of buildings}}} \\ &= \sqrt{\frac{8}{3}} = \mathbf{1.63 \text{ floors.}} \end{aligned}$$

To calculate the normalized standard deviation:

$$\begin{aligned} & \text{Normalized Standard dev (\%)} \\ &= \frac{\text{Standard dev (floors)}}{\text{average floors}} \times 100\% \\ &= \frac{1.63}{5} \times 100\% = \mathbf{33.7\%} \end{aligned}$$

**This means building A, B and C cannot be grouped into a subproject due to Normalized Standard Deviation being >10%.**

*Buildings* being combined shall:

- Use the EEM01 window-to-wall ratio detailed calculator.
- Use the weighted average for the floor-to-floor height and number of floors by area.
- Add up all the *building envelope* lengths by orientation.
- Add up all the roof areas into one.

Note 1: Each subproject will receive a single certificate (except homes and apartments).

Note 2: The project team may decide to create separate subprojects even if they meet the conditions above. This is especially relevant when more granularity in the EDGE App is required to better assess the impact of measures.

Note 3: Thermally conditioned basements that have a significantly larger footprint (i.e., >10% of *building footprint*) compared to the *building* tower shall be separated into a different subproject. Partially conditioned basements that have >10% of the building footprint, with the conditioned space within the *building footprint*, will not be required to have a separate subproject.

### 3.5.3. Existing Building and Retrofit Projects

Existing *buildings* may apply for EDGE certification. The same standards for energy and water apply to existing *buildings* as for new construction.

Existing *building* and retrofit projects that do not have details on the building element construction shall use the thickness of the wall and provide a calculation using the default base case, e.g. brick walls with no insulation. The same applies same for roofs and other passive elements.

Materials in existing *buildings* that are being kept in the *building* or re-used and are older than five years may be claimed as “re-used.” (This applies to re-use of materials older than five years in new construction as well). To claim a *building* as existing and/or to claim re-use of materials, the project team must provide documentation from the formal local source that shows the date when the building was constructed or last modified. For example, the formal source in a location may be a building department and the documents may be drawings stamped by the *building* department. Pictures of the existing *building* and materials shall also be provided as evidence.

Note: Existing *buildings* and Retrofit projects have the same calculation methodology in the EDGE app.

### 3.5.4. Reporting Equipment Loads from Existing Buildings

For existing *buildings* and major renovations that are currently in operation, it is highly recommended to report equipment and plug loads, as shown in Figure 5. This practice helps to reduce discrepancies between the expected and the actual loads. By doing so, the predictive accuracy of the EDGE App is enhanced, leading to better-informed decision-making.

Calculator

Detailed Loads Input

Activities	Space Conditioning Type	EDGE Default Space Conditioning	Default Heating and Cooling Set-point Temperature	Plug Loads (W/m <sup>2</sup> )	Equipment Load (W/m <sup>2</sup> )	People Sensible Heat (W/Person/Hour)
Bedroom	Both Heating and ...	AC & HTG	C 24°C & H 22°C	<input type="text"/>	<input type="text"/>	<input type="text"/>
Kitchen	Both Heating and ...	NON AC & NO HTG	C 24°C & H 22°C	<input type="text"/>	<input type="text"/>	<input type="text"/>
Dining	Both Heating and ...	AC & HTG	C 24°C & H 22°C	<input type="text"/>	<input type="text"/>	<input type="text"/>
Living	Both Heating and ...	AC & HTG	C 24°C & H 22°C	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 5: Plug and Equipment Loads in the Detailed Loads Input.



Note: For detailed information on each of the columns editable by the project teams, consult **Part 2 - User Guide -Design Tab** - Detail Load Inputs.

To do so, the Project team shall follow these steps:

- 1. Inventory Equipment:** Create a detailed inventory of all equipment in the building that consumes energy, including HVAC systems, lighting, appliances, office equipment, and any specialty equipment.
- 2. Record Specifications:** For each piece of equipment, record detailed specifications such as make, model, power rating (watts or kilowatts), and operational schedules. This information can often be found on the equipment nameplate or in the manufacturer's documentation. If the number of equipment units is large (e.g. > 50 pumps), Annex 1: Sampling Methodology may be used.
- 3. Calculate Loads:** Use the recorded power ratings to calculate the load of each piece of equipment. For variable loads or equipment that cycles on and off, estimate the average load based on typical usage patterns.
- 4. Summarize Data:** Organize the equipment loads in a spreadsheet, categorizing them by type and including subtotals for each category.
- 5. Apply Diversity Factors:** Not all equipment will operate at full capacity simultaneously. Apply diversity factors to account for such variation in use. If this value is not known, assume 0.5.
- 6. Calculate electricity use by area:** Divide the resulting loads (in Watts) by the corresponding space area (m<sup>2</sup>). Provide such value in the corresponding column (Plug Loads or Equipment Loads) in the Detailed Loads Input.

The plug and equipment loads report shall be attached as part of the documentation in the Design tab section, if applicable.

#### 3.5.5. Core & Shell and Partially Unfinished Projects

Core and Shell are commercial and/or industrial projects where the owner is responsible for the building exterior (“shell”) and the core facilities (“core”), but the interior areas are constructed by the tenants (“fit out”). The owner or developer must certify the entire space they own/develop.

For Core and Shell projects, the measures for which the tenants are responsible can also be claimed in EDGE as per those shown in Annex 2: Core & Shell measures.

In commercial buildings, this is allowed only if a “tenant fit-out guide” is included in the lease agreement and signed between the tenants and owners. This tenant fit-out guide must define the requirements to be fulfilled by the tenants for the measure and be included in the EDGE submission. If some of the tenants have not signed a lease at the time of EDGE certification, the *building* owner must show EDGE compliance by providing the template of the lease agreement accompanied by a signed letter stating that the tenant fit-out guide in the template lease agreement will be included in all tenant lease agreements signed for the building.

Residential projects that do not provide fit out installations and finishes are not considered Core and Shell but Partially finished projects and have different considerations found in Annex 3: Unfinished/Partially finished projects.

### 3.5.6. Partial Building Projects

A part of a commercial building may apply for EDGE certification provided that the space has control of the HVAC system (both primary cooling system and distribution system). Both residential and industrial projects cannot apply for partial building certification.

Partial building projects may be either owner led, or tenant led:

- For owner-led certification, the owner must certify all areas within the building that are under the same ownership.
- For tenant-led certification, the tenant must certify all areas that are part of their lease agreement. Certification of the tenanted area shall expire upon the departure of the tenant from the certified area.

The certification of partial building projects shall:

1. have occupancy requirements;
2. be fully sub-metered (at least for electricity);
3. be capable of having an independent user schedule, to other spaces;
4. have water consumption requirements; and
5. be physically defined by a physical and permanent barrier, e.g. by walls (interior and/or exterior).

For partial building projects, the following EDGE App entries must be made, as applicable:

- For the building envelope, the external wall lengths, materials, and WWR ratio shall represent the actual space applying for certification.
- Buildings that have walls that are not exposed to the exterior shall subtract the portion of the wall that is not exposed.
- The project team shall enter the ceiling area as its roof area. If there are floors located above the project, a U value of 0.01 shall be entered in EEM05: Insulation of roof. If the project is located on the topmost floor, the actual U value of the roof shall be entered in EEM05: Insulation of roof.
- If the space under the floor of the space is considered permanently conditioned, the bottom floor U value shall be 0.01. If the certification area is at the bottom floor, the bottom floor U value must be used, if known, use the Base case U value otherwise.
- Bathroom fixtures and fittings may not be within the *building*, but they may be in the *project boundary*. In this scenario, the project team must obtain water consumption data (flush rates, flow rates) of all shared facilities. Should these data not be available, the project team must perform an onsite measurement. If faucets and flush measurements cannot be measured, then the base case values may be used.
- Projects that may not have bathrooms (i.e., shared toilets) may enter '0' for the toilet area. The EDGE app calculates water demand based on occupancy and will assume consumption without including areas that are not part of the certification.

### 3.5.7. Industrial Buildings

Unlike most building typologies, for industrial buildings, there is no assumption of business as usual related to process loads, i.e. equipment and plug gains. The Project team shall actively document each of the relevant loads and provide them to the EDGE app. The *Project boundary* includes everything in the manufacturing process, including anything that is outside the building and building site.

In order of importance, project teams shall either:

1. Provide an equipment schedule following steps in 3.5.4, where buildings are fully operational at the time of the certification, if this option is not possible, then;
2. Calculate the process loads by estimating equipment gains for similar industrial subtypes (usage) in the region and/or the client’s own portfolios; or
3. Assume:
  - For the warehouse subtypology, 35% of the GIA as “cold storage” space.
  - For the light industry subtypology, 70% of the equipment loads contribute to the total energy consumption of the base case scenario (i.e., prior to the implementation of on-site renewable energy sources).

### 3.6. Data Centers

EDGE offers project teams the opportunity to certify data centers as green. This certification is still in the pilot phase. 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.
2. The Power Usage Effectiveness (PUE) of the data center must be at least 20% better than the baseline PUE, where

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

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 Table 2. These values are subject to change after the pilot phase.

*Table 2: 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.

#### 3.6.1. Documentation Submission

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

- A. The project shall use the Mixed Use building type.

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

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

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

- C.  $PUE_{\text{RE}}$ , which includes renewable energy, shall be calculated with the following equation for onsite and offsite renewable energy:

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

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 2

- D. The total improvement in PUE can be modeled using “EEM34 – Other Energy Saving Measures”

- 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:

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

- c. Select applicable energy efficiency measures 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 shall send a copy of the PUE report to IFC ([edge@ifc.org](mailto:edge@ifc.org)) for review and approval before recommending the project for certification.
- E. PUE shall 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)”.
- a. Readings must be made as total kWh over a 12-month period.
  - b. All fuel types serving the data center must be converted to equivalent kWh.
- F. The PUE report shall include details of all the inputs and assumptions that were used in the simulation:
- c. Weather file
  - d. Building construction and fenestration details (U-values, SRI, WWR, etc.)
  - e. Lighting power densities
  - f. Occupancy, lighting, and equipment profiles
  - g. Indoor temperature and humidity set points
  - h. HVAC systems details (capacity, efficiency, part load performance etc.)

- G. The post-construction evidence needed shall include:
- a. As-built drawings showing envelope and fenestration details and calculations of:
    - i. Glass: U-value ( $W/m^2 K$ ), SHGC, VT(Factor).
    - ii. Floors: U-value ( $W/m^2 K$ ), Weighted Average U-value ( $W/m^2 K$ ), if applicable
    - iii. Roofs: Roof Assembly U-value ( $W/m^2 K$ ), Weighted Average Roof U-value ( $W/m^2 K$ ), if applicable
    - iv. Exterior Walls: U-value ( $W/m^2 K$ ), Weighted Average Roof U-value ( $W/m^2 K$ ), 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
      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.)

## 4. Navigating the EDGE App

The EDGE App is designed with a simple, user-friendly interface. This section highlights a few key features.

The EDGE App loads in the Homes typology by default. A user can select a different typology from the sidebar on the left as shown in Figure 6, or from the drop down menu in the first panel. From the top right options, a user can view their user dashboard, change the version and language, and sign in.

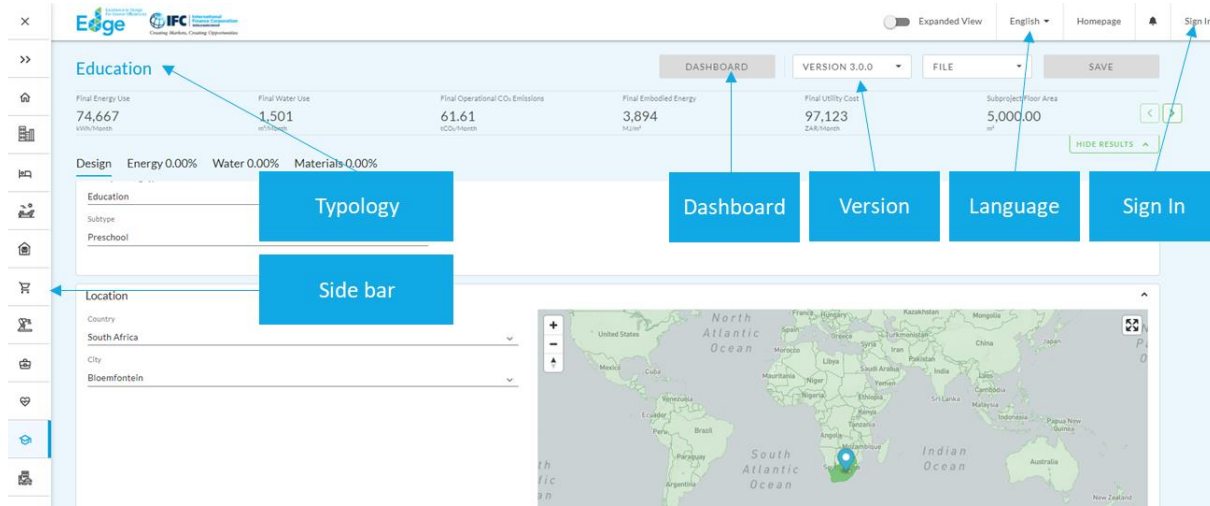


Figure 6. Screenshot showing the primary layout of the EDGE App

Figure 7 shows the main tabs — Design, Energy, Water and Materials. Above the tabs is the Results bar. Some panels on the Design tab, and all Measures, have an Options menu. The Options menu can provide several functions depending on the panel, such as Detailed Inputs, Calculators, or Document Upload.

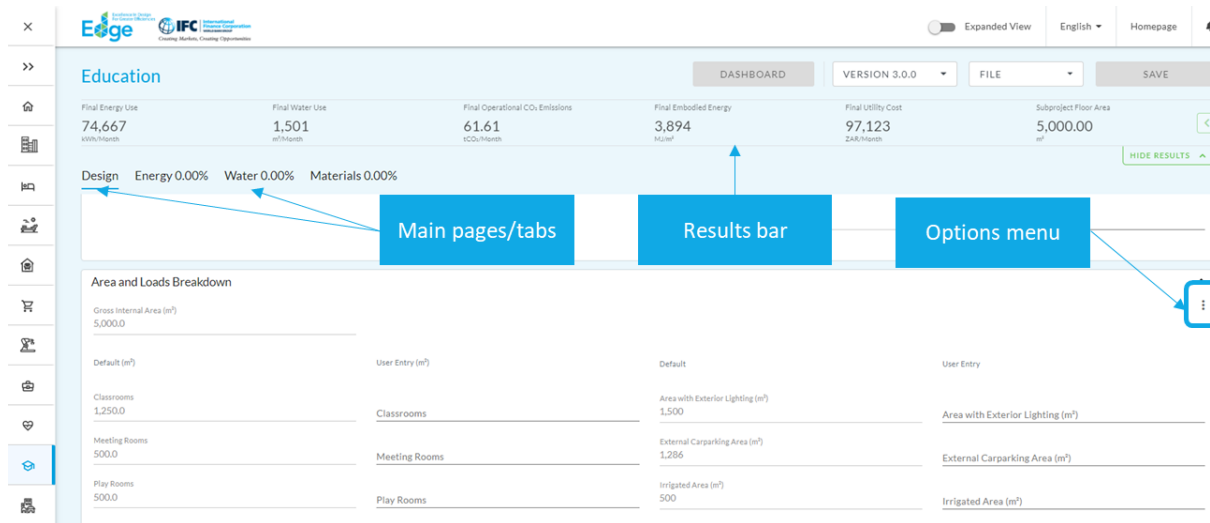


Figure 7. Screenshot of the EDGE App showing key features – the Main Pages or Tabs, Results Bar, and the Options Menu

#### 4.1. Default Values and User Entries

The EDGE App is designed with default input values for all fields so that users can model the buildings with minimal inputs.

However, users must note that the EDGE App *will* use the default values unless a user overwrites them. Therefore, attention must be paid to the default values, especially during the certification process, to confirm that the assumptions reflect the actual building.

##### Fuel Usage

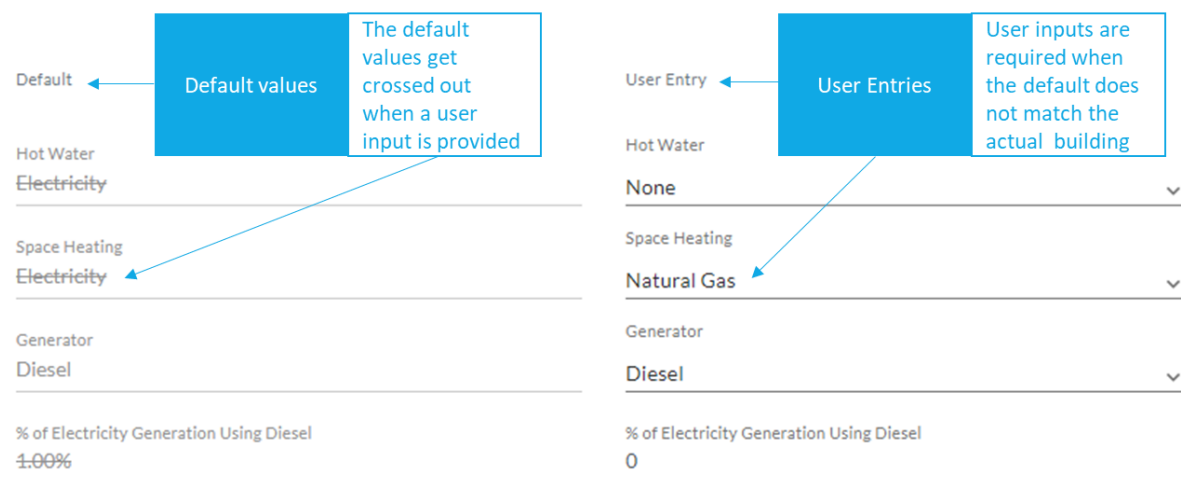


Figure 8. An example of default values and user entries in the EDGE App

Tip: Underlined field names in EDGE are editable.

Project Name\*

Clicking on the field name displays the input field.

Project Name\*

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Figure 9. Most fields in the EDGE App are editable.

Similarly, most efficiency measures are editable. However, their availability may vary per building typology.

Selecting a measure displays the possible inputs. The value associated with a measure gets overwritten by the user input. For example, in the measure EEM01 in Figure 10, a user can overwrite the value 16% with the actual value in the project. Some measures will have a calculator. If this is present, you may edit it by clicking the three

dots on the right side of the box, and then selecting “calculator”. Project teams shall utilize the calculators where applicable.

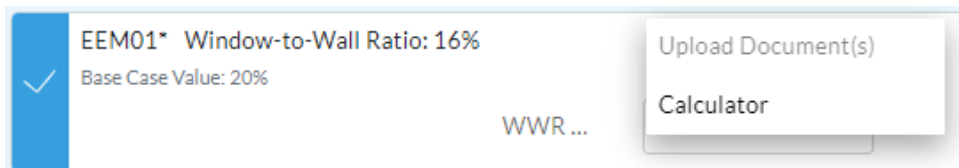


Figure 10. Most measures in the EDGE App are editable.

## 4.2. Required Measures

In EDGE, an asterisk (\*) next to a measure indicates that the project team is “required” to enter the actual specifications of the measure in EDGE if that measure is present in the project.

The indication of a “required” measure in EDGE does not mean that EDGE requires that the measure must be implemented in the project, or that the improved case must meet or exceed the baseline case to comply with EDGE requirements.

For example, if a residential project needs to report glazing material, the measure must be selected, and the actual specifications of the glazing must be entered into the user input fields for the measure regardless of whether there is an improvement in glazing specifications or not.

## 4.3. Results Bar

The Results Bar in the EDGE App is a summary of the Key Performance Indicators (KPIs) calculated by EDGE. To calculate performance against these indicators, EDGE makes assumptions on how the building will be used by the occupants. Since the actual usage patterns may differ depending on occupant consumption, the water and energy usage and subsequent costs may vary from EDGE predictions. The KPIs include:

- Final Energy Use – the energy consumption (in kWh/month) for the project is calculated automatically by EDGE, based on the data entered in the Design section and any reduction achieved through the selection of efficiency measures. The results exclude all virtual energy.
- Final Water Use – the water consumption (in m<sup>3</sup>/month) for the project is calculated automatically by EDGE, based on the data entered in the Design section and any reduction achieved through the selection of water efficiency measures.
- Final Operational CO<sub>2</sub> Emissions – EDGE automatically calculates the CO<sub>2</sub> emissions (in tCO<sub>2</sub>/month) based on the final energy use multiplied by the CO<sub>2</sub> emission factor for the generation of grid electricity and other fuels in the project. The default value for the selected country’s CO<sub>2</sub> emissions is shown in the Design section but can be overwritten if evidence can be provided to support it. The evidence must be from a reliable source such as a peer-reviewed publication from an international organization or a specialized government-approved study. The results exclude all virtual energy.
- Final Embodied Carbon – EDGE automatically calculates the embodied carbon (in tCO<sub>2e</sub>/m<sup>2</sup>) from the building dimensions and the materials selected in the Materials section.
- Final Utility Cost – EDGE projects the monthly cost (in USD/month or local currency per month) for energy and water use. The results exclude all virtual energy.



- Subproject Floor Area – EDGE displays the calculated GIA for the Subproject multiplied by the Subproject Multiplier.
- Energy Savings. The results include all virtual energy.
- Water Savings
- Operational CO2 Savings. The results include all virtual energy.
- Embodied Energy Savings
- Utility Cost Savings – EDGE projects the annual savings (in USD and local currency in specific countries) in utility bills. The results include all virtual energy.
- Base Case EPI (Energy Performance Index) — energy use per unit area. The results include all virtual energy.
- Improved Case EPI (Energy Performance Index) — energy use per unit area. The results include all virtual energy.
- Total Building Construction.
- Incremental Cost – Additional cost of implementing the selected efficiency measures (in USD or local currency in specific countries). Certain building measures may contribute to a lower overall cost compared to the baseline. Therefore, negative incremental costs are possible. EDGE cost data is based on average global data and is continuously being refined. It is only meant as a guidance tool for comparison between measures. If specific local data is available, the use of it in a more specific financial model is encouraged for making financial decisions.
- Increase in Cost (%)
- Payback in Years – Number of years to repay the incremental cost compared to the cost savings of utilities. The method used is simple payback based on the capital cost of the measure.
- Number of People Impacted
- Base Case – Refrigerant Global Warming Potential
- Improved Case – Refrigerant Global Warming Potential
- Detailed Results for Typologies – Only applicable to Residential typology. This gets activated when multiple typologies are present.

#### 4.4. Saving a Project

Users can save their projects within the online EDGE software platform.

- A user account is required to save a project file, and a user must be logged in to save the project.
- Fields marked with an asterisk\* on the Design tab are also required to save the project file.

EDGE can be accessed via handheld devices such as iPhones, Android and tablets. Project teams should exercise caution when accessing saved projects via handheld devices as EDGE automatically saves changes to projects every three minutes; this time limit does not apply to Certifiers.

If a user is not active on EDGE for two hours, the system will log the user out. This duration of time for which their session stays active while they are away from their computer can be changed by the user in their profile settings.

To create multiple versions of a project with different combinations of measures, it is best to retain your inputs by downloading the data into separate PDFs and saving the documents on your computer (File > Download PDF). In this way, you maintain one project file for your building within EDGE.

## Annex 1: Sampling Methodology

Sampling is a cost-effective method to estimate the characteristics of a population with the minimum amount of effort while having statistical confidence in the representativity of the results. For example, to determine the rated power of a large number of pumps, it is possible to investigate a representative number of samples, rather than the entire population.

Project teams may follow the requirements from the latest recommendations of the Uncertainty Assessment for International Performance for Measurement and Verification Protocol (IPMVP) for sampling section 1.5 sample size determination<sup>1</sup>.

Use equations 11 and 12 to determine the minimum number of elements that shall be sampled given the entire size of the portfolios. Unless you have evidence, you may assume a Z value for 90% confidence and 10% precision and a CV of 0.5.

Equation 11:

$$n_0 = \left( \frac{Z \cdot CV_{\%}}{e_{\%}} \right)^2$$

Where:  $CV_{\%}$  is the coefficient of variation, the standard deviation normalized by the mean.

$e_{\%}$  is the desired level of relative precision. For example, 10%.

Z is the t-statistic for the desired confidence level. For example, 1.645 for 90% confidence.

$n_0$  is the sample size, assuming infinite number of units.

Equation 12:

$$n_{reduced} = \frac{n_0 \cdot N}{n_0 + N}$$

Where:  $N$  is population size, e.g. number of units.

$n_{reduced}$  is the reduced minimum sample after adjustment.

For example, the minimum sample size of a portfolio with 148 similar buildings, is 46.

Parameter	Value
Z (confidence level)	1.645
$CV_{\%}$ (coefficient of variation)	0.5
$e_{\%}$ (desired level of relative precision)	0.1
$n_0$ (Sample size assuming infinite number of units)	67.7
$N$ (Total number of units)	148
$n_{reduced}$ (sample size adjusted by the total number of units)	<b>46</b>

<sup>1</sup> <https://evo-world.org/en/library/download-protocol-documents-mainmenu-en/ipmvp-core-concepts-application-guides-0/1773-2019-uncertainty-assesment-for-ipmvp-application-guide-in-english>

## Annex 2: Core & Shell measures

Table 3: Allowable improved values when passed to tenants in Core & Shell Projects by category.

	Offices	Education	Healthcare	Retail	Mixed Use	Industrial
<b>EEM13</b> Cooling System Efficiency	The minimum efficiency required in ASHRAE 90.1-2016 or local code for a given cooling equipment type and capacity					
<b>EEM16</b> Space Heating System Efficiency	The minimum efficiency required in ASHRAE 90.1-2016 or local code for a given heating equipment type and capacity					
<b>EEM18</b> Domestic Hot Water (DHW) System	Base Case					The min. efficiency required in ASHRAE 90.1-2016 or local code for a given hot water equipment type and capacity
<b>EEM22</b> Efficient Lighting for Internal Areas	Up to of 90lm/W					Up to of 70lm/W
<b>WEM01</b> Water-efficient Showerheads	Up to 7 l/min					
<b>WEM02</b> Water-efficient Faucets for all Bathrooms	Up to 5 l/min					
<b>WEM04</b> Efficient Water Closets for All Bathrooms	Up to single flush 5 liters/flush or equivalent.					
<b>WEM08</b> Water-efficient Faucets for Kitchen Sinks	Up to 7 l/min	Up to 8 l/min				
<b>MEM03</b> Floor Finish	Any valued specified in the legally binding contract					

## Annex 3: Unfinished/Partially finished projects

This applies only to residential typologies (Homes & Apartments).

*Table 4: Improved case values for unfinished or partially finished projects per measure.*

		Homes & Apartments
<b>EEM13</b>	Cooling System Efficiency	Base Case
<b>EEM16</b>	Space Heating System Efficiency	Base Case
<b>EEM18</b>	Domestic Hot Water (DHW) System	Base Case
<b>EEM22</b>	Efficient Lighting for Internal Areas	Base Case
<b>WEM01</b>	Water-efficient Showerheads	Base case + Penalty factor
<b>WEM02</b>	Water-efficient Faucets for all Bathrooms	Base case + Penalty factor
<b>WEM04</b>	Efficient Water Closets for All Bathrooms	Base case + Penalty factor
<b>WEM08</b>	Water-efficient Faucets for Kitchen Sinks	Base case + Penalty factor
<b>MEM03</b>	Floor Finish	Savings can be claimed

### Penalty factor:

In residential typologies (Homes & Apartments), the Project team cannot claim savings if no installations are completed during the audit. Furthermore, with a higher the percentage of unfinished works delivered, the probability of negative deviation from the base case increases; therefore, an increasing base case penalty is required to minimize the probability of under prediction future water demand.

If the Project team does not provide water fixtures and finishes, or part thereof, the following measures must be entered as base case as a weighted average with a penalty factor as outlined below:

- WEM01: Water efficient showerheads
- WEM02: Water efficient faucets for all bathrooms
- WEM04: Efficient water closets for all bathrooms
- WEM06: Water efficient bidets
- WEM08: Water efficient faucets for kitchen sinks

Table 5: Base case penalty value for Water Fixtures that are not included in home units.

% of the units without fixtures	Base Case Penalty Factor
<b>0 &lt; current % ≤ 10</b>	1.1
<b>10 &lt; current % ≤ 20</b>	1.15
<b>20 &lt; current % ≤ 30</b>	1.20
<b>30 &lt; current % ≤ 40</b>	1.28
<b>40 &lt; current % ≤ 50</b>	1.38
<b>current % &gt; 50</b>	1.53

All the units with the base case are multiplied by the base case penalty factor.

For example, 58% of homes have kitchen faucets of 5 l/min installed, and 42% of homes do not have kitchen faucets installed. Assuming the base case kitchen faucet flow rate is 10 l/min and one kitchen faucet per home, the base case penalty factor is 1.38, hence:

$$\text{Water Fixture Flow Rate Entered in EDGE} = (58\% \times 5 \text{ l/min}) + (42\% \times 10 \text{ l/min} \times 1.38) = 8.7 \text{ l/min}$$

## Annex 4: Primary Energy Demand (PED)

Project teams interested on aligning with the EU taxonomy compliance may be required to estimate Primary Energy Demand. EDGE calculations are based on delivered rather than primary energy. Hence, the spreadsheet below can be used for calculating PED from EDGE outputs.

<https://epb.center/support/documents/spreadsheet-exported-energy-explained/>

If not specified by the EU country or government authority, the following primary energy weighting factors, obtained from Appendix B in ISO 52000-1:2017, can be used.

*Table 6: Weighting factors (based on gross or net calorific value). From ISO 52000-1:2017, Appendix B.*

Energy carrier Delivered from distant		fPren	fPren	fPtot	KCO2e (g/kW h)
<b>Fossil fuels</b>	Solid	1.1	0	1.1	360
	Liquid	1.1	0	1.1	290
	Gaseous	1.1	0	1.1	220
<b>Electricity</b>		2.3	0.2	2.5	420
<b>Delivered from nearby</b>					
<b>District heating</b>		1.3	0	1.3	260
<b>District cooling</b>		1.3	0	1.3	260
<b>Delivered from on-site</b>					
<b>Solar</b>	PV electricity	0	1	1	0
	Thermal	0	1	1	0
<b>Environment</b>	Geo-, aero-, hydrothermal	0	1	1	0
<b>Exported</b>					
<b>Electricity</b>	To the grid	2.3	0.2	2.5	420
	To non EPB uses	2.3	0.2	2.5	420

Likewise, if not specified by the EU country or government authority, the following  $k_{exp}$  factors, obtained from Appendix B in ISO 52000-1:2017, may be used.

*Table 7:  $k_{exp}$ -factor*

Description	Value
$k_{exp}$ that is used to control which part of the exported energy is included in the energy performance of the building	1



[www.edgebuildings.com](http://www.edgebuildings.com)