Cool Up
Upscaling Sustainable Cooling

FINANCE MARKET ASSESSMENT TÜRKİYE

October 2022

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Acronyms

AC	Air Conditioning
BAU	Business As Usual
BoP	Balance Of Payments
CO2	Carbon Dioxide
CSOs	Civil Society Organisation
CTF	Clean Technology Fund
CW	Calendar Week
EBRD	European Bank For Reconstruction And Development
EE	Energy Efficiency
EIP	Efficiency Increasing Projects
ESCO	Energy Service Company
FDI	Foreign Direct Investment
FIs	Financial Institutions
GCF	Green Climate Fund
GDP	Growth Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GWH	Gigawatts Per Hour
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbons
HFC	Hydrofluorocarbon
HVAC	Heating, Ventilating And Air Conditioning
INDC	Intended Nationally Determined Contribution
K-CEP	Kigali Cooling Energy Programme
MEPS	Minimum Energy Performance Standards
MLF	Montreal Multi Fund
MoENR	Ministry Of Energy And Natural Resources
MoIT	Ministry Of Industry And Technology
MP	Montreal Protocol
MTCo2	Eq Metric Ton Carbon Dioxide Equivalent
NCCAP	National Climate Change Action Plan
NCP	National Cooling Plan
NDC	National Determined Contribution
NEEAP	National Energy Efficiency Action Plan
NGOs	Non-Governmental Organisation
NOU	National Ozone Unit
NPL	Non-Performing Loan
ODP	Ozone-Depleting Substances

OIZ	Organized Industrial Zone
PPP	Public Private Partnership
RAC	Refrigeration And Air Conditioning
RE	Renewable Energy
TOE	Tonne of Oil Equivalent
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention On Climate Change
UNIDO	United Nations Industrial Development Organization
WhCs	White certificates

1. Introduction

With energy demand expected to increase 50% by 2040,[1] 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 2,000 times more potent for the climate (direct greenhouse gas emissions) than carbon dioxide and natural refrigerant alternatives. Without further policy intervention, direct and indirect emissions from cooling and refrigeration may rise 90% above 2017 levels by 2050, 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 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, and training and raising awareness.

The programme's cross-segment approach focuses on the residential and commercial AC sector and 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 significant 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 the 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

[1] 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.

1.2. Aim and scope of this report

This finance market assessment report is the first in a series of reports that the Cool Up programme will produce. It aims to provide an overview of the banking and finance sector in Türkiye with reference to the RAC space laying the foundation for further work to be used within the programme and facilitating informed decision makers for all public and private sector stakeholders. This report will lead to other work in the area of the 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 a compilation of limited data available on direct financing of the RAC sector (primarily AC in residential and non-residential buildings and commercial refrigeration). While the report mainly focuses on commercial financing aspects, it briefly summarises the current policy landscape and the cooling sector status.

- Chapter 2 provides a brief country economic overview followed by high-level summaries of the policy and cooling sector status.
- Chapter 3 elaborates on definitions used in this report and 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 of the value chain associated with the RAC sector and our understanding of the financing of individual elements of the value chain. This section also summarises the banking sector in Türkiye and details various green financing schemes. The report discusses the roles of non-finance organisations in support of climate change and energy efficiency.
- Chapter 5 outlines various financing approaches that could be explored further for sustainable cooling technologies in three prominent end-use sectors such as residential, commercial and public. Cool Up has selected these approaches as these have been used reportedly for 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 the 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 to 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 came into force on 1 January 2019 and implemented a global HFC phase-down to reduce HFC production and consumption by more than 80% over the next 30 years.

For the Cool Up partner countries — Egypt, Jordan, Lebanon, and Türkiye[2] — exact 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.

[2] 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	
Phase down	10% of the baseline for 2029-2034
Phase down	30% of the baseline for 2035-2039
Phase down	50% of the baseline for 2040-2044
Phase down	80% of the baseline for 2045

There will be numerous opportunities and also challenges for cooling sector conversions and the introduction of sustainable and future-proof alternatives to ODS and HFCs in upcoming years.

Over the past years, in many countries, HCFC replacement has 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. Early in the transition process, this direct replacement is called leapfrogging 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 to as not-in-kind technologies[3]) 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.

[3] Systems that do not rely on a vapor compression cycle using a gaseous refrigerant.

2. Overview

2.1. Setting the scene

Türkiye has six relevant climate zones ranging from very cold to hot and humid. Türkiye's energy consumption has steadily increased across all sectors, reaching 103 Mtoe in 2018 and contributing to net GHG emissions of 422.1 $MtCO_{2eq}$ in 2019.[4] In 2018, electricity demand in the residential and public and commercial sector combined accounted for 48% of Türkiye's total electricity consumption.[5] Türkiye's efforts to phase-out ODS emphasise why it is an important, emerging actor for the European and Middle East heating, ventilation and air conditioning (HVAC) markets.

2.2. Macroeconomic overview

Türkiye has a GDP of 719.496 billion EUR[6] or EUR 9,619 per capita in 2021.[7] It imports the majority of its energy needs, 75% as of 2015, with natural gas making up the largest share of that.[8] This high level of import dependence has moved Türkiye to diversify its energy supply, investing heavily in renewable energy (RE), tripling RE generation in the last decade, and investing in three new nuclear power plants.[9]

2.2.1. Electricity Consumption

In Türkiye the residential sector accounts for around 21% of total electricity consumption (2018), making it the third largest consuming sector behind industry (44%) and services (33%).[10] Electricity made up the bulk of energy consumption in the building sector at 52%, with fossil fuels (for cooking and heating) making up the rest.[11] Heating and cooling make up over one third of the energy used in buildings.[12]

In the last two years electricity consumption in Türkiye has plateaued, mainly due to the corona crisis, after a growth rate of over 5% yearly for the period from 2010-2018.[13] Demand, however, is expected to continue to grow yearly between 2.8% and 4.7% (base case) between 2021 and 2030.[14]

Electricity demand growth is primarily driven by the following:[15]

- Economic growth and increased industrial output

[4] International Energy Agency: County Report Türkiye. International Energy Agency. Available online at https://www.iea.org/countries/turkiye

[5] International Energy Agency: Data & Statistics. International Energy Agency. Available online at https://www.iea.org/data-and-statistics

[6] All data given in USD in the original source has been converted to EUR. 1 USD has been converted to 0.9993 EUR, based on European Central Bank, "Euro foreign exchange reference rates," at the time of publication.

[7] World Bank: "Türkiye Country Context" (2022). https://www.worldbank.org/en/country/turkey/overview

[8] World Bank: "Energy imports, net (% of energy use) – Turkiye" (2015). https://data.worldbank.org/indicator/EG.IMP.CONS.ZS?end=2015&locations=TR&start=1960&view=map&year=2015

[9] International Energy Agency (IEA): "Türkiye 2021: Energy Policy Review" (2021). https://iea.blob.core.windows.net/assets/cc499a7b-b72a-466c-88de-d792a9daff44/Turkey_2021_Energy_Policy_Review.pdf

[10] Ibid.

[11] Patricolo, Claudia: "How Turkey is decarbonising its largest energy-consuming industry: the building sector" (2021). https://ceenergynews.com/climate/how-turkey-is-decarbonising-its-largest-energy-consuming-industry-the-building-sector/

[12] Energypedia: "Turkey- Energy Efficiency in Buildings". https://energypedia.info/wiki/Turkey-_Energy_Efficiency_in_Buildings#cite_note-Assosiation_for_Energy_Efficiency:_http:.2F.2Fwww.enver.org.tr.2Fmodules.2Fmastop_publish.2F.3Ftac.3D17-2

[13] Enerdata: "Turkey country Information". https://www.enerdata.net/estore/energy-market/turkey/

[14] PWC: "Overview of the Turkish Electricity Market for the Presidency of the Republic of Türkiye Investment Office" (2021). https://www.invest.gov.tr/en/library/publications/lists/investpublications/overview-of-turkish-electricity-market.pdf

[15] Ibid

- Increases in population
- Increases in wealth and living standards
- Electrification including an increase in electric heating in households
- Government policies

2.2.2. RAC Sector Emissions

The share of direct emissions from the building sector is 14.5% of energy related CO_2 emission, stemming from burning fuels for heating and cooking, while indirect emissions for cooling and electrical appliances account for 13.48% of energy related emissions. In Türkiye, there is lack of country-specific studies on 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).[16] The model categorizes 67% of overall RAC sector emission as indirect emission and 33% as direct ones. Of the overall RAC sector emissions, the model allocates the largest share to mobile AC (passenger cars) at 34%, followed by commercial refrigeration (26%) and commercial and residential AC (13%) (see **Figure 1**). The rest of the sector emissions are attributed to commercial and residential chillers (6%), domestic refrigeration (12%) and others such as industrial and transport refrigeration (9%).[17]

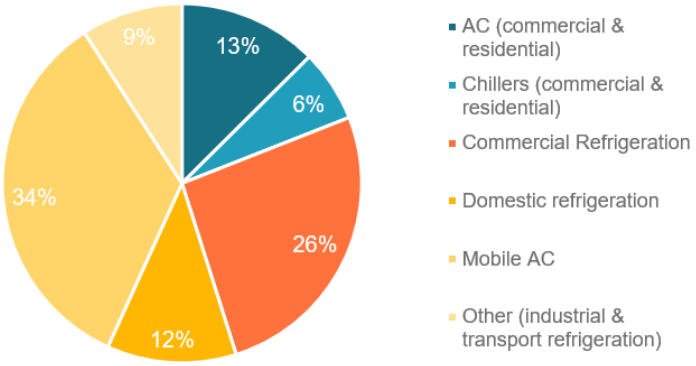

Figure 1: RAC sector emissions Türkiye (2016)

2.3. Policy overview

Turkey ratified the Kigali Amendment in March 2021 and has progressed in meeting its commitments relevant to the Montreal Protocol and its amendments through implementing several programs, laws, and other policy instruments such as codes and standards. The regulatory analysis shows that Turkey has reached ODS and HCFC consumption limits as required by the Montreal Protocol phase-out schedule, but that this achievement has also resulted in an increase in HFC consumption. Turkey has elaborated many national plans that contribute to reducing the consumption of ozone depleting substances (ODS) and HFC's, as well as increasing energy efficiency and cooling demand reduction. Specific plans include the Climate Change Action Plan (NCCAP) 2011 – 2023 (2012), the Energy Efficiency Strategy (2012), the National Renewable Energy Action Plan for Turkey (2014), the National Energy Efficiency Action Plan (NEEAP) 2017 – 2023 (2018), and Turkey's Intended Nationally Determined Contribution (INDC) (2015), which will need to be updated to be in-line with the Paris Agreement. However, Turkey has not developed a National Cooling Plan to integrate cooling aspects in Turkey's overall climate strategies. Cooling is only specifically addressed in the NEEAP in Goal B which highlights the potential of "increase[ing] energy savings and the use of renewable energy for heating & cooling by switching to central and district heating systems in mass housing complexes and large settlement units." Policies implementing these switches have not yet been specifically planned or executed.

[16] Green Cooling Initiative: "Türkiye" (2021). https://www.green-cooling-initiative.org/country-data#!country-data-sheet/792/all-sectors9

[17] Ibid

Turkey has also developed national legislation that covers multiple aspects of the ODS phase-out and HFC phase-down. The Ministry of Environment, Urbanisation and Climate Change updated the Turkish F-gas regulation in-line with the Kigali Amendment and EU F-gas regulation which entered into force in 29 June 2022. Turkey has also taken a systemic approach to addressing energy efficiency and climate policy through adopting the Energy Efficiency Law in 2007 (last updated in 2019) and largely harmonising its building and product efficiency standards with the corresponding EU Directives including the Directive on Energy Performance of Buildings Regulation (EPBD) (2017), the Regulation on Environmentally Friendly Design of Energy-Related Products (2010, revised in 2021) and the Regulation on labelling and standard product information of the consumption on energy and other resources by energy-related product (2011, revised in 2021). Most existing laws are well enforced and implemented but there is room for improvement in implementing measures to ensure results reporting, setting targets, and measuring target achievement. In addition, Turkey is currently drafting a Climate Law to regulate climate change under a single piece of legislation that outlines a net zero target for 2053. At the level of standards and MEPS, there are several well elaborated MEPS and labels for most RAC appliances and buildings, most of which are also harmonized with EU Standards. There is room for improvement to regularly review and strengthen MEPS as well as ensure MEPS and labelling policies are updated in line with future revisions of the EU Eco-design, Labelling and EPBD Frameworks.

Additionally, there are other barriers such as safety concerns related to the use of F-gas alternatives which should be addressed through awareness raising and capacity building. The level of awareness about natural refrigerants is not at desired levels amongst different stakeholders and therefore more awareness activities are needed.

2.4. Cooling Sector overview

The Turkish cooling sector market has substantial production capacity (especially for split AC and air handling units), considerable product diversification and specialisation, a highly qualified workforce, and an efficient supply chain and qualified logistics infrastructure. Türkiye's cooling market is enabled by its open market and fair competition conditions, as well as regulatory efforts to harmonize product standards, and the updated Turkish F-gas regulation with EU standards and regulations. Türkiye is an important actor in the AC market for EU countries as well as the MENA region and Russia. Türkiye has a customs union with the European Union and has free trade agreements with Egypt, Jordan, and Lebanon, contributing to its current role as a growing manufacturing and export hub for global and large-scale companies.

The AC market is driven by affordability (gross domestic product growth), 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 installation in new buildings, first time installations in existing buildings (to increase the share of air conditioned rooms), and the replacement of defective AC systems.[18] In the new construction sector, around 70% of all new apartments and 50% of new single-family buildings and almost all new office buildings, supermarket and retail, hotel and healthcare buildings install AC systems (90-100%). In the existing building stock, there is substantial growth potential for the cooling market in the residential sector, as about 85% of the residential floor area is not yet air conditioned. [19]

In the past few years, the sales for heat pumps, variable refrigerant flow (VRF) systems, split systems, and indoor air quality systems have increased. In contrast, the sales numbers for chiller systems have decreased. Emerging trends include increased installations of heat pumps (monoblock), heat recovery and mini VRFs in single-family buildings; split systems in multifamily buildings; and VRF systems in healthcare buildings. Overarching trends include a focus on heat recovery, energy efficiency, eco-design compatible units and %100 fresh air systems. [20]

[18] Expert Interviews (2022)

[19] Expert Interviews (2022)

[20] ISKID Air Conditioning and Refrigeration Manufacturers Association 2022; Survey among ISKID members

Currently, installed AC systems in Türkiye have a lower efficiency than the best available technology, and there is large potential for energy savings, i.e. AC systems installed in existing buildings have a coefficient of performance (COP) in the range of 2-2.5 (split systems) that is below best available technology.[21]

In 2020, Türkiye produced AC systems in the value of 655 million USD, it imported AC systems in the value of 510 million USD and exported 310 million USD.[22] The main countries of origin (import) were China 35%, Thailand 19%, Czechia 10%, Italy 8%, South Korea 6%, Belgium 5%, Germany 3%. The main countries of destination (export) were Italy 16%, France 12%, Spain 9%, Germany 8%, Netherlands 5%, Belgium 4%, Portugal 3%.[23] The market volume in number of units sold was around 1.2 million AC systems of which the single split systems represented around 88% of the market.[24] 70% of all single splits systems sold were produced domestically in 2018. Air handling units (AHU) are mainly produced locally. Chillers, Fan coils, multi-splits and variable refrigerant flow systems (VRF) are mainly imported.[25]

In the commercial refrigeration sector, the domestic market in Türkiye is dominated by local manufacturing. In 2020, Türkiye produced and sold around 75,000 units generating 150 million USD and imported 5000 units for 10 million USD, totalling a market size of 80,000 units and 160 million USD in 2020. The main countries of origin (import) are Italy and China. Türkiye also has a strong export market with around 40,000 units generating 80 million USD exported in 2020 mainly to Azerbaijan, Uzbekistan, Kazakhstan, Iraq, and UK. In terms of technologies, the market is dominated by standalone refrigerators and freezers (about 45% of share in sales) and condensing units (about 45% of share in sales). Central systems add up to about 10% of total sales in 2020.[26]

Türkiye currently imports all refrigerants that are used for its commercial refrigeration applications. The demand in 2020 added up to 9,000 tons. HFC based refrigerants dominated the market with a share of 90% followed by 8% of natural refrigerants and 2% of HCFC refrigerants. The main refrigerant used in existing installed AC systems is R410A followed by R134a and R32. For new systems, the focus is shifting towards lower GWP refrigerants, and R32 became the most sold refrigerant in 2020 followed by R410A. As for commercial refrigeration, the main refrigerants used in existing standalone refrigerators for freezers and condensing, and for central systems is R404.This is followed by R507A and R407A for standalone refrigerators/freezers and by R134a, and R22 for condensing and central systems. As of 2020, new systems have shifted from the traditional high GWP refrigerants to lower GWP refrigerants; for instance, R449A, R448A, R513A and R290 were the dominant refrigerants sold in 2020 for standalone refrigerators and freezers, respectively. Similarly, R449A, R448A, R513A and R452B were the newly dominant sold refrigerants for central systems and condensing units. [27] The government is promoting the transition to natural refrigerants in RAC applications through both the recent publication of the updated Turkish F-gas regulation in June 2022, as well as by mobilising the required support from international agencies for the private sector to facilitate the shift to new technologies. There are already various demonstrations of sustainable supermarket cooling systems (mostly transcritical CO_2), but projects for sustainable cooling with natural refrigerants in the air conditioning sector are limited.[28]

The overall market for cooling equipment in Türkiye is expected to continue to grow. This strong market growth requires introducing sustainable cooling technologies and natural refrigerants early on as a direct replacement to prevent potential lock-in effects to harmful refrigerants. Perceived key challenges to the uptake of natural refrigerants include training, addressing safety issues, and associated costs.[29]

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[21] Ibid

[22] ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

[23] Ibid

[24] Ibid

[25] The Building Services Research & Information Association (BSRIA) (2019), Split Systems 2019, Türkiye

[26] ISKID Air Conditioning and Refrigeration Manufacturers Association 2022, Survey among ISKID members

[27] ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

[28] Expert Interviews (2022)

[29] Expert Interviews (2022)

Cool Up presents a unique opportunity to build on the regulatory framework currently in place, as well as Türkiye's well-established manufacturing sector and commercial banks, which can 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 opportunities around natural refrigerants and reducing cooling demand.

3. Methodology

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

It is essential to understand what and how the RAC sector is referred to in this report. The following set offers 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, and specialised local financing institutions (at national 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.[30]

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

Air conditioning (often referred to as AC, A/C, or air con) is a process to remove 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 do not generally exceed a capacity of 200 kW and keep temperatures between -25°C and 8°C.[31]

Commercial refrigeration cold storage includes commercial-scale cold storage rooms, usually equipped with condensing or centralised units with 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 storing food or in the manufacturing process of petrochemicals, chemicals, and pharmaceuticals. Such systems range in size from 5 MW to 30 MW.[32]

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 watts (W). A higher EER rating corresponds to higher energy efficiency.

Residential building sector consists of single and multifamily buildings.

[30] Dictionary.com. "Definitions for international financial institutions." https://www.definitions.net/definition/international+financial+institutions.

[31] Definition based on United Nations Environment Programme, "Presession Documents: Workshop on Hydrofluorocarbon Management"

[32] United Nations Environment Programme, "2018 Report of the Refrigeration, Air Conditiong and Heat Pumps Technical Options Committee"

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, safe, and satisfies the user needs with the lowest possible environmental impact. This specifically implies the absence of environmentally harmful refrigerants (such as fluorinated gases), a low energy demand (including a 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 the scope of the Cool Up programme

3.2.1. AC sector

Building segments: Focuses on residential buildings that cover single-family and multifamily buildings and non-residential buildings, i.e. public and private offices, education, health and social, hotel and restaurant, wholesale and retail trade, and other buildings (e.g. sports facilities).

Equipment types (AC systems): Although many different technologies are installed on the market, they can be clustered into the following key technology segments, which are used to depict the market characteristics.[33] 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, normally located in the attic or basement. Cool (or hot) air is distributed through a series of ducts and vents in 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.[34]
- 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 or air handling units).

[33] 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 Conditiong and Heat Pumps Technical Options Committee"

[34] 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 is 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:[35] standalone equipment, condensing units, and centralised systems (for supermarkets). The different equipment types are used in various building segments:

- Most medium to large supermarkets prefer to use centralised systems as they are usually more energy efficient than condensing units and plug-in cabinets. The sales floor of supermarkets that use a centralised refrigeration system ranges from 400 m^2 to 20,000 m^2.
- Condensing units are commonly used in medium and small stores and can often be found in fast food outlets, restaurants, bars, and convenience stores. Compared to a centralised system, they allow fewer cabinets to be connected to the system, take up less space, and are usually easier to install.
- Standalone refrigeration systems, such as ice cream freezers, display cases, and vending machines are typically self-contained. 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 meetings). The interviews were conducted primarily with banking sector officials in Türkiye (from 6 commercial banks (Yapi ve Kredi Bankası A.Ş., Türkiye Sınai Kalkınma Bankası A.Ş.(TSKB, Industrial Development Bank of Türkiye), Türkiye Kalkınma ve Yatırım Bankası A.Ş.(TKB, Development and Investment Bank of Türkiye), Garanti BBVA, İş Bankası A.Ş., Şekerbank A.Ş. and 3 IFIs, (EBRD, KfW, AFD).

Secondary data was obtained from a diverse set of publications covering banking sources, e.g., Central Bank, multilateral institutions such as The World Bank and IMF (Article IV reports). National policy documents and other papers were accessed for data collection.

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

[35] United Nations Environment Programme (UNEP) Ozone Secretariat, "FACT SHEET 4 Commercial Refrigeration" (UNEP Ozone Secretariat, Bangkok, 2015)

4. Summary of key findings and recommendations

Türkiye has a well-established financial sector, banks being the primary funding source for both public and private sectors. The Turkish Banking Sector presents a relatively solid stance in terms of financial strength parameters with a capital adequacy ratio of 18.34 %, well above the prudential requirement of the Basel Committee of 12% and has comfortable liquidity, with an average ratio of 148%, well over the regulatory minimum of 100%. The banking sector working in close contact with international financial institutions has taken an important role in developing the sustainability concept in Türkiye, integrating an environmentally responsible approach with regard to financing and throughout their decision-making process at all levels.

Private and public development banks being the pioneers, all the big players of the banking sector, both private and public, and commercial banks granted substantial loans to support renewable energy and energy efficiency investments and inserted sustainability concepts in their banking applications with all respects. Within that context, Türkiye has already conceptualised RAC financing as part of the energy efficiency investments in many sectors until now. On the other hand, sustainable cooling is a new concept that needs to be explained to the public. But these two concepts intercept each other in the sense that they aim for CO_2 emission reduction. Since a long way has already been covered in energy efficiency in Türkiye, in the application phase of future projects, energy efficiency and sustainable cooling can walk hand in hand.

Türkiye is one of the leading manufacturers and exporters of white goods, and the industry has been trying to adapt production processes to comply with the recent EU eco-design requirements that underline the use of refrigerants with low GWP and the new energy labelling in EU improving efficiency performance and decreasing emissions even further. But there are still a lot of investments that need to be made. While this is the case for the export market, special attention is needed to produce the domestic market. Only 10% of the existing stock has A++ or higher performance for HVAC equipment. Being an emerging economy, Türkiye has low use air conditioning rate, especially in the residential areas. However, with expectations of a rise in the general income level, the sector has growth potential. Therefore, **regulations should be established** before this growth occurs to ensure that the most efficient and environmentally friendly HVAC units are used. Continuous efficiency increases are recorded in both the new buildings and newly produced appliance stock. However, the old and inefficient stock in use still deserves policy action, especially in refrigerators and HVAC equipment. **Government incentives in the form of tax reductions or easing the conditions in financing these investments, both for the new goods and for the replacement of the old ones, would motivate the end-users.**

The 'EU Taxonomy Regulation' entered into force in July 2020, classifying environmentally sustainable economic activities to achieve the green and digital transformation objectives of the European Green Deal. Within that scope, taxonomy aims to help develop and increase the efficiency of green finance. The COOL UP project has the potential to fit in with **EU Taxonomy**. Since the financial model for the funding of the COOL UP projects is in the structuring phase, investment topics that will be subject to the allocation of credit lines should be chosen carefully to fit within the 'EU Taxonomy Regulation's scope.

According to the calendar of the EU, the transition to Carbon Border Adjustment Mechanism (CBAM) will be effective as of 2025, following an incremental plan. The EU has been developing strategies to fund the small investors and households affected adversely by the increase in prices of certain imported goods due to the transition to the CBAM. A Social Climate Fund is being structured to be effective between 2025-2032 years to support those groups. In that sense, our interviews revealed that local FIs should give more support to SMEs by financing and providing technical assistance. Both CBAM and Kigali agreement put the local FIs in a position to support "M/SME size manufacturers" to sustain their businesses. IFIs operating in Türkiye are highly aware of the market gaps and threats ahead and urge FIs to decarbonize their business/credit lines. The Cool Up Programme also designates how the Kigali Agreement plays a pivotal role in F-gas phasing out in manufacturing lines for large scale and SME levels. In that sense, FIs should not omit the needs of SMEs in terms of Technical Capacity and access to finance. Additionally, the IFIs interviewed showed their willingness to co-financing with another IFI or multilateral FI as an option to scale up sustainable cooling. For the further steps of the projects, the potential connection with IKI and other IFIs could create good synergy and opportunity for the effective implementation of HFC gas phasing out.

Türkiye has several energy efficiency incentive programs that could be uplifted by inserting the use of climate-friendly goods. In realizing these required transitions both in the existing and new investments, using Energy Performance Contracts (EPCs), a successful model widely used in different countries, could be a solution for the know-how and financing. The energy management services sector, including the **ESCOs market, is developing, and MoENR has initiatives to drive a vibrant ESCO market by putting the necessary regulatory and legislative improvements into action.**

This ongoing interest in that edge of the sector with a huge growth potential is expected to provide ease in financing future projects in sustainable cooling and energy efficiency investments. However, energy efficiency investments are based on the savings of energy principle rather than the generation of revenues from the sale of an item. On the other hand, sustainable cooling investments are neither about saving energy nor selling a product. The profitability of these projects can be measured by the reduction in CO^2 emission the project created, in other words, by the carbon revenues that will be generated. This, in turn, brings in the issue of the **development of a carbon market in Türkiye**.

Türkiye does not currently mandate a carbon pricing policy. However, projects for the Voluntary Carbon Market, established with the principle of environmental and social responsibility, have been developed and implemented for a long time.[36] Türkiye is also assessing the possibility of implementing an official government carbon pricing mechanism. Türkiye is working with the World Bank's Partnership for Market Readiness (PMR) program to explore Türkiye's low carbon development policies and potential use of market-based instruments. As part of this work, an assessment is being conducted to consider establishing and operating an Emission Trading System for Türkiye.

[36] Özlem Duyan (2020): A Voluntary Carbon Market in need of Carbon Pricing Policy in Turkey. Available online at https://www.climatescorecard.org/2020/03/a-voluntary-carbon-market-in-need-of-carbon-pricing-policy-in-turkey/.

5. Finance Landscape

5.1. Financing Value Chain

The financing of cooling solutions is not a widely recognised topic as it is inadequately defined and is not tracked worldwide. Besides, cooling solutions have a broad spectrum to suit different applications (small and large in scale with a wide cross-section of application sectors such as residential and commercial sectors for space cooling), food, health, supermarkets, restaurants, hotels, (for refrigeration).[37] 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 the financing organisation also govern funding needs and financing instruments. It may be observed that both private and public sector financing have respective roles in the financing RAC sector. Public private partnership (PPP) approach is also possible for large HVAC projects (covering large districts of residential, commercial or government-owned buildings).

Conventional financing instruments can broadly be categorised 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 commercialisation. While grants are needed for technology development projects, conventional debt is mainly applicable for the commercialisation phase of a product/technology. Financing "sustainable cooling solutions" also encompass a broad range of financing approaches. It may be noted that applications of most sustainable cooling technologies directly reduce energy use (or improved energy efficiency). Hence, often it is prudent to select approaches that may suit energy efficiency projects.

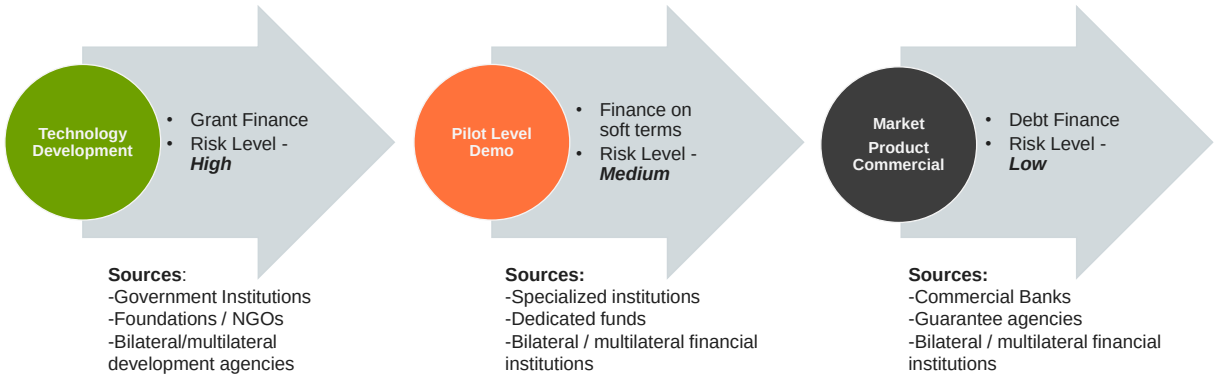


Figure 2: Financing of different stages from technology development through commercialisation

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

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 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:

[37] 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

Air Conditioning systems

- Residential (de-central and central)
- Non-residential (includes commercial) (de-central and central)
- Large commercial (Central) – Chillers-based systems

Commercial Refrigeration

- Central (Centralised reach-in refrigerators, reach-in freezer cabinets and cold rooms)
- Condensing units (reach-in freezers, reach-in refrigerators, reach-in refrigerators cabinets)
- Standalone (Chest freezers, reach-in freezers, reach-in refrigerators, display refrigerators)

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 (residential and commercial refrigeration and VRF, multi-split, fan-coil, rooftop 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

Türkiye does not produce refrigerant gases, so all refrigerant gases are imported for domestic use. Besides this, Türkiye partly imports room air conditioners to meet local demand for these appliances. Among AC systems, single splits are the primary imported goods, owing to their large overall market share and despite significant local production. Multi-split and VRF systems are not produced in Türkiye and are fully imported. Likewise, refrigeration systems such as plate freezers and absorption chiller freeze dryers are not produced in Türkiye and are imported from European countries, e.g. Germany and Denmark.

Commercial banks offer finance for imports. 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. A letter of credit is from a bank guaranteeing that a buyer's payment (in full) to a seller will be received in due time (as mentioned in the contract). If the buyer cannot make a payment for the purchase in question, the bank is required to cover the total or remaining amount of the purchase.[38] Although there are various types of LCs, the most commonly used is an irrevocable letter of credit. An irrevocable letter of credit (ILOC) is a guarantee for payment issued by a bank for goods and services purchased, which cannot be cancelled during some specified period. Nearly all commercial banks in Türkiye offer LCs to importers.

On the other hand, foreign export credit agencies (ECA) provide loans where the importer's country risk is insured, and long-term buying opportunities for importers are offered. The import of investment type of goods can benefit from the medium and long-term loan programs of the ECA of the relevant countries and with a guarantee of the intermediary banks. Such credits and their countries are mainly as follows: Germany (Hermes), Italy (Sace), Austria (OekB), USA (US Exim), Canada (EDC), Belgium (OND) etc.

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.

[38] Kagan, Julia (2021): Letter of Credit: What It Is, Examples, and How One Is Used. Available online at https://www.investopedia.com/terms/l/letterofcredit.asp.

5.1.2. Manufacturing

Türkiye is one of the leading manufacturers and exporters of white goods. The industry has been taking the necessary actions proactively to comply with the changing energy efficiency regulations and the energy labelling in the EU, the biggest export market. Therefore, new Turkish white goods have improved even further from the efficiency performance perspective.

The Turkish HVAC sector is the European market leader with its production capacity in split air conditioners.[39] Even though the percentage is smaller than split A/Cs, VRF internal and external units, rooftop package A/C, fan coil A/C, central air handling and cooling units and chiller groups are also produced locally. Except for VRF units, for all the other products, the amount of local production has been following an increasing trend compared to imports in recent years, thanks to the growing number of R&D investments.[40] As well as local producers that are high in number, many international brands include Daikin, Delonghi Carrier, Johnson Controls, LG, Mitsubishi Electric, Samsung, Toshiba, Trane, Trox Technik etc. With the incentives provided by the government, the industry expects that Türkiye could be a hub for foreign investors with its strategic geographical position and flexible production capability.

Commercial refrigeration systems, mainly condensing and centralised systems, cold rooms, refrigerated storage panels, refrigerated display cabinets, bottle coolers, chest freezers, medical freezers etc., are prominent items that local brands manufacture. Many local producers are not only exporters but also importers. Around 250 firms operate as exporters in the cooling systems and industrial fridges and freezers subsectors.[41]

Local commercial banks primarily provide finance for manufacturing.
Manufacturers make the production in the local plants where they might be used for different financing types for various requirements throughout the manufacturing process:

- Local commercial/development banks provide medium - to long-term financing for corporate firms and SMEs in TL or foreign currency. The loan is provided based on the strength of a balance sheet, generally to 80% of the project's cost, with a balance of 20% brought in by the project developer. The debt/equity ratio may change according to the borrower's credibility and the type of investment. For start-up investments such as a brand new production plant/unit, new investments in technology and energy efficiency by the renovation of the existing plant and modernisation of the present machinery and equipment, long-term financing is required to back up equity provided by the investor. Local banks can also act as intermediary banks and allocate loans provided by International Financial Institutions such as The World Bank, the French Development Agency, the European Investment Bank, and the Council of Europe Development Bank; with appropriate interest and maturity options in topics such as project investment, Greenfield investment, expansion, modernisation, renovation, quality improvement, debottlenecking, completion, integration, product variation. In addition to these present financers, **Multilateral Development Banks and Green Funds could be potential fund providers.**

- The average tenure for medium to long-term loans may vary among banks, but generally seven to ten years with grace periods of two to three years and advantageous interest rates. Interest rates on loans could be fixed, variable or based on Trlibor, Libor and Euribor; actualised and collected every three or six months, including the grace period depending on the conditions put by the fund provider.

[39] ISKID (2022): ISKID Magazine - HVAC&R Journal for Turkey. Volume 23. ISKID. Available online at https://iskid.org.tr/wp-content/uploads/2022/08/iskid_magazin_2022_23_sayi_EN_LOW-1.pdf.

[40] TOBB Acclimatisation Assembly; Turkish Acclimatization Industry Sector Report, 2018 Available online at https://www.tobb.org.tr/YayinMudurlugu/Sayfalar/TOBB-Yayinlari.php/Sektör Meclisi Raporları

[41] Turkish Exporter: Heating - Cooling - Ventilation Companies. Available online at https://www.turkishexporter.net/en/companies?categoryId=27.

- On the other hand, for the working capital financing requirement will emerge throughout manufacturing firms' production and operational process, local commercial/development banks provide working capital loans for a maximum tenure of five years, with one year grace period. Likewise, International Financial Institutions provide working capital loans for the investment topics listed above for a maximum tenure of four years, with one year grace period.

- Since SMEs are the Turkish economy's dynamic players, many commercial banks have designed specific support loan packages customised according to their needs. There are credit lines addressed to manufacturing SMEs, covering capital investment and working capital needs, particular loans designed to purchase machinery and equipment and green credit lines motivating SMEs' renewable energy and energy efficiency investment.

- In Türkiye, many commercial banks also have leasing companies. With cross-financing techniques, both corporate companies' machinery and equipment needs and SMEs can be financed through leasing contracts.

- In addition to the financing activities of financial institutions, the public sector also supports SMEs. The Directorate of SME Development and Support **(KOSGEB),** under the MoIT is supplying EE grants for energy audits, training and consultancy services provided to SMEs. [42]

- Ministry of Energy and Natural Resources also provides incentives for projects that increase efficiency.[43]

5.1.3. Export

The chairperson of the Heating, Ventilation, Air Conditioning and Refrigeration sector has announced that the exports of the Turkish HVAC&R sector reached 5.6 billion USD as of January – November 2021 period, which was 4.2 billion USD same period last year, growing by 33%. By the end of the year, the industry's export surpassed 6.2 billion USD.[44]

On the other hand Chairperson of the Association of White Good Producers of Türkiye (Türkiye Beyaz Eşya Sanaycileri Derneği (TURKBESD)) informed in the press release of the association held on January 2022, 2021, on a units basis for six main product groups production increased by 17%, domestic sales and exports increased by 9% and 18% respectively. The total production numbers increased to 34.4 million units. 2.25 million refrigerators and 1.12 million freezes units have been sold in the domestic market. The export numbers of the white goods sector increased to 25.9 million units as of the end of 2021.

The EU is the biggest export market for Türkiye. The white goods imported from Türkiye constitute 15% of the total import of the EU as of 2019. In order of magnitude, the first five countries that import Turkish white goods were the United Kingdom, France, Germany, Italy and Spain. This situation reveals that the Turkish white goods industry closely follows the developments, legislations, and requirements in EU countries, especially European Green Deal, Non-Toxic European Agenda, Carbon Border Adjustment Mechanism– CBAM, Europe Eco Design and Energy Labelling Agenda.

As far as the financing of exports is concerned. **Local commercial banks and Turk Eximbank, a specialised institution for trade finance that generally provide trade finance for exports**. Turk Eximbank supports exporters, export-oriented manufacturers, overseas investors, contractors, and companies conducting business that bring foreign currency earnings through short, medium, and long-term cash and

[42] Republic of Türkiye Ministry of Industry and Technology, Directorate General for Strategic Research and Productivity, TEVMOT Project Management Unit: Promoting Energy-Efficient Motors in Small- and Medium-Sized Enterprises (SMEs) in Turkey (TEVMOT). Available online at https://www.tevmot.org.tr/en/incentives-supports/.

[43] Republic of Türkiye Ministry of Energy and Natural Resources (2021): Enerji Verimliliği Destekleri. Available online at https://enerji.gov.tr/bilgi-merkezi-enerji-verimliligi-destekleri.

[44] İSKİD, 2022

non-cash loans. In addition, to increase export volumes and help exporters reach new and target markets, sales export receivables are discounted on deferred payment conditions to provide liquidity to exporters.[45]

Local commercial banks offer instruments such as letters of credit, acceptance aval credits, export credits, pre-financing loans, export factoring, external guarantees, insurance, and post-financing to finance trade transactions of their corporate and SME customers.

5.1.4. Distribution

Distribution management is the transfer of goods from the manufacturing facility to the point of sale. Manufacturers can either handle distribution themselves (direct distribution) by approaching the end customer directly or via independent companies (indirect distribution) that are solemnly responsible for distributing goods. In the indirect distribution, there are either single (wholesaler) or multiple distribution channels (wholesaler and retailer). Distribution of goods could be a stable operation for corporate manufacturer firms with a huge sales volume and countrywide sales, whereas for SMEs, it could be simpler.

Regarding **direct distributors of HVACs for the residential sector**, manufacturers may make bulk sales directly or through wholesaler-distributors to construction companies that do mass real estate development projects throughout Türkiye. According to the Law of Transformation of Areas under the Disaster Risks (Law No. 6306) which came into force in 2012, the rehabilitation, clearance, and renovations of areas and buildings at disaster risk should be done in accordance with relevant standards to create a healthy and safe living environment.[46] Many urban transformation projects are completed within that context, and many constructions are still in progress. In addition, according to the new regulations, all new buildings must have an Energy Performance Certificate. So especially for newly built private real estate development projects with built-in A/C systems, it is a must for the contractors to maintain energy-efficient products. In this context, two regulations complement each other and create demand and increase sales for HVAC products.

In existing commercial buildings, purchase decisions for new AC systems are made by the company or business using the facility, based on recommendations from the contracted MEP consultants or following country standards in the case of large companies. Architects, planners, or consultants decide what system will be installed in new buildings.

Wholesaler distribution companies and companies that make bulk purchases directly from manufacturers finance themselves through **commercial banks, credit lines provided by IFIs and distributed via commercial banks to support distributors and construction companies to purchase energy-efficient goods**. The sale of energy-efficient residential units with a B or above energy certificate is backed by green mortgage loans with more favourable terms. This motivates the customers to prefer houses with higher energy efficiency certificates and, in turn, for the contractors to build energy-efficient homes that, in the end, cause an increase in demand for energy-efficient goods. Such examples would create a synergetic effect to combine the energy efficiency concept with sustainable cooling and promote the idea of purchasing appliances with LGWP.

Regarding the **distribution stage of RAC products** for the commercial sector and wholesaler distribution companies, manufacturers can sell directly to big corporate customers/buyers that operate as gross chain markets, private hospital chains, hotel chains, malls, etc. With big corporate customers, these decisions can be predetermined by the parent company's existing (sometimes international) standards, depending on recommendations from contracted MEP consultants. In small independent supermarkets, restaurants, hotels or corner stores, these decisions are taken by the store owner directly, sometimes upon advice from sellers, installers or consultants. Most commercial refrigeration and air conditioning systems are sold through direct inquiries.

[45] Eximbank: We in Figures. Available online at https://www.eximbank.gov.tr/en/we-in-figures#credits.

[46] Republic of Türkiye Ministry of Environment, Urbanisation, and Climate Change - Directorate General for Infrastructure and Urban Transformation Services: Legislation. Available online at https://altyapi.csb.gov.tr/en/legislation-i-5083.

In Türkiye, alternative fund providers for these customers can be listed as commercial banks, and IFI loans require **that the RACs investments are energy-efficient leasing companies.** Financing for such systems is provided through medium-term loans (equipment loans) with three to five years tenure by local commercial banks, five to seven years tenure, and a one-year grace period by financing provided through IFI funds. Most commercial banks offer equipment loans for commercial refrigeration products in Türkiye. Loans are secured through collateral such as an equipment pledge or guarantees. **Leasing** is an alternative financing method when a company does not want to own (not reflected in the balance sheet).

With the improvement of the present legislative and regulative infrastructure, ESCOs could be more active players in the financing process of Türkiye's energy efficiency-related investments. The COOL UP project could be integrated with the energy efficiency investments that have already gained acceleration.

In this respect, there are satisfactory developments in Türkiye. **Enerjisa,** one of Türkiye's leading electricity distribution and retail companies, has launched the "Energy for My Business" programme and introduced the Energy Performance Contract (EPC) model. Enerjisa offers to facilitate the energy practices to be applied in the customer's company by financing the whole or a part of the investment needed. Enerjisa guarantees the performance of the equipment that is replaced or made more efficient by the EPC model and guarantees performance. Another recent progress was Siemens, which has been giving energy consultancy services, signing an Energy Performance Contract with Söktaş, one of the leading textile producers of Türkiye. All these developments show that ESCOs could play a more significant role in energy efficiency financing in the near future.

Distributors also undertake the operation of storing goods during transportation. Warehouse operations are an integral part of inventory entry into a warehouse(s) until products are transported and sent to the point of sale. So each step of the distribution process requires financing distribution cost comprises transportation, storage, insurance, product handling, and often selling costs. **Financing distribution** is often an integral part of the working capital finance under corporate finance. Effective working capital management is achieved through efficient distribution.

SMEs are another target group that can take great advantage of ESCO financing. In that sense, in Türkiye, working capital financing needs for selling expenses of corporate, SME manufacturers and distributors are provided by local commercial banks in the form of working capital loans. For SMEs and companies smaller than SMEs, there are special credit lines designed by Credit Guarantee Fund (KGF) Support Loans in collaboration with several commercial banks. To cover excessive guarantee demands of banks and thus to ensure continuity of the support provided for SMEs, the KGF Support Loans "KGF Destek Kredisi" programme has been engineered with a total volume of TRY 1,25 billion loans as a separate project. This loan aims to support the eligible firms in strengthening their supply chain and meeting their working capital requirements with the guarantee provided by KGF of up to 80% as collateral. The lending conditions and limits for each bank change, but the maturity is a minimum of 36 and a maximum of 60 months with a grace period of up to 12 months.

5.1.5. Retail sale

Retail sale is the sale of goods or services directly to the end-user for personal or household use. A retailer buys goods directly from manufacturers or in large quantities through a wholesaler and then sells in smaller quantities to consumers at a profit. Retailers are the last link in the supply chain from producer to consumer. In the case of RACs buyers, a residential /private customer or a small commercial customer interacts with a retail sale agency, a distributor, a company-owned showroom, an electronic goods chain store or home improvement/hardware stores to buy an appliance.

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. If a new house is set up or a complete renovation is on the table, several appliances would be needed. In this case, many customers seek short-term loans/credits with tenures of one to two years (or even three years). Manufacturers, dealers, chain stores of electronic goods and home improvement/hardware stores make agreements with commercial banks to give special and longer tenures than a credit card to attract customers and increase their purchasing power. Moreover, commercial banks also promote retail loans for customers directly.

On the other hand, a retailer also needs finance to purchase equipment and cover operational costs.

Financing of retailer firms can be considered partly for corporate loans (chain stores, outlets) and partly for commercial loans (retail sale agents, dealers, etc.), depending on the retailer's size. Retailing operational 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. Commercial banks provide various finance facilities for the operations of a retail agency, such as cash credit, revolving loans, spot loans, overdrafts and working capital loans. Working capital finance depends on the company's cash cycle, credit terms and terms of sales and is short-term finance. Banks also offer cash management services for corporate retail clients. They provide products and services created for saving time and labour regarding collection and payment of firms with tech support, eliminating the errors that might arise due to manual transactions, and surveillance of the present and future cash flows. Firms with a widespread vendor/procurement network and intense collection and payments, such as chain stores of electronic equipment, can make excellent use of these applications. Banks require collateral for working capital finance (including hypothecation, lien, pledge of equity shares etc.).

Financing a customer's purchase of home appliances by granting a loan is another aspect of retail business. Retail sales of appliances can be increased by providing attractive consumer financing conditions. Consumer financing focuses mainly on what the borrowing terms will be. Many retail outlets (selling domestic appliances) in Türkiye offer financing schemes between a manufacturer and partner commercial banks with preferential interest rates and attractive lending terms. Online sale channels are also emerging, and on retail chain websites, many banks even offer online shopping loans of up to 36 months for home appliances.

In Türkiye, successful applications have been made for TURSEFF and TUREEFF credit lines financed by EBRD and distributed with the collaboration of the leading commercial banks of Türkiye, targeting small investors SMEs and individual household owners. They want to invest in energy efficiency and renewable energy appliances in their houses and businesses. A list of Eligible Materials and Equipment (LEME) has been complied with at www.tureeff.org, including more than 2.500 references for small-scale investments in RAC and other energy efficiency items. The customers can choose suitable equipment online from the list and apply for a loan. A similar model could easily be used for the COOL UP project.

In many countries, manufacturers utilise "trade discounts" on products to meet a part of the interest cost and hence offer lower or interest-free loans to customers to acquire appliances. Such schemes apply to residential customers and small commercial establishments such as shops, offices, restaurants, etc.

The following diagram illustrates all elements associated with financing the value chain of RAC products for the residential sector.

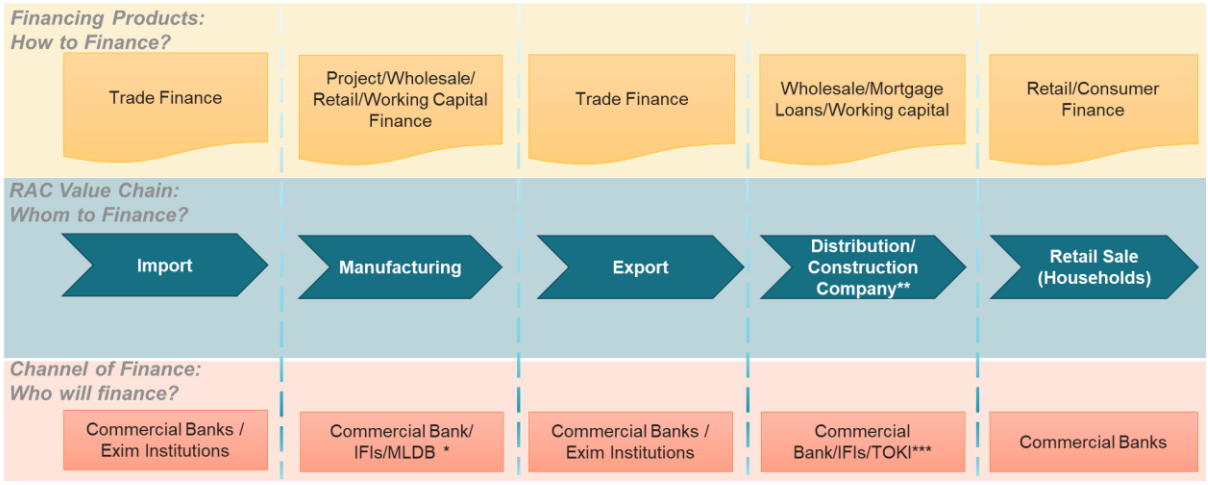


Figure 3: Principal elements of value chain financing for the residential sector

** Multilateral Development Banks and Green Funds*

***Both corporate and small construction companies are customers of RAC units. Real estate development projects are being conducted by private construction companies and by the state via TOKI. In addition, the Turkish Government has started an Urban Transformation Plan to demolish and reconstruct thousands of buildings deemed unsafe in earthquake-prone areas. This plan provides an opportunity to construct both safer and energy-efficient buildings. SME corporation companies mostly conduct these projects. Both corporate and SME companies are furbishing the buildings and houses with central cooling units and split room air conditioners.*

**** The Housing Development Administration of the Republic of Türkiye (TOKİ)*

The following diagram illustrates all elements associated with financing the value chain of RAC products for the commercial sector.

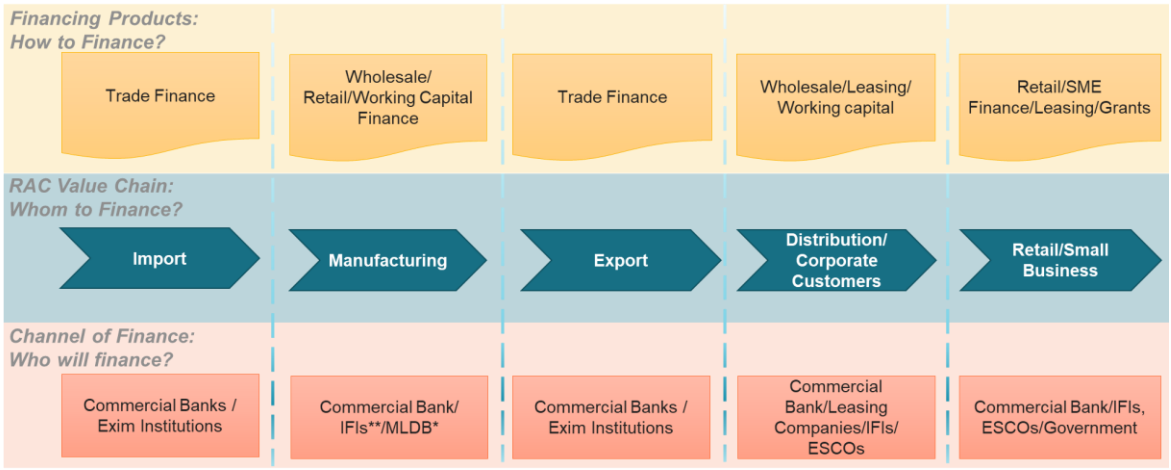


Figure 4: Principal elements of value chain financing for the commercial sector

* Multilateral Development Banks and Green Funds

*** As an example of IFI financing, Arçelik, one of the leading home appliances such as refrigerators, washing machines, cooking appliances, vacuum cleaners, and consumer electronics product manufacturers, recently received a loan from EBRD for green manufacturing.*

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

5.1.6. Waste Management, Extended Producer Responsibility and ODS Reclamation

Waste management, Extended Producer Responsibility and ODS reclamation is also an issue that must be considered as a subset of the manufacturing process as far as the value chain financing of the RAC sector is concerned.

Refrigerators, freezers, other appliances used for cooling and preserving food and all sorts of air conditioning devices become electronic waste when they complete their product life cycle. If these devices are not processed in licensed facilities, using the proper techniques, hazardous gases will cause severe damage to the environment and human health. Recycling of each refrigerator 1.020 kg CO2 equivalent R12 gas and 1.746 kg CO2 equivalent R11 gas is prevented from being released into the atmosphere. [47]

[47] Akademi Cerve: Refrigerators / Coolers / Air Conditioners. Available online at https://akademicevre.com/en/refrigerators-coolers-air-conditioners.

Several national legalisations in Türkiye are relevant to waste management and Extended Producer Responsibility in general, covering all sectors, including the cooling sector, refrigerants and gases that might create a potential environmental danger. These regulations are as follows:

- Waste Management Regulation (for recovery/recycling/reclamation /destruction of F-gases), Official Gazette Date: 4 February 2015, Number: 29314.
- By-law on Control of Waste Electrical and Electronic Equipment, Official Gazette Date: 22 May 2012, Number: 28300
- Law number 7153; on Change in Environmental Law, Official Gazette Date: 10 December 2018, Number: 30621
- Regulation on Reclamation Participation Fee as stated on Law number 7153, Official Gazette Date: 31 December 2019, Number: 30995
- Circulars on the Methods and Basis of the Application of Reclamation Participation Fee dated; 7 February 2020, 29 June 2020, 23 July 2020
- Regulation on Fluorinated Greenhouse Gases, Official Gazette Date: 29 June 2022, Number: 31881

As stated in the legislation, the principle of 'Polluter Pays' is also valid for Türkiye. Conforming to the latest revisions under the Environment Law, producers of electrical and electronic goods both have to pay the reclamation participation fee (environmental tax) and are also liable, starting as of 2020, for collecting the electronic devices from their source at the rate of the quota specified for the sector. The participation fee is set to 30kr/kg as of January 2020 for refrigerators, freezers and acclimatisation devices.

According to the latest Communique on Reclamation Participation Fee by the 2872 Law of Environment, published in the Official Gazette, dated 31 December 2021, the participation fee has been raised from 30 kr/kg to 43 kr/kg for refrigerators, cooling, and air conditioning devices.

Producers of refrigerators, coolers and acclimatisation devices indirectly reflect the participation fee to the end users by adding the environmental tax amount to the selling price of the products. The reclamation participation fee collected from consumers will be transferred to the related ministry. According to a projection done in January 2020, depending on the white goods sales numbers in total, the reclamation participation fee was about 120/160 million TL/year (around 16.5-22 million USD/year)[48] over an average weight of the sales of expected white goods. This projection comprises of all white goods, excluding A/Cs. The percentage of refrigerators and freezers to the total sales volume of white goods is around 40%. This amount is expected to increase depending on the increase in white goods sales.

On the other hand, as stated in Article 7 of Law 7153; Change in Environmental Law, Official Gazette Date: 10 December 2018, Number: 30621, the institutions and businesses that implemented the zero-waste management system that aims to accumulate and collect the relevant waste at source, are qualified to benefit from the incentive system that the Ministry of Environment, Urbanisation and Climate Change governs.[49]

According to the Law, the producers that switch to deposit systems and collect the waste at the source will be deemed exempt from the reclamation participation fee. Producers have the right to collect the products that consumers want to exchange for higher quality or more efficient models or those that are no longer used. They are entitled to conduct campaigns to exchange the old/used products for new ones directly or through their distributors.

[48] 1 USD=7.34 as of 7,January 2020

[49] Ministry of Environment, Urbanisation and Climate Change, Directorate General of Environmental Management, Department of Zero Waste and Waste Treatment, https://cygm.csb.gov.tr/birimler/dongusel-ekonomi-ve-atik-yonetimi-dairesi-baskanligi

As part of the Expanded Producer Responsibility, some of the prominent producers of white goods have established or worked with several Waste Electrical and Electronic Equipment (WEEE) recycling plants licensed by the Ministry of Environment, Urbanisation and Climate Change (MoEU). There are currently 58 companies licensed from MoEU that specialise in WEEE and on the subject of ODS. These companies control the dangerous CFC gases contained in the products released by refrigerator manufacturers after completing their product life cycle. They provide end-to-end monitoring of products at their disposal points and give feedback to companies on low carbon management.

As far as the steps taken in this field are concerned, Arçelik is a perfect example. Arçelik being the leader of the sector and a pioneer in the industry, established the Waste Electrical and Electronic Equipment (WEEE) recycling plants in Eskişehir (refrigerators), and Bolu (other white goods and small domestic appliances) in 2014. Arçelik is also the only company which manufactures and owns such a plant in its sector.

As stated in the 2021 sustainability report of Arçelik, since 2014 approximately 1.6 million WEEE units have been recycled in their recycling plants. Between 2014 and 2021 this saved 397 GWh of energy, achieved by replacing old, high-energy-consuming products with new, low energy-efficient products. This is equivalent to the daily electricity consumption of about 50 million Turkish households. In addition, by recycling waste products, 195,000 tons of CO2 emissions have been prevented.[50]

The Arçelik plant in Eskişehir is the first recycling plant in Türkiye that has a closed system to collect chlorofluorocarbon (CFC) gases, ozone-depleting compounds which is used in old refrigerators. Other materials such as plastic, iron, copper, and aluminium obtained from recycled WEEEs find their way back into the economy in accordance with the resource efficiency policy. WEEEs collected in other categories are sent to their contracted recycling plants that have environmental permits and licenses.

5.2. Banking Sector Overview

5.2.1. Banking Sector Players

Türkiye has a well-developed financial system of 55 banks, of which 34 are deposit/commercial banks, 15 development banks, and six are participation banks. The number of branches and personnel is 11,098 and 202,136 as of 2021.[51]

According to the data published by the Banking Regulation and Supervision Agency, as of December 2021, the total assets of the banking sector have increased by 50.9% in nominal terms but only 16% in real terms net of y-o-y 2020 inflation of 36.08%. As a result of the increase in USD rate by 80%, asset size reached TL 9,213 trillion (USD 691 billion) compared to December 2020 data of TL 6,108 trillion (USD 823 billion). When the data for the first two months of 2022 are compared to the same period of 2021, it is seen that the volume of the total asset increased by 55%, that is, the growth rate increased compared to the year-end.[52] The ratio of the total asset size to GDP thaw was 1.21% as of the end of 2020 and increased to 1.29% as of December 2021.

Banks are the primary funding source for both public and private sectors and have a capital adequacy ratio of 18.34 %, which is well above the prudential requirement of 12%. For the first two months of 2022 CAR ratio increased to 19.05%. The sector has comfortable liquidity, with an average ratio of 148%, well over the regulatory minimum of 100%.[53]

Commercial loan growth showed an increasing trend after the revisions in monetary policy stance since September 2021. Annual economic growth accelerated in the last quarter of 2021 due to stronger

[50] Arcelik: Waste Electrical And Electronic Equipment (WEEE) Recycling. Available online at https://www.arcelikglobal.com/en/sustainability/intouch/areas/waste-electrical-and-electronic-equipment-weee-recycling.

[51] Banking Regulation and Supervision Agency of Turkey (2021): Turkish Banking Sector Main Indicators. December 2021. Available online at https://www.bddk.org.tr/Veri/EkGetir/17?ekId=90.

[52] Banking Regulation and Supervision Agency of Turkey: Monthly Banking Sector Data. Available online at https://www.bddk.org.tr/BultenAylik/en.

[53] Ibid

household consumption growth. Because of that, retail loans showed a stronger increase that could be assigned to the realisation of deferred demand after the re-opening of the economy from pandemics. Total loans increased by 37% as of 2021, compared to a 34.7 % increase in 2020.[54]

Loans account for 52% of total assets, whereas deposits accounted for 58 % of total liabilities/equities in 2021. Similar to the increase in asset volume, the total loan amount of the sector increased by 5%, compared to a 4% increase in total deposits during the first two months of 2022.

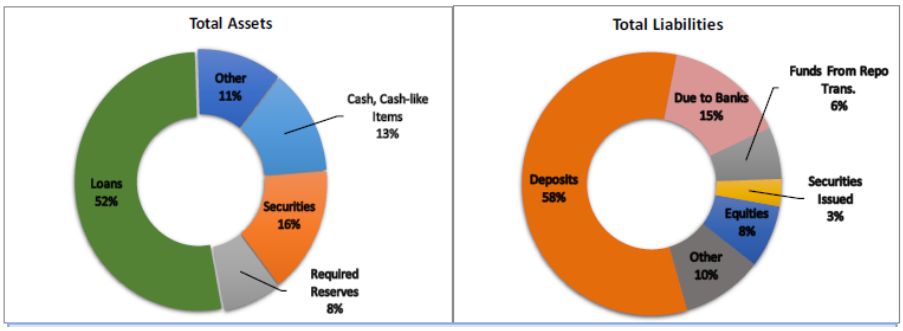


Figure 5: The distribution of total assets and liabilities in 2021

On the other hand, the composition of assets changed by the 2021 year-end. Although loans still have the majority, the total share decreased from 58% to 52%. In contrast, cash and cash-like items increased from 9% to 13%. Required reserves increased from 5% to 8% due to the decision to postpone certain investments and stay in more liquid assets because of the volatility and the upward trend in FX rates. Traditionally, deposits have dominated the funding structure of the Turkish banking sector. To fund fast-growing loans, the sector sought alternative funding sources from abroad and supported its resource structure with the issuance of financial securities in 2020. However, the share of deposits increased to 58% by the end of 2021 from 56% of 2020 year-end results, and financial security issuance decreased to 3%. On the other hand, funds from the repo increased from 4% to 6% by the 2020 year-end.

The ratio of FX assets in the balance sheet to total assets is 51%, while the ratio of total FX liabilities to total liabilities is 58%. The share of FX loans in total loans is 42%, while the percentage of FX deposits to total deposits is 65%. The increase in deposit accounts could be related to the entrance of a new instrument, a foreign currency-linked deposit account, that attracts clients to have both interest income and protect the value of their savings against changing FX rates and an increase in the number of FX deposits.

As of December 2021, the share of commercial and corporate loans is 58%, the share of SME loans is 22%, and the share of consumer loans (including credit cards) is 20% of total loans. The number of total loans was TL 4.901 billion. The commercial and corporate loans were realised as TL 2.840 billion, SMEs loans as TL 1.074 billion, while consumer loans and credit cards were realised as TL 987 billion.[55]

[54] Central Bank for the Republic of Turkey (2021): Financial Stability Report. Volume: 33. Ankara, Turkey. Available online at https://www.tcmb.gov.tr/wps/wcm/connect/0cdfa240-721f-48fb-8572-534e6af4a891/TamMetin.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-0cdfa240-721f-48fb-8572-534e6af4a891-nVHS2FV.

[55] Banking Regulation and Supervision Agency of Turkey (2021)

The distribution of total loans according to their utilised sectors is given below.

There is no substantial change in the figures when the 2020 and 2021 year-ends are compared. The individual consumer loans constitute nearly 10% of total loans and are classified under the other loans (19%) title together with other miscellaneous items. When the other loans, credit card loans, and wholesale and trade of vehicle loans that constitute nearly 38% of the total loan volume are discarded, the most important sectors are manufacturing (21%), construction (9%) and electric, gas and water resources loans (8%), wholesale, trade and brokerage (7%, transportation (6%). On the other hand, hotels and restaurant loans constitute nearly 4%of total loans.[56] All the mentioned sectors with significant loan amounts could be eligible for potential energy efficiency and sustainable cooling investments.

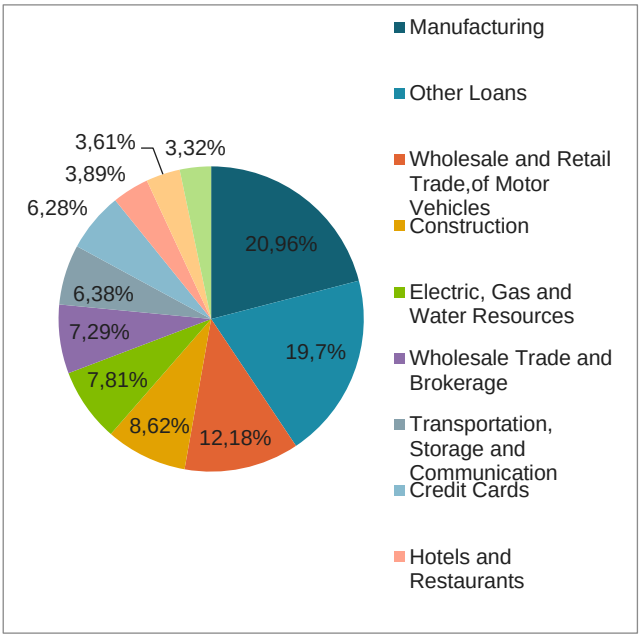
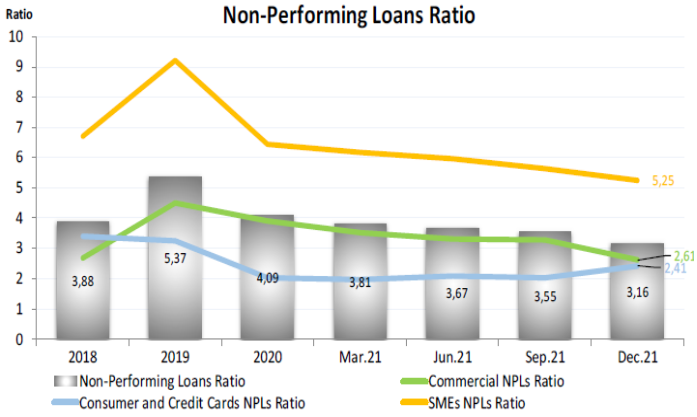


Figure 6: The distribution of loans to sectors in 2021



The Turkish Banking Sector presents a relatively solid stance in terms of financial strength parameters as far as the capital adequacy mentioned above and Non-Performing Loan ratios are concerned. The NPL ratio continued to decline gradually to become 3.16% as of the end of 2021. Similarly, the Non-Performing Loan ratio, which was 5.37% as of 2019, decreased to 4.08% by the 2020 year-end with the support of the accelerated increase in the loan volume 2020.[57]

Figure 7: The Non-Performing Loans Ratio Trend 2018-2021

Profitability performance of the banking sector increased from TL 58.5 billion by 57% in nominal terms and by 11% in real terms (net of y-o-y 2021 inflation of 36.08%) compared to 2020 to become TL 92 million as of the end of 2021.

5.2.2. Financial products focus on sustainable/green finance

Starting from the 2000s, the concept of sustainability became a part of the vision statements and business strategies of financial institutions and private companies in developed countries. Likewise, it became necessary for the Turkish financial institutions and firms to work in alignment with the priorities and requirements of their counterparties to conduct business successfully and in the right way.

International Financial Institutions' overall policy on the environment has evolved in a way to compromise the assessment of specific projects on development while, at the same time, complementing these studies by efforts to help governments build environmental concerns into policymaking at all levels. These institutions have increased their lending facilities on environmental projects, established requirements and guidelines for environmental assessment, and promoted national environmental action plans. Within

[56] Ibid
[57] Ibid

this context, the public and private development banks in Türkiye that had close contact with these international financial institutions were the first to adopt these principles.

Türkiye's first private development bank, Industrial Development Bank of Türkiye (TSKB) and its conjoint bank in the public sector, Development Investment Bank of Türkiye (TKB), were the first two banks that approached the credit appraisal process on environmental conscious. This policy leads the banks to be very considerate of the issue of the environment during the project appraisal process. In addition to their general concern for the environment, starting from the first half of 2000's they began to finance renewable energy and energy efficiency investments with funds provided from international financial institutions such World Bank (WB), International Finance Corporation (IFC), European Investment Bank (EIB), KfW BankenGruppe, Japan Bank for International Cooperation (JBIC), European Council Development Bank (CEB), Agence Française de Développement (AFD), European Bank for Reconstruction and Development (EBRD). Interacting with these IFIs increased their focus on environmental issues and put new goals on their agenda for green finance.

Since **renewable energy** and **energy efficiency investments** became a hot topic, commercial banks also started to finance energy investments. Eventually, as demand for long-term funds to support those investments increased, IFIs started to provide finance for commercial banks to fund these investments. Working with IFIs and following their environmental guidelines during the credit appraisal process helped to increase awareness in the sector on these topics. The banking sector that had attracted foreign investments at that time was reshaped by the partnership of foreign banks with several Turkish banks. The foreign partners' corporate culture and working principles also became effective in the approach of Turkish commercial banks to the issue of the environment.

Among the commercial banks, **Akbank** initially took the lead in **sustainable banking applications** and signed in for the many firsts in the field. Yapı Kredi joined Akbank soon in this journey. Garanti BBVA followed the steps of its precedents quickly and came forward with its pioneering actions in sustainability and the generation of different creative green finance products. Among the private banks, all the big players in the sector Is Bank, Akbank, Yapı Kredi Bank, ING, QNB Finansbank, Denizbank, Şekerbank. Among the public banks, Vakıf Bank and Halk Bank are the ones that could be named to show the most effort on sustainability issues. All of them granted loans to support renewable energy and energy efficiency investments and inserted sustainability concepts in their banking applications with all respects, covering topics from environmental concerns, social responsibility, gender equality, and corporate governance to responsible banking.

The milestones of the development of the sustainable finance sector in Türkiye since 2005 are depicted in **Table 2**.

Table 2: The milestones of the sustainable finance sector in Türkiye

2005	Environmental Management System has been developed and put into action by TSKB
2006	The first ISO 14001 Environmental Management System certification was taken by TSKB
2008	TSKB is announced to be Türkiye's first carbon-neutral bank
2009	Environmental Risk Evaluation Tool (ERET) has been put into application by TSKB. This evaluation model is developed to quantify the environmental and social risks inherent in every project based on five criteria of risk under forty-five separate headings TSKB prepared the first sustainability report Sustainable Growth in the Financial Sector Working Group, founded by the Banks Association of Türkiye (TBB) Sekerbank has put into application the social and environmental management system in all lending processes prepared under the guidance of the International Finance Corporation (IFC)
2010	Both TSKB and Akbank became the banks to publish a Sustainability Report per the Global Reporting Initiative (GRI) standards. The first signatory to the United Nations Global Compact of Türkiye was TSKB Carbon Disclosure Project (CDP) Türkiye has been launched with the support of Akbank and the Sabancı University Corporate Governance Forum
2012	Akbank became one of the first companies in the world to sign the "Carbon Price Communiqué" prepared by The Prince of Wales's Corporate Leaders Group on Climate Change (CLG),

2014	Garanti BBVA qualified for the BIST Sustainability Index and BIST Corporate Governance Index Sustainable Growth in the Financial Sector Working Group prepared the Sustainability Guidelines for the Banking Sector
2015	Akbank signed the Pledge for Action Garanti BBVA became the only Turkish company to be listed in the Dow Jones Sustainability TM Emerging Markets Index
2017	Garanti BBVA was the first bank to propose Green Mortgage Loan for energy-efficient buildings Akbank participated in the update of the Declaration on Sustainable Finance with the UN Global Compact Working Group
2018	"The Principles for Responsible Banking" was launched in New York; Garanti BBVA, ING, Development and Investment Bank of Türkiye, Şekerbank, Industrial Development Bank of Türkiye, and Yapı Kredi from Türkiye were the committed banks
2020	Yapı Kredi issued its first green bond. The bond worth USD 50 million issued with a maturity of 5 years will be used to finance renewable energy projects
2021	TSKB has emerged as the first bank to issue a 'Basel III Complaint Sustainable Tier II Bond' on international markets EBRD invests US$ 50 million in QNB Finansbank's first green bond to finance internationally certified green building projects in its portfolio.

5.3. Overview of RAC finance initiatives (incl. sources of finance)

Starting in 2007, with the adoption of the Energy Efficiency Law, the concept of energy efficiency was introduced into the sustainability agenda of Türkiye. As far as RAC is concerned, a subset of actions taken to promote Energy Efficiency (EE), within the context of further regulations, brought on energy efficiency in home appliances, energy performance classifications and energy labels for buildings, energy efficiency in transportation and home appliances.

Starting with the legislation act, some financing schemes provided by the government and private sector have been applied.

5.3.1. Government/Public Sector Support Programmes

Currently, some grant programmes are provided by the government for EE investments. These are:

- Efficiency Increasing Projects (VAP)
- Voluntary Contracts
- 5th Region Incentives
- KOSGEB EE Support Programme
- Green technology Projects Support Program (YETEP)

The MoENR offers grants for EE investments in manufacturing plants based on the rules specified in the regulations related to the Energy Efficiency Law. Due to the latest regulation, the annual energy consumption of the applicant organisation must be at least 500 TOE. The investment cost must be at the most 5,000,000 TL, the payback period must be at the most five years, and the grant will be at the most 30% of the project cost, including consultancy services. The EE projects include efficient equipment or system use, repair, insulation, modification, rehabilitation, and process design. The invested equipment subject to the grant is to be installed within two years of the project acceptance.

The projects applied for EIP from the beginning of the programme until the end of 2021 are summarised below.

Table 3: Efficiency Increasing Projects (VAP) 2011-2021

	Number of Projects	Investment Cost	Grant Amount	Energy Saving	Energy Saving
		(Million TL)	(Million TL)	(Million TL)	(TOE/Year)
Completed Projects	346	189.4	47.2	137.1	75.751
On-going Projects	225	305.7	91.5	111.4	35.916
Total	**571**	**495.1**	**138.7**	**248.5**	**111.666**

The application date is usually January. Although it is possible to say that this fund has been affected by economic fluctuations in the past years, VAP grants have been increasingly popular among medium to large-scale manufacturing plants in the last years; 50 and 80 projects received grants annually over the previous two years. The number of applications increased drastically in 2021, and 186 projects received grants. The EIP (VAP) programme is the most benefitted among the EE support programmes. It is stated by the Minister of Energy and Natural Resources that the scope of EIP (VAP) will be broadened to cover the investments in commercial buildings, energy, services, and agriculture sector facilities.

5.3.2. Voluntary Contracts

Manufacturing plants are allowed to sign voluntary contracts with the MoENR declaring to reduce their annual energy intensity (based on the last five years) by 10% for the next three years. Due to the latest regulation, the annual energy consumption of the applicant organisation must be at least 500 TOE, and the grant will be 30% of the annual energy consumption, at the most, with a maximum of 1,000,000 TL. The grant is awarded to successful companies at the end of the 3-year energy reduction period. In the past ten years, the MoENR supplied 900,000 TL to eight successful industrial organisations. The total investment cost of these projects is 8.3 million TL, and their annual energy savings amount to 5.7 million TL.[58] The projects applied for VAP from the beginning of the programme until the end of 2021, they are summarised in the table below.

Table 4: Voluntary Contracts from the beginning of the programme until the end of 2021

	Number of Projects	Investment Cost	Grant Amount	Energy Saving	Energy Saving
		(Million TL)	(Million TL)	(Million TL)	(TOE/Year)
Completed Projects	8	8.3	0.90	5.7	5,542
On-going Projects	29	154.9	29.0	42.2	11,770
Total	**37**	**163.2**	**29.9**	**47.9**	**17.312**

[58] Republic of Turkey Ministry of Energy and Natural Resources: Gönüllü Anlaşma Destekleri. Available online at https://enerji.gov.tr/evced-enerji-verimliligi-destekleri-gonullu-anlasma-destekleri.

5.3.3. 5th Region Incentives

The MoIT supported various investments by the six development regions defined in Türkiye. The 1st Region was the biggest city, Istanbul, and the 6th Region was the most rural, less developed area. The support mechanisms vary and increase incrementally from the 1st region to the 6th. EE investments to be made in manufacturing plants are included in the support mechanism for the 5th Region regardless of the geographical region of the investor. The annual energy consumption of the applicant organisation must be at least 500 TOE, the investment must reduce the annual energy consumption by 15%, and the payback period must be five years at the most. The MoIT receives the applications, and the MoENR evaluates the EE criteria. The 5th Region funds are exempt from VAT, customs tax, tax reduction, insurance support for the employer, interest support and area allocation for the investment. This fund mechanism is relatively new for the EE projects, and as of 2021, no project benefitted from this support.

5.3.4. KOSGEB EE Support Programme

The Directorate of SME Development and Support (KOSGEB), under the MoIT, is supplying EE grants for energy audits, training and consultancy services provided to SMEs. The maximum amount of these grants is 2,000 TL for preliminary energy audits, 20,000 TL for detailed energy audits, 5,000 TL for consultancy on VAP application, and 3,000 TL for the energy manager training programme. Different companies must provide consultancy services for each item, and the grants are offered for three years at the most, with a maximum amount of 75,000 TL in total. KOSGEB also has grant limits for projects applied in each of the six development regions of Türkiye. These limits are 50% for the 1st Region, 60% for the 2nd, 3rd, and 4th Regions, and 70% for the 5th and 6th Regions. This fund is relatively popular among SMEs.

In January 2020, the Minister of Industry and Trade spoke at the 7th Energy Summit of Organized Industrial Zones Supreme Organisation (Organize Sanayi Bölgeleri Üst Kuruluşu –OSBÜK) and announced that strategic steps are to be taken to ensure the growth of the industry, with more efficient use of resources. The minister commented that the energy demand of the Turkish industry had more than doubled in the last 17 years, and that it is important to make improvements in the energy-intense sub-sectors of the industry. With this objective in mind, a new project has been started under the body of KOSGEB to support the transformation from the old inefficient and costly electric motors to the installation of new energy-efficient electric motors in the industry.

The project will cover the selected pilot 7 Organized Industrial Zones with the contribution of the MoIT, Organized Industrial Zones (OSB), OSBÜK and KOSGEB province in the first phase. The Project of Encouragement of Energy Efficient Motors in Türkiye (Türkiye 'de KOBİ'lerde Enerji Verimli Motorların Teşvik Edilmesi (TEVMOT) Projesi), will be applied firstly in Gebze, İzmir-Kemalpaşa, Antalya, Uşak, Adana-Hacı Sabancı, Bursa and Ankara Industrial Chamber and 1. Organised Industrial Zone.[59] The project will be financed by KOSGEB Business Development Support Programme and United Nations Development Fund. By this means, the industrial producers will have direct access to financial and technical support. It is planned that the investors will be allocated a 10 billion TL fund within the next two years.

KOSGEB will give 60% of the investment cost of the energy-efficient motors as a grant. If the electric motors are manufactured locally, the support amount will be 75% of the investment cost. The upper limit for the grant shall be 80.000TL.[60]

As an extension to this project, another pilot application started in the Kayseri Industrial Zone with the support of MoIT Efficiency General Directorate, KOSGEB, Kayseri Organized Industrial Zone, Credit Guarantee Fund and Turkish Banks.[61] The companies that require financial support for the transformation of the energy-efficient electric motors in Kayseri OIZ, can apply to receive the support provided for the interest expenses of the loans, that they can utilize for the instalment of the energy-efficient electric motors. The preliminary condition for receiving this support is that the companies are registered in the KOSGEB database and have completed an Energy Efficiency Audit with an approved SME Declaration Form. The highest limit being 300.000TL, all of the interest expenses that stem from the loans will be paid for by KOSGEB. The terms of the loan will be 36 months with a 12 month grace period. The Credit Guarantee Fund will provide the companies support if they are having difficulties fulfilling the collateral conditions. The

[59] TEVMOT

[60] KOSGEB: Destek Unsurları. Available online at https://www.kosgeb.gov.tr/site/tr/genel/detay/6797/destek-unsurlari.

[61] A presentation by Hürol Mete industry and technology expert from the Ministry of Industry and Technology, Directorate of Strategic Research and Efficiency. 2022. https://www.emosad.org/etkinlikdetay-sanayide-dusuk-verimli-elektrik-motorlarinin-donusumu-programi-4.html

program for Kayseri Organized Industrial Zone, was completed in 2016 and a new program covering the Bursa Organised Industrialized Zone started in 2017.

On the other hand, in October 2021. KOSGEB has launched a new financial support programme called Vegetables and Fruits Cold Chain Leasing Support Programme. By this new financial support programme vegetable and fruit losses in the cold chain process of SMEs is aimed to be reduced by contributing to the financing of the domestically produced air-cooling unit and/or frigorific unit investments of SMEs. According to the project KOSGEB will provide financial support up to TL 750,000 for the leasing interest expenses and/or profit share costs of SMEs.[62]

5.3.5. Green Technology Projects Support Program (YETEP)

The Technical Development Foundation of Türkiye (TTGV) offers loans on climate-friendly technologies, clean production, EE, renewable energy, and other energy technologies through the YETEP programme. YETEP aims to increase the environmental performance of industrial organizations.

The main objective of the Climate Friendly Technologies Support Program is to promote the local and innovative projects that aim to focus on the production of climate-friendly, energy-efficient, reliable alternatives to decrease the utilization and emission of gases with high potential of Global Warming Potential (GWP) such as hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs) in the cooling sector.[63]

Applications are accepted once per year. In the selection process, priority is given to investments with national products and innovative technologies. Industrial organizations that have been operating for three years are eligible. The awarded projects are selected by independent experts on behalf of TTGV within three months after the application deadline. The support period for the project is 15 months at the most. The budget allocated for each project ranges from 100,000 and 400,000 USD. The last application call was completed in March 2020.

5.3.6. Local FIs and International FIs and Programmes

The financial programmes eligible for RAC financing have been provided through the collaboration of local FIs and international FIs in Türkiye under the umbrella of the energy efficiency credit lines. Some distinguished financial programmes offered were specifically designed for buildings and heating and cooling systems including RAC.

As far as the financial support mechanisms for the energy efficiency investments in the residential sector provided by commercial banks are concerned, the first credit line was initiated by the funding of KfW via Şekerbank under the title of the Eco-credit line for residential EE projects in 2009. The loans are classified into six groups: insulation (building shell, heat, water, acoustic and fire), heating/cooling systems, home appliances, lighting, solar energy, and elevators. Since 2009, the Eco-credit fund has supplied almost over 1 billion TL to 117,000 clients, saving almost 31 billion kWh of energy and reducing 6.7 million tons of CO_2 emissions. The KfW project with Şekerbank included industrial and agricultural investment funds for energy efficiency between 2011 and 2013. EE investments were assessed by independent auditors, with an eligibility criterion of 20% savings in a combination of energy consumption and CO_2 emissions.

Since then, many programmes targeting EE investments in buildings and residential and commercial cooling have been supported by international financial and non-financial institutions and the government in Türkiye.

5.3.7. Local FIs that offer RAC financing directly or indirectly

In recent years, local financial institutions started to extend credit lines specifically for residential energy efficiency and cooling investments. The content and conditions of these credit lines and leasing options are summarised in

Table 5. These products indicate that public banks, private banks, and leasing companies are financing energy-efficient cooling technologies for different targeted groups such as households, SMEs, etc.

[62] KOSGEB: Vegetables and Fruits Cold Chain Leasing Support Programme. Available online at https://en.kosgeb.gov.tr/site/tr/genel/destekdetay/7250/vegetables-and-fruits-cold-chain-leasing-support-programme

[63] AHILER Development Agency: Yeşil Teknoloji Projeleri (YETEP) Destek Programı. Available online at https://www.ahika.gov.tr/destekler/diger-kurumlarin-destek-programlari/yesil-teknoloji-projeleri-yetep-destek-programi.

However, as far as the financing for cooling equipment is concerned, the main worry is energy efficiency rather than the clean cooling technologies, as the concept is still hardly known by the financial sector.

Table 5: Local Financial Institutions Offering Sustainable RAC Financing

State-Owned Deposit Banks					
Bank	**Credit Line**	**Loan Amount**	**Grace Period (months)**	**Maturity (months)**	**Interest Rate (monthly)**
T.C. Ziraat Bankası A.Ş.[64]	EE Consumer Loans	0-5,000 TL	0	0-36	1.54
	EE Building Loans	0-5,000 TL	0	0-36	1.54
T. Halk Bankası A.Ş.[65]	EE Consumer Loans	0-50,000 TL	0	0-36	1.58
	EE SME Loans by AFD/Proparco	0-2,000,000 €	0-24	0-84	n.a
T. Halk Bankası A.Ş.	EE SME Loans by World Bank	0-5,000,000 $	0-24	0-84	n.a
Privately Owned Deposit Banks					
Garanti BBVA	Green Mortgage Loans	credit up to 80% of the appraisal value of the house	0	0-240	1.46[66]
	Consumer-Vendor Loans	0-30,000 TL	0	0-36	1.79
ING Bank A.Ş.	Consumer-Vendor Loans	0-20,000	0	0-36	2.26
Şekerbank A.Ş.[67]	Eco Credit Consumer Loans	The investment amount[68]	0	0-36	Zero-Type of Investment[69]
	Eco Credit Insulation-Building Loans	The investment amount	0	0-60	Zero -Type of Investment
	Eco Home Loan	The investment amount	0	0-120	1.68
Türk Ekonomi Bankası A.Ş. (TEB)	Eco Vehicle Loan	The proforma invoic amount	0	0-36	1.64
	Consumer Loans	0-50,000 TL	0-3	0-36	1.65

[64] Ziraat Bank: Energy Efficiency Consumer Loans. Available online at https://www.ziraatbank.com.tr/tr/bireysel/krediler/genel-ihtiyaclar/bireysel-enerji-verimliligi-kredisi

[65] Halk Bank: Energy Efficiency Consumer Loans. Available online at https://www.halkbank.com.tr/tr/bireysel/krediler/ihtiyac-kredileri/enerji-destek.html

[66] The loan rates vary depending on the presence of the Energy Identity Certificate and the energy performance of the house

[67] Seker Bank: Energy Efficiency Consumer Loans. Available online at https://www.sekerbank.com.tr/bireysel/bireysel-krediler/eko-kredi

[68] The investment amount could be the upper limit, the pro-forma invoices should be submitted

[69] Depending on the investment type the interest rate could be zero. Zero interest rate is valid for the Eco -Credit Insulation campaign for the deals done with the firms listed in Şekerbank's website.

Türkiye İş Bankası A.Ş.	İş Solar Loan	The investment amount[70]	0-12	0-120	n.a
Yapı ve Kredi Bankası A.Ş.	Environment-Friendly Mortgage Loans	credit up to 90% of the appraisal value of the house can be given		0-120	1.39[71]
TURSEFF Sustainable Energy and Resource Efficiency Loans Aklease, Denizbank, Garanti Leasing, İş Bankası, İşlease, Vakıfbank, Qnbfinans Leasıng	TURSEFF[72] SME loans	0-250.000 €[73] 5 mn-15 mn €[74] 1 mn-5 mn €[75]			
TUREEFF Small Investment Energy Efficiency Loans[76]Garanti BBVA, İşbankası, Şekerbank, Yapıkredi	Individual Loans				
TUREEFF Small Investment EE Loans: **Garanti BBVA, Is Bank, Şekerbank, Yapıkredi**	Commercial Loans	0-5.000.000 $			
TUREEFF Rehabilitation EE Loans: **Garanti BBVA, Is Bank, Şekerbank, Yapıkredi**	Individual Loans	0-250,000 $			
	Commercial Loans	0-5,000,000 $			
TUREEFF Construction and Reconstruction EE Loans: **Garanti BBVA, Is Bank, Şekerbank, Yapıkredi**	Commercial Loans	0-5,000,000 $			
TUREEFF Mortgage Loans: **Garanti BBVA, Is Bank, Şekerbank, Yapıkredi**	Individual Loans	0-250,000 $ 50%of the value of the property			
Leasing Companies					
Aklease	Eco Lease	Up to the investment amount of the equipment	0	48-60	
Garanti BBVA Leasing	Cooling Equipment Lease				

[70] The investment amount of the solar panels and the construction cost. Loan could be utilized in TL, USD, or EURO.

[71] The loan rates vary depending on the presence of the Energy Identity Certificate and the energy performance of the house

[72] Türkiye Sustainable Energy Financing Facility (TurSEFF): What is TurSEFF? Available online at https://www.turseff.org/sayfa/facility

[73] For small investments in pre-approved technology, the maximum individual finance amount, and the maximum purchase price of each piece of leased equipment

[74] For non-producer firms, the maximum individual finance amount, and the maximum purchase price of each piece of leased equipment will be five mn €, and aggregate finance amounts will not exceed 15 mn€

[75] Producer firms, the maximum individual finance amount, and the maximum purchase price of each piece of leased equipment will be one mn €, and aggregate finance amounts will not exceed 5 mn€

[76] European Bank of Reconstruction and Development: Turkey Residential EEFF (TurREEFF) https://www.ebrd.com/work-with-us/projects/psd/turkey-residential-eeff-(turreeff).html; Stantec: Turkish residential energy efficiency financing facility. https://www.stantec.com/tr/projects/turkish-residential-energy-efficiency-financing-facility

İş Lease	TURSEFF SME leases	Up to the investment amount of the equipment	0		
QNB Lease	Heating/Cooling Equipment Lease			0-60	
Yapı Kredi Lease	Arçelik Solar systems lease	7.250-14.000	0	0-18	

The mapping of current sustainable RAC financing indicated that Governmental support and FIs credit lines for the RAC technologies are developed under the "Energy efficiency" segment. To reduce the use and emission of gases with high global warming potential, such as hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs), RAC manufacturers are producing sustainable technologies. In that regard, the Cool Up finance workstreams aim to reduce information asymmetries across the RAC sector and ecosystem to help unlock the needed capital and financial flows for sustainable cooling technologies. A focus will be on working with financial institutions to develop strategies to realise opportunities in this space. This will include connecting them to broader sustainable finance international investment flows. Together with the Cool Up program, these new RAC technologies are aimed to be mainstreamed with sustainable financing loan products.

Before designing any loan product, it is extremely important to examine and investigate the size of the market. The sizeable market happens with a steady demand and source. The essence of sizing the market is to look across the segments based on our analysis of financing and other workstreams from the technical and policy perspective. The main focus of this study is to synthesise the technical and policy elements within the "Market assessments on financing landscape" workstream to show the sector's capacity. With this in mind, we will discuss the particular demand estimation and financing gap in the next section. After constructing this first pillar, our studies within this project will continue conducting the feasibility studies for sustainable cooling investments and developing financing strategies for the FIs.

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 fit with the current and potential financing dynamics and practices of the Türkiye 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, we selected the most viable and applicable ones for each segment (residential, commercial, and public). We discussed how they can be applied and why we thought these options were feasible and also optimistic to scale up RAC financing in Türkiye.

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. Likewise, 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 an extension of financing energy efficiency. In addition, the focus is on financing the RAC sector and RAC products and equipment. This document has focused on financing three principal 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. This can be replicated for the EE sector in general and RAC in specific. As a starting point, these can be used to upscale the cooling sector in Türkiye before expanding to other potential innovative financing schemes.

6.1.1. The broad cross-section of sources of finance

As discussed in previous sections, Türkiye has a wide cross-section of sources of finance. These include commercial banks, leasing companies, microfinance institutions and specialised institutions such as the Directorate of SME Development and Support (KOSGEB) and Credit Guarantee Fund (KGF). Most commercial banks support renewable energy and energy efficiency projects in an increasing trend and provide guarantees. Türkiye has a dedicated development bank for meeting the financing needs of Special Provincial Administrations and Municipalities called İller Bankası.

The following table provides a list of all sources of finance for energy efficiency projects:

Table 6: Sources of finance for energy efficiency projects

Sources of Finance	Residential	Commercial	Public Sector
Commercial Banks	•	•	
Development Banks	•	•	
Non-banking Financing Companies	•	•	
Micro Finance Institutions		•	
Private Equity Funds/Venture Capital		•	
Housing Finance Institutions	•		
Leasing Companies	•	•	
Guarantee Agencies/ Institutions	•	•	•
Crowd Funding Institutions	•	•	
National Financing Institutions	•	•	•
Bilateral Financing Institutions	•	•	•
International Financing Institutions	•	•	•

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

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 regarding poverty reduction and improving living conditions, promoting regional cooperation and contributing to sustainable development.

In Türkiye, energy efficiency finance has become the focus investment area of IFIs, increasing their loan portfolio gradually over recent years, including investments in public and residential buildings. World Bank and EBRD, being the leading players in the emerging energy efficiency market, have put their signatures on many energy efficiency projects. Apart from the World Bank and International Finance Corporation, European Bank for Reconstruction and Development, European Investment Bank, other international and bilateral financial institutions like KfW, Agence Française de Développement/PROPARCO, Council of Europe Development Bank (CEB), Austrian Development Bank (OEEB, JBIC, and Asian Infrastructure and Development Bank (AIIB) have completed and on-going programmes in Turkey.

Being the leading player in the emerging energy efficiency market, EBRD have put their signature on many energy efficiency projects in Türkiye. Turkish Residential Energy Efficiency Financing Facility, developed by the EBRD and supported by the Clean Technology Fund (CTF) and the EU (European Union), has become an important promoter for financing energy efficiency investments at a residential level. So far, about 3,292 residents have received TuREEFF mortgages and loans to purchase efficient homes or household equipment with energy-saving technologies. Over 50 thousand other households have benefited directly or indirectly by installing efficient heating or cooling systems, windows or white goods acquired from specialized vendors. The program has financed more than 4000 cumulative residential energy efficiency investments amounting to $350 million.

On the other hand, with the TURSEFF program, another financing initiative of EBRD targeting SMEs, around USD 80 million in loans was allocated for EE investments. Even though both programs terminated, EBRD continues its financing activities with a new facility with a broader concept called **Green Economic Financing Facility, amounting to EUR 500,000,000.** The concessional co-financing of EUR 20,000,000 by **the Clean Technology Fund disclosed** in September 2021.

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.

Financing mechanisms and business models for the residential sector

- **Loans, Green Credit Lines**
- **Revolving loan funds, guarantee/ insurance schemes**
- **Dealer financing**
- **Positive lists**
- **Mortgage Financing**

Loans, green credit lines

Loans are given directly by Local Financial Institutions, mostly commercial banks, to personal banking clients in the form of consumer loans. The scope of these loans is very general. They can cover any topic to fulfil the cash requirement of the client, including the purchase of home appliances with an energy efficiency concept. In Türkiye, the tenure of these loans is 24 months maximum for loan amounts over 50.000TL and 36 months maximum for amounts below 50.000 TL, interest rates being determined according to the spot rate.

Green Credit lines are the loans provided by International Financial Institutions and/or Bilateral Development Banks to be allocated to end users via commercial banks. In Türkiye, these credit lines have been applied in the past years with the name of Eco Loan to finance small residential investors that invested in energy-efficient home appliances. The maximum tenure was 0-36 months.

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

Revolving loan funds, guarantee/ insurance schemes

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.

Revolving loan funds do not exist for the moment in Türkiye. However, according to the National Energy Efficiency Action Plan enacted in 2018, covering the period 2017-2023, the development of an energy efficiency financing mechanism is on the agenda. Within the context of these studies, the establishment of a national revolving financing fund is considered a strong option which should be backed up with solid legislation defining the status/structure of the fund with the related guarantee/ insurance schemes.

Dealer financing

Dealer financing is financial support from energy efficiency technology providers to residential customers through a credit-based model. Direct lending by dealers could do this, or an indirect lending model backed up by commercial banks.

Indirect lending model, the residential customers acquire energy-efficient products with no (or very little) down payment, on a promise to pay later to a schedule agreed upon by the provider and guaranteed with a promissory note signed between the dealer and the customer up to 10-12-15 months tenure with equal instalments.

RAC products are sold for cash or via a credit card. In the case of indirect lending, dealers, chain stores for electronic goods and home improvement/hardware stores make agreements with commercial banks to give special and longer tenures than regular credit cards to attract customers and increase their purchasing power. In Türkiye, credit tenor is usually between 30 and 180 days.[77] Moreover, in the indirect lending model, commercial banks also directly promote retail loans for customers.

Positive Lists

This is a flexible financing mechanism. It provides agreed-upon lists of sectors, sustainable technologies, or technology providers pre-approved for lending by financial institutions. Here, the 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 facilitates the credit application process for the client and creates a standard for defining the nature of energy efficiency projects. It also follows standard lending procedures in assessing the credit and conducting due diligence in line with any positive list. This can be specifically directed to the RAC financing by suggesting guidelines, market standards and consistent methodology for the FIs use. This financing form enables the FIs to proceed cautiously in delivering specific loans for RAC financing and promoting the development and integrity of green-loan products. This form of financing can be used with other financing firms, such as green loans and revolving funds.

This model has already been used in Türkiye by EBRD's TUREEFF credit line and has proved successful.

Mortgage Financing

Energy-efficient mortgages (EEM) or Green Mortgages are loan products that allow borrowers to reduce their utility bills by financing the cost of integrating energy efficiency features into a new home or refinancing an existing home. Green Mortgage loans have been initiated in Türkiye by collaborating with a commercial bank and IFIs that also provide financing. A mortgage loan is offered with a 50% exemption advantage in special loan allocation fees for houses with Class A and B Energy Identity Certificates to encourage the demand for highly energy-efficient houses. The other three leading banks follow this application in the sector. It seems possible to widen the application by the participation of other banks.

[77] Şekerbank: Eco Credit. Available online at www.sekerbank.com.tr.

Financing mechanisms and business models for the commercial sector

- **Loans, green credit lines, dealer or trade financing, positive lists and revolving loan funds, guarantees and insurance**
- **Leasing, Green Bonds and Green Leasing**
- **Emission Trading System - White Certificates Guarantees and insurance**
- **Energy performance contracts - shared and guaranteed savings models (ESCOs)-**
- **Crowdfunding for the commercial sector**

Out of the above-mentioned financial mechanisms for the commercial sector, the ones listed below are most suitable for Türkiye. Some of them are already being used as a financing method.

Loans, green credit lines, dealer or trade financing and revolving loan funds, guarantees and insurance

Commercial enterprises often finance their activities by **direct loans from local FIs.** However, corporate firms and SMEs prioritise core business activities over energy efficiency improvements. In Türkiye, local FIs also tend to finance core business activities with local funds. However, there are grant and support programmes provided by the government agencies KOSGEB and KGF to support energy efficiency investments, and local banks act as intermediaries in the distribution of these funds. These applications worked well in the past. The amount of support could be increased.

On the other hand, **green credit lines** funded by IFIs and/or Multilateral Development Banks stimulated the energy investments both for corporate firms and SMEs with this system that is well established and functioning properly in Türkiye. The scope could be widened by increased funding and awareness-raising/capacity-building studies.

Dealer financing or trade financing is financial support from energy-efficient technology providers to commercial customers. Through this credit-based model, customers acquire energy-efficient products with little or no down payment and then pay later on a schedule agreed upon with the provider. In Türkiye, this application has already been used for every type of machinery and equipment without the discrimination of energy efficiency. Direct lending by the vendors could do this, or an indirect lending model backed up by commercial banks. Credit tenor is normally between 30 and 180 days.

However, by the funds provided by IFIs and distributed via local FIs, tenor and interest rates became more favourable. This is a well-functioning business model, and the scope could be enhanced.

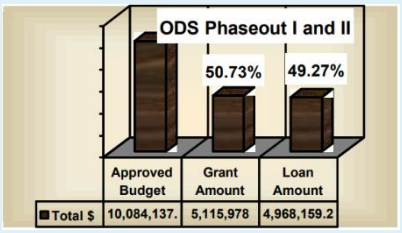
Another perspective of the funding process in Türkiye was financing the dealer companies by funds provided by IFIs with convenient terms through commercial banks with the method of **positive lists.** Dealers providing goods for commercial firms can have financing if they sell eligible products included in the List of Eligible Materials and Equipment (LEME) designed by the fund provider. This support also encourages the dealers/vendors to market energy-efficient machinery and equipment.[78]

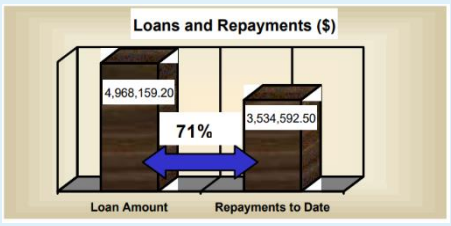
As mentioned above, forming revolving loan funds would be much more meaningful for the commercial sector, both for corporate firms and especially for SMEs. The related guarantee/ insurance schemes are also a must for the revolving funds.

[78] Green Economy Financing Facility (GEFF): TuREEFF (Turkish Residential Energy Efficiency Financing Facility). European Bank of Reconstruction and Development. Available online at https://ebrdgeff.com/seff_facilities/turkey-residential/.

Case Study: Energy Efficiency Revolving Loan Funds Türkiye

There are several examples of successful energy efficiency revolving loan funds for the commercial sector. For example, in Türkiye, Thailand and several states in the USA, there are/were commercial sector focused energy efficiency revolving loans funds. In 1992, Türkiye prepared a national program with the support of the World Bank and decided to implement an accelerated ozone-depleting substances (ODS) phaseout program. The Revolving Loan Fund in Türkiye was made available to selected enterprises for energy-efficient and ozone-friendly cooling appliances. For many revolving loan funds, the initial capital is sourced through a grant or very low-interest loan from public entities, such as government or multilateral development funds. For example, the Revolving Loan Fund in Türkiye was made available through a Multilateral Fund (MLF) grant to implement the Montreal Protocol. As a result of this, The Turkish ODS phaseout approach has yielded interesting results through the use of loans from a revolving fund.[79] Although Türkiye received the funds from the MLF as a grant, Türkiye decided to use part of the grants as loans to enterprises through a revolving fund due to the economic health of the first enterprise participating in the program. The sectors covered were refrigeration, foam and solvents. Eleven organizations received grants, and eight organizations received partial loans. This approach helped to phase out about 1600 tonnes of ozone-depleting potential. The repayment rate has been very high, with more than 71% of the loans paid back up to now. As a result of its excellent performance, Türkiye received an award from United Nations Environment Programme (UNEP) in 1997 for being one of nine countries out of 49 which had most successfully implemented the Montreal Protocol.





Leasing, Green Bonds and Green Leasing

Leasing arrangements help customers that lack the capital to make upfront capital investments for energy efficiency. Using the equipment as collateral has its advantages. There are no strict covenant requirements to invest in the latest technology equipment and flexible payment terms in which the equipment might be returned or purchased during the end of the contract period are possible. In addition to this, working with structured corporate companies that are dependable and transparent in the pricing structure of the equipment is the pluses of the leasing system for the lessee, especially for energy efficiency investments.[80] It may not be easy for operational leasing agreements from the lessor's side. When the leasing contract is terminated, the leased equipment must be sold on the second-hand market, which is not very easy for equipment subject to energy efficiency/or sustainable cooling investment. If it is a financial leasing agreement and the ownership stays at the lessee, this is a more favourable situation for the leasing companies. On the other hand, in Türkiye, there are many examples for leasing air conditioners, air handling units, refrigerators, commercial countertop refrigerators with 100% financing opportunities with flexible rental payment plans, medium-term financing, and an operational convenience.[81]

Green Bonds are financial instruments issued by banks or private corporations to use the proceeds for investments in sustainable development and climate change. It could be an alternative funding source for energy efficiency investments. Until now, many banks and private corporations have issued green bonds in international markets in Türkiye.

A green lease is a commercial lease designed for buildings that helps balance tenant and landlord interests for investments in energy efficiency. Landlords benefit from an investment that increases the value of their assets, and tenants benefit from remarkably decreased monthly operating costs. A green lease brings in a cost-sharing concept by enabling landlords to pass part or all of the cost of an energy-efficiency

[79] World Bank (1999): Revolving Funds: Lessons Learned in Turkey. Available online at http://web.worldbank.org/archive/website00675/WEB/PDF/TURKEYRE.PDF.

[80] Magallón, Daniel; Neve, Jasmine; Pillet, Aurélien (2019): Manual of Financing Mechanisms and Business Models for Energy Efficiency. BASEL AGENCY FOR SUSTAINABLE ENERGY FOR UN ENVIRONMENT. Available online at https://www.ctc-n.org/sites/www.ctc-n.org/files/resources/manual-of-financing-mechanisms-and-business-models-for-energy-efficiency2.pdf.

[81] QBN Finans Leasing. Available online at https://www.qnbfl.com/.

investment on to their tenants. The average payback time for most energy-efficiency retrofits is roughly three years.[82]

Capital Markets Board of Türkiye announced in November 2021 the draft guidelines for the regulation of Green Debt Instruments and Green Lease Certificates. The guidelines state that the proceeds of these instruments will be used exclusively in the partial or total financing or refinancing of new and/or existing green projects in accordance with the definition of eligible green projects. These instruments could hopefully be issued and used in the local capital markets in the coming future as funding sources.[83]

Emission Trading System - White Certificates

Türkiye does not currently mandate a carbon pricing policy. However, projects for the Voluntary Carbon Market, established with the principle of environmental and social responsibility, have been developed and implemented for a long time. Türkiye is working with the World Bank's Partnership for Market Readiness (PMR) program to explore Türkiye's low carbon development policies and potential use of market-based instruments under the provision of the Ministry of Environment, Urbanization and Climate Change. As part of this work, an assessment is being conducted on the consideration of the establishment and operation of an Emission Trading System for Türkiye. Türkiye is also assessing the possibility of implementing an official government carbon pricing mechanism. Once the market is established, it can lead the way for other alternative instruments such as white certificates.

Bonus system developed to increase EE and/or decrease CO2 emission. If your EE and/or CO_2 emission is below the required limits, you can issue and sell WC to the companies that exceed the limits. White certificates (WhCs), or as they are generally addressed as energy efficiency obligation schemes (EEOs) are used in many EU countries to motivate parties to reach their energy efficiency targets. White Certificates are tradable and provide extra finance for the issuers on top of the reduced energy costs.

Energy performance contracts - shared and guaranteed savings models (ESCOs)- Crowdfunding for the commercial sector

Energy Performance Contracts (EPCs) are performance-based contracts through which a service provider (Energy Service Companies-ESCOs) agrees to finance, develop and deploy energy efficiency/renewable energy projects for clients without any upfront capital expenditures.

Crowdfunding is the practice of funding a project or venture by raising small amounts of money from a large number of people. Sometimes, a project developer or ESCO meets the investors and fundraisers, realise the project, and transfer the payments from investors to lenders. For energy efficiency, it can be used when there is a lack of affordable financing or high upfront costs for implementing or scaling up cost-effective energy efficiency measures especially for small businesses.

The legal infrastructure exists both for ESCOs- EPCs and Crowd Funding in Türkiye enacted in 2018 and 2019, respectively. The development of ESCOs and crowdfunding would be very beneficial, especially for SMEs and spread energy efficiency investments to a broader group. As several actions are already taken on the corporate side, it is always difficult to reach the smaller investors who play an important role in the economy as intermediate players, product and service providers.

Financing mechanisms and business models for the public sector

- **Public-private partnerships**
- **Revolving loan funds**
- **Energy performance contacts - shared and guaranteed savings models (ESCOs)**
- **Bulk Procurement**
- **Municipal financing models**

[82] Aquicore: What is a Green Lease? Available online at https://aquicore.com/blog/what-is-a-green-lease/.

[83] Capital Markets Board of Türkiye (2021): Capital Markets Board Green Debt Instruments and Green Lease Certificate Guidelines. Available online at https://spk.gov.tr/data/61e22aef1b41c612388360c3/4f2ff8cfc73c5c0a7fe66eba25d47e54.pdf.

Public-private partnerships (PPPs)

Through the PPP methodology, the government and public entities partner with the private sector in designing, building, financing, and operating infrastructure traditionally provided by the public sector. PPPs are commonly applied in Türkiye. Türkiye has implemented $156 Billion worth of Public-Private Partnership (PPP) projects in various sectors from transportation to healthcare energy and other infrastructure investments.[84] Türkiye has still a projected significant investment need in infrastructure development.

Türkiye's macroeconomic policies, investments and, more importantly, strong public finance management support PPP investments that require guaranteed purchase. Türkiye has favourable investment legislation for PPP investments that can be realized through various models, such as build-operate, build-operate-transfer, transfer of operational rights, etc. Türkiye's investment climate is further strengthened by domestic and international laws that protect investments and provide international arbitration.

PPPs are appropriate for private investment in some types of public EE investments, such as significant or higher risk projects. Moreover, infrastructure projects spread all over the country, like EE investments in public buildings, hospitals, municipalities, etc., require enormous investment. These PPPs typically last for 20-30 years and more, where the private sector provides the funding in the form of a project financing basis and constructs and maintains the project's physical assets. PPP financing in the RAC sector would require the private sector to supplement the project funding and install and retain the technology RAC. At the same time, the government entity may secure the financing with the guarantees provided.

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.

PPPs offer optimal risk-sharing with the private sector to deliver better value for the public users. This provides the public sector opportunities 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

As mentioned above, forming revolving loan funds would be much more meaningful for the commercial sector, both for corporate firms and SMEs especially. The related guarantee/ insurance schemes are also a must for the revolving funds.

Energy performance contacts - shared and guaranteed savings models (ESCOs)

It is also possible to finance energy efficiency investments required by the public sector by Energy Service Companies through the Energy Performance Contracts (EPCs). The ESCOs use one of the two contracting models, the shared savings model and the guaranteed savings model. In the shared savings model, ESCOs directly finance the project and a certain percentage out of the revenue stream that will come from energy savings will be used to pay back ESCO. ESCOs guarantee a certain amount of energy-saving in a guaranteed savings model and commit to pay the difference if the realized savings are under the guaranteed amount.[85] Although the regulations regarding the establishment of EE consultancy companies and EE contracts were firstly adopted in 2008 and last updated on 27/10/2011 in Türkiye, these companies generally served as energy audit companies to identify the EE investment requirements. Even though the legal infrastructure exists for ESCOs, they do not function in the real sense as defined in their mission statement. However,

[84] Presidency of the Republic of Türkiye: Investment Office (2022): Investing in Infrastructure & Public Private Partnerships (PPP) Projects in Türkiye. Available online at https://www.invest.gov.tr/en/library/publications/lists/investpublications/infrastructure-industry.pdf.

[85] Magallón, Daniel; Neve, Jasmine; Pillet, Aurélien (2019)

with the emerging EE market, their role is increasing. By supporting the ESCOs with new legislation and providing them with the opportunities to strengthen their capital structures, the government can stimulate the ESCO market. With the partnership of government and foreign ESCOs with local ESCOs, Super ESCOs can be established to realize a larger scale of EE investments in the public sector in public buildings, hospitals, universities and utility services

Bulk Procurement

Maintaining high efficiency and high quality could be difficult, thus relatively high-priced products for the public sector. They generally act with a limited budget and aim to allocate scarce resources to efficient, profitable investments. In that sense, the public sector can use the advantage of buying in large amounts by issuing tenders with a set of eligibility criteria. With the economies of scale principle being valid, manufacturers could lower their prices at the end of successive bidding rounds. The purchase is made directly from manufacturers without any intermediary sales agent, hence both parties benefit from the transaction.[86] By that means, purchasing in large amounts, a certain aggregated demand is produced for energy-efficient products, and the rest of the market indirectly adapt to the change. It encourages the manufacturers to increase the production of these products, increase their capacity, and lower their prices.

On the other hand, large investments in energy efficiency made by the public sector will pay back a decrease in energy costs in considerable amounts. The public sector with a limited budget can get the help of guaranteed savings and ESCOs models, credit guarantees and concessional loans by green financing lines from IFIs in financing the bulk procurement. This model could be used in Türkiye as the public sector is familiar with bulk procurement for different areas. There is a lot of potential for energy efficiency investments in the public sector. In addition, there are examples of green line financing done by the EU and IFIs over the past few years for the energy efficiency transformation of public buildings. The energy efficiency audits of a sample of 255 public schools have been conducted to understand the size of potential energy efficiency investments.

Municipal financing models

Municipalities are important entities for public service, and they are both important focus groups and action takers when energy efficiency investments are concerned. Besides having a special budget allocated to them by the government, they have their sources of income through some of the services they provide. Municipalities could finance municipal financing energy efficiency infrastructure investments through the use of operating revenues and borrowing and charges on developers and public-private partnerships (PPP). ESCOs and credit risk guarantees could be other important tools for financing municipal EE investments. In Türkiye, most of the municipalities are conducting studies on the issues of sustainability and energy efficiency. They are elected bodies trying to differentiate themselves from their competitors and want to come forward with new projects such as smart cities or green cities; they are engaged in green city action plans. They provide green credit lines from IFIs, they also get TA from programs like EU Horizon 2020 for their EE investments.

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

Table 7: Financing mechanisms for energy efficiency projects

Financing Mechanisms	Residential	Commercial	Public Sector
Credit Guarantee	•	•	•
Debt Finance(including dealer financing)	•	•	•
Trade Finance/Debt Finance	•	•	
Leasing	•	•	•
ESCO(Energy Performance Contract)	•	•	•
On-Bill Financing	•	•	
Cluster Finance Approach(Debt)	•	•	

[86] Ibid

Bulk Procurement	•		•
Financial incentives(rebates/subsidies)	•	•	
Positive list	•	•	
Revolving Credit		•	•
Green Credit Lines	•	•	•
Insurance and Guarantees	•	•	•
Public-Private Partnership			•
Municipal Financing Models			•

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

6.1.3. Financing Instruments

A financing instrument 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 get short-term credits to acquire domestic appliances. Mortgage loans for financing the purchase of real estate generally have more than eight years long tenure. 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 of long-term loans to install central air conditioning systems (or replace old systems with energy efficiency). Commercial customers have wider financing options, including getting equipment on lease rent. 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. Public sector organisations can also finance equipment or projects using traditional financing products Financing of energy efficiency products and projects also use these financing products. The following table provides an overview of the different financing products applicable to energy efficiency products/projects in the sectors under discussion.

Table 8: 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. Drivers, barriers, opportunities

Financial institutions are familiar with the energy efficiency concept. To provide financing for sustainable cooling and refrigeration investments first, they need to be presented with a clear business case (market opportunity/demand and profitability) before engaging in developing targeted financing products (i.e., loans), promoting the subject to their customer base and operationally managing the product and actual investment portfolio.

In-depth interviews with the six major FIs and three IFIs having EE financing in Türkiye were conducted to gather feedback and create awareness. This synthesis draws key lessons from FIs and IFIs' evaluations of climate finance. Particularly three main domains of IFI's role in climate finance i-) financing, ii-) mobilising the money, iii-) transformation markets are discussed deeply with the FIs. IFIs in Türkiye are well-positioned to deploy and mobilise climate finance and help close this gap in the private and public sectors.

Snapshot from Interviews
Garanti BBVA is one of the pioneer banks in Türkiye in terms of its sustainable approach from the beginning of the 2000s, both with its approach to internal affairs and with the financial products developed in this field. The Bank has a high awareness of the Kigali Agreement, and they are willing to understand how the evolution of the existing cooling systems will be realized based on producer firms or end-users. Some of the Bank's clients are aware of the coming change, and as Garanti Bank, they have been organizing training in the Organized Industry Zones about European Taxonomy and the 'Green Deal'. During these training, they realized that besides the ones preparing themselves for the upcoming changes, many parties were new to the subject. Within this respect, it was discussed that after creating awareness on the subject on the producers' side, it could be possible to introduce related financial products.
İş Bank has a sustainable banking approach and calculates the Scope 1 and Scope 2 CO_2 calculations covering their activities. In addition to these, İş Bank is studying to widen its CO_2 reporting to Scope 3, representing other indirect actions that create CO_2 emissions. In that sense, supporting the investments done for sustainability by the clients will indirectly affect the carbon footprint of İş Bank. So loan activities for sustainable cooling will create a win/win effect for the bank and the customer. It was highlighted that it is easier to explain new concepts or products with sustainability components to corporate customers than to SMEs.
Şekerbank, a bank that differentiated itself in the sector with its innovative products on the environment, questioned how will Şekerbank get an advantage by being a part of the COOL UP programme. It is underlined that besides these, Şekerbank has also transformed all its banking applications and internal procedures under the sustainability concept. Their expertise with IFIs and sustainable credit lines has always been collaborative. For instance, in the past, for TUREEFF credit lines, Şekerbank worked with EBRD on a customized business model for its operations. The Bank is willing to take the initiative, be proactive and work with IFIs to develop the business model.
TKYB stressed that it would be very beneficial to conduct capacity-building activities by jointly including engineering and sustainability teams in the study as far as climate financing is concerned. If TKYB takes part in sustainable cooling financing directly or indirectly in the form of APEX banking as done today to finance SMEs through PFIs, assistance for building the technological infrastructure was found beneficial. TKYB obtained long-term loans from IFIs under the Republic of Türkiye Ministry of Treasury and Finance guarantee as per Bank's structure. The Bank currently lends to any Refrigeration & Air Conditioning company if they are a manufacturer. The prior need from the Cool Up project is underpinned as "Developing a framework and templates to account for climate change impacts and risks related to sustainable cooling" and then "Tools to screen for new opportunities in sustainable cooling".
TSKB is a pioneer bank in sustainability and started the first of many financial instruments or applications in the portfolio of many banks today. The Bank is mostly concerned with project finance. Thus, the scope of the COOL UP project may not be of direct interest to TSKB. However, the Bank is aware of the F-gas regulation and has taken precautions regarding its CO_2 emission reduction targets until 2035. In the short run, they are targeting to switch to sustainable gases for the fire extinguishers. The Bank shared its previous satisfaction with the capacity increasing training programs done for the engineering team on the eligible energy efficiency investments, and calculations in CO_2 emission reductions were very useful in the past. Especially IBRD and other IFIs explain the best practices approach, explaining different technical and financial approaches in different countries and helping the institution decide what will fit best for their country, environmentally and financially meaningful and feasible. It would be beneficial to see the well-functioning examples in that Cool Up TA context.

Yapı Kredi is highly involved in green and sustainable banking by financing green investments and supporting agriculture and women entrepreneurs. They have a sustainability team dealing with risk assessment and corporate governance issues. As far as RAC financing is concerned, Yapı Kredi, a Koc Group company, works mainly with Arçelik, one of the major players in the durable goods sector and locomotive companies Koc Group, in terms of supporting both the main company, suppliers and the dealers. It is mentioned that Yapı Kredi is also working with all the other big RAC producers. The Bank has high awareness that the European Green Deal is on the agenda, and Türkiye, being a big exporter to Europe in the RAC sector, needs to be prepared for the future requirements of the European market. It is also discussed that their customers would also like to be prepared for the changing market conditions, but he added that the customers seek some financial incentives. If grants and/or favourable interest rates are on the table, the clients' investments and financing become attractive. It is also highlighted that the availability of credit guarantees also creates a very stimulating effect for investors. That is why Credit Guarantee Fund may gain importance as far as SMEs are concerned.

KfW has been working with development banks and financing these types of investments under sustainability and energy efficiency. However, they indicated that there is no credit line specifically designed for the reductions of F-gases. But it is possible to design once the scope of the credit line and the related instruments are defined clearly and appropriately. KfW has also underlined that since Türkiye has taken important steps to be part of the European Union Green Deal through its Green Deal Action Plan that was released in July 2021, new credit lines for Türkiye could be on the agenda of KfW, under the current generally accepted rating rules and regarding the credibility of the related financial institutions. The amount of the potential credit lines is important, and it should be big enough to distribute among the participating banks.

GIZ pointed out that selecting the target markets and end-users of the credit line is very important in the design of the credit line to promote and allocate the loans effectively in the right way. For example, the model applied in TURSEFF, and TUREEFF Sustainable Energy and Resource Efficiency Loans of EBRD worked very well. In that case, the Project Consultant developed a List of Eligible Materials and Equipment (LEME) and a List of Eligible Suppliers and Installers for SMEs, vendors and dealers, ESCOs, and small and individual investors who want to invest in energy efficiency and renewable energy. The investors could choose personally from the list on the project's website for the needed technology and equipment. The process was easy to access and apply for end-users, especially small investors. GIZ suggested that a similar approach could be applied to the small investors in the COOL UP project. It is also noted that it is always more difficult to reach the end customer, small household and/or commercial investor and try to convince them to change the existing technology than to reach the manufacturer and motivate for a renovation in the production technology for a more sustainable product. GIZ does not provide direct finance but could give technical assistance to develop and integrate sustainable cooling technologies into the production process within the scope of the COOL UP programme.

AFD and PROPARCO stated that AFD Group, composed of Agence Française de Développement and its subsidiary PROPARCO provide finance for fair and sustainable economic growth in developing countries. AFD Türkiye office is responsible for 18 non-EU countries, including Türkiye. Out of the total financial support of the Group, 80% is provided by AFD and the remaining 20% by PROPARCO. The focus of AFD is the public sector covering State, ministries, local authorities, municipalities, and NGOs, whereas PROPARCO concentrates on financing the private sector investments. Both institutions work in close contact with local commercial and development banks as intermediary financial institutions to channel funds for renewables, energy efficiency and other investments concerning mitigation and adaptation to climate change. PROPARCO mentioned a new loan agreement signed with AKlease to support green leasing projects and another with Sanko, one of Türkiye's most important textile producers, to finance the investments that build up the firm's sustainability strategy. Additionally, it is declared that the COOL UP project is intriguing for them, and a business prospect could be kept warm as PROPARCO is currently formulating a project with a producer of HVAC. Since the HVAC equipment is started to be used at an increasing rate, it is important to switch to EE technologies for the new products. Big corporations like Arçelik have the 99% expertise to switch their production processes and products to more efficient technology. However, it is stressed that it is more important for SMEs to make that transition.

EBRD recognized the facts and related actions announced by Kigali Agreement, and we support them. But currently, EBRD does not have a direct initiation about Kigali Agreement. On the other hand, EBRD is a member of the Three Percent Club that brings together governments and supporting organizations that commit to working together to put the world on a path to take the necessary actions to have three percent annual efficiency improvement, the rate required to deliver the Paris Agreement goals. In 2020 EBRD became a member of 'Cool Coalition', a United Nations initiative to raise awareness of sustainable cooling and help develop projects to accomplish this aim. Similarly, EBRD follows the works of organisations like E3G - an independent climate change Think tank organisation whose mission is to accelerate the global transition to a low carbon economy. EBRD pointed out that they have been providing finance for Türkiye's renewable energy and energy efficiency projects since 2010. TURSEFF, MIDSEFF and TUREEFF were very good examples of these. They closed TUREEFF and MIDSEFF lines successfully, and TURSEFF is soon to end. However, the EBRD board approved a new credit line under the Green Economic Financing Facility title in November 2021. The project aims to support green economy investments, including energy efficiency, renewable

energy, and climate resilience measures. The loans will be supported by Technical Cooperation ("TC") and by incentive payments, as envisaged by the Green Economy Financing Facility ("GEFF") Framework. Concessional financing will also be available to support the Turkish corporate and financial sectors in integrating climate change into their corporate governance approach. Funds may also be on-lent to vendors and producers of suitable material and equipment covered by the Green Technology Selector for Türkiye. In that sense, it is envisaged that if IKI brings out this project by contributing financially, EBRD would like to step in as these projects are already in our scope but with the condition to make its due diligence before committing itself to a new project. Moreover, sustainable cooling technologies would be a part of the green technology list of the EBRD programme.

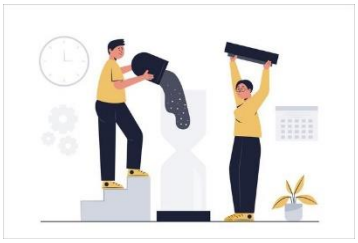
After outlining the main barriers and opportunities, innovative financing mechanisms and business models, favourable financing sources, and value chain actors, the Cool Up mapped the recommendations and set key actions to encourage sustainable cooling investments in Türkiye.

To utilise these advantages, the feedback of FIs from their previous TA experiences shall be contemplated prudently, and the most efficient TA for the COOL UP Programme is aimed to be designed. In addition, for the successful implementation strategy of the programme at the Finance pillar, the Cool Up prepared a set of recommendations and key actions that should be taken as follows:

Implementation remarks for the recommended strategy

- Sustainable cooling is a niche, so multi-faceted and collaborative approaches will achieve the greatest impact
- Mechanisms and business models should be adapted to local market conditions
- Mechanisms and models should be developed with a long-term market-based view
- Financing mechanisms and models are most effective when they are consumer-focussed
- A more solution-oriented approach should be followed by starting a top-down movement from manufacturers to end-users as far as the technology change is concerned
- The eligible technologies and equipment and credit conditions should be clear and to the point
- Misinformation and excessive paperwork documentation should be avoided
- The financial and environmental KPI s are important determinants of the financing process. They should be relevant and compatible with the current market conditions
- Demo projects and capacity building studies are important. Case studies and best practices could be good examples for financial institutions to be more involved with the topic
- On the job coaching for the pilot projects is perceived as eligible by FIs and should be considered an option

Key actions to take



- Develop and implement a comprehensive national policy on sustainable cooling and enhance regulatory measures
- Improve awareness and information availability, quality and impact on consumers and professional decision-makers
- Provide incentives, including financial incentives, for energy efficiency purchases and sustainable cooling-related purchases, and encourage research in sustainable cooling (nat./reg./int. level)
- Development and promotion of innovative finance mechanisms (e.g. climate bonds, white certificates)
- Development of National Carbon Market

- Supporting the development of ESCOs and the functioning of Energy Saving Performance Contracts

FIs are familiar with EE lending instruments, which can easily be translated to sustainable cooling solutions with support from IKI Cool Up. Once the real business cases are proved (market opportunity/demand, CBA, and profitability), the origination of the financial product is to be conducted. To sum it up - to realize this objective, the Cool Up programme in Türkiye needs to work closely with financing institutions/banks and other stakeholders, including manufacturers/retailers of RAC equipment/appliances, industry associations/chambers of commerce and the government (policymakers) to determine the right and most efficient approach.

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