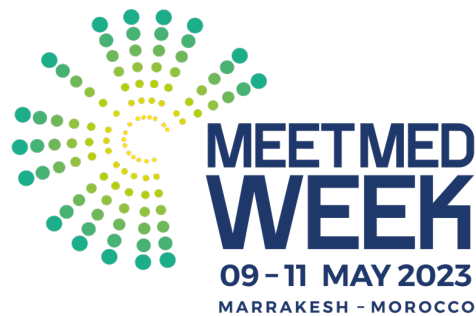




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Mitigation Enabling Energy Transition in the MEDiterranean region

SESSION 2

IMPROVING AND IMPLEMENTING BUILDING CODES LEBANON

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11 May 2023
Marrakech



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I. History of the EEBC - Lebanon

- **“TSBL” (2005):** Not a standard but a report that includes a set of recommendations to develop EE buildings.
 - **“TSBL” (2010):** Booklet and Tool for new residential and non-residential buildings
 - ✓ Developed in by the OEA of Beirut, LIBNOR and ECOTECH Engineering
 - ✓ Support of ADEME and ALMEE
 - ✓ Contribution of LGBC and ASHRAE.
 - ✓ Specifies minimum energy criteria to be met
 - ✓ Aimed to improve the thermal performance of building envelopes (thermal comfort, reduction of the cooling/heating energy)
- **Not mandatory to date but encouraged by the OEA**

- **“Initiative 10” of the NEEAP I (2011-2015)**
 - Aimed to develop a building code for Lebanon
 - Blocked the implementation of the Thermal Standard 2010
 - Didn’t succeed in developing an alternative energy code
 - This initiative was not implemented

- **“End-Use Measures in the Building Sector” of the NEEAP II (2016-2020) – B03**
 - Aimed to improve the EE standard of new buildings.
 - The technical Committee TC205 created by LIBNOR has prepared for the development of the **“Building Environmental Performance Principles, Requirements and Guidelines”**
 - Recently postponed this work due to the economic crisis

- **NEEAP III (2021-2025):** Not published yet

- Except the TSBL/TSBC 2010 (optional), no improvement in the EEBC at national level in Lebanon.

II. What is in the Actual Lebanese Building Code?

The Lebanese construction law (legalization 2004, modifications 2005-2007-2022) includes some **INCENTIVES** to encourage efficient buildings:

1. Building Envelope:

- ✓ Double-wall, Roof and Thermal Insulation
- ✓ Shading Devices
- ✓ Daylight savings

2. Rainwater Collection Tanks

III. Efficient Appliances

- In decree 5305/2010, Lebanon's Council of Ministers (CoM) made the standards **mandatory** for:
 - ✓ solar water heaters (SWH)
 - ✓ Compact fluorescent lamps (CFL)
- In Decree 6997\2020 MEPS was **mandated** for:
 - ✓ SWHs (updated)
 - ✓ PVs
- Existing MEPS for Refrigerators and ACs but still **voluntary** (very old before 2010 and should be updated)

IV. Other Initiatives

- **EPCB**

- ✓ aimed at establishing a system of certification and labelling of the energy performance of buildings
- ✓ setting minimum energy performance requirements for new buildings
- ✓ developed within BUILD_ME project, yet not achieved
- ✓ No certification and labelling system has been established for the energy performance of buildings

- **GBRS**

- ✓ Beside the international RS, Lebanese GBRSs were developed to promote efficient construction: ARZ 1.0 in 2011- GRASS in 2012- GRASSMED in 2022- ARZ 2.0 in 2023

V. Draft Laws

- ✓ Distributed Renewable Energy Draft Law
- ✓ Energy Conservation Law

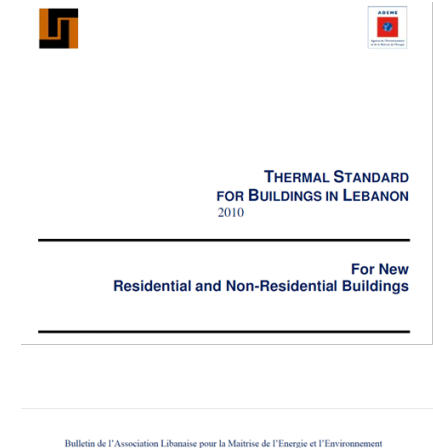
VI. How to Improve the Building Code in Lebanon?

- ✓ Greening the Building Code : authorizing a systematic body of standards and codes, that promote environment-friendly sustainable planning and design serving as auxiliary design guidelines to professionals.
- ✓ The National Plans targeted the development of this Code. Yet, no Sustainable Building Code has been developed and adopted to date.
 - ✓ In the elaboration process of new codes and standards: Organizations - Orders - Associations - LIBNOR – Government → to issue a decree making environmental specifications for sustainable construction mandatory.
 - ✓ The Parliament must update and approve the Building Code to be applicable and sustainable.

- ✓ Envelope
- ✓ HVAC
- ✓ Hot Water
- ✓ Lighting
- ✓ Electrical Equipment
- ✓ Performance approach of compliance

✓ Envelope → TSBL 2010

- “TSBL 2005”
- ASHRAE/IES standard 90.1.2004
- “French Thermal Regulation for Buildings, RT2005”
- “Tunisian Thermal Regulation for Buildings, 2008 ”
- Many sections of the TSBL 2010 were creative



It specifies minimum energy criteria to be met:

- Minimum prescriptive or performance criteria for energy-related building materials or components (U-value by component and Solar Shading level for windows);
- Minimum performance criteria for entire building (U-building, U-Façade and Equivalent Windows to Wall, WWR-eq);
- Maximum thermal energy needs (cooling and heating) for whole buildings (kWh/m².year).

✓ Envelope → TSBC

Thermal Standard Building Compliance Tool:

- ✓ Simplified tool
- ✓ Provides an analysis of a building's thermal cooling and heating needs
- ✓ Assessing compliance with the TSBL2010
- ✓ Calculates yearly thermal cooling and heating needs of a building given a description of the building's geometry and construction.

It generates at the end a Thermal Performance Label/Certification for a building (A,B,C,D, and F)

→ **The TSBL 2010 /TSBC can be considered as the Envelope Chapter.**

✓ HVAC

Study ALMEE – LU:

- ✓ Aimed to perform an energy analysis DesignBuilder as a simulation tool,
- ✓ Decomposing Lebanon into 5 different climatic zones with their corresponding hourly weather files
- ✓ Focusing on different types of buildings (Res. and non-res., different # of floors...).
- ✓ Parametric analysis was conducted and appropriate coefficients of performance and efficiency for HVAC equipment's were proposed based on the International Energy Building Codes and Standards.
- ✓ Requirements proposed for the HVAC chapter of Energy Building Code of Lebanon (local climate, economic conditions and the availability of technologies).



→ This parametric analysis done, but the HVAC chapter should be developed and completed.

✓ Hot Water

Study ALMEE – LU:

- ✓ aimed to assess the performance of the solar water heater for different weather files and component parameters in Lebanon using SimSol and Solo software for simulations
- ✓ Domestic Hot Water demands for Centralized and Individual SWH performance
- ✓ The different parameters may increase the solar gain energy and reduce the heat losses through the system components
- ✓ Impacts of these parameters quantified for weather conditions in Lebanon
- ✓ A simplified sizing procedure for solar domestic hot water systems
 - ✓ Requirements proposed for the Hot Water Chapter of Energy Building Code of Lebanon

→ **This parametric analysis done, but the Hot Water chapter should be developed and completed.**

✓ Electrical Equipment and Lighting



OEA publication about Green Codes – 2017

- ✓ specifications should be updated (very old data for the LED lighting and efficient equipment)

CRITERIA FOR GREEN BUILDINGS
IN LEBANON

March 2017
First Edition

✓ Performance Approach of Compliance

Method of using the performance pathways to energy code compliance / model / optimizing the various building components, equipment and assemblies, saving money, time and operating expenses

VII. How to Implement the EEBC in Lebanon?

- A strategic roadmap for Green Building regulations in the Lebanese regulatory framework (ALMEE –LGBC)
- Two key compliances, voluntary and mandatory.
- Mandatory should be based on the EEBC.
 - ✓ Institutional Framework: LIBNOR - DGUP – OEA – IRI – NGOs - Municipalities
 - ✓ Regulatory Framework: Impose regulations (Parliament, Parliament Committee and CoM) - provide sufficient resources for enforcement by OEA. Some regulations are highly needed for a successful implementation of the EEBC in Lebanon (Electricity and Renewable Energies, Energy Conservation, Environmental Protection...)
 - ✓ Implementing body : OEA
 - ✓ Training and Awareness: Educational Institutions (Universities...), NGOs (LGBC, ALMEE, LCEC...)

VIII. Next Step

ALMEE Experts team will achieve within the A2.2 of the WP2 of meetMED II:

- ✓ Develop the EEBC within 8 months
- ✓ Present the EEBC to the OEA and to the LGBC in a seminar
- ✓ 2 National Seminars for professionals, students and different actors (30-40p each)





Contact us!



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Together We Switch to Clean Energy

For any inquires or comments,
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