



REGULATORY ANALYSIS TÜRKIYE:

Analysis and recommendations for the regulatory and policy instruments governing the RAC sector

August 2022



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Table of Contents

1. Introduction	1
1.1. The Cool Up programme	1
1.2. Aim and scope of this report.....	2
2. Overview	4
2.1. Setting the scene	4
2.2. Cooling market landscape	4
2.3. Finance landscape.....	6
3. Methodology	8
4. Summary of key findings and policy recommendations	12
5. Regulatory analysis	14
5.1. International protocols and commitments	14
5.2. National plans and strategies	17
5.3. Laws and bylaws and other national legislation	19
5.4. Standards and codes	24
6. Bibliography	27

Figures

Figure 1	Key Responsibilities among governmental stakeholders in Türkiye	3
Figure 2	Methodology and working steps of the regulatory analysis in Türkiye	8
Figure 3	ODS and HCFC consumption in Türkiye	17

Tables

Table 1	Aspects of policy instruments analysis in Türkiye	9
Table 2	Colour codes.....	9
Table 3	Colour codes applied for the different aspects of the policy analysis	10
Table 4	Explanation of the technical aspects considered in the regulatory analysis in Türkiye	11
Table 5	Status of Montreal Protocol ratification in Türkiye	15
Table 6	Programmes and Projects to ensure compliance with the Montreal Protocol in Türkiye	15
Table 7	Status of key national strategies relevant to ODS phaseout and cooling demand reduction in Türkiye	19
Table 8	Initial assessment of laws relevant to the RAC sector. Colour coding as described in Table 3	22
Table 9	Summary of the assessment of standards and codes relevant to the RAC and building sectors	25

Acronyms

AC	Air conditioning/conditioner
BAU	Business as usual
CLP	Regulation on Classification, Labelling and Packaging
CO ₂	Carbon dioxide
ECA	Export Credit Agencies
EE	Energy efficiency
EPBD	Energy Performance of Buildings Directive
ESCO	Energy Service Company
F-gas	Fluorinated gases
GHG	Greenhouse gas
GWP	Global warming potential
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HPMP	HCFC Phase-out Management Plan
HVAC	Heating, Ventilation and Air Conditioning
IFI	International Financial Institutions
IKI	International Climate Initiative
INDC	Intended nationally determined contribution
LC	Letter of Credit
MENA	Middle East and North Africa
MENR	Ministry of Energy and Natural Resources
MEPS	Minimum energy performance standards
MLF	Multilateral Fund
MOEU (DGLA)	Director General for Local Authorities
MOSIT	Ministry of Science, Industry, and Technology
MP	Montreal Protocol
NC	National communication to the Conference of the Parties
NCCAP	National Climate Change Action Plan
NDC	Nationally determined contribution
NEEAP	National Energy Efficiency Action Plan
NOU	National Ozone Unit
NPL	Non-Performing Loan
ODS	Ozone-depleting substances
RAC	Refrigeration, Air Conditioning
RACHP	Refrigeration, air conditioning, and heat pump equipment
RE	Renewable energy
SASO	Saudi Standards, Metrology and Quality Organization
SEER	Seasonal energy efficiency ratio
SME	Small and Medium-Sized Enterprises
TKB	Development Investment Bank of Turkey
TOKI	Housing and Development Authority

TSE	Turkish Standards Institute
TSKB	Industrial Development Bank of Turkey
UNDP	United Nations Development Programme
UNDP-GEF	United Nations Development Programme-Global Environment Facility
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
VAP	Efficiency Increasing Project
YETEP	Green technology Projects Support Program

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

The programme is divided into three pillars:

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

¹ British Patrol, "BP Energy Outlook 2018 Edition"

This report focuses on the policy and regulation pillar. Policy and regulation are powerful stimuli to encourage the uptake of new technologies. In the policy and regulation pillar, the Cool Up programme supports its partner countries to leverage policy stimuli and develop policy interventions closely linked to national policy goals, strategies, plans and programmes as well as international processes. Cool Up works with partner countries to define roadmaps and regulatory measures to create a regulatory environment that requires reduced cooling demand, increased energy efficiency, and supports sustainable cooling technologies that contribute to the phase-down of HFCs and focus on natural refrigerants.

Building on a scan of policy instruments conducted as a part of Cool Up's cooling sector status reports, the Cool Up programme has developed an in-depth regulatory analysis, analysing strengths and shortcomings in each partner country.

1.2. Aim and scope of this report

The main output of this report is to derive clear interventions and policy recommendations towards phasing down HFC's, utilizing natural refrigerants and reducing cooling demand in Türkiye.

The analysis covers four categories of policy instruments:

- ▶ International protocols and commitments
- ▶ National plans and strategies
- ▶ Laws and bylaws relevant to the refrigeration, air conditioning (RAC) and building sector
- ▶ Standards and codes

This report examines the status of these instruments and investigates the degree to which they are implemented and complied with. Finally, the analysis also discusses which key technical elements are covered by each policy instrument, examining if and how they contribute to enhancing energy efficiency (EE) in the refrigeration, air conditioning, and heat pump sector, reducing cooling demand, phasing out ozone-depleting substances (ODS), phasing down HFCs, and promoting natural refrigerants. Data for the analysis was gathered by studying country specific laws, regulations, standards and codes, input from the Cool Up cooling sector status reports, secondary literature, and interviews, bilateral meetings, and stakeholder discussions with national experts and policy stakeholders. The reports culminate in an action plan and a roadmap to support the respective partner country in making policy and institutional changes to accelerate the implementation of the Kigali Agreement. All identified measures have been discussed and agreed upon in conjunction with the National Ozone Unit (NOU) in each Cool Up partner country. Figure 1 provides an overview of the key implementing institutions across the sustainable cooling policy space in Türkiye.

<p>NOU National Ozone Unit (NOU is structured within the scope of Department for Monitoring of Greenhouse Gas Emissions, which is within the Climate Change Presidency, under the Ministry of Environment Urbanization and Climate Change)</p>	<ul style="list-style-type: none"> • Responsible for coordinating and managing national programmes to comply with the provisions of Vienna Convention and Montreal Protocol on Substances that Deplete the Ozone Layer and its Amendments and implementing policies regarding to VC and MP.”
<p>MOEU (DGLA) Directorate General for Local Authorities</p>	<ul style="list-style-type: none"> • Responsible for setting standards for energy efficient construction in Türkiye.
<p>MENR Ministry of Energy and Natural Resources</p>	<ul style="list-style-type: none"> • Responsible for developing building codes, energy efficiency codes, and refrigeration codes.
<p>MOSIT Ministry of Science, Industry and Technology</p>	<ul style="list-style-type: none"> • Responsible for auditing energy efficient equipment in industry.
<p>TSE Turkish Standards Institute</p>	<ul style="list-style-type: none"> • Responsible for the quality control and testing of equipment for energy efficiency.
<p>TOKI Housing and Development Administration</p>	<ul style="list-style-type: none"> • Responsible for implementing energy efficient cooling systems in government buildings.

Figure 1 Key Responsibilities among governmental stakeholders in Türkiye

2. Overview

2.1. Setting the scene

Türkiye has a Mediterranean climate with hot, dry summers. Türkiye's energy consumption has steadily increased across all sectors, reaching 103 Mtoe in 2018 and contributing to net GHG emissions of 422.1 MtCO₂e (carbon dioxide) in 2019². In 2018, electricity demand in the residential and public and commercial sector combined accounted for 48% of Türkiye's total electricity consumption³. 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. Cooling market landscape

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 an 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.⁴ 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.⁵

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.⁶

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.⁷

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.⁸ 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%,

²Source: <https://www.iea.org/countries/turkey>

³Source: <https://www.iea.org/data-and-statistics/data-browser?country=WORLD&fuel=Energy%20supply&indicator=CoalProdByType>

⁴Expert Interviews (2022)

⁵Expert Interviews (2022)

⁶ISKID Air Conditioning and Refrigeration Manufacturers Association 2022, Survey among ISKID members

⁷ISKID Air Conditioning and Refrigeration Manufacturers Association 2022, Survey among ISKID members

⁸ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

Portugal 3%.⁹ 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.¹⁰ 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.¹¹

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 2020.¹²

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.¹³ The government is promoting the transition to natural refrigerants in RAC applications through both the recent publication of the Turkish F-gas regulation, 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 CO₂), but projects for sustainable cooling with natural refrigerants in the air conditioning sector are limited.¹⁴

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.¹⁵

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.

⁹ ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

¹⁰ ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

¹¹ The Building Services Research & Information Association (BSRIA) (2019), Split Systems 2019, Türkiye

¹² ISKID Air Conditioning and Refrigeration Manufacturers Association 2022, Survey among ISKID members

¹³ ISKID Air Conditioning and Refrigeration Manufacturers Association 2022

¹⁴ Expert Interviews (2022)

¹⁵ Expert Interviews (2022)

2.3. Finance landscape

Türkiye has a well-developed financial system of 55 banks out of which 34 is deposit/commercial banks, 15 development banks and six participation banks. Banks in Türkiye are the primary funding source for both the public and private sectors and have a capital adequacy ratio of 18.34 %, well above the prudential requirement of 12%. According to the data published by the Banking Regulation and Supervision Agency, as of December 2021, the banking sector total assets have increased by 50.9% in nominal terms but only 16% in real terms net of y-o-y 2020 inflation of 36.08%. Traditionally, deposits dominate the funding structure of the Turkish banking sector. To finance rapidly growing loans, the sector went for alternative funding sources from abroad as well as supporting its resource structure with the issuance of financial securities in 2020. The Non-Performing Loan (NPL) ratio that was 5.37% as of 2019 decreased to 4.08% in 2020 year-end by the support of the accelerated increase in the loan volume in 2020. The NPL ratio continued to decline gradually to become 3.16% as of the end of 2021. This shows that Turkish banks have good recovery rates.

Türkiye has well-developed value chain for refrigeration and air conditioning systems with strong backing of commercial banks, and development financial institutions. Türkiye imports refrigerants, components, specialized RAC equipment (e.g., absorption chiller and freeze dryers) and ready assembled room air conditioners. Nearly all commercial banks in Türkiye offer Letter of Credits (LCs) to importers. In addition, loans are provided by foreign export credit agencies (ECA) where the importer's country risk is insured, offer long-term buying opportunities to importers.

Most Turkish commercial banks offer finance for manufacturing activities including new projects to working capital finance. Similarly, renovation of an existing plant and modernisation of the present machinery and equipment is financed through long-term loans. International Financial Institutions (IFIs) also offer specialized debts through their programmes and initiatives implemented through local commercial banks or institutions. Average tenure for medium to long-term loans may vary among banks but it is generally 7 to 10 years with grace periods of 2 to 3 years. Commercial banks also offer specialized / customised loans to Small and Medium-Sized Enterprises (SME) units. Leasing companies do offer services for equipment leasing to manufacturers.

The EU is the biggest export market for Türkiye. The white goods imported from Türkiye constitute 15% of the total import of EU as of 2019. Distribution of goods could be a significant part of the operation for corporate manufacturer firms with a huge sales volume, countrywide sales and exports. As far as financing of exports are concerned. Local commercial banks and Turk Eximbank, a specialized institution for trade finance that generally provide trade finance for exports. Turk Eximbank supports exporters, export-oriented manufacturers, overseas investors and contractors and companies conducting businesses that bring foreign currency earnings through short, medium and long-term cash and non-cash loans.

As far as the direct distribution of HVACs for residential sector is concerned, manufacturers may make bulk sales directly or through wholesaler distributors to construction companies that make mass real estate development projects throughout Türkiye. Regarding the distribution stage of RAC products for commercial sector in addition to wholesaler distribution companies, manufacturers can sell directly to big corporate customers/buyers that operate as chain gross markets, private hospital chains, hotel chains, malls etc. 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. In that sense, in Türkiye working capital financing needs for selling expenses of both corporate, SME manufacturers and distributors are provided by local commercial banks in the form of working capital loans.

Retailers are the final link in the supply chain from producers to consumers. 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 against cash or through a credit card. Financing of retailer firms can be considered to belong partly to corporate loans (chain-stores, outlets) and partly to commercial loans (retail sale agents, dealers etc) depending on the size of the retailer. Banks also offer cash management services for corporate retail clients.

Starting from the 2000's, the concept of sustainability started to become a part of the vision statements and business strategies of both the financial institutions and private companies in developed countries. Turkish financial institutions and firms also aligned their priorities on the similar lines and adopted sustainability as their priority. The first private development bank of Türkiye, Industrial Development Bank of Turkey (TSKB) and its conjoint bank in public sector Development Investment Bank of Turkey (TKB) were the first two banks that approach the credit appraisal process with an environmental accent. Most commercial banks provide financial assistance to renewable energy (RE) and EE projects. Among the commercial banks, Akbank at first took the lead in sustainable banking.

Türkiye has some grant programmes provided by the government for EE investments. These include

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

Local financial institutions and banks extend credit lines specific to EE projects under variety of programme. Therefore, Türkiye can extend finance to sustainable cooling technology options with relative ease and minimum changes to existing operating structures within banks and institutions.

3. Methodology

Türkiye ratified the Kigali Amendment in March 2021 and has progressed on the commitments relevant to the MP through the implementation of several relevant programs, laws, and other policy instruments such as codes and standards. In this report, the policy instruments governing the RAC and building sector in Türkiye were analysed to identify the key strengths and shortcomings towards the phase-down of HFCs, the utilization of natural refrigerants and the reduction of cooling demand. The regulatory analysis covers the four categories of policy instruments that hierarchically include the following categories:

- ▶ International Protocols and commitments
- ▶ National Plans and Strategies
- ▶ Laws and bylaws relevant to the RAC and building sector
- ▶ Standards and codes

Figure 2 explains the main steps of this analysis. The first step is to analyse the existing policy instruments, secondly the analysis, and thirdly an initial list of policy recommendations to be formulated. The initial list of recommendations will be then discussed with relevant stakeholders, mainly with NOU.

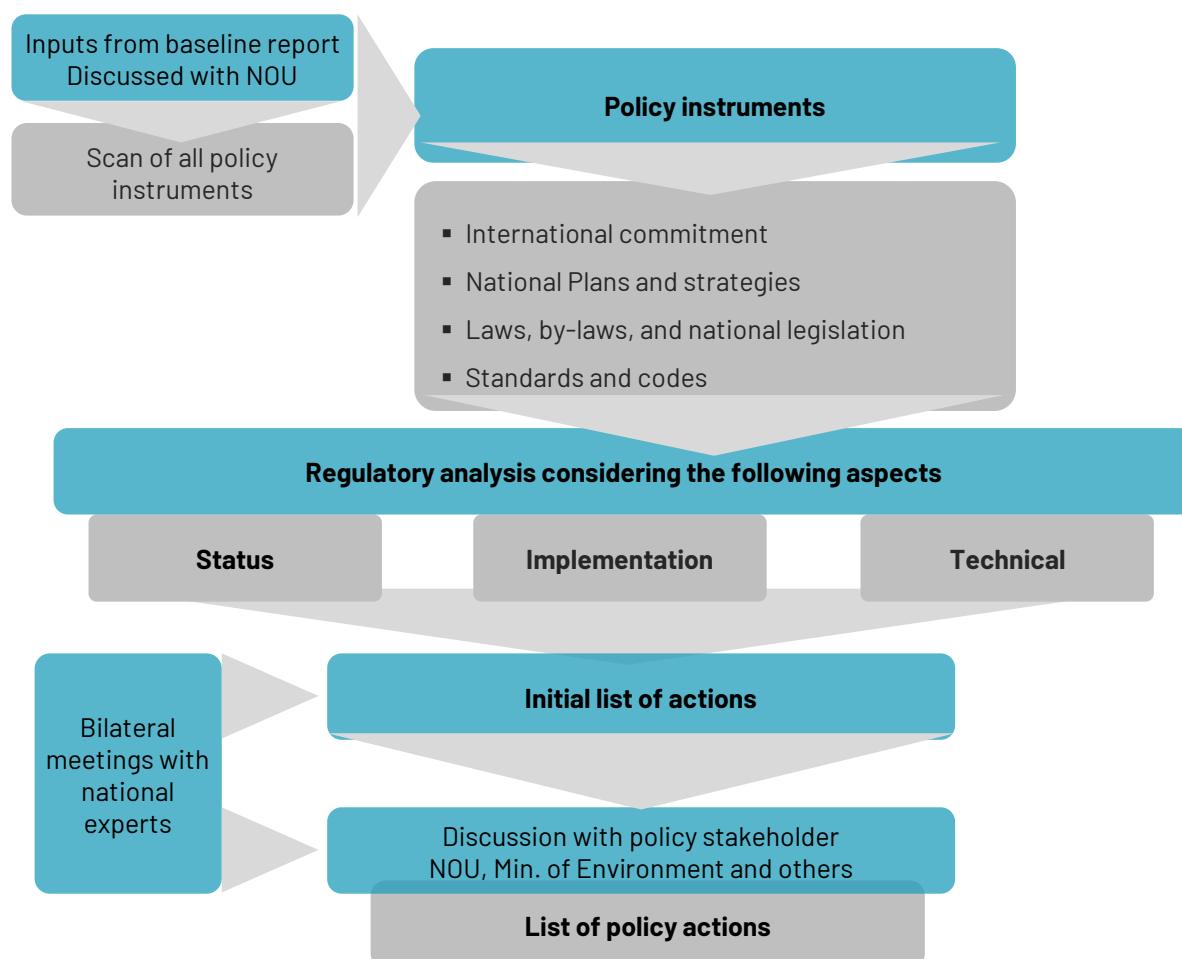


Figure 2 Methodology and working steps of the regulatory analysis in Türkiye

The regulatory analysis in this report covers three key aspects of analysis (see Table 1).

- ▶ Availability status of the policy instruments in Türkiye
- ▶ Implementation and compliance
- ▶ Provisions of the policy instruments in terms of the required and planned technical aspects

Table 1 Aspects of policy instruments analysis in Türkiye

A. Status	B. Implementation and/or compliance aspects	C. Technical aspects
In place	High level of compliance/ Implementation	EE of refrigeration, air conditioning and heat pump (RACHP) equipment and systems
Planned	Medium level of compliance/ Implementation	Reducing cooling demand
Not available	Low levels of compliance/ Implementation	Phase out of ODS
		Phase down of HFCs
		Promoting Natural Refrigerants

The colour codes of the analysis

For the analysis of the policy instruments, a colour code has been used in a table format to outline and scan the key strengths and define the gaps in policy instruments governing the RAC sector. Three shades of colours have used for this purpose as explained in Table 2. The white colour has been used when the aspect in question is not applicable or is not relevant.

Table 2 Colour codes

Colour	Meaning
Advanced	Highlight the aspect that has been sufficiently addressed by the policy instrument.
Moderate	Describes the aspects that are partially mentioned and/or partially developed.
Early	Depicts that there is gap that needs to be further investigated.
White	Not applicable

Table 3 explains the colour code applied for the different aspects of the policy analysis. For example, the first group of aspects that cover the status of the policy instruments, Table 3 explains the meaning of the three possible status including "in place", "planned" and "not available". The second group of aspects focuses on the implementation and enforcement of the policy instruments. In many cases, the codes and standards are well elaborated and include ambitious EE requirements and sufficient technical detail, but those codes and standards are intermittently implemented and not sufficiently enforced. While some laws, standards and codes are fully enforced with high or almost complete levels of compliance, some other laws and regulations are not well enforced due to a lack of compliance procedures or the complexity of implementing these policy instruments.

Table 3 Colour codes applied for the different aspects of the policy analysis

A. Status aspects	
in place	One of the following conditions applies: <ul style="list-style-type: none"> ▪ The policy instrument has been issued/adopted through a decision, law, or other legal procedures. ▪ The competent authority has officially announced the adaptation. ▪ The policy instrument has been published in the National Gazette.
is planned	One of the following conditions applies: <ul style="list-style-type: none"> ▪ The adaptation/issuance process is ongoing. ▪ Has been officially announced to be under preparation. ▪ It has been suggested/proposed by the competent authority.
is not available	No announcement/proposal/suggestion yet.
B. Compliance and Implementation aspects	
High level of compliance/ implementation	One of the following conditions applies: <ul style="list-style-type: none"> ▪ High levels of compliance (e.g., most of the appliances have an EE label). ▪ There is a monitoring/reporting mechanism in place. ▪ The implementation meets the planned targets (e.g., reduction of HCFC was successful).
Medium level of compliance/ implementation	One of the following conditions applies: <ul style="list-style-type: none"> ▪ Medium level of compliance. For example, there is no sufficient capacities to control compliance, and/or there are no clear compliance/implementation procedures. ▪ The monitoring/reporting/verification mechanism is not completely implemented. ▪ The implementation partially meets the planned targets.
Low level of compliance/ implementation	One of the following conditions applies: <ul style="list-style-type: none"> ▪ Low level of compliance (e.g., most of the buildings do not comply with the code) ▪ There is no clear monitoring/reporting/verification mechanism in place. ▪ The implementation has not started and/or far from meeting the planned targets.
C. Technical aspects	
Specified	One of the following conditions applies: <ul style="list-style-type: none"> ▪ The criterion/topic has been explicitly specified in the policy instrument ▪ Clear targets and/or plans have been identified.
Not specifically mentioned	One of the following conditions applies: <ul style="list-style-type: none"> ▪ The criterion/topic has not been mentioned but other provisions indirectly lead to and/or promote this criterion/topic. ▪ The aspect will be considered in the update of the policy instruments or is planned to be included.
Not provided	The aspect is not covered and/or not considered.

The third group of aspects covers the relevant technical criteria including EE of RACHP (Refrigeration, air conditioning, and heat pump) equipment, reducing cooling demand, phase out of ODS, Phase down of HFCs and Promoting Natural Refrigerants. Table 4 explains the meaning of those aspects, for example technical aspects such as reducing the cooling demand is naturally an integral part of any plans or policy instruments to phase-out ODS consumption.

Table 4 Explanation of the technical aspects considered in the regulatory analysis in Türkiye

C. Technical aspects	Example
EE of RACHP equipment and systems	Energy efficiency of RACHP equipment and systems: Addressing energy-efficient operation of RACHP equipment and systems, e.g., by establishing energy monitoring, setting targets for Seasonal Energy Efficiency Ratio (SEER) or other parameters, enhancing maintenance etc.
Reducing cooling demand	Reducing cooling demand in buildings: Addressing energy consumption of buildings through measures assessing and reducing the cooling demand such as e.g., energy monitoring, insulation, shading, and utilizing RE to meet the cooling demand etc.
Phase out of ODS	ODS phase-out: Addressing import, manufacture, export, and destruction of bulk ODS as well as import, manufacture, export, installation, servicing, maintenance, end-of life management of equipment and systems containing or relying on ODS.
Phase down of HFCs	HFC phase-down: Addressing import, manufacture, export, reclamation and destruction of bulk HFCs as well as import, manufacture, export, installation, servicing, maintenance, end-of life management of equipment and systems containing or relying on HFCs.
Promoting Natural Refrigerants	Promoting natural refrigerants: Addressing production and use of natural refrigerants in refrigeration and air conditioning.

Furthermore, aspects of awareness raising, capacity building, training and certification will be considered when it is related to sustainable cooling e.g., by promoting consumer information, enhancing labelling, providing information for different target groups, setting requirements for training and certification of technicians, capacity building of planners, relevant authorities etc.

4. Summary of key findings and policy recommendations

Türkiye approved ratification of the Kigali Amendment in March 2021 and ratified in November 2021 (https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-2-f&chapter=27&clang=_en) has progressed in meeting its commitments relevant to the MP and its amendments through implementing several programs, laws, and other policy instruments such as codes and standards. For the regulatory analysis, the policy instruments governing the RAC and building sector in Türkiye were analysed to identify the key strengths and areas for improvement in phasing down HFCs, using natural refrigerants and reducing cooling demand.

The regulatory analysis shows that Türkiye has reached ODS and HCFC consumption limits as required by the MP phase-out schedule, but that this achievement has also resulted in an increase in HFC consumption. Türkiye has elaborated many national plans that contribute to reducing the consumption of ODSs and HFCs, as well as increasing EE 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 NEEAP 2017 – 2023 (2018), and Türkiye's INDC (2015), which will need to be updated to be in-line with the Paris Agreement. However, Türkiye has not developed a National Cooling Plan to integrate cooling aspects in Türkiye'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 RE 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.

Türkiye has also developed national legislation that covers multiple aspects of the ODS phase-out and HFC phase-down. Regulation on Fluorinated Greenhouse Gases was published in the Official Gazette No. 31881 on 29 June 2022. . Türkiye has also taken a systemic approach to addressing EE 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, Türkiye 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 harmonised 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.

Based on this analysis, some key policy recommendations have been derived to support the preparation of policy frameworks that guide the transition towards sustainable cooling and natural refrigerants use.

1. Nationally Determined Contribution (NDC) Support

To mainstream sustainable cooling into national strategy documents, cooling demand will need to be elaborated on Türkiye's updated NDC, specifically in line with the updated F-gas regulation as well as the forthcoming Turkish Climate Law. Broad stakeholder engagement is needed to create ownership and commitment to implement it.

2. National Cooling Plan

An NCP is an integrated document linked to climate and energy strategies and it is based on the HPMP (HCFC Phase-out Management Plan) and HFC phase down plans. It supports the pathway to reduce energy consumption and related emissions from cooling, aligned with plans to reduce emissions from refrigerant transition. The content of a NCP would refer not only to refrigeration and air conditioning but to all cooling sectors like mobile AC in transport, cold chain in food and healthcare, industrial process cooling and may include a wide range of measures such as promoting stringent enforcement of MEPS for cooling appliances, building codes, etc. and outline potential financial mechanism for sustainable cooling. Broad stakeholder engagement is needed to create ownership and commitment to implement it.

3. Safety standards for technology using natural refrigerants

To address safety concerns related to the use of F-gas alternatives, a compilation of best practice approaches from EU HFC alternatives and safety groups will be compiled. The focus will be on identifying specific safety groups for HFCs with lower GWP and natural refrigerants as identified in the Turkish F-gas regulation and in-line with EU F-gas regulation.

4. Accompanying measure: Awareness activities and capacity building

Awareness activities can increase the knowledge on natural refrigerants and make the outreach to the relevant private and public stakeholders. Awareness activities should include crucial topics such as sustainable cooling technologies and disposal of conventional refrigerants. Consumer awareness activities are needed as well to increase demand for higher energy-efficient cooling appliances and for improved energy performance of buildings.

5. Regulatory analysis

5.1. International protocols and commitments

Türkiye is a party to the Vienna Convention for the Protection of the Ozone Layer and the MP on Substances that deplete the ozone layer and its follow-on amendments. The Ministry of Environment, Urbanisation and Climate Change / Presidency of Climate Change acts as the National Focal point and coordinating body, for all national and international efforts on the protocol. The MP was initially transposed into Turkish legislation through the By-Law on the Control of Ozone-Depleting Substances dated 25/07/1999 and published in the Official Gazette No. 23766. It was revised as the By-Law on Control of Ozone-Depleting Substances dated 23/06/2006. Türkiye is classified as an Article 5 country under the MP and as such is entitled to an extended phase out period for hydrochlorofluorocarbons (HCFCs).

By-law on The Substances Depleting The Ozone Layer, was published in Official Gazette No: 30031 on 7 April 2017. This by-law has been prepared in line with the Regulation EC/1005/2009 Ozone Depleting Substances. Amendment to the by-law on The Substances Depleting The Ozone Layer entered into force upon its publication in the Official Gazette No: 31266 on 6 October 2020. Regarding critical uses of the halon, the legal expiry date for the protection of sink waste containers in the aircraft was 2020. With the amendment, this period has been extended to 2021.

With regards to the Kigali Amendment, the Turkish parliament approved the ratification of the Kigali Amendment on 11 March 2021, publishing the approval in the Official Gazette No. 31420. Türkiye officially ratified the Kigali Agreement internally and communicated official ratification to the UN on 10 November 2021. Being a party to Kigali Amendment, Türkiye is committed to reducing the production and consumption of hydrofluorocarbon (HFCs) by more than 80% by 2045. As Türkiye is among the “Group 1” countries, the baseline calculation is based on the average production/consumption of HFCs in 2020, 2021, and 2022 (and a proportion of HCFC consumption) and is to be implemented in parallel to the ODS phase-out. The HFC reduction steps will start from 2024 with step 1 to be achieved by 2029 with a reduction of 10% of HFC consumption (United Nations Environment Programme (UNEP). The reduction calendar as per years will be determined by the Ministry of Environment, Urbanization and Climate Change.

Table 5 Status of Montreal Protocol ratification in Türkiye

Policy instrument/ commitment/ protocol	Aspects of analysis	
	Status	Compliance and Implementation
Montreal Protocol	Ratified on 8 September 1988 Accepted all amendments brought to the Montreal Protocol on 20 September 1991	Presidential Decree No. 1990/733 of the Council of Ministers
Kigali Amendment	Ratification approved on 11 March 2021, officially ratified on 10 November 2021	Approval published in the Official Gazette No. 31420

Furthermore, several international projects and MP enabling activities are being implemented in Türkiye in cooperation with the NOU and the Ministry for Environment, Urbanisation and Climate Change, Presidency of Climate Change as well as other stakeholders. The following table shows a list of the internationally funded and international projects taking place in the country (IPA Projects or UNIDO (United Nations Industrial Development Organization) Open Data Platform, 2021).

Table 6 Programmes and Projects to ensure compliance with the Montreal Protocol in Türkiye

International project and/or programs	Aspects of analysis	
	Status	Compliance and Implementation
Enabling activities for HFC Phase Down in Türkiye	Completed at the end of 2021	Allow for early ratification of the Kigali Amendment to help Türkiye fulfil their initial obligations with regard to HFC phase-down in line with Kigali Amendment and the ExCom Decision by end of 2021
Technical assistance for increased capacity for transposition and capacity building on F-gases (IPA funded Project)	In-place	Increase capacity to transpose EU legislation and capacity building on F-gases by end of 2020
Institutional strengthening project Phase IX	In-place/ ongoing	Ensure compliance with the Montreal Protocol Adoption/implementation of ODS legislation and regulation to control and monitor ODS consumption by end of 2022. The project is addressing further institutional strengthening and capacity building for MoEUCC/NOU. In addition to ODS monitoring, awareness raising activities and trainings for related stakeholders are also under the main scope of IS.
HCFC phase-out management plan (phases)	In-place/ ongoing	Ensure compliance with the Montreal Protocol Phase out 60.8 ton(s) of ODS Strengthening the control of HCFC imports and use Working to implement technical assistance in refrigeration servicing sector, including strengthening the recovery, recycling, and reclaiming (RRR) network by end of 2025 Custom trainings and capacity building initiatives to help with the control export, import, and use of HCFC gases.
Preparation of Kigali HFC implementation	In place/ongoing	Kigali HFC implementation process is supported through this project, which is initiated in June, 2022. https://open.unido.org/projects/TR/projects/220101

The NOU's efforts and several ongoing projects focused on complying with the MP has resulted in Türkiye succeeding in complying with its commitments. As shown in the below Figure 3, HCFC and ODS consumption in Türkiye are far below control limits and have continued to decrease in line with targets specific to Türkiye (UNIDO Open Data Platform, 2021; (Ozone UNEP, 2021))

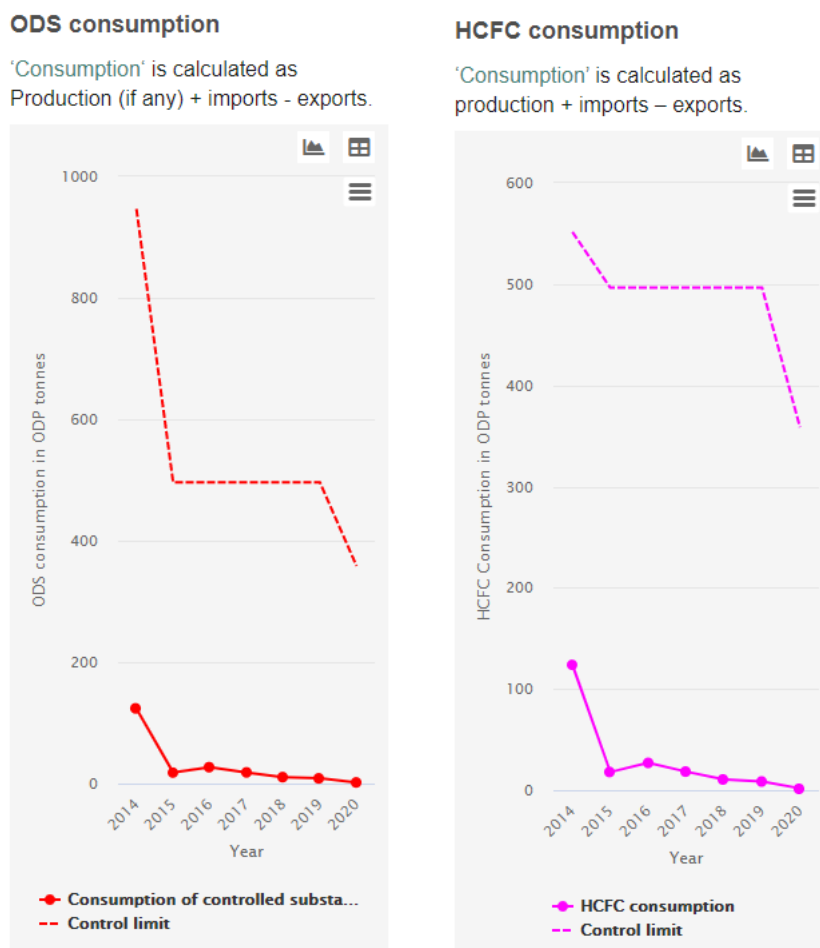


Figure 3 ODS and HCFC consumption in Türkiye

5.2. National plans and strategies

Türkiye has elaborated many national plans that contribute to reducing the consumption of ODSs and HFCs, as well as supporting sustainable cooling initiatives. Specific plans include the Climate Change Action Plan (NCCAP) 2011 - 2023 (2012), Energy Efficiency Strategy (2012), National Renewable Energy Action Plan for Turkey (2014), National Energy Efficiency Action Plan (NEEAP) 2017 - 2023 (2018), and Türkiye's Intended Nationally Determined Contribution (INDC) (2015) which, however, will need to be updated to be in line with the Paris Agreement. Türkiye's INDC pledges up to 21% reduction in GHG emissions from the Business as Usual (BAU) level by 2030. The building sector is among the important sectors to achieve Türkiye's targets. The NCCAP, the Energy Efficiency Strategy, and the NEEAP, all emphasise the urgency of implementing EE measures in all sectors. Cooling is specifically addressed in the NEEAP, which aims to reduce the Turkish primary energy consumption by 14% by 2023 compared to 2017 levels, and specifically refers to cooling in Goal B of the NEEAP (MENR, 2018). Goal B highlights the potential of "increase [ing] energy savings and the use of RE for heating & cooling by switching to central and district heating systems in mass housing complexes and large settlement units." To establish these settlement units, direct and indirect incentives will be developed and will be measured through indicators such as developing a legislative framework, the number of conducted mandatory economic feasibility studies, and central and district heating applications (MENR, 2018) but have not specifically planned or implemented yet.

Türkiye has also developed an HCFC Phase-Out Management Plan, which acts as the national strategy through which action plans are developed to control the import, export, and use of the HCFC gases. Institutional structure and capacities are assessed in the relevant sectors (foam, cooler manufacturing, service, etc.) according to their current use of HCFCs, alternative gas and technologies, national and international legislation. With a budget provided by Multilateral Fund (MLF), the HCFC Phase-Out Plan aims at terminating substances that deplete the ozone layer, raising awareness of Customs

Directorates and end users. The plan also aims to implement pilot and demonstration projects such as the project of "Demonstration and Pilot Activities for Encouraging Low Global Warming Potential (GWP) Refrigerants in the Republic of Turkey", which was a cooperation between UNIDO and the Refrigeration Industry Businessmen Association (SOSİAD)(UNIDO, 2021). Furthermore, there are several ongoing activities including a program for RRR enhancement (recovery/recycling/reclaim); and non-investment components such as customs trainings and capacity building initiatives.

Türkiye has made substantial progress reducing ODS after introducing a by-law to support the HCFC phase-out that has in turn contributed to diminishing consumption of ODS from 13,200 ODP in 2009 to 200 ODP tonnes in 2019. However, because of the ODS phase-out, the consumption of HFCs has increased significantly. Türkiye has also received support to phase down HFCs through a UNIDO project focused on specific enabling activities, including supporting early ratification of the Kigali Agreement and supporting institutional arrangements, as well as reviewing the licensing systems and data reporting systems (UNIDO 2017).

Given HFCs are fluorinated GHGs, they are fully in scope of Türkiye's Regulation on Fluorinated GHGs that is harmonised with European legislation (further detail in section 2.3).

Key Conclusions of analysis of the national plans and strategies

Türkiye's success in implementing an HCFC phase-out plan as well as strategies to reduce energy demand and increase EE, demonstrate that there is capacity to turn to addressing HFCs and cooling demand reduction. Because of the ODS phase-out, the consumption of HFCs has increased significantly, resulting in a need to develop an HFC phase-down plan. HFCs could also be addressed through Türkiye developing a National Cooling Plan, which would also work to integrate cooling aspects in Türkiye's overall climate strategy (updated NDC, Climate Change Action Plan and NEEAP).

Table 7 Status of key national strategies relevant to ODS phaseout and cooling demand reduction in Türkiye¹⁶

National Plans/ strategies	Status	Compliance and implementation	Technical aspects				
			EE of RACHP equipment and systems	Reducing cooling demand	Phase out of ODS	Phase down of HFCs	Promoting Natural Refrigerants
INDC, 2015	Update needed	Being implemented	EE mentioned	Cooling demand mentioned	Not specifically mentioned	Not specifically mentioned	Not specifically mentioned
NCCAP, 2012	In place	Being implemented	EE mentioned	Cooling demand mentioned	Not specifically mentioned	Not specifically mentioned	Not specifically mentioned
Energy Efficiency Strategy, 2012	In place	Being implemented	EE mentioned	Cooling demand mentioned	Not provided	Not provided	Promotes innovative technologies
National Renewable Energy Action Plan, 2014	In place	Being implemented	Not provided	Not provided	Not provided	Not provided	Not provided
NEEAP, 2018	In place	No enforcement and monitoring mechanism in place	EE mentioned	Reducing cooling demand is mentioned, but not explicit goal	Not provided	Not provided	Not provided
HPMP Stage I	In place	Working to finish implementing effective licensing and quota systems for HCFC imports and exports, and strengthening the recovery, recycling, and reclaiming (RRR) network	Not provided	Not provided	Still working to achieve total phase out of HCFC	Not provided	Not provided
National Cooling Plan	Not available						

5.3. Laws and bylaws and other national legislation

Türkiye has established two key regulations to support the implementation of the MP and the early implementation of the Kigali Amendment, specifically the Regulation on Substances that Deplete the Ozone Layer, which entered into force in 2017 and the Regulation on Fluorinated GHGs, which became effective in 2018, as well as through issuing a Communiqué on the Export of Substances that Deplete the Ozone Layer in January 2014 and issuing a Communiqué on the Import of ODS and Fluorinated GHGs in December 2020 (Turkey NOU). The previous regulation (30291) was repealed by the new F-gas regulation entered into force on 29 June 2022/31881. Combined, the regulation and communiqués have enabled the Turkish government to prevent 135 billion tons of CO₂ equivalent emissions from ODS into the atmosphere (Turkey NOU). The communique on the certification of natural or legal persons who interfere with the equipment containing or whose functioning relies upon on fluorinated greenhouse gases was published in Official Gazette No: 31254 on 24 September 2020.

As Türkiye now moves to address the increasing use of HFCs, it has issued the Regulation on Fluorinated GHGs, which aims to diminish emissions of fluorinated GHGs listed under the Kyoto Protocol, including

¹⁶ Source: Author based on various sources as mentioned in the report. For colour codes, refer to Table 3

HFC's, as well as limit the use of products or equipment that contain fluorinated GHGs. Important elements of this regulations include measures related to containment, competence of personnel handling F-gases, bans of F-gases in specific applications, imports and exports. There was also a ban on non-refillable containers, from the 30291 regulation.. The regulation was initially issued in line with core aspects of the EU F-gas Regulation 842/2006 and has since been updated to be fully compliant with the Regulation (EU). No 517/2014 and the Kigali Amendment. The revision of the regulation also enables the government to enforce annual quota allocations for hydrofluorocarbon importers and prohibits the import of hydrofluorocarbons without quotas or in quantities exceeding the quota (Dila Sen 2021). Some exceptions do exist for establishments importing hydrofluorocarbons below 100 tons of CO2 equivalent per year in pre-charged RACHP equipment, however they are obliged to submit reports to the Annual Reports Database managed by the Ministry of Environment and Urbanisation. The draft regulation also focuses on the training and certification of natural and legal persons whose operation is based on equipment that contains, or whose functioning relies upon fluorinated GHGs (Dila Sen 2021). Additionally, supportive national legislation to diminish the use of fluorinated gases include the Regulation on Classification, Labelling and Packaging (CLP) of Substances and Mixtures dated 11 December 2013 numbered 28848 (Dila Sen 2021), the Communiqué on Import of ODS and Fluorinated GHGs issued in December 2020, and the Communiqué on Certification of Real and Legal Persons Who Interfere with Equipment Containing Fluorinated GHGs or whose Operation Relies on These Gases issued in September 2020 (Turkey NOU). The revision for fluorinated gas law is published in June 2022.

In terms of EE and climate in general, Türkiye is currently drafting a Climate Law to regulate climate change under a single piece of legislation committed to Net Zero Target in 2053 and has initiated a National Climate Consultation Process in January 2022. The law is expected to focus on regulating the principles and procedures related to limiting the activities that cause climate change, mitigating GHG emissions and adaptation to the impacts of climate change. Currently there is not a direct reference to the cooling sector however there is a strong emphasis on promoting EE across all sectors.

Furthermore, Türkiye has taken a systemic approach to addressing EE through adopting the Energy Efficiency Law (No: 5627) in 2007 and last updated in 2019. This law aims to ensure and increase the efficient use of energy and energy resources and to minimize energy costs. To reach this aim country wide the law establishes an Energy Coordination Board. The law further covers provisions on education and raising awareness on EE, government supports for EE projects. The Regulation on Energy Efficiency Law covers principles and procedures related to mandatory training and certification activities for technicians and energy managers focused on EE audits, certification, project implementation, and consulting services (Turkish Official Gazette 10/25/2008).

Türkiye has largely harmonised its building and product efficiency standards with the EU Energy Performance of Buildings Directive 2010/31/EC (EPBD) and the Eco-design Directive 2009/125/EC, as well as the Energy Labelling Framework Directive 2010/30/EU and its implementing measures. The government published the transposed Directives Energy Performance of Buildings Regulation in 2017 and Regulation on Environmentally Friendly Design of Energy-Related Products in 2010. The Regulation on labelling and standard product information of the consumption on energy and other resources by energy-related product was published in 2011 and revised in 2021. Additionally, a revised regulation on Eco-design requirements, originally proposed on 3 July 2017, was published in the Official Gazette on 2 March 2021. It proposes to repeal the existing regulation published on 7 October 2010 and is modelled on the Directive 2009/125/EC.

Furthermore, there are several additional national regulations in Türkiye that are relevant to the cooling sector, refrigerants and to gases. For example:

- ▶ Green Buildings Regulation (2017)
- ▶ 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

- ▶ By-law on Environment Permit and License, Official Gazette Date: 10 September 2014, Number: 29115
- ▶ By-law on CLP of Substances and Mixtures, Official Gazette Date: 11 December 2013, Number: 28848
- ▶ The Circular about Halon's of 2/2/2007: established under the coordination of Ministry of Environment and Urbanisation. It defines the responsibilities of Turkish Halon Bank. It also regulates the recordings of the existing halon gases in Türkiye (NOU, 2021).
- ▶ Circular on Import and Use of ODS 2016: This circular stipulates all requirements regarding the import for servicing or production, export, selling, use and domestic movement of gases.
- ▶ The communique on the certification of natural or legal persons who interfere with the equipment containing or whose functioning relies upon on fluorinated greenhouse gases was published in Official Gazette No: 31254 on 24 September 2020.

Key conclusions of analysis of the national legislation

The revision for fluorinated gas law is published in June 2022 to be in line with Kigali Amendment. Though there is a systemic approach in Türkiye to addressing EE, both in buildings and in products. But there is a gap in measures to ensure individual results reporting, setting targets, measuring target achievement and reporting of the overall results as well as regular revision (SHURA and BPIE 2019).

Table 8 Initial assessment of laws relevant to the RAC sector. Colour coding as described in Table 3

Laws and bylaws	Status	Compliance and implementation	Technical aspects				
			EE of RACHP equipment and systems	Reducing cooling demand	Phase out of ODS	Phase down of HFC	Promoting Natural Refrigerants
ODS regulation	In place	In place	Not implemented with this policy	Not implemented with this policy	specifically addressed	Not mentioned	Not mentioned
F-gas regulation	Adapted in line with Kigali implementation, working through internal approval process in the Ministry for Environment	Adapted in line with Kigali implementation, working through internal approval process in the Ministry for Environment	Not implemented with this policy	Not mentioned	Not implemented with this policy	Specifically addressed	Not mentioned
Climate Law	Under preparation						
Energy Efficiency Law 2007, updated 2019	In place	No monitoring plan in place to ensure enforcement	Minimum efficiency standards for air conditioners		Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Energy Efficiency Regulation, 2011	In place	No monitoring plan in place to ensure enforcement	Labelling for air conditioners and refrigerators		Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Energy Performance of Buildings Regulation, 2017	In place	No monitoring plan in place to ensure enforcement	Mandate an Energy Performance Certificate for all buildings purchased, sold, or rented as of 01 January 2020; requires cooling load to be taken into account		Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Green Buildings Regulation, 2017	In place	No monitoring plan in place to ensure enforcement			Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Regulation on Eco-design for energy-related products ((2009/125/AT) Ecodesign Regulation, revised 2021)	In place	No monitoring plan in place to ensure enforcement	Revised: requirements for refrigerating appliances		Not implemented with this policy	Not implemented with this policy	Not implemented with this policy

Laws and bylaws	Status	Compliance and implementation	Technical aspects				
			EE of RACHP equipment and systems	Reducing cooling demand	Phase out of ODS	Phase down of HFC	Promoting Natural Refrigerants
Regulation on labelling and standard product information of the consumption of energy and other resources by energy-related products ((2010/30/EC) Energy Labelling Regulation, revised 2021)	In place	No monitoring plan in place to ensure enforcement			Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Waste management regulation 29314, dated 2 April 2015	In place	No monitoring plan in place to ensure enforcement			Not implemented with this policy	Not implemented with this policy	Not implemented with this policy

5.4. Standards and codes

In cooperation with the relevant authority, the Ministry of Economy publishes communiqués to regulate whether imported products contain certain substances or are subject to ban in international agreements that Türkiye is a party to or are addressed into national regulations. The following are the latest versions related to reducing ODS:

- ▶ Import Control Communiqué of Chemicals Under Control in Terms of Environmental Protection - by the Ministry of Trade, 2020.
- ▶ Communiqué on Import of ODS and Fluorinated GHGs - by the Ministry of Trade, 2022. This communicate is updated on a yearly basis. The latest one is 2022/14.
- ▶ Communiqué on Certification of Natural and Legal Persons Interfering with Equipment Containing Fluorinated GHGs or whose Operation Relies on These Gases - by the Ministry of Environment and Urbanisation, 2020.
- ▶ Communiqué on the Export of ODS - by the Ministry of Economy, 2014.

Türkiye has also adopted several standards on EE to define requirements for appliances, energy performances of buildings and energy labelling requirements for buildings and appliances. As a candidate country of the EU, Türkiye is working to achieve full harmonisation with EU standards. To this end, the Energy Performance of Buildings Regulation consists of key standards addressing cooling demand, such as National Standard of Thermal Insulation Requirements for Buildings TS 825 (2000, 2008, 2013). Türkiye has also elaborated several Minimum Energy Performance Standards (MEPS) and support policies relevant for the cooling sector. They include:

- ▶ MEPs Residential Refrigerators - Turkish Official Gazette No 28063 (transposition of EC 643/2009)
- ▶ MEPs Air Conditioners - Turkish Official Gazette No. 28712 (transposition of EC 206/2012)
- ▶ Label Comparative for residential refrigerators and freezers - Turkish Official Gazette No. 28331 (transposition of EC 1060/2010)

Additional communiqués for EE measures relevant for the cooling sector are listed below:

- ▶ Communiqué on Environmentally Friendly Design Requirements for Household Cooling Appliances (SGM-2011/17)(23.09.2011 - 28063)
- ▶ Communiqué on Environmentally Friendly Design Requirements for Air Conditioners and Fans (SGM-2012/13)(19.07.2013 - 28712)
- ▶ Communiqué on Environmentally Friendly Design Requirements for Electric Motors (SGM-2012/2) (07.02.2012 - 28197)
- ▶ Communiqué on Environmentally Friendly Design Requirements Regarding No-Load Energy Consumption and Average Active Efficiency of External Power Sources (SGM-2011/11)(27.08.2011 - 28038)
- ▶ Communiqué on Energy Labelling of Household Cooling Devices (SGM-2012/4)(22.06.2012 - 28331)
- ▶ Communiqué on Energy Labelling of Air Conditioners (SGM/2013-11)(24.12.2013 - 28861)
- ▶ Communiqué on Energy Labelling of Space Heaters, Combined Heaters, Space Heater, Temperature Control and Solar Device Packages and Combined Heater, Temperature Control and Solar Energy Device Packages (SGM: 2018/1)(28.03.2018 - 30374)

Finally, an EE testing lab under the Turkish Standards Institute (TSE) has also been installed with UNDP-GEF Project support, promoting energy-efficient motors in SMEs in Türkiye. This laboratory is accredited for measurement of energy performance and energy labelling of appliances including the ones used in cooling sector. This entire lab also is accredited by the Saudi Standards, Metrology and Quality Organization (SASO), to be able to serve for the region, as well. This lab supports the policy set up in the field of EE through energy labelling, green building certifications, TS ISO EN 50001 Energy Management System accreditation.

Key Conclusions of analysis of the standards and codes

There are several well elaborated MEPS and labels for most RAC appliances and buildings, which are fairly harmonised with EU standards. There is room for improvements to regularly review and strengthen MEPS and to ensure MEPS and labelling policies are updated in line with future revisions of the EU Eco-design and EPBD Frameworks.

Table 9 Summary of the assessment of standards and codes relevant to the RAC and building sectors

Standards and codes	Status	Compliance and Implementation	Technical aspects				
			EE of RACHP equipment and systems	Reducing cooling demand	Phase out of ODS	Phase down of HFC	Promoting Natural Refrigerants
Import Control Communiqué of Chemicals Under Control in Terms of Environmental Protection - by the Ministry of Trade, 2020.			Not implemented with this policy	Not implemented with this policy			Not implemented with this policy
Communiqué on Import of Ozone-Depleting Substances and Fluorinated Greenhouse Gases - by the Ministry of Trade, 2020.			Not implemented with this policy	Not implemented with this policy			Not implemented with this policy
Communiqué on Certification of Natural and Legal Persons Interfering with Equipment Containing Fluorinated Greenhouse Gases or whose Operation Relies on These Gases - by the Ministry of Environment and Urbanisation, 2020.			Not implemented with this policy	Not implemented with this policy			Not implemented with this policy
Communiqué on the Export of Ozone-Depleting Substances - by the Ministry of Economy, 2014.			Not implemented with this policy	Not implemented with this policy		Not implemented with this policy	Not implemented with this policy
MEPs Residential Refrigerators - Turkish Official Gazette No 28063 (transposition of EC 643/2009)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
MEPs Air Conditioners - Turkish Official Gazette No. 28712 (transposition of EC 206/2012)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Label Comparative for residential refrigerators and freezers Turkish Official Gazette No 28331 (transposition of EC 1060/2010)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy

Standards and codes	Status	Compliance and Implementation	Technical aspects				
			EE of RACHP equipment and systems	Reducing cooling demand	Phase out of ODS	Phase down of HFC	Promoting Natural Refrigerants
The National Standard of Thermal Insulation Requirements for Buildings (TS 825)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Environmentally Friendly Design Requirements for Household Cooling Appliances (SGM-2011/17)(23.09.2011 – 28063)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Environmentally Friendly Design Requirements for Air Conditioners and Fans (SGM-2012/13)(19.07.2013 – 28712)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Environmentally Friendly Design Requirements for Electric Motors (SGM-2012/2)(07.02.2012 – 28197)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Environmentally Friendly Design Requirements Regarding No-Load Energy Consumption and Average Active Efficiency of External Power Sources (SGM-2011/11)(27.08.2011 – 28038)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Energy Labelling of Household Cooling Devices (SGM-2012/4) (22.06.2012 – 28331)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Energy Labelling of Air Conditioners (SGM/2013-11)(24.12.2013 – 28861)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy
Communiqué on Energy Labelling of Space Heaters, Combined Heaters, Space Heater, Temperature Control and Solar Device Packages and Combined Heater, Temperature Control and Solar Energy Device Packages (SGM: 2018/1)(28.03.2018 – 30374)					Not implemented with this policy	Not implemented with this policy	Not implemented with this policy

6. Bibliography

British Petrol. "BP Energy Outlook 2018 Edition." London, UK, 2018. <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2018.pdf>.

Expert Interviews, June - September 2022. Selected market actors from different sectors: Manufacturer, Assembler, Wholesale, Dealer, Architect, MEP (mechanical, electrical, plumbing) consultant, Project developer (anonymous).

ISKID Air Conditioning and Refrigeration Manufacturers Association. "Survey among ISKID members." June - September 2022. Not available online.

Dila Sen (2021): Turkish Draft F-Gas Regulation to Implement Kigali Amendment. Turkish Law Blog.

SHURA; BPIE (2019): Enhancing Turkey's policy framework for energy efficiency of buildings, and recommendations for the way forward based on international experiences. SHURA Energy Transition Center Buildings Performance Institute Europe. SHURA; BPIE.

The Building Services Research & Information Association. "Split Systems 2019: Türkiye." Report 61071/18, BSRIA, Bracknell, March 2019.

Turkey National Ozone Unit: National Regulations, checked on 11/16/2021.

Turkish Official Gazette (10/25/2008): Regulation on Increasing Energy Efficiency in the Use of Energy Resources and Energy No. 27035. Available online at <http://www.lawsturkey.com/regulation/27035-regulation-on-energy-efficiency-law>, checked on 16 November 2021.

UN Environment (UNEP): The Kigali Amendment to the Montreal Protocol: HFC Phase-down. OzonAction Fact Sheet. UN Environment (UNEP); OzonAction. Paris.

UNIDO (2017): Submission of funding request for enabling activities. Enabling activities for HFC phase-down in Turkey. UNIDO, checked on 11/9/2021.