Samoa's Second Nationally Determined Contribution

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Abbreviations and Acronyms

AFOLU	Agriculture, Forestry and Other Land Use
AUA	Apia Urban Area
CH_4	Methane
CIM	Community Integrated Management Plans
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
EEZ	Exclusive Economic Zone
GDP	Gross Domestic Product
Gg	Gigagram
GGGI	Global Green Growth Institute
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
Ha	Hectare
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
mm	Millimeters
MWh	Megawatt-hours
N_2O	Nitrous oxide
NDC	Nationally Determined Contribution
NDC Hub	Regional Pacific NDC Hub
NMVOC	Non-Volatile organic compound
NOx	Nitrogen Oxide
NWU	North-West Upolu
ROU	Rest of Upolu
SAV	Savai'i
SDGs	Sustainable Development Goals
SIDS	Small Island Developing State
SNC	Second National Communication on Climate Change
SO_2	Sulphur dioxide
SPC	The Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. Executive Summary

Samoa is an island nation located in the Pacific Ocean, that is made up of nine (9) volcanic islands –two of which are Savai'i and Upolu. Upolu is the most populated where the capital city Apia is located, and Savai'i is the largest of the nine.

Samoa is extremely vulnerable to climate change impacts due to its geographic location, status as a Small Island Developing State (SIDS) in the Pacific, and the importance of natural resources to its main economic sectors of fisheries, agriculture, and tourism. Samoa is only responsible for an insignificant proportion of global greenhouse gas (GHG) emissions. Despite this, Samoa is keen to play its part in global climate change mitigation efforts.

Samoa is experiencing higher average temperatures, greater frequency in extreme daily rainfall events, and sea level rise[1], as well as increases in ocean acidification and coastal erosion[2]. Changing weather patterns and natural disasters are impacting Samoa's settlements, as 70 percent of the population and infrastructure are located in low-lying coastal areas.[3] Climate change and variable weather patterns are also impacting the country's primary industries, such as agriculture and fishing.

Predicted increases in extreme weather conditions from climate change indicates that Samoa will face even greater impacts in the future, in addition to living with the constant threat of earthquakes and tsunamis. These impacts, combined with the recent economic shock caused by the ongoing COVID-19 pandemic, are making the Government's poverty alleviation and national development goals more challenging.

According to Samoa's Second National Communication (SNC) to the United Nations Framework Convention Climate Change (UNFCCC), Samoa emitted a total of 352.03 Gg carbon dioxide equivalent (CO_2e) in 2007. The energy sector accounted for 50 percent of this total, the agriculture forestry and other land use (AFOLU) sector accounted for 38 percent, the waste sector accounted for 9 percent, and the industrial processes and product use (IPPU) sector accounted for 3 percent.

As a leader in climate action and committing to the urgency of the Paris Agreement, Samoa has developed its Second NDC undertaking an inclusive stakeholder engagement process with key national stakeholders, ministries, and departments, with the technical assistance and support of the Regional Pacific NDC Hub and the Global Green Growth Institute (GGGI), in collaboration with the strategic advisory firm Castalia.

Considering its negligible GHG emissions and limited resources, as well as the ongoing disruption and uncertainty brought about by the COVID-19 pandemic, Samoa's Second NDC is ambitious and reflects the urgency of the Paris Agreement.

1 https://unfccc.int/resource/docs/natc/samnc2.pdf, p.42.
2 https://www.sprep.org/news/accelerating-actions-to-address-ocean-acidification-in-the-pacific
3 https://www.adaptation-undp.org/explore/polynesia/samoa

Mitigation

Samoa aims to reduce overall GHG emissions by 26 percent in 2030 compared to 2007 levels (or by 91 Gg CO_2e compared to the new reference year[4] once Samoa's GHG emissions inventory has been updated).[5]

This economy-wide emissions reduction target comprises the following sector-specific mitigation targets:

- **Energy** - reduce GHG emissions in the energy sector[6] by 30 percent in 2030 compared to 2007 levels (or by 53 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).[7]
- **Waste** - reduce GHG emissions in the waste sector by 4 percent in 2030 compared to 2007 levels (or by 1.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).
- **AFOLU** - reduce GHG emissions in the AFOLU sector by 26 percent in 2030 compared to 2007 levels (or by 35.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).

Adaptation

Samoa's National Climate Change Policy 2020 – 2030 provides the framework for both national adaptation and mitigation actions through a whole-of-country approach to build resilience to the impacts of climate change. At the community level, Samoa has developed Community Integrated Management (CIM) Plans which identify prioritized adaptation actions by all of Samoa's 368 villages to enhance their climate resilience. This work builds on Samoa's successful implementation of its National Adaptation Programme of Action (NAPA) in 2005.

Building on current adaptation actions, Samoa identifies the following quantitative targets that contribute to adaptation in the marine and AFOLU sectors:

- **Marine** - expand the area of mangrove forests in Samoa by 5 percent by 2030 relative to 2018.[8]
- **AFOLU** - expand the area under agroforestry to an additional 5 percent of agricultural land by 2030 relative to 2018.[9]
- **AFOLU** - manage forests sustainably and increase total forest cover by 2 percent by 2030 relative to 2013.[10]

It is expected that these adaptation targets will also contribute to mitigation.[11]

Mitigation and adaptation targets are conditional on external financial support.

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4 Gross emissions of 352.03 Gg in 2007 are taken as the baseline for this overall target. Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC. SIDS have flexibility in their submissions under the Paris Agreement, therefore Samoa has included this alternative specification of the overall mitigation target to ensure it can use updated information on national emissions when this becomes available.

5 This overall target, and the subsidiary sector-specific targets, are set based on the aggregate emissions reduction potential of a pipeline of climate change mitigation projects identified in Samoa's NDC Implementation Roadmap and NDC Investment Plan. The economy-wide target accounts for emissions reductions from adaptation actions, therefore it is greater than the sum of the energy, waste, and AFOLU sector mitigation targets.

6 To ensure accuracy against GHG emissions reported in 2007, the energy sector includes the electricity, land transport, maritime transport, and tourism sub-sectors. While emissions from these sub-sectors were not reported in a way that would allow Samoa to form sub-sector targets relative to the 2007 emissions inventory baseline, Samoa would like to put forward to following mass-based sub-sector GHG emissions reduction targets that can be applied relative to the new reference year once the GHG emissions inventory is updated:

- Electricity 44.2 Gg CO_2e
- Land transport 5.2 Gg CO_2e
- Maritime transport 3.0 Gg CO_2e
- Tourism 0.5 Gg CO_2e

Each sub-sector has specific means to achieve the overall energy sector target.

7 To avoid double counting, the GHG emissions reductions of the 100 percent renewable electricity sector project is taken as the total GHG emissions reduction potential in the electricity sub-sector.

8 Samoa has set an area-based target for mangrove restoration using recent land cover estimates from 2018. It is expected that expansion of mangrove forests will also contribute to climate change mitigation, however, Samoa's 2007 emissions inventory did not include data on marine sector emissions and removals, so it was not possible to set a percentage-based target for emissions reductions in this sector.

9 According to the FAO, the area of land used for agriculture in Samoa in 2018 was approximately 75,700 ha. Data on land use is recorded on the FAO's FAOSTAT database, available at: http://www.fao.org/faostat/en/#data/RL Accessed on 26 May 2021.

10 The total forest area in Samoa was 165,049 ha in 2013. This figure is taken from the National Land Cover Map (2013), developed by MNRE in consultation with the Japan International Cooperation System.

11 The expected GHG emissions reduction potential of the three adaptation targets were taken into account when determining the GHG emissions reduction targets.

2. National Circumstances

Geographical characteristics

The Independent State of Samoa consists of two main islands, Savai'i (1,700 square kilometers) and Upolu (1,100 square kilometers), and eight smaller islands, making up a total land area of 2,900 square kilometers.[12] The capital, Apia, is located on Upolu. Samoa has an exclusive economic zone (EEZ) of 120,000 square kilometers.[13] Samoa has mountainous terrain as well as narrow coastal settlements.[14]

Climate profile

Samoa has a tropical climate with two distinct seasons: a hot and wet season (November—April) and cool and a dry season (May—October). Samoa's annual mean rainfall ranges from 3,000 to 6,000 millimeters, with approximately 70 percent of annual rainfall occurring in the hot and wet season. The south to southeast regions of the main islands experience more rainfall than the north to northwest regions. The El Niño Southern Oscillation (ENSO)[15] brings lower than average rainfall for Samoa and is associated with droughts and forest fires. La Niña[16] brings above average rainfall, and is associated with flooding of low-lying areas, particularly in and around Apia.[17] The mean annual temperature ranges from 26 to 31 degrees Celsius.[18] Humidity is high, at approximately 80 percent. Southeast trade winds dominate Samoa all year round.[19]

Samoa is experiencing greater maximum air temperature, greater frequency in extreme daily rainfall events, sea level rise of 5.2 millimeters (mm) per annum, and maximum hourly sea level increasing at a rate of 8.2 mm per annum,[20] as well as increases in ocean acidification and coastal erosion.[21] Higher sea-surface temperatures, cyclones, and longer, more frequent droughts are additional climate change-related risks for Samoa.[22] Samoa is extremely vulnerable to the impacts of climate change because about 70 percent of the population and infrastructure are located in low-lying coastal areas,[23] and citizens rely on the productivity of primary industries such as agriculture and fishing, which have been adversely impacted by changing weather patterns and natural disasters.[24]

Population profile

Samoa's total population is approximately 202,500.[25] Of this total, approximately 77 percent live on Upolu, 22 percent live on Savai'i, and the remaining population live on the outer islands of Manono and Apolima.[26] Approximately 19 percent of Samoa's population live in urban areas, while 81 percent live in rural areas.[27] The country has approximately 340 villages, which are divided into 43 districts. These districts are grouped into four regions: Apia Urban Area (AUA), North-West Upolu (NWU), Rest of Upolu (ROU) and Savaii (SAV).[28] Samoa's average population density is 70 people per square kilometer.[29]

Samoa has a relatively young population, with a median age of 22 years.[30] More than 57 percent of the population is aged 15-64 years, 37 percent are aged under 15, while only 5 percent are 65 years old and

12 https://www.sbs.gov.ws/digi/2017%20-%20Samoa%20Bureau%20of%20Statistics%20-%20Statistical%20Abstract.pdf
13 A country's EEZ is the area of sea to which a country has special rights to the use of marine resources. This zone extends 200 nautical miles from a country's coastline.
14 https://www.sbs.gov.ws/digi/2017%20-%20Samoa%20Bureau%20of%20Statistics%20-%20Statistical%20Abstract.pdf
15 El Niño and La Niña are opposite phases of El Niño Southern Oscillation (ENSO), a global cyclical oceanic and climatic phenomenon which influences rainfall, temperature, and wind patterns.
16 During La Niña, sea surface temperatures in the eastern equatorial part of the Pacific Ocean are significantly lower than normal. It is associated with specific climatic conditions throughout the Pacific region.
17 http://www.samet.gov.ws/index.php/climate-of-samoa
18 http://www.samet.gov.ws/index.php/climate-of-samoa
19 http://www.samet.gov.ws/index.php/climate-of-samoa
20 https://unfccc.int/resource/docs/natc/samnc2.pdf
21 https://www.sprep.org/news/accelerating-actions-to-address-ocean-acidification-in-the-pacific
22 https://unfccc.int/resource/docs/natc/samnc2.pdf
23 https://www.adaptation-undp.org/explore/polynesia/samoa
24 https://www.sbs.gov.ws/digi/2017%20-%20Samoa%20Bureau%20of%20Statistics%20-%20Statistical%20Abstract.pdf
25 As of 2020—https://www.sbs.gov.ws/population
26 https://www.sbs.gov.ws/digi/2017%20-%20Samoa%20Bureau%20of%20Statistics%20-%20Statistical%20Abstract.pdf
27 https://www.sbs.gov.ws/population
28 https://www.sbs.gov.ws/digi/2017%20-%20Samoa%20Bureau%20of%20Statistics%20-%20Statistical%20Abstract.pdf
29 https://data.worldbank.org/indicator/EN.POP.DNST?locations=WS
30 https://www.worldometers.info/world-population/samoa-population/

above.[31] Approximately 23 percent of Samoa's population live below the poverty line, as of 2018.[32] Poverty rates have fluctuated over the past ten years, largely due to Cyclone Evan (2012), Cyclone Gita (2018), and the measles epidemic (2019). Poverty rates are expected to increase due to the COVID-19 pandemic.[33]

Socio-economic background

Samoa's Gross Domestic Product (GDP) for the year ended December 2020 was US$733 million, with a per capita GDP of US$3,630.[34] Economic activity declined by 8 percent in the December 2020 quarter, due to the impacts of the COVID-19 pandemic.[35] Before the pandemic, Samoa's GDP for the year ended December 2019 was US$804 million, with a per capita GDP of US$3,970.[36] The service sector (tertiary sector) is the largest contributing sector, making up approximately 74 percent of total nominal GDP in 2019.[37] The primary sectors (including agriculture and fisheries) share of GDP has declined in recent years, contributing approximately 10 percent of GDP in 2019.[38]

The total value of Samoa's exports was US$49 million in 2019[39], made up of approximately 28 percent re-exports, and 72 percent domestically produced exports[40]. The top five exported products (by trade value) are petroleum[41], fresh fish, taro, crude coconut oil, and beer[42]. Exports are sent chiefly to American Samoa, New Zealand, the United States, Tokelau, and Australia.[43] Exports are subject to constraints, such as price instability, high transport costs, lack of overseas markets, and harsh weather conditions.

3. Mitigation

3.1 Priorities for Mitigation

According to Samoa's SNC to the UNFCCC, Samoa's total GHG emissions was 352.03 Gg CO_2e in 2007.[44] 50 percent of this total comes from the energy sector, while 38 percent comes from the AFOLU sector. Waste and Industrial Processes and Product Use (IPPU) emit 12 percent of GHGs in Samoa.[45]

In developing this NDC, Samoa focused on opportunities to reduce emissions in the energy sector (including electricity, land transport, maritime transport, and tourism), the waste sector, and the AFOLU sector. Samoa did not develop a GHG emissions reduction target for the industrial processes and product use (IPPU) sector because:

- GHG emissions from IPPU represent only a small fraction (less than 3 percent) of Samoa's total GHG emissions, given the absence of mineral, chemical, metal, electronics, and other manufacturing industries as well as the limited use of lubricants, paraffin waxes, and solvents.
- There is a lack of data on emissions from the IPPU sector.

Samoa wishes to communicate the following targets for reducing GHG emissions in the energy, waste and AFOLU sectors, detailed in Table 3.1.

31 https://data.worldbank.org/country/samoa
32 Samoa's Second Voluntary National Review on the implementation of the Sustainable Development Goals (2020) available at: https://sustainabledevelopment.un.org/content/documents/26429Samoa_Samos2ndVNR2020reduced.pdf
33 https://www.adb.org/offices/south-pacific/poverty/samoa
34 2013 constant prices—https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/2020/q/GDPReport-December2020quarter.pdf
35 https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/2020/q/GDPReport-December2020quarter.pdf
36 2013 constant prices—https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/GDP_Report-December2019Final.pdf
37 https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/GDP_Report-December2019Final.pdf
38 https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/GDP_Report-December2019Final.pdf
39 https://wits.worldbank.org/countrysnapshot/en/WSM/textview
40 https://www.samoagovt.ws/2021/03/the-samoan-economy-2/
41 https://wits.worldbank.org/countrysnapshot/en/WSM/textview
42 https://www.samoagovt.ws/2021/03/the-samoan-economy-2/
43 https://wits.worldbank.org/countrysnapshot/en/WSM/textview
44 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data throughout.
45 Samoa's National GHG Inventory, 2007.

Table 3.1: Mitigation targets, means, and requirements

Sector	Target[46]	Subsector	Means	Requirements
Energy[47]	▪ Reduce GHG emissions in the energy sector by 30 percent in 2030 compared to 2007 levels (or by 53 Gg CO_2e compared to the new reference year levels once the GHG emissions inventory is updated)[48]	Electricity	▪ Reach 100 percent renewable electricity generation by 2025 ▪ Implement and monitor energy efficiency programs ▪ Implement grid stabilization and network loss reduction programs	▪ Samoa will need external financial support to reach its renewable electricity target ▪ Samoa will need external financial support to implement energy efficiency projects, grid stabilization projects, and network loss reduction work
		Land transport	▪ Electrification of vehicles ▪ Shared electric micro mobility[49]	Samoa requires external financial support and technical assistance to support electrification of vehicles and shared electric micro mobility
		Maritime transport	▪ Develop shore side electricity supply for vessels and reviewing the energy efficiency of maritime transport ▪ Expand Samoa's efforts to install solar panels on vessels ▪ Pilot the use of biodiesel on one of Samoa's freight or passenger vessels ▪ Conduct studies to understand viability of low carbon maritime transport options	▪ Samoa can develop shore side electricity supply for at-berth vessels and review energy efficiency in the sector without external financial support ▪ Samoa requires external financial support to introduce renewable energy technologies to vessels ▪ Samoa requires external financial support and technical assistance to support projects to scope and develop low-carbon maritime transport options
		Tourism	▪ Implement and monitor a program to support energy efficient appliances	▪ Given the lack of visitors caused by COVID-19, Samoa's tourism sector will require grant funding and external financial support to adopt energy efficient appliances
Waste	▪ Reduce GHG emissions in the waste sector by 4 percent in 2030 compared to 2007 levels (or by 1.2 Gg CO_2e compared to the new reference year levels once the GHG emissions inventory is updated)		▪ Implementing landfill gas capturing technologies to Samoa's landfills	▪ Samoa requires external financial support and technical assistance to implement landfill gas capturing technologies
AFOLU	▪ Reduce GHG emissions in the sector by 26 percent in 2030 compared to 2007 levels (or by 35.2 Gg CO_2e compared to the new reference year levels once the GHG emissions inventory is updated)		▪ Improve agriculture practices through improved manure management and fertilizer use ▪ Reforestation, forest restoration, and promoting agroforestry	▪ Samoa requires external financial support and technical assistance to improve manure management, fertilizer use, support reforestation, forest restoration, and the expansion of agroforestry

Note: Targets are informed by the emissions reduction potential of projects in the NDC Implementation Roadmap and NDC Investment Plan (including project pipeline), which has been developed alongside Samoa's Second NDC.

46 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the aim of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

47 To ensure accuracy against GHG emissions reported in 2007, the following sub-sectors have been included under the energy sector:
> Electricity > Land transport > Maritime transport > Tourism Each sub-sector has specific means to achieve the energy sector target.

48 To avoid double counting, the GHG emissions reductions of the 100 percent renewable electricity sector project is taken as the total GHG emissions reduction potential in the electricity sub-sector.

49 Micro mobility refers to a range of small, lightweight vehicles operating at speeds typically below 25 km/h and are driven by users personally for short distance trips. Vehicles include bicycles, e-bikes, and e-scooters. This project envisages the introduction of shared e-scooters.

3.2 Energy Sector

Targets

Samoa aims to reduce GHG emissions in the energy sector[50] by 30 percent in 2030 compared to 2007 levels[51] (or by 53 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).[52]

Overview of measures and requirements to achieve targets

Electricity

Reducing GHG emissions in the electricity sub-sector may be achieved by expanding renewable electricity generation, introducing monitoring and energy efficiency programs, and introducing grid stabilization and network loss reduction programs. Samoa aims to generate 100 percent of electricity from renewable sources by 2025. Samoa will require external financial support to achieve this goal. The successful adoption of energy efficiency programs will require appropriate financing measures to meet greater upfront costs of energy efficient buildings and appliances. These energy efficiency projects will also require external financial support. Grid stabilization and network loss reduction programs will require technology transfer, capacity building, and external financial support.

Land transport

Reducing GHG emissions in the land transport sector may be achieved by initially electrifying a percentage of vehicles in Samoa, with an incremental percentage increase each year. This shall also provide an opportunity for the inclusion of shared electric micro mobility.[53] The successful adoption of these measures will require further feasibility studies and assessments, public acceptance of changes to transportation modes, technology transfer, capacity building, and external financial support.

Maritime transport

Reducing GHG emissions in the maritime transport sector may be achieved by developing shore side electricity supply for vessels and reviewing the energy efficiency of maritime transport, introducing renewable energy technologies to vessels (solar and biodiesel), and conducting studies to understand viability of low carbon transport options. While energy efficiency reviews and development of shore-side electricity supply can be achieved without external financial support, the development of renewable energy technologies on vessels and the exploration of low-carbon maritime transport options will require technology transfer, capacity building, and external financial support.

Tourism

Reducing GHG emissions in the tourism sector may be achieved by implementing and monitoring energy efficiency programs for appliances. The successful adoption of energy efficient appliances will require appropriate financing measures to meet greater upfront costs, however these could be funded by long-term electricity costs savings. Given the lack of visitors caused by COVID-19, Samoa's tourism sector will require grant funding and external financial support to adopt energy efficient appliances.

50 To ensure accuracy against GHG emissions reported in 2007, the following sub-sectors have been included under the energy sector:
- Electricity
- Land transport
- Maritime transport
- Tourism

Each sub-sector has specific means to achieve the energy sector target.

51 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

52 To avoid double counting, the GHG emissions reductions of the 100 percent renewable electricity sector project is taken as the total GHG emissions reduction potential in the electricity sub-sector.

53 Micro mobility refers to a range of small, lightweight vehicles operating at speeds typically below 25 km/h and are driven by users personally for short distance trips. Vehicles include bicycles, e-bikes, and e-scooters. This project envisages the introduction of shared e-scooters.

3.3 Waste Sector

Targets

Samoa set the target of reducing GHG emissions in the waste sector by 4 percent in 2030 compared to 2007 levels[54] (or by 1.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).

Overview of measures and requirements to achieve targets

Reducing GHG emissions in the waste sector may be achieved by installing geomembranes on landfills in Samoa to capture landfill gas (mainly methane from the anaerobic decomposition of organic material). The successful adoption of this measure will require technology transfer, capacity building, and external financial support.

3.4 AFOLU Sector

Targets

Samoa set the target of reducing GHG emissions in the AFOLU sector by 26 percent in 2030 compared to 2007 levels[55] (or by 35.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).

Overview of measures and requirements to achieve targets

Reducing GHG emissions in the AFOLU sector may be achieved by improving agriculture practices through improved manure management and fertilizer use, and reforestation, forest restoration, and promoting agroforestry. The success of improving agriculture practices will require public acceptance of changes to business-as-usual practices, external technical expertise, and external financial support. Reforestation, forest restoration, and promotion of agroforestry will require considerable technical expertise and external financial support. At the national level the consent from landowners and various stakeholders is required to determine the land areas that can be used for forest restoration and reforestation that will be monitored by the designated entity.

4. Adaptation

4.1 Priorities for Adaptation

Samoa recognizes that climate change will have significant impacts on the country, particularly in sectors including agriculture, health, tourism, forestry, and water as well as coastal infrastructure and marine ecosystems. These sectors and priority areas are highlighted within the Community Integrated Management (CIM) Plans and National Climate Change Policy 2020-2030.

54 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

55 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

4.2 Overview of Targets, Measures, and Requirements

In addition to building on the activities outlined in its the Community Integrated Management (CIM) Plans and current National Climate Change Policy 2020-2030, Samoa wishes to communicate the following quantitative targets for adapting to climate change in the marine and AFOLU sectors, as detailed in Table 4.1.

Table 4.1: Adaptation targets, means, and requirements

Sector	Target	Means	Requirements
Marine	▪ Expand the area of mangrove forests in Samoa by 5 percent by 2030 relative to 2018[56]	▪ Mangrove restoration and planting programs in coastal areas	▪ Samoa requires external funding support and technical assistance to support mangrove restoration and planting
AFOLU	▪ Expand the area under agroforestry to an additional 5 percent of agricultural land by 2030 relative to 2018[57]	▪ Awareness raising activities and targeted support, including provision of seedlings	▪ Samoa can promote the expansion of agroforestry with external financial support and external technical assistance
	▪ Manage the use of forest sustainably and increase total forest cover by 2 percent by 2030 relative to 2013[58]	▪ Develop a program for reforestation and forest restoration supported by incentive payments	▪ Samoa requires external financial support and technical assistance to manage forests sustainably and incentivize reforestation and forest restoration

It is expected that these adaptation targets will also contribute to mitigation.[59]

4.3 Marine Sector

Targets

Samoa has set the target of expanding the area of mangrove forests by 5 percent by 2030 relative to 2018.[60] Expanding the area of mangrove forest will help to protect coastal areas and communities against coastal flooding, coastal erosion, and storm surges. It will also provide valuable habitat for fish, help to protect marine ecosystems, and enhance ecosystem services.

Overview of measures and requirements to achieve targets

Expansion of the area under mangrove forests may be achieved through a large-scale program to plant and restore mangrove forests. The success of mangrove restoration and planting will require technical expertise, external financial support, and consent from various stakeholders (including coastal villages) in order to determine the areas on which mangroves will be planted and how mangroves will be planted and monitored.

56 Samoa has set an area-based target for mangrove restoration using recent land cover estimates from 2018.
57 According to the FAO, the area of land used for agriculture in Samoa in 2018 was approximately 75,700 ha. Data on land use is recorded on the FAO's FAOSTAT database. Available at: http://www.fao.org/faostat/en/#data/RL Accessed on 26 May, 2021
58 The total forest area was Samoa is 165,049 ha in 2013. This figure is taken from the National Land Cover Map (2013), developed by MNRE in consultation with the Japan International Cooperation System.
59 The expected GHG emissions reduction potential of the three adaptation targets were taken into account when determining the GHG emissions reduction targets.
60 In 2018, Samoa had three large mangrove and a total mangrove area of 374 ha (as reported in Percival, J.E.H. (2018). The Importance of Seascape Structure on Fish Communities in the Mangroves of Samoa. Graduate School of Global Environmental Studies Kyoto University, Japan. In Samoa Ocean Strategy, available at: https://www.mnre.gov.ws/wp-content/uploads/2018/11/Samoa-Ocean-Strategy_2020-2030.pdf

4.4 AFOLU Sector

Targets

Samoa has set two quantitative targets to contribute to adaptation in the AFOLU sector.

Firstly, Samoa aims to expand the area under agroforestry to an additional 5 percent of agricultural land by 2030 relative to 2018.[61] Increasing the use of agroforestry is expected to contribute to several important ecosystem services. For example, agroforestry systems help protect crops from cyclone damage, diversify agricultural incomes, and reduce riverine flood risk.

Secondly, Samoa aims to manage forests sustainably and increase total forest cover by 2 percent by 2030 relative to 2013.[62] Managing forests responsibly and promoting afforestation is expected to moderate stream flow (reducing the risk of riverine flooding and drought), protect indigenous ecosystems, preserve cultural values, and maintain the supply of non-timber forest products.

Overview of measures and requirements to achieve targets

It is expected that expanding agroforestry will be achieved by awareness raising activities that promote traditional knowledge of agroforestry systems and provide targeted support, including providing seedlings to landholders. Samoa can support the expansion of agroforestry without the need for external financial support, however the success of the agroforestry program will require external technical assistance as well as consent from landholders to determine the areas on which trees will be planted and who will be responsible for planting and monitoring the trees.

It is expected that Samoa can manage forests sustainably gradually and increase total forest cover by developing a program for reforestation and forest restoration. Samoa would require external financial support and technical assistance to develop this program. The expansion of forest area would also require consent from various stakeholders in order to determine the areas on which forest will be planted and who will be responsible for planting and monitoring these areas.

5. Planning Processes

5.1 Information on the process to prepare the NDC

Several key sectoral policies, plans, and strategies inform Samoa's Second NDC. The Strategy for the Development of Samoa (2016) (SDS) and Samoa 2040 (2021) are Samoa's overarching national planning documents. The SDS lays out the strategy for Samoa's overall development based on the four pillars of sustainable development (economic, social, infrastructure, and environment). Samoa 2040 focuses on Samoa's growth, particularly in relation to the Sustainable Development Goals (SDGs).

Other key documents include the Samoa Climate Change Policy 2020, the National Environment Sector Plan 2017-2021, the Energy Sector Plan 2017-2022 (2017), the Energy Management Act (2020), the Transport Sector Plan 2013-2018 (2013), and the Agriculture Sector Plan 2016-2020 (ASP), as well as the National Policy for Gender Equality 2021-2031 (2021) and the Inclusive Governance Policy 2021-2031 (2021). A full list of key sectorial plans and strategies is included in Appendix A.

61 According to the FAO, the area of land used for agriculture in Samoa in 2018 was approximately 75,700 ha. Data on land use is recorded on the FAO's FAOSTAT database, available at: http://www.fao.org/faostat/en/#data/RL Accessed on 26 May, 2021.

62 The total forest area was Samoa is 165,049 ha in 2013. This figure is taken from the National Land Cover Map (2013), developed by MNRE in consultation with the Japan International Cooperation System.

The Government of Samoa has led the development of Samoa's Second NDC. Progress towards achieving the targets identified in Samoa's First NDC was reviewed and mitigation and adaptation opportunities to contribute to this Second NDC were identified. Further details of the review of the First NDC is included in Appendix C. The work to identify mitigation and adaptation opportunities for Samoa's Second NDC focused on identifying climate change mitigation and adaptation investment projects, which were informed by data sets, academic studies, policies, strategies, and other reports, as well as consultation workshops and meetings with national stakeholders, including government and non-government organizations, the private sector, and civil society. Given the focus on identifying climate change mitigation and adaptation investment projects rather than policy or regulatory interventions, there will likely be other opportunities to reduce emissions in Samoa beyond those used to form the targets in this NDC.

The recommendations from the review of Samoa's First NDC, project scoping exercise, and stakeholder consultations were integrated into the NDC Implementation Roadmap and NDC Investment Plan, discussed in section 5.2. The findings were then validated by MNRE and relevant stakeholders through national consultation workshops and meetings. These workshops and meetings were attended by stakeholders from government and private sector. The Second NDC was prepared building on these recommendations and a second validation process was undertaken based on the draft Second NDC. The Second NDC content had then been agreed across ministries and departments.

5.2 Information on implementation plans

The Government of Samoa is currently developing an NDC Implementation Roadmap and NDC Investment Plan (including project pipeline). This work has been undertaken in parallel with developing Samoa's Second NDC. The NDC Implementation Roadmap and NDC Investment Plan informs the targets included in this NDC and will support Samoa in achieving these targets by setting out practical steps and tangible projects to mitigate GHG emissions across the energy (including sub-sectors), waste, AFOLU, and marine sectors.

6. Fairness and Ambition

Samoa is a SIDS and its GHG emissions are negligible on a global scale. Samoa is highly vulnerable to climate change, due to its geography (with majority of the population living in low-lying coastal areas), and its reliance on primary industries (agriculture and fishing) which have been particularly impacted by changing weather patterns and natural disasters. Approximately 22.7 percent of Samoa's population live below the poverty line, as of 2018.[63] Poverty rates have fluctuated over the past ten years, largely due to Cyclone Evan (2012), Cyclone Gita (2018), and the measles epidemic (2019). Poverty rates are expected to increase due to the COVID-19 pandemic and its impacts on the tourism sector.[63] Achieving the targets set out in Samoa's Second NDC will require investment of large proportions of Samoa's fiscal budget and public service capacity. The country also requires considerable external financial support, capacity building, and technology investment. Accounting for these national circumstances, Samoa considers its NDC to be fair and ambitious.

63 https://sustainabledevelopment.un.org/content/documents/26429Samoa_Samos2ndVNR2020reduced.pdf

Appendix A: Information to facilitate clarity, transparency, and understanding of Samoa's Second NDC

Table 6.1 details information to facilitate clarity, transparency and understanding of Samoa's Second NDC.

Table 6.1: Information to facilitate clarity, transparency and understanding of Samoa's Second NDC

1. Quantifiable information on the reference point (including, as appropriate, a base year)	
a) Reference year(s), base year(s), reference period(s) or other starting point(s)	The GHG emissions reduction targets in this NDC are defined for the year 2030 and measured against a base year of 2007 (or measured against the new reference year[64] once the GHG emissions inventory has been updated). The 2007 base year was chosen to make use of the most recent comprehensive GHG inventory. Samoa's 2007 emissions inventory did not include data on marine sector emissions and removals, so it was not possible to set a percentage-based target for emissions reductions in this sector. Therefore, Samoa has set an area-based target for mangrove restoration using recent land cover estimates from 2018.
b) Quantifiable information on the reference indicators, their values in the reference year(s), base year(s), reference period(s) or other starting point(s), and, as applicable, in the target year	Total GHG emissions in Samoa in 2007 were 352.03 Gg CO_2e, of which the: ▪ Energy sector contributed 174.35 Gg CO_2e ▪ AFOLU sector contributed 135.37 Gg CO_2e ▪ Waste sector contributed 32.81 Gg CO_2e ▪ IPPU sector contributed 9.51 Gg CO_2e[65] The breakdown of total GHG emissions in Samoa in 2007 is included in Appendix B.
c) For strategies, plans and actions referred to in Article 4, paragraph 6, of the Paris Agreement, or polices and measures as components of nationally determined contributions where paragraph 1(b) above is not applicable, Parties to provide other relevant information	Relevant strategies, plans, and actions include: ▪ Overarching documents: – Samoa 2040 (2021) – Samoa Climate Change Policy 2020 – Low Carbon Development Strategy 2020-2030 (draft 2021) – National Environment Sector Plan (2019) – National Policy for Gender Equality 2021-2031 (2021) – Inclusive Governance Policy 2021-2031 (2021) – National Appropriate Mitigation Actions Plan (NAMA) (2018) – Community Integrated Management Plans (CIM Plans) (2018) – National Environment Sector Plan 2017-2021 (NESP) (2017) – Strategy for the Development of Samoa (SDS) 2016-2020 (2016) – Samoa's Nationally Determined Contribution (NDC) (2015) – Second National Communication to the UNFCCC (2009) – GHG Inventory (2007)

64 This new reference year should be the most recent year for which Samoa's updated emissions inventory estimates GHG emissions by sector. Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

65 Samoa's National GHG Inventory, 2007

	▪ Electricity sector: – Energy Sector Plan 2017-2022 (2017) ▪ Land transport sector: – Transport Sector Plan 2013-2018 (2013) ▪ Maritime transport sector: – Transport Sector Plan 2013-2018 (2013) ▪ Waste sector: – National Waste Management Strategy 2019-2023 (NWMS) – Water and Sanitation Sector Plan (WSSP) (2017) ▪ Tourism sector: – Tourism Sector Plan 2014-2019 (2014) ▪ Marine sector: – Samoa Ocean Strategy (SOS) 2020-2030 (2020) ▪ AFOLU sector: – Agriculture Sector Plan 2016-2020 (ASP)
d) Target relative to the reference indicator, expressed numerically, for example in percentage or amount of reduction	Overall GHG emissions reduction of 26 percent in 2030 compared to 2007 levels[66] (or 91 Gg CO_2e compared to the new reference year once Samoa's GHG emissions inventory has been updated).[67] This will be achieved by targets for each priority sector, which are: ▪ Energy—reduce GHG emissions in the energy sector[68] by 30 percent in 2030 compared to 2007 levels (or by 53 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).[69] ▪ Waste—reduce GHG emissions in the waste sector by 4 percent in 2030 compared to 2007 levels (or by 1.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated). ▪ AFOLU—reduce GHG emissions in the AFOLU sector by 26 percent in 2030 compared to 2007 levels (or by 35.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated). ▪ Marine—expand the area of mangrove forests in Samoa by 5 percent by 2030 relative to 2018.[70] ▪ AFOLU—expand the area under agroforestry to an additional 5 percent of agricultural land by 2030 relative to 2018.[71] ▪ AFOLU—manage forests sustainably and increase total forest cover by 2 percent by 2030 relative to 2013.[72]

66 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

67 The overall target, and the subsidiary sector-specific targets, are set based on the aggregate emissions reduction potential of a pipeline of climate change mitigation projects identified in Samoa's NDC Implementation Roadmap and NDC Investment Plan. Based on the requests from the Government of Samoa, GGGI, as an implementation partner of the Regional Pacific NDC Hub, engaged a consulting firm Castalia Advisors Ltd to enhance Samoa's NDC and develop an NDC Implementation Roadmap and NDC Investment Plan. This project involved gathering inputs from stakeholders in Samoa, identifying gaps in and progress of the First NDC, forming mitigation targets in the electricity, land and maritime transport, tourism, waste, marine, and AFOLU sectors in Samoa, and identifying measures to achieve these targets. It also involved developing an NDC Implementation Roadmap and NDC Investment Plan that sets out practical steps and tangible projects that will help Samoa achieve its NDC targets.

Stakeholders in Samoa were involved at every step when identifying climate change mitigation projects and developing the NDC Implementation Roadmap and NDC Investment Plan. Stakeholders included government officials, technical experts, and other industry representatives. The NDC Implementation Roadmap and NDC Investment Plan includes gender responsive considerations in the form of guidelines for promoting gender and social inclusion. MNRE took a coordinating role in gathering input from stakeholders and reviewing the outputs of the project.

68 To ensure accuracy against GHG emissions reported in 2007, the following sub-sectors have been included under the energy sector:
> Electricity > Land transport > Maritime transport > Tourism
Each sub-sector has specific means to achieve the overall energy sector target.

69 To avoid double counting, the GHG emissions reductions of the 100 percent renewable electricity sector project is taken as the total GHG emissions reduction potential in the electricity sub-sector.

70 Given the lack of data on marine sector emissions, it is not possible to specify a numerical reduction target. Samoa has set an area-based target for mangrove restoration using recent land cover estimates from 2018. It is expected that expansion of mangroves forests will also contribute to climate change mitigation, however, Samoa's 2007 emissions inventory did not include data on marine sector emissions and removals, so it was not possible to set a percentage-based target for emissions reductions in this sector.

71 According to the FAO, the area of land used for agriculture in Samoa in 2018 was approximately 75,700 ha. Data on land use is recorded on the FAO's FAOSTAT database, available at: http://www.fao.org/faostat/en/#data/RL Accessed on 26 May, 2021.

72 The total forest area was Samoa is 165,049 ha in 2013.This figure is taken from the National Land Cover Map (2013), developed by MNRE in consultation with the Japan International Cooperation System.

e) Information on sources of data used in quantifying the reference point(s)	Government of Samoa's Second National Communication (SNC) (2009)
f) Information on the circumstances under which the Party may update the values of the reference indicators	The reference indicators for national and sectoral emissions may be updated to reflect the most recent information once the next GHG inventory is published. Information on any updates made will be reflected in Samoa's Third National Communication to the UNFCCC.
2. Time frames and/or periods for implementation	
a) **Time frame and/or period for implementation, including start and end date, consistent with any further relevant decision adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA)**	The implementation period of Samoa's Second NDC is 1 January 2022 to 31 December 2030
b) **Whether it is a single-year or multi-year target, as applicable**	Single year target
3. Scope and coverage	
a) General description of the target	Overall GHG emissions reduction of 26 percent in 2030 compared to 2007 levels[73] (or 91 Gg CO_2e compared to the new reference year once Samoa's GHG emissions inventory has been updated).[74] This will be achieved by targets for each priority sector, which are: ▪ Energy—reduce GHG emissions in the energy sector[75] by 30 percent in 2030 compared to 2007 levels (or by 53 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated).[76] ▪ Waste—reduce GHG emissions in the waste sector by 4 percent in 2030 compared to 2007 levels (or by 1.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated). ▪ AFOLU—reduce GHG emissions in the AFOLU sector by 26 percent in 2030 compared to 2007 levels (or by 35.2 Gg CO_2e compared to the new reference year once the GHG emissions inventory is updated). ▪ Marine—expand the area of mangrove forests in Samoa by 5 percent by 2030 relative to 2018.[77] ▪ AFOLU—expand the area under agroforestry to an additional 5 percent of agricultural land by 2030 relative to 2018.[78] ▪ AFOLU—manage forests sustainably and increase total forest cover by 2 percent by 2030 relative to 2013.[79]

73 Samoa's last comprehensive GHG inventory was prepared in 2007. It monitored the years 2000 to 2007 for each sector. Samoa is in the process of updating its GHG inventory to reflect changes since 2007. However, given the urgency of developing a Second NDC for Samoa, the Government of Samoa has used 2007 data to develop this Second NDC.

74 The overall target, and the subsidiary sector-specific targets, are set based on the aggregate emissions reduction potential of a pipeline of climate change mitigation projects identified in Samoa's NDC Implementation Roadmap and NDC Investment Plan. Based on the requests from the Government of Samoa, GGGI, as an implementation partner of the Regional Pacific NDC Hub, engaged a consulting firm Castalia Advisors Ltd to enhance Samoa's NDC and develop an NDC Implementation Roadmap and NDC Investment Plan. This project involved gathering inputs from stakeholders in Samoa, identifying gaps in and progress of the First NDC, forming mitigation targets in the electricity, land and maritime transport, tourism, waste, marine, and AFOLU sectors in Samoa, and identifying measures to achieve these targets. It also involved developing an NDC Implementation Roadmap and NDC Investment Plan that sets out practical steps and tangible projects that will help Samoa achieve its NDC targets.

Stakeholders in Samoa were involved at every step when identifying climate change mitigation projects and developing the NDC Implementation Roadmap and NDC Investment Plan. Stakeholders included government officials, technical experts, and other industry representatives. The NDC Implementation Roadmap and NDC Investment Plan includes gender responsive considerations in the form of guidelines for promoting gender and social inclusion. MNRE took a coordinating role in gathering input from stakeholders and reviewing the outputs of the project.

75 To ensure accuracy against GHG emissions reported in 2007, the following sub-sectors have been included under the energy sector:
> Electricity > Land transport > Maritime transport > Tourism
Each sub-sector has specific means to achieve the overall energy sector target.

76 To avoid double counting, the GHG emissions reductions of the 100 percent renewable electricity sector project is taken as the total GHG emissions reduction potential in the electricity sub-sector.

77 Given the lack of data on marine sector emissions, it is not possible to specify a numerical reduction target. Samoa has set an area-based target for mangrove restoration using recent land cover estimates from 2018.
It is expected that expansion of mangroves forests will also contribute to climate change mitigation, however, Samoa's 2007 emissions inventory did not include data on marine sector emissions and removals, so it was not possible to set a percentage-based target for emissions reductions in this sector.

78 According to the FAO, the area of land used for agriculture in Samoa in 2018 was approximately 75,700 ha. Data on land use is recorded on the FAO's FAOSTAT database. Available at: http://www.fao.org/faostat/en/#data/RL Accessed on 26 May, 2021.

79 The total forest area was Samoa is 165,049 ha in 2013.This figure is taken from the National Land Cover Map (2013), developed by MNRE in consultation with the Japan International Cooperation System.

b) Sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines;	Sectors: ▪ Energy (including sub-sectors of electricity, land transport, maritime transport, and tourism) ▪ Waste ▪ AFOLU ▪ Marine Gases: ▪ Targets will apply to all gases: Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Carbon monoxide (CO), Sulphur dioxide (SO_2), Non-Volatile organic compound (NMVOC), Nitrogen Oxide (NOx) ▪ All targets will be expressed in CO_2 equivalent (CO_2e)
c) How the country has taken into consideration paragraph 31(c) and (d) of decision 1/CP.21: **(c) Parties strive to include all categories of anthropogenic emissions or removals in their nationally determined contributions and, once a source, sink or activity is included, continue to include it** **(d) Parties shall provide an explanation of why any categories of anthropogenic emissions or removals are excluded**	Samoa aimed to include all categories of anthropogenic emissions or removals into its Second NDC. A target for GHG emission reduction for the industrial processes and product use (IPPU) sector was not developed because: ▪ GHG emissions from IPPU represent only a small fraction (less than 3 percent) of Samoa's total GHG emissions, given the absence of mineral, chemical, metal, electronics, and other manufacturing industries as well as the limited use of lubricants, paraffin waxes, and solvents. ▪ There is a lack of data on emissions from the IPPU sector. Omission of this sector has a negligible impact on Samoa's Second NDC.
d) Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures, and initiatives of Parties' adaptation actions and/or economic diversification plans	Not applicable. Samoa accounts for mitigation co-benefits from adaptation actions included in this NDC as mitigation actions, in accordance with the planning processes and approaches outlined in Section 5 of this document.
4. Planning processes	
a) Information on the planning processes that the country undertook to prepare its NDC and, if available, on the country's implementation plans, including, as appropriate:	
i) Domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner	**NDC Implementation Roadmap and NDC Investment Plan project** Based on the request from the Government of Samoa to the Regional Pacific NDC Hub, GGGI, as an implementation partner of the Regional Pacific NDC Hub, engaged a consulting firm[80] to prepare Samoa's Second NDC and develop an NDC Implementation Roadmap and NDC Investment Plan. This project involved gathering inputs from stakeholders in Samoa, identifying opportunities for improvement in and progress of the First NDC, forming mitigation targets in the electricity, land and maritime transport, tourism, waste, marine, and AFOLU sectors in Samoa, and identifying measures to achieve these targets. It also involved developing an NDC Implementation Roadmap and NDC Investment Plan (including project pipeline) that sets out practical steps and tangible projects that will help Samoa achieve its Second NDC goals. Stakeholders throughout this project included government officials, technical experts, and other industry representatives. The NDC Implementation Roadmap and NDC Investment Plan included gender responsive considerations in the form of guidelines for promoting gender and social inclusion. MNRE took a coordinating role in gathering input from stakeholders and reviewing the outputs of the project.
ii) Contextual matters, including, inter alia, as appropriate:	

80 Castalia Advisors Ltd.

a. National circumstances, such as geography, climate, economy, sustainable development, and poverty eradication	▪ Samoa is a small island developing state, comprising four main inhabited islands and six small, uninhabited islands. ▪ Samoa's climate is characterized by high rainfall and humidity, near-uniform temperatures throughout the year, winds dominated by the south-easterly trade winds and the occurrence of tropical cyclones during the southern-hemisphere summer. ▪ Samoa's geography and economic structure make the country susceptible to the adverse impacts of climate change. Agriculture and fishing are significant economic sectors in Samoa that are vulnerable to climate change. Exports are subject to a number of constraints, such as price instability, high transport costs, lack of overseas markets, and harsh weather conditions. ▪ Tourism is also an important part of Samoa's economy, which has been hard hit by travel restrictions associated with the COVID-19 pandemic. ▪ Approximately 22.7 percent of Samoa's population live below the poverty line, as of 2018.[81] Poverty rates have fluctuated over the past ten years, largely due to Cyclone Evan (2012), Cyclone Gita (2018), and the measles epidemic (2019). Poverty rates are expected to increase due to the COVID-19 pandemic.[82] ▪ Samoa has made progress on its sustainable development goals (SDGs). A breakdown on Samoa's progress can be found on the SDG Knowledge Platform.[83]
b. Best practices and experience related to the preparation of the nationally determined contributions	Samoa regards coordination between and consultation of all relevant stakeholders and alignment with existing policies, strategies, and roadmaps, and sustainable development goals (SDGs) as crucial to the development and effective implementation of its NDC. Samoa also recognizes the need to strengthen data collection to comply with the 2006 IPCC Guidelines.
c. Other contextual aspirations and priorities acknowledged when joining the Paris Agreement	Not applicable. Samoa did not acknowledge any other contextual aspirations and priorities when joining the Paris Agreement.
b) Specific information applicable to Parties, including regional economic integration organizations and their member States, that have reached an agreement to act jointly under Article 4, paragraph 2, of the Paris Agreement, including the Parties that agreed to act jointly and the terms of the agreement, in accordance with Article 4, paragraphs 16– 18, of the Paris Agreement;	Not applicable. Samoa is not part of any joint fulfilment agreement under Article 4, paragraph 2 of the Paris Agreement.
c) How the country's preparation of its NDC has been informed by the outcomes of the global stock-take, in accordance with Article 4, paragraph 9, of the Paris Agreement	According to Article 14, paragraph 2 of the Paris Agreement, the first global stock take will take place in 2023. In line with Article 14, paragraph 3 of the Paris Agreement, the outcome of the global stock take will inform Samoa in updating and enhancing its future nationally determined contributions.
d) Each Party with a nationally determined contribution under Article 4 of the Paris Agreement that consists of adaptation action and/or economic diversification plans resulting in mitigation co-benefits consistent with Article 4, paragraph 7, of the Paris Agreement to submit information on: i) How the economic and social consequences of response measures have been considered in developing the nationally determined contribution; ii) Specific projects, measures and activities to be implemented to contribute to mitigation co-benefits	Not applicable. Samoa accounts for mitigation co-benefits from adaptation actions included in this NDC as mitigation actions, in accordance with the planning processes and approaches outlined in Section 5 of this document.

81 Samoa's Second Voluntary National Review on the implementation of the Sustainable Development Goals (2020) available at: https://sustainabledevelopment.un.org/content/documents/26429Samoa_Samos2ndVNR2020reduced.pdf

82 https://www.adb.org/offices/south-pacific/poverty/samoa

83 https://sustainabledevelopment.un.org/memberstates/samoa

5. Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals:

a) Assumptions and methodological approaches used for accounting for anthropogenic GHG emissions and removals corresponding to the country's NDC, consistent with decision 1/ CP.21, paragraph 31, and accounting guidance adopted by the CMA: ▪ 31a. Parties account for anthropogenic emissions and removals in accordance with methodologies and common metrics assessed by the Intergovernmental Panel on Climate Change and adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement; ▪ 31b. Parties ensure methodological consistency, including on baselines, between the communication and implementation of nationally determined contributions"	Samoa's first GHG emission inventory was published in 1999, covering the years 1994—1997. Samoa's second, and most recent, GHG emissions inventory focused on emissions for the years 2000—2007, and included a revision of the results from the first GHG inventory to allow a complete assessment of national GHG emission trends. Samoa's GHG emissions and removals in 2007 totaled 352 Gg CO_2e and 787.07 Gg CO_2e respectively. A summary of Samoa's GHG emissions for the years 1994 (base-year), 2000, and 2007 is presented in Table 6.2. The anthropogenic emissions and removals in Samoa's second GHG inventory were prepared in accordance with the methodologies and common metrics described in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines). However, although the 2006 IPCC Guidelines provide a comprehensive overview and categorization of all potential sources of GHG emissions, not all of them are relevant to Samoa. In addition, although certain sources are relevant to Samoa, there are insufficient data to include them in the inventory. Samoa therefore also used the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories as they better reflected national circumstances. Samoa is currently updating its GHG inventory, following the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories, and the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, using the Tier 1 approach and applying default emission factors.
b) Assumptions and methodological approaches used for accounting for the implementation of policies and measures or strategies in the nationally determined contribution	When accounting for the impacts of implementing measures or strategies in the nationally determined contributions in the energy, AFOLU, and waste sectors, Samoa will follow the 2006 IPCC Guidelines for National GHG Inventories, and the 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories, using the Tier 1 approach and applying default emission factors. Samoa will also apply this approach when reporting progress towards the targets set in its Second NDC.

c) If applicable, information on how the Party will take into account existing methods and guidance under the Convention to account for anthropogenic emissions and removals, in accordance with Article 4, paragraph 14, of the Paris Agreement, as appropriate	The anthropogenic emissions and removals in Samoa's second GHG inventory were prepared in accordance with the methodologies and common metrics described in the 2006 IPCC Guidelines. However, although the 2006 IPCC Guidelines provide a comprehensive overview and categorization of all potential sources of GHG emissions, not all of them are relevant to Samoa. In addition, although certain sources are relevant to Samoa, there is insufficient data to include them in the inventory. Samoa therefore also used the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories as they better reflected national circumstances. Samoa is currently updating its GHG inventory, following the 2006 IPCC Guidelines for National GHG Inventories, and the 2019 Refinement to the 2006 IPCC Guidelines for GHG Inventories, using the Tier 1 approach and applying default emission factors.
d) IPCC methodologies and metrics used for estimating anthropogenic greenhouse gas emissions and removals	The anthropogenic emissions and removals in Samoa's second GHG inventory were prepared in accordance with the methodologies and common metrics described in the 2006 IPCC Guidelines. However, although the 2006 IPCC Guidelines provide a comprehensive overview and categorization of all potential sources of GHG emissions, not all of them are relevant to Samoa. In addition, although certain sources are relevant to Samoa, there is insufficient data to include them in the inventory. Samoa therefore also used the Revised 1996 IPCC Guidelines for National GHG inventories as they better reflected national circumstances.
Sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, as appropriate, including, as applicable:	
i) Approach to addressing emissions and subsequent removals from natural disturbances on managed lands **ii) Approach used to account for emissions and removals from harvested wood products** **iii) Approach used to address the effects of age-class structure in forests** **iv) Treatment of land sector**	The second GHG inventory estimates removals from the AFOLU sector. However, there was very limited data available to accurately estimate how changing land use patterns may be affecting CO_2 emissions and removals. The estimate of CO_2 removals from forests are based on 1999 satellite images and expert opinion about the trends in forest area in the years since. The estimates do account for changes in carbon stocks due to logging and fuelwood extraction, but do not account for possible conversions of forest land to grassland or cropland. This can only be done once up-to-date satellite images have been purchased, analyzed, and compared to the 1999 images. Samoa strives to report anthropogenic emissions or removals from AFOLU, following the 2006 IPCC Guidelines for National GHG Inventories, and the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, using the Tier 1 approach and applying default emission factors. However, until additional work has been done, Samoa's CO_2 removal data must be treated with caution.
f) Other assumptions and methodological approaches used for understanding the NDC and, if applicable, estimating corresponding emissions and removals, including:	
i) How the reference indicators, baseline(s), and/or reference level(s)—including, where applicable, sector-, category- or activity specific reference levels—are constructed, including, for example, key parameters, assumptions, definitions, methodologies, data sources, and models used	The anthropogenic emissions and removals in Samoa's second GHG inventory were prepared in accordance with the methodologies and common metrics described in the 2006 IPCC Guidelines. However, although the 2006 IPCC Guidelines provide a comprehensive overview and categorization of all potential sources of GHG emissions, not all of them are relevant to Samoa. In addition, although certain sources are relevant to Samoa, there is insufficient data to include them in the inventory. Samoa therefore also used the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories as they better reflected national circumstances. Samoa is currently updating its GHG inventory, following the 2006 IPCC Guidelines and the 2019 Refinement to the 2006 IPCC Guidelines, using the Tier 1 approach and applying default emission factors.

ii) Whether the baseline scenario is static (will be fixed over the period) or dynamic	The baseline scenario target is static (fixed over the period). Any changes will be accounted for qualitatively.
iii) For Parties with nationally determined contributions that contain non-greenhouse-gas components, information on assumptions and methodological approaches used in relation to those components, as applicable	Samoa's Second NDC contains quantitative greenhouse gas reduction targets in the energy, waste, and AFOLU, sectors. Given the lack of data on marine sector emissions, it was not possible to specify a numerical reduction target for emissions reductions in the marine sector. However, Samoa has set the target of expanding the area of mangrove forests by 5 percent by 2030 relative to 2018. This rests on the assumption that Samoa's total mangrove area was 374 hectares (ha) in 2018.[84] Increasing this area by 5 percent would require Samoa to plant 18.7 ha of new mangroves, while preventing any loss of current mangrove forests.
iv) For climate forcers included in nationally determined contributions not covered by IPCC guidelines, information on how the climate forcers are estimated;	Not applicable. Samoa's Second NDC does not include any climate forcers that are not covered by the IPCC guidelines.
v) Further technical information, as necessary	Not applicable
g) The intention to use voluntary cooperation under Article 6 of the Paris Agreement, if applicable	Samoa intends to achieve the mitigation targets stated in its Second NDC through domestic efforts and actions, and it does not intend to use internationally traded credits to meet these targets. However, Samoa is interested in selling carbon credits to more developed countries that may be interested.

6. How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances

a) How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances;	Samoa is extremely vulnerable to climate change due to its geographic location, status as a SIDS, and the importance of natural resources to its main economic sectors of fisheries, agriculture, and tourism. Dealing with the impacts of climate change is made more challenging due to limited financial, technical, and human resources. However, Samoa recognizes the potential for reduction of its emissions to not only support global efforts and demonstrate its willingness to address climate change issues but also to support the government's development vision of improved quality of life for all. Accounting for these circumstances, Samoa considers its NDC as fair and ambitious.
b) Fairness considerations, including reflecting on equity	
c) How the Party has addressed Article 4, paragraph 3, of the Paris Agreement	The targets set in Samoa's Second NDC represent a progression beyond Samoa's First NDC in that it: ▪ Sets a clear and transparent target for reducing overall GHG emissions ▪ Sets clear and transparent targets for reducing GHG emissions in the following key sectors that were not included in the First NDC: – Waste – AFOLU ▪ Sets clear and transparent targets for adaptation in the marine and AFOLU sectors.
d) How the Party has addressed Article 4, paragraph 4, of the Paris Agreement;	Samoa has increased its ambition from its First NDC efforts by including an economy-wide emissions reduction target, as well as sector-specific emissions reduction and adaptation targets. Samoa will continue to revise these targets over time.
e) How the Party has addressed Article 4, paragraph 6, of the Paris Agreement	In alignment with its Second NDC, Samoa is currently preparing a Low Carbon Development Strategy covering the years 2020-2030. This strategy is due to be launched in 2021.
How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2	

84 Percival, J.E.H. (2018). The Importance of Seascape Structure on Fish Communities in the Mangroves of Samoa. Graduate School of Global Environmental Studies Kyoto University, Japan. In Samoa Ocean Strategy. Available at: https://www.mnre.gov.ws/wp-content/uploads/2018/11/Samoa-Ocean-Strategy_2020-2030.pdf

a) How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2	As part of its Second NDC, and its NDC Implementation Roadmap and NDC Investment Plan (including project pipeline), Samoa has identified a clear and transparent target to reduce overall GHG emissions overall, and sector-specific targets to reduce emissions in the energy, waste, and AFOLU, sectors, and adaptation targets in the marine and AFOLU sectors. Samoa will strive to increase the ambition of its NDC over time by increasing its sector-specific targets when new mitigation and adaptation opportunities arise, and by including more detailed adaptation actions in future iterations. As part of the Second NDC, and its NDC Implementation Roadmap and NDC Investment Plan, Samoa has identified where financing and capacity building is required to achieve its targets.
b) How the NDC contributes toward Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement	As part of its Second NDC, and its NDC Implementation Roadmap and NDC Investment Plan, Samoa has identified a clear and transparent target to reduce overall GHG emissions and sector-specific targets in the energy, waste, and AFOLU sectors and adaptation targets in the marine and AFOLU sectors. Samoa will strive to increase the ambition of its NDC over time by increasing its sector-specific targets when new mitigation and adaptation opportunities arise. Samoa will continue to increase ambition in subsequent NDCs in a manner that allows for continued development and poverty reduction, and that accounts for Samoa's national circumstances as a SIDS that is highly vulnerable to the impacts of climate change. Samoa will work with development partners and multilateral climate funds to pursue mitigation and adaptation actions that would be unaffordable in the absence of external support.

Appendix B: Summary of Samoa's emissions profile

Table 6.2 summarizes Samoa's GHG emissions for 1994, 2000, and 2007.

Table 6.2: Summary of Samoa's GHG emissions in 1994, 2000, and 2007

Sector	1994 (Gg CO_2e)	2000 (Gg CO_2e)	2007 (Gg CO_2e)
Estimated GHG emissions			
Energy	102.83	142.74	174.35
Industrial Processes and Product Use (IPPU)	Unavailable	4.59	9.51
Agriculture, Forestry and Other Land Use (AFOLU) (excluding removals)	37.92	86.06	135.37
Waste	24.88	33.09	32.81
Total emissions	165.63	266.43	352.03
Estimated GHG removals			
AFOLU	-358.56	-1150.04	-757.07

Source: Samoa's National GHG Inventory, 2007

Table 6.3 lists the sources of GHG emissions from the energy sector in 2007 by sub-sector. Land transport accounts for the majority of emissions from the energy sector, followed by electricity generation.

Table 6.3: GHG emissions from the energy sector in Samoa (2007)

Source	GHG emissions (Gg CO_2e)	Percent of total emissions (%)
Land transport	95.02	54%
Electricity generation	44.21	25%
Manufacturing and construction	16.30	9%
Residential energy use	6.22	4%
Fishing	5.70	3%
Domestic shipping	5.51	3%
Commercial and institutional	1.39	1%
Total	174.35	100%

Source: Samoa's National GHG Inventory, 2007

Appendix C: Review of First NDC (2015)

Samoa's First NDC focuses primarily on reducing emissions from the energy sector

Samoa included the following goal in its First NDC:

> *"[Samoa is] committed to reducing its [greenhouse gas] GHG emissions from the Electricity sub-sector through the adoption of a 100% Renewable energy target for electricity generation through to the year 2025"*

The Government is committed to increasing the use of renewables for electricity generation to improve sustainability and strengthen Samoa's energy sector. Reducing the use of fossil fuels can also have a significant economic benefit by reducing expenditure on fuel imports.

Samoa has achieved 50 percent renewable energy generation[85]

Some national mitigation projects have already been implemented, or are currently underway, that contribute to GHG emissions reductions in multiple sectors. For example, the passenger ferry, Lady Samoa III, recently had solar panels installed on the roof. There has also been an initiative to restore mangroves through the establishment of mangrove conservation areas.

However, Samoa has some way to go to reach its renewable energy targets

Limited financial capability and other constraints are hindering Samoa's ability to make faster progress in reducing emissions.[86] Samoa is not on track to achieve the targets set in its First NDC. Reaching 100 percent renewable electricity generation in 2017 and maintaining this through 2025 would have reduced operational emissions from the electricity sector to zero. However, the renewable energy percentage in electricity generation in Samoa in 2021 was 50 percent.[87] This is an increase in renewable energy share by 24 percentage points (from 26 percent in 2014).

Although the share of renewable energy has increased, total electricity generation also increased from 126,800 MWh in 2014 to 132,000 MWh in 2019.[85] This increase in generation partially offsets the reduction in GHG emissions from increased renewable energy because fossil fuels are still used for electricity generation.
At present, estimated operational emissions in the electricity sector is 48,225 tCO_2e per annum.[88] Assuming the emissions intensity of non-renewable electricity production remained constant, estimated emissions from the electricity sector decreased by 12 percent between 2014 and 2019.

There is also scope to reduce emissions in other sectors

The First NDC does not include specific goals for any sector other than electricity. Samoa's First NDC indicates significant potential to reduce emissions in sectors other than electricity, such as transport (land and maritime), waste, tourism, marine, and forestry sectors. However, it does not specify how this should be done, nor does it set targets for these other sectors.

GHG emissions reductions across all sectors were framed as being conditional on Samoa receiving external financial assistance from the international community. The First NDC did not specify the projects or policies required to realize GHG emissions reductions in sectors other than electricity.

Opportunities in each priority sector will help determine new GHG emission targets for Samoa's Second NDC

There is a lack of information on the current levels of GHG emissions in each priority sector— energy (including electricity, transport (land and maritime)), waste, tourism, marine, and AFOLU. The Third National Communication and First Biennial Update Report (BUR) is currently under development, however preliminary findings are not yet available, and are not expected until the second half of 2021. The report will include an updated national Greenhouse Gas Inventory.

85 EPC data, mentioned at the Consultation Workshop ("Enhancement of Samoa's NDC and Preparation of an Implementation Plan: Cross Sector Workshop" held on 22 November 2020).
86 Feedback provided by stakeholders at the Consultation Workshop.
87 EPC data, mentioned at the Consultation Workshop.
88 Electricity production: https://www.indexmundi.com/g/g.aspx?v=79&c=ws&l=en; renewable energy contribution: https://www.hydroreview.com/2019/06/26/hydro-review-small-islands-of-samoa-lead-renewable-energy-efforts/#gref

While Samoa's First NDC mentioned adaptation, it focused explicitly on mitigation

Samoa's First NDC includes a brief section mentioning the need for adaptation to climate change. In this section, Samoa highlights the work done to develop Samoa's NAPA,[89] notes that some progress has been made, and emphasizes the need to build on this work leveraging external financial support. However, Samoa's First NDC does not set any specific targets for adaptation, and the adaptation section of the document explicitly states that the focus of the First NDC is on mitigation.

Appendix D: Key inputs and feedback from stakeholders

Selection of a base year

The base year for this NDC is defined by the Government of Samoa as 2007. The most recent GHG inventory for Samoa was completed in 2007, and this contains the most recent estimates of emissions disaggregated by sector. While a new emissions inventory for Samoa is currently being developed, this will not be ready until after Samoa needs to submit its Second NDC to the UNFCCC ahead of COP26 in Glasgow in 2021. Therefore, the Government of Samoa communicates this Second NDC based on the 2007 GHG emissions inventory.

Number of projects that can be implemented concurrently in each sector

Stakeholders detailed the number of projects that could be implemented at the same time in each sector, summarized in Table D.1. This feedback is informed by institutional constraints and context in each sector, such as financial limitations, human capacity constraints, and experience implementing GHG mitigation projects. This feedback was important when sequencing possible GHG mitigation projects[90] and enabled reasonable targets to be assigned to each sector.

Table D.1: Number of projects that can be implemented at the same time in each sector

Sector	Number of projects that can be implemented at the same time (feedback from survey)[91]
Electricity	5-6
Land transport	3-4
Maritime transport	3-4
Waste	3-4
Tourism	1-2
Marine	1-2
AFOLU	1-2

Institutions and their capacity to implement GHG mitigation projects

Stakeholders detailed the capacity of key institutions to implement GHG mitigation projects, detailed in Table D.2. The number of full-time staff equivalent (FTE)[92] is calculated from the number of staff available and amount of time (in hours) each staff member has available to manage mitigation projects per week.

89 The Samoa National Adaptation Programme of Action, 2005 (NAPA). Available at: https://unfccc.int/resource/docs/napa/sam01.pdf
90 Detailed in Samoa's NDC Implementation Roadmap and NDC Investment Plan.
91 Number based on most common response.
92 One FTE represents one staff member available to work 40 hours per week.

Table D.2: Key institutions and their capacity to implement GHG mitigation projects

Institution	Number of FTE available
Electric Power Corporation (EPC)	0.4
Land Transport Authority (LTA)	0.4
Ministry of Agriculture and Fisheries (MAF)	0.4
Ministry of Commerce, Industry and Labour (MCIL)	0.15
Ministry of Finance (MoF)	0.8
Ministry of Natural Resources and Environment (MNRE)	2.0
Ministry of Works, Transport and Infrastructure (MWTI)	2.0
Samoa Bureau of Statistics (SBS)	0.4
Samoa Police Services (SPS)	2.0[93]
Samoa Shipping Corporation (SCS)	0.4
Samoa Tourism Authority (STA)	0.4
Samoa Water Authority (SWA)	2.0[94]
Scientific Research Organization of Samoa (SROS)	2.0[95]
Secretariat of the Pacific Regional Environment Programme (SPREP)	0.4[96]
Village Fono (councils)	0.4

GHG mitigation project prioritization

Stakeholders provided feedback on the prioritization of possible GHG mitigation projects, using a score from 1 to 5 (in which 1 indicates they think the project should receive the lowest priority and 5 indicates they think the project should receive the highest priority). This prioritization ensured that local expert advice was at the forefront of Samoa's pipeline of mitigation projects.[97]

93 Available staff work in supporting services, such as the policy and planning, finance, and assets unit, rather than Police Officers themselves.
94 Number of FTE at SWA is an estimate based on information from SWA about number of staff available to assist with implementing climate change mitigation projects.
95 Number of FTE at SROS is an estimate based on information from SROS about number of staff available to assist with implementing climate change mitigation projects.
96 Number of FTE at SPREP is an estimate based on information from SPREP about number of staff available to assist with implementing climate change mitigation projects.
97 The pipeline of mitigation projects can be found in Samoa's NDC Implementation Roadmap and NDC Investment Plan.

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6. Mangrove planting – Ministry of Natural Resources and Environment
7. Waste sector – Ministry of Natural Resources and Environment

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