Background paper
Global Alliance for Buildings and Construction's (GlobalABC) Regional Round Table North Africa and the Mediterranean

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List of Accronyms

BAU: Business as Usual
CITET: Centre International des Technologies de l'Information de Tunis
COP: Conference of the Parties to the UNFCCC
EE: Energy Efficiency
GlobalABC: Global Alliance for Buildings and Construction
GHG: Greenhouse gas emissions
IPCC: International Panel on Climate Change
MSSD: Mediterranean Strategy for Sustainable Development
MENA: Middle-East and North Africa
Mtoe: Million tonnes of oil equivalent
NDC: Nationally Determined Contribution
RES: Renewable Energy System
SDG: Sustainable Development goals
UNFCCC: United Nations Framework Convention on Climate Change

Executive Summary

Buildings account for almost 40% of global energy-related CO_2 emissions when upstream power generation is included, a third of the world's final energy use and half of its electricity consumption. Energy intensities of the buildings and construction sectors need to be reduced by 30% on average by 2030 to be in line with the long-term goals set in the Paris Agreement. Buildings are also central to the resilience of cities and territories to climate change.

In its inputs submitted to the Talanoa Dialogue, the GlobalABC stresses the need to increase speed and scale of action at all levels. For this purpose, the GlobalABC developed a Global Roadmap structured around 9 key objectives, which will be further refined and regionalised also through Regional Roundtables. Regional Roundtables are aimed at policy makers to help address regional priorities and challenges and facilitate peer-to-peer learning for climate action in buildings and construction.

The present Regional Roundtable focuses on North Africa and the Mediterranean. This region experienced rapid economic and demographic growths in the last decades, increasing pressures on natural resources with rapid urban developments and high demand for new constructions, particularly near the coasts. It was also identified as a hotspot to climate change, where vulnerabilities are enhanced by strong climate perturbations combined with limited adaptation capacities. While North Africa and the Mediterranean's share to global greenhouse gas emissions is still small (around 1% of reported emissions in 2015), projected developments of demographic and economic growths indicate that this situation may rapidly change in the future.

Final energy consumption in South-MED countries[1] rose from 113Mtoe in 1990 to 248 Mtoe in 2013, and could reach 606 Mtoe by 2040 in a conservative scenario[2]. Over 20% of this consumption would come from buildings, with the construction of 50 million additional dwellings foreseen by 2040. Under an energy transition scenario[3], 40% of energy savings in new buildings and 10 to 15% in the existing building stock would be needed, with an emphasis on the residential sector. According to GlobalABC's last Global status report, the energy-carbon intensity of the building sector remains very high (over 150 tCO2/TJ of energy consumed) in Libya and Lebanon and high (100 to 150 tCO2/TJ) in the other countries of the region, to the exception of Algeria and Turkey (50 to 100 tCO2/TJ).

At the international level, sustainable buildings and construction policies are framed by the Paris Agreement on climate change, the Sustainable Development Goals and the new Urban Agenda. For the Mediterranean basin, a strategy for sustainable development 2016-2025 was conceived under the leadership of the Mediterranean Commission for Sustainable Development[4]. In parallel, the involvement of all stakeholders is enhanced through initiatives such as the MEDCOP Climat, a Mediterranean forum gathering States and non-state actors. These come in support to actions taken at national levels, such as energy efficiency markets development, buildings' energy regulations and minimum standards for appliances and lighting.

However, barriers to sustainable buildings remain, with a general lack of policy integration, scattered energy efficiency markets and gaps in local knowledge and capacities. Some countries in North Africa and the Mediterranean are starting to tackle financial aspects through innovative mechanisms involving the private sector, but here also numerous roadblocks need to be considered. Finally, and though the range of potential actions is wide, it is critical that measures are integrated into transparent and global approaches, informed by an in-depth knowledge of the local buildings and construction sectors, which is still to be improved in most countries.

[1] The terminology "South-MED" was used in the Mediterranean 2040 energy transition scenario report (see OME, ADEME, MED-ENER, 2016) and concerns the eight countries of focus of this note along with Israel, Palestine and Syria.
[2] As defined in OME, ADEME, MED-ENER (2016)
[3] Idem
[4] With support from the Coordinating Unit of the Mediterranean Action Plan (UNEP/MAP) acting as Secretariat of the Barcelona Convention and its Plan Bleu Regional Activity Centre (PB/RAC).

Introduction

1. Buildings and construction at the heart of climate change mitigation and adaptation

Buildings account for a third of the world's final energy use and half of its electricity consumption; their final energy consumption rose from 119 Exajoules (EJ) in 2010 to 125 EJ in 2016[5]. Excluding traditional biomass and considering the primary energy input for power generation, fossil fuels supplied over 80% of this consumption in 2015[6].

As a result, buildings represented almost 40% of global energy-related CO_2 emission when upstream power generation is included. The combined effects of population growth and rapid urban development (the world's built floor area grows by 2.3% per year on average[7]) could lead to a doubling or tripling of buildings' related GHG emissions by 2050[8]. Reaching the well-below 2°C target set in the Paris agreement would mean reducing on the average the global energy intensity (energy use per m²) of buildings by 30% by 2030[9].

In the meantime, rapid urban expansion in many emerging and developing countries tend to increase population's vulnerability to the impacts of climate change. Where investments cannot keep up with levels of urban growth, the ability of local and national authorities to provide basic services decreases. Limited adaptive capacities, in particular of small and medium cities, to deal with climate impacts[10] is also the result of structural factors, including urban planning and in some regions the sprawling of informal settlements, among other issues[11]. Sustainable buildings and construction initiatives need therefore to be integrated with adaptation strategies and sustainable development programmes; the sector is strongly linked to economic growth, employment levels, social development, as well as numerous environmental concerns such as solid waste generation and resources consumption.

2. The Talanoa Dialogue and the GlobalABC's roundtables

With the adoption of the Paris Agreement in 2015, it was agreed that a facilitative dialogue should take place in 2018, with the aim to "*take stock of the collective efforts of Parties in relation to progress towards the long-term goal*"[12] of the Agreement. Named under COP23's Fijian Presidency the Talanoa dialogue, this process started in January and will last until COP24, held in December 2018 in Katowice, Poland. An online platform[13] was launched to gather inputs submitted by both Parties and non-state actors involved in climate actions, around the following three topics:

Where are we? Where do we want to go? How do we get there?

This provides an opportunity for all stakeholders to consider how ambition levels can be raised in the short (pre-2020) and long term. It constitutes a forum for debates outside the traditional negotiations processes and within which countries and stakeholders can meet, exchange and take stock.

3. The GlobalABC and the regional roundtables

The GlobalABC pursues a vision of a zero-emission, efficient, and resilient buildings and construction sector, especially related to sustainable development goals 7, 11 and 13. GlobalABC's submission to the Talanoa Dialogue[14] highlights the network's activities to increase speed and scale of action (through global advocacy, catalysing action, leveraging finance and keeping progress under review).

[5] UN Environment, International Energy Agency (2017)
[6] Ibid
[7] Ibid
[8] IPCC (2014)
[9] UN Environment, International Energy Agency (2017)
[10] IPCC (2014)
[11] See ENERGIES 2050, CGLUA (2017)
[12] Talanoa dialogue website – see [online] https://talanoadialogue.com/background
[13] Talanoa dialogue website, see [online] https://talanoadialogue.com/presidencies-corner
[14] See [online] https://unfccc.int/documents/64962

To spur on the global transformation of the buildings and construction sectors, the GlobalABC developed a Global Roadmap structured around 9 objectives (see Part 3)[15].

This Global Roadmap will be regionalized over the coming years, with Latin America released in 2018, and Asia and Africa in 2019. Additional input is collected through Regional Roundtables. Aimed at national policy makers, these Regional Roundtables aim to better address regional priorities and challenges and facilitate peer-to-peer learning for climate action. The situation with regards to buildings and construction in North Africa and the Mediterranean is outlined in this document. This review is not meant to be comprehensive but aims to offer ground for debates.

4. The regional context: the euro-Mediterranean cooperation

The euro-Mediterranean basin benefits from a wide range of initiatives and actors relevant to sustainable buildings and construction. A Mediterranean Strategy for Sustainable Development (MSSD) was designed for the period 2016-2025 under the leadership of the Mediterranean Commission for Sustainable Development[16], structured around 6 objectives. Strategic direction 3.6 of the MSSD aims to *promote green buildings and reduce ecological footprint of the built environment* and include a set of actions related to buildings standards and retrofitting measures at national and the Mediterranean levels[17].

In addition, stakeholders' mobilisation at the regional level is enhanced by initiatives such as MedCOP Climat, the forum of States and non-State actors involved in climate actions in the Mediterranean. MedCOP Climat 2016 held in Tangiers brought together 3500 participants and led to the adoption of the Mediterranean's Agenda of Solutions, in which buildings and construction sectors are set to play a major role. Can also be mentioned here the Mediterranean Climate House led by the Tangier-Tetouan El Hoceima Region, which directly follows-up MedCOP Climat 2016 and intends to become a "climate hub on a Mediterranean-African scale"[18]. A number of specifically Mediterranean stakeholders can finally support sustainable buildings initiatives, among which the Mediterranean Experts on Climate and environmental Change (MedECC)[19], the Maghenov network (focusing on innovation in renewable energy and energy efficiency), MEDREG, the association of Mediterranean energy regulators, MED-ENER, the Mediterranean association of national energy agencies, etc.[20]

Part 1: Where are we - regional context

1. Framework conditions for buildings and construction

Socio-economic trends

All countries of North Africa and the Mediterranean (political events aside) experienced rapid economic and demographic growths in the last three decades (table below); as an illustration, the size of the region's three largest economies (Turkey, Egypt and Morocco) grew by factors 3.6 to 5.6 over the period. This leads to increased pressures on natural resources and rapid urban developments, in particular on coastal areas. Close to 65% of the region's population live in the coastal hydrological basins[21], and since 1950 some cities grew by factors up to 10[22].

[15] UN Environment, GlobalABC (2016)
[16] With support from the Coordinating Unit of the Mediterranean Action Plan (UNEP/MAP) acting as Secretariat of the Barcelona Convention and its Plan Bleu Regional Activity Centre (PB/RAC).
[17] UNEP/MAP (2016)
[18] See for more ENERGIES 2050, FEMISE, IM (2018)
[19] See [online] http://www.medecc.org/
[20] For more, see ENERGIES 2050, FEMISE, IM (2018)
[21] UNEP, MAP (2016)
[22] Ibid

Figure 1: Selected socio-economic indicators per country[23]

	GDP (current USD – Billions)			Population (millions)			Density (persons/m²)			Urban pop. growth (annual %)
	1990	*2017*	*Evo. (%)*	*1990*	*2017*	*Evo. (%)*	*1990*	*2017*	*Evo. (%)*	*2017*
Algeria	62	170.3	174	25.9	41.3	59	10.9	17.3	59	2.6
Egypt	43.1	235.4	446	57.4	97.5	70	57.7	98	70	1.9
Jordan	4.16	40.07	863	3.56	9.70	172	40.4	109.3	171	2.8
Lebanon	2.84	51.84	1725	2.70	6.08	125	264.2	594.6	125	1.4
Libya	28.9	50.98	76	4.44	6.37	43	2.5	3.6	44	1.6
Morocco	30.2	109.1	261	24.9	35.7	43	55.7	80.1	44	2.2
Tunisia	12.29	40.26	228	8.23	11.5	40	53	74.2	40	1.6
Turkey	150.7	851	465	53.9	80.8	50	70.1	104.9	50	2.2

Regional aspects regarding climate change

North Africa and the Mediterranean's contribution to global GHG emissions remains relatively moderate; it represented only around 1% of reported global emissions in 2015, compared to 7% for Europe's Mediterranean countries[24]. This is despite a notable growth in recent years.

Between 2000 and 2013, primary energy demand grew at a rate of 3.5% per year on average in the region[25] and, since 1990, GHG emissions have more than doubled in countries such as Turkey (411 MtCO2e in 2015, +123.7%) and Morocco (100.5 MtCO2e in 2012, +152.1%)[26]. The following table summarises trends for energy use, CO_2 emissions and electric power consumption per capita.

Figure 2: Greenhouse gas emissions and energy consumption indicators[27]

	Energy use (kg of oil equivalent per capita)			CO2 emissions (metric tons per capita)			Electric power consumption (kWh per capita)		
	1990	*2017*	*Evo. (%)*	*1990*	*2017*	*Evo. (%)*	*1990*	*2017*	*Evo. (%)*
Algeria	856.2	1321	54	3	3.72	24	528.4	1356	157
Egypt	562	815	45	1.32	2.20	67	663	1658	150
Jordan	920	929	1	2.92	3	3	935	1888	102
Lebanon	723	1337	85	3.04	4.3	41	518	2893	458
Libya	2517	2880	14	8.29	9.19	11	1577	1857	18
Morocco	306	553	81	0.95	1.74	83	358	901	152
Tunisia	601	944	57	1.61	2.59	61	632	1444	128
Turkey	978	1657	69	2.71	4.49	66	930	2855	207

In matters of adaptation, the Mediterranean basin was identified as one of the world's 25 hotspots to climate change, with vulnerabilities especially in the North Africa and the Mediterranean region due to stronger climate perturbations and limited adaptation capacities[28]. Depending on emissions scenarios, the IPCC estimates that "by 2100, average temperatures could increase by up to 7.5°C and mean precipitations could decrease by up to 60%. With regard to sea levels, an average raise of 0.4 to 0.5m is projected for most of the Mediterranean"[29].

[23] Data worldbank, see [online] https://data.worldbank.org/country - note that growths of population and density in Jordan and Lebanon and to a lesser extent Turkey in recent years are also related to displaced persons from Syria
[24] Based on ENERGIES 2050, FEMISE, IM (2015) – data UNFCCC
[25] ENERGIES 2050, FEMISE, IM (2018)
[26] Data UNFCCC analysed in ENERGIES 2050, FEMISE, IM (2018)
[27] Data worldbank, see [online] https://data.worldbank.org/country
[28] IPCC (2014)
[29] Source IPCC cited in UNEP/MAP (2016).

2. Key facts and figures of buildings and construction

Emissions and energy

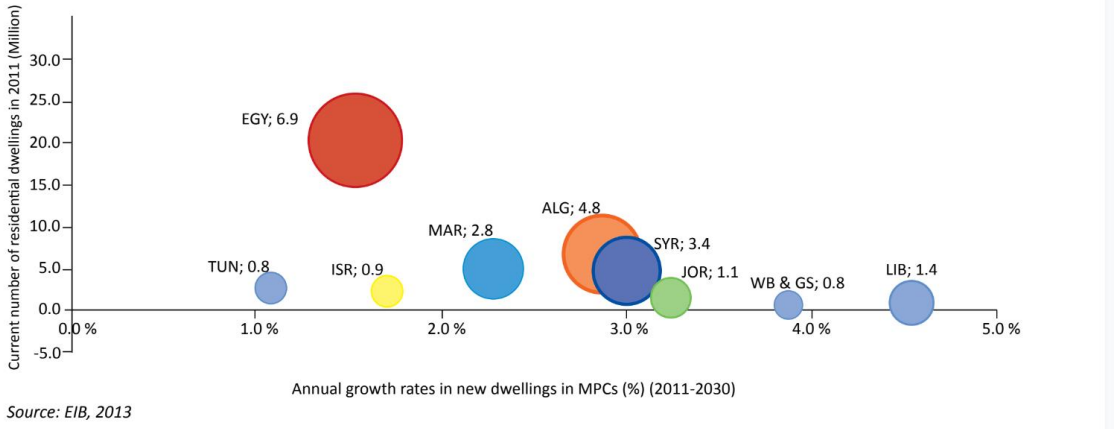
Energy-carbon intensity of the building sector is very high (over 150 tonnes CO2 per Tera Joule of energy consumed) in Libya and Lebanon and high (100 to 150 tCO2/TJ) in the other countries, apart from Algeria and Turkey (50 to 100 tCO2/TJ)[30]. The residential sector could account for a quarter or more of existing annual energy efficiency potential in Algeria (23.1%), Egypt (25.9%), Jordan (28.9%), Lebanon (31%) and Morocco (31.7%)[31].

A report from the Mediterranean Energy Observatory (OME), ADEME and MED-ENER indicated that final energy consumption of South-MED countries[32] rose from 113 Mtoe in 1990 to 248 Mtoe in 2013, and could reach 606 Mtoe (equivalent to 1908Mt CO_2) by 2040 under a conservative scenario[33]. In this scenario, over 20% of the energy consumption would come from buildings, with 50 million additional dwellings foreseen by 2040[34]. Under this report's energy transition scenario, South-MED's final energy consumption could be reduced to 430 Mtoe by 2040. This would require up to 40% of energy savings in new buildings and 10 to 15% in the existing building stock through refurbishments. Additional gains would be achieved with more efficient equipment and renewable energy development[35].

Overview of buildings typology and stocks in North Africa and the Mediterranean

Detailed statistics and data on building stocks are generally lacking for most countries of the North Africa and the Mediterranean region, but some global characteristics can be drawn. Several studies tend to show that the residential sector accounts for the majority of buildings in the region[36]. As a matter of fact, by 2030, the number of dwellings is set to raise significantly in all countries.

Figure 3: Evolution of residential housing numbers from 2011 to 2030[37]



Source: EIB, 2013

Domestic buildings are very heterogeneous, and include informal settlements, traditional housing based on vernacular architecture and the use of local/traditional materials, social and affordable housing, as well as modern-types housing, apartments and flats. As an example, "Modern" housing represented 65% of the housing stock in Morocco in 2014, above apartments at 17.5%[38]. However popular, these types of dwellings are not always adapted to local conditions and can be as a result very energy intensive, especially when embedded energy is taken into account.

[30] UN Environment, International Energy Agency (2017), figure 10
[31] World Bank Group (2016), data RCREEE
[32] The terminology "South-MED" was used in the Mediterranean 2040 energy transition scenario (see OME, ADEME, MED-ENER, 2016) and concerns the eight countries of this note along with Israel, Palestine and Syria.
[33] See more on what this scenario and the energy transition scenario imply in OME, ADEME, MED-ENER (2016)
[34] OME, ADEME, MED-ENER (2016)
[35] Ibid
[36] See for example OME, ADEME, MED-ENER (2016), MED-ENEC (2015), etc.
[37] Source European Investment Bank, in MED-ENEC (2015)
[38] SEED (2018)

Informal housing are often characterised by a lack of basic services, hazardous locations and heightened poverty levels[39]. Informal urban housing population was estimated at over 7.9 million in Turkey, 6.8 million in Egypt, over 3 million in Morocco and 2 million in Lebanon where more than 50% of the urban population reside in such dwellings[40].
Whereas traditional construction is mostly found in rural and suburban areas, promoting vernacular architecture and local materials could still support sustainable buildings policies, as these are often cost effective, enhance local skills and knowledge and can be well-suited to local climate, offering comfort at lower energy-costs.

Box 1: Source of energy use in the residential sector
According to a study led on a set of Mediterranean countries, less than 5% of Households' energy consumption in Morocco was dedicated to heating purposes in 2010, 20% in Tunisia, above 30% in Algeria, and close to 50% in Lebanon (against 70% in France for example). Electrical appliances and air-conditioning have a growing impact in these 4 countries: the share of households using air-conditioning rose between 2000 and 2010 from 16% to 50% in Lebanon, close to null to around 15% in Morocco and Tunisia and from 8% to again around 15% in Algeria. The use of electricity from the residential sector increased sharply as a result[41].

Tertiary (offices, hotels, hospitals etc.) and public buildings are usually built with more modern norms, standards and materials. The latter can result in costly material imports (with high embedded emissions and energy) and in infrastructures poorly adapted to local conditions, such that comfort is maintained through energy-high air-conditioning / heating systems. Commercial and industrial buildings accounted for around 15% of the new ground surfaces construction authorised in Morocco in 2014[42], and in many countries their demand spurs economic growth.

National energy efficiency policies

Energy efficiency policies were adopted in most countries of North Africa and the Mediterranean.
In Turkey for example[43], these are based on the legal framework of the Energy Efficiency Law No. 5627 of 2007 and on several by-laws or regulations. The national energy efficiency strategy sets as targets for 2023 a 10% reduction of the energy intensity and energy losses in the Industry and services; a decrease in buildings' energy demand and greenhouse gas emissions, with at least a quarter of 2010's building stock converted into sustainable buildings; and a decrease of annual energy consumption in public buildings and facilities of up to 20% by 2023.
Morocco adopted a national energy strategy which aims to reduce energy consumption in buildings, industry and transports by 12% by 2020 and 15% by 2030 (compared to a BAU scenario); Buildings would account for 29% of these savings (19% for residential and 10% for tertiary)[44].
In Tunisia, the national strategy for energy conservation was adopted in 2014 and aims to reduce the country's primary energy demand by 17% by 2020 and 34% by 2030 compared to a BAU scenario; Here, buildings would account for 26% of these savings[45].
In its National programme to develop renewable energy and energy efficiency[46], **Algeria** pledged to reach over 60 million tonnes of oil equivalent (Mtoe) of energy savings by 2030, including 30 Mtoe in buildings. Among other measures are foreseen the thermal insulation of buildings (7Mtoe of savings expected) and an extended use of low energy light bulbs (20Mtoe).

[39] UN-HABITAT (2011c)
[40] Data - Urban data from UN Habitat
[41] MEDENER (2013)
[42] SEED (2018)
[43] IEA (2016)
[44] See [online] http://www4.unfccc.int/ndcregistry/PublishedDocuments/Morocco%20First/Morocco%20First%20NDC.pdf
[45] See [online] http://maghrenov.eu/file/download/2878/Strategie+Nationale+de
[46] See [online]
http://www.energy.gov.dz/francais/uploads/2016/Projets_du_Secteur/Programme_EnR_2016/Plaquette_PNEREE_2016_Fr.pdf

Jordan[47], in its national green growth plan and in its NDC, pledged to improve the country's energy efficiency by 20% by 2020, with actions in public buildings and the residential sector, including through support to the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).
In its NDC also, **Egypt** enhances the need for energy efficiency improvements in all sectors including in the residential and commercial, but without mentioning clear targets[48]. Recent information was not available for **Libya**.

Box 2: Green buildings certifications in North Africa and the Mediterranean

Several buildings in North Africa and the Mediterranean are already certified "green" under various programmes. The LEED, Leadership in Energy and Environmental Design, which "*provides a framework to create healthy, highly efficient and cost-saving green buildings*"[49], was for example awarded to the *Marché Covert Bab-Ezzouar* in Algiers, the *BIG Factory Tunisia* near Tunis and to a range of buildings in Jordan including the *Dutch embassy*, the *Middle East Insurance building* or the *ABS Randa Kawar IB College*, all located in Amman[50]. In Lebanon, the BREEAM, the Building Research Establishment Environmental Assessment Method, was awarded to buildings such as the *LWFC Retail & Gym* (tertiary) and the *Promenade residences 1 and 4* (residential), both located in Dbayyeh[51]. BREEAM is a *third-party certification of the assessment of an asset's environmental, social and economic sustainability performance*[52]. The Energy Star is another certification which focuses specifically on energy aspects. In 2010, the *Colgate-Palmolive* in Casablanca was for example awarded the Energy Star Challenge for Industry for successfully reducing its energy consumption by 17.8%. The certification HQE™ (Haute qualité environnementale - High Environmental Quality) can finally be mentioned. Several HQE™ projects are found in Morocco (e.g. *International University of Rabat, Touristic station of Taghazaout Bay*, etc.), Algeria (*Novotel Alger Airport, Société Générale's new headquarters*) and Tunisia (*Lake Tower 1, Residence Jardin du Lac*)[53].

3. Policy instruments/frameworks/plans in place

The international context: NDCs, SDGs and the new urban agenda (Habitat III)

Policies for sustainable buildings and construction are framed at the international level by several major Agendas, including in particular the implementation of the Paris agreement on climate change. As a matter of fact, building policies are directly mentioned in several NDCs of the North Africa and the Mediterranean region[54]. Turkey aims for a *Buildings and urban transformation*, with actions related to compliance of new constructions with national Energy Performance of Buildings Regulations, the creation of energy performance certificates and the dissemination of green buildings, among other priorities. The building sector is also explicitly mentioned in Tunisia's NDC as part of the energy efficiency and renewable energy strategy, in Algeria where thermal insulation of buildings is part of the main actions to be implemented in the energy sector, and in Egypt which emphasises the need to improve energy efficiency and develop the use of solar water heating in residential and commercial buildings. Detailed targets are also given for both the residential and service sectors in Morocco[55].

Besides, the year 2015 was marked by the adoption of the Sustainable Development Goals (SDG) Programme for the period 2015-2030, consisting of 17 broad objectives associated with 169 targets. Of relevance to sustainable buildings and construction are SDG7 related to affordable and clean

[47] See [online] http://www.greengrowthknowledge.org/project/gggi-jordan-national-green-growth-plan
[48] See [online] http://www4.unfccc.int/ndcregistry/PublishedDocuments/Egypt%20First/Egyptian%20INDC.pdf
[49] See [online] https://new.usgbc.org/leed
[50] See [online] www.gbig.org/search/advanced?search%5Bflat_rating_program_ids%5D=Certification&search%5Bplace_ids%5D=659
[51] See [online] http://www.gbig.org/buildings/1361094
[52] See [online] https://www.breeam.com/
[53] See [online] https://www.behqe.com/fr/hqe-dans-le-monde/liste-des-projets
[54] See [online] http://www4.unfccc.int/Submissions/INDC/Submission%20Pages/submissions.aspx
[55] See [online] http://www4.unfccc.int/Submissions/INDC/Submission%20Pages/submissions.aspx

energy, SDG11 related to sustainable cities and communities and SDG13 related to climate action. Finally, a new urban agenda was adopted in 2016, in Quito, Ecuador, at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III). This Agenda is set around several key priorities including urban prosperity and environmental sustainability[56].

National frameworks

A sample of measures taken to promote energy efficiency is provided in the table below.

Figure 4: Recent energy efficiency policies related to buildings[57]

Country	Energy efficiency regulations	
Algeria	*Buildings*	Voluntary thermal regulations for new buildings
	Appliances	Minimum energy performance standards for refrigerators and air conditioners
	Lighting	Mandatory energy labelling of EE light bulbs for residential use
	Industrial	Mandatory energy audits for industrial buildings with consumption > 2,000 toe/year
Egypt	*Buildings*	Mandatory EE code for residential and commercial buildings
	Appliances	Minimum energy performance standards for refrigerators, air conditioners, and washing machines
Jordan	*Buildings*	Mandatory thermal insulation code, mandatory energy conservation building code, mandatory solar energy building code
	Appliances	Minimum energy performance standards for refrigerators, air conditioners, and washing machines
	Lighting	Technical regulations for lighting products - minimum EE classification requirements
	Industry	Mandatory and periodic energy audits for facilities whose annual energy consumption exceeds 50 toe per year
Lebanon	*Industry*	Draft energy conservation law requires mandatory energy audits for establishments whose annual energy consumption exceeds 400 toe
Morocco	*Buildings*	Mandatory regulation for construction in Morocco.
	Lighting	Mandatory energy labelling of households' electric lamps
	Industry	Law No 47-09 - energy-intensive industries to undergo mandatory energy audits – the application of this law is pending
Tunisia	*Buildings*	Mandatory EE specifications for administrative buildings (2008). Mandatory EE specifications for residential buildings (2009). Voluntary minimum EE performance specifications for hospitals and hotels
	Lighting	Sale of incandescent light bulbs with power superior or equal to 100 watt and voltage superior or equal to 100 volts is banned
	Appliances	Minimum energy performance standards for refrigerators and air conditioners
	Industry	Mandatory audits for industrial establishments with consumption > 800 toe/y. Mandatory prior consultation with ANME for new industrial projects whose total projected energy consumption > 800 toe + for new construction projects for residential and services sectors whose projected energy consumption > 200 toe
Turkey	*Buildings*[58]	Aligned with European's Energy Performance in Buildings Directive. Adoption of Building Energy Performance regulation, mandatory for all new buildings except industry, buildings with a total useful floor area of less than 50m², etc. Building regulations for existing residential and commercial buildings.
	Lighting and appliances	Energy labels for household appliances and lighting
	Industry[59]	EE law number 5627 – Support scheme for energy efficiency in Industry (voluntary)
Libya	No recent information available	

[56] See [online] http://habitat3.org/wp-content/uploads/Draft-Outcome-Document-of-Habitat-III-E_29556.pdf
[57] World Bank Group (2016)
[58] See [online] http://www.gbpn.org/sites/default/files/Turkey_Country%20Summary_0.pdf
[59] See [online] https://www.iea.org/policiesandmeasures/energyefficiency/?country=Turkey

Part 2: Energy efficiency improvements: challenges and opportunities

1. *Main challenges and barriers to sustainable buildings and construction*

By nature, the building sector is very transversal and involve a wide range of actors (see figure 5), from owners and users to managers, local and national authorities, construction and energy service companies, etc. The variety of buildings' types, each requiring specific measures, adds-up to this complexity.

Reaching targets is therefore difficult without coordination mechanisms and a holistic approach to buildings' issues including technical, legal, and awareness aspects. These are still lacking in most countries of North Africa and the Mediterranean.

Other barriers include market, financial, technical, awareness and institutional issues (see figure below). Financial aspects, emphasised in the following part, are a key driver, especially in a context of rapid urban and economic development.

Figure 5: Stakeholders involved in buildings governance[60]

The need for capacity building at all levels and for all stakeholders (builders, architects, urban planners, etc.) must also be stressed. Training institutions of all kinds (e.g. Universities, CITET in Tunis, etc.) are already getting involved in this field, a trend which needs to be accelerated.

Figure 6: Barriers to energy efficiency[61]

Market	Financial	Technical	Awareness	Institutional
•Price distorsions devaluing EE investments •Split incentives among stakeholders •High transaction costs, low energy prices •Disperse and diffuse market structures •Externalities of fossil fuels not priced	•High upfront costs and lack of budget •Perception of risks and financial returns •Lack of external finance •Small projects non suitable for financing without external incentives •Constrained internal capital and operational budgets	•Lack of local capacities •Lack of technologies and knowledge suitable to local conditions •Lack of firms able to aggregate projects, which penalise EE cost-effectiveness •Lack of trust in energy savings projects' performance	•Lack of understanding •Lack of info on energy efficiency in buildings •Lack of benchmarks to assess performance •Energy information not accessible to end users •Perception that EE measures lead to more expensive buildings	•Limited capacities of local governments •Limited transversal coordination •Low attention to demand-side measures •Limited use of private public partnerships •No financial incentives for energy providers to promote EE

2. *Financing energy efficiency: a critical issue*

Financing issues are among the most critical obstacles to the promotion of energy efficient and sustainable buildings. According to a study led for the Middle East and North Africa (MENA) region, 91 billion€ would be needed if all targets set under national energy efficiency action plans are to be reached, with most savings and investments occurring in Algeria and Egypt[62]. Several sources of

[60] WRI (2016)
[61] Adapted from WRI (2016)
[62] MED-ENEC (2015)

funding can be mobilised to this purpose: international (climate and development funds, bilateral and multilateral donors, etc.) public (investment subsidies, fiscal incentives, energy efficiency Funds, concessional loans, lines of credit, revolving funds, risk mitigation products) but also private (ESCO, utilities and customer financing)[63].

For now, energy efficiency programmes in North Africa and the Mediterranean are still mostly financed through governments and international donor agencies, the private sector playing a limited role. The table below gives examples of financing mechanisms already implemented.

Figure 7: Examples of financing mechanisms at country level[64]

Country	Fund	Source of funding	Activity (selection)
Algeria	National Fund for Energy Management Annual capital of 57 million €	Tax on natural gas, initial government contribution €1.15M and continuous budgetary support	
Egypt	Support via Industrial Modernisation centre	Government budget	Credit Guarantee programme ; equipment grant scheme
Jordan	Jordanian Renewable Energy and EE Fund	Annual budget allocation with initial donor support	Interest rate subsidies; guarantee facility
Lebanon	National Energy Efficiency and Renewable Energy Action	Government, European Investment Bank	
Morocco	Energy Development Fund – Capital 1 billion USD	Government, Hassan II fund (20%), UAE and Saudi Arabia (80%)	Credit guarantee fund; Interest rate subsidies
Tunisia	Energy Transition Fund	Government and donor	Grants for energy audits, investments in EE and RES and substitution to natural gas
Turkey[65]	Turkish Residential Energy Efficiency Facility	270 million USD loans from EBRD Clean Technology Fund	Framework operation for financing Energy Efficiency investments at a residential level, through Participating Financial Institutions
Libya	No recent information		

At the international level, climate finance – through the Green Climate Fund (GCF), the Adaptation Fund, and the Global Environment Facility (GEF) - could play an important role[66]. Egypt's renewable energy financing framework for example is partly funded with a grant from GCF[67], whereas numbers of projects already received support from GEF in the region (43 in Algeria, 81 in Egypt, 43 in Lebanon, 86 in Morocco, 65 in Tunisia, 58 in Turkey and 19 in Libya). Some of them are directly targeting buildings, e.g. the project for EE codes in residential buildings in Morocco[68].

However, most recent climate related investments in North Africa and the Mediterranean came from three other institutions: the European Bank for Reconstruction and Development (who also support the development of national energy efficiency plans), the French Development Agency, and the European Investment Bank[69]. Numerous projects dedicated to renewable energy and urban developments in the region were supported by these organisations, with implications for buildings and construction but usually without a specific focus on this sector[70].

[63] World Bank Group (2016)
[64] Ibid
[65] See [online] https://www.tureeff.org/hakkimizda?lang=en
[66] See for more ENERGIES 2050, FEMISE, IM (2018) and MED-ENEC (2015)
[67] See for more [online]: https://www.greenclimate.fund/what-we-do/projects-programmes
[68] See for more [online]: https://www.thegef.org/topics/gefsgp
[69] See for more ENERGIES 2050, FEMISE, IM (2018)
[70] See [online] https://www.ebrd.com/work-with-us/project-finance/project-summary-documents.html ; https://www.afd.fr/fr/recherche?page=all&view=start and http://www.eib.org/en/projects/index.htm

Box 3: Mobilising private finance – the case for EPCs and other mechanisms

To enhance funding from the private sector, innovative mechanisms can be promoted such as energy performance contracting (EPC). EPCs can be defined as a contractual agreement between a beneficiary and the supplier (usually an energy service company - ESCO) of an EE project, according to which investments for the project are made (by the beneficiary, the ESCO or a third part) and in which the level of energy savings is contractually defined (and can serve to repay the initial investments)[71]. EPC have significant advantages for large projects where it can unlock investments, give confidence to all parts, and engage stakeholders in a strategy of continuous improvements with close monitoring and shared benefits[72]. Several countries already include EPC development in their national strategies, such as Tunisia, Lebanon, Egypt and Morocco.

Aside from EPCs, other mechanisms can be used. In Lebanon for example, finance for energy efficiency was channelled through commercial banks using a system involving the Central Bank of Lebanon and the local authority for energy, who together developed a national fund. The objective was to use banks to stimulate investments through low costs funds in the form of subsidized interest rates, cash subsidies, loan guarantees for SMEs, building capacities programmes, etc.[73]

Beyond funds availability issues, other bottlenecks to financing EE are to be considered. They include, in particular, the lack of visibility of energy savings, which require a proper verification system, and the diverse and fragmented EE market which limit economies of scale. Are also often mentioned higher transaction costs than for renewable energy, the lack of holistic approaches by governments, the reluctance of commercial banks to fund EE projects often due to a lack of technical knowledge, the long payback periods, the split incentives between developers, owners and tenants, the lack of awareness and technical understanding from stakeholders, and the lack of guarantees on savings.[74]

Part 3: Suggestions for priorities regarding effective measures for a zero-emission, efficient, and resilient buildings and construction sector

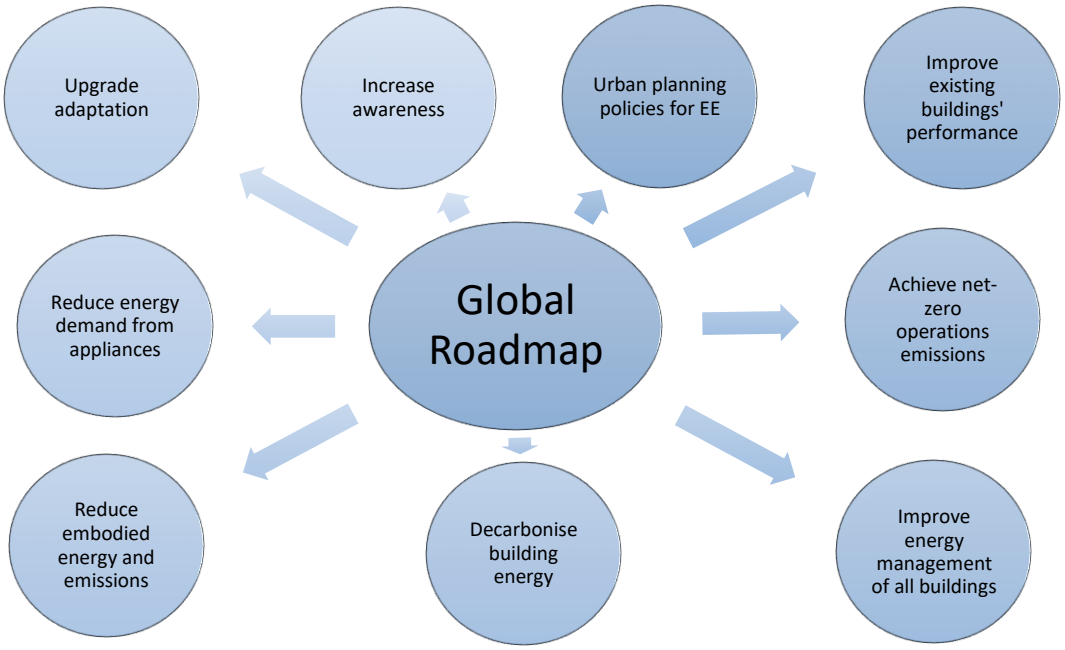
With regards to the situation in North Africa and the Mediterranean, actions could be taken to:

- Improve knowledge of national building stocks, based on relevant statistics and data;
- Extend and apply buildings' energy efficiency regulations in all countries;
- Coordinate efforts under the frame of NDCs implementation, and in synergies with international and Mediterranean initiatives;
- Mobilise finance at all levels, and enhance market mechanisms to increase investments from the private sector, e.g. through EPCs and other specific market incentives;
- Raise awareness and build capacities through locally-adapted programmes;
- Build-on existing best practices in the region to enhance further progresses.

Design of policies can be framed around the 9 objectives identified in GlobalABC's Global Roadmap to move towards energy-efficient, zero GHG emission and resilient buildings[75].

[71] See [online] http://www.planbatimentdurable.fr/le-contrat-de-performance-energetique-r136.html
[72] To learn more on EPC see [online] http://www.trustepc.eu/en
[73] MED-ENEC (2015)
[74] Ibid
[75] UN Environment, GlobalABC (2016)

Figure 8: Objectives of GlobalABC's Global Roadmap



Another study[76] from the world resources institute identified 8 categories of actions to promote sustainable buildings and construction: Codes and standards; Setting targets; Information and certifications; Incentives and finance; Government leadership by example; Engaging owners, managers and occupants; Engaging technical and financial service providers; and Working with utilities. All these categories and objectives are relevant to North Africa and the Mediterranean and can be linked to a wide panel of specific activities: trade-offs need then to be done according to local priorities.

Beyond singular actions, policies related to sustainable buildings and construction must be addressed using a systemic approach, with coordination mechanisms between international, regional, national and local policies, and be based on a clear understanding of the state and trends of the building stocks. Results of these policies need to be measurable, reportable and verifiable to attract private, national and international funding, with transparent performance criteria and benchmarks. Setting up flexible methodologies that stakeholders can adapt at the local level is equally crucial. These methodologies must emphasise a life cycle and systemic approach that also addresses adaptation and informality issues. Sustainable buildings and constructions will finally only make sense if they are part of wider urban planning policies and based on a participative approach involving all relevant stakeholders.

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[76] WRI (2016)

About the author: ENERGIES 2050

ENERGIES 2050 is a French non-governmental and non-profit organization which gathers members and partners from more than sixty nationalities working on Climate change, Sustainable development and committed to the Great Transition, including the ecologic and energy transition, sustainable cities and territories and the shift towards a more humane, plural and united society, bringing peace and respecting the common goods of humanity. ENERGIES 2050 implements projects in more than forty countries and is a recognised player in climate change negotiations and in preparing and setting up national and international low carbon strategies and action programmes.

Sustainable buildings and construction are at the core of ENERGIES 2050's activities. Member of the GlobalABC, the association is involved in several key global initiatives and has cofounded with the Institut de la Francophonie pour le Développement Durable (IFDD), subsidiary body of the International Organization of La Francophonie, the *Francophonie's Initiative for Sustainable Cities*. ENERGIES 2050 is also a member of the Multi-stakeholder Advisory Committee (MAC) of the Sustainable Buildings and Construction Program (UN's One Planet network), and implements several European projects related to energy efficiency in buildings under programmes such as Horizon 2020, Intelligent Energy Europe, Erasmus Plus, etc. ENERGIES 2050 also authored key publications on the subject and intervene in several institutions and universities in France and abroad. In partnership with IFDD and the African School of Architects and Urban professions (EAMAU – Ecole Africaine des Métiers de l'Architecture et de l'Urbanisme), and with the support of several other institutional partners, the NGO has also created and implemented a regional training programme for African professionals in the built environment (the 6th edition was held in July 2018 in Lomé). **www.energies2050.org**

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