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meetMED

Mitigation Enabling Energy Transition in the MEDiterranean region

The Study of the Potential of District Cooling in the Region

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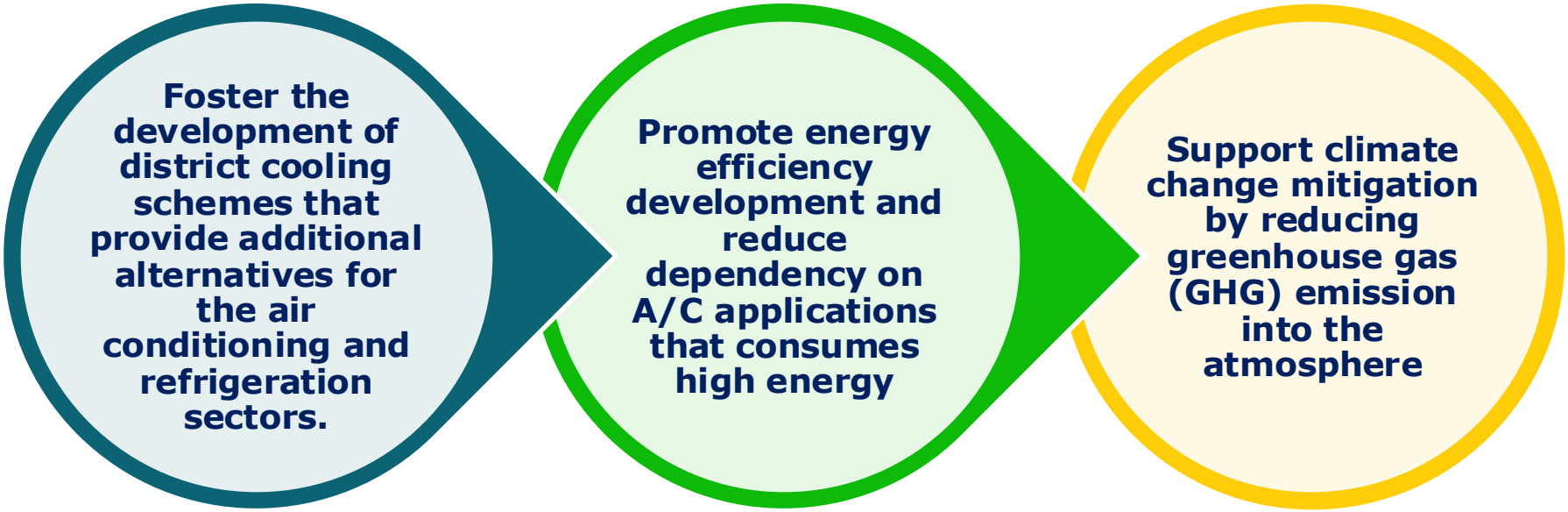
MED ENER

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

Activity: 3.1.7. Study on the potential of District Cooling in the South Mediterranean Countries

Objective



List of specific stakeholders to be involved:

Targeted Countries:

- Algeria
- Egypt
- Jordan
- Lebanon
- Libya
- Morocco
- Palestine
- Tunisia.

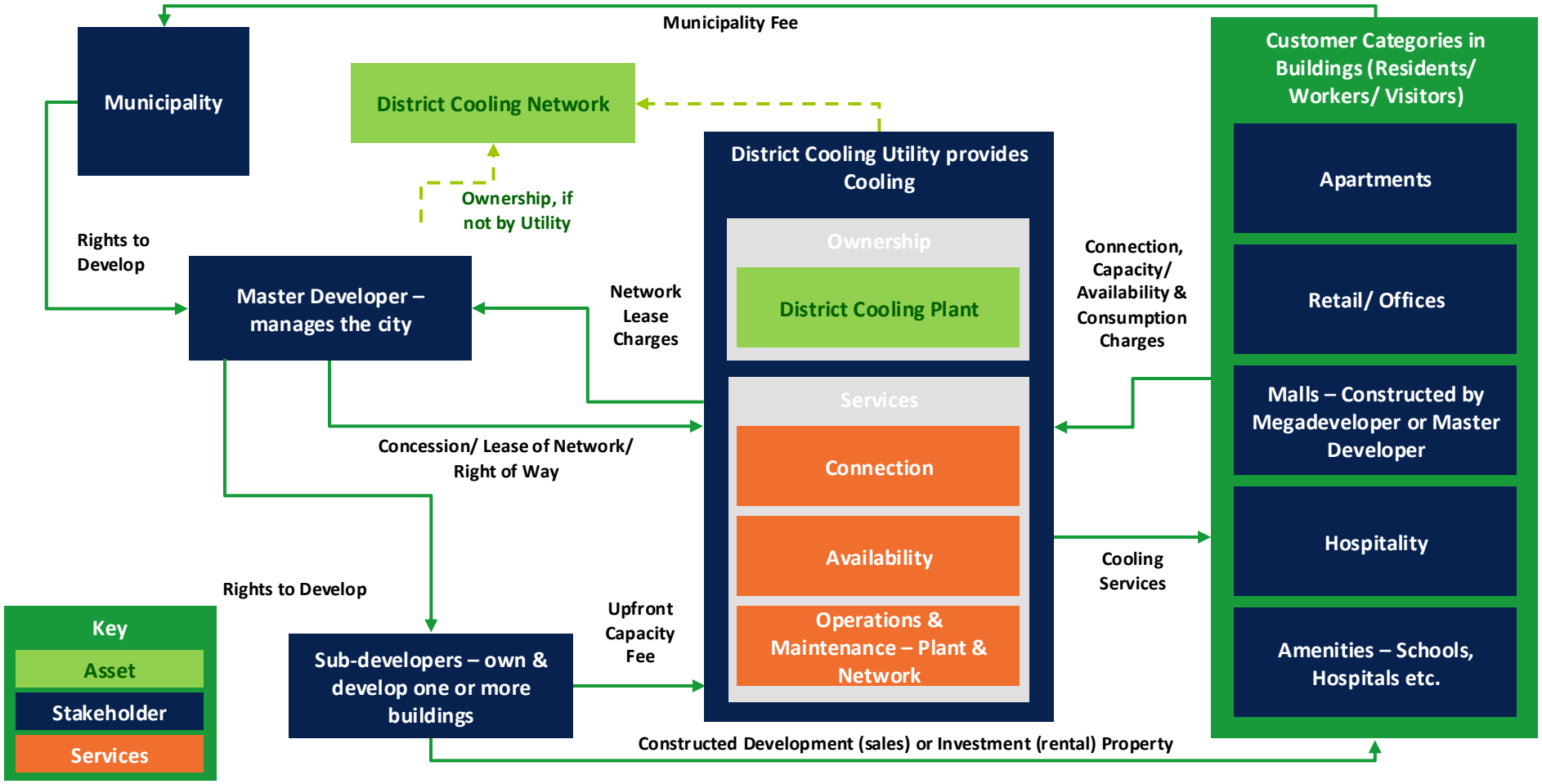
meetM Phase II

District Cooling Potential ?

District energy currently supplies a relatively small share of heating and cooling demand in the buildings sector, at around 6% of global consumption, with fossil fuels acting as the primary fuel source in most countries today.

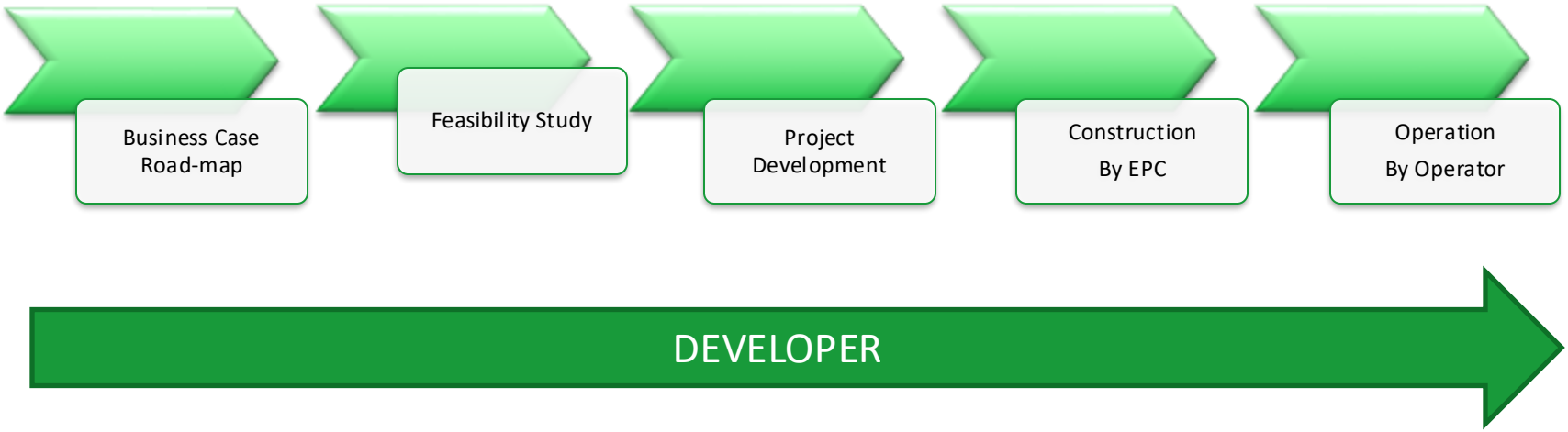
District cooling networks are primarily used to supply space cooling to commercial buildings in Europe, some countries in the Middle East, as well as some emerging markets.

Stakeholders' Relation Map



BUSINESS MODELS OVERVIEW EXAMPLES

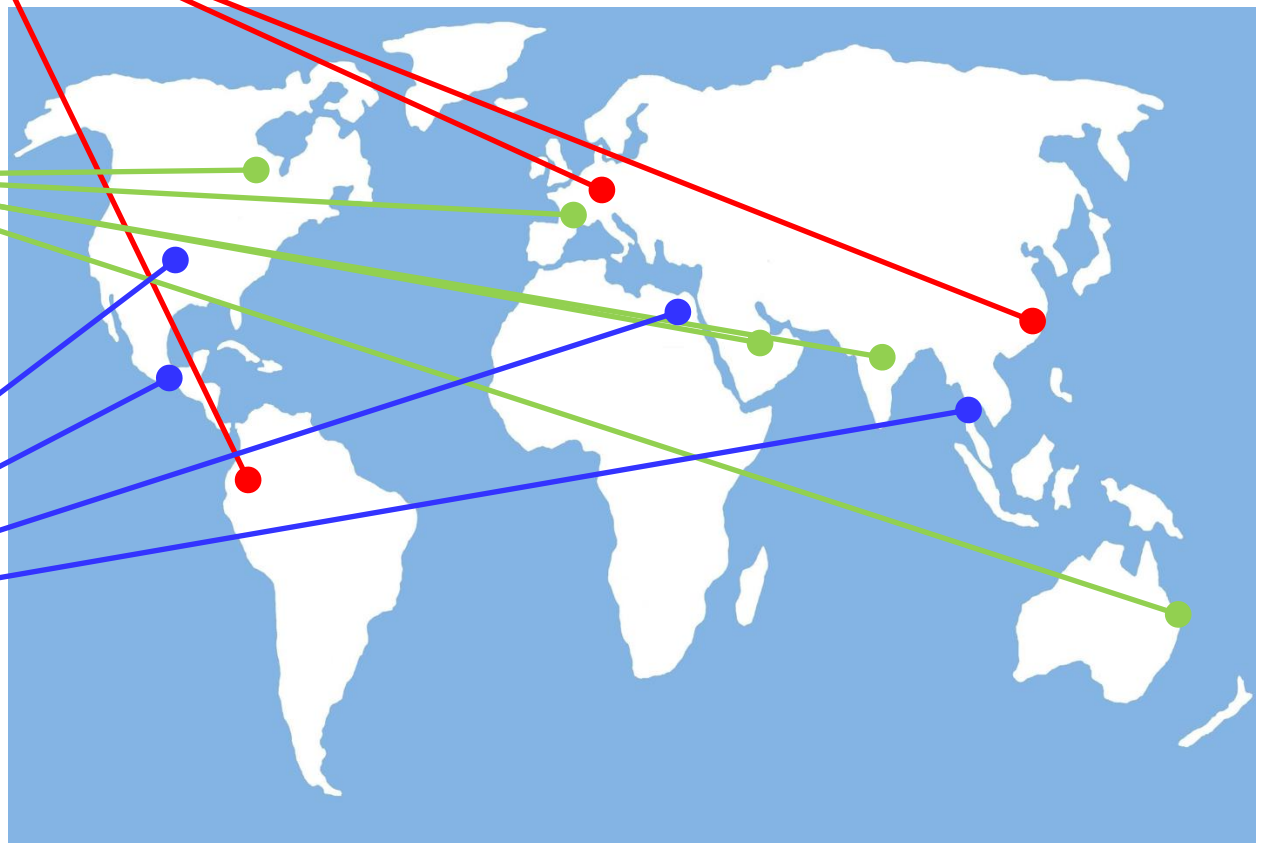
NON-CONCESSION STRUCTURES



CONCESSION STRUCTURES

BUSINESS MODELS OVERVIEW EXAMPLES

- Municipality owned and operated
  - Europe
  - China
  - Columbia
- Concession business model
  - Middle East (KSA/UAE/Oman/Kuwait)
  - France
  - India
  - Australia
  - New Zeeland
  - Canada
- JV/Public/Private
  - US
  - Malaysia
  - Thailand
  - Egypt
  - Mexico



In general countries with long history from thermal energy business trend to have municipality owned and operated systems .

Contractual Forms:

Operations and leasing models

- Traditional sequential model
- Design Build (DB)

Turnkey models

- Engineer Procure Construct (EPC)
- Build Operate Transfer (BOT)

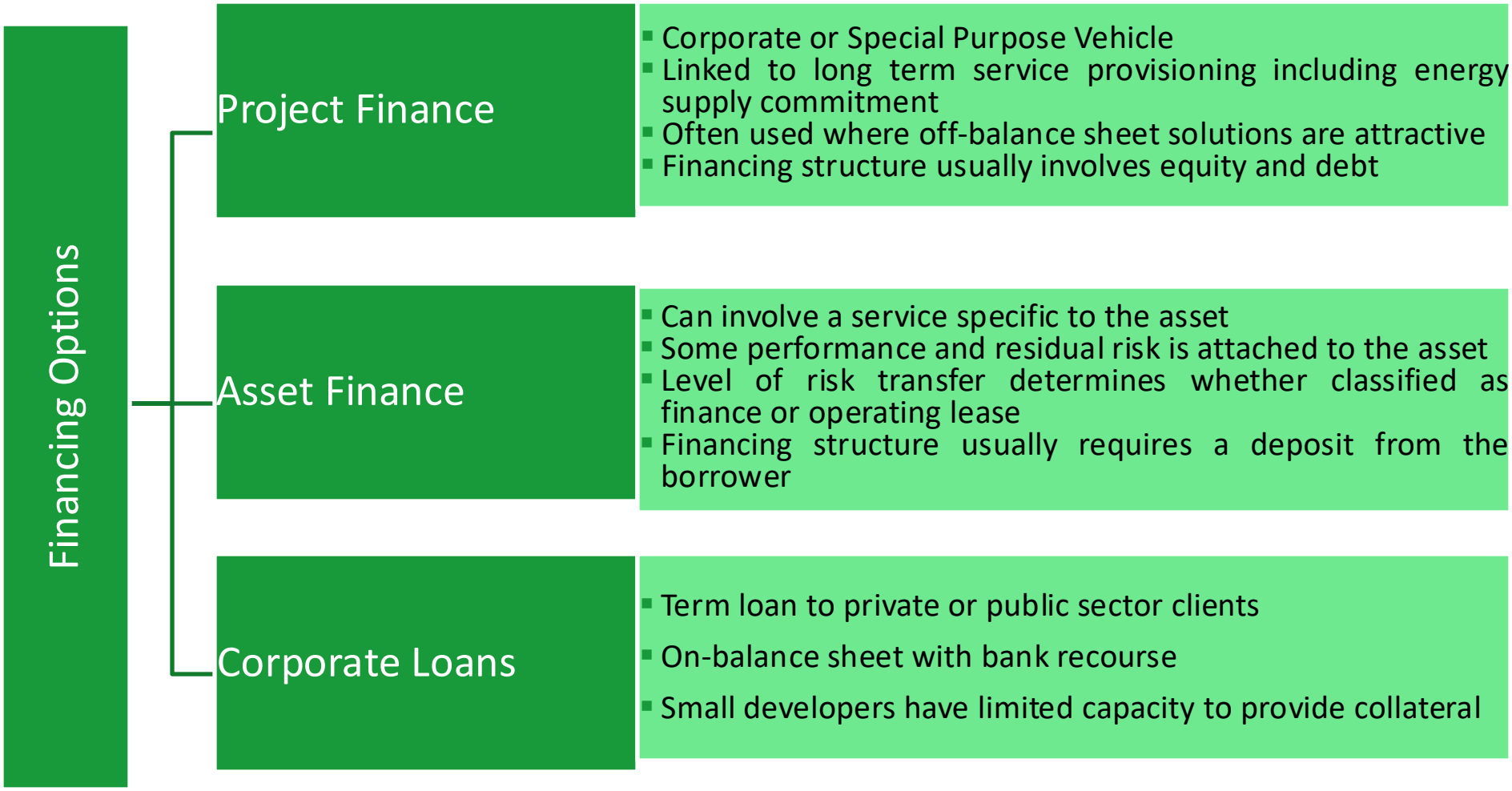
Construction Rehabilitation

- Build Own Operate (BOO)
- Build Own Operate Transfer (BOOT)
- Design Build Operate (DBO)
- Design Build Operate Maintain (DBOM)
- Design Build Finance Operate (DBFO)

Contract Model Options

	Main Features	Application example	Key drivers
EPC or similar contracting	Contract with third party to design and built Facility is financed and owned by developer/city	Suited for projects with small operating requirements Suited if developer/city wishes to retain operating responsibility	Transfer of design and construction risk
Built Operate Transfer models	Contract with third party contractor to design, build and operate City/developer facility for defined period and hand back to City /developer The facility is financed by City /developer and remains in City/developer ownership throughout the contract	Suitable for projects with significant operating content Common for water and waste water projects	Transfer of operating risk in addition of design and construction risk
Design, Build, Finance, Operate models	Contract with third party to design, built, operate and finance the facility for defined period after which facility reverts to city/developer The facility is owned by third party for the contract period and recovers cost from City /developer	Suitable for projects with significant operating content Common for water, roads and waste water projects	Utilization of private financing and transfer of design, construction and operating risks
Concession type contracts	As for DBFO except third party recover costs from user charges	Suitable to projects that provide an opportunity for user charging Particular for water, waste and district energy projects	Utilization of private financing and transfer design, construction and operating risks. Potential to partially mitigate end user risk

Financing Options



Morocco

Sustainable Energy Laws

The Energy Efficiency Strategy for 2030 have been presented to the Council of Ministers, targeting a broad range of measures in the key energy-end use sectors in line with a more ambitious 2030 target of 20%. The strategy builds on an action plan, which is being consolidated with all the stakeholders and the large number of private sector initiatives. The new Energy Efficiency Agency (AMEE) oversees the implementation of the action plan across industry, transport and buildings.

Regulatory Analysis

In 2020, Morocco paid great efforts to the energy efficiency in appliances and in building through focusing on the Minimum Energy Performance of appliances and equipment **running on electricity, natural gas or liquid or gaseous petroleum products, this promulgation was scheduled for April 2020 should prohibit the marketing of Lower Energy Efficiency Classes from C class. (Article 2 of Law 47-09).**

On the other hand, the brands and the local manufacturer have already anticipated the promulgation of the decree relating to the energy efficiency of this equipment, which affect positively to the market where more than 80% of the products currently offered on the market are of an energy efficiency class higher than A.

Regulatory Analysis

- Morocco launched its **National Plan against climate change** in 2009, this plan presents the mitigation and adaptation actions taken to combat climate change.
- It **consolidates** mitigation measures align with the 2008 National Energy Strategy which is mainly related to energy efficiency and the production of renewable energy. The plan comprises seven main areas covering the energy demand and supply, the transport, the industry, the waste management, the agriculture, the forestry, and the construction.
- Through this plan the environmental department focus on the energy efficiency improvement in **existing buildings and energy saving by 12% by 2020 and 15% by 2030**. This plan was revised in 2019 by the National Plan against Climate Change with a vision until 2030.

Potential for Cooling Activities

Following the energy audits guided by AMEE the refrigeration units and air conditioners account for 30% of electricity consumption in the tertiary sector. **The individual air conditioners only shared with 6% of the national electricity consumption. 10% of households owning air conditioners at the urban arears while in the rural areas only 1,7%.** In term of cooling power, the market was dominated by equipment low and medium power till 2017. 65% of the air conditioners sold in 2017 have a power between 9000 and 12000 BTU.

The potential energy saving in the building sector represents around of 40% *while the national potential of the electricity saving in the individual air conditioners is around 35%.*

Potential for Cooling Activities

Morocco selected Marrakech as its initiative pilot city to implement it's first district cooling project in the touristic area with total investment of 10.6 million USD. The project was launched at COP22 by the city of Marrakech, the Moroccan Agency for Energy Efficiency, the Italian Ministry, and UN Environment with total capacity of 6,500 TR and 46% CO2 emissions reduction (UNEP). This project aims to improve the commercial viability of district cooling systems in the North-African region. The perspective of developing the project of a district cooling system in the area of Marrakech will also evaluate the potential contribution of district cooling systems to refrigerant phasing out under the Montreal Protocol and Kigali Amendment

PROJECT: HIVERNAGE

Total Investment: $10.6 million

Internal Rate of Return: 11.7% (30years), 10.52% (20 years)

Payback period: 10 years

10% costs reduction for consumers for space cooling, reduced maintenance

Benefits:

- 46% CO2 emissions reduction
- 34% Refrigerants emissions reduction
- 4,8 GWh/yr of electricity saved

Algeria

The common practises in building sector :

- Individual air conditioners / monobloc air conditioners / air distribution
- Unit air conditioner
- VRF system (Variable refrigerant flow) in heating/air conditioning mode
- Mobile split air conditioners
- Adiabatic cooling with mobile cooling

Individual air conditioning is present in all sectors, residential and non-residential, with a prominent place for split-type individual air conditioners in the residential sector. The distribution of the air conditioning stock between the residential and non-residential sectors has an impact on the types of air conditioning equipment, the tertiary sector preferably adopting centralized air conditioning,

Currently, we are looking towards setting up the implementation of A minimum energy performance standard (**MEPS**) for equipment,

Sustainable Energy Laws

a National Energy Conservation and Efficiency Program, a National Renewable Energy Development Program, and a new National Energy Mix Model. Energy conversation and efficiency efforts will improve energy efficiency by ten percent annually in transportation, housing, and industry. Renewable energy development will focus on developing extensive solar resources in the high plateaus and Sahel regions and substituting natural gas consumption with blue and green hydrogen. Finally, the country's energy mix model aims to reach at least 30 percent power generation from renewables by 2030 and generate 25 gigawatts of power from green and blue hydrogen by 2050.

There are some initiatives from Ministry (feasibility study) to deployement it in the new cities of the country . Also there is no decrees or legal documents related to DC projects deployement, only the cooling decrees

Regulatory Analysis

- Ministry of Energy Transition and Renewable Energies (METRE): In June 2020, the government created METRE, the first of two new bodies to manage and carry out the transition plan. The government hopes to end managerial problems of competing prerogatives witnessed in earlier renewable energy initiatives by creating this new ministry. The government will also provide the new ministry with the resources that energy transition planners need to better manifest initiatives.
- Regulatory Reform: On January 25th, 2021, the Ministry of Energy declared that the 2002 law on electricity would soon be reformed to open the market to small and medium-sized enterprises working in renewable energies, reduce natural gas consumption, and accelerate renewable energy production. Furthermore, the ministry indicated that any price changes would only apply to electricity operators and large consumers versus consumers at large.

Tunis

- Tunisia **is one of the leading countries that has taken early steps towards energy efficiency** by focusing on creating an advanced and sustainable regulatory framework and encouraging investment in energy efficiency and energy management since 1985 by establishing the National Agency for Energy Management (ANME) which is a non-administrative public institution under the supervision of the Ministry of Industry, that is responsible on the implementation of the state's policy in the field of energy management.

Regulatory Analysis

A new energy transition fund (Law 2013-54 art 67: A special treasury fund entitled energy transition fund) have been issued in 2014 to encourage the investment in the energy management. Later then by September 2015 **Tunisia submitted its first Nationally Determined Contributions (NDCs) which is the policy instrument that officially reflects each country's commitment to contributing to the international effort to combat climate change, with a main objective to reduce carbon intensity in all sectors of the economy by 41% in 2030 reference to 2010 levels.**
With special focus on the energy with 75% towards the overall mitigation objective of the Tunisian NDC. Energy efficiency and renewable energies aim to reduce carbon intensity in the energy sector by 46% in 2030 compared to the 2010 level. Focusing only on the EE action plan ambitious goal to reduce energy consumption by 30% in 2030.

Tunis

Sustainable Energy Laws

By 2016 Tunis adopted **the first Energy efficiency strategy for 2030** to cover the EE measures in many sectors including the Residential, Tertiary, Industry, Transports and Agriculture to be followed by the Action Plan to accelerate Energy Efficiency Programs, EE Strategy horizon 2050. These include the implementation of insulation standards, the development of EE building codes and the creation of EE labelling systems for buildings

Regulatory Analysis

Another instrument as a way forward to the climate change mitigation actions and energy security was the development of the National Low-Carbon Strategy (Stratégie Nationale Bas-Carbone – SNBC) and updating the NDC in the energy sector in 2020, those instruments gives an ambitious climate vision in the medium- and long-term, based on low-carbon development and a change in the energy landscape to meet the energy, climatic and socioeconomic challenges of the period, 2030 – 2050

Tunis

Tunisia have already established legal frameworks for the implementation of energy efficiency building codes (EEBCs) as a mandatory mechanism to be implemented under the responsibility of the government while their monitoring is carried out by the private sector covering the residential and commercial buildings.

Regulatory Analysis

Tunisia through the National Agency for Energy conversion (ANME) has set an energy policy specifically for the air conditioners including the undertaken series of reforms to ensure the improvement in energy efficiency levels of the space cooling through:

- Enforcing a periodic energy audit for the existing building and energy audits of new building construction
- Inefficient AC systems and refrigerator were no longer commercialized.
- Enforcing a mandatory energy efficiency indication on individual ACs, whose capacity is less than 12 kW
- **Stating the energy efficiency in the ACs rating from 1 to 8 (1 is the most efficient while 8 is the least efficient) as a step to maximize the demand side management in the energy efficiency at the residential and commercial sectors. Banning the promotion of ACs with an energy efficiency of different rating**.

Potential for Cooling Activities

Bab Saadoun Project

This project aims to to reduce the energy consumption, the emission of CO2 and Nox, to enhance the indoor air quality and to use eco-friendly refrigerant through the concentration of district cooling and heating networks in the health complex in Bab Saadoun, which includes 8 hospitals.

The preparations of this project started in December 2020 through technical and economic lunching for contracting an engineering firms to be in charge of the feasibility studies under the supervision of the main stakeholders from the National Agency for Energy Conservation, the Tunisian Ministry of Health, the ministry of equipment and the hospitals.

Potential for Cooling Activities

Al Buhaira (the Lake) District Cooling Project

The project started back in 2015 as a district cooling network project in areas of high urban density, including tourist areas, administrative areas and health complexes for the Lake area in Tunis the capital and the adjacent administrative districts, through which technical and economic studies for the networks were prepared for Cooling and heating areas to examine the institutional, regulatory, technical and technological aspects of this project along with the identification of barriers that may hinder investment in this type of network.

Image:

Potential for Cooling Activities

Monastir Project

feasibility study was developed by Tractebel Engineering for the tourist strip in Monaster 23 tourist units with estimated Cooling capacity of 20 MW. The initial phase planned to be realized with 8 MW cool with 6 km pipelines with total estimated cost 17.3 M€. the project is a cooperation between ANME, SPLT and the Ministry of the equipment.

The main recommendation of the project is to choose a place with a denser and unbuilt zone to make the project much profitable and reduce CAPEX (Survey).

Potential for Cooling Activities

SPLT (funding)

- A study was developed by Tractebel Engineering,
- The estimated power need is 20 MW cool. The initial phase could be realized with 8 MW cool with 6 km pipelines,
- The total estimated cost 17.3 M€
- The main recommendation of the project is to choose a place with a denser and unbuilt zone to make the project much profitable and reduce CAPEX,
- Stakeholders : ANME, SPLT, Ministry of the equipment, Establishment of Lake zone

Cooling Bab Saadoun

- The plant will sully 08 hospitals located in Bab Saadoun with heating and cooling,
- The objectives of the projects are to reduce the energy consumption, the emission of CO2 and Nox, to enhance the indoor air quality and to use eco-frindly refrigerant
- ToRs will be lunched to contract an engineering firms that will be in charge of the feasibility study,
- Stakeholders: ANME, hospitals, Tunis municipality, ministry of equipment

Egypt

Policy Framework

NEEAP II has taken measures for cooling in Egypt such as:

- Complete Activation of the Electricity Efficiency Specifications and Labelling Program (EESLP) for home appliances.
- Energy efficiency code in buildings.
- Elimination of non-energy efficient equipment in addition to use of solar air-conditioning technology.

- The Supreme Energy Council approved, "Integrated and Sustainable Energy Strategy till 2035 ". Private sector investments will play critical role in achieving the target through a framework mechanisms .Targeting 42% RE as a share of generated electricity by year 2035.Studies are in progress to raise the share of RE in energy mix based on the reduction of technology cost and development of storage.
- Egypt submitted its Intended Nationally Determined Contribution (INDC) in November 2015 to achieve the global targets of Paris Agreement. Which is considered as NDC and this is the first update to Egypt's first NDC, covering the period between 2015 till 2030.

Market Size

Egypt's Air Conditioner Market size is projected to grow at a CAGR of 5.7% during 2021-27. Room air conditioning acquired much of the revenue share in the air conditioner market of Egypt in 2020. The residential and commercial sectors account for about 50% of the total market revenues in 2020. 7% of energy consumption in residential sector is in AC the number of AC units rose from 196,000 in 1999 to three million in 2009, and then doubled to six million units by 2012. Residential and commercial buildings are responsible for almost 50% of the total electricity consumption in Egypt. The building consumption is expected to increase, as it has been increasing in the last decade from 150 GWh in 2009 up to 217 GWh in 2017.

Regulatory Analysis Legal framework

The umbrella legislation covering district cooling as a construction project is the Construction Law no. 119/2008, which has covered the competencies of the Ministry of Housing. Additionally, Presidential decree no. 63/2005 re-organizes the Housing and Building National Research Centre. Decree no. 250/2015 was issued to establish a permanent supervisory committee and a drafting committee of nine members to prepare the district cooling code (the “District Cooling Code”). Decree no. 977/2018 issued by the Ministry of Housing, Utilities and Urban Communities put the District Cooling Code into force in Egypt. The District Cooling Code includes seven chapters and covers all technical aspects from system manufacturing requirements to implementation.

Potential for Cooling Activities

The largest district cooling plant in Egypt and Africa. The plant is located in Egypt's New Administrative Capital with a capacity of 64,000 refrigeration tons serving the new Government districts, the financial districts, and another 180 important buildings in the Administrative Capital using the latest state of the art technology using a combined system of electricity and other natural gas units, which ensures the work of the station even in the event of any interruption of any of the energy sources.

Central business district in New Capital, Egypt	55,000 TR
Kayan district cooling plants, Egypt	60,000 TR
Cairo Festival City, Egypt	25,000 TR
Mall of Egypt, Egypt	15,000 TR
Almaza City Center, Egypt	9,500 TR
City Stars Complex, Cairo, Egypt	16,000 TR
Zewail City of Science and Technology	14,000 TR
Projects in the pipeline:	
Smart village DCP phase-2	5,000 TR
Kattameya Mall DCP	7,500 TR
Ivory Business Park DCP	750 TR
Paris Mall DCP	10,000 TR

Lebanon

Sustainable Energy Laws

In NEEAP II, Energy Efficiency initiatives were suggested to reduce electricity demand and the total energy savings were estimated around 828.1 GWh:

- Implementing Minimum Energy Performance Standard (MEPS) and Labeling Program for at least 5 Types of Equipment (air conditioners, lamps, refrigerators, televisions, washing machines).

The Energy Conservation Law was approved by the Council of Ministers and needs to be approved by the parliament. Some of the EE topics that this law would regulate:

- Energy consumption labeling ordinance (appliances, electrical motors, lights…),
- Banning import of non-efficient appliances and equipment, and incentives for importing efficient equipment. As per Chapter 5, all materials and equipment for buildings have to be labeled as efficient according to international standards determined by LIBNOR.
- All the efficient equipment and green materials should be exempted from customs duties and related incentives should be considered. This law needs to be followed by executive decrees for the technical, inspection and compliance aspects development.
- One of the end-Use Measures in **the Building Sector (Building code):** B04 (Use of Efficient Equipment).

Regulatory Analysis

Adopted EE polices/measures for cooling and thermal technologies in Lebanon:

- The voluntary energy efficiency standards for five household appliances: solar water heaters (SWH), compact fluorescent lamps (CFL), refrigerators, A/C split units and electric and gas water heaters
- Mandating the standards for solar water heaters (SWH) -2010
- The Thermal Building Standard for Lebanon (Booklet and Tool 2010)
- Voluntary Lebanese Energy Efficient HVAC Equipment Standard-2011 that needs to be updated as per the new technologies
- Guidance for integrating efficient cooling in national policies in Lebanon 2020:

Proposed roadmap by UNDP and the MoE. This "National Cooling Plan" (NCP), recommended the following elements towards the introduction of the MEPS and Labels regulation:

- Establishment of the Minimum Energy Performance Standards,
- Establishment of the Labelling System,
- Development of Testing Procedures.

Noting that this plan is yet to be adopted.

- The climate in Lebanon is Mediterranean with cold wet winter and hot dry summers, the average temperature in summer is 30 Celsius.
- Air conditioning is highly demanded; In 2019, cooling consumption made the third of total electricity demand, half of the cooling demand is by the residential sector.
- However, the recent financial crisis in Lebanon led to limited market mechanism and general economic challenges.
- In numbers, the demand of Air conditioning in 2019 was 6000 units, this number decreased to the half, 3000 units, in 2021.

Potential for Cooling Activities

Project Location	DC Capacity (in referagion tons)
Lebanese University Rafik Hariri campus	1000
American University of Beirut	4000
Beirut Airport	6400
Stakeholders	
NGOs: ALMEE, LGBC, ASHRAE Lebanese Chapter, LSES, LCEC.	
Public Entities: MoEW, MoIM, MoPW, CDR, GDUP, Municipalities and Unions of Municipalities, LIBNOR, IRI	

Palestine

Sustainable Energy Laws

Law No. 14 (2015), General Electricity Law No. 13

- Promoting clean and efficient energy in the Palestinian market, especially in the fields of lighting, heating, and cooling, and raising the level of local production.
- State of Palestine Environmental Quality Authority (EQA) Climate Technology Centre & Network (CTCN) "Technology Roadmap for the Implementation of Climate Action Plans in Palestine" Identification and Prioritization report – 2019
- Mandatory Technical Instructions 88-2020, Energy statement for air conditioners (2020 / 12 / 16) , Palestinian Standards Institute "PSI".

Regulatory Analysis

The World Bank in partnership with PENRA, and in collaboration with the Agency Française development (AFD) prepared this **Energy Efficiency Action Plan for 2020-2030 (NEEAP II)**

The NEEAP II plan focuses on electricity since this form of energy has the largest share in the Palestinian final energy mix. The plan is also concentrated on a reduction of the consumption and not on the development of the renewable energy such as wind, biomass, or solar PV. An ambitious target to reduce total electricity consumption by 500 MWh per year.

The Action Plan focuses on measures to reduce the consumption of electricity in the residential sector (two thirds of the national consumption) because of its largest savings potential.

Potential for Cooling Activities

The need for heating, cooling and ventilation systems increased sharply and energy consumption in the new buildings has therefore also increased.

An initiative developed to establish the Palestinian Higher Green Building Council "PALGPC". The initiative which was supported by the UNDP aimed at forming a regulator for developing Green Buildings Code and other related regulations and procedures. later, the initiative was called **Palestine Green Building Initiative.**

Financing opportunities for DC projects in the Country

Sunref II Palestine follows on from the successful phase of Sunref I in the country headed up by AFD.

The first phase demonstrated that there is both a market and real enthusiasm for green energy in Palestine. Consequently, Sunref II Palestine will target energy efficiency projects that are likely to have a real impact on reducing greenhouse gas emissions and on helping Palestinian SMEs to become more efficient and to thrive in a highly challenging economic environment.

Jordan

Sustainable Energy Laws

- Regarding the energy efficiency recommendations; the strategy aims **to improve the use of energy efficiency in various sectors to range %9 by 2030** compared to the average energy consumption in 2018.
- Implement and improve energy efficiency programs in the water sector **to reduce the electricity demand to %15 by 2025**.
- Enhance and optimize public transportation, rapid Bus and railway transit systems.
- Improve energy efficiency of the domestic, industrial, government, commercial and service sectors.

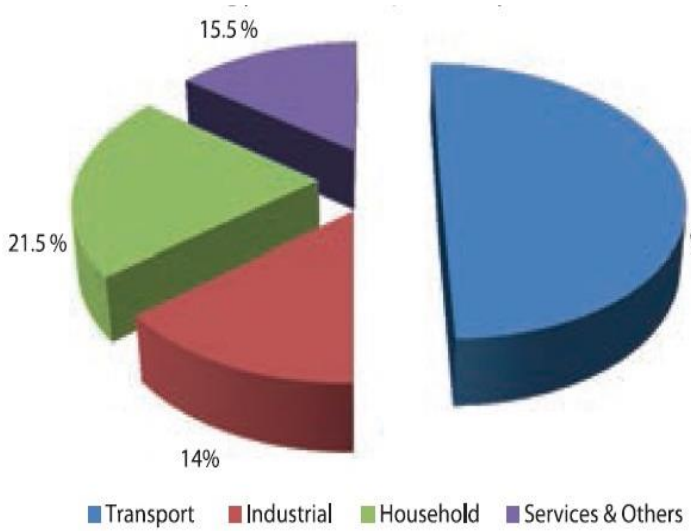
Regulatory Analysis

Update and follow-up the legislations and The National Energy Efficiency Action Plans, 3rd NEEAP is being developed.

- Energy efficient building code. 2010
- Thermal Insulation Code. 2009
- Mechanical ventilation and air conditioning Code. 2018
- Natural ventilation and health aspects Code. 1992
- Central Heating Code. 2018
  - NB: The above mentioned codes were issued by the Jordan National Building Council (JNBC)/ Ministry of Public Works and Housing (MoPWH). It's all mandatory codes, but still not enforced yet.
- District Cooling Code (Planned); as recommended measure in the 3rd NEEAP.

Market Size

- Jordan's climate varies between Mediterranean and desert and is generally very arid. There are approximately **1113 cooling degree days in Jordan a year.** Energy consumption and power demand in the country has steadily increased due to economic and population growth. With these increases, Jordan is facing rising energy demand, particularly in the residential sector. Lighting, cooling, and heating represent the largest share of energy consumption in the country.
- The residential sector accounts for **21% of final energy consumption**. As of 2020, the residential building sector in Jordan is the single largest electricity consumer in Jordan. On average, more than 60% of energy consumed in households was used for space heating and cooling. The demand on AC has increased due to the rise in peak summer temperatures and inefficient natural ventilation in buildings.



Final Energy Consumption by Sector - 2020

- While the AC market in Jordan already grew by 1.5% between 2017 and 2020, **the AC market is expected to experience a compound annual growth rate (CAGR) of about 6% between 2021 and 2027**.

Potential for Cooling Activities

Al Abdali District Cooling Plant

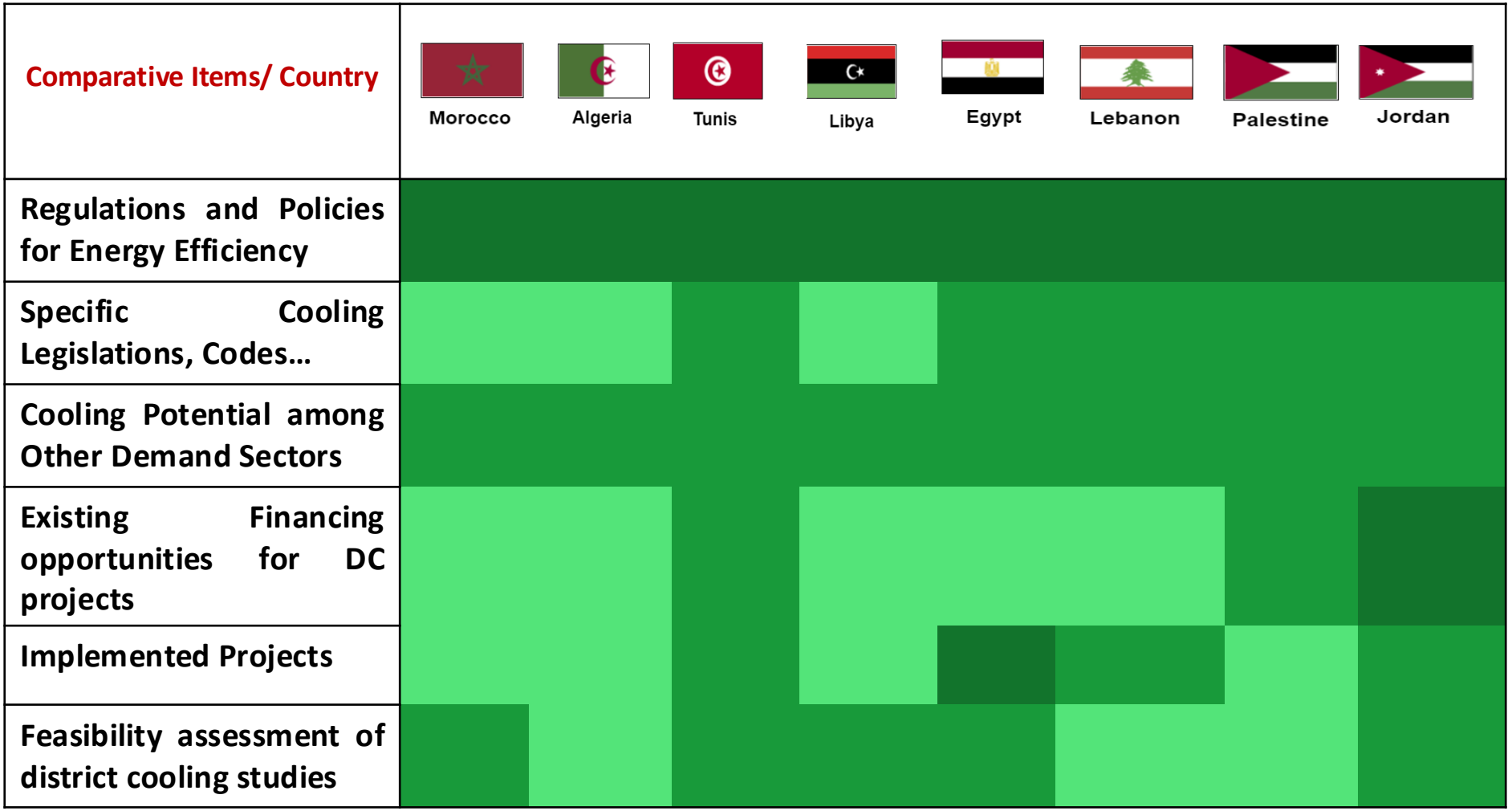
- The project was built in 2016, it produces 31,000 tons of cooling capacity and running all year around. It provides cooling to 18 buildings (residential, commercial, hotels, malls, etc.) with a total floor area of 300,000 m2.
- the system is located in Abdali, Amman.
- The project is designed to save 40% in energy consumption by significantly reducing peak electrical demand, which lowers the cost of heating and cooling for end users.
- The total project cost exceeds EUR 95 million, including a loan of EUR 27 million by EBRD.
- Observation of the system's performance and Hypermarket electricity bills indicate savings up to 60%. The system is also stable–the temperatures of the cabinets have been steadily maintained since the activation of the system.
- On top of this, the system is centrally monitored and controlled by the maintenance staff; it also remotely monitored by Abdin Industries.

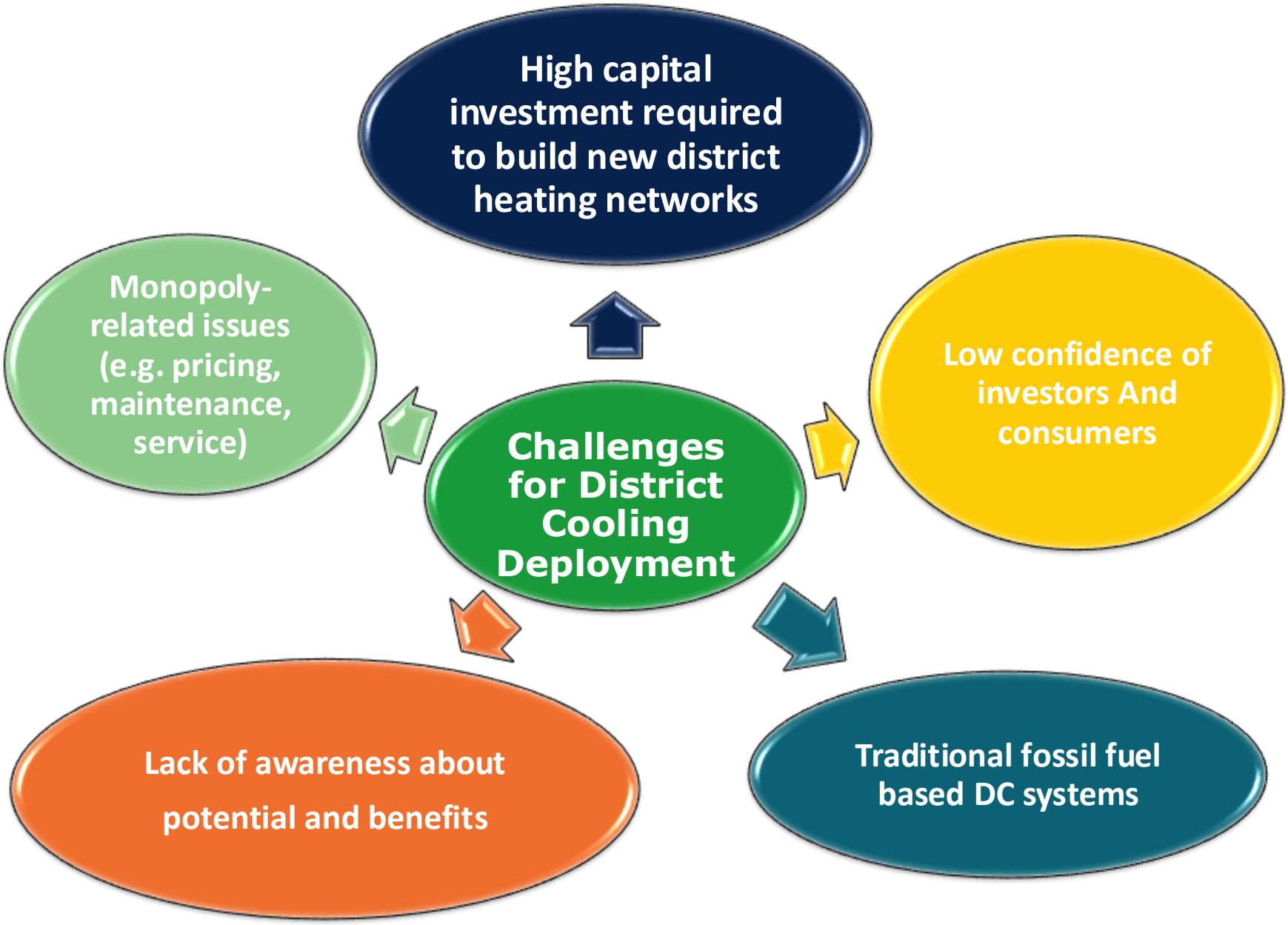
District Cooling Plant - Saraya Aqaba Resort

The project was built in 2018, it involves construction of a district cooling plant with a total capacity of 8,000 TR along with the seawater intake and pumping station for the entire Saraya Aqaba.

District Cooling Plant - Ayla Oasis Aqaba

Heat Map ➡ District Cooling Potential in the Region




High capital investment required to build new district heating networks
Monopoly-related issues (e.g. pricing, maintenance, service)
Low confidence of investors And consumers
Challenges for District Cooling Deployment
Lack of awareness about potential and benefits
Traditional fossil fuel based DC systems

Country Needs for Promoting DC technologies

- Laws and Regulations.
- National Funding mechanisms for DC technologies.
- Institutional framework available and best practices.
- Knowledge Exchange: Previous experiences.
- Capacity Building programs to increase DC experts regarding operation and maintenance.

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For any inquires or comments, please don't hesitate to contact us

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