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BUILD_ME

Climate-friendly buildings in the MENA region

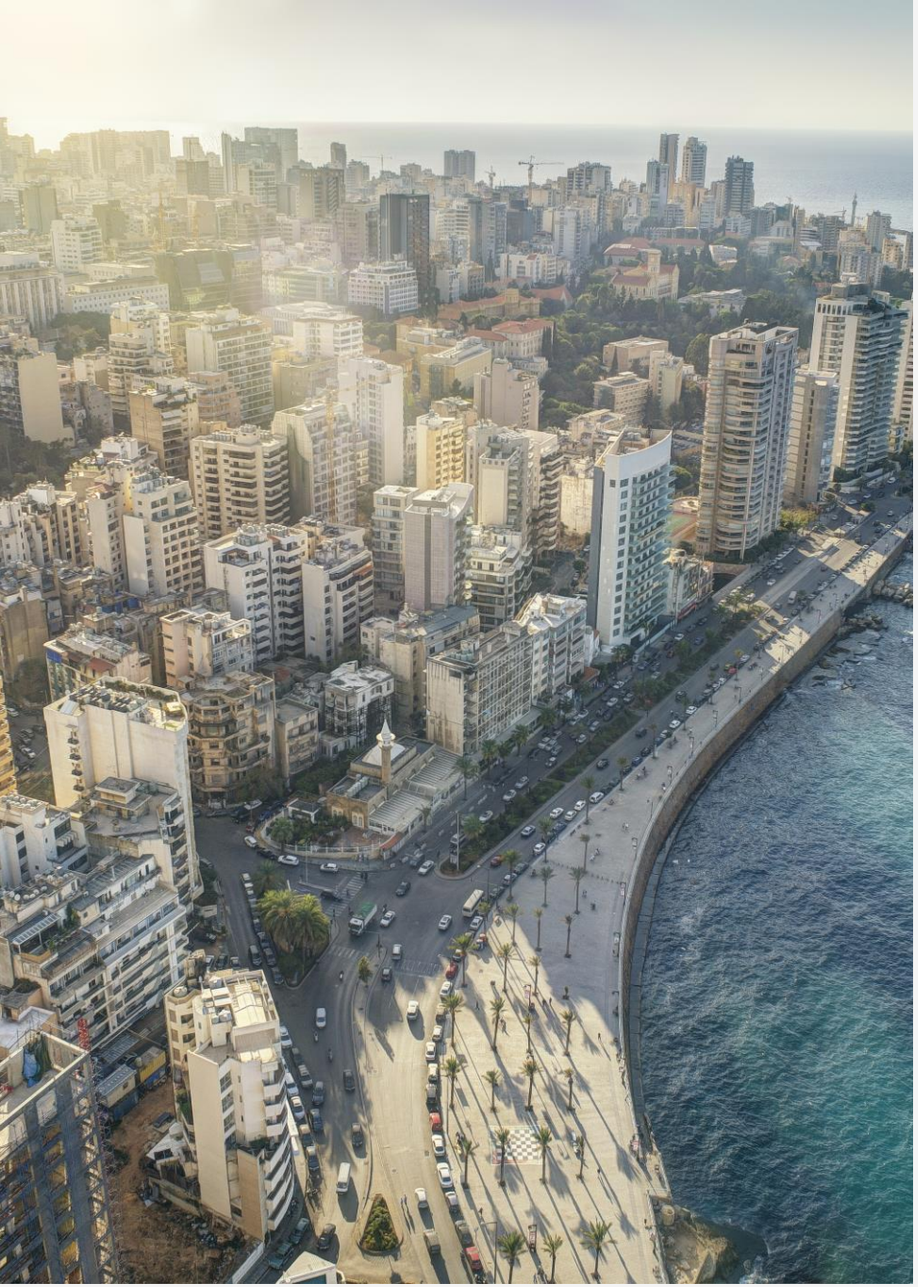
Understanding the context and barriers in Egypt, Jordan and Lebanon

3 November 2020

Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag



Agenda

- Overview of the BUILD_ME project
- Insights from Egypt
- Insights from Jordan
- Insights from Lebanon
- Approach and outlook
- Q&A

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Guidehouse at-a-glance

Guidehouse

OUR COMPANY

50+

7,000+ employees

4 Forbes 2019 AMERICA'S BEST MID-SIZE EMPLOYERS

Malcolm Baldrige National Quality Award

#10 Energy Consulting

#12 Healthcare Consulting

#20 Financial Consulting

OUR PEOPLE

33 languages fluently spoken

46% hold professional certifications

38% have advanced degrees

Commitment to Inclusion, Diversity, and Belonging

37% radically diverse

6 generations of professionals

49% female

51% male

7 employee affinity groups

5% Veteran & Active Duty

10 HRC consecutive perfect scores

BEST PLACES TO WORK 2019 for LGBTQ Equality 100% CORPORATE EQUALITY INDEX

Great Place to Work

Great Place To Work. Certified

OUR CLIENTS

Healthcare:

7 of the top 10 hospital systems (by Member Hospital Beds)*

Financial Services:

8/10 of the largest U.S. banks

Life Sciences:

36 of the top 50 pharmaceutical companies**

Energy:

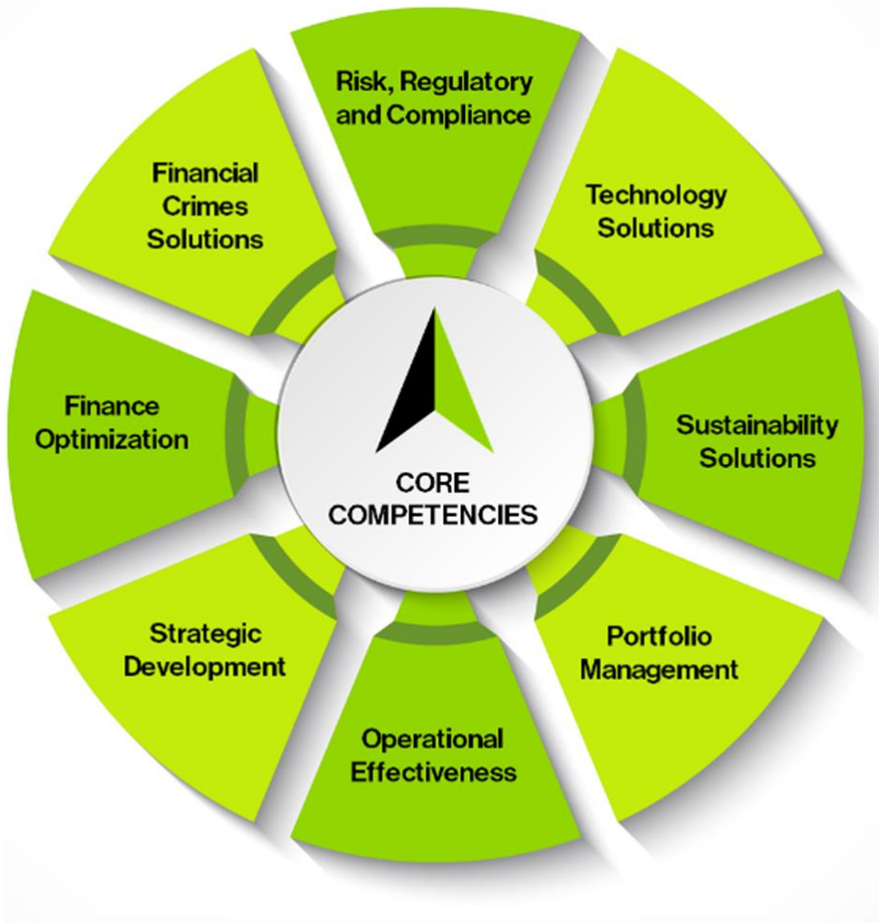
60 of the world's largest electric and gas utilities***

Public Sector:

Federal Ministry for the Environment, Nature and Nuclear Safety

European Commission

Federal Ministry for Economic Affairs and Energy



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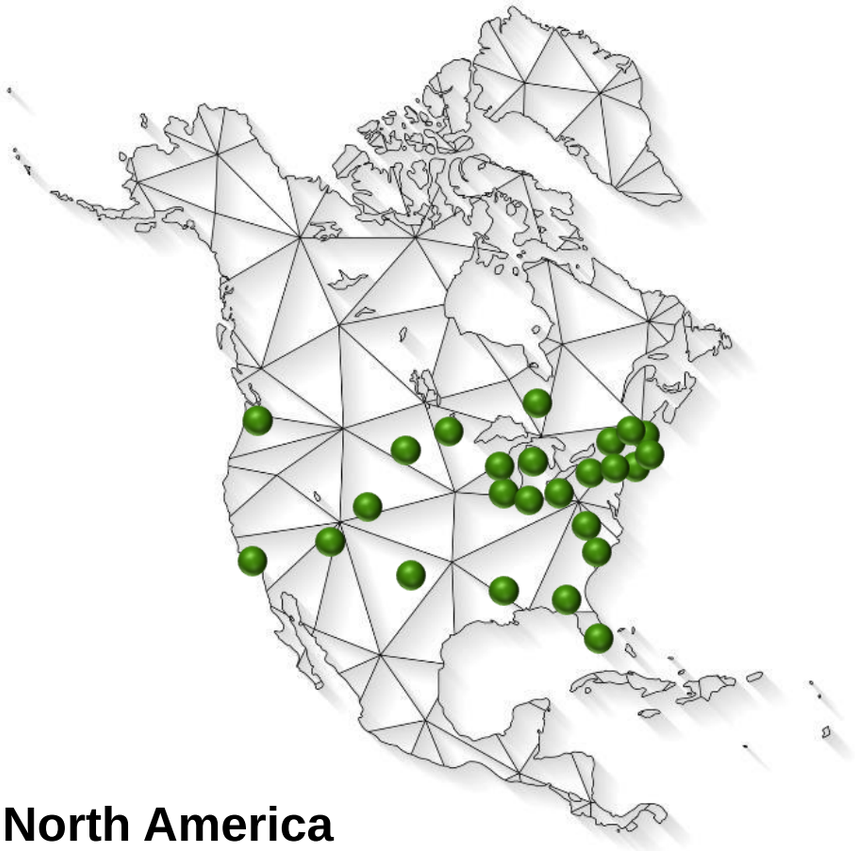
Our Locations



North America

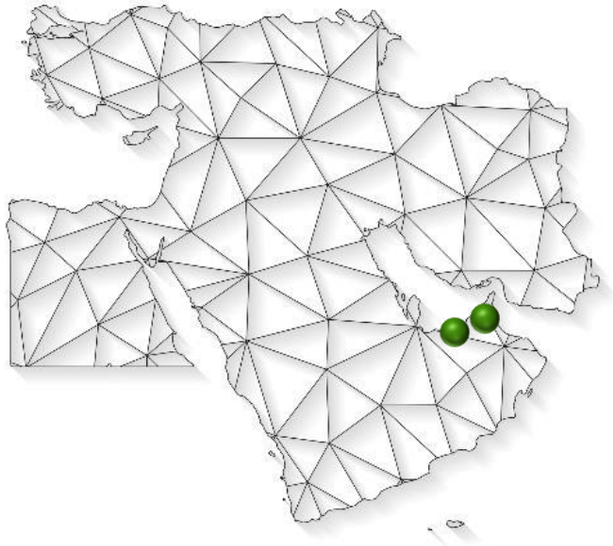
Canada: Ontario
US: Alabama, Arizona, California, Colorado, District of Columbia, Florida, Georgia, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, Wisconsin

Europe

Germany: Berlin, Cologne
The Netherlands: Utrecht
United Kingdom: London

Asia

China: Beijing, Shanghai
India: Nagercoil, Trivandrum
South Korea: Seoul



Middle East

United Arab Emirates:
Abu Dhabi, Dubai

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Today‘s speakers

Experts on buildings and the MENA region

Carsten Petersdorff
Director

Guidehouse

Eslam Mahdy
Senior Consultant

Guidehouse

Dr. Mohammed Salheen
Founder and Chairperson

Integrated Development Group (IDG)

Eng. Muhieddin Tawalbeh
Manager of Energy Efficiency & Solar Thermal Division

The Royal Scientific Society

Dr. Sorina Mortada
Technical Consultant

The Lebanese Center for Energy Conservation (LCEC)

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Overview of the BUILD_ME project

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BUILD_ME

Overview

BUILD_ME project purpose

Buildings account for ~40% of global **GHG emissions**

The long lifetime of buildings leads to a **lock-in effect** – if the right measures are not taken now, the Paris goals will be unattainable

The **MENA region** is especially exposed to such risks due to strong population and economic growth as well as rising heating and cooling demand

BUILD_ME supports MENA countries in reaching a nearly-zero energy buildings sector

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Overview about the project

BUILD_ME

Fund

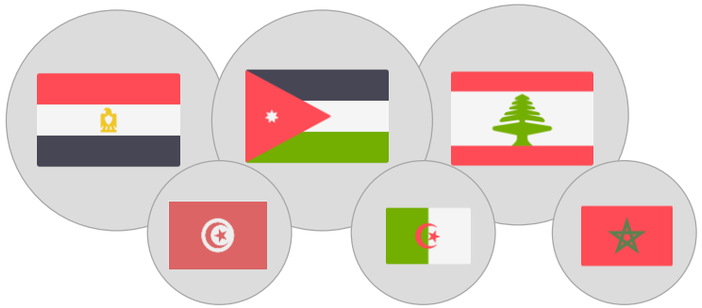
IKI International Climate Initiative,
German Federal Ministry of Environment

Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

based on a decision of the German Bundestag

Scope



1st Phase: 2016 - 2018

2nd Phase: 2019 - 2021

Partners

HBRC – المركز القومي لبحوث الإسكان والبناء

IDG MATRIX – Integrated Development Group

الجمعية العلمية الملكية – Royal Scientific Society

LCEC – Lebanese Center for Energy Conservation – المركز اللبناني لحفظ الطاقة

European Bank for Reconstruction and Development

Guidehouse

TRACK

ALCOR – Développeur d'avenir durable

RCREEE – Regional Center for Renewable Energy and Energy Efficiency – المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

EGYPT GBC – EGYPT GREEN BUILDING COUNCIL

LGBC – lebanon green building council – مجلس لبنان للأبنية الخضراء

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Market insights

Egypt

Evident growth in the construction sector

The sector contributed around 9% to the GDP. This is mainly due to the newly developed cities.

Development & reform of policies in the Energy Sector

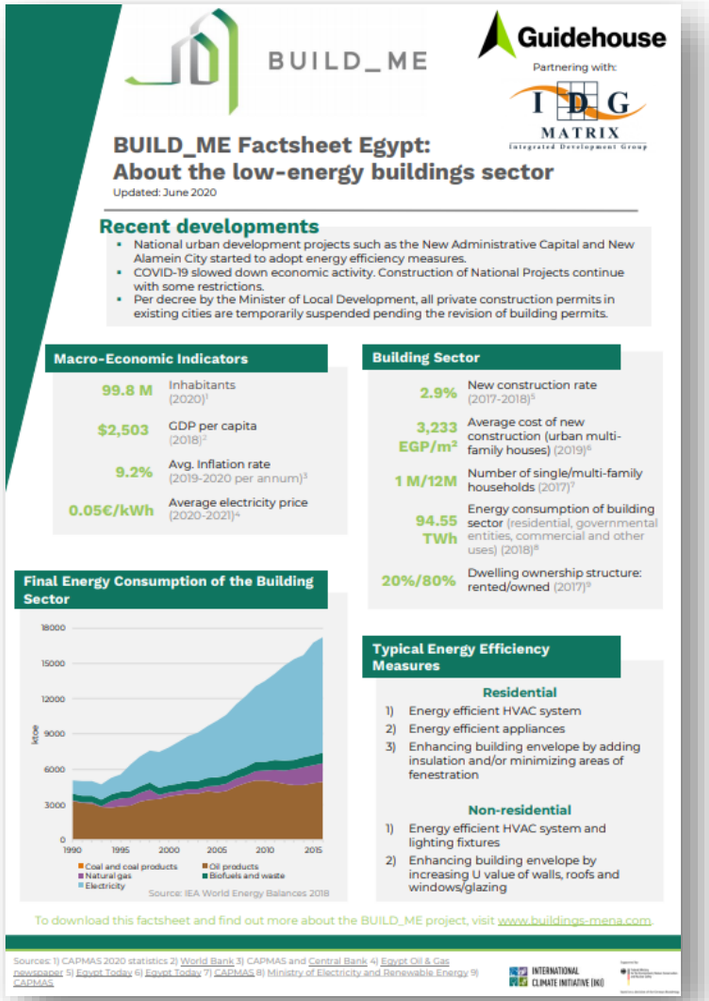
Interest on EE in the buildings is gradually increasing due to the governmental plans to phase out energy subsidies by 2025. The interest on EE is backed up by laws and schemes that support RE uptake like FIT(Feed-in tariff) and Net metering.

Development of sector specific green building codes

EEBCs were issued in 2005 but with little adoption by the market due to its non-obligatory status and lack of incentives. Moreover, sector specific codes such as “Green Hospitals Code” have been recently introduced.

Interest and Support of Governmental Stakeholders

Ministry of Housing & Ministry of Electricity & their affiliated entities: HBRC, NUCA, NREA in addition to the real-estate developers.



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Partnering with: IDG MATRIX Integrated Development Group

BUILD_ME Factsheet Egypt: About the low-energy buildings sector

Updated: June 2020

Recent developments

- National urban development projects such as the New Administrative Capital and New Alamein City started to adopt energy efficiency measures.
- COVID-19 slowed down economic activity. Construction of National Projects continue with some restrictions.
- Per decree by the Minister of Local Development, all private construction permits in existing cities are temporarily suspended pending the revision of building permits.

Macro-Economic Indicators

99.8 M	Inhabitants (2020)[1]
$2,503	GDP per capita (2018)[2]
9.2%	Avg. Inflation rate (2019-2020 per annum)[3]
0.05€/kWh	Average electricity price (2020-2021)[4]

Building Sector

2.9%	New construction rate (2017-2018)[5]
3,233 EGP/m²	Average cost of new construction (urban multi-family houses) (2019)[6]
1 M/12M	Number of single/multi-family households (2017)[7]
94.55 TWh	Energy consumption of building sector (residential, governmental entities, commercial and other uses) (2018)[8]
20%/80%	Dwelling ownership structure: rented/owned (2017)[9]

Final Energy Consumption of the Building Sector

Source: IEA World Energy Balances 2018

Typical Energy Efficiency Measures

Residential

1) Energy efficient HVAC system
2) Energy efficient appliances
3) Enhancing building envelope by adding insulation and/or minimizing areas of fenestration

Non-residential

1) Energy efficient HVAC system and lighting fixtures
2) Enhancing building envelope by increasing U value of walls, roofs and windows/glazing

To download this factsheet and find out more about the BUILD_ME project, visit www.buildings-mena.com.

Sources: 1) CAPMAS 2020 statistics 2) World Bank 3) CAPMAS and Central Bank 4) Egypt Oil & Gas newspaper 5) Egypt Today 6) Egypt Today 7) CAPMAS 8) Ministry of Electricity and Renewable Energy 9) CAPMAS

INTERNATIONAL CLIMATE INITIATIVE (IKI)

Download the factsheet here.

Recommendations to accelerate EE in the building sector

Egypt

Facilitating finance

- Address the additional costs of EE measures that may hinder the units' competitiveness in the market.
- Emphasize cost effectiveness - the key driver for end-users to invest in EE
- Create a clearer mechanism for banks to disperse funds for EE building projects

Updating Regulation

- Simplify building codes and ensure gradual enforcement, couple enforcement mechanisms with financial incentives
- Promote local certification schemes
- Capitalize on energy/electricity regulatory reforms and schemes
- Foster synergies between EE stakeholders/strategies

Supporting EE market

- Capitalize on increased demand for some EE measures (LED lighting, efficient HVAC systems, VRF systems)
- Market EE measures for the building envelope and EE systems
- Increase availability of some EE measures in the market
- Market RE measures (PVs) as they are currently more affordable

Raising awareness

- Build capacity of different stakeholders on implementation of EE measures
- Implement pilot projects and disseminate results to showcase EE benefits to different audience.
- Raising awareness on EE measures' performance and availability in the market

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Current Trends and Opportunities

Egypt

Urban Development

Energy Sector

Current Trends & Mega Projects

New Cities

Construction of 20 Fourth Generation Cities in Egypt

Mobility

Modern network of roads & public transportation

Housing

Introducing huge stock to the housing market

Mega RE Projects

Developing mega RE projects such as solar parks and wind farms

RE & EE Legislations

Development of “Feed-In Tariff” then “Net-Metering” as a step towards more open Energy market

Foreseen Opportunities

Introduction of new infrastructure, local management & governance schemes

Optimized mobility, transportation and connectivity

Creates an opportunity for Macroeconomic Model for Energy Efficiency

Expanding cleaner energy production could encourage implementation of RE at smaller scales

Development of extensive codes & local rating scheme (GPRS) into more user and sector-oriented tools

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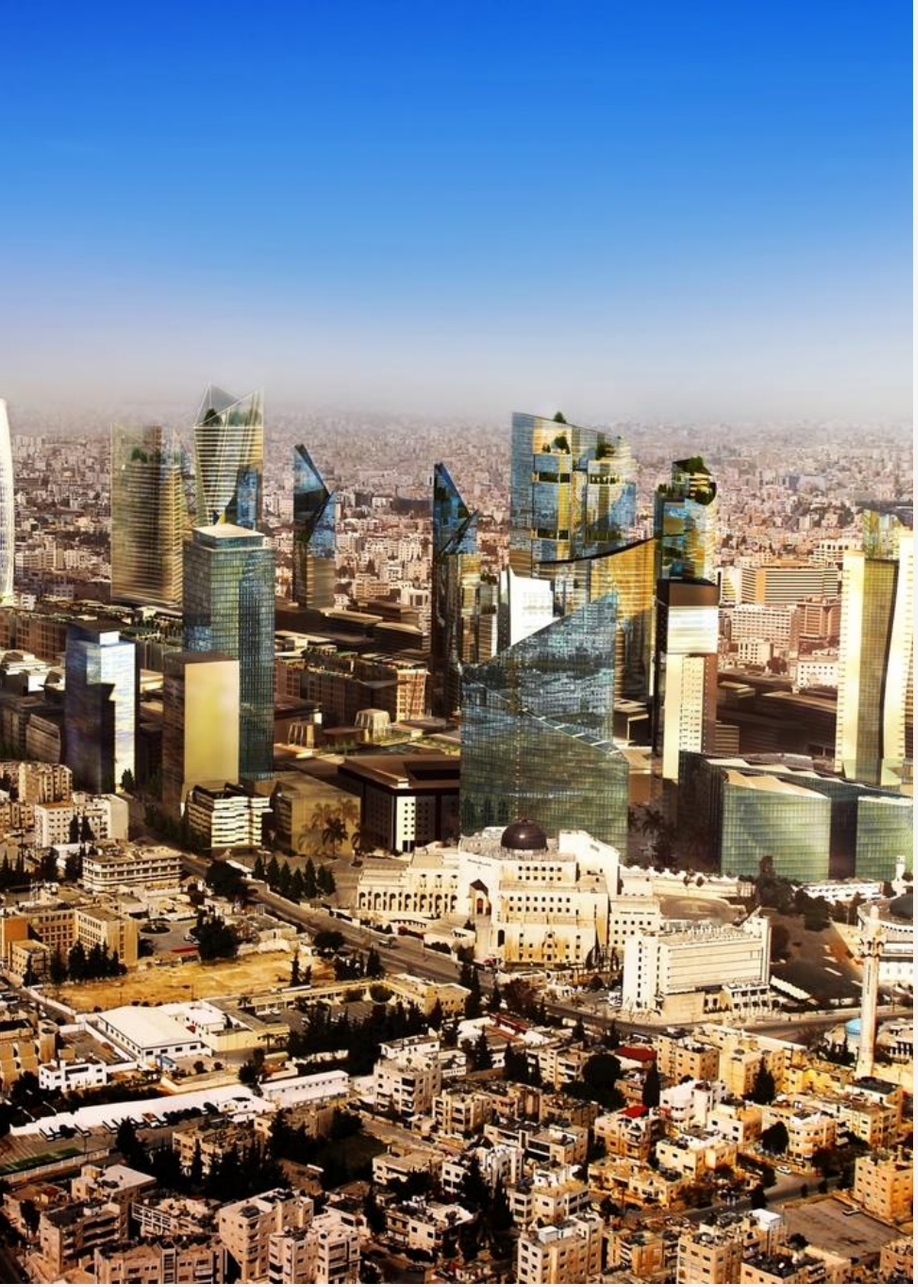

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Market insights

Jordan

Construction sector is the largest employer

Jordan's construction sector is one of the largest employers in the economy. During the period 2015-2018, the construction industry was the 6th largest employer in Jordan (DOS).

High energy subsidies, 6% of GDP

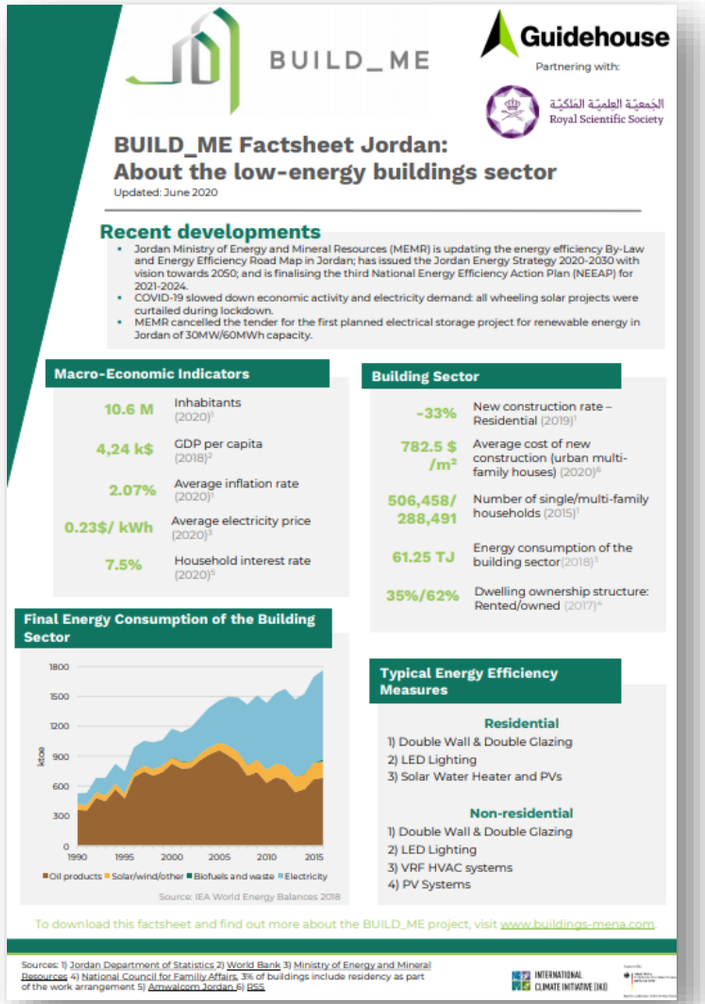
Energy subsidies in Jordan are high with approximately 6% of GDP spent on them in 2015, twice as much as in 2010. Subsidies are in place for low electricity tariff categories and LPG. There is a considerable political willingness to reduce subsidies.

Well elaborated codes and guidelines

More than 50 codes/regulations/guidelines in Jordan
15 codes and guidelines related to RE & EE (enforced, implemented partially). Jordan was one of the first countries in the Middle East to develop a thermal insulation code for buildings

Key Stakeholders

RSS, JSMO, MEMR, MoPWH, MoEnv, JNBC, JREEEF, JEA, JCCA, academia, private sector



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Partnering with:

الجمعيّة العلميّة الملكيّة
Royal Scientific Society

BUILD_ME Factsheet Jordan:
About the low-energy buildings sector

Updated: June 2020

Recent developments

- Jordan Ministry of Energy and Mineral Resources (MEMR) is updating the energy efficiency By-Law and Energy Efficiency Road Map in Jordan; has issued the Jordan Energy Strategy 2020-2030 with vision towards 2050; and is finalising the third National Energy Efficiency Action Plan (NEEAP) for 2021-2024.
- COVID-19 slowed down economic activity and electricity demand: all wheeling solar projects were curtailed during lockdown.
- MEMR cancelled the tender for the first planned electrical storage project for renewable energy in Jordan of 30MW/60MWh capacity.

Macro-Economic Indicators

10.6 M	Inhabitants (2020)[1]
4,24 k$	GDP per capita (2018)[2]
2.07%	Average inflation rate (2020)[1]
0.23$/ kWh	Average electricity price (2020)[3]
7.5%	Household interest rate (2020)[5]

Building Sector

-33%	New construction rate – Residential (2019)[1]
782.5 $ /m²	Average cost of new construction (urban multi-family houses) (2020)[6]
506,458/ 288,491	Number of single/multi-family households (2015)[1]
61.25 TJ	Energy consumption of the building sector (2018)[3]
35%/62%	Dwelling ownership structure: Rented/owned (2017)[4]

Final Energy Consumption of the Building Sector

Ktoe: 1800, 1500, 1200, 900, 600, 300, 0
1990, 1995, 2000, 2005, 2010, 2015
Oil products, Solar/wind/other, Biofuels and waste, Electricity

Source: IEA World Energy Balances 2018

Typical Energy Efficiency Measures

Residential
1) Double Wall & Double Glazing
2) LED Lighting
3) Solar Water Heater and PVs

Non-residential
1) Double Wall & Double Glazing
2) LED Lighting
3) VRF HVAC systems
4) PV Systems

To download this factsheet and find out more about the BUILD_ME project, visit www.buildings-mena.com.

Sources: 1) Jordan Department of Statistics 2) World Bank 3) Ministry of Energy and Mineral Resources 4) National Council for Family Affairs, 3% of buildings include residency as part of the work arrangement 5) Amwalcom Jordan 6) RSS

INTERNATIONAL CLIMATE INITIATIVE (IKI)

Download the factsheet here.

Recommendations to accelerate EE in the buildings sector

Jordan

Facilitating finance

- Additional costs of EE measures may hinder the units' competitiveness in the market
- Most banks have no clear procedure to disperse money for EE building projects
- Establish funds and provide incentives for compliance with the EEBC

Updating regulation

- Adopt enforcement schemes & activate a clear third-party inspection with dictated staff and responsibilities
- Adopt coordination mechanism between different stakeholders
- Reduce the current time cycle for review the codes and manual (5 years)

Technical solutions

- Prepare manual for illustrating the methods for the calculation of energy performance, energy demand, and energy audit in industrial and commercial sector
- Establish software/online list for investigation check

Raising awareness

- Establish national capacity building and awareness raising program about national building codes
- Provide continuing education for engineers'
- Awareness for the inspection bodies of the implementation of the codes

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Building Codes
Jordan

Codes development system is well defined and established (preparation, technical revision, and approval)

1. A decision is made to prepare / update certain code or manual by JNBC
2. A technical committee of JNBC, RSS prepare the first draft of the new code/manual.
3. JNBC forms a technical review committee from different stakeholders involved in the draft content, i.e. public and private sectors, academia, designers and contractors.
4. The second draft is submitted to the technical committee of JNBC for comments and approval.
5. The draft is submitted for the approval of JNBC and is presented for public in libraries for 60 days for any final comments.
6. The final draft is approved by the Cabinet as national code/manual.

Implementation & inspection?

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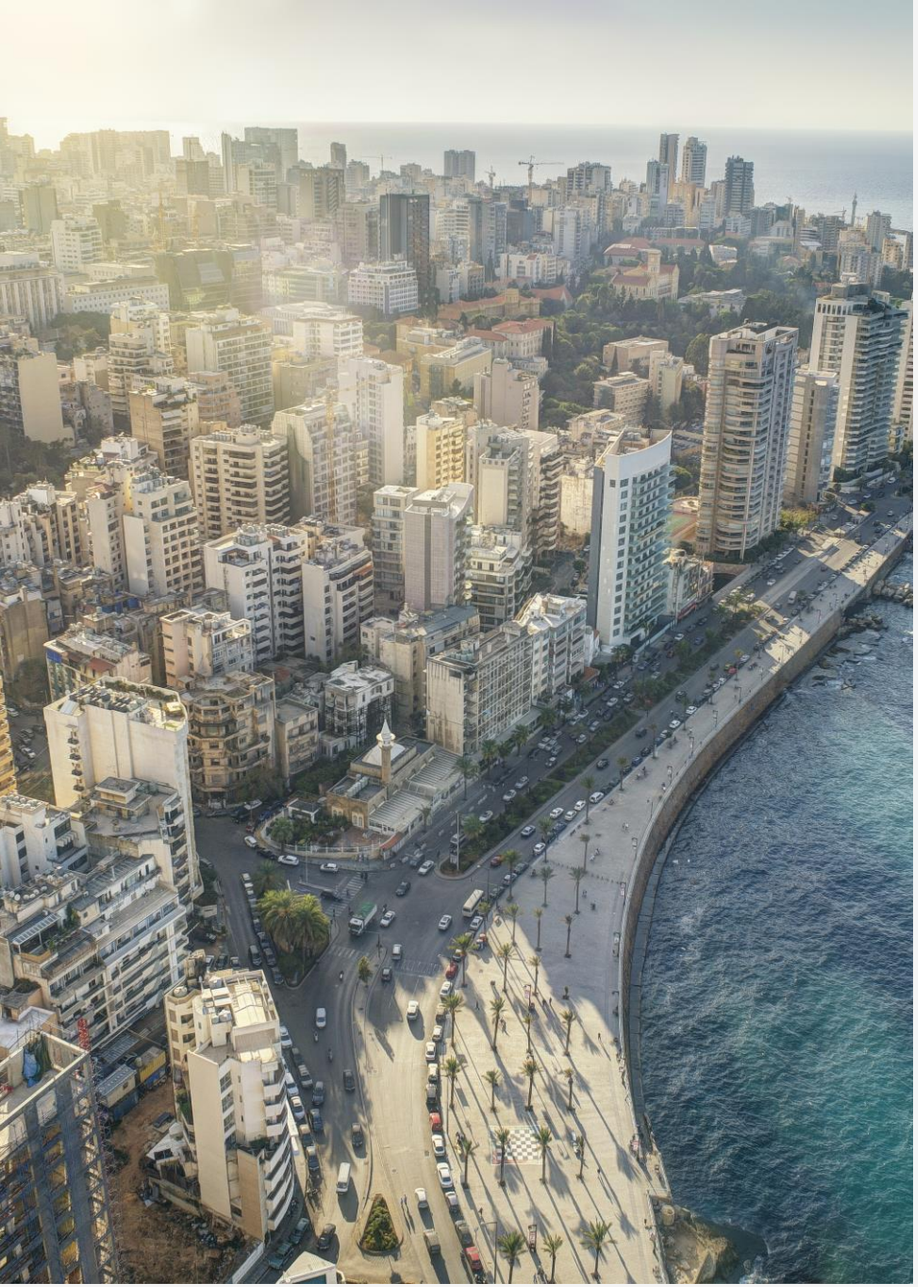

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Market insights

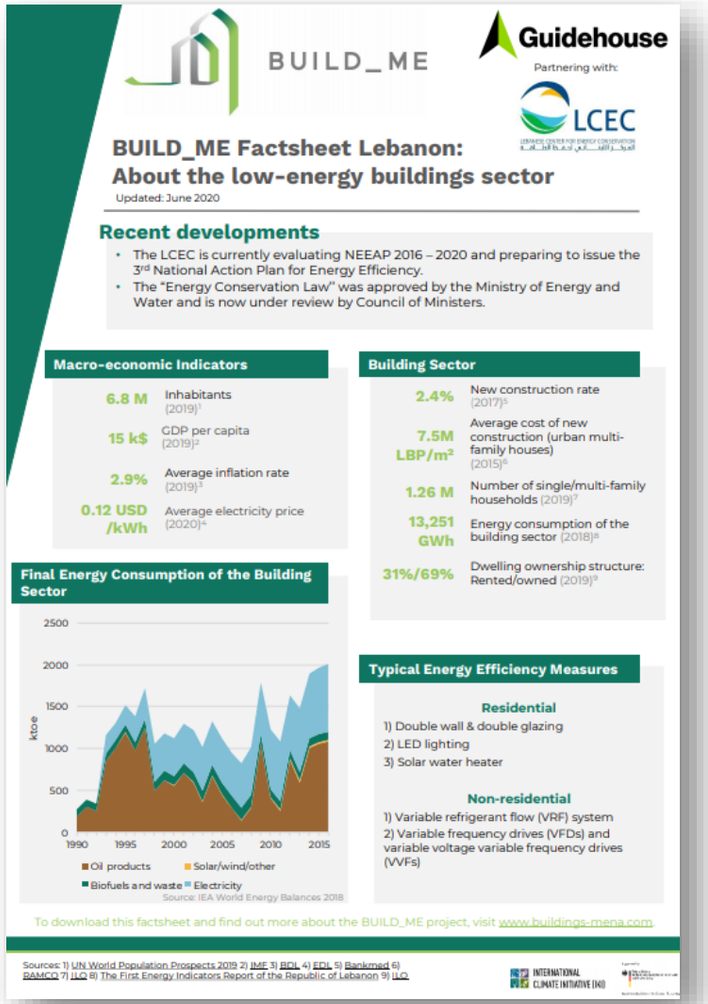
Lebanon

- Yearly construction permits for residential: ~22,000 units

- One electricity utility (EDL) → financial deficit due to subsidies and losses
- Shortage in supply → private generators

- Sustainable building code under preparation
- General budget law 2019 (↑investment factors up to 25%)
- Available voluntary standards (TSBL 2005) and criteria

- Ministry of Energy and Water, LCEC, Ministry of Public Works, Urban Planning Directorate, municipalities, more..



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Partnering with: LCEC

BUILD_ME Factsheet Lebanon: About the low-energy buildings sector

Updated: June 2020

Recent developments

- The LCEC is currently evaluating NEEAP 2016 – 2020 and preparing to issue the 3rd National Action Plan for Energy Efficiency.
- The "Energy Conservation Law" was approved by the Ministry of Energy and Water and is now under review by Council of Ministers.

Macro-economic Indicators

6.8 M	Inhabitants (2019)[1]
15 k$	GDP per capita (2019)[2]
2.9%	Average inflation rate (2019)[3]
0.12 USD /kWh	Average electricity price (2020)[4]

Building Sector

2.4%	New construction rate (2017)[5]
7.5M LBP/m²	Average cost of new construction (urban multi-family houses) (2015)[6]
1.26 M	Number of single/multi-family households (2019)[7]
13,251 GWh	Energy consumption of the building sector (2018)[8]
31%/69%	Dwelling ownership structure: Rented/owned (2019)[9]

Final Energy Consumption of the Building Sector

Source: IEA World Energy Balances 2018

Typical Energy Efficiency Measures

Residential

1) Double wall & double glazing
2) LED lighting
3) Solar water heater

Non-residential

1) Variable refrigerant flow (VRF) system
2) Variable frequency drives (VFDs) and variable voltage variable frequency drives (VVFs)

To download this factsheet and find out more about the BUILD_ME project, visit www.buildings-mena.com

Sources: 1) UN World Population Prospects 2019 2) IMF 3) BDL 4) EDL 5) Bankmed 6) RAMCO 7) ILO 8) The First Energy Indicators Report of the Republic of Lebanon 9) ILO

INTERNATIONAL CLIMATE INITIATIVE (IKI)

Download the factsheet here.

Energy Demand
Lebanon

Cooling and dehumidification: constituted 29% of the total electricity demand in 2009 and reached **40% in 2014**. The cooling share:

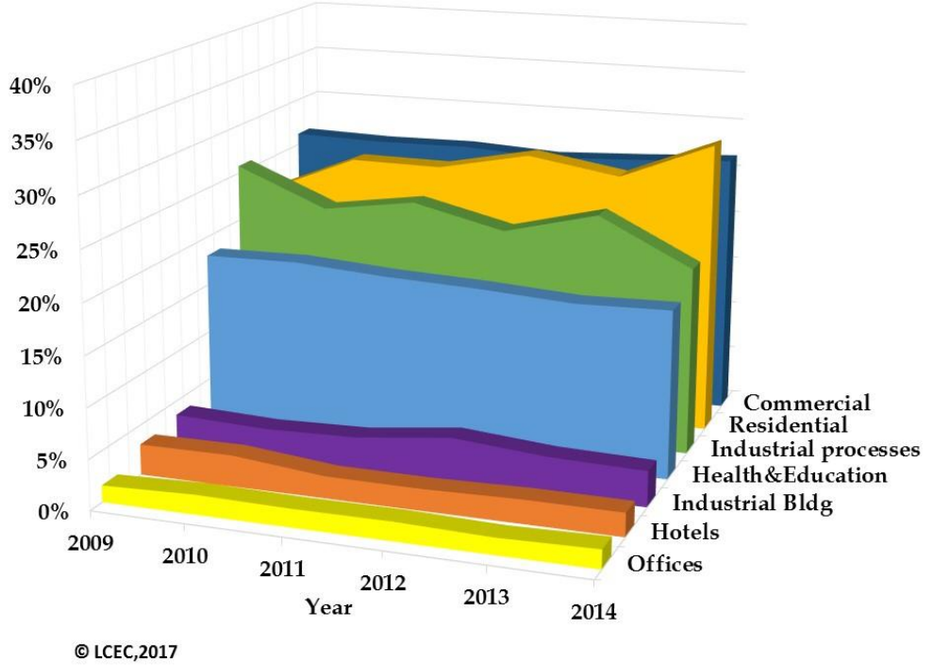
- Residential sector 19%
- Commercial sector 11%,
- Health and education sector 8%

Lighting: the second highest consumer in the buildings sector **~31%** of total Lebanese electricity demand in 2013.

- Commercial sector share of 16%,
- Residential sector share of 5%

2015

residential sector ~70% of the total built area
health and education ~11% of the total built area
commercial ~8% of the total built area



Share in overall electricity demand 2009-2014

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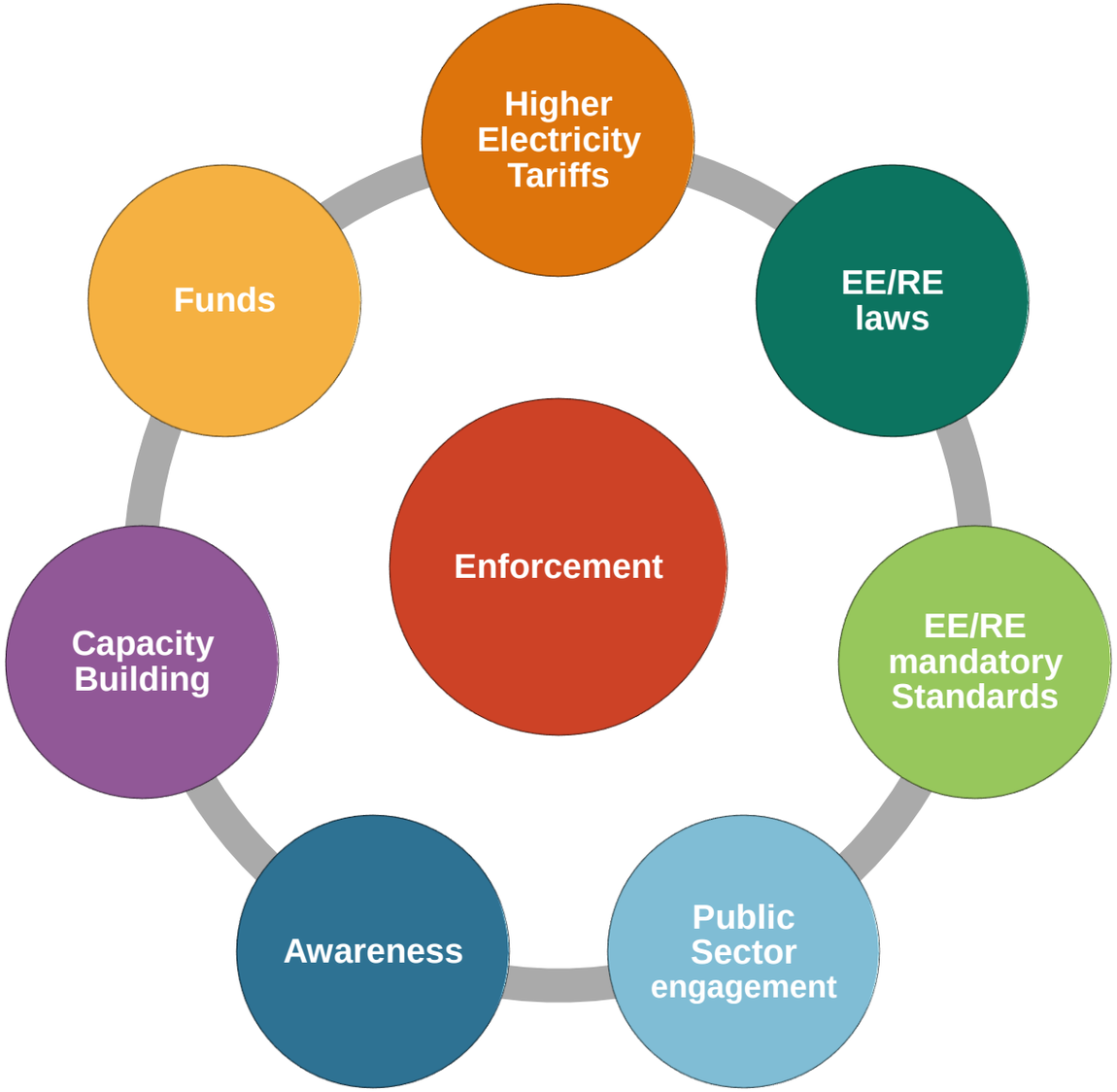
Challenges and Must-Haves

Lebanon



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Recommendations to accelerate EE in the buildings sector

Lebanon

Facilitating finance

- NEEREA, LEEREFF, GEFF
- Home appliances programme (Italian products)
- Incentives (grant) for heat pumps
- Decrease taxes on EE equipment
- Cost effectiveness is the key driver for clients to invest in EE
- Increase electricity tariffs

Updating regulation

- Create a labelling scheme for existing building
- MEPS and labels for equipment
- Energy Conservation law
- Sustainable/Green Building code
- Develop proper implementation monitoring and inspection scheme of energy efficiency measures

Technical solutions

- EE solutions already available in the market
- Train inspectors to verify the installation of different measures at different construction phases
- Checklist with min. requirement for permits and implementation & verification
- Support the local energy efficiency industry

Raising awareness

- Standards and energy efficiency courses in the university programs
- Tackle all involved in the building sector: architects, engineers, owners, technicians, etc.
- Educate the end-user through campaigns
- Target municipalities in awareness raising activities
- Home appliances programme

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Key insights from Phase I

Approach

Project developers

- **Low cost packages** in average can already **save 30%** of energy costs.
- Investments of „nZEB variants“ **only 10-15% higher** than baseline
- **End users** are often responsible for **purchasing HVAC technologies**, separately from apartment

Financial institutes (FI)

- Funds are available but instruments are missing to prove eligibility. Process too complex for rather small building projects

- **Capacity building FI** staff: Improve the knowledge on energy efficiency
- Facilitate process to check **fulfilment of eligibility criteria**
- Merchandise **financing option for building EE** measures and incorporate in your portfolio

Policy and decision makers

- Update/develop **building codes** and improve their enforcement
- Formulate benchmarks and develop a **classification scheme**
- Lack of **quantified (GHG) saving potentials** for the building sector in policy strategies

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BUILD_ME scope

Approach

Original Project

2016 - 2018

- Extensive analysis and research
- Identification of barriers
- Recommendations

Project Extension

2019 – 2021

- Implementation of recommendations
- Dissemination of results
- Upscaling

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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

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

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

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

WP4
Capacity Building and Dissemination

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

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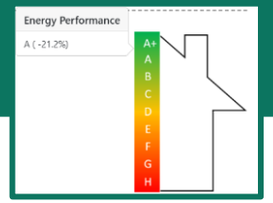
Logic of activities

Approach



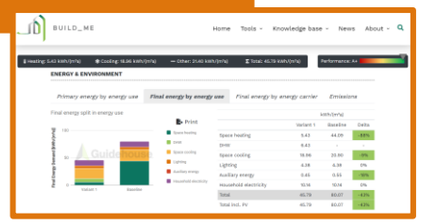
Voluntary classification scheme

Embed classification scheme in banks' funding process

Training local stakeholders

Building typology database (baseline)

Buildings energy performance (BEP) tool



National strategies/NDCs

testing

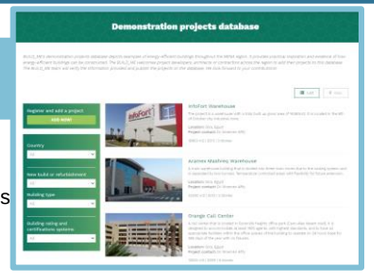
testing

on the ground insight

Technical support for pilot projects

Building code analysis

Demonstration project database



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Classification scheme concept

Approach

1 Define technical aspects

Existing schemes

Building Typology

BEP Calculation Tool

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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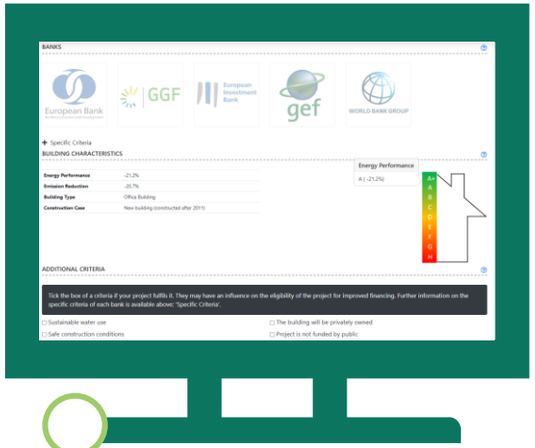
Easier access to financing for energy efficient buildings

Approach

How to design and finance an energy efficient project?



BEP Tool shows:

- ✓ [25]% energy saving in comparison with **baseline**
- ✓ Financing available at local bank

Intermediating **bank grants credit** based on BUILD_ME classification scheme

Project is realized as energy efficient building

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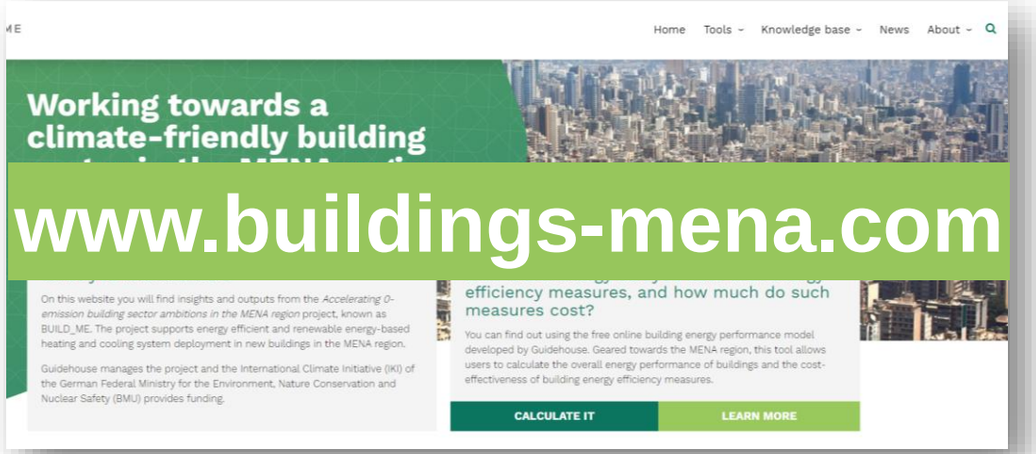
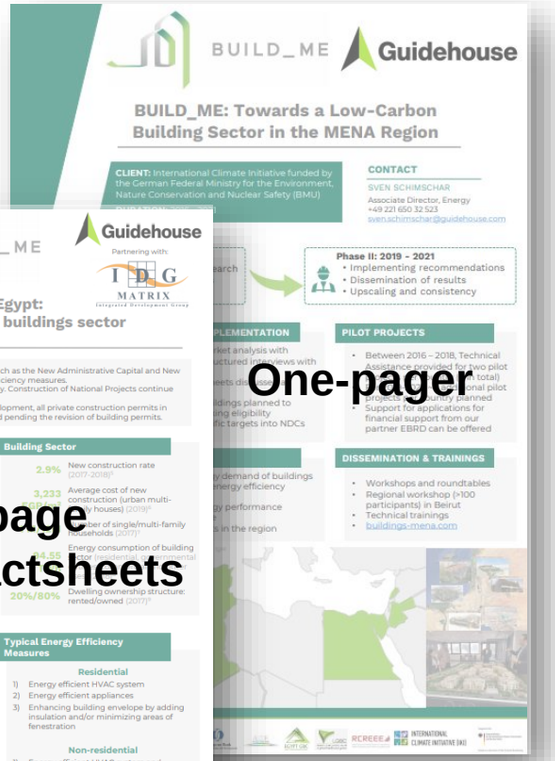
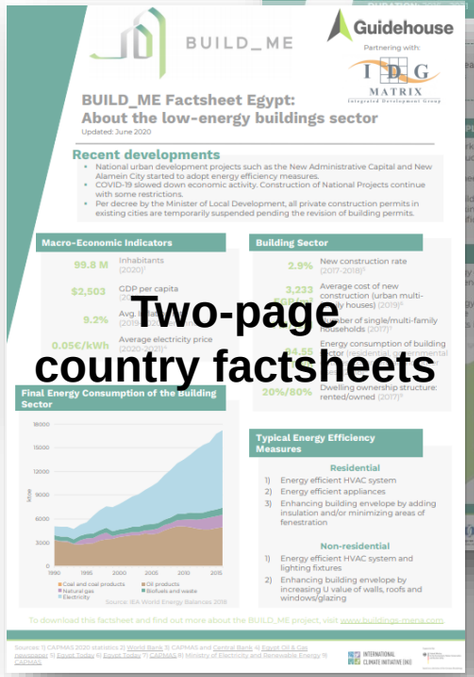
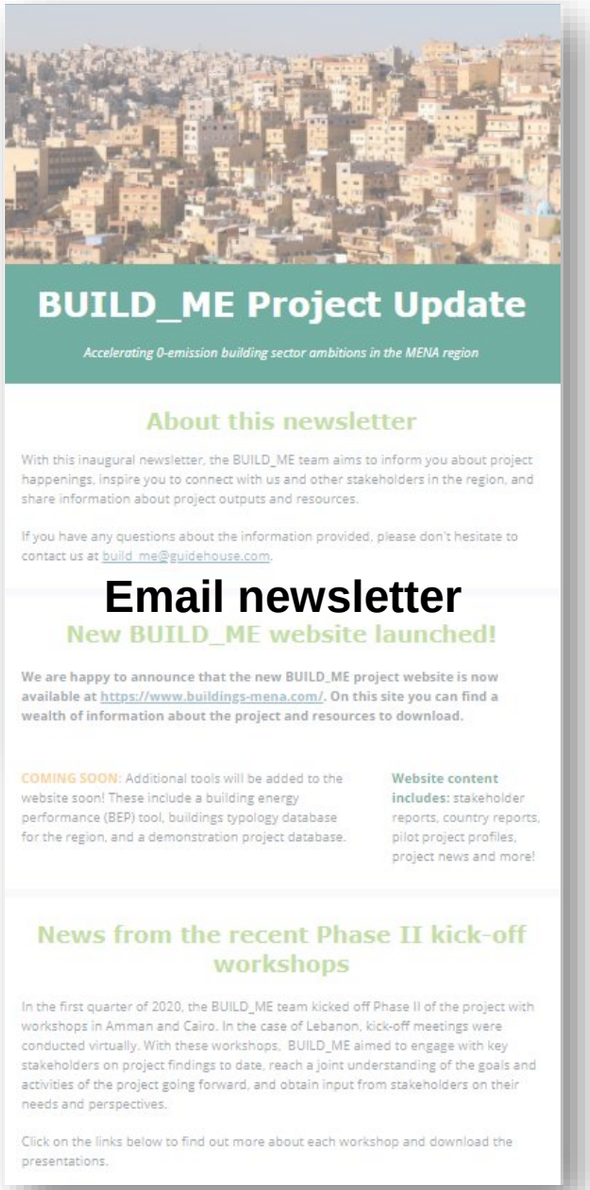
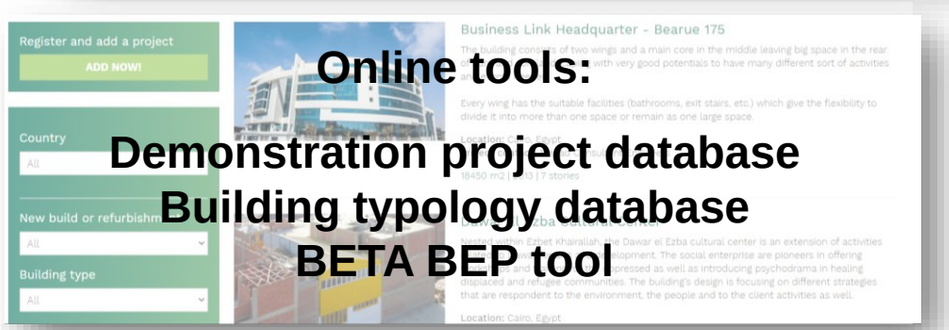
Online resources











Agenda

Overview of the BUILD_ME project

Insights from Egypt

Insights from Jordan

Insights from Lebanon

Approach and outlook

Q&A

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