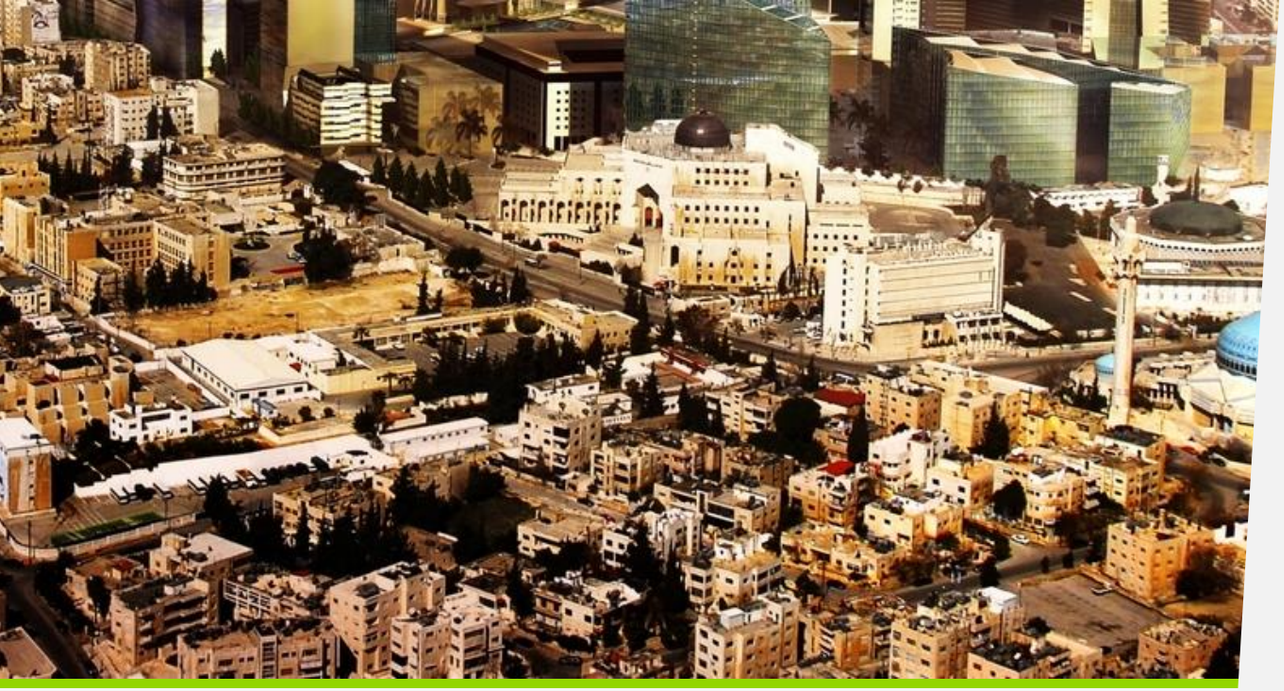
Definition of Baselines to Develop an Energy Labelling Scheme for Buildings in the MENA Region

BUILD_ME - Working Towards a Climate-Friendly Building Sector in the MENA Region

July 7, 2020



1 Introduction & Objectives

2 Building Typology

3 Building Energy Performance (BEP) tool

4 Building Energy Labelling Scheme

5 Conclusion

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1) Introduction & Objectives

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Introduction to the BUILD_ME Project

IKI International Climate Initiative,
German Federal Ministry of Environment

Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag

EGY JOR LEB

1st Phase: 2016 - 2018

2nd Phase: 2019 - 2021

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Objectives of the 2nd Phase of the BUILD_ME Project

Objectives and Goals

- Facilitate & increase access to financing & funding opportunities for EE building projects.
- Support the reform & transitions of political frameworks towards improving energy efficiency in the building sector.
- Focus on supporting the implementation of energy efficiency measures in pilot projects

WP1 Preparatory Steps

- Software tool: energy performance & cost-effectiveness
- Building Typology
- Buildings specifications & reference values

WP2 Support Pilot Projects

- Technical support
- Testing EE Labelling scheme
- Support the financing applications

WP3 Framework Conditions

- Voluntary EE Labelling scheme
- Facilitate & increase access to financing
- Building codes, NEEAPs & NDCs

WP4 Capacity Building and Dissemination

- Website, workshops, training, database for best practice buildings, webinars, brochures, etc.

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Objectives of today´s Presentation: Insights of BUILD_ME Tools

Working Towards a Climate-Friendly Building Sector in the MENA Region

2019 - 2021 Ongoing Phase

Illustrate the significance of BAU and baseline definition

Building Typology

Building Energy Performance Calculation tool

Building Energy Labelling Scheme

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Starting Point : The Lack of a Baseline

Problem Identification

EEBC Enforcement

Data Availability

Benchmarking

NO
energy consumption baseline definition

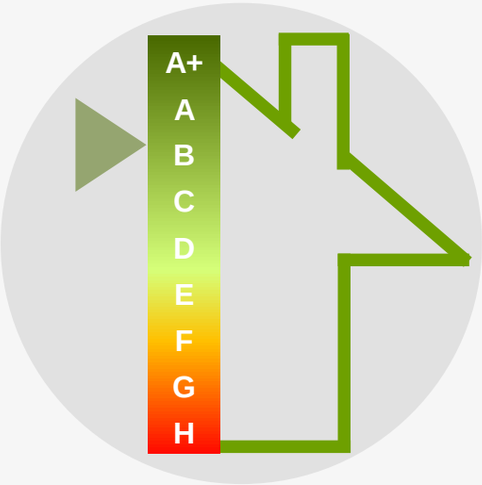
Bottleneck
Not allowing the uptake of finance energy efficient buildings

Expected Solutions

Building Typology

Calculation Tool

Reference Buildings



Labelling Scheme
Transparent classification scheme for building energy standards.

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Define Baselines and Develop Labelling Scheme

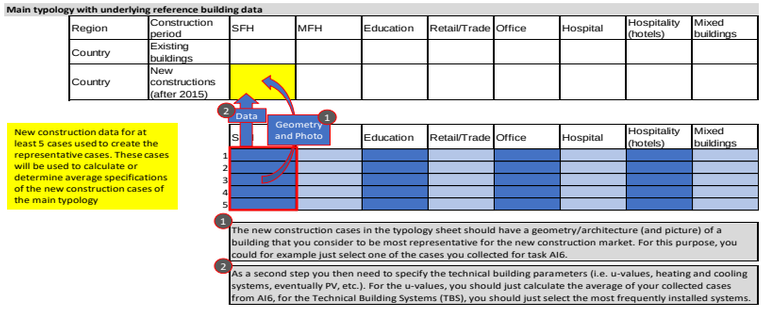
Assessing Typical New Constructions

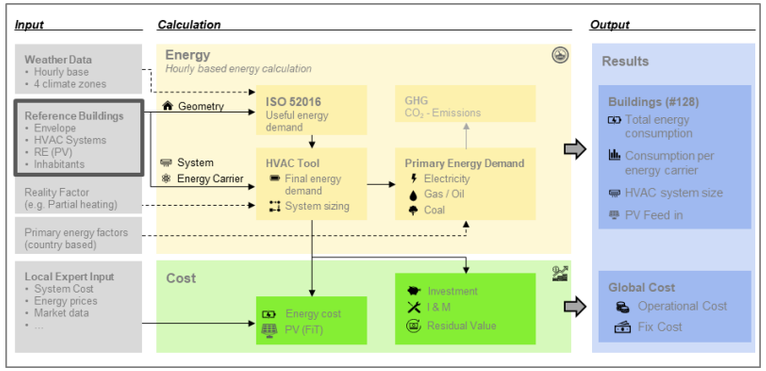
- Data from real constructions not older than 3 years
- At least 5 cases per building type covered in each country building typology
- Data from subsidy programs, literature, interviews with relevant stakeholders, permits documents etc.

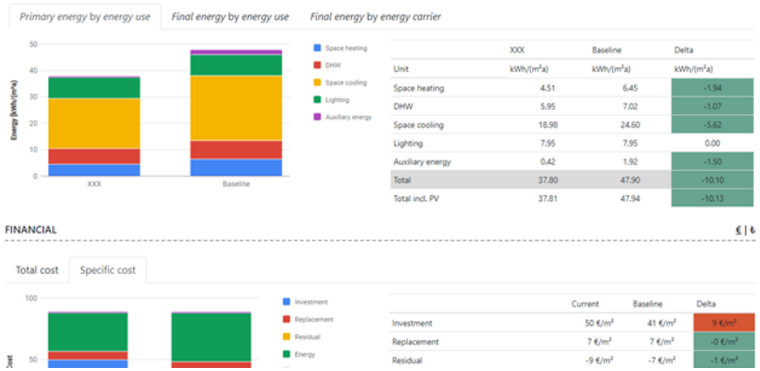
Reference Buildings and Building Typology

BUILD_ME Building Energy Performance Calculation tool

Classification of Buildings







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2) Building Typology

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Approach of Building Typology Development

Four main working steps	2019					2020								
	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.
Template Formulation prepared by Navigant			■	■										
Data Collection National partners collect data from literature, databases and stakeholder interviews					■	■	■	■	■	■	■	■		
Data Validation by Navigant and National partners								■	■	■	■	■		
Reporting > Upload on the website													■	■	■

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Results, Template Main Sections

A : General information

Country	Project Name	Building type	Region (specify)	Construction Period	ID	Reference ID

B: Geometries

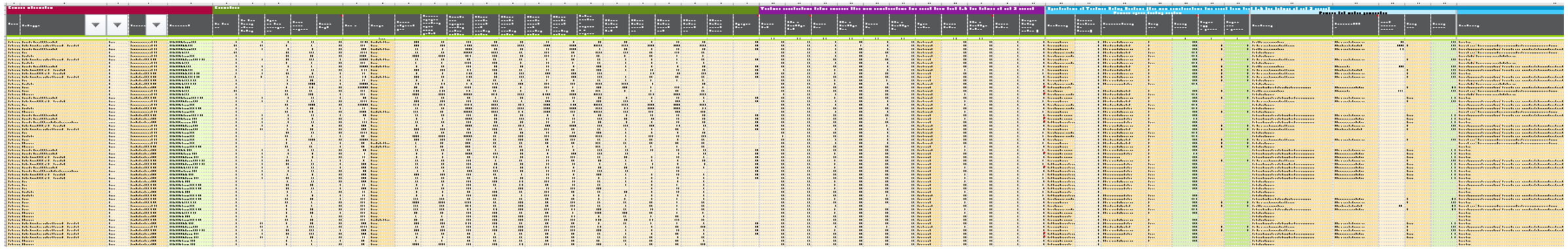
Number of stories	Number of dwellings	Typical number of occupants / users	Net floor area	Clear room height	Volume	Roof type	Area floor slab (ground plate)	Roof area opaque	Façade area opaque	Share of facade oriented north	Share of facade oriented east	Share of facade oriented south	Share of facade oriented west	Window area	Share of windows oriented north	Share of windows oriented east	Share of windows oriented south	Share of windows oriented west	Share of windows oriented horizontal	Opaque doors	Ratio Floor / Ground	Ratio Floor / Roof	Ratio Floor / Facade (excluding windows)	Ratio Floor / Facade (including windows)	A/V

C: Technical specifications building envelope

Thermal heat bridge - Slab	U-value - Roof	Thermal heat bridge - Roof	U-value - Wall	Thermal heat bridge - Wall	Type of window	U-value - Window	Thermal heat bridge - Window	G-value Windows	Avergae shading factor of windows (0-1)

D: Specifications of Technical Building Systems

Primary space heating system	Secondary space heating system	Primary hot water generator	Secondary hot water generator	Primary space cooling system	Secondary space cooling system	Ventilation	Photovoltaics	Lighting	Temperature set-points



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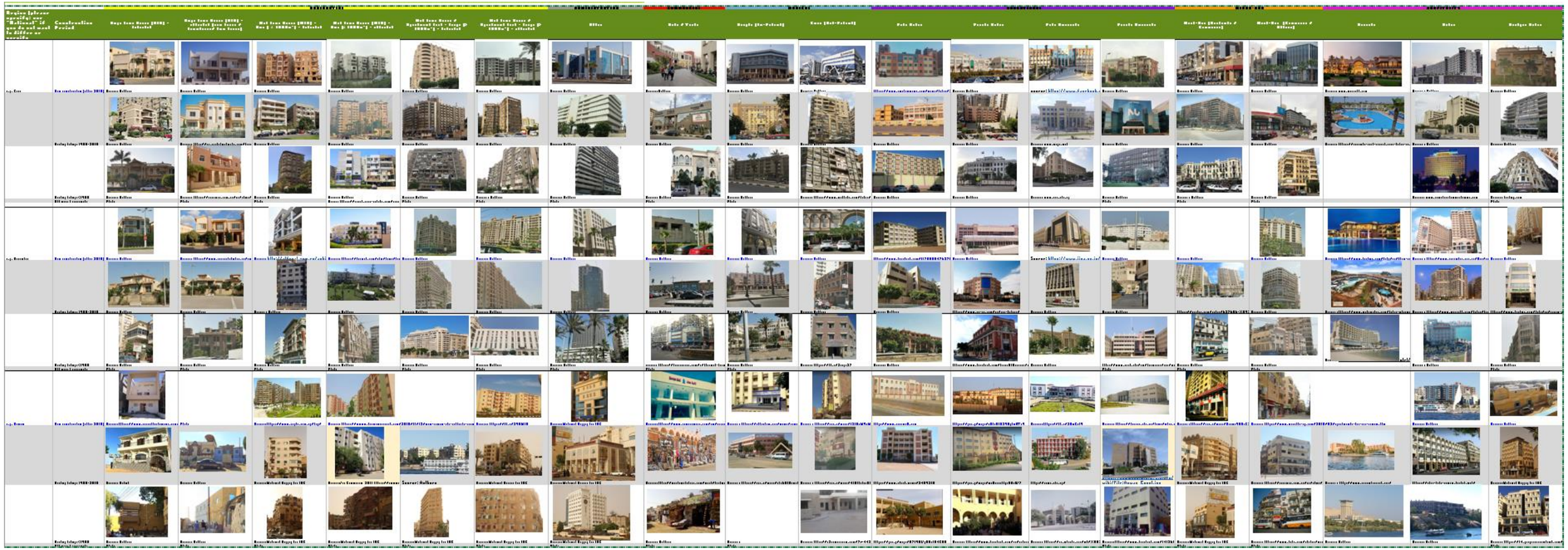
Building Typology

Example Egypt



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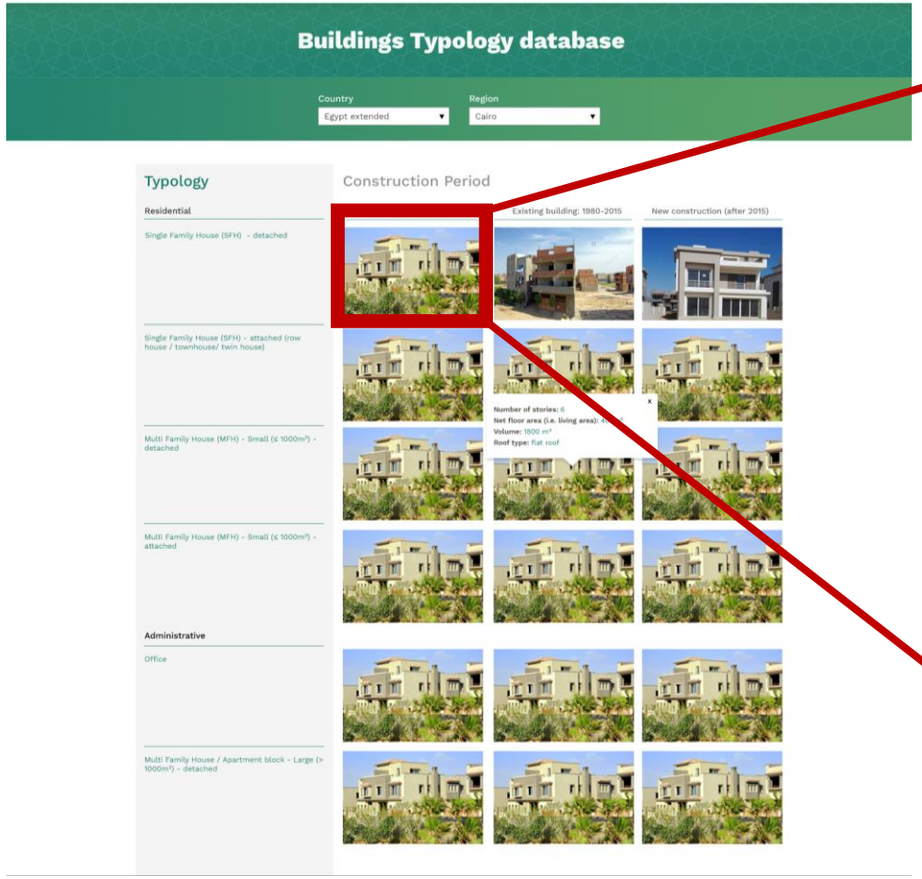
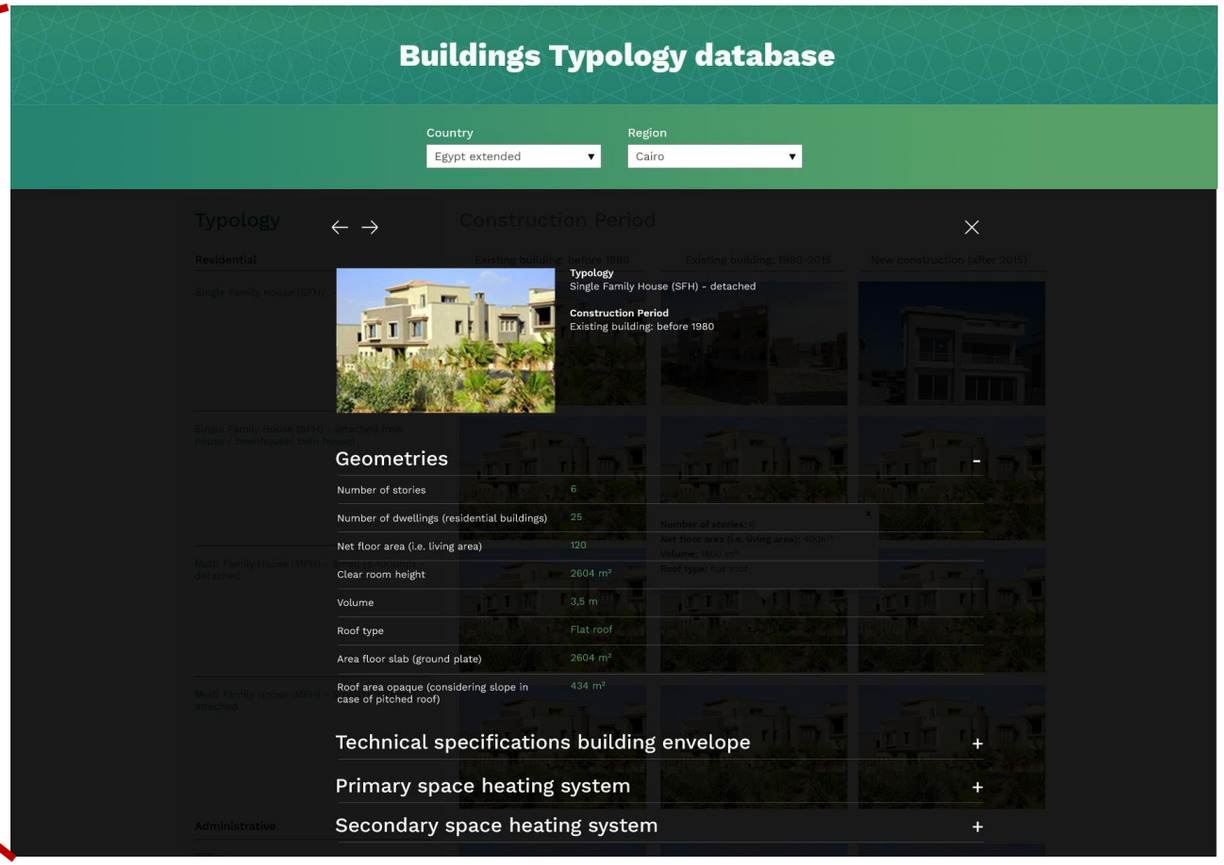
Building Typology – Proposed Design on Website

General Building Typology of the country



Detailed energy characteristics of selected buildings



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3) Building Energy Performance (BEP) tool

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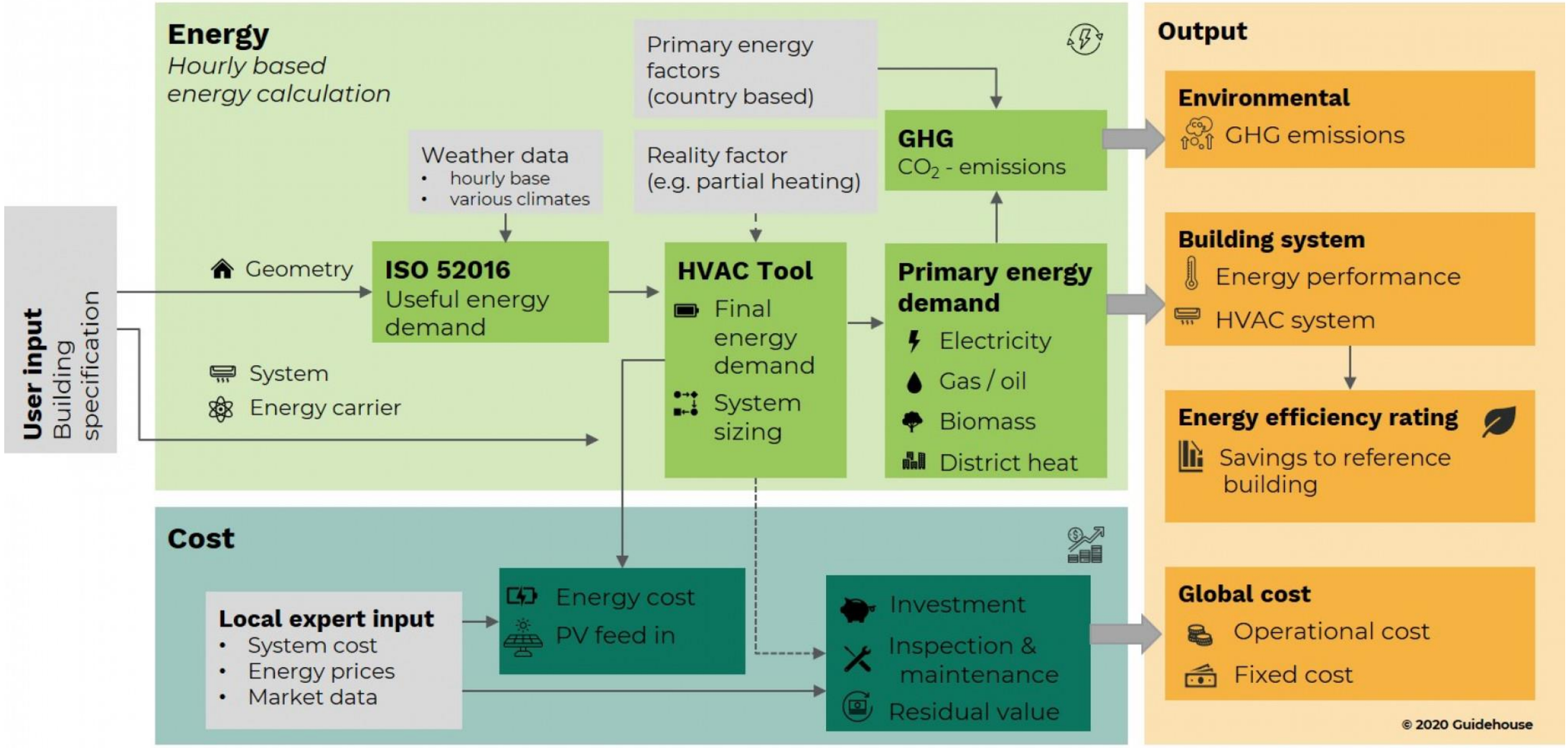
Hourly Based Tool: Energy Consumption and Other KPIs



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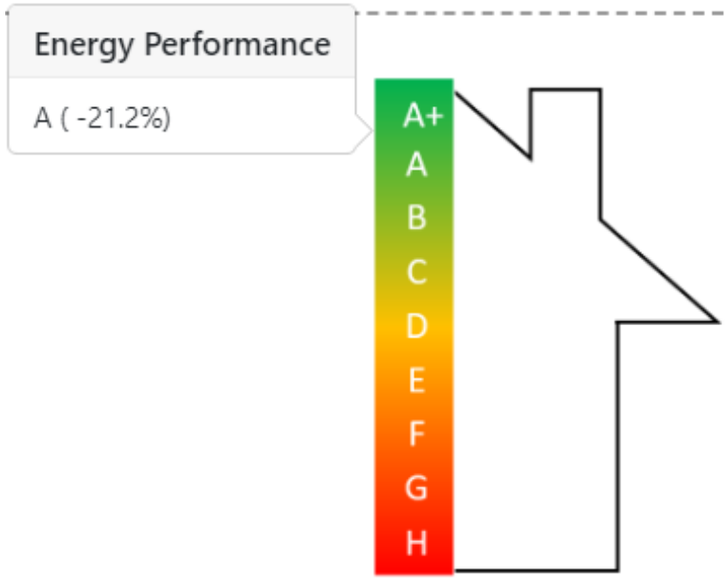
BEP Tool Layout: Accessible on Project Website

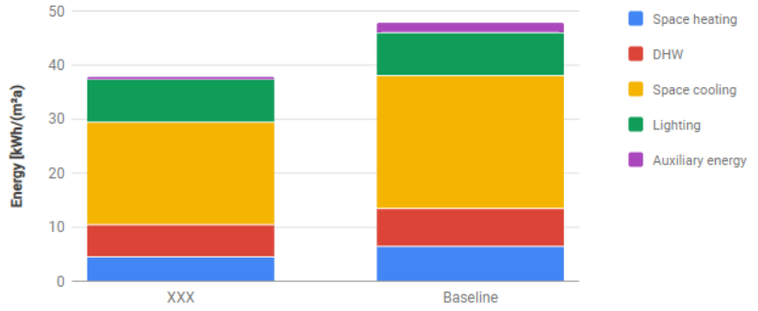
- Energy Consumption calculation
- Global Cost Calculation
- Building Performance Classification



General Information | Input | Results | Detailed Results | Funding Criteria | My Database

ENERGY — **ENERGY RATING: A**

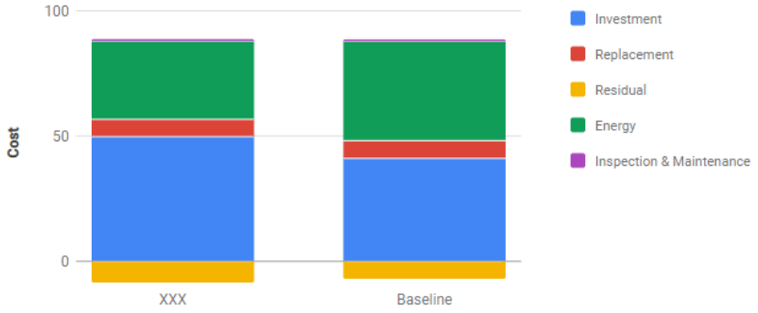
Primary energy by energy use | *Final energy by energy use* | *Final energy by energy carrier*



	XXX	Baseline	Delta
Unit	kWh/(m²a)	kWh/(m²a)	kWh/(m²a)
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

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

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4) Building Energy Labelling Scheme

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Classification Scheme: Six Components of Approach

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BUILD_ME Classification Scheme Implementation Concept

Goal: Institutionalize the Scheme to Facilitate Lending for Buildings EE

1 Define technical aspects

- Existing schemes
- BEP Calculation Tool

- Building Typology

2 Tailored Scheme to banks' eligibility

Requirements of international FIs have to accept a scheme?
Energy savings

- Emission reduction
- Building types
- Public projects
- Private projects
- Occupational H&S
- Sustainable water use
- …
- …..

3 Concept for Operation and Management

- Ownership and running
- Operational structure of scheme
- Certification and labelling process
- Process of audit
- Process of audit

4 Implementation in target countries

- Which requirements do local banks have to accept scheme?
- Test scheme with pilot projects in each target country
- Conduct trainings with local bankers and project developers

5 Readiness for operation in lending

Illustrative Example

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5) Conclusion

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Results Achieved, Preliminary Conclusions and Next Steps

	Results Achieved	Preliminary Conclusions	Next Steps
BEP Tool	Calculation engine responding to the needs of the local climate	Flexible and robust tool, tested with the first pilot projects	Trial version will be tested by selected experts from the region
Building Typology	Reference buildings have been defined in EGY and LEB	Good starting point and other building types can be added in the future	Reference Buildings in Jordan still to come and typology will published soon
Labelling Scheme	Analysis of existing, regional schemes and International best practice examples	Interaction with local and international financial institutions to develop a tailor made labelling scheme	Development of Implementation Concept

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https://www.buildings-mena.com/

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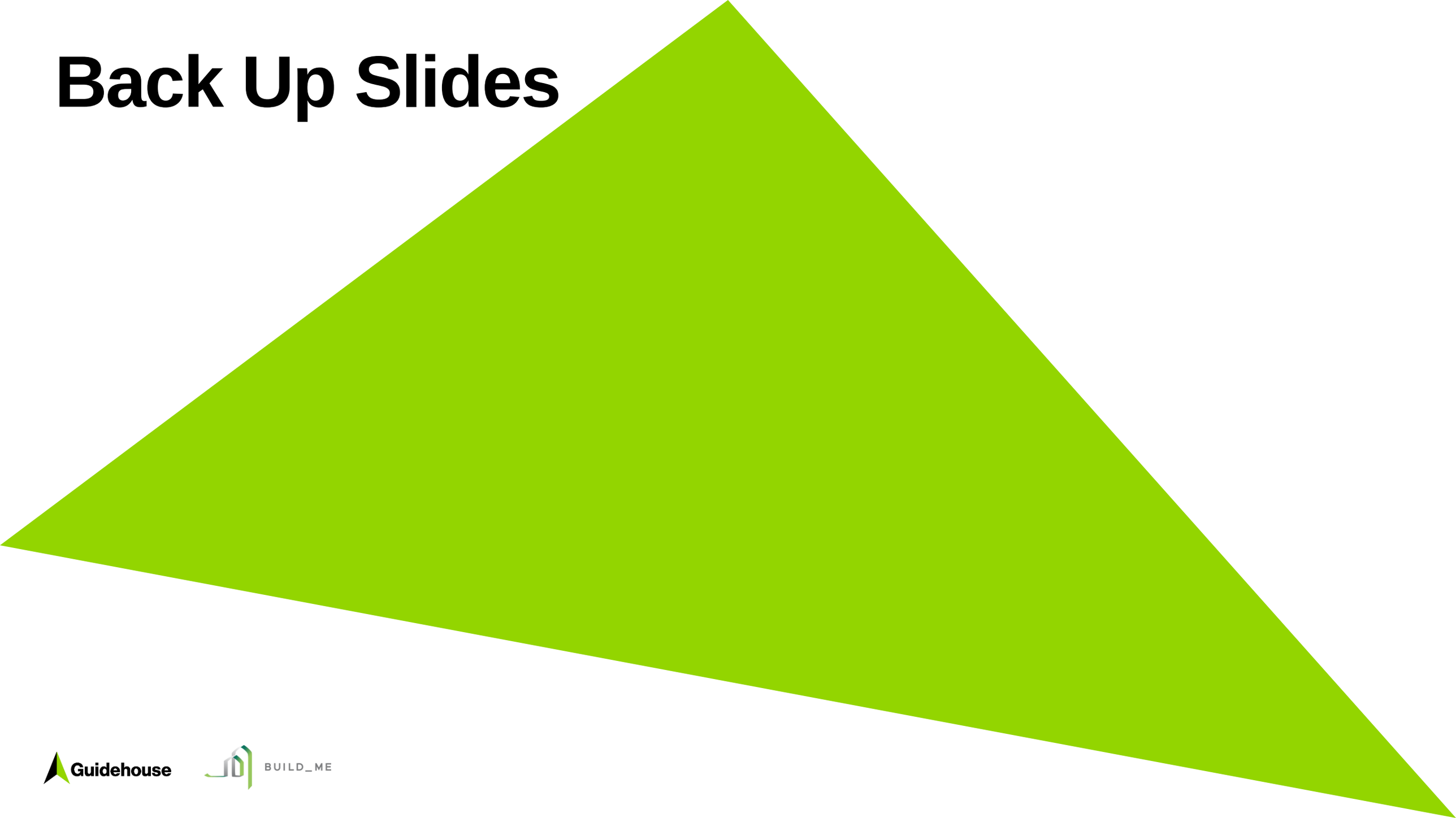
Back Up Slides



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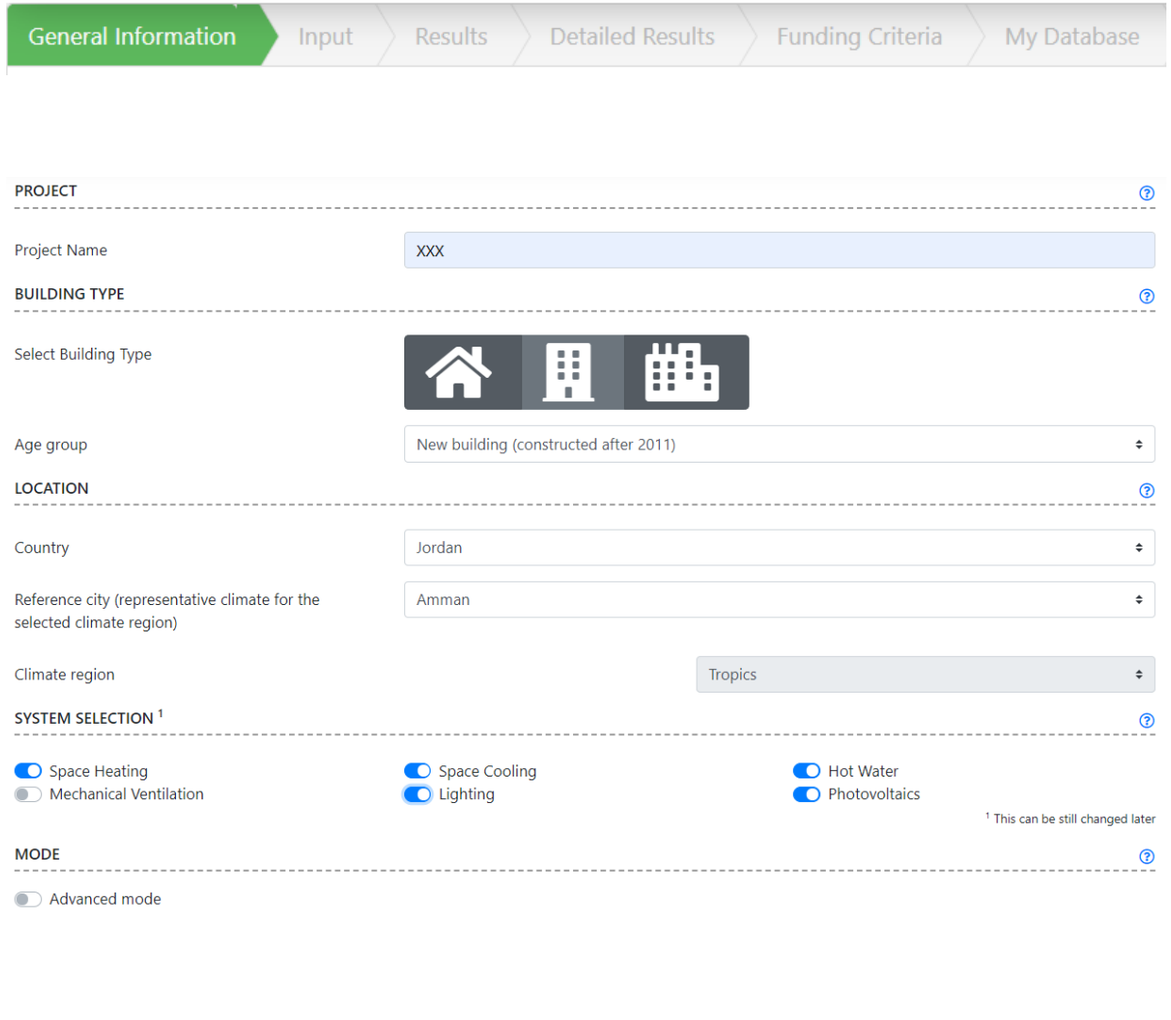
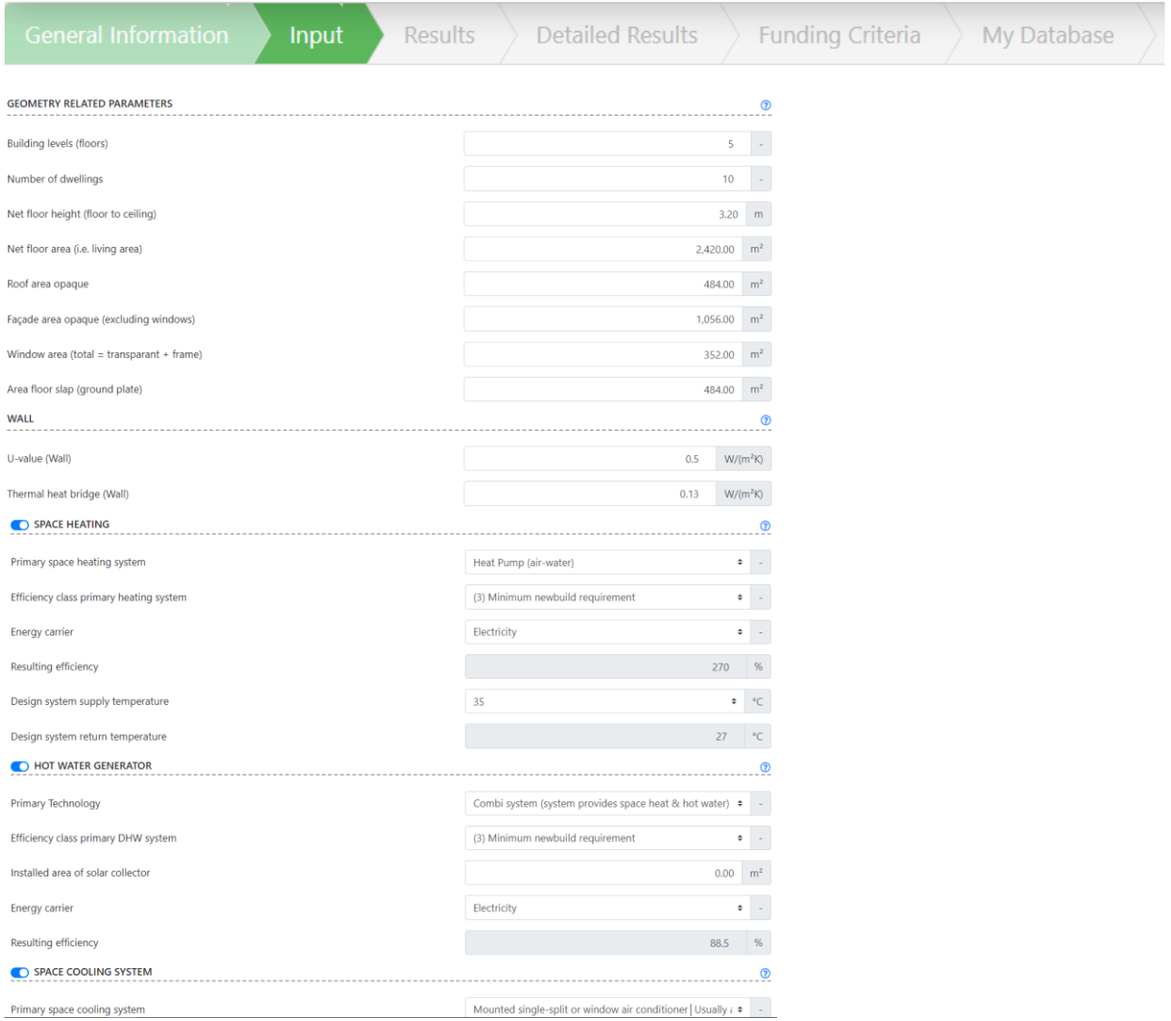
BEP Tool Structure > Inputs





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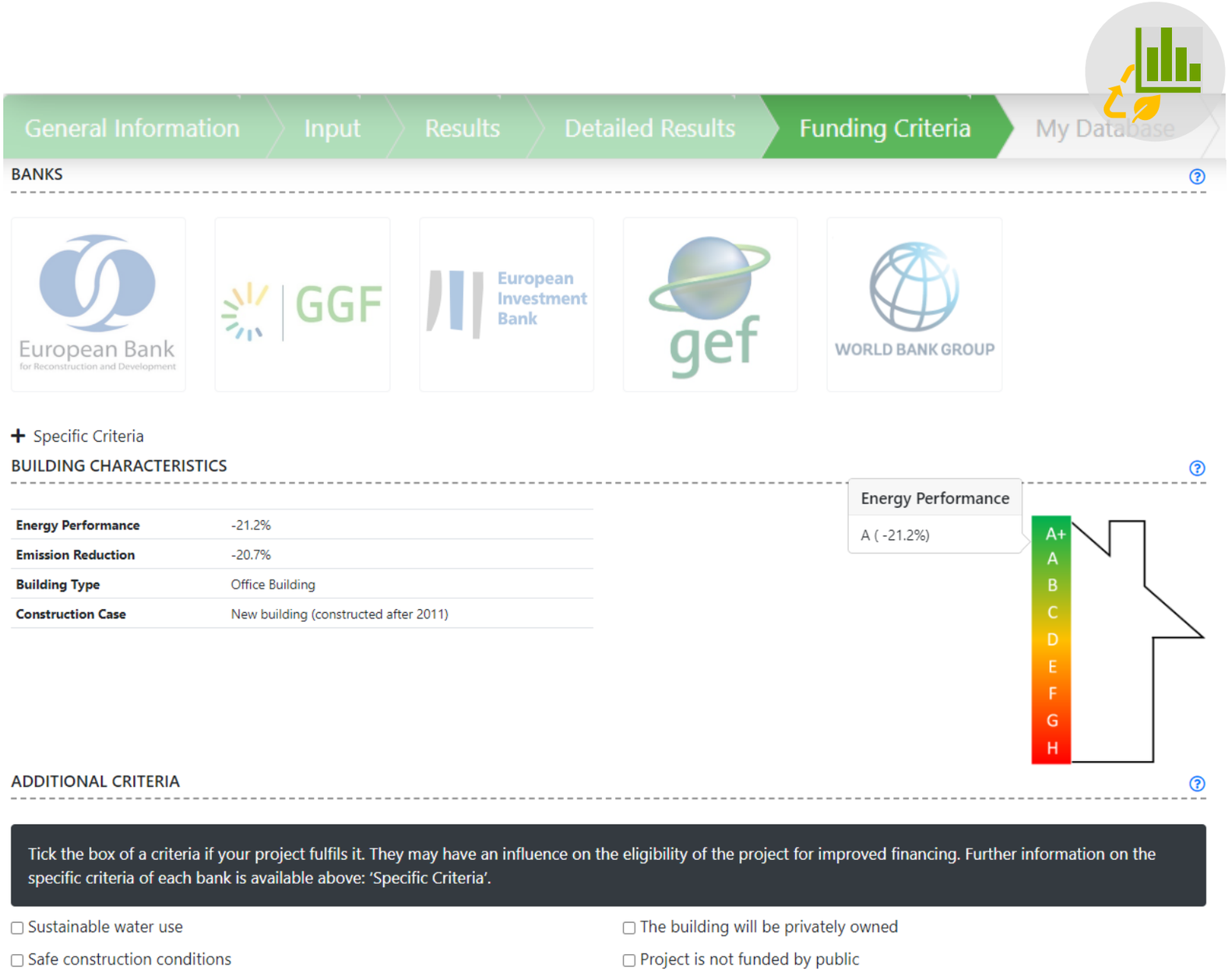
BEP Tool Structure

- Possible funding and finance options from international and local FIs.
- Broad fund and/or finance eligibility criteria are provided.
- Possible support from BUILD_ME team to the fund/finance application.



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Selected Pilot Projects in Egypt

Cairo West Residence

MFH in Giza, 690 sqm.

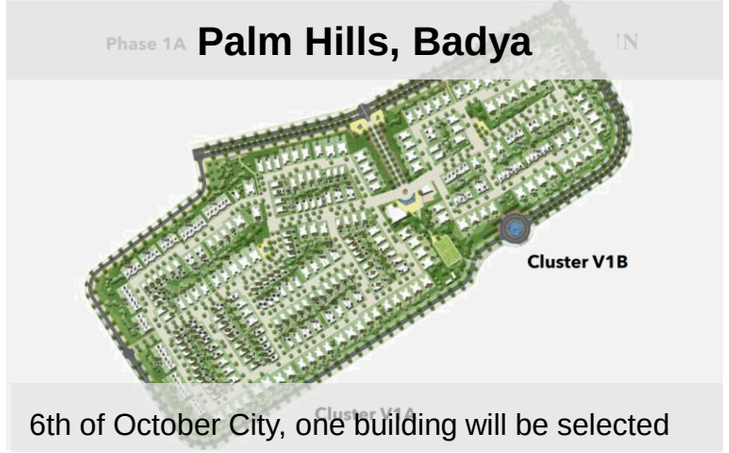
Beverly Hills - 229

MFH in Sheikh Zaid City, 440 sqm.

New Mansoura university

Library building in New Mansoura City, 1200 sqm.

Palm Hills, Badya



6th of October City, one building will be selected

Palm Hills, Alexanderia

Alexanderia, one building will be selected

Misr Alghad

Cairo, Mixed-use, 2578 sqm.

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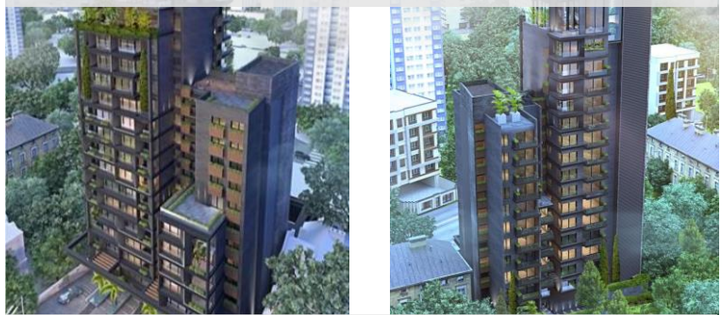
Selected Pilot Projects in Lebanon

Arcade Suites II

Residential apartments in Beirut, 6000 sqm

KLEOS / Ashrafieh Appartments



MFH in Ashrafieh, Beirut, 15,000 sqm

Frames / Baasir

MFH in Baasir, Chouf, 4100 sqm

Kye Beachfront Resort

Chalets,Residential units in Tabarja – 200,000sqm

City Towers Project

Mixed-use in Beirut, 152,000 sqm

Extension of Collège Notre Dame De Nazareth

Amphitheatre of 840 sqm, in Beirut

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Selected Pilot Projects in Jordan

KONN Modular Houses

Prototypes of affordable SFH of diffrent sizes

fsdfasfdas

fdfdfadfdsfd

fsdfasfdas

fdfdfadfdsfd

Private Residence

SFH of 455 sqm in Amman

fdfdfafdsa

dafdadfd

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Work still in progress to get more PPs in Jordan

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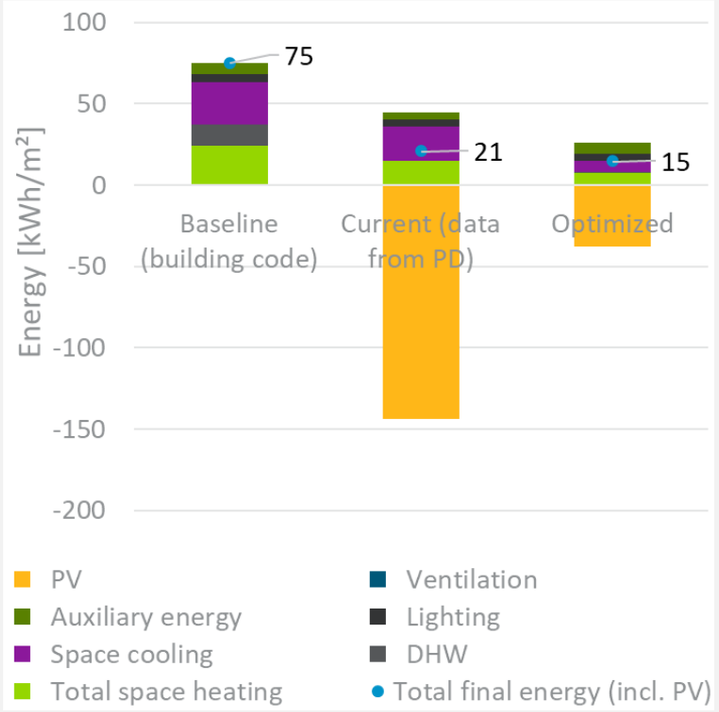
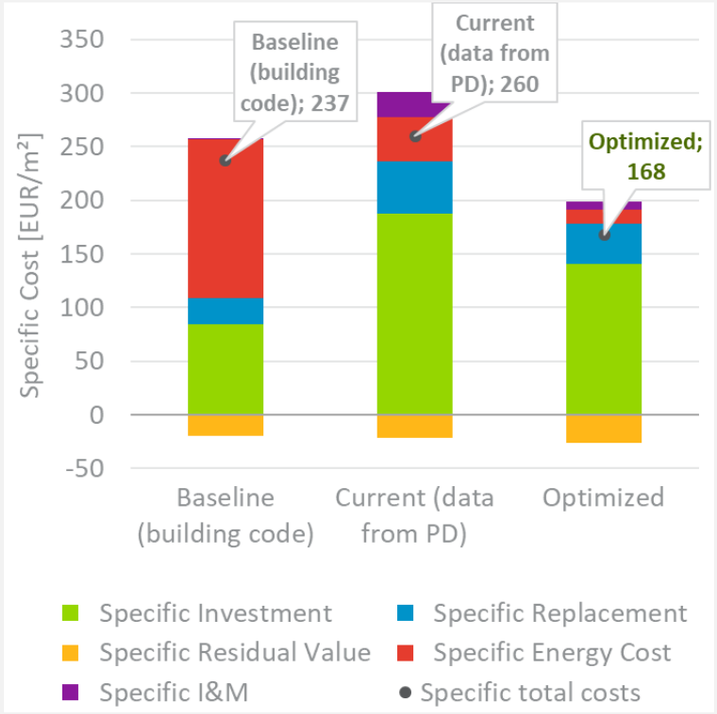
Example of Pilot Project Results

PP 1, Jordan – KONN Project

Final Energy Demand



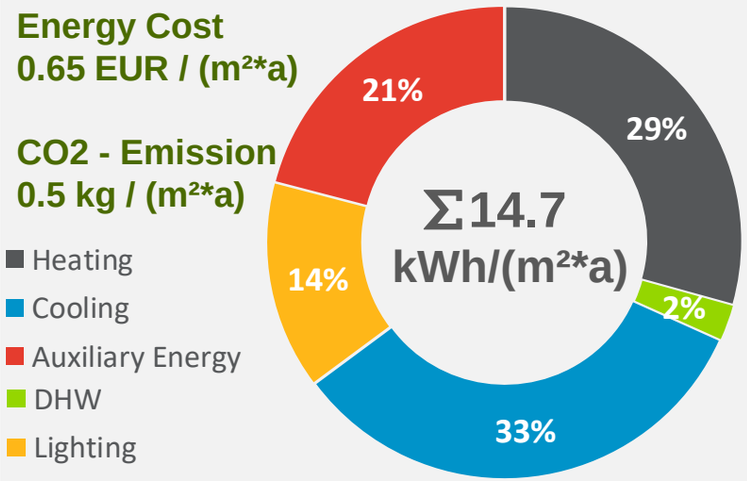
Global Cost



Parameters	Baseline
Roof insulation (U-Value)	0.34 W/m²K
Wall insulation (U-Value)	0.40 W/m²K
Floor insulation (U-Value)	3.6 W/m²K
Windows (U-Value; G-Value)	1.3 W/m²K; 0.65
Window fraction	Ø 5%
Shading	Overhang South
Air tightness	0.25 1/h
Heat supply	reversible split unit - COP 5
Cold supply	reversible split unit - COP 5
Hot water	electric instantaneous | Solar
Ventilation systems	Natural ventilation
Lighting systems	LED
Renewable energy	1 kWp (PV) | 2m² (Solar Thermal)
Set temperature cooling/heating	26°C / 20°C

Energy Cost
0.65 EUR / (m²*a)

CO2 - Emission
0.5 kg / (m²*a)



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