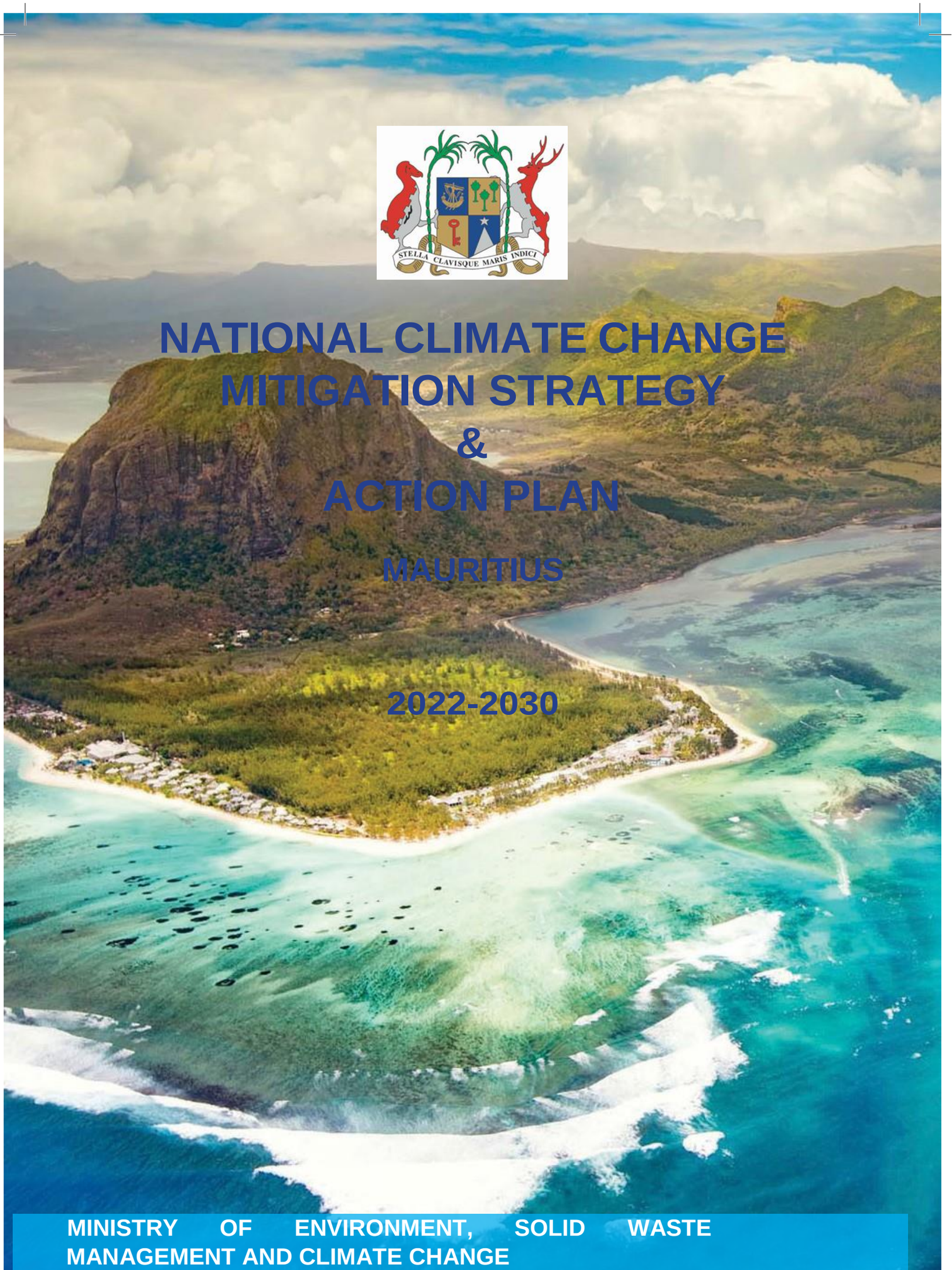

NATIONAL CLIMATE CHANGE MITIGATION STRATEGY & ACTION PLAN

MAURITIUS

2022-2030

MINISTRY OF ENVIRONMENT, SOLID WASTE MANAGEMENT AND CLIMATE CHANGE

NATIONAL CLIMATE CHANGE MITIGATION STRATEGY & ACTION PLAN

MAURITIUS
2022-2030

Developed under the Nationally Appropriate Mitigation Actions (NAMA) for Low Carbon Island Development Strategy for the Republic of Mauritius (NAMA Project)

November 2023

Republic of Mauritius
National Climate Change Mitigation Strategy & Action Plan
Mauritius 2022-2030

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LIST OF ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use
ATCS	Adaptive Traffic Control System
BAU	Business-as-usual
BM	Business Mauritius
BUR1	Biennial Update Report (First)
CCA 2020	Climate Change Act 2020
CCC	Climate Change Committee
CCM	Climate Change Mitigation
CEB	Central Electricity Board
CO_2e	Carbon dioxide equivalent
DCC	Department of Climate Change
DLL	Dry Low Land
DOC	Degradable Organic Content
EE	Energy Efficiency
EEMO	Energy Efficiency Management Office
ETF	Enhanced Transparency Framework
EV	Electric Vehicle
FAREI	Food Agricultural Research and Extension Institute
FS	Forestry Service
GACMO	Greenhouse Gas Abatement Cost Model
GDP	Gross Domestic Product
$GgCO_2e$	Gigagram of carbon dioxide equivalent
GHG	Greenhouse Gas
GWh	Gigawatt hour
HEC	Higher Education Commission
HEI	Higher Education Institution
HFC	Hydrofluorocarbon
HFO	Heavy Fuel Oil
HOV	High Occupancy Vehicle
IMCCC	Inter-Ministerial Council on Climate Change
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IPPU	Industrial Processes and Product Use
KIP	Kigali Implementation Plan
$ktCO_2e$	Kilo tonne of carbon dioxide equivalent
ktoe	Kilo tonne of oil equivalent
LPG	Liquefied Petroleum Gas
LFG	Landfill Gas
LRS	Light Rail System
MAIFS	Ministry of Agro Industry and Food Security
MARC	Marginal Abatement Revenue Curve
MARENA	Mauritius Renewable Energy Agency
M&E	Monitoring and Evaluation
MEL	Metro Express Limited
MEPU	Ministry of Energy and Public Utilities
MESWMCC	Ministry of Environment, Solid Waste Management and Climate Change
METEST	Ministry of Education, Tertiary Education, Science and Technology

MFARIIT	**Ministry of Foreign Affairs, Regional Integration and International Trade**
MFEPD	**Ministry of Finance, Economic Planning and Development**
MFSGG	**Ministry of Financial Services and Good Governance**
MGEFW	**Ministry of Gender Equality and Family Welfare**
MIE	**Mauritius Institute of Education**
MITCI	**Ministry of Information Technology, Communication and Innovation**
MITD	**Mauritius Institute of Training and Development**
MLIRE	**Ministry of Labour, Industrial Relations and Employment**
MLTLR	**Ministry of Land Transport and Light Rail**
MMS	**Mauritius Meteorological Services**
MNICD	**Ministry of National Infrastructure and Community Development**
MRIC	**Mauritius Research and Innovation Council**
MRA	**Mauritius Revenue Authority**
MSB	**Mauritius Standards Bureau**
MSW	**Municipal Solid Waste**
$MtCO_2e$	**A Million tonne of carbon dioxide equivalent**
MW	**Megawatt**
MYESR	**Ministry of Youth Empowerment, Sports and Recreation**
NAMA	**Nationally Appropriate Mitigation Action**
NCCMSAP	**National Climate Change Mitigation Strategy and Action Plan**
NECCF	**National Environment and Climate Change Fund**
NLTA	**National Land Transport Authority**
NDC	**Nationally Determined Contribution**
NIR	**National Inventory Report**
NOU	**National Ozone Unit**
OECD	**Organisation for Economic Co-operation and Development**
OECD-DAC	**OECD Development Assistance Committee**
OIDC	**Outer Islands Development Corporation**
ODS	**Ozone Depleting Substances**
PA	**Paris Agreement**
PAX-km	**Passenger kilometre**
PS	**Private Sector**
RAC	**Refrigeration and Air Conditioning**
RCCC	**Rodrigues Climate Change Committee**
RE	**Renewable Energy**
REHF	**Renewable Energy Hybrid Facility**
RMCF	**Resource Mobilization Committee for Climate Finance**
SEDEC	**Service Diocésain de L'Éducation Catholique**
SEP	**Stakeholder Engagement Plan**
SIDS	**Small Island Developing States**
SWM	**Solid Waste Management**
SWMD	**Solid Waste Management Division**
TMRSU	**Traffic Management and Road Safety Unit**
TNC	**Third National Communication**
UNEP	**United Nations Environment Programme**
UNFCCC	**United Nations Framework Convention on Climate Change**
USD	**United States Dollar**
WMA	**Wastewater Management Authority**
WTE	**Waste-to-Energy**

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This Strategy and Action Plan has been drafted using a participatory approach. We recognise the contribution of all Ministries, parastatal bodies, private sector, and academia for providing data and information for the development of sectoral strategies and actions as well as their participation and active engagement.

We thank the Consultant for his drive and the hands-on support provided throughout the project.

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FOREWORD

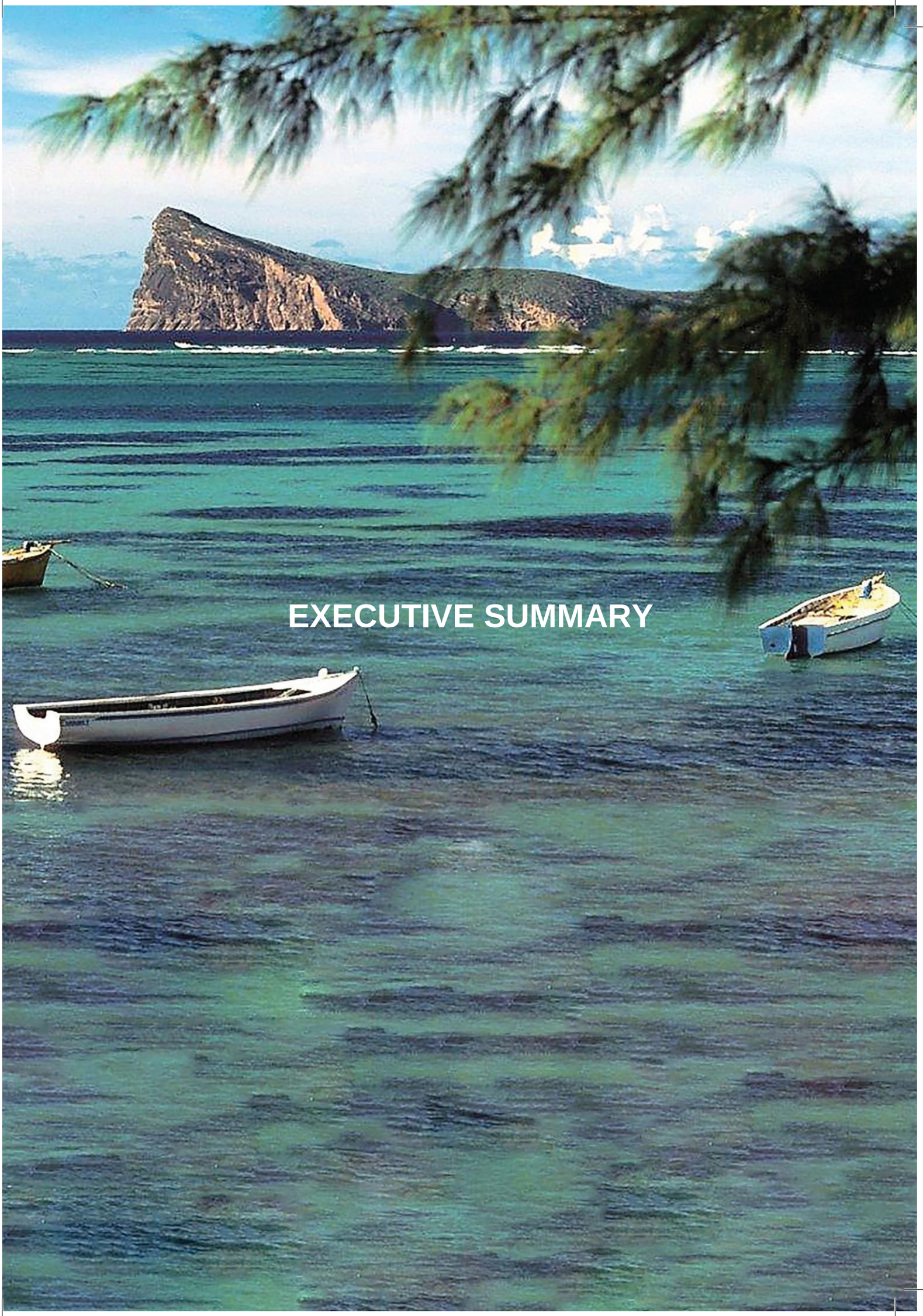
It gives me great pleasure to introduce the first National Climate Change Mitigation Strategy and Action Plan for the Republic of Mauritius. With an increase in the global average temperature of 1.2 degrees Celsius, the world is witnessing the worsening impacts of climate change. The goal of keeping the 1.5 degrees Celsius alive is becoming more and more critical in order to avoid a catastrophic and irreversible situation, especially for vulnerable and Small Island Developing States such as the Republic of Mauritius. The Intergovernmental Panel on Climate Change Report, published last February, calls for countries to urgently take accelerated and transformational actions to collectively reduce greenhouse gas emissions as climate change is happening faster than we are able to deal with it. The global stock take report has also highlighted the mitigation gap and the need for concrete on-ground actions by developed countries.

For Small Island Developing States, the situation is even bleaker. Due to our geographical position, the 2023 World Risk Report has ranked our island as the 106th country with the highest disaster risk. Despite the fact that our greenhouse gas emissions stood at an insignificant 0.01% of the total global emissions, the Government of the Republic of Mauritius is doing its fair share in terms of mitigation, adaptation and climate investment in order to contribute to the global effort to address climate change. In line with the 2021 updated Nationally Determined Contributions, Mauritius is aiming to achieve a reduction of 40 percent of greenhouse gas emissions through four strategic measures: namely the production of 60 percent of energy needs from renewable sources by 2030 and phasing out of coal before 2030; increasing energy efficiency by 10 % based on the 2019 figures; promotion of smart transport systems, namely mass transit and electric vehicles; and diversion of 70% of solid waste from the Mare Chicose landfill.

The National Climate Change Mitigation Strategy and Action Plan for the Republic of Mauritius has been developed for the period 2022-2030, under the Nationally Appropriate Mitigation Actions for Low Carbon Island Development Strategy for Mauritius (NAMA) project, to support implementation of the Nationally determined Contributions and a long-term objective for contributing towards achieving a net-zero carbon society by 2070 while achieving the Sustainable Development Goals. The focus is on delivering sustainable development co-benefits while at the same time reducing greenhouse gas emissions across mitigation sectors. This document is also a contribution towards the formulation of mitigation strategies as provisioned under the Climate Change Act 2020 and the Paris Agreement including mitigation actions with a total capital investment estimated at some USD 3.08 billion, for a total emission reduction of 2,175 kilotonnes carbon dioxide equivalent by 2030, including the enhancement of sinks.

I take this opportunity to extend the gratitude of the Government of the Republic of Mauritius to the Global Environment Facility, the United Nations Environment Programme and the UNEP Copenhagen Climate Centre for the support extended for the preparation of this Strategy and Action Plan. I would also like to convey my deep thanks to all the staff of my Ministry as well as representatives from key Ministries, parastatal bodies, the private sector and the academia for their unflinching collaboration and active participation in the process.

Honourable Rajesh Anand BHAGWAN
Minister of Environment, Solid Waste Management and Climate Change



EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

In 2021, the Climate Change Act (CCA) 2020 was proclaimed with the overarching objective of enhancing the national climate governance 'with a view to making Mauritius a climate change-resilient and low-emission country'. The CCA 2020 will also support Mauritius in implementing the provisions of the Paris Agreement (PA). In 2021, Mauritius also submitted its updated Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) according to the requirements of the PA. The updated NDC expresses an increase in the level of ambition to reduce atmospheric emissions of greenhouse gases (GHGs), while taking into account the country context and the common but differentiated responsibilities and respective capabilities to address climate change.

The National Climate Change Mitigation Strategy and Action Plan for Mauritius (NCCMSAP) has been developed for the period 2022-2030 to support the implementation of the NDC. The NCCMSAP supports the long-term objective 'to contribute towards achieving a net-zero carbon society by 2070 while achieving the Sustainable Development Goals. The focus is on delivering sustainable development co-benefits while at the same time reducing GHG emissions across mitigation sectors. The NCCMSAP is also a contribution towards the formulation of mitigation strategies as provisioned under the CCA 2020 (Section 14) and the PA (Article 4(19)). In addition to identifying the Strategies, Actions, Measures and Investments to support the implementation of the NDC, a number of Enabling Factors (Legal & Institutional; Technology Transfer & Financing; Education and Research, Awareness Raising, and Role of Media; Gender and Children and Youth Mainstreaming) have been identified to support its formulation.

The NCCMSAP at a glance

The NCCMSAP is ordered using the sector classification used by the Intergovernmental Panel on Climate Change (IPCC) and these sectors are as follows: (i) Energy Industries; (ii) Land Transport; (ii) Solid Waste Management, (iii) Waste Water Management, (iv) Industrial Processes and Product Use; (v) Agriculture (Crop and Livestock); and (vi) Forestry. Some sectors are disaggregated for ease of readership. The NCCCMSAP comprises a total of 18 mitigation strategies and 32 mitigation actions. The total capital investment has been estimated to at least **USD 3.082 billion** for a total emission reduction of **2,175 $ktCO_2e$** by 2030, including the enhancement of sinks. The emission reductions are measured relative to the business as usual (BAU) scenario, which in 2030 amounts to 5,349 $ktCO_2e$ for all sectors. Hence, the total emission reduction represents 40.7% of the BAU emissions in 2030. It has been estimated that 7.6% and 92.4% of investments will be from public and private sources, respectively. The below table summarises the number of mitigation strategies and actions for each sector, including the estimated investment costs and the percentage allocation between public and private sources.

SECTOR	NUMBER OF STRATEGIES & ACTIONS	EMISSION REDUCTIONS 2030($ktCO_2e$)	ESTIMATED COST (USD MILLION)	PUBLIC / PRIVATE ALLOCATION (%)
Energy Industries	Strategies = 2 Actions = 11	1,942.0	1,745.03	Public – 10.2% Private – 89.8%
Land Transport	Strategies = 4 Actions = 8	74.0	>1,306.3	Public – 3.9% Private – 96.1%
Solid Waste Management	Strategies = 3 Actions = 3	42.3	>16.3	Private – 100%
Waste Water Management	Strategies = 1 Actions = 2	6.0	To be determined through feasibility studies	-
Industrial Processes and Product Use	Strategies = 3 Actions = 3	103.0	>0.17	Public – 100%
Agriculture (Crops and Livestock)	Strategies = 3 Actions = 3	(1.7)	>7.06	Public – 100%
Forestry	Strategies = 2 Actions = 2	9.5	7.3	Public – 100%
All Sectors	***Strategies=18 Action = 32***	***2,175.1***	***3,082.16***	***Public – 7.6% Private-92.4%***

Sectoral Mitigation Strategies and Actions

Energy Industries

OUTCOME: DECARBONISATION OF THE ELECTRICITY SYSTEM USING RENEWABLE ENERGIES AND DEMAND-SIDE ENERGY EFFICIENCY TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 1,942 $ktCO_2e$ IN 2030 INVESTMENT: USD 1 ,745.03 MILLION		
EI1	Promote end-use energy efficiency	**EI1**. 1. Increase economy-wide efficiency in electricity consumption by 10% in 2030 with 2019 as the base year
EI2	Enhancing renewable energy sources in the electricity mix, with completed phase out of coal before 2030 [60% RE in 2030]	**EI2**.1. Installation of additional 29 MW utility-scale PV **EI2**.2. Installation of additional 214 MW rooftop PV (residential, commercial, and educational institutions) **EI2**.3. Installation of additional 32 MW floating solar PV **EI2**.4. Increase biomass generation capacity by 100 MW (hybrid facility) **EI2**.5. Renewable Energy (RE) from waste project for 10 MW **EI2**.6. Installation of a 50 MW offshore wind energy **EI2**.7. Installation of a 20 MW marine renewables (Wave and/or Tidal) **EI2**.8. Installation of a 100 MW new RE hybrid facility (solar + battery) **EI2**.9. Installation of a 40 MW new RE hybrid facility (small scale solar + battery) **EI2**.10. Installation of a 100 MW new RE hybrid facility (solar + wind + battery storage)

Land Transport

OUTCOME: TOWARDS A SUSTAINABLE LOW-CARBON LAND TRANSPORT SYSTEM IN MAURITIUS TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 74 $ktCO_2e$ IN 2030 INVESTMENT: USD 1,306.3 MILLION		
LT1	Improved fuel economy of vehicles	**LT1.1.** Increased fuel economy at a rate of 0.5% per year
LT2	Decreasing peak time congestion to improve traffic fluidity	**LT2.1.** High Occupation Vehicles lane for uninterrupted flow along M2 **LT2.2.** Substituting Adaptive Traffic Control System (ATCS) for single-timing traffic signaling to enhance real-time decision-making **LT2.3.** Promoting active transportation **LT2.4.** Promoting carpooling
LT3	Reducing consumption of fossil fuels through increased adoption of lower-carbon vehicles	**LT3.1.** Increasing the share of hybrid cars to 8.31% of total passenger travel demand in 2030 **LT3.2.** Increasing the share of electric cars to 4.5% of total passenger travel demand in 2030
LT4	Electrification of mass transit mode of passenger transport	**LT4.1**. Operationalisation of the Light Rail System between Curepipe and Port Louis

Solid Waste Management

OUTCOME: AVOIDED EMISSIONS AT LANDFILLS FROM A CIRCULAR WASTE ECONOMY TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 42.3 ktCO2e IN 2030 INVESTMENT: USD 16.3 MILLION		
SWM1	Composting of the putrescible fraction of solid waste	**SWM1.1.** Composting of 31% of municipal solid waste in 2030
SWM2	Recycling of municipal solid waste	**SWM2.1.** Recycling of 22% of municipal solid waste by 2030
SWM3	Energy recovery from municipal solid waste	**SWM3.1**. Twenty percent (20%) of municipal solid waste recovered for waste-to-energy

Waste Water Management

OUTCOME: AVOIDED EMISSIONS IN WASTEWATER MANAGEMENT FROM THE ADOPTION OF LOW-CARBON TECHNOLOGIES TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 6 ktCO2e IN 2030 INVESTMENT: TO BE DETERMINED FOLLOWING A FEASIBILITY STUDY		
WWM1	Reduced methane emissions from the adoption of low-carbon water treatment technologies	**WWM1**.1 Increasing the utilisation level of aerobic treatment from 0.01 (BAU) to 0.03 in 2030
		WWM1.2 Increasing the utilisation level of anaerobic treatment from 0.01 (BAU) to 0.035 in 2030.

Industrial Processes and Product Use

OUTCOME: REDUCING THE IMPORT OF HFCS ACCORDING TO THE KIGALI AMENDMENT TO THE MONTREAL PROTOCOL TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 103 ktCO2e IN 2030 INVESTMENT: USD 0.15 MILLION		
IP1	Phase-Down of hydrofluorocarbons (HFCs) refrigerants in Mauritius	**IP1.1**.Reducing imports of HFCs by 10% of baseline value (2024) by 2029
IP2	Phase out of equipment using HFCs	**IP2.1.** Import ban on non-inverter type air conditioners with a capacity above 36,000 BTU as from 2022 in a phased manner for the total ban in 2024
IP3	Environmentally sound disposal of HFC refrigerants	**IP3.1.** Recovery and safe disposal of HFCs in retired stock of RAC equipment based on the Kigali Implementation Plan (KIP)

Agriculture (Crops and Livestock)

AGRICULTURE (CROPS) OUTCOME: REDUCING EMISSIONS FROM GOOD AGRICULTURAL PRACTICES TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 2.7 ktCO2e IN 2030 INVESTMENT: USD 5.66 MILLION		
A1	Reducing chemical inputs in crop production	**A1.1** Reducing chemical inputs by 1% absolute per year until 2030 (bio-farming practices
A2	Implementation of bio-farming and other sustainable agricultural practices	**A1.2** Application of compost produced from MSW in crop cultivation
AGRICULTURE (LIVESTOCK) OUTCOME: IMPROVED FOOD SECURITY WITH APPLICATION OF MITIGATION TECHNOLOGIES FOR LIVESTOCK WASTE MANAGEMENT TARGET: LIMITING INCREASED EMISSIONS RELATIVE TO BAU TO 4.4 ktCO2e. IN 2030 INVESTMENT: USD 1.4 MILLION		
L1	Improved food security through the adoption of environmentally sound animal excrement management technologies	**L1.1.** Increase in livestock heads for increased food security with low-carbon excrement management technologies

Forestry

OUTCOME: INCREASING THE SINK CAPACITY OF MAURITIUS TARGET: ENHANCING SINK CAPACITY RELATIVE TO BAU BY 9.5 ktCO2e IN 2030 INVESTMENT: USD 7.3 MILLION		
F1	Planting trees in urban areas	**F1.1.** Planting of 600,000 trees over a period of 7 years along the M1/M2 motorways
F2	Afforestation of abandoned agricultural land	**F2.1.** Afforesting 1,750 ha of abandoned sugar cane land with a combination of endemic plants by 2030

Monitoring and Evaluation (M&E) Framework to Enhance Transparency

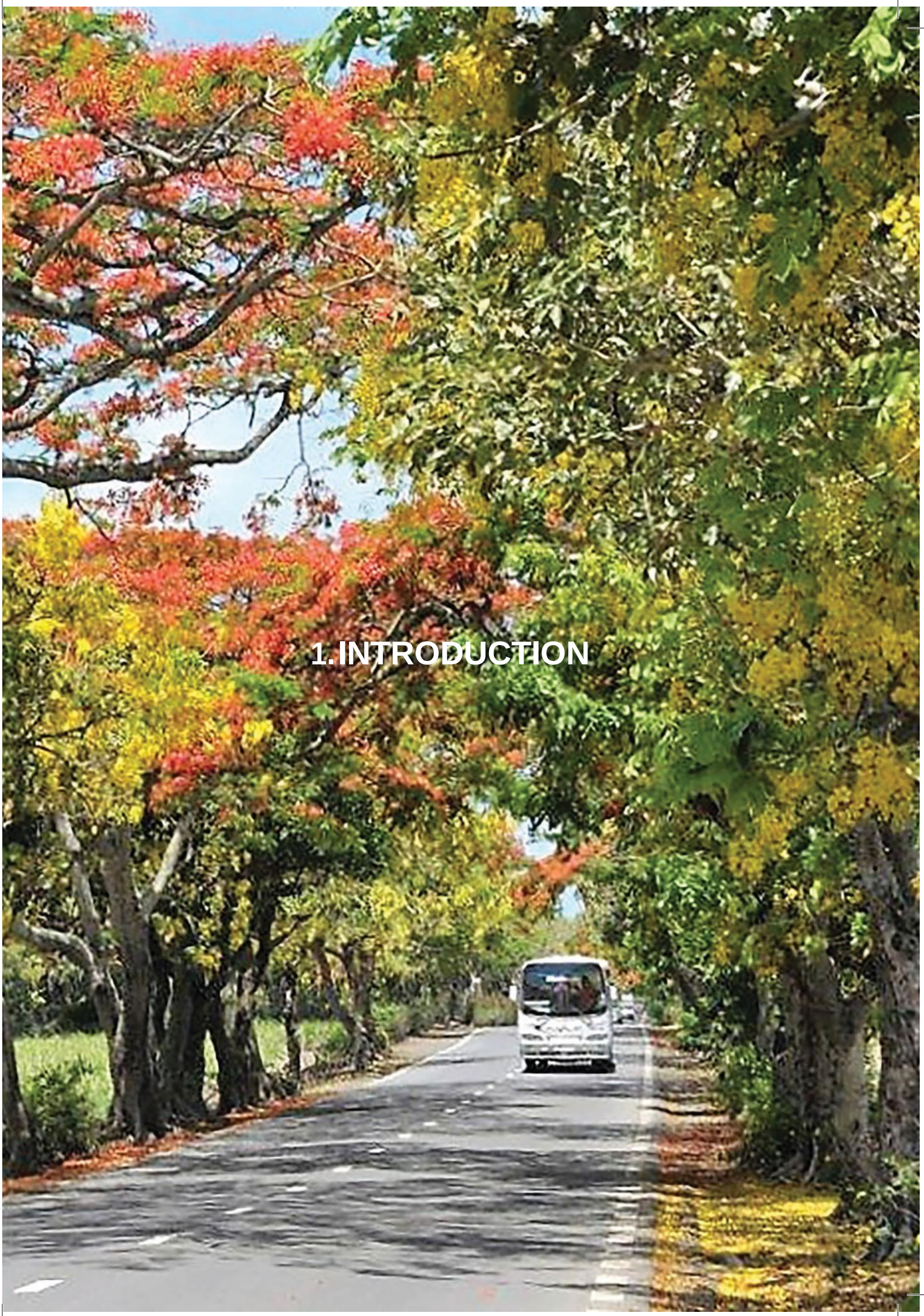
The CCMSAP is accompanied by a Monitoring & Evaluation (M&E) Framework that seeks to address the transparency requirements of the PA and to measure the sustainable development benefits of the mitigation actions of the NDC. For the transparency requirements, an online Mauritius NDC Registry has been designed under the NAMA project to provide a user-friendly and accessible platform that will facilitate data submission on outcomes, interventions, indicators, and support needed and received from relevant stakeholders for tracking the implementation progress of the NDC. This will allow for a visualisation of progress on climate action (mitigation and adaptation) and support needed and received, and facilitate the generation of reports and decision-making at the national level. To measure the sustainable development benefits of mitigation, three types of indicators (agenda setting indicators; policy/strategy formulation indicators; policy/strategy evaluation indicators) underpinning an integrated policy cycle have been proposed for all emission sectors. A selected set of indicators for the Energy Industries is illustrated below as an example.

ISSUE	AGENDA SETTING	FORMULATION	EVALUATION
Rising energy costs due to heavy reliance on imported fossil fuels (supply side)	1. Per capita energy bill (US$/person/year) 2. Fossil fuel use (% of total final energy and electricity consumption) 3. Fossil fuel subsidies (US$/year) 4. Share of floor area of green buildings in the total park of buildings (%)	1. Share of renewables in electricity production (%) 2. Economic and financial incentives (US$/year) to invest in renewable energy sources and energy storage technologies 3. Investments in grid strengthening (US$/year) 4. Installed capacity of different types of renewables (MW) 5. Number of persons trained in renewable value chains (sex disaggregated)	1. Reduced costs of energy imports (US$/year) 2. National and household energy savings (US$/ year) 3. Emissions from electricity generation and consumption (tCO_2/year) 4. Grid emission factor (tCO2 /MWh) 5. Number of green jobs created in the electricity supply and demand value chains
Low adoption of end use energy efficiency (demand-side management)		1. Amount of incentives for energyefficient appliances (US$/year) 2. Number of energy efficiency performance standards and labels, including building energy codes, that are enforced 3. Number of persons trained in demand-side management value chains (sex disaggregated) 4. Number of annual energy audits and energy value (GJ / GWh) carried out in manufacturing and commercial and distributive trades 5. Number of registered energy auditors 6. Investments in urban green infrastructure (US$/year)	

Financing Mitigation Measures

A marginal abatement revenue curve analysis of the mitigation measures finds that most mitigation measures for the energy industries are expected to yield a positive return on investment compared to the BAU scenario, while contributing to the achievement of emission reductions. Only four of the thirty-two mitigation measures presented in this NCCMSAP, the Installation of additional 29 MW utility-scale PV (EI2.1), the Installation of additional 214 MW rooftop PV (residential, commercial, and educational institutions) [EI2.2], the Operationalisation of the Light Rail System between Curepipe and Port-Louis (LT4.1) and the Planting of 600,000 trees over a period of 7 years along the M1/M2 motorways (F1.1) are found to be investment-ready. Three actions have a high level of maturity, EI2.4, LT3.2 and L1.1, but still lack clarity regarding the financial mechanism or implementation arrangements. The remaining actions are found to be in need of support for preparation and/or development, or are expected to be implemented in the longer term. This highlights the need for increased strategic resource allocation for the implementation of mitigation measures, and enhanced financial, technological development and transfer, and capacity building from the international community.

Part of the USD 3.082 billion needed for the implementation of the NCCMSAP are expected to be covered by government resources (7,6%), while the majority of the needed investments are expected to be covered by the private sector, donors, and other external sources. Mauritius should continue to secure finance for the implementation of the NCCMSAP through its existing long-standing strategic relationship with international partners, while exploring new funding opportunities and diversifying both the funding sources and applied financial instruments.



1. INTRODUCTION

1. INTRODUCTION

The scientific consensus is clear that unabated emissions of greenhouse gases (GHGs) in the atmosphere will have irreversible detrimental effects on the global climate system.[1] The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC)[2] is to achieve stabilisation of atmospheric greenhouse gases (GHGs) at a level that would prevent dangerous anthropogenic interference with the climate system. The post-2020 legal instrument for achieving the objectives of the UNFCCC is the Paris Agreement. Its objective is to constrain the temperature increase to well below 2°C and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.[3] Each Party to the Paris Agreement is expected to communicate ambitious efforts in Nationally Determined Contribution (NDC) reflecting the common but differentiated responsibilities and respective capabilities in the light of its national circumstances. Mauritius submitted its initial NDC in 2015[4] and an updated and enhanced NDC in 2021.[5] The increased mitigation ambition is reflected by an increase in economy-wide emissions reductions from 30% to 40% in 2030 relative to the business-as-usual (BAU). According to the updated NDC, business-as-usual (BAU) emissions would reach 6.9 $MtCO_2e$ in 2030.

Connected to the NDC is the preparation and communication of mid-century strategies, plans, and actions[6] for low GHG emissions development in line with the National Climate Change Mitigation Strategy and Action Plan for Mauritius (NCCMSAP). Another requirement of the Paris Agreement is the need for a Party to provide information necessary for clarity and transparency related to progress made in the implementation of contributions. In this respect, and while noting some flexibility for developing countries on the information to be reported and providing Small Island Developing States (SIDS) the option to submit the information at their discretion, Parties are expected to submit Biennial Transparency Reports (BTRs) by December 31, 2024. In order to be able to carry out reporting on implementation progress as well as on support needed and received, an Enhanced Transparency Framework (ETF) needs to be established at the national level.

The long-term objective of the NCCMSAP is "to contribute towards achieving a net-zero carbon society by 2070 while achieving the Sustainable Development Goals". It is underpinned by several Rio Principles, including: sovereignty (Principle 2), common-but-differentiated responsibilities and respective capabilities (Principle 7), inclusiveness and subsidiarity (Principle 10), women and youth participation (Principle 20 and Principle 21), intergenerational equity (Principle 3), poverty elimination (Principle 5), precautionary approach (Principle 15), and partnerships (Principle 27).

Scope of the National Climate Change Mitigation Strategy and Action Plan

Article 4 of the Paris Agreement states that Parties[7] should aim to reach global peaking of GHGs as soon as possible and to undertake rapid reductions thereafter based on the best available science in order to achieve balance between anthropogenic emissions and removals by sinks of GHGs – i.e. net zero carbon emissions – in the second half of this century. Reductions in GHGs are to be carried out on the basis of equity and based on national circumstances[8] to support sustainable development and the eradication of poverty. Article 4 of the Paris Agreement is reflected in Section 14 of the Climate Change Act (CCA) 2020[9], which provides the legal framework towards making Mauritius a climate change-resilient and low-emission country. The NCCMSAP responds to Article 4 of the Paris Agreement and Section 14 of the CCA 2020, and, in particular, to the provisions of its Section 14(3) shall include –

(a) National development priorities;
(b) Policy formulation, including national policies and measures for mitigation and the enhancement of sinks;
(c) An action plan and investment programme;
(d) Information on compliance with international commitments;
(e) Research and development;
(f) Climate data and information;
(g) Recommendations on education, training, and public awareness; and
(h) Approaches for monitoring, evaluation, and reporting."

1 IPCC (2021) Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson- Delmotte, V., et al. (eds.)]. Cambridge University Press.
2. UNFCCC (1992) United Nations Framework Convention on Climate Change. https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf. Accessed April 15, 2022.
3. UNFCCC (2015) Decision 1/CP.21: Adoption of the Paris Agreement. Paris Climate Change Conference, Paris, France.
4. Republic of Mauritius (2015) Intended Nationally Determined Contribution for the Republic of Mauritius, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.
5. Republic of Mauritius (2021) Update of the Nationally Determined Contribution of the Republic of Mauritius, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.
6. The long-term, low-carbon strategies that have been communicated to the UNFCCC are found at: https://unfccc.int/process/the-paris-agreement/long-term-strategies - accessed October 19, 2021.
7. Article 4(6) states that 'The least developed countries and small island developing States may prepare and communicate strategies, plans, and actions for low greenhouse gas emissions development reflecting their special circumstances'.
8. Parties should strive to formulate and communicate their long-term low GHG emission development strategies, mindful of Article 2 – i.e. pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels – using the principle of common but differentiated responsibilities and respective capabilities; PNK Deenapanray (2021) Increasing the ambition of mitigation action in small emitters: the case of Mauritius, Climate Policy 21(4):514-528.
9. Republic of Mauritius (2020) The Climate Change Act 2020, Government Gazette of Mauritius No. 145 of 28 November 2020.

Approach Used for Mitigation Assessments

Mitigation assessments can be made based on a combination of three alternatives: (i) a project- or activity-based approach, (ii) an outcome-based approach, or (iii) a combination of the two. These types of mitigation actions, known as 'contribution type' are depicted in **Figure 1.**

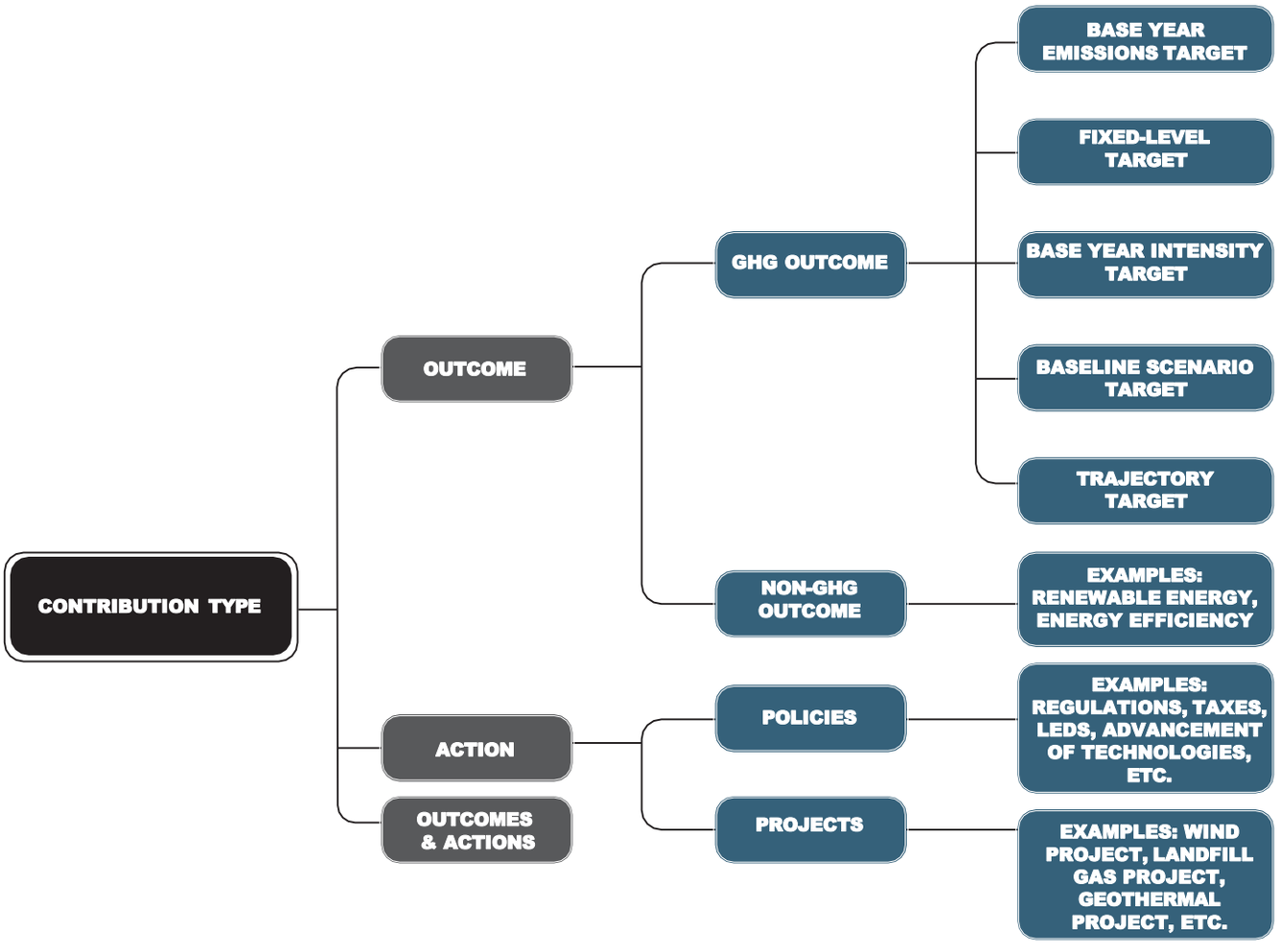


Figure 1. Definition of Different Types of Mitigation Contributions
(Source: WRI & UDP 2015)

In developing the NCCMSAP, both activity-based (bottom-up) and outcome-based (top-down) approaches have been adopted. The overall level of GHG emission reductions, or sequestration, has been calculated by developing BAU sectoral baseline scenarios and mitigation scenarios comprised of mitigation actions.

The NCCMSAP has been formulated based on the objectives and goals emanating from the Inter-Ministerial Council on Climate Change, as captured in the updated NDC. The strategy and action planning have hinged on three interrelated activities, namely: (i) stakeholder engagement; (ii) identification and prioritisation of mitigation actions; and (iii) policy and mitigation scenario analyses, including costing.

Stakeholder engagement is a cornerstone of the CCA 2020, both through Section 8(2)(l) and Section 19 on public consultation, where public institutions should carry out public consultations for the purpose of developing strategies and policies. As per Section 19 of the CCA 2020, the process of formulating the Mitigation Strategy and Action Plan requires broad stakeholder consultations, including cross-sectoral coordination between public institutions. A Stakeholder Engagement Plan (SEP)[10] has been developed to guide the facilitation of multi-stakeholder processes in order to achieve inclusiveness in participation.

Mitigation actions were identified using policy documents and expert knowledge on mitigation technologies and deployment pathways that are detailed for each sector below. For the purpose of the NCCMSAP, the definition of sectors has been aligned with the nomenclature of the Intergovernmental Panel on Climate Change (IPCC). A BAU GHG emission scenario was modelled for each sector (or sub-sector), reflecting the absence of a mitigation strategy and action plan. Similarly, alternative lower-emission scenarios were modelled for the identified mitigation policies and actions.

10. Ministry of Environment, Solid Waste Management and Climate Change (2022) Stakeholder Engagement Plan, MESWMCC, Mauritius.

The modelling approaches and customised tools for carrying out mitigation scenario analyses[11] are listed in **Table 1**.

Energy industries (electricity generation and use)	System dynamics model customised for Mauritius.[12] Customization was carried out in collaboration with the Central Electricity Board (CEB). The model has been transferred to CEB, and the purchase of necessary software to run (and update) the model and mitigation scenarios was funded by this GEF-financed NAMA project.
Transport (land)	Econometric modelling of travel demand for passengers and freight[13] and allocation of total travel demand to different modes of land transportation. Disaggregation of travel demand by vehicle type is then converted to energy use and greenhouse gas emissions.
Solid waste management	Excel-based tool customised for Mauritius using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[14]
Waste water management	Excel-based tool customised for Mauritius using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[15]
Agriculture (food crops and livestock waste management)	Excel-based tool customised for Mauritius using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[16]
Forestry	Excel-based tool customised for Mauritius using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[17]
Refrigeration and air conditioning	Excel-based tool customised for Mauritius using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.[18]
All sectors	The development of the Marginal Abatement Revenue Curve (MARC) has been carried out using the Greenhouse Gas Abatement Cost Model (GACMO) developed by the United Nations Environment Programme (UNEP) Copenhagen Climate Centre.

Table 1: Approaches and Tools Used to Carry Out Mitigation Scenario Analyses in NAMA project

11. *PNK Deenapanray and AM Bassi (2022) Mitigation Scenarios Modelling for Strategic Planning in Mauritius; The tools have been developed as open-source products, and have been shared with institutional stakeholders.*
12. *More details of the structure of the model can be found in: Bassi A.M., and Deenapanray, P.N.K. (2012). A green investment analysis using system dynamics modeling – The case study of Mauritius. Small States: Economic Review and Basic Statistics, 16(12):256-265; Deenapanray, P.N K., and Bassi, A.M. (2015). System dynamics modelling of the power sector in Mauritius. Environmental and Climate Technologies, 16(1):20-35.*
13. *PNK Deenapanray, N Khadun (2021) Land transport greenhouse gas emission scenarios for Mauritius based on modelling transport demand, Interdisciplinary Perspectives in Transportation Research 9, 100299.*
14. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf - accessed January 18, 2022.*
15. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_6_Ch6_Wastewater.pdf - accessed November 20, 2021.*
16. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_05_Ch5_Cropland.pdf; https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_Ch10_Livestock.pdf - accessed February 18, 2022;*
17. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf - accessed February 18, 2022.*
18. *https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/3_Volume3/V3_7_Ch7_ODS_Substitutes.pdf - accessed February 15, 2022.*

2. CLIMATE GOVERNANCE IN MAURITIUS AND ENABLING ACTIONS FOR THE FORMULATION AND ACHIEVEMENT OF NDC COMMITMENTS

2 CLIMATE GOVERNANCE IN MAURITIUS AND ENABLING ACTIONS FOR THE FORMULATION AND ACHIEVEMENT OF NDC COMMITMENTS

2.1. National Climate Governance

The CCA 2020 sketches the institutional arrangements for climate governance in the Republic of Mauritius. A schematic representation of the institutional mechanism proposed in the CCA 2020 is shown in **Figure 2**. The main organs of this institutional structure are:

- The apex body, the **Inter-Ministerial Council on Climate Change** (IMCCC), is established as per Section 4 of the CCA 2020. Section 5 of the Act mandates the IMCCC to set national objectives, goals, and targets, determine policies and priorities for climate change adaptation and mitigation, and to monitor and review progress made by public departments on any aspect of climate change projects and programmes. Although not mentioned explicitly, it is understood that the objectives, goals, and targets set by the IMCCC will be used to formulate the National Climate Change Mitigation Strategy and Action Plan (NCCMSAP)[19] and the corresponding NDC. The IMCCC is composed of Ministers, and it is chaired by the Prime Minister. The Chief Commissioner of Rodrigues can be invited to attend IMCCC meetings on a need basis. The Director of the Department of Climate Change will act as Secretary to the IMCCC;
- Based on the national objectives, goals, and targets set by the IMCCC, the **Minister** (MESWMCC) is to propose and develop policies on climate change (adaptation and mitigation) as per Section 7(1) of the Act. The Minister may set up Technical Advisory Committees on a needs basis;
- **A Department of Climate Change** (DCC) is established under Section 8(1), and it will be headed by a Director (Section 9). The responsibilities of the Director are stipulated in Section 9(3). The Director is responsible for executing the climate change policy of the Ministry. In turn, the DCC shall be responsible for developing policies, formulating and implementing measures, coordinating, monitoring and evaluating programmes and action plans relating to climate change, as well as conducting and coordinating research on climate change.

Reporting on progress made in the formulation and implementation of climate change strategies and action plans in order to achieve the goals and objectives set by the Council flows from the DCC to the Minister to the Council. Section 9(3) is explicit that the Director of the DCC shall report to the Minister: (i) on an annual basis regarding the compliance with Section 16 of the CCA 2020 relating to the duties of public and private institutions (discussed in the next section), and (ii) on any such matters as may be required under the CCA 2020.

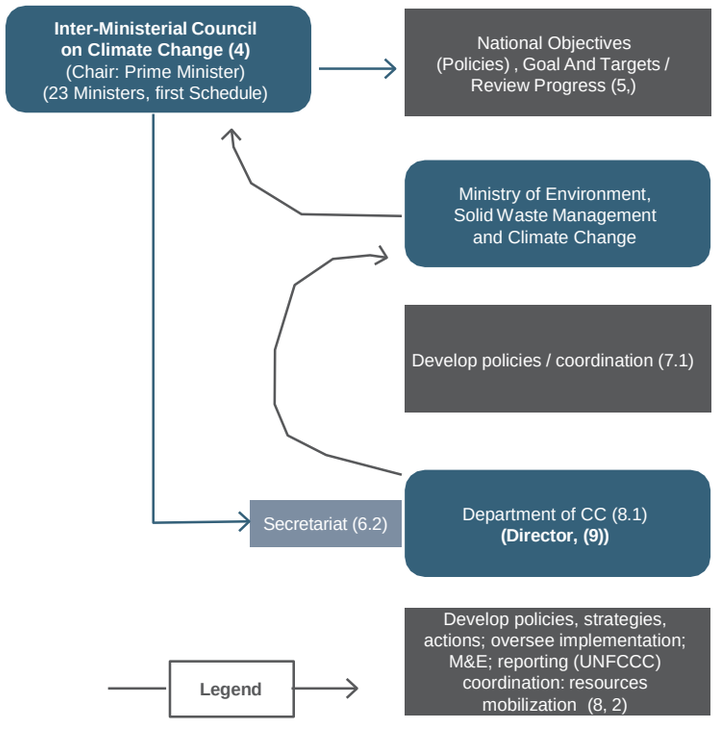


Figure 2. Schematic of Institutional Arrangements Proposed in the Climate Change Act 2020

19. The institutional arrangements for developing the NMSAP as per Section 15 of the Act are discussed in section 4 of this report.

Since climate change is a developmental issue that cuts across all socioeconomic systems, the CCA 2020 also makes provision for carrying out multi-stakeholder coordination. For this, a Climate Change Committee (CCC) is established under Section 11(1), which shall coordinate the implementation of activities related to greenhouse gas inventories, greenhouse gas emission reductions, climate change vulnerability assessments, and adaptation and ensure compliance with the provisions of the CCA 2020, as well as monitoring climate change relevant targets of Sustainable Development Goals (Section 11(3)). The CCC is chaired by the Supervising Officer (Permanent Secretary, MESWMCC), and is constituted by representatives from 29 public institutions; 1 professional body; 1 civil society; 1 private sector as per Section 11(1). This Committee is expected to report to the Minister on progress made in discharging its functions every 2 years (Section 11(4)). It adjourns on a monthly basis, and has the mandate to establish subcommittees as may be necessary. The Secretariat of the CCC is a public officer of MESWMCC chosen by the Supervising Officer (presently an Assistant Permanent Secretary).[20] The institutional arrangements, including the CCC and subsidiary bodies that may be established, are shown in **Figure 3.**

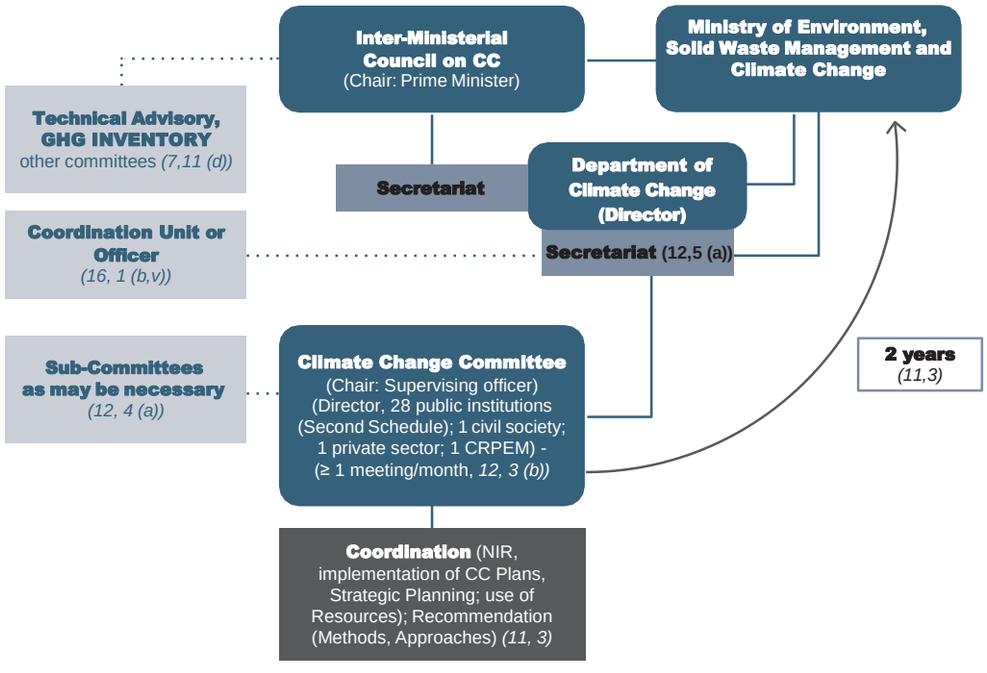


Figure 3. Additional Structures Proposed in the CCA 2020

Similarly, the CCA 2020 proposes the setting up of a **Rodrigues Climate Change Committee** (RCCC), which shall coordinate strategic planning and policies in the field of climate change in Rodrigues, coordinate the implementation of climate change measures, and collaborate and coordinate with the DCC for reporting purposes to the UNFCCC Secretariat. The Departmental Head of the Commission (Environment) has the mandate to appoint any officers to support the RCCC in discharging its functions.

According to Section 15(4) (b) of the CCA 2020, the General Manager of the Outer Islands Development Corporation (OIDC) shall, at the request of the Department, provide data on GHG emissions and sinks for the preparation of the annual GHG inventory report.

20. The CCA 2020 does not explicitly state that the said Public Officer should be from the Department of Climate Change.

2.2. Enabling Factors for Mitigation Strategic Planning

Several enabling factors, or drivers of change, will be required to implement all sectoral mitigation strategies and actions that are detailed in the NCCMSAP. The mitigation landscape is dynamic, and actions to 2030 must be extended to reach the long-term objective of a net-zero carbon society. Hence, the following enabling factors underpin a forward-looking approach to decarbonisation in the Republic of Mauritius, as well as supporting the country to respond to the requirements of the Paris Agreement.

2.2.1. Legal and Institutional Arrangements

The Climate Change Act 2020 makes provisions for institutional arrangements, mainly at the national level, for carrying out stakeholder coordination related to climate change. It also broadly lists the roles and responsibilities of stakeholders. In order to foster the Principles of subsidiarity and inclusiveness (Rio Principle 10[21]) and partnerships (Rio Principle 27[22]), and to operationalise the roles and responsibilities of stakeholders as per the requirements of the Paris Agreement, **Table 2** proposes Strategies and Actions to improve the national climate governance discussed above. Institutional arrangements should allow for stakeholders to be coordinated in two distinct processes, namely: (i) processes related to UNFCCC initiatives (e.g. national communications, biennial transparency reports, and the Nationally Determined Contribution) that are under the oversight of the CCC; and (ii) processes related to the formulation of sectoral mitigation strategies and action plans. Plans to engage stakeholders in the two processes are likely to be distinct as well.

21. *Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided*
22. *States and people shall co-operate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.*

LEGAL AND INSTITUTIONAL (LI) ARRANGEMENTS				
	STRATEGY	**ACTION**	**TIME FRAME**	**OWNER**
LI1	Improved legal framework for enhanced climate governance	**LI1.1.** Update the Climate Change Act 2020 and associated legislation using an adaptive management approach based on lessons learned from its application	Ongoing	MESWMCC, DCC
		LI1.2. Strengthen laws & regulations, such as creating a legal code for defining the responsibilities of main emitters, introducing extended producer responsibility, and adopting novel market-based tools to support mitigation actions	Ongoing	MESWMCC, DCC
		LI1.3. Update the National Code of Corporate Governance 2016 for public interest entities to explicitly integrate climate risk analysis	2023-2024	Ministry of Financial Services and Good Governance (MFSGG)
LI2	Improving stakeholder coordination for climate inclusiveness	**LI2.1.** Operationalise Sectoral Guidelines for supporting institutions to carry out their obligations, and roles and responsibilities	2022 - 2025	DCC & institutional stakeholders
		LI2.2. Establish a work programme under the aegis of the CCC that will culminate in the setting up of a formal institutional mechanism for taking the views of children and youth into account in public decision-making related to climate change	2022 - 2023	CCC
		LI2.3. Provide technical support to stakeholders to fulfil their respective roles and responsibilities in relation to Operational Guidelines (LI2.1)	2022 - 2024	DCC & institutional stakeholders
		LI2.4. Support provided to institutional stakeholders to implement the Stakeholder Engagement Plan (SEP) for engaging all key stakeholders in the formulation of sectoral mitigation strategies, action plans, and projects/programmes	2022 - 2024	DCC & institutional stakeholders
LI3	Institutional strengthening of public institutions to integrate the function of climate change	**LI3.1.** Identify the human needs and technical capacity needs of institutional stakeholders to implement the provisions of the CCA 2020	2022	DCC & institutional stakeholders
		LI3.2. Scale up ef forts to establish and operationalise Climate Change Units / Focal Points in public and private institutions	2022 - 2024	DCC & institutional stakeholders
		LI3.3. Training provided to policymakers on Integrated Policy Planning for mainstreaming climate change mitigation in sectoral policies, strategies, and action plans.	2022 - 2024	DCC & institutional stakeholders
		LI3.4. Establish a formal Scientific Advisory Body for the Inter-Ministerial Council to enhance the science-policy interface	2022	MESWMCC; DCC
LI4	Institutional strengthening for enhanced regional and international climate dialogues	**LI4.1**. Establish a work programme under the aegis of the CCC that will enhance the capacity of Mauritius to contribute to regional and international climate dialogues for enhanced climate governance	2025	CCC

Table 2: Strategies and actions for strengthening National Climate Governance

2.2.2. Technology Transfer and Financing

The process of achieving the long-term objective is dynamic, implying that there will be a constant need to review, revise, and update the NCCMSAP. Two important aspects of this process are: (i) to scan for technological change; and (ii) to mobilise sufficient financial resources for implementation. The investment plan for the NCCMSAP is detailed in section 10. The Strategies and Actions addressing the provisions made under Article 10 (technology development and transfer) and Article 9 (financing) of the Paris Agreement are given in **Table 3** and **Table 4**, respectively.

TECHNOLOGY DEVELOPMENT AND TRANSFER (TT)				
	Strategy	**Action**	**Time Frame**	**Owner**
TT1	Developing and updating Technology Action Plans (TAPs)	**TT1.1.** Apply the Guidelines for identifying and prioritising mitigation technologies in all emitting sectors using a participatory, inclusive multi-stakeholder process	2022-2030	DCC; institutional stakeholders
		TT1.2. Carry out a barrier analysis and detail the enabling environment for prioritised technologies	2022-2030	DCC; institutional stakeholders
		TT1.3. Develop Technology Action Plans (TAPs) and use them to formulate bankable proposals to attract international climate finance and funding from development partners and to update sectoral strategies and action plans	2022-2030	DCC; institutional stakeholders
		TT1.4. Update TAPs on a regular basis to inform the formulation of a higher-level ambition NDC and the continuing effort to attract climate finance	2022-2030	DCC; institutional stakeholders
TT2	Institutional and human capacity strengthening for TT action planning	**T2.1**. Capacity building on the Technology Needs Assessment (TNA) methodology and tools	2022 - 2024	DCC
		T**T2.2.** Institutionalisation of TNA methodology and tools to develop TAPs through application of the Sector Guidelines (LI3.1)	2022-2024	DCC; institutional stakeholders

Table 3: Strategies and Actions for Technology Transfer

FINANCING (F)				
	STRATEGY	**ACTION**	**TIME FRAME**	**OWNER**
F1	Institutionalising direct access and tracking flows of climate finance	**F1.1.** Implement budget tags and codes for tracking the allocation of climate finance in national budgetary process (including Funds related to CC such as the National Environment and Climate Change Fund, disaster funds)	2022-2024	MFEPD
		F1.2. Establish and operationalise National Implementing Entity (NIE) for direct access to multilateral climate funds as per Section 24 of CCA 2020	2022 - 2024	MFEPD; MESWMCC; Mauritius Renewable Energy Agency (MARENA)
F2	Institutional and human capacity strengthening for accessing international climate finance	**F2.1.** Develop a Climate Finance Policy and Strategy Framework (including a national Work Programme that identifies and prioritises projects/programmes for financial resource mobilisation)	2022 - 2023	MFEPD; DCC
		F2.2. Enhance human capacity (public, private, civil society, and non-profit organisations, academia) to develop bankable proposals to attract international climate finance from multilateral (e.g. Green Climate Fund) and bilateral sources (a learning-by-doing approach is preferred)	ongoing	MFEPD; DCC; institutional stakeholders
		F2.3. Develop a pipeline of concept notes and proposals to increase preparedness to attract climate finance based on country priorities (sections 2 to 8 and TT1.3)	ongoing	MFEPD; DCC; institutional stakeholders
		F2.4. Strengthen donor / development partner coordination to match concept notes and proposals with potential sources of climate finance	ongoing	MFEPD; Ministry of Foreign Affairs, Regional Integration and International Trade (MFARIIT)
		F2.5. Leverage private sector participation and investments through public-private engagements	ongoing	MFEPD; DCC; BM

Table 4: Strategies and Actions for Climate Financing

Education and Research, Awareness Raising, and the Role of Media

Climate change is a fast-evolving area that requires adaptive education at all levels. Research on all aspects of climate change can provide a scientific basis for informed decision-making. As per the Mauritius Meteorological Services (MMS) Act 2019, the MMS has the mandate to promote education, sensitization, and awareness on weather and climate. Also, all stakeholders in the country have an influence on emissions of greenhouse gases, and they are, in turn, impacted by decisions that are taken to reduce emissions. Consequently, outreach activities on climate mitigation are necessary and reflective of an inclusive approach to achieving the long-term objective of a net-zero carbon society. In this process, media outlets constitute a key group of stakeholders. **Table 5** gives the Strategies and Actions related to these elements of climate change mitigation.

EDUCATION AND RESEARCH (ER)				
	STRATEGY	**ACTION**	**TIME FRAME**	**OWNER**
ER1	Integrating climate change into educational curricula at all levels	**ER1.1.** Strengthen the integration of the science of climate change and climate change mitigation in primary and secondary school curricula, including adequate pedagogical tools for learning-by-doing and interactive approaches.	Ongoing	Ministry of Education, Tertiary Education, Science and Technology (METEST); Mauritius Institute of Education (MIE); MMS; DCC
		ER1.2. Support the development of undergraduate and postgraduate courses in areas of climate change mitigation where gaps exist.	Ongoing	METEST; Higher Education Commission (HEC); Higher Education Institutions (HEIs); MMS; DCC
		ER1.3. Review and update / develop vocational training courses for supporting climate change mitigation based on needs gap analyses, in conjunction with the private sector.	Ongoing	METEST; Mauritius Institute of Training and Development (MITD); DCC
		ER1.4. Support the establishment of environmental clubs within schools at all levels to incentivise students to participate in climate mitigation actions.	Ongoing	METEST; MESWMCC; Service Diocésain de L'Éducation Catholique (SEDEC)
ER2	Enhance the science-policy interface for evidence-based public policy decision-making	**ER2.1.** Support provided to tertiary institutions for the development of trans disciplinary approaches to climate science, mitigation scenario analyses, and technology development and transfer to support the science-policy interface through the Scientific Advisory Body (see LI3.4). Data sharing for the purpose of research to support the science-policy interface will also be facilitated.	Ongoing	DCC; HEIs; METEST
		ER2.2. Support to establish collaborations between local research institutions and regional and international counterparts to strengthen local institutional capabilities in all aspects of climate research, including mobilisation of regional and international research funding.	Ongoing	DCC; HEIs; METEST; MARENA
		ER2.3. Establish dedicated priority funding for research on climate change in support of the science-policy interface.	2023 onwards	HEC; Mauritius Research and Innovation Council (MRIC); DCC

AWARENESS RAISING (AR)				
AR1	Communication strategy for stakeholder outreach	**AR1.1.** Develop a communication strategy based on the Stakeholder Engagement Plan (SEP) and Gender and Youth Action Plan developed at LI3.2 and GY1.2, respectively.	2023-2024	DCC; Ministry of Gender Equality and Family Welfare (MGEFW); Ministry of Youth Empowerment, Sports and Recreation (MYESR)
		AR1.2. Carry out outreach activities to cover communication and awareness-raising on all climate-related issues with stakeholders at all levels.	Ongoing	DCC
AR2	Building partnerships for enhancing awareness on climate issues	**AR2.1.** Build partnerships between the public, private, NGOs and CSOs to deliver the most effective and efficiency sensitisation campaigns at all levels	Ongoing	DCC
		AR2.2. Awareness raising among policymakers, parliamentarians, and legislators to enhance cross-sectoral integration of climate mitigation in public policies.	Ongoing	DCC

CONTRIBUTION OF MEDIA (ME)				
ME1	Enhancing the role of the media as a conduit between decision makers and all stakeholders	**ME1.1.** Capacity building of journalists and influencers on the science of climate change, mitigation scenarios, and the sustainable development benefits of mitigation.	Ongoing	DCC
		ME1.2. Establish focal points in traditional media outlets and engage them on a regular basis to communicate about all climate related initiatives.	2022	DCC
		M**E1.3.** Enhance the capacity of the government to utilise emerging digital media platforms to carry out large-scale outreach activities related to climate change to reach all stakeholders.	2022 2023	Ministry of Information Technology, Communication and Innovation (MITCI)
		ME1.4. Government to ensure that appropriate media and outreach approaches are used to target children, young people, and other vulnerable groups that do not have access to traditional media or digital media	Ongoing	DCC

Table 5: Strategies and Actions for Education and Research, Awareness Raising, and the Role of Media

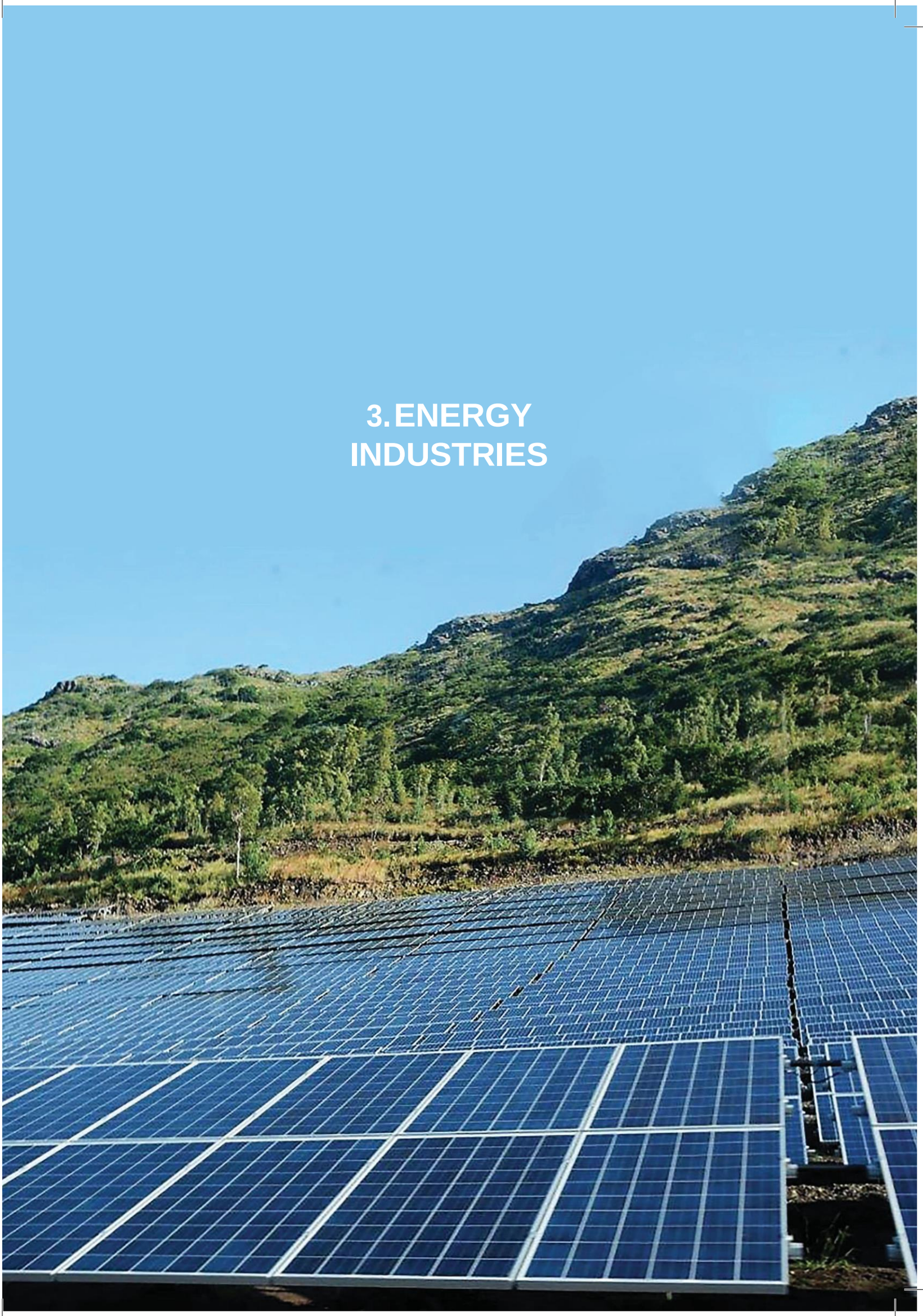
2.2.3. Gender, Children and Youth Mainstreaming

Women, children and youth form a significant segment of the population. A gendered approach to climate change is envisaged from a Human Rights approach. Also, children and youth are key stakeholders that are often neglected in climate change policymaking, despite the fact that it is known that future climate changes will become more severe. By virtue of the fact that long-term mitigation strategies are forward-looking and spanning at least one generation (25-30 years), children and youth will be called upon to implement those strategies. Hence, it is equally important to include their interests and concerns in the strategic decision-making process. **Table 6** lists the Strategies and Actions for mainstreaming gender and youth in climate governance, which are additional to the strengthening of stakeholder inclusiveness **(Table 2).**

GENDER, CHILDREN AND YOUTH (GY)				
	POLICY	**ACTION**	**TIME FRAME**	**OWNER**
GY1	Gender and youth mainstreaming in climate change	**GY1.1**. Carry out Gender, Children and Youth Analysis as part of baseline assessments when formulating sectoral climate mitigation strategies and projects/programmes in collaboration with relevant organisations.	2023	MGEFW; MYESR; DCC
		GY1.2. Formulate Gender, Children and Youth Action Plan for all sectoral climate strategies and projects/programmes in collaboration with relevant organisations.	MGEFW; 2024	MYESR; DCC
GY2	Institutional and human capacity strengthening for gender and youth mainstreaming in climate change	**GY2.1.** Enhance the human capacity of specialised focal person(s) dealing with gender, children and youth. Also, to propose best practices for institutional coordination in other institutions, such as academia and the private sector.	2022 onwards	MGEFW; MYESR; DCC; institutional stakeholders
		GY2.2. Capacity building of public and private institutions to carry out Gender and Youth Analysis, and to develop Gender, Children and Youth Action Plan for climate-related initiatives.	2023 onwards	MGEFW; MYESR; DCC; institutional stakeholders

Table 6: Strategies and Actions for Gender, Children and Youth Mainstreaming

3. ENERGY INDUSTRIES



3. ENERGY INDUSTRIES

3.1. Sectoral Emission Profile

The Energy Industries (EI) are related to the production of electricity from a combination of renewable and non-renewable energy sources. Since production is carried out to match consumption, electricity end-use efficiency (demand-side management) is also included. The island of Mauritius has one electricity network comprised of a number of power plants and power units, with a total of 849.1 MW installed capacity in 2021.[23] The distribution of installed generation capacities is listed in **Table 7** in terms of renewable and non-renewable production and public (Central Electricity Board, CEB) and private (Independent Power Producer, IPP) generation. The largest share (668.4 MW) of electricity generation capacity is for thermal generation using fossil fuels (Heavy Fuel Oil - HFO and coal) and renewable biomass in the form of bagasse. Thermal generation using Landfill Gas is relatively small at 3.45 MW. The combined installed capacity of photovoltaic (PV), wind, and hydroelectric generation was 177.195 MW.

PRODUCER	THERMAL (HFO)	THERMAL(COAL AND BAGASSE)	THERMAL (LANDFILL GAS (LFG)	PV	WIND	HYBRID
CEB	438.0	-	-	5.165	-	60.5
IPP		230.40	3.45	102.18	9.35	-

Table 7: Installed Power Generation Capacity in Mauritius, 2021 (MW)

The effective plant capacity was 760.9 MW in 2021, when peak demand reached 470.8 MW. It is observed that the peak demand was 507.2 MW in 2019. The baseline year of 2019 has been used for mitigation scenario analysis as it provides a more realistic baseline for electricity production compared to 2020 and 2021, when the generation and consumption of electricity were affected by Covid-19.

The Energy Industries is the single largest source of GHG emissions in Mauritius. In 2019, it contributed ~2,450 $ktCO_2e$ - i.e. just over 57% of national emissions.[24] In Mauritius, there is a relatively high share of renewable electricity generation. Of the 3,192.5 GWh generated in 2019, 259.3 GWh was generated using non-biomass renewable energy technologies: hydro (98.6 GWh), wind (12.9 GWh), photovoltaic (128.0 GWh) and landfill gas (19.8 GWh). A further 439.6 GWh of electricity was generated from the combustion of bagasse, which is a renewable biomass. Hence, around 21.9% of the total electricity generated in Mauritius was from renewable energy sources. Except for hydropower and some PV that is generated by the Central Electricity Board (CEB), the remaining renewable electricity was generated by Independent Power Producers (IPPs). In 2019, the CEB and the IPPs generated 44.4% and 55.6% of total electricity in Mauritius, respectively.[25]

The non-renewable electricity was produced from thermal energy sources, including heavy fuel and diesel oil (1,349 GWh or 41.7% of electricity), and coal (1,174 GWh or 36.3% of electricity), which constitute the sources of GHG emissions.[26] The fuel input for the thermal generation of electricity was 1,904.12 kilotonne in 2019, with the largest share (47.9%) and the smallest share (0.1%) going to coal and diesel oil, respectively **(Figure 4).**

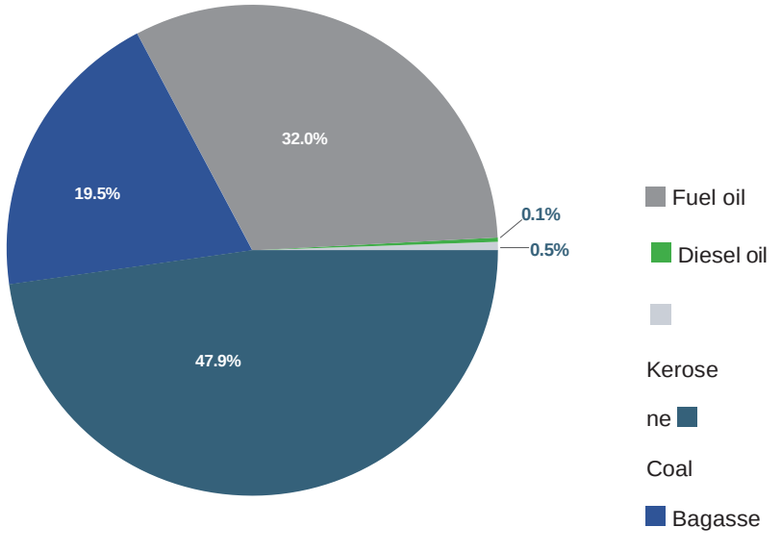


Figure 4. Fuel Input for Thermal Generation, 2019 (%)

23. Statistics Mauritius. 2022. Energy and Water Statistics – 2021, Ministry of Finance, Economic Planning and Development, Mauritius.
24. Statistics Mauritius, 2020. Environment Statistics – 2019, Ministry of Finance, Economic Planning and Development, Mauritius.
25. Statistics Mauritius. 2022. Energy and Water Statistics – 2021, Ministry of Finance, Economic Planning and Development, Mauritius.
26. Statistics Mauritius, 2020. Energy and Water Statistics – 2019, Ministry of Finance, Economic Planning and Development, Mauritius; Statistics Mauritius, 2022. Digest of Statistics Rodrigues – 2021, Ministry of Finance, Economic Planning and Development, Mauritius.

3.2. Sectoral Strategies and Targets

The sectoral strategies and targets underpinning low-carbon development in the EI are aligned with those reported in the updated NDC. The key mitigation objective by 2030 is to reduce overall greenhouse gas (GHG) emissions by 40%, predominantly by increasing the share of energy generation from green sources to 60% **(Table 8)**, including phasing out the use of coal, and increasing economy-wide efficiency in electricity end-use by 10% relative to 2019.

Electricity production is planned according to the Renewable Energy Roadmap 2030 for the Electricity Sector – Review 2022[27] which has as its main objectives:

- The establishment of the Green Energy Industries as an economic pillar of activity;
- An accelerated increase in the share of Renewable Energy in the electricity mix to 60% by 2030, including the phasing out of the use of coal in electricity generation before 2030.

The above objectives also take into account the electrification of the land transport sector, especially through the implementation of the 10-year Electric Vehicle Integration Roadmap for Mauritius.[28]

RENEWABLE ENERGY TECHNOLOGY	INCREMENTAL CAPACITY (MW)
Solar PV (Utility)	29
Solar PV (Rooftop)	214
Solar PV (Floating PV)	32
Offshore wind	50
Marine renewables	20
Renewable energy from waste	10
Renewable Energy Hybrid Facility, REHF (solar PV + battery)	100
REHF biomass	100
REHF small-scale	40
REHF (solar + wind + battery)	100
TOTAL	**695**

Table 8: New Renewable Energy Capacity Additions for Electricity Generation: 2022-2030
Source: Renewable Energy Roadmap 2030 for the Electricity Sector – Review 2022

27. MEPU, MARENA, CEB and EEMO (2022) Renewable Energy Roadmap 2030 for the Electricity Sector – Review 2022, Ministry of Energy and Public Utilities, Port Louis. The capacity additions and timeline for investments are already prioritised.
28. EVConsult and Ecosis Ltd. (2020) A 10-year Electric Vehicle Integration Roadmap for Mauritius.

3.3. Mitigation Actions, Enabling Measures and Finance Needs

The mitigation actions are detailed in **Table 9** following the deployment of renewable energy sources contained in the Renewable Energy Roadmap 2030 for the Electricity Sector – Review 2022. It also includes an economy-wide target of 10% electricity end-use efficiency, as captured in the updated Nationally Determined Contribution (NDC).[29] The enabling measures and capital investment needs are given in **Table 10**. The capital investments required for the additional 695 MW of renewable energy installations to reach the objective of 60% renewables in the electricity mix by 2030 are taken from the Renewable Energy Roadmap 2030 for the Electricity Sector – Review 2022. The modelled total GHG emission reductions expected by 2030 are 1,942 $ktCO_2e$ relative to the BAU. The total investment cost for mitigation actions in the Energy Industries is estimated at USD 1,745.03 Million.

ENERGY INDUSTRIES, EI OUTCOME: DECARBONISATION OF THE ELECTRICITY SYSTEM USING RENEWABLE ENERGIES AND DEMAND-SIDE ENERGY EFFICIENCY TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 1,942 $ktCO_2e$ IN 2030				
ID	STRATEGY	STAKEHOLDERS ACTION	TIME FRAME	MAIN
EI2	Promote end-use energy efficiency [234 $ktCO_2e$ ER]	EI1.1. Increase economy-wide efficiency in electricity consumption by 10% in 2030 (baseline 2019)	2022 - 2030	Energy Efficiency Management Office (EEMO)
	Enhancing renewable energy sources in the electricity mix, with completed phase out of coal before 2030 [60% RE in 2030] [1,708 $ktCO_2e$ ER]	EI2.1. Installation of additional 29 MW utility scale PV	2022 - 2026	Ministry of Energy and Public Utilities (MEPU); CEB; MARENA; Private Sector (PS)
		EI2.2. Installation of additional 214 MW rooftop PV (residential, commercial, educational institutions)	2022 - 2026	MEPU; CEB; MARENA; PS
		EI2.3. Installation of additional 32 MW floating solar PV	2023 - 2026	MEPU; CEB; MARENA; PS
		EI2.4. Increase biomass generation capacity by 100 MW (hybrid facility)	2021 - 2025	MEPU; CEB; MARENA; PS
		EI2.5. RE from waste project for 10 MW	2030	MEPU;; CEB;SWMD, PS
		EI2.6. Installation of 50 MW offshore wind energy	2026 - 2030	MEPU; Ministry of Blue Economy, Marine Resources, Fisheries and Shipping; CEB; MARENA; PS
		EI2.7. Installation of 20 MW marine renewables (Wave and/or Tidal)	2026 - 2030	MEPU: Ministry of Blue Economy, Marine Resources, Fisheries and Shipping; CEB; MARENA; PS
		EI2.8. Installation of 100 MW new RE hybrid facility (solar + battery)	2026 - 2030	MEPU; CEB; MARENA; PS
		EI2.9. Installation of 40 MW new RE hybrid facility (small-scale solar + battery)	2026 - 2030	MEPU; CEB; MARENA; PS
		EI2.10. Installation of 100 MW new RE hybrid facility (solar + wind + battery storage)	2026 - 2030	MEPU; CEB; MARENA; PS

Table 9: Mitigation Strategies and Actions for Energy Industries

29. Republic of Mauritius (2021) Update of the Nationally Determined Contribution of the Republic of Mauritius, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.

EI1.1. Increase economy-wide efficiency in electricity consumption by 10% in 2030	**USD 400 million**
• Measure 1.1.1. Establish an energy efficiency (EE) Financing Scheme to promote commercial financing for EE projects in Small and Medium Enterprises (SMEs) and other companies	
• Measure 1.1.2. Establish an EE Information Centre for awareness raising and the provision of tailored technical information on EE technologies, opportunities, costs, suppliers, and energy audits by an EE Information Centre	
• Measure 1.1.3. Development of an Energy Information System	
• Measure 1.1.4. Implementation of energy efficiency measures in the building envelope	
• Measure 1.1.5. Financial incentives for retrofits (appliance and building envelope) for targeted groups	
• Measure 1.1.6. Building capacity of local installers (building envelope and systems) in the use of appropriate technologies for. efficient use of energy in buildings	
• Measure 1.1.7. Implementation of Minimum Energy Performance Standards	
• Measure 1.1.8. The use of Building Energy Management Systems in hotels and service sector buildings	
• Measure 1.1.9. Introduce energy managers in all public buildings (with appropriate training)	
• Measure 1.1.10. Implementation of a programme to eliminate energy-inefficient lamps in outdoor lighting	
• Measure 1.1.11. Efficient energy use for water pumping at the Central Water Authority, Wastewater Management Authority, and Irrigation Authority.	
• Measure 1.1.12. Improving the Energy Use Intensity of primary, secondary and tertiary educational institutions	
• Measure 1.1.13. Use of mobile applications and artificial intelligence to promote EE	
EI2.1. Installation of additional 29 MW utility-scale PV	**USD 11.75 million**
• Measure 2.1.1. Implementation of CEB's Green Field RE Scheme	
EI2.2. Installation of additional 214 MW rooftop PV (residential, commercial, and educational institutions)	**USD 120.70 million**
• Measure 2.2.1. Implementation of the Solar Home Project	
• Measure 2.2.2. Implementation of the Small-Scale Distributed Generation (SSDG) Net-Billing Scheme	
• Measure 2.2.3. Implementation of the Solar PV Scheme for charging EVs	
• Measure 2.2.4. Implementation of the Solar PV Scheme for Educational Institutions	
• Measure 2.2.5. Introduce the second phase of the Medium-Scale Distributed Generation (MSDG) Scheme	
• Measure 2.2.6. Implementation of SSDG Schemes for Cooperatives and SMEs	
EI2.3. Installation of additional 32 MW floating solar PV	**USD 19.78 million**
• Measure 2.3.1. Implementation of a 2 MW pilot at Tamarind Falls Reservoir (2023) that will then be scaled up thereafter	
EI2.4. Increase hybrid biomass generation capacity by 100 MW	**USD 325 million**
• Measure 2.4.1. Implementation of the Biomass Framework	
EI2.5. RE from waste project for 10 MW	**USD 48.1 million**
• Undertake a feasibility study for the implementation of waste-to-energy	
EI2.6. Installation of 50 MW offshore wind energy	**USD 99.3 million**
• Undertake a feasibility study for the implementation of offshore wind energy	
EI2.7. Installation of 20 MW marine renewables (Wave and/or Tidal)	**USD 114.4 million**
• Undertake a feasibility study for the implementation of marine renewables (wave and/or tidal)	
EI2.8. Installation of 100 MW new RE Hybrid Facility (solar + battery)	**USD 145 million**
• Measure 2.8.1. Launching of the Request for Proposal for the RE Hybrid Facility	
• Measure 2.8.2. Signing of the Power Purchase Agreement	
EI2.9. Installation of a 40 MW new RE Hybrid Facility (small-scale solar + battery)	**USD 200 million**
• Measure 2.9.1. Launching of the Request for Proposal for the RE Hybrid Facility	
• Measure 2.9.2. Signing of the Power Purchase Agreement	

EI2.10. Installation of 100 MW new RE Hybrid Facility (solar + wind + battery storage)	USD 261 million
• Measure 2.10.1. Launching of Request for Proposal for RE Hybrid Facility • Measure 2.10.2. Signing of Power Purchase Agreement	
Cross-cutting measures supporting EI2 (CcME) • CcME 1: Grid reinforcement using Battery Energy Storage System, Automatic Generation Control, Advanced Distribution Management System, Advanced Metering Infrastructure and the installation of Gas Insulated Switchgear Substations • CcME 2: Full operationalisation of the Utility Regulatory Authority • CcME 3: Continued application of existing fiscal incentives to promote renewables • CcME 4: Operationalisation of new Renewable Energy Generation Schemes to promote solar PV (e.g. smart cities) • CcME 5: Measure 3.2.3. Implementation of the Biomass Framework • CcME 6: Carry out a feasibility study of substituting coal with locally-grown renewable woody biomass • CcME 7: Cost-benefit analysis of increased penetration of variable REs with alternative storage technologies	

Table 10: Enabling Measures and Financing Needs in the Energy Industries

3.4. Mitigation Scenarios

The impact of the mitigation strategies and actions **(Table 9)** on emissions reductions in the Energy Industries is shown in **Figure 5**. The scenarios take into account the effect of COVID-19 on electricity consumption in 2020 and 2021.[30] The mitigation strategies are implemented sequentially relative to a business-as-usual (BAU) scenario that includes the adoption of electric vehicles.[31] On a base-case scenario, the share of renewables in the electricity mix increases from 18% (BAU) to ~20% (10% energy efficiency) to ~63% with complete coal phase-out by 2030. Whereas electrification of land transport results in an increase in electricity use, it does not influence GHG emissions. In 2030, the BAU emissions are 3.04 $MtCO_2e$. As expected, the progressive implementation of energy efficiency and renewable energies (RE) with the coal phase-out reduces the emissions of GHGs, as shown in **Figure 5**. In 2030, Energy Efficiency (EE) gains in the electricity sector yield 0.23 $MtCO_2e$ emission reductions, and the combination of EE and RE, including coal phase-out, yields a total reduction of 1.9 $MtCO_2e$ **(Table 11)**.

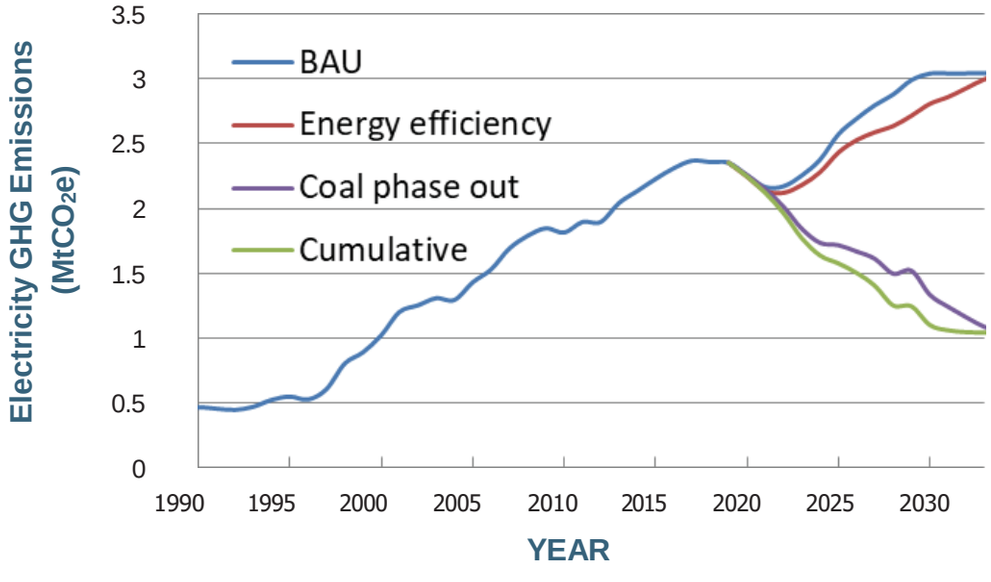


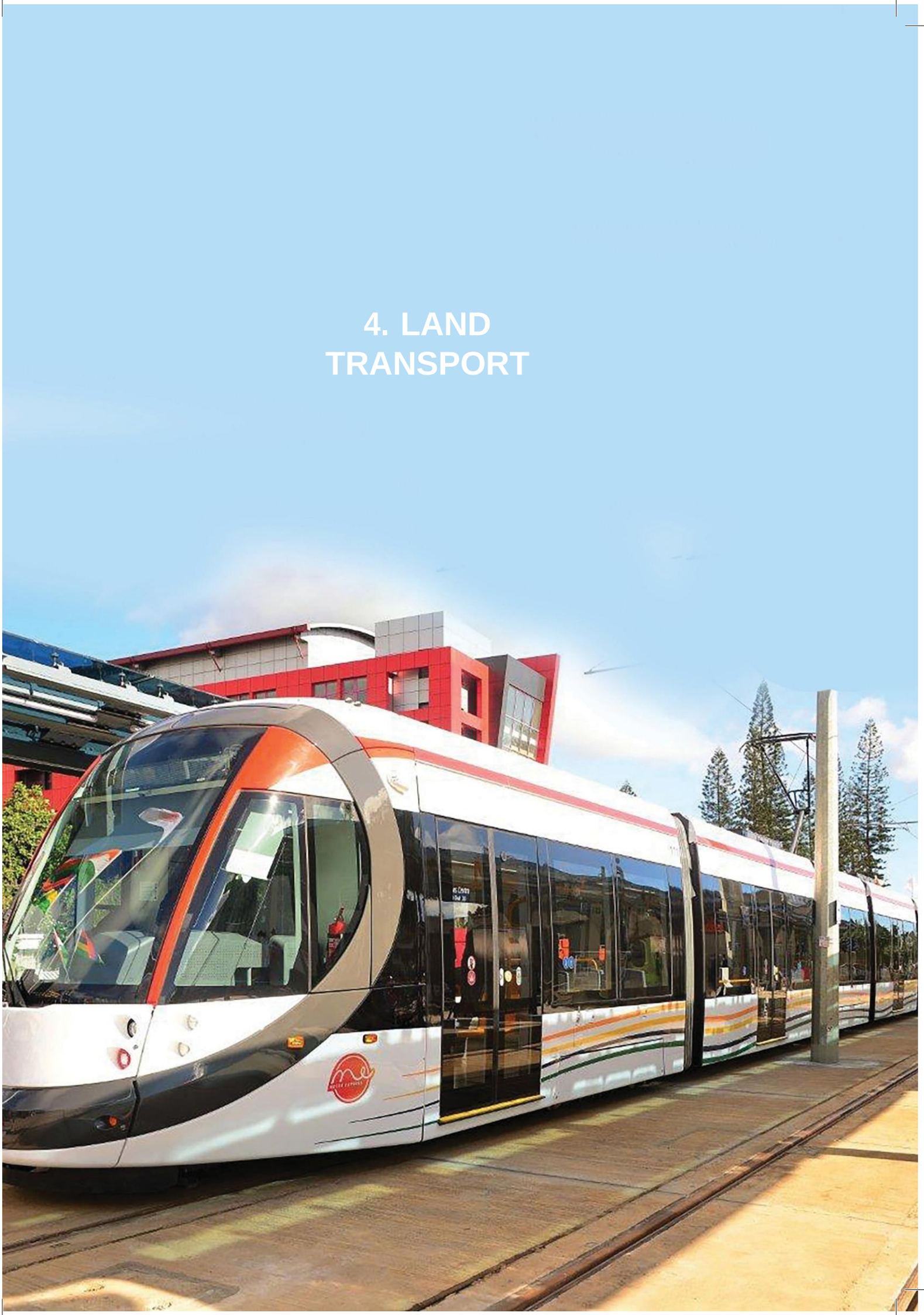
Figure 5. GHG Emissions Scenarios for Energy Industries

Relative to BAU	2022	2030
Energy efficiency	0	234
Renewable energies (including coal phase-out)	0	1,708
Cumulative effect	0	1,942

Table 11: Emission Reductions in the Energy Industries Relative to the Bau Case, $GgCO_2e$ or $ktCO_2e$

30 An intermediate pace of the recovery, with GDP growth reaching pre-crisis levels in 2022 and staying slightly higher thereafter as a result of the push created by economic stimulus measures, with GDP aligning with pre-crisis expectations by 2030.
31 As per guidance received from the Ministry of Energy and Public Utilities, the medium market growth trajectory for electric vehicles (EVs) has been adopted, with EVs comprising 26,000 units in 2030.

4. LAND TRANSPORT



4. LAND TRANSPORT

4.1. Sectoral Emission Profile

The land transport sector is the second-largest contributor of GHGs in Mauritius, accounting for 1,132 $ktCO_2e$ in 2019.[32] A significant aspect of emissions from the land transport sector is that they are increasing at a Compound Average Growth Rate (CAGR) of 2.4% between 2010 and 2019 compared to 1.9% between 2005 and 2010. The increase in land transport emissions is directly related to the utilisation of motorised modes of transport. The historical increase in the number of registered vehicles is shown in **Figure 6** for Mauritius. The park of registered vehicles has increased at a compound annual growth rate (CAGR) of 6.16% between 1987[33] and 2019 (pre-Covid19 baseline year). The growth rates between 2000 and 2009 and between 2010 and 2019 were 3.64% and 4.70%, respectively, indicating a relative increase in new vehicle additions over the most recent pre-Covid19 years.

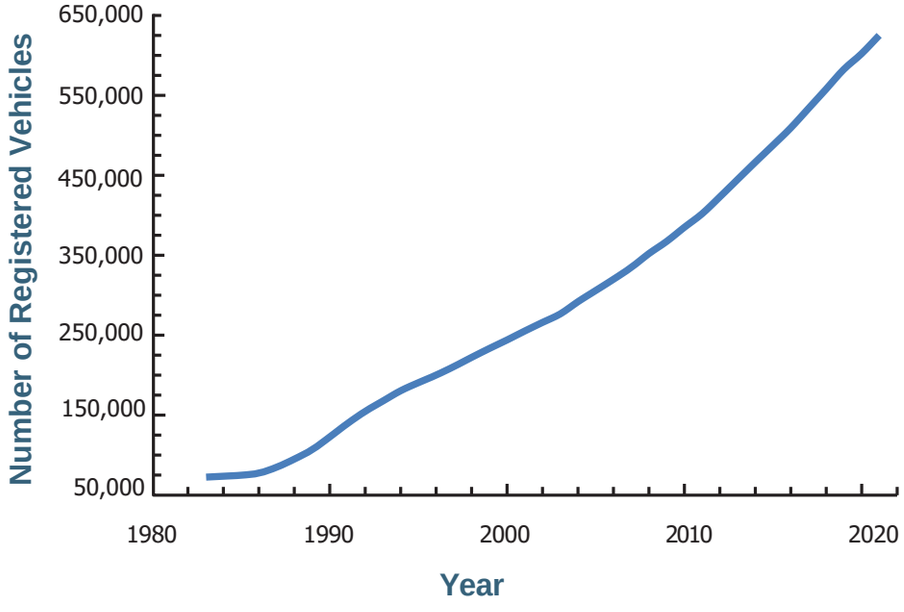


Figure 6. Number of Registered Cars in Mauritius. 1981-2021

In 2021, ownership of motorised vehicles for private passenger transport (car, autocycle and motorcycle) constituted 81.3% (i.e. 506,629 vehicles out of a total of 622,988 registered vehicles) of the total park of vehicles, while 16.9% of vehicles (1.e. 105,781 vehicles) included dual-purpose vehicles, lorries and trucks, double-cab pickups and vans. The public transport system was serviced by 3,151 buses, representing around 0.5% of the total number of registered vehicles. The remaining 1.3% comprised heavy vehicles such as tractors, prime movers, and road rollers. There is an almost linear relationship between the number of registered vehicles and economic performance.[34] All else being equal, the increasing trend in **Figure 6** can be expected to continue on its linear growth path as economic output grows in the future.

The land transport sector is heavily dependent on imported fossil fuels, namely gasoline and diesel oil. The land transport energy consumption and its share in the total energy consumption of Mauritius are shown in **Figure 7**. In 2019 (the pre-Covid19 base year), energy consumption reached its historical maximum of 552 ktoe, corresponding to 54.3% of all final energy consumption. Consequently, land transport contributes proportionally to the country's energy bill (Rs 35,848 million) which stood at 18% of the total import bill of Mauritius.[35] This economic burden will only increase with fossil fuel price inflation arising from supply chain disruptions and global geopolitical concerns.

32. Statistics Mauritius, 2020. Environment Statistics –2019, Ministry of Finance and Economic Development, Mauritius.
33. The year was used to mark the onset of an increase in the number of registered vehicles.
34. A linear regression to data points corresponding to the years 2001 and 2019 has r2 = 0.99 (95% confidence interval) as shown in PNK Deenapanray, N Khadun (2021) Land transport greenhouse gas emission scenarios for Mauritius based on modelling transport demand, Interdisciplinary Perspectives in Transportation Research 9, 100299. A similar trend has been found in both developed and developing countries, including small island developing states.

35. Statistics Mauritius, 2020b. Energy and Water Statistics – 2019, Ministry of Finance and Economic Development, Mauritius.

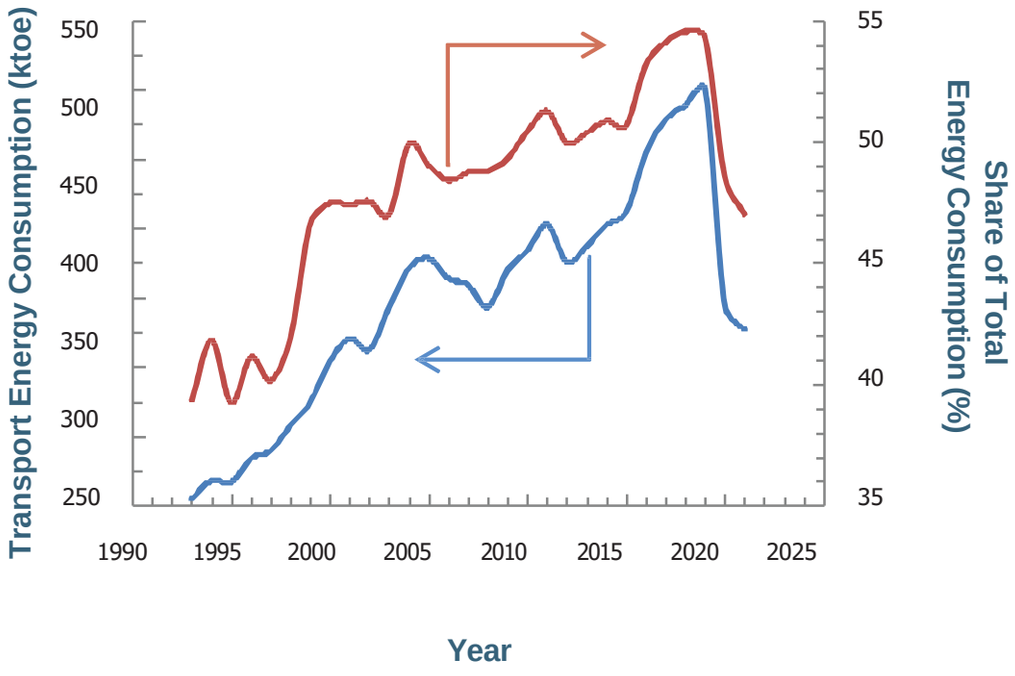


Figure 7. Transport Energy Consumption, ktoe (left); Share of Total Energy Consumption, % (right)

4.2. Sectoral Strategies and Targets

With an increase in travel demand, rising incomes, and the availability of cheaper vehicles, the level of GHGs from land transport will continue to increase in the coming decades unless strict measures are put in place to contain the transport demand.[36] Except for electric vehicles (private cars and light rail), there is currently no policy, strategy, or action plan for land transport that can be used to develop low-carbon scenarios.37 Hence, mitigation strategies and targets were identified using multi-stakeholder engagements, as listed in **Table 12**. They are based on a combination of ongoing government objectives and projects that seemed promising and practicable based on the expert judgement of the technical bodies operating under the aegis of the Ministry of Land Transport and Light Rail (MLTLR).

36 PNK Deenapanray, N Khadun (2021) Land transport greenhouse gas emission scenarios for Mauritius based on modelling transport demand, Interdisciplinary Perspectives in Transportation Research 9, 100299.
37 PNK Deenapanray and FA Canu. 2021. MRV Baseline Analysis. Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.

STRATEGIES	DESCRIPTION OF MITIGATION ACTIONS AND TARGETS
Strategy 1: *Vehicle fuel intensity improvements*	Improvements in the fuel intensity of vehicles (applied to all vehicles) at a rate of 0.5% per year between 2022 and 2030, decreasing to 0.25% per year after 2030. This scenario was identified for two reasons: (1) technological improvements would result in new vehicles having better fuel economies; and (2) investments in increasing the carrying capacity of the road network. The decrease in efficiency gains is related to the rebound effect of a stimulation in passenger transport demand, which results in traffic decongestion in the medium-to-long term.[38]
Strategy 2: *Efficiency gains at peak travel time*	The Traffic Management and Road Safety Unit (TMRSU) has identified a number of measures that will help decongest at peak hours in selected geographic areas. All the measures were modelled except the one related to 'Telecommuting'.[39]
Strategy 3: *A bundle of low-carbon technological options*	A combination of two low-carbon transport technologies has been modelled: i). hybrid cars; ii). electric cars.[40] Hybrid and electric cars are expected to replace conventional gasoline-powered cars. The percentage annual increases in the share of hybrid and electric cars in total passenger travel demand are listed below. Hybrid and electric cars accounted for 1.43% and 0.00%, respectively, of total passenger travel demand in 2019. The travel demand[41] used for the two technologies is listed in the Table below.

TIME PERIOD	TRAVEL DEMAND HYBRID (%)	TRAVEL DEMAND ELECTRIC (%)
2020	2.06	0
2025	4.46	1.5
2030	8.31	4.5
2035	13.31	8.25
2040	20.81	13.25
2045	30.81	19.5
2050	43.31	27.0

Table 12: Mitigation Strategies for Land Transport

Strategy 4: *Light Rail System (LRS)*	The LRS is expected to generate a modal shift away from private cars and buses along the Curepipe – Port Louis.corridor. Implementation of the LRS started in 2018, with the first tranche operational between Port Louis.and Rose Hill at the end of December 2019. It is assumed that the Curepipe – Port Louis.line will be fully operational by the end of 2022. The impact of the LRS on road transport GHG emissions has been modelled, taking into account the reduction in car and bus annual distance travelled, as follows: 2020: Cars - 109,540,000 km; Buses – 10,547,000 km; 2028: Cars - 107,204,000 km; Buses – 10,836,000 km; 2038: Cars - 115,300,000 km; Buses – 11,330,000 km; The above data is not publicly available and was obtained by the NTA from the then Ministry of Public Infrastructure and Land Transport. The above data were first converted into annual car and bus passenger travel demand using passenger occupancy data. These car and bus passenger travel demands were then subtracted from the baseline scenario, representing a modal shift towards the LRS. The reductions have been kept constant at their 2038 levels for the period 2039 to 2050 because of the unavailability of data. Also, 90% of the reduction in car passenger transport is attributed to gasoline-fueled cars, and the remaining 10% to diesel-fueled cars.

38 The results in Deenapanray and Khadun (2021) have revealed the influence of the rebound effect. The parameters used are assumptions that are lower than were previously used in order not to overestimate GHG emission reductions. More research is required to quantity the rebound effect arising from efficiency gains in land transport.

39 Travel demand management through telecommuting is expected to generate relatively high reductions in travel demand, and therefore in fossil fuel combustion. If not implemented, its inclusion in the mitigation analysis for Scenario 3 would give an overestimation of GHG emission reductions that would violate the Conservativeness Principle of carbon accounting.

40 Aligned with the medium trajectory in 'EVConsult and Ecosis Ltd (2020) A 10-year electric vehicle integration roadmap for Mauritius', which is the same as used for mitigation scenario modelling in the Energy Industries.

41 Fuel use and emissions reductions in land transport are done by modeling passenger and freight travel demand. For passenger travel, this is done in units of passenger kilometer per year (PAX.km/ year); for freight, it is done in units of tonne kilometer per year (tonne.km/year).

4.3. Mitigation Actions, Enabling Measures, and Finance Needs

The mitigation actions are given in **Table 13** for the mitigation strategies that are identified in **Table 12**. The enabling measures and capital investment needs are given in **Table 14.** The investments required for implementing the mitigation actions for the Land Transport sector are estimated to be above USD 1,306.27 million. The expected total GHG emission reductions expected by 2030 are 74 $ktCO_2e$ relative to the BAU, which is related to the displacement of liquid fossil fuels used in land transport.

LAND TRANSPORT, LT OUTCOME: TOWARDS A SUSTAINABLE LOW-CARBON LAND TRANSPORT SYSTEM IN MAURITIUS TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 74 $ktCO_2e$ IN 2030				
ID	**STRATEGY**	**ACTION**	**TIME FRAME**	**MAIN STAKEHOLDERS**
LT1	Improved fuel economy of vehicles [6.7 $ktCO_2e$ ER]	LT1.1. Increased fuel economy 2021 - 2030 at a rate of 0.5% per year	2021-2030	MLTLR; TMRSU; Mauritius Standards Bureau (MSB); National Land Transport Authority (NLTA); EEMO; Mauritius Revenue Authority (MRA); Ministry of National Infrastructure & Community Development (MNICD) [Mechanical Engineering Section]
LT2	Decreasing peak-time congestion to improve traffic fluidity [5.3 $ktCO_2e$ ER]	LT2.1. High Occupancy Vehicles (HOV) lane for uninterrupted flow along M2	2025 - 2027	MLTLR; TMRSU
		LT2.2. Substituting single-timing traffic signalling for ATCS to enhance real-time decisionmaking	2022 - 2027	MLTLR; TMRSU
		LT2.3. Promoting active transportation	2021 – 2025	MLTLR; TMRSU
		LT2.4. Promoting carpooling	2022 - 2030	MLTLR; TMRSU
LT3	Reducing consumption of fossil fuels through increased adoption of lower-carbon vehicles [34.5 $ktCO_2e$ ER]	LT3.1. Increasing the share of hybrid cars to 8.31% of total passenger travel demand in 2030	2021 - 2030	MLTLR; MFEPD; NLTA; MEPU; MNICD (Mechanical Engineering Section)
		LT3.2. Increasing the share of electric cars to 4.5% of total passenger travel demand in 2030	2021 - 2030	MLTLR; MFEPD; NLTA; MEPU; MNICD (Mechanical Engineering Section)
LT4	Electrification of mass transit modes of passenger transport [27.5 $ktCO_2e$ ER]	LT4.1. Operationalisation of the Light Rail System between Curepipe and Port Louis.[42]	2022	MLTLR; Metro Express Limited (MEL)

Table 13: Mitigation Strategies and Actions for Land Transport

42 It is pointed out that the aim of Government is to extend the light rail network in the years to come. For instance, the light rail would operate from Rose Hill to Réduit by the end of 2022 while the corridor would also be extended to St Pierre and Cote D'Or afterwards.

LAND TRANSPORT, LT	
LT1.1. Increased fuel economy at a rate of 0.5% per year	**USD 0.10 million**
• Measure 1.1.1. Natural decrease in engine fuel intensity due to technology evolution	
• Measure 1.1.2. Develop and implement a fiscal instrument for placing a higher import tax on high-fuel-intensity vehicles (applied in conjunction with Measure 1.1.3)	
• Measure 1.1.3. Implement Energy Efficiency Labelling of vehicles	
• Measure 1.1.4. Implement Energy Efficiency Labelling of tyres	
LT2.1. High Occupancy Vehicles (HOV) lane for uninterrupted flow along M2	**USD 20 million**
• Measure 2.1.1. Vissim traffic micro-simulation to build a micro-simulation network model	
• Measure 2.1.2. Provision of overpasses, grade-separated junctions, adaptive traffic control systems (ATCS) and coordinated ATCS in identified congested areas	
LT2.2. Substituting single-timing traffic signalling for ATCS to enhance real-time decision-making	**>USD 0.23 million**
• Measure 2.2.1. Use high-speed broadband technology to support the implementation of island-wide Intelligent Transport System	
LT2.3. Promoting active transportation	**>USD 4.56 million**
• Measure 2.3.1. Developing cycle networks in four towns (Rose Hill, Vacoas, Grand Baie, Flacq)	
LT2.4. Promoting carpooling	**No cost**
• Measure 2.4.1. Adoption of carpooling from Plaine Magnien to Port Louis.on Motorway M1	
LT3.1. Increasing the share of hybrid cars to 8.31% of total passenger travel demand in 2030	**(USD 497.68 million)**
• Measure 3.1.1. Promote the socio-economic and financial benefits of hybrid cars	
• Measure 3.1.2. Implementation of the GEF-financed project on e-mobility	
LT3.2. Increasing the share of electric cars to 4.5% of total passenger travel demand in 2030	**USD 1,281.38 million**
• Measure 3.2.1. Promote the socio-economic and financial benefits of electric cars	
• Measure 3.2.2. Investments in battery charging infrastructure	
• Measure 3.2.3. Adopt financial and economic incentives to promote electric vehicles	
LT4.1. Operationalisation of the Light Rail System (Metro Express) between Curepipe and Port Louis	**USD 405 million (sunk cost)**

Table 14: Enabling Measures and Financing Needs, Land Transport

4.4. Mitigation Scenarios

The scenario modelling results are shown in **Figure 8**. In all scenarios, the recovery of land transport demand is 90% of its expected value without COVID-19 in 2021. All the scenarios are measured against the BAU simulation, which shows a monotonic increase. Fuel efficiency gains from Strategies 1 and 2 are negligible, and, for practical purposes, they overlap with the BAU scenario. The penetration of hybrid and electric cars would generate the most GHG emission reductions, but the impacts are more pronounced in the medium-to-long term – i.e. post-2030. The amount of emission reductions produced by the mitigation scenarios, as well as the cumulative effect, are summarised in **Table 15.** The reductions are not given for 2020 because of the masking effect of depressed travel demand and hence lower GHG emissions due to the COVID-19 situation.

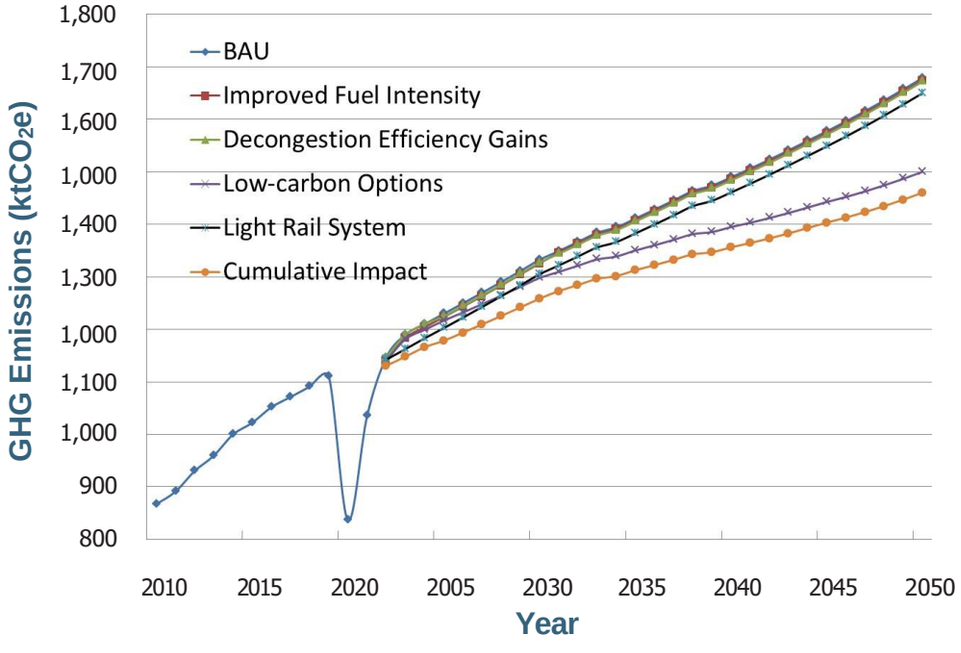
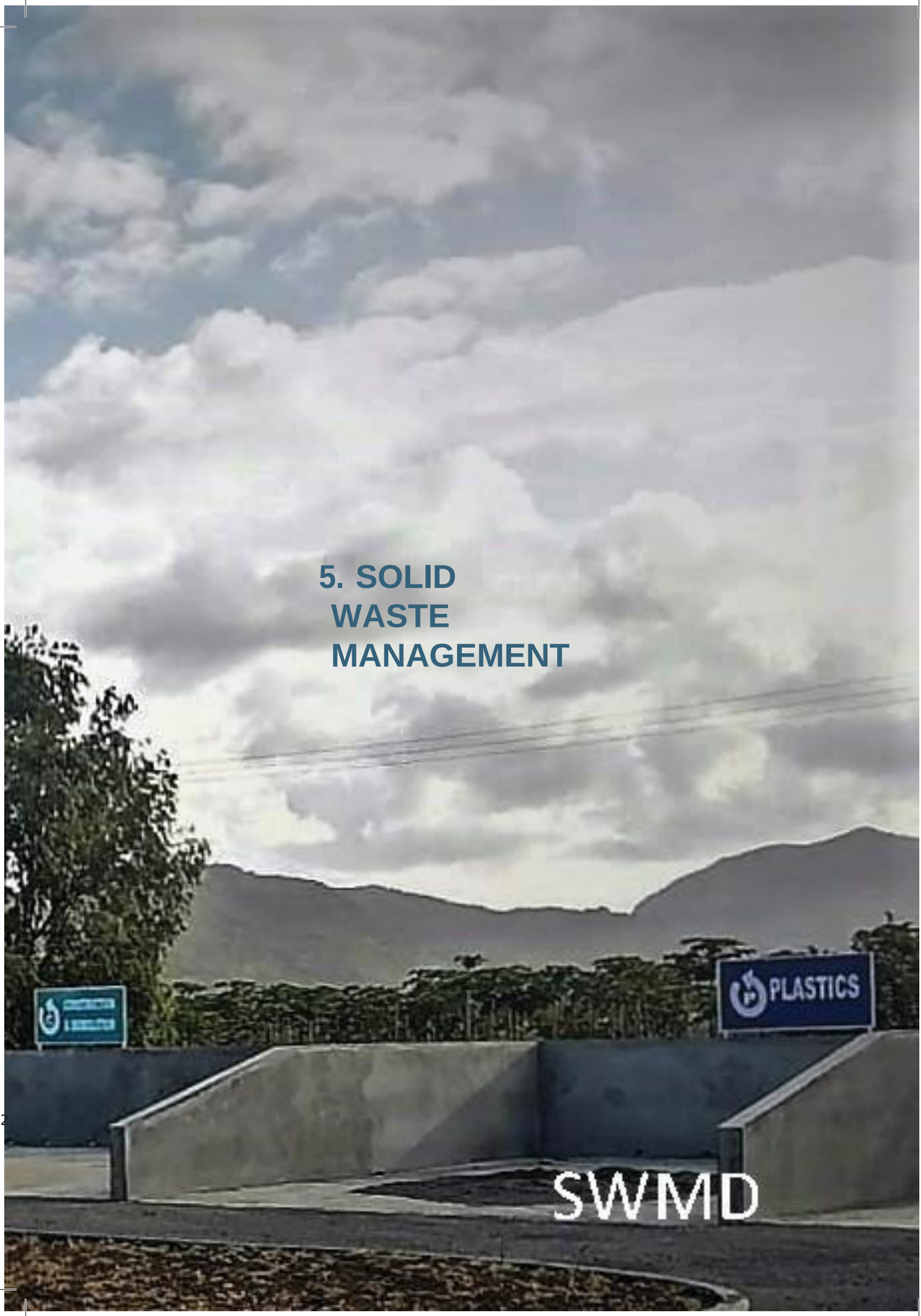


Figure 8. Mitigation Scenarios for Land Transport

Relative to BAU	2022	2030	2040	2050
Improved fuel intensity	5.7	6.7	3.7	4.2
Efficiency gains	0.0	5.3	6.0	6.7
Low-carbon vehicles	6.0	34.5	94.7	178.5
Light Rail System	3.8	27.5	28.9	28.9
Cumulative effect	15.5	74.0	133.3	218.3

Table 15: Emission Reductions in Land Transport Relative to the BAU Case, $ktCO_2e$



5. SOLID WASTE MANAGEMENT

5. SOLID WASTE MANAGEMENT

5.1. Sectoral Emission Profile

Solid Waste Management (SWM) is the largest emitter of methane arising from the engineered landfill at Mare Chicose. Compared to the National Inventory Report (NIR) produced under the Third National Communication (TNC), the inventory for GHG emissions from solid waste in the First Biennial Update Report (BUR1) has seen a decrease of around a factor 3.[43] Since the latest BUR1 inventory data is for 2016, analytical modelling (see '5.4 - Mitigation scenarios') has been used to estimate GHG emissions of around 392 $ktCO_2e$ in 2019. All else being equal, GHG emissions arising from SWM would increase to 606 $ktCO_2e$ in 2030, representing an increase of 35.3% relative to 2019, and to 921 $ktCO_2e$ by 2050.

5.2. Sectoral Strategies and Targets

The Solid Waste Management Division (SWMD) of the MESWMCC is in the process of finalising a Strategic Plan for developing a circular waste economy in Mauritius. Under the business-as-usual scenario (**Figure 9**), the quantity of solid waste is expected to reach 647,930 tonnes per year in 2030. The bulk of this waste, i.e., 95% - would be destined for landfilling, with the rest being recycled.

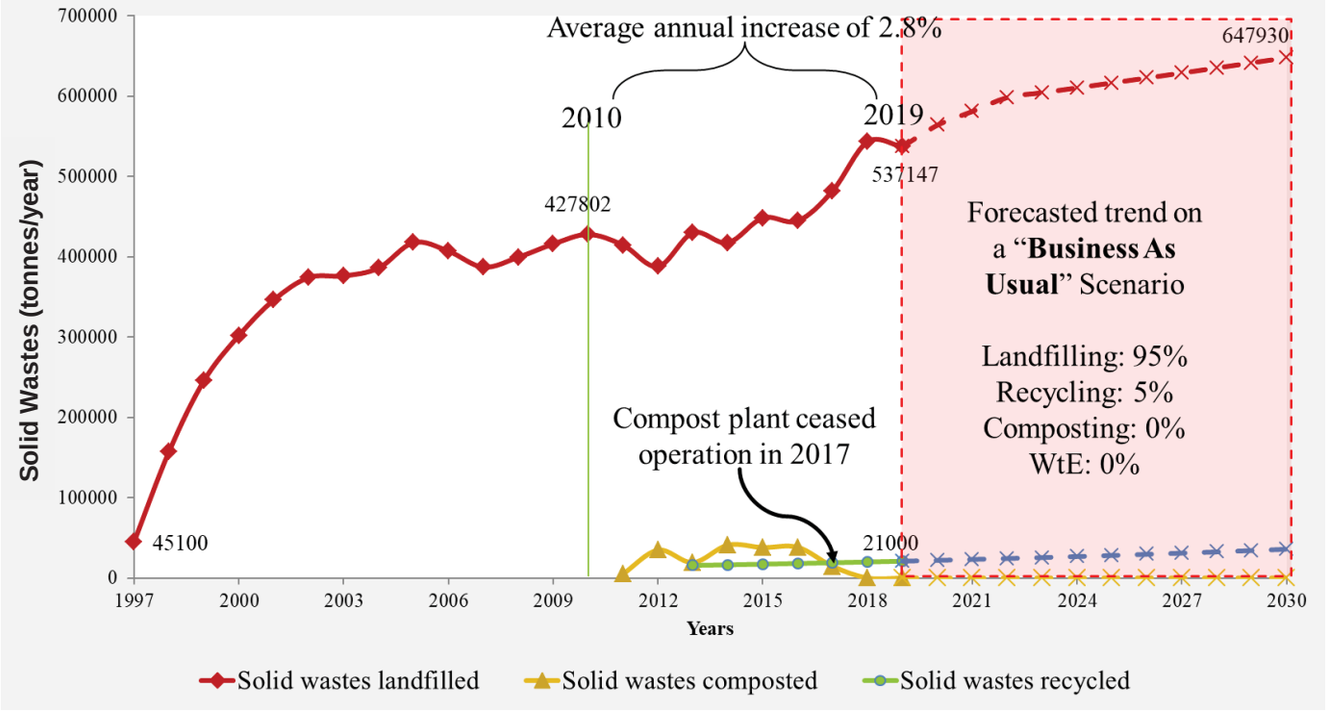


Figure 9. Evolution of Solid Waste Generation and Management Under the BAU Scenario
(Source. Mr A. Beerachee. 2020. Solid Waste Management. Solid Waste Management Division, MESWMCC)

For a more sustainable management of solid waste, including addressing the pressing issue of the scarcity of land for landfilling solid waste,[44] the SWMD has proposed four technological options for solid waste management between 2020 and 2030 (**Figure 10**).[45] These technological options can be used to develop mitigation scenarios for 2030, and consist of a combination of composting, and anaerobic digestion of putrescible waste, and waste recovery for recycling. Thermal waste-to-energy (WtE) will only be envisaged in the long term if the need arises and subject to the outcome of a proper feasibility study and the establishment of all legal and institutional frameworks.

43. Republic of Mauritius (2021) National Inventory Report (NIR) to the United Nations Framework Convention on Climate Change, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.
44. Neehaul, N., Jeetah, P. and Deenapanray, P.N.K., 2020. Energy recovery from municipal solid waste in Mauritius: Opportunities and challenges, Environmental Development, 33, 100489.
45. Presentation made by Mr. B. Beerachee, Ag. Director, SWMD on 17 December 2020 as part of the national dialogue on the formulation of the National Environment Policy.

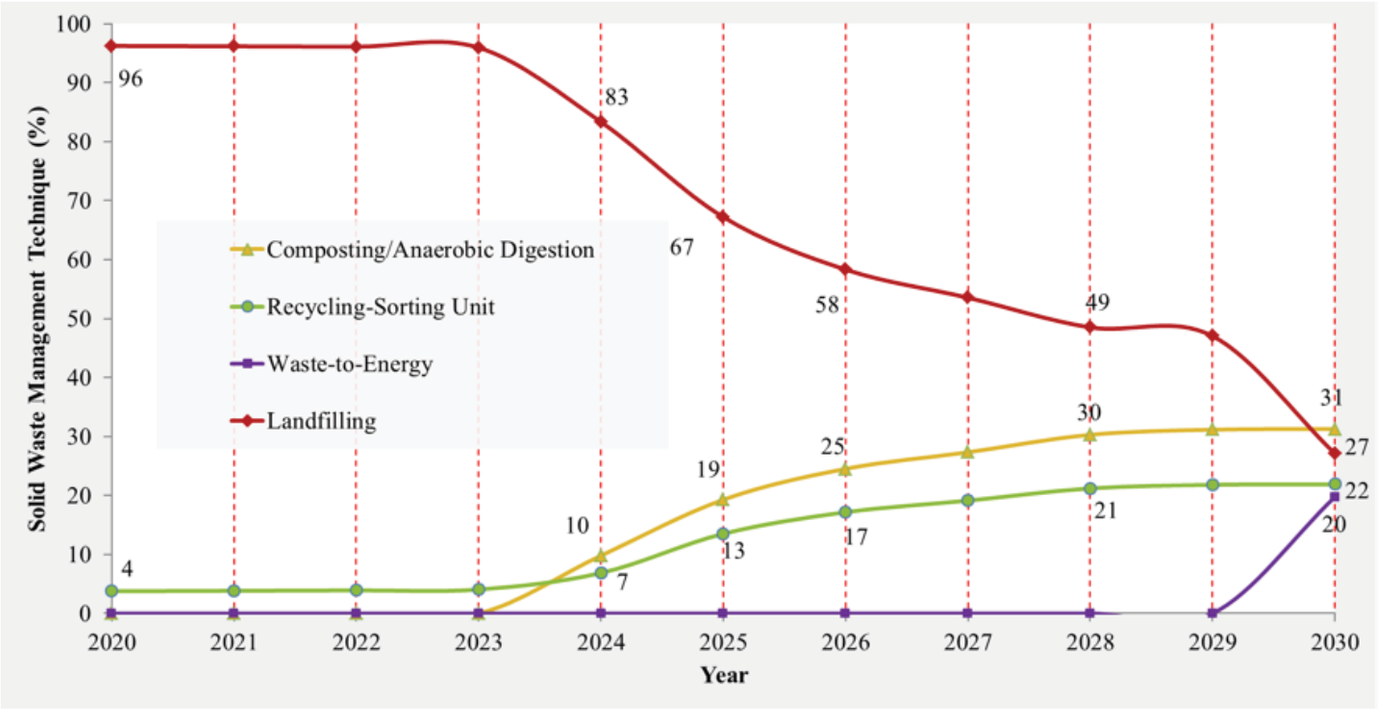


Figure 10. Technological Options for Solid Waste Management. 2020 - 2030
(Source. Mr A. Beerachee. 2020. Solid Waste Management. Solid Waste Management Division, MESWMCC)

Three mitigation strategies have been identified for SWM, as described below:

- Strategy 1: Increase in the quantity of solid waste that is composted or anaerobically digested, as shown in **Figure 10**. It is assumed that solid waste diverted from the landfill will be composed of 50% garden waste and 50% food waste;[46]
- Strategy 2: Increase in the quantity of waste that is recycled above the baseline value of 4%, as shown in **Figure 10**. A mass balance exercise has been used to allocate different types of waste for recycling, using the latest breakdown of recycled waste for 2019/2020;[47] and
- Strategy 3: This includes the diversion of 20% of total solid waste for a waste-to-energy (WTE) project in 2030. For the purposes of calculating avoided methane at landfills, a mass balance exercise was carried out to calculate the amount of organic waste that would be used for WTE. Over and above plastic waste, 3.35 Gg of paper waste and 2.14 Gg of wood waste are assumed to be diverted from landfilling.

46. This assumption was made following discussions with the SWMD in order to keep recyclable and compost waste mutually exclusive (from a mass balance perspective). For instance, paper/carton and textile waste can be composted but would rather be recycled.
47. It is assumed that 38% of paper and 16% of textile waste will be recycled.

5.3. Mitigation Actions, Enabling Measures and Finance Needs

The mitigation actions for SWM related to the three mitigation strategies are given in **Table 16.** The corresponding enabling measures and capital investment needs are given in **Table 17.** The investments required for implementing the mitigation actions are estimated to be at least USD 16.3 million. The expected total GHG emission reductions expected from the three strategies by 2030 are 42.3 $ktCO_2e$ relative to the BAU, which is related to the avoidance of methane emissions from landfills. Reductions in emissions related to electricity generation (10 MW) from municipal solid waste are accounted under Energy Industries **(Table 9).**

SOLID WASTE MANAGEMENT (SWM) OUTCOME: AVOIDED EMISSIONS AT LANDFILL FROM A CIRCULAR WASTE ECONOMY TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 42.3 $ktCO_2e$ IN 2030				
ID	**STRATEGY**	**ACTION**	**TIME FRAME**	**MAIN STAKEHOLDERS**
SWM1	Composting of the putrescible fraction of solid waste [36.3 $ktCO_2e$ ER]	SWM1.1. Composting of 31% of municipal solid waste in 2030	2024 2030	SWMD; PS
SWM2	Recycling of municipal solid waste [5.8 $ktCO_2e$ ER]	SWM2.1. Recycling of 22% of municipal solid waste by 2030	2022 2030	SWMD; PS
SWM3	Energy recovery from municipal solid waste energy [0.2 $ktCO_2e$ ER]	SWM3.1. Twenty percent (20%) of municipal solid waste recovered for waste-to-	2030	SWMD; CEB; MEPU; PS

Table 16: Mitigation Strategies and Actions for SWM

SOLID WASTE MANAGEMENT (SWM)	
SWM1.1. Composting of 31% of municipal solid waste in 2030	**USD 16.28 million**
• Measure 1.1.1. Recovery of 50% food waste (17.28 Gg) and 50% garden waste (34.13 Gg) in 2030	
SWM2.1. Recycling of 22% of municipal solid waste by 2030	**To be determined**
• Measure 2.1.1. Recovery of 8.36 % paper (9.72 Gg) and 3.52% textiles waste (1.44 Gg) in 2030	
SWM3.1. Twenty percent (20%) of municipal solid waste recovered for waste-to-energy	**No cost (capital cost covered under Energy**
• Recovery of 2.88 % paper (3.35 Gg) and 5.48% wood waste (2.14 Gg) in 2030	**Industries)**

Table *17: Enabling Measures and Financing Needs, Solid Waste Management*

5.4. Mitigation Scenarios

In order to align the mitigation analyses described below with historical data produced in the BUR1, all model parameters have been aligned with those used in the BUR1 up to 2020. The BAU situation assumes that landfilling and recycling of solid waste will continue at the same pace as it was in 2020. The quantity of waste is assumed to grow at 1.82% per year, which is the projected rate of waste generation assumed by the SWMD for 2030. The same rate of growth is used for the post-2030 timeline. All else being equal, the BAU scenario exhibits a monotonically increasing trend in emissions of 35.3% between 2019 and 2030. For the post-2030 mitigation scenarios, the percentage allocation of wastes given in **Figure 10** is frozen at their 2030 values.

The results of the mitigation scenario analyses are shown in **Figure 11** and the emission reductions accruing from the three strategies relative to the BAU situation are summarised in **Table 18**.

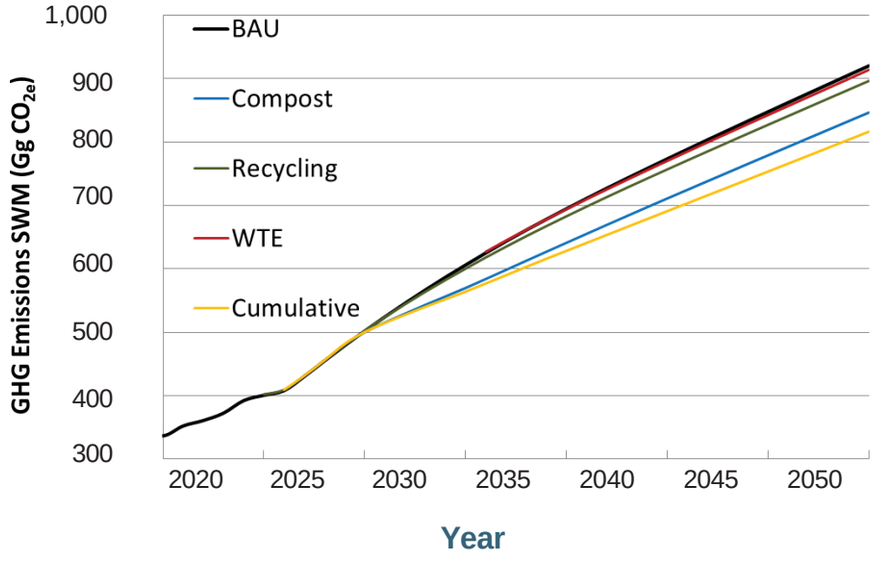


Figure 11. GHG Emission Scenarios for Solid Waste Management

Relative to BAU	2020	2030	2040	2050
Composting/Anaerobic Digestion	0.0	36.25	62.62	73.71
Recycling	0.0	5.80	16.66	23.79
WTE	0.0	0.2	3.27	6.33
Cumulative Effect	0.0	42.05	82.55	103.83

Table 18: Emission Reductions Relative to BAU scenario, $ktCO_2e$

6. WASTEWATER MANAGEMENT

6. WASTEWATER MANAGEMENT

6.1. Sectoral Emission Profile

The main source of GHG emissions in Wastewater Management is methane. Data from BUR1 shows that total emissions from wastewater management have decreased from 206.37 $ktCO_2e$ in 2000 to 182.70 $ktCO_2e$ in 2016 (the most recent inventory year).[48] The inventory also revealed large uncertainties in emissions calculations because of large uncertainties in activity data.[49] Because of uncertainties in industrial wastewater treatment, the mitigation scenario analyses have focused on domestic wastewater treatment that is under the control of the Wastewater Management Authority (WMA). Regarding domestic wastewater management, historical emissions between 2006 and 2016 (using data from BUR1) have been fairly constant between 127.3 $ktCO_2e$ (2006) and 136 $ktCO_2e$ (2011).[50] This level of emissions is similar to that from agriculture (food crops and livestock), which represents around 2% of national emissions. All else being equal, emissions were modelled (see 'Mitigation scenarios' below) to be around 132.6 $ktCO_2e$ in 2019, and increasing to 138.3 $ktCO_2e$ by 2030.

The WMA operates a wastewater management network comprised of 755 km of sewer lines and ten wastewater treatment plants that treat 132,000 m^3 of wastewater on a daily basis. As of July 2022, there were 81,454 registered customers (i.e., households) connected to the sewer system.[51] Details about the wastewater treatment plants are given in **Table 19.** The total flow design of the four large treatment plants is 170,500 m^3 per day. Taking into consideration the maximum average daily flow values given in **Table 19,** the four large treatment plants can accommodate at least an additional 36,000 m^3 of wastewater daily. The focus will be on extending the sewer network and to make use of the existing wastewater treatment plant capacity.

TREATMENT PLANT	AVERAGE ACTUAL FLOW (M^3/ DAY)	LEVEL OF TREATMENT	USE OF TREATED EFFLUENT
Montagne Jacquot	33,000 – 38,000	Advanced primary; influent undergoes coagulation and flocculation processes followed by primary sedimentation; primary sludge extracted from the primary sedimentation tanks is thickened and dewatered in a belt filter press and stabilized with hydrated lime prior to landfilling.	Sea outfall
St Martin	55,000 – 59,000	Tertiary; the sludge generated from the primary settling tank and secondary treatment is thickened and undergoes stabilization through anaerobic digestion; a Combined Heat & Power system for the heating of sludge for digestion and power generation; 65 MW is produced per month corresponding to about 20%-25% of the total plant energy consumption.	Irrigation of sugar cane and sea outfall
Grand Baie	2,000 – 2,500	Tertiary; treatment in three (3) stages at the plant comprising inter alia of the primary (aerated chamber to remove grease and grit), secondary (Activated Sludge Plant for nutrients removal) and tertiary treatment processes (Disc Filters and Chlorination).	Irrigation of sugar cane and borehole injection
Baie du Tombeau	33,000 – 38,000	Preliminary treatment, whereby the influent undergoes grit removal and screening.	Sea outfall
Small treatment plants (total of 6)	270 – 550 Cumulative – 1,160	Secondary followed by chlorination	Lea

Table 19: Characteristics of Wastewater Treatment Plants

Source: https://www.wmamauritius.mu/treatment-plants/ - accessed 18 November 2022

6.2 Sectoral Strategies and Targets

Strategic development in Wastewater Management is geared towards large infrastructure projects related to household and commercial sewer connections. There is less emphasis on low-carbon water treatment technologies. Hence, for this sub-sector, only one mitigation strategy has been identified based on inputs from sector stakeholders. In the BAU scenario, sewer connectivity is expected to continue at the same relatively low pace as witnessed over the past 3–4 years – i.e. ~2,000 households per year. The penetration levels of the four wastewater treatment technologies are listed Table 20

48. *Republic of Mauritius (2021) National Inventory Report (NIR) to the United Nations Framework Convention on Climate Change, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.*
49. *The uncertainty in activity data for CH4 and N2O inventories was 107.35% and 95%, respectively. With an uncertainty of 42.43% for the emission factor, the combined uncertainty in CH4 emissions from wastewater was 115.43%.*
50. *Ibid.*
51. *https://www.wmamauritius.mu/ - accessed 18 November 2022.*

The technology utilisation levels for the period 2031 to 2050 are frozen at their 2030 values, and will have to be identified in future studies.

Technology	2020	2030	2040	2050
Anaerobic digester	0.02	0.01	0.01	0.01
Septic system	0.94	0.97	0.97	0.97
Latrine	0.03	0.01	0.01	0.01
Aerobic system	0.01	0.01	0.01	0.01

Table 20: BAU Scenario Level of Utilisation of Four Wastewater Treatment Technologies (%)

In the mitigation strategy, the level of utilisation of the four treatment methods is assumed to gradually shift towards the lower emission technologies, as listed in **Table 21.** The utilisation levels used for 2025 are relatively conservative and reflect the anticipated short-term technological development in the sector. The utilisation levels reflect a number of projects that are in the pipeline and that would materialise before 2025. The higher levels of low-carbon technologies after 2030 will require detailed technical feasibility studies.

Technology	2020	2025	2030	2040	2050
Anaerobic digester	0.02	0.03	0.035	0.06	0.135
Septic system	0.94	0.93	0.92	0.9	0.8
Latrine	0.03	0.02	0.015	0.005	0
Aerobic system	0.01	0.02	0.03	0.035	0.065

Table 21: Mitigation Scenario Level of Utilisation of Wastewater Treatment Technologies (%)

6.2. Mitigations Actions, Enabling Measures and Finance Needs

The mitigation actions for Wastewater Management are given in **Table 22**, and their enabling measures are given in **Table 23**. Feasibility studies for the introduction of low-carbon wastewater treatment technologies will be required to inform the level of investment needed to implement the mitigation actions. Based on the conservative assumptions used for mitigation scenario analyses, only 6 $ktCO_2e$ is expected to be reduced relative to the BAU by 2030. In any case, it can be anticipated that the carbon abatement cost will be quite high, given the high capital infrastructure costs in this sub-sector.

WASTEWATER MANAGEMENT (WWM) OUTCOME: AVOIDED EMISSIONS IN WASTEWATER MANAGEMENT FROM ADOPTION OF LOW-CARBON TECHNOLOGIES TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 6 $ktCO_2e$ IN 2030				
ID	**STRATEGY**	**ACTION**	**TIME FRAME**	**MAIN STAKEHOLDERS**
WWM1	Reduced methane emissions from the adoption of low-carbon water treatment technologies [6 $ktCO_2e$ ER]	WWM1.1. Increasing utilisation level of aerobic treatment from 0.01 (BAU) to 0.03 in 2030	2021 - 2030	Wastewater Management Authority (WMA); MEPU; PS
		WWM1.2. Increasing utilisation level of anaerobic treatment from 0.01 (BAU) to 0.035 in 2030	2021 - 2030	WMA; MEPU; PS

Table 22: Mitigation Strategy and Actions for Wastewater Management

WASTEWATER MANAGEMENT (WWM)	
WWM1.1. Increasing the utilisation level of aerobic treatment from 0.01 (BAU) to 0.03 in 2030	To be confirmed following feasibility study
WWM1.2. Increasing the utilisation level of anaerobic treatment from 0.01 (BAU) to 0.035 in 2030	To be confirmed following feasibility study
Cross-cutting measures (CcMWWM)	
• CcMWWM 1. Feasibility study, including cost-benefit analysis of adoption of aerobic and anaerobic treatment technologies • CcMWWM 2. Identification and mobilisation of resources for capital and operational expenditures	

Table 23: Enabling Measures and Financing Needs, Wastewater Management

6.3. Mitigation Scenarios

The results of the scenario modelling are shown in **Figure 12**. Because the emission factor for centralised aerobic system is zero, it has the largest effect on reducing GHG emissions. Based on the utilisation values given in **Table 21**, emission reductions are marginal in 2025 (2.5 $ktCO_2e$) and reaching 5.9 $ktCO_2e$ in 2030. For all practical purposes – i.e., compared to emission reductions in the Energy Industries, Land Transport and Solid Waste Management, such decreases are not significant.

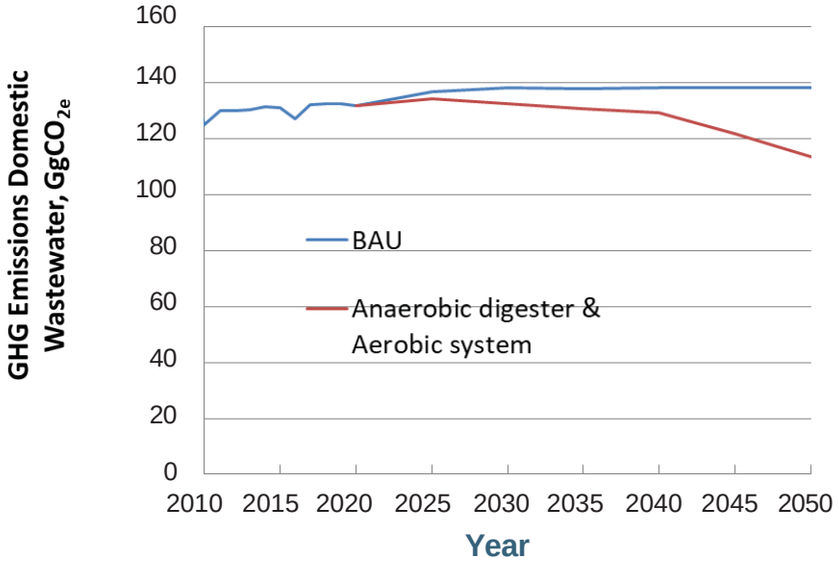


Figure 12. Mitigation Scenario Analyses for Wastewater Management

7. INDUSTRIAL PROCESSES AND PRODUCT USE

7. INDUSTRIAL PROCESSES AND PRODUCT USE

7.1. Sectoral Emission Profile

Emissions from the IPPU sector consist of the release of GHGs from industrial processes that chemically or physically transform materials, and GHGs, such as refrigerants and aerosols that are used in products. The updated National Inventory Report (NIR) in BUR1 has shown that, in 2016, product uses as substitutes for Ozone Depleting Substances (ODS) – i.e., hydrofluorocarbons used as refrigerants, accounted for 90.7% of total IPPU-related emissions.[52] This was followed by the metal industry, constituted by iron and steel production industries at 6.9%, and non-energy products from fuels and solvent use, which represent a further 2.5% of the IPPU emissions. Over the years, the emission of carbon dioxide from lime production has dwindled, and production ceased in 2015. It is also noted that the relatively larger increase in the use of HFC refrigerants over the past two decades has implied an increasingly smaller share of the metal industry and non-energy products in the total IPPU emissions.

The IPPU sector in Mauritius is mainly dominated by emissions due to leakage of refrigerants used in the refrigeration and air conditioning (RAC) sub-sector. Although there were only 48.77 $ktCO_2e$ (or 0.8% of total) emissions reported in 2019[53], the updated National Inventory Report (NIR) in BUR1 2013-2016 has noted an increase in RAC emissions by a factor ~6 that would make it about three times as large an emitting sector as agriculture. In 2016, products used as substitutes for ODS, which is HFC, accounted for 282.1 $ktCO_2e$ of total IPPU emissions (311.18 $ktCO_2e$).[54] Also, the trend was a rising share over time, which is also due to the decline in emissions from other activities such as lime, and iron and steel production. Hence, the focus of mitigation strategies is on the RAC sub-sector, which will cover both stationary and mobile uses of refrigerants.

GHG emissions from the RAC sub-sector to 2050 have been studied, and the results are shown in **Figure 13**.[55] Based on current trends and a predicted increasingly hotter climate in Mauritius, the GHG will more than double by 2050 to over 7 $MtCO_2e$. It needs to be noted that the Business As Usual (BAU) GHG emission scenario is based on an energy mix that continues to rely on fossil fuels to power the RAC appliances[56]. This data includes CO_2 emissions that are emitted from the combustion of fossil fuels to power the refrigeration and air conditioning equipment and appliances, and not just emissions related to refrigerants. The direct emissions from refrigerants in the CTCN study[57] were 260 $ktCO_2e$ in 2015, which is close to the value of 269.03 $ktCO_2e$ reported in the BUR1 for the year 2015.

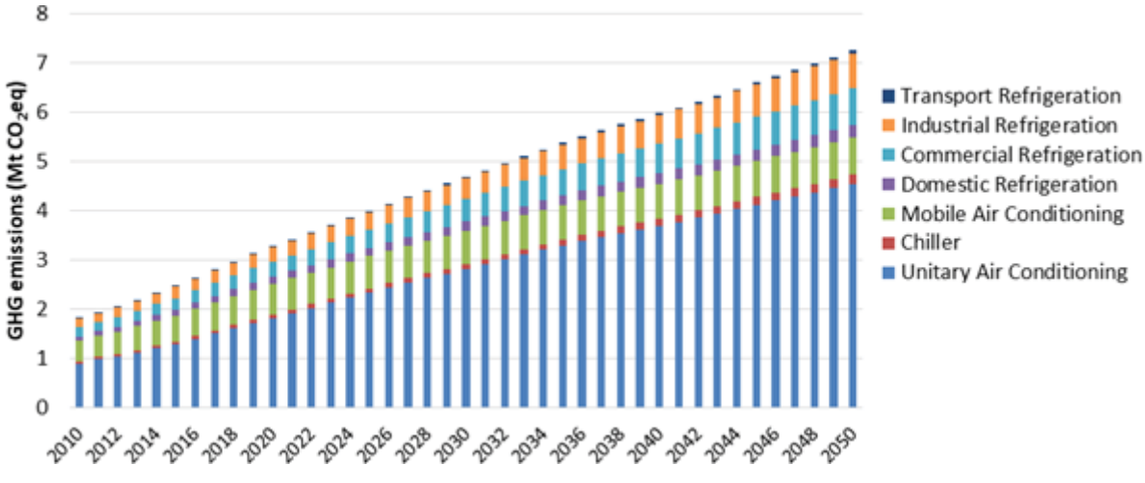


Figure 13. Projected Emissions in the RAC Sub-Sector in Mauritius. 2010–2050

Source. CTCN (n.d.). Green Cooling Africa Initiative Interim Report II – Refrigeration and Air Conditioning Greenhouse Gas Inventory and Technology Gap Analysis Draft Report for Mauritius

48. *Republic of Mauritius (2021) National Inventory Report (NIR) to the United Nations Framework Convention on Climate Change, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.*
49. *Statistics Mauritius (2020).*
50. *Republic of Mauritius (2021) National Inventory Report (NIR) to the United Nations Framework Convention on Climate Change, Ministry of Environment, Solid Waste Management and Climate Change, Port Louis.*
51. *In the IPPU sector, regarding projections of GHG emissions till 2050 from Refrigeration and Air Conditioning sub-sector, the demarcation between actual emissions and potential emissions should be taken into account. Potential emissions assume that all emissions from activities occur during the current year, whereas actual emissions include delays in emissions or banks due to the cumulative difference between the amount of chemical consumed in an application and that which has already been released.*
52. *See also Government of Mauritius (2010) Mauritius Second National Communication' Table 4.3*
53. *CTCN (n.d.). Green Cooling Africa Initiative Interim Report II – Refrigeration and Air Conditioning Greenhouse Gas Inventory and Technology Gap Analysis Draft Report for Mauritius*

7.2. Sectoral Strategies and Targets

Underlying the low-carbon scenario analysis is that in nearly all sub-sectors there are technology alternative RAC systems available, operating without hydrofluorocarbons (HFCs) and with zero or very low global warming potential (GWP) refrigerants (such as R717 and R290, R600a, among others). In alignment with the need to protect both the ozone layer and climate systems, Mauritius is implementing a hydro-chlorofluorocarbon (HCFC) phase-out management plan, whereby concerned stakeholders, such as importers, trainers and technicians are empowered to shift from HCFC and HFC to climate-friendly refrigerants.[58] With the Kigali Amendment, developing countries (A5 countries under the Montreal Protocol) have to gradually phase down HFCs. In this respect, Mauritius will soon embark on the formulation of an HFC Phase Down Management Plan under the Kigali Implementation Plan (KIP).

The mitigation strategies and associated targets for the RAC sub-sector taken by the government, including budgetary policy decisions in 2019, and as per commitments under the Kigali Amendment, are listed in **Table 24**.

STRATEGIES	DESCRIPTION OF ACTIONS
Phase down of HFCs	1. Freeze imports of HFCs as from 2024 using the average import for the years 2020, 2021 and 2022 for baseline calculation 2. Reduction will start with refrigerants with high GWP such as R404 A; ammonia and hydrocarbon-based refrigerants, such as R290a and R600a will be promoted 3. Targets: Reduce by 10% (of the baseline value) by 2029; 30% by 2035; 50% by 2040; 80% by 2045
Equipment Phase Out	4. Policy to ban refrigerators using HFCs and non-inverter-type air conditioners with capacity above 36,000 BTU in 2024 5. Policy to ban all RAC equipment running on HFCs as per the timeframe of KIP 6. The above policies will contribute to the HFC-Phase Down targets given above
Environmentally-sound disposal of HFC refrigerants	7. Recovery and recycling of HFC refrigerant

Table 24: Mitigation Strategies and Targets for the Phase Down and Phase Out of fluorinated ODS
Source: National Ozone Unit

7.3. Mitigation Actions, Enabling Measures and Finance Needs

The mitigation actions for IPPU (RAC sub-sector) are given in **Table 25**, and their enabling measures are given in **Table 26**. Based on the target for Phase-Down of HFCs, 103 $ktCO_2e$ emission reductions are estimated by 2030. An initial amount of USD 170,000 is allocated under the Multilateral Fund to the Montreal Protocol, for the preparation of a Kigali Implementation Plan (KIP) for establishing the enabling conditions, such as the regulatory framework and coordination of market actors, and for carrying out the market and technical feasibility of the island-wide recovery and safe disposal of HFCs in retired equipment. The aim is to phase out HFCs.

IPPU (IP) OUTCOME: REDUCING THE USE OF HFCS ACCORDING TO KIGALI AMENDMENT TO THE MONTREAL PROTOCOL TARGET: REDUCE EMISSIONS RELATIVE TO BAU BY 103 $ktCO_2e$ IN 2030				
ID	**STRATEGY ACTION**		**TIME FRAME**	**MAIN STAKEHOLDERS**
IP1	Phase-Down of HFCs in Mauritius	**IP1.1.** *Reducing HFCs by 10% of the baseline value (2024) by 2029*	*2025 - 2030*	*National Ozone Unit (NOU); MRA (Customs);* ***PS***
IP2	Phase out of equipment using HFCs	**IP2.1.** *Import ban on non-inverter type air conditioner with capacity above 36,000 BTU as from 2022 in a phased manner for the total ban in 2024.*	*2025 - 2030*	*MEPU. EEMO, NOU; MRA (Customs); PS*
IP3	Environmentally sound disposal of HFC refrigerants	**IP3.1.** *Recovery and safe disposal of HFCs in retired stock of RAC equipment based on KIP*	*2025 - 2030*	*NOU; PS*

Table 25: Mitigation Strategy and Actions for IPPU

54. Republic of Mauritius (n.d.) HCFC Management Plan 2011-2025 (document shared by the CCD, MESWMCC on 6 February 2021).

IPPU	
IP1.1. Reducing HFCs by 10% of the baseline value (2024) by 2029	>USD 170,000
• Measure 1.1.1. Formulate the HFC phase-down plan under KIP • Measure 1.1.2. Freeze imports of HFCs as from 2024 using the average imports for the years 2020, 2021 and 2022 for the baseline calculation • Measure 1.1.3. Start Phase Down by substituting most potent HFCs (e.g. R404A, R134a) with carbon dioxide, ammonia and hydrocarbon-based refrigerants	
IP2.1. Import ban on non-inverter type air conditioner with capacity above 36,000 BTU as from 2022 in a phased manner for the total ban in 2024.	Covered under IP1.1
• Measure 2.1.1. Introducing necessary regulation and legal provision for ban (following Measure 1.1.1)	
IP3.1. Recovery and safe disposal of HFCs in retired stock of RAC equipment based on the Kigali Implementation Plan (KIP)	Investments to be confirmed following the completion of HFC phase-down plan
• Measure 3.1.1. Feasibility study on the most appropriate system of recovery and disposal (completed under Measure 1.1.1)	

Table 26: Enabling Measures and financing Needs, IPPU

7.4. Mitigation Scenarios

The mitigation analyses are shown in **Figure 14** for the reduction and elimination of HFCs in the RAC sub-sector, which, as mentioned earlier, comprises close to 92% of IPPU GHG emissions. Historical data up to 2020 was used with linear extrapolation to obtain the projected level of HFC-related emissions up to 2050. All else being equal, emissions would increase from 347 $ktCO_2e$ in 2020 to 521 $ktCO_2e$ in 2030 to 899 $ktCO_2e$ in 2050. Emissions reductions are measured against the 2024 baseline level using the targets given in **Table 24**. It is assumed that substitutes will be refrigerants having zero or very low global warming potential (GWP) refrigerants (e.g. R717, R290, R600a). The amount of GHG emission reduction is estimated at 103 $ktCO_2e$ by 2030; 382.5 $ktCO_2e$ by 2040 and 771.7 $ktCO_2e$ by 2050.

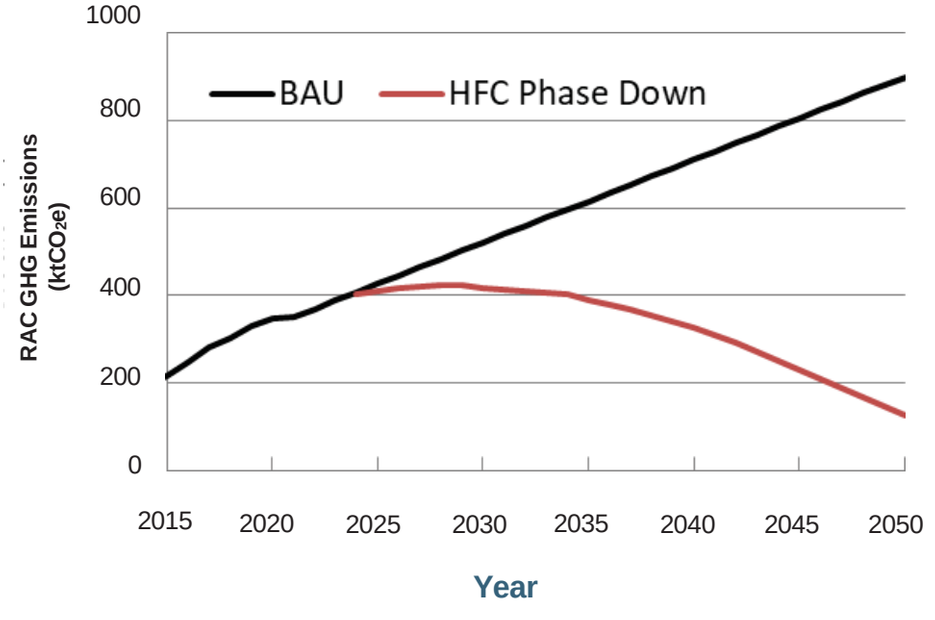


Figure 14. Mitigation Scenarios for the Phase-Down of HFC

8. AGRICULTURE AND LIVESTOCK

8. AGRICULTURE AND LIVESTOCK

8.1. Sectoral Emission Profile

Agriculture is the smallest emitting sector in Mauritius, accounting for only 2% (or 116.37 $ktCO_2e)_2$ in 2019.[59] It is pointed out that most of the mitigation actions being developed and promoted in the agricultural sector involve and rely heavily on farmers' behavioral change.

In 2021, there were 7,922 ha of land under food crop cultivation, and a total of 101,537 tonnes of fresh produce were harvested. The main categories of crops that were produced are creepers (25,922 tonnes), mixed vegetables (13,459 tonnes), potato (12,910 tonnes), banana (9,629 tonnes), tomato (9,603 tonnes), pineapple (6,547 tonnes), and onion (5,590 tonnes). Other food crops such as maize, cabbage, groundnut, brinjal, garlic, ginger, chilies, and beans and peas were produced in the range of 31 tonnes and 3,520 tonnes, respectively.[60] Agricultural production also comprised 2,669,667 tonnes of sugar cane planted on 43,711 ha of land, and 5,034 tonnes of tea leaves cultivated on 685 ha of land. One of the main inputs in crop production is nitrogen-based chemical fertilizers that produce nitrous oxide emissions. The consumption of fertilisers in Mauritius is shown in **Table 27**.

YEAR	2017	2018	2019	2020	2021
Weight (tonnes)	35,000	29,802	29,664	24,843	34,425

Table 27: Utilisation of Chemical Fertilisers (tonnes) in Mauritius: 2017-2021
Source: Digest of Agricultural Statistics, 2021

For the same year, the production of beef from live cattle was 1,823 tonnes. Beef production from the slaughter of imported cattle, accounting for 99.4% of the total production, was 1,812 tonnes. Year-on-year changes saw local beef production going down by 38.9% from 18 tonnes (2020) to 11 tonnes (2021). Goat meat and mutton production also decreased, albeit by a much smaller amount of 2.4% from 42 tonnes in 2020 to 41 tonnes in 2021. The production of pork decreased by 4.0% from 598 tonnes in 2020 to 574 tonnes in 2021. In contrast, the production of poultry increased by 3.4% from 47,500 tonnes in 2020 to 49,100 tonnes in 2021.[61]

59. *Statistics Mauritius, 2020. Environment Statistics – 2019, Ministry of Finance, Economic Planning and Development, Mauritius.*
60. *Statistics Mauritius, 2022. Agricultural and Fish Production – 2021, Ministry of Finance, Economic Planning and Development, Mauritius*
61. *.bid.*

8.2 Sectoral Policies and Targets

The most recent agricultural policy document that addresses climate change issues in agriculture is the Strategic Plan 2016–2020 for the Food Crop, Livestock and Forestry. Although agriculture does not contribute significantly to GHG emissions, it is highly vulnerable to climate extremes and climate variability, which give rise to disasters and result in lower agricultural productivity, crop loss or crop failure, and highlights the urgency to implement adaptation and mitigation strategies for climate change. While the Strategic Plan is being updated, its broad orientations, together with expert judgements from sector stakeholders, have been used to identify the mitigation strategies and targets for the production of food crops and livestock. A strong emphasis is placed on food security, as reflected in the targets, including for livestock. The mitigation strategies for agriculture are listed in **Table 28**.

STRATEGIES	DESCRIPTION OF ACTIONS
AGRICULTURE (FOOD CROPS)	
Baseline situation	The use of chemical inputs increases by 2% per annum based on historical trends.
Strategy 1: Reducing chemical inputs in crop production	The Russia-Ukraine War has increased the price of chemical fertilisers. This strategy is aligned with Government measures to reduce dependency on imported chemical inputs in agricultural production. It is assumed that the reduction in the use of chemical inputs starts in 2021 by 1% absolute per year until 2030. At this rate of decrease, chemical inputs reach 90% of the value in 2020. Thereafter, the decrease is 5% every 5 years, with chemical inputs reaching 80% and 70% of the 2020 value in 2040 and 2050, respectively.
Strategy 2: Application of compost in crop production	In a bio-farming system and other sustainable practices, it is unlikely that the use of chemical fertilisers will be reduced without any substitution. This strategy implies the co-use of compost produced from Municipal Solid Waste (MSW) and other sources in food crop cultivation as from 2024 using the following amounts (kilo tonne)

2024	2030	2040	2050
2.95	9.83	11.05	12.43

Table 28: Mitigation Strategies and Targets, Agriculture

AGRICULTURE (LIVESTOCK)						
Baseline situation	A quasi-stagnating livestock sector is assumed after 2020. The model assumes that the technological options used for livestock manure management remain unchanged from those used in 2015 (i.e. old technology) up to 2050.					
Policy scenario (enhanced food security)	Increase in the number of livestock heads using data provided to 2030 by the livestock section of the Food and Agricultural Research and Extension Institute (FAREI). Post-2030 values are extrapolations using changes between 2020 and 2030, with the increase in the number of livestock heads decreasing between 2040 and 2050. The manure management technology was kept constant at the 2015 values (i.e., as in the Baseline situation).					
Mitigation scenario (enhanced food security with low-carbon manure management technologies)	Policy scenario with new technologies used for the management of manure produced by dairy cows, other cattle and pig husbandry. The manure management technologies are solid storage, aerobic digestion and anaerobic digestion, and their utilisation levels are given below with values for pig husbandry shown in brackets. The utilisation levels for dairy cows and other cattle are the same.					
		2015	2020	2030	2040	2050
	Solid storage	0.97 (0.5)	0.9 (0.4)	0.83 (0.4)	0.7 (0)	0.49 (0)
	Aerobic digestion	0.01 (0.25)	0.03 (0.3)	0.07 (0.3)	0.13 (0.4)	0.24 (025)
	Anaerobic digestion	0 (0.25)	0.05 (0.3)	0.08 (0.3)	0.15 (0.6)	0.25 (0.75)

Table 29: Mitigation Strategy and Actions for Agriculture

8.3 Mitigation Actions, Enabling Measures and Finance Needs

The actions related to the mitigation strategies for agriculture are given in **Table 29**, and the enabling measures and financial needs are shown in **Table 30**. As expected, the emissions reductions from food crop production are relatively small at 2.7 $ktCO_2e$ by 2030. The emphasis on food security in livestock production results in GHG emissions from an increasing livestock heads outstripping emission reductions from the adoption of low-carbon manure treatment technologies. In this case, there is an increase of 4.4 $ktCO_2e$ relative to BAU by 2030. Hence, there is a combined marginal increase in GHG emissions of 1.7 $ktCO_2e$ by 2030. Finance estimated at USD 7.06 million is needed to implement the mitigation actions. This is a lower limit that excludes capital investments in scaling up low-carbon manure treatment systems.

AFOLU AGRICULTURE (A)	
A1.1. Reducing chemical inputs by 1% absolute per year until 2030 (bio-farming)	
1. Measure 1.1.1. Develop and promoting the concept of the Integrated Plant Nutrition System (IPNS)	
2. Measure 1.1.2. Develop composting technologies, including vermicomposting, and promote organic waste recycling at farm level	**USD 1.01 million**
3. Measure 1.1.3. Development and promotion of Organic Farming and related agro ecological and natural systems of crop production, which prohibit or decrease chemical fertiliser use, as well as increase C stock in the soil solum	
4. Measure 1.1.4. Substitution of chemical fertilisers with compost from seagrass and seaweeds	
A1.2. Application of compost produced from MSW in crop cultivation	**USD 4.65 million**
Cross-cutting Measures Agriculture (CmMA)	
5. Capacity building to entice farmers to adopt MauriGAP (Mauritius Good Agricultural Practices)	
6. Crop diversification on marginal and abandoned sugar cane plantations, having co-benefit potential of carbon sequestration, such as macadamia plantations	
7. Economic and financial incentives for farmers to adopt good agricultural practices, including adoption of low-carbon techniques	
LIVESTOCK (L)	
L1.1. Increase in livestock heads for increased food security with low-carbon excrement management technologies	**USD 1.40 million**
8. Measure 1.1.1. Technology transfer of aerobic and anaerobic (with biogas production) treatment of waste at the expense of solid storage	
9. Measure 1.1.2. Capacity building of farmers on the use of aerobic and anaerobic animal waste technologies	
10. Measure 1.1.3. Economic and financial incentives provided to farmers for the adoption of low-carbon technologies	

Table 30: Enabling Measures and Financing Needs, Agriculture

8.4 Mitigation Scenarios

While the process of updating the Strategic Plan 2016–2020[62] is ongoing, the approach used to model mitigation scenarios in agriculture is the continuation of the broad orientations of the existing Strategic Plan.

Food Crops

The BAU scenario has been taken as the situation of no implementation of the policies, strategies and actions proposed in the Strategic Plan 2016 – 2020. In this scenario, it is assumed that chemical fertiliser use increases by 2% per year after 2020. As shown in Figure 15, there is an increase in GHG emissions from 99.9 $ktCO_2e$ in 2020 to ~101 $ktCO_2e$ in 2030, and reaching ~105 $ktCO_2e$ by 2050. These relatively small changes are mainly due to an increase in chemical inputs. Reducing chemical inputs causes a decrease in direct N2O emissions, as shown in **Table 31**. The addition of compost as a substitute for chemical fertilisers as from 2024 results in a slight increase in GHG emissions due to the release of N2O from the compost. The use of compost also includes an increase in manure applied to the soil with increasing livestock heads to enhance food security under the policy option. The curve shows the combined effect of reduced use of chemical fertilisers and use of compost, including the calculation of both direct and indirect N2O emissions.

The GHG emissions from the different strategies relative to the BAU are summarised in **Table 31**. As it can be seen, the total GHG emissions reduction in 2030 is only 2.7 $ktCO_2e$, which would increase by a factor of 2.7 by 2050.

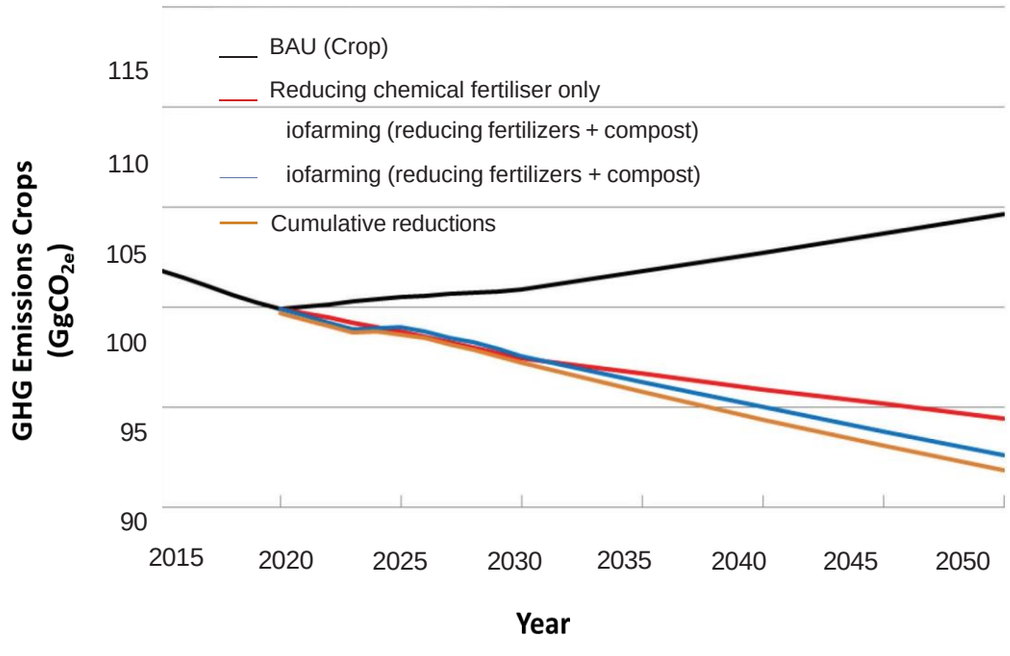


Figure 15. Mitigation Scenarios for Agriculture (Food Crops)

SCENARIO DESCRIPTION	2020	2030	2040	2050
Reducing chemical inputs relative to BAU	0.0	3.42	6.83	10.25
Use of compost (incremental effect)	0.0	(0.75)	(1.82)	(2.88)
Cumulative effect	0.0	2.7	5.64	8.11

Table 31: Summary of Relative GHG Emissions Reductions for Food Crops, $GgCO_2e$

55. Ministry of Agro-Industry and Food Security (2016) Strategic Plan 2016 – 2020 for the Food Crop, Livestock and Forestry Sectors.

Livestock

The results of the mitigation analyses are given in Figure 16. Both GHG emissions and emission reductions (with the adoption of lower-carbon manure management technologies) are very small in this sub-sector. It is also the sector that exhibits a policy-induced increasing in total emissions. The BAU scenario reflects a quasi-stagnant sub-sector, with emissions increase marginally from 28.6 $GgCO_2e$ (or $ktCO_2e$) in 2020 to 30.6 $GgCO_2e$ in 2030. The policy scenario that is geared towards increasing local production to enhance food security results in an increase in emissions to 35 $GgCO_2e$ in 2030 and 41.4 $GgCO_2e$ in 2050, with no evolution in lower-carbon manure management technologies. With the adoption of lower-carbon manure management technologies, emissions in 2030 are virtually unchanged, and they are marginally lower at 39.9 $GgCO_2e$ in 2050.

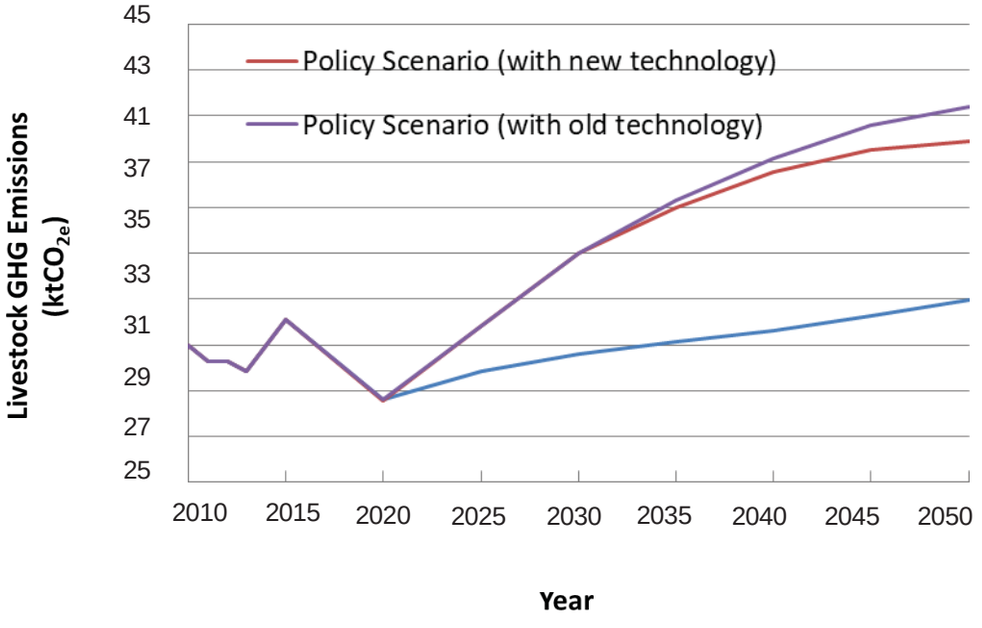
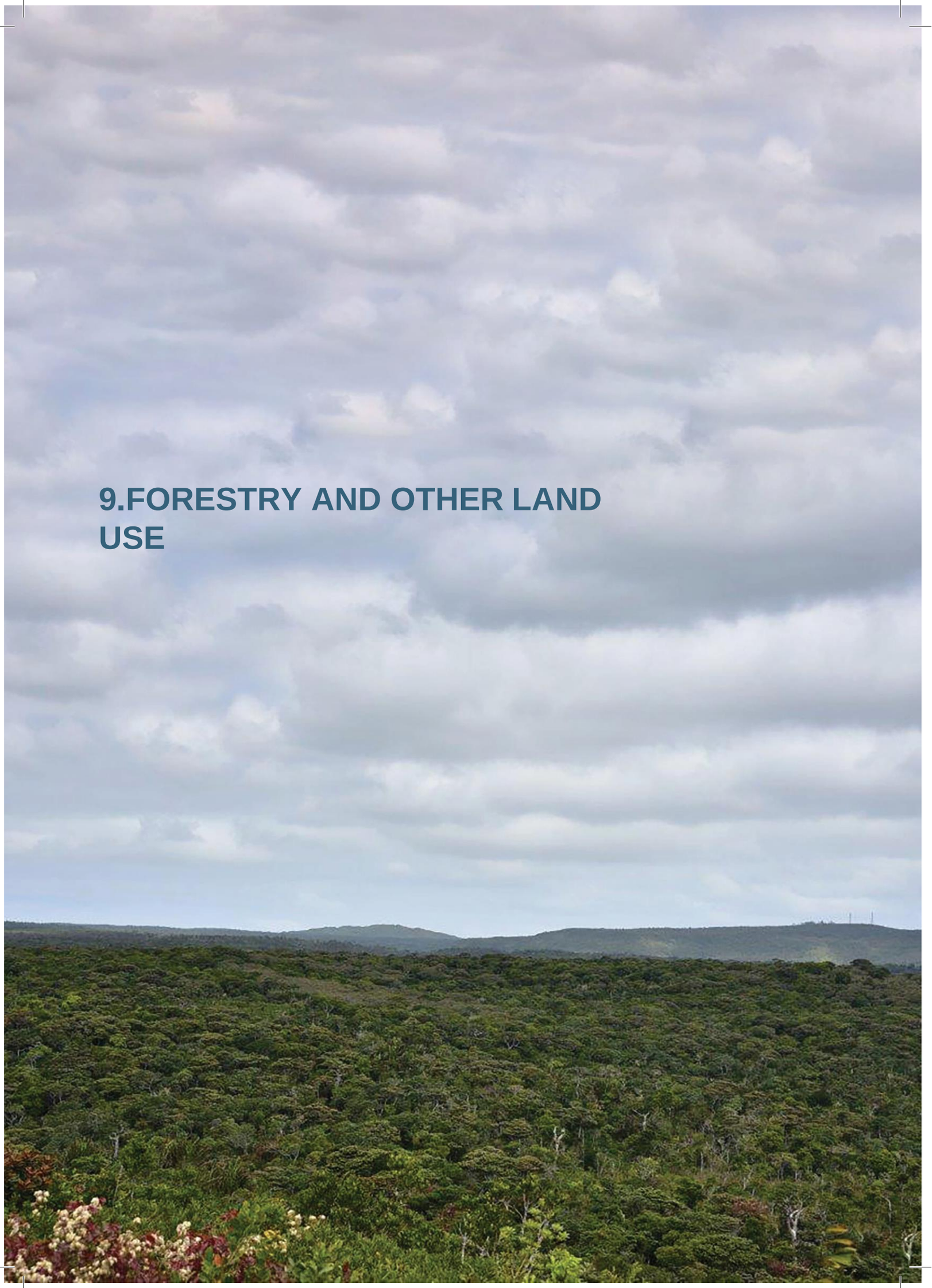


Figure 16: Mitigation Scenarios for Livestock Manure Management

9.FORESTRY AND OTHER LAND USE



9. FORESTRY AND OTHER LAND USE

9.1 Sectoral Emission Profile

Forestry (and other land use) represents a carbon sink that totaled 360.9 $ktCO_2e$ in 2019.[63] This level of carbon sink has been fairly constant in the past decade, revealing an unchanging stock of primary and secondary forests in Mauritius.[64]

In 2021, the total extent of forest cover in Mauritius was 47,006 ha, out of which around 25,000 ha were under private ownership and the remaining 22,006 ha on State Lands.[65] The Forestry Service (FS) has jurisdiction of 14,540 ha of State Forest Lands; 7,233 ha under that of the National Parks and Conservation Service and 275 ha are managed by the Vallée d'Osterlog Endemic Garden Trust. The FS also has surveillance oversight over 6,540 ha of privately owned mountain and river reserves.[66] Approximately 14,613 hectares of land are covered with planted forests. The remaining are natural forests, most of which are badly degraded. Only around 2% of the land area of Mauritius is considered to be covered with good-quality native forests.[67] Around 16,196 ha of land are found in Terrestrial Protected Areas in 2021,[68] including 46 ha of wetlands and 599 ha of protected offshore islets. The largest protected areas are National Parks (7,071.2 ha) and privately owned mountain and river reserves (6,553 ha). There were 11,774 ha of forest plantations for silviculture.[69] However, the production of timber is gradually being phased out, with more emphasis placed on conservation, protection and the sustainable management of remaining forests for enhancing ecosystem functions such as reducing soil erosion, enhancing carbon sequestration, conservation of biodiversity & genetic resources, recreation & ecotourism.[70] The area of mangroves amounted to 160.06 ha in 2018.[71]

9.2 Sectoral Strategies and Targets

While the process of updating the Strategic Plan 2016–2020[72] is ongoing, the approach used to model mitigation scenarios for forestry is the continuation of the broad orientations of the existing Strategic Plan (as in the case of Agriculture). In the BAU situation, there is no implementation of the policies, strategies and actions proposed in the Strategic Plan 2016–2020. The parameters used for the BAU scenario are given in **Table 32**.

		2015	2020	2030	2040	2050
Mangrove Forest (ha)		159.4	160.1	160.1	160.1	160.1
Wood Removal (m^3/year)	DLL Eucalyptus	528	478	300	200	100
	WUL pine>20 yr	708	650	550	300	100
Fuelwood Removal (m^3/year)	DLL Eucalyptus	1,769	1,204	557	400	100
	WUL pine>20 yr	1,587	1,125	565	350	100

Table 32: Selected Parameters Used to Model the Forestry BAU Scenario

Source: Forestry Services, Ministry of Agro-Industry and Food Security; Digest of Environment Statistics 2019

Two mitigation strategies have been proposed, as described in **Table 33**.

63. *Statistics Mauritius, 2020.*
64. *It is pointed out that most land use changes involving forest cover took place in the 18th and 19th century.*
65. *Statistics Mauritius (2022) Environment Statistics – Year 2021, Ministry of Finance, Economic Planning and Development, Port Louis.*
66. *Although privately-owned, these reserves are protected under the Forests and Reserves Act 1983.*
67. *Forestry Service (2018) Annual Report of the Forestry Service 2018, Ministry of Agro-Industry and Food Security, Port Louis.*
68. *Statistics Mauritius (2022) Environment Statistics – Year 2021, Ministry of Finance, Economic Planning and Development, Port Louis.*
69. *Statistics Mauritius (2022) Environment Statistics – Year 2021, Ministry of Finance, Economic Planning and Development, Port Louis.*
70. *Ibid, pg. 11.*
71. *Information provided by Department of Environment, MESWMCC.*
72. *Ministry of Agro-Industry and Food Security (2016) Strategic Plan 2016 – 2020 for the Food Crop, Livestock and Forestry Sectors.*

<table>
<tr><th>MITIGATION STRATEGIES</th><th>DESCRIPTION OF ACTIONS</th></tr>
<tr><td>Strategy 1: Tree Planting</td><td>The tree planting targets are given below, and they relate to a Master Plan Greening and Embellishment of motorways M1 and M2 to plant 600,000 over a period of 7 years along the M1/M2 motorways. It is estimated that around 40% of the plants will be of woody biomass that will be effective carbon stocks. It is also assumed that planting will take place between 2022 and 2028.
<table>
<tr><th>PARAMETERS</th><th>2020</th><th>2022-2028 (ANNUALLY)</th></tr>
<tr><td>Area planted (ha)</td><td>20</td><td>35</td></tr>
<tr><td>Number of trees</td><td>22,000</td><td>38,500</td></tr>
</table></td></tr>
<tr><td>Strategy 2: Afforestation</td><td>The strategy consists of investigating the impact of afforesting 1,750 ha of abandoned sugar cane land. It is assumed that all the 1,750 ha of land are available in the agro-ecological zone of Dry Lowland (DLL). Afforestation was added to the analysis as an indicative measure for increase of the carbon sinks in Mauritius (against a quasi-stagnating baseline). The parameters used for modeling this scenario are given below, assuming a 1:1 ratio of native species to exotic species.
<table>
<tr><th rowspan="2">TIME PERIOD</th><th rowspan="2">AREA PLANTED WITH NATIVE TREE SPECIES (HA/YR)</th><th colspan="3">AREA PLANTED WITH EXOTIC TREES (HA/YR)</th></tr>
<tr><th>ARAUCARIA</th><th>EUCALYPTUS</th><th>TABEBUIA</th></tr>
<tr><td>2021-2025</td><td>5</td><td>1.25</td><td>2.5</td><td>1.25</td></tr>
<tr><td>2026-2030</td><td>20</td><td>5</td><td>10</td><td>5</td></tr>
<tr><td>2031-2035</td><td>302026</td><td>7.5</td><td>15</td><td>7.5</td></tr>
<tr><td>2036-2040</td><td>35</td><td>8.75</td><td>17.5</td><td>8.75</td></tr>
<tr><td>2041-2045</td><td>40</td><td>10</td><td>20</td><td>10</td></tr>
<tr><td>2046-2050</td><td>45</td><td>11.25</td><td>22.5</td><td>11.25</td></tr>
</table></td></tr>
</table>

Table 33: Mitigation Strategies and Targets, Forestry

9.3 Mitigation Actions, Enabling Measures and Finance Needs

The actions related to the mitigation strategies for Forestry are given in **Table 34**, and the enabling measures and finance needs are shown in **Table 35**. The total increase in carbon sink resulting from the two mitigation strategies is 9.5 $ktCO_2e$ in 2030. The finance needed to implement the mitigation actions has been estimated at USD 7.3 million.

FORESTRY (F) OUTCOME: INCREASING THE SINK CAPACITY OF MAURITIUS TARGET: ENHANCING SINK CAPACITY RELATIVE TO BAU BY 9.5 $ktCO_2e$ IN 2030				
ID	**STRATEGY**	**ACTION**	**TIME FRAME**	**MAIN STAKEHOLDERS**
F1	Planting trees in urban areas [4.3 $ktCO_2e$ ER]	**F1.1.** Planting of 600,000 trees over a period of 7 years along the M1/M2 motorways	2022 - 2028	MAIFS; Forestry Service (FS); MESWMCC
F2	Afforestation of abandoned agricultural land [5.2 $ktCO_2e$ ER]	**F2.1.** Afforesting 1,750 ha of abandoned sugar cane land with a combination of endemic by 2030	2022 - 2030	FS; PS

Table 34: Mitigation Strategy and Actions for Forestry

FORESTRY (F)	
F1.1. Planting of 600,000 trees over a period of 7 years along the M1/M2 motorways	USD 5.33 million
F2.1. Afforesting 1,750 ha of abandoned sugar cane land with a combination of endemic by 2030	USD 1.97 million
Cross-cutting Measures Forestry (CcMF) • CcMF1. Improved coordination between stakeholders involved in tree planting activities • CcMF2. Develop an integrated land use plan for zoning afforestation projects	

Table 35: Enabling Measures and Finance Needs, Forestry

9.4 Mitigation Scenarios

Figure 17 shows the results of the mitigation scenarios. The BAU scenario shows marginally increasing carbon stocks for a constant area of forest land (408 $ktCO_2e$ in 2020; 411 $ktCO_2e$ in 2030; 412 $ktCO_2e$ in 2040; 414 $ktCO_2e$ in 2050). The increase in carbon sink for the two mitigation strategies relative to the BAU case is given in **Table 36**. Planting trees and afforestation will increase the sink of carbon by 4.34 $ktCO_2e$ and 5.20 $ktCO_2e$ by 2030, respectively. The cumulative effect of the two strategies in 2030 represents an increase in carbon sink by 2.3%, with the increase becoming more pronounced by 2050 (7.7%), especially due to the effect of afforestation.

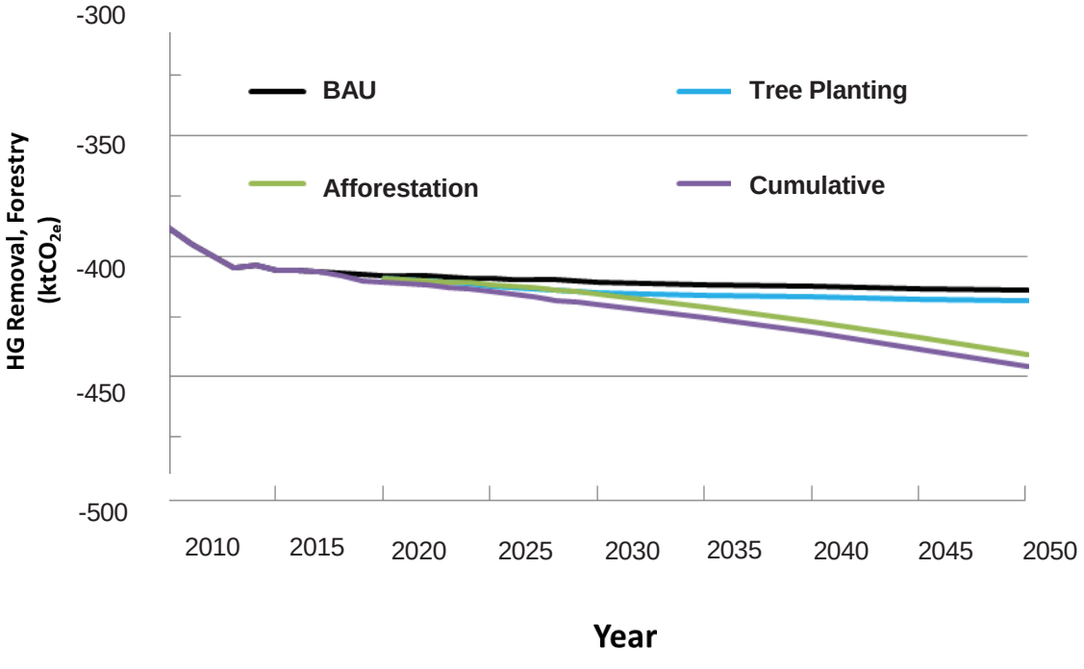
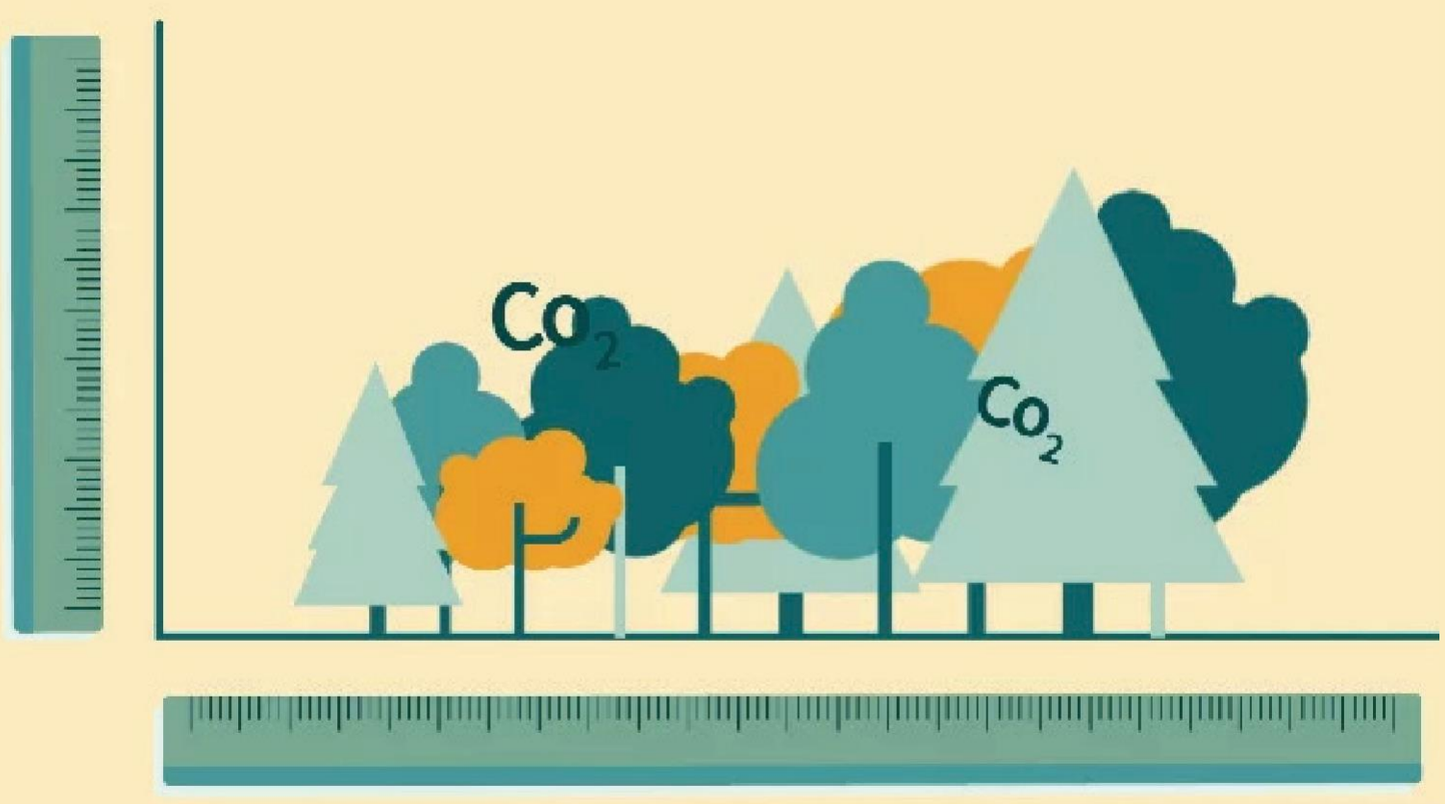


Figure 17. Enhanced Levels of Carbon Sink in Forestry

Relative to BAU	2020	2030	2040	2050
Tree planting	-	4.34	4.44	4.68
Afforestation	-	5.20	14.66	27.13
Cumulative	-	9.54	19.1	31.81

Table 36: Increase in carbon sequestration, $GgCO_2e$

10. ENHANCED TRANSPARENCY AND EFFECTIVE IMPLEMENTATION THROUGH MEASURING, REPORTING AND VERIFICATION



10. ENHANCED TRANSPARENCY AND EFFECTIVE IMPLEMENTATION THROUGH MEASURING, REPORTING AND VERIFICATION

The Monitoring and Evaluation (M&E) Framework is proposed from two perspectives, namely: (i) actions to achieve the reporting requirements under Article 13 of the Paris Agreement, and (ii) tracking progress in implementing the NCCMSAP, including the sustainable development benefits. Outcomes and measures will undergo a measurement, reporting and verification (MRV) process facilitated by the online Mauritius NDC Registry (MauNDC Registry), which is being developed under the NAMA project. The information collected will be used to monitor the progress of implementation and achievement of the mitigation goals stated in the NDC and NCCMSAP, contributing to the reporting of progress in implementing the NDC to UNFCCC Secretariat, and also facilitating the assessment of the effectiveness of national policies and measures, and their contribution to national sustainable development.

10.1. Reporting Requirements under the UNFCCC and Paris Agreement

With the Paris Agreement and its Article 13, the Enhanced Transparency Framework (ETF) for action and support was established. The modalities, procedures and guidelines for Article 13 provide operational details on how to report on the information on national GHG inventories, tracking of progress of implementation and achievement of the NDC, climate change impacts and adaptation efforts, support provided and received for implementing the Paris Agreement, and general functioning of the ETF. The strategies and actions to achieve these reporting requirements are shown in **Table 37**, and will take place in conjunction with the relevant Legal and Institutional interventions (e.g. LI3.1). While the focus of the Strategy is on the requirements under the UNFCCC, the actions are supportive of cooperation and data sharing as provisioned under Section 17 of the CCA 2020.

REPORTING REQUIREMENTS (RR) UNDER THE UNFCCC				
	STRATEGY	**ACTION LIST**	**TIME FRAME**	**OWNER**
RR1	Enhanced Transparency Framework established and operational	**RR1.1.** Online MauNDC Registry for reporting on the implementation of mitigation contributions in NDC, and support received is established and operationalised	2022	DCC
		RR1.2. Capacity building of institutional stakeholders to use the online Mauritius NDC Registry	2021 - 2022	DCC
		RR1.3. Human and institutional strengthening to produce Biennial Transparency Reports (BTRs) [Discretion for SIDS – No Timeline Specified]	2023 - 2024	DCC

Table 37: Strategies and Actions to Meet the Reporting Requirements Under the Paris Agreement

10.2. MauNDC Registry

The MauNDC Registry[73], which went live in 2022, will assist in the systematic and regular collection, preparation and reporting of data on climate action and support in Mauritius. The transition to an online information system (**Figure 18**) will make the process more efficient, reliable, systematic and traceable by assembling, storing, processing and delivering relevant and useful information to stakeholders.

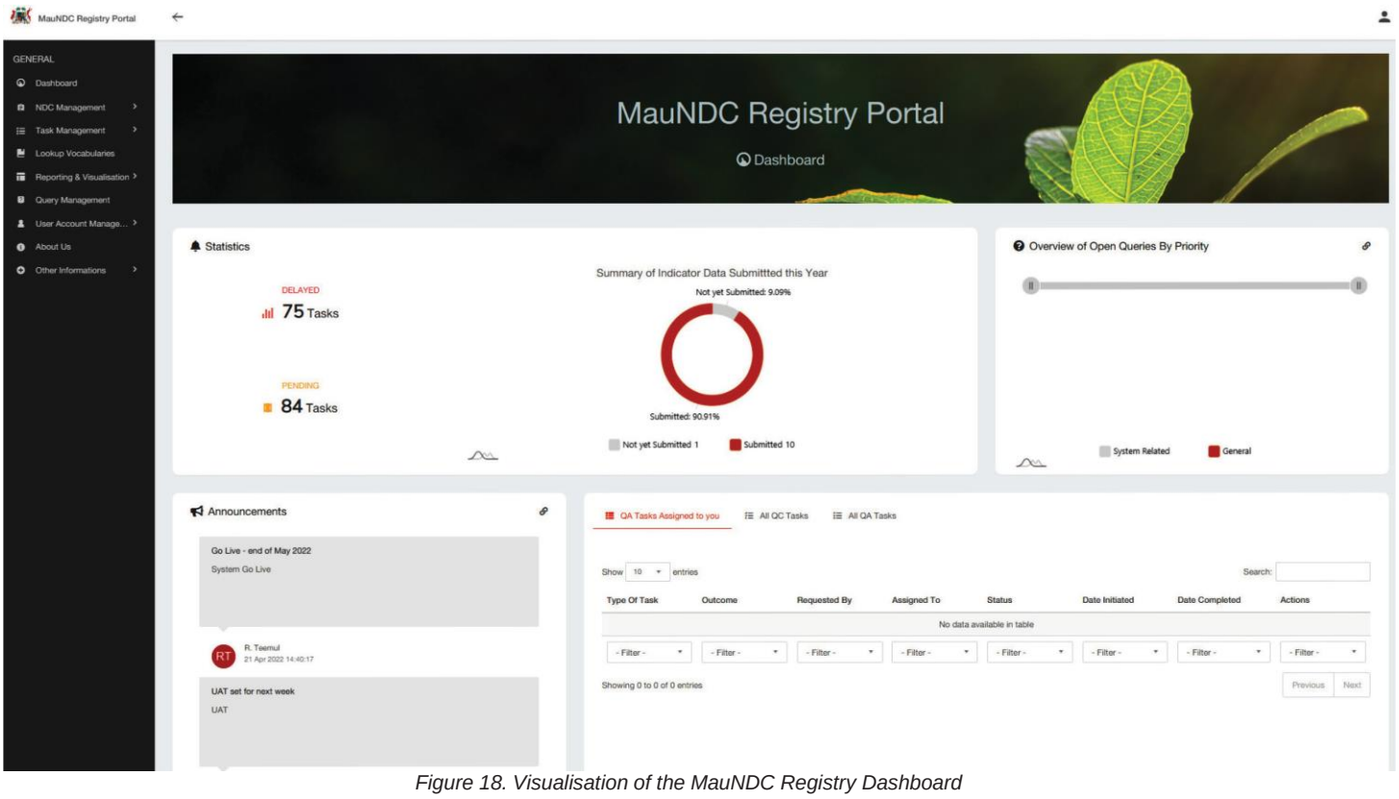


Figure 18. Visualisation of the MauNDC Registry Dashboard
(Source: PwC, 2022)

The registry is currently designed to allow for reporting on the following elements:

- **Outcomes**, including mitigation, adaptation and cross-cutting outcomes
- **Interventions** (measures) to be linked to the achievement of outcomes
- **Indicators** to track the implementation of the interventions, outcomes and sustainable development
- **Support** needed and received (Financial, Technological, Capacity Building and Transparency related) towards the achievement of interventions and outcomes

MauNDC Registry will facilitate the visualisation of progress on climate action and the generation of reports that will ultimately contribute to the biennial reporting to the UNFCCC Secretariat through BTRs. In addition, the MauNDC Registry has been customized to allow the addition of new modules, such as GHG inventories.

The system has interrelated human and computer elements. While the computer elements will be responsible for processing and storing data, as well as handling data retrieval and data management requests, the human aspects include keying in the relevant data, editing data, doing data cross-checking and quality control, and interpreting information. The ultimate functioning and benefits of the MauNDC Registry are therefore dependent on the inputs from the relevant stakeholders. The main typologies and roles of stakeholders necessary for the functioning of the MauNDC registry are illustrated in **Figure 19**.

73.https://maundcregistry.govmu.org/NDCRegistery/frmlogin.aspx

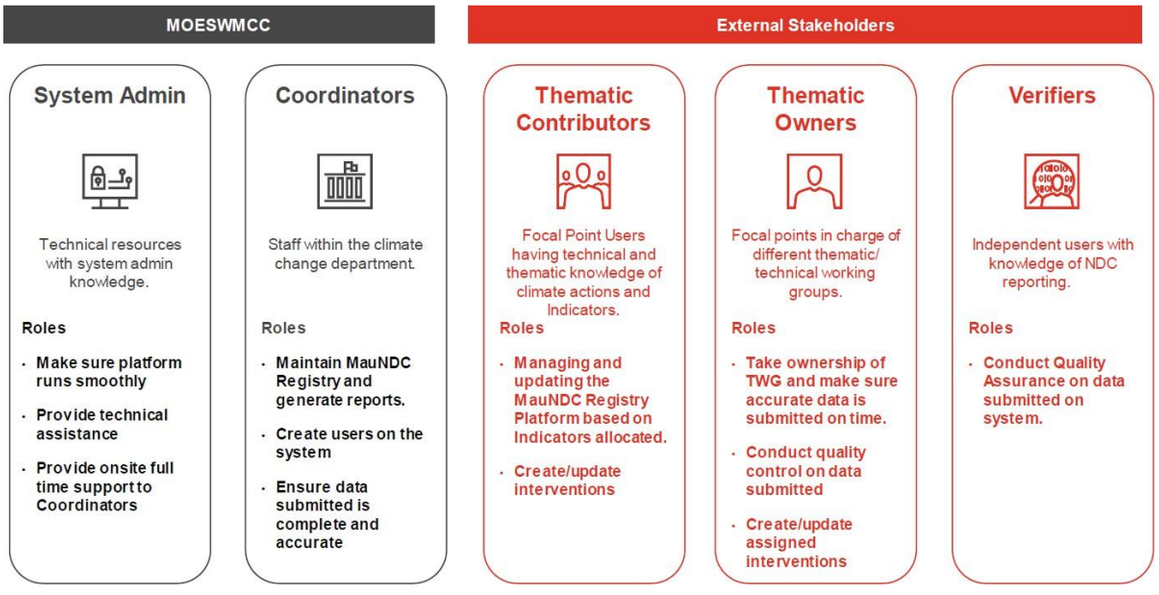


Figure 19. Typology and Roles of Stakeholders Relevant for the MauNDC Registry
(Source. PwC, 2022)

10.3. Indicators for Monitoring and Evaluation (M&E) of the NCCMSAP

The monitoring and evaluation of the NCCMSAP 2022–2030 take into account the economic, social and environmental – i.e., sustainable development - objectives of interventions. The process for the monitoring of progress is contained in an integrated policymaking approach. Typically, climate change mitigation should be framed following a policy cycle that includes (1) the definition of issues (or agenda setting), (2) policy formulation, (3) decision-making, (4) implementation, and (5) evaluation.[74] A description of the three types of indicators that inform the integrated policy cycle is given in **Table 38**. The M&E Framework given in **Table 39** applies the three types of indicators to support the implementation and review of the NCCMSAP as part of the adaptive management of sectoral mitigation strategies and actions.

AGENDA SETTING INDICATORS	FORMULATION INDICATORS	EVALUATION INDICATORS
State of the environment and impacts of economic activity. • Indicators to identify issues related to the environment – e.g., GHG emission levels - resulting from economic activities, as well as from climate change feedbacks • Indicators selected to best identify the baseline problem and its causes (e.g., socioeconomic reasons underlying mitigation)	**Policy cost and reach.** • Indicators to assess the potential cost and performance of various intervention actions • For CC mitigation, it could be the abate cost of CO2, and net savings from avoided energy use	**Policy impacts on economic, social and environmental progress and overall human well-being.** • Indicators to assess the success of interventions • Indicators may include the overall progress of human well-being; adaptation co-benefits; and social advancements (i.e., job creation, poverty alleviation, social inclusiveness, gender and youth mainstreaming)

Table 38: Three Types of Indicators in M&E Framework

74.UNEP (2009) Integrated Policymaking for Sustainable Development – A reference manual. UNEP, Geneva.

SECTOR	PROBLEM	INDICATOR OF ISSUE IDENTIFICATION	INDICATOR OF POLICY/STRATEGY FORMULATION
Cross-Sectoral Indicators	1. Socioeconomic impacts of climate change mitigation and policy-induced interventions	1. Number of persons impacted by and influencing climate change mitigation, disaggregated by gender, children and youth in all emission sectors	1. Number and share of children receiving formal education on climate change mitigation and interventions 2. Number of persons (disaggregated by sex, youth and children) participating in design, planning and monitoring of climate mitigation actions 3. Number of young women and men supported in studies/ training on disciplines related to climate mitigation 4. Number of young women and men supported in climate mitigation plans along with national poverty reduction policies and action plans
Agriculture	1. Poor application of good agricultural practices in crop production	1. Amount of fertiliser/ pesticides used (tonne/year) 2. Agricultural soil loss or deterioration (tonne/ha/yr) 3. Average nitrate and pesticide concentrations in surface and groundwater (mg/l)	1. Number of capacity building activities on good agricultural practices, including low-carbon methods of agriculture 2. Investments in low-carbon climate technologies for agriculture (USD/year) 3. Number of soil management plans implemented 4. Amount of tax exemptions on organic fertilisers, soil conditioners, and bio-pesticides (USD/year)
	2. Use of traditional and inefficient technologies for managing animal waste	1. Livestock production (number of heads and tonnes of different animals per year) 2. Methods of excrement management (% utilization for waste management)	1. Number of farmers adopting low-carbon technologies for managing animal excrement 2. Investment in training and dissemination of new technology for waste management (USD/year) 3. Number of capacity-building programs implemented for sustainable livestock production
Energy (Energy Industries)	1. Rising energy costs due to heavy reliance on imported fossil fuels (supply side)	1. Per capita energy bill (US$/person/ year) 2. Fossil fuel use (% of total final energy and electricity consumption) 3. Fossil fuel subsidies (US$/ year) 4. Share of floor area of green buildings in the total park of buildings (%)	1. Share of renewables in electricity production (%) 2. Economic and financial incentives (USD/year) to invest in renewable energy sources and energy storage technologies 3. Investments in grid strengthening (USD/year) 4. Installed capacity of different types of renewables (MW) 5. Number of persons trained in renewable value chains (sex disaggregated)
	2. Low adoption of end-use energy efficiency (demand side management)		1. Amount of incentives for energy-efficient appliances (USD/year) 2. Number of energy efficiency performance standards and labels, including building energy codes, that are enforced 3. Number of persons trained in demand-side management value chains (sex disaggregated) 4. Number of annual energy audits and energy value (GJ / GWh) carried out in manufacturing, and commercial and distributive trades 5. Number of registered energy auditors 6. Investments in urban green infrastructure (USD/year)

INDICATOR OF POLICY/STRATEGY EVALUATION	RESPONSIBLE PARTY
1. Share of renewable energies in the total primary energy consumption 2. Share of energy bill in the total importation bill of the country 3. Gender-differentiated green jobs created 4. Carbon intensity of the economy (1000 units of GDP/ tCO_2e)	MEPU, MFEPD, MESWMCC, METEST, Ministry of Labour, Industrial Relations and Employment (MLIRE)
1. Decrease in C content of agricultural production (tCO_2e/t (produce)) 2. Reduction in yield variability (%) 3. Number of farmers adopting MauriGAP, and agriculture land area under sustainable farming (ha) 4. Carbon stock in soil (tonne/ha)	MAIFS, FAREI
1. Reduction of GHG emissions per unit of product (tCO_2e/kg of meat) 2. Increases in livestock production for enhanced food security (kg of meat/year) 3. Amount of treated sludge and animal manure composting (tonne/year)	MAIFS, FAREI
1. Reduced costs of energy imports (USD/year) 2. National and household energy savings (USD/year) 3. Emissions from electricity generation and consumption (tCO_2e/year)	MEPU, CEB, MARENA
4. Grid emission factor (tCO_2e/MWh) 5. Number of green jobs created in the electricity supply and demand value chains	MEPU, EEMO, MNICD

Table 39: M&E Framework for the NCCMSAP

SECTOR	PROBLEM	INDICATOR OF ISSUE	INDICATOR OF POLICY/STRATEGY FORMULATION
Energy (Transport)	1. Unsustainable access and mobility in land transport	1. Number of commuters using public transport	1. Investment in transport infrastructure (e.g., light rail system/Metro Express, carpooling, park-and-ride, etc.) to enhance accessibility and mobility
	2. Aggravated transport of goods within the country	1. The volume of freight transport per unit of Gross Domestic Product (GDP)	1. Investment in improving and developing the national road network to curb congestion
	3. Unaffordability of low-carbon modes of passenger transport	1. Number of hybrid and electric vehicles in both public and private transport 2. Fuel consumption per type in maritime transport and aviation	1. Economic and financial incentives (USD/year) to invest in low-carbon vehicles 2. Existence of a regulatory framework for taxing private vehicles based on carbon emissions and labeling 3. Investments to promote the use of alternative low-carbon fuels (USD/year)
	4. Low transport efficiency	1. Number of commuters using private transport 2. Volume of air travel routes	1. Number and types of incentives for the reduction use of private passenger travel 2. Investments in low-carbon carriers on domestic air travel routes (USD/year)
Forestry (and Natural Capital)	1. Weak institutional capacity for sustainable forest management	1. Percentage of forest areas and degraded ecosystems 2. Area of forest and conservation land affected by invasive species 3. Rate of deforestation (ha/yr) 4. Number of protected and conservation areas 5. Coastal erosion and flooding related to degradation of ecosystem services	1. Investments in forestation projects (USD/year) 2. Development of a forest protection policy framework, strategy and action plan 3. Enforcement of forest protection laws 4. Capacity building of forest and parks conservators on climate change mitigation (e.g., GIS-based inventory, scenario modeling, vulnerability assessments and climate impact studies on the stock of forests) 5. Incentives/investments in the afforestation of abandoned/marginal land 6. Investments in conservation measures for climate-threatened species and habitats (USD/year) 7. Investments in restoration and new mangrove plantation (USD/year and ha restored/planted)
Solid Waste	1. Embryonic circular waste economy	1. Amount of produced/ treated/cycled/reused solid waste (tonne/ year) per source and type	1. Investments in enhancing the national circular waste economy, taking into account all waste management operations (USD/year) 2. Investments in energy production/recovery from solid waste (USD/year)
Waste Water	1. Waste water treatment with a low focus on GHG emissions	1. Amount of produced/ treated/ waste water (tonne(BOD)/year) by source and by type of treatment	1. Investments on low-carbon treatment facilities, including capacity building (USD/year) 2. Investments on energy production/recovery from solid waste (USD/year)
IPPU	1. Shifting focus from minimising ozone depletion to be inclusive of climate change	1. Amount of refrigerants, including HFCs imported (tonne/year) and identification of end uses 2. Number and type of equipment imported that uses HFCs as refrigerants	1. Phase-down plan for HFCs, including regulations/ legal mandates for implementing the Kigali Amendment to the Montreal Protocol 2. Investments in new equipments that use GWP-free refrigerants (USD/year). 3. Number of stakeholders capacitated in the use of GWP-free refrigerants and method of HFC recovery and disposal

INDICATOR OF POLICY/STRATEGY EVALUATION	RESPONSIBLE PARTY
1. Number of commuters using public transport 2. GHG emissions from transport sector (tCO_2e/yr) 3. Percentage of fuel consumption (in tons per year) 4. Distance travelled in 1000-km per day per type of vehicle 5. Emission factor per type of vehicle	MLTLR, NLTA, MEL
1. GHG emissions from transport of goods (tCO_2e/yr)	MLTLR, NLTA, TMRSU
1. Number of hybrid and electric (and other low-carbon) vehicles in both public and private transport 2. GHG emissions from passenger transport and maritime transport and aviation (tCO_2e/yr)	MLTLR, NLTA, Mauritius Shipping Corporation Mauritius Ports Authority Department of Civil Aviation
1. GHG emissions from domestic and air travel routes (tCO_2e/yr)	MLTLR, NLTA, Department of Civil Aviation
1. GHG sinks in inventories (tCO_2/yr) 2. Percentage of forest area 3. Number of rehabilitated forests/abandoned land (ha) 4. Rate of deforestation (ha/yr) 5. Percentage of forest area impacted by pests and diseases 6. Count and distribution of fauna and flora species 7. Number of implemented Ecosystem-based Adaptation (EbA) tools and measures 8. Area of mangrove plantations (ha)	MAIFS, FS, MESWMCC
1. Energy produced from solid waste management (MWh/year) 2. GHG emissions from the solid waste sector (tCO_2e/year) 3. Quantity and types of waste recycled and/or treated for environmentally-sound disposal 4. Jobs created in the circular waste economy	MESWMCC, SWMD
1. GHG emissions from waste water management (tCO_2e/year) 2. Amount of treated sludge (tonne/year) and methane recovered (tCH4/year) 3. Energy produced from waste water management (MWh/year)	MEPU, WMA
1. GHG emissions from refrigerants (tCO_2e/year) 2. Number and type of equipment using HFCs retired from the market 3. Amount of HFCs recovered for safe disposal (tonne/year)	MESWMCC, NOU

11. FINANCIAL ASPECTS AND ENABLING FACTORS

11. FINANCIAL ASPECTS AND ENABLING FACTORS

It is estimated that USD 2 billion will be required by 2030 for an effective implementation of Mauritius' NDC (2021) related to mitigation, and USD 4.5 billion will be required for adaptation, for a total of USD 6.5 billion. 35% of this amount would be covered by government resources and private sector contributions, with the remainder expected to be covered by donors and other external sources. The needed investment for mitigation has, in the analysis for the NCCMSAP, been adjusted up to USD 3.082 billion with an expected 7.6% contribution from national public sources.

11.1. Financing of Mitigation Measures

According to stakeholder consultations made through the NDC update activities, there is a large variation in the investment maturity of various identified mitigation measures. The analysed mitigation measures can be divided into the following general categories of investment maturity:

1. Investment Ready (IR)

These mitigation measures include projects already under implementation with intended scale-up and replication underway, projects with clear technical specifications, existing feasibility studies, and where there are either existing budgeted national funds available and/or secured financing from national and/or international sources of finance. Examples are the installation of 10 MW Roof-top Solar Capacity through CEB own funds and a loan from the Abu Dhabi Fund for Development, and Installation of 1000 kit of 2 kW for commercial consumers under tariff 215 (Flat Rate Tariff for Commercial Consumers), where the tender for the second phase is under preparation.

2. Needs Support for Implementation (SI)

These mitigation measures include projects where the technology and scope are known where the government has already decided to implement the projects, but where financing sources are still not identified and/or implementation modalities are still under design. Examples are Purchase of Electrical Energy from 30-40 MW Wind Farm Projects, where the tender is under preparation, and Renewal of Alteo coal bagasse contract to a dedicated biomass contract, where the project proposal has been submitted, but there are still uncertainties regarding the tariff structure.

3. Needs Support for Preparation (SP)

These mitigation measures include projects where the scope is known, but the exact technical specifications and financial information are still unknown. Many of these projects are expected to be implemented during the period 2025–2030. Examples include a decrease in landfill emissions through recycling and composting, where the feasibility study is ongoing in connection with the setting-up of composting plants and sorting units, scheduled for 2024, and the adoption of HFC alternatives in the Refrigeration and Air-Conditioning sector, where alternative technologies exist, but policy formulation is at its infancy.

4. Needs support for Development and Preparation (DP)

These mitigation measures include a wide range of different projects and concepts. Some are known technologies, but there is a lack of local studies and planned implementation modalities, while others are less mature technologies or where implementation modalities are still unknown. The majority of these measures are envisioned to be implemented during the period 2025–2030. Examples include many of the envisioned measures to achieve the 10% economy-wide energy efficiency improvements, including the establishment of an Energy Efficiency Financing Scheme, and the setting up of Energy Performance Contracting, and offshore wind farms and measures in the wastewater sector.

Table 40 list the mitigation measures classified by level of investment maturity. Investment-ready measures are deemed to not be in need of financial support, although they might need some form of funding for technical or capacity-building support for an effective implementation. Measures classified as in need of support for implementation are the ones where it is relevant to reach out to national and international sources of climate finance to attract financial support for investments in activities and technologies. Most of the measures are deemed to be in need of funding and support for preparation, meaning that there are clear concepts established, but they lack a clear definition of implementation arrangements and intended financial mechanisms for implementation. Measures in need of support for development and preparation are deemed to be at an early conceptual stage. Measures in need of support for preparation and development should first focus on seeking funding for preparation through international support providers focusing on technical assistance to achieve a higher level of investment maturity, before identifying appropriate sources of financial support for investments.

SECTOR / STATUS	IR	SI	SP	DP
EI2.1. Installation of additional 29 MW utility scale PV	x			
EI2.2. Installation of additional 214 MW rooftop PV (residential, commercial, educational institutions)	x			
LT4.1. Operationalisation of the Light Rail System between Curepipe and Port Louis	x			
F1.1. Planting of 600,000 trees over a period of 7 years along the M1/M2 motorways	x			
EI2.4. Increase biomass generation capacity by 100 MW (hybrid facility)		x		
LT3.2. Increasing the share of electric cars to 4.5% of total passenger travel demand in 2030		x		
L1.1. Increase in livestock heads for increased food security with low-carbon excrement management technologies		x		
EI2.3. Installation of additional 32 MW floating solar PV			x	
EI2.8. Installation of 100 MW new RE hybrid facility (solar + battery)			x	
EI2.9. Installation of 40 MW new RE hybrid facility (small scale solar + battery)			x	
EI2.10. Installation of 100 MW new RE hybrid facility (solar + wind + battery storage)			x	
LT3.1. Increasing the share of hybrid cars to 8.31% of total passenger travel demand in 2030			x	
SWM1.1. Composting of 31% of municipal solid waste in 2030			x	
SWM2.1. Recycling of 22% of municipal solid waste by 2030			x	
IP1.1. Reducing HFCs by 10% of the baseline value (2024) by 2029			x	
IP2.1. Import ban on refrigerators using HFCs in 2024, and all Refrigeration and Air Conditioning (RAC) equipment running on HFCs by 2029			x	
IP3.1. Recovery and safe disposal of HFCs in retired stock of RAC equipment			x	
F2.1. Afforesting 1,750 ha of abandoned sugar cane land with a combination of endemic by 2030			x	
EI2.5. Renewable Energy (RE) from waste project for 10 MW				x
EI2.6. Installation of 50 MW offshore wind energy				x
EI2.7. Installation of 20 MW marine renewables (Wave and/or Tidal)				x
LT1.1. Increased fuel economy at a rate of 0.5% per year				x
LT2.1. High Occupation Vehicles lane for uninterrupted flow along M2				x
LT2.2. Substituting ATCS for single timing traffic signaling to enhance real-time decision-making				x
LT2.3. Promoting active transportation				x
LT2.4. Promoting carpooling				x
SWM3.1. Twenty percent (20%) of municipal solid waste recovered for waste-to-energy				x
WWM1.1. Increasing utilisation level of aerobic treatment from 0.01 (BAU) to 0.03 in 2030				x
WWM1.2. Increasing utilisation level of anaerobic treatment from 0.01 (BAU) to 0.035 in 2030				x
A1.1. Reducing chemical inputs by 1% absolute per year until 2030 (bio-farming practices)				x
A1.2. Application of compost produced from MSW in crop cultivation				x
EI1.1. Increase economy-wide efficiency in electricity consumption by 10% in 2030 with 2019 as base year				x

Table 40: Mitigation Measures by Level of Investment Maturity

A: Agriculture; **EI**: Energy industries; **F:** Forestry; **IP:** Industrial Processes; **LT:** Land Transport; **SWM:** Solid Waste Management; **WWM:** Wastewater Management. **IR:** Investment ready; **SI:** Needs support for implementation; **SP:** Needs support for preparation; **DP:** Needs support for development and preparation

11.2. Marginal Abatement Revenue Curves of Mitigation Measures

Marginal Abatement Cost Curves (MACC) present the costs related to different mitigation options, alongside the expected emission reductions from their implementation, and are a useful tool to inform decisions about investment strategies. Inverting a MACC switches the focus from costs to revenues, in practice generating a Marginal Abatement Revenue Curve (MARC), which easily identifies the mitigation options that potentially generate revenues alongside emission reductions when implemented, compared to a BAU scenario. The MARC gives a quick graphical comparison among the mitigation measures in terms of their cost efficiency in reducing greenhouse gas emissions.

A MARC has been calculated for the target 2030 **(Figure 20)**[75]. The curve was created based on the expected revenue or savings of each mitigation measure per tCO_2e reduced USD/tCO_2e (y-axis), and the GHG emission reduction impact of the mitigation measure in 2030 $ktCO_2e$/year (x-axis). All measures located above the X-axis are "win-win" options, allowing mitigation and cost savings in comparison to the BAU scenario. The size of the area of each mitigation measure in the graphs is proportional to the total amount of greenhouse gas emissions reduced by the measure.

All measures for the energy industries have been analysed, but the remaining mitigation measures presented in this NCCMSAP were not included in the MARC curve, as the data needed by the model to either estimate investment needs or monetary benefits for the remaining options were not available. The results of the analysis can assist in decisions related to where to prioritise investment to maximise emission reductions and identifying financial support needed from the international community to support mitigation measures, which represent incremental costs compared to the baseline.

For the analysed measures in the energy industries, the expected capital investments needed for the implementation of mitigation measures is approximately 1.75 billion USD, and a reduction of approximately 1.94 $MtCO_2e$[76]. The analysis illustrates that Energy Efficiency and solar technologies are the options leading to the largest emission reductions, while also leading to savings (including expected operation and maintenance costs), compared to the BAU scenario. Wind, biomass and waste to energy are also a win-win option with large yearly expected emission reductions, and considerable cost savings compared to the BAU. Marine renewables and small-scale solar power with battery storage have considerable emission reductions, but negative return on investment per reduced ton CO_2e, compared to the BAU.

Table 41 lists all mitigation options included in the analysis, and their related savings/revenue per ton CO_2 reduced. In order to maximise savings and revenues, the actions should be prioritised in descending order, while the prioritisation of emission reductions can be based on identifying the measures with the largest expected emission reductions per year. Although it is important to note that data on cost savings compared to the BAU can in some cases be subject to a degree of uncertainty, e.g., for energy efficiency and associated investments in energy-efficient technologies to be introduced. Although, the energy efficiency analysis illustrates that energy efficiency measures would yield the highest emission reductions, and they should therefore be identified as a strategic priority. In general terms, energy efficiency investments yield positive returns on investments with a reasonable payback time. Many of the measures presented in the NCCMSAP, deemed as a result of improved regulation, could not be analysed as they did not represent investments in physical assets, technologies, etc., but are still expected to yield a noticeable amount of expected emission reductions.

75. The analysis was made using the Greenhouse Gas Abatement Cost Model (GACMO) developed by the UNEP Copenhagen Climate Center. The model includes default values for the mitigation potential parameters and economic-financial parameters of each mitigation option and their corresponding reference option in the baseline situation. The mitigation and economic-financial parameters have been adjusted as far as possible to the Mauritian context, but some discrepancies exist.

76. The investments required, and capacity additions, were sourced through the Renewable Energy Roadmap 2030 for the Electricity Sector. The electricity generation potential of the various technologies is based on expected daily insolation, examples of technologies in existing CDM projects and IPCC Special Report on Renewable Energy (2011). Electricity prices to calculate revenues are assumed to be 0,2 USD/kWh, while emission reductions are calculated based on a grid emission factor of 0,9915 tCO_2e/MWh.

OPTIONS INCLUDED IN MAR CURVE		
Reduction option	**Revenue / Saving** **USD/tonCO_2e**	**Emission reduction in 2030 per** **option ktCO_2e/ year**
EI1.1. Increase economy-wide efficiency in electricity consumption by 10% in 2030 with 2019 as base year	200.35	234.00
EI2.1. Installation of additional 29 MW utility scale PV	178.35	52.48
EI2.3. Installation of additional 32 MW floating solar PV	166.06	57.90
EI2.2. Installation of additional 214 MW rooftop PV (residential, commercial, educational institutions)	163.43	329.15
EI2.6. Installation of 50 MW offshore wind energy	133.24	158.64
EI2.8. Installation of 100 MW new RE hybrid facility (solar + battery)	118.06	180.95
EI2.4. Increase biomass generation capacity by 100 MW (hybrid facility)	62.63	426.35
EI2.10. Installation of 100 MW new RE hybrid facility (solar + wind + battery storage)	51.14	180.95
EI2.5. Renewable Energy (RE) from waste project for 10 MW	40.09	198.24
EI2.7. Installation of 20 MW marine renewables (Wave and/or Tidal)	-74.58	52.11
EI2.9. Installation of 40 MW new RE hybrid facility (small scale solar + battery)	-86.75	72.38

Table 41: Mitigation Measures and Related Revenues and Emission Reductions

Revenue of Reduction Options (USD/tCO_2e)

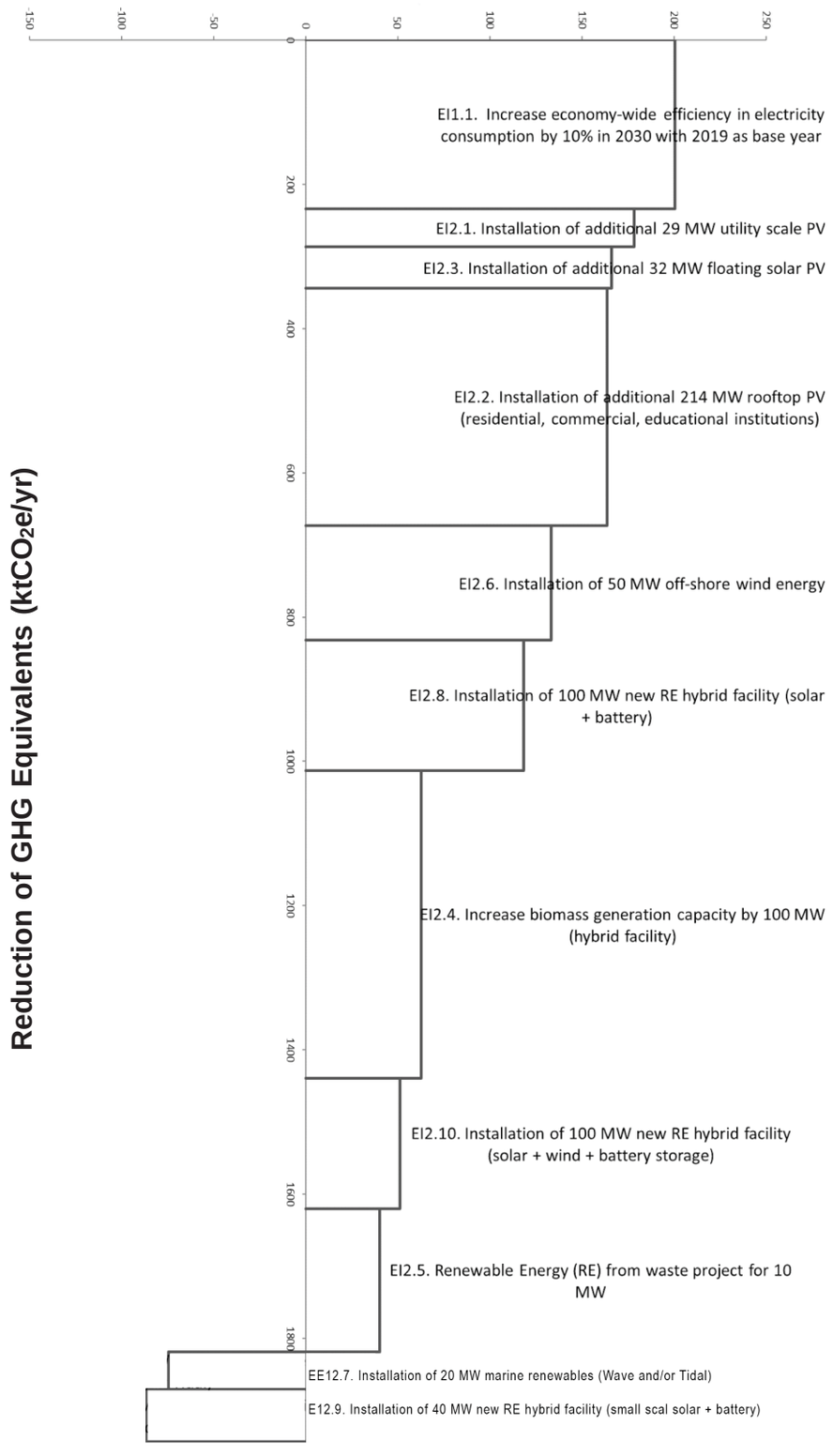


Figure 20. MARC for Mitigation Measures 2030

11.3. Enhancing Investment Readiness Through National Channels

A NDC Coordination Committee on Resource Mobilization for Climate Finance (RMCF) was set up by the IMCCC under the chairmanship of the Ministry of Finance, Economic Planning and Development (MOFEPD) to implement the NDC. The RMCF work will also be central for planning resource mobilization of the NCCMSAP. The National Environment and Climate Change Fund (NECCF) established under the Environment Protection Act is another relevant initiative that can be used to mobilize finance for implementation of the NCCMSAP.

Based on the analysis of investment maturity and the GACMO analysis, the RMCF and NECCF should focus their efforts in the short term towards measures with high expected impact and return on investment per ton of CO_2e, with a need for support for implementation. For the medium term, the focus should be on measures with a high expected impact and return on investment per ton of CO_2e, a need for support for preparation. The remaining measures can be the focus of longer-term planning until 2030. Actions related to, e.g., Large scale solar PV, are already in the pipeline and are receiving support through projects such as the Green Climate Fund and others as general support for renewable energy technologies. The gaps to achieving investment maturity for increased biomass generation, an increased share of electric cars and increased use of landfill gas should be addressed in the short term, and support for implementation should be sought from appropriate international sources of climate finance. The remaining activities are in need of support for preparation, and the RMCF should consider reaching out to potential funding sources to support feasibility studies and investment plan development. The RMCF could also, in dialogue with the NECCF identify strategic funds to be used for project preparation of priority actions with a low level of investment maturity, such as on-shore wind and composting of municipal solid waste.

Table 42 provides an attempt to cross-examine investment maturity of the different mitigation measures with the MARC analysis to provide guidance on short-, medium- and long-term investment efforts. Investment-ready measures with high emission reductions and revenue impacts are prioritized for the short term. Measures in need of support for implementation and preparation with high and medium emission reduction and revenue impacts are prioritized for the medium term, while measures in need of preparation and development that have an expected additional cost under current analysed conditions are set as long-term priorities.

SECTOR / STATUS	IR	SI	SP	DP	MARC HIGH	MARC MED	MARC NEG	PRIORITY
EI2.1. Installation of additional 29 MW utility scale PV	x				x			Short-term
EI2.2. Installation of additional 214 MW rooftop PV (residential, commercial, educational institutions)	x				x			Short-term
EI2.4. Increase biomass generation capacity by 100 MW (hybrid facility)		x				x		Medium-term
EI2.3. Installation of additional 32 MW floating solar PV			x		x			Medium-term
EI2.8. Installation of 100 MW new RE hybrid facility (solar + battery)			x		x			Medium-term
EI2.6. Installation of 50 MW offshore wind energy				x	x			Medium-term
EI2.10. Installation of 100 MW new RE hybrid facility (solar + wind + battery storage)			x			x		Medium-term
EI2.5. Renewable Energy (RE) from waste project for 10 MW				x		x		Medium-term
EI1.1. Increase economy-wide efficiency in electricity consumption by 10% in 2030 with 2019 as base year				x	x			Medium-term
EI2.9. Installation of 40 MW new RE hybrid facility (small scale solar + battery)			x				x	Long-term
EI2.7. Installation of 20 MW marine renewables (Wave and/or Tidal)				x			x	Long-term

Table 42: Assessment of Investment Maturity and Emission and Revenue Potential for Prioritisation of Mitigation Measures

EI: Energy Industries; IR: Investment Ready; SI: Needs Support for Implementation; SP: Needs Support for Preparation; DP: Needs Support for Development and Preparation; MARC High: High Emission Reduction and Revenue Impact; MARC Med: Medium Emission Reduction and Revenue Impact; MARC Neg; Low Emission Impact and Negative Revenue

11.4. Identification of International Source of Climate Finance

Mauritius has a long-standing strategic relationship with a wide range of international partners providing financial support for climate change mitigation activities, including those related to technology development and transfer and capacity building. Mauritius has been able to mobilise around USD 90 million of grant funding from all development partners for both mitigation and adaptation over the period 2016–2021.

Looking at the information reported from donors can provide a broader perspective on amounts, scope, financial instruments used, and indications of donor priority in financing mitigation. For the period 2008–2020 donors have reported having provided just above 1 billion USD of climate-related development finance to Mauritius, of which most was mitigation-related (906 million USD, of which some projects were also cross-cutting adaptation). **Figure 21** illustrates the total amounts of mitigation-related development finance provided to Mauritius as reported by OECD development finance statistics. The support provided is divided into Significant and Principal categories, where Principal signifies that the support provided directly and explicitly addresses climate change mitigation, while Significant signifies support where climate change mitigation is explicitly stated as an objective, but is not the fundamental driver for the support provided.

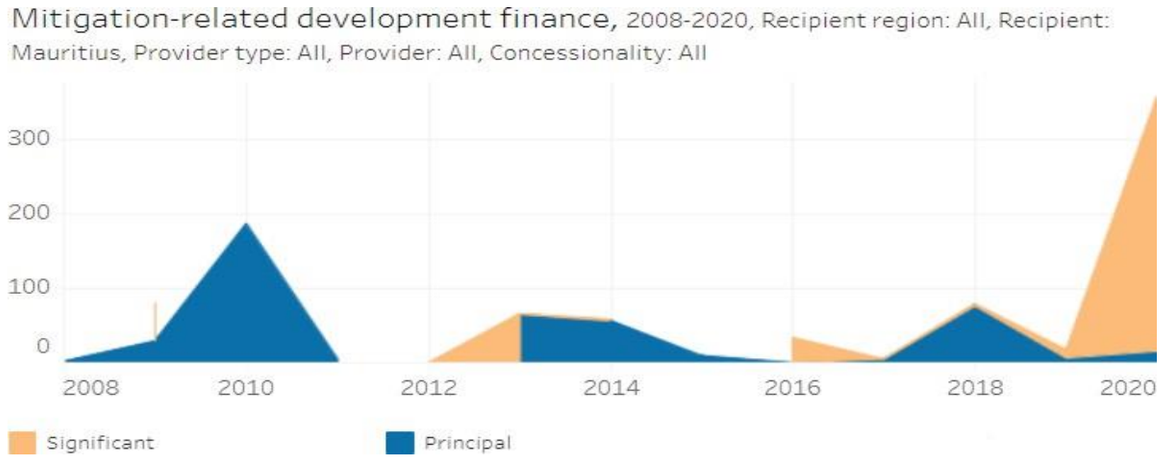


Figure 21. Mitigation-Related Development Finance Provided to Mauritius 2008–2020 in USD Million, Constant Prices in 2020.

Source. OECD DAC External Development Finance Statistics, 2022

No specific trend in the success of securing mitigation-related support can be identified from Figure 21. Although there might be a general increase in the share of support provided where climate change mitigation is not the fundamental driver but part of the objective. This might be attributed to increased efforts in streamlining climate change into national policies, therefore making climate change mitigation a significant component of national programs for which support is secured. The spikes in 2010 and 2020 are mainly attributed to support received from the French Development Agency. The large support provided in 2020 by the French Development Agency is deemed to only have a significant climate component, as the main purpose of the support provided was directed towards COVID-19 responses. The prevalence of bilateral assistance and the French Development Agency is also illustrated by Figure 22, which lists the top 10 financial support providers of mitigation finance to Mauritius between 2008 and 2020.

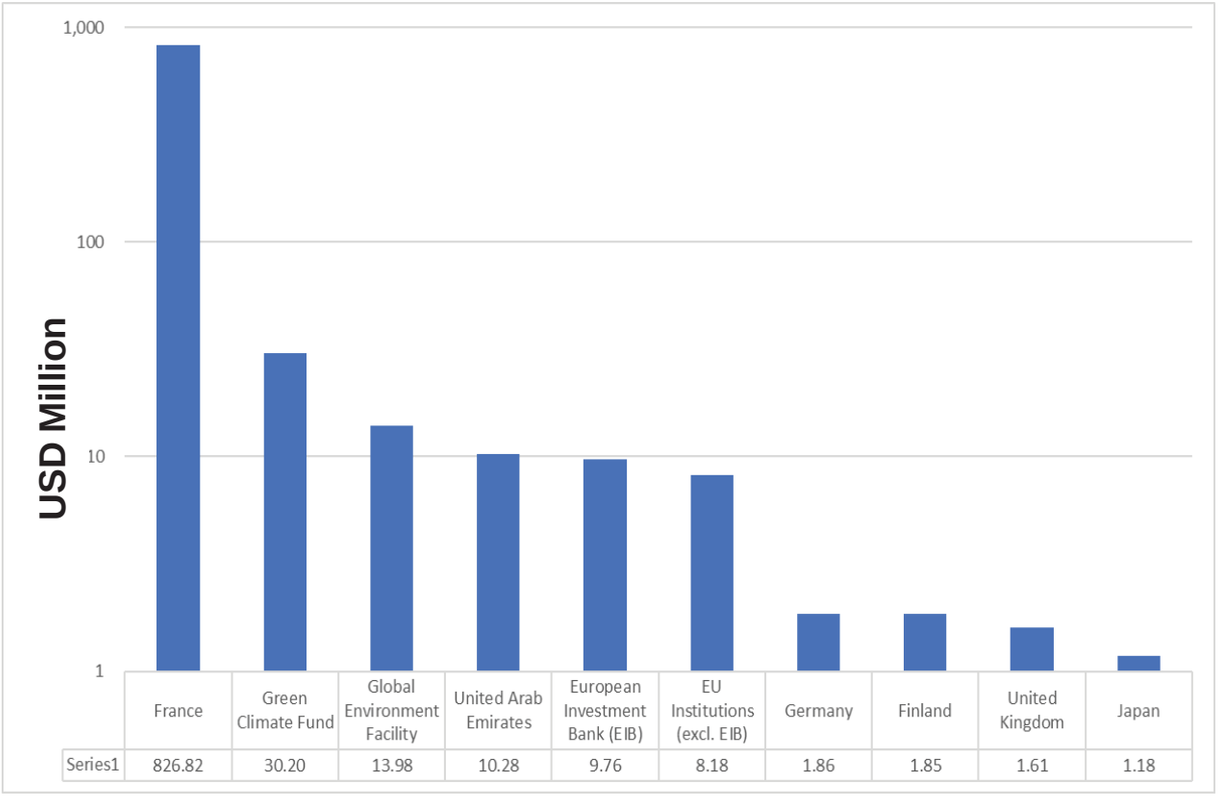


Figure 22. Top 10 Support Providers for Mitigation-Related Development Finance in Mauritius, by Source in USD million, 2020 Constant Prices (logarithmic scale)

Source. OECD DAC External Development Finance Statistics, 2022

The financial instrument most used is concessional debt, accounting for 89% of all mitigation finance received, 11% is grants, and only 1 project financed by the Finnish Fund for Industrial Cooperation used alternative financial instruments (Equity and shares in collective investment vehicles). **Figure 23** provides an overview of the top recipient sectors for mitigation-related finance in Mauritius, as reported by donors for the period 2008 to 2020. Again, there is probably an over-representation of Social infrastructure and services due to a large tranche of climate-related finance mainly directed to the COVID-19 response.

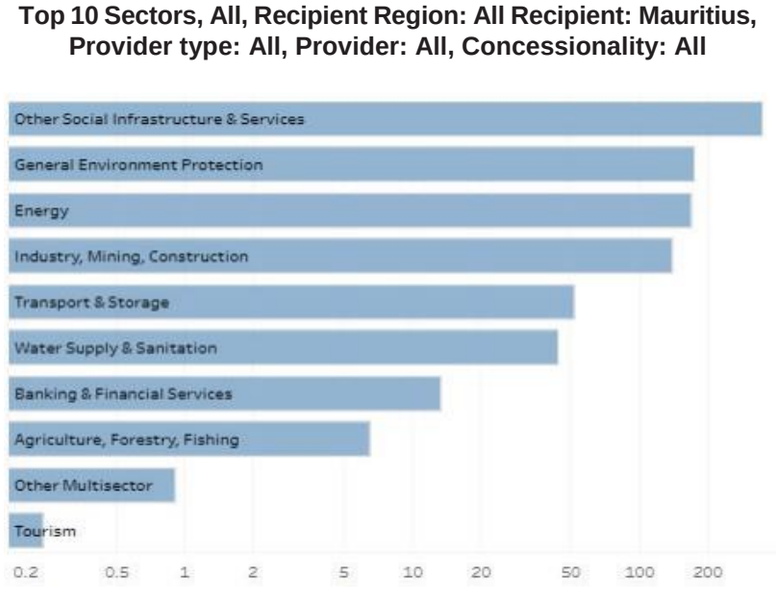


Figure 23. An Overview of Top 10 Sectors Towards Which Donors Reported Climate-Related Finance was provided 2008–2020,

Source. OECD DAC External Development Finance Statistics, 2022

Mauritius should continue pursuing further cooperation with its existing partners, but given the large variety of bilateral and multilateral sources of climate finance available, the RMCF should explore additional funding opportunities, and also consider diversifying the financial instruments used to facilitate investments in mitigation measures.
Table 43 lists a selection of relevant financial instruments, their advantages and potential disadvantages and typical providers, while **Table 44** and **Table 45** provide an overview of relevant sources for funding and financing climate measures.

FINANCIAL INSTRUMENT	DEFINITION	ADVANTAGE / DISADVANTAGE	TYPICAL PROVIDERS
Grants	*Provision of funds without expectation of repayment, e.g., to cover certain up-front costs of projects such as feasibility studies and technical assistance. A grant can also be repayable, e.g., dependent on the generation of revenues from the project.*	*Advantage: Provides technical assistance and capacity building. Gives viability to a project and complements other instruments.* *Disadvantage: There are no reflows of the funds, and the size and scope of the grant are usually quite limited.*	*Multilateral and bilateral donors, philanthropic funds.*
Debt / Loans	*Traditional finance is repaid with interest. Loans can be on standard terms (market rate and tenor), but also concessional, i.e., to be repaid on favorable conditions like lower interest rates, longer repayment and/or grace periods, or a mix of them.*	*Advantage: There is a reflow of funds and can be of considerable size, allowing for large-scale investments. Concessional loans are used when market financing conditions are not sufficient to make the investment viable.*	*Banks, development banks, climate funds and bilateral donors.*
Repayable advances	*A repayable advance is similar to a reimbursable grant. It is a loan for which repayment is usually made depending on the outcome of the financed project, e.g., the generation of positive cash flows.*	*Advantage: A repayable advance potentially mitigates the expense for the financier and lowers risk for the recipient compared to standard debt. It can be larger compared to grants.*	*Multilateral and bilateral donors, development banks and climate funds.*
Equity	*Injection of capital to grow the operation of a project or a firm, made by investors that take ownership in accordance with their provision of capital.*	*Advantage: Leverages resources and mitigates risk for other investors.* *Disadvantage: Has potentially high opportunity cost compared to debt*	*Private companies, venture funds, pension funds, some climate funds and development banks*
Risk cover instruments, Guarantees	*Instruments are provided mostly in the form of insurance against certain events. E.g., political guarantees, technical risk cover, currency fluctuation guarantees, etc. They are normally paid as a fee (except for government guarantees) .*	*Advantage: Attracts debt capital on better terms by lowering risks.* *Disadvantage: It is hard to quantify risks.*	*Export credit agencies, insurance companies, governments, development banks and climate funds*
Result based payments / Pay for result prizes	*Financial rewards (prizes) in the form of grants and/or concessional finance, awarded to one or more competing entities that demonstrate they have accomplished predefined targets (e.g., emission reductions.).*	*Advantages: Rewards successful implementation of projects, with low risk for the financier.* *Disadvantage: Funds are provided after implementation, making it harder to leverage finance up front.*	*Bilateral and multilateral donors and climate funds*

Table 43: Examples of Financial Instruments, Advantages, Disadvantages and Typical Providers
Source: GCF, Lütken, S. 2014

International support providers should be targeted strategically for the scope of the support, i.e., investment/preparation and development, and the financial instruments offered. Generally, for mitigation measures, grants are usually provided for preparatory activities such as feasibility studies, elements of pilot projects and technical support for capacity, policy development, etc., while for investments in assets, especially the ones where future cash flows or savings are expected, debt instruments, risk mitigation instruments, e.g., guarantees, and equity are normally applied. Some support providers mainly provide support for upstream preparatory activities through grants, while others have a focus on downstream support, i.e., implementation, while also providing support for preparatory activities for making projects investment-ready.

NAME OF FUND OR SOURCE	RELEVANT DETAILS ON FUND'S FOCUS AREA	FINANCIAL INSTRUMENTS
Climate & Clean Air Coalition	*The Coalition helps partners and stakeholders create policies and practices that deliver substantial reductions in short-lived climate pollutant emissions. It also funds projects through calls for proposals.*	*Grants*
Climate Action Enhancement Package	*NDC Partnership Climate Action Enhancement Package delivers fast-track support and readiness funds for countries to plan and implement their NDC and Paris Agreement-related strategies.*	*Grants*
Climate Technology Center and Network	*The Center and Network is the operational arm of the UNFCCC Technology Mechanism. It supports the accelerated transfer of climate technologies at the request of developing countries. It provides technology solutions, capacity-building and advice on policy, legal and regulatory frameworks.*	*Grants*
Global Climate Change Alliance Plus	*This SIDS targeted EU initiative supports adaptation and mitigation efforts towards a climate-resilient, low-carbon future through multi-year programs with an average contribution of EUR 5 million per project.*	*Grants*
Green Climate Fund - Readiness Program	*The Green Climate Fund (GCF) Readiness Program provides resources for readiness, including mitigation measure preparation. Resources may be provided in the form of grants up to USD 1 million per country per year or technical assistance.*	*Grants*
Global Environment Facility	*The GEF funds projects and programs to meet the objectives of international environmental conventions and agreements. Mauritius has a dedicated allocation of funds for climate action for GEF activities.*	*Grants*

Table *44: Selected International Climate Finance Sources with Mitigation Measure Preparation Focus*

NAME OF FUND OR SOURCE	RELEVANT DETAILS ON FUND'S FOCUS AREA	FINANCIAL INSTRUMENTS
African Development Bank	*The bank has a strong focus on energy and green bonds for climate infrastructure projects. It intends to invest at least USD 6.4 billion over the next five years in climate finance.*	*Debt* *Equity* *Guarantees* *Grants*
AfricaGoGreen Fund	*The Fund provides support for investments in Energy Efficiency, Renewable Energy within the areas of Green Mobility, efficient appliances and solutions, industrial energy efficiency and green buildings.*	*Debt* *Guarantees* *Grants*
AgResults Initiative	*AgResults designs and implements Pay-for-Results (PfR) prize competitions to "pull" the private sector to overcome deep-rooted market failures in agricultural systems.*	*Pay-for-Results prize*
CIF Accelerating Coal Transition Investment	*The Program offers a comprehensive toolkit for transitioning from coal to clean energy. The program works with public-sector utilities and private-sector operators to define paths to advance transitions.*	*Debt* *Equity* *Guarantees* *Grants*
CIF Clean Technology Fund (CTF)	*The Fund provides scaled-up financing to contribute to the demonstration, deployment and transfer of low-carbon technologies.*	*Debt* *Equity* *Guarantees* *Grants*
European Investment Bank	*The European Investment Bank provides large-scale climate finance through energy and urban funds.*	*Debt* *Equity* *Guarantees* *Grants*
FISP-Climat	*Led by the French Facility for Global Environment, the fund focuses on projects led by private actors in partnership with local actors. It provides repayable advances to address the challenge of scaling up.*	*Repayable advances*
CIF Forest Investment Program	*The program supports efforts to reduce deforestation and forest degradation and promote sustainable forest management. It also provides scaled-up financing for readiness reforms and public and private investments.*	*Debt* *Equity* *Guarantees* *Grants*
French Development Agency	*The agency supports large-scale climate finance projects in mitigation and adaptation, lately focusing on solar technologies and nature-based solutions.*	*Debt* *Guarantees* *Grants*
French Facility for Global Environment	*For 2019–2022, the facility focuses its action on five priority themes: (1) Protection and enhancement of biodiversity; (2) Sustainable forests and agricultural lands; (3) Resilience of aquatic ecosystems; (4) Energy transition and resilient cities; (5) Product life cycle, pollution, and waste*	*Repayable advances* *Grants*
German Development Bank	*The bank provides finance for climate interventions in developing countries. It focuses on investment projects that enhance mitigation and adaptation of replicable activities through large-scale projects.*	*Debt* *Grants*
Green Climate Fund	*The fund was established by the UNFCCC to make funding available to developing countries in order to enable climate action. Mauritius has already successfully engaged with the Fund and further opportunities are in the pipeline.*	*Debt* *Equity* *Guarantees* *Grants*
International Climate Initiative (IKI)	*IKI provides funding for climate action and biodiversity conservation through calls for proposals. The funding amount per project can range from 5 to 30 million euros. Next Call: May-June 2022*	*Debt* *Equity* *Guarantees* *Grants*
NAMA Facility	*The NAMA Facility funds innovative projects that tackle local challenges for reducing emissions in sectors and countries with strong potential for up-scaling, replication, and the ability to influence wider sectoral changes.*	*Grants*

Table 45: *Selected International Climate Finance Sources with a Mitigation Measure Implementation and/or Preparation Focus*

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