White paper

The Transition to Energy Efficiency: Navigating the Egyptian Real Estate Landscape

PROJECT:

BUILD_ME

Project No.: 149019
March 2025

White paper
The Transition to Energy Efficiency: Navigating the Egyptian Real Estate Landscape
A report prepared as part of the IKI project "BUILD_ME - Accelerating 0-emission building sector ambitions in the MENA region".

Publisher
Guidehouse Germany GmbH
Bellevuestr. 3
10117 Berlin
+49 (0)30 297735790
www.guidehouse.com

Contact us at BUILD_ME@guidehouse.com Visit us at www.buildings-mena.com

Authors
Mai Adel Marzouk, Rana Mohamed, Dr. Mohamed Salheen (Integrated Development Group – IDG)
Reviewed by: Jessica Weir, Eslam Mohamed Mahdy, Dr. Andreas H. Hermelink (Guidehouse Germany GmbH)

Date
March 2025

Disclaimer

This deliverable was prepared by Integrated Development Group (Egypt) and Guidehouse Germany GmbH for the sole use and benefit of, and pursuant to a client relationship exclusively with German Ministry of Economic Affairs and Climate Action – BMWK ("Client"). The work presented in this deliverable represents Guidehouse's professional judgement based on the information available at the time this report was prepared. Guidehouse is not responsible for a third party's use of, or reliance upon, the deliverable, nor any decisions based on the report. Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

BUILD_ME is part of the International Climate Initiative (IKI). The Federal Ministry of Economic Affairs and Climate Action – BMWK supports this initiative on the basis of a decision adopted by the German Bundestag. The information and views set out in this publication are those of the authors and do not necessarily reflect the official
opinion of the Federal Ministry of Economic Affairs and Climate Action – BMWK.

Table of Contents

Executive Summary ..... **iii**

1. Unlocking Growth: The Potential for Upscaling Energy Efficiency in Egypt's Built Environment **1**

1.1 Steady growth of the Egyptian construction sector 1

1.2 Egypt's Energy Sector: Consumption Trends and Policy Reforms 2

2. Energy efficiency: A Business case for the building sector **4**

3. Key Challenges and Barriers to Upscaling Energy Efficiency in Egypt **7**

3.1 Regulatory and policy framework status 7

3.2 Economic conditions 8

3.3 Awareness and capacities status 10

4. BUILD_ME's Solutions to Accelerating Energy Efficiency in Egypt's Built Environment **11**

4.1 Solutions for supporting regulatory frameworks 11

4.2 Solutions for financing mechanisms 12

4.3 Solutions for raising awareness and building capacities 13

5. Conclusion **14**

Bibliography **16**

Executive Summary

This white paper evaluates the current market dynamics in the Egyptian construction sector, focusing on the potential and implications for energy efficiency (EE) projects. Egypt's real estate market is dynamic, rapidly changing, and influenced by several economic, social, and regulatory factors. The analysis in this report strives to provide stakeholders shaping this market with valuable insights, allowing for more informed decision-making and strategic planning regarding energy efficiency uptake.

The paper builds on the outcomes of the BUILD_ME project titled "*Accelerating 0-emission building sector ambitions in the MENA region*", which endeavours to promote low energy buildings by improving access to finance, advising on the policy framework, and offering technical solutions.

Key findings point to a market with high development potential, driven by population growth, urbanisation trends, and government-led large-scale infrastructure projects. The continuous growth of the building sector and its high consumption patterns stands out, emphasizing the importance of shifting to energy-efficient practices and showcasing the magnitude of benefits that could. Next to savings energy resources, those benefits include green job creation, financial savings, economic growth, and environmental benefits. Along with these advantages, there are also some drawbacks, such as regulatory uncertainty, financial limitations, affordability concerns, and insufficient awareness. Against this backdrop, addressing the transition to EE seems to be an essential component of the sector's long-term development.

The analysis emphasizes the need to prioritise energy-efficient practices and technologies by thoroughly analysing market trends, and investment patterns, and by supporting regulatory and financial frameworks. Taking a proactive approach to EE can result in a range of benefits, including cost savings, resource preservation, pollution reduction, and improved market competitiveness.

Strategic measures are recommended to improve energy efficiency in Egypt's real estate market. These include encouraging public-private partnerships, providing robust regulatory frameworks, enhancing the supporting financial frameworks, promoting energy-efficient projects and practices, and raising the awareness of different stakeholders. The Egyptian construction sector must transition towards increasing the uptake of energy efficiency. Accepting these findings and executing focused actions allow stakeholders to capitalise on opportunities, overcome challenges, and contribute to the resilience and sustainable development of Egypt's construction sector

1. Unlocking Growth: The Potential for Upscaling Energy Efficiency in Egypt's Built Environment

1.1 Steady growth of the Egyptian construction sector

Egypt's building industry has grown during the last ten years. Following a temporary standstill due to the COVID-19 pandemic, the sector was predicted to grow at an annual pace of 9% between the years 2020 and 2024. According to the Ministry of Housing, Egypt has completed infrastructure projects costing around $106.25 billion between the years 2021 and 2023 (GLCM, 2023; Figure 1). As a result, in FY 2022, the industry grew by 8.8%, reaching a market size of about $65.6 B (Global data, 2023). During the period from 2023 to 2026, the market growth rate has an average of 7.4% to 10.6% annualised rate (Global data, 2023; IFC, 2023; Ahram 1, 2023).

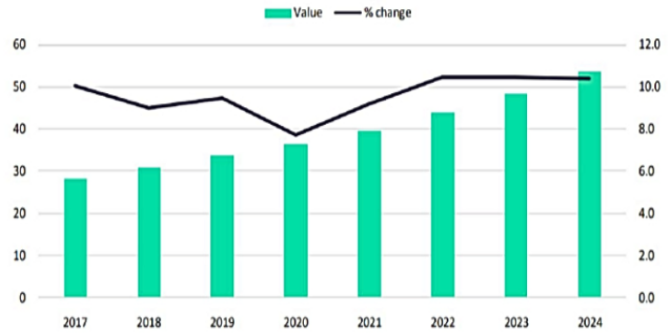

Figure 1: *Construction output, Egypt (Real, US$ billion, 2017 prices). (GLCM, 2023).*

The growth is attributed to the increased investment in projects related to housing, transportation, etc., under the umbrella of Egypt's Vision 2030, which aims at diversifying the country's economy (Global data, 2023; IFC, 2023). One of the main projects of the vision is the construction of the fourth-generation of new cities that should emerge as hotspots for sustainable and smart living. More than 20 new cities are currently under construction to provide adequate housing for the massively increasing urban population, in addition to attracting foreign capital, which further boosts the economy. Among the promising fourth generation cities is the New Administrative Capital, constructed east of the Greater Cairo Region, which extends over an area of around 175,000 acres to host an estimated population of 8.5 million inhabitants (NUCA, 2023). New Alamein, another new city, will encompass an area of 50,000 acres over the Mediterranean coastline, and New Mansoura is planned in the Nile Delta region as a hub for innovation and technology with an area of 5104 acres (Keeler, 2023).

This expansion of large-scale projects resulted in an increase in the investments directed towards Egypt's construction industry to support different construction sectors. This unprecedented growth rate of the construction sectors, despite its positive impact on

economic growth, will contribute to a huge increase in energy consumption patterns and consequently, GHG emissions. For instance, the residential construction sector is poised for growth in the foreseeable future due to investments in housing projects. In the Q2 of 2024, Cairo saw the construction of 2,200 new residential units, bringing the total housing stock to approximately 278,000 units. An additional 22,000 units are anticipated in the second half of the year. Consequently, the Egyptian real estate market is valued at $20.02 billion in 2024, with projections indicating growth to $33.67 billion by 2029 (Ahram 1, 2024).

Despite the significant environmental challenges posed by the rapidly expanding construction sectors, particularly through the depletion of non-renewable energy resources, they represent a major opportunity for the transition towards Energy Efficiency (EE). Given the large scale and number of newly constructed buildings in such projects, immense positive outcomes could be achieved, if EE measures were to be implemented, especially if implementation was upscaled.

1.2 Egypt's Energy Sector: Consumption Trends and Policy Reforms

The energy sector in Egypt represents 13.1% of the overall GDP (Informa Markets, 2022). The sector has been facing major challenges owing to the high consumption patterns, which result from the overall inefficient use of energy resources and energy subsidies. Driven by Egypt's industrialization and urbanisation, the energy consumption rate has increased significantly over the past decade in three major sectors: **(i) the residential sector, that accounts for around 38% of total final electricity consumption** (EEHC, 2023; Figure 2), (ii) the industrial sector that accounts for 29% of the total final electricity consumption (IEA, 2023), and (iii) the transportation sector as a result of the expansion of different transportation networks. **Continuously improving living standards will continue to increase energy consumption rates until they exceed the available supply of energy unless a nationwide shift towards more energy-efficient practices takes place.**

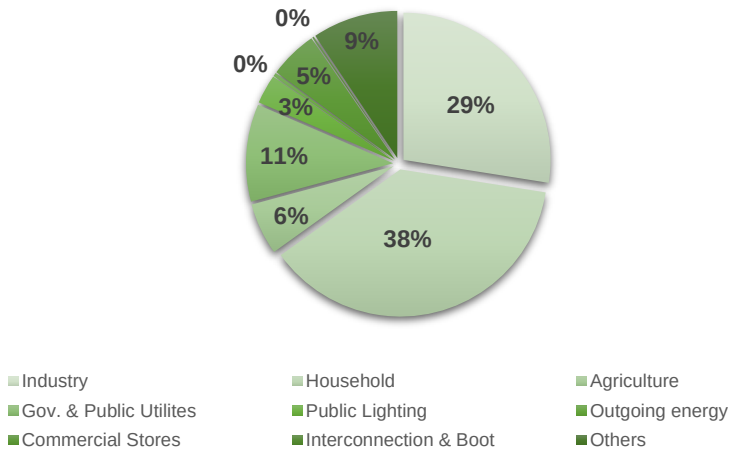

Figure 2: *Energy consumption per sector in the year 2020/2021 (EEHC, 2023).*

As a means of supporting the transition towards renewable energy sources and energy-efficient practices, Egypt has implemented several policy reforms. Since 2016, the country has adopted the Integrated Sustainable Energy Strategy (ISES 2035) developed by the Ministry of Electricity and Renewable Energy, which outlines significant energy policy reforms, including renewable energy and energy efficiency programs (NDC, 2022). Based on the strategy, Egypt has embarked on an ambitious energy policy reform, including setting a target to source 42% of its electricity from renewable energy sources by 2035 (UNDP, 2022). This target is divided into 14% from wind energy, 2% from hydropower, and 26% from solar energy (NREA, 2022). The new energy strategy, approved in 2024, aims to scale up the contribution of renewables to the energy mix to 60% by 2040 (SIS, 2024).

As part of the reform program, since 2014, the government announced a comprehensive program to phase out energy subsidies and reform the electricity and oil & gas sectors – projected to be completed by FY 2027/2028. Prior to this plan, energy subsidies accounted for 22% of total government expenditure and 6% of GDP in FY 2012/2013. After the plan, Egypt's energy subsidies decreased by over half to 3.4% of the total GDP, reaching only 0.3% in FY 2019/2020. By gradually phasing out subsidies that made fossil fuels cheap, the government aimed to reduce overconsumption, decrease environmental degradation, and promote investment in renewable energy sources. **The increasing electricity prices because of subsidy alleviation is expected to increase the market appetite for energy efficiency measures and support its business case, especially with the continuously increasing demand. In line with that, there is growing awareness among Egyptian businesses and consumers about the benefits of energy efficiency.** As power outages have become more frequent, people and companies are looking for ways to reduce their energy consumption and buffer themselves against disruptions. This translates to demand for energy-saving technologies and solutions.

2. Energy efficiency: A Business case for the building sector

To demonstrate the potential of implementing EE measures in Egypt as a promising business case, two pilot projects were studied to showcase a comparison between their current situation and an improved scenario when applying EE measures. The study used the Building Energy Performance (BEP) tool, developed as part of the BUILD_ME project, to calculate the improved overall energy performance of buildings and the cost-effectiveness of EE measures. The BEP tool uses baselines customised for the MENA region and Egypt in particular, which depict representative reference buildings in Egypt according to the specific building type, region's architecture, and technical systems.

The analysis of the case studies (i.e., two pilot projects) was conducted in two steps as follows:

(i) Initial Analysis (BaU vs current situation): Compares the currently planned construction of the project against the business-as-usual (BaU) baseline scenario (common practice in the Egyptian market) without EE considerations. Initial inputs related to the selected building's envelope, systems, and renewable energy applications were analysed. This initial analysis compares the currently planned construction against the BaU baseline in terms of predicted energy demand and global cost savings.

(ii) Improved Scenario (current situation vs. optimised): Compares the current situation against the optimised solution after using the recommended EE measures embedded in the BEP tool. Recommended measures to reduce energy demand were implemented in three steps: (a) improving the building envelope, (b) upgrading HVAC systems, and (c) incorporating renewable energy generation. The analysis compared several key performance variables using the BEP tool to identify the most cost-effective case. The results compared energy demand reduction and global cost savings.

The illustrated case studies demonstrate that energy demand reduction from efficiency measures could reach up to 70% when the most efficient technical measures specific to a building typology are used. The BUILD_ME BEP tool supports developers in making these decisions by allowing them to compare the BaU versus enhanced efficiency scenarios. The tool additionally shows that cost savings from reduced energy demand combined with on-site renewable energy generation could reach up to 60%, highlighting the business case for energy efficiency improvements. The case studies further illustrate the substantial energy and financial benefits obtainable through a comprehensive approach focused on efficiency upgrades and integrated renewable systems.

BUILD_ME project case study 1

Palm Hills, Badya, a new residential development located in the sixth of October city, Giza, Egypt. A prototype of a multi-family residential building was selected as a **residential pilot project** to apply the BEP tool calculations and compare the results.

Initial analysis (BaU vs current situation): The design parameters of the BaU and currently planned construction are compared against the minimum building code requirements to evaluate their relative performance. (Figure 3) indicates that the current design has an estimated energy savings of 7% and global cost savings of 6% compared to the BaU baseline construction.

Improved Scenario (Current situation vs. optimised): The BaU, the current design, and the optimised proposal were compared (Figure 4). This approach yielded energy savings of 72% and reduced overall costs by 56% when compared to the BaU baseline scenario.

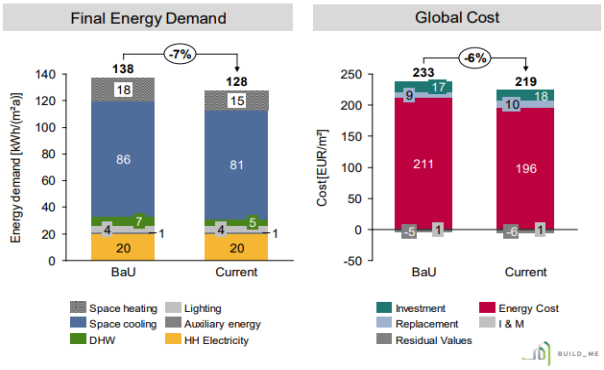

Figure 3: *BaU vs. current design final energy demand and global cost (BUILD_ME, 2024)*

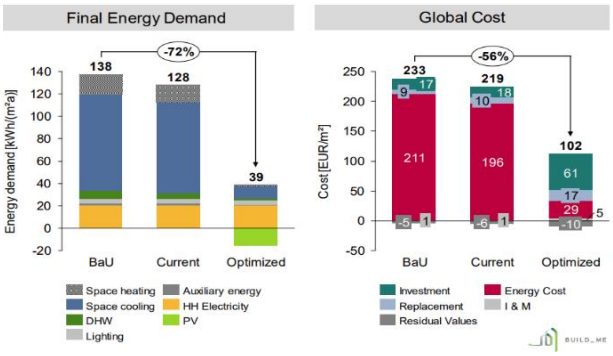

Figure 4: *Final energy demand and global cost after applying BEP tool recommended measures (BUILD_ME, 2024)*

The recommendations formulated for the Badya Project primarily aim to optimise energy efficiency and reduce the overall demand. Improvements are proposed for the building envelope, which include enhancing the insulation of exterior walls and roofing materials. Additionally, high-performance triple-glazed windows are to be installed building-wide. The recommended HVAC system is the most energy-efficient split unit system, with a Coefficient of Performance (CoP) of 5. Solar thermal collectors are to be deployed and anticipated to provide approximately 50% of domestic hot water needs, and the remaining roof area should be utilized for photovoltaic modules to generate electricity.

BUILD_ME project case study 2

The library building of the New Mansoura University in Mansoura, Egypt, consists of several halls and a hub for academic events. The library is currently in its design phase and has not been constructed yet. The specific challenge is that the building is near the seacoast, which provides the potential of sea breeze but also might result in high levels of humidity. The project was selected as a **non-residential pilot project** to apply the BEP tool calculations and compare the results.

Analysis (BaU vs current situation): The design parameters of the BaU and currently planned construction are compared against the minimum building code requirements to evaluate their relative performance. (Figure 5) indicates that the current design has an estimated energy savings of 25% and global cost savings of 24% compared to the BaU baseline construction.

Improved Scenario (Current situation vs. optimised): The BaU, the current design, and the optimised proposal were compared (Figure 6). This approach yielded 60% energy savings and 36% lower overall costs when compared to the original baseline scenario.

The optimization of the library building to reduce energy demand focuses on improving the building envelope and mechanical systems. External walls are to be enhanced with Delta Blocks and cavity insulation to minimise thermal transfer. A reversible split unit air conditioning system with high energy efficiency is also recommended. Finally, the maximum available roof area was utilized for a photovoltaic (PV) system installation in a cost-effective manner.

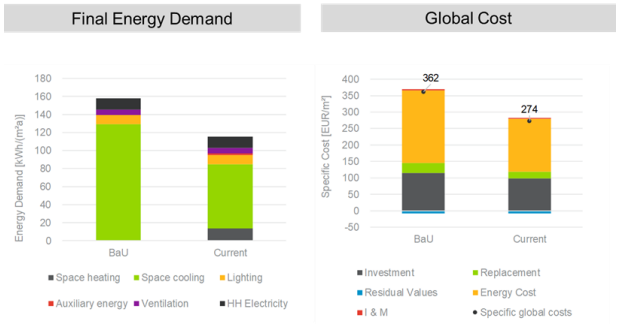

Figure 5: *BaU and current design final energy demand and global cost (BUILD_ME, 2024).*

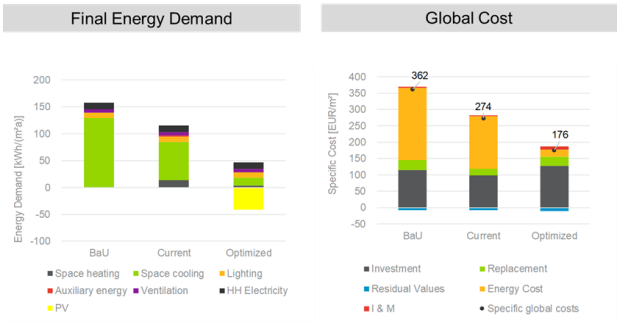

Figure 6: *Final energy demand and global cost after applying BEP tool recommended measures (BUILD_ME, 2024)*

3. Key Challenges and Barriers to Upscaling Energy Efficiency in Egypt

Egypt is developing energy efficiency (EE) measures in response to the rising energy consumption but faces significant obstacles in the process. Despite the prominence of EE, the country encounters a variety of challenges, including regulatory framework limitations, economic constraints, and low awareness. Understanding these issues is important for developing effective measures that drive Egypt toward a more sustainable energy future. This chapter investigates the current barriers to EE advancement in the context.

3.1 Regulatory and policy framework status

A Variety of projects and initiatives have been launched to improve the energy efficiency (EE) situation, yet they seem to have a limited impact on supporting the on-ground implementation of EE measures in Egypt. In the early 2000s, several codes and regulations were developed to support and manage energy efficiency in the built environment, yet they remain voluntary and lack the necessary enforcement mechanisms, hence their limited impact in pushing the implementation of EE in the building sector. The major efforts in this regard were carried out by the Ministry of Housing and its technical arm, the Housing and Building National Research Centre (HBRC), which developed several voluntary codes and guidelines including (i) the Energy Efficiency Residential Building Code (EERBC) issued in 2005 and the Energy Efficiency Commercial Building Code (EECBC) issued in 2009, (ii) the recently issued Green Hospital Design Guidelines (Guidehouse 2, 2021), and (iii) the Egyptian Code for Smart Cities (767/2020) and the Sustainability, Green Architecture, and Energy Guidelines (IFC, 2023). HBRC has also developed several rating systems in support of green buildings, including the Green Pyramids Rating System (GPRS) for new residential buildings, GPRS for commercial buildings, and GPRS for banks, however, their adoption rates in the context were limited (Guidehouse 2, 2021).

To complement these efforts, Egypt Electricity Holding Company (EEHC) initiated a program to promote the use of EE lighting units, where CFLs replace incandescent bulbs (World Bank, 2010). Lastly, the Egyptian Organization for Standardization and Quality (EOS) was responsible for issuing the EE labels for four residential appliances: refrigerators, washing machines, air conditioners, and electric water heaters. This labelling scheme was a mandatory regulation that helped raise awareness of the importance of energy efficiency for appliances, which could support increasing EE awareness in other sectors, especially the building sector (Guidehouse 3, 2022).

At the level of environmental plans and policies, the recently updated Nationally Determined Contributions (NDC) and the recently issued National Climate Change

Strategy (NCCS) have given special attention to the renewable energy targets and energy efficiency measures, which are compatible with the emissions reduction goals, set as 80,520 gigagrams (Gg) carbon dioxide equivalent (CO_2e) by 2030 (NDC, 2023). Yet, their translation into actionable steps and practical implementation is below the expected potential. Even though there are efforts directed to propose codes, guidelines, and regulations to support and manage energy efficiency in the Egyptian built environment, their impact on-ground is still limited.

3.2 Economic conditions

The long-term economic challenges faced in Egypt have recently intersected with several economic and political global crises and were amplified by the domestic challenges, including the elevated government debt (World Bank, 2023). As a result, the inflation rates have reached unprecedented high levels, and the foreign currency has witnessed severe shortages (OECD, 2024).

In response to the economic challenges, Egypt has devalued its currency four times since March 2022, leading to a depreciation of approximately 70% against the United States Dollar (USD) (Ahram 3, 2024). The USD/EGP exchange rate reached 15.71 in 2022, and after the Ukraine crisis, the rate surged to 18.54, and in 2023, it increased to 27.22. The Central Bank of Egypt (CBE) endeavoured to stabilise the economy in early March 2024 by instituting exchange rate flexibility, which allows market forces to manage the value of the Egyptian pound. The CBE also raised interest rates by 600 basis points (6%), resulting in the increase of the USD/Egyptian Pound (EGP) exchange rate to around 46.94 (Cochintu, 2024).

These conditions have several implications for the construction market. In recent months, construction costs have been fluctuating because of the ongoing effects of Egyptian currency devaluation as well as supply chain bottlenecks. While Egypt is currently progressing towards self-sufficiency in the manufacturing of major construction materials, it still relies on imported raw materials and fuel, the majority of which comes from Europe. Therefore, high inflation rates (Figure 8) and market swings are posing significant challenges for contractors (Gleeds experts, 2023) and further hinder the market's adoption of energy efficiency (EE) measures.

International petroleum prices have also increased by over 70% at the start of 2022. The price of fuel is growing gradually, affecting both local transportation and the local production costs. Locally manufactured construction products, which rely heavily on imported raw materials, were also affected by this inflationary surge. The ongoing consequences of supply chain disruption had a detrimental impact on the pricing of several construction materials. Reinforcement steel prices have increased by 25-30%, while cement prices have climbed by 35-45%. These make up a significant portion of the concrete work in construction projects, accounting for 15-20% of the total project cost.

As a result, a decline of around 37% in residential units that were built in FY 2021/2022 than that in FY 2020/2021 was witnessed, according to CAPMAS (Gleeds experts, 2023).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
January	90%	97%	92%	107%	107%	110%	126%	142%	143%	209%	240%	264%	273%	298%	341%	493%
February	92%	99%	92%	110%	106%	118%	127%	141%	143%	206%	240%	264%	273%	301%	345%	493%
March	93%	94%	93%	109%	107%	122%	130%	142%	150%	210%	253%	264%	271%	303%	381%	502%
April	100%	93%	96%	107%	106%	124%	132%	143%	153%	210%	250%	264%	271%	305%	406%	
May	101%	92%	100%	108%	106%	124%	133%	144%	156%	210%	249%	264%	271%	318%	404%	
June	104%	92%	101%	110%	106%	124%	133%	142%	155%	213%	251%	265%	271%	321%	404%	
July	107%	93%	103%	109%	106%	124%	136%	136%	155%	225%	266%	265%	271%	328%	400%	
August	109%	92%	103%	110%	106%	124%	139%	142%	158%	228%	265%	265%	273%	329%	400%	
September	104%	93%	104%	110%	106%	124%	140%	143%	158%	230%	265%	265%	273%	330%	401%	
October	102%	93%	104%	109%	106%	124%	141%	143%	174%	233%	265%	268%	278%	332%	402%	
November	99%	92%	104%	107%	106%	125%	140%	145%	190%	235%	265%	266%	278%	338%	415%	
December	98%	91%	104%	107%	107%	125%	141%	143%	203%	240%	264%	265%	288%	340%	428%	

Figure 8: *Construction materials inflation rate in Egypt (CAPMAS,2023)*

Furthermore, the transition to EE in the building sector faces the additional challenge of the scarcity of viable financial mechanisms and incentives to support the uptake of EE measures. The European Bank for Reconstruction and Development (EBRD) and the Commercial International Bank (CIB) provided some financing assistance, albeit with limitations, particularly in covering only a few building sectors. For instance, the Green Economy Financing Facility Egypt Loan and Grant provided by EBRD-GEFF, in cooperation with AFD and European Investment Bank, provides a higher investment incentive of 15% of eligible costs for eligible enhanced efficiency investments such as small-scale cogeneration or tri-generation, energy saving ratio higher than or equal to 40%; renewable energy projects that exceed 1.74 kWh per annum of electricity generated (EBRD, 2024). In addition, the Commercial International Bank (CIB) has offered solar loans for financing solar energy solutions since 2023, which is equal to approximately EGP 350,000, covers up to 100% of the cost of solar panels, and has a flexible loan repayment period of up to 5 years (CIB, 2024).

In conclusion, the Egyptian economy is currently facing significant challenges in its transition to energy efficiency. Despite the considerable potential for energy savings, much of this is largely untapped due to several barriers, including insufficient funding for energy efficiency initiatives, limited services to promote such projects, and energy prices that are still significantly lower than the costs incurred, thus hindering energy conservation efforts. Additionally, fluctuating construction material prices, driven by currency devaluation and supply chain disruptions, further complicate the adoption of energy-efficient solutions in the built environment.

3.3 Awareness and capacities status

Currently, Egypt lacks several supporting mechanisms necessary for the implementation of EE, such as (i) energy consumption monitoring or auditing in the building sector, except for the industrial buildings (IEE, 2014), (ii) clearly developed benchmarks of the business-as-usual building practices, and (iii) energy classification or labelling systems for buildings of different typologies. The absence of these mechanisms affects the effective public communication of energy efficiency potential in buildings, further exacerbated by the varying levels of awareness among different stakeholder groups (Guidehouse 2, 2021). For instance, end users currently have limited awareness of the technical capacity and economic feasibility of implementing energy efficiency upgrades in their buildings. Furthermore, the cost-benefit analyses that demonstrate the financial returns of various energy efficiency investments have not been widely communicated among building owners and facility managers.

Only limited capacity-building opportunities and training programs are provided to involved professionals such as architects, engineers, contractors, project developers, bankers, policymakers, and government officials. For instance, even though the Energy Efficiency Building Codes (EEBCs) were developed many years ago, no formal training or certification mechanism has been developed to qualify experts in code implementation (Guidehouse 2, 2021). Training programs were mostly limited to capacitating and certifying experts in different green building rating systems, such as the international LEED, EDGE, etc., or the local GPRS.

Accordingly, the sector witnesses a gap in the knowledge of its stakeholders. Despite the preliminary understanding of professionals, especially architects and engineers of EE concepts through undergraduate education programs, most still lack the necessary practical knowledge that could drive successful implementation on ground. Additionally, the end users – building owners, tenants, or users – remain largely unaware of the potential benefits of implementing EE measures in their buildings.

4. BUILD_ME's Solutions to Accelerating Energy Efficiency in Egypt's Built Environment

Considering Egypt's pressing need to improve energy efficiency in the built environment amid rising energy demand and growing environmental concerns, several projects are driving progress and fostering change, such as the BUILD_ME project. This chapter digs deeper into the recommended solutions, emphasising BUILD_ME's role in accelerating the adoption of energy-efficient measures and contributing to a more sustainable future for Egypt's built environment.

4.1 Solutions for supporting regulatory frameworks

To promote energy efficiency in the building sector, efforts directed at improving codes and regulations are necessary. In addition, enacting an EE law is crucial for establishing and enforcing regulations as well as legitimising organisations and allocating clear responsibilities across public entities (World Bank, 2010; Guidehouse 2, 2021).

BUILD_ME's Recommended Actions: Roadmap for Change:

- Simplifying the Energy Efficiency Building Codes (EEBCs) and digitising them to create online digital codes for wider dissemination. The report is available at https://www.buildings-mena.com/files/EGbuildingcodereport.pdf
- Enforcing the implementation of EEBCs in the building sector and eventually mandating it.
- Developing a transparent, cost-effective Energy Performance Certification (EPC) scheme for labelling the performance of new and existing buildings, which will be managed and implemented as a nationwide standard. The scheme will serve as a catalyst for financial initiatives, policies, and national action plans through establishing a comprehensive national database of certified buildings.
- Empowering an institution/entity to issue the Energy Performance Certification (EPC) for buildings and be responsible for the inspection after construction
- Developing an online free Building Energy Performance BEP tool to calculate the overall energy performance of buildings and the cost-effectiveness of building EE measures to deliver realistic results based on a solid, internationally applicable methodology and support the EPC process. The BEP tool is available at https://www.buildings-mena.com/info/building-energy-performance-tool.

Further recommendations:

- Establishing an institutional structure tailored to the local situation to promote and build road maps for implementing EE to further achieve the aims reflected in national strategies such as NDCs and NCCS.

- Devising a regulation to facilitate the collection and analysis of energy consumption data across building sectors to create a reliable national energy consumption database.

4.2 Solutions for financing mechanisms

Driven by the critical role of financial considerations in implementing energy efficiency measures in the building sector, the BUILD_ME project has included finance as one of its three pillars for upscaling EE ambitions. With eight years of presence in the local market, BUILD_ME has contributed to the following:

- Facilitating access to financing for EE building projects by creating links between the beneficiaries (e.g., project developers, end users) and the banks/financial institutions across the country.
- Devising a user-friendly tool (BEP tool) that facilitates the performance and cost calculation of EE projects to support the banking and financial sector in evaluating the eligibility of projects for financing. Supporting an easy provision of funding from donors or funding agencies to eligible EE projects by avoiding bureaucratic processes and delays.
- Supporting financial institutions' ability to assess EE buildings. BUILD_ME increased the EE knowledge of many calibres, including bankers, financiers, and other financial stakeholders, through webinars, group meetings, and in-country workshops, increasing major banks' risk appetite for EE. Additionally, training sessions and webinars on the BEP tool were executed for the financial sector players.
- Increasing finance by sending a strong message to investors about the importance of energy efficiency and its potential business case using different communication channels such as webinars, publications, workshops, and roundtable discussions.

Further recommendations:

- Devising financial incentives (such as tax cuts and subsidies) to speed the uptake of EE measures. Incentives could be for EEBCs compliance or for adopting new EE technologies.
- To adopt non-financial incentives to support the adoption of EE measures. This may include zooning bonuses, increased built-up areas for EE buildings, speed building permit facilitations, and capacity building and trainings for the staff of the project developers.

4.3 Solutions for raising awareness and building capacities

As awareness and capacity building have vital roles in promoting EE across diverse sectors, the BUILD_ME project carried out activities and is suggesting enhancement through several aspects such as:

- Building capacity and raising awareness through tailored training programs for different target groups, including professionals, project developers, government officials, bankers, etc., on integrating the BEP tool into their scope of work.
- Developing a training and certification process for professionals involved in the energy performance certification (EPC) process in buildings. BUILD_ME offered EPC training for different target groups, including EPC experts, EPC auditors, and EPC owners representing local entities in target countries.
- Organizing several events, including webinars and national and regional workshops since the project start to raise awareness of the local market.
- Demonstrating the benefits of EE through real-life case studies to increase the awareness of end users and project developers. Several pilot projects were studied to present them with cost-optimal variants of EE and RE measures that achieve the highest environmental and economic benefits.
- Supporting research and development projects in the field of energy efficiency, which can spur innovation in construction processes and technologies. BUILD_ME has recently published several reports with the aim of disseminating knowledge, such as the “Zero Energy Ready Building (ZERB) report” and “Mapping of the Building Sector in National Strategies of Egypt”.
- Actively participating in international events to reflect on Egypt’s efforts in supporting the EE transition. BUILD_ME participated in events such as WUF12 and COP29 to demonstrate its commitment to global sustainability efforts and position EE at the forefront of international discussions.

Further recommendations:

- Capacity building for the involved professionals such as architects, engineers, bankers, manufacturers, and legislators is needed, especially on EEBCs. The training programs should be tailored to the aims and needs of each group.
- Organising broader awareness-raising campaigns directed at the end users using media and social media channels.
- Supporting the inclusion of energy efficiency-related topics in the undergraduate and postgraduate education of architects, engineers, and construction professionals.

5. Conclusion

There is a significant potential for energy efficiency (EE) in the Egyptian building sector. Egypt's green building market is showing early signs of transition towards the uptake of EE, yet it requires immense development to reach its full potential. The BUILD_ME project is supporting the reform of regulatory and policy frameworks to harness EE implementation potential in the rapidly growing building sectors. It is facilitating and increasing the access to financing to support the market in overcoming the challenging economic conditions, which contribute to the slow transition to EE buildings. Finally, it aims to disseminate EE knowledge and experience by implementing EE measures in pilot projects to enhance visibility.

The BUILD_ME project has focused on addressing challenges and implementing solutions at multiple scales i) Building Scale, ii) Market scale, and iii) Country scale. At the building scale, the Building Energy Performance (BEP) tool and the Energy Performance Certification (EPC) scheme have provided a standardized methodology for calculating the energy demand of buildings and the cost-effectiveness of EE measures. These tools empower stakeholders to make informed decisions, thus ensuring the adoption of EE practices that optimize building performance while reducing operational costs and carbon emissions.

For the market scale, BUILD_ME has supported both private and public sector stakeholders, such as the project developers of large-scale projects, by providing technical assistance on integrating EE and RE solutions from the early stages of selected pilot projects. In parallel, BUILD_ME has actively promoted direct exchange between project developers and financial institutions, facilitating connections to improve access to financing for low-energy buildings – a key challenge in the context.

At the broader country scale, the project has had a larger impact on EE in the building sector by enhancing knowledge, awareness, and technical capacities. A key achievement has been capacity building through successfully delivering EPC training to EPC experts and auditors. Additionally, the project has provided comprehensive studies to support national strategies, published publicly in a number of reports with the aim of disseminating knowledge to involved stakeholders, including policymakers, government officials, professionals, etc.

BUILD_ME's efforts not only reflect Egypt's ambitions for an energy-efficient building sector but also reinforce its commitment to global initiatives, on top of which is the recently joined Buildings Breakthrough Agenda (BBT) "**Near-zero emission and resilient buildings are the new normal by 2030**" (GlobalABC, 2023), which was officially launched at COP28 UAE. The agenda intends to support the decarbonization of the built

environment, and Egypt joined the BBT along with 27 countries worldwide with a serious commitment to advancing its goals.

The BUILD_ME project solutions directly support Egypt's focus on key aspects of the BBT agenda. Namely, BUILD_ME addresses B1 on **Standards and Certifications** by working on the definition of near-zero energy buildings, developing a national building classification scheme in Egypt, and supporting the implementation of the EPC certification. It also aligns with B3 on **Finance and Investment** by supporting the access to easy assessment of bankable low-energy building projects, in addition to seeking finance for green buildings and matchmaking between project developers and financial institutions to unlock financial resources. Finally, BUILD_ME is in line with B5 on **Capacity and Skills** through dissemination and knowledge transfer. The project organized several events and online seminars to close gaps and increase awareness.

Looking toward the future, BUILD_ME aims to upscale the implementation of the EPC as a voluntary certification scheme in Egypt, supporting its rollout as a pivotal policy instrument. The EPC scheme is expected to unlock financing opportunities from national and international donors for the building sector, ultimately enhancing EE, reducing carbon emissions, and achieving significant financial savings. By continuing to bridge gaps between policy, finance, and technical expertise, BUILD_ME is laying the foundation for a more sustainable and energy-efficient built environment.

Bibliography

Ahram 1 (2024). Egypt property market soars despite economic strain. Ahram Online, Wednesday 4 Sep. 2024. https://english.ahram.org.eg/News/530547.aspx (Last access: February 2024).

Ahram 2 (2021). Building Egypt's 4G cities. Ahram Online. Karima Abdel-Ghani, Tuesday 29 Jun. 2021 https://english.ahram.org.eg/News/416262.aspx

Ahram 3 (2024). Egypt likely to devalue currency to reflect parallel market rate: S&P. Ahram Online. Asmaa Mostafa, Tuesday 30 Jan 2024 https://english.ahram.org.eg/News/516813.aspx (Last access: March 2024).

CAPMAS (2022). Bulletin of Housing "Housing in Egypt", June 2022. Retrieved from: https://www.capmas.gov.eg/Admin/News/PressRelease/202262134913_%D8%A8%D9%8A%D8%A7%D9%86%20%D8%B5%D8%AD%D9%81%D9%8A%20%D8%A7%D9%86%D8%AC%D9%84%D8%B4.pdf (Last access: March 2024).

CIB - the Commercial International Bank - Solar loan - retrieved from: https://www.cibeg.com/en/personal/loans/solar Last access: March, 2024.

Cochintu, C. (2024). Egyptian Pound Forecast & Price Predictions (USD/EGP) for 2024, 2025-2030,11 March 2024. Retrieved from: https://capex.com/eu/overview/egyptian-pound-forecast (Last access: March 2024).

EBRD (2024). GEFF Grant support - Where finance and green technologies meet. Retrieved from: https://ebrdgeff.com/egypt/grant-support/ (Last access: March 2024).

Egypt Today (2022). Egypt's energy sector represents 13% of GDP. Retrieved from: https://www.egypttoday.com/Article/3/119472/Egypt-s-energy-sector-represents-13-of-GDP (Last access: February 2025).

GLCM (2023). Egypt. Global Leaders in Construction Management. Columbia University. Retrieved from: https://www.glcm.info/egypt#:~:text=Egypt's%20building%20industry%20has%20risen,of%2010%25%20in%20FY%202018 (Last access: March 2024).

Gleeds experts (2023). Egypt Market Report 1Q: Construction market overview. Retrieved from: https://focus.gleeds.com/egypt-construction-market-report-1q-2023/construction-market-overview#:~:text=Historic%20inflation%20overview,the%20cost%20of%20construction%20materials (Last access: February 2024).

GlobalABC (2023). Buildings Breakthrough: Near-Zero Emission and Resilient Buildings are the new normal by 2030. https://globalabc.org/our-work/fostering-collaboration (Last access: April 2024).

Global data (2023). Egypt Construction Market Report Overview. December 26, 2023. Report Code: GDCN1301MR-ST. https://www.globaldata.com/store/report/egypt-construction-market-analysis/ (Last access: February 2024).

Guidehouse 3 (2022). Regulatory Analysis Egypt: Analysis and recommendations for the regulatory and policy instruments governing the RAC sector. Guidehouse Germany GmbH. August 2022. Retrieved from: https://www.coolupprogramme.org/wp-content/uploads/2022/09/Cool-Up_Regulatory-Analysis-Egypt.pdf (Last access: March 2024).

Guidehouse 2 (2021). Analysis and Recommendations for the Improvement of Energy Efficiency Building Codes in Egypt. Guidehouse Germany GmbH. December 2021. Retrieved from: https://www.buildingsmena.com/files/EGbuildingcodereport.pdf

Guidehouse 1 (2021). Summary Report: Lessons Learnt of technical assistance offered to Pilot Projects. BUILD ME project: Boosting ambitions to achieve a climate-neutral building standard in the MENA region. Guidehouse Germany GmbH. November 2021. Retrieved from: https://www.buildings-mena.com/files/BUILD_ME_SummaryReport-LessonsLearntoftechnicalassistanceofferedtoPilotProjects.pdf (Last access: February 2024).

IFC (2023). Egypt Green Building Market Snapshot 2023. International Finance Corporation. Retrieved from: https://edgebuildings.com (Last access: March 2024).

IEE (2014). Industrial Energy Efficiency Project Egypt - Industrial Energy Efficiency Policy, International practice and experience analysed for application in Egypt 2014. Retrieved from: ieeegypt.org/wp-content/uploads/2016/04/Industrial_best_practice_report.pdf

Informa Markets (2022). Egypt Energy Sector – Market Report, 2022 Edition. Egypt Energy. Retrieved from: https://www.egypt-energy.com/content/dam/Informa/egypt-energy/en/pdf/Egypt%20Energy%20Report-16-5%20.pdf (Last access: February 2025).

NDC (2023). Egypt's Second Updated Nationally Determined Contributions. 26 June 2023. Retrieved from: https://unfccc.int/sites/default/files/NDC/2023-06/Egypts%20Updated%20First%20Nationally%20Determined%20Contribution%202030%20%28Second%20Update%29.pdf (Last access: February 2024).

NDC (2022). Egypt's First Updated Nationally Determined Contributions. 8 June 2022. Retrieved from: https://unfccc.int/sites/default/files/NDC/2022-07/Egypt%20Updated%20NDC.pdf.pdf (Last access: February 2024).

NUCA (2023). About new cities - Home, New Urban Communities Auth. http://www.newcities.gov.eg/english/New_Communities/default.aspx (Last access: May 2023).

OECD (2024). Egypt economic snapshot: Economic survey of Egypt. Retrieved from: https://www.oecd.org/economy/egypt-economic-snapshot/#:~:text=Economic%20Survey%20of%20Egypt%20(February,stepping%20up%20economic%20reform%20efforts (Last access: March 2024).

Presidency of Egypt, 2018 - New Mansoura City. Retrieved from: https://www.presidency.eg/en/ (Last access: February 2025).

NREA (2022). Renewable Energy Targets. New and Renewable Energy Authority, NREA. Retrieved from: http://nrea.gov.eg/test/en/About/Strategy

IRENA (2018). Renewable Energy Outlook Egypt, 2018. International Renewable Energy Agency, IRENA, October 2018. Retrieved from: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA_Outlook_Egypt_2018_En.pdf

SDS (2016). Egypt Vision 2030. Retrieved from: http://sdsegypt2030.com/?lang=en https://arabdevelopmentportal.com/sites/default/files/publication/sds_egypt_vision_2030.pdf (Last access: February 2024).

IEA (2023). Share of electricity in final consumption. International Energy Agency, IEA. https://www.iea.org/countries/egypt/electricity

IEA (2017). Setting energy efficiency targets. Energy Efficiency Insights Brief. OECD/IEA 2017.

SIS (2024). New urban communities in Egypt. State Information Service (SIS), 2024. Retrieved from: https://www.sis.gov.eg/Story/197694?lang=en-us (Last access: February 2025).

UNDP (2022). Transforming Egypt's energy market, July 2022 https://www.undp.org/egypt/stories/transforming-egypts-energy-market

World Bank (2023). The World Bank in Egypt: Overview. Retrieved from: https://www.worldbank.org/en/country/egypt/overview (Last access: March 2024).

World Bank (2010). Egypt: Improve Energy Efficiency. Final Report, Sustainable Development Department (MNSSD) Middle East and North Africa Region. November 2010. Retrieved from: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/570371468028445468/egypt-improve-energy-efficiency (Last access: March 2024).


BUILD_ME