

Whitepaper

Energy Efficiency in Existing Buildings in the United Arab Emirates: Towards Effective Policies & Regulations

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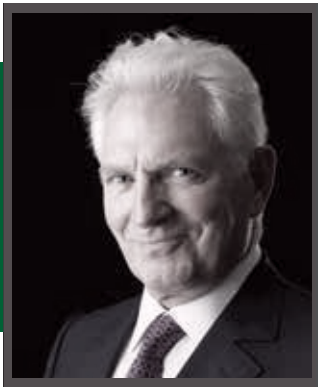
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Foreword

In recent years, the United Arab Emirates has demonstrated unparalleled dedication to sustainability, setting ambitious goals for carbon reduction and renewable energy. As Chair of the Clean Energy Business Council MENA, I am proud to witness the UAE's progress, particularly in addressing energy efficiency within our existing building stock. With over 80% of the buildings in the UAE constructed before sustainable building codes were enforced, improving energy efficiency in these structures is paramount to achieving our national targets and supporting global climate goals.

This whitepaper, a collaborative effort from the members of the CEBC's Energy Efficiency Working Group and the Issam Fares Institute at the American University of Beirut, examines the UAE's journey toward building energy efficiency and highlights both regional and international best practices. It delves into policy frameworks, financial mechanisms and case studies, providing a roadmap for enhancing building retrofits and reducing energy demand across our urban landscapes.

Such work is only possible through the dedicated input of industry experts and policy leaders who have contributed their knowledge and insights. Their collective expertise will support the UAE as it pioneers solutions that balance economic growth with environmental stewardship, setting an example for the MENA region and beyond.

I extend my gratitude to all contributors and partners whose insights made this whitepaper possible. Together, we are laying the groundwork for a sustainable, energy-efficient future in the UAE and strengthening the role of clean energy in the global economy.

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Current Status of the UAE in Terms of Energy Efficiency

1.1. UAE Compliance with the Climate Agenda

The UAE has been at the forefront of supporting the global climate agenda. As a country at the heart of climate impacts and undergoing a major energy transition, it has long viewed climate change as a challenge that must be overcome (Embassy of the UAE, 2023). The country has developed many government programs like the UAE Energy Strategy 2050, the UAE National Agenda vision 2021, and the National Climate Change Plan 2017, which aim to promote the deployment of nuclear and renewable energies, strengthen energy efficiency, drive research and development and innovation in energy technologies, enhance local clean energy capacity, and support investments in the country's renewable and clean energy sector.

In fact, it is the first country in the region to ratify the Paris Agreement, the first to commit to an economy-wide reduction in emissions, and the first to announce a Net Zero by 2050 strategic initiative, demonstrating its dedication to increasing efforts in climate action (Embassy of the UAE, 2023).

With the overarching theme "Save To Sustain," the Ministry of Energy and Industry (MOEI) initiated the National Energy Conservation campaign. The campaign's primary objective is to enhance public awareness and understanding of electricity and water conservation. It encompasses a broad audience, including students, families, employees, workers, and tourists, and centres its efforts on promoting energy efficiency in various sectors, including buildings, transportation, manufacturing, and agriculture (UAE, 2023).

1.2. COP28

The UAE hosted the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28) from November 30 through December 12, 2023 uniting the world towards an agreement on bold, practical and ambitious solutions to the most pressing global challenge of our time (Embassy of the UAE, 2023). This has resulted in the historic announcement of the UAE consensus, at the heart of which lies the first-ever Global Stocktake (GST) along with 11 other pledges and declarations. All eyes are now on the upcoming COP29 in Baku, where a new Global Climate Finance Goal (or new collective quantified goal on climate finance - NCQG) should be agreed upon (OIES, 2024).

The UAE's hosting of COP28 builds on the country's track record of action to meet the global climate challenge. The UAE is a global hub for logistics, transportation and green technology and is at the crossroads of business, commerce and tourism. The country is therefore uniquely positioned to build bridges and foster consensus to accelerate inclusive climate progress (Embassy of the UAE, 2023).

COP28 took place at a critical time for

the MENA region, that is still facing tremendous challenges including the , the ongoing war on Gaza, as well as political crises and uncertainties. Additionally, the MENA region is grappling with climate hazards such as droughts and changes in precipitation patterns, which are affecting river flows and groundwater recharge. Among the most important pledges agreed at COP28 was the "Global Cooling Pledge" endorsed by 71 countries so far, including the UAE. The pledge will have a significant impact on building efficiency through passive cooling, increased efficiency, and low global warming refrigerants, as it commits to "reducing cooling-related emissions across all sectors by at least 68% globally relative to 2022 levels by 2050." In addition, it aims to "collectively increase the global average efficiency rating of new air conditioning equipment sold by 50% by at the latest 2030 from global 2022 installed baseline." Therefore, signatories must establish Minimum Energy Performance Standards (MEPS) by 2030 at the latest.

1-Energy Efficiency within the UAE

Each of the UAE's seven emirates have been putting a lot of effort into sustainability and energy efficiency, developing initiatives to mitigate the impact of climate change on a national level.

The Emirates Green Building Council (Emirates GBC) was established in 2006 as a non-profit organization that aims to promote green building practices in the UAE. Emirates GBC has been active in promoting retrofitting initiatives such as the Retrofitting Task Force, which was formed in 2013 to promote the retrofitting of existing buildings.

Furthermore, each emirate has been pushing for building retrofitting laws, regulations, and initiatives to improve the energy efficiency of buildings and reduce CO2 emissions. Some of the main initiatives taken by three emirates to promote retrofitting in the country include:

2.1. Building Retrofit Policies and Guidelines in Dubai



Refurbish (retrofit) is defined by the Green Building Regulations and Specifications codes published by the Government of Dubai, DEWA and Dubai Municipality as “the substantial alteration of a building or building services to replace or improve the quality of the building. This may occur when a new tenant occupies the building or part of the building,” which does not make reference to specific codes and regulations.

The elements that can be considered to retrofit an existing building can cover the building envelope (eco-friendly material), energy efficiency equipment (fuel boilers, air conditioning, and water chilling packages integrated in buildings must comply with minimum energy efficiency test requirements and

procedures), the integration of solar panels, water use efficiency, rain water harvesting; incorporation of energy metering, heat recovery; insulation and ducts, energy saving design features for escalators and elevators, among others.

In Dubai, H.H. Sheikh Mohammed bin Rashid Al Maktoum, issued a resolution to implement green building specifications and standards in new buildings. In 2014, the building code became mandatory for all new buildings in the emirate (UAE, 2023).

Local authorities across the UAE are spearheading retrofit programmes to enhance the energy performance of some existing buildings. Dubai leads the way and has completed the retrofitting of more than 1,000 buildings and 7,000 villas.

In addition, in 2013, Dubai launched the Etihad Super Energy Service Companies (Super ESCO) program, the first of its kind in the MENA region. In 2017, the Etihad Super ESCO had already generated AED452 million in cumulative investments, achieved 194 million kilowatt-hour (kWh) energy savings and 132 million imperial gallons (MIG) in water savings (Econoler, 2020).

The Dubai Electricity and Water Authority (DEWA) launched the

Demand Side Management (DSM) program to promote energy efficiency practices in existing buildings. The DSM program offers incentives to building owners who install energy-efficient equipment and systems, as well as those who participate in building retrofitting activities.

The Dubai Supreme Council of Energy (DSCE) also launched the Dubai Green Building Regulations and Specifications (DGBRS) in order to promote sustainable practices in the construction industry. The DGBRS includes specifications for building envelope, lighting, HVAC systems and other building components (Dubai Supreme Council of Energy, 2021).

Dubai appears to be leading the way in building retrofitting, given that it hosts the largest number of Energy Service Companies (ESCOs) in the MENA region, which in turn, facilitates the implementation of numerous projects. Yet, despite all the measures and initiatives taken at this level, these have yet to be imposed as a requisite standard on both new and existing buildings.

Once implemented as mandatory measures, energy savings in building retrofitting can be significantly improved

2.2. Building Retrofit Policies and Guidelines in Ras Al Khaimah



In Ras Al Khaimah (RAK), the Barjeel Green Building Regulations launched by RAK Municipality establish minimum sustainability requirements for new construction projects. These regulations mandate minimum standards in design, construction and equipment for new buildings that are calibrated to achieve a 30% reduction in energy and water consumption compared to prior practices in RAK. As of January 2020, Barjeel has become mandatory for all new buildings, following a one-year voluntary adoption period (UAE, 2023).

The Municipality of RAK developed a strategy for renewable energy and energy efficiency in line with several government programs mentioned above. The strategy supports RAK Vision 2030's goal of making the emirate a competitive and sustainable investment destination with high public service standards. Within this context, energy efficiency and renewable technology adoption are vital for fulfilling the 2030 Vision. The strategy consists of nine programs that are intended to cover the majority of RAK's energy and water use: green building regulations for new buildings; building retrofits for existing buildings; efficient appliances; energy management for large energy users; efficient street lighting; water reuse and efficient irrigation; solar programs; waste to energy; efficient vehicles (Khaimah, 2021).

Meanwhile, energy efficiency regulations for old buildings in RAK, in the form of a rating system, are still under development (Khaimah, 2021). Once finalized, it is recommended that they be imposed on a mandatory level for old and new buildings.



2.3. Building Retrofit Policies and Guidelines in Abu Dhabi

In Abu Dhabi, the Regulation and Supervision Bureau works actively with residents to reduce electricity and water consumption and demand (UAE, 2023).

The DSM Regulations support government objectives under the Abu Dhabi DSM and Energy Rationalization Strategy 2030, unveiled in 2019 to provide economic and environmental benefits in line with Abu Dhabi Vision and UAE national strategies. The strategy aims to address supply and demand issues through a nine-program multi-stakeholder approach that has a potential to reduce electricity consumption by 22% and water consumption by 32% by 2030, from the 2013 baseline. These programs include: building retrofits, demand response, efficient water use/re-use, building regulations, street lighting, district cooling, standards and labels, energy storage, and rebates and behavioral change (Abu Dhabi, 2023).

The Abu Dhabi Urban Planning Council (UPC) has also developed a number of regulations that aim at improving the energy efficiency of existing buildings in the emirate. One of the regulations is the Estidama Pearl Rating System, a sustainability-based framework for buildings, communities and villas (Abu Dhabi Urban Planning Council, 2023).

The 2040 vision and policies related to sustainability and energy efficiency are still under development and are not implemented yet. Once finalized, it is recommended that they be imposed on a mandatory level.



2.4. Gaps and Weaknesses to Implementing Building Retrofitting within the UAE

Based on the above-mentioned policies and regulations, a cross-cutting major gap within the main emirates is the non-obligatory mandate of these regulations, which refrains owners and residents of existing buildings from undergoing necessary energy efficiency measures due to the lack of incentives.

Nevertheless, this is accompanied by other challenges and weaknesses identified in the literature, as well as from consultation meetings conducted by the Clean Energy Business Council MENA with energy stakeholders and experts working in the UAE. These gaps include economic, regulatory, social and knowledge weaknesses. On an economic level, the lack of funds, high upfront costs and payback expectations were highlighted. On the regulatory front, the institutional and structural weaknesses, fragmented market structure, and the government slow driving force for Energy Efficiency (EE) initiatives were mentioned. While on the social and knowledge level, the lack of information and social awareness on EE were identified as the key barriers.

3. Cases from Gulf Countries



The UAE is not alone in its efforts to enhance energy efficiency and building retrofits. Other Gulf Cooperation Council (GCC) countries are also working to implement and integrate energy efficiency approaches, as follows:

3.1. Kingdom of Saudi Arabia



The King Abdul-Aziz City for Science and Technology has developed a program to assist the newly-established Saudi Energy Efficiency Centre in its efforts to achieve the energy conservation goals of the country. As Saudi Arabia moves towards a more diversified economy with reduced reliance on oil exports, there has been a significant increase in energy consumption in important sectors such as housing, consumer appliances, heavy industry, water, and transport. As a result, the government and industry leaders are committed to reduce energy intensity growth through the implementation of various policies, management practices, and technological advancements. One of the main objectives is to conserve oil resources for future generations, particularly since a significant portion of electricity in Saudi Arabia is generated from oil-burning power plants (UNDP, 2023).

This project is centred on achieving four primary outcomes, with the overarching objective of enhancing the capabilities of the Saudi Energy Efficiency Centre:

- **Energy Efficiency Policy and Regulations:** This involves creating the initial Energy Conservation Law and associated action plans and regulations at both the national and local levels to meet specified targets.

- **Energy Information System:** The project entails developing and establishing a new national energy information system to serve as the foundation for data regarding energy supply and demand, forecasting, and the monitoring and evaluation of set targets.
- **Capacity Development for Energy Efficiency Managers and Leaders:** The initiative encompasses the design and execution of comprehensive training programs, aimed at equipping energy managers and leaders in both the public and private sectors, to address challenges and opportunities in critical sectors such as buildings, consumer appliances, heavy industry, transport, power supply, and water.
- **Awareness Raising on Energy Conservation:** This focuses on creating and implementing a nationwide campaign to promote energy conservation, with the objective of improving public energy consumption patterns and behaviours.

To attain its intended objectives, it is highly likely that this project will require an extension and additional funding. As for the National Energy Efficiency Plan, its significant effects can be summarized by the following (UNDP, 2023):

- Enhancing efficiency and minimizing losses in the generation (G), transmission (T), and distribution (D) of electrical power.
- Promoting and implementing energy conservation measures in residential, commercial, and industrial sectors through activities like education, promotion, financial support, and setting industry standards.
- Mitigating the need for increased supply-side investments (in G/T/D) by curbing peak demand.
- Decreasing system losses.

”

One example of the outcomes of such efforts is Saudi Arabia's first Super ESCO, Tarshid, established in 2017 and funded by the Saudi Public Investment Fund (PIF). Tarshid was mandated to retrofit all government buildings in the country to lower energy consumption. Tarshid's mandate includes around 70% of the energy efficiency projects in Saudi Arabia, which is estimated to be a market of approximately USD11 billion (Lütken & Zhu, 2020). Since its inception, Tarshid has implemented a multitude of energy efficiency projects in Saudi Arabia. In 2020, Tarshid began retrofitting ministry buildings in Riyadh, which is expected to abate 3,700 tonnes of CO₂ emissions (Oommen, 2020). Additionally, Tarshid has also completed the first phase of retrofitting streetlights in numerous cities in Saudi Arabia. The replacement of energy inefficient streetlights in Makkah alone is projected to result in energy savings of about 70% (MEP, 2021).



3.2. Morocco



Morocco's susceptibility to climate change impacts, especially droughts, has been particularly pronounced over the years. To address these challenges, the National Energy and Energy Efficiency Plan was established with the aim of reducing Morocco's carbon footprint and cutting energy production costs. The initial objective was to generate 8% of primary energy (equivalent to 20% of the national electricity consumption) from renewable sources by 2012. This was increased to 42% by 2020 and eventually 52% by 2030. The plan envisioned a balanced increase in renewable energy production, incorporating wind, solar, and hydroelectric sources. Simultaneously, it emphasized the importance of energy efficiency. To foster the growth of the renewable energy sector, the government phased out petrol and diesel subsidies in 2014-2015, a period marked by low oil prices. Furthermore, the renewable energy market was opened to foreign competition, encouraging investment in government-led projects (Pathfinders, 2023).

By the end of 2021, the renewable energy portion of the country's electrical capacity, as reported by the Office National de l'Electricité (ONE), stood at 37.08%, part of which hydroelectricity accounted for 16.14%, wind energy contributed 13.37%, and solar energy made up 7.58%. This shift resulted in a notable reduction in the fuel share, decreasing from 14% in 2008 to 7.67% by 2021 (Pathfinders, 2023).

Furthermore, the building sector in Morocco stands out as one of the sectors consuming a significant amount of energy, accounting for up to 33%. This energy usage is distributed as follows: 7% attributed to commercial buildings and 26% to residential buildings. Anticipated factors contributing to the rise in energy consumption include demographic growth, the establishment of new cities, and the continued prevalence of air conditioning and heating systems. This sector alone represents an energy saving potential of 40% (Ameel, 2023). Morocco has been expanding its ESCO market and promoting energy efficiency; it is one of the few MENA countries to have a Super ESCO. Although the ESCO market in Morocco is considerably smaller than the ones in the UAE and Saudi Arabia, it does have the potential to grow in the future, especially with increased support from the government.

3.3. Oman



Due to high fossil fuel subsidies, Oman has one of the lowest electricity prices in the MENA, which has resulted in a lack of sufficient incentives for energy efficiency investments and initiatives. The industrial sector is the largest consumer of energy. However, to tackle the growing energy consumption and lack of energy efficiency, the government has taken steps to develop its ESCO market (Econoler, 2020).

Oman has directed its focus towards addressing climate change, prioritizing clean energy transitions and enhancing resilience. Oman Vision 2040 and the National Energy Strategy have set a goal to increase the adoption of renewable energy and enhance energy efficiency.

Simultaneously, the National Strategy for Adaptation and Mitigation to Climate Change, along with the second nationally-determined contribution (NDC), acknowledge the necessity of bolstering the resilience of energy infrastructure against the impacts of climate change. To effectively achieve climate-resilient energy transitions in Oman, additional policy measures are crucial (iea, 2023).

Completing the National Adaptation Plan (NAP) and the government's endorsement of climate risk and impact assessments within the energy sector can serve as a starting point. The government's endeavors to integrate climate resilience considerations at the core of decision-making for energy projects through guidelines, regulations, and project approval processes, which will spur action in bolstering resilience. Furthermore, ongoing support for the diversification of energy technologies and the increased adoption of renewable energy will better equip the country to withstand climate-related shocks, facilitating the shift to alternative options and reducing the risk of energy supply disruptions (iea, 2023).

4. International Case Studies

4.1. Europe

According to a study conducted by the European Environmental Bureau (EEB) based on interviews and web-based research between September 2022 - April 2023, several EU countries have already implemented mandatory and voluntary measures for the public and private sectors at the level of member states. These countries, including Germany, Italy, France, Portugal, and Spain, also report regularly and openly on the implementation and progress of energy savings (EEB, 2023).

The most robust measures in place have been noted in Germany, Italy, France, Portugal, and Spain. This is particularly relevant, as these five countries alone covered over 60% (equal to 254,12 billion cubic meters, bcm) of the EU's gas demand in 2021. Compulsory measures to reduce consumption have been introduced in Germany and Italy for all sectors: public, private citizens and businesses. In France and Spain, the focus was on the public sector and small and large enterprises. Some of these measures were already in place during the summer of 2022 in France, Germany and Spain (EEB, 2023).

Most important measures adopted by countries with stringent measures

- Mandates limiting heating and air conditioning France and Spain limited heating and air condition for public and business actors, while Germany and Italy additionally targeted private households.
- Mandates limiting energy use for lighting Germany introduced wide-ranging but temporary limits on lighting not essential for safety, while France and Spain required businesses to turn off lighting for advertising and shop lights at night.

- Portugal limited lighting in central government offices and issued recommendations for private households and businesses

- **Other energy-saving measures**

France, Germany, and Portugal reduced heating in public pools. In France, companies were required to cut their energy use by 10% or face enforced rationing of electricity and gas.

- **Public information campaigns**

In each country of mentioned above, public information campaigns encourage citizens to make small behavioural changes to limit their energy use. In France, citizens were further urged, including through real time electronic alerts, to specifically minimise energy use at peak consumption times .

- **Measures by sub-national authorities**

France: In Paris, public lighting of the Eiffel Tower was reduced, and streetlight bulbs replaced by more efficient LEDs. The town of Thouars limited streetlights from 10 p.m. to 6 a.m. starting June 2022. Some high schools in Brittany lowered their thermostats.

Germany: Hanover, Berlin, and Bavaria implemented various energy-saving measures.

Italy: In Florence, an ordinance prohibits public, commercial and administrative establishments from keeping their doors open when air conditioning systems are operating.

Spain: The municipality of Pedreguer converted nearly all municipal lighting to LED and promoted energy community formation. Spain actively supports energy efficiency efforts by regions and cities, offering subsidies for a variety of energy efficiency building improvements that yield a 10% reduction in final energy consumption.

Portugal: 103 municipalities reduced indoor and exterior lighting. All these measures were implemented between 2022 and 2023.

4.2. China



In April 2022, the General Code for Building Energy Conservation and Renewable Energy Utilization came into effect by the Chinese Ministry of Housing and Urban-Rural Development. This regulation is the first mandatory policy that specifically targets carbon emissions arising from buildings and construction activities. The regulation has a wide scope, which includes new buildings, existing buildings, renewable energy systems, construction commissioning and approval, as well as building operations. China's building sector is responsible for over 50% of the country's total carbon emissions. To align with ambitious carbon reduction goals, this policy is just one amongst other policies to be implemented in the coming years. The new General Code will need stringent energy savings in industrial, new and residential building construction (Aden, 2021).

4.3. Japan



In April 2010, the Tokyo Metropolitan Government (TMG) introduced the Tokyo Cap-and-Trade Program (TCTP), which sets mandatory CO₂ emissions reduction targets for the largest energy consumers in the city. This includes approximately 1,400 facilities, comprising 1,100 office and mixed-use commercial buildings and about 300 industrial facilities. While there is no direct correlation between total annual energy consumption and building size, the buildings covered by the TCTP are generally from 20,000 to 30,000 square meters or more. Although these facilities represent only about 0.2% of all commercial and industrial facilities in Tokyo, they account for about 40% of the total CO₂ emissions from those sectors (ACEEE, 2020).

4.4. United States



4.4.1. Washington, DC

In December 2018, the Council of the District of Columbia (DC) adopted the Clean Energy DC Omnibus Amendment Act of 2018, which increased the DC renewable portfolio standard, expanded energy efficiency funding and programs, sought to expand use of electric vehicles, and adopted mandatory building energy performance standards for large buildings, including multifamily buildings. The legislation requires buildings with a floor area of 50,000 square feet or more to meet energy performance standards or take other required actions by January 1, 2026, with the standards extending to buildings of 25,000 square feet or more on January 1, 2028, and to buildings of 10,000 square feet or more on January 1, 2031. The performance standards are part of the district's efforts, as specified in the legislation, to reduce GHG emissions 50% by 2032 and to achieve carbon neutrality by 2050 (ACEEE, 2020).



4.4.2. New York

In April 2019, the New York City (NYC) City Council passed a package of bills known as the Climate Mobilization Act (CMA). The centerpiece of the CMA is Local Law 97 of 2019, which requires buildings larger than 25,000 square feet to meet strict GHG emissions limits starting in 2024. The law established GHG intensity limits, expressed in CO₂ equivalent per square foot for 10 building categories (based on Building Code occupancy groups), with the limits taking effect in 2024 (covering each year in the 2024–29 period) affecting the most carbon-intensive 20% of buildings. Some of the buildings affected in this first compliance period will need to reduce their emissions by only 10% or less, but other high-emission buildings in many of the occupancy groups will have to achieve significantly higher reductions. Significantly more stringent limits take effect for the second compliance period, 2030–34, and will affect about 75% of covered buildings.

Some building types are excluded from the law's GHG limits. The largest sector excluded is multifamily housing buildings with at least one rent-regulated unit or other low-income or subsidized housing. These buildings can either meet the emissions limits or follow a prescriptive path that requires a list of relatively low-cost energy savings measures (ACEEE, 2020).

Beyond state level policies, a game changer in US energy policymaking was the passing of the Inflation Reduction Act (IRA) in 2022, the single largest investment in climate and energy in American history to tackle the climate crisis. As part of its USD11.7 billion in support of issuing new loans, it includes Federal Energy Retrofits Funds to improve the energy efficiency and retrofit of existing homes (whole-house rebates and Electric Home Rebate Program).

5. Energy Efficiency from a comparative analysis perspective

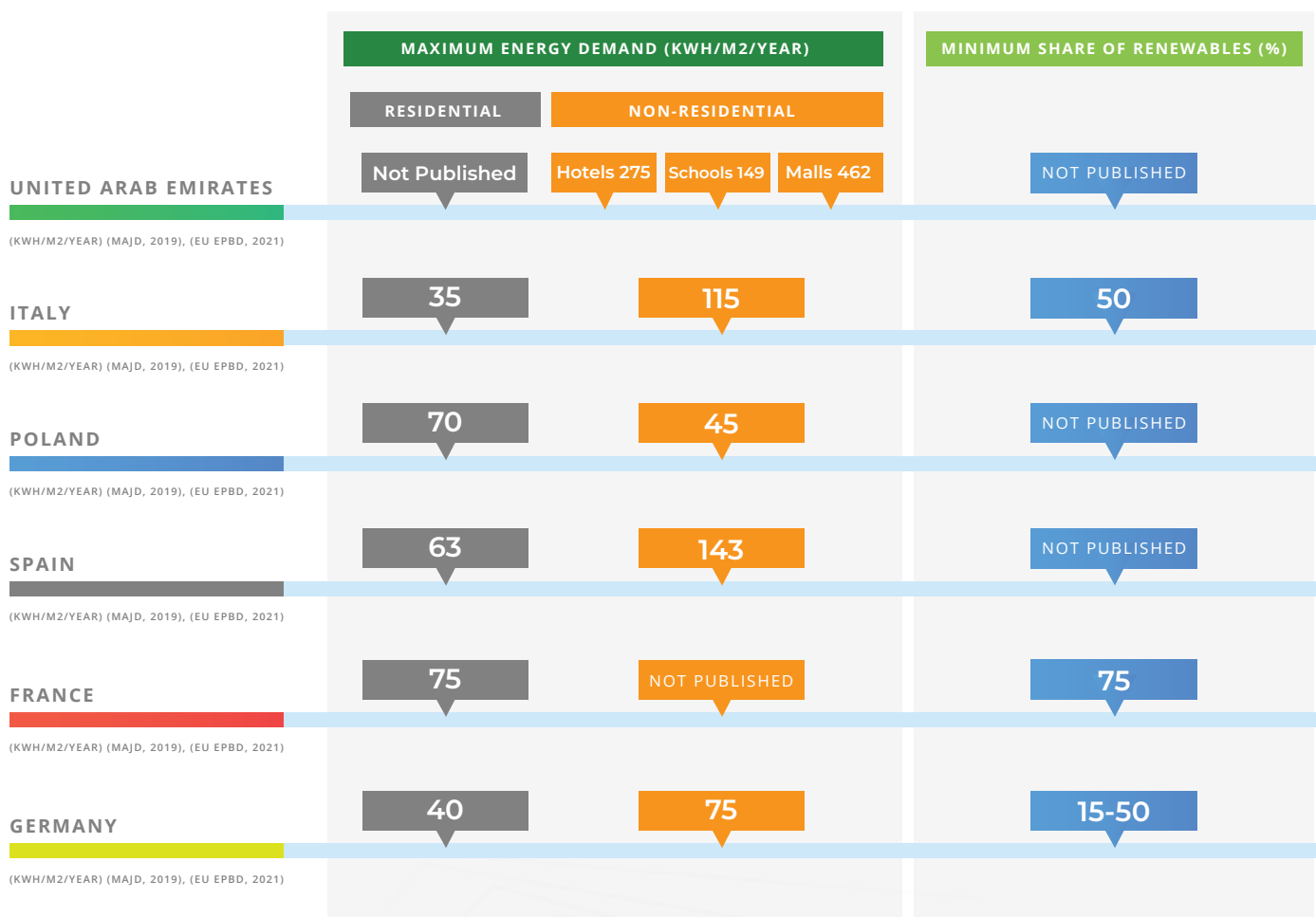
Building on this empirical review of existing literature, we complement this work with quantitative data that would position the UAE's energy efficiency behavior in comparison to other countries. .

In 2019, the building sector represented around 28% of greenhouse gas emissions in the UAE (Emirates GBC, 2023). The total GHG emissions in 2022 were 295 million tons of CO₂ equivalent per year (Mt CO₂eq/yr) and buildings were responsible for 82 Mt CO₂eq/yr. The UAE aims to reduce its building emissions by 81% by 2030, thus tripling its energy efficiency that is in line with the final declaration of Dubai's COP28 last year. This ambitious target requires the coordination and collaboration of multiple stakeholders to share expertise and diversify aspects of technology, policy and finance. According to a survey conducted by Emirates GBC in 2021, 84% of the 120 respondents believed in 50% energy savings using available technologies of building retrofits. Also, around 80% of respondents mentioned that these should be mandated by government regulations, while 52% believed that the current low cost of energy does not allow low payback periods. The survey highlighted a lack of landlord/owner interest, primarily due to the lack of required skills and lack of feasible financial mechanisms, making it difficult to implement energy conservation measures. The survey also showed the importance of transparency in water and energy consumption ratings, as 86% agreed that they would be more inclined to retrofit buildings if these ratings are made publicly.

Another study by Emirates GBC was conducted to benchmark buildings in schools, hotels, and malls in 2019 (Majd, 2019). A total of 121 properties, 103 of which were in Dubai, participated in the study and findings

revealed valuable information about annual water and energy consumption in kWh/m²/year. Data from the UAE were compared with similar recommended values in some European countries, especially in Italy, Poland, Spain, France and Germany (Table 1). Data showed the high energy demand in UAE’s non-residential buildings and emphasizes the importance of following energy efficiency measures.

Table 1. Comparison of UAE with some EU countries, Maximum energy demand (kWh/m²/Year) (Majd, 2019), (EU EPBD, 2021)



Additionally, Emirates GBC published the “UAE Sustainability Built Environment Blueprint” in 2023, supported by the UAE’s Ministry of Energy and Infrastructure and the Ministry of Climate Change and Environment. Regulations (47%) and green finance (32%) were identified as the key enablers for developing sustainable built environment by 75 participants (Emirates GBC, 2023).

Floor area per capita (m² per capita) is also an important parameter to consider when dealing with the policy framework for built environment. This parameter has not been considered in the design guidelines or policy proposals, even though it is an important parameter for improving energy efficiency. Data from the International Panel on Climate Change (IPCCC) report shows that an increase in floor area per capita has been linked with increasing GDP of the relative countries (6th Assessment Report, 2022). However, limiting the floor area per capita would also ensure that efficiency improvements are not offset. Global data analysis highlights that, compared to 2020, the lack of measures will contribute to increasing emissions by 31% combining embodied and functional carbon, thus compromising the energy efficiency measures in the UAE. Also, according to the same IPCC report, despite decreasing energy use per unit of floor area at an average rate of 1.3% per year, the growth of floor area at an average rate of 3% per year causes rising energy demand and GHG emissions as every new square meter must be served with thermal comfort and/or other amenities (Hickel et al., 2021).

Table 2. Floor area per capita (m² per capita) (6th Assessment Report, Chapter 2022 ,9)

	HISTORICAL				CURRENT SCENARIO	RECC LED AND 2°C POLICY SCENARIO*		
	1990	2000	2010	2020	2050	2030	2040	2050
GLOBAL AVERAGE	17	19	23	25	36	27	27	27
NORTH AMERICA	48	59	65	67	73	58	52	42
SOUTHREN ASIA	8	9	10	13	40	25	28	29
EUROPE	22	25	28	31	49	32	31	30
MIDDLE EAST	15	22	31	35	47	35	32	31

*Resource Efficiency and Climate Change-Low Energy Demand (RECC-LED) scenario is produced by a global bottom-up model, which assesses contributions of resource efficiency to climate change mitigation.



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6.UAE Way Forward & Recommendations

The UAE has an opportunity to lead at the energy efficiency front, especially in existing buildings, with the already existing framework and initiatives. The ambitious target of building emissions' reduction by 81% highlights the opportunity for the UAE to decouple economic growth from carbon. This can be achieved by strategic planning and careful implementation of energy conservation measures and increasing the share of renewable energy in the national electric grid. Based on the research and review conducted in this paper, the authors and contributors from the Clean Energy Business Council MENA's Energy Efficiency Working Group propose several recommendations, focusing on the following aspects:

Regulatory and Policy Level

- Advocate for mandatory energy efficiency policies at both the national and emirate levels.
- Finalize the regulatory framework to address any gaps in energy efficiency coverage.
- Set ambitious yet achievable energy efficiency targets to incentivize and drive energy efficiency progress.
- Launch public awareness campaigns to promote the adoption of energy efficiency practices.
- Implement comprehensive market surveillance and certification programs, including energy performance certificates for buildings and local testing labs in the GCC region, to ensure the removal of low-quality or inefficient products from the market.

- ◆ Introduce regulations for reporting and overseeing carbon emissions originating from buildings and equipment, using internationally-recognized carbon emissions measuring standards like ASHRAE for buildings and AHRI for HVAC systems.
- ◆ Encourage new lifestyle and working culture schemes such as teleworking, coworking, more efficient space design, planning and use, higher density of building and settlement inhabitation, flexible space usage, and housing swaps, among others.

Financial Level

- ◆ Encourage and support energy efficiency measures through direct subsidies and financial assistance, tailored to the specific needs of each emirate.
- ◆ Gradually reform the fossil fuel subsidy framework to better incentivize energy efficiency initiatives.
- ◆ Foster public-private partnerships (PPPs) to leverage combined public and private financing to play a key role in the development of energy efficiency measures.

Training, Certification and Monitoring

- ◆ Promote innovation and education through public information campaigns, energy efficiency funding and programs, and the implementation of mandatory building energy performance standards.

- ◆ Encourage cooperation between universities and public institutions to finance and support innovative research and initiatives focused on energy efficiency in both existing and new buildings.
- ◆ Develop a publicly accessible data-sharing platform for government, local authorities, stakeholders, and the community to enhance transparency and collaboration.
- ◆ Introduce workshops on energy efficiency and develop business plans to support the sector's growth in the country.
- ◆ Train and certify technicians in the installation, service, and maintenance of HVAC equipment and systems to significantly improve energy efficiency and reduce negative environmental impacts.

7. References

- ACEEE. (2020). Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals. Retrieved from https://www.aceee.org/sites/default/files/pdfs/buildings_standards_6.22.0_2020.pdf
- Aden. (2021). China's new green building regulations are here: what you need to know. Retrieved from <https://www.adenservices.com/en/blogs/china-green-buildings-regulations/>
- Abu Dhabi, G. o. (2023). Abu Dhabi Demand Side Management and Energy Rationalization Strategy 2030. Retrieved from <https://doe.gov.ae/-/media/Project/DOE/Department-Of-Energy/Media-Center-Publications/English-Files/Abu-Dhabi-DSM-and-Energy-Rationalization-Strategy.pdf>
- Abu Dhabi Urban Planning Council. (2023). Retrieved from <https://www.dmt.gov.ae/en/adm/About-Abu-Dhabi-City-Municipality/About-Us>
- Amee. (2023). Energy efficiency in buildings. Retrieved from <https://www.amee.ma/en/node/118#:~:text=The%20building%20sector%20is%20among,and%20%25%2026for%20residential%20buildings.>
- EEB. (2023). Saving Energy for Europe Spring 2023 update: Contrasting EU states' measures to reduce gas and electricity consumption. Retrieved from https://eeb.org/wp-content/uploads/05/2023/EEB_Saving-Energy-for-Europe-report_Spring-2023.pdf?utm_source=T%26E+EEB+super+list&utm_campaign=9cd2ca225e-EMAIL_CAMPAIGN_05_09_16_03_2023_COPY_01&utm_medium=email&utm_term=3-_0d0fb2fff5%-3BLIST_EMAIL_ID%5D

- ◆ EmbassyofUAE. (2023). COP28 UAE. Retrieved from <https://www.uae-embassy.org/discover-uae/climate-energy/cop28>
- ◆ EmiratesGBC. (2021). Advancing Deep Retrofits in the UAE Appendix. www.emiratesgbc.org
- ◆ Emirates GBC. (2023). UAE Sustainability Built Environment Blueprint ENDORSING MINISTRIES.
- ◆ EPBD. (2021). DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
- ◆ Hickel, J., Brockway, P., Kallis, G., Keyßer, L., Lenzen, M., Slameršak, A., Steinberger, J., & Ürge-Vorsatz, D. (2021). Urgent need for post-growth climate mitigation scenarios. *Nature Energy*, 768–766 ,(8)6. <https://doi.org/10.1038/s9-00884-021-41560>
- ◆ IEA. (2023). Climate Resilience for Energy Transition in Oman. Retrieved from <https://www.iea.org/reports/climate-resilience-for-energy-transition-in-oman>
- ◆ IPCC 6th Assessment Report. (2022). Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change Mitigation of Climate Change. www.ipcc.ch
- ◆ Khaimah, G. o. R. A. (2021). RAS AL KHAIMAH ENERGY EFFICIENCY & RENEWABLES STRATEGY 2040. Retrieved from https://reem.rak.ae/ReemDocuments/Publications/EERStrategyAnnualReports/English/Annual%20Report%202021_RAK%20Energy%20Efficiency%20and%20Renewables%20Strategy%202040_English.pdf

- Majd. (2019). BUILDING EFFICIENCY ACCELERATOR EmiratesGBC PROJECT REPORT Project Partners Dubai Supreme Council of Energy Sustainable Energy for All (SEforALL) Leadership Team Project Team.
- Oxford Institute for Energy Studies (OIES) (2024) Ten key conclusions from COP28: a farewell to fossil fuels Retrieved from: <https://www.oxfordenergy.org/publications/ten-key-conclusions-from-cop28-a-farewell-to-fossil-fuels/>
- Pathfinders. (2023). Morocco's National Energy and Energy Efficiency Plan. Retrieved from <https://www.sdg16.plus/policies/moroccos-national-energy-and-energy-efficiency-plan/#:~:text=According%20to%20ONEE%2C%20and%20as,in%20%202008to%20%207.67percent>
- PEEB, P. f. E. E. i. B. (2019). BUILDING SECTOR BRIEF: MOROCCO. Retrieved from https://www.peeb.build/imglib/downloads/PEEB_Morocco_Country%20Brief_Mar%202019.pdf
- UAE. (2023). Energy efficiency. Retrieved from <https://u.ae/en/information-and-services/environment-and-energy/water-and-energy/energy-efficiency>
- UNDP. (2023). NATIONAL ENERGY EFFICIENCY PROGRAMME: PHASE 2. Retrieved from <https://www.undp.org/saudi-arabia/projects/national-energy-efficiency-programme-phase-2>
- Econoler (2020). Super ESCO: An innovative approach to unlock energy efficiency potential. The Econoler Series. https://econoler.com/wp-content/uploads/01/2021/The-Econoler-Series_SuperESCO.pdf

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