



# FINANCE MARKET ASSESSMENT JORDAN

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# Finance Market Assessment Report Jordan



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## Acronyms

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AB	Arab Bank
AC	Air Conditioner
AFD	Agence Française de Développement
CAB	Cairo Amman Bank
CBJ	Central Bank of Jordan
CCAC	Climate and Clean Air Coalition
CO2	Carbon Dioxide
CVDB	Cities and Villages Development Bank
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EIB	European Investment Bank
ESCO	Energy Service Company
EU	European Union
FI	Financial Institution
GEFF	Green Economy Financing Facility
GoJ	Government of Jordan
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Green House Gas
GRI	Good Reporting Initiative
GWP	Global Warming Potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HVAC	Heating, Ventilation and Air Conditioning
IFC	International Finance Corporation
IFI	International Financial Institution
IMF	International Monetary Fund
JAB	Jordan Ahli bank
JIB	Jordan Islamic Bank
JLGC	Jordan Loan Guarantee Corporation
JOD	Jordanian Dinar
JREEEF	Jordan Renewable Energy & Energy Efficiency Fund
LC	Letter of Credit
MEMR	Ministry of Energy and Mineral Resources

M&E	Monitoring and Evaluation
MFI	Micro Finance Institution
Mol	Ministry of Investment
NEEAP	National Energy Efficiency Action Plan
NGGP	National Green Growth Plan
NGO	Non Governmental Organisation
NERC	National Energy Research Centre
PPP	Public-Private Partnership
RAC	Refrigeration and Air Conditioning
RE	Renewable Energy
SDGs	Sustainability Development Goals
SEED	Sustainable Energy and Economic Development
SMEs	Small and Medium Enterprises
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USD	United States Dollar

# 1. Introduction

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With energy demand expected to increase 50% by 2040,<sup>1</sup> Middle East and North Africa (MENA) countries are facing a range of climate-change related challenges. The region's energy challenges include rapidly growing populations, urbanisation, and a heavily strained energy infrastructure. Cooling in Air Conditioning (AC)-equipped households already represents a major source of energy consumption in the region. The use of cooling is expected to grow further since, with an improved standard of living, more households are using air conditioning (AC) systems. There is large potential for energy saving as many of the space cooling and refrigeration systems in use have a low energy efficiency. An additional climate impact from cooling comes from the refrigerants still used in many of today's air conditioners and refrigerators. Such refrigerants with a high global warming potential are hundreds to thousands. Without further policy intervention, direct and indirect emissions from cooling and refrigeration may rise 90% above 2017 levels by 2050,<sup>2</sup> creating a vicious feedback loop.

## 1.1. The Cool Up programme

The Cool Up programme promotes accelerated technological change and early implementation of the Kigali Amendment to the Montreal Protocol and Paris Agreement in Egypt, Jordan, Lebanon, and Türkiye. The programme focuses on enabling natural refrigerants and energy efficient solutions to mitigate the effects of the rising cooling demand. The Cool Up approach is based on four pillars: reducing cooling demand, phasing down hydrofluorocarbons (HFCs), replacing and recycling inefficient equipment and refrigerants; training and raising awareness.

The programme's cross-segment approach focuses not only on the residential and commercial AC sector but also the commercial refrigeration sector.

The programme aims to develop lasting institutional capacity and increase the deployment of sustainable cooling technologies in the market. To enable a cooling market transformation towards sustainable cooling technologies, the Cool Up programme will:

- ▶ Enhance cross-sectoral dialogue between national actors to build ownership to support long-term impact.
- ▶ Develop policy actions to create a supportive regulatory environment.
- ▶ Develop financial mechanisms and funding structures to enable the cooling market transition.
- ▶ Support the commercial deployment and dissemination of existing and emerging technologies with natural refrigerants.
- ▶ Provide resources for capacity development on sustainable cooling in the four partner countries.

In MENA countries, cooling constitutes a major source of energy consumption; it produces indirect greenhouse gas (GHG) emissions and contributes to ozone depletion and global warming. The Cool Up programme seeks to address this challenge in its partner countries by mitigating the adverse impacts of refrigerants through promoting accelerated technological change and facilitating early implementation of the Kigali Amendment and Paris Agreement.

The programme is divided into three pillars:

- ▶ Policy and regulation
- ▶ Technology and markets
- ▶ Financing and business models

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<sup>1</sup> BP Energy Economics: BP Energy Outlook 2018 Edition. Available online at <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2018.pdf>.

<sup>2</sup> United Nations Environment Programme and International Energy Agency (2020). Cooling Emissions and Policy Synthesis Report. UNEP, Nairobi and IEA, Paris.



## 1.2. Aim and scope of this report

This finance market assessment is the first in a series of reports that will be produced by the Cool Up programme. It aims to provide an overview of the banking and finance sector in Jordan with reference to RAC space, laying the foundation for further work to be used within the programme and to facilitate informed decision makers for all public and private sector stakeholders. This report will lead further work in the area of financing of sustainable cooling technologies under the Cool Up programme in the partner countries – Egypt, Jordan, Lebanon and Türkiye.

This finance market assessment report presents compilation of limited data available on direct financing of RAC sector (primarily AC in residential and non-residential buildings and commercial refrigeration). While the report primarily focuses on commercial financing aspects, it briefly summarises the cooling sector status and the current policy landscape and outlines several types of policies and regulations (e.g. international protocols, national strategies, laws and standards, and code policy).

- ▶ Chapter 2 provides a brief country economic overview followed by high level summaries of the policy and cooling sector status reports.
- ▶ Chapter 3 elaborates definitions used in this report, sector focus (what areas are covered under air conditioning and refrigeration). This section states the methodology adopted to prepare this report and associated limitations and boundaries.
- ▶ Chapter 4 gives an overview about the value chain associated with the RAC sector and financing of individual elements of the value chain. This section also summarises the banking sector in Jordan and details various green financing schemes. The report discusses roles of non-finance organizations in support of climate change and energy efficiency.
- ▶ Chapter 5 outlines various financing approaches which could be explored further for sustainable cooling technologies in three prominent end-use sectors such as residential, commercial and public sectors. Cool Up selected this approach as they have been reportedly used during other energy efficiency projects in many developing countries.
- ▶ Chapter 6 provides a conclusive summary and recommendations.

## 1.3. Kigali Amendment

Most cooling systems rely on refrigerants with high global warming potential (GWP), leading to high direct emissions from the refrigerant circuit. Adopted in 1987, the Montreal Protocol phases down consumption and production of ozone-depleting substances (ODS)—most notably hydrochlorofluorocarbons (HCFCs)—in a stepwise manner, with different timelines for developed and developing countries (referred as Article 5 countries). Recognising the threat of fluorinated gases, specifically HFCs, to global climate change, in 2016, the international community decided in Kigali (Rwanda) on an amendment to the Montreal Protocol. Jordan has become the first country in the Middle East to ratify the Kigali Amendment to phase down HFCs. The Kigali Amendment went into force on 1 January 2019 and implements a global HFC phase-down to reduce HFC production and consumption by more than 80% over the next 33 years.

For the Cool Up partner countries—Egypt, Jordan, Lebanon, Türkiye<sup>3</sup> – the same HFC phase-down schedules apply under the Kigali Amendment (see **Table 1**).

The baseline is determined as the country's average consumption of HFCs for 2020, 2021, and 2022 plus 65% of the baseline for HCFCs.

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<sup>3</sup> These countries are considered developing (Article 5) countries under the Montreal Protocol. Article 5 countries follow different phase-out schedules than industrialized countries.

**Table 1:** Schedule of phase-down of HFC consumption in Cool Up partner countries

Freeze consumption 2024-2028	
<b>Phase down</b>	10% of the baseline for 2029-2034
<b>Phase down</b>	30% of the baseline for 2035-2039
<b>Phase down</b>	50% of the baseline for 2040-2044
<b>Phase down</b>	80% of the baseline for 2045

The upcoming years represent numerous opportunities and challenges for cooling sector conversions and the introduction of sustainable and future-proof alternatives to ODS and HFCs.

In many countries in past years, HCFC replacement led to the introduction of HFCs in major cooling applications. However, with the reduction schedule for HFCs in the Kigali Amendment, HFCs no longer represent a sustainable alternative to ODS. Enabling the uptake of sustainable alternatives, such as natural refrigerants, prevents a switch from HCFCs to HFCs and from HFCs to environment friendly low GWP alternatives. This direct replacement early in the transition process is called leap frogging and creates opportunities for emission reductions, energy savings, and investments in future-proof technology.

In the last decade, natural refrigerants, and climate-friendly measures (referred as not-in-kind technologies)<sup>4</sup> have been researched extensively. Examples of such not-in-kind technologies are being commercially introduced worldwide (e.g. passive cooling of buildings). Additionally, technical solutions to boost system efficiency have been identified and established for applications relying on natural refrigerants.

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<sup>4</sup>Systems that do not rely on a vapor compression cycle using a gaseous refrigerant.

## 2. Overview

### 2.1. Setting the scene

Jordan's climate varies between Mediterranean and desert and is generally very arid. 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, and the residential sector accounts for about half of electricity consumption in Jordan. More than 60% of energy consumed in households is used for heating and cooling.<sup>5</sup>

### 2.2. Macroeconomic overview

Jordan has a GDP of EUR<sup>6</sup> 39.5 billion or EUR per capita of 3,854 in 2020. Given the scarce availability of water, oil, and other natural resources, the government heavily relies on imports to meet its energy needs. In 2017, more than 94% of Jordan's energy use was imported—mainly natural gas.<sup>7</sup> The government subsidises energy prices to ensure affordable energy prices to Jordanians.

#### 2.2.1. Electricity consumption

The residential sector accounts for 21% of final energy consumption.<sup>8</sup> As of 2020, the residential building sector in Jordan is the single largest electricity consumer in Jordan, with 49% of the country's total electricity consumption. The non-residential building sector accounts for more than 10% of total electricity consumption.<sup>9</sup> On average, more than 60% of energy consumed in households was used for space heating and cooling.<sup>10</sup> The demand on AC has increased due to the rise in peak summer temperatures and inefficient natural ventilation in buildings.<sup>11</sup>

Electricity demand has been increasing about 4.3% per year, on average, since 2018.<sup>12</sup> Energy demand and electricity demand were forecast to grow by 3.5% and 4%, respectively, in 2020.<sup>13</sup> Based on the results of the Electricity Demand Forecast Study for 2020-2040, the peak load is expected to increase by 3% in 2019 and 2.9% annually.<sup>14</sup>

Energy demand growth is primarily driven by the following:

- ▶ Steep growth in population, mainly from an influx of refugees—from 5 million in 2000 to 9.9 million in 2016.<sup>15</sup>
- ▶ Economic development (average GDP growth of 3% per year between 2008 and 2018).<sup>16</sup>

<sup>5</sup> Al-Hinti and Al-Sallami. (2017) "Potentials and Barriers of Energy Saving in Jordan's Residential Sector through Thermal Insulation"

<sup>6</sup> All data given in USD in the original source has been converted to EUR. 1 USD has been converted to 0.90 EUR, based on European Central Bank, "Euro foreign exchange reference rates"

<sup>7</sup> Ministry of Energy and Mineral Resources, "Energy 2020 - Facts & Figures"; The World Bank, "Energy imports, net (% of energy use)"

<sup>8</sup> Ministry of Energy and Mineral Resources, "Energy 2015 - Facts and Figures"

<sup>9</sup> Based on:

Ministry of Energy and Mineral Resources, "Energy 2020 - Facts & Figures"; International Energy Agency, "Key stats for Jordan 1990-2016"; National Energy Research Center, "Personal communication with Eng. M. Tawalbeh"

<sup>10</sup> Al-Hinti and Al-Sallami "Potentials and Barriers of Energy Saving in Jordan's Residential Sector through Thermal Insulation"

<sup>11</sup> Jordan Green Building Council, "Developing an Energy Benchmark for Residential Appartements in Amman"

<sup>12</sup> Ministry of Energy and Mineral Resources MEMR, "Energy Brochure 2019"; National Electric Power Company, "Annual Report 2019"

<sup>13</sup> Ministry of Energy and Mineral Resources, "Energy 2020 - Facts & Figures"

<sup>14</sup> Based on:

Ministry of Energy and Mineral Resources, "Energy 2020 - Facts & Figures"; Ministry of Energy and Mineral Resources, "Energy 2015 - Facts and Figures"; International Energy Agency, "Key stats for Jordan 1990-2016"; National Energy Research Center, "Personal communication with Eng. M. Tawaleh"

<sup>15</sup> International Energy Agency; International Energy Agency (IEA) 2021. The population growth is driven mainly by influx of refugees (2 million Palestinians, 2.5 million Syrians, in addition to 700,000 South Asians low-wage workers).

<sup>16</sup> International Monetary Fund (IMF) 2021

- ▶ Increased living standards.<sup>17</sup>
- ▶ Climate change (raising outdoor air temperature).

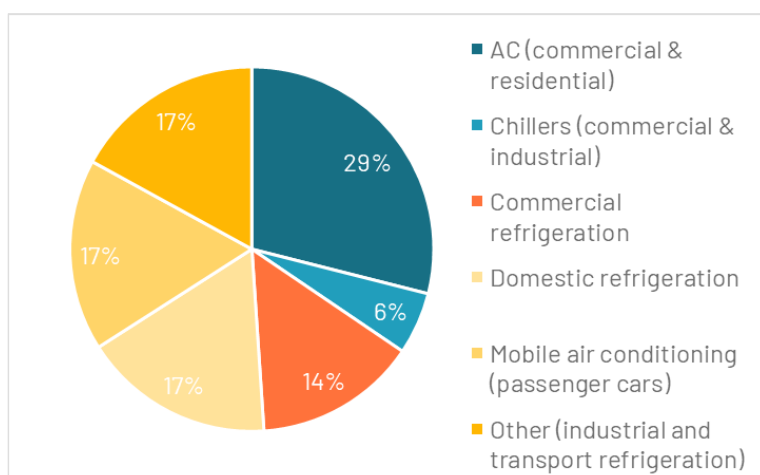
Resulting economic challenges lie in persistently high poverty rates, unemployment and underemployment, budget and current account deficits, and government debt.<sup>18</sup>

Jordan's increasing energy needs make it vulnerable to international price volatility.<sup>19</sup> The cost of energy subsidies consumed nationally represent 10% of Jordan's GDP (2018).<sup>20</sup>

## 2.2.2. RAC sector emissions

The share of direct emissions in the sector's overall emissions is in the range of 15% to 40% according to different studies.<sup>21</sup> There is lack of country-specific studies on specific refrigeration and air conditioning (RAC) sector emissions.

The Green Cooling Initiative (GCI) has developed an online model that provides RAC sector-specific data on installed technologies, sales, and emissions (and saving potential).<sup>22</sup> The model allocates about 40% of the total (i.e. direct and indirect) emissions of the RAC sector to the AC and commercial refrigeration subsector, of which about 29% of the emissions stemmed from commercial and residential AC systems and 14% stemmed from commercial refrigeration systems (see **Figure 1**). The GCI model allocates 6% of the emissions to chillers (industrial and commercial subsectors). The remaining emissions are allocated to other RAC subsectors (mobile AC-passenger cars, transport refrigeration-trucks, and domestic and industrial refrigeration).<sup>23</sup>



**Figure 1:** RAC sector emissions Jordan (2016)

<sup>17</sup> Sahawneh 2015

<sup>18</sup> CIA World Factbook 2018

<sup>19</sup> CIA World Factbook 2018; Jordan has secured several contracts for liquefied natural gas and is exploring nuclear power generation, exploitation of abundant oil shale reserves, and renewable technologies, as well as the import of Israeli offshore gas

<sup>20</sup> Ministry of Energy and Mineral Resources MEMR

<sup>21</sup> See, for example:

National Ozone Unit Lebanon 2021; Egypt Environment Agency Affairs 2020; Campbell et al. 2018

Own calculations based on:

Build\_ME 2021

United States Environmental Protection Agency (EPA) 2021

California Air Resources Board 2017

United States Environmental Protection Agency (EPA) 2021

<sup>22</sup> Green Cooling Initiative 2021

<sup>23</sup> Based on: Green Cooling Initiative 2021

## 2.3. Policy overview

Jordan has been a party to the Montreal Protocol (MP) since 1989 and has ratified the five subsequent amendments made under the MP, including the recent Kigali Amendment in October 2019. Jordan has progressed on its commitments relevant to the Montreal Protocol and Kigali Amendment through the implementation of several relevant programs, laws, and other policy instruments such as codes and standards. The policy instruments governing the RAC and building sector in Jordan were analysed to identify the key strengths and shortcomings towards phasing down HFCs, using natural refrigerants and reducing cooling demand. The regulatory analysis covers the four categories of policy instruments that hierarchically include the following categories: a) International Protocols and commitments, b) National Plans and Strategies, c) Laws and bylaws relevant to the RAC and building sector, and d) Standards and codes.

The regulatory analysis shows that Jordan has successfully implemented ongoing projects to phase out HCFCs, including through controlling imports of ODS through licensed importers and monitoring ODS-consuming and converted enterprises. Jordan has also started implementing a plan to phase down HFCs through the recently approved instructions. Though new instructions for phasing down HFC consumption are in place, HFCs are not yet controlled substances and are not monitored by Jordanian customs. As a result, importers are not obliged to register or obtain a license to import nor to report the quantities of imported HFCs to the NOU.

Sustainable cooling still needs to be reflected and streamlined across the different Jordan national strategies. The government has published an updated NDC (2021) and has raised Jordan's mitigation ambition to 31% reduction of emissions by 2030 compared to business as usual for base year 2012. The updated NDC includes a measure targeting reduction of HFCs consumption aligned with the national commitments to comply with the Kigali Amendment. For instance, the Ministry of Energy and Mineral Resources is planning to prepare the Third NEEAP which is supposed to compile key measures that are relevant to energy efficiency and related national priorities. However, Jordan has not developed a National Cooling Plan to integrate cooling aspects in Jordan's overall climate strategies.

Most of the existing laws are –to a large extent– well enforced and implemented, however there is room for improvement. For example, the Waste Management Framework Law No.16 of 2020 and the forthcoming Electrical and Electronic Waste Management all could contribute to improving the end-of-life management of the RAC appliances but a recovery and waste management scheme for phased-out refrigerants still needs to be elaborated. There is room for improvement to further develop codes and standards which govern the waste management of ODS and HFC as well as safety requirements and the certification of technicians and updating procedures for MEPS. There are several well-elaborated MEPS and labels for most RAC appliances of residential use but not for commercial RAC appliances.

Although Jordan has a National Ozone Committee, that serves as an advisory body to provide guidance to NOU to prepare the national ODS phase-out regulations, it lacks awareness of the linkages between F-gases regulations, energy efficiency standards of the RAC sub-sectors and the building codes. This lack of awareness is identified as a key gap that hinders the coordination and mainstreaming of the cooling relevant issues across national regulations and policies. There is also a need for awareness raising around other sustainable cooling topics, especially the link between Kigali Amendment commitments and energy efficiency measures, as well as the enforcement of the building codes to reduce the cooling demand.

Based on the analysis of the policy instruments and experts interviews with several stakeholders in Jordan, some key policy recommendations have been derived to support the preparation of policy frameworks that guide the transition towards sustainable cooling and utilization of natural refrigerants. There is a detailed report with full analysis and policy recommendations available on the Cool Up [website](#).

## 2.4. Cooling market landscape

Several companies in Jordan are manufacturing different types of air conditioning (AC) under different brand names. Roughly 50% of all AC systems on the market in Jordan, are produced by local manufacturing companies. However, the country still relies on imports from other countries to meet the growing demand.

Jordan has more than 400 workshops that provide maintenance and services to the refrigeration and air conditioning (RAC) sector.<sup>24</sup>

The demand for RAC units across Jordan is growing and this trend is expected to continue. AC market drivers include increasing affordability (gross domestic product growth), rising population, new construction activities, climate change, increasing electricity prices, the introduction of new technical regulations, and the availability of new technologies. The demand for different AC technologies is driven by the installation in new buildings, new installations in existing buildings (to increase the share of air conditioned rooms), and the replacement of defective AC systems.<sup>25</sup> In the new construction sector, around 60% of all new apartments and 80% of new single-family buildings, between 70% and 75% of new offices and supermarkets, and 90% and 95% of new healthcare and new hotel buildings install AC systems.<sup>26</sup> In existing residential buildings, there is substantial growth potential for the cooling market, as about 80% of the residential floor area and about 50% of the non-residential floor area is not yet air conditioned.<sup>27</sup> While the AC market in Jordan has already grown 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.

Currently installed equipment and new units installed have a lower efficiency than the best available technology, so there is a large potential for energy savings. AC systems installed in the building stock have an energy efficiency ratio (EER) or a coefficient of performance (COP) in the range of 2.5-4.5 (existing buildings) and an average of about 3.5.<sup>28</sup>

The commercial refrigeration sector is dominated by local manufacturers for condensing and centralised systems. Commercial standalone refrigeration systems are locally manufactured and imported. The main suppliers of standalone systems to supermarkets and quick service and casual restaurants are the Jordanian and international food and beverage industries.<sup>29</sup>

Jordan currently imports all refrigerants. The main refrigerant used in the AC sector is R410A, followed by R134a. The refrigeration sector mainly uses R134a, R404A, and R407C. Servicing equipment mostly employs R22 for the old units and R134a, R407C, R410A, R600a, and R717 for the newly installed units. Natural refrigerants are available in Jordan, though their uptake has been limited.<sup>30</sup> The government is promoting the transition to natural refrigerants in RAC applications by mobilising the required support from international agencies for the private sector to facilitate the shift to new technologies.

The overall market for cooling equipment in Jordan is expected to continue to grow. This strong market growth requires sustainable cooling technologies, and natural refrigerants being introduced very early as a direct replacement to prevent potential lock-in effects to harmful refrigerants. Perceived key challenges to the uptake of natural refrigerants include safety issues and the associated costs.

Cool Up presents a unique opportunity to build on the regulatory framework that is currently in place - Jordan's well-established manufacturing sector, and commercial banks, which provide green finance to scale-up sustainable cooling technologies and the use of natural refrigerants. It is imperative that Cool Up raises awareness of the potential and opportunities around natural refrigerants and improving energy efficiency; the programme must also address concerns about safety and upfront investment costs.

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<sup>24</sup> United Nations Industrial Development Organization (UNIDO) 2018, Cooling Sector Status Report Jordan 2022

<sup>25</sup> Cooling Sector Status Report Jordan 2022

<sup>26</sup> Ibid

<sup>27</sup> Ibid

<sup>28</sup> Ibid

<sup>29</sup> Cooling Sector Status Report Jordan 2022; United Nations Industrial Development Organization (UNIDO) 2018

<sup>30</sup> Expert Interviews 2021

<sup>30</sup> National Ozone Unit Jordan 2021, Jordan Customs 2021

### 3. Methodology

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The first step in developing the finance assessment report is to define boundaries of this report. This report focusses on generic financing of the refrigeration and air conditioning (RAC) sector and not specific financing situations. This report has used widely accepted nomenclature and financing terms, some of which, are elaborated in this section.

It is essential to understand what the RAC sector is referring to in this report. The following set of measures were used to guide programme activities to maintain clarity in definitions, data scope, and limitations of the study.

#### 3.1. Definitions

The Cool Up programme uses the following definitions:

Financial institutions:

- ▶ Financial institutions include commercial banks, investment banks, insurance companies, brokerage firms as well as specialized local financing institutions (at national level or provincial levels).
- ▶ International financial institution (IFI): An International Financial Institution (IFI) is a financial institution established (or licensed) by more than one country and is therefore subject to international law. Their owners or shareholders are generally national governments, but other international organizations and other organizations may also emerge as shareholders. Bilateral financial institutions are technically IFIs.<sup>31</sup>
- ▶ A multilateral development bank (MDB) is an institution, created by a group of countries, that provides financing and professional advice to enhance development.
- ▶ RAC sector:
  - ▷ Refrigeration: Domestic, commercial, industrial, and transport refrigeration
  - ▷ AC: Residential and commercial AC manufacturing (including chiller)
- ▶ Servicing sector for RAC: providing maintenance for air conditioning and refrigeration sector.
- ▶ Air conditioning (often referred to as AC, A/C, or air con) is the process of removing heat and moisture from the interior. It is used in domestic and commercial environments.
- ▶ The commercial refrigeration scope includes stationary systems used to store and display food and beverages in retail (supermarkets, shops) and food service (restaurants, hotels) but not for processes. The United Nations Environment Programme (UNEP) defines commercial refrigeration systems as systems that usually include standalone, condensing, or centralised units that mostly do not exceed a capacity of 200 kW and keep temperatures between -25°C and 8°C.<sup>32</sup>
- ▶ Commercial refrigeration cold storage includes commercial-scale cold storage rooms, which are usually equipped with condensing or centralised units and have capacities of up to 200 kW. These applications serve as storage for food and beverage products and differ from industrial-scale cold storage, which is used for the processing and storage of food and beverages or in the manufacturing process of petrochemicals, chemicals, and pharmaceuticals. Such systems can range in size from 5 MW to 30 MW.<sup>33</sup>
- ▶ Synthetic refrigerants are substances of anthropogenic origin (they do not occur naturally). These include HCFCs and HFCs, among others.
- ▶ Natural refrigerants are non-synthetic refrigerants that can be found in nature.
- ▶ Energy efficiency ratio (EER) W/W measures the energy efficiency of cooling devices in BTU/Watt. A higher EER rating corresponds to higher energy efficiency.

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<sup>31</sup> Dictionary.com. "Definitions for international financial institutions."  
<https://www.definitions.net/definition/international+financial+institutions>.

<sup>32</sup> Definition based on United Nations Environment Programme (UNEP) 2015, Pre-session Documents: Workshop on Hydrofluorocarbon Management

<sup>33</sup> United Nations Environment Programme (UNEP) 2019

- ▶ Residential building sector consists of single and multifamily buildings.
- ▶ Non-residential building sector includes public and private offices, education, health and social, hotel and restaurant, wholesale and retail trade, and other buildings (e.g. sports facilities). Industrial, agricultural and fishery buildings and warehouses are not included.
- ▶ Sustainable cooling is affordable and safe cooling that satisfies user needs with lowest possible impacts on the environment. This specifically implies the absence of environmentally harmful refrigerants (such as fluorinated gases), a low energy demand (including high efficiency), and at least readiness for a fully renewable energy supply.
- ▶ Direct greenhouse gas (GHG) emissions are related to refrigerant losses on each appliance (refrigerant leakage, operational and at disposal after end of life).
- ▶ Indirect GHG emissions are those related to the generation of the electricity used for cooling.

## 3.2. Building segments and equipment types in scope of the Cool Up programme

### 3.2.1. AC sector

- ▶ Building segments: Focuses on residential buildings and on non-residential buildings.
- ▶ Equipment types (AC systems): Although there are many different technologies installed in the market, they can be clustered into the following key technology segments, which are used to depict the market characteristics.<sup>34</sup> AC systems can generally be divided into central and decentral systems.
  - ▷ Ducted air conditioning provides cooling (or heating) through a system of ducts. The central unit consists of a compressor, condenser, and an air handling unit (AHU). Cool (or hot) air is distributed through a series of ducts and vents to the building. These systems are also called central air conditioning systems, which can be broadly segregated into two types, i.e., split central air conditioners (duct split) and packaged central air conditioners.<sup>35</sup>
  - ▷ Splits units: Single split systems consist of an indoor and an outdoor unit and provide AC for one indoor zone.
  - ▷ Multi-split and variable refrigerant flow (VRF) systems: Multi-split systems consist of one outdoor and several indoor units. VRF systems are sophisticated multi-split systems. Several outdoor units can support many indoor units (up to 64), and the indoor units can be regulated individually.
  - ▷ Packaged units (e.g. rooftop): All components are enclosed in a single box. Packaged units are typically located outside (rooftop, terrace) and provide cooling by delivering conditioned air to one or more indoor zones.
  - ▷ Chillers: Central cold generation units as part of a central AC system, which can be categorised into three groups:
    1. Compression water-cooled chillers
    2. Compression air-cooled chillers
    3. Sorption (absorption or adsorption) chillers

Chillers are connected to distribution water or delivery systems (fan coil units or air handling units).

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<sup>34</sup> United Nations Environment Programme (UNEP) Ozone Secretariat, "FACT SHEET 7 Small Self Contained Air Conditioning" (UNEP Ozone Secretariat, Bangkok, 2015)

United Nations Environment Programme (UNEP) Ozone Secretariat, "FACT SHEET 8 Small Split Air Conditioning" (UNEP Ozone Secretariat, Bangkok, 2015)

United Nations Environment Programme (UNEP) Ozone Secretariat, "FACT SHEET 9 Large Air-Conditioning (air-to-air)" (UNEP Ozone Secretariat, Bangkok, 2015); United Nations Environment Programme (UNEP) Ozone Secretariat, "FACT SHEET 10 Water chillers for air conditioning" (2015)

United Nations Environment Programme, "2018 Report of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee"

<sup>35</sup> CIELO, "Ducted vs. Ductless Air Conditioning Systems," <https://www.cielowigle.com/blog/ducted-vs-ductless-air-conditioning-systems/>



### 3.2.2. Commercial refrigeration sector

Cool Up focuses on the commercial refrigeration sector. Domestic and industrial refrigeration are not included in the Cool Up programme scope.

- ▶ **Building segments:** Focuses on corner stores, restaurants, supermarkets, and hotels, including areas for cold storage.
- ▶ **Equipment types (commercial refrigeration systems):** Covers the three main types of equipment: standalone equipment, condensing units, and centralised systems (for supermarkets). The different equipment types are used in different building segments:
  - ▷ Most medium to large supermarkets prefer to use centralised systems because they are usually more energy efficient than condensing units and plug-in cabinets. The size of the sales area of supermarkets that use a centralised refrigeration system range from 400 m<sup>2</sup> to up to 20,000 m<sup>2</sup>.
  - ▷ Condensing units are commonly used in medium and small stores and can often be found in fast food outlets, restaurants, bars, and convenience stores. In comparison to a centralised system, they allow fewer cabinets to be connected to the system, take up less space, and are usually easier to install.
  - ▷ Stand-alone refrigeration systems are typically self-contained systems such as ice cream freezers, display cabinets, and vending machines. They are often referred to as plug-in units because they are closed systems, which do not require extensive installation.

### 3.3. Data collection approach

The data for this report was collected from various primary and secondary sources.

- ▶ **Primary data** was gathered through expert interviews (in-person and / or over the phone / virtual meeting). The interviews were primarily conducted with banking sector officials in Jordan.
- ▶ **Secondary data** was obtained from a diverse set of publications covering banking sources e.g., Central Bank of Jordan (CBJ), The Association of Banks in Jordan (ABJ), multilateral institutions such as The World Bank and IMF (Article IV reports). National policy documents and other papers were accessed for the data collection.

Data on financing of RAC sector is not available as the sector does not receive adequate focus. Besides, banks and financial institutions are not required to categorize finance in to this category. Due to the data situation in the mentioned, this report acknowledges data gaps and data from different sources that results in discrepancies.

## 4. Summary of key findings and recommendations

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Jordan has a well-established financial sector with a predominant presence of commercial banks. Most progressive banks offer sustainable energy finance, including financial assistance to solar PV generation and green infrastructure projects. The Jordanian banking system has a higher capital adequacy ratio (18.3%) than that recommended by the Basel Committee (12%). Jordan banks support the whole value chain associated with refrigeration and air conditioning, mainly manufacturing and retail operations. Jordan imports all its refrigerants as there are no local manufacturers. Most refrigeration systems (mainly comprising display refrigerators and reach-in freezers) are locally fabricated with the import of critical components. Room air conditioners are sold through retail stores and company-owned outlets. Banks offer credit finance (of 12 to 36 months) to individual and small commercial customers. Retail stores avail working capital finance from commercial banks to support operations and inventory holding. Financial intervention under the Cool Up programme can be designed for appropriate target stage(s) within the RAC value chain.

Sustainable cooling technology options are low global warming potential (GWP) technologies with high energy efficiency. Financing sustainable cooling technology (SCT) solutions are similar to financing energy efficiency yet potentially feature even higher GHG mitigation. Over the years, energy efficiency financing has been widely practised and documented. Traditional barriers to energy efficiency include high upfront investment, and inadequate awareness of technologies are also applicable to SCT options. Jordan Loan Guarantee Corporation (JLGC) has an existing programme to cover energy efficiency loans to manufacturing establishments. Debt finance through "green credit lines" could be explored to support sustainable cooling technology options for residential and commercial sectors. Large municipal HVAC projects can be financed through public, private partnership (PPP) options or conventional municipal financing models.

International financial institutions (IFIs) can play an influential role in Jordan by offering soft loans through partner commercial banks and can provide guarantee coverage for these loans to cover perceived technology risks. SCT options can be scaled up through the appropriate financing mechanisms mentioned above. Choice of which financing mechanism will be governed by technology option and its commercialisation stage. Commercially available products can be scaled up through conventional financing products and channels. Technology option at a pre-commercial stage needs support for pilot scale-up of prototypes through soft funding.

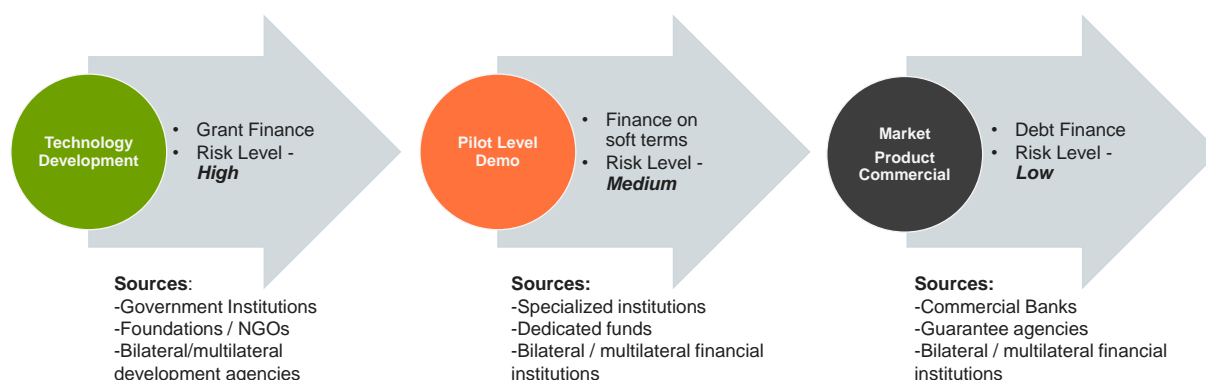
**Recommendations:** The Cool Up programme needs to work closely with financing institutions/banks and other stakeholders, including manufacturers and retailers of RAC equipment/appliances, industry associations/chambers of commerce and government (policymakers) in Jordan. Subsequent to selection of focus sustainable cooling technology areas, the Cool Up programme envisages studying the cost benefit aspect of these technologies from the perspective of end users as well as that of financing agencies in the next phase.

## 5. Finance Landscape

### 5.1. Financing Value Chain

Financing of cooling solutions is not a widely recognized topic as it is inadequately defined and is not tracked across the world. In addition, cooling solutions have a broad spectrum to suit different applications (small and large in scale with wide cross-section of application sectors such as residential and commercial sectors for space cooling), food, health, supermarkets, restaurants, hotels, (for refrigeration).<sup>36</sup> Therefore, financing mechanisms and financing approaches for cooling solutions also vary according to applications and sectors. On the other hand, the type of end-user (beneficiary) and nature of financing organization also govern funding needs and the nature of financing instruments. It may be observed that both private sector financing as well as public sector funding play respective roles in the financing RAC sector. The Public Private Partnership (PPP) approach is also possible for certain types of large HVAC projects (covering large districts of residential, commercial or government owned buildings).

Conventional financing instruments can generally be categorized into a) grants; b) equity; c) debt; and d) guarantee products (risk mitigation instruments). Each of these instruments are applicable as per the stage of technology development and commercialization. While grants are needed for technology development projects (when risk level is in the higher side), funds with relatively lower cost funds support pilot (semi-commercial) stage of product development. Once a product arrives at commercialization stage, it faces the market environment and most commercial banks finance through commercial loans (loans at prevailing commercial rates of interest, where risk level is on the lower side). Financing “sustainable cooling solutions” also encompass a broad range of financing approaches. It may be noted that applications of most sustainable cooling technologies result in the direct reduction of energy use (or improved energy efficiency) and lower environmental impact. Hence, often it is prudent to select approaches that may suit energy efficiency projects.



**Figure 2:** Financing for different stages technology development, pilot / prototype development and market commercialization

This report has elaborated on generic financing solutions and not specific solutions. Being the finance market assessment phase, the report has primarily focused on conventional commercially available RAC technologies. It may be noted that the Cool Up programme is expected to catalyse financing of pilot demonstration and commercialization phases.

An overview of financing of the value chain of the Refrigeration and Air Conditioning (RAC) Sector provides details of finance stakeholders (financing agencies), financing products and processes. Individual players

<sup>36</sup> Miller, Alan; Uwamaliya, Alice; Hartley, Ben; Rossi di Schio, Clotilde. (2020). Financing Access to Cooling Solutions – Knowledge brief. Sustainable Energy for All. <https://www.seforall.org/system/files/2021-04/Financing-Cooling-SEforALL.pdf>

in the RAC value chain broadly remain the same for different customer segments, such as residential and small commercial customers.

RAC products under consideration for the Cool Up project include:

- ▶ Air Conditioning systems
  - ▷ Residential (decentral and central)
  - ▷ Non-residential (includes commercial)(decentral and central)
  - ▷ Large commercial (Central) – Chillers based systems
- ▶ Commercial Refrigeration
  - ▷ Central (Centralised reach-in refrigerators and cold rooms)
  - ▷ Condensing units (reach-in freezers)
  - ▷ Standalone (display refrigerators cabinets)

The analysis has been conducted with apparent differences for these end-user groups in the latter part of this section.

The value chain of air conditioners and commercial refrigeration systems broadly comprises:

- ▶ Import (components and refrigerants)
- ▶ Manufacture (mainly fabrication and assembly)
- ▶ Export (commercial refrigeration and room air conditioning systems)
- ▶ Distribution (including warehousing)
- ▶ Retail sale / commercial sale

The following paragraphs outline each stage in the value chain and the associated financing.

### 5.1.1. Import

Jordan does not produce refrigerants, so for domestic use, all the refrigerants are being imported. Besides this, Jordan partly imports commercial refrigeration systems and room air conditioners to meet its local demand for these appliances. Many brands of air conditioners are imported and sold in Jordan. Jordan imports compressors needed for all commercial refrigeration systems that are assembled locally.

Commercial banks offer finance for imports or a dedicated national export-import financing institution. Importers need financing support to assure payment to the seller of goods located in another country. A "letter of credit" (LC) is provided by a local commercial bank from a country where goods are imported. It is basically a financial contract between a bank, a bank customer, and a beneficiary. A letter of credit is usually issued by the importer's bank and guarantees payment to the beneficiary if the terms of the letter of credit are met.<sup>37</sup> There are variations of LC facility, including usance LC and standby LC. Most commercial banks in Jordan offer LCs to importers.

Focus on specific natural refrigerants under the Cool Up programme may require interventions at the import stage. These could be policy interventions to reduce import tariffs or provide access to concessional finance to importing agencies.

### 5.1.2. Manufacture

Jordan has a small manufacturing base of commercial refrigeration equipment and room air conditioners. Air conditioners (ACs) of local (Petra) and international brands (including Daikin, Carrier, Trane, Samsung, and LG) are widely available in Jordan. Almost 50% of the AC systems sold in Jordan are manufactured locally. Commercial refrigeration systems (mainly condensing and centralised systems), including prominent local brands, are manufactured in Jordan. Around 85% of these systems are designed according

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<sup>37</sup> BDC. What is a letter of credit? <https://www.bdc.ca/en/articles-tools/marketing-sales-export/export/what-is-a-letter-of-credit>

to customer requests and manufactured locally. Jordan has roughly 29 manufacturing companies in this segment. It may be noted that Jordan has more than 400 workshops that provide maintenance and services to the RAC sector.

Local commercial banks primarily provide finance for manufacturing. While entrepreneurs raise the equity capital, most commercial banks offer term loans to new industrial projects. Banks offer equipment finance in loan or lease finance forms, apart from term debt for setting up facilities. The loan is provided based on the strength of a balance sheet to the extent of 70% of the project's cost with a balance of 30% brought in by the project developer (under the normal circumstances) in the form of equity. The average tenure of term loans from commercial banks may vary from 5 to 8 years, depending on the sector and nature of a project. Avenues for the financing manufacturing sector (regarding RAC products under review) include private equity, equipment lease and microfinance institutions (MFIs). Considering that most manufacturers and repair workshops of commercial refrigeration equipment belong to SMEs, these options described are applicable. SMEs account for a substantial share of economic activity in Jordan.<sup>38</sup> More than 90% of the enterprises in Jordan are SMEs. Terms of finance vary substantially with the nature and type of financing agency.

The Cool Up programme may advocate using Jordan's energy-efficient and low GWP RAC products. Under this situation, new manufacturing facilities could be set up, depending on the demand, local skillset, and manufacturing capacity. Finance for manufacturing may assume importance under these condition.

### 5.1.3. Export

Jordan does not have a solid manufacturing base in RAC products and exported AC systems during 2019 to a value of USD 90 million. Mainly room air conditioners are exported to Saudi Arabia, Kuwait, and Qatar. A small number of room ACs were exported to Lebanon from Jordan. **Local commercial banks and specialised financial institutions generally provide finance for export.** Export credit agencies offer loans, loan guarantees and insurance to help companies limit the risk of selling goods and services in overseas markets.

### 5.1.4. Distribution

Distribution management is the transfer of goods from the manufacturing facility to the point of sale. Distributors also undertake storing goods during transit and transporting them. Warehouse operations are an integral part of inventory entry into a warehouse(s) until products are transported and sent to the point of sale. The distribution assumes higher importance for room air conditioners, as volume runs in millions of numbers and requires transportation. Distribution cost includes transportation, storage, product handling, and often selling costs. **Financing the distribution sector** is often an integral part of the working capital finance under corporate finance. Effective working capital management is achieved through efficient distribution.

### 5.1.5. Retail sale

A buyer interacts with a retail sale agency or an outlet (or company-owned showroom) to buy an appliance or product (in the case of a residential customer or small commercial customer) at the retail sale stage. Retail sale operations result in receipt of cash against sales. In the case of a residential customer, the sale of RAC products (room AC or domestic refrigerator) takes place in cash or through a credit card. Many customers seek short term loans/credits with tenures of 1 to 2 years (or even 3 years). Retail operations for a retailer need to pay for rent, inventory costs, staff salaries, and other administrative expenses.

**Financing retail operations** is often a part of corporate finance, a forte of commercial banks. Commercial banks provide various finance facilities for operations of a retail agency, such as cash credit, overdraft, bill finance and working capital loans. Retailing operations cost is a part of the working capital requirement. Working capital is the fund invested in current assets and is needed to meet day-to-day expenses. Working

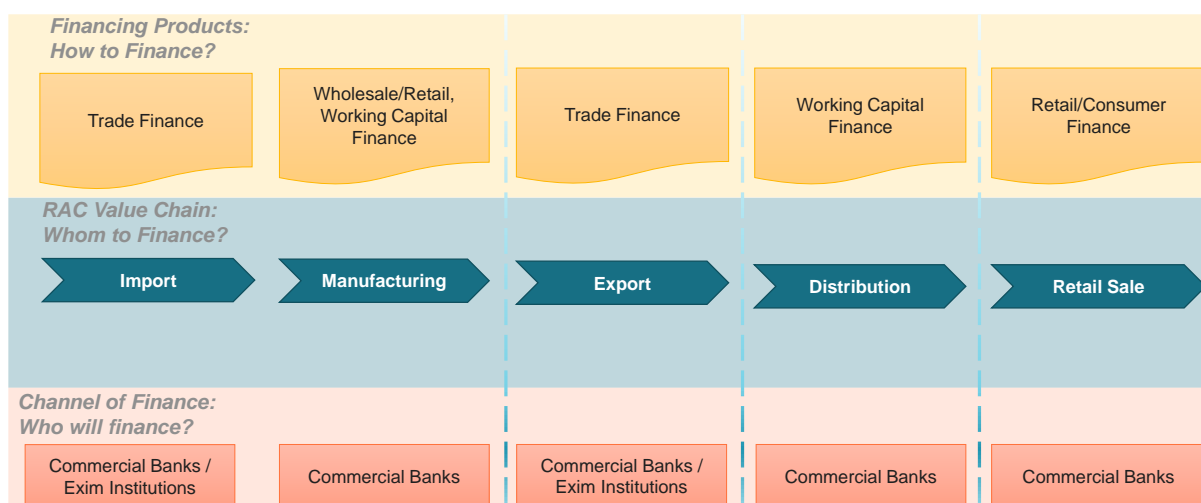
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<sup>38</sup> Betz, Frank; Frewer, Geoff. (02.2016). Neighbourhood SME financing: Jordan  
[https://www.eib.org/attachments/efs/economic\\_report\\_neighbourhood\\_sme\\_financing\\_jordan\\_en.pdf](https://www.eib.org/attachments/efs/economic_report_neighbourhood_sme_financing_jordan_en.pdf)

capital finance depends on the cash cycle of that company, credit terms and terms of sales and is short term finance. Banks require collateral for working capital finance (including hypothecation, lien, pledge of equity shares etc.).

Financing a customer to purchase home appliances by providing credit is another aspect of retail operations. The focus is on how the consumer borrows and on what terms. Retail sales of appliances can be multiplied through attractive consumer finance (e.g. "ZERO" interest loan). Many retail outlets (domestic appliances) in Jordan offer such financing schemes through an arrangement between a manufacturer and a partner commercial bank. Bank offers attractive lending terms. The manufacturer provides access to its customers to partner with the commercial bank through its retail sale outlets. In many countries (including Jordan), manufacturers utilise "trade discounts" on products to meet a part of the interest cost and hence offer lower interest loans or interest-free loans to customers to acquire appliances. Such schemes are applicable to residential customers and small commercial establishments such as shops, small offices, restaurants, etc. new channels of online sales are also emerging as new options.

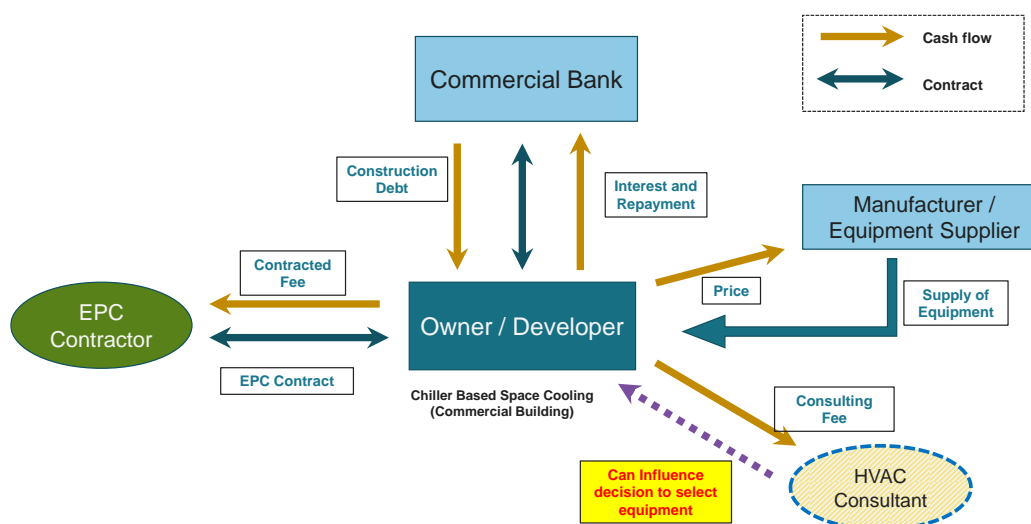
The following diagram illustrates all elements associated with the financing of the value chain of RAC products (as applicable for residential and small commercial customers):



**Figure 3:** Principal elements of value chain financing

**Commercial customers (Large):** Large commercial customers, such as large companies, large departmental stores and hotels are served directly by dealers, trading companies or manufacturers (direct sale). Most commercial refrigeration and air conditioning systems are sold through direct inquiries. Financing for such systems is provided through medium-term loans (equipment loans) with 3 to 5 years tenure. Most commercial banks offer equipment loans for commercial refrigeration products in Jordan. Loans are secured through collaterals such as hypothecation of the equipment or guarantees. **Leasing** is an alternative way to finance when a company does not want to own (and not reflected in the balance sheet). HVAC consultants play an essential role in selling large central space cooling projects (chiller-based systems).

The following schematic diagram provides an overview of a typical arrangement among the stakeholders associated with a large space cooling systems project.



**Figure 4:** Financing of a large space cooling project

A large-scale new project (space cooling or central cooling) has a broad cross-section of stakeholders such as a developer, an equipment supplier, heating, ventilation, air conditioning (HVAC) consultant, an EPC contractor, and a commercial bank. At the same time, the developer is the main stakeholder and the decision-maker in selecting equipment and availing a long-term debt from a bank or institution. HVAC consultants who (generally) advise developers often influence the decision to select an equipment or technology option. On the other hand, a retrofit of an existing chiller system with efficiency has a separate consideration, as the focus is on energy efficiency improvement. In this situation, the Energy Service Company (ESCO) often plays an essential role as a service provider.

The Cool Up programme may have to significantly focus on the retail stage to promote a particular group of products or sustainable cooling technology.

## 5.2. Banking Sector Overview

### 5.2.1. Banking Sector Players

Jordan has a well-developed financial system of 23 banks, 16 Jordanian banks, of these 3 are Islamic, and 7 foreign Banks. 862 branch, 76 offices, and 2038 ATMs.<sup>39</sup>

10 Microfinance institutions, 162 exchange houses, five payment service providers, 32 leasing companies, and 24 insurance companies and more than 1600 cooperatives, of which 900 are active.<sup>40</sup>

The Central Bank of Jordan (CBJ) regulates these players, with additional regulations in the financial sector coming from the Jordan Securities Commission. According to the CBJ, the financial sector represents about 20% of GDP, with commercial banks holding the lion's share of the industry.

Banks are the primary funding source for both the public and private sectors and have a capital adequacy ratio of 19%, well above the prudential requirement of 12%. They have comfortable liquidity, with an average ratio of 138.1%, well over the regulatory minimum of 100%.<sup>41</sup>

As per the data released from the Central Bank of Jordan, the total assets of the banking sector increased from JD 53.6 billion in 2019 to JD 57 billion in 2020, i.e., by a total of 6.3%. This points to the increase in assets from direct lending to the private sector, which after a decrease in 2018, sees a rise in 2019 and again in 2020 by 6.1%. One factor may be the Government's introduction of policies with subsidised lending

<sup>39</sup> Central Bank of Jordan - Annual Report 2021

<sup>40</sup> Ibid

<sup>41</sup> Nzebile, Peter; Denadi, Davy. USAID's Digital Finance Country Report – Jordan. ([https://pdf.usaid.gov/pdf\\_docs/PA00W9T5.pdf](https://pdf.usaid.gov/pdf_docs/PA00W9T5.pdf))

rates to the private sector, and more SMEs accessed the utilisation of the financing resources during the pandemic.

On the liabilities side, the increase has been very little in private sector deposits, which indicates that the loans given to the private sector increased by a higher percentage than the funds deposited by the private sector, which shows an increase in spending during the pandemic. There is an increase in the borrowings from the Central Bank by the commercial banks, which may fulfil the increasing demand for private lending. Moreover, an increase in foreign liabilities shows a popular trend in pandemics to move towards more stable currencies and hedge the risk of local currency valuation. Overall, the Country's financial sector has demonstrated resilience to changing financing climate and adapting to the Government's policies to address the economic requirements resulting from COVID-19 while still maintaining enough liquidity.

The outstanding balance of the credit facilities extended by the Jordanian banks showed positive growth of 5.7%, to increase to JD 28 billion in 2020. The credit extended to the private sector constituted 89.1% of the total credit facilities, while 8.3% was lent to the public sector.<sup>42</sup>

The credit extended to the construction sector in terms of economic activity turned out to be the highest, and all other economic activities also showed an increase in accessing credit facilities owing to a liquidity crunch during the pandemic, except for the mining sector, which showed a negative growth of lending by around 20%.<sup>43</sup>

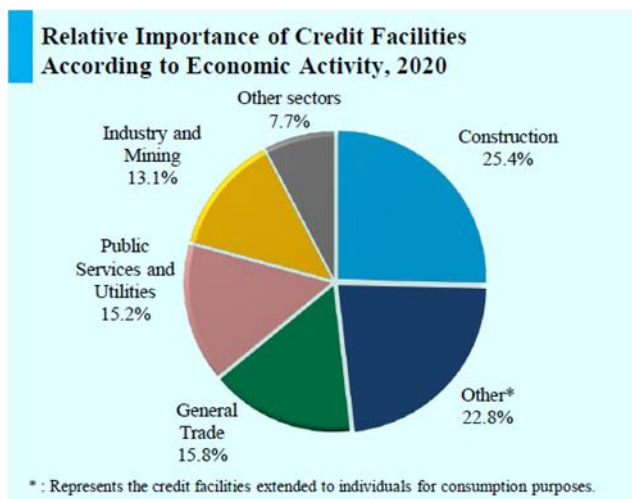
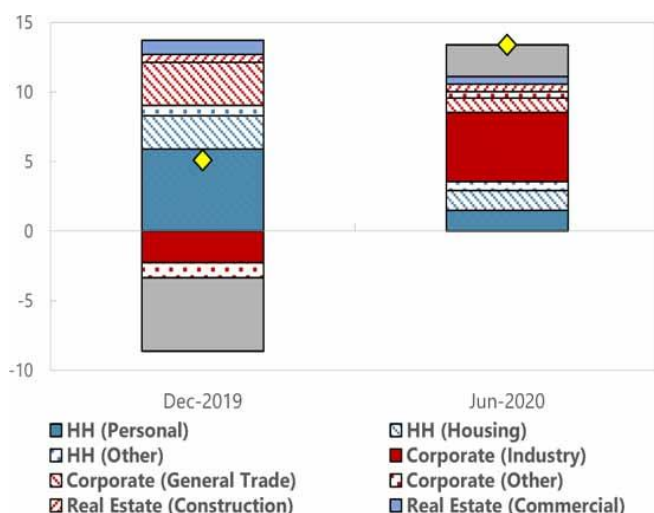


Figure 5: Break up of Credit from Jordan Banks



Source: IMF Staff Country Report 2021

Figure 6: Contributions to NPLs by Sectors

The ratio of non-performing loans (NPLs) has stayed relatively low at 5.5% in 2020, with the highest defaulter being the industry with over half the number of defaults.<sup>44</sup> As per the historical data, the major defaulter in the Jordanian financial sector had been households; however, due to the pandemic, as more SMEs access financing and cannot recover that amount in revenues, the probability of default increases. As per the same report, the probability of default became the highest for the communications sector in Q4 2020. According to IMF, the economic outlook for Jordan remains challenging. IMF projected real GDP at market prices at 2.0% in 2021, and it is expected to gradually increase to 3.3% in 2024.

<sup>42</sup> Annual Report of Association of Banks in Jordan (ABJ) 2020

<sup>43</sup> Annual Report 2020, Central Bank of Jordan, Issued September 2021

<sup>44</sup> International Monetary Fund. Middle East and Central Asia Dept. (2021) Jordan: Second Review Under the Extended Arrangement Under the Extended Fund Facility: Staff Report. 188;10.5089/9781513594705.002.A001 (<https://www.elibrary.imf.org/view/journals/002/2021/188/article-A001-en.xml#A001app02>)



## 5.2.2. Financial products focus on sustainable/green finance

Financial institutions have been performing well in Jordan, and with the policy push from the Government and CBJ, they have been expanding their portfolios within the EE and RE sectors. In the following are some emerging stakeholders:

Arab Bank has provided USD 267 million in loans and other infrastructure support since 2012, including projects such as wind, solar and wastewater treatment. The bank also periodically reports on its sustainability initiatives and expands its portfolio.

Jordan Islamic Bank (JIB) has been integrating sustainability into its operations and has helped with multiple renewable energy projects. It also included energy efficiency in its operations by incorporating energy-saving equipment.

The financial sector offerings for RE & EE projects vary from bank to bank. These offerings are either self-driven or initiated by the CBJ in cooperation with public institutions and Government Ministries, mainly the MEMR and MoE.

Banks with an extensive network with a regional and international presence, such as Arab Bank (AB) and Jordan Ahli Bank (JAB), have sustainability approaches, commitments, disclosure, and adequate reporting. These banks issue their annual sustainability reports frequently and disclose them by the Good Reporting Initiative (GRI), the Country's Sustainability Development Goals (SDGs), the Country's vision, and the voluntary guidelines of the capital markets on sustainability. In this context, banks' sustainability reports focuses on responsible financing, internal operations, digitalisation, employee empowerment, transparent reporting, system optimisation, and community awareness & cooperation.

Large banks such as AB contributed to financing infrastructure RE & EE projects in the Country. The AB has detailed reporting on the sustainability initiatives. AB, for instance, invested in RE projects to address climate change mitigation and support SDGs.

Selected banks offer finance for supporting RE and EE through JREEEF. Offerings from the banks mentioned above are added to the CBJ supported loan guarantee program directed to finance RE & EE projects for the individuals and SMEs. However, Cairo Amman Bank, Jordan Islamic Bank, Capital Bank, Union Bank, and other banks implemented the CBJ loan guarantee program. They shared the credit risk with the JLGC and enjoyed the subsidised rates provided by CBJ.

The Jordan Renewable Energy & Energy Efficiency Fund (JREEEF) was established (in 2010) by the Ministry of Energy and Mineral Resources (MEMR) in response to meet the needs of the Kingdom to invest in various sources of renewable energy and energy-efficient technologies to widen the benefit in multiple sectors, such as residential, educational (schools), health (hospitals) as well as private, public, industrial and service sectors. JREEEF signed an agreement with a number of local commercial banks under the auspices of the Banks Association in Jordan to provide finance at the subsidised rates of interest. These banks include Cairo Amman Bank, Al Ahli Bank, Union Bank, Capital Bank, Jordan Islamic Bank and Arab International Islamic Bank. The JLGC guarantees all the RE and EE projects supported by JREEEF up to 70% of the loan amounts. It aims to enable the participating banks to introduce comprehensive and integrated financing packages to support the beneficiaries of JREEEF programs to minimise electricity consumption and the efficient use of energy.

JREEEF covers the interest of the loan to implement energy efficiency improvement projects (energy saving measures). The industrial establishment can avail a loan of up to EUR 440,000 from one of the participating banks and a tenure of up to 5 years. Jordan Loan Guarantee Corporation (JLGC) provides a guarantee of up to 70% of the loan amount. Besides this, JREEEF provides grants for conducting energy audits to industrial companies.

These schemes financed solar water heaters and solar PV through households and SMEs. Cairo Amman Bank offers renewable energy (RE) and energy efficiency (EE) projects loans. Following are the product details:<sup>45</sup>

**Table 2:** Details of RE and EE finance products (Cairo Amman Bank)

Loan	Interest	Loan Limit	Payment Period
Home Solar PV Cells Loans	4.50%	2,250 JOD	48 months
Home Solar Water Heaters Loans	4.50%	500 JOD	36 months
Loans for Renewable Energy Products and Energy Saving Products for SMEs and Tourism, Specialized education, IT, health sector, Industry sector, Agriculture sector, Engineering Consultancy Projects.	Between (4.5% - 5%) depends (in or out) of Amman	Maximum 4,000,000 JOD	Maximum of 10 years in & out of Amman

In collaboration with the MEMR and renewable energy promotion and energy conservation fund, Jordan Islamic Bank launched a subsidised solar PV and solar water heaters scheme, subsidised by around 30%. Household sector financing for Solar PV with a maximum tenure of 48 months and JD 1,980 and solar water heaters for a tenure of 12 months up to JD 300.<sup>46</sup>

The financial programs relevant for RAC financing have come through the collaboration of local and international FIs, particularly after establishing the JREEEF. This fund was established to provide funds through various instruments, including loan interest rate subsidy, revolving funds, financial risk mitigation, credit guarantees, and equity and soft investments to promote renewable energy and energy efficiency. These schemes are implemented in alliance with local institutions. In the household sector, JREEEF was able to mobilise funds to install 30,000 solar water heaters and 3,500 solar PV systems at the cost of JD 17.4Million. The industrial sector finances energy audit studies and lending for project implementation. In 2020 this amounted to JD 5.5Million.<sup>47</sup>

The following table summarises an indicative list of programmes applicable for the Cool Up and its different possible alternative paths:

**Table 3:** Indicative list of programmes applicable for Cool Up

Indicative Programme Area	Features	Relevant Ongoing Facility
Energy Efficiency	Efficient Appliances	JREEEF, JLGC,
Energy Efficiency	Reduce energy needs for cooling by improving the building envelope	JREEEF
Cooling efficiency	Improving cooling efficiency of appliances	JREEEF
Manufacturing	Switch to more efficient cooling equipment manufacturing	Commercial loans (from banks), JLGC

### 5.2.3. Status of Non-Finance Stakeholders

The Government of Jordan has played a significant role in supporting energy efficiency, renewable energy, and sustainable cooling efforts through its ministries and institutions. Some of these initiatives were

<sup>45</sup> Cairo Amman Bank. Services. <https://www.cab.jo/service-details/265>

<sup>46</sup> Jordan Islamic Bank is the first Jordanian bank offers 30% Home Solar Cell Heaters Financed from the Renewable Energy Fund. (13.11.2019). <https://www.jordanislamicbank.com/en/content/jordan-islamic-bank-first-jordanian-bank-offers-30-home-solar-cell-heaters-financed>

<sup>47</sup> United Nations Economic and Social Commission for Western Asia - ESCWA. (n.d.). JREEEF Milestones <https://www.unescwa.org/sites/default/files/event/materials/1.5%20-%20Mr.%20Rasmi%20Hamze%20-%20JREEEF%20Milestones.pdf>

commenced almost a decade ago. On the other hand, bilateral and multilateral institutions have also contributed to these efforts.

### **Royal Scientific Society/National Energy Research Center**

The Royal Scientific Society (RSS) is an NGO that was established in 1970, a knowledge leader for science and technology locally and regionally. The RSS uses scientific and engineering research to power economic development and social progress.

The Royal Scientific Society is the largest applied research institution, consultancy, and technical support service provider in Jordan and is a regional leader in the fields of science and technology.

The National Energy Research Center (NERC), is part of the Royal Scientific Society (RSS), and was established in Amman for the purposes of research, development, training in the fields of new and renewable energy and raising the standards of energy use in the different sectors and to promote the utilization of renewable energy in Jordan.

NERC is specialized in promoting energy efficiency and conservation practices in Jordan and the middle east countries and has trained many private and public sector professionals in this area. NERC is strongly involved in projects within programs that deal with the development of new energy efficiency technologies and techniques as well as know-how transfer. With regards to the services provided to third parties, NERC carries out techno economic feasibility studies, building energy design studies, energy audits, monitoring and measurements, as well as performance measurements and certification of buildings & products.

In addition, NERC was heavily involved in the development of the technical documents related to energy labelling and minimum performance and has assisted the public and private sectors in bridging the gap between them to ensure a smooth transition towards energy labelling and minimum performance parameters for home appliances. NERC has energy labelling lab that performs energy labelling tests for home appliances (air conditioning, refrigerators & freezers, washing machines and lighting).

A cooperation between the National Energy Research Centre (NERC) and the Renewable Energy Promotion and Energy Conservation Fund (JREEEF) has been achieved. RSS/NERC has created partnerships to implement projects and programs, mainly including School Heating Program within the Royal Initiative to warm schools in cold areas and provide cooling in hot areas through implementing air conditioning , PV efficient lighting, and thermal insulation measures in schools.

### **EDAMA Association**

EDAMA in Arabic means "sustainability". EDAMA Association is a Jordanian NGO established in 2009 to cultivate an environment where innovative solutions for energy and water independence and environmental conservation emerge. EDAMA is the NGO recognised for creating a thriving green economy, where businesses are empowered to play a leadership role in transforming Jordan's energy, water, waste, food, and transport systems.

EDAMA's efforts are focused on four primary areas (Advocacy, Business, Networking, and Education). EDAMA aims to advance Jordan's movement towards a green economy as a priority goal that needs robust knowledge hubs, multi-stakeholder dialogue avenues, and private sector mobilisation in its advocacy work. EDAMA perceives that, key players from the public, private, and NGO sectors discuss and shape the future development of Jordan's energy, water, and Environment (EWE) sectors.

EDAMA works with its partners to enable the private sector to become competitive and innovative. Moreover, EDAMA continues to build on its experience within the clean energy sector. The NGO believes that networking is the most productive & efficient way to strengthen the social capital of the Energy, Water and Environment sectors. EDAMA also conducts capacity building and development programmes in the Energy, Water and Environment sectors offered to members and non-members. These capacity-building programs aim to contribute to sector growth and help individuals and companies expand their knowledge base and work areas.

## **Manufacturers**

Regarding implementing agencies and suppliers, Abdin Industrial is a leading manufacturer and supplier of refrigeration and kitchen equipment in the Middle East. It was the implementing partner of every trans-critical CO<sub>2</sub> refrigeration system in a supermarket in Amman. This project was completed in collaboration with UNEP (CCAC), UNIDO and the Ministry of Environment and served as a model project that transitioned to natural refrigerants and showcased energy efficiency, which saved on operating costs. Abdin has stated its intention to replicate this model throughout the region and the country.

Petra (Jordan) is a leading HVAC company in Jordan and was established in 1987. Principal products of Petra include air handling units (AHUs), Chillers, exhaust fans (and fan coil units) and other associated equipment needed for HVAC systems. Besides, Petra offers complete HVAC systems, package units as also cooling systems for data centres, etc. Petra caters to broad spectrum of sectors which include, commercial (buildings, malls), education (school college buildings), entertainment (movie theatres and auditoria), health and industrial sectors. Petra has served more than 20 countries from around world including MENA region countries and USA.

## 6. Opportunities for Financing of Sustainable Cooling Technologies

The following paragraphs present an overview of the potential financial mechanisms, business models, and proposed financing products that might fit with the current and potential financing dynamics and practices of the Jordanian FIs, including the banks in the private and public sectors, and the justifications for the introduction and expansion in these financing offerings.

Although many innovative financing products and services are used worldwide to finance the RAC sector, the most viable and applicable ones for each segment (residential, commercial, and public) were selected.

### 6.1. Sources of finance, financing mechanisms and business models

Sustainable Cooling Options (Technologies and Products) are primarily RAC products and equipment with high energy efficiency (EE) and low Global Warming Potential (GWP). Thus, a room air conditioner using natural refrigerant and having high energy efficiency can be classified as a sustainable cooling appliance. Similarly, a space cooling system with high-efficiency chillers and a radiant cooling system can be termed a sustainable cooling technology/system. The following passage describes financing aspects related to sustainable cooling options.

Financing energy efficiency has been discussed widely over the years, and there is a substantial amount of literature. Financing Sustainable Cooling Options (Technologies and Products) can be broadly considered as an extension of financing energy efficiency. Besides, the focus is on financing the RAC sector, including RAC products and equipment. This document focuses on financing three principal end-user segments, a) residential, b) commercial, and c) public sector concerning RAC products.

There is a broad cross-section of financing mechanisms/products and offerings related to EE. On the other hand, financing RAC is commonly used in financing RAC sectors and technologies. These are used at different implementation levels in different countries, depending on the specific needs of the sector in each Country, their viability & feasibility, as well as the readiness of the market and its participants, the risk appetite of the FIs, and the availability of proper guarantees and collaterals. For each sector, financing mechanisms have been shortlisted based on the local FI's familiarity in terms of applicability, procedures, risks and commonly used guarantees in financing used in other economic sectors and retail clients in the country. In general, this can be replicated for the EE sector and RAC in specific. As a starting point, these can be used to upscale the cooling sector in Jordan before expanding to other potential innovative financing schemes.

#### 6.1.1. The broad cross-section of sources of finance

As discussed in the previous sections, there is a wide cross-section of sources of finance in Jordan. These include commercial banks, leasing companies, microfinance institutions and specialised institutions such as Jordan Loan Guarantee Corporation (JLGC). Jordan has a dedicated institution for financing urban local bodies called the Cities and Villages Development Bank (CVDB). Commercial banks do provide guarantees to their customers. Most of these institutions also support renewable energy and energy efficiency projects. The following table provides a list of all sources of finance for energy efficiency projects:

**Table 4:** Sources of finance for energy efficiency projects

Sources of Finance	Residential	Commercial	Public Sector
<b>Commercial Banks</b>	•	•	
<b>Non-banking Financing companies</b>	•	•	
<b>Micro Finance Institutions (MFIs)</b>	•		
<b>Private Equity Funds / Venture Capital</b>		•	

<b>Housing Finance Institutions</b>	•		
<b>Leasing Companies</b>	•	•	•
<b>Guarantee Agencies / Institutions</b>	•	•	•
<b>Crowd Funding Institutions</b>	•	•	•
<b>National financing institutions</b>			•
<b>Bilateral Financing institutions (e.g., KfW)</b>	•	•	•
<b>International Financing Institutions (IFIs)</b>	•	•	•

**Source:** Manual of Financing Mechanisms and Business Models for Energy Efficiency, Basel Agency for Sustainable Energy (BASE) (2019)

International financial institutions (IFIs): The role of international financial institutions (IFIs) in sustainable development financing (and sustainable energy) in developing countries and transitional economies cannot be disputed. Sustainable finance banks and FIs offer new products such as renewable energy (RE), energy efficiency (EE), microfinance and low-income housing. This promotes sustainable development and helps partner banks to differentiate themselves. The most important characteristic of these institutions is high (AAA) credit ratings and a broad membership of borrowing and donor countries. These institutions operate independently but have shared objectives of poverty reduction and improving people's living conditions, promoting regional cooperation and contributing to sustainable development.

Apart from the World Bank and International Finance Corporation, European Bank for Reconstruction and Development, European Investment Bank, and Islamic Development Bank have ongoing programmes in Jordan. In addition, bilateral financing agencies such as AFD, JICA and KfW are active.

### 6.1.2. Financing Mechanisms

Sustainable Cooling solutions will revolve around Energy-Efficient equipment with low Global Warming Potential (GWP). Therefore, alternative financing approaches for EE financing are also applicable for sustainable cooling.

#### A. Financing mechanisms and business models for the residential sector

- ▶ **Dealer financing**
- ▶ **Positive lists**
- ▶ **Guarantees**



#### Dealer financing

Through Dealer Financing, the energy-efficient technology providers support the residential RAC sector by implementing a credit-based model. The residential customers acquire energy-efficient products with no (or very little) money by promising to pay later following a time schedule agreed upon by the provider.

This form of financing can be made through direct and indirect dealer financing models, though direct credit is more commonly used.

The providers of the direct loans use their resources to finance the energy-efficient equipment purchased by customers, with a typical tenure of 90 and 180 days. In the indirect loan model, however, the provider facilitates the loan application by collecting information from the customer and forwarding the application to a lender who assesses the application and quotes the credit. This can also be supported by an agreement between the provider and a bank to allow the use of a credit card for payment with special credit conditions (e.g. for 6 months of credit at no interest). Banks also offer 12 -36 months credit to acquire domestic appliances often via credit cards.

#### Positive Lists

This is a flexible financing mechanism. It provides pre-agreed lists of sectors, equipment, sustainable technologies, or technology providers pre-approved for lending by financial institutions. Under the arrangement, FIs give loans to borrowers and require that the loan proceeds are solely used for projects and investments that comply with the pre-approved list. This method follows standard lending procedures in assessing the credit and conducting due diligence in line with the positive list. This can be directed to the RAC financing specifically by suggesting a set of guidelines, market standards and consistent methodology for FIs' use. This form of financing can be used in combination with other financing products, such as green loans and revolving funds.

## Guarantees

An example of this financing form is the partial loan guarantee payment guarantee, such as the program provided by the JLGC to finance the EE and RE in Jordan through the participating local FIs. The guarantees are designed to reduce the FIs' perceived risks in the short term and improve their technical and financial confidence in specific EE projects in the long term. It can help expand the loan financing of commercially viable EE investments in the residential sector. It will also help increase the EE projects' awareness and risk mitigation options.

The guarantees to local FIs are usually provided by IFIs, governments, or utility providers through public policy EE investment programmes backed by IFIs or government resources. These guarantees are offered to participating FIs that initiate the relevant transactions with borrowers seeking commercial loans.

This type of financing gives FIs incentives to lend as they are partially compensated for potential losses. It proved helpful when the banking system functions well and allows for market and sector development through supported EE lending.

## B. Financing mechanisms and business models for the commercial sector

- ▶ **Loans and green credit lines**
- ▶ **Dealer or trade financing**
- ▶ **Guarantees and insurance**



The following financing mechanisms have been shortlisted for the commercial RAC sector in Jordan:

### Loans and green credit lines

Several FIs use put credit lines for financing EE projects, sometimes with favourable conditions and/or preferential terms such as subsidising the interest rates on the loans or the extended tenors. Commonly, commercial enterprises finance their activities through direct commercial loans from local FIs. This applies to the financing of EE projects. The ability of an enterprise to access this financing source is highly affected by creditworthiness of that commercial borrower. This creates a challenge to the start-up businesses and some SMEs, who have to prioritise financing their core business activities over the financing of EE projects.

FIs financing can also be supported by funding from international development funds or development banks. The expansion in offering this type of financing is expected to succeed in Jordan. It is the situation in many counties, as loans and credit lines have proven successful in scaling-up commercial EE projects.

Green credit lines are suitable for overcoming high upfront cost barriers in financing EE projects. This applies to medium and large enterprises, while the SMEs may face difficulties providing the required collaterals. Credit Guarantee funds can support SMEs by covering their collateral requirements in similar situations. The **positive lists** can also facilitate the due diligence of the green loans.

### Case Study: Promoting Energy Efficient Room Air Conditioners (PEERAC) (UNDP, n.d.)

To reduce the GHG emissions from room air conditioners (RACs) in China's residential and commercial sectors, the Credit line funded\* by GEF, the Chinese Government, other funding sources (China's Great Orient Chemical and Ministry of Agriculture) and in-kind contributions (RAC manufacturers) was operated during 2008 - 2015. The project successfully facilitated efficiency upgrades to older units and promoted energy-efficient RACs in the domestic market. For successful dissemination of energy-efficient units and to ensure savings were achieved, this programme required awareness-raising and engagement to stimulate demand. This involved consumer education, public relations events, and preliminary work to enhance national energy-efficient labelling to ensure information availability and consumer awareness. The main project activities were:

- ▶ AC compressor (ACC) efficiency upgrades
- ▶ RAC efficiency upgrades
- ▶ Energy efficient (EE) RAC promotion
- ▶ 20,000 inefficient RACs retired and recycled

UNDP implemented the project activities, and as a result of this programme, ACC efficiency increased by 13%, and RAC efficiency increased by 23% over the project baseline (2.67%), exceeding the 2012 target.

(\* Global Environment Facility (GEF): US\$6,263,600, Government: \$100,000, Other: \$20,000,000 In-kind contributions: \$1,250,000

### Dealer or trade financing

It is a credit-based model in the form of financial support from the EE technology providers to their commercial clients who acquire energy-efficient products with no (or very little) money, on a promise to pay later according to a schedule agreed upon by the provider.

As with the case in the residential sector, this form of financing can be made through direct and indirect dealer financing models, while direct credit is more commonly used. The providers of the direct loans use their capital to finance the energy-efficient equipment purchased by customers. In the indirect loan model, however, the provider facilitates the loan application by collecting information from the customer and forwarding the application to a lender who assesses the application and quotes the credit. This can also be supported by an agreement between the provider and a bank to allow the use of a credit card for payment with special credit conditions (e.g. for 6 months of credit at no interest).

### Guarantees and insurance

Like the residential RAC sector, guarantees can be used as a financing product for the commercial RAC sector in Jordan. This can be applied through a partial loan payment guarantee, such as the program provided by the JLGC to finance the EE and RE in Jordan through the participating local FIs. It can help expand the loan financing of commercially viable EE investments in the commercial sector. It will also help increase the FIs' awareness of the EE projects, their risk mitigation options, and/or their reluctance to lend due to the small project sizes and high transaction costs, which causes a high level of perception of credit and repayment risks. The guarantees are designed to reduce the FIs' perceived risks in the short term and increase their technical and financial confidence in specific EE projects in the long term.

The guarantees to local FIs are usually provided by IFIs, governments, or utility providers through public policy EE investment programmes. These guarantees are offered to participating FIs that initiate the relevant transactions with borrowers seeking commercial loans. The agreements lay out the eligibility criteria and guarantee support for a loan portfolio. Guarantees can be offered in combination with other credit enhancement measures and financial incentives to the FIs (such as grants from public funds or international development institutions or funds).



This type of financing gives FIs incentives to lend, partially compensating for potential losses due to specific causes. At the same time, some other credit guarantees may cover the loss from loan default regardless of the cause of the loss. This form of financing proves helpful when the banking system functions well and allows for market and sector development through supported EE lending.

Guarantees usually cover less than 100% of the default loss to preserve the incentives for the FIs to conduct their part of the due diligence and the assessment of their borrowers' credit risk and creditworthiness. If the guarantees are also supported with EE technological or contractual obligations insurance, this will incentivise the FIs to apply this form of financing.

### C. Financing mechanisms and business models for the public sector

- ▶ **Public-private partnerships**
- ▶ **Revolving loan funds**
- ▶ **Municipal financing models**



The public sector in Jordan is broad in scope and includes public street lighting, administrative buildings, public hospitals, schools, and other public facilities. This creates diversity in the most effective models to suit the needs of each market segment. The following are the most viable, applicable, and promising for financing the RAC in the public sector in Jordan:

#### **Public-private partnerships (PPPs)**

PPP approach involves a government agency and a private company to finance, design, construct and operate infrastructure facility. PPPs are commonly applied in Jordan in mega projects in the different economic sectors and at different size scales. The local regulations encourage and support PPPs, backed by PPP law and the recent formation of the Ministry of Investment (MoI) with a clear mandate towards enhancing the PPP initiatives and implementation.

PPPs are appropriate for private investment in some types of public EE investments, such as significant or higher risk projects. Concession under a PPP approach typically last for 20-30 years, where a private sector company provides the funding on a structured project finance basis and constructs, operates, and maintains the project's physical assets. PPP financing in the RAC sector would require the private sector to secure project financing to install and retain the technology RAC.

The primary security sources to the private sector investor/funder are the contractual payments from the public sector. The key advantage of PPPs for municipalities is the source of capital (the private sector), which is supported in some cases by supplementary grants.

EE street lighting is an example project in Jordan implemented by the Ministry of Local Affairs (MoLA), the Jordanian Municipalities, and a private sector investor to benefit the municipalities throughout the Jordanian governorates.

PPPs offer optimal risk-sharing with the private sector to deliver better value for the public users. This provides opportunities for the public sector to improve the delivery of services, better management of facilities, speed up the delivery of public infrastructure, and the mobilisation of private capital.

#### **Revolving loan funds**

These funds are lent in subsidised loans to end-users for projects that fit a specific purpose, such as EE upgrades. Loans are repaid to the fund, usually with a small amount of interest (just enough to cover the administrative fees for the fund), and then they are re-lent to new end-users in a revolving manner. A government agency or government-backed entity typically manages these funds.

The key feature of these revolving funds is the low-interest rate charged and long-term tenor available from commercial banks.

#### **Municipal financing models**

This financing mechanism involves revenue and expenditure decisions to fund EE projects in the public sector. The municipalities decisions relate to their revenue sources: taxes, municipality fees, government transfers, investment income, property sales, licences, and permits. These are used to finance EE infrastructure using operating revenues and borrowing, which PPPs can supplement.

The public bidding process allows for public bids and direct bidding if a RAC technology provider wants to bid for an innovative or cost-effective foreign RAC technology. Municipalities may rely on their budget revenues, while they may use a mix of local taxes and government transfers to finance annual capital funds for the EE investments. Suppose these sources are not enough to cover the upfront costs of the EE project. In that case, the municipalities need to look for other financing sources by applying for loans through the CVDB, the main financing arm of the municipalities in Jordan. This requires providing CVDB with loan applications supported by justifications and a pre-feasibility study of the potential project. Besides the economic assessment of the viability of the project, the feasibility indicators should highlight the expected energy savings to be achieved by the EE retrofit projects that will lead to future budget savings, which can be allocated by the municipality to tackle other investment needs and to improve the quality of their service delivery.

#### Case Study: EESL Super-Efficient Air Conditioning Programme (ESEAP)

The main goal of the programme was to increase the availability of affordable super-efficient room air conditioners (RACs) in India

and Indian export markets (Bangladesh, Nepal, Sri Lanka).

To lower price and increase the quality of super-efficient RACs using lower-GWP refrigerants by buying in bulk and streamlining distribution & installation, a joint venture company of the Government of India Ministry of Power and Public Service Undertakings (PSUs). Supported by TERI, IGSD, TERRE, and NRDC initiated the "Competitive bulk procurement of super-efficient RACs" programme in 2017. The budget was US\$68m purchase to 100,000 super-efficient.

RACs first tender round in February 2017 for 100,000 RACs with an Indian Seasonal Energy Efficiency Ratio (ISEER) of 5.2 or higher, including a 3-year comprehensive warranty. The Indian Government requires at least 3 qualifying bidders. Second tender round where bidders can match the lowest bid to qualify for a portion of the bulk purchase. As a result of this programme, Panasonic produces 60,000 super-efficient RACS, Godrej providing 40,000, at ISEER 5.2. EESL plans to purchase 500 more RACs similarly in the future.

The following table enlists various financing mechanisms for implementing energy efficiency projects in the three sectors. The table highlights a more relevant financing mechanisms for Jordan, as described in the previous paragraphs.

**Table 5:** Financing mechanisms for energy efficiency projects

Financing Mechanisms	Residential	Commercial	Public Sector
<b>Credit Guarantee</b>	•	•	•
<b>Debt Finance (including dealer financing)</b>	•		•
<b>Trade Finance / Debt Finance</b>		•	
<b>Positive list</b>	•	•	
<b>Revolving credit</b>			•
<b>Insurance and guarantees</b>		•	•
<b>Public-Private Partnership (PPP)</b>			•
<b>Municipal Financing models</b>			•

Source: Manual of Financing Mechanisms and Business Models for Energy Efficiency, Basel Agency for Sustainable Energy (BASE) (2019)

## Financing Instruments

A financing product is an instrument in which a person or an entity can make a financial investment (for example, a share); borrow money (for example, credit cards, loans or bonds); or save money (for example, term deposits). Most individuals avail short-term credits to acquire domestic appliances. Mortgage loans for financing the purchase of an apartment or a house generally have more than 10 years of tenure (going up to 15 to 20 years). Commercial customers (e.g. supermarkets or departmental stores) borrow medium-term loans to acquire display refrigerators or reach-in freezers. On the other hand, hotels and offices may avail long-term loans to install central air conditioning systems (or replace old systems with energy efficiency). Commercial customers have wider financing options, including the possibility to rent or lease equipment. Leasing is a typical off-balance-sheet financing mechanism wherein the leased equipment is not reflected in the balance sheet. Public sector organisations, mainly urban local bodies (ULBs), can issue bonds to raise resources for their projects (e.g. public buildings and HVAC systems in these buildings) apart from conventional loans. Jordan has a specialised institution called Cities and Village Development Bank for financing ULBs. Public sector organisations can also avail themselves of traditional financing products to finance equipment or projects. Financing of energy efficiency products and projects also uses these financing products. The following table provides an overview of different financing products applicable to energy efficiency products/projects in the sectors under discussion.

**Table 6:** Financing products for financing energy efficiency

Financing Products	Residential	Commercial	Public Sector
Grant	•	•	•
Credit (conventional debt)	•	•	•
Short Term Debt	•	•	•
Long Term Debt	•	•	•
Lease (Rental)	•	•	•
Credit Guarantee		•	•
Partial Credit Guarantee		•	•
Pension Funds (Bonds)	•		
Bonds (Green bonds)			•

Source: Manual of Financing Mechanisms and Business Models for Energy Efficiency, Basel Agency for Sustainable Energy (BASE) (2019)

## 6.2. Finance Stakeholder Inputs

Interactions with commercial banks and local FIs provided insights into banking and finance in Jordan regarding the RAC sector. There was one meeting with an official from the World Bank. Most banks provide financial assistance to MSME segments, and almost 10% of the loan portfolio belongs to the MSME segment. JLGC provides guarantee cover to partner commercial banks for EE and RE projects loans. JLGC covers up to 70% to 85% of a loan through a guarantee for up to 250,000 JOD (for loans with a maximum repayment period of up to 60 months). CBJ has schemes for providing funds on soft terms to commercial banks. These schemes are implemented in association with relevant ministries and commercial banks. Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) allied with several commercial banks in 2016 to finance green power projects. This scheme can provide MSEs up to JOD 250,000 to construct their electricity-generation systems. JREEEF provided 3 loans during 2020. Most commercial banks seek funds from IFIs at rates lower than the cost of funds to banks. Banks do receive technical assistance and training under programmes of IFIs. Many banks provide finance to green projects as a part of corporate social responsibility and do not focus on green finance.

A recent stakeholder consultation meeting held on 20 April 2022 provided an opportunity to understand how commercial refrigeration systems manufacturers developed some of the products. Industry

representatives indicated financing could be an important factor in supporting sustainable cooling technology options in Jordan.

It is envisaged to work closely with select banks and institutions to develop the feasibility of different sustainable cooling technology options and business models. It is proposed to develop a bankability/screening tool in close cooperation with selected partner banks.

### **Snapshot from Interviews**

Capital Bank of Jordan has general guarantee schemes for different sectors (like JLGC); however, no guarantee scheme is specifically for energy efficiency or green financing. The Bank stated that supporting energy transformation in the Country, reinforcing Bank's environmental responsibility and decreasing electricity bills would be the main driver of green financing projects. The CBJ financing program specializes in EE, and the green represents 1% the of overall bank portfolio, but they are in the CBJ renewable energy programme.

Ahli Microfinance will start promoting green products through their new consumption loan and is interested in the Cool Up project.

Bank Al Etihad stressed that the availability of collateral for loans above 250 thousand JOD as JLGC guarantees all under is one of the main challenges for financing green energy projects. On the other hand, there are not many banks focusing on Green financing In the Country, and the Bank would like to expand and add more products to serve other sectors.

Jordan Loan Guarantee Corporation (JLGC) guarantees loans within energy projects through the Energy Program in cooperation with the Energy Fund to encourage the beneficiaries of the SME sector registered in Jordan and individuals to obtain a system of renewable energy sources, thus reducing the burden of energy bills on the beneficiary and the Government, helping beneficiaries to assess their energy needs, and improving the efficiency of beneficiaries of this service, in a way to cover their financial needs from Banks & Financial institutions.

World Bank indicated that the current focus of the Bank's efforts is on the policy aspects of energy tariffs and the financial sector's recovery. The Bank activities have no direct linkages to the RAC sector as such. However, its actions support the green economy and integrate climate-responsive actions in its investments (part of the appraisal process). The principal barriers to investments in EE projects include inadequate awareness of technology related to EE and the high initial investment required for EE equipment. The main challenges of the RE and EE projects in Jordan are identified as the lack of end users awareness, either corporates or individuals, high initial investment such as replacing old machinery and equipment with new energy-efficient machinery and equipment, and the energy efficiency and green energy projects need a lot of efforts and engagement from many different parties.

GIZ at present facilitates the Green Action in Enterprises (GAIN) programme being executed by the Ministry of Environment. GIZ aims to enhance technical capabilities to promote resource-efficient and ecologically sustainable production. GIZ works with public and private partners for the purpose.

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