

THE MALDIVES

COUNTRY ASSESSMENT REPORT

For the Implementation of the Kigali
Amendment to the Montreal Protocol
on Substances that Deplete the Ozone
Layer

PREPARED BY

The National Ozone Unit, Ministry of Environment with
the assistance from from the United Nations Environment
Programme and the financial support of the Multilateral
Fund



MINISTRY OF ENVIRONMENT,
CLIMATE CHANGE AND
TECHNOLOGY

SEPTEMBER 2021

Table of Contents

1. INTRODUCTION	10
1.1. Country background.....	11
1.2. The Maldives’s ratification of the Montreal Protocol and its Amendments	11
1.3. The Maldives’ ODS phase-out achievements.....	12
1.4. The context, objective, and methodology of the Country Assessment Report	14
2. THE KIGALI AMENDMENT AND ITS IMPLICATIONS TO THE MALDIVES.....	19
2.	19
2.1. The Kigali Amendment obligations applicable to the Maldives	19
2.2. The benefits of implementing the Kigali Amendment.....	20
2.3. The challenges and costs of implementing the Kigali Amendment	21
3. MARKET ASSESSMENT	23
3.	23
3.1. Consumption of HFCs.....	23
3.2. Supply of HFCs and their alternatives	26
3.3. Supply of HFC-based equipment	29
3.4. Key applications.....	30
3.4.1. Room air-conditioners and variant flow (VRF) system.....	31
3.4.2. Domestic refrigerators and freezers	33
3.4.3. Commercial refrigeration system – small stand-alone units.....	34
3.4.4. Large refrigeration system.....	35
3.4.5. Mobile air conditioner (MAC).....	37
4. REFRIGERATION AND AIR-CONDITIONING SERVICING SECTOR ASSESSMENT.....	38
4.1. RAC servicing workshops	38
4.2. RAC servicing technicians	38
4.3. Maldives National Qualification Framework for RAC technicians training.....	39
4.4. Training institutes for RAC technicians.....	40
4.4.1. Training curriculum.....	40
4.4.2. Students.....	43
4.4.3. Trainers.....	44
4.4.4. Tools for training	45
4.5. Initiation of the licensing system for the servicing technicians	46
5. OVERVIEW OF EXISTING POLICIES.....	47
5.	47
5.1. Policies on ozone layer protection, control of ODSs, alternatives, and RAC equipment ..	47
5.1.1. Development of key ODS policies	47

5.1.2.	Measures to Protect the Ozone Layer Act 2015 and the Regulation on Chemical Substances and Various Equipment that Harm the Ozone Layer 2017	48
5.1.3.	Import quota system.....	50
5.1.4.	Import license and permit system.....	50
5.1.5.	Data monitoring and reporting.....	52
5.1.6.	Enforcement	53
5.2.	Policies on climate change.....	55
5.3.	Policies on energy efficiency	58
5.4.	Policies on safety.....	60
5.5.	Policies on chemical and waste management.....	61
5.6.	Other relevant policies	63
6.	STAKEHOLDER ENGAGEMENT	66
6.	66
6.1.	Stakeholder Mapping	66
6.2.	National Ozone Unit.....	67
6.3.	Outreach and awareness-raising for stakeholder engagement	67
7.	ASSESSMENT OF NEEDS FOR HFC PHASE-DOWN IN THE MALDIVES	69
7.	69
7.1.	Gaps and needs in the market	69
7.2.	Gaps and needs in the RAC servicing sector	70
7.3.	Gaps and needs in the import quota, license, and permit system.....	71
7.4.	Gaps and needs in the data monitoring and reporting system.....	72
7.5.	Gaps and needs in the control of RAC equipment	73
7.6.	Gaps and needs in climate change policies	73
7.7.	Gaps and needs in energy efficiency policies	74
7.8.	Gaps and needs in safety policies.....	74
7.9.	Gaps and needs in the chemical and waste management policies.....	75
7.10.	Gaps and needs in awareness-raising and stakeholder engagement	75
8.	CONCLUSION AND SUMMARY OF RECOMMENDED ACTIONS	78
	Annex 1: GWP values of HCFCs, HFCs, and other alternatives	81
	Annex 2: Example of the form used to collect information from the importers	82

List of Tables

Table 1: The Maldives’ ratification of the ozone and climate-related multilateral environmental agreements	12
Table 2: The Maldives’ accelerated HCFC phase-out schedule per HPMP	13
Table 3: The Country Assessment Report’s contribution to different components of the EA	16
Table 4: List of stakeholders consulted and type of information collected for the Country Assessment Report	17
Table 5: Survey sample and size	18
Table 6: HFC phase-down schedule for the Maldives and Article 5 Group 1 countries per the Kigali Amendment.....	19
Table 7: HFC and ODS alternatives usage by end-user.....	25
Table 8: List of registered refrigerant importers.....	26
Table 9: Maldives National Qualification Framework (MNQF) levels	40
Table 10: RAC servicing training offered by the three training institutes in the Maldives	40
Table 11: Main topics covered under the training programme for RAC equipment in the training institutes.....	42
Table 12: Time allocated for each topic per training institute.....	42
Table 13: Number of trainers at RAC training institutes.....	44
Table 14: Trainers’ qualification and experience	44
Table 15: Availability of tools at training institutes for practical sessions training.....	45
Table 16: Objectives of the 2015 Act and the 2017 Regulation	48
Table 17: Banned and controlled substances under the 2015 Act.....	49
Table 18: Phase-down timeline for HCFC import in the Maldives under the 2015 Act.....	49
Table 19: Comparison of the import quota, license, and permit system in the Maldives	51
Table 20: Policies on climate change.....	56
Table 21: Electricity tariff rates, Maldivian Rufiyaa (MVR).....	59
Table 22: Policies on energy efficiency	59
Table 23: Policies on chemical and waste management	61
Table 24: Other relevant policies	64
Table 25: Key stakeholders and their roles	66
Table 26: Outreach and awareness-raising for each target group.....	67
Table 27: Market gaps and needs.....	69
Table 28: RAC servicing sector gaps and needs.....	70
Table 29: Import quota, license, and permit system gaps and needs	71

Table 29: Data monitoring and reporting system gaps and needs.....	72
Table 30: Control of RAC equipment gaps and needs	73
Table 31: Climate change policy gaps and needs	73
Table 32: Energy efficiency policy gaps and needs.....	74
Table 33: Safety policies gaps and needs.....	74
Table 34: Chemical and waste policies gaps and needs	75
Table 35: Awareness raising and stakeholder engagement gaps and needs	75
Table 36: Outreach and awareness-raising for each target group.....	75
Table 37: Summary of recommended actions for the Maldives to implement the Kigali Amendment	78

List of Figures

Figure 1: The Maldives' HCFC consumption against the Montreal Protocol and HPMP phase-out schedules.....	14
Figure 2: HFC phase-down schedule for the Maldives and Article 5 Group 1 countries per the Kigali Amendment.....	19
Figure 3: Main sectors that use RAC equipment in the Maldives	24
Figure 4: Consumption of HCFCs and HFCs, MT, 2015 – 2019.....	25
Figure 5: ODS and HFC import per refrigerant, MT, 2019.....	27
Figure 6: HFC imports per refrigerant, MT, 2016 – 2020.....	27
Figure 7: Natural refrigerant imports per refrigerant, MT, 2016 – 2020.....	28
Figure 8: HFC Imports per year, MT, 2011 – 2020.....	28
Figure 9: Natural refrigerant imports per year, MT, 2011 – 2020.....	29
Figure 10: Countries from which the Maldives import HFC-based equipment, units, 2016-2019.....	30
Figure 11: Market share of RAC equipment by equipment type, 2016-2019	31
Figure 12: Import of AC equipment, unit, 2016-2019.....	32
Figure 13: Refrigerants used in the ACs in tourism facilities, 2019.....	32
Figure 14: Import of domestic refrigerators and freezers, unit, 2016-2019	33
Figure 15: Domestic refrigerants used in the refrigerators and freezers in tourism facilities, 2019 ..	34
Figure 16: Import of commercial refrigeration system - small stand-alone units, 2016- 2020	35
Figure 17: Import of large refrigeration system, 2016-2019.....	36
Figure 18: Reefer containers in the bonded warehouse of Maldives customs used to store products imported by resorts.....	36
Figure 19: Import of vehicles, 2015-2019.....	37
Figure 20: Import quota, licence and permit process in the Maldives	52

Table of Acronyms

BTU	British Thermal Unit
CFC	Chlorofluorocarbons
CP	Country Programme
EPA	Environment Protection Agency
ERC	Environment Research Centre
GDP	Gross Domestic Product
GHG	Greenhouse gas
GWP	Global Warming Potential
HC	Hydrocarbon
HFC	Hydrofluorocarbons
HPMP	HFC Phase-out Management Plan
HS	Harmonized system codes
IMDG	International Maritime on Dangerous Goods Code
INDC	Intended Nationally Determined Contribution
IS	Institution Strengthening
KA	The Kigali Amendment
KW	Kilowatt
LVC	Low Volume Consumption
MAC	Mobile air conditioning
MEPS	Minimum Energy Performance Standards
MOECCT	Ministry of Environment, Climate Change and Technology
MIFCO	Maldives Industrial Fisheries Company
MIT	Maldives Institute of Technology
MLF	Multilateral Fund for the Implementation of the Montreal Protocol
MNQF	Maldives National Qualification Framework
MQA	Maldives Qualification Authority
MP	The Montreal Protocol
MT	Metric Tonnes
NAP	National Action Plan
NC	National Communication
NGIS	National Geographic Information System

NOU	National Ozone Unit
ODS	Ozone-depleting substance
RAC	Refrigeration and air conditioning
RMP	Refrigeration Management Plan
RWMT	Regional Waste Management
S&L	Standards and Labelling Program
SAP	Strategic Action Plan
SIDS	Small Island Developing State
TPMP	Terminal Phase-out Management Plan
TVEC	Technical and Vocational Education Centre
TVET	Technical and Vocational Education and Training
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change

The report was developed by the National Ozone Unit, Ministry of Environment, Climate Change and Technology with the assistance of the United Nations Environment Programme, and the financial support from the Multilateral Fund.

Published by: Government of Maldives in collaboration with the United Nations Environment Programme and the Multilateral Fund

Copyright: © Government of Maldives, Ministry of Environment, Climate Change and Technology

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder

Authors: Aishath Shuaila Rasheed¹, Hawwa Shafeea Riza², Maldives Institute of Technology³, Miruza Mohamed⁴, Thibyan Ibrahim⁵

¹ Project Officer for Ministry of Environment, Climate Change & Technology

² Legal Consultant for Ministry of Environment, Climate Change & Technology

³ Consultant for the Country Assessment Report, Maldives Institute of Technology

⁴ Director for Ministry of Environment, Climate Change & Technology

⁵ Environment Analyst for Ministry of Environment, Climate Change & Technology

Minister's Foreword

The Maldives has always been exemplary in fulfilling the obligations of the Montreal protocol on substances that deplete the ozone layer. Over the last 15 years we have already phased out several ozone depleting substances. This includes Chloroflorocarbons (CFCs) in 2008, two years before the target, and Hydrochloroflorocarbons (HCFCs), 10 years in advance at an accelerated rate, with a schedule more stringent than the one set out by the Member countries.

Maldives has ratified the Kigali Amendment which proposes to phase down the production and usage of hydrofluorocarbons (HFCs) by mid-2040. The Amendment will be an important catalyst in mitigating the negative impacts of climate change, as its achievement could help to reduce the global temperature rise by 0.5 degree Celsius by the year 2100.

Building on this success, this report is the result of further efforts to identify key stakeholders, analyse the policy and market readiness to implement the Kigali Amendment in the Maldives, and recommend a national action plan with regards to HFC phase-down.

This report provides a clear insight on the current HFC usage in the country and see where the policy gaps are, where to strengthen the regulations and initiate work on priority areas. It is a stepping stone to create an enabling environment for the cooling and refrigeration industry of the Maldives to adopt zero ODP and low GWP alternatives.

In this regard, a coordinated effort in capacity building for major industries to adopt alternative technologies, implementing import quota and license, data monitoring and reporting systems and ensuring all national strategies coherently address the implications of the Kigali Amendment will be key to successfully phasing out HFC.

The government of Maldives remains fully committed to implement the obligations of Kigali Amendment and take all necessary actions to mitigate the negative impacts of climate change.



1. INTRODUCTION

As the global hydrochlorofluorocarbon (HCFC) phase-out is progressing, their alternatives that have zero ozone-depleting potential (ODP), such as hydrofluorocarbon (HFC), hydrofluoroolefin (HFO), hydrocarbon (HC), ammonia (NH₃), and carbon dioxide (CO₂) are gradually being phased in.

HFCs have become the major replacement for HCFCs over the last decade due to their features like low or non-flammability, chemical inertness, relatively low cost, and excellent performance as refrigerants, foam blowing agents, aerosol propellants, or solvents. However, the most used HFC substances and blends are powerful greenhouse gases (GHG) that have high global warming potential (GWP). Therefore, uncontrolled growth in HFC use combined with growing global heating and cooling demand is expected to contribute to climate change significantly. If business as usual continues, it is estimated that HFC emissions will be equivalent to 9-19 percent of total global carbon dioxide (CO₂) emissions by 2050¹.

Accordingly, at the 28th Meeting of the Parties in October 2016, the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer agreed on the Kigali Amendment², which extended the list of the Protocol's controlled substances to include 18 HFCs. The Amendment also established phase-down schedules for HFC production and consumption. HFC consumption according to the Protocol is defined as production plus imports minus exports of HFCs expressed in CO₂ equivalent (CO₂e). The Parties decided on different phase-down schedules for two groups of Article 5 Parties: Group 1 to achieve 80% phase-down in HFCs by 2045 with the freeze starting in 2024; and Group 2 to achieve 85% phase-down in HFCs by 2047 with the freeze starting in 2028. The Republic of Maldives is classified as an Article 5 Group 1 country. The Kigali Amendment entered into force on 1 January 2019. Globally, the HFC phase-down can help avoid up to 0.4 degrees Celsius of global temperature rise by 2100.

The Maldives is a party to the Montreal Protocol and has ratified the Kigali Amendment. It is thus important for the Maldives to understand the implications that the Amendment will have on the country, including the current situation in terms of policies and institutions, market and

¹ HFCs: A Critical Link in Protecting Climate and the Ozone Layer; A UNEP Synthesis Report, UNEP, 2011. <http://wedocs.unep.org/handle/20.500.11822/8014>

² The text of the Kigali Amendment as issued by the Depository of the Amendment, the Secretary-General of the United Nations, on 23 November 2016 in all the six official languages of the United Nations is available at: <https://treaties.un.org/doc/Publication/CN/2016/CN.872.2016-Eng.pdf>.

servicing sector, and gaps and needs for the country to effectively implement the Amendment.

1.1. Country background

The Maldives is a tropical country made up of 1,190 coral islands spread around 90,000 square kilometers. The islands are divided into 19 atolls. Around 150,000 people, or a quarter of the national population, reside in the capital city Male making it one of the world's most densely populated cities.

The economy has been growing at an annual rate of 10% for the past two decades and the GDP per capita was last recorded as USD 11,890 in 2018³. Tourism is the main industry which accounts for almost 31% of the GDP. Building and construction and the fisheries industries follow closely behind. The refrigeration and air conditioning (RAC) sector has seen exponential growth due to the rising standard of living, expanding tourism, and fish exports.

The Maldives only imports and does not produce or export any ozone-depleting substances (ODSs) or any other refrigerants. In the Maldives, ODSs are mainly used for RAC equipment servicing. The residential and commercial sectors are the largest consumers of RAC equipment in the country followed by the tourism sector. However, the Maldives' national average consumption of ODS is within 300 grams per capita and it is a Low Volume Consuming (LVC) country.

As a Party to the Montreal Protocol, the Maldives has phased out chlorofluorocarbons (CFCs) in 2008 and is currently implementing measures to phase-out HCFCs by 2020. As a result, the consumption of HFCs which are used as their alternatives has been increasing significantly over the past 15 years.

1.2. The Maldives's ratification of the Montreal Protocol and its Amendments

The Maldives is a party to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol. It has ratified all the amendments to the Montreal Protocol, including the Kigali Amendment. The Maldives was the twelfth country to ratify the Amendment, having ratified it on 9 November 2017. It has also ratified all the major international agreements related to climate change.

³ Country Overview , The World Bank Group website, <https://www.worldbank.org/en/country/maldives/overview> (Accessed 20 July 2020)

Table 1: The Maldives' ratification of the ozone and climate-related multilateral environmental agreements

Agreement	Entry into force	Ratification/accession
Vienna Convention	22/09/1988	26/04/1988 (Accession)
Montreal Protocol	01/01/1989	16/05/1989 (Ratification)
London Amendment	10/08/1992	31/07/1991 (Ratification)
Copenhagen Amendment	14/06/1994	27/09/2001(Ratification)
Montreal Amendment	10/11/1999	27/09/2001 (Ratification)
Beijing Amendment	25/02/2002	03/09/2002 (Accession)
Kigali Amendment	01/01/2019	09/11/2017 (Ratification)
United Nations Framework Convention on Climate Change	21/03/1994	09/11/1992 (Ratification)
Kyoto Protocol	16/02/2005	30/12/1998 (Ratification)
Paris Agreement	04/11/2016	22/04/2016 (Ratification)

As an Article 5 country under the Montreal Protocol, the Maldives is entitled to receive financial support from the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) and technical support from the international community to support its activities to implement the Montreal Protocol.

1.3. The Maldives' ODS phase-out achievements

As a signatory to the Montreal Protocol, the Maldives has implemented several programs to phase-out the consumption of ODSs according to the targets set by the Protocol.

The Country Programme (CP), which was prepared by the Ministry of Planning and Environment in April 1993 and approved at the 10th Meeting of the Executive Committee of the Multilateral Fund (EXCOM) in June 1993, helped the Maldives to put in place policy measures such as the control on the importation of ODS and their products, labelling of ozone-friendly products, duty exemptions for recycling and recovery equipment and a government subsidy at 30 percent of the cost for every recycling recovery units. It also facilitated the industry to implement projects in the refrigeration sector.

The Institutional Strengthening (IS) project, also funded by the MLF, has helped the Maldives to establish the National Ozone Unit (NOU). The IS program commenced in January 1995 and continued until today through subsequent project renewals. The IS project supports the operation of the NOU, public awareness activities, information exchange, and training and monitoring programs.

Through the Refrigerant Management Plan (RMP), the Maldives trained more than 100 servicing technicians, provided one recovery machine to a training center, trained a total of

140 customs officers, and provided nine CFC detecting toolkits to the Customs Service. The RMP also helped the Maldives provide awareness programs for end-users and training for technicians in the mobile air-conditioning (MAC) sector, procure recovery and recycling equipment, some of which were provided to the Faculty of Engineering of the Maldives College of Higher Education. The conversion of the MAC systems and the end-user incentive program were the most successful components of this project which was completed in 2006.

In January 2003, the Maldives banned the importation of the following ODSs: halons, methyl chloroform, bromochloromethane, methyl bromide, and carbon tetrachloride. A ban on the importation of equipment containing CFC-11 and CFC-12 followed a year later with Public Announcement made on 27 May 2003. Equipment banned included refrigerators, deep freezers, water coolers, mini-bars, and motor vehicles manufactured before 1998 that contain CFCs in their air conditioning units.

The Maldives focused on capacity building and provided training on good practices in refrigeration to 67 technicians in the tourism and fisheries sectors via the CFC Terminal Phase-out Management (TPMP). The Maldives also trained enforcement officers to strengthen the control of ODS import and export and provided 5 CFC identifiers to the Customs Service.

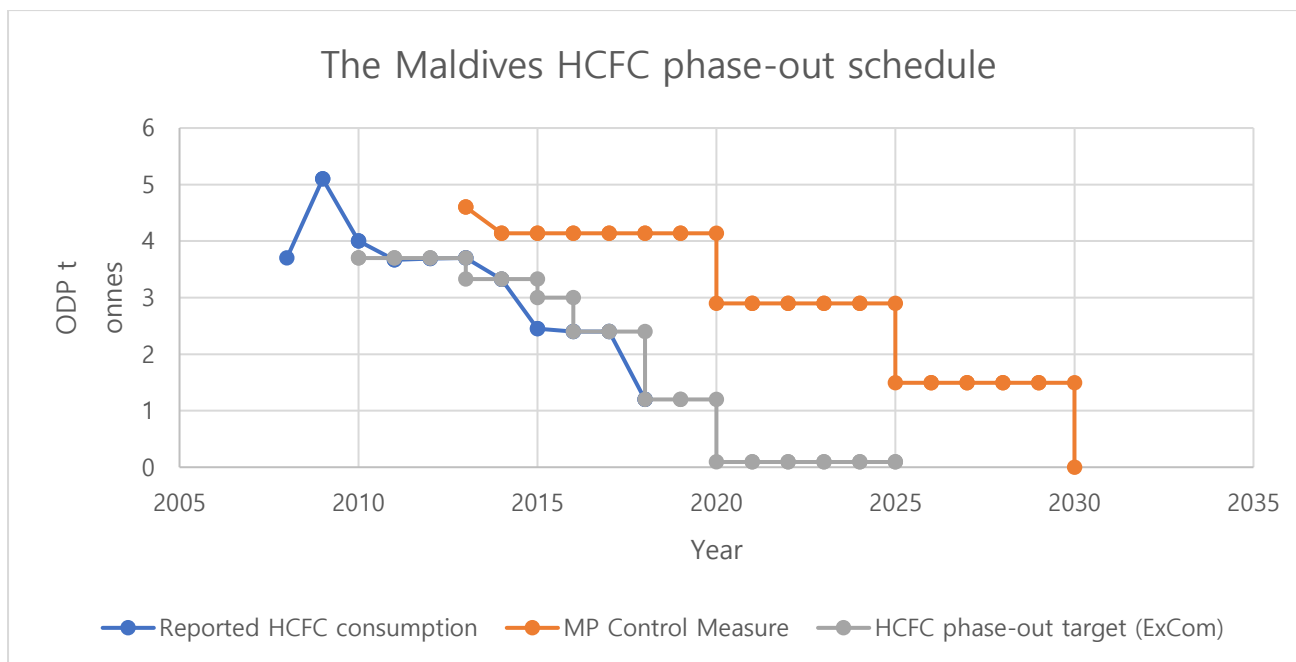
These combined efforts enabled the Maldives to completely phase out CFCs in 2008, two years ahead of the Montreal Protocol schedule, and helped lay the foundation to phase out HCFCs.

The HCFC Phase-out Management Plan (HPMP) was approved at the 60th Meeting of the Executive Committee in 2010. The Plan aims at phasing out HCFC consumption by 2020 at an accelerated rate agreed between the Maldives and the MLF, per the below schedule. This schedule is even more stringent than the schedule set out in the Montreal Protocol.

Table 2: The Maldives' accelerated HCFC phase-out schedule per HPMP

Action	Year
Freeze at baseline level (average of 2009-2010 consumption)	2011
10% reduction	2013
20% reduction	2015
35% reduction	2016
67.5% reduction	2018
97.5% reduction (2.5% for servicing use until 2025)	2020

Figure 1: The Maldives' HCFC consumption against the Montreal Protocol and HPMP phase-out schedules



The Maldives implemented the HPMP starting with the control of HCFC import in 2011. The plan has been implemented successfully with the engagement of all key stakeholders and the close collaboration between the NOU and the customs. Some notable achievements under the HPMP include the publication of the first Ozone Act and the amendment of the Import-Export Act⁴ under the Ministry of Economic Development to apply tax incentives and disincentives related to the import of ODSs.

Thanks to these efforts, having allocated the final quota of 1.68 metric tonnes for 2020, the Maldives achieved a 97.5% reduction in HCFC consumption in 2020 with a 2.5% tail for servicing use until 2025.

1.4. The context, objective, and methodology of the Country Assessment Report

The EXCOM, at its 79th meeting in July 2017, adopted Decision 79/46 on Enabling Activities for Article 5 countries to facilitate the early ratification of the Kigali Amendment and to support the countries to fulfil the initial obligations related to HFC phase-down. The Enabling Activities for the Maldives was approved at the 80th Meeting of the EXCOM in November 2017 with UNEP as the implementing agency.

⁴ <http://www.trade.gov.mv/page/import-license-issuing>

The Maldives' Enabling Activities project aims to enhance country ownership of the Kigali Amendment and ensure a smooth implementation by assessing the readiness of different sectors to adopt zero ODP and low GWP alternatives. More specifically, the activities include developing the Country Assessment Report; capacity building for key stakeholders; facilitating tourism and fisheries sector to adopt alternative technologies; identifying training needs for handling HFC alternatives in different sectors; implementing import quota and license and data monitoring and reporting systems and ensuring all national strategies coherently address the implications of the Kigali Amendment.

The objective of this Country Assessment Report, prepared as part of the Enabling Activities project, is to identify key stakeholders, analyze the policy and market readiness to implement the Kigali Amendment in the Maldives, and recommend a national action plan. More specifically, the Report consists of:

- Assessment of HFC consumption in relevant sectors based on customs import statistics. This includes residential and commercial sectors and tourism and fisheries sectors. The hospitals and healthcare centers have been grouped into residential and commercial sectors.
- Analysis of existing policies related to ODS, climate change, and other relevant sectors to draw the linkages and identify gaps that need to be filled to implement HFC phase-down.
- Assessment of feasible and viable technologies for the Maldives and the conditions needed to be met for smooth introduction and adoption of low GWP alternatives.
- Identification of gaps in the existing import quota and licensing system and recommendation on ways to include HFCs and improve the existing system, for instance, the use of Single Window System (Makudi run by the Ministry of Defense).
- Identification of challenges and gaps in the current data collection, monitoring, and reporting system and recommendation on ways to improve it while extending the system to cover HFCs.
- Identification of key national stakeholders of the Kigali Amendment and recommendations on ways to raise awareness and engagement.
- Identification of gaps in regulating the servicing sector and recommendations for improvement.

The Country Assessment Report, as a comprehensive key report under the Enabling Activities project, covers most aspects of the project's components. The development of the Report facilitated and contributed to the implementation Enabling Activities project as a whole and built on the outputs of its components.

Table 3: The Country Assessment Report's contribution to different components of the EA

Enabling Activities Project Components	Interaction with the Country Assessment Report and its development process
Preparation for the Kigali Amendment implementation	The Country Assessment Report provided the basis for the policy instruments developed under this component. Consultations with policymakers during the Report's development process helped also to raise the awareness of the policymakers on the country's obligations, challenges, and recommended activities to implement the Kigali Amendment in the Maldives.
Sensitizing the fisheries sector on the HFC phase-down and the Kigali Amendment	The survey conducted to gather information for the Report facilitated the identification of barriers, gaps, and capacity-building needs that exist in these sectors to implement the Kigali Amendment. The recommended actions in the Report provide concrete actions to address these issues in these sectors.
Sensitizing the tourism sector on the HFC phase-down and the Kigali Amendment	
Online data system	The Report reviewed the existing licensing and reporting system for ODS and RAC equipment and proposed ways to include HFCs in the system while suggesting the development of an online system for license and data processing and organization of awareness and training for customs and importers to better utilize the system.

The following activities were conducted by the NOU to develop this country assessment report:

- Two national consultants were hired to conduct the market and policy analysis. The market analysis consultant worked from May 2019 to April 2020 and the legal consultant worked from September 2019 to February 2020.
- Examined the existing ODS import quota and licensing system and identified gaps.
- Identified challenges in the customs procedure in the import process.

- Conducted one stakeholder consultation on 24 November 2019 with key stakeholders to gather information and to share the findings of the initial market analysis. The validation workshop was scheduled to take place in April 2020 but had been delayed due to the Pandemic and was conducted online in February 2021.
- Conducted a workshop with tourism industry professionals on 24 February 2020 to develop an initial plan to facilitate the HFC phase-down.

The market and RAC servicing sector needs assessment was done mainly through desk research and field surveys. All surveys were conducted by the market analysis consultant from the Maldives Institute of Technology (MIT). Structured questionnaires were developed and used for each target group. The table below maps out the stakeholders who were consulted and the type of data gathered.

Table 4: List of stakeholders consulted and type of information collected for the Country Assessment Report

Government Stakeholders	Type of information gathered
Maldives Customs Service	Import data of all types of refrigerants and equipment
Maldives Tourism Development Corporation	List of all registered resorts, guest houses, safari vessels, and hotels
Ministry of Fisheries, Marine Resources and Agriculture	Data on the total number of fishing vessels per year
Ministry of Transport and Civil Aviation	Data on the total number of registered vehicles per year
National Bureau of Statistics	Data on the total number of households and the number of ACs and refrigerators per year
Educational Organizations	Type of information gathered
Technical and Vocational Education and Training Authority	Data on types of training provided and technicians and students trained
Maldives Institute of Technology	Data on training and curriculum
Maldives Polytechnic	Data on training and curriculum

The sample survey approach was used for the field surveys conducted. The sample size and the percentage of its representation are shown in the table below. The survey questionnaires were sent to all the resorts from all over the country in the directory provided by The Maldives Tourism Development Corporation. And the survey questionnaires/ forms were completed by 23 resorts.

As for the servicing workshops, it was not possible to know the total number of workshops, as there is no comprehensive list of workshops that provide RAC servicing in the country.

However, only 3 servicing workshops sent back the answered survey forms, and the data was incomplete.

Table 5: Survey sample and size

Study subjects	Sample size	Total number in the Maldives	Sample's percentage of the total
Resorts	23	164	14%
RAC training institutions	3	3	100%
Servicing workshops	3	Unknown	Unknown

2. THE KIGALI AMENDMENT AND ITS IMPLICATIONS TO THE MALDIVES

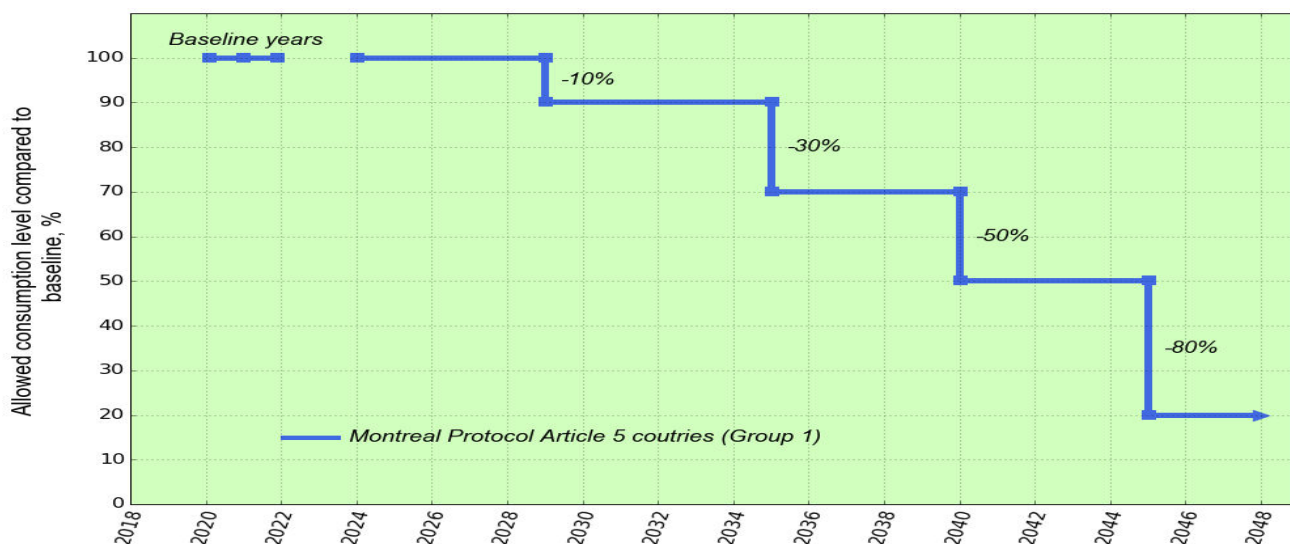
2.1. The Kigali Amendment obligations applicable to the Maldives

The Maldives ratified the Kigali Amendment in September 2017 and the Amendment entered into force for the Maldives in January 2019. Therefore, the Maldives needs to reduce the consumption of HFCs, whether as a single substance or as composition in any mixtures, according to the phase-down schedule set out in the Amendment for Article 5 Group 1 countries, shown in the table below.

Table 6: HFC phase-down schedule for the Maldives and Article 5 Group 1 countries per the Kigali Amendment

Article 5 Group 1 Parties, including the Maldives		
Baseline Years	2020, 2021, 2022	
Baseline Calculation	Average production/consumption of HFCs in 2020, 2021, 2022 plus 65% of HCFC baseline production/consumption	
Reduction steps		
Freeze	2024	
Step 1	2029	10% reduction
Step 2	2035	30% reduction
Step 3	2040	50% reduction
Step 4	2045	80% reduction

Figure 2: HFC phase-down schedule for the Maldives and Article 5 Group 1 countries per the Kigali Amendment



The HFC phase-down implementation for the Maldives will start in 2024, with the freeze in HFC consumption from January 2024 at the baseline level, and ultimately phasing down 80% of its HFCs consumption from the baseline by 2045. CO₂ is used to measure the consumption baseline and emission from HFCs. Since the Maldives imports 100 percent of the refrigerants

used in the country and does not produce or export any HFCs, the country's HFC consumption equals its HFC import. The country, therefore, needs to control its HFC imports to reduce its HFC consumption.

In addition to the phase-down obligation, the Maldives needs to provide accurate reporting of HFC consumption data annually as per Article 7 of the Montreal Protocol. Reporting must start for the year the Kigali Amendment enters into force for a country. The Maldives, therefore, has started reporting HFC consumption data from 2019.

Further, the Maldives must establish an effective licensing system to control the import and export of HFCs as per Article 4B of the Montreal Protocol, by 1 January 2021.

2.2. The benefits of implementing the Kigali Amendment

The benefits of implementing the Kigali Amendment in the Maldives include:

- Showing commitment to global climate change and ozone layer protection efforts and contributing to GHG emissions reduction. The early ratification of the Kigali Amendment by the Maldives has demonstrated the country's commitment to addressing the issue of global environmental challenges.
- Moving away from HFC can be an opportunity to leapfrog from high GWP-based equipment to low GWP-based equipment that is also more energy-efficient. This can bring additional climate benefits by reducing energy use in RAC equipment.
- As an Article 5 country that has ratified the Kigali Amendment, the Maldives has access to international financial and technical support through the MLF to support its efforts in improving the capacity of the national stakeholders to reduce HFC consumption.
- As the Maldives ratified the Kigali Amendment, it will avoid HFC trade sanctions that will be imposed on non-parties to the Amendment. As Maldives imports all HFCs and RAC equipment, it is an important aspect that will have positive implications for the country.
- The Kigali Amendment allows flexibility for each country to choose its HFC phase-down priorities. The Maldives will be able to select the types of HFCs, sectors, technologies, and alternatives to prioritize based on what is best suited for the Maldives without having to get clearance from the other Parties.
- Implementing the Kigali Amendment will be an opportunity to regulate the servicing sector, for example, through voluntary certification, which can be made mandatory overtime.

- Implementing the Kigali Amendment will also be an opportunity to strengthen the data collection and monitoring system which will, in turn, lead to better management of the refrigerants throughout the lifecycle, from importation to disposal.

2.3. The challenges and costs of implementing the Kigali Amendment

However, there will also be some challenges that should be considered and addressed:

- Resistance from the fisheries and tourism sectors due to a lack of affordable alternatives.
- Challenges in enforcing the control of the servicing sector will result in undermining the safety when using climate-friendly but flammable alternatives to HFCs.
- Disruption in the livelihoods of smaller business which offer informal servicing.

Some of the expected main administrative costs include costs related to activities outlined below:

- Surveying existing HFC consumption to better understand the HFC use situation in the country. The data currently available is limited to customs import data.
- Developing the resources to ensure accurate and timely reporting of HFC consumption.
- Amending the existing policies or introducing new ones to include the HFC phase-down obligations. These include various policies on ODS control, climate change, energy efficiency, and safety.
- Extending the existing ODS import quota and licensing system to cover HFCs.
- Capacity building for customs officers to control HFCs.
- Providing training for technicians to handle HFC alternatives that are flammable or toxic (HFC-32, HC-290, HC-600a, R-717, etc.).
- Further developing the single window Makudi System to ensure all permits and licenses can be obtained online.
- Purchasing tools needed to handle HFC alternatives such as HFOs, HCs, and natural refrigerants.
- Engaging additional stakeholders under the Kigali Amendment regime.
- Developing national strategies and action plan for HFC phase-down.
- Attending any additional international meetings relevant to the Kigali Amendment.

It should be however noted that the MLF provides funding to support Article 5 countries in the implementation of the Montreal Protocol and its amendments. The established Trust Fund for the Montreal Protocol also supports the participation of key national decision-makers of Article 5 countries in international meetings. Therefore, it is expected that no substantial additional cost will incur for the Government of the Maldives. The initial support provided by the MLF through the Enabling Activities project which covers some of the costs related to the activities mentioned above is expected to be followed by further technical and financial assistance for the country to build its capacity for the phase-down of HFC.

3. MARKET ASSESSMENT

3.1. Consumption of HFCs

The Maldives is a Small Island Developing State with a population of 545,000. The climate is hot and humid and there is a high demand for cooling throughout the year. Over 30 percent of the population resides in the capital city, Male, which is one of the world's most densely populated cities. Over the last decade, the Maldives has developed exponentially with considerable improvements in the country's infrastructure and connectivity. In 2018, its GDP reached USD 11,890, from USD 200 in 1978 according to the World Bank⁵. The standard of living has increased significantly which has led to an increased demand for cooling.

With its unique geography and pristine beaches, tourism and fisheries are the main backbones of the economy. Since the 1970s, the tourism industry has been growing steadily. Over the past five years from 2014 to 2018, tourism accommodation facilities and their bed capacity have been increasing at an annual average rate of 14.3% (Tourism Yearbook, 2019). As of 2019, there have been 19 new resort developments with a bed capacity of 4501 beds. Currently, there are 164 resorts, 11 hotels, and 561 guest houses, and 154 safari vessels in the Maldives (Statistical Pocketbook of Maldives, 2020)⁶.

Although the geography of the islands is the perfect tool to attract upmarket tourists, it has led to a dispersed population and proved to be a development challenge. To address this issue, the government has then reversed centralization policies to develop at least 5 regional economic hubs across the country. This means more infrastructure projects and airports for the next few years (World Bank, 2020)⁷.

As the population increases, the demand for housing continues to increase in the Greater Male Region. According to the last census in 2014, there are 68,249 households. In Male, more than 96% of households live in flats and apartments (National Bureau of Statistics, 2014)⁸. In efforts to decrease congestion in the capital city, most of the residential developments will take place in Hulhumale. Almost half of Phase Two developments are

⁵ Country Overview, The World Bank, <https://www.worldbank.org/en/country/maldives/overview> (Accessed 27.10.20.)

⁶ Statistical Pocketbook of Maldives, 2020, (<http://statisticsmaldives.gov.mv/statistical-pocketbook-of-maldives-2020/>)

⁷ Country Overview, The World Bank, <https://www.worldbank.org/en/country/maldives/overview> (Accessed 27.10.20.)

⁸ National Bureau of Statistics, 2020

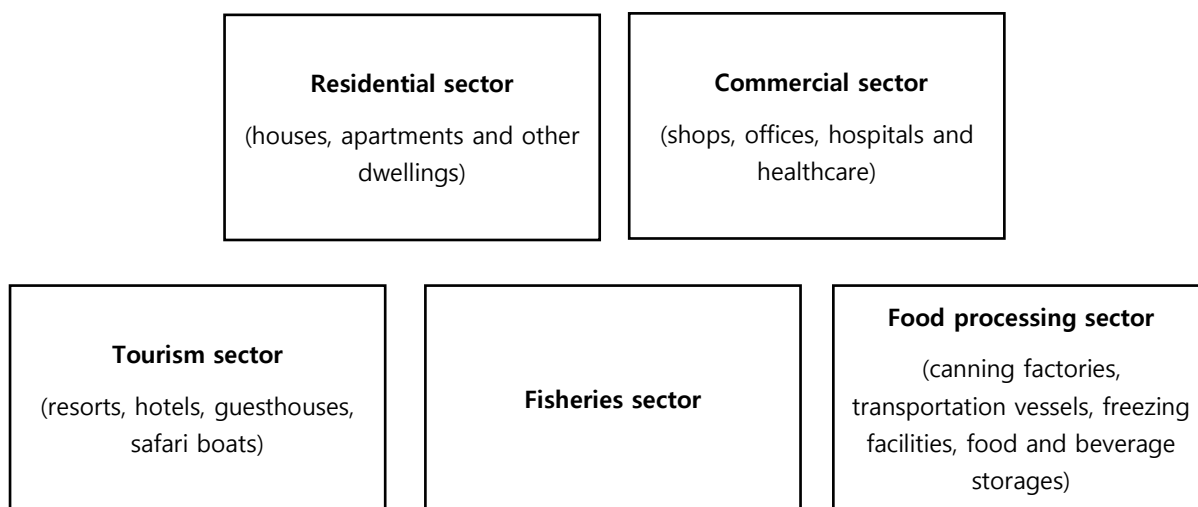
allocated for residential developments with a target population of 140,000 (Housing Development Cooperation, 2016)⁹.

The abundance of marine life makes up the next main economic activity. Fisheries and fish processing accounted for 5.1% of the GDP in 2013. In the past ten years, this sector modernized and expanded with new, larger vessels (Food and Agriculture Organization of the United Nations, 2020)¹⁰.

Moreover, Maldives has been developing steadily and the standard of living has been increasing which means that the demand for RAC equipment is increasing and will continue to do so. Refrigerants and RAC equipment are imported into the country and are used solely for air-conditioning and refrigeration.

The most reliable data available for this report is the Customs Import Statistics. Analysis of the import statistics from 2016 to 2020 suggests that the main end-users are the tourism accommodation facilities, housing units, public procurement (airports, schools, public offices, buildings, etc.), shops, restaurants, and fish processing facilities. The main sectors are summed up in the figure below.

Figure 3: Main sectors that use RAC equipment in the Maldives



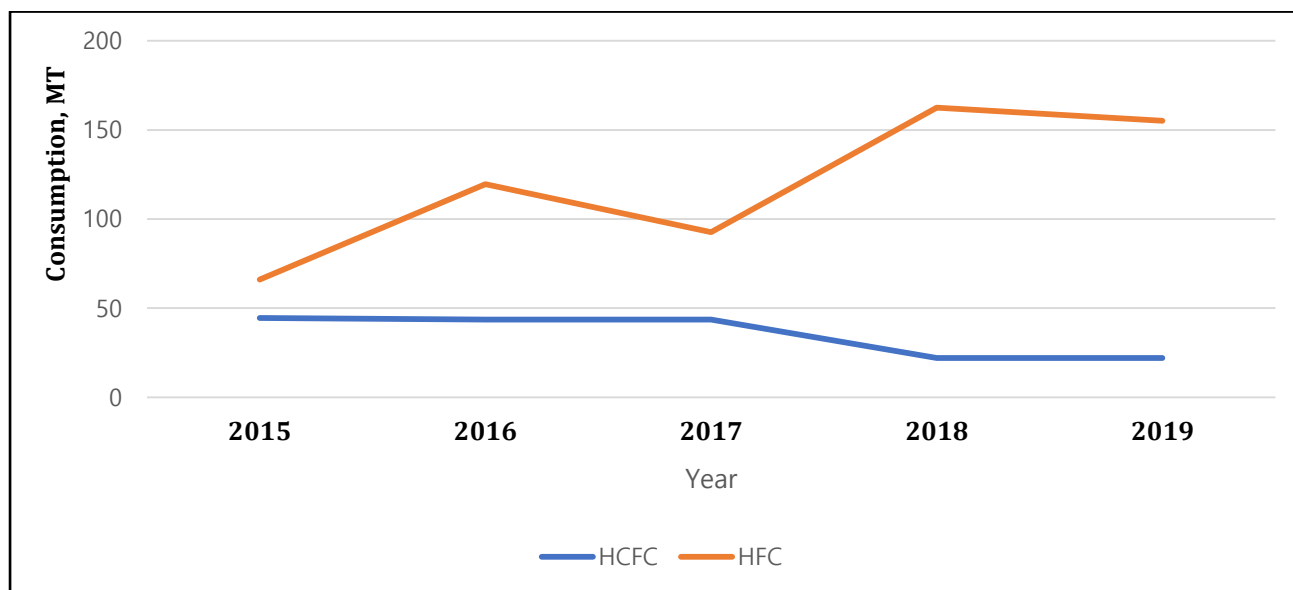
Since the implementation of the HPMP in 2010, the consumption of HCFCs has been gradually dropping while that of ODS alternatives has been steadily increasing. According to the Maldives' ODS Alternatives Survey 2016, the consumption of HCFCs at the end of 2015

⁹ Housing Development Corporation, 2016, <https://hdc.com.mv/projects/residential-developments> (Accessed 20.12.20.)

¹⁰ Food and Agriculture Organization of the United Nations, 2020 (<http://www.fao.org/fishery/facp/MDV/en.>)

takes up 40% while ODS alternatives account for 60% of the total refrigerant consumed in the Maldives.

Figure 4: Consumption of HCFCs and HFCs, MT, 2015 – 2019



Source: Customs Import Statistics 2015-2019

The most commonly used HFC recorded in 2016 was HFC-134A. Other commonly used HFC blends in the Maldives are R-404A, R-407C, R-410A, and R-417A which were imported every year since 2012. Occasionally consumed blends are R-507C, which was imported in 2012 and 2014 only, and R-438A which was imported in 2015 (ODS Alternatives Survey, 2016).

Ammonia is also used mainly in industrial refrigeration in the fisheries industry. According to the ODS Alternatives Survey 2016, the main consumer of ammonia was the Maldivian Industrial Fisheries Company (MIFCO). It was predicted that 6 tonnes of ammonia would be imported per year. The table below has been adapted from the ODS Survey Report.

Table 7: HFC and ODS alternatives usage by end-user

	HFCs	Non-HFCs
Residential buildings	HFC-134a, R-410A, HFC-32	HC-290, HC-600a
Commercial buildings	HFC-134a, R-404A, R-407C, R-507A, HFC-32	HC-290, HC-600a
Cold storages	HFC-134a, R-404A, R-507A	R-717
Tourism sector	HFC-134a, R-410A, R-404A, R-407C, R-507A, R-417A	R-717
MAC	HFC-134a	None
Fisheries enterprises (on shore processing units, fishing vessels)	HFC-134a, R-404A, R-418A, R-438A	R-717

Source: ODS Alternative Survey 2016

However, the analysis of customs import statistics of 2019 shows that R-410A is now the most imported refrigerant and not the HFC-134a of before.

3.2. Supply of HFCs and their alternatives

In the Maldives, all refrigerant gases are imported and they are all imported for use in the RAC servicing sector. The refrigerants also enter the country as pre-charged gas in the imported RAC equipment but such pre-charged substances are not counted as an import under the Montreal Protocol.

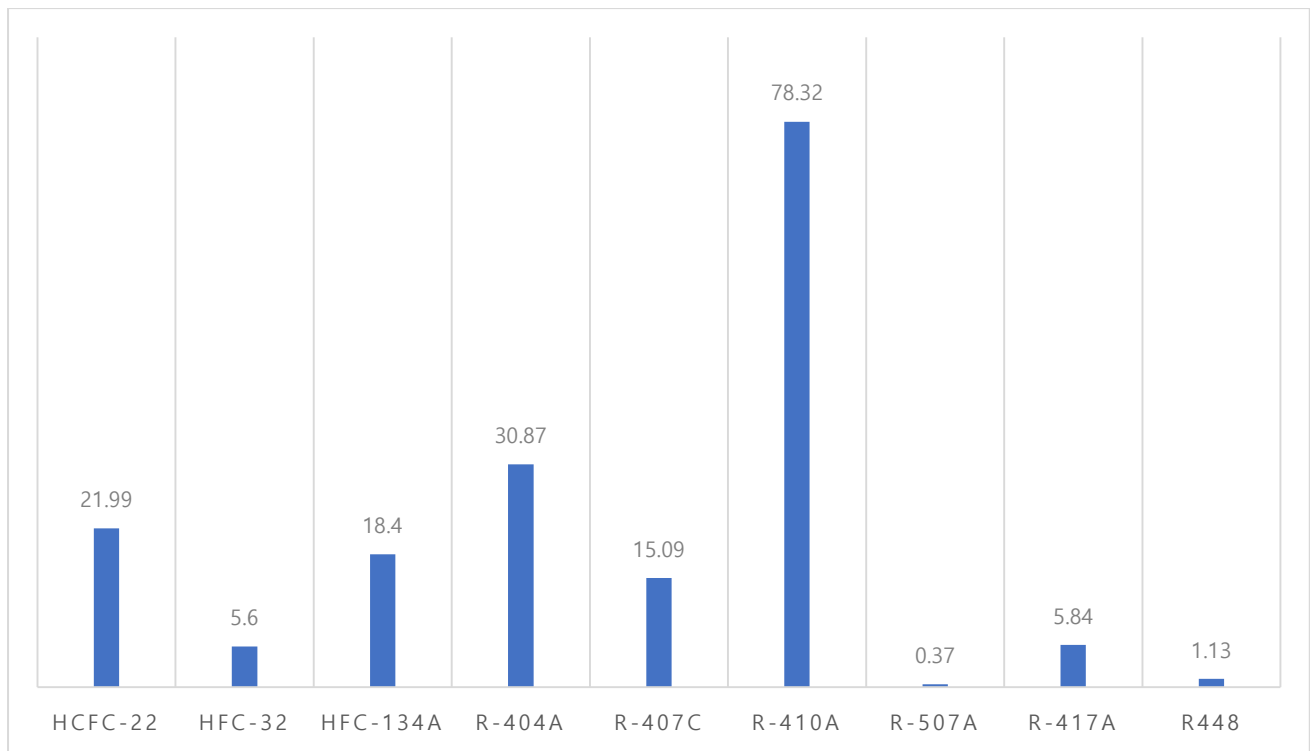
As of 2019, there are 23 registered refrigerant importers. The list is given below.

Table 8: List of registered refrigerant importers

	Importer name
1	24 Seven Service
2	Aim Refrigeration Service
3	Bright Brothers pvt.ltd
4	Capital Auto Service
5	Capton Refrigeration
6	Coastal Million Maldives
7	Cool line
8	CURE Engineering Workshop
9	Flux Maldives
10	Galolhu Auto Garrage
11	Hithima Refrigaeration
12	Ibaan Air conditioning Service
13	Kool Temp
14	Lintel Service Centre
15	Niyaz Enterprises pvt.ltd
16	Refcool
17	Sakura Showroom
18	Tommy Refrigeration
19	Veliga hardware
20	Waadhee Traders pvt ltd
21	WEE Refrigeration and Air conditioning engineering
22	Wheel Engineering Services
23	Wizco garage

According to the ODS Alternatives Survey Report in 2016, the majority of the HFCs were imported from China, Singapore, Sri Lanka, UAE, India, and some EU countries. However, according to the most recent import statistics, HFCs are imported from China, Thailand, Malaysia, and Singapore.

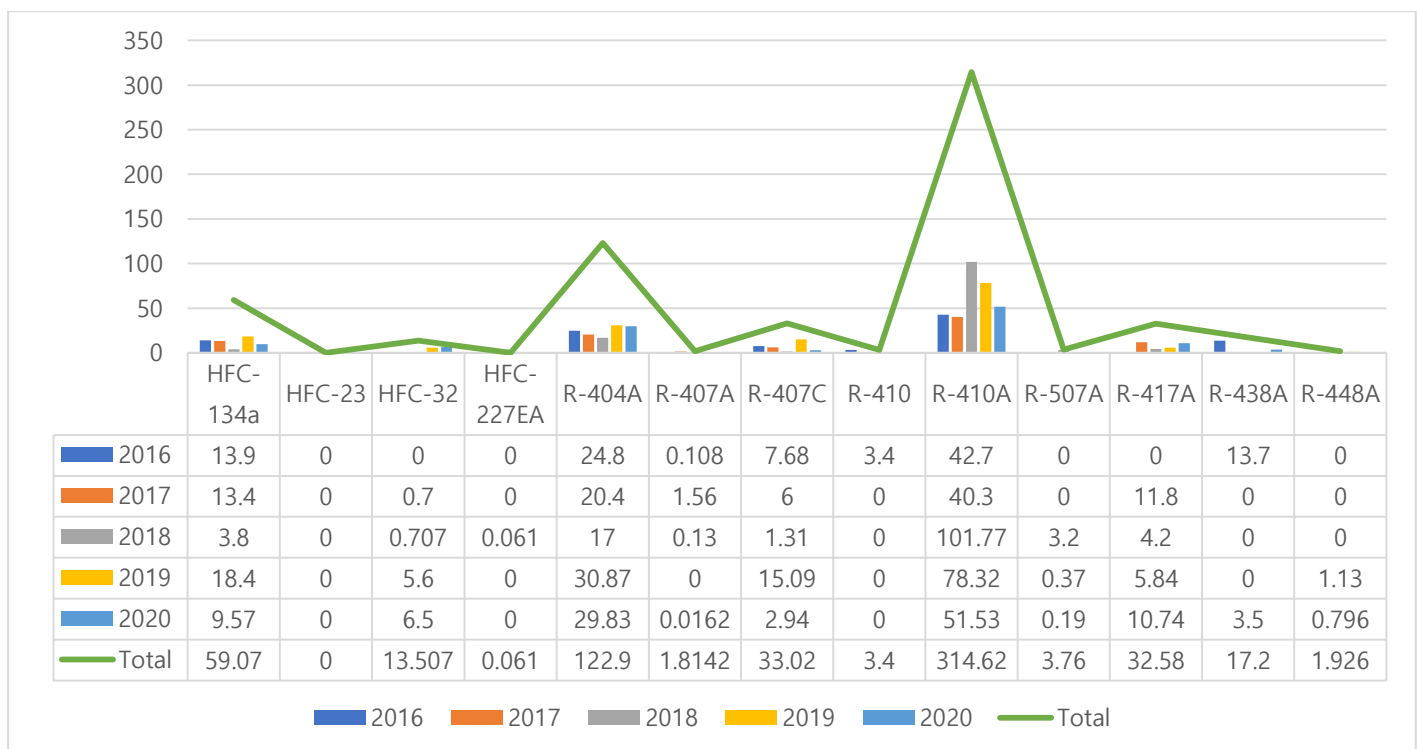
Figure 5: ODS and HFC import per refrigerant, MT, 2019



Source: Customs Import Statistics 2019

The figure above illustrates the amounts of refrigerants imported in 2019. R-410A is by far the most imported HFC, at 78.32 MT. It is followed by R-404A, HFC-134a, and R-407C.

Figure 6: HFC imports per refrigerant, MT, 2016 – 2020

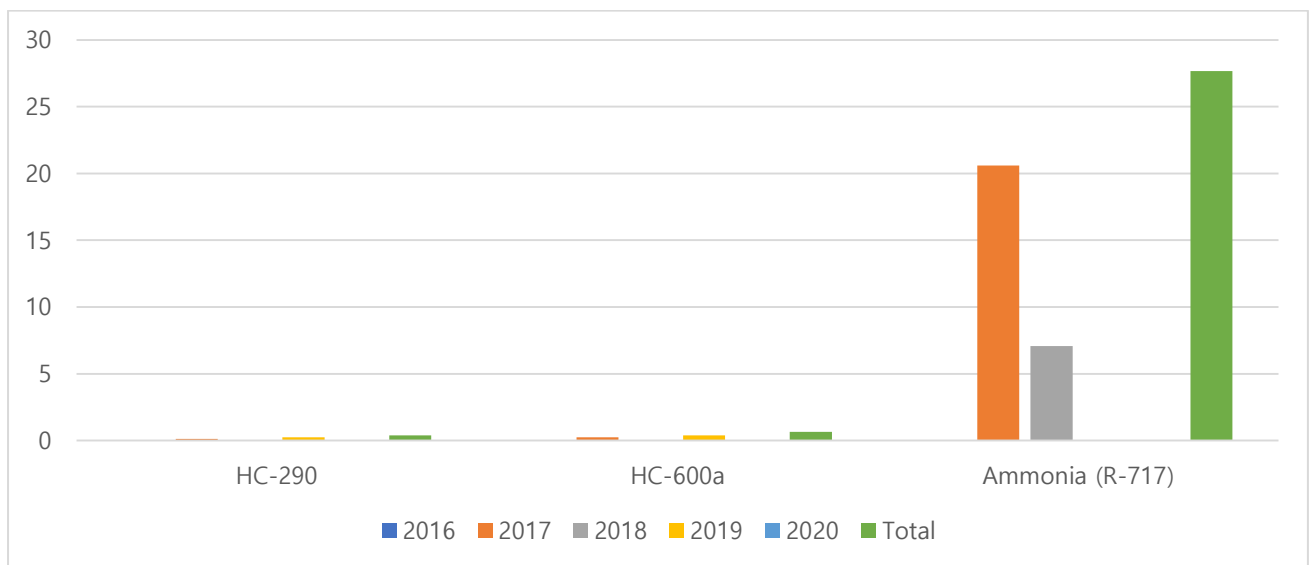


Source: Customs Import Statistics 2016-2020

The import statistics of HFCs from 2016-2020 show that the import of R-410A has generally increased. The import amount of R-404A, HFC-134a, and R-407C has been fairly consistent during the period. The presence of two HFC-23 Cascade Blast Freezers (40ft container size for rapid cooling of fish) located in Maandhoo Fisheries Enterprises was noted. However, no recent import of HFC-23 was recorded.

The next figure shows the import of natural refrigerants from 2016 to 2020. The import of ammonia has generally increased during this period.

Figure 7: Natural refrigerant imports per refrigerant, MT, 2016 – 2020



Source: Customs Import Statistics 2016-2020

The figure below illustrates the steadily rising import of HFCs from 2011-2020.

Figure 8: HFC Imports per year, MT, 2011 – 2020

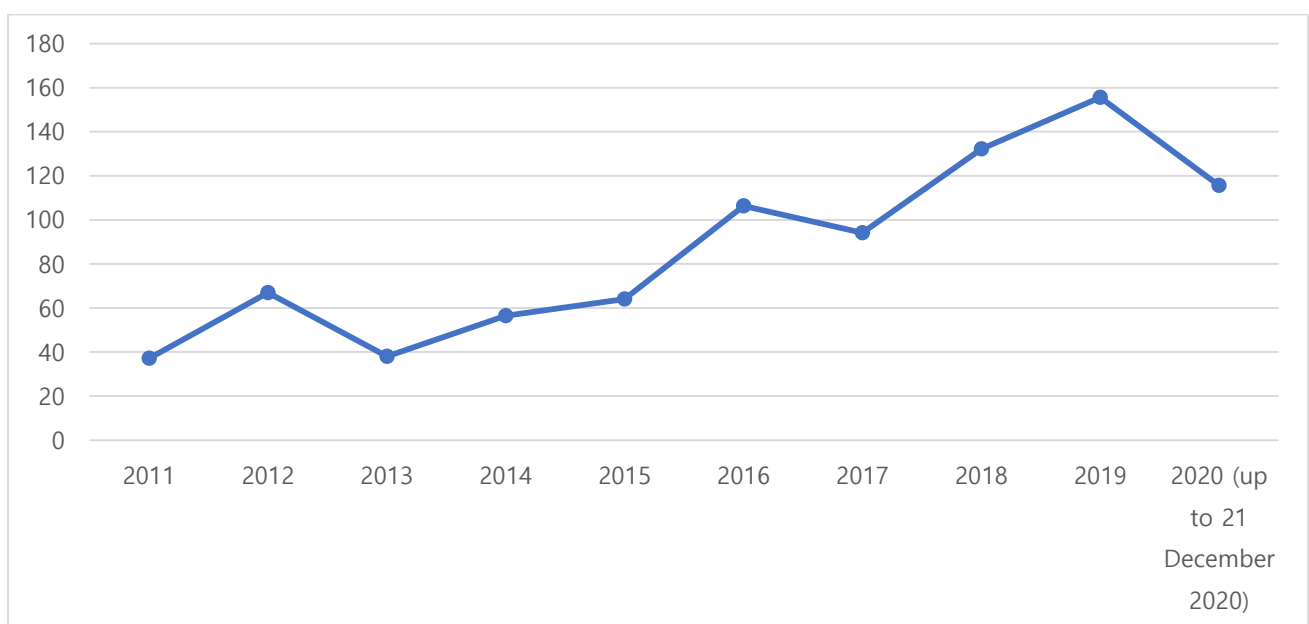
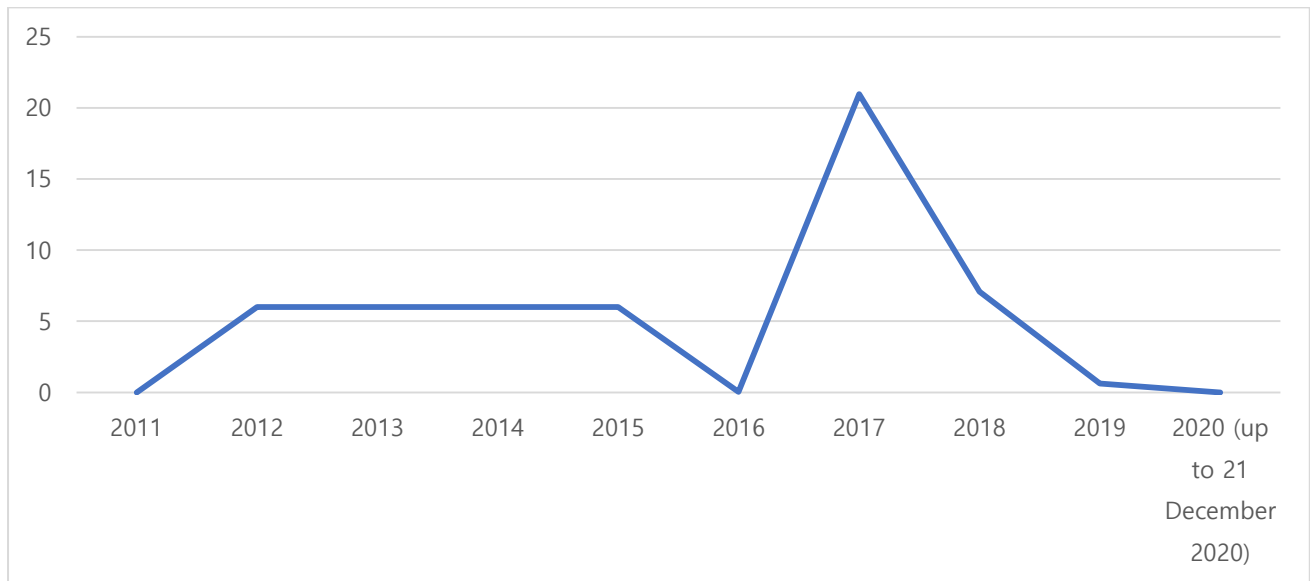


Figure 9: Natural refrigerant imports per year, MT, 2011 – 2020



The above figure shows the import of natural refrigerants per year from 2011 to 2020. Overall, since the implementation of the HPMP, HCFCs have been phased out and increased demand for HFCs and natural refrigerants can be observed.

3.3. Supply of HFC-based equipment

The prevailing hot and humid atmospheric conditions, general economic growth accompanied by improvement in the quality of life in the country, and recent developments in the tourism sector have resulted in an increase in RAC units across the country. In 2009, permission to operate guesthouses on local islands was granted which led to a further increase in tourism establishments and RAC equipment used therein. Air-conditioning is a necessity for tourists and for many people in the capital city Male, where the population is growing and dwellings are congested.

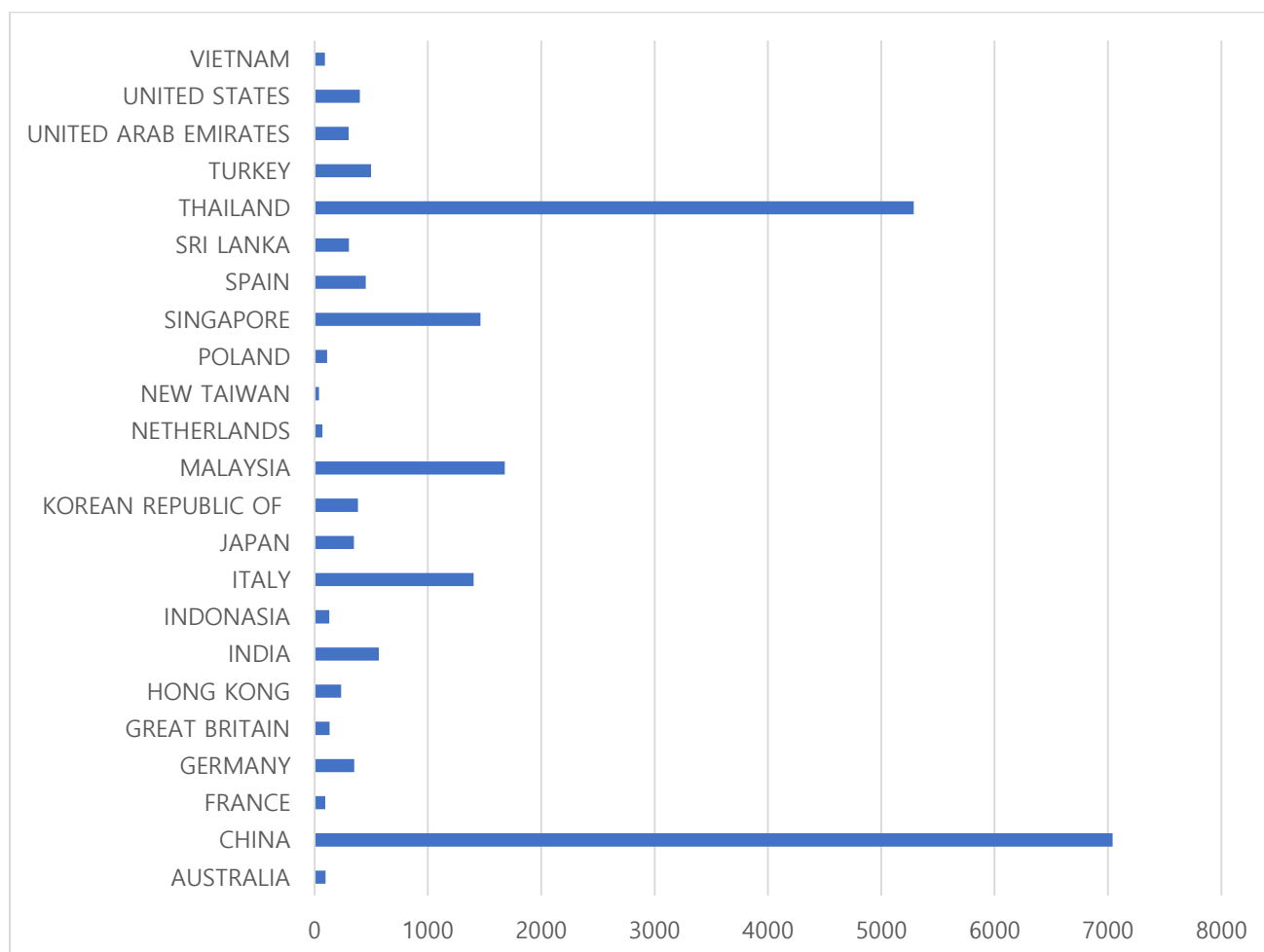
The Maldives does not manufacture any kind of RAC equipment. Instead, all equipment is imported from the countries shown in the figure below.

The customs import statistics from 2016 to 2019 indicate that the majority of RAC equipment is brought in from China, Thailand, Singapore, Malaysia, and Italy. The types of RAC equipment imported are:

- Small standalone systems: beer cooler, bottle cooler, ice cream maker, ice cube machine, ice flaker

- Chillers and refrigerators: household and non-household, deep freezers
- Blood banks
- Large freezer containers
- Air conditioners
- Mobile air-conditioning units

Figure 10: Countries from which the Maldives import HFC-based equipment, units, 2016-2019



Source: Customs Import Statistics 2016-2019

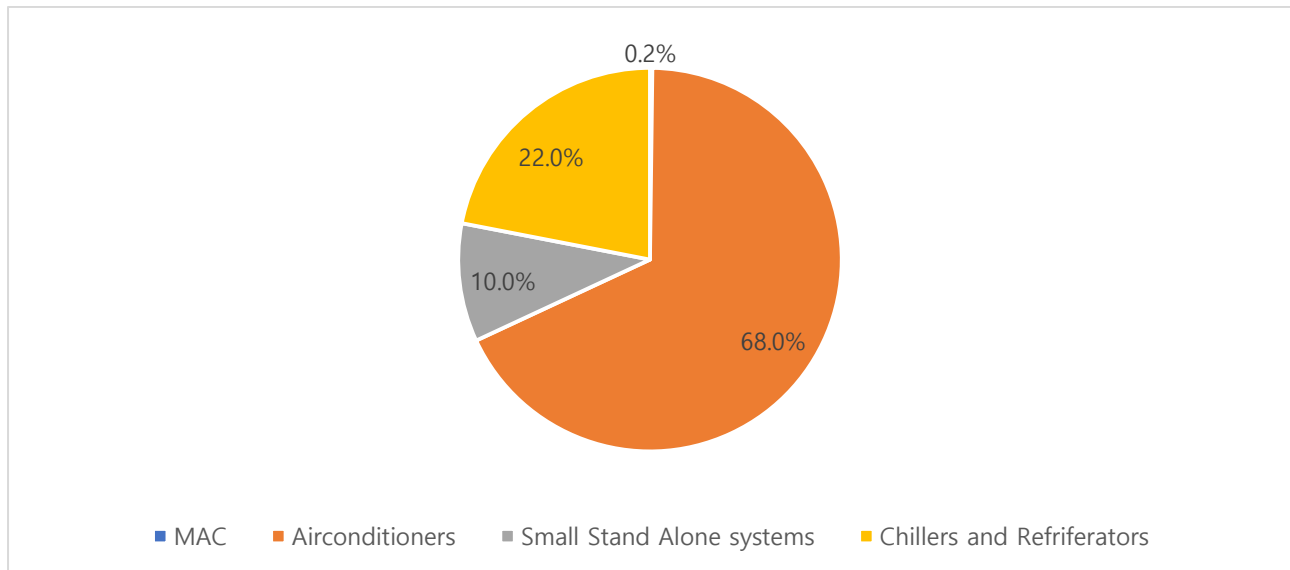
The equipment is imported new and pre-charged except for some of the large freezer containers, 10 percent of which are imported as refurbished.

3.4. Key applications

RAC equipment is imported for commercial purposes, for use in residential units (by construction and development companies), tourism facilities, healthcare providers, fisheries establishments, and food and beverage operators. The figure below indicates the market share of RAC equipment from 2016 – 2019 per type of equipment. It is observed that almost

70% of the RAC equipment in the Maldives is air conditioners. It is expected that the demand for air conditioners will keep rising as the climate keeps getting warmer.

Figure 11: Market share of RAC equipment by equipment type, 2016-2019



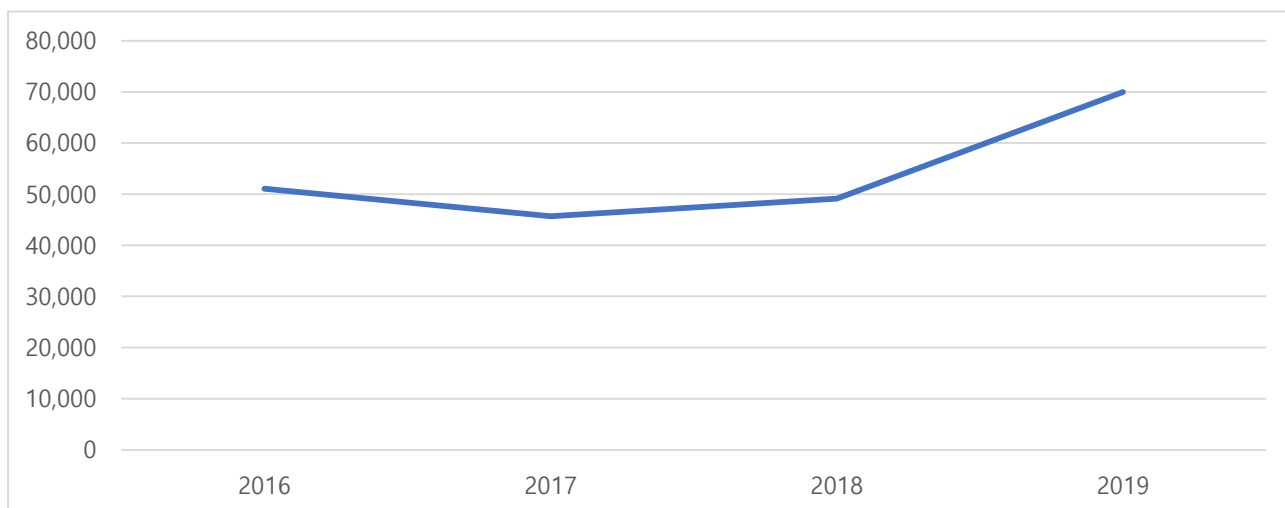
Source: Customs Import Statistics 2016-2019

3.4.1. Room air-conditioners and variant flow (VRF) system

All air conditioners (ACs) are grouped into one single category in this report as the available import statistics from customs do not account for different categories of ACs. This category includes both small to large split systems (9000 BTU to 24,000 BTU) and VRF units in different capacities.

As shown in the figure above, AC dominates the largest portion of RAC equipment in the Maldives. With the total number of RAC equipment increasing every year, AC and VRF have maintained the highest percentage at almost 70% of the total RAC equipment imported in the country. The figure below shows that the number of AC being imported into the country has increased by 9.3 percent from 2016-2019 according to customs data.

Figure 12: Import of AC equipment, unit, 2016-2019

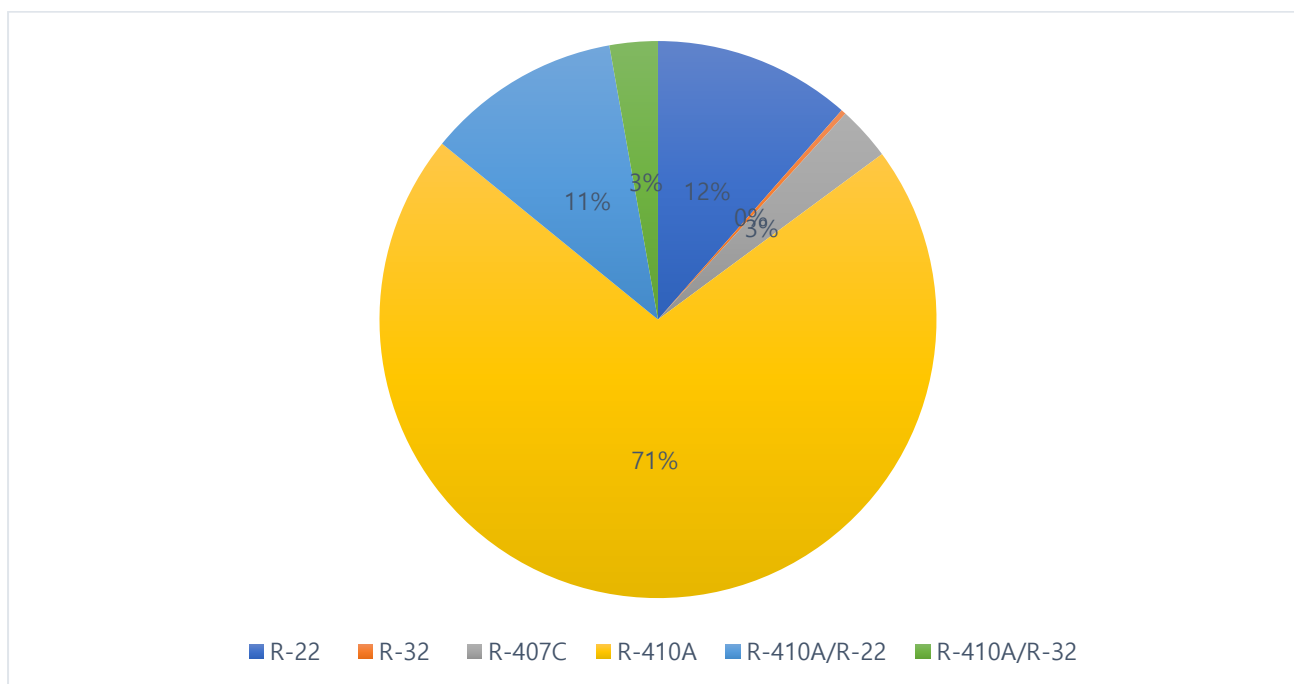


Source: Customs Import Statistics, 2016-2019

Some of the popular AC brands in the market are AUX, LG, Panasonic, GREE, and Daikin. Currently, in the Maldives, there are no ACs using HCFCs due to the ban on the import of HCFC-based equipment in 2016, except for a few remaining HCFC-based ACs that were imported before 2016.

The survey conducted on 23 resorts (out of a total of 164) indicates that 71% of the air conditioners are based on R-410A.

Figure 13: Refrigerants used in the ACs in tourism facilities, 2019



Source: Country Assessment Report Survey 2019

Approximately 35% of the total existing AC units require servicing annually which includes refrigerant charging. The average charge size required during servicing is 1 kg per unit. Most new systems are imported pre-charged and no refrigerant charging is required.

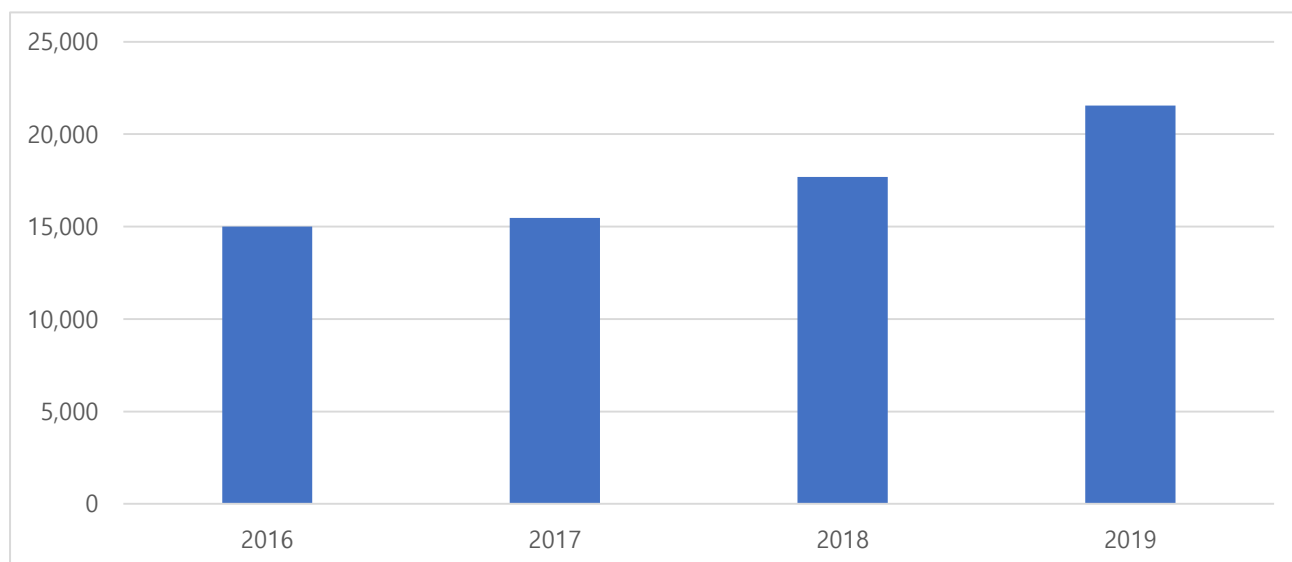
3.4.2. Domestic refrigerators and freezers

Domestic refrigerators are sold as stand-alone units. They are mostly imported from Singapore, China, Thailand, UAE, Italy, and Malaysia. Domestic refrigerators and freezers are predominantly used in residential and commercial buildings but are also used extensively in the tourism sector. The type of refrigerators and freezers in this category are:

- Combined refrigerators-freezers, with separate external door
- Compression type household refrigerators
- Refrigerator (household) other
- Freezers of chest type, capacity=<800 liters
- Deep freezer of upright type=<900 liters
- Refrigerator (blood bank)

The import statistics from 2016 to 2019 revealed that the imports for domestic refrigerators and freezers are increasing steadily, parallel to the growth of the economy.

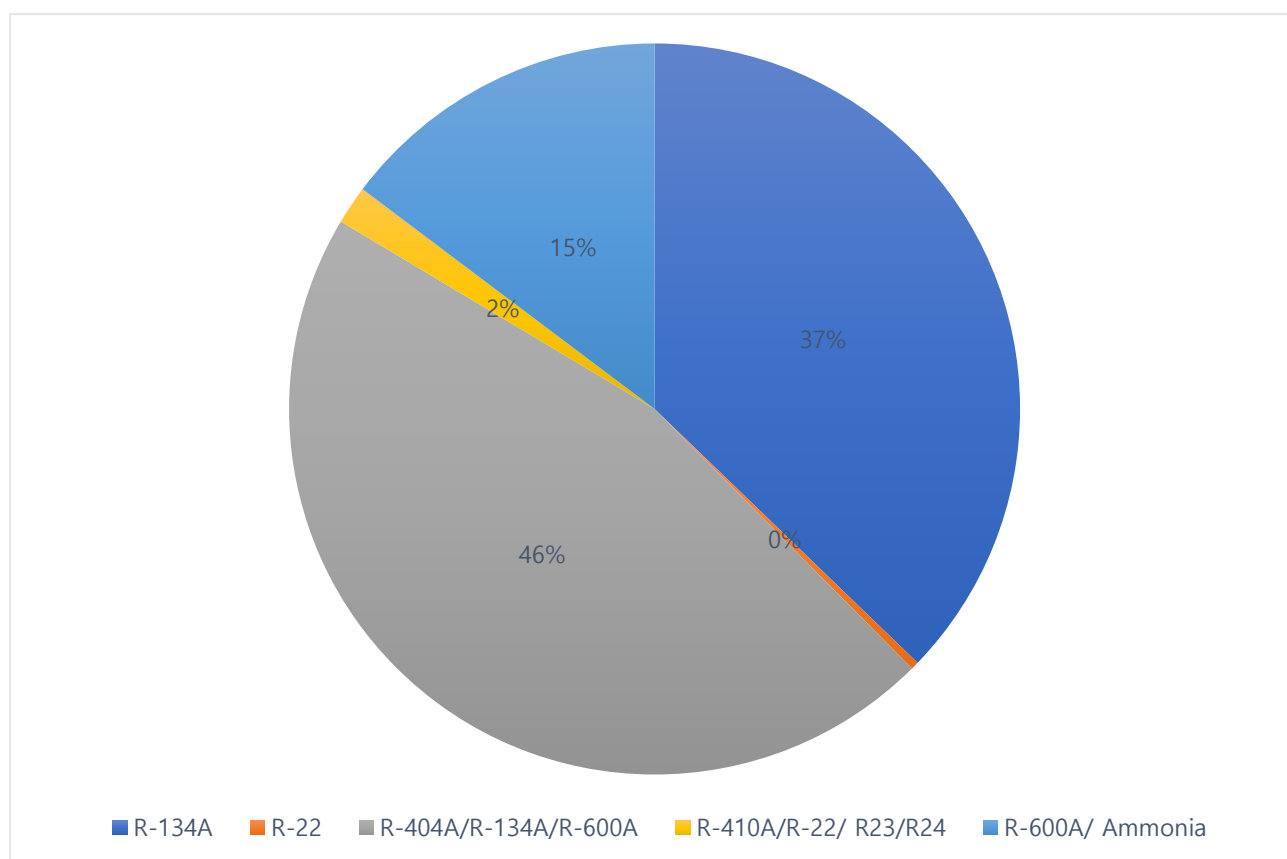
Figure 14: Import of domestic refrigerators and freezers, unit, 2016-2019



Source: Customs Import Statistics 2016-2019

The survey of the tourism facilities indicated that R-404A, HFC-134A, and HC-600a are the most commonly used refrigerant in this sector.

Figure 15: Domestic refrigerants used in the refrigerators and freezers in tourism facilities, 2019



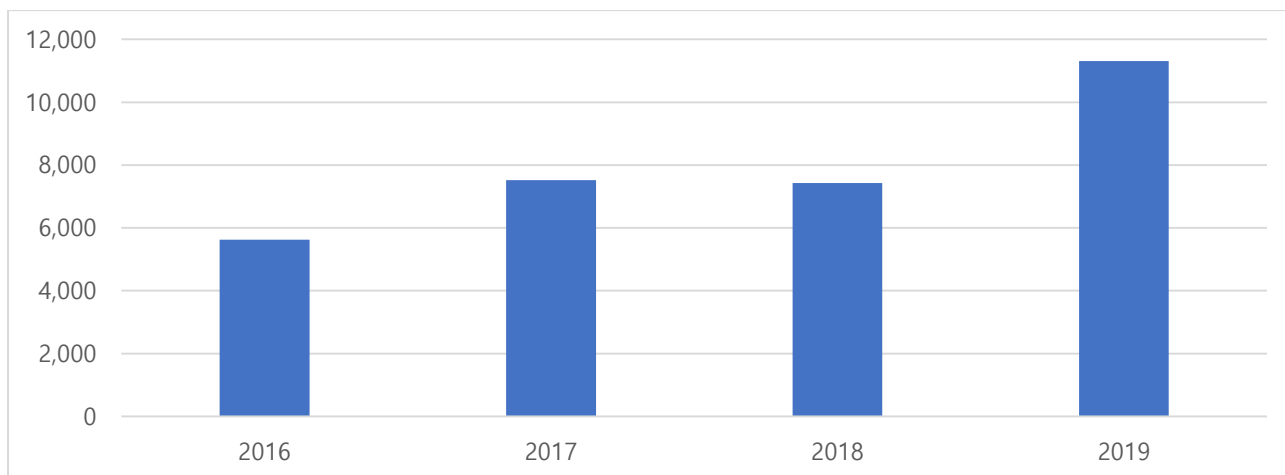
Source: Country Assessment Report Survey 2019

3.4.3. Commercial refrigeration system – small stand-alone units

A small standalone system is refrigeration equipment that is mostly used in the tourism sector. They are also used in commercial establishments but rarely at homes and in offices. Types of equipment covered within this category are:

- Refrigerating counter and table
- Bottle cooler
- Water cooler
- Ice cube machine
- Beer cooler
- Ice flaker
- Ice-cream machines
- Beverages and liquid dispenser
- Water dispenser

Figure 16: Import of commercial refrigeration system - small stand-alone units, 2016- 2020



Source: Customs Import Statistics 2016-2019

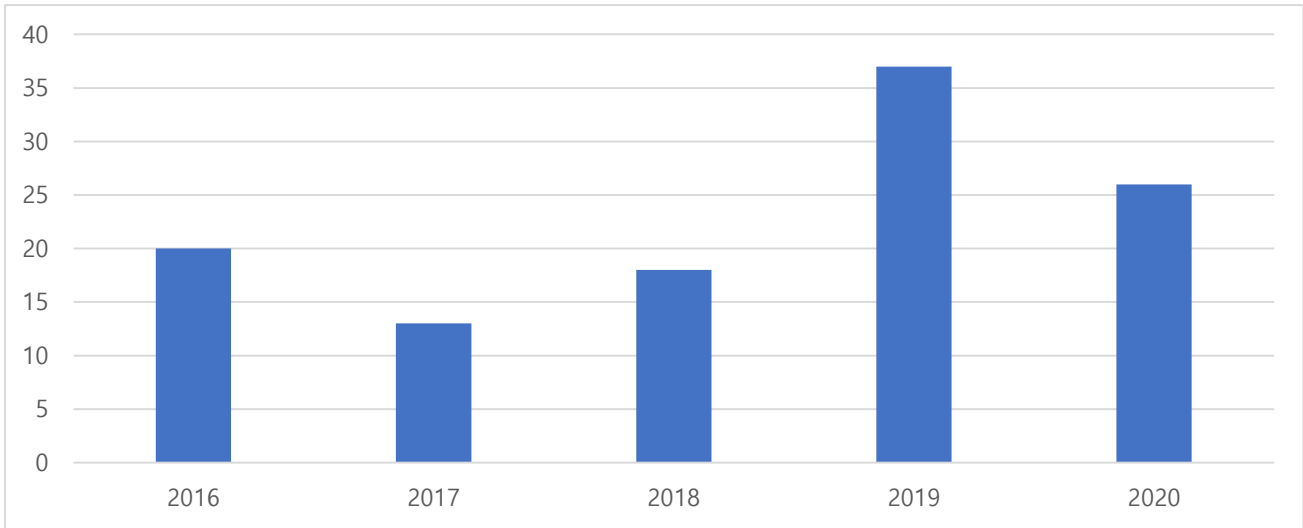
The number of commercial refrigeration systems imported into the country shows an increasing trend.

Commercial refrigeration systems are imported by distributors and commercial establishments such as resorts, hotels, and guesthouses. They import different brands and mostly as new systems. They are usually pre-charged with R-404A and HFC-134a.

3.4.4. Large refrigeration system

Reefer container and freezer containers are used for transportation of food like fruit, meat, and non-food-related items such as flowers and pharmaceuticals. These containers include freezer containers (20ft and 40ft), walk-in chillers and freezers, sea freight 20 ft containers, and work table chillers. Most are imported as new and only 10% is imported as second hand. Second-hand equipment is imported from UAE, Singapore, and Sri Lanka. Importers include resort developers, food suppliers, supermarkets, fish processing companies, and plant, flower sellers.

Figure 17: Import of large refrigeration system, 2016-2019



Source: Customs Import Statistics 2016-2019

Some of this refrigeration equipment is used within the bonded warehouse of Maldives Customs and needs to be accounted for when implementing the HFC phase-down. The objective of the bonded warehouse is to keep any goods that are permitted to be imported or exported from the Maldives. The bonded warehouse is registered under Customs and importers are allowed to store pork and pork-related products, liquor items, and winery products required by the local resorts.

As per the information gathered from an external source, a bonded warehouse is equipped with general storage as well as chillers and freezer containers. Pork and pork products are stored in freezer containers while liquor and wine products are stored in chiller containers.

Some importers have also been given extra land where they have built cold rooms and other storage facilities to cater for the imported products at the bonded warehouse.

The type of refrigerant used is not indicated and remains a gap in the data available.

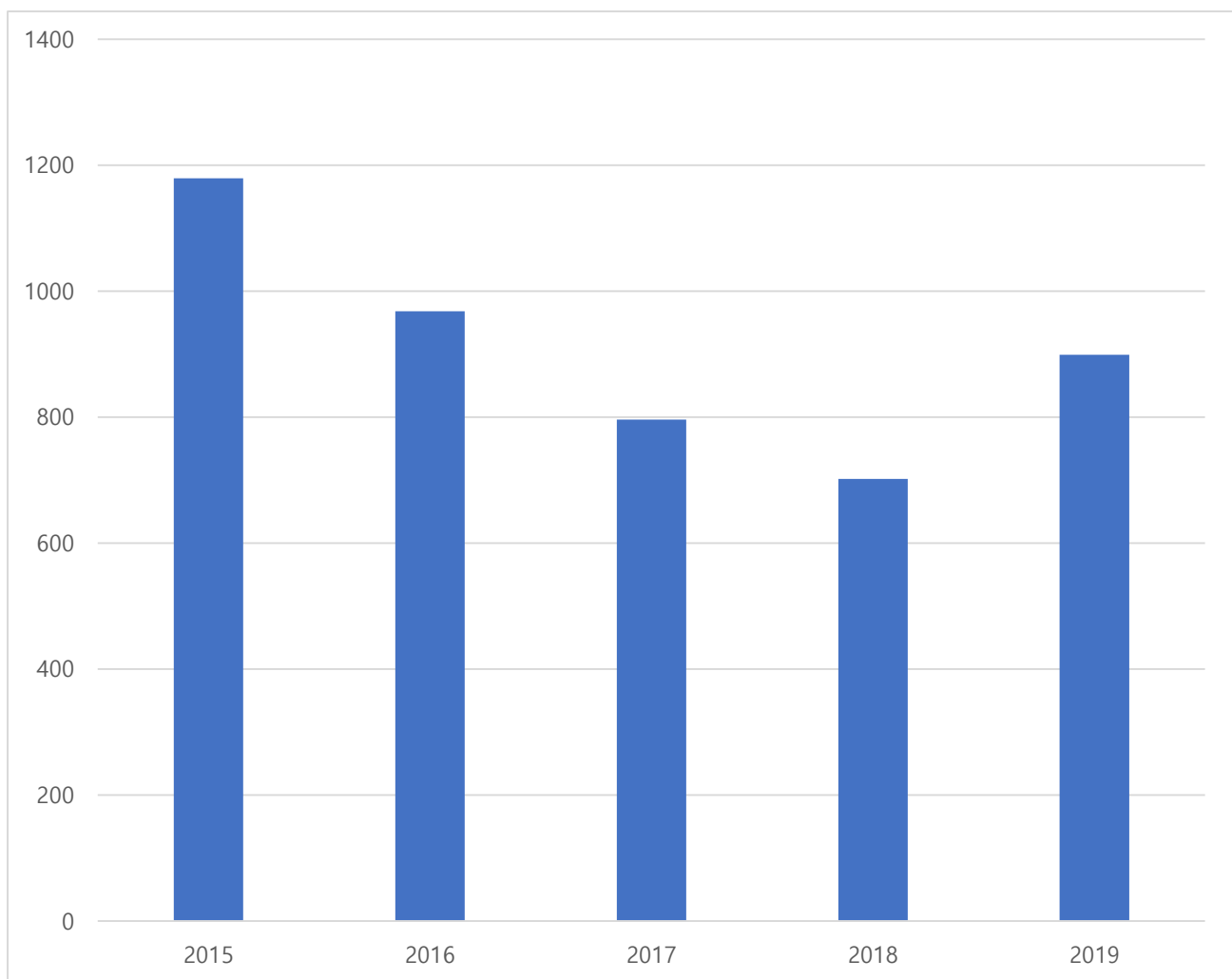
Figure 18: Reefer containers in the bonded warehouse of Maldives customs used to store products imported



3.4.5. Mobile air conditioner (MAC)

Mobile Air-conditioners (MAC) used in vehicles are an important part of the RAC equipment being used across the Maldives. Many vehicles are imported secondhand and most of these vehicles are pre-charged with HFC-134 which has high GWP. The types of vehicles within which MAC is installed are buses, cars, vans, light trucks, and heavy vehicles such as cranes, forklifts, and excavators. MAC takes up approximately 2% of the total RAC equipment imported into the country. The import statistics from 2015 to 2019 show that the import amount is generally decreasing. Many are imported second-hand.

Figure 19: Import of vehicles, 2015-2019



Source: Transport Authority

4. REFRIGERATION AND AIR-CONDITIONING SERVICING SECTOR ASSESSMENT

4.1. RAC servicing workshops

HFCs in the Maldives are used mainly in the RAC servicing sector. However, the servicing sector remains largely unregulated since the Maldives currently does not have a regulation that controls the opening of a RAC servicing workshop nor a registration system for RAC service workshops. Any business or company registered in the Ministry of Economic Development can provide servicing for RAC equipment. This makes it challenging to provide the exact number of RAC servicing workshops operating in the country.

The majority of the workshops are located in Male and most resorts have their in-house technicians to service the RAC equipment. Out of the roughly estimated 260 workshops that provide RAC servicing in the Maldives, none are registered as RAC servicing workshops for the reasons mentioned above. It is estimated that about 80% of the workshops engage in the repair and maintenance of domestic RAC equipment, and the remaining 20% provide servicing for commercial RAC equipment. Only a limited number of workshops provide servicing for commercial equipment as they require properly trained technicians with more skills, knowledge, and tools.

It is estimated that only about 30% of servicing workshops can provide good servicing practices. This was calculated based on the percentage of technicians who have participated in either long-term or short-term training programs on the repair and maintenance of RAC.

4.2. RAC servicing technicians

There is currently no regulation that mandates a practicing license or certificate for RAC technicians. Hence any person can offer RAC servicing, and the practice remains largely unregulated.

Approximately 1,300 technicians are working in the RAC servicing sector in the Maldives. Most of the technicians lack formal qualifications or have qualifications that are not formally recognized. In the Maldives, approximately 70% of the technicians are expatriates, coming mainly from Bangladesh and Sri Lanka. As there is not a mandatory registration or certification system, it is not possible to categorize the percentage of certified technicians.

However, based on the number of students who have undertaken the training of Maldives National Qualification Framework (MNQF) certificate level III from any of the training institutes across the country, it is estimated that on average, 30% or about 390 technicians in the RAC servicing workshops have the level III certificate whereas the remaining 70%, or 910 technicians, do not. Expatriates can join the courses offered, however, the language barrier is a challenge, and therefore they do not join very often.

The servicing sector survey conducted by the Maldives Institute of Technology (MIT) as part of this study found that the servicing technicians in the Maldives handle HFCs such as R-410A, HFC-134a, R-404A, and R-407A. The only low GWP technology that the technicians have had used during servicing recently is HC-600a.

Although there is RAC equipment based on flammable refrigerants such as HC-600a and HC-290 in the market, the knowledge, and skills related to the safe handling of flammable refrigerants are limited as the technicians lack formal education, and the majority of them do not follow good practices in servicing.

4.3. Maldives National Qualification Framework for RAC technicians training

In the Maldives, there is an increasing number of private education providers catering to the post-secondary education sector. Due to the increasing demand, the Maldives Qualification Authority (MQA) developed the Maldives National Qualification Framework (MNQF) to facilitate quality assurance in the post-secondary education sector. It also acts as the framework to recognize the qualifications offered locally and internationally.

To improve the quality and relevance of post-secondary education and training in the Maldives, the MNQF incorporated a broader and more cohesive technical and vocational qualification system. This provided the opportunity to include more sustainable and strategic solutions to cater to national human resource development needs.

The MNQF has ten levels: level 1 (certificate I) is the lowest and level 10 (Ph.D.) the highest. The MNQF includes all post-secondary school qualifications from the initial certification to advanced academic, technical, and professional qualifications. Certificate I recognize the acquisition of core entry-level skills for a new worker. Certificates II, III, and IV recognize increasing levels of capability and competence through to the fully qualified person. Diplomas, advanced diplomas, and higher diplomas recognize technician, technologist,

managerial and professional level skills and knowledge. Qualifications can be achieved through learning in institutions and the workplace.

As of now, RAC equipment servicing programs exist between levels 3 and 5. Based on the review of all the curriculums, level 3 qualification target the development of knowledge and skills related to servicing domestic equipment while level 5 targets servicing commercial equipment used in cold storage and food and beverage outlets.

Table 9: Maldives National Qualification Framework (MNQF) levels

MNQF levels	Qualifications titles
10	<ul style="list-style-type: none"> • Doctoral Degree • Higher Professional Diploma • Higher Professional Certificate
9	<ul style="list-style-type: none"> • Master's Degree • Advanced Professional Diploma • Advanced Professional Certificate
8	<ul style="list-style-type: none"> • Postgraduate Diploma • Graduate Diploma • Postgraduate Certificate • Graduate Certificate
7	<ul style="list-style-type: none"> • Bachelor's Honour's Degree • Bachelor's Degree • Professional Diploma • Professional Certificate
6	<ul style="list-style-type: none"> • Advanced Diploma / Associate Degree • Professional Certificate
5	<ul style="list-style-type: none"> • Diploma
4	<ul style="list-style-type: none"> • Certificate IV / Advanced Certificate
3	<ul style="list-style-type: none"> • Certificate III
2	<ul style="list-style-type: none"> • Certificate II
1	<ul style="list-style-type: none"> • Certificate I

4.4. Training institutes for RAC technicians

4.4.1. Training curriculum

There are a total of three institutes that provide RAC servicing-related training in the Maldives. Maldives Polytechnic is run by the government while the others are private institutions.

Table 10: RAC servicing training offered by the three training institutes in the Maldives

Name of the training institute	Location	Certificate level	Duration
Maldives Polytechnic	Male	Certificate Level III	4 months
		Certificate Level IV	1.5 years
	Male	Certificate Level III	4 months

Maldives Institute of Technology (MIT)		Certificate Level IV	1 year
		Diploma	1 year
Technical and Vocational Education Centre (TVEC)	Kihaadhoo, Baa Atoll	Certificate Level III	4 months

Source: Country Assessment Report Survey 2019

A review of the training curricula of the three institutes showed that the existing programs in each level provide the following training:

- **Certificate Level-III:** focuses on the repair and maintenance of split systems, domestic refrigerators, and water coolers.
- **Certificate Level-IV:** provides knowledge and skills related to commercial refrigeration.
- **Diploma:** focuses on developing the conceptual knowledge of RAC and covers both domestic and commercial RAC equipment.

The curricula of the RAC courses offered by the institutes are prepared using the MNQF guidelines. They are developed based on the contributions from trainers, in-house technicians, field experts, industry personnel, and any relevant institutions. Furthermore, the curricula are updated based on surveys, references to other universities, advice from consultants and industry experts, and feedback from workshops.

MIT and Maldives Polytechnic offer courses on RAC servicing for all types of RAC equipment: residential, commercial, individual, and MAC. TVEC only offers RAC servicing in the residential sector equipment.

Regarding refrigerators, all three institutions include residential equipment in their training. Two institutions cover commercial refrigerators, refrigeration racks with separate condensing units, and central refrigeration systems in their training programmes.

The types of refrigerants covered in the training programmes for refrigerators are HCFC-22, HFC-134a, R-404A, R-600a, and R-744. All three institutions cover HCFC-22, HFC-134a, and R-600a. Two institutions cover R-404A, and only one covers R-744. R-507A and R-717 are not covered by any institute.

Regarding ACs, all three institutions cover room ACs - small split systems up to 3 TR), multi splits with single outdoor units, and chillers. Two institutions cover room ACs - window units. Only one institution covers room ACs - medium split systems up to 6TR, central ducted system /VRF systems, and MACs.

The types of refrigerants covered in the training programmes for ACs are HCFC-22, HFC-134a, HFC-32, R-407C, R-410A, and R-290. All three institutions cover HCFC-22, HFC-134a, R-410A, and R-407C. Only one institution covers HFC-32 and R-290.

The table below shows the main topics covered under the training programmes in all three institutions.

Table 11: Main topics covered under the training programme for RAC equipment in the training institutes

Refrigerators	Airconditioners
Finding refrigerator fault	Assembly and disassembly of ACs
Check compressor pressure	Removal/installation of grill
Test refrigerant leak in the equipment, check capillary tube	Removal/installation of evaporator fans
Check evaporator flow	Removal of condenser/compressor with refrigerant recovery
Check condenser flow	
Repair of refrigerators	Repair of ACs
Test refrigerant leak in the equipment, check capillary tube	Cleaning of main components
Check evaporator flow	Check of low/high pressure cut-out
Check condenser flow	Check of oil pressure cut-out
Clean condenser	Oil change/charge
Replace compressor	Refrigerant charging
Replace evaporator	Leak testing
Pinch copper pipe	Perform vacuum and hold
Leak test	
Replace defrost	
Replace condensers and thermostat perform vacuum	

Source: Country Assessment Report Survey 2019

The table below shows how much time is allocated for each topic of the modules.

Table 12: Time allocated for each topic per training institute

Topics covered under refrigeration	Time allocated (Hours)		
	TVE C	MIT	Polytechnic
Principals of refrigeration systems and refrigerant types	45	4	All topics covered, but hours not specified
Montreal Protocol, climate change and energy efficiency	6	2	
Component selection for repairs	14	4	
Refrigerant recovery and re-use	6	2	
Pinch and brazing/debrazing of pipes/ports	12	4	
Performing leak tests (dry nitrogen and soapy water)	12	3	

System evacuation (perform vacuum and hold vacuum)	12	2	
Charging of refrigerant (by weighing)	12	2	
Checking performance	18	4	
Management of unwanted refrigerant	6	unknown	
Topics covered under air-conditioning			
Principals of AC systems and refrigerant types	12	3	All topics covered, but hours not specified
Montreal Protocol, climate change and energy efficiency	6	2	
Component selection for repairs	8	4	
Refrigerant recovery and re-use	12	2	
Flushing	10	unknown	
Choke Testing	6	2 (pressurizing)	
Performing leak tests and detection	12	2	
Copper tube operations	12	4 (brazing, bending, flaring, swaging)	
System evacuation (perform vacuum and hold vacuum)	12	3	
Charging of refrigerant (by weighing)	12	3	
Checking performance	18	4	
Management of unwanted refrigerant	6	unknown	

Source: Country Assessment Report Survey 2019

Overall, all three institutions include the same topics in their training programmes. However, TVEC offers more training hours than MIT.

In addition, the good servicing practices module for RAC developed by UNEP is part of the course in MIT and TVEC. Maldives Polytechnic does not include the good servicing practice module.

However, the existing programs lack training on how to handle flammable refrigerants. There is also a lack of training on the impact of RAC servicing on the environment, and many graduates lack the knowledge of the Montreal Protocol and the global efforts to phase out HCFCs and HFCs.

4.4.2. Students

From 2014 to 2018, there have been a total of 698 graduates from all 3 institutions. MIT had the most recorded number of students while Maldives Polytechnic had 167 graduates during this period. TVEC only provided information for 2018, which was 31 students. MIT stated that most students find work in the construction sector after graduation.

The entry requirements into these programs are set according to the MNQF and the requirements are similar in all three institutions as they follow the MNQF guidelines.

There are between 1-4 students on a workbench. Students are evaluated by practical and written tests. They are also assessed based on direct observation, logbooks, and feedback.

4.4.3. Trainers

The table-13 below shows the number of trainers at each institute. And table-14 shows the trainers' qualifications, years of training experience, and years of experience in working with natural refrigerants.

Table 13: Number of trainers at RAC training institutes

RAC training institute	Number of trainers
Maldives Polytechnic	2 trainers
MIT	8 trainers
TVEC	2 trainers

Source: Country Assessment Report Survey 2019

Table 14: Trainers' qualification and experience

Trainer number	Qualification of trainer	Years of experience	Years of experience in working with hydrocarbon, ammonia, CO2 systems, and others
1	Advanced Diploma RAC	24	Not specified
2	Diploma	18	Not specified
3	Masters	20	20 (hydrocarbon)
4	Masters	12	5 (hydrocarbon)
5	Advanced Diploma	25	0
6	Diploma	25	0
7	Diploma	12	12 (hydrocarbon)
8	Diploma	15	0
9	Diploma	8	0
10	Advanced Certificate	5	0
11	Diploma RAC	14	5
12	0	>25	5

Source: Country Assessment Report Survey 2019

Based on the survey, trainers have an average of 16 years of experience. Their education qualifications ranged from advanced certificate to Masters, and there was one trainer without

education qualification. The five trainers who specified to have experience in hydrocarbon, ammonia, and CO2 systems have between 5 to 20 years of experience.

In terms of the trainers' participation in training offered by the NOU, trainers from MIT and TVEC have received training from the NOU. Some of the subjects covered during the training are recovery and declining, hydrocarbons, district cooling, retrofit, and reclamation.

4.4.4. Tools for training

The table below summarizes the tools available at training institutes for training during practical sessions.

Table 15: Availability of tools at training institutes for practical sessions training

Tools	Availability
Test terminals, digital clamp meter, digital thermometer, ratchet wrench, igniter	1 institute does not have clamp meters
Pinch-off plier, piercing plier, tube cutter, capillary cutter	1 institute does not have pinch-off pliers
Tube bender, flaring tool, deburring tool, core removal tool	Sufficient for all
Swaging kit, expander heads, wire brush, 4-way gauge manifold, brazing kit, oil test kit	Sufficient for all
Recovery machine (HCFC/HFC/HC), recovery cylinders, vacuum pump (spark-free, 2 stage), digital micron gauge/pressure gauge, oxygen-free nitrogen, charging station with digital weighing scale, electronic leak detector (HCFC/HFC/ HC, lokrings)	1 institute does not have recovery cylinders 1 institute does not have lokrings

Personal protection equipment	1 institute does not have safety shoes
-------------------------------	--

Source: Country Assessment Report Survey 2019

4.5. Initiation of the licensing system for the servicing technicians

The Ministry of Environment, Climate Change and Technology (MOECCT) in collaboration with UNEP, pilot tested the Refrigerant Driving License (RDL) program in the Maldives in 2019. RDL is a globally recognized and accepted qualification program that sets minimum requirements for the proper and safe management of refrigerants in the RAC sector. The RDL is issued to individuals who work as RAC servicing technicians to appreciate their technical skills and competencies who have achieved enhanced refrigerant management skills, including the handling of HFC refrigerants as well as flammable and other low-GWP refrigerants, improved safety skills and servicing practices, reduced refrigerant emission during the services and increased the cost-effectiveness of the equipment and services. Two batches of students have gone through the RDL program and the program was well-received. It needs to be organized and delivered across the country to be implemented at a larger scale.

Besides, the MOECCT is currently working to introduce the local licensing system nationally. The MOECCT is currently developing the required documents and frameworks to implement this local licensing system.

5. OVERVIEW OF EXISTING POLICIES

In this report, the term policy is defined broadly to include national legislation, regulation, strategic plan, guideline, standard, and other national interventions that have the purpose of achieving certain goals set by the Government.

5.1. Policies on ozone layer protection, control of ODSs, alternatives, and RAC equipment

5.1.1. Development of key ODS policies

- ***Public Announcement No A-14 2002: the introduction of the import control system***

The ODS import control system became effective on 1 April 2002 through the *Public Announcement No A-14 2002* dated 20 March 2002, which was made by the then Ministry of Trade and Industries. Under the then-existing Constitution, public announcements made by the government fell within the definition of law. All ODSs, including HCFCs and their blends, were covered under this Announcement. Furthermore, under this announcement, ODSs could be imported after an importer is registered with the NOU and it has obtained an import permit for each shipment from the then Ministry of Housing, Transport, and Environment. Under these rules, an import license was required to be renewed annually.

- ***Public Announcement No 10ERC/2002/44: the ban on import of selected ODSs***

A ban on importing of certain ODSs came into effect in January 2003 through the *Public Announcement No 10ERC/2002/44* dated 19 December 2002. Under this announcement, the import of halons (1211,1301, 2402), methyl chloroform, bromochloromethane, methyl bromide, and carbon tetrachloride were banned.

- ***Public Announcement No A-28-2003/44: the ban on import of equipment containing CFCs***

A year later, the import of equipment containing CFC-11 and CFC-12 were banned by way of *Public Announcement No A-28-2003/44* dated 27 May 2003. Items banned under this announcement included refrigerators, deep freezers, water coolers, mini-bars, and motor vehicles which are manufactured before the year 1998 and which contained CFCs in their air conditioning units.

- **2010 Regulation on the Management and Control of HCFCs and blends of HCFCs:**
the introduction of quota and licensing system for HCFCs

The 2008 Constitution required all laws to be in the format of an act and be passed by the Parliament or be in the format of a regulation enacted under an Act and be passed by the Parliament. Therefore, a regulation governing HCFCs trade was enacted in 2010. This regulation titled *the Management and Control of HCFCs and blends of HCFCs* consisted of a phase-out schedule, required quota allocation, and licensing of importers.

5.1.2. Measures to Protect the Ozone Layer Act 2015 and the Regulation on Chemical Substances and Various Equipment that Harm the Ozone Layer 2017

Measures to Protect the Ozone Layer Act (Law Number 41/2015) became effective on 6 December 2015, abolishing the 2010 Regulation explained above and broadening the scope of its provisions to cover not only ODSs but also ODS alternatives.

The 2015 Act obliges the MOECCT to formulate all necessary regulations and guidelines that are required to be formulated according to the Act. Hence a regulation titled the *Chemical Substances and Various Equipment that Harm the Ozone Layer* (Regulation Number: R-9/2017) was further introduced on 22 January 2017 to provide additional provisions on the control of ODS and ODS alternatives, including an import permit system for HFCs and other ODS alternatives. The primary government agency responsible for the monitoring and administration of the 2015 Act and the 2017 Regulation is the MOECCT.

Table 16: Objectives of the 2015 Act and the 2017 Regulation

	Measures to Protect the Ozone Layer Act (Law Number 41/2015)	Chemical Substances and Various Equipment that Harms the Ozone Layer (Regulation Number: R-9/2017)
Objectives	<ul style="list-style-type: none"> • reduce and control any negative impacts to the environment from ODSs and ODS alternatives; • reduce and control the import and use of ODS and ODS alternatives and equipment relying on ODS and ODS alternatives; • implement the obligations under the international agreements related to the protection of the 	<ul style="list-style-type: none"> • regulate the import of ODSs and ODS alternatives including HFCs; • penalize the prohibited and restricted import of ODSs and ODS alternatives including HFCs; • regulate the disposal and destruction of ODS and ODS alternatives including HFCs and of equipment relying on them in the Maldives.

	ozone layer that the Maldives has ratified.	
--	---	--

The 2015 Act, since its introduction on 6 December 2015, bans the import of substances that are under Annex A, Annex B, Group III of Annex C, and Annex E of the Montreal Protocol. Furthermore, under the 2015 Act, all substances under Group I of Annex C of the Montreal Protocol are stipulated as controlled substances. Controlled substances can be imported with prior approval from the MOECCT. Amongst the controlled substances provided in the 2015 Act, only HCFC-22 is imported into the Maldives.

Table 17: Banned and controlled substances under the 2015 Act

Banned substances	Controlled substances
CFC halon carbon tetrachloride methyl chloroform bromochloromethane methyl bromide	HCFC (Only HCFC-22 is currently being imported)

Additionally, the 2015 Act provides for a complete ban on imports of equipment that are based on banned or controlled substances in the 2015 Act. This ban on the import of equipment became effective on 31 May 2016.

The 2015 Act further stipulates that any ODS alternatives to banned and controlled substances provided in the Act shall only be imported upon receiving a prior permit from the MOECCT. This hence applies to HFCs as well.

One of the hallmark features of the 2015 Act is that it takes a phase-down approach concerning the import of controlled substances determined under the Act. The following table which provides the phase-down timeline is included in Annex 3 of the 2015 Act.

Table 18: Phase-down timeline for HCFC import in the Maldives under the 2015 Act

Phase-down amount	Year	Maximum permissible limit (MT)
Decrease by 20%	2015	53.60
Decrease by 35%	2016	43.55
Decrease by 67.5%	2018	22.00
Decrease by 100%	2020	1.68

2.5% only for domestic use	2020-2025	1.68
----------------------------	-----------	------

5.1.3. Import quota system

The 2015 Act and the 2017 Regulation have provisions to control the import of controlled substances by imposing quota limits. Under the 2017 Regulation, the MOECCT is required to announce the quota by 15 December of the preceding year to which the import quota is applicable. The quota limit for every year is determined according to the phase-down timeline table provided in the 2015 Act. The MOECCT announces the annual quota limit by publishing a public notice¹¹.

Thereafter, importers interested in obtaining a quota for the import of controlled substances must submit all the information and proposal as required by the Ministry. Quota determined by the Ministry is allocated to parties that submit the most adequate proposal among the applicants.

The quota is awarded according to the procurement rules provided in the Public Finance Act (Law Number: 3/2006)¹² and its regulation. The procurement rules under Public Finance Act followed in this process mandate the authorities to publicly announce the call for proposals for importers and to evaluate each proposal. The announcement is made by the MOECCT and the proposals that are submitted pursuant to the announcement are evaluated by the MOECCT as well.

The current regulation does not provide an appeal system for grievances regarding the quota allocation process, so any appeal against the allocated quota must go through the ordinary court system to get redress or judicial review.

Currently, the MOECCT issues quota only for HCFC-22. It is also the only controlled substance to which import license is given at present.

5.1.4. Import license and permit system

The Maldives has been implementing the licensing system for ODS since April 2002 following the Public Announcement No A-14 2002 dated 20 March 2002, which was made by the then Ministry of Trade and Industries.

¹¹ Public notice of the annual quota of 2020: <https://www.gazette.gov.mv/iulaan/print/119371>

¹² <https://www.finance.gov.mv/public-finance-ac>

Following the 2015 Act and the 2017 Regulation, an import license is being issued by the Ministry of Economic Development for the importers who have secured the quota. Under the 2015 Act and the 2017 Regulation, the licensed parties are required to get a prior permit from the MOECCT before each transaction by submitting the completed form in Annex 4 of the 2017 Regulation.

Furthermore, the import of alternatives to either banned or controlled substances under the law is subject to the same requirement of seeking a prior permit from the Ministry by submitting the form in Annex 4 of the 2017 Regulation, which can also be found on the Ministry website.¹³

Table 19: Comparison of the import quota, license, and permit system in the Maldives

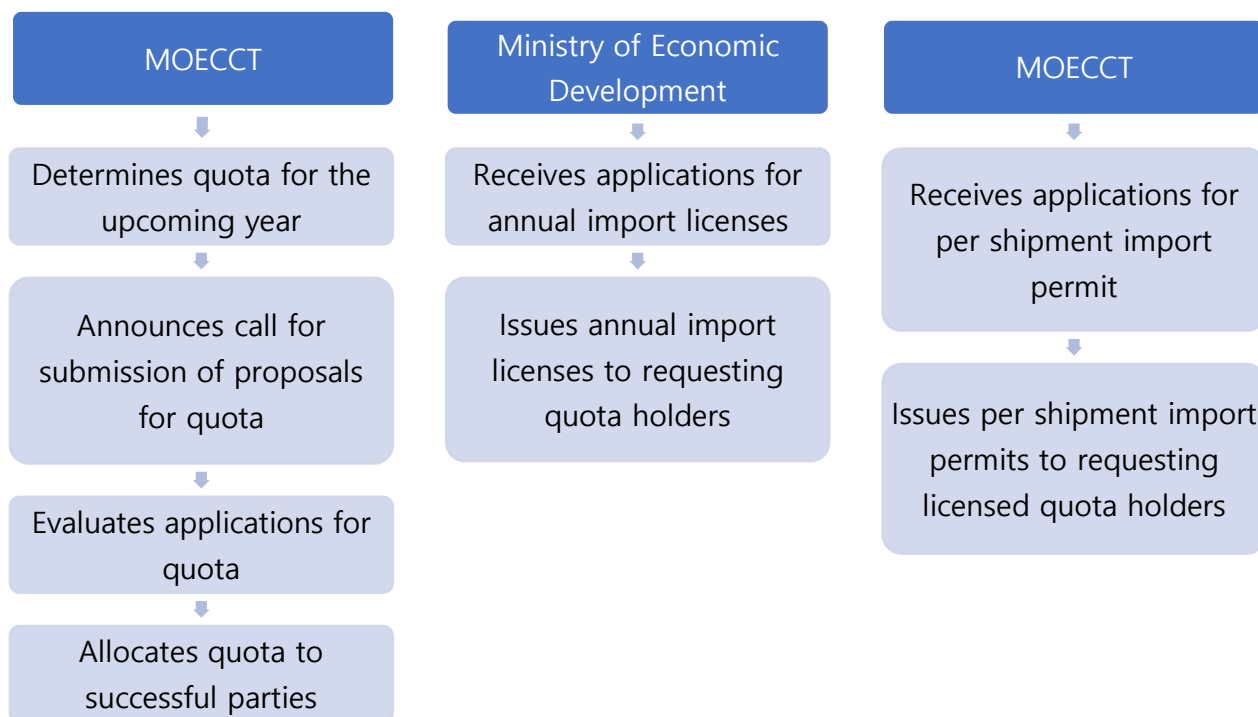
	Import quota	Import license	Import permit
Issued to	Importers	Importers who have secured a quota	Licensed importers prior to shipment
Issued by	MOECCT	Ministry of Economic Development	MOECCT
Frequency	Annual	Annual	Per shipment
Substances	HCFC	HCFC	HCFC and other ODS alternatives including HFCs

The above figure illustrates the process of the import quota, license, and permit system.

¹³ <http://www.environment.gov.mv/v2/en/download/10044>

Currently, only one importer, Bright Brothers, has been given the quota of 1.62 metric tonnes and the license to import HCFC-22. This is the final quota given to an importer according to the HCFC phase-out schedule.

Figure 20: Import quota, licence and permit process in the Maldives



5.1.5. Data monitoring and reporting

As explained above, the importers of HCFC, HFC, and other ODS alternatives need to fill in the form in Annex 4 of the 2017 Regulation and submit it to the MOECCT to receive their per shipment import permit. The process is now online through the Makudi System. The information that needs to be submitted includes:

- Importer's details
- Contact person's details
- Details of the substances to be imported.
 - Name of the refrigerant
 - ASHRAE number
 - Customs code
 - Country of manufacture
 - Weight content per unit

- Quantity of units to be imported
- Total weight contents to be imported

The MOECCT, together with the Ministry of Defense, has developed an online system called the *Makudi* systems to enable importers to apply for licenses and permits online.¹⁴

In addition, licensed importers are required by the 2015 Act to share statistics of their transactions every month with the MOECCT. They are required to submit the details of their monthly sales and the contact details of the client. This information is submitted via email in an excel spreadsheet; an example is attached in the annex of this report.

Furthermore, the Act requires the MOECCT to annually publish in the Government Gazette the importers which are licensed to import equipment that contains controlled substances, and the import limits determined as per the phase-down provided in the 2015 Act. However, as the ban on the import of such equipment became effective on 31 May 2016, this provision is no longer applicable. Importers of equipment are not required to have a license of any kind as the import of equipment based on controlled substance is banned by public announcement. The same procedure will apply to HFC-based equipment in the future.

Article 9 of the 2015 Act requires that the importers of substances listed under Annex 2 are required to provide data and annual statistics of transactions to the Ministry.

In addition, there is a memorandum of understanding between the NOU and the customs, and the relevant data is made available to each other upon request. Furthermore, import statistics are shared annually and kept up to date.

5.1.6. Enforcement

The 2015 Act and the 2017 Regulation provide a list of offences that are subject to penalty or fine and give the MOECCT the enforcement powers. The 2017 Regulation delegates such powers to the Maldives Customs Service. Below actions are considered an offence according to the 2015 Act and 2017 Regulation:

- to import any banned substance prescribed in the Act.
- for the permitted party to exceed the import quota for the controlled substances.
- for any persons other than the permitted party to import any controlled substance.

¹⁴ <http://makudi.egov.mv>

- to import any equipment that contains any banned or controlled substance.

The penalties for importing a banned substance is as follows.

- First-time offenders are subject to a penalty of a fine of MVR 1000 for every kg imported
- Second-time offenders are subject to a penalty of a fine of MVR 5000 for every kg imported
- Third-time and repeated offenders are subject to a penalty of a fine of MVR 8000 for every kg imported

The penalties for importing a controlled substance by a licensed party in excess to the quota limit are as follows.

- First-time offenders are subject to a penalty of a fine of MVR 1000 for every kg imported and a ban on import license for a period of 3 years
- Second-time offenders are subject to a penalty of a fine of MVR 5000 for every kg imported and a ban on import license for a period of 4 years
- Third-time and repeated offenders are subject to a penalty of a fine of MVR 8000 for every kg imported and a ban on import license for a period of 5 years

The penalties for importing a controlled substance by an unlicensed party are as follows.

- First-time offenders are subject to a penalty of a fine of MVR 1000 for every kg imported
- Second-time offenders are subject to a penalty of a fine of MVR 5000 for every kg imported
- Third-time and repeated offenders are subject to a penalty of a fine of MVR 8000 for every kg imported

The penalties for importing equipment that contains banned or controlled substances are as follows.

- First-time offenders are subject to a penalty of a fine of MVR 10,000 for each equipment imported
- Second-time offenders are subject to a penalty of a fine of MVR 50,000 for each equipment imported
- Third-time and repeated offenders are subject to a penalty of a fine of MVR 100,000 for each equipment imported

Pursuant to the 2015 Act and the 2017 Regulation, controlled substances that are imported in violation of the law and banned substances that are imported must be disposed of at a facility that uses the technology approved by the Montreal Protocol Meeting of the Parties. Where such a facility is not available, the Regulation requires the substances to be re-exported. Under the Regulation, the party which imports the substances must bear the expenses of disposing or re-exporting the substances.

5.2. Policies on climate change

Although the Maldives' contribution to GHG emissions is negligible, as a low-lying Small Island Developing State (SIDS) that is very much vulnerable to the impacts of climate change, it is committed to taking a low-emissions development path.

The Maldives ratified the United Nations Framework Convention on Climate Change (UNFCCC) on 9 November 1992 and subsequently ratified the Kyoto Protocol on 30 December 1998. Further, on 22 April 2016, the Maldives ratified the Paris Agreement.

In the Maldives, there is no climate change-specific law in place. However, there are two key policy documents, namely, the Maldives Climate Change Policy Framework of 2015 and the Strategic Action Plan (SAP) 2019-2023¹⁵.

The Maldives Climate Change Policy Framework¹⁶ was published in 2015 by the MOECCT and consists of the strategic component and the building blocks. The strategic components are based on low emission development, adaptation measures, opportunities to ensure safety for food production and sustainable economic development, and meeting international obligations and commitments. The building blocks focus on technology transfer, finance, and capacity building.

SAP is a five-year action plan that sets the country's socio-economic growth targets from 2019 to 2023. It outlines the main policies and key strategies aimed at fulfilling its core pledges. It identifies the phase-down of HFC by 2045 through the actions identified under the Montreal Protocol as a specific action item.

Whilst there is no specific office for climate change in the Maldives, the MOECCT is mandated with the responsibilities related to climate change. The MOECCT is tasked with the responsibility of determining policies and practice standards related to climate change and

¹⁵ <https://presidency.gov.mv/SAP/>

¹⁶ <http://www.environment.gov.mv/v2/en/download/4594>

monitoring them, enacting regulations on climate change, providing technical assistance to relevant persons in conceptualizing projects related to climate change, advocating and representing the Maldives in international fora on climate change, developing safety measures to build resilience from effects of climate change in cooperation with international parties, coordinating projects related to climate change and providing assistance in such projects.

Table 20: Policies on climate change

Policies	Brief Description	Relevance to MP/KA
Maldives Climate Change Policy Framework 2015	Promotes low emission development include strengthening the legal and regulatory framework for providing energy efficiency and conservation, establishing standards, and sectoral low emission development plans to reduce greenhouse gas emission in areas of power generation, transport, agriculture, and waste.	Does not specify HFC or RAC sector but promotes low emissions development and energy efficiency which will contribute to MP/KA and vice versa.
Strategic Action Plan (SAP) 2019-2023	SAP is a five-year action plan that sets the country's socio-economic growth targets from 2019 to 2023. It includes below actions items: <ul style="list-style-type: none"> - Integrate sustainable financing into low emission development measures - Enhance bilateral and multilateral engagements, strategic partnerships and international cooperation to establish a leading role in climate diplomacy and advocacy on the international front. 	<ul style="list-style-type: none"> - Includes action item 1.6a: phase down HFC by 2045 through the actions identified under the Montreal Protocol and identifies the MOECCT, Maldives Customs Services and Ministry of Defense as key implementing agencies. - Making financial allocations for low emission development activities will lead to the promotion of low emission of ODS to opt for better alternatives. - Playing a leading role in climate diplomacy will facilitate the Maldives to meet its international obligations.
Maldives Intended Nationally Determined	Reduce 10% (unconditionally) or 24% (conditionally) of GHG emissions below business-as-usual	<ul style="list-style-type: none"> - No specific mention of HFC and RAC sectors. - INDC promotes GHG emission through energy

Contribution (INDC) 2015¹⁷	by 2030, in sectors of energy, tourism, waste, water, and building.	efficiency in domestic consumption and processes and product use, which will contribute to MP/KA and vice versa.
Second National Communication (SNC) of Maldives to the UNFCCC 2016¹⁸	Provides an update on the Maldives climate change efforts, national GHG inventory, and mitigation of GHG emissions, etc.	<ul style="list-style-type: none"> - The GHG inventory for 2011 presented in the NC includes HFC-23 and HFC-134 as GHG sources but does not provide their estimate amount for 2011 due to lack of data. - HFC phase-down implementation can contribute to GHG inventory data collection and vice versa. - SNC indicates that an increase in temperatures due to climate change will increase cooling costs in the Maldives. - HFC phase-down can contribute to energy efficiency in the cooling sector and contribute to GHG reduction goals.
Maldives First Biennial Update Report to the UNFCCC 2020¹⁹	Provides an update of GHG inventory and mitigation actions.	<ul style="list-style-type: none"> - The GHG inventory for 2011 presented in the BUR includes HFC-23 and HFC-134 as GHG sources but does not provide their estimate amount for 2011 due to lack of data. - HFC phase-down implementation can contribute to GHG inventory data collection and vice versa.

¹⁷ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Maldives%20First/Maldives%20INDC.pdf>

¹⁸ https://unfccc.int/sites/default/files/resource/SNC%20PDF_Resubmission.pdf

¹⁹ https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/29357641_Maldives-BUR1-1-First%20BUR%20of%20Maldives.pdf

		<ul style="list-style-type: none"> - Includes an assessment of the cooling sector and RAC equipment. - HFC phase-down can contribute to energy efficiency in the cooling sector and contribute to GHG reduction goals.
--	--	--

5.3. Policies on energy efficiency

The MOECCT is the responsible government authority for energy sector policies. The Maldives Energy Authority, established under the MOECCT, is a semi-autonomous regulatory body that operates under the guidance of a governing board convened by the President. The mandate of this authority is to establish tariffs, issue guidelines and regulations to ensure the reliability and security of the grids, and safeguard the rights and obligations of consumers and service providers.

Whilst there is no specific energy law in the Maldives, there is one policy document in place related to energy efficiency. The Maldives Energy Policy and Strategy²⁰, published in 2016 by the MOECCT outlines key energy policies and objectives of the Government. The 2016 Policy focuses on five policy goals. They are, strengthening the institutional and regulatory framework of the energy sector, promoting energy conservation and efficiency, increasing the share of renewable energy in the national energy mix, improving the reliability and sustainability of electricity service and maintaining universal access to electricity, and increasing national energy security.

The Maldives achieved universal access to electricity in 2008. The electricity generation for the greater Male region (Male, Villingili, and Hulhumale) accounts for 56.9% of the total electricity generation for all the inhabited islands. This region also has the highest annual energy consumption of approximately 400 GWh, with an installed capacity of 101 MW. The rest of the inhabited islands are equipped with 186 powerhouses. This makes up a total installed capacity of 240MW of diesel generators. The total installed capacity of renewable energy systems of the Maldives is 11MW (Island Electricity Data Book, 2018)²¹.

²⁰ <http://www.environment.gov.mv/v2/wp-content/files/publications/20161220-pub-mv-energy-policy-strategy-2016-20dec2016.pdf>

²¹ <https://www.environment.gov.mv/v2/en/download/8106>

The electricity tariff rate implemented since 2016 is as follows:

Table 21: Electricity tariff rates, Maldivian Rufiyaa (MVR)

Greater Male Region²²			
Units	Domestic	Units	Commercial
0-100	1.5	0-100	3.30
101-200	1.7	101-300	3.35
201-300	2.15	301-500	3.65
301-400	2.5	501-600	4.00
401-500	2.95	601-3000	4.35
501-600	3.55	3001-10,000	5.75
600>	4.25	>10,000	6.65
Other Islands²³			
Units	Domestic	Commercial	
0-100	1.5	3.25	
101-200	1.7	3.75	
201-300	2.15	4.75	
301-400	2.5	6.00	
401-500	2.95	6.00	
501-600	3.55	6.00	
600>	4.25	6.00	

Source: State Electric Company Limited

Table 22: Policies on energy efficiency

Policies	Brief Description	Relevance to MP/KA
Maldives Energy Policy and Strategy 2016	Key strategies outlined under this policy include creating an enabling environment for energy efficiency and energy conservation.	<ul style="list-style-type: none"> - Promotes implementing energy labelling program for major energy-consuming equipment and appliance in the industrial and domestic sector. - Promotes developing and publishing energy efficiency index.
Strategic Action Plan (SAP) 2019-2023	Includes below strategies and action items on energy efficiency: <ul style="list-style-type: none"> - Strengthen the institutional and regulatory framework of the energy sector 	<ul style="list-style-type: none"> - Promoting energy efficiency via strategies and actions listed on the left will contribute to enhancing energy

²² www.stelco.com.mv/tariff-rates#tariff-rates-male-region-commercial

²³ www.stelco.com.mv/tariff-rates#other-island-powerhouses

	<ul style="list-style-type: none"> - Promote energy conservation and efficiency - Establish minimum energy performance standards for appliances (MEPS) which are being prepared. - Develop a framework to implement the Standards and Label (S&L) programme - Initiate an energy labelling scheme implementation (grading scheme) for energy-efficient appliances. - Provide market incentives to appliances that achieve the highest grade in the energy labelling scheme. - Review and amend the Public Finance Act to incorporate the use of life cycle costing to promote procurement of energy-efficient appliances in public buildings - Conduct public awareness regularly on energy efficiency and conservation. 	<p>efficiency in RAC equipment and vice versa.</p>
--	---	--

5.4. Policies on safety

The Measures to Protect the Ozone Layer Act 2015 and Chemical Substances and Various Equipment that Harm the Ozone Layer 2017 do not have provisions to regulate labelling, transfer, handling, servicing and storage of controlled substances. Furthermore, there is currently no legal framework in place for national harmonized standards in labelling. However, work is currently being undertaken to develop a national code on classification and labelling.

The Maldives currently imports only HCFC-22 and R-404A, R-407C, R-410A, R-417A, R-507C and R-438A blends of HFC. While there are no specific legal requirements in place for the safe handling of the aforesaid substances, there is a general regulation called Hazardous Chemical Regulation (Regulation Number: R-1057/2019)²⁴, which is enacted under Import Prohibition Act (Law Number: 4/75). This regulation is monitored and implemented by the Ministry of Defense. This regulation categorizes dangerous chemicals based on the International Maritime on Dangerous Goods Code (IMDG Code). As some of the

²⁴ <https://www.gov.mv/en/guidance-and-regulations/hazardous-chemical-regulation-2019r-1057>

aforementioned substances, especially HCFC-22, fall within class 2 of the IMDG Code, the following rules apply:

- All imports must bear the respective color code provided in the regulation, “Caution!”, “Hazardous Chemical” and “Danger” labels even at the time of import, during handling, transfer, storage, and sale.
- Special requirements on handling and transfer, including standards in accordance with IMDG code on handling substances.
- Special requirements on storage and warehouses, including standards in accordance with IMDG code on storage of substances. These requirements include standards on ventilation, cooling spaces, heat mitigation, and safety.

5.5. Policies on chemical and waste management

As identified in the Maldives National Chemical Profile²⁵ published in 2015 by the MOECCT, despite there being many laws that address chemical and waste management in part as shown in the table below, there is no national legislation focusing specifically on chemical management. Furthermore, as highlighted in that study, as the Maldives does not manufacture and chemicals and imports all chemicals, most of these laws concentrate on imports. Additionally, the study finds that there is no control on the quality of the chemicals and labelling at present, except for the labelling according to the Dangerous Chemicals Regulation. The study further finds that there is no comprehensive reporting mechanism in place for consumers, distributors, and retailers. The same finding is made concerning the lack of a comprehensive mechanism for licensing distributors, users, and retailers of chemicals, save for chemicals used for pharmaceutical purposes. In addition, there is no prescriptive list of hazardous waste which includes ODS or HFC.

Table 23: Policies on chemical and waste management

Policies	Brief Description	Relevance to MP/KA
Environment Protection and Preservation Act 1993²⁶	Covers use, transport, and disposal of harmful waste, oil, poisonous gases, and hazardous/toxic or nuclear wastes. This law requires the mandated government authorities to provide the necessary guidelines and advice on	Not Relevant, as substances relevant to Montreal Protocol is covered under other laws

²⁵ <http://www.environment.gov.mv/v2/en/download/4307>

²⁶ https://en.unesco.org/sites/default/files/maldives_act_11_08_1998_engl_orof.pdf

	environmental protection per the prevailing conditions and needs of the country.	
Import Prohibition Act 1975	Covers import, use, disposal, and storage of chemicals, acid, poisons, toxic substances, and explosives.	Relevant, as this law regulates the import of prohibited substances in the Montreal Protocol such as CFCs.
Hazardous Chemical Regulation 2019²⁷	Regulation outlining comprehensive rules regarding licensing, labelling, classification, sale, storage, transportation, and disposal of various dangerous chemicals in accordance with the International Maritime on Dangerous Goods Code.	Relevant, as currently, HCFC-22 is subject to the requirements under this regulation
Waste Management Regulation 2013	Covers import, export, storage, transport, and disposal of hazardous waste (e.g. explosives, flammable liquid/solids, corrosives, toxic/poisonous substances/ organic peroxides, etc.) Also covers special waste (e.g. combustible/ reactive/corrosive/ poisonous waste).	Not Relevant, as disposal of substances relevant to the Montreal Protocol is specifically provided for in the Measures to Protect the Ozone Layer Act.
Regulation on Protection and Conservation of Environment in the Tourism Industry 2006²⁸ enacted pursuant to Maldives Tourism Act	Covers disposal of hazardous or toxic waste.	Not Relevant, as disposal of substances relevant to the Montreal Protocol is specifically provided for in the Measures to Protect the Ozone Layer Act.
Waste Management Policy 2015²⁹	A section on strengthening the regulatory framework in waste management includes a strategy to review and amend the regulation on the disposal of harmful waste and to introduce waste management plans for	Relevant, as this promotes regulation and planning of waste management in industrial zones

²⁷ <https://www.gov.mv/en/guidance-and-regulations/hazardous-chemical-regulation-2019r-1057>

²⁸ <http://extwprlegs1.fao.org/docs/pdf/mdv130850.pdf>

²⁹ <http://www.environment.gov.mv/v2/en/download/4584>

	islands that are leased for industrial purposes.	
Strategic Action Plan (SAP) 2019-2023	<ul style="list-style-type: none"> - Action item to develop overarching legislation on chemical management, paying specific attention to diversity and usage across their lifecycle, to ensure effective management and safe disposal. - Action item to strengthen quality control of labelling in imported chemicals, establishing reporting requirements for chemical distributors, retailers, and consumers for chemical storage warehouses. - Action items to formulate and implement guidelines for the handling, storage, and transport of non-medical hazardous waste and chemicals generated in the inhabited islands until they reach RWMT Facilities, formulating and implementing guidelines for the reuse and recycling of construction and demolition waste. 	Promoting chemical and waste management via actions listed on the left will contribute to enhancing sound management of ODS, HFC, and alternatives and their waste and vice versa.

5.6. Other relevant policies

The Maldives legal system has adopted fiscal measures to encourage environment-friendly refrigerants by providing import duty incentives. The 17th Amendment of Law no 31/79 of the Import-Export Act 1979 of Maldives, chapter 29 on organic chemicals, states that HC-600a is subject to 5% import tax while HFCs (R-142B, R-141B, R-123, R-33) is subject to 100% import duty. Furthermore, chapter 33 on products or equipment containing certain HFC blends (R-502, R-402B, R-408A, R-406A) is subject to 100% import duty.

In the building and construction sector, whilst the Maldives has newly adopted a Building Code³⁰ under the 2017 Construction Act, there are no specific rules in the said laws on space cooling or the promotion of low GWP options.

³⁰ <http://www.mvlaw.gov.mv/pdf/gavaid/planning/R1020-2019.pdf>

Concerning air quality, in 2019, the MOECCT published the National Action Plan on Air Pollutants³¹, a comprehensive policy document that outlines the mitigation measures to reduce emissions, measures to reduce air pollutants, and measures to enhance implementation, monitoring, and management of air quality. This Action Plan outlines key action items specifically targeted towards implementing the Kigali Amendment and focused on sensitizing both the tourism and the fisheries sectors on the HFC phase-down.

Table 24: Other relevant policies

Policies	Brief description	Relevance to MP/KA
National Action Plan on Air Pollutants 2019	<p>Includes strategies to sensitizing the fisheries and the tourism sectors on HFC phase-down and Kigali Amendment. Key actions in the fisheries sector include:</p> <ul style="list-style-type: none"> - Conducting a detailed survey of all marine and land vessels in the fisheries sector for the use of HFC and alternatives and identifying the barriers - Providing specific training - Developing technical guidelines on safety and handling of HFC alternatives - Revising proposed bank loan schemes to include options for promoting HFC alternatives, and conducting awareness in this regard to encourage private companies to switch over to low GWP alternatives - Assisting companies to come up with an internal plan for switching to low GWP alternatives and to prevent the introduction of HFCs in the sector <p>Key actions in the tourism sector include:</p> <ul style="list-style-type: none"> - Conducting high-level meeting for managers of resorts to inform and discuss Kigali Amendment and way forward - Signing with interested resorts on partnering with NOU on phasing down HFCs - Initiating the ozone and climate-friendly resort award - Providing specific training 	<p>Relevant, as the actions directly promote the implementation of the Kigali Amendment</p>
Strategic Action Plan (SAP) 2019-	<ul style="list-style-type: none"> - Action item on developing a Construction Air Quality Management Plan to manage and minimize impacts during construction projects. 	<p>Relevant, as a national system to improve air</p>

³¹ <http://www.environment.gov.mv/v2/en/download/9444>

<p>2023</p>	<ul style="list-style-type: none"> - Action item to integrate and update data on the status, trends and threats to biodiversity and national ambient air quality into National GIS (NGIS) and publish the data through a web-based public platform. - An action item to establish natural capital accounting systems and a monitoring framework to track progress and effectiveness of conservation efforts and air quality monitoring. 	<p>quality will help control ODS emissions</p>
--------------------	---	--

6. STAKEHOLDER ENGAGEMENT

This chapter discusses the key stakeholders that play a role in the implementation of the Montreal Protocol in the Maldives and the main platforms and activities that are in place or are being undertaken to engage the stakeholders and coordinate their work. The NOU is the focal point for the Montreal Protocol and all collaborations with stakeholders are done through the NOU.

The stakeholders identified in the next section are the key players in the implementation of the Montreal Protocol. They have been identified based on their role in policymaking and the market and influence in the process of implementation.

6.1. Stakeholder Mapping

The table below provides a list of stakeholders which include national authorities, and educational institutes in the Maldives that currently play a role in the control of ODS and equipment containing them. There is no official document that identifies all stakeholders and defines their roles. The stakeholders and their roles have been identified based on the nature of the entity's mandate and based on what has been practiced so far.

Table 25: Key stakeholders and their roles

Name of Stakeholder	Role in the implementation of MP
Government Institutions	
MOECCT	The NOU operates under the MOECCT. Formulates ODS-related policies and regulations. Supports arrangements for the ratification of the protocol and its amendments by the Parliament. Issues import license for controlled substances under the Montreal Protocol.
Maldives Energy Authority	Responsible for energy efficiency-related policies.
Ministry of Tourism	Facilitates the engagement of the tourism sector to transition to low GWP alternatives. Collects and provides end-user data.
Ministry of Fisheries, Marine Resources and Agriculture	Facilitates the engagement of the fisheries sector to transition to low GWP alternatives Collects and provides end-user data.
Ministry of Defense	Responsible for issuing permits for hazardous chemicals including HCFC-22.

	Manages the Makudi System which will be used to submit all information on permits and licenses.
Ministry of National Planning, Housing and Infrastructure	Responsible for developing and implementing building codes.
Maldives Customs Service	Controls the imports of controlled and banned substances and equipment. Provides data on refrigerant and equipment imports.
Educational Institutions	
TVEC, Maldives Polytechnic, and Maldives Institute of Technology	Provides vocational training and servicing training for RAC servicing technicians.

6.2. National Ozone Unit

The National Ozone Unit (NOU) became fully operational only in 2000 when it was set up at the Environment Research Centre (ERC). In 2009, the functions and the name of ERC were changed to Environmental Protection Agency (EPA), and the NOU was moved to be under then the Ministry of Housing, Transport, and Environment, and has remained as a Unit within the Ministry since.

6.3. Outreach and awareness-raising for stakeholder engagement

The table below explains the outreach activities that the Maldives has been undertaking to raise the awareness of different target groups on the issue of ozone layer protection and ODS management.

Table 26: Outreach and awareness-raising for each target group

Target group	Main topics covered	Activity
<ul style="list-style-type: none"> - End-user - University students - Government officials 	<ul style="list-style-type: none"> - Ozone layer protection - ODS and alternatives - Labelling on ODS 	<ul style="list-style-type: none"> - Information materials (books, brochures, pamphlets) - Presentations - Workshops
<ul style="list-style-type: none"> - Servicing sector workshop and technicians - TVET 	<ul style="list-style-type: none"> - Ozone layer protection - ODS and alternatives, their cost and benefits - Labelling on ODS - Standards - Good practices in installation, maintenance, and repairing of ODS alternatives 	<ul style="list-style-type: none"> - Information materials (handbooks) - Presentations - Workshops

	<ul style="list-style-type: none"> - Certificate system and competency assessment - Policies on ODS management 	
<ul style="list-style-type: none"> - Importer/exporter of ODS and ODS-based equipment - Shipping companies - Suppliers of equipment - Retailers - Customs 	<ul style="list-style-type: none"> - Ozone layer protection - ODS and alternatives - Labelling on ODS - Standards - Custom codes, license, and quota requirements for ODS - Testing kit and identifiers of ODS - Policies on ODS management 	<ul style="list-style-type: none"> - Information materials (handbooks, manuals) - Presentations - Workshops

7. ASSESSMENT OF NEEDS FOR HFC PHASE-DOWN IN THE MALDIVES

This chapter assesses the gaps between the need for the Maldives to implement the Kigali Amendment and the current established national infrastructure in different aspects elaborated in the previous chapters of the report. It also provides necessary actions and options to fill these identified gaps, especially the actions needed for the country to meet its initial obligations under the Kigali Amendment.

7.1. Gaps and needs in the market

Table 27: Market gaps and needs

Recommended Actions	Description
Develop an early plan to support the small businesses that will be affected by the HFC phase-down	Phasing down HFCs will have a significant impact on small businesses across the country. To minimize the negative impact, it is important to actively involve all stakeholders and develop a phase-down plan that will ease their transition. The plan should provide opportunities for any capacity-building training that is needed as well. The plan can be officially registered through an MOU between the MOECCT and the relevant business. The early development of such a phase-down plan will prepare the businesses and provide adequate time to ensure country targets are attained in advance.
Develop financial incentive schemes to support businesses to retrofit and replace high GWP based RAC equipment	Complying with the Kigali Amendment means replacing RAC equipment that uses high GWP refrigerants. This will no doubt be costly for businesses. Therefore, an incentive scheme that provides financial assistance for retrofitting and replacing RAC equipment, especially for smaller businesses such as safaris and guesthouses will be helpful to accelerate the transition.
Develop a scheme to recognize resorts that use high energy efficiency standards and low GWP refrigerants	Given that a large portion of RAC equipment is used in the tourism industry in the Maldives, recognizing a specific tourism business' use of environmentally friendly refrigerants can help the business to use the recognition to leverage their marketing strategies and build an environmentally conscious customer base, thereby providing an incentive for the tourism industry to use low GWP refrigerants.
Amend the Import-Export Act to provide a fiscal incentive for low GWP refrigerants	Amend the Act to increase the import duty levied on high GWP refrigerants and reduce the duty levied on low GWP refrigerants to promote the import of low GWP refrigerants for those sectors

	and uses where suitable and accessible alternatives exist after the baseline has been established.
Amend the Public Finance Regulation to update public procurement guidelines	Amend the Regulation to update the public procurement guidelines to mandate the procurement of low GWP RAC technologies

7.2. Gaps and needs in the RAC servicing sector

There is a major policy gap to regulate the RAC servicing sector in the Maldives in terms of eligibility to work as a technician and standards of practice. Below actions are required to improve the capacity and the control of the servicing sector.

Table 28: RAC servicing sector gaps and needs

Recommended Actions	Description
Amend the 2015 Act to empower the MOE to regulate the servicing sector	Include a provision in the 2015 Act that empowers the MOE to regulate the servicing sector workshops and technicians. This will provide a legal basis for the MOE to act.
Enact a regulation to regulate the servicing sector	The regulation should include provisions on the standards of operation, codes of practice, technical guidelines, data management of servicing sector, and the licensing requirements of the technicians.
Introduce the RAC servicing technicians licensing system	The RAC servicing sector in the Maldives is unregulated and mainly comprised of semi-skilled workers who are predominantly expatriates. Although a portion of the RAC workforce includes trained professionals, it is generally challenging to implement good practices in RAC equipment servicing. This also often compromises the lifespan of the equipment. A properly structured licensing system for RAC technicians will help ensure that the technicians are up to date with the latest knowledge, skills, and technologies and enable the wider application of good servicing practices in the sector. It can be implemented voluntarily and be made mandatory within five years. A database of licensed technicians should be established as well.

Develop a registry of RAC servicing workshops	The current business registration system of the Maldives does not have a way of identifying the servicing workshops based on their scope of work and it is difficult to obtain an accurate number of RAC servicing workshops in the country. With the implementation of the Kigali Amendment, it is important for all workshops providing RAC services to be registered for the NOU to monitor the safe handling of HFC alternatives in the country.
Collaborate with the education institutions to update the current RAC servicing curriculum	The current RAC servicing curriculum does not cover the use and safe handling practices of flammable refrigerants. Modules must be updated to create an enabling environment for the implementation of the Kigali Amendment, and safe handling practices for flammable refrigerants need to be included in the programs under the National Qualification Framework.
Strengthen the capacity and professional development of RAC technicians	The majority of local RAC servicing technicians lack the knowledge and skills related to the safe and effective handling of low GWP refrigerants such as HFC-32, R-290, and R-717. Training must be provided to ensure all technicians are trained to safely handle flammable refrigerants. Workshops on safe handling practices specifically for the fisheries sector should be conducted as well.
Introduce the recognition of prior learning (RPL) system	Recognition of Prior Learning (RPL) is a process to assess, recognize and certify those technicians who have the required skills and competency to practice their professions in their areas of expertise but do not possess a formal qualification to do so. It is recommended to introduce the RPL in the Maldives. This will help upgrade the skills and license the informal technicians.

7.3. Gaps and needs in the import quota, license, and permit system

Table 29: Import quota, license, and permit system gaps and needs

Recommended Actions	Description
Enact a new bill to support the implementation of the Montreal Protocol and the Kigali Amendment	Amend the provisions in the 2015 Act and the 2017 Regulation to specify the list of HFCs as controlled substances and that the import of HFCs will be subject to quantitative restrictions from 2024 (quota allocation process) and specify the criteria, methodology, and procedures for the quota and license application process, include the HFC phase-down schedule as provided in the Kigali Amendment. Maldives will know its HFC Maximum Allowable Consumption in 2023 after the average consumption during baseline years will

	be clear. At the discretion of the NOU, a reference to the established Maximum Allowable Consumption, the consumption reduction schedule and its precise values in CO ₂ e may be introduced with a later Amendment.
Strengthen and streamline the electronic import licensing and permit system (Makudi System)	Previously, the application for import licenses and permits was paper-based. However, it is now done online through the Makudi system. As it is still fairly new, some improvements can be made to make the process more streamlined and user-friendly and make it easier to collect data on a real-time basis.

7.4. Gaps and needs in the data monitoring and reporting system

Table 30: Data monitoring and reporting system gaps and needs

Recommended Actions	Description
Include mandatory periodical data reporting for all refrigerants importers in the new Amendment	To properly monitor HFC and HFC alternatives imports and enable the NOU to periodically conduct crosschecking of the import data from different sources (customs and importers), it is important that all importers are mandated to report their import data in full. The proper reporting shall be considered as a prerequisite to be eligible to apply for import license and permit.
Collect data on the type of refrigerants the newly imported RAC equipment is based on	<p>Currently, there is no process to collect data on what type of refrigerants the newly imported RAC equipment is based on. Lack of such data will pose a challenge for the NOU to plan the adequate prioritization of its HFC phase-down strategy.</p> <p>It will be important for the NOU to have a clear picture of the refrigerants used by the newly imported RAC equipment per sector. This way, within each sector, the NOU and stakeholders will be able to discuss possible priorities in restriction measures to be applied to specific equipment based on high-GWP HFCs, where feasible and affordable alternatives are available. By doing so the NOU can lower the higher-GWP HFCs servicing needs in the longer run, thus be in an easier position to meet its CO₂e reduction targets.</p> <p>The MOECCT shall work closely with the Maldives Customs to ensure that such data can be collected from importers.</p> <p>The MOECCT should also provide the right information to ensure importers are aware of the information that is required from them and know how to fill out the forms correctly.</p>

Continue to provide comprehensive training for customs officers	To properly implement the Kigali Amendment, it is imperative to provide continuous capacity building for customs officials. Future training should include the use of HS codes, HFCs and new RAC equipment, and safety concerns for new refrigerants.
Develop and apply HS codes for different types of HFCs and HFC blends	When WCO 2022 HS code will be implemented, due to its structure grouping certain substances together, it will be necessary to utilize sub-codes to make sure all HFCs commonly imported in the Maldives have an individual code.
Collaborate with stakeholders to develop a sound data collection system	Coordinate with and engage importers, customs and the National Bureau of Statistics to develop a sound data collection system.

7.5. Gaps and needs in the control of RAC equipment

Table 31: Control of RAC equipment gaps and needs

Recommended Actions	Description
Evaluate and discuss with stakeholders feasible control measures on the import of RAC equipment relying on high-GWP HFCs	Evaluate and discuss with stakeholders the possibility to include further import control measures (e.g. permit and quota system, import duties extension to cover equipment currently exempt, bans) on HFC-based equipment relying on high GWP refrigerants, where viable alternatives are available in the market.
Train enforcement officers to control HFC based equipment	Conduct training and awareness sessions on revised policies on the restriction of importing HFC-based equipment.
Introduce a ban on the investment of large scale HFC equipment	Ban the installation of manufacturing facilities that depend on HFC technology (especially the fisheries sector) in the future once the alternative to HFCs are introduced and are common in the marketplace.

7.6. Gaps and needs in climate change policies

Table 32: Climate change policy gaps and needs

Recommended Actions	Description
Update Maldives Climate Change Policy Framework 2015	The NOU should work closely with the Climate Change Department to update the Climate Change Policy to ensure the RAC sector is accountable for its GHG emissions and to make

	use of the opportunity to use the RAC sector to decrease GHG emissions and contribute to low emissions development.
Update the NDC, NC, and BUR to include the Kigali Amendment goals and impacts and HFC data	The HFC and RAC Sector is not taken into consideration at the moment in the NDC, NC, and BUR of the Maldives. The NOU should collaborate with the Climate Change Department to integrate the HFC data and the HFC phase-down goals, activities, and achievements within these documents and processes.

7.7. Gaps and needs in energy efficiency policies

Table 33: Energy efficiency policy gaps and needs

Recommended Actions	Description
Update 2017 Regulation on chemical substances and various equipment that harm the ozone layer	Update the Regulation to include guidelines on labelling (for purposes of safety and energy efficiency), the safety of handling, transfer, and storage of refrigerants, and to create a mechanism to register the product.
Develop a labelling system for RAC equipment	It is recommended that the NOU collaborates with relevant ministries to develop a labelling system for RAC equipment to provide users with information on energy efficiency and eco-friendliness of the equipment.

7.8. Gaps and needs in safety policies

Table 34: Safety policies gaps and needs

Recommended Actions	Description
Enact regulation on refrigerants to include safety standards	Collaborate with the Ministry of Defence to enact regulations to specify safe handling practices for flammable refrigerants. This includes developing minimum standards on safe handling, labelling, and management (storage, transfer, disposal) of HFCs and RAC equipment by importers, distributors, retailers, and the service industry.
Revise Building Code to include rules on space cooling and promotion of low GWP options	Revise building codes to include rules of space cooling, promote and provide incentives for low GWP alternatives.

7.9. Gaps and needs in the chemical and waste management policies

Table 35: Chemical and waste policies gaps and needs

Recommended Actions	Description
Update Waste Management Policy 2015	Revise Waste Management Policy to harmonize waste management of refrigerants as provided in regulation on refrigerants.
Enact regulation on safe disposal of refrigerants	Enact a regulation on refrigerants to include rules on waste management of refrigerants.

7.10. Gaps and needs in awareness-raising and stakeholder engagement

Table 36: Awareness raising and stakeholder engagement gaps and needs

Recommended Actions	Description
Raise awareness of the importers on the new HFC phase-down policies	Develop and conduct awareness-raising for importers regarding the new policies on HFC import quota and licensing
Develop an HFC Phase down plan for the tourism sector	Garner commitment from the tourism sector, including resorts, hotels, guesthouses, and safari vessels to develop a plan to switch to greener alternatives to lead the way for climate-friendly establishments.
Develop and conduct an awareness campaign for social media	Develop an awareness campaign on social media on HPMP achievements, environmental impacts of HFCs, the implementation of the Kigali Amendment, and responsible consumer choices for Ozone Day.

In addition to the above, the table below explains in detail the outreach activities that the NOU is considering to raise awareness of different target groups on the Montreal Protocol related issues.

Table 37: Outreach and awareness-raising for each target group

Target group	Main topics covered	Activity
<ul style="list-style-type: none"> - End-users including the tourism and fisheries sector - Government officials - University students 	<ul style="list-style-type: none"> - Ozone layer protection and climate change - ODS, HFC, and alternatives and their effect on the environment - Labelling on ODS, HFC, and RAC equipment - Consumer responsibility and environment-friendly options 	<ul style="list-style-type: none"> - Information materials (books, brochures, pamphlets) - Presentations - Workshops - Social media - Public events

	<ul style="list-style-type: none"> - RAC equipment and energy efficiency - ODS and HFC policies, control measures, and phase-down schedules 	
<ul style="list-style-type: none"> - Servicing sector workshop and technicians - TVET 	<ul style="list-style-type: none"> - Ozone layer protection and climate change - ODS, HFC, and alternatives and their effect on the environment and cost and benefits - Labelling on ODS, HFC, and RAC equipment - Consumer responsibility and environment-friendly options - RAC equipment and energy efficiency - ODS and HFC policies, control measures, and phase-down schedules - Relevant standards - Good practices in installation, maintenance, and repairing of ODS, HFC, and alternatives - Competency assessment, licensing, and registration systems - Import quota, licensing, permit systems - Data monitoring and reporting system - Alternative technologies, equipment, and energy efficiency potentials. - Identification and labelling of refrigerants and equipment, and practices of smuggling and mislabelling. 	<ul style="list-style-type: none"> - Information materials (handbooks, manuals, factsheets, guidelines) - Publication of online tools (relevant websites, courses, mobile applications) - Regular exchange of information - Presentations - Workshops, training, roundtables, seminars - Distribution of merchandises (wearables and gadgets)
<ul style="list-style-type: none"> - Importer/exporter of ODS, HFC, alternatives, and RAC equipment - Shipping companies - Suppliers of RAC equipment 	<ul style="list-style-type: none"> - Ozone layer protection and climate change - ODS, HFC, and alternatives and their effect on the environment and cost and benefits - Labelling on ODS, HFC, and RAC equipment 	<ul style="list-style-type: none"> - Information materials (factsheets, guidelines) - Regular exchange of information - Presentations - Workshops, training, roundtables, seminars

<ul style="list-style-type: none"> - Retailers - Customs officers - Customs brokers 	<ul style="list-style-type: none"> - Consumer responsibility and environment-friendly options - RAC equipment and energy efficiency - ODS and HFC policies, control measures, and phase-down schedules - Relevant standards - Import quota, licensing, permit systems - Data monitoring and reporting system - Alternative technologies, equipment, and energy efficiency potentials. - Identification and labelling of refrigerants and equipment, and practices of smuggling and mislabelling. - HS codes - Testing kit and the identifier of ODS and HFC 	<ul style="list-style-type: none"> - Production and distribution of merchandise (wearables and gadgets). - Promotion of smartphone apps developed by UNEP on OzonAction for Customs.
---	---	--

8. CONCLUSION AND SUMMARY OF RECOMMENDED ACTIONS

In this report, the status of the implementation of the Montreal Protocol in the Maldives and its readiness to adopt its new amendment to phase down HFCs was reviewed. Based on the current market trends and the policy framework, the following conclusion can be drawn.

Maldives's ratification and implementation of the Kigali Amendment will contribute to the international effort to contribute to the mitigation of climate change. Furthermore, it contributes to regulating the servicing sector which will play a key role in supporting low emissions development.

The Maldives has successfully phased out HCFCs and is ready to create an enabling environment to safely transition to greener alternatives and contribute towards the country's energy efficiency goals as well.

Regarding the country's readiness, many areas need to be improved to create an enabling environment to implement the Kigali Amendment as discussed in the previous chapter. The list of recommended actions is summarized in the table below.

Table 38: Summary of recommended actions for the Maldives to implement the Kigali Amendment

What needs to be done	Lead and partners	Timeframe
Market		
Develop an early plan to support the small businesses that will be affected by the HFC phase-down	NOU, Ministry of Economic Development	2021
Develop financial incentive schemes to support businesses to retrofit and replace high GWP-based RAC equipment and transition to energy-efficient technologies.	NOU, Climate Change, Energy, and MEA	2021-2022
Develop a scheme to recognize resorts that use low GWP refrigerants	NOU, Interested resorts	2021-2023
Amend the Import-Export Act to provide a fiscal incentive for low GWP refrigerants	NOU, Ministry of Economic Development	2022
Amend the Public Finance Regulation to update procurement guidelines	NOU, Ministry of Finance	2021
Servicing sector		

Amend the 2015 Act to empower the MOE to regulate the servicing sector	NOU	2021-2023
Enact a regulation to regulate the servicing sector	NOU	2021
Introduce the RAC servicing technicians licensing system	NOU	2021
Develop a registry of RAC servicing workshops	NOU	2021
Collaborate with the education institutions to update the current RAC servicing curriculum	NOU, Ministry of Higher Education, TVEC, MIT, Polytechnic	2021 onwards
Strengthen the capacity and professional development of RAC technicians	NOU, Ministry of Higher Education, TVEC, MIT, Polytechnic	2021 onwards
Introduce the recognition of prior learning (RPL) system	NOU, Ministry of Higher Education, TVEC, MIT, Polytechnic	2021 onwards
Import quota, licensing, and permit system		
Enact a new bill to support the implementation of the Montreal Protocol and the Kigali Amendment	NOU	2021
Strengthen and streamline the electronic import licensing and permit system (Makudi System)	NOU, Ministry of Defense	2021
Data monitoring and reporting system		
Include mandatory periodical data reporting for all refrigerants importers in the new Amendment	NOU, Customs	2021
Collect data on the type of refrigerants the newly imported RAC equipment is based on	NOU, Customs	2021
Continue to provide comprehensive training for customs officers	NOU, Customs	2021 onwards
Develop and apply HS codes for different types of HFCs	Customs	2022
Collaborate with stakeholders to develop a sound data collection system	NOU, Customs, National Bureau of Statistics	2021
Control of RAC equipment		

Evaluate and discuss with stakeholders feasible control measures on the import of RAC equipment relying on high-GWP HFCs	NOU	2021 onwards
Train enforcement officers to control HFC based equipment	NOU, Customs	2023-2024
Introduce a ban on the investment of large scale HFC equipment	NOU	2024
Policies in relevant sectors		
Update Maldives Climate Change Policy Framework 2015	NOU, Climate Change Department	2022
Update the NDC, NC, and BUR to include the Kigali Amendment goals and impacts and HFC data	NOU, Climate Change Department	2022
Update 2017 Regulation on chemical substances and various equipment that harm the ozone layer	NOU	2022
Develop a labelling system for RAC equipment	NOU, Customs	2022
Enact regulation on refrigerants to include safety standards	NOU, Chemicals Unit, Ministry of Defense	2022
Revise Building Code to include rules on space cooling and promotion of low GWP options	NOU, Ministry of Planning, Housing, and Infrastructure	2022
Update Waste Management Policy 2015	NOU, Chemicals Unit, Waste Department	2022
Enact regulation on safe disposal of refrigerants	NOU	2021
Awareness raising and stakeholder engagement		
Raise awareness of the importers on the new HFC phase-down policies	NOU, Awareness Unit	2021
Develop an HFC Phase down plan for the tourism sector	NOU, Ministry of Tourism, Maldives Tourism Development Board	2021
Develop and conduct an awareness campaign for social media	NOU, Awareness Unit	2021

Annex 1: GWP values of HCFCs, HFCs, and other alternatives

HCFCs	100-year Global Warming Potential
HCFC-22	1810
HCFC-141b	725
HCFC-142b	2310
HFCs (as per KA ANNEX F)	100-year Global Warming Potential
HFC-134	1,100
HFC-134a	1,430
HFC-143	353
HFC-245fa	1,030
HFC-365mfc	794
HFC-227ea	3,220
HFC-236cb	1,340
HFC-236ea	1,370
HFC-236fa	9,810
HFC-245ca	693
HFC-43-10mee	1,640
HFC-32	675
HFC-125	3,500
HFC-143a	4,470
HFC-41	92
HFC-152	53
HFC-152a	124
HFC-23	14,800
HFC blends (not an exhaustive list)	100-year Global Warming Potential
R-404A	3921
R-407A	2107
R-407C	1773
R-410A	2087
R-417A	2346
R-438A	2264
R-448A	1386
R-507A	3985
R-508B	12802
Other alternatives	100-year Global Warming Potential
HC-290	<1
HC-600a	<1
R-717	0
R-744	1
R-1234yf	<1
R-1234ze	<1

Source: The GWP values for HCFCs and HFCs are taken from the Montreal Protocol Annex C and F. All HFC blends and other alternatives' GWP values are from UNEP's WhatGas application³².

³² <https://www.unenvironment.org/ozonaction/resources/what-gas/what-gas>

Annex 2: Example of the form used to collect information from the importers

BRIGHT BROTHERS PVT LTD

MONTH :

MONTHLY HCFC SALES AND DISTRIBUTION MONITORING SHEET

No.	DATE	COMPANY	NAME	ADDRESS	ID CARD NO.	PREVIOUS	
						QTY/KG	PRICE (Mrf)