



www.edgebuildings.com

EDGE V3

Part 9.1

Energy Calculation Methodology

Contents

1. Introduction.....	3
How to use this document	4
Relationship with the other EDGE Version 3 guides	4
2. Scope and calculation boundary	4
2.1 Energy uses included in the assessment	4
2.2 Items outside the calculation scope	4
2.3 Consistent boundary between cases.....	5
3. Base case, improved case, and savings	5
3.1 The base case.....	5
3.2 The improved case	5
3.3 Savings calculation.....	6
3.4 Special calculation pathways.....	6
4. Input data and default logic	6
4.1 Defaults, blanks, zero, and not applicable	7
4.2 Activity areas	7
4.3 Conditioned spaces inside another conditioned building	7
4.4 Partial system provision	7
5. Overall calculation sequence.....	7
5.1 Monthly heat balance.....	7
6. Climate, geometry, and thermal zoning.....	8
6.1 Climate data	8
6.2 Heating and cooling season.....	8
6.3 Geometry and orientation.....	8
6.4 Thermal zones and conditioning status.....	8
7. Envelope heat transfer and solar response.....	8
7.1 Transmission through the envelope.....	8
7.2 Infiltration and outdoor air.....	9
7.3 Solar gains through glazing.....	9
7.4 Opaque-surface solar absorption and SRI	9
7.5 Overhangs, fins, and other shading.....	9
8. Internal gains, schedules, and thermal mass	9
8.1 Occupancy, lighting, and equipment gains	9

8.2 Operating days and hours	10
8.3 Effective thermal mass	10
8.4 Time constant and utilization factors	10
8.5 Intermittent operation	10
9. Heating, cooling, ventilation, fans, and pumps	10
9.1 Monthly heating and cooling need.....	10
9.2 From thermal need to system energy	10
9.3 Distribution systems without ductwork	10
9.4 Fans and pumps.....	11
9.5 Natural ventilation and ceiling fans.....	11
9.6 Building automation	11
10. Other energy uses and renewables.....	11
10.1 Domestic hot water	11
10.2 Lighting	11
10.3 Appliances, cooking, refrigeration, and common amenities.....	12
10.4 On-site renewable energy	13
10.5 Operational emissions calculation	13
10.6 Refrigerant emissions calculation	13
11. Virtual energy and conditioning options	13
12. Results, checking, and quality control.....	14
12.1 Energy chart and indicators.....	14
12.2 Input and model checks	14
12.3 Reproducibility	14
13. Limitations	14
13.1 Appropriate use and limitations.....	14
Annex 1 - ISO 52016-1:2017 Annex A selections for EDGE Version 3	15
Annex 2 - Types of models for energy performance	33
Changes log.....	35

1. Introduction

EDGE (Excellence in Design for Greater Efficiencies) is a green building standard, certification system, and online assessment application of the International Finance Corporation. Part 9.1 explains only the energy calculation methodology used in EDGE Version 3, including 3.0 and 3.1. The document is written for project teams, technical reviewers, auditors, certifiers, software specialists, and readers who want to understand how the energy result is produced.

The methodology compares two representations of the same building: a base case and an improved case. Both use the same location, building purpose, main geometry, and operating context. The improved case then reflects the project design and selected energy measures. EDGE calculates savings based on the complete set end uses instead of adding independent percentage savings.

Important: EDGE is a comparative annual assessment. It supports consistent design comparison and certification. It is not intended for equipment sizing, detailed hourly overheating analysis, local safety design, or guaranteed prediction of utility bills.

Table 1 shows the relative position of this document within the set of EDGE user guides.

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		
Building Certification Guidance							
Operations Certification Guidance			Part 6 – Operations Rating: Energy and Water				Part 7 – Operations Certification Guidance
Auditor Guidance		Part 8 – Auditor Guidance					
Methodology	Part 9.1– EDGE V3 Energy Calculation Methodology						
Homes Prescriptive Certification Guidance	Check country-specific documentation						
Note 1: The shaded modules are not applicable, modules in blue are initiatives in pilot phase. Note 2: All guidance and user guide documents are complimentary information to the EDGE protocol documents. In case of any discrepancy, the EDGE protocol document takes precedence.							

To share feedback with the EDGE team, please send suggestions along with relevant documentation to edge@ifc.org.

How to use this document

Sections 2 to 5 define the assessment boundary, the two-case comparison, input data, and calculation sequence. Sections 6 to 10 explain the envelope and thermal balance, technical systems, other energy uses, virtual energy, renewables, and result aggregation. Sections 11 to 13 explain quality controls and limitations. Annex 1 records the ISO 52016-1 calculation selections used by EDGE Version 3, both 3.0 and 3.1. Annex 2 compares common energy-model types.

Relationship with the other EDGE Version 3 guides

Document	Relationship to Part 9.1
Part 1 - Building Certification Guidance	Defines certification scope, eligibility, project structure, and program-level requirements.
Part 2 - User Guide - Design Tab	Defines project, typology, geometry, loads, HVAC, fuel, and climate inputs.
Part 3 - User Guide - Energy Measures	Defines the individual energy measures, user entries, calculators, and compliance guidance.
Part 8 - Auditor Guidance	Defines how project inputs and claimed measures are verified.
Part 9.1 - Energy calculation methodology	Explains how Version 3 calculation inputs are processed into energy results.

2. Scope and calculation boundary

The assessment object is a *building* represented as an EDGE subproject. The methodology is designed for whole-building assessment, but eligible building components, or parts of building components may be modeled using conservative assumptions as per *Part 1 – Building Certification Guidance* document. The methodology estimates annual delivered energy for the energy services and end uses applicable to the selected typology. Results are normalized by gross internal area and expressed in kWh/m²/year. Homes and apartment outputs also use the per-house, per-apartment, or whole-subproject display defined by the relevant Version 3 application release.

2.1 Energy uses included in the assessment

- Space heating and the associated fans and pumps.
- Space cooling and the associated fans and pumps.
- Mechanical ventilation and air movement.
- Domestic hot water.
- Internal and external lighting.
- Appliances, plug loads, cooking, laundry, refrigeration, lifts, water pumping, treatment systems, pools, and common amenities where applicable.
- Virtual heating, cooling, fan, and pump energy where conditioning is required but no system is specified.
- Eligible on-site renewable energy that offsets improved-case delivered energy.

2.2 Items outside the calculation scope

The methodology does not perform detailed industrial process simulation, hourly comfort or moisture analysis, equipment sizing, overheating risks, or utility forecasting for individual buildings. Process loads that belong within the building boundary are still represented through the applicable detailed-load inputs or typology-specific methods.

2.3 Consistent boundary between cases

A valid comparison requires the same assessed spaces, energy services, schedules, and functional requirements in both cases. A load cannot be removed from the improved case merely because it is inconvenient to model. Where a special lighting type is excluded from an efficiency measure, for example, its energy remains in the assessment as equipment or process energy when required by Version 3 guidance.

Methodology rule: Base-case and improved-case totals must contain the same applicable building functions. Design measures may change performance parameters, but they do not change the fundamental service expected from the building.

3. Base case, improved case, and savings

3.1 The base case

The base case is the benchmark used for comparison. Depending on location and typology, it reflects prevalent construction practice, an applicable building-energy code, the global EDGE baseline, or selected ASHRAE 90.1-2016 assumptions. The active baseline dataset belongs to the relevant release of the EDGE App and is applied consistently across the project.

Baseline type	General application
Country-customized	A national benchmark is used where construction practice or code requirements support a common baseline.
City-customized	A city-level benchmark is used where climate, practice, or code implementation differs materially.
Global EDGE	Typical emerging-market practices are used where a more specific baseline is not available.
ASHRAE 90.1-2016	Selected higher-performance baseline and system assumptions are used for applicable locations.

3.2 The improved case

The improved case represents the project design or as-built condition. Default values displayed when a measure is selected are informative starting points. For certification, the project team replaces them with supported project values where the user guide requires project-specific entries.

Measures are processed within an integrated model. Lower lighting power, for example, reduces lighting electricity and internal heat gains. The change may reduce cooling while increasing heating. Higher roof or wall reflectance can reduce cooling but increase heating in colder conditions. EDGE reports the combined result rather than adding isolated measure percentages.

3.3 Savings calculation

Annual energy savings are calculated from the annual base-case and improved-case totals:

$$\text{Energy savings (\%)} = 100 \times (\text{EBC} - \text{EIC}) / \text{EBC}$$

EBC and EIC are the annual energy indicators calculated for the same assessment boundary. Applicable virtual energy is included in the comparison. Eligible on-site renewable energy is applied to the improved case. EDGE Certified requires at least 20% energy savings, while EDGE Advanced requires at least 40%.

3.4 Special calculation pathways

Some building uses need a dedicated comparison. Data centers use Power Usage Effectiveness (PUE). The energy improvement is calculated as 1 minus the ratio of base-case PUE to improved-case PUE. Version 3 uses the climate-dependent base PUE specified in the current guidance. Special external simulations, such as approved refrigeration calculations, are incorporated only through the applicable Special Ruling Request pathway and must maintain alignment with the EDGE base case and avoid double counting.

4. Input data and default logic

The energy result is controlled by a connected set of inputs. A change to area, operating hours, glazing, infiltration, equipment load, set point, or system efficiency can affect several parts of the calculation. Inputs are therefore reviewed as a coordinated building description rather than as independent form fields.

Input family	Examples	Methodology role
Project and typology	building type, subtype, GIA, project boundary	Selects activity areas, default loads, schedules, baseline assumptions, and result display.
Climate	monthly temperature, humidity, wind, solar data, latitude	Drives transmission, ventilation, solar, renewable, and seasonal calculations.
Geometry	areas, heights, orientation, exposed lengths, windows	Defines envelope heat transfer, solar gains, and area normalization.
Use and loads	occupancy, operating days, hours, lighting, equipment	Defines direct energy and internal gains.
Envelope	U-values, SRI, SHGC, WWR, infiltration, shading	Defines transmission, absorbed solar energy, transparent solar gains, and airflow.
Systems	system type, efficiency, distribution, fans, pumps, controls	Converts thermal need into delivered energy.

Renewables	annual generation, allocation	Offsets eligible improved-case demand after efficiency measures, except for EEM34
-------------------	-------------------------------	---

4.1 Defaults, blanks, zero, and not applicable

A default is an explicit methodology value used when the relevant project-specific entry is not required or available. A blank field triggers a default or indicate missing data, depending on the field.

4.2 Activity areas

Activity areas function as simplified thermal zones and load categories. Their floor areas determine how occupancy, lighting, equipment, ventilation, hot water, and schedules are combined.

4.3 Conditioned spaces inside another conditioned building

A tenant or certifiable space fully surrounded by conditioned space has no exposed external façade for the enclosed sides. The energy representation uses zero exposed façade where applicable, the ceiling area as the roof-area input, and the tenant perimeter for building dimensions. Envelope measures that belong to the host building are retained at the base-case level for the tenant assessment, while the efficiency of the central heating or cooling system may be represented where the tenant is served by that system.

4.4 Partial system provision

If only part of a project is provided with air conditioning, the detailed conditioning selection represents the required service and the system efficiency is calculated as a weighted average. Installed capacity uses the actual efficiency; non-installed capacity uses the applicable base-case efficiency. If non-installed capacity is not known, it may be estimated from the relationship between conditioned floor area and installed capacity.

5. Overall calculation sequence

EDGE repeats the following sequence for the base and improved cases. Monthly results are accumulated to form the annual result.

- Define the project boundary, typology, activity areas, climate location, and baseline.
- Build the monthly use profile from occupancy, schedules, loads, and conditioning status.
- Determine envelope areas and thermal and solar properties.
- Calculate transmission and ventilation heat transfer.
- Calculate internal and solar gains.
- Apply effective thermal mass, time constants, utilization factors, and intermittent-operation factors.
- Determine monthly heating and cooling needs.
- Convert needs to system energy and calculate fans, pumps, lighting, hot water, equipment, and other end uses.
- Apply virtual-energy rules where conditioning is required but no system is installed.
- Apply eligible on-site renewable generation after efficiency measures.
- Aggregate annual end uses and calculate the base-to-improved percentage saving.

5.1 Monthly heat balance

For each conditioned area and month, EDGE first estimates heat moving through roofs, walls, floors, glazing, ground contact, and outdoor air. It then estimates heat added by people, lighting, equipment, cooking,

appliances, and the sun. The relationship between these heat flows indicates whether heating or cooling is needed.

Monthly gains and losses do not occur at exactly the same time. The method therefore uses thermal capacity, a time constant, and utilization factors to estimate the useful share of gains for heating and the useful share of heat transfer for cooling. This represents key dynamic effects without running a full hourly simulation.

6. Climate, geometry, and thermal zoning

6.1 Climate data

EDGE uses monthly climatic inputs for the selected city. The same dataset is used for both cases so that calculated savings result from the building and system choices, not from different weather assumptions. The annual output is a typical-year comparison, not a forecast for a particular calendar year.

6.2 Heating and cooling season

The heating season is represented by months with calculated heating need greater than zero. Where the Version 3 certification rules allow a different treatment, it requires the stated approval pathway. Cooling is similarly determined month by month from calculated need and the applicable conditioning and natural-ventilation settings.

6.3 Geometry and orientation

Floor area sets the scale of loads and energy-intensity results. Exposed wall, roof, floor, and window areas determine transmission and solar gains. Orientation matters because incident solar energy differs around the building. Detailed calculators shall contain a complete and internally consistent set of façade and glazing areas; an omitted orientation may cause defaults to be used.

Homes with different layouts use the weighted-average building length for each orientation on a per-home basis. Common external areas across separate subprojects are allocated using the applicable gross-internal-area weighting so that they are not omitted or counted more than once.

6.4 Thermal zones and conditioning status

EDGE activity areas operate as simplified, thermally uncoupled zones. Each zone is assigned a conditioning status. “Conditioning provided” uses the selected actual system. “No conditioning provided” activates virtual energy. “No conditioning required” removes heating and cooling need only where that status is valid for the activity area.

Cold, frozen, and fruit-and-vegetable storage require refrigeration or conditioning. If the developer does not provide the system, the correct status is “no conditioning provided,” not “no conditioning required.” This distinction keeps the required service inside the energy comparison.

7. Envelope heat transfer and solar response

7.1 Transmission through the envelope

Monthly transmission heat transfer is determined from element area, thermal transmittance, boundary condition, and the difference between indoor calculation temperature and outdoor temperature. Lower U-values generally reduce heat flow through roofs, walls, floors, windows, and doors. Ground contact uses the applicable simplified ground heat-transfer method.

Base-case and improved-case geometry differs only in façade orientation, allowing the improved case to capture energy savings from orientation. Measures such as window-to-wall ratio change the allocation between opaque wall and glazing, and the model recalculates conductive heat transfer and solar gains together.

7.2 Infiltration and outdoor air

Uncontrolled infiltration and required outdoor air add transmission-like loads because outdoor air must be brought toward indoor conditions. EDGE combines airflow, air properties, operating time, outdoor temperature, and the applicable temperature adjustment. Airtightness measures affect infiltration, while ventilation measures affect the defined outdoor-air pathway.

7.3 Solar gains through glazing

Solar gains through transparent elements depend on orientation, monthly irradiation, overall transparent area, frame fraction, glazing solar properties, and shading. Version 3 uses the fixed frame fraction and glazing factors recorded in Annex 1. Project-specific glazing performance is entered through the applicable measure calculator.

7.4 Opaque-surface solar absorption and SRI

Opaque roofs and walls absorb part of the incident solar energy. EDGE converts the entered Solar Reflectance Index into solar absorptance using the documented Version 3 approach. Increasing SRI generally reduces absorbed solar heat and therefore cooling need. In a heating-dominated climate, the same change can increase heating need because useful solar heat is also reduced. The energy chart shows the net result of both effects.

7.5 Overhangs, fins, and other shading

Horizontal overhangs and vertical fins are represented using the monthly coefficients in Annex 1. Façade direction and hemisphere determine the coefficient set. The resulting factor is limited to the physical range from zero to one. Contextual obstacles are not credited by default, and non-standard devices use the alternative compliance or special-ruling route rather than an unrelated standard input.

High-level shading calculation steps

1. Gather façade orientation, window dimensions, overhang and fin geometry, nearby-obstruction geometry, glazing solar properties, and the applicable solar position and irradiation data.
2. For each orientation and calculation period, determine the unshaded solar exposure and the shaded fraction of each glazed area from the external shading geometry and surrounding obstructions.
3. Convert the shaded fraction into a solar-reduction factor and apply it to direct and diffuse solar gains through the glazing.
4. Use the resulting solar gains in the cooling and heating demand calculations for the base case and improved case. Apply improved-case shading geometry only to the improved case.

8. Internal gains, schedules, and thermal mass

8.1 Occupancy, lighting, and equipment gains

People, lighting, equipment, appliances, cooking, and other activities release sensible heat inside the building. These gains can increase cooling need and can offset part of the heating need. EDGE combines the load intensity, area or occupancy basis, and operating schedule for each activity area.

8.2 Operating days and hours

Schedules connect installed loads to annual energy and determine when internal gains occur. A schedule represents the expected building use. Base-case and improved-case schedules remain aligned.

8.3 Effective thermal mass

Thermal mass represents the ability of the building fabric to store heat. Version 3 uses the monthly simple method: an areal internal heat-capacity class is multiplied by useful conditioned floor area to obtain effective heat capacity in J/K. The class values and default typology mapping are recorded in Annex 1.

Where purposeful improvements in thermal inertia are assessed through a Special Ruling Request, the building is calculated using the relevant base thermal-inertia value and then the project-specific improved value. The difference in heating and cooling result represents the energy effect. The supporting calculation must use the same regularly occupied areas and temperature assumptions in both runs.

8.4 Time constant and utilization factors

Effective heat capacity is combined with heat-transfer coefficients to obtain a zone time constant. The time constant and monthly gain-loss ratio determine utilization factors. For heating, the gain-utilization factor estimates the useful share of internal and solar gains. For cooling, the heat-transfer utilization factor estimates the useful share of heat transfer that offsets gains.

8.5 Intermittent operation

Heating Method A adjusts the monthly indoor calculation temperature for qualifying reduced-heating periods. If no qualifying reduction applies, the factor is one. Cooling Method A recognizes the adopted full-weekend reduction condition recorded in Annex 1; otherwise, the reduction factor remains one. These factors affect annual energy need and are not peak equipment-sizing corrections.

9. Heating, cooling, ventilation, fans, and pumps

9.1 Monthly heating and cooling need

Heating and cooling needs are determined after transmission, ventilation, internal gains, solar gains, thermal mass, utilization, and intermittency have been evaluated. Heating and cooling are calculated independently by month and accumulated annually.

9.2 From thermal need to system energy

Useful thermal need is converted to delivered energy using the selected generation, distribution, emission, and auxiliary assumptions. For cooling, a higher coefficient of performance reduces delivered energy for the same cooling output. Heating conversion depends on the selected heat pump, electric, combustion, or district system pathway.

Where several systems serve the project, the project team uses the applicable calculator or weighted-average method. Equipment efficiency, capacity, and served area must use a consistent weighting basis. Nominal, seasonal, and part-load metrics are not used.

9.3 Distribution systems without ductwork

In the system-selection logic, a direct-expansion split system without ductwork is represented using the fan-coil-unit distribution selection.

9.4 Fans and pumps

Fans and pumps are calculated from the applicable airflow, fluid flow, power, schedule, and system arrangement. A reduction in thermal need can also reduce auxiliary operation.

9.5 Natural ventilation and ceiling fans

Natural ventilation and ceiling fans are treated as interacting comfort strategies. Natural ventilation can remove cooling need for qualifying months. Ceiling fans can raise the acceptable cooling set point, reducing cooling need while adding fan electricity. When both strategies are present, the full applicable ceiling-fan consumption is included.

High-level natural ventilation calculation steps

1. Identify the spaces for which natural ventilation is claimed and gather operable-opening area, opening type, space area, occupancy schedule, climate data, and any ceiling-fan inputs.
2. Check the periods when natural ventilation is available using the applicable indoor-outdoor temperature, humidity, occupancy, and operating-condition rules.
3. Determine the effective ventilation contribution for eligible periods and the share of occupied time or conditioned area served by natural ventilation.
4. Reduce the mechanical cooling and ventilation requirement only for the eligible periods or space fraction. Where ceiling fans are included, account for their comfort effect and their electricity use separately.
5. Calculate the base case without the improved natural-ventilation measure and calculate the improved case with the eligible reduction.

9.6 Building automation

Advanced HVAC automation that is not represented by a standard measure may be assessed through EEM34 using the Version 3 percentage adjustments defined by building typology and end use. These adjustments are applied only to the eligible heating or cooling end use and require the applicable technical justification and approval pathway. They are not a general percentage reduction from total building energy.

10. Other energy uses and renewables

10.1 Domestic hot water

Useful hot-water energy is calculated from water volume, the difference between cold-water supply and delivery temperature, and the heat capacity of water. Delivered energy then reflects generation and distribution efficiency. Water-efficiency measures that reduce hot-water volume also reduce hot-water energy.

The domestic-hot-water base case depends on the Version 3 application release and fuel pathway. Version 3.1 uses an 80% boiler base case for EEM18.

Important case-separation note: For EEM18, domestic hot-water energy in the base case shall be calculated using the base-case hot-water demand, and domestic hot-water energy in the improved case shall be calculated using the improved-case hot-water demand

10.2 Lighting

Lighting energy is calculated from installed power or lighting power density, served area, operating hours, and eligible control effects. Lower lighting power also reduces internal gains, which can decrease cooling and increase heating. Version 3 recalculates both effects.

The EEM24 detailed calculator is used for activity areas where compliant controls are installed. The current guidance requires automatic controls to operate the defined proportion of lighting in each claimed area; direct measure selection is reserved for the stated full-coverage condition.

High-level daylighting calculation steps

1. Gather space geometry, façade orientation, glazing area and visible transmittance, external obstructions, internal surface assumptions, target illuminance, occupancy schedule, and lighting power density.
2. Estimate the daylight contribution or daylight factor for the relevant floor area, accounting for glazing and shading conditions.
3. Determine the proportion of the occupied area and occupied hours for which daylight can meet or offset the target illuminance.
4. Apply the daylight-availability fraction together with the lighting-control response to reduce electric-lighting operating hours or load in the improved case.
5. Calculate annual lighting electricity and associated internal heat gains for each case, and pass the revised gains to the cooling and heating calculations.

10.3 Appliances, cooking, refrigeration, and common amenities

Typology-specific methods represent appliances, plug loads, cooking, laundry, refrigeration, lifts, pumps, treatment systems, pools, and other common amenities. Some are calculated from installed load and schedule, while others use dedicated Version 3 assumptions or calculators.

External refrigeration simulation approved through an SRR must preserve the EDGE base-case comparison. Cold-storage envelope and refrigeration measures are set as instructed by the user guides, affected storage areas are represented consistently in the Design Tab, and duplicate savings are removed from other measures.

High-level indoor and outdoor pool energy calculation steps

1. Classify the pool as indoor or outdoor and gather water surface area, volume where required, water-temperature setpoint, operating schedule, occupancy or activity assumptions, cover use, climate data, and equipment efficiencies.
2. Calculate pool-water heat losses from evaporation, convection, radiation, and make-up water. For outdoor pools, apply outdoor climate and wind exposure. For indoor pools, use pool-hall air conditions and include the interaction with space-conditioning and dehumidification loads where applicable.
3. Calculate useful heat required to maintain the pool-water setpoint, including any initial or scheduled reheating treatment defined by the methodology.
4. Convert useful heat to delivered energy using the pool-heating system efficiency or coefficient of performance.
5. Add auxiliary electricity for circulation pumps, filtration, treatment, controls, and other defined pool equipment, adjusted for operating hours and improved-case controls.
6. Calculate base-case and improved-case pool energy separately and aggregate thermal energy and electricity into the applicable common-amenities end uses.

High-level lift energy calculation steps

1. Assume total running and standby components as a function of the total number of floors above and below grade.
2. Apply the yearly consumption to both the base and improved case.

10.4 On-site renewable energy

Eligible on-site renewable generation is applied after efficiency measures. For photovoltaic systems, Version 3 uses a typical-year generation estimate rather than selecting one favorable year of measured production. Global Solar Atlas, PVWatts, or another accepted source may support the estimate. Shared nearby generation needs dedicated metering and transparent allocation to the assessed subproject.

Only the electrical demand is offset in EEM33. The display basis for homes and apartments differs between Version 3.0 and Version 3.1, so the App version and typology configuration must be considered when interpreting the annual generation and demand fields. The subproject multiplier is not applied at the calculator stage described in the current guidance.

10.5 Operational emissions calculation

EDGE estimates operational greenhouse gas emissions separately for the base case and improved case by multiplying annual delivered energy from each source, excluding virtual energy, by the applicable emissions factor and summing the results. Grid-electricity emissions are calculated using the location-specific grid emissions factor; EDGE Version 3 uses the harmonized International Financial Institution (IFI) default grid factors, but a project-specific factor may replace the default when it is supported by verifiable documentation from a government authority or an equivalent authoritative source and accepted through the applicable review process by IFC or the EDGE Certification Provider. Results are reported as annual absolute emissions in kgCO₂e/year and, where applicable, normalized by the rated building area in kgCO₂e/m²/year.

10.6 Refrigerant emissions calculation

Refrigerant emissions are estimated from the quantity of refrigerant contained in the applicable cooling or refrigeration systems, the assumed annual leakage rate, and the refrigerant's 100-year Global Warming Potential (GWP). At a high level, the annual refrigerant emissions for each system equal the refrigerant charge multiplied by the leakage rate and the GWP; the results are summed across systems and refrigerants and expressed as kgCO₂e/year, with an area-normalized indicator where applicable. Base-case and improved-case values are calculated separately so that changes in refrigerant type, charge, leakage assumptions, or GWP can be reflected, and the refrigerant result is reported separately from energy-related operational emissions.

11. Virtual energy and conditioning options

Virtual energy prevents a building from appearing efficient simply because heating or cooling equipment is omitted. If an activity area requires conditioning for comfort but no system is installed, EDGE assigns an assumed system and calculates heating or cooling and the related fan and pump energy.

Envelope and passive-design improvements therefore reduce virtual demand in the same way they reduce demand for an installed system. Virtual energy is included in the certification savings comparison but is separated from utility-cost outputs because no actual purchased-energy system has been specified.

Conditioning status

Calculation treatment

Conditioning provided (Both heating and cooling, only cooling, only heating)	Use the documented project system and efficiency.
No conditioning provided	Calculate virtual heating or cooling and associated auxiliaries.
Mechanical Ventilation	Applies mechanical ventilation energy and, in selected spaces, virtual energy needs.
No conditioning required	Assign no heating or cooling need only where this status is valid for the activity area.

12. Results, checking, and quality control

12.1 Energy chart and indicators

The energy chart presents the base and improved cases by end use. The project team can use the breakdown to identify the dominant loads and check whether the direction of change is reasonable.

12.2 Input and model checks

A useful review starts with the largest end uses and checks the inputs that control them. Cooling is sensitive to climate, exposed areas, glazing, shading, internal gains, airflow, schedules, and system efficiency. Heating responds to many of the same variables. Hot water is controlled mainly by volume, temperature rise, and system efficiency. Lighting and equipment depend on installed loads.

12.3 Reproducibility

A reproducible assessment identifies the App release, climate dataset, baseline dataset, project inputs, calculators, default values, and selected measures. Software quality controls include calculation tests, regression tests, range checks, and release management.

13. Limitations

13.1 Appropriate use and limitations

- Monthly averaging does not reproduce all hourly peaks, short overheating events, detailed controls, or rapidly changing conditions.
- Actual consumption can differ because of weather, occupancy, tenant behavior, commissioning, maintenance, equipment degradation, and changes in building use.
- Simplified activity-area zoning improves scalability but may not represent every interaction in complex mixed-use buildings, atria, or unusual geometries.
- Virtual energy is a certification construct and does not predict the exact system that may later be installed.
- EDGE results do not replace detailed design simulation, equipment sizing, local compliance calculations, or measurement and verification when those are required.

Annex 1 - ISO 52016-1:2017 Annex A selections for EDGE Version 3

This annex records the ISO 52016-1:2017 Annex A calculation choices and input values used by the EDGE Version 3 energy methodology. It is a methodology selection record and does not reproduce the ISO calculation standard..

Unless otherwise stated, values are based on the informative defaults in ISO 52016-1:2017, Annex B. “N/A” or “Not applicable” indicates that an option is not used, with an explanation provided where needed.

The scope is limited to global assumptions and methodological decisions associated with the adoption of ISO 52016-1:2017. Country-specific requirements, national annexes, jurisdiction-specific assumptions, and calculations related to individual energy efficiency measures are excluded.

Table A.1 — References

EPB module	Reference	EDGE use	Status
M1-4	ISO 52003-1:2017	Overall energy indicators and ratings	Applied
M1-6	EDGE-defined values	Ventilation and occupancy factors by space type	EDGE method
M1-8	ISO 52000-1:2017	Overall EPB assessment and aggregation	Applied
M1-13	ANSI/ASHRAE Standard 169	Climate classification and climatic data	Supporting
M2-4	ISO 52018-1:2017	Fabric and thermal-balance indicators	Supporting
M2-5.1	ISO 13789:2017	Transmission and ventilation heat-transfer coefficients	Applied
M2-5.2	ISO 13370:2017	Ground heat transfer	Applied; V4 has four foundation types
M2-5.3	ISO 6946:2017	Opaque-element thermal resistance and U-value	Applied
M2-5.4	N/A	No separate EDGE reference assigned	N/A
M2-5.5	ISO 14683:2017	Simplified thermal-bridge treatment	Supporting
M2-5.6	ISO 10077-1:2017	Windows, doors and shutters - U-value	Supporting
M2-5.7	N/A	No separate EDGE reference assigned	N/A

M2-5.8	ISO 12631:2017	Curtain-wall thermal transmittance	Supporting
M2-8	ISO 52022-1:2017	Simplified glazing and solar-protection method	Selected
M2-8	ISO 52022-3:2017	Detailed glazing and solar-protection method	Not selected
M3-1 / M3-4	EN 15316-1:2017	Heating-system energy and efficiency framework	Supporting
M3-5 / M4-5	EN 15316-2:2017	Heating and cooling emission systems	Supporting
M4-1 / M4-4	EN 16798-9:2017	Cooling-system energy requirements	Supporting
M5-1	EN 16798-3:2017	Non-residential ventilation system requirements	Supporting
M5-5	EN 16798-7:2017	Airflow rates and infiltration	Supporting
M5-6	EN 16798-5-1:2017	Ventilation distribution and generation - Method 1	Selected
M5-6	EN 16798-5-2:2017	Ventilation distribution and generation - Method 2	Not selected
M6-1 / M6-4 / M6-5	N/A	Humidification system modules	N/A; align with Table A.39
M7-1 / M7-4 / M7-5	N/A	Dehumidification system modules	N/A
M9-1	BS EN 15193-1:2017+A1:2021	Lighting energy	Supporting
M10-1	ISO 52120-1:2021	Building automation and control factors	Supporting

Complementary references

Reference	EDGE use / boundary
CIBSE AM10:2005	Peak design loads in EDGE Version 3; not used for EDGE Version 3 monthly energy needs.
CIBSE Guide A:2015, revised 2021	Ventilation conductance, admittance, design loads, intermittent operation and sizing where identified in EDGE documentation.

ANSI/ASHRAE/IES 90.1-2016	Base case HVAC system selection and envelope U values for selected regions.
ANSI/ASHRAE Standard 62.1	People-based and area-based outdoor-air rates.
ASTM E1980-24	Conversion of user-entered SRI to solar absorptance.

Table A.2 — Choice between hourly or monthly calculation method

Type of object and/or application	All applications
Description	Choice
Only hourly method allowed	No
Only monthly method allowed	Yes
Both methods are allowed	No

Table A.3 — Thermal zoning rules

Description	Apply the described method?	If “No”: Alternative method
Application:		
Zoning step 1. Assessment of thermal envelope	Yes	N/A
Zoning step 2. Grouping according to space category	Yes	N/A
Zoning step 3. Grouping in case of large openings	No	Thermal zones with large openings are excluded from the thermal analysis (i.e. No conditioning required)
Zoning step 4. Split to have same combination of services	Yes	N/A
Zoning step 5. Further grouping according to similar thermal conditions of use	No	The number of thermal zones is fixed for all building typologies. User may declare the absence of a thermal zone type by declaring area = 0. For self-defined building, user may select up to 25 thermal zones.
Zoning step 6. Split according to specific system or subsystem properties	No	
Zoning step 7. (Further) split to have sufficient homogeneity in thermal balance	No	
Zoning step 8. (Further) grouping of thermally unconditioned zones	No	

Zoning step 9. Simplification in case of small thermal zones	No
Zoning step 10. Simplification in case of very small thermal zones	No

Table A.4 — Choice of method for thermally unconditioned zones

External thermally unconditioned zones

Situation	Default value of $b_{ztu;m}$ for a thermally unconditioned zone, type: external
N/A	No Default values provided

Internal thermally unconditioned zone type allowed?

Choice	Yes/No
Internal thermally unconditioned zone type allowed?	Yes. Each thermal zone can be one of the following: No conditioning required, conditioning required but no system provided, mechanical ventilation only, and physically unconditioned ancillary space.

Internal thermally unconditioned zones

Situation	Default value of $b_{ztu;m}$ for a thermally unconditioned zone, type: internal
N/A	No Default values provided. The calculation is not done for thermally unconditioned spaces.

Table A.5 — Default contribution of ventilation in external construction of a thermally unconditioned zone

Application	All Applications
Description	Choice
Default allowed?	No
If Yes:	
Coefficient fcor default	Not applicable
contribution of ztu;ve	Not Applicable

Table A.6 — Choice of spatial temperature averaging in residential buildings

Description	Choice
-------------	--------

Application of the given formula for spatial temperature averaging		No
If No:		
No application of the given formula for spatial temperature averaging	It is assumed that the same temperature set-point for heating applies also to partly or moderately thermally conditioned residential spaces.	N/A
	Calculate the fully and partly or moderately thermally conditioned residential spaces as separate, thermally uncoupled thermal zones.	Yes (EDGE Version 3)
	Calculate the fully and partly or moderately thermally conditioned residential spaces as separate, thermally coupled thermal zones.	N/A
In case of application of the formula		Value
f mod;t		N/A
f mod;sp		N/A
H mod;sp		N/A

Table A.7 — Choice between calculations with thermally coupled or uncoupled thermal zones

Application	All applications
Description	Choice
Thermally uncoupled calculations	Yes (EDGE Version 3)
Thermally coupled calculations	No
Both methods are allowed	No

Table A.8 — Default thermal coupling properties in case of thermally coupled zones

Choice			
Heat transfer part	Quantity	Default value	Unit
Transmission heat transfer between zones z y	Not applicable	Not applicable	...

ventilation heat transfer from zone z to zone y	Not applicable	Not applicable
ventilation heat transfer from zone y to zone z	Not applicable	Not applicable

Table A.9 — Factor for consideration of internal heat gains in design heat load calculation

Note: Data related to Hourly Calculation

Table A.10 — Alternative choices in modelling

Note: This table is not applicable. Data related to Hourly Calculation

Table A.11 — Convective fractions

Note: This table is not applicable. Data related to Hourly Calculation

Table A.12 — Specification of internal partitions

Note: This table is not applicable. Data related to Hourly Calculation

Table A.13 — Distribution of mass of opaque and ground floor elements

Note: This table is not applicable. Data related to Hourly Calculation

Table A.14 — Specific heat capacity of opaque and ground floor elements

Note: Data related to Hourly Calculation but associated to monthly calculations. Reference: Table 21.

Table A.15 — Solar absorption coefficient of external opaque surfaces

Updated in table related to Monthly Calculation

Table A.16 — Coefficient to limit assumed temperature in adjacent thermally unconditioned zone

Note: Not considered

Application	All applications
	$cz_{tu,h;max}$
Value	Not Applicable

Table A.17 — Specific heat capacity of air and furniture

Note: Not considered.

$\kappa_{m;int} \text{ J}/(\text{m}^2 \cdot \text{K})$
Not Applicable

Table A.18 — View factor to the sky

Note: This table is for Hourly calculation. Details are updated in table related to monthly method.

Table A.19 — Difference between external air temperature and sky temperature

Note: This table is for Hourly calculation. Details are updated in table related to monthly method.

Table A.20 — Choice of method for moisture absorption and desorption in materials

Note: Not considered

Application	All applications
Description	Choice
Moisture absorption and desorption calculated?	No
If No:	$G_{abs}; z; t = 0$
If Yes: give reference to method	Not Applicable

Table A.21 — Choice of glazing area or frame area fraction

Note: This table is for Hourly calculation. Details are updated in table related to monthly method.

Table A.22 — Factors related to the solar energy transmittance

Note: This table is for Hourly calculation. Updated the table related to monthly calculation. Table A.43 — Factors related to the solar energy transmittance.

Table A.23 — Rules for operation of shutters

Application	All Applications
Control level	Rules
0 Manual operation	Not Applicable
1 Motorized operation with manual control	Not Applicable
2 Motorized operation with automatic control	Not Applicable
3 Combined light/blind/HVAC control	Not Applicable

Table A.24 — Rules for operation of solar shading devices

Application	All Applications
Control level	Rules
0 Manual operation	Closed: if solar irradiance $> 300 \text{ W/m}^2$ Open: if solar irradiance $< 200 \text{ W/m}^2$
1 Motorized operation with manual control	Not Applicable
2 Motorized operation with automatic control	Not Applicable

3 Combined light/blind/HVAC control	Not Applicable
--	----------------

Table A.25 — Choices between options and methods for calculation of shading by external objects

Note: This is an hourly calculation table as result it is omitted. Added details in Monthly calculation table A.45

Table A.26 — Number of skyline segments, n for input solar shading objects

Not Considered EDGE V3. F.3.5.1.2 Monthly calculation procedures followed and skyline segments are not considered. The shading for all orientation is calculated.

Application b	All applications
Description	Value of $n_{sh;segm}$
Maximum number of segments over n	Not Considered
Fixed width (= $360 / n_{sh;segm}$)	Not considered

Table A.27 — Monthly ventilation heat transfer coefficient

Application	All applications
Description	Choice
Method A	Yes
Method B	No
Both methods	No

Table A.28 — Dynamics correction factor for ventilation

Dynamics correction factor for monthly mean air flow	Value
$f_{ve;dyn;k}$	1.0

Table A.29 — Solar absorption coefficient of external opaque surfaces

Note: Base case considers 0.6 as value and improved case varies based on the SRI value entered by the user.

	Choice
Differentiation in solar absorption coefficient?	Yes
If Yes:	
Category	Specification

Category 1 $\alpha_{sol} = 0,3$ (light colour)	See note in Category 2.
Category 2 $\alpha_{sol} = 0,6$ (intermediate colour)	Absorption coefficient estimated from Solar Reflective Index (SRI) using ASTM E1980-24 Standard. Generally base case SRI is 45, resulting in $\alpha_{sol} \approx 0.6$ For improved case, the user can select a range of SRI from 0 to 135, which is then converted to a Solar absorption coefficient.
Category 3 $\alpha_{sol} = 0,9$ (dark colour)	See note in Category 2.
Choice	
If No:	Not Applicable

Table A.30 — View factor to the sky

Note: The view factor F_{sky} assumed as 1 for unshaded horizontal Roof and 0.5 for unshaded vertical wall

	Unshaded horizon- tal roof	Unshaded vertical wall
F	1.0	0.5

Table A.31 — Difference between external air temperature and sky temperature

Climatic region a	Sub-polar areas	Tropics	Intermediate zones
$\Delta\theta_{sky;m}$ (K)	9.0	9.0 in EDGE V3 13.0 in EDGE Version 3	9.0 in EDGE V3 11.0 in EDGE Version 3

Table A.32 — Choice between detailed or simple method to determine the internal effective heat capacity (monthly method; see 6.6.9)

Application	All applications
Description	Choice
Only detailed method allowed	No
Only simple method allowed	Yes
Both methods allowed	No

Table A.33 — Simple method to determine the internal effective heat capacity. Specification of the classes

Class definitions and calculation values

Class	Specification of class	Areal internal effective heat capacity, $C_{m,areal}$	Unit	Status
-------	------------------------	---	------	--------

All	All construction types	EDGE V3: 370 000	J/(m ² ·K)	ISO monthly-method class value
-----	------------------------	------------------	-----------------------	--------------------------------

Monthly simple-method equation. For each thermally conditioned zone ztc and case BC/IC:

$$C_{m,int,eff,ztc,BC/IC} = A_{use,ztc} \times C_{m,areal,class,BC/IC}$$

where **C_{m,int,eff}** is the effective internal heat capacity in J/K, **A_{use}** is useful floor area in m², and **C_{m,areal,class}** is the selected class value in J/(m²·K).

EDGE methodology decision. The same class assignment is a default based on primary building typology. The assignment shall be applied consistently to all thermally conditioned space types associated with the primary typology.

Implementation requirements and validation

- The effective zone heat capacity shall be calculated in J/K by multiplying the areal class value by useful zone floor area in m². The areal value shall not be described as J/K before multiplication by area.
- Base-case and improved-case values shall be evaluated separately, even where the defaults are identical.
- A missing typology mapping shall default to Medium and shall generate a traceable informational record. It shall not silently default to zero or null.

Table A.34 — Values of the reference numerical parameter a and the reference time constant H,0 τ for the gain utilization factor

aH,0	τH,0 h
1	15

Table A.35 — Values of the reference numerical parameter a and the reference time constant C,0 τ for the loss utilization factor

aC,0	τC,0 h
1	15

Table A.36 — Choice between methods A and B for heating intermittency (see 6.6.11.3)

Application	All applications
Description	Choice
Only Method A	Yes
Only Method B	No
Both methods are allowed	No

Processing and downstream application

- For each conditioned space type and month, determine whether day, night, and/or weekend reduced-heating periods apply.
- 1. Combine the day, night, and weekend effects to calculate $a_{H,red,ztc,m,BC/IC}$. The final value shall be limited to the closed interval [0, 1].
- 1. Use the factor to calculate the monthly indoor calculation temperature for heating: $\theta_{int,calc,H} = a_{H,red} \times (\theta_{int,set,H} - \theta_{e,db,m}) + \theta_{e,db,m}$.
- 1. Use the adjusted monthly indoor calculation temperature in the monthly transmission and ventilation heat-transfer calculations for heating.

No-intermittency rule. Where no qualifying day, night, or weekend reduced-heating period applies, set $a_{H,red,ztc,m,BC/IC} = 1.0$, representing continuous heating with no intermittency reduction.

Validation and disclosure controls

- The normal and reduced set points, external temperature, and zone time constant shall be present before Method A is evaluated; the only permitted time-constant fallback is 20 h.
- The same method shall be applied to the base and improved cases. Case-specific results may differ because thermal properties, heat-transfer coefficients, or set points differ.
- The heating-energy intermittency factor in this table does not replace the separate CIBSE-based factor used to size peak heating plant.

Table A.37 — Choice between methods A and B for cooling intermittency

Method selection

If Method A applies

Parameter	EDGE value	Valid range / unit
Correlation factor for intermittent cooling, $b_{C,red,wknd}$	0.30	0 to 1, dimensionless

Scope of selection. This choice applies to the ISO 52016-1:2017 monthly calculation of cooling need for thermally conditioned zones in the EDGE base case and improved case. It does not define peak cooling-load corrections or operational control sequences.

Normative calculation rule adopted by EDGE

Eligibility condition. Method A recognizes an intermittent-cooling reduction only when cooling is reduced or switched off for the entire weekend, meaning a duration of at least 48 hours per week. Otherwise, the reduction factor is 1.0.

$$f_{C,red,wknd,ztc} = (\Delta t_{C,red,wknd,ztc} \times n_{rep,C,red,wknd,ztc}) / (24 \times 7)$$

$$a_{C,red,ztc,m} = (1 - f_{C,red,wknd,ztc}) + b_{C,red,wknd} \times f_{C,red,wknd,ztc}$$

If $\Delta t_{C,red,wknd,ztc} < 48$ h/week: $a_{C,red,ztc,m} = 1.0$

Variable	Definition	Type / unit	Validation
$\Delta t_{C,red,wknd,ztc}$	Duration of weekend cooling reduction or switch-off	hours/week	$0 \leq \text{value} \leq 168$
$n_{rep,C,red,wknd,ztc}$	Number of qualifying weekend intermittency repetitions per week	integer	0 or 1 for the weekly schedule
$f_{C,red,wknd,ztc}$	Relative part of the week with qualifying intermittency	dimensionless	$0 \leq \text{value} \leq 1$
$b_{C,red,wknd}$	Empirical Method A correlation factor	dimensionless	Fixed at 0.30
$a_{C,red,ztc,m}$	Monthly reduction factor applied to cooling need	dimensionless	$0 \leq \text{value} \leq 1$

Implementation requirements

- Method selection is a methodology constant.
- If no weekend reduction or switch-off is present, $n_{rep,C,red,wknd,ztc}$ shall be 0 and $a_{C,red,ztc,m}$ shall be 1.0.
- The correlation factor $b_{C,red,wknd}$ is 0.30 and is not editable by the project team.
- The factor shall be calculated for every thermally conditioned zone and month.
- Base-case and improved-case schedules are processed separately.
- The output description shall refer to cooling, not heating. A value of 1.0 means no reduction in calculated cooling need; lower values represent a reduction.
- Long unoccupied periods, including school holidays, remain identified as post-MVP work in the cooling-demand methodology.

Table A.38 — Choice between methods A and B for overheating indicator

The risk of undersizing of a cooling system cannot be calculated with the monthly calculation method, unless reliable (national or regional) hourly cooling load frequency distribution curves are available for each space category.

Table A.39 — The monthly fraction of energy need for humidification

Monthly fraction of energy need for humidification $f_{HU;m}$
--

Formula? If Yes, give formula	Yes but not implemented in EDGE V3, to be implemented in EDGE Version 3
	for each month m : $f_{HU;m} = Q_{H;nd;m} / Q_{H;nd;an}$ where $Q_{H;nd;m}/an$ is the monthly / annual energy need for heating, as determined in 6.5.4.1, in kWh
If No, give fraction for each month (total = 1)	Monthly fraction of energy need for humidification $f_{HU;m}$
January	Not applicable
February	Not applicable
March	Not applicable
April	Not applicable
...	...

Table A.40 — Efficiency of latent heat recovery

Note: This is not used

Table A.41 — Annually accumulated amount of moisture to be supplied per kg dry air supply

Note: This is not used

Table A.42 — Choice of glazing area or frame area fraction

Description	Choice
For each window: free choice between glazing area or fixed frame fraction	No
For all windows the same choice: either glazing area or fixed frame fraction	Yes
For all windows: only glazing area allowed	No
For all windows: only fixed frame fraction	No
In case of frame fraction:	F_{fr}
Frame fraction fixed value	Version 3.0: 0.5 Version 3.1: 0.25. <i>Note: the value applies only to façade windows.</i>

Table A.43 — Factors related to the solar energy transmittance

Correction and weighting factor for g-value non-scattering and scattering transparent glazing's and blinds:		
F _w	a _g	alt _g
0.9	0.75	45
Default values of the total solar energy transmittance at normal incidence, g _n , for typical types of glazing		
Type	g _n	
Single glazing	0.87 (EDGE Assumption)	
Correction and weighting factor for g-value non-scattering and scattering transparent glazings and blinds		
F _w	a _g	alt _g
Double glazing	0.76 (EDGE Assumption)	
Double glazing with selective low-emissivity coating	0.37 (EDGE Assumption)	
Triple glazing	0.76 (EDGE Assumption)	
Triple glazing with two selective low-emissivity coatings	0.37 (EDGE Assumption)	
Double window	0.76 (EDGE Assumption)	

Blind Type	Optical properties of blind	Optical properties of blind	Reduction factor with	Reduction factor with
	Absorption	Transmission	Blind inside	Blind outside
Generic blinds	Not Applicable	Not Applicable	Not Applicable	0.4

Table A.44a — Movable shutter reduction factor, f , and movable solar shading reduction sht ;with factor f

Note: This is not part of present Version 3 calculation methodology. Assumed as 1 throughout the year.

Table A.44b — Movable shutter reduction factor, f , and movable solar shading reduction sht ;with factor f

Note: This is not part of present Version 3 calculation methodology. The value 1 is used in formula

Table A.44c — Movable shutter reduction factor, f , and movable solar shading reduction sht ;with factor f

Note: This is not part of present Version 3 calculation methodology.

Table A.45 — Choices between options and methods for calculation of shading by external objects

Description	All applications
Is the effect of shading by distant objects included?	No

Description	Shall be taken into account	May be taken into account	Shall be ignored
When calculating solar shading on building elements: which types of distant shading objects (not on site) may or shall be taken into account or ignored. NOTE For instance landscape (such as hills or dikes), vegetation (such as trees), other constructions (such as buildings)	None	Other constructions (such as buildings)	Temporary objects. Vegetation (such as trees) Landscape (such as hills or dikes).
When calculating solar shading on opaque building elements such as roofs or facades: which types of onsite shading objects can or shall be ignored. NOTE For instance rebates, overhangs or other shading objects from the own building(s) on site.	None	None	None
When calculating solar shading on transparent building elements: NOTE For instance window rebates, overhangs and side fins	Horizontal overhangs and vertical side fins on the building itself, at any depth (no 20% depth threshold)	None	Window rebates or reveals and all other on-site objects
Specific subdivision rules for the calculation of solar shading on building elements	None		
Choice of solar shading method			All applications
Method 1: shading of direct radiation			Yes
Method 2: shading of direct and diffuse radiation			No
If Method 2, reference to calculation procedure			Not Applicable

Table A.46 — Parameters for monthly solar shading due to **overhangs**

Application. All months, façade orientations and hemispheres where a horizontal overhang is entered for a transparent element.

Period:	summer: June - September for northern hemisphere
----------------	---

Orientation		A1	B1	A2	B2
North hemisphere	South hemisphere				
S	N	-3.023	0.045	1.285	-0.006
SE-SW	NE-NW	-1.255	0.015	0.905	-0.008
E-W	E-W	-0.684	0.005	0.610	-0.004
NE-NW	SE-SW	-0.654	0.006	0.616	-0.006
N	S	-0.726	0.007	0.616	-0.007

Methodology statement

EDGE uses the coefficients above in the monthly overhang correlation defined by the approved shading-calculation method. The project latitude determines the hemisphere column.

Implementation controls

- Use these coefficients only for horizontal overhangs on transparent elements.
- Limit the resulting shading factor to the physical range 0.0 to 1.0.
- If no overhang is entered, use an overhang shading factor of 1.0.
- Apply the coefficient table to improved case only, unless explicitly indicated.
- Do not use the fin coefficients in Table A.47 for an overhang.

Table A.47 — Parameters for monthly solar shading due to fins

Period: summer: June - September for northern hemisphere					
Orientation		A1	B1	A2	B2
North hemisphere	South hemisphere				
S	N	-1.175	0.012	0.860	-0.008
SE-SW	NE-NW	-0.799	0.009	0.684	-0.006
E-W	E-W	0.118	-0.014	0.005	0.010
NE-NW	SE-SW	0.155	-0.041	-0.680	0.009
N	S	0.275	-0.133	0.641	0.039

Methodology statement

EDGE uses the coefficients above in the monthly vertical fins correlation defined by the approved shading-calculation method. The project latitude determines the hemisphere column.

Implementation controls

- Use these coefficients only for fins on transparent elements.
- Limit the resulting shading factor to the physical range 0.0 to 1.0.
- If no overhang is entered, use an overhang shading factor of 1.0.
- Apply the coefficient table to improved case only, unless explicitly indicated.
- Do not use the overhang coefficients in Table A.46 for a side fin.

Table A.48a — Parameters for monthly solar shading by obstacles; more detailed method

Application. All projects using the monthly calculation method, for both the base case and improved case.

Item	Symbol	Unit	EDGE V4 selection
Monthly weighting factor	w_obst,m	Dimensionless	1.0 for every month.
External-obstacle shading factor	F_sh,obst,k,m	Dimensionless	1.0 for every month and orientation when no approved obstacle dataset is used.
Contextual obstacles	-	-	Neighbouring buildings, terrain and vegetation are not modelled by the current default method.
Building shading devices	-	-	Overhangs and side fins are calculated separately under the applicable EDGE shading-device method.
Base and improved cases	-	-	Apply the same external-obstacle assumption to both cases.

Methodology statement

EDGE adopts a constant monthly weighting factor of 1.0. Where no approved project-specific obstacle dataset is used, the external-obstacle shading factor is also 1.0. This means that contextual external obstacles do not reduce calculated solar irradiation.

The assumption applies equally to the base case and improved case. Dedicated shading devices entered in EDGE, including overhangs and side fins, are evaluated separately and are not external obstacles under this table.

Implementation controls

- Valid range for $F_{sh,obst,k,m}$: 0.0 to 1.0.
- Default value: 1.0 when approved obstacle data are absent.
- Do not use blank, null or zero as a substitute for the default value.
- Use the same default for all twelve months and all EDGE orientations.
- Do not combine contextual-obstacle shading with overhang or fin shading unless overlap is explicitly resolved.

Table A.48b — Parameters for monthly solar shading by obstacles; more detailed method (See F.3.1.2 and F.3.5.2.2)

Note: Solar Shading by obstacle is not considered.

Annex 2 - Types of models for energy performance

This annex explains why EDGE Version 3 uses a monthly calculation method and when another model type may be more appropriate.

A2.1 Comparison of model types

Model type	Typical basis	Strengths	Limitations	Appropriate use
Empirical or benchmarking	Measured or surveyed performance from comparable buildings and statistical relationships.	Useful for stock comparison and portfolio screening; can reflect real operating outcomes.	Needs a large, representative dataset and has limited ability to test individual design changes.	Existing-building benchmarking and contextual checks.
Steady-state or degree-day	Average conditions, temperature differences, and degree-day relationships.	Transparent and relatively simple with limited inputs.	Limited treatment of thermal mass, solar timing, intermittency, and interacting gains.	Simple checks and preliminary estimates.
Monthly quasi-steady-state	Monthly heat balances with heat transfer, gains, thermal capacity, time constants, utilization factors, and intermittency.	Repeatable and auditable; captures key interactions with a manageable input burden.	Does not resolve hourly peaks, short overheating events, or detailed controls.	The principal EDGE Version 3 method for annual heating and cooling needs.
Dynamic simulation	Hourly or sub-hourly heat balances, system operation, control, and weather response.	Can examine peaks, comfort, complex zoning, controls, and transient effects.	Data- and skill-intensive; greater setup and review burden; sensitive to assumptions.	Detailed design, overheating, complex buildings, and complementary validation.
Calibrated operational model	Physics-based or statistical model adjusted against measured energy and operating data.	Connects model behavior with an occupied building and supports diagnostics.	Requires reliable metering, weather, occupancy, and operational records.	Existing-building analysis and measurement and verification.

A2.2 Why EDGE Version 3 uses the monthly method

EDGE needs a calculation that can be used consistently across many building types, climates, project stages, and markets. The monthly method balances technical representation with an input and review burden suitable for certification. It includes the main physics that drive annual demand while keeping inputs understandable and auditable.

Compared with a simple annual steady-state model, the method represents monthly internal and solar gains, effective thermal capacity, utilization factors, and intermittent operation. Compared with hourly simulation, it requires fewer time-series inputs and provides a more repeatable pathway for global assessment.

Hourly simulation remains appropriate where a decision depends on peak loads, short-duration comfort, detailed natural ventilation, humidity, unusual geometry, or control sequences. In those cases, the detailed analysis complements the standardized EDGE comparison.

A2.3 Transparency and accuracy

Transparency and accuracy are related but not identical. A transparent method may be too simple for a particular design decision, while a detailed model may still be unreliable if inputs or controls are poorly defined. EDGE Version 3 prioritizes a transparent and repeatable annual comparison. Additional analysis is appropriate where the limitations in Section 13 affect the decision.

Changes log

Date	Version	Changes
Oct - 20 - 2026	1.0	Official Publication



www.edgebuildings.com