



BUILD_ME

IKI Project - Accelerating 0-emission building sector ambitions in the MENA region

Training for TG1:

Financial institution: EBRD - GEFF

16.07.2024

Supported by:



based on a decision of the German Bundestag

Welcome words

Riadh Bhar
Guidehouse



Objectives of the training

EBRD - GEF



- 1 Recap - Overview of the project and its objectives
- 2 Provide an understanding of the tool and the EPC process
- 3 Enable the utilisation of the BEP tool to calculate the energy performance of a building



Agenda

Welcome words and short introduction of the project	5 min
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Background of the BEP Tool	5 min
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The BEP tool 2.0 and automated EPC process	15 min
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Walk through the website	30 min
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Case study and discussion	20 min
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Q&A	15 min
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Short introduction to the project

Introduction to the BUILD_ME Project



Overarching storyline of BUILD_ME phases

Phase 1

2016 - 2018



Analysis & Recommendations

- Analysis of boundary conditions and stakeholder perspectives
- Formulating recommendations for implementation

Phase 2

2019 - 2022



Prepare the Implementation

- Developing tools for implementation
- Connecting with stakeholders to initiate the implementation

Phase 3

2022-2025



Support the Roll-Out

- Piloting the roll-out to reach implementation on all levels
- Scaling up activities to enlarge the impact

Problem Identification

The lack of a baseline hindering the assessment of low energy buildings in the BUILD_ME countries

Lack of enforcement and/or
availability of EEBCs

Lack of data about BaU
constructions

No benchmarking of buildings'
energy performance

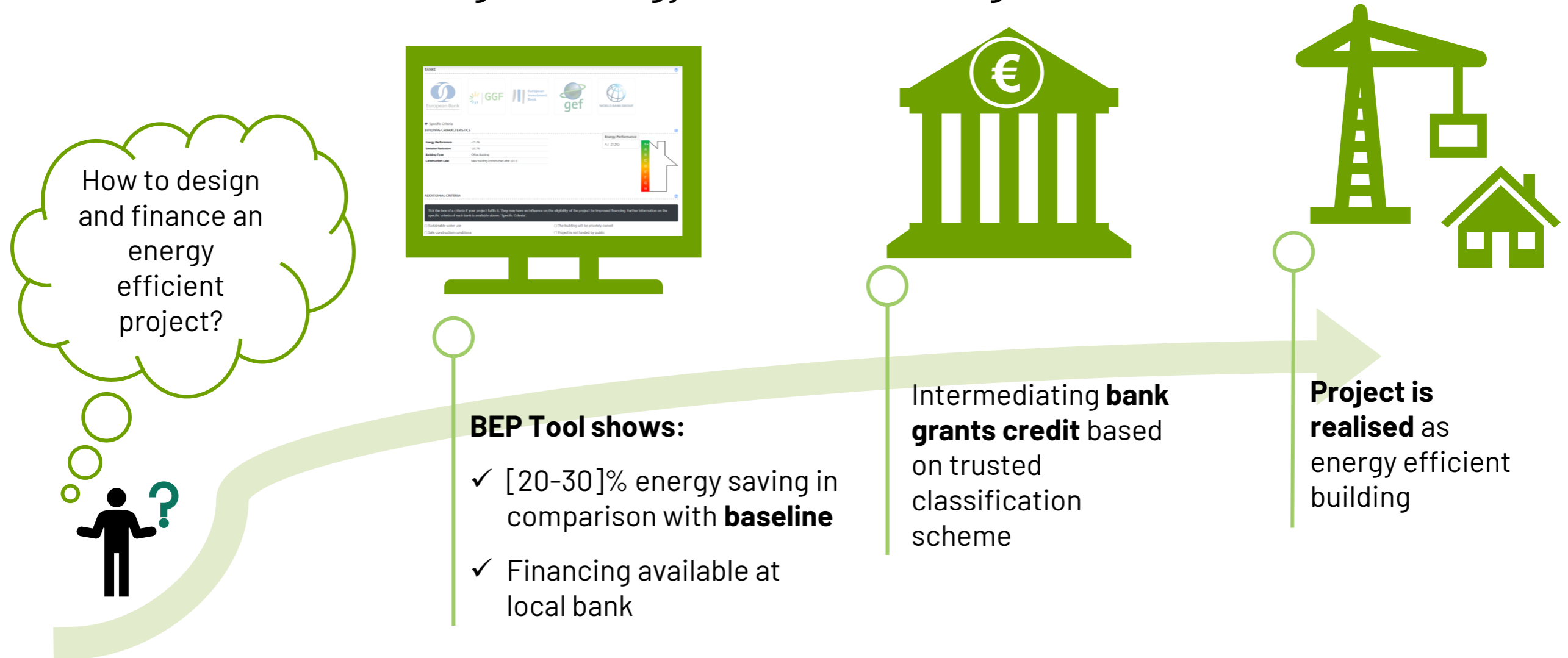
NO
energy consumption baseline

Bottleneck
To finance energy efficient buildings

Background of the BEP Tool

Objective of the BEP Tool

Easier access to financing for energy efficient buildings



Our Integrated Solution

Define own baselines and develop tailored energy labelling scheme for new buildings

- Data from real constructions not older than 3 years
- At least 5 cases per building type covered in each country building typology
- Data from subsidy programs, literature, interviews with relevant stakeholders, permits documents etc.
- BEP tool based on ISO 52016, fed with local data used as calculation engine.
- Researched buildings in building typology represents baseline, which is shown in the BEP Tool as default value.

Reference Buildings and Building Typology

BUILD_ME Building Energy Performance Calculation tool

Classification of buildings compared to baseline

Building typology database

Country: Lebanon | Region: Village

This buildings typology database depicts representative reference buildings in Egypt, Jordan, Lebanon, and the United Arab Emirates. These are buildings in the building stock (new and existing buildings) that represent a specific building type (e.g. free-standing single-family house) and reflect the typical architectural and technical building systems. The photos shown are generic photos for that category and the technical specifications that can be found within the BEP tool. Some of the photos are also general for that category, meaning they do not correspond exactly to the specific buildings in the photos.

Typology

- Multi Family House (MFH) - Small ($S \le 1000m^2$) - detached
- Single Family House (SFH) - detached

Construction period

- New and recent constructions (after 2015)
- Existing building: 1980-2015
- Existing building: before 1980

Home Tools Knowledge base

My database

PROJECT

Project Name: []

LOCATION

Country: Jordan

Reference city (representative climate for the selected climate region): Amman

Specify region (e.g. urban): Amman-East

BUILDING TYPE

Select building type: MFH (Multi family house/Apartment block)

Age group: New construction (after 2010)

New construction or renovation project: New building

SYSTEM SELECTION 1

ENERGY

Primary energy by energy carrier | Energy by energy use | Final energy by energy carrier

Energy (kWh/m²a)

XXX | Baseline

Unit	XXX	Baseline	Delta
Space heating	4.51	6.45	-1.94
DHW	5.95	7.02	-1.07
Space cooling	18.98	24.60	-5.62
Lighting	7.95	7.95	0.00
Auxiliary energy	0.42	1.92	-1.50
Total	37.80	47.90	-10.10
Total incl. PV	37.81	47.94	-10.13

ENERGY RATING: A

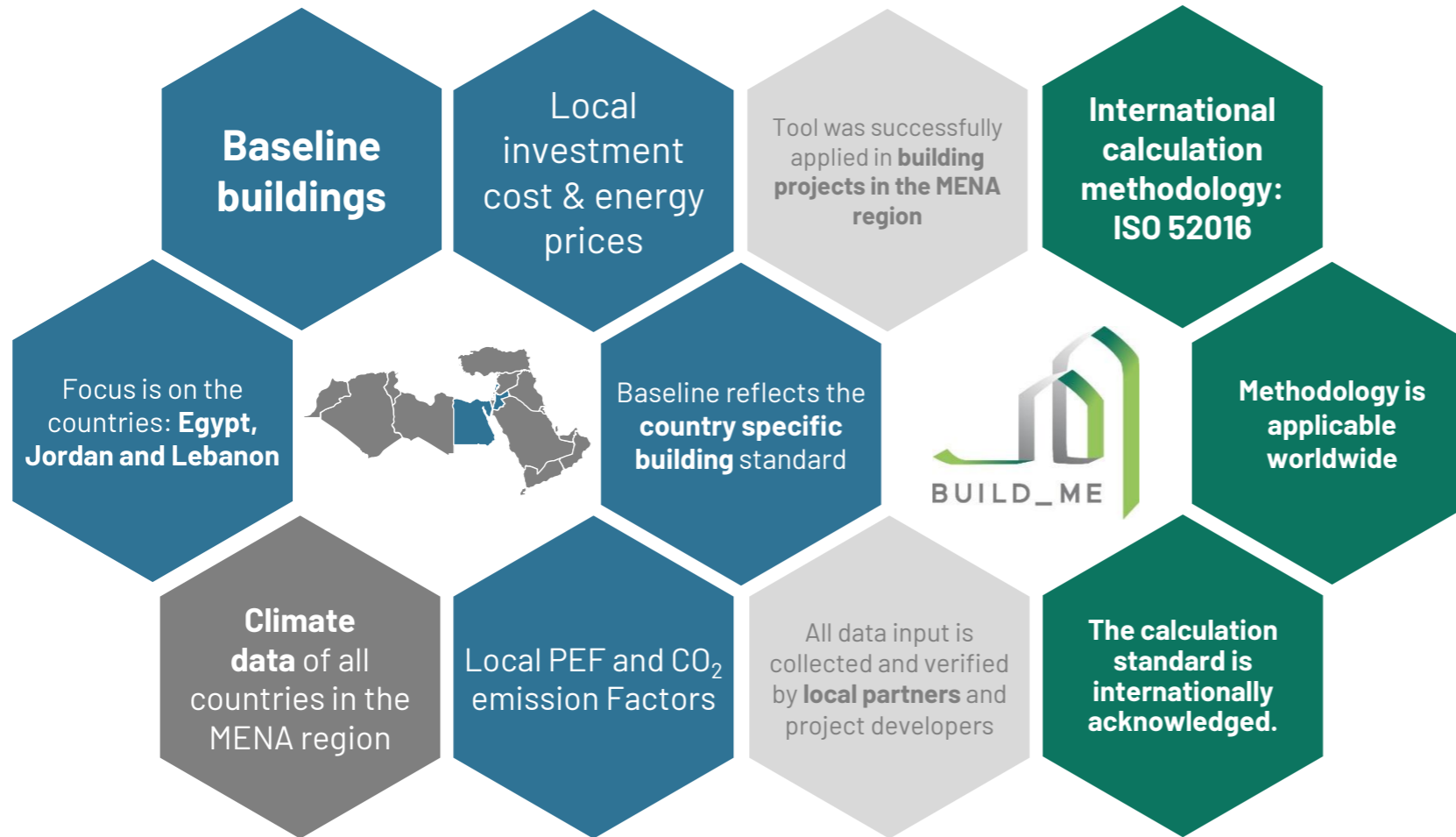
FINANCIAL

Total cost | Specific cost

	Current	Baseline	Delta
Investment	50 €/m²	41 €/m²	9 €/m²
Replacement	7 €/m²	7 €/m²	0 €/m²
Residual	-9 €/m²	-7 €/m²	-1 €/m²
Energy	31 €/m²	40 €/m²	-8 €/m²
Inspection & Maintenance	1 €/m²	1 €/m²	0 €/m²
Global cost (total)	80 €/m²	81 €/m²	-1 €/m²

Developed for the MENA region

Database from **local partners** & **international** calculation methodology



Internal market data is **collected from local partners** for Egypt, Jordan and Lebanon.



International energy calculation methodology.



Country specific climate data, incl. multiple climate zones within each country.

BEP Tool

Developed for the MENA region: Database from **local partners** & **international** calculation methodology



Internal market data is **collected from local partners** for Egypt, Jordan and Lebanon.



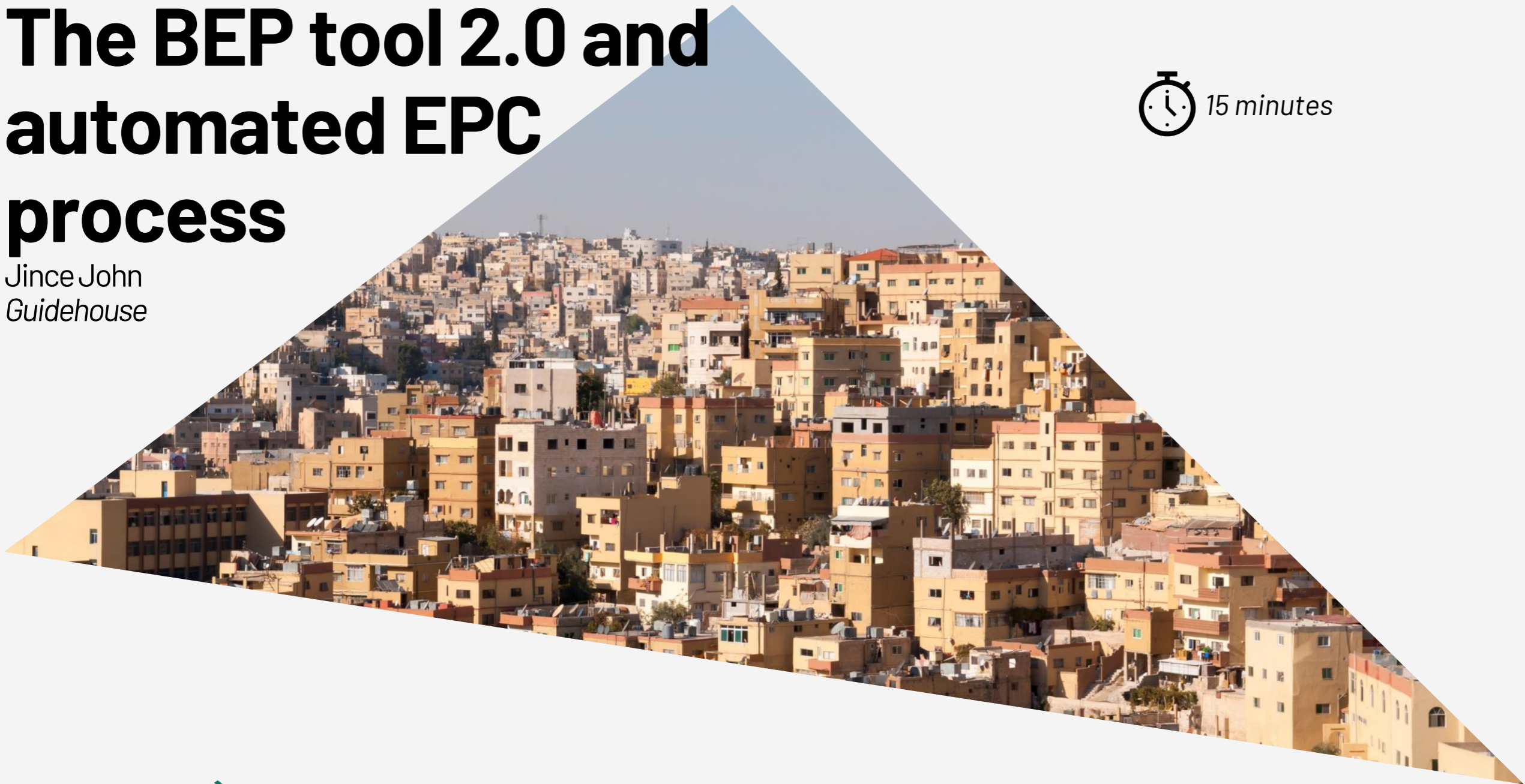
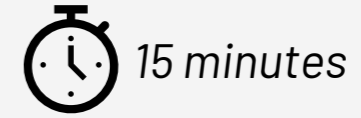
International energy calculation methodology.



Country specific climate data, incl. multiple climate zones within each country.

The BEP tool 2.0 and automated EPC process

Jince John
Guidehouse



Building Energy Performance (BEP) tool 2.0

Logic of the BEP tool (1)

Customisable, transparent, adapted to the MENA region



Performance of energy efficiency measures & RE

- Calculate **energy demand** of building
- Compare it to the **country's baseline** buildings or other personal projects
- Determine the **energy savings** of single or multiple efficiency measures and the use of renewable energies



Calculation of monetary savings

- Identify **cost savings** resulting from the energy efficiency measures and get the **cost-optimal** case
- **Local market data** is already available for Egypt, Jordan and Lebanon (investment cost, energy prices)...
- ...or enter the real investment cost and energy prices of the specific project (*not in beta*)



Free web application

- Tool is **free to use as browser application**
- Optimized for **mobile devices**
- Provides **default input values** for faster application, but also **advanced mode** for experienced user



Proven methodology

- Energy calculation is based on the **international norm** for modelling thermal building performance (EN ISO 52016)
- The BEP-Tool was already **successfully applied** in various projects and countries
- **Full transparency** with a detailed user manual, incl. all calculation steps and internal assumptions.

Logic of the BEP tool (2)

Customisable, transparent, adapted to the MENA region

In comparison to other available tools, the BEP tool is



MENA Specific

Up-to-date baseline in the 3 countries

Up-to-date cost data and prices based on market analysis

Updated energy consumption patterns for building types



Easy/Simple to use

No modelling needed

No advanced knowledge required



Allows for Editable Inputs and creating own baseline

Can compare with codes/rating systems

Useful for analysing the retrofitting option



Provides Detailed Explanation of the Results

Can convert to primary energy outputs

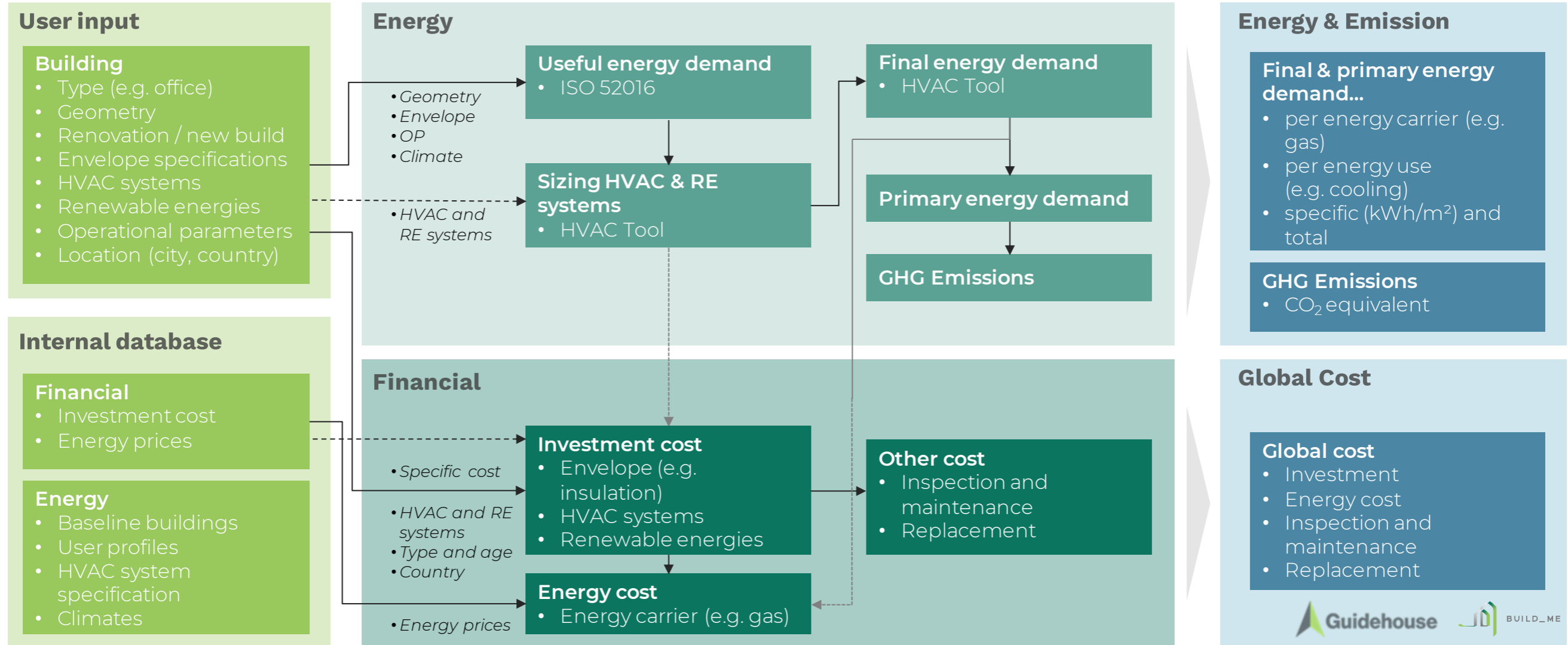
Can show the distribution of CO2 savings per energy consumer

Calculation methodology

Input

Calculation engine

Output

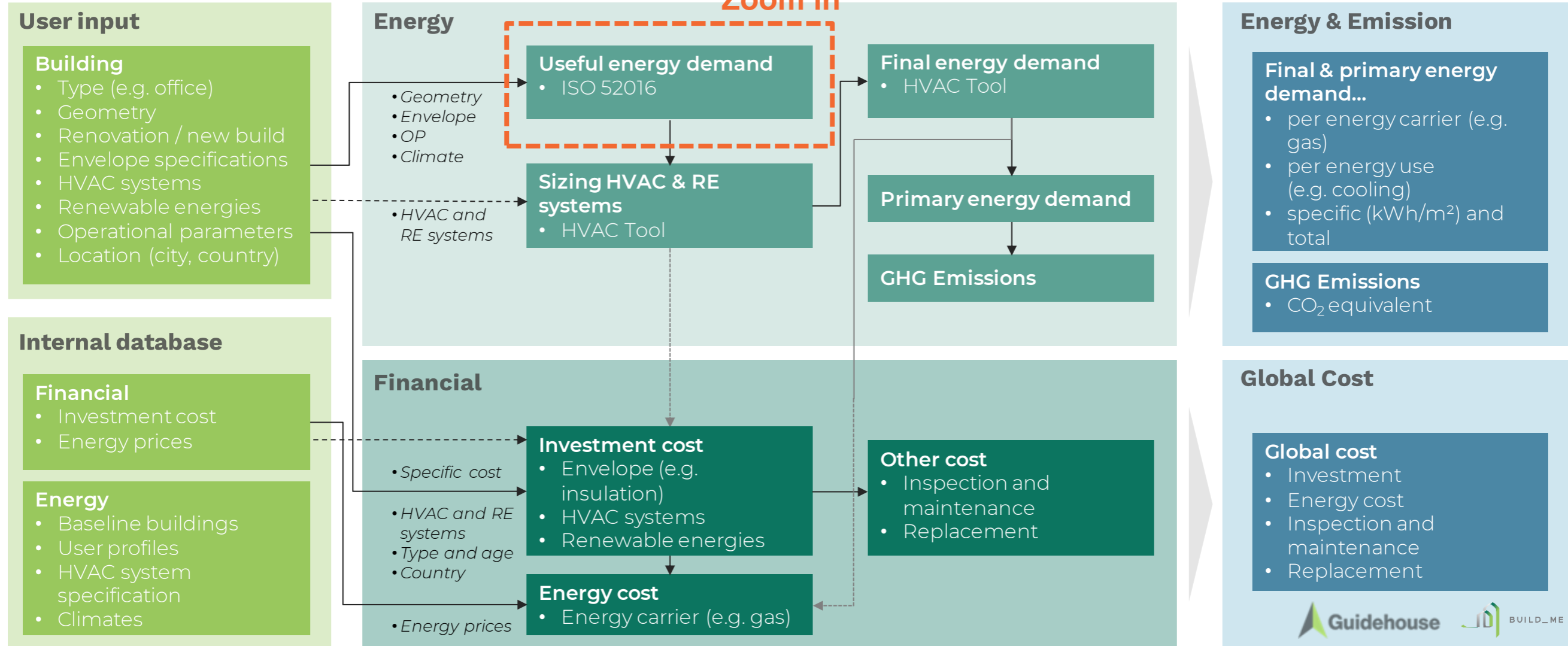


Calculation methodology

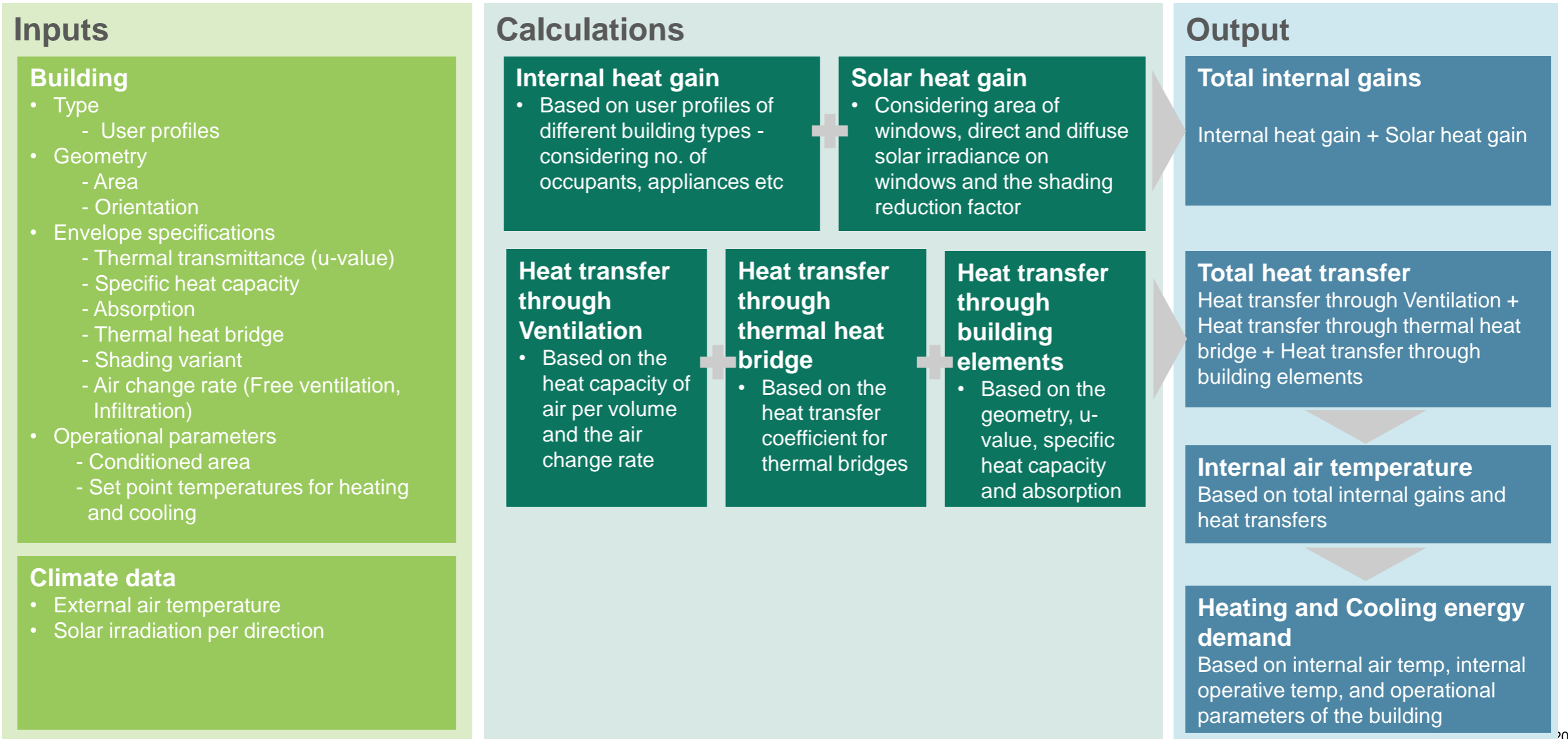
Input

Calculation engine

Output



Calculation methodology – Zoom into: Useful energy H&C

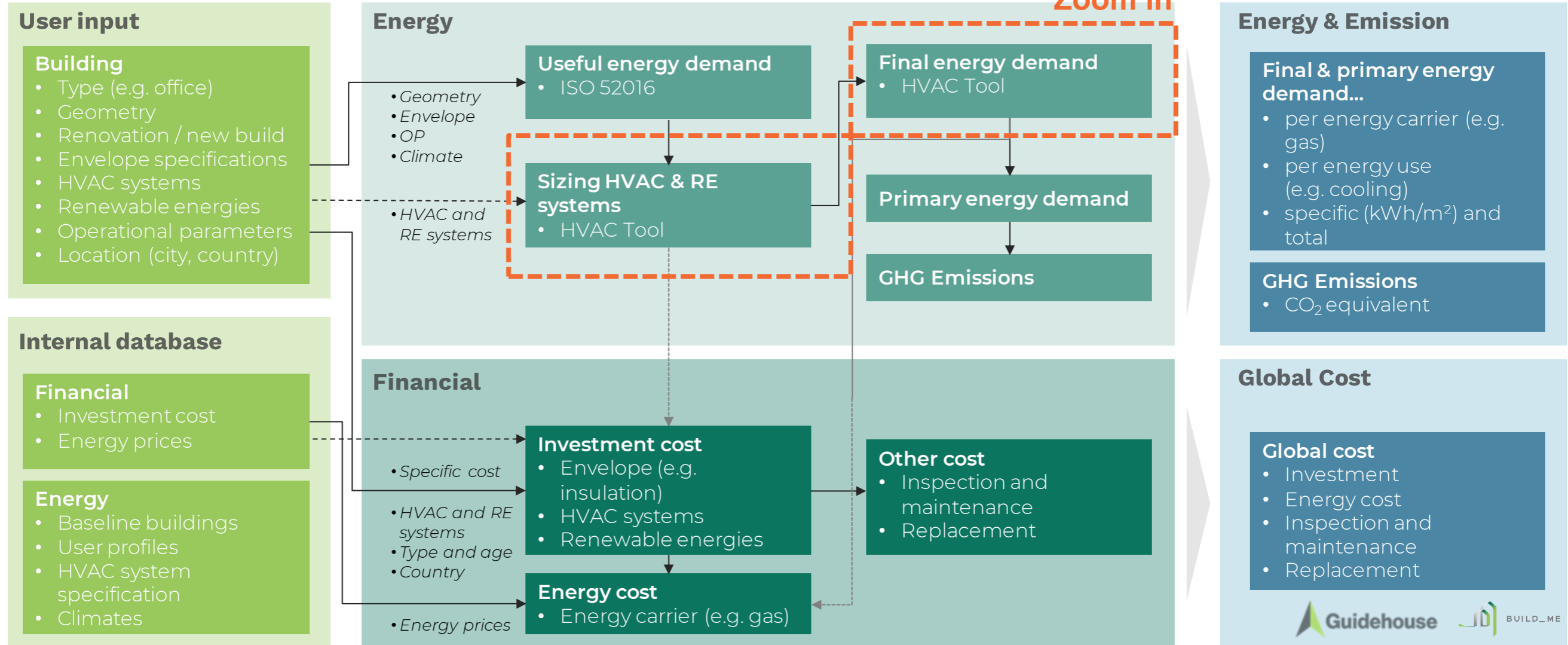


Calculation methodology

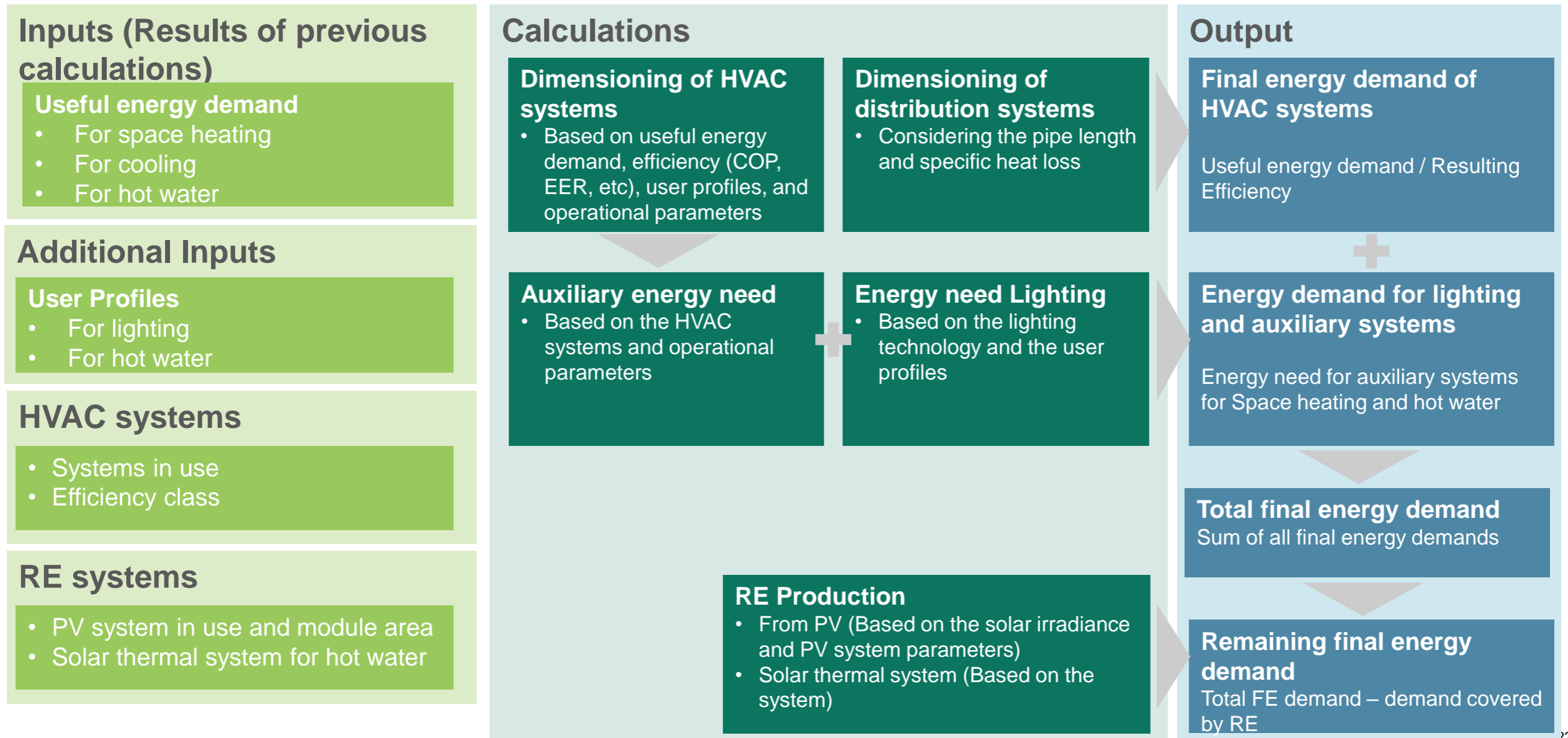
Input

Calculation engine

Output



Calculation methodology – Zoom into: Final Energy



Online Web App - Input

1 **General Information** **Input** **Results**

version: 2.0. [Previous](#) [Next](#)

PROJECT ?

Project Name

LOCATION ?

Country

Reference city (representative climate for the selected climate region)

Specify baseline

BUILDING TYPE ?

Select building type 

Age group

New construction or renovation project

SYSTEM SELECTION ¹ ?

Space heating Space cooling Hot water
 Mechanical ventilation Lighting Photovoltaics

¹ This can be still changed later

2 **General Information** **Input** **Results**

version: 2.0.9.13 [Previous](#) [Next](#)

GEOMETRY-RELATED PARAMETERS ?

Building levels (floors)	<input type="text" value="6"/>	-
Number of dwellings	<input type="text" value="10"/>	-
Net floor height (Floor to ceiling)	<input type="text" value="3.40"/>	m
Net floor area (i.e. living area)	<input type="text" value="1,485.00"/>	m ²
Roof area opaque	<input type="text" value="270.00"/>	m ²
Façade area opaque (excluding windows)	<input type="text" value="1,075.20"/>	m ²
Window area (Total = transparent + frame)	<input type="text" value="268.80"/>	m ²
Area floor slab (ground plate)	<input type="text" value="270.00"/>	m ²

WALL ?

U-value (wall) W/(m²K)

Calculate U-Value

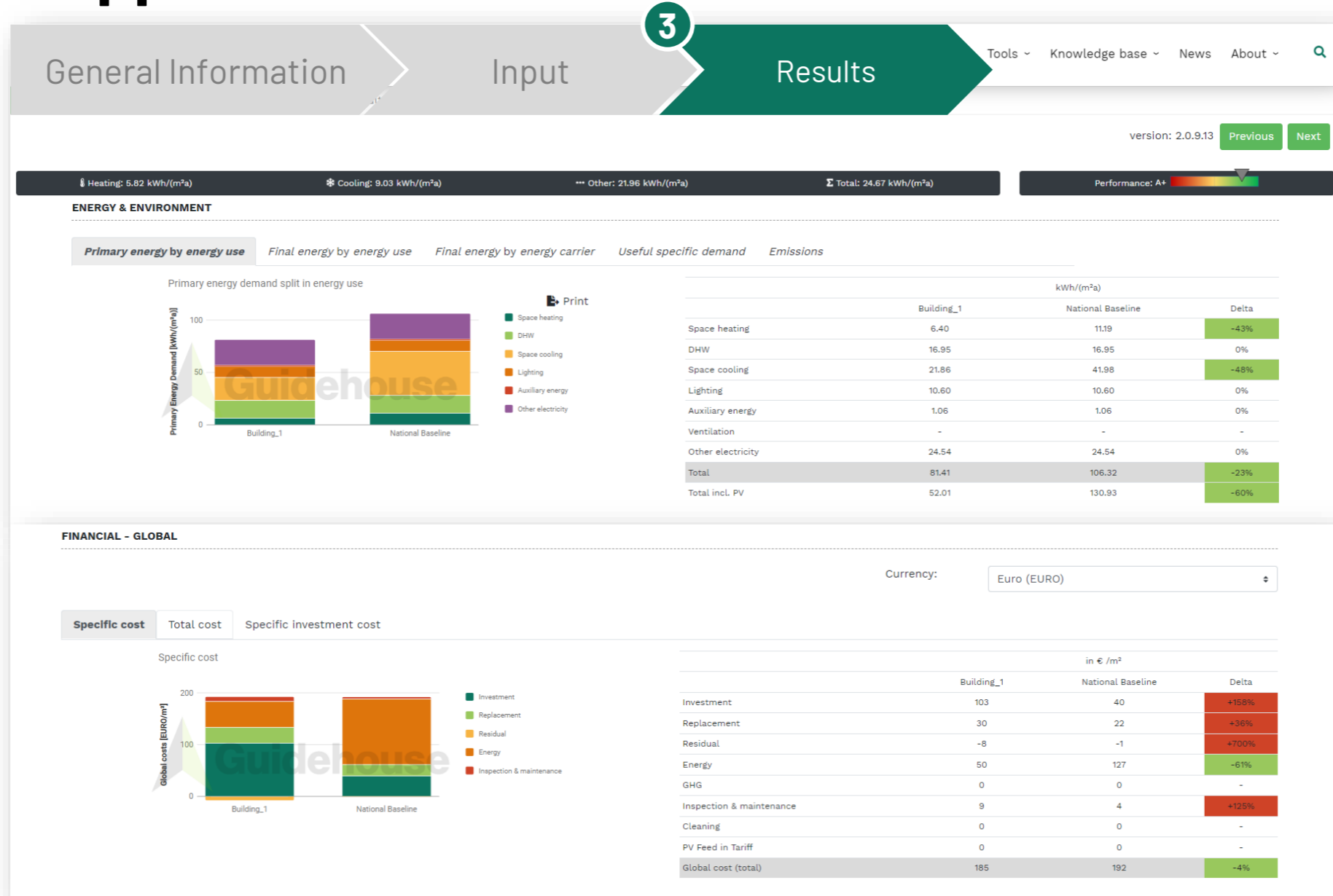
ROOF ?

Type (material)

U-value (roof) W/(m²K)

Calculate U-Value (roof)

Online Web App – Results



Online Web App – Results detail

1| Quick overview

The main facts.

2| Output selection

4 tabs to select the energy performance indicator.

3| Overview chart

Comparison to the baseline building.

4| Results table

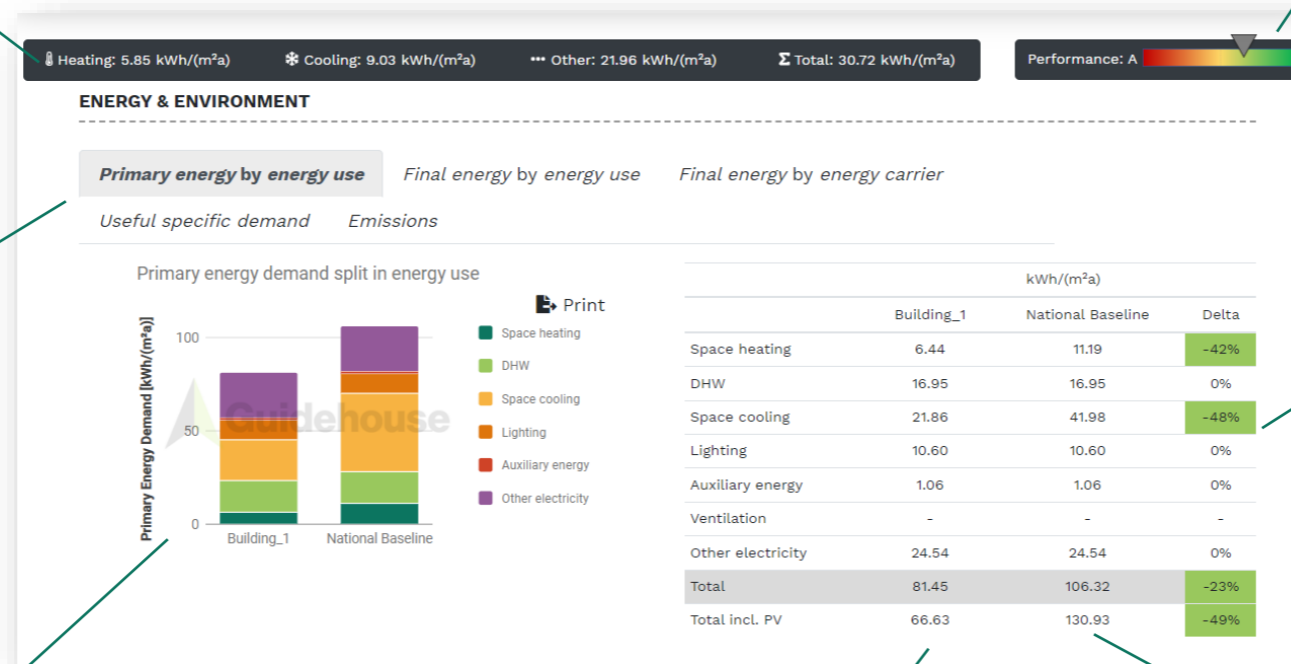
Detailed results in numbers.

7| Performance rating

C = equal to baseline

6| Comparison

Difference to the baseline buildings.



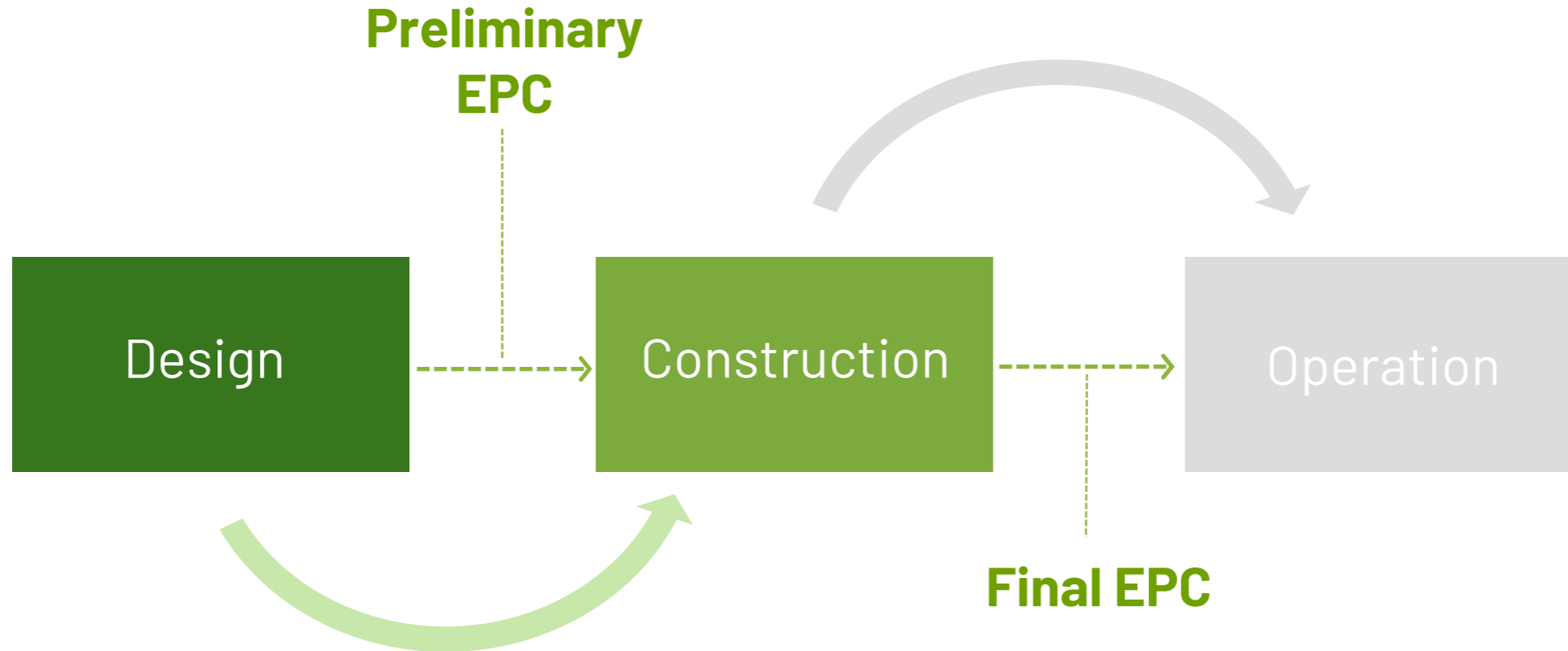
5| Baseline building

Detailed results of the baseline building.

Energy Performance Certificate

Energy Performance Certificate

EPC process



Initial **Preliminary EPC** for design stage and a **Final EPC** after construction stage. There is no EPC for operation stage.

Energy Performance Certificate

EPC Process - Functions & Roles



Developer/Owner Project Team/ EPC expert

- Perform self-assessment in EPC software (BEP tool)
- Register for certification
- Prepare & submit supporting documents



EPC Auditor

- Review & approve supporting documents
- Perform site visit
- Recommend certification



EPC Scheme Operator

- Issue EPC certificate
- Provides quality assurance
- Trains EPC Auditors
- Provides education & customer support

Energy Performance Certificate

EPC Process - Functions & Roles

Developer/Owner Project Team/ EPC expert

- Help determine which strategies to use
- Complete calculations & self assessments
- Compile documentation & submit to Auditor
- Provide clarifications & coordinate site visits

EPC Auditor

- Review documentation package submitted by the EPC expert
- Conduct site Audit
- Recommend project certification to the scheme operator
- Answer technical questions

EPC Scheme Operator

- Lead and manage the process of EPC
- Review documents submitted by EPC Auditor
- Provide quality control

Energy Performance Certificate

EPC Process - Functions & Roles

Developer/Owner Project Team/ EPC expert

- Help determine which strategies to use
- Complete calculations & self assessments
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- Recommend project certification to the scheme operator
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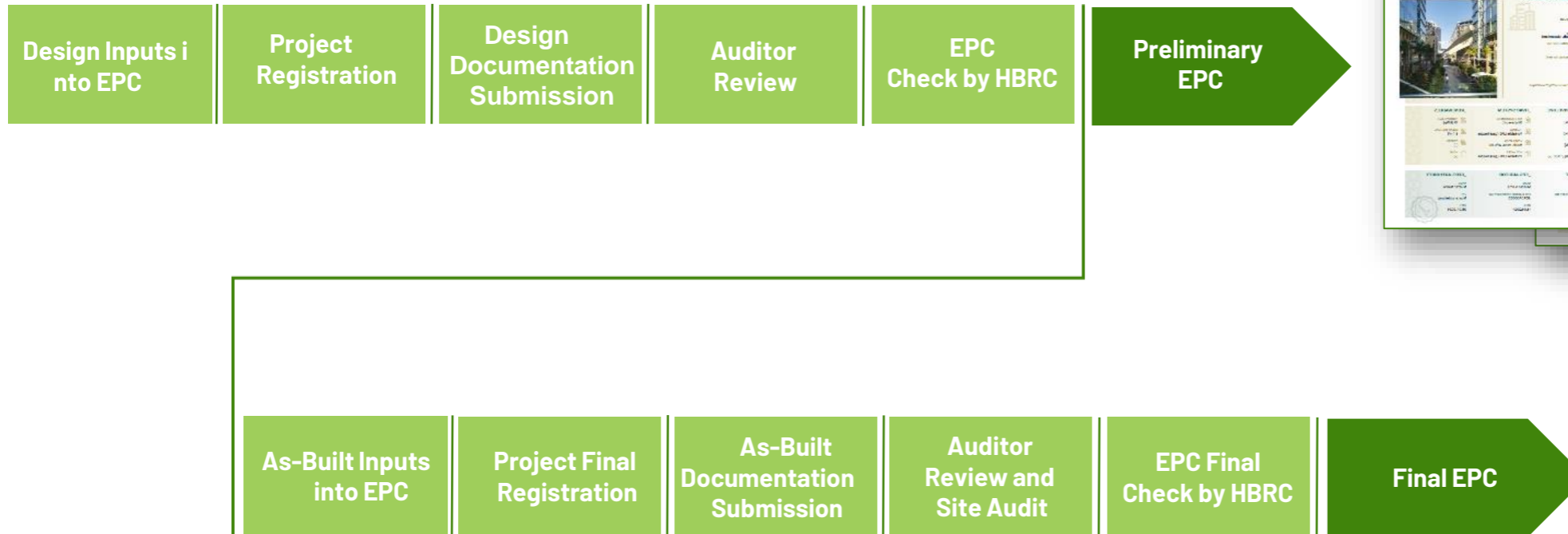
EPC Scheme Operator

- Lead and manage the process of EPC
- Review documents submitted by EPC Auditor
- Provide quality control

Independent at Project Level

Energy Performance Certificate

EPC process exemplary for Egypt



Energy Performance Certificate

Design of the certificate - Example of a Preliminary EPC

General building info

PRELIMINARY ENERGY PERFORMANCE CERTIFICATE_for Single Family House

VALID UNTILL 20.03.2029
CERTIFICATION NO. PRE_LEB202400002
CLIMATE ZONE Beirut

_GENERAL BUILDING INFORMATION

BUILDING TYPE: Single Family House
ADDRESS: Musterstraße xx, XXXX Musterstadt, Musterland
PLANNED YEAR OF CONSTRUCTION: 2024
AMOUNT OF APARTMENTS BY MFA: 16
NET FLOOR AREA: 2800 [m²]
SPECIFIC BASELINE (NATION/CITY/TOWN/Village): National

_BUILDING ENVELOPE
WALL: 0,57 [W/m²K]
ROOF: 0,28 [W/m²K]
FLOOR: 1,20 [W/m²K]
WINDOW: 1,20 [W/m²K] / 0,85 [-]

_HVAC SYSTEM
AIR CONDITIONING: Single-split
HEATING: Portable LPG (gas) heater
VENTILATION: Mech. vent. w/o HR
HOT WATER: Portable LPG (gas) heater

_RENEWABLES
PHOTOVOLTAIC: 10 [kWp]
SOLAR THERMAL: 5 [m²]
OTHERS: [-]
NONE: [-]

_EPC EXPERT
NAME: Muster Name
EPC EXPERT CERTIFICATE NO.: JOR0A00025
DATE: 03.04.2024

_EPC AUDITOR
NAME: Muster Name
EPC AUDITOR CERTIFICATE NO.: JOR0A00025
DATE: 15.04.2024

_CERT. AUTHORITY
NAME: Muster Name
UNIT: Musterabteilung
DATE: 05.04.2024

KPIs

PRELIMINARY ENERGY PERFORMANCE CERTIFICATE_for Single Family House

VALID UNTILL 20.03.2029
CERTIFICATION NO. PRE_LEB202400002
CLIMATE ZONE Beirut

_FINAL ENERGY DEMAND
56,78 [kWh/m²a]
0,48 [-]

_CO₂ EQUIVALENT
18,06 [kgCO₂/m²a]
0,48 [-]

_ENERGY CONSUMERS
Final energy split in energy use
56,78 [kWh/m²a]
Baseline: 102,48 [kWh/m²a]

_ECONOMIC INDICATOR
Very economical
Incremental costs 10 [%]
pay 7 [years]
Global LCOE savings 52 [%]

Recommendations

PRELIMINARY ENERGY PERFORMANCE CERTIFICATE_for Single Family House

VALID UNTILL 20.03.2029
CERTIFICATION NO. PRE_LEB202400002
CLIMATE ZONE Beirut

_RECOMMENDATIONS TO REACH ZERO ENERGY BUILDING STANDARD [A+]

No.	Category	Measures
1	Building Envelope	Foramti omnimittas mllab inuipar Busam cullabore, tempore oreus utlabo. Ita volorae cum quibus apidpant pro cum eest. Aepeclia verum vellistis denuidum volupta dolore nobit utasmo loresta voluptam es solore es sequa seris doluptatis mo berumet aut mod quae vidella aut explignit isenit de sed quam nhib, si dolupta velecto magnatint ea enim erum qui sequataquae.
2	HVAC	Ita volorae cum quibus apidpant pro cum eest. Aepeclia verum vellistis denuidum volupta dolore nobit utasmo loresta voluptam es solore es sequa seris doluptatis mo berumet aut mod quae vidella aut explignit isenit de sed quam nhib, si dolupta velecto magnatint ea enim erum qui sequataquae.
3	Renewables	Aepeclia verum vellistis denuidum volupta dolore nobit utasmo loresta voluptam es solore es sequa seris doluptatis mo berumet aut mod quae vidella aut explignit isenit de sed quam nhib, si dolupta velecto magnatint ea enim erum qui sequataquae.
4	Behavior	Equid esequi lur suate comine norem, cum mullor aut quibus pos exeepermatem doluptae mullptae lum quo doluptatiani. Heniant empore erserum eate aliberit pei elur? Ciplatis aut fuga. Peri archit upata dolorem re molorequid nonetis doluptat as simpore nlenhi temporum fugiat unehendit velignam hant quam isam non none pla viles doloris lunt. Igender litore velenitit occusam, ulparh ellabor epudit doluptat assequi stibus, eleceit none moluptatui.

_EXPECTED RESULTS

ENERGY: A+ 25 [kWh/m²a] 0,2
ECONOMY: Very economical PBP 7 [years] Global costs savings 78%

Explanations

PRELIMINARY ENERGY PERFORMANCE CERTIFICATE_for Single Family House

VALID UNTILL 20.03.2029
CERTIFICATION NO. PRE_LEB202400002
CLIMATE ZONE Beirut

_EXPLANATIONS

Reference Page	Topic
1	Building Types: In building types are available in the BEP tool including single-family house (SfH), multi-family house (MfH), office, educational building, shop, and hospital. This section defines the baseline building used to compare the energy performance of the project building.
1	Net Floor Area: Entire conditioned area of the building. For MfH, building area is used, not apartment area.
1	Building Envelope: The calculation of the envelope considers the insulation of the roof, facade and surface, the windows, and the cost to increase the general airtightness of the building's envelope.
1	HVAC: Heating, Ventilation, and Air Conditioning. Based on air change rate, space heating, hot water generation, space cooling, and mechanical ventilation.
1	Renewables: Capacity of the photovoltaic (PV) system described by the power output of the entire system at standard conditions.
1	EPC expert: A trained EPC expert must prepare all technical and administrative documents for building energy labels on behalf of end-users, using the BEP tool.
1	EPC auditor: A trained EPC auditor must review all technical and administrative documents for building energy labels.
1	EPC certification authority: certifying body approved to issue the EPC.
2	Baseline: The baseline building data was collected in 2010 and reflects real constructions. By default, every project is compared to its according baseline. In the EPC, the baseline building is represented by level C.
2	Final energy: Total energy consumed by end users.
2	CO ₂ : Carbon dioxide equivalent represents the impact of different greenhouse gases (GHG) and their equivalent global warming impact.
2	Energy consumers: Equipment consuming the most energy in the building.
2	Economic indicators: Incremental costs represent the costs in addition to baseline for selected measures. Payback period is the amount of time required for the investment to recover its initial outlay in terms of energy savings. Global cost savings refers to the benefits realized from the energy savings actions.
2	Zero Energy Building Standard (ZEB): A new or renovated net-zero building is highly energy efficient, does not cause any on-site GHG emissions from fossil fuels, and reduces embodied carbon to a significant extent. It uses renewable energy, preferably generated on-site, if technically feasible, and/or off-site to fully cover its remaining, very low energy use.
2	Expected results: Expected energy savings, CO ₂ , and economic indicators calculated from planned energy efficiency measures.

Energy Performance Certificate

Design of the certificate - Example of a final EPC

General building info

FINAL ENERGY PERFORMANCE CERTIFICATE_for Single Family House

LCEC
VALID UNTIL: 20.03.2029
CERTIFICATION NO.: PRE_LEB202400002
CLIMATE ZONE: Beirut

_GENERAL BUILDING INFORMATION

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AIR CONDITIONING: Single-split
HEATING: Portable LPG (gas) heater
VENTILATION: Mech. vent. w/o HR
HOT WATER: Portable LPG (gas) heater

_RENEWABLES
PHOTOVOLTAIC: 10 [kWp]
SOLAR THERMAL: 5 [m²]
OTHERS: [-]
NONE: [-]

_EPC EXPERT
NAME: Muster Name
EPC EXPERT CERTIFICATE NO.: JOR0000025
DATE: 03.04.2024

_EPC AUDITOR
NAME: Muster Name
EPC AUDITOR CERTIFICATE NO.: JOR0000025
DATE: 15.04.2024

_CERT. AUTHORITY
NAME: Muster Name
UNIT: Musterabteilung
DATE: 05.04.2024

KPIs

FINAL ENERGY PERFORMANCE CERTIFICATE_for Single Family House

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VALID UNTIL: 20.03.2029
CERTIFICATION NO.: PRE_LEB202400002
CLIMATE ZONE: Beirut

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_ENERGY CONSUMERS
Final Energy split in energy use
Final Energy Demand [kWh/m²a]

_ECONOMIC INDICATOR
Very economical
Incremental costs 10 [%]
Payback 7 [years]
Global cost savings 52 [%]

Explanations

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LCEC
VALID UNTIL: 20.03.2029
CERTIFICATION NO.: PRE_LEB202400002
CLIMATE ZONE: Beirut

_EXPLANATIONS

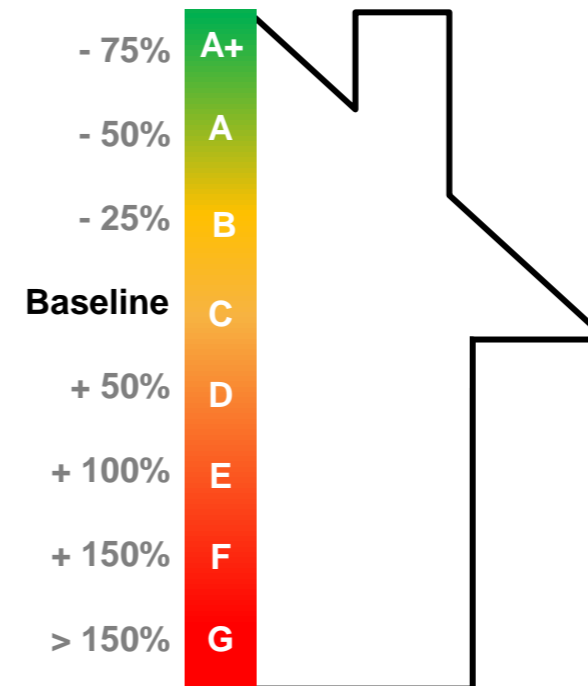
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2	CO ₂ _Carbon dioxide equivalent represents the impact of different greenhouse gases (GHG) and their equivalent global warming impact.
2	Energy consumers_Equipment consuming the most energy in the building.
2	Economic indicators_Incremental costs represent the costs in addition to baseline for selected measures. Payback period is the amount of time required for the investment to recover its initial outlay in terms of energy savings. Global cost savings refers to the benefits realized from the energy savings actions.
2	Zero Energy Building Standard [A+]_A new or renovated net-zero building is highly energy efficient, does not cause any on-site GHG emissions from fossil fuels, and reduces embodied carbon to a significant extent. It uses renewable energy, preferably generated on-site, if technically feasible, and/or off-site to fully cover its remaining, very low energy use.
2	Expected results_Expected energy savings, CO ₂ e and economic indicators calculated from planned energy efficiency measures.

Energy Performance Certificate

Rating score

Rating scores for BUILD_ME building types

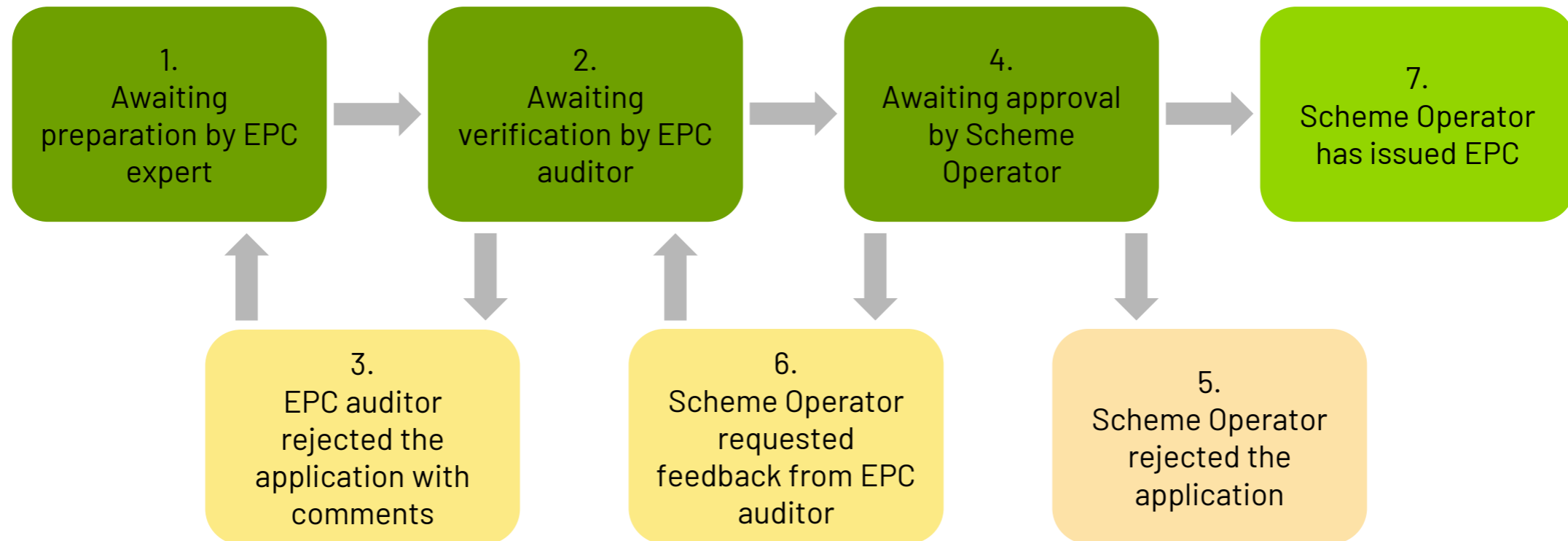
Class	Term	Score
A+	better than the Energy Performance Regulation Reference (+75%)	≤ 0.25
A	better than the Energy Performance Regulation Reference (+50%)	0.26 - 0.5
B	better than the Energy Performance Regulation Reference (+25%)	0.51 - 0.75
C	1 stands for the Energy Performance Regulation (new buildings according to EEBC / national Build_ME baseline)	0.76 - 1
D	between the Energy Performance Regulation Reference, and the Building stock reference	1.01 - 1.5
E	Building stock reference starts here	1.51 - 2.0
F	poorer than the Building Stock Reference	2.01 - 2.5
G	poorer than the Building Stock Reference	> 2.5



Automated EPC process through BEP 2.0

Automated EPC process through BEP 2.0

Workflow on the website



Automated EPC process through BEP 2.0 (Cont...)

Workflow on the website

Save changes to project "EPC_Test" Discard changes and start new project Jince_Expert

PROJECTS

Show 10 entries Search:

Show on results tab as well	Actions	Project name	City	Last saved	Label	Delta CO ₂
<input type="checkbox"/>	DELETE LOAD RENAME COPY Start EPC workflow	EPC_Test <<<Current Project>>>	Cairo	28-Apr-2024 13:15	B	-47.0%
<input type="checkbox"/>	DELETE LOAD RENAME COPY Start EPC workflow	Aqaba_Test	Aqaba	16-Apr-2024 19:43	B	-35.0%
<input type="checkbox"/>	DELETE LOAD RENAME COPY Start EPC workflow	EPC_Workflow_Test_3	Amman	03-Apr-2024 17:13	B	-51.0%
<input type="checkbox"/>	DELETE LOAD RENAME COPY [Final]7. Scheme Operator has issued the EPC	EPC workflow - Test2 EPC Project Status:	Amman	20-Mar-2024 11:12	B	-31.0%
<input type="checkbox"/>	DELETE LOAD RENAME COPY [Final]4. Awaiting approval by the Scheme Operator	EPC_Workflow_Test EPC Project Status:	Amman	19-Mar-2024 14:19	B	-51.0%

1 Start EPC workflow

EPC Expert is starting the EPC workflow

2 Project status

The status of projects is visible here

Automated EPC process through BEP 2.0 (Cont..)

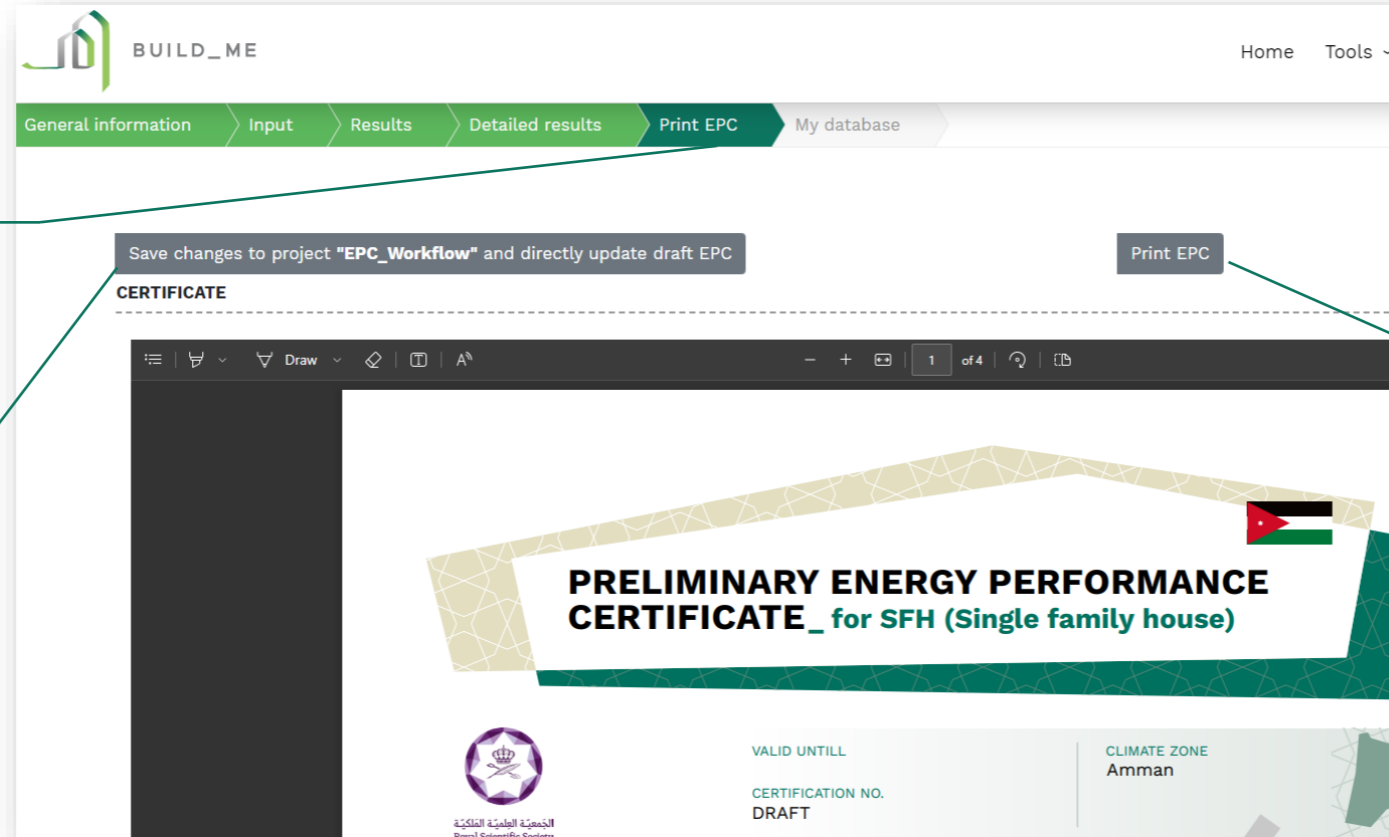
Print EPC tab

1| New tab "Print EPC"

View and download Draft, Preliminary, and Final EPC

2| Update the preview

Button to update the preview after changing the input




3| Print Button

Download/print directly from here

4| Preview

Preview of the EPC.

Walk through the website

 30 minutes



Walk through the website

www.buildings-mena.com

- [Towards a low-carbon building sector in the MENA region - BUILD_ME \(buildings-mena.com\)](https://www.buildings-mena.com)

BUILD_ME Home Tools Events and Workshops Knowledge base News

Working towards a climate-friendly building sector in the MENA region

Smart solutions powered by Guidehouse

What you will find here

On this website you will find insights and outputs from the *Accelerating 0-emission building sector ambitions in the MENA region* project, known as BUILD_ME. The project supports energy efficient and renewable energy-based heating and cooling system deployment in new buildings in the MENA region.


Guidehouse manages the project and the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) provides funding.

How much energy can you save with energy efficiency measures, and how much do such measures cost?

You can find out using the free online building energy performance model developed by Guidehouse. Geared towards the MENA region, this tool allows users to calculate the overall energy performance of buildings and the cost-effectiveness of building energy efficiency measures.

FIND INSPIRATION FOR YOUR NEXT BUILDING PROJECT **EXPLORE OUR DATABASE OF DEMONSTRATION PROJECTS** **CALCULATE IT** **LEARN MORE**

Case study and discussion

 25 minutes

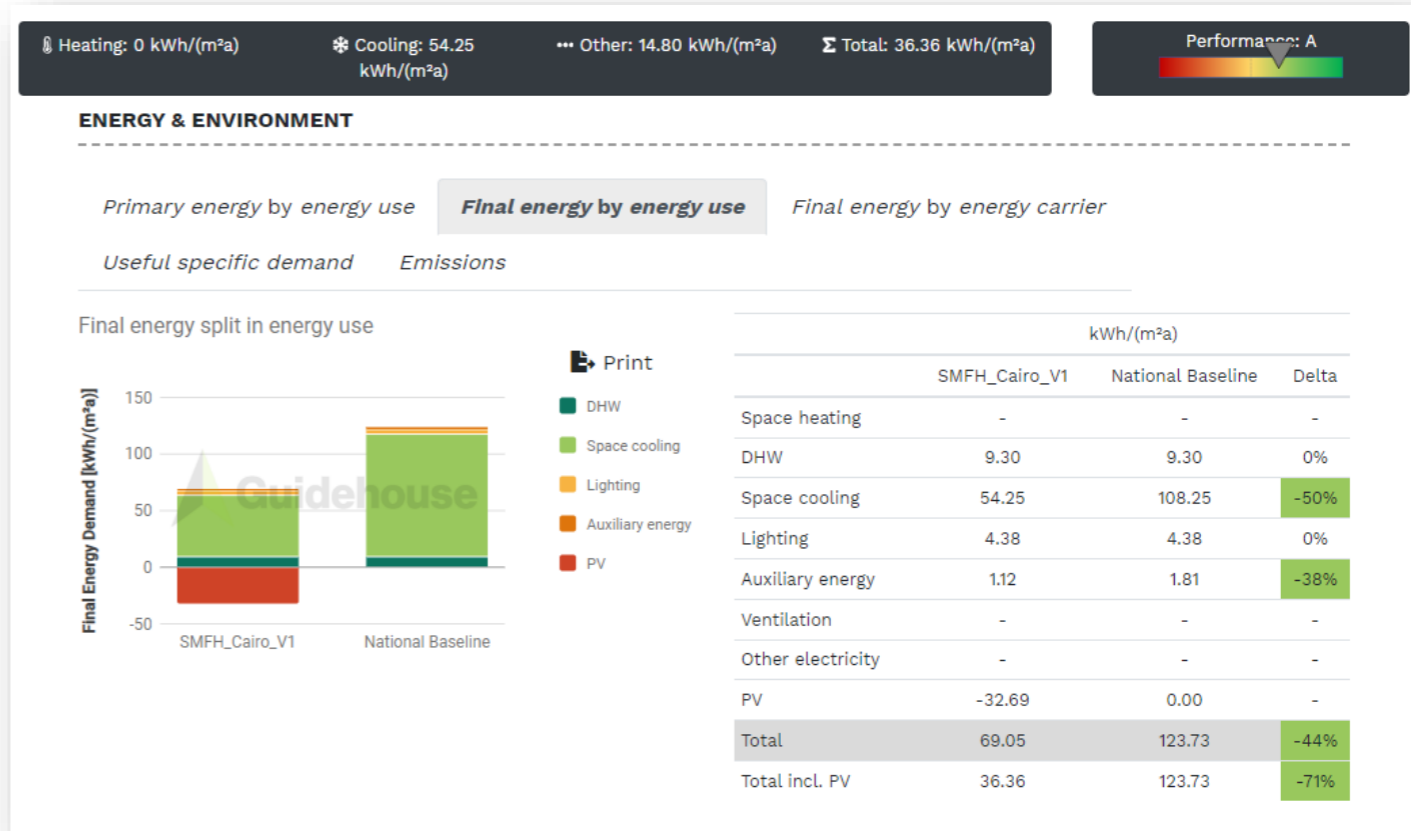


Case study

What does a building in class A look like? Variant-1

EBRD agreed to **finance** buildings with A certification

Building type	Small multi-family house	
Climate region	Cairo	
Measure	Baseline situation	V1 – Envelope + HVAC + PV
Roof	0.76 W/m ² K	0.64 W/m ² K
Wall	2.4 W/m ² K	1.1 W/m ² K
Windows	Single glass (U: 5.7 W/m ² K / G: 0.85)	Double glass (U: 3.0 W/m ² K / G: 0.7)
Cooling system	Mounted single-split or window AC (Low EER: 2.9 - 2.1)	Mounted single-split or window AC (Minimum req. EER: 3.9 - 3)
Renewable energy	No	PV, 20 kWp
Results		
Total final energy	124 kWh/m ² a	36 kWh/m ² a [-71%]
Global cost	224 €/m ²	180 €/m ² [-20%]
Final investment	406 €/m ²	443 €/m ² [+9%, PBP: 9 Years]

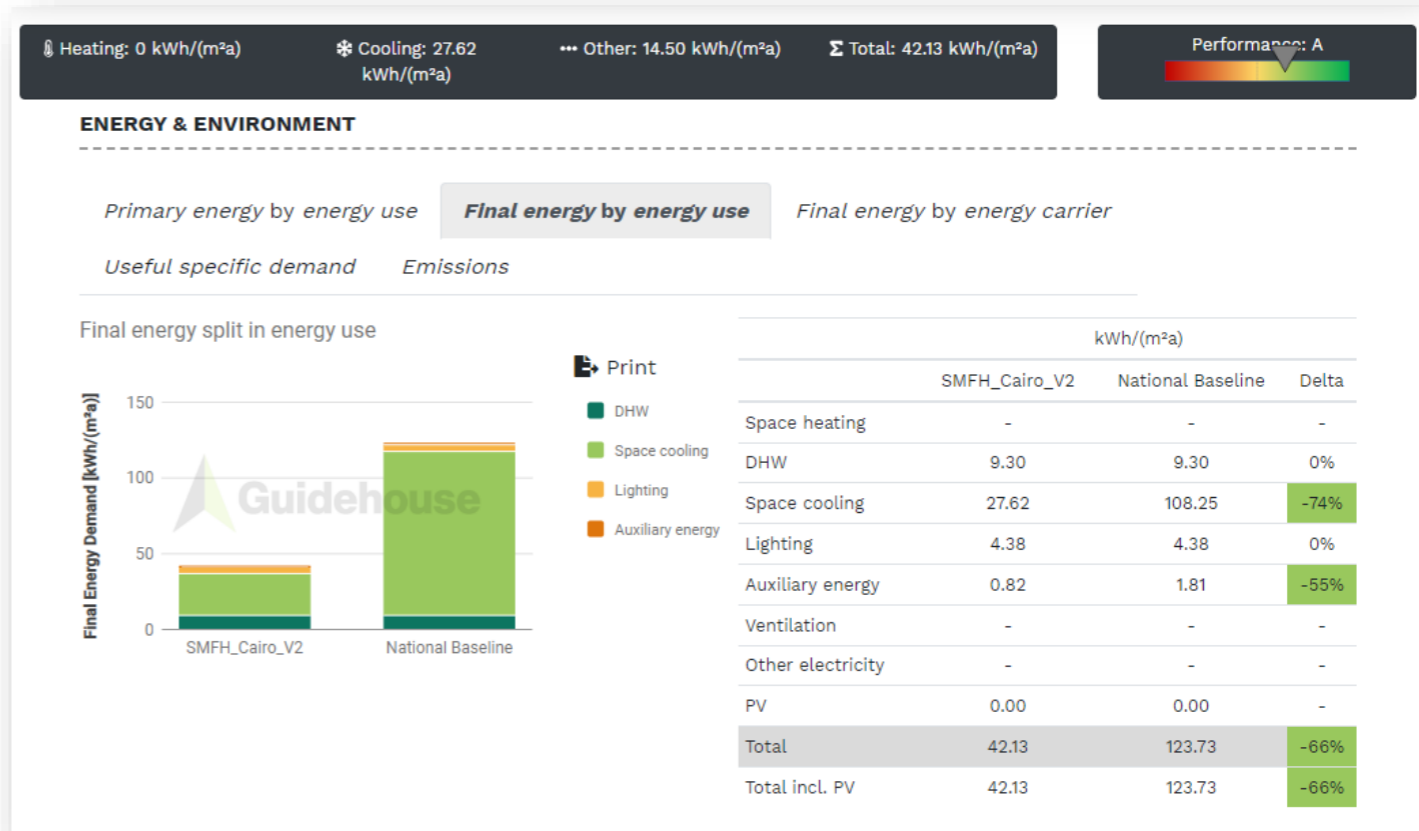


Case study

What does a building in class A look like? Variant-2

EBRD agreed to **finance** buildings with A certification

Building type	Small multi-family house	
Climate region	Cairo	
Measure	Baseline situation	V2 – Envelope + HVAC
Roof	0.76 W/m ² K	0.43 W/m ² K
Wall	2.4 W/m ² K	0.73 W/m ² K
Windows	Single glass (U: 5.7 W/m ² K / G: 0.85)	Double glass (U: 1.2 W/m ² K / G: 0.7)
Cooling system	Mounted single-split or window AC (Low EER: 2.9 - 2.1)	Mounted single-split or window AC (BAT, EER: >5)
Renewable energy	No	No
Results		
Total final energy	124 kWh/m ² a	42 kWh/m ² a [-66%]
Global cost	223 €/m ²	146 €/m ² [-35%]
Final investment	406 €/m ²	437 €/m ² [+8%, PBP: 8 Years]



Instructions

Case 1 – SFH



Objective

Find out a suitable combination of measures to reach the performance class A



Tools

Add/Change the all/any of the available measures (see the overview on the right)



Focus

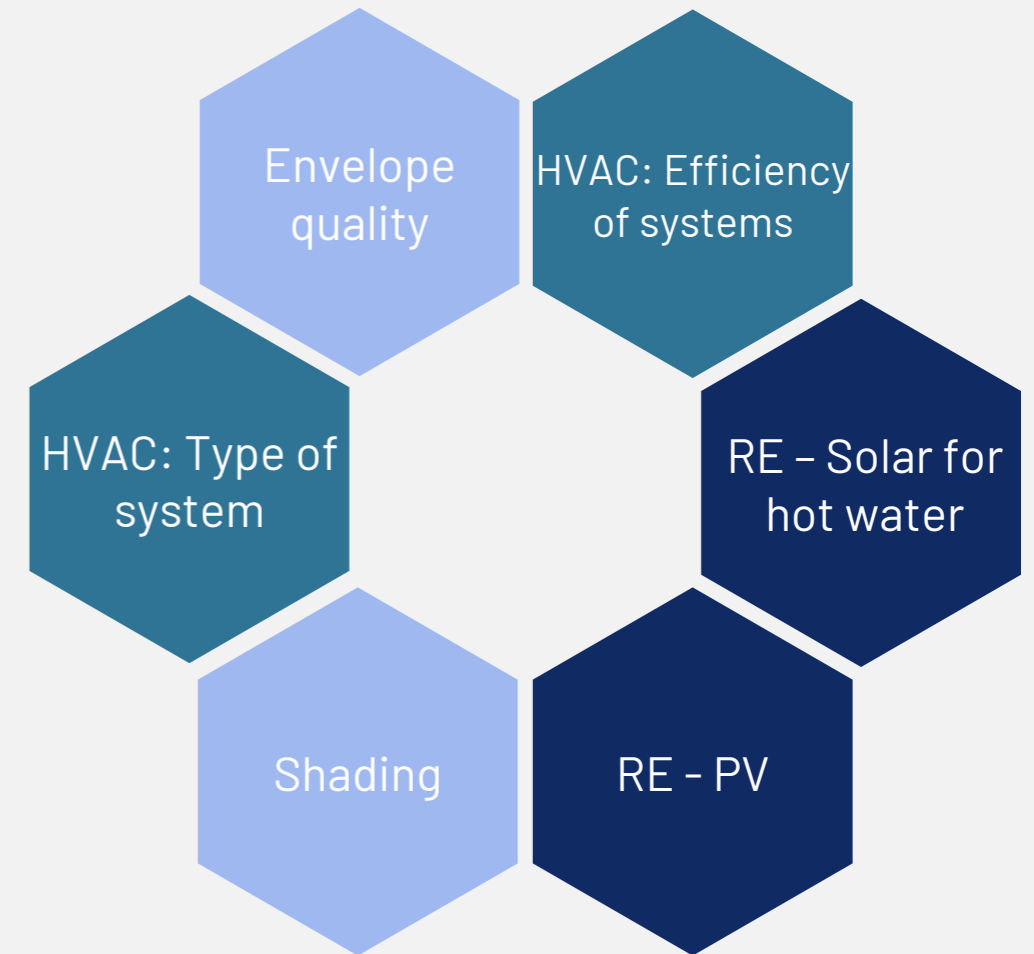
Country: Egypt | Climate: Cairo | Building: SFH |
Age group: New construction



Time

10 min to work on the case

Measures available in the BEP Tool



Discussion topics

First list of questions to be clarified

- The preliminary list of possible candidates attending the training for EPC experts or EPC auditors
- How can we co-operate to reach out to project developers?
- List of eligibility criteria of project developers?
- Financial offerings: Class A = 10% cash back, how will we deal with A+?

Training for TG1: Financial institution: EBRD/GEFF Survey



https://forms.office.com/Pages/ResponsePage.aspx?id=Q4_kTI3hSk-tVdCZCqxmDrudIATxHUtNtu91Z3nP615UMU40MVUyTVNBQIBNVFFPMDE4WjVUUK1MOS4u

Questions



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