

BUILD_ME Training:

Financing Schemes for Energy Efficient Buildings in Jordan and the BEP Tool



30th August, 2021

Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

Agenda



Image source: <https://www.jdtours.com/>

Log in	09:50 – 10:00
Welcome and Instructions	10:00 – 10:05
Introduction to BUILD_ME Project	10:05 – 10:20
Introduction to Climate-Friendly Buildings (Political, Technical, Financial Instruments)	10:20 – 10:50
Q&A + Break	10:50 – 11:10
Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)	11:10 – 11:20
EBRD/GEFF Project in Jordan	11:20 – 11:30
Building Energy Performance “BEP” Tool	11:30 – 11:50
Wrap Up and Final Remarks	11:50 – 12:00



Technical instructions

Working together effectively

- Presentation will be published on our project website afterwards.
- The session will not be recorded.
- We look forward to your active participation.
- Please stay muted but feel free to write your questions in the chat box or raise your hands in the Q&A sessions. Questions will be answered in the Q&A sessions.
- Please be punctual after the break.
- For technical problems/questions, reach out to: Ali AlMarzouq at Ali.Marzouq@rss.jo

Welcome Words

Muhieddin Tawalbeh, RSS/NERC

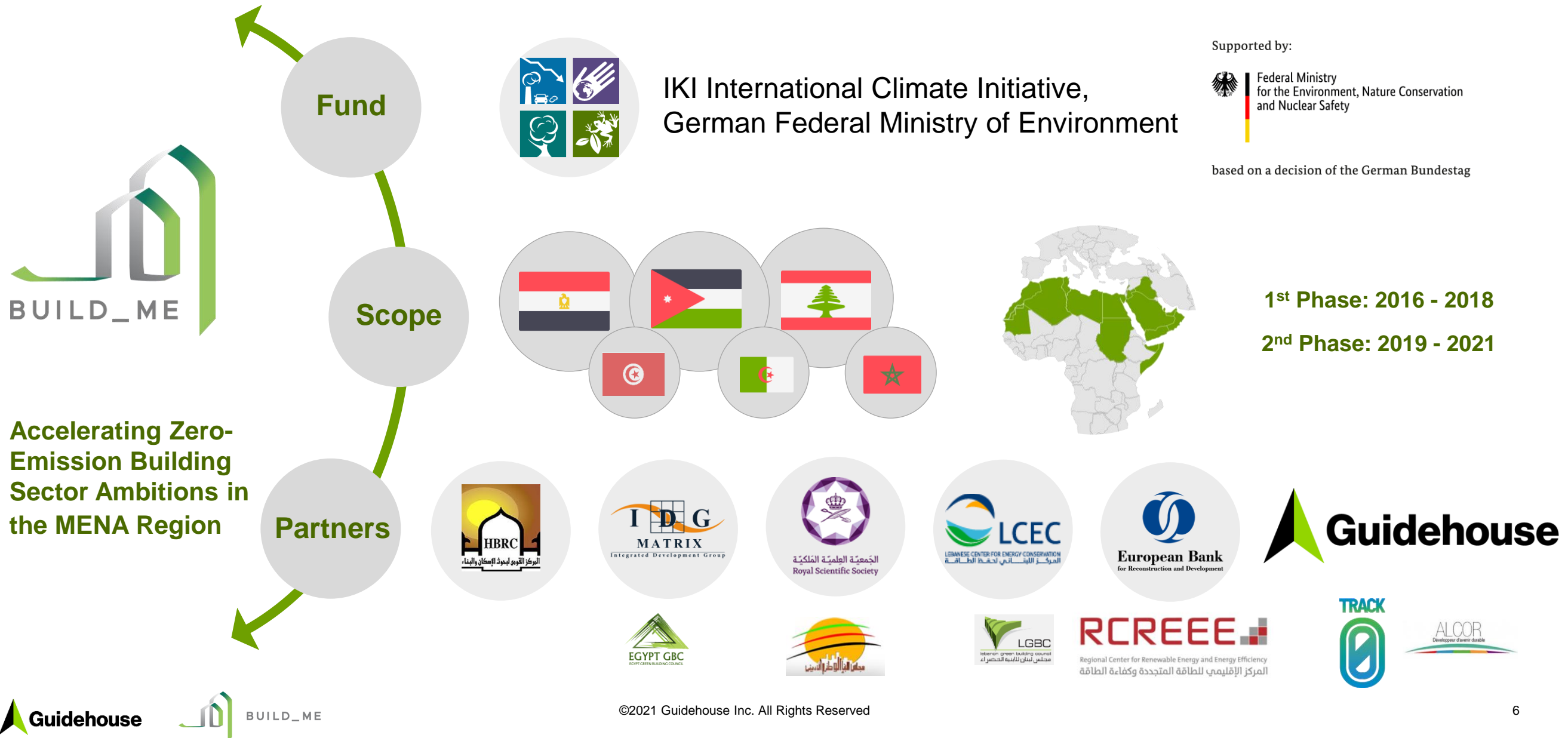


Introduction to BUILD_ME Project

Ali AlMarzouq, RSS/NERC



Overview



BUILD_ME scope

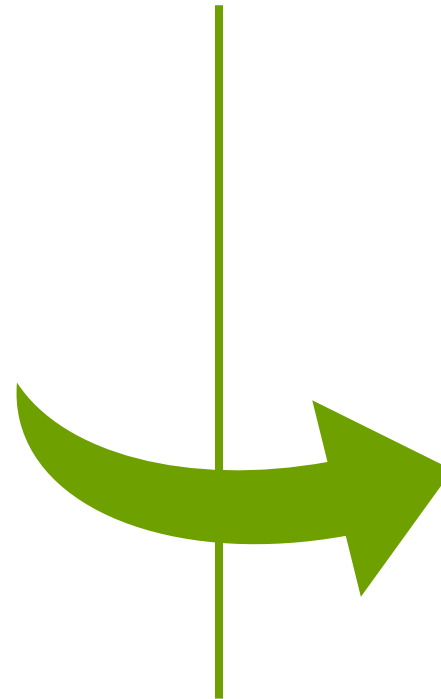
Approach



Original project

2016 - 2018

- Extensive analysis and research
- Gap analysis
- Identification of barriers & drivers
- Recommendations



Project extension

2019 – 2021

- Implementation of recommendations
- Upscaling
- Dissemination of results

Structure and objectives of Phase II

Approach

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

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

WP2 Support Pilot Projects

- Technical support
- Collect insights on the ground as input for WP3
- Testing EE classification scheme
- Support financing applications

WP3 Framework Conditions

- Building codes
- Support national strategies (NEEAPs & NDCs)
- Voluntary EE classification scheme
- Facilitate & increase access to financing

WP4 Capacity Building and Dissemination

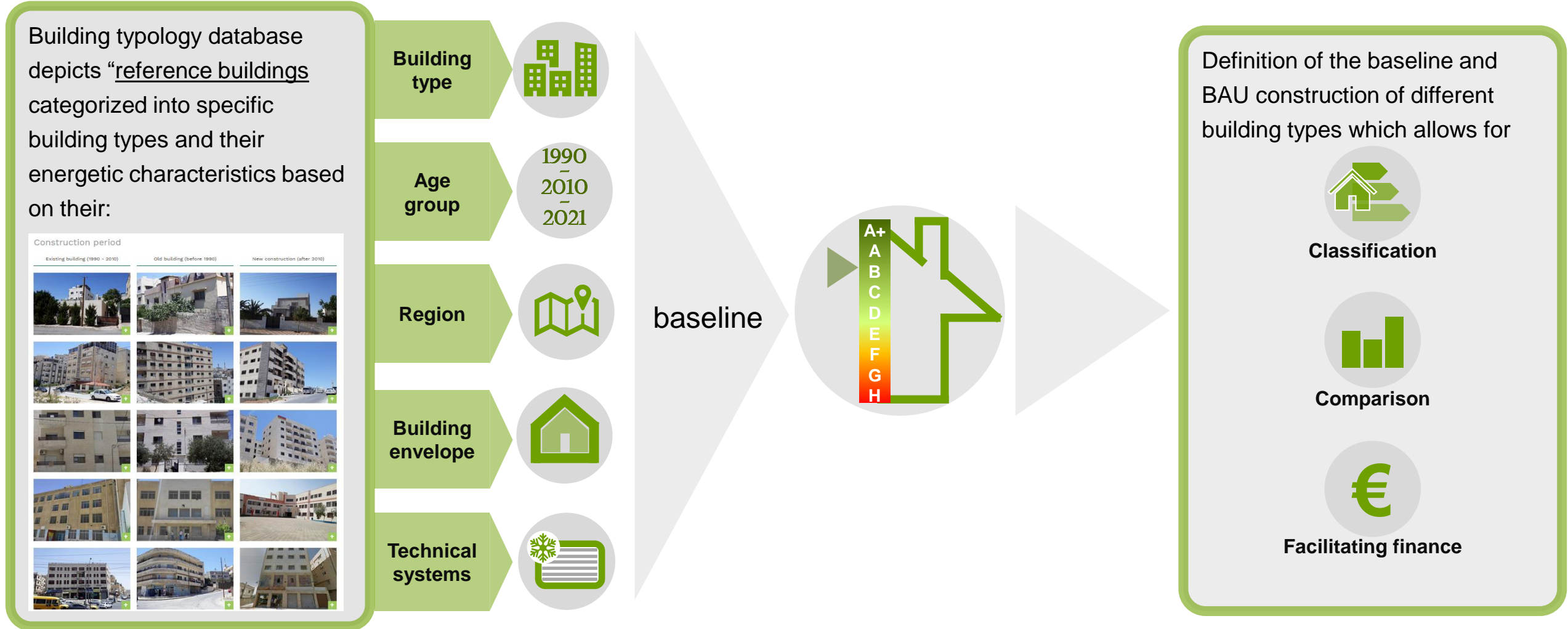
- Website, workshops, trainings, database for best practice buildings, webinars, newsletters, brochures, etc.



Building Typology

Building Typology

What is meant with building typology and why it is needed?



Results, template main sections

General information	Geometries	
Country	Number of stories	Share of facade oriented south
Project Name	Number of dwellings	Share of facade oriented west
Building type	Typical number of occupants / users	Window area
Region	Net floor area	Share of windows oriented north
(specify)	Clear room height	Share of windows oriented east
Construction Period	Volume	Share of windows oriented south
ID	Roof type	Share of windows oriented west
Reference ID	Area floor slab (ground plate)	Share of windows oriented horizontal
	Roof area opaque	Opaque doors
	Façade area opaque	Ratio Floor / Ground
	Share of facade oriented north	Ratio Floor / Roof
	Share of facade oriented east	Ratio Floor / Facade (excluding windows)
		Ratio Floor / Facade (including windows)
		A/V

Technical specifications of the building envelope		Specifications of technical building systems
Thermal heat bridge - Slab	Type of window	Primary space heating system
U-value - Roof	U-value - Window	Secondary space heating system
Thermal heat bridge - Roof	Thermal heat bridge - Window	Primary hot water generator
U-value - Wall	G-value Windows	Secondary hot water generator
Thermal heat bridge - Wall	Average shading factor of windows	Primary space cooling system
		Secondary space cooling system
		Ventilation
		Photovoltaics
		Lighting
		Temperature set-points

Building Typology | Jordan Results



Building type

- Single-family house (SFH) - detached
- Multi-family house (MFH) - Large (>1500m²) - detached
- Multi-family house (MFH) - Small (≤ 1500m²) - detached
- Schools
- Trade + MFH
- Trade + Office

Age group

- Existing building (1990 - 2010)
- Old building (before 1990)
- New construction (after 2010)

Regions

- Amman-East
- Amman-West

[Link to the typology on BUILD ME website](#)

Typology

Single Family House (SFH) - detached

Multi Family House (MFH) - Large (>1500m²) - detached

Multi Family House (MFH) - Small (≤ 1500m²) - detached

Schools

Trade+MFH

Trade+Office

Construction period

Existing building (1990 - 2010)

Old building (before 1990)

New construction (after 2010)





Baseline

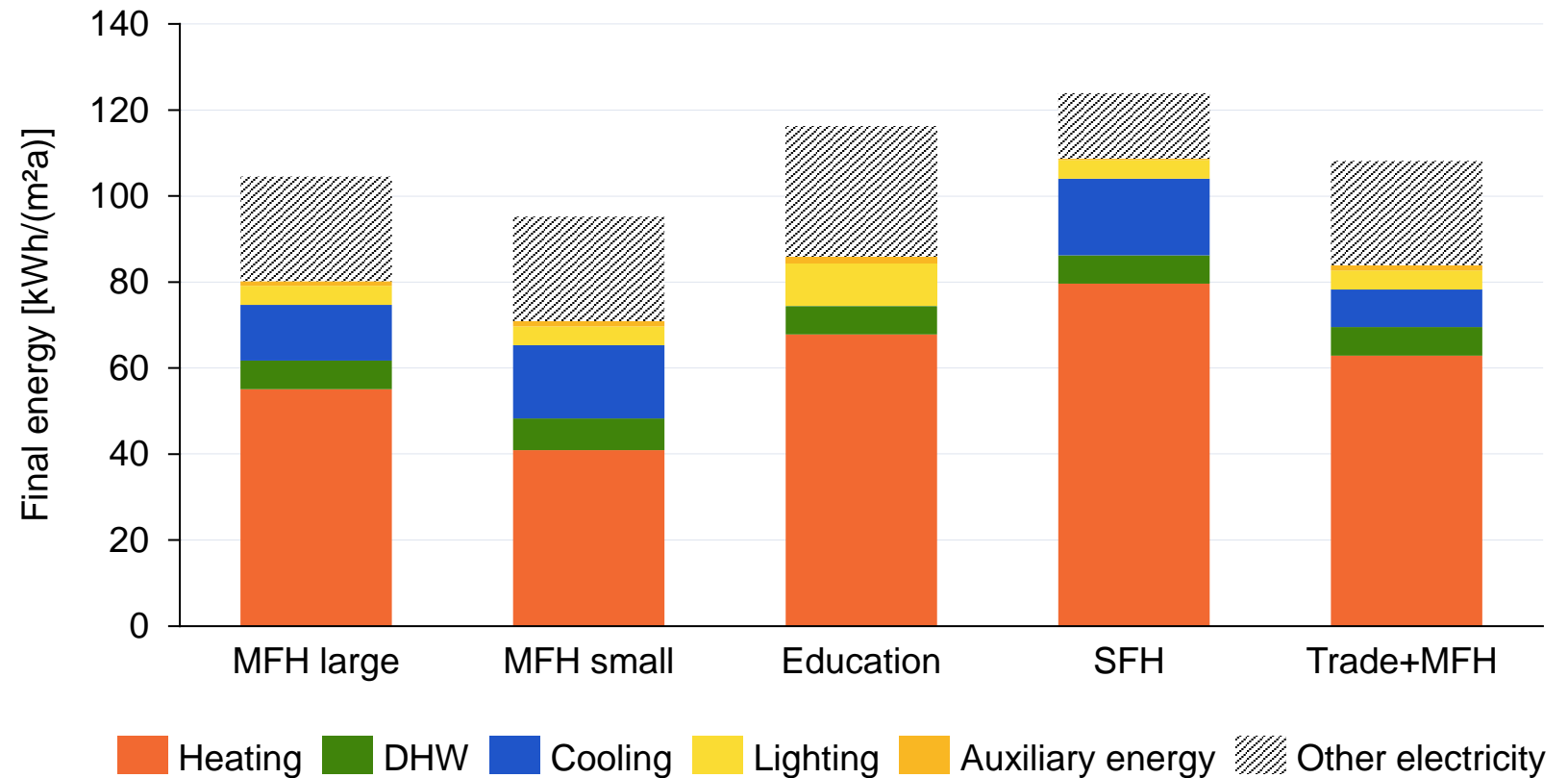
Baseline | Jordan

Illustrating energy intensity of selected Jordan building types

Key takeaways

- Specific final energy demand ranges between **95 – 120 kWh/(m²a)** for buildings constructed over the past decade
- **Space heating** accounts for largest energy demand
- **Space cooling** is about 1/3 of the space heating demand
- Note: Other electricity stands for plug-loads (e.g. fridge, TV, etc.) and is informational.

National baseline (new buildings, after 2010)



Baseline | Jordan

Illustrating energy intensity: Multi-family house (large)

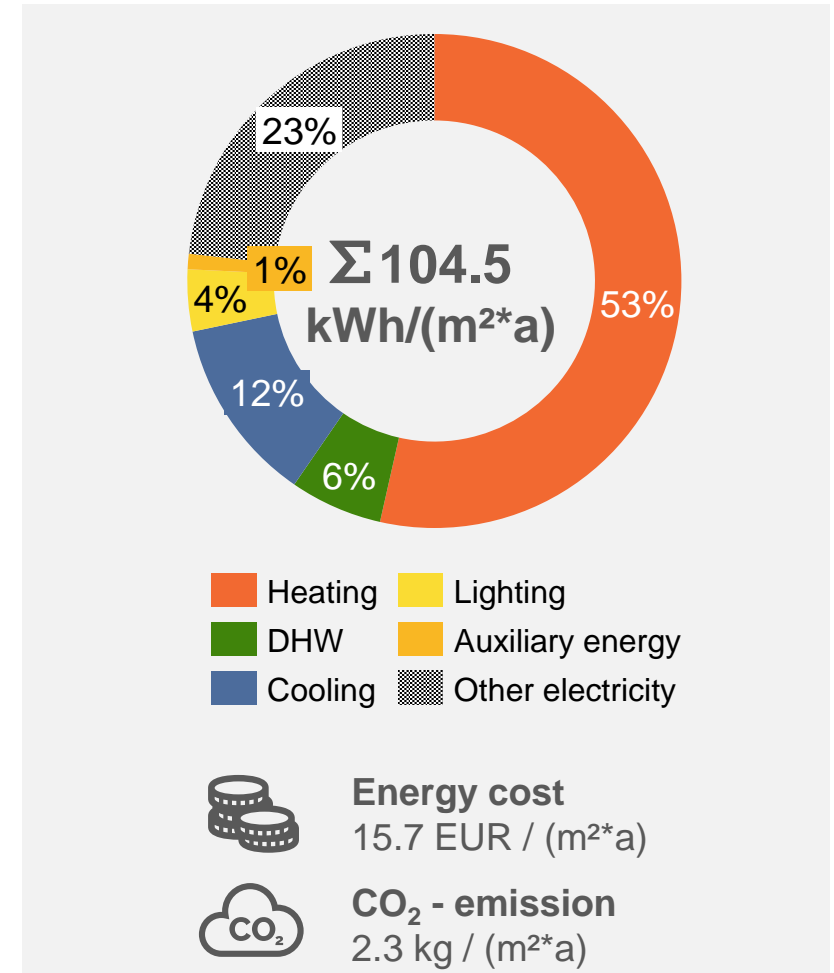
Building standard

- New buildings (constructed after 2010)
- Thermal insulation is used in external walls and roofs
- Following the EEBC 2018

Energy demand

- 105 kWh/m²/a (80 kWh/m²a for HVAC and Lighting)
- Energy consumption for heating approx. half of total

Parameters	Baseline
Roof insulation (U-Value)	0.55 W/m ² K
Wall insulation (U-Value)	0.57 W/m ² K
Floor insulation (U-Value)	1.2 W/m ² K
Windows (U-Value; G-Value)	5.7 W/m ² K; 0.85
Window fraction	Ø 11%
Shading	Manual shading
Air tightness	0.25 1/h
Heat supply	LPG heater (80%)
Cold supply	Single split (EER: 3.0 – 3.9)
Hot water	Direct electric
Ventilation systems	Free ventilation
Lighting systems	LED
Renewable energy	No
Set temperature cooling/heating	24°C / 21°C



Energy Efficiency Building Code in Jordan



Analysis of EEBC in Jordan

Approach and working steps

A. Status quo analysis

- Code development process
- Technical requirements
- Implementation mechanisms

B. National experts interviews

- Government experts
- Academia
- NGO and associations

C. Challenges and recommendations

- General Challenges
- General Recommendations
- Priority Recommendations.

D. Analysis of best practices

- Comparison with best practices
- Regional practices, international practices.

E. Specific recommendations

- Exchange with relevant stakeholders.
- Recommendations for implementation and/or enforcement

Pilot Projects



Supporting and Learning from Pilot Projects

Overview of Selected Pilot Projects in Jordan

KONN Modular Houses



- KONN concept represents a number of prototypes of residential single-family houses
- The prototypes are envisioned to provide affordable modular housing by using smart modular construction.

Private Residence



- A private single-family house designed by Salfiti architecture.
- It is an example of single-family houses in the Greater Amman Municipality.

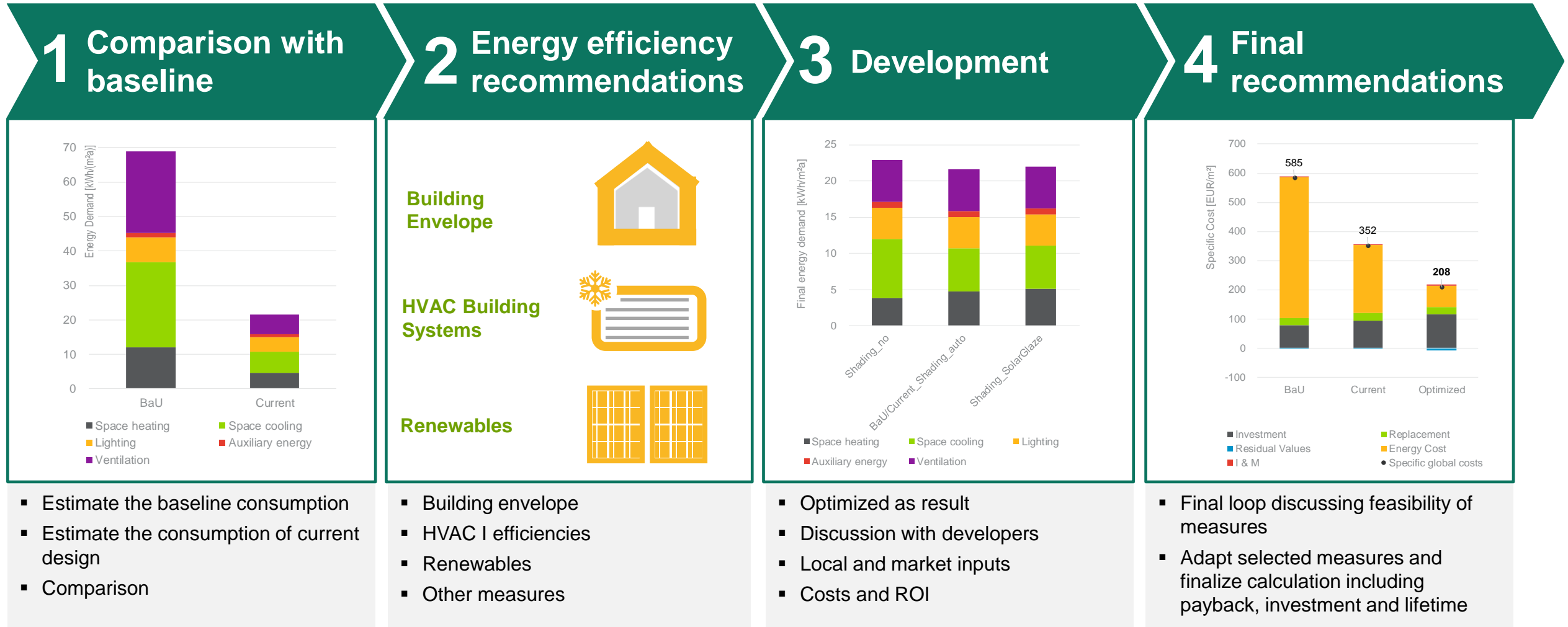
Dar Al-Oqoud



- Dar Al-Oqoud is designed and constructed by MAS Design Studio as a passive energy house.
- It is constructed using traditional building techniques such as loadbearing stone walls with vaults and domes.

Approach and methodology

Steps towards a low energy building



Demonstration Project Database (DPD)








Demonstration project database

Crowd-sourced examples from the region

Register and add a project

ADD NOW!

- Searchable database of practical inspiration
- Welcome input from project developers, architects or contractors from across the region
- Currently approx. 50 examples

	Orange Call Center A call center that is located in Pyramids heights office park (Cairo-Alex desert road). It is designed to accommodate at least 1400 agents, with highest standards, and to have all appropriate facilities within the office spaces of the building to operate on 24 hours base for 365 days of the year with no failures. Location: Giza, Egypt Project contact: Dr. Moemen Afify 12500 m2 2009 4 stories
	Arab Technical Group "ATG" Headquarter Building Arab Technical Group (ATG) Headquarters was awarded LEED Gold Certificate for Interior Commercial Category, and was the first Jordanian company to receive such a certificate in 2015. ATG is an engineering trading company that offers high-quality products and innovative solutions for the heating, cooling & renewable energy markets. With customer service and satisfaction at the core of ATG mission, ATG adhere to the highest proficiency standards and credibility to ensure the delivery of top class environmentally-friendly and energy saving solutions to guarantee the delivery of the highest comfort levels to ATG discerning clients in Jordan, Palestine and the Arab region. Location: Amman, Jordan Project contact: Eng. Faisal Abdallat 1285 m2 Unknown 6 stories
	Business link Headquarters Bureau 175 The project is an office building located in New Cairo, in a distinguished plot in the 5th settlement with streets on the front and on the side, which enables the building to face the vehicles coming in its direction. Location: New Cairo, Egypt Project contact: Metlad Consultant Engineers 18450 m2 2012 7 stories
	Fort Arabesque Resort Fort Arabesque is a resort with magnificent coral reefs and categories including villas. The resort has been awarded the Green Star Certificate and become an eco-friendly resort so a Sustainable Management Policy was adopted which considers legal requirements for the finances, quality, and health and safety of the resort. Location: Hurghada, Egypt Project contact: Bassant Saad 250000 m2 1997 1 story
	Dawar El Ezba Cultural Center Located at the heart of Cairo, the dawar el ezba Cultural Center aims to bring recreational and educational activities to the people of El bet Khairallah. The Center consists of a kitchen that offers vocational training for women, an art studio for kids, and a theatre space for multi-purpose activities. The building seeks to retranslate the architectural language of the area through using local materials and aims to become a living agent within its context. Location: Cairo, Egypt Project contact: Dawar For Arts and Development 318 m2 2019 4 stories

Visit <https://www.buildings-mena.com/info/demonstration-projects-database>

Description

Old single-glazed windows are affecting the operation of the heating system and the indoor conditions, so they will be replaced by double-glazed system. The old lighting system will be replaced with modern fluorescent lamps. An efficient sandwich panel will be integrated in the roof structure for more energy savings and new efficient DX inverter systems will be installed in the new labs and classrooms.

Project info

Construction phase	Refurbishment
Building type	Non-residential building
Detailed building type	Education
Net floor area	40000 m2
Stories	4 stories
Construction type	Concrete
Original construction year of the building	1968
Project contact	Pere Charbel Haddad
Contact email address	p.charbelhaddad@cndLedu.lb

Project team

Energy efficiency consultant(s)	Apave Liban
HVAC consultant(s)	Apave Liban

Building Rating and Certifications systems

Rating and certifications systems	Not applicable
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Building Envelope

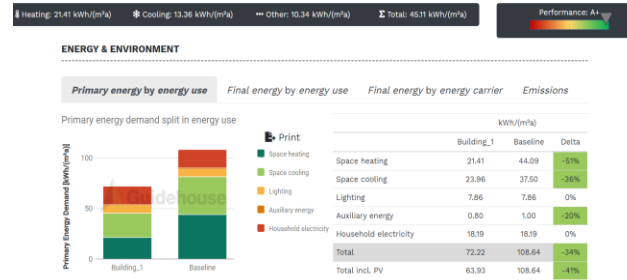
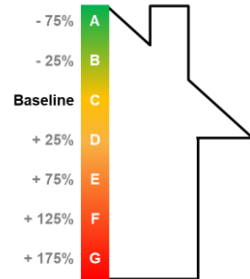
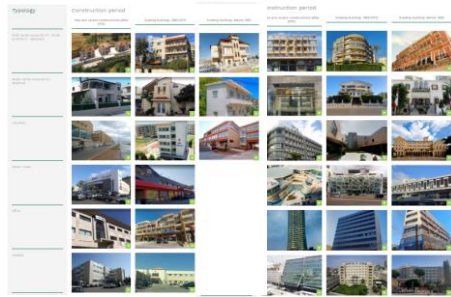
External walls	
Description of construction	Double Wall (10cm - 3 cm gap - 10 cm) with cladding
U-Value	1.21 W/(m²K)
Roof type	
Description of construction	Brick 5 cm - Sandwich panel 5 cm. The additional insulation to the roof structure has reduced the cooling load to 56.65 kW and resulted in a total savings of 4.2% of the total electricity bill.
U-Value	0.37 W/(m²K)
Openings and windows	
Glazing type	Double glazed
Frame material / description	Aluminum
Overall u-value window	2.78 W/(m²K)
Description of construction	The previous thermal load was estimated around 368.74 kW, but with the new double glazed installations, a reduction of 130 kW is achieved. The new windows are double glazed with an aluminum frame, resulting in a U-value of 2.78 W/m2 compared to 5.8 W/m2 of the previous windows.

Voluntary Energy Classification Scheme



Voluntary Energy Classification Scheme

Starting point and objective



Systems of national institutions

Requirements local banks

BUILD_ME Building Typology
considering the prepared typology as a baseline

Building Energy Performance Tool (BEP) tool as a calculation method considering local market information

Adaptability to national context
Considering country needs and managerial infrastructures

Establishment of a national energy classification scheme

Ensure implementation and ownership of the scheme beyond BUILD_ME

Problem statement

How to introduce the BEP Tool in the built environment of BM countries

Option A) Integrated

- Integrate the BEP tool in an existing scheme
- BEP tool as built-in module, calculating the energy performance of the energy chapter of sustainable certification scheme



Option B) Independent

- Develop a stand-alone scheme
- BEP tool as stand alone with a clear focus only on energy



Operation



What is the operational framework? Certification and labelling process?

Verification



How is verification, monitoring, surveillance and enforcement done?

Testing



Testing and roll out?
Evaluation and updates to the scheme?

Ownership



Evaluation and ownership of updating the scheme?

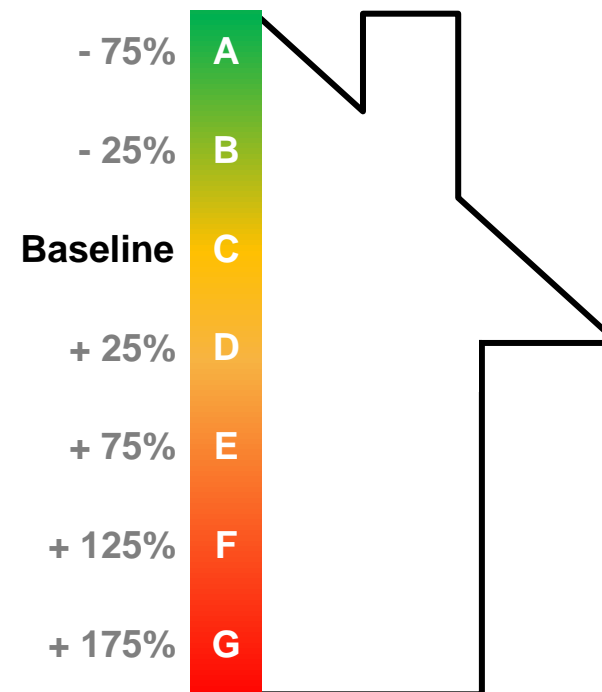
Next steps, development of classification scheme

Identification of the rating score

Classification scores for BUILD_ME building types

Class	Term	Score
A	Nearly zero energy building	<0.25
B	High performance building	0.25 - 0.75
C	Average new construction	0.76 - 1.25
D	Stock, better quality	1.26 - 1.75
E	Stock, medium quality	1.76 - 2.25
F	Stock, poor quality	2.26 - 2.75
G	Stock, urgent renovation demand	>2.75

Application of the classification score to baseline level



Methodology behind the BUILD_ME classification

- Classification logic is based on the European energy performance certificates of buildings norm [EN 15217]
- Adapted with feedback from financial institutes active in the markets and findings of the building typology
- Baseline (new buildings energy consumption) is equal to Class C (score of 1.0)

Introduction to Climate-Friendly Buildings

Riadh Bhar, Guidehouse





1 | Introduction

2 | Regulative

3 | Technical

4 | Economic

5 | Conclusion

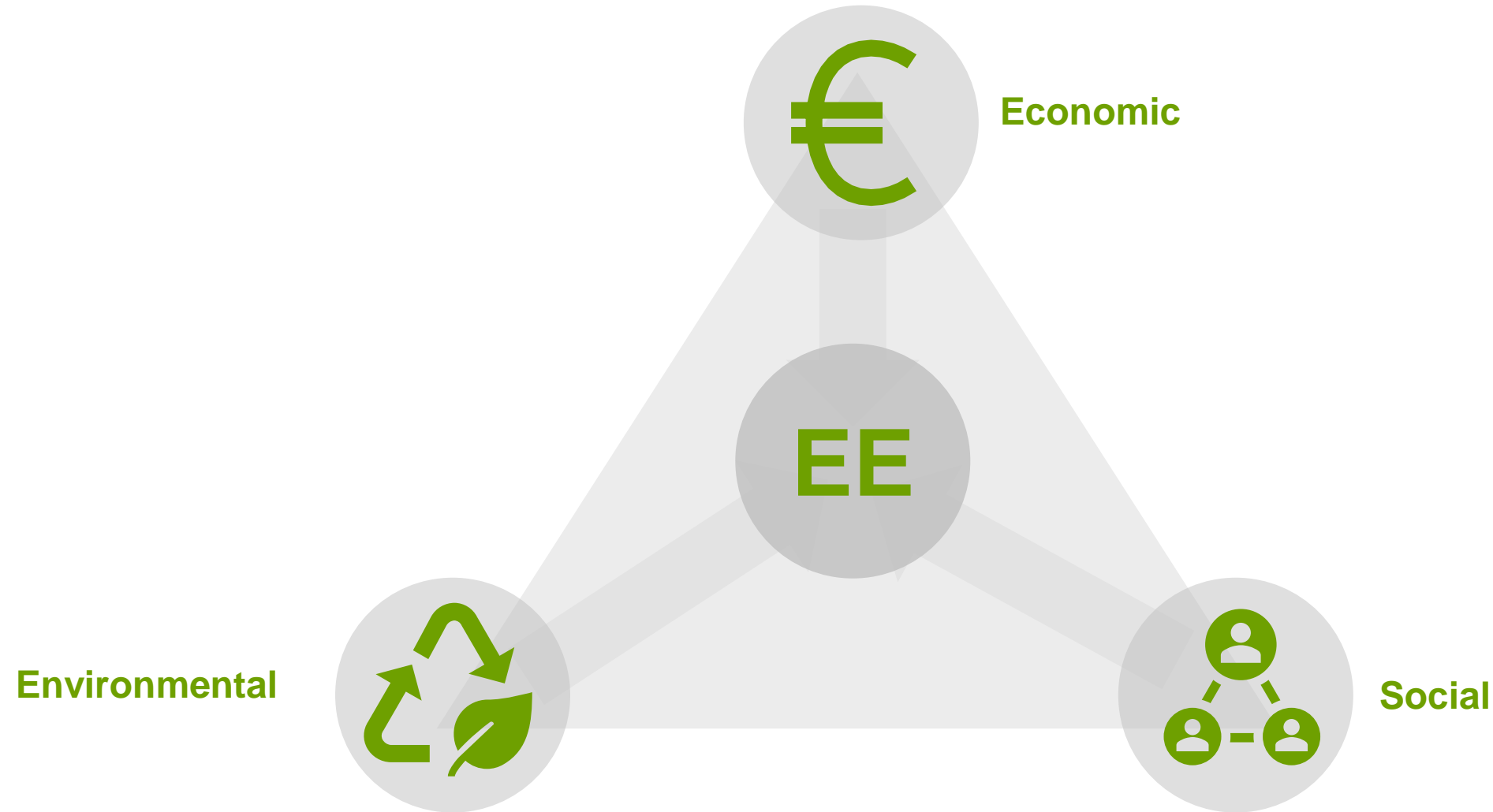


Photo: <https://theculturetrip.com/>

Introduction

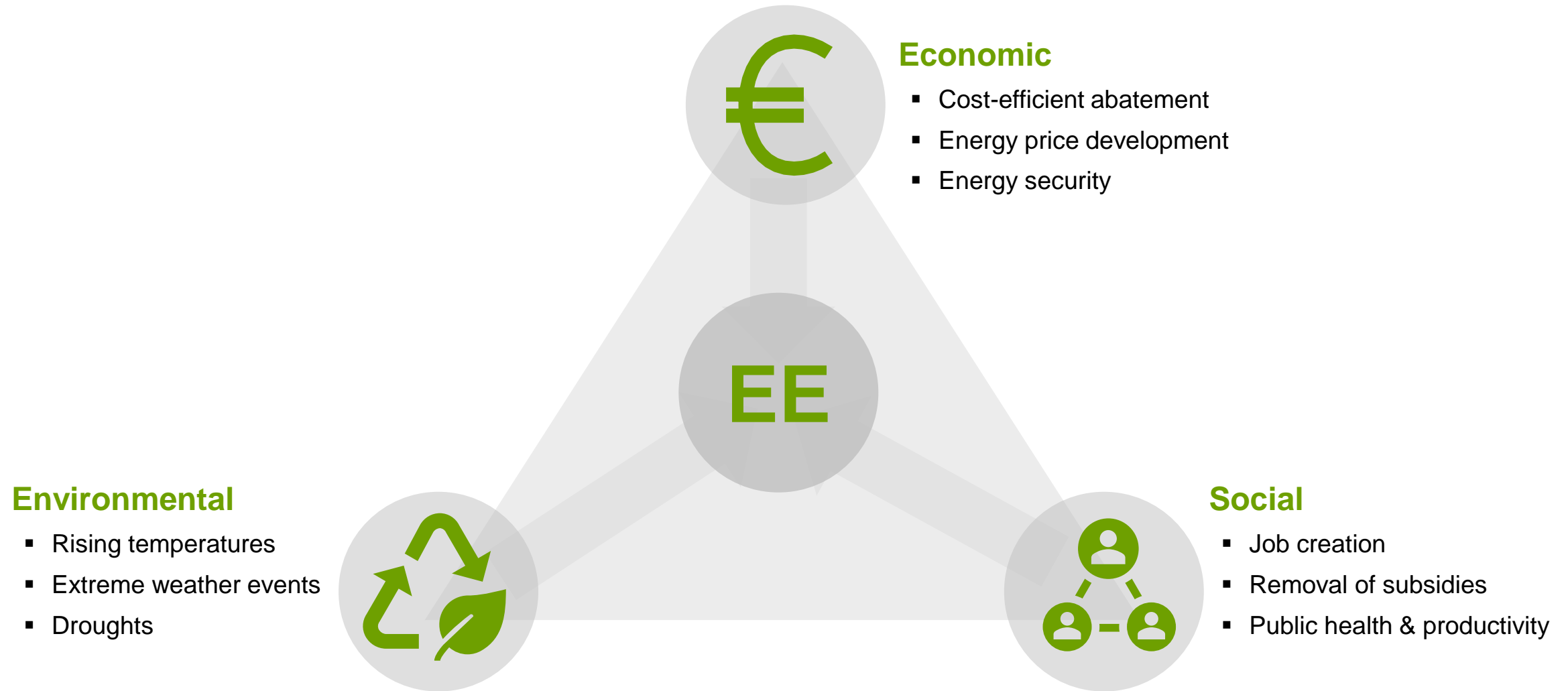
Setting the scene – the relevance of low energy buildings

The Sustainability Triangle or three Pillars of Sustainability



Setting the scene – the relevance of low energy buildings

The building sector offers cost attractive measures to cut down GHG emissions



Huge potential in the field of green buildings

Green buildings becoming more and more a billion dollar market

“Green buildings represent a major global investment opportunity, with buildings making up the largest segment of the **US\$ 231** billion energy efficiency market.”



“ During the next decade, green buildings represent a significant low-carbon investment opportunity in emerging markets **\$24.7 trillion** by 2030.”...



“ Global green building materials market size is expected to reach **\$377,029 million by 2022 from \$171,475 million** in 2015 with a CAGR of 11.9% from 2016 to 2022....



Current Situation in Jordan

The exploitation of EE/RE in the Jordanian built environment still offers opportunities

Existing buildings



- Hardly no retrofit of building envelope
- Specific financial instruments need (will) be developed
- 75-95%* of building stock not thermally insulated

New buildings



- Most relevant codes are available
- Energy efficiency building code – latest version expected in 2021
- Enforcement experiences still room for improvement

Green buildings



- LEED: 11
- BREEAM: 0
- EDGE: 1
- Daleel: 12
- Sawsana: 0

* Rough expert guess



Enabling framework *regulative*

Carrot, Stick and Tambourine Principle



Different types of policy instruments



Carrot = Incentives



Stick = Regulations



Tambourine = Information

Exemplary policy instruments in Jordan



Carrot = Incentives

- JREEEF
- GEFF / EBRD
- Others



Stick = Regulations

- EEBC
- Thermal insulation code
- Solar Energy Code
- Green Building Guidelines
-



Tambourine = Information

- Labelling of Appliances
- Trainings (JREEEF, JGBC etc.)
- Awareness Campaigns
- ...

Conclusion



No Silver Bullet



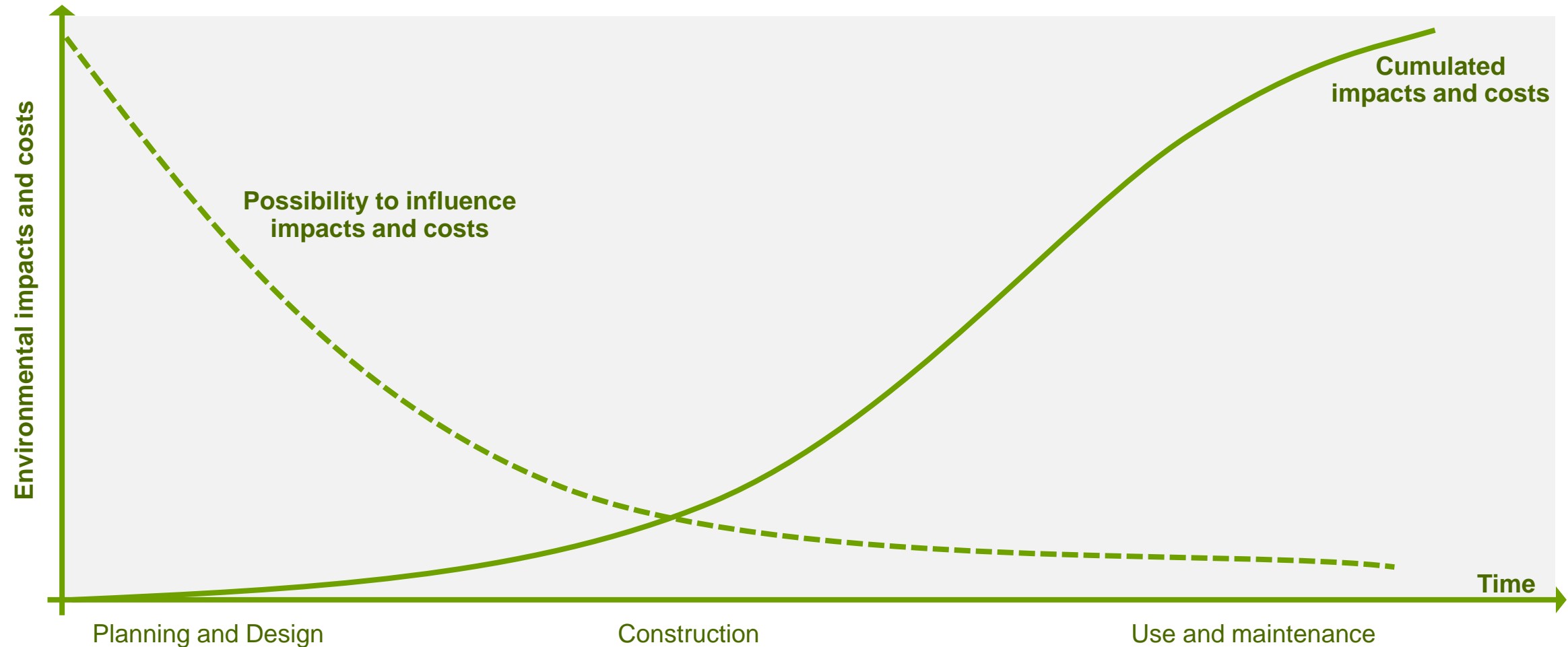
Policy Mix is needed



Enabling framework

technical

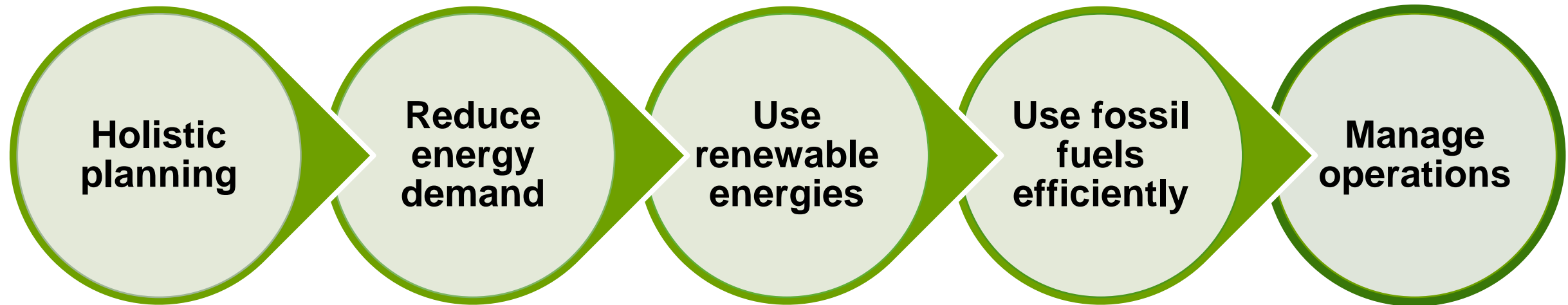
Influence of design decisions on life cycle impacts and costs



Source: Kohler & Moffatt, 2003

General principles to conceive a low energy building

Embed Trias energetica, „The most sustainable energy is saved energy“



Case Studies

Energy Efficient Buildings in Jordan

Multiple sites, Jordan
KONN Modular House



<https://www.buildings-mena.com/info/demonstration-projects-database>

Amman, Jordan
Izzat Marji Group Head Quarter Building



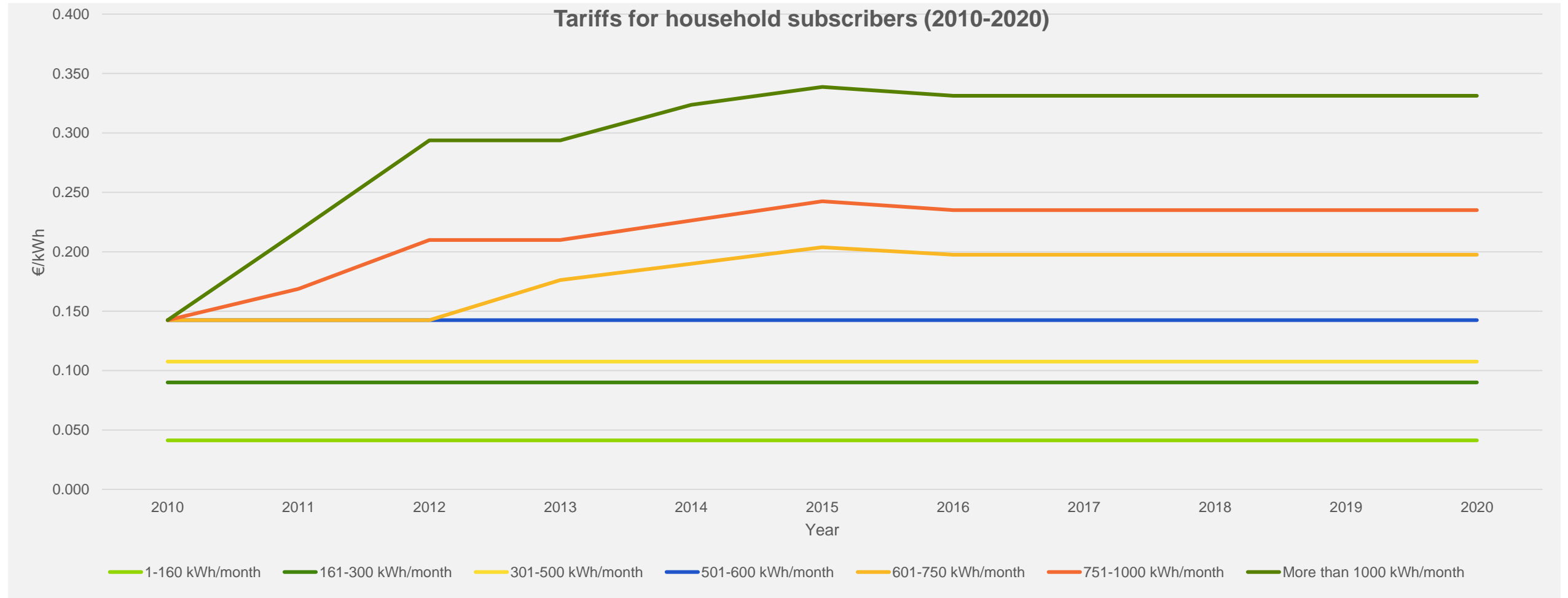


Photo by zibik on Unsplash

Enabling framework *economic*

Energy price development in Jordan

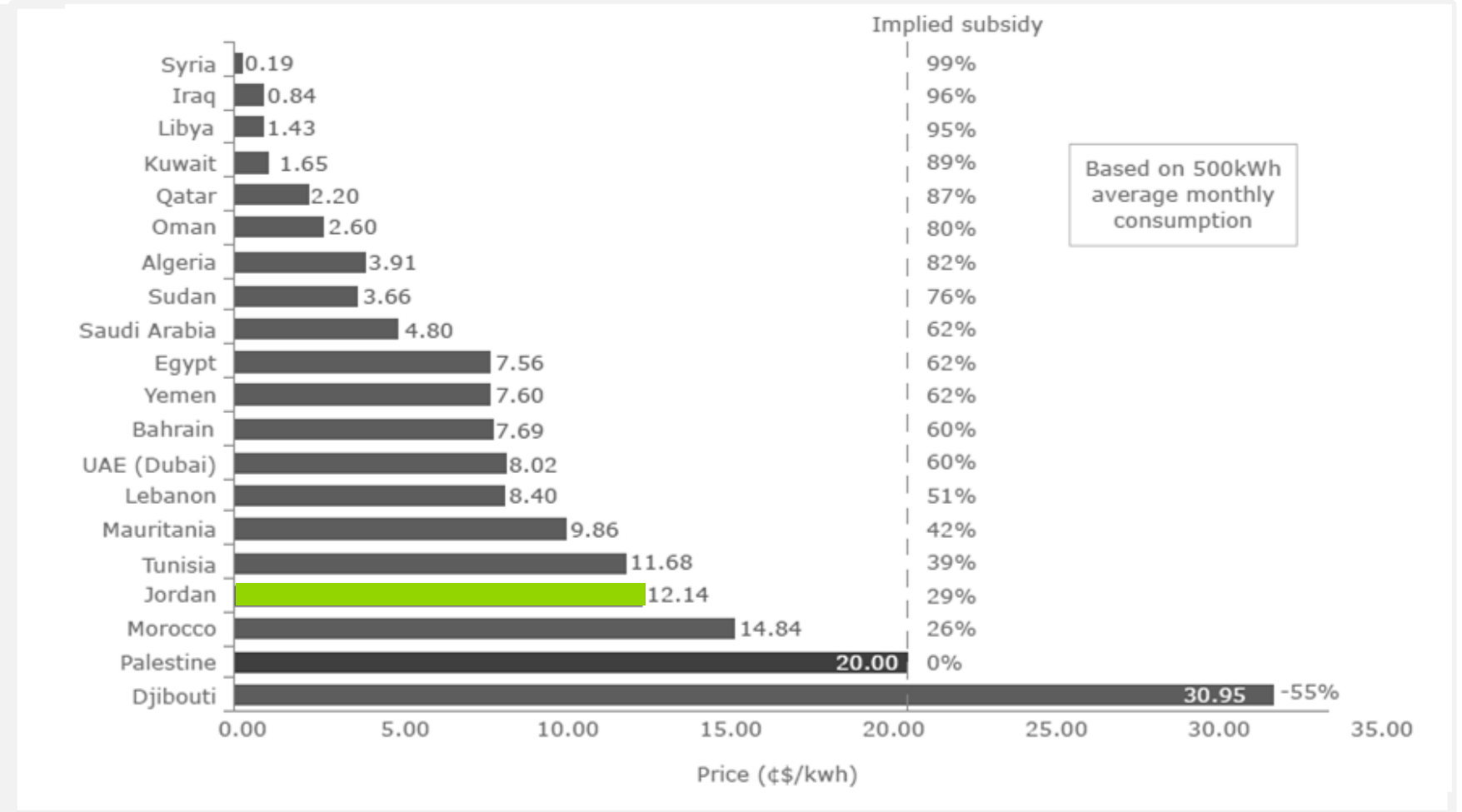
Higher tariff classes have increased since 2010 and saturated in 2015



Residential sector electricity tariff (2018) in Arab countries

S: RCREEE, Arab Future Energy Index

Electricity tariff in Jordan is among **the highest** in the MENA region



Market availability of EE/RE technologies

Maturity and awareness of EE / RE technologies

Envelope



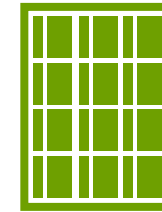
- Roof insulation
- Wall insulation
- Floor insulation
- Double Low E Glazing
- Triple Glazing
- Air tightness bonds

HVAC



- Condensing boiler
- Mech. Ventilation with heat recovery
- Floor heating

Renewable

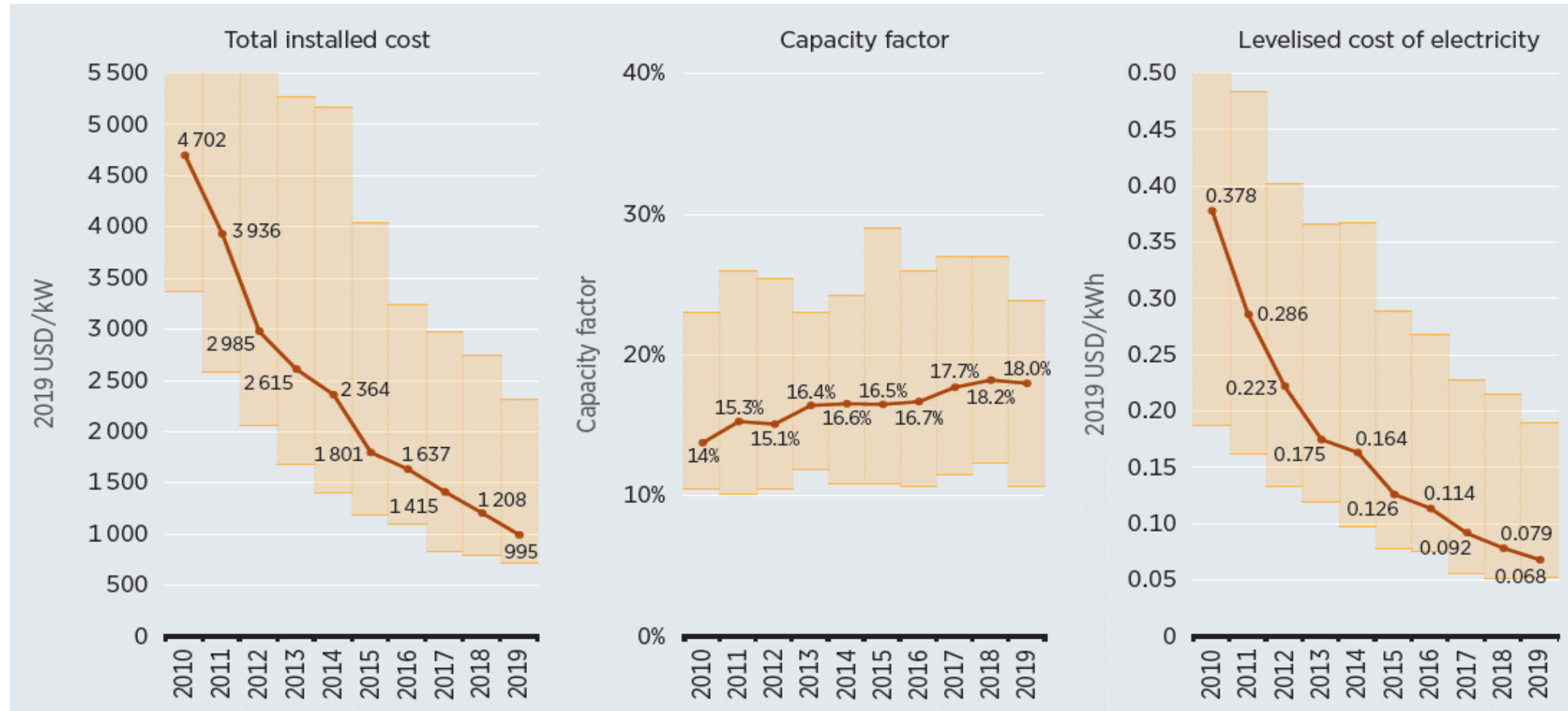


- PV
- Solar thermal thermosiphon
- Solar thermal pumped system
- Heat pumps, air / air
- Heat pumps, ground or water

● Mature/often used ● moderately used ● immature/ not often used

Development of Photovoltaics (PV), S: IRENA

Global weighted average total installed costs, capacity factors and LCOE, 2010 - 2019



S: IRENA Renewable Cost Database



Conclusion

Conclusion

The ingredients exist for the uptake of Energy Efficiency in Buildings



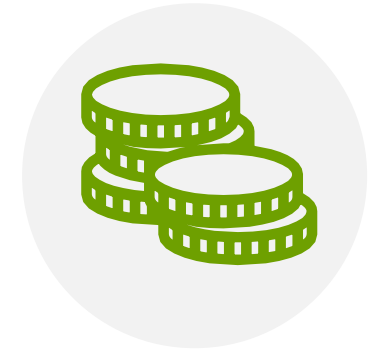
Regulative

- Most relevant codes are available.
- The enforcement in need for further attention.
- Promising first steps have been initiated



Technical

- Technologies exist in the local market.
- Capable architects and engineers are available
- High upfront costs are the main barrier for some EE measures.



Economic

- The shift towards „Real“ energy price will encourage the utilization of EE/RE
- The availability of the most relevant EE/RE technologies in the market eliminate possible barriers
- Latest price development of technologies (e.g. PV) makes investment more attractive

Q&A

Break



Photo by Fahmi Fakhruddin on Unsplash

Renewable Energy and Energy Efficiency Fund “JREEEF”

Ola Sarhan, JREEEF





وزارة الطاقة والثروة المعدنية
المملكة الأردنية الهاشمية



J R E E E F
Jordan Renewable Energy & Energy Efficiency Fund
صندوق تشجيع الطاقة المتجددة وترشيد الطاقة
MINISTRY OF ENERGY AND MINERAL RESOURCES
وزارة الطاقة والثروة المعدنية

JREEEF milestones

Financing scheme for energy efficient buildings in Jordan & the BEP tool

LEADING NATIONAL EFFORTS TO OPTIMIZE THE UTILIZATION OF ENERGY CONSUMPTION THROUGH EE & RE

Overview

The Renewable Energy and Energy Efficiency Fund was established under the Renewable Energy and Energy Efficiency Law No. (13) of 2012, and its own bylaw No. (49) was issued in the year 2015, where it actually started its work as an executive arm of the Ministry of Energy and Mineral Resources. The fund works to provide the necessary financing to implement energy conservation and renewable energy programs and projects.

Where the Fund has designed a package of programs and projects that include various sectors and that are implemented through several financing windows, and the strategic plan and implementation programs of the Fund stem from the general strategic plan of the Ministry of Energy and Mineral Resources and the national strategy for the energy sector to achieve national goals, and contribute to achieving Jordan's commitments International Conference on Climate Change and the Paris Agreement.

Minister of Energy chairs the Fund Management Committee formed according to the law, which consists of six members, three of them from the public sector and three from the private sector: This is an example of effective partnership between the public and private sectors.

Financial mechanisms & windows

Financial Mechanisms

- Grants
- Interest Rate Subsidy
- Banks Loans Guarantees
- Cost sharing With International Donors

Financial windows

- Banks
- Microfinance companies
- Local NGOS /CBOs

JREEEF Polices

- Gender Policy
- Evaluation Policy
- Environment & Social Policy
- Data Policy

JREEEF Objectives

Reducing the financial burdens on consumers and the economy resulting from energy sector.

Support RE and EE projects and programs that open up new markets and are replicable and scalable.

Increase the private sector's economic resilience and competitiveness through deploying EE/RE applications.

Support development of a domestic industry that can deliver the projects and services necessary to scale-up utilization of RE and EE in Jordan.

Develop a network of partnerships for developing and implementing RE and EE projects of all sizes.

Engage with donor agencies and other funds to establish a continuing flow of funding for renewable energy and energy efficiency investments.

Schools

Household
sector

Tourism
sector
(hotels)

Industry
sector

Non profit entities
with public
objectives
(accommodation)

Agriculture
sector

health
sector

Awareness
training &

Municipalities

worship
places

JREEEF programs for the household sector

Installing heaters and solar cells and replacing energy-saving lamps for citizens' homes.

Funding Mechanism:

- A full grant for the homes of poor families, chaste families, and the homes of the High Royal support, which are chosen in cooperation with the Royal Court, the Ministry of Social Development and the National Aid Fund.

Funding values :

- A full Grant for poor and chaste families.
- Support 50%, 30% of systems cost.

Program achievements till the end of the year 2020:

program	Number of installed systems
SWH	30,000
PV	3,500
Efficient LED	220,000 Units

Total cost of home sector projects:
17,480,087 Jordanian dinars

Targeted 2021

solar water heater 2500

solar photovoltaic cells 1,250

Funding windows:

- Local Associations: 250 local associations in various governorates of the Kingdom work with the Fund to implement programs.
- Commercial banks.
- The civil institution.
- Foundation for retired military personnel.
- Various donors.



PROJECT PERFORMANCE / IMPACT INDICATORS



212,389
The estimated number of citizens Beneficiaries of energy efficiency and renewable energy applications



5,801,131
Expected savings on your household bill
Jordanian Dinar

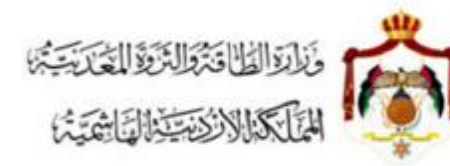


30,850
The expected decrease in carbon dioxide emissions by tonnes annually



48,431
Expected decrease in electrical energy consumption (MWh) annually

JREEEF program for Non profit entities with public objectives (accommodation)



Supporting the installation of solar cell systems for institutions, associations and centers that deal with orphans, people with disabilities and the elderly.

Funding Mechanism:

Full (100%) grant from the Energy Fund to install the system.



Program achievements for the end of the year 2020:

Photovoltaic cell systems were installed and commissioned for 11 enterprises.

Targeted during 2021: 20 charities, with a maximum of 10 kilowatts

PROJECT PERFORMANCE / IMPACT INDICATORS



850,137

Expected savings on your household bill
Jordanian Dinar



290

The expected decrease in carbon dioxide emissions by tonnes. annually



433.3

Expected decrease in electrical energy consumption (MWh) annually

Industrial sector

Supporting and financing energy audit studies and implementing energy-saving measures in small and medium-sized factories.

Funding Mechanisms:

- Fund energy audit studies by 50%.
- Supporting bank interests and guaranteeing loans for the loan granted to the factory to implement the project, with a ceiling of 350,000 dinars.

Program achievements:

For the end of the year 2020

Number of completed energy audit studies	Number of participating factories
27	79
Number of factories obtaining loans and implementing procedures	Number of energy audit studies underway
10	52

The total cost of the project to date
5.500.260 JD

The number of factories that implemented the procedures with self-financing
13

Targeted for 2021

factories / energy audit study 20



PROJECT PERFORMANCE / IMPACT INDICATORS



823

The estimated number of citizens Beneficiaries of energy efficiency and renewable energy applications



872,842

Expected savings on your household bill Jordanian Dinar



4,176

The expected decrease in carbon dioxide emissions by tonnes, annually



2,488

Expected decrease in electrical energy consumption (MWh) annually

Tourism sector / hotels



Fund the implementation of energy audit studies and implementing energy efficiency and rationalization measures in four-star hotels or less. In regions outside the capital.

Funding Mechanisms:

- Grant support (100%) to conduct the hotel energy audit study.
- Supporting the implementation of energy conservation measures emanating from the study.

Program achievements for the end of the year 2020:

The number of hotels benefiting from its history is
16 hotels in Petra and Madaba

The total cost of the project to date:

6,657,540 JD

Targeted for 2021

Executing an energy audit study for hotels of four-star category or less to include 10 hotels in Aqaba during the year 2021 and implementing the outputs of these studies for the participating hotels at a total cost of 2.7 million dinars.

PERFORMANCE INDICATORS RESULTS

Performance Index	Results Achieved 2015-2020
implemented applications of energy efficiency	12
Number of energy audit studies conducted.	18
Number of LEDs replaced.	5,908
Solar heaters capacity (liters).	9,150



PROJECT PERFORMANCE / IMPACT INDICATORS



213,321

The estimated number of citizens Beneficiaries of energy efficiency and renewable energy applications



474,300

Expected savings on your household bill
Jordanian Dinar



1018

The expected decrease in carbon dioxide emissions by tonnes, annually



2,818.7

Expected decrease in electrical energy consumption (MWh) annually

Public schools program

Implementing procedures for rationalization, conservation, energy efficiency and renewable energy for public schools.

Funding Mechanisms:

100% grant from the Renewable Energy Fund and donor partners participating in the program.

Program procedures:

Implementation of energy efficiency measures, installation of air conditioning systems, general maintenance of classrooms, installation of solar heaters systems, installation of photovoltaic systems that cover the entire electrical consumption of the school, in addition to installing central control systems and implementing comprehensive awareness campaigns for students, teachers and the local community about energy conservation and renewable energy applications .

Number of schools completed

136

Total cost by the end of 2020

11. 804 Million

Targeted for 2021

schools with an 20
estimated cost of one
million dinars



PROJECT PERFORMANCE / IMPACT INDICATORS



74,208

The estimated
number of citizens
Beneficiaries of
energy efficiency
and renewable
energy applications



505,786

Expected
savings on your
household bill
Jordanian Dinar



2,101

The expected
decrease in
carbon dioxide
emissions by
tonnes.
annually



3,299

Expected
decrease in
electrical energy
consumption
(MWh) annually

Municipalities program



- Fund the installation of solar cell systems on the rooftops of major municipal buildings, with the aim of reducing the electricity bill costs on them.
- The project is implemented in cooperation with the Ministry of Local Administration.

Support Mechanism:

100% grant for the cost of the system for renewable energy through a grant provided to the Energy Fund by the Italian Ministry of Environment, and allocated by the fund to support municipalities in the Kingdom.

- **Program achievements for the end of the year 2020:**
- Building two renewable energy stations with a capacity of (1 megawatt) per station, for the municipalities of Deir Alla and Maadi, at a cost of (1.5 million dinars), with a grant through the Economic Development and Sustainable Energy (SEED) program supported by the Canadian government and the Energy Fund.
- Building a renewable energy system with a capacity of (50 kW) for Ajloun municipality to establish an electric vehicle charging station for citizens.

The total cost of the Deir Alla and Ajloun projects: 1.6 million dinars.

Targeted project, starting from 2021:

First	30 municipalities for the year 2021. (The bid was Issued)
Second	municipalities for the year 2022 30
Third	.municipalities for the year 2023 40

The total cost of the project for the next three phases:

3.5 million dinars

Health centers program



Installing solar cells and air conditioning systems for health centers. With the aim of improving the work environment in these centers and creating a better environment for the auditors.

Funding Mechanism:

100% grant from the fund

Implementation mechanism:

The program is implemented in cooperation with the Ministry of Health to select the health centers that are most occupied, especially in remote areas. (Outside the capital)

Program achievements for the end of the year 2020:

Installing solar cells, air conditioning systems and energy-saving lamps for five (5) health centers in Ajloun and Deir Alla through the Economic Development and Sustainable Energy (SEED) program supported by the Canadian government and the Energy Fund.

- **Targeted for 2021**

25 health centers at an estimated cost of 750,000 dinars, distributed over the Kingdom's governorates.



Sustainable energy worship places

Supporting the installation of solar cell systems for places of worship in all governorates of the Kingdom.

How the program works:

The program is implemented in cooperation and partnership with the Ministry of Endowments, where the fund contributes 25% of the cost and the Ministry of Endowments contributes a similar rate, in which the bodies responsible for mosques and churches contribute 50%.

PROGRAM ACHIEVEMENTS BY THE END OF THE YEAR 2020

The total cost of the project is 6.6 million Jordanian dinars

Performance Index	Achieved results by the end of 2020
Number of houses of worship that participated in the program (completed)	570
Systems Capacity (kW. Peak)	9,152
Production Capacity (MWh)	14,275

Target for 2021: 100 houses of worship



PROJECT PERFORMANCE / IMPACT INDICATORS



580,000
The estimated number of citizens Beneficiaries of energy efficiency and renewable energy applications



3,453,842
Expected savings on your household bill
Jordanian Dinar



9,095
The expected decrease in carbon dioxide emissions by tonnes. annually



14,275
Expected decrease in electrical energy consumption (MWh) annually

Agricultural sector

Supporting the installation of solar cell systems for small farms, in cooperation with the Agricultural Credit Corporation.

Support Mechanism:

Providing support (grant) benefits and services resulting from the loan provided to these farms from the Agricultural Credit Corporation, with a ceiling of 15,000 dinars, to install a system with a capacity of up to 30 kilowatt peak.

ACHIEVEMENTS FOR THE END OF THE YEAR 2020:

Photovoltaic cell systems were installed and commissioned for 90 farms.

The total cost of the project: 2,344,125 JD

Targeted in 2021: 80 new farms



PROJECT PERFORMANCE / IMPACT INDICATORS



4,394

The estimated number of citizens Beneficiaries of energy efficiency and renewable energy applications



128,960

Expected savings on your household bill Jordanian Dinar



1,513

The expected decrease in carbon dioxide emissions by tonnes. annually



2,375

Expected decrease in electrical energy consumption (MWh) annually

Solar power for Vulnerable Families



Provide Solar power for Vulnerable Families or they registered at the National Aid Fund, the project is financed 100% from "Files al reef".

Objectives:

- Help the most Vulnerable communities in Jordan gain energy access.
- Reducing the electricity consumption for low-income families.
- Reduce costs from fuel imports and energy.
- Reduce the significant burden on the economy and the National Electric Power Company (NEPCO) from large energy subsidies of this demographic.

Target group & Target

Residential; and the family monthly power consumption should not exceed 300kWh, The target is to Cover the power needs of as many as possible from vulnerable communities in Jordan, namely the low-income families registered with the National Aid Fund (NAF) about 5000 families every year.

Achievements

During the first year of implementation, the Fils Al Reef has successfully financed the installation of 2,225 solar systems and currently financing 3,315 more systems for homes of Vulnerable families distributed across the 12 governorates.



Replacing conventional street lighting units with energy-saving lighting units (LED)

The project support replacing un-effciecnt street lighting to LED efficient lighting to help municipalities reduce the running cost of street lighting.

Objectives:

- Reducing the electricity consumption for municipalities.
- Reduce costs from fuel imports and energy.
- Reduce the significant burden on the economy and the National Electric Power Company (NEPCO) .

Target group & Target

Municipalities, Replace all traditional street lighting units in all municipalities of the Kingdom with 410,000 energy-saving units.

Partners

- Municipalities
- Contractors



JREEEF& The local community



JREEEF & The local community



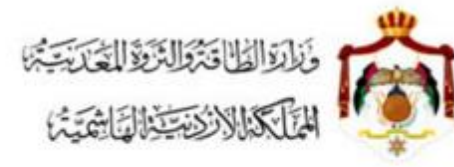
Partners

The Renewable Energy and Energy Efficiency Fund built successful partnerships that contributed to the success of its programs and projects, which included local and international partners. And he won regional and international Donors.

Relevant
ministries

Commercial
banks

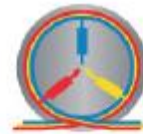
Local
associations



Association of Energy
Engineers - AEE JU



نقابة المهندسين الأردنيين
Jordan Engineers Association



شركة الكهرباء الأردنية المساهمة العامة المحدودة
Jordan Electric Power Company



غرفة صناعة الأردن
Jordan Chamber of Industry



JORDAN GBC
المجلس الأردني للأبنية الخضراء
Jordan Green Building Council



Schools Heating Program / His
Majesty's Initiative
Implemented by JREEEF wins Best
MENA Project Award of 2018



EBRD/ Green Economy Financing Facility in Jordan

Mohammad Maaytah and Michał
Deuszkiewicz, EBRD/GEFF Jordan





European Bank for Reconstruction and Development

Green Economy Financing Facility in Jordan





Supported by:



With funding by:

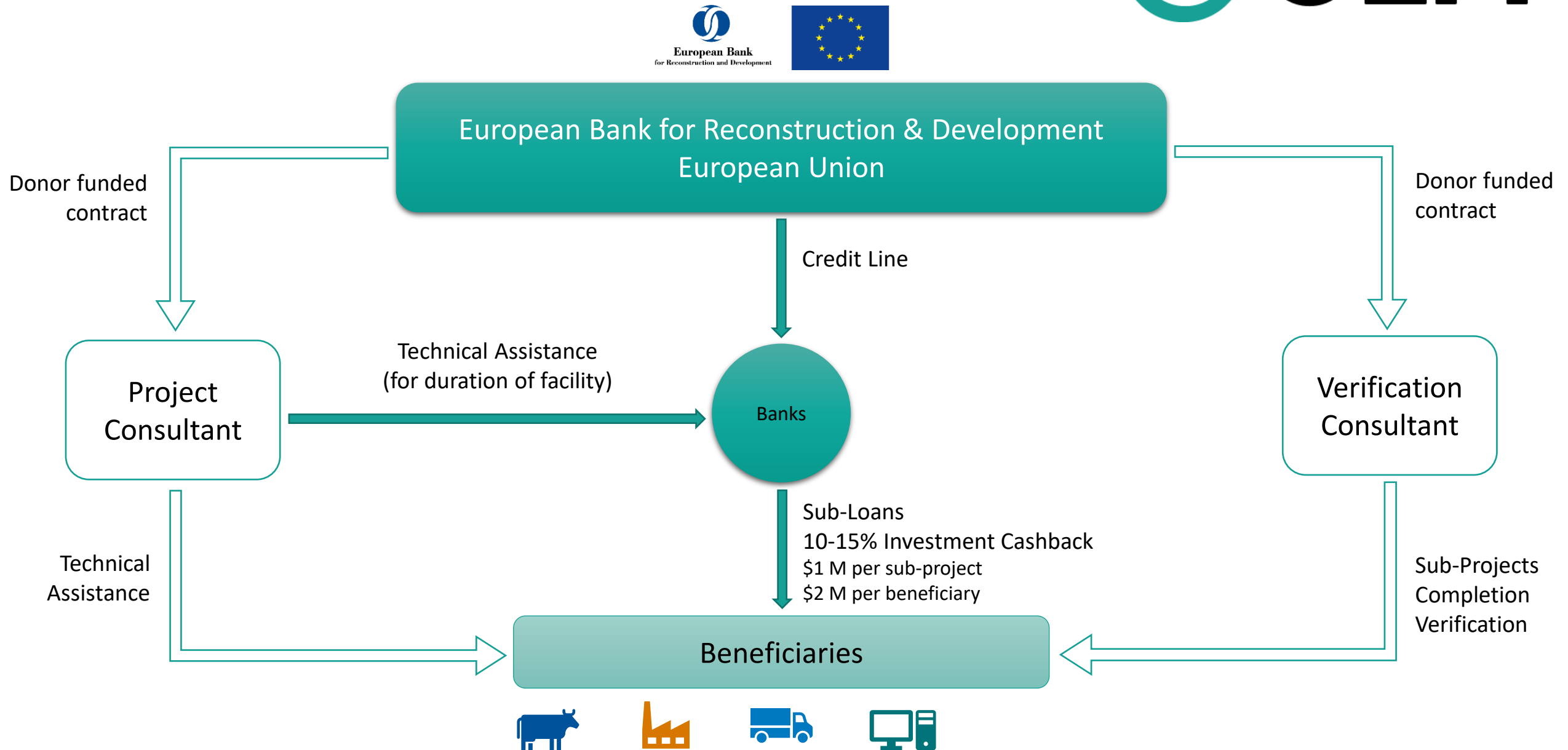


Agenda

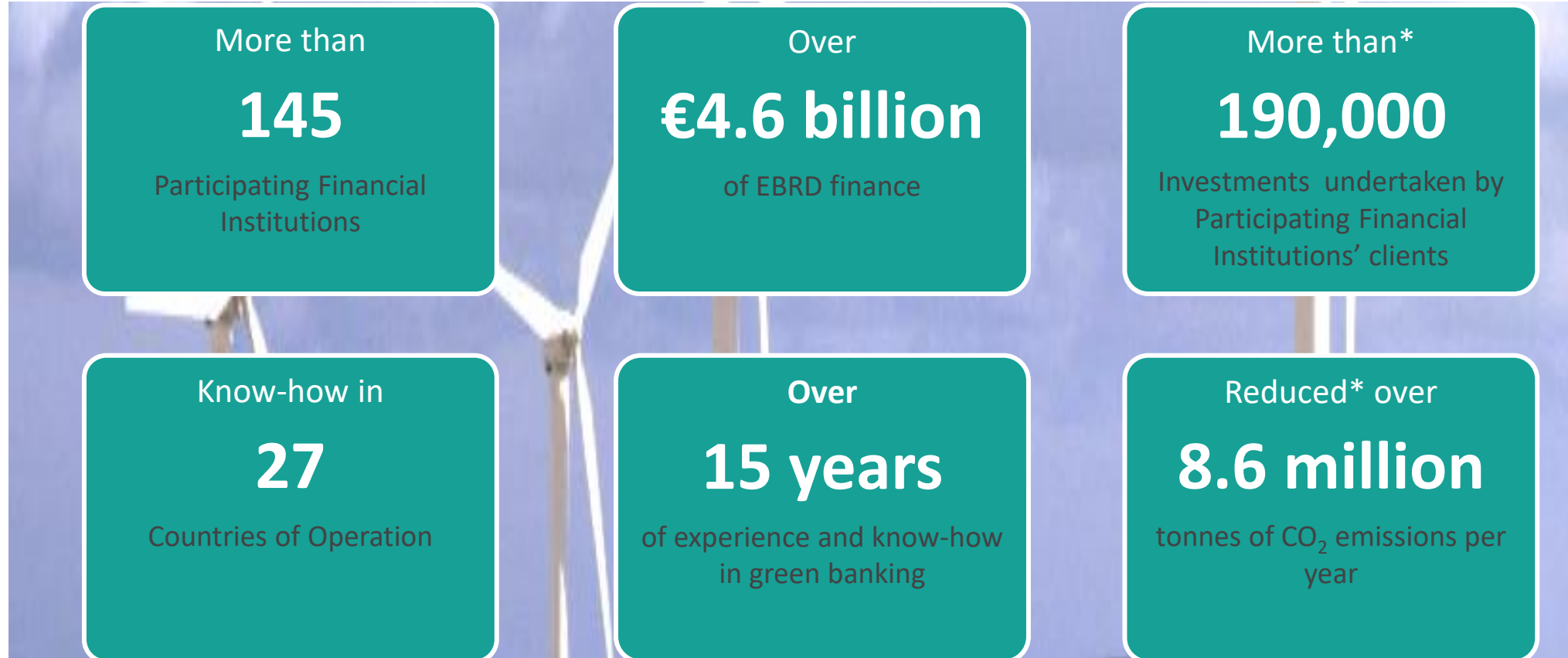


1. General introduction
2. Local Consultant role
3. Eligibility criteria – sub-borrowers
4. Eligibility criteria – projects
5. Benefits for the stakeholders

General Introduction



General Introduction



* Figures correspond to finance provided by the EBRD and its co-financing partners where applicable

LOCAL CONSULTANT ROLE



TRAINING

- ✓ Full time project office in Amman over the lifetime of the facility
- ✓ Provide training, documentation and ongoing support to the PFI Loan officers.
- ✓ Support the PFIs in analysing its client data base and developing the project pipeline

MARKETING SUPPORT

- ✓ Marketing of the GEFF in Jordan
- ✓ Facility coordination

TECHNICAL SUPPORT

- ✓ Sub-project technical eligibility assesment:
 - dedicated site visits (if necessary)
 - analysis of feasible green investments and of additional potential opportunities
 - assessment of Sub-projects cash-flow and its profitability, reducing risks related to the investment (includes financial, technical, implementation and environmental risks of project)

Eligibility criteria – sub-borrowers



Small and Medium
Enterprises

Industrial and commercial sector:

- SME/Corporate borrowers
- Vendors and suppliers of equipment



Agriculture,
forestry and
fishing



Food
processing



Manufacturing



Commercial
sector

Residential sector:

- Individuals
- SME/Corporates in the residential sector



Individual
households



Multi-family
residential
buildings

Small corporates

- Private companies (> 50%), any sector of activity (except of those on exclusion list)
- Producers, vendors and suppliers of green equipment and technologies are additionally eligible for working capital loans (no cashback)

Eligibility criteria - projects



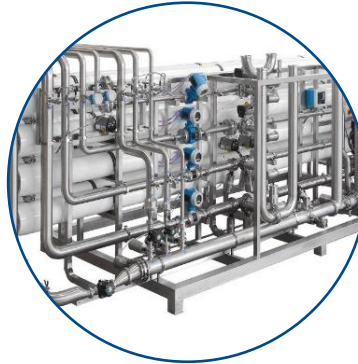
ENERGY EFFICIENCY

- Replacement of equipment
- Min 20% energy efficiency improvement (or CO2 emission reduction)



RENEWABLE ENERGY

- PV electricity and heat
- Biomass, biogas
- Waste-to-energy



WATER SAVINGS

- Equipment or technologies to reduce water consumption and / or improve water use (min 20%)



WASTE REDUCTION

- Equipment or technologies to reduce waste and / or improve the use of resources (min 20%)



BUILDINGS

- Residential buildings
- Commercial buildings
- Certified Green Buildings or proven performance improvement of 20% relative to national standards

Eligibility criteria - projects



Cumulative funding per borrower up to 20% of Loan amount

Green Technology Selector PROJECTS

Loan or lease \leq USD 300,000 (per
piece of equipment)

Pre-approved equipment selected
from the Green Technology Selector
database

10% Investment cashback

ASSESSED PROJECTS

$\leq 10\%$ of Loan amount

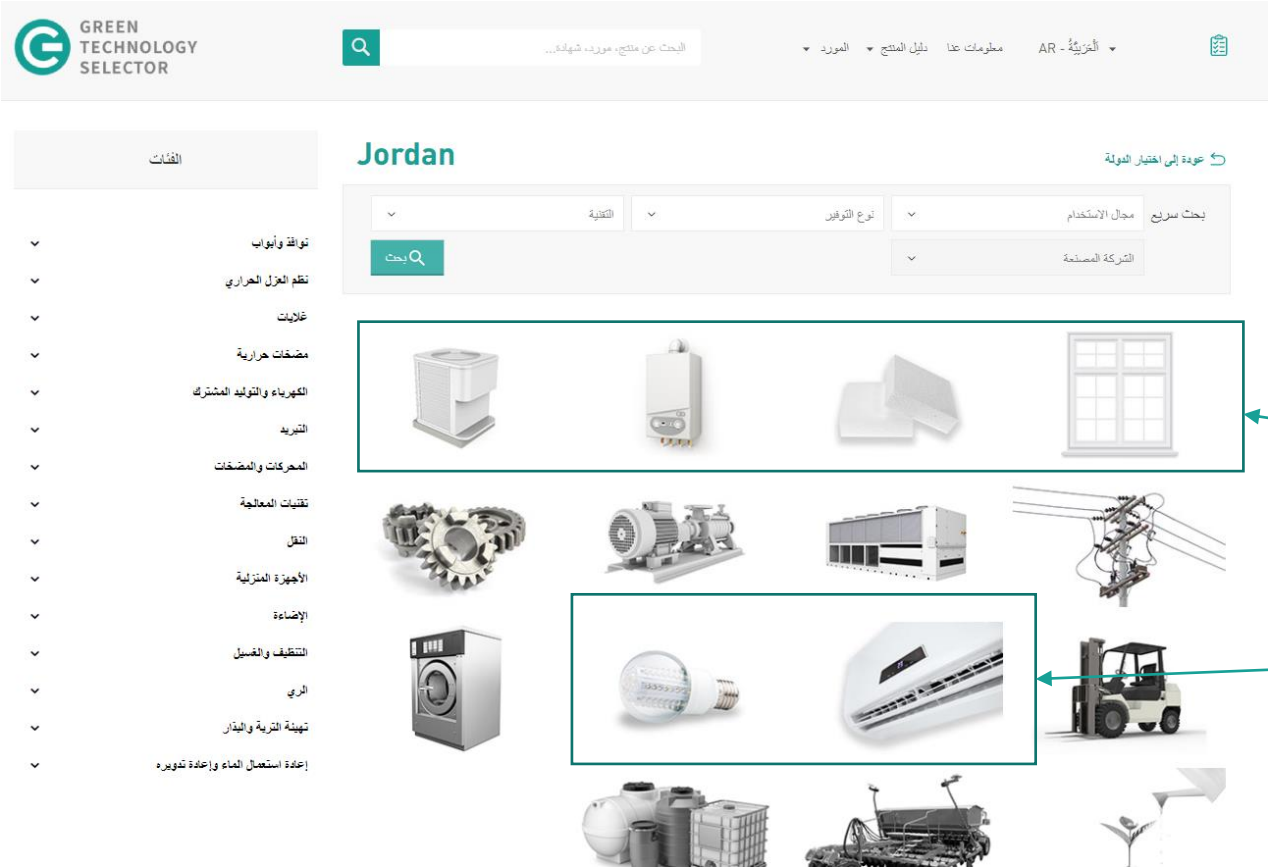
Complex projects requiring specific
support

Up to 15% Investment cashback

Eligibility criteria – projects

Green Technology Selector

to make equipment selection easy!



Building related
technologies

Web-based tool

Products eligible for GEFF in Jordan Financing

> 900 products available via Jordan vendors

Verification by experienced engineers

> 35 000 eligible in Jordan products

> 100 Jordan vendors registered

Eligibility criteria – projects

Assessed projects - Buildings



Sub-projects involving the improvement of existing buildings have a performance baseline defined by the current condition of the building fabric and engineering systems. Sub-projects (excluding costs of land and existing building acquisition) are eligible if the building will obtain environmental certification at a minimum level of:

- ✓ LEED (Silver),
 - ✓ BREEAM (Good),
 - ✓ EDGE Standard, Passive House (Standard),
 - ✓ DGNB (Bronze)
- Or
- ✓ >30% Energy savings / Renewable Energy Sources
- Or
- ✓ >15% savings against the national standards

We are in the process of adding to the list the Build ME certification

Benefits for stakeholders



Participating Financial Institutions:

- ✓ Identifying green opportunities
- ✓ Expanding financing under CAPEX investments
- ✓ Offering a new product which may help retain existing and attract new clients
- ✓ Increased competitiveness for PFI by offering a new, cost saving products for SMEs and Retail clients
- ✓ Free marketing support:
 - ✓ Effective promotion of the Jordan GEFF credit line throughout Jordan with a clear and recognizable visual identity
 - ✓ Organisation of promotional events
- ✓ Training and ongoing support for loan officers

Sub-borrowers:

- ✓ Only the best available and eligible products leading to savings
- ✓ Free engineering support
- ✓ Clear and simple procedure
- ✓ Investment Incentive (10% or 15% of the loan value)



Contact us!



Mohammad Maaytah – Operational Leader GEFF in Jordan

Michał Deuzkiewicz – International Lead Engineer - Michal.deuzkiewicz@ebrdgeff.com

<https://ebrdgeff.com/jordan/>

<https://techselector.com/jordan-en/>

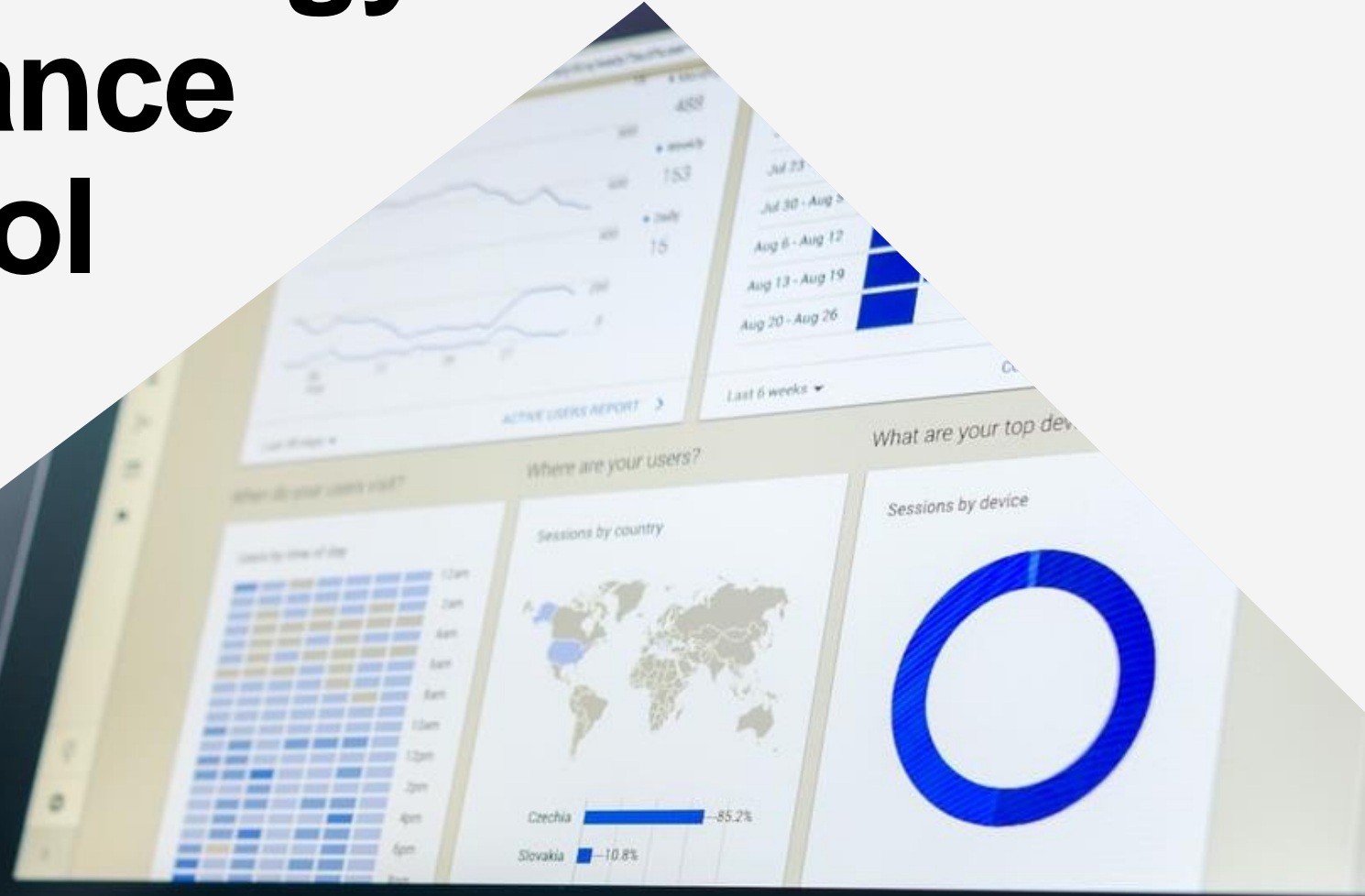


THANK YOU !



Building Energy Performance (BEP) Tool

Ali AlMarzouq, RSS/NERC
Riadh Bhar, Guidehouse



Logic of the BEP Tool

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

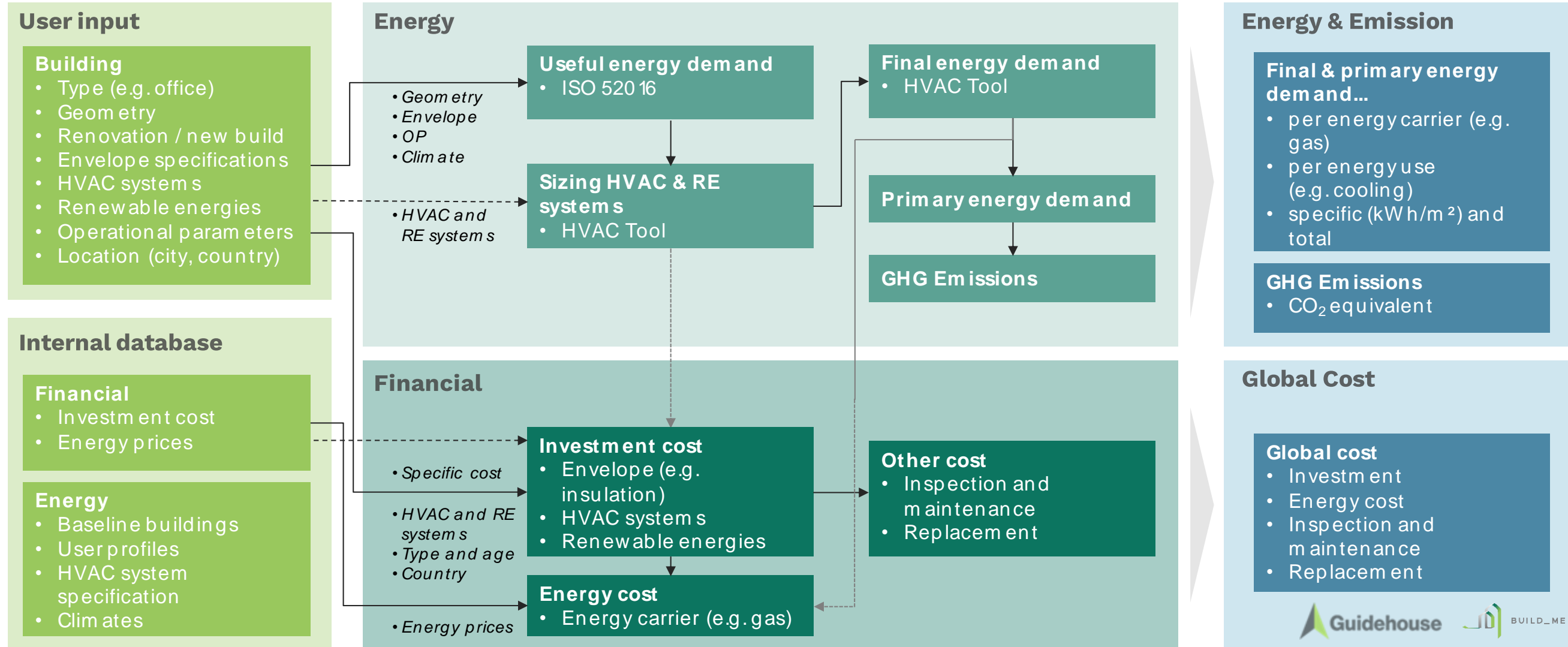
- Energy calculation is based on the **international norm** for modelling thermal building performance (EN ISO 52016)
- The BEP-Tool was already **successfully applied** in various projects and countries
- **Full transparency** with a detailed user manual, incl. all calculation steps and internal assumptions.

Calculation methodology

Input

Calculation engine

Output



Wrap Up and Outlook



Photo by Martin Adams on Unsplash

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BUILD_ME@guidehouse.com

Contact

Ali AlMarzouq – RSS/NERC

Ali.Marzouq@rss.jo

Riadh Bhar - Guidehouse

Riadh.Bhar@guidehouse.com

Eslam Mohamed Mahdy Youssef - Guidehouse

eslam.mahdy@guidehouse.com



الجمعية العلمية الملكية
Royal Scientific Society

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This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.



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