

Showcasing BUILD_ME's innovative benchmarking tool to assess Buildings Energy Performance



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Showcasing BUILD_ME's innovative benchmarking tool to assess Buildings Energy Performance

- in Egypt, Jordan and Lebanon

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Federal Ministry
for Economic Affairs
and Climate Action

Overview



Problem

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

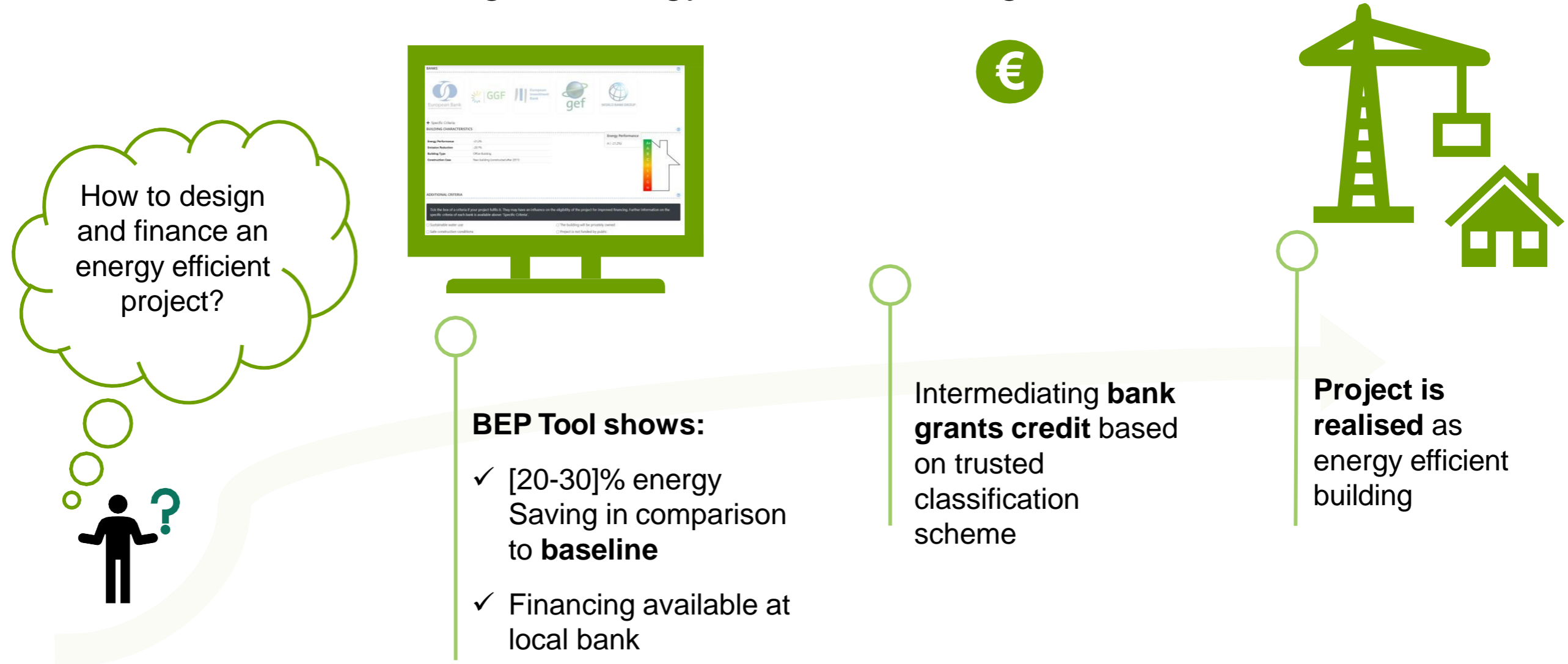
energy consumption baseline

Bottleneck

To finance energy efficient buildings

Objective of the BEP Tool

Easier access to financing for energy efficient buildings

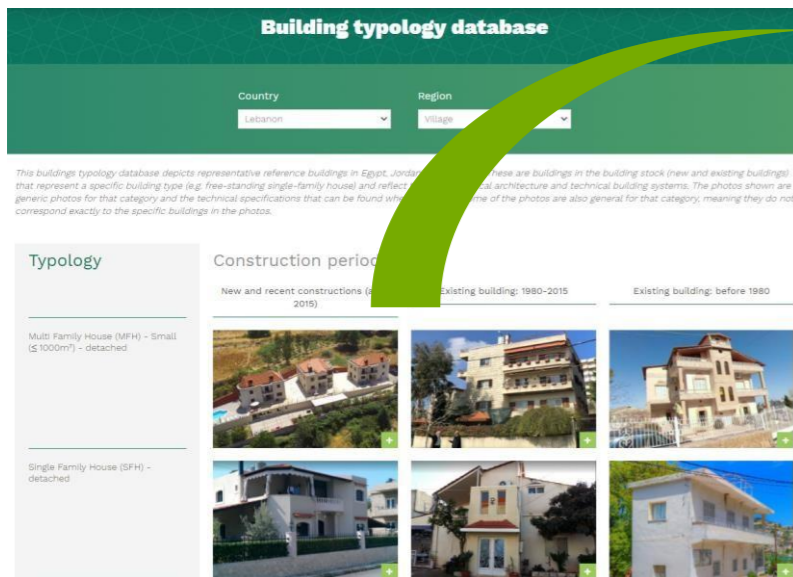


Our Integrated Solution

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

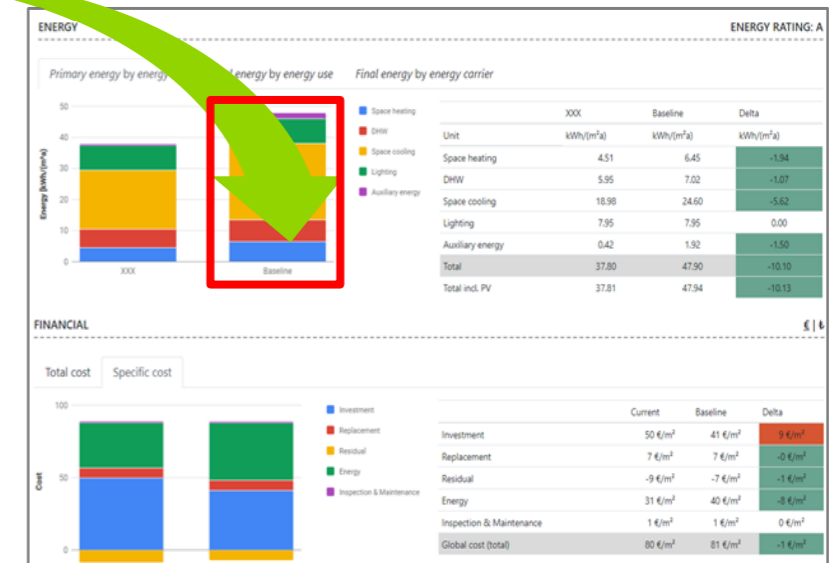
- Data from real constructions not older than 3 years
- At least 5 cases per building type covered in each country building typology
- Data from subsidy programs, literature, interviews with relevant stakeholders, permits documents etc.
- BEP tool based on ISO 52016, fed with local data used as calculation 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



Calculation methodology

Input

Calculation engine

Output

User input

Building

- Type (e.g. office)
- Geometry
- Renovation / new build
- Envelope specifications
- HVAC systems
- Renewable energies
- Operational parameters
- Location (city, country)

Internal database

Financial

- Investment cost
- Energy prices

Energy

- Baseline buildings
- User profiles
- HVAC system specification
- Climates

Energy

- Geometry
- Envelope
- OP
- Climate

Useful energy demand

- ISO 52016

Sizing HVAC & RE systems

- HVAC Tool

Final energy demand

- HVAC Tool

Primary energy demand

GHG Emissions

Financial

- Specific cost

Investment cost

- Envelope (e.g. insulation)
- HVAC systems
- Renewable energies

Other cost

- Inspection and maintenance
- Replacement

Energy cost

- Energy carrier (e.g. gas)

- Energy prices

Energy & Emission

Final & primary energy demand...

- per energy carrier (e.g. gas)
- per energy use (e.g. cooling)
- specific (kW h/m²) and total

GHG Emissions

- CO₂ equivalent

Global Cost

Global cost

- Investment
- Energy cost
- Inspection and maintenance
- Replacement

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

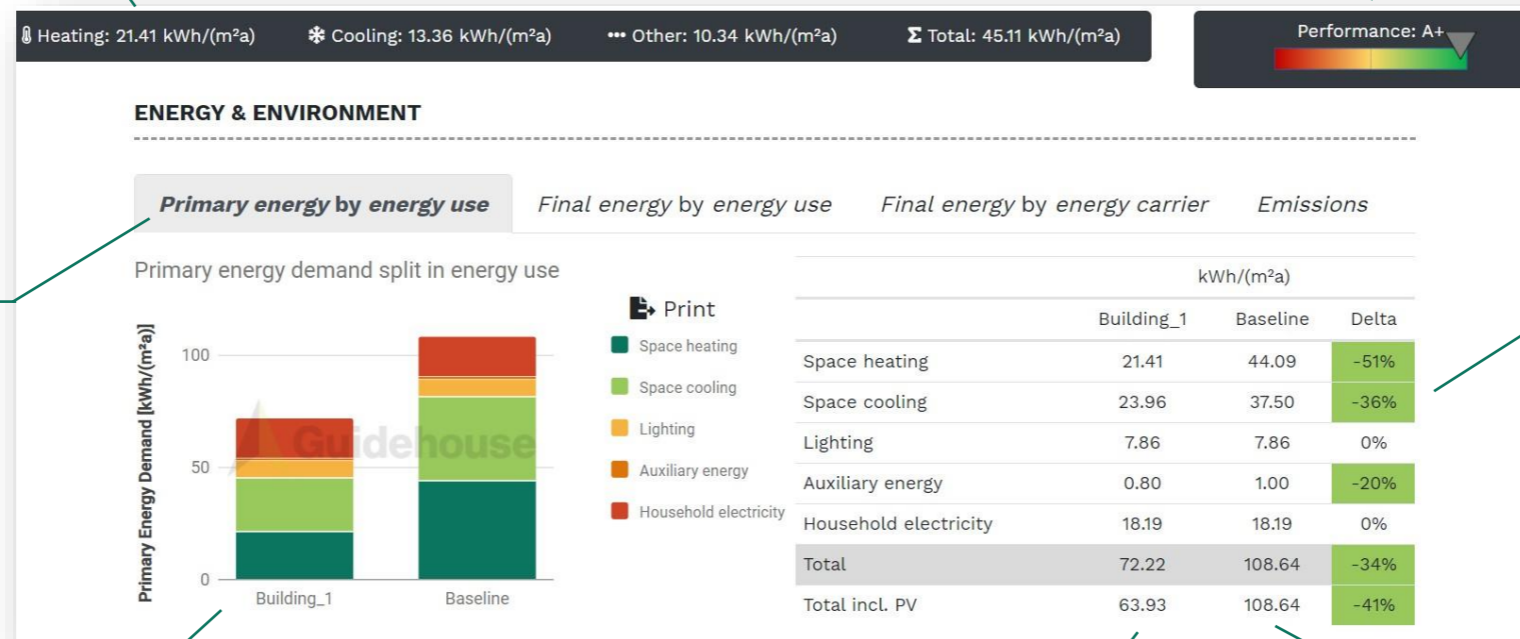
C = equal to baseline

6| Comparison

Difference to the baseline buildings.

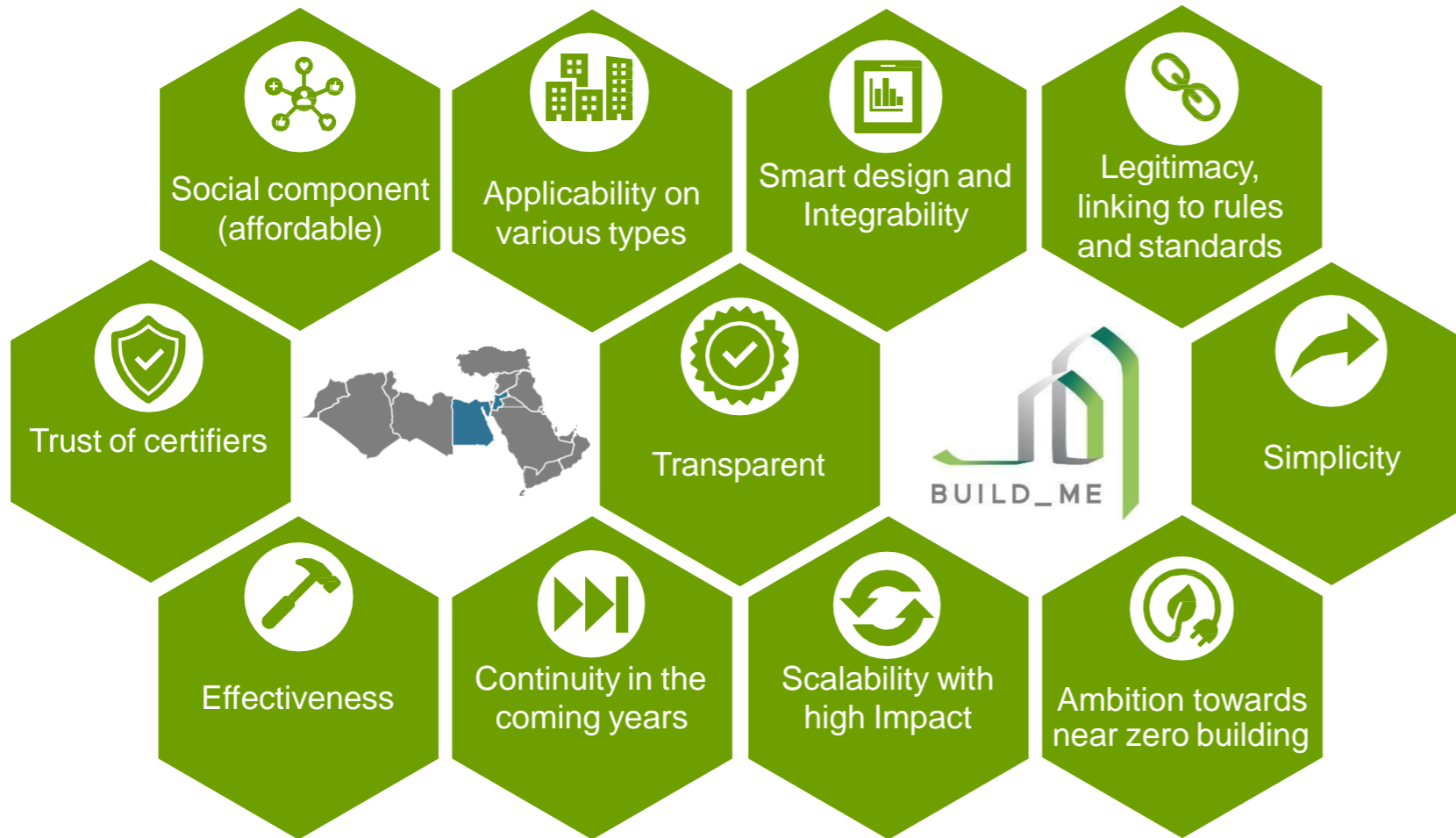
5| Baseline building

Detailed results of the baseline building.



Key characteristics 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.



Exploring Opportunities to Improve Benefit-Cost Ratio of Office Buildings' Energy Efficiency Technology Applications (EETA) in Egypt

Mennatullah AbdelGawad

Supervised by:

Prof. Dr. Mohamed Salheen

Assoc. Prof. Danae Hernandez-Cortes

Assoc. Prof. Khaled Tarabieh



BEP tool Implementation in the National researches

Energy Simulation Tools

Criteria: Free, Accessible, and User-Friendly so they could be used by developers.

EDGE



IFC – World Bank



ASHRAE 90.1



Climatic Zone



Incremental Cost
(not accurate)

Build_Me



Guide House, IDC, HBRC,
EBRD et al.



ISO 52016



Local Data (Egypt
EEBC)



Incremental Cost
(not accurate)

eQuest



DOE



ASHRAE 90.1



Climatic Zone



No Cost (has to be
inputted)

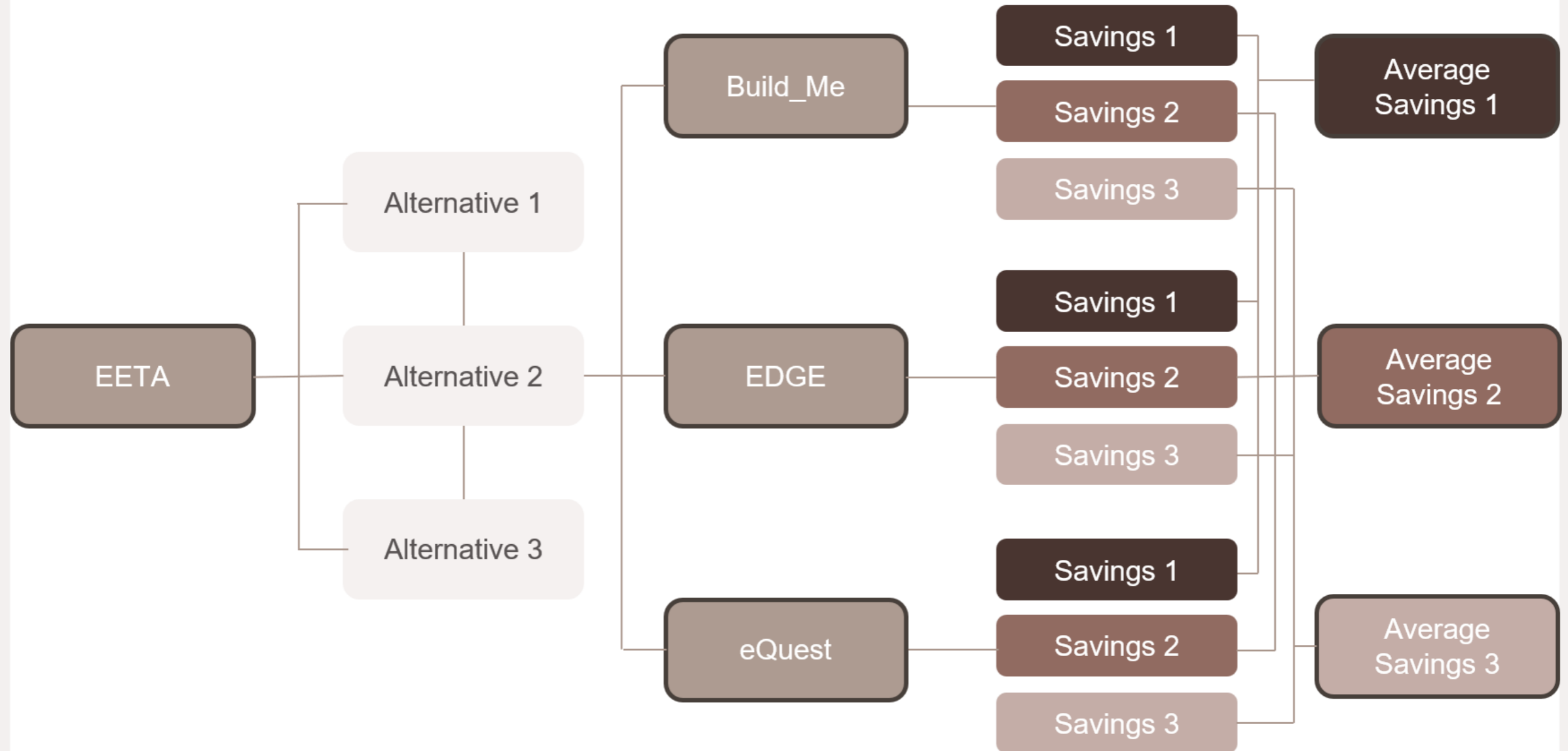
BEP tool Implementation in the National researches

Baseline

		EDGE	Build_Me	eQuest
1	Light Bulbs	65 L/W	Linear fluorescent Lamps	0.64 W/fts ²
2	Light Controls	No Auto Controls	No Auto Controls	No Controls
3	WWR	40%	40%	40%
4	Roof SRI	45	Intermediate Color – 60	Medium abs. 0.6
5	Walls SRI	45	Intermediate Color - 60	Medium abs. 0.6
6	HVAC	Air Cooled DX Split System – COP: 2.78	Central System – COP: 3	DX Coils
7	Shading	No Shading – AASF 0.12	Manual Shading	No shading
8	Wall Insulation	U-Value: 1.86 W/m ² .K	2.1 W/m ² .K	2.11 W/m ² .K – 8 in
9	Roof Insulation	U-Value: 1.91 W/m ² .K	0.6 W/m ² .K	2.31 W/m ² .K – 8 in
10	Windows	U-Value: 3.5 W/m ² .K	3 W/m ² .K	3.21 W/m ² .K
11	Domestic Hot Water	100% Boiler	Exist – NA	Natural Gas
12	Meters	No Smart Meters	NA	NA
13	Sub-meters for cooling	No sub-meters for cooling	NA	NA
14	Heating	Electric Resistance	AC Heater	Electric Resistance

BEP tool Implementation in the National researches

Energy Simulation Process



BEP tool Implementation in the National researches

Ranking Based on NPV - Summary

Rank based on NPV	Small Building	Medium Building	Large Building
1	WWR	WWR	Light Bulbs
2	Insulation (Walls)	Insulation (Walls)	WWR
3	Light Bulbs	Light Bulbs	Light Controls
4	Light Controls	Light Controls	Insulation (Walls)
5	SRI	SRI	SRI
6	Insulation (Roof)	Insulation (Roof)	Insulation (Roof)
7	Window Glass and shading	Window Glass and shading	Window Glass and shading
8	HVAC	HVAC	HVAC

	High Cost High Saving		High Cost Low Saving		Low Cost High Saving		Low Cost Low Saving
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Outlook

The BEP tool will be the core of the newly developed Energy Performance Certificate (EPC) scheme

Clear focus on energy

- Less complex, focusing only on energy reduction measures
- Tackle the main GHG emitter

Affordability, lean and trustworthy, robust process

- Smart pricing definition avoiding hurdles and increasing affordability
- Job creation for certifiers and auditors
- High quality ensured by national entity and third-party involvement

A national system managed by relevant national authority

- Ownership of the tool beyond the BUILD_ME lifetime ensured
- Has the potential to become an important instrument that informs the policy makers in the building sector.

PRELIMINARY CERTIFICATION for Building Type

Valid till: M/Year Registration Number: XXX

General Building Information

Picture of the building:

Building type:

Address:

Year of construction: M/Year

Number of Apartments (for MFH):

Net floor area: m²

Building Envelope

Wall:

Roof:

Floor:

Window:

HVAC System

Air Conditioning:

Heating:

Ventilation:

Hot water:

Final Energy Demand [kWh/m²a]

Score: Energy rating:

Background information related to the energy performance certificate

Insert information about the EPC here

EPC Expert

Name:

Address:

Date: M/Year

Signature:

Certification Authority

Name:

Address:

Date: M/Year

Signature:

Explanations (how to interpret the results)

Insert explanation here

Economic Indicator

Good Average Bad

Insert explanation here

Running costs savings

CO2 Equivalent [kg/m²a]

Insert information about the EPC here

Energy Rating

The graph shows this property's current and potential energy efficiency. Properties are given a rating from A (most efficient) to G (least efficient).

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