



TONGA

TECHNICAL ASSISTANCE REPORT—CLIMATE CHANGE POLICY ASSESSMENT

June 2020

This Technical Assistance Report on Tonga was prepared by a staff team of the International Monetary Fund in collaboration with the World Bank. It is based on the information available at the time it was completed on April 2020.

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Tonga

Climate Change Policy Assessment

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GLOSSARY

ADB	Asian Development Bank
BESS	Battery Energy Storage Systems
CAT-DDO	Catastrophe Deferred Drawdown
CEO	Chief of Executive Office
CERC	World Bank's Contingent Emergency Response Component
CCPA	Climate Change Policy Assessment
CCTF	Climate Change Trust Fund
CDCC	Cabinet Coordination Development Committee
CFRGA	Climate Financing & Risk Government Assessment
CO ₂	Carbon Dioxide
COP26	Conference of the Parties, November 2020
COVID19	Coronavirus disease
CSU	Central Services Unit
DSA	Debt Sustainability Analysis
ECCSC	Environment and Climate Change Standing Committee
EU	European Union
ESR	Institute of Environmental Science and Research Limited
EWS	Early Warning System
FAD	IMF Fiscal Affairs Department
FY	Fiscal Year
FSM	Federal States of Micronesia
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
Gq	Gigagram
GHG	Greenhouse Gas
GOT	Government of Tonga
IDA	World Bank International Development Association
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producers
JICA	Japan International Cooperation Agency
JNAP2	Joint National Action Plan Climate Change Adaptation and Disaster Risk
KOT	Kingdom of Tonga
Wh	Watt-hour
LPG	Liquefied Petroleum Gas
LULUCF	land use, land-use change, and forestry
MEIDECC	Ministry of Meteorology, Energy, Information, Disaster Management, Environment,
MOF	Ministry of Finance
MHEWS	Multi-Hazard Early Warning
MLSN	Ministry of Lands, Survey and Natural Resources
NDC	Nationally Determined Contribution
NECCC	National Environmental and Climate Change Committee
NEMA	National Emergency Management Act
NEMO	National Emergency Management Office
NRBT	National Reserve Bank of Tonga
NRD	National Resource Division
PACCSAP	Australia Climate Change Science and Adaptation Planning
PACER	Pacific Agreement on Closer Economic Relations
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PEFA	Public Expenditure and Financial Accountability Framework
PICs	Pacific Island Countries
PIMA	Public Interment Management Assessment
PMUs	Project Management Units

PPP	Public-Private Partnership
PREP	World Bank's Pacific Resilience Program
PRIC	Pacific Catastrophe Risk Insurance Company
PV	Present Value
OCHA	United Nation Office for the Coordination of Humanitarian Affairs
OECD	Organization for Economic Co-operation and Development
OpCit	opus citatum
RCP	Representative Concentration Pathway
SDG	Sustainable Development Goal
SEI	Stockholm Environment Institute
SLR	Sea Level Rise
SOEs	State Owned Enterprises
TA	Technical Assistance
TC	Tropical Cyclone
TCCP	Tonga's Climate Change Policy
TERM	Tonga Energy Road Map
TMS	Tonga Meteorological Service
TON\$	Tongan pa'anqa
TPL	Tonga Power Limited
TSDF	Tonga's Strategic Development Framework
UN	United Nation
UNFCCC	United Nation Framework for Climate Change
UNDP	United Nation Development Program
UN CTCN	United Nation Climate Technology Center & Network
US\$	United States Dollar
VNR	Voluntary National Review
WASH	Water, Sanitation, and Hygiene
WB	World Bank
WEO	World Economic Outlook
WDI	World Development Indicators
WHO	World Health Organization

PREFACE

In response to a request from the CEO of the Ministry of Finance, Ms. Fa'otusia, a joint IMF-World Bank mission visited Nuku'alofa, Tonga, February 3-10, 2020, to conduct a Climate Change Policy Assessment (CCPA). The CCPA is a joint initiative by the IMF and WB to assist small states to understand and manage the expected economic impact of climate change, while safeguarding long-run fiscal and external sustainability.

The mission was led by J. Daniel (IMF), and included A. Banerji, R. Neves, D. Prihardini, C. Sandoz, A. Zdzienicka (IMF), A. Blackman, S. Esler, N. Palu, V. Piatkov (WB) and T. Moeaki (ADB). Additional input to the report was provided by L. Alton, P. Graftieaux, A. Hurley, S. Ivatts, N. Kiode, J. Plevin, M. Ruest and M. Vasquez (all WB), M. El Rayess, M. Fouad, M. Garcia-Escribano, V. Ha, D. Prady (all IMF). P. Cortez Quiros, V. Allena, J. Kilpatrick (all IMF) provided editorial and research assistance.

The mission met with: the Minister of Finance Hon. Tevita Lavemaau; Governor of National Reserve Bank of Tonga Dr. Sione Ngongo Kioa; Minister of Education and Training Hon. Siaso Sovaleni; Deputy Secretary for Community Development Projects Mrs. Lupe Feiloaki; Acting Deputy Secretary for National Planning Division Mr. Eti Teumohenga; CEO for the MEIDECC Mr. Paula Pouvalu Ma'u; CEO for the Ministry of Infrastructure Mr. Ringo Fa'oliu; the CEO for the Ministry of Lands, and Natural Resources Mrs. Rosamond Carter Bing; CEO for Ministry of Agriculture, Food, and Forestry Dr. Viliami T. Manu; CEO for the Ministry of Tourism Mr. Sione Finau Moala-Mafi; CEO of Tonga Water Board Mr. Sione Finau; CEO for Waste Authority Limited Mr. Malakai Lomu Sika; CEO for the Ministry of Revenue and Customs Mr. Kelemete Vahe; CEO for Education and Training Dr. Tangikina Moimoi Steen; CEO for Tonga Power Limited Mr. Setitaia Chen; Financial Controller for Electricity Commission Mr. Kilisimasi Ma'asi; Tonga Statistics Department Government Statistician Dr. Viliami Fifita; Ministry of Health and Tonga Communication Corporation, Australia High Commission; New Zealand High Commission and their staff, as well as the representatives of the Civil Society Organizations.

The team is most grateful for the generous cooperation and support received from all those whom it met, especially the Ministry of Finance.

The mission benefited from discussion with G. Huang, M. Keen, and C. Pattillo (all IMF), C. Cisneros Tiangco (ADB), K. Petrini (UNDP), M. Ashworth and A. Bolton (ESR), and information received from A. Atteridge and N. Canales (SEI), P. Gibourdel and A. Nicolae (Delegation of the EU for the Pacific), and N. O'Brien (ADB).

EXECUTIVE SUMMARY

Tonga is one of the world's most exposed countries to climate change and natural disasters. It suffered the highest loss from natural disasters in the world (as a ratio to GDP) in 2018 and is among the top five over the last decade (Table 1). Climate change will make this worse. Cyclones will become more intense, with more damage from wind and sea surges. Rising sea levels will cause more flooding, coastal erosion and contaminate fresh water. Daily high temperatures will become more extreme, with more severe floods and drought.

Tonga is especially vulnerable to these hazards. Its economy relies on agriculture, tourism, and fishery, its infrastructure and public services are largely not climate resilient, the population lives in places highly exposed to natural disasters, and its development needs are still substantial. Cyclone Gita in 2018 demonstrated this vulnerability, causing immediate damage of 38 percent of GDP, and will have long-lasting effects, for example, on the children whose education was disrupted after their schools were damaged. In sum, climate change will make achieving Tonga's development goals even more difficult.

Tonga has made good progress on being prepared for natural disasters and climate change at the national, strategic, level. Tonga's 2015 Nationally Determined Contribution (NDC) already identified that "climate change is the single biggest issue that will determine the future of Tonga over the coming decades and will require a whole-of-Tonga level of cooperation and coordination." This high-level awareness has been reflected in many other strategic plans and policies, such as Tonga's National Strategic Development Framework (TSDf, 2015-2025), Climate Change Policy (TCCP 2016-2035), the Joint National Action Plans on Climate Change Adaptation and Disaster Risk Management (JNAP 2018-2028), the National Infrastructure Investment Plan (NIIP 2013-2023), and the Third National Communication (TNC forthcoming).

But these strategic plans need to be more consistently implemented. Strategic plans have only partly been used to inform sector-specific plans and annual budgets, which remain largely project-based. This mainly reflects Tonga's limited human and financial capacity, but it is also exacerbated by frequent natural disasters, gaps in coordination, and changes in priorities.

Tonga also needs to plan more for the long-term, extreme events, and possible "transformational" responses. While this may seem a long way off and divert resources from immediate risks, some of these transformational responses may need action now. For example, under very high emissions scenarios (RCP 8.5), some sea level estimates based on the upper bounds of the Intergovernmental Panel on Climate Change (IPCC) suggest that the mean in Tonga could be almost 0.9 meters higher by 2100—Tonga's capital, Nuku'alofa, is mainly 1-2 meters above sea level (Figure 1). This suggests the need to consider longer-term adaptation horizons and transformational responses, such as relocating major pieces of infrastructure away from vulnerable areas, and supporting migration from at-risk areas.

Tonga's emissions are globally minuscule, but Tonga is doing its part. The acceleration of renewable energy, mainly solar, is underway. Electricity though is underpriced. The full cost of

diesel used for generation should be passed on to consumers and the electricity company should not be granted tax breaks. Any resulting rise in electricity tariffs could be phased in while protecting vulnerable households. Achieving renewables targets should allow the electricity price to be reduced in the future, given renewables' potential lower running costs.

Tonga's main climate challenge is to build resilience. The list of projects to help do so is long and expensive—some 140 percent of 2018 GDP cumulatively. Development partners' financing has been secured for about half. Tonga also has other development goals to achieve. While many of them will overlap with the climate needs, many will go beyond requiring an additional spending. Given Tonga's high risk of debt distress, external financing should be in the form of grants to avoid worsening debt dynamics. Fiscal consolidation is also required to ensure Tonga's debt is sustainable (see the Concluding Statement to 2020 Article IV Consultation for Tonga).¹

Building resilience requires not only financing projects, but also managing the financial risk that natural disasters pose. Tonga has a reasonable range of tools to do so and it should continue to maximize their use. It would also benefit from developing a comprehensive disaster risk financing strategy, informed by comprehensive, accessible, and appropriately-scaled disaster and hazard risk information. There are merits in this strategy considering building up the Emergency Fund to around 1 percent of GDP and establishing clear operational procedures, registering and insuring more government assets, building out the social protection system (which can be automatically scaled up after a disaster), and exploring options to develop the existing, though small, private insurance market, including support for the sector by helping build awareness and financial literacy.

Suitable natural disaster and emergency management systems are in place, but they could be enhanced. In addition to building up the National Emergency Fund, the systems could be strengthened by finalizing the reform of the National Emergency Management Act to establish an overarching framework that would more explicitly define National Emergency Management Office (NEMO)'s role, give clearer guidance on implementation, and enable a more inclusive approach (e.g. involving village, district and regional committees) during planning and delivery to improve effectiveness. That should be complemented by continuing to improve and coordinate the multi-hazard early warning system, developing assessments of hazard impacts, more tailored information for land use and ministries' planning, and greater population awareness. Boosting human and financial resources for key MEIDECC and Ministry of Lands, Survey and Natural Resources (MLSNR) functions, including the National Resource Division (NRD), is also warranted. Practices for gathering and reporting post-disaster data and information (including damages) should be made consistent and comparable across ministries.

Climate resilience requires not just more spending, but spending it better. On the whole, Tonga's public financial management systems are reasonably sound. Public investment management, like similar countries', relies on development partners' technical and financing assistance for most investment projects. Fixing some key weaknesses would help Tonga get

¹ <https://www.imf.org/en/News/Articles/2020/02/25/mcs022520-tongo-staff-concluding-statement-imf-2020-article-iv-consultation-mission>.

better value for money. The process needs to start now as it will take time, particularly given already limited human resources. The 2013-2023 NIIP is largely completed, and the opportunity should be taken to update it with costed, prioritized, sequenced, and whole-of-government investment projects. This should be updated in the annual budget, and governments should avoid frequent changes in priorities. Involving MEIDECC more in the planning and technical coordination stage of ministerial projects and budgets would help mainstream climate, though the MOF should be responsible for managing climate financing and its central oversight (which will require building its capacity).

Climate resilience and economic development go hand-in-hand. The IMF's Article IV Concluding Statement and forthcoming report discusses Tonga's broader structural reform agenda, but some reforms would be particularly helpful for building resilience. In particular, improving and enforcing the building and land use codes, establishing an effective Housing Sector Resilience Office, and strengthening awareness and information sharing related to climate change impacts and natural disaster risks among governmental units, will help Tonga build back better.

An overarching constraint on Tonga's ability to reach its climate (and general development) goals is its human and financial limited capacity. Tonga's thin public sector capacity is typical in very small states, with only a few qualified public servants called upon to implement the many tasks of central government, as well as gaps in systems, processes, data and information sharing. The constraints of the domestic private sector—the shortage, for instance, of construction firms and skilled labor—is also a challenge. While domestic capacity is—and needs to keep—growing, this will take time and Tonga's climate needs are urgent. This calls for greater transparency on the pipeline of priority projects so the market can prepare, and strengthening procurement measures, potentially including framework agreements or bundling contracts, to attract international firms, where appropriate, as a complement to local capacity.

Tonga has very limited capacity to finance its climate resilience needs itself and continued support of the international community is essential. Tonga certainly needs to do more itself to achieve its climate goals. But Tonga is not responsible for climate change and will not succeed without more help from the international community. The international community could more fully recognize the already-occurring impact of climate change on Tonga and the existential threat it poses. Most obviously, the international community should reduce emissions to stabilize global warming. Specifically for Tonga, the international community could—in line with the Paris Agreement—help by: additional financing (via grants) for adaptation, maintenance, and insurance; streamlining access to international climate funds and helping Tonga apply; coordinating better on projects; supporting Tonga's own public financial management systems; broadening the coverage of regional parametric insurance schemes (e.g., to cover storm surges); and partnering with Tonga and other Pacific Island Countries (PICs) in considering longer-term, and potentially transformative, approaches that could include supporting migration from at-risk areas.

Box 1. Summary of Key Recommendations

(Short term: within 1-2 years; medium term: within 2-5 years)

General preparedness	Priority
<ul style="list-style-type: none"> • Update the NDC and plan for longer-term adaptation horizons 	Short term
<ul style="list-style-type: none"> • Mainstream climate resilience into all sectoral plans and strengthen cooperation across ministries, especially between MEIDECC, MOF, and MLSNR 	Short term
<ul style="list-style-type: none"> • Finalize the reform of the National Emergency Management Act to provide an overarching framework, a clearer role for NEMO and a more inclusive approach to preparedness and response 	Short term
<ul style="list-style-type: none"> • Continue to develop a fully integrated MHEWS, strengthening human and financial resources for key functions across MEIDECC and MLSNR, while promoting clear roles, responsibilities and an integrated approach for monitoring and issuing warnings for natural hazards. 	Short to Medium term
<ul style="list-style-type: none"> • Standardize post-disaster information gathering and reporting across ministries 	Short term
Mitigation	
<ul style="list-style-type: none"> • Accelerate expansion of renewables, as planned 	Short to Medium term
<ul style="list-style-type: none"> • While protecting the poor, remove electricity subsidies by passing on the full cost of diesel used for generation in the electricity tariff 	Short to Medium term
<ul style="list-style-type: none"> • Apply excise duty on diesel used for generation 	Short term
<ul style="list-style-type: none"> • Apply the standard rate of consumption tax on electricity 	Short term
<ul style="list-style-type: none"> • Introduce a higher excise tax on older vehicles, or, alternatively, “feebates” to encourage uptake of fuel-efficient vehicles 	Short term
Adaptation	
<ul style="list-style-type: none"> • Extend coverage of adaptation strategies and plans to current and capital projects in more sectors (especially health and education) 	Short to Medium term
<ul style="list-style-type: none"> • Use international firms as a complement to local capacity 	Short to Medium term
<ul style="list-style-type: none"> • Improve, enact and enforce the climate-informed building and land-use codes 	Short term
<ul style="list-style-type: none"> • Establish the Housing Sector Resilience Office 	Short term
<ul style="list-style-type: none"> • Explore options to further develop the private insurance market for homes and businesses including by raising awareness and improving financial literacy to include natural disasters. 	Short to Medium term
Financing	
<ul style="list-style-type: none"> • Continue project preparation and dialogue with development partners to secure donor financing for unmet climate and development goal 	Short to Medium term
<ul style="list-style-type: none"> ➤ Given Tonga’s high debt distress risk, this financing should be in the form of grants to avoid worsening debt dynamics, complemented by fiscal consolidation 	Short to Medium term

Box 1. Summary of Key Recommendations (Concluded)

➤ Improve visibility across ministries on international climate financing and application procedures	Short term
➤ Improve administrative capacities in planning, project implementation, monitoring	Short term
➤ International community should streamline access to climate funds, and assist Tonga to apply	Short term
Risk management	
• Develop a comprehensive National Disaster Risk Financing Strategy that could usefully consider:	Short to Medium term
➤ Increasing the Emergency Fund's size to about 1 percent of GDP with a review of the Emergency Fund Act	Short to Medium term
➤ Insuring more government infrastructure assets	Short to Medium term
➤ Continuing to expand the social safety net to cover more vulnerable households, and ensure it can be effectively used after disasters	Short to Medium term
• The international and regional community could usefully continue broadening the offer of sovereign insurance solutions, building on existing initiatives/platforms (such as PCRIC)	Short term
National processes	
• Strengthen NIIP with costed, prioritized, sequenced whole of government investment projects and update in the annual budget	Short to Medium term
• Better integrate climate into ministries' plans and regular budget process—greater involvement of MEIDECC would help	Short term
• The MOF should be responsible for managing climate financing, but needs to build capacity in climate financing and collaborate with MEIDECC	Short term
• Prepare and keep updated a registry of public fixed assets, ensure they are maintained, and plan for their replacement/repair after a disaster	Short to Medium term
• Incorporate the Climate Change Trust Fund into the regular budget/public financial management system	Short term
• Expand the classification of capital spending and better identify the climate component	Short term

I. CLIMATE CHANGE RISKS AND PREPAREDNESS

Tonga is one of the most vulnerable countries to natural disasters and will increasingly continue to suffer from the effects of climate change, which will significantly affect economic growth and debt sustainability. Despite good progress in developing strategic climate change policies, these have not been consistently translated into sectoral plans. Tonga is reasonably prepared to deal with natural disasters but would benefit from finalizing work on a stronger emergency management framework, a fully-integrated Multi-Hazard Early Warning (MHEWS), and more resources for critical agencies.

A. Impact of Climate Change Risks on the Macro-Framework/Long-Term Outlook

How Vulnerable is the Economy to Climate Change?

- 1. Tonga faces both short- and long-term exposure to the adverse impacts of natural disasters and climate change.** These include: (i) extreme seismic activity with earthquakes and tsunamis, (ii) frequent tropical cyclones with damaging winds, rain and storm surges, and coastal flooding, (iii) drought, and (iv) high exposure to sea-level rise, which can result in coastal erosion and salination of freshwater systems. Tonga's economy includes important agriculture, tourism, and fishery sectors, and sea-level rise, alongside increases in temperature and extreme weather, have the potential to significantly lower output and increase vulnerability. Despite many improvements, climate-resilient critical infrastructure and services are generally lacking, and the population is highly exposed to longer-term climate and natural disaster risks (access to fresh water, non-communicable diseases, food security, etc.). All these factors amplify the socio-economic costs of extreme weather conditions, temperature changes, and sea-level rise.
- 2. In recent years, Tonga has been hard-hit by several natural disaster shocks.** The recent Tropical Cyclone (TC) Gita caused extensive damage and loss, equivalent to around 38 percent of Tonga's annual GDP, from which the economy is yet to fully recover. In 2018, Tonga experienced the largest climate-related loss globally (as a percent of GDP) and has consistently been among the top five in the last decade (Table 1).²
- 3. Tonga will experience increasing costs from the impact of climate change, irrespective of global action to reduce greenhouse gas emissions.** Short and medium-term effects of natural disasters may be even more extreme in the future as tropical cyclones are

² As reflected in the 2019 World Risk Index which encompasses exposure to vulnerability, susceptibility, lack of coping capacities, and lack of adaptive capacities to disaster risks.

predicted to become more intense, though less frequent, with damaging storm surges (Figure 1, Box 2).

Table 1. Ranking of Climate-Related Loss (percent of GDP, 1999-2018 and 2018)

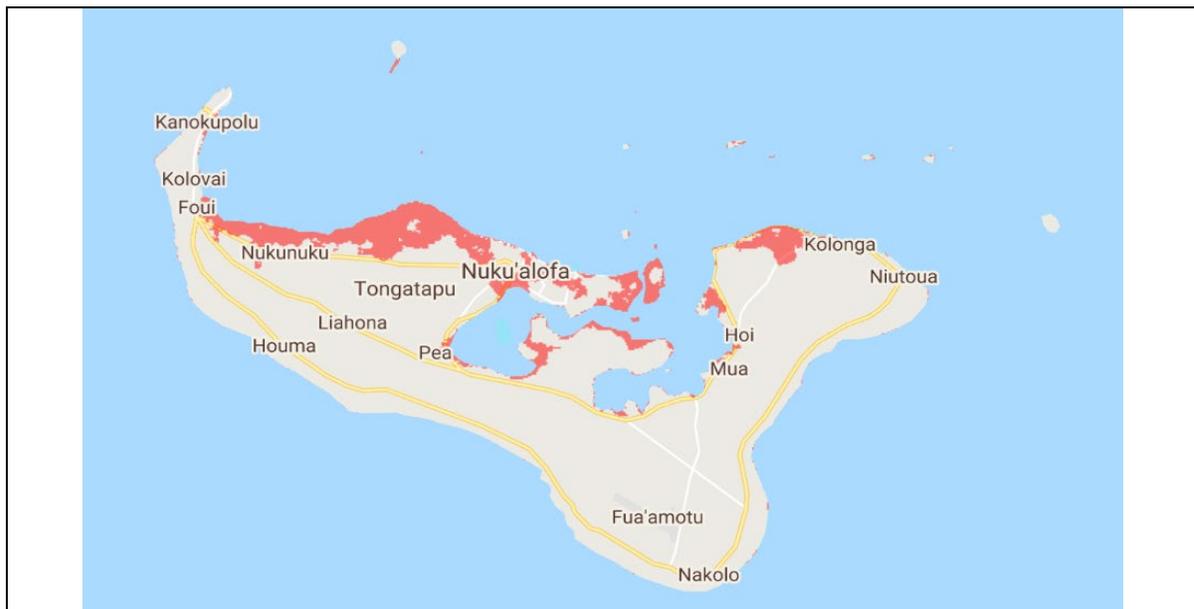
Climate-related loss (% GDP) 1999-2018		Climate-related loss (% GDP) 2018	
Country	Rank	Country	Rank
Dominica	1	Tonga	1
Tuvalu	2	Samoa	2
Grenada	3	Oman	3
Tonga	4	Madagascar	4
Puerto Rico	5	Sri Lanka	5

Colombia	90	Kazakhstan	90

Brunei Darussalam	180	Zambia	135

Source: Global Climate Risk 2020

Figure 1. Indicative Projection of Land Below Annual Flood Level in Tongatapu by 2100



Note: This projection combines and uses globally-extensive local projections for sea level rise built on Kopp et al. 2014 considering high SLR, emission scenarios, and other geological changes. It also explicitly adds the possibility of early-onset decay of the West Antarctic Ice Sheet.

Source: Climate Central (<https://coastal.climatecentral.org/>)

Box 2. Summary of Expected Climate Developments and Consequences for Tonga

<p>Extreme Weather Events</p>	<p>Since 1997, Tonga has experienced 15 significant natural disasters including tropical cyclones, earthquakes and droughts. Between 1969 and 2010, Tonga experienced an average of 17 cyclones per decade. 32 percent of cyclones that have affected Tonga from 1970-2015 have been classified by Tonga’s Meteorological Service as severe (KOT 2020). Projections for Tonga show that tropical cyclones will be more intense by the late 21st century. The number of tropical cyclones that have affected Tonga has increased, contrary to the Southwest Pacific trend, due to a progressive eastward shift in the cyclone tracks. Average maximum wind speeds and rainfall intensity are projected to increase by 2-11 percent and about 20 percent, respectively (PACCSAP, 2015, GOT 2018, JNAP 2). PCRAFI (2012) estimates that Tonga (i) is expected to incur on average US\$ 16 million of losses (3 percent of 2018 GDP) per event per year due to earthquakes and tropical cyclones. Also, “[in] the next 50 years Tonga has a 50 percent chance of experiencing a per even loss exceeding [...] \$US178.2 million [(37 percent of 2018 GDP)], and a 10 percent chance of experiencing a per event loss exceeding [...] US\$437.4 million [(91 percent of 2018 GDP).”</p>
<p>Precipitation</p>	<p>Tonga’s rainfall predominantly occurs from November to April with mean annual rainfall showing significant variability, though an overall increasing trend. During El Nino summers, rainfall is likely to be reduced significantly and severe drought can occur. During La Nina summers, rainfall can increase up to 3 times the monthly average and create severe flooding. Both drought and extreme rainfall events causing flooding are likely to be more intense (OpCit).</p>
<p>Temperatures</p>	<p>Tonga’s mean annual temperatures show a general increase of 0.2 to 0.4°C in the past four decades (TNC 2020). Wet season maximum and dry season minimum temperatures per decade have increased in the past 7 decades. Annual mean temperature and extreme daily high temperatures are expected to continue to rise (PACCSAP 2015).</p>
<p>Sea Level Rise & Ocean Acidification</p>	<p>The sea level has risen near Tonga by about 6mm per year since 1993, much larger than the global average of 2.8 – 3.6 mm (OpCit). Sea level projections from Tonga Meteorological Service (TMS) suggest that under high emissions scenarios, the further rise by 2030 could be in the range of 0.03 to 0.17m (KOT 2020). However, some scientists warn that larger rises than are currently predicted are possible. The IPCC in 2019 updated predictions to suggest that the median and upper bounds of global sea level rise are likely to be greater than previously expected, and calculations for Tonga suggest that the mean SLR for the second half of the 21st century under RCP8.5 is 0.41-0.88m (Kiem 2019).¹ Additionally, since the 18th century, the level of ocean acidification has been slowly increasing in Tonga’s waters. Ocean acidification is expected to continue, with a higher risk of coral bleaching. The latter will have adverse effects on fisheries and coastal community livelihoods (PACCSAP, 2015, GOT 2018, JNAP 2).</p> <hr/> <p>¹The IPCC has determined four Representative Concentration Pathways (RCPs) in the Fifth IPCC Assessment report. RCP 8.5 is the highest pathway which implies very high emissions and the impact of a pathway with no policy of reducing emissions (i.e. a worst-case scenario). More information on RCPs can be found through the IPCC website and the 2013 AISM-Annex1: Atlas of Global and Regional Climate Projections – Supplementary Material RCP8.5</p>

4. **Tonga, like other Pacific Islands, is beginning to consider longer-term adaptation horizons.** Tonga's Third National Communication (forthcoming) notes, for instance, that, "most of the urban area of Nuku'alofa is only 1–2 meters above sea level and is subject to periodic flooding during heavy rain. The risk of coastal inundation and erosion is often intensified by social behavior patterns and preferences. [...], local communities in Tongatapu tend to live in topographically low (higher flood risk) areas. Owing to sea level rise and flooding induced by a higher water table, it is anticipated that people currently living in these locations may have to move to higher ground or to other islands in the future."

What Impact Could Climate Change Have on Macro Sustainability?

5. **Natural disasters and climate change are expected to continue to adversely affect economic growth, worsen fiscal and external sustainability, set back development goals, undermine the business environment, and increase already-high debt levels.**

- **Natural disasters are expected to continue affecting economic growth.** Tonga's experience with TCs shows that their impact can be substantial. For instance, Tropical Cyclones Ian and Gita caused damage and loss equivalent 11 and 38 percent of GDP, respectively, destroying power lines, crops and fruit trees, damaging houses, public buildings, schools, and transport infrastructure. TC Gita's impact spread over different sectors—particularly affecting the most vulnerable population—resulting in economic growth dropping more than 5 percentage points between 2017 and 2018 (KOT 2018). It also led to a substantial unanticipated fiscal financing gap that was only closed by additional development partner grant financing. Without donor funding, the costs of the reconstruction program would be difficult for the budget to accommodate. More intense natural disasters are likely to provide larger shocks to economic activity. Some estimates indicate that economic growth could be lower on average by 0.1-0.2 percentage points per year (Lee and others 2018). Others show that Tonga is expected to incur, on average, about US\$9.5 million of losses (2.7 percent of 2018 GDP) per event per year due to tropical cyclones.³
- **Natural disaster shocks could further jeopardize already-weak growth and debt sustainability trends.** The IMF staff estimates for the Debt Sustainability Analysis (DSA, Figure 13) indicates that a natural disaster shock could reduce economic growth by more than 3 percentage points, with exports contracting by 7 percentage points of GDP. Following the shock, the Present Value (PV) of public debt-to-GDP is expected to immediately increase by 15 percentage points of GDP in 2021 and reach 100 percent in 2030.

³ PCRAFI's risk analysis models (2011) use historical data on natural hazards, building and infrastructure footprints and estimates of losses due to damage of the built environment and crops but also damage from wind, flood, and storm surge. It simulates the impact of tropical cyclones and earthquakes on next year's activity in the entire Pacific Basin. It measures direct losses including repairing or replacing the damaged assets but no other indirect losses.

- **Long-term effects of climate change could lower potential growth further through their impact on major economic sectors such as agriculture, water and food security, and infrastructure.** Irregular variation in winds and sea surface temperatures can cause drought, flooding, coral bleaching, and more frequent wave over-washing, raising uncertainty and volatility for Tonga’s biodiversity as well as the agricultural and fisheries sector. Rising sea levels will cause saltwater contamination and increase the salinity of groundwater lenses, reducing the availability of fresh water, while decreased rainfall threaten freshwater lenses and agricultural sustainability. A compounding concern that factors into the overall impact is the failure to manage and maintain infrastructure assets in PICs, including Tonga, which has resulted in widespread premature deterioration of infrastructure to states such that it is very costly to rehabilitate.

B. General Preparedness

Do the Nationally Determined Contributions (NDC) and Other National Resilience-Building Strategies Present a Comprehensive and Costed Strategy for Climate Change Response?

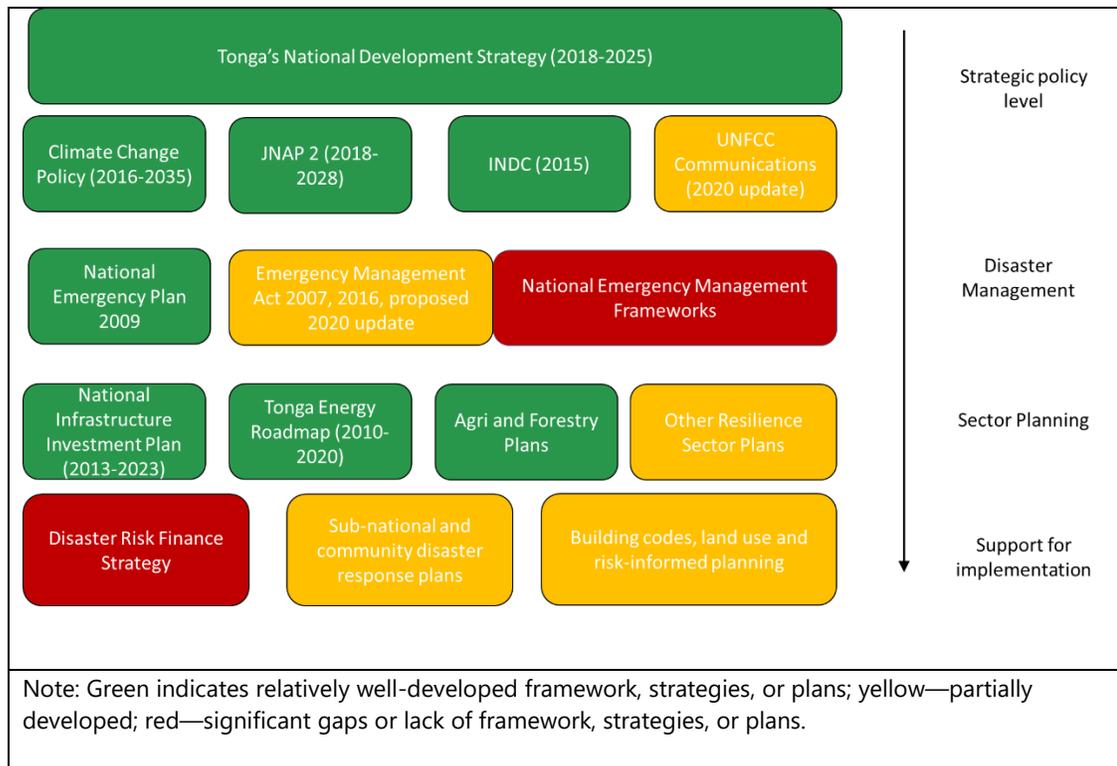
6. **Despite significant progress in developing a national resilience-building policy framework, gaps persist in translating it into comprehensive, consistent, and costed sectoral policies and operational plans.** Tonga has made significant progress toward integrating climate change adaptation, mitigation and resilience building into national policies and frameworks, including through its NDC, the Climate Change Policy and the Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management. But there are substantial gaps in translating the national ‘vision’ into sectoral policies and plans, and developing comprehensive, consistent, and costed climate change adaptation and disaster risk management responses (Figure 2).⁴

- **The NDC focuses Tonga’s strategy towards mitigation,** setting up the agenda for renewable energy and reduction of energy losses to achieve emission reduction targets. The NDC has limited consideration of adaptation and does not set objectives with adequate costing for other-than-energy sectors. The NDC acknowledges the need to access climate financing through multiple channels, but is not supported by specific financing proposals. These gaps could usefully be filled in the updated NDC, which all countries are to submit by ahead of Conference of the Parties (COP26) in November 2020.
- **National policies and plans provide an adequate overarching framework for adaptation and disaster risk management.** Tonga’s Strategic Development Framework (TSDF, 2015-2025) includes commitments and a general framework for effective land, environmental,

⁴ Similar findings have been proposed under the Kingdom of Tonga’s Climate Financing and Risk Governance Assessment (2016) which also provides a review of climate and DRM legislation.

climate risk management, and climate resilience. A revised Tonga’s Climate Change Policy (TCCP, 2015) integrates awareness and response to climate change risks at the national level through a multi-sectoral approach and includes targeted adaptation objectives. Tonga’s Joint National Action Plan 2 Climate Change Adaptation and Disaster Risk Management (JNAP2, 2018-2028) provides the strategic action plan for both the NDC and TSDF. The JNAP2 provides some costing for implementation of selected adaptation projects in various sectors and at subnational levels (Chapter III and VI).

Figure 2. Climate Change and Disaster Framework, Strategies, and Plans



- **Tonga has adequate natural disaster and emergency management plans and processes in place, including to deal with tsunamis and tropical cyclones, but improvements can be made.** Although there is an Emergency Management Plan, the implementation framework to support delivery is lacking, resulting in challenges for coordination, low clarity of responsibilities, and difficulties in accessing funding (Chapter V).
- **National climate change and disaster management policies have not been consistently applied or used to inform sectoral planning, prioritization or decision making.** The NIIP includes investment in energy, infrastructure, and water, sanitation, and hygiene (WASH) sectors but climate adaptation costs in these sectors are not consistently and comprehensively considered. Energy and Agriculture/Forestry plans provide clearer climate change adaptation and mitigation objectives aligned with broader development goals, while other sectors such

as tourism have recognized land use and environmental management needs that take climate change impacts into account (see also CFRGA 2016). Other sectors, such as health, education and WASH are yet to reflect consistent and comprehensive climate and disaster risk mainstreaming. There is need for national planning to provide a full picture of ongoing and recent projects, broader adaptation needs at sectoral and national level, and guidance in terms of prioritization and sequencing.⁵ The authorities recognize the critical importance of climate change to their work, and have an opportunity to provide for greater integration and mainstreaming of climate change and disaster management as they update their sectoral strategic plans.

- **Tonga also needs to plan more for extreme events, long-term adaptation horizons, and possible “transformational responses.”** While this may seem a long way off and divert resources from immediate needs, some of these transformational responses may need action now. This suggests the need to consider longer-term adaptation horizons and transformational responses, such as relocating major pieces of infrastructure away from vulnerable areas, and supporting migration from at-risk areas.

7. **Institutional preparedness has improved with key government stakeholders taking charge of adaptation and disaster risk management, but implementation and coordination challenges remain.**

- **There is high-level commitment across the government to coordinate on climate change and disaster risk management** through the parliamentary-level National Environment and Climate Change Committee (NECCC) and the Environment and Climate Change Standing Committee (ECCSC). At an institutional level, Tonga has consolidated several climate change and disaster risk management functions under MEIDECC, which includes several institutions responsible for forecasting, early warning, coordinating, and implementing the emergency response, promoting climate risk preparedness and adaptation. Since 2017, MEIDECC has received the highest recurrent budget allocation, reflecting ongoing adaptation and disaster risk management projects supported by development partners and the GCF.
- **However, beyond high-level commitment and policy-setting, coordination of strategies and effective ownership and responsibility of policy implementation remains a challenge.** There is a lack of clarity of roles and responsibilities both within MEIDECC’s different departments and across ministries, including with the MOF and the Department of Planning in the Prime Minister’s office. Improvements could usefully be made to clarify institutional structures and define roles and responsibilities for climate change and disaster

⁵ The Plan could draw upon the Green Climate Fund Country Program for Tonga (GCF 2018). The GCF provides a clearer and costed overview of sectoral projects and is currently updated (Chapter III and VI).

risk management planning, financing and implementation, while promoting cross-ministerial and cross-sector collaboration.

Is the Climate Response Strategy Consistent with Broader Development Goals?

8. **The climate response strategy is broadly consistent with Tonga’s development goals (SDGs).** Tonga included both its SDGs and climate resilience objectives into TSDf. The National Action Plan for Climate Change, TCCP, and JNAP2 single out climate and disaster resilience as an ‘integral component’ of Tonga’s development strategy. As a result, climate mitigation and adaptation, and disaster risk management are well integrated at the strategic policy level into all sectoral aspects of TSDf (Table 1). Tonga’s Voluntary National Review (VNR, 2019) of SDG progress confirms this approach.

Table 2. Development Goals and Climate Response Strategy Components

TSDf National Outcomes	SDGs	Climate Mitigation and Adaptation Components, * targets in NDC, # mentioned in NDC
Economic Development: more inclusive, sustainable, dynamic, knowledge-based economy	1, 2, 8, 10	Climate Resilient Environments for Agriculture*, Forestry*, Fisheries* Resilient Housing# Protection of vulnerable-to-natural disasters population
Urban and Rural Development: more inclusive, sustainable, and balanced development across islands	11	Protection of vulnerable-to-natural disaster areas* Access to quality infrastructure and public building# Better management of land*
Human Development and Gender Equality: more inclusive, sustainable, and empowering	3, 4, 5, 10	Access to health and education (incl. safe schools and hospitals)# Developing skills for climate resilient infrastructure Health, WASH, disaster preparedness awareness programs and curriculum Protection of vulnerable-to-natural disasters population Protection of vulnerable-to-natural disasters areas*
Good Governance: more inclusive, sustainable and responsive	16	Access to climate change and disaster resilience statistics and information Efficiency of public management system
Provision and Maintenance of Infrastructure: More inclusive, sustainable, and successful	9	Access to resilient infrastructure, public buildings, schools, hospitals# Sound disaster emergency plans and risk management
Land and Environment Management and Resilience to Climate and Risks: more inclusive, sustainable and effective	6, 7, 12, 13, 14, 15,	Costal Protection# Sustainable management of costal, marine, and land resources* Safely managed WASH# Universal access to clean and resilient infrastructure*
External Interests, Security, and Sovereignty: more inclusive, sustainable and effective	17	Better access to and management of climate finances Stronger project implementation and monitoring capacity through technical assistance Better climate change and disaster resilience statistics and information

Note: TSDf lists Tonga Development Outcomes for 2015-2025; SDGs refer to the number of the sustainable development goal to achieve by 2030; Climate components are mitigation and/or adaptation objectives included in Tonga SDGs. Both SDG and Climate Components are based on Tonga’s VNR (2019). * and # indicate respectively emission targets and objectives included in Tonga INDC (2015).

SDG numbers and definitions: 1--No Poverty; 2--Zero Hunger; 3--Good Health and Well-being; 4--Quality Education; 6--Clean Water and Sanitation; 7--Affordable and Clean Energy; 8--Decent Work and Economic Growth; 9--Industry, Innovation, and Infrastructure; 10--Reduced Inequalities; 11--Sustainable Cities and Communities; 12--Responsible Consumption and Production; 13--Climate Action; 14--Life below Water; 15--Life on Land; 16--Peace and Justice, Strong Institutions; 17--Partnerships for the Goals.

Sources: TSDf (2015), NDC (2015), NCCP (2016), JNAP2 (2018), and Tonga’s VNR (2019)

How Well-Prepared is the Country to Cope with Possible Intensified Disasters?

9. **Tonga has made progress in improving immediate preparedness and emergency response across the government and community levels.** Primary responsibility for saving lives and preserving public health after a natural disaster rests with the government of Tonga, though there is also support through the international community. There are structures in place to support coordination. This includes a cross-government Emergency Management Committee and ten key clusters.⁶ They mobilize to meet pre-and post-disaster needs and benefit from the support of Tonga’s military and key UN bodies such as WHO and OCHA.

10. **Some cluster systems work well but others face human, financial, and institutional constraints.** The clusters provide a good venue for collaboration. Institutional structures include the National Emergency Management Office (NEMO), the Tonga Meteorological Service (TMS) under MEIDECC, and the National Resources Division and Tonga Geological Service (TGS) under MLSNR, which play a critical role in pre-disaster monitoring, planning, pre-disaster emergency mobilization, evacuation, sheltering, and immediate post-disaster relief operations and assessments. There is need to ensure their stronger collaboration, including on individual roles pre-and post-disaster, and topical and financial responsibilities within and across clusters. Climate resilience and disaster recovery—as the government key priorities—have a national level budget allocation until 2021 (when budget priorities will be reevaluated). But the authorities highlight that this is not enough to meet their needs for adequately resourcing the clusters in terms of human capacity. The Prime Minister’s office, Ministry of Finance, MEIDECC and key cluster leads are encouraged to coordinate and review resourcing needs for consideration in future budgets.

11. **There are remaining challenges associated with limited financial, data, and human resources.** The current legislative reform proposed for the National Emergency Management Act (a draft bill has been revised and is envisaged for submission to Parliament by FY 2021) will help address some of these issues, including a more inclusive model of disaster recovery management.

- **Financial resources.** The government has taken steps to strengthen its financial response to disasters (Chapter V) but still depends on the National Emergency Fund and international relief for post-disaster financing that can delay initial implementation. There is need for more clarity on access to, and procedures for drawing on, existing funding sources, particularly between climate change and disaster risk management services. Individual ministry budgets lack dedicated funds for disaster resilience and response, and systems for managing post-disaster data could be improved with a standardized approach to collecting, reporting and sharing of weather and post-disaster information. This would allow for greater clarity on

⁶ The clusters include shelter, education, water and sanitation (WASH), food security and livelihood, safety and protection, telecommunication, essential services (waste management, water and electricity), early recovery and logistics, and economic and social recovery.

damage and losses and be useful in supporting financing requests to donors, and enable more robust government financial planning for future disasters

- **Tonga requires stronger localized hazard and risk information to enhance early warning systems and to improve the capacity to develop policies and priorities in response to climate change and disaster risk.** Multi-hazard early warning systems (MHEWS) are particularly critical to enhance Tonga's ability to integrate and respond to risks. Although Tonga's Meteorological Services (TMS) are comprehensive and continuing to scale up with support of the international donor community, TMS have experienced growth in both demand and the need for more specialized and qualified staff. Work supported by the WB PREP project as well as Japan, Australia and New Zealand to strengthen MHEWS is encouraged, as resources are needed to upgrade and maintain the physical infrastructure and data gathering and processing to meet communication and capacity needs.
- **There is a lack of clarity between the ministries responsible for hazard monitoring and early warning and preparedness** (including MEIDECC and MLSNR). There is a need for greater clarity, coordination and knowledge-sharing between these key stakeholders to enable a comprehensive and integrated MHEWS. For example, identifying clear responsibilities for monitoring and issuing warnings for natural disasters, and ensuring a collaborative and inclusive response which includes both hydromet and geophysical hazards. Additional human resource capacity is also required to support all agencies involved in MHEWS to help create consistent and standardized technical information on climate hazards and disaster risks for use by ministries and sectors in prioritizing their adaptation, preparedness or response measures. This includes awareness raising at community and village levels, where information may need to be tailored to specific needs and languages (see also CFRGA 2016).
- **The reform of the National Emergency Management Act (NEMA) is an important step to promote a new model of disaster recovery management.** Although there is an Emergency Management Plan, there is no overarching Emergency Management Act to provide clear guidance on operationalization and implementation to consolidate disaster resilience planning, emergency preparedness and response. The legislative reforms to the NEMA should help to clarify the role of the NEMO with respect to disaster response and longer-term recovery and establish a legislative framework for a more decentralized and consultative model of disaster recovery management. This would include village, district and regional committees and streamline processes for improved coordination for preparedness and response.
- **National emergency management and disaster risk preparedness can also extend to health emergencies.** Many PICs have experienced a serious strain on resources as a result of health-related emergencies. For example, the measles outbreak across the Pacific in 2019 which required mass vaccination and quarantine programs. The urgency and impact of health emergencies is also evident in more recent COVID 19 outbreaks around the world. Natural

disasters can include health-related events and strong emergency management and disaster financing frameworks can provide critical human and financial resources to ensure the health and safety of a population. In mainstreaming disaster resilience into all sector plans and strengthening cross-government coordination, the government of Tonga should consider how health emergencies are integrated into disaster preparedness and response policies and disaster risk management frameworks. This could include a review of the draft Emergency Management Bill to integrate a 'declaration of a state of health emergency'. This could also include a review of disbursement triggers for contingent disaster-risk financing instruments (Chapter V) to ensure an appropriate link to natural disasters that includes health emergencies, including a link for responding to health emergencies as part of the future proposed World Bank supported CAT-DDO (Box 3).

Recommendations for General Preparedness		Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)		Short term
II.	Update the NDC and plan for longer-term adaptation horizons	Short term
III.	Mainstream climate resilience into all sectoral plans and strengthen cooperation across ministries, especially between MEIDECC, MOF, and MLSNR	Short term
IV.	Finalize the reform of the National Emergency Management Act to provide an overarching framework, a clearer role for NEMO and a more inclusive approach to preparedness and response	Short term
V.	Continue to develop a fully integrated MHEWS, strengthening human and financial resources for key functions across MEIDECC and MLSNR, while promoting clear roles, responsibilities and an integrated approach for monitoring and issuing warnings for natural hazards.	Short to Medium term
VI.	Standardize post-disaster information gathering and reporting across ministries	Short term

II. CONTRIBUTION TO MITIGATION

Tonga contributes insignificantly to global greenhouse gas (GHG) emissions. It plans to meet its mitigation pledge for the Paris Agreement by expanding renewable power generation and improving the efficiency of power generation. These mitigation efforts in electricity generation would be supported by correctly pricing electricity.

Box 3. Main Mitigation Objectives and Policies

Tonga’s NDC does not specify a target level of emissions reduction. Instead, targets are set for renewable in total energy generation of 50 percent in 2020 and 70 percent in 2030. Achieving this target in 2020 is estimated by the authorities to reduce emissions by 27 Gigagram (Gg), around 9 percent from 2006. In addition, Tonga has also committed to reducing electricity line losses from 18 percent in 2010 to 9 percent by 2020.

How Does Tonga Intend to Meet its Emission Reductions Targets?

12. **Despite important commitments, Tonga is a net GHG “sink” with its miniscule contribution to global GHG emission and about five times larger GHG absorption.** Tonga emits 310 Gg (0.001 percent of the global GHG emissions). The bulk of these emissions (Table 3) are from land use change (60 percent) and transportation (23 percent) followed by electricity generation (13 percent). Emissions from land use, land-use change, and forestry (LULUCF) are driven by commercial forest harvesting and clearing of land for agriculture. Once tree cover is accounted for, Tonga is a carbon sink overall, absorbing approximately 1568 Gg of emissions.⁷ However, progress on mitigation remains important. Implementing mitigation commitments can give small states credibility in international dialogue on the Paris process, potentially leverage external finance, mobilize domestic revenues —through correctly pricing electricity and reduce dependence on volatile international oil markets.

Table 3. Mitigation Objectives and Proposed Actions

Sector	Mitigation Objective	Proposed Actions
Renewables	Increase share of renewable energy sources to 50% of the generation mix in 2020 and 70% by 2030	Increase investment in solar generation, expand use of solar water pumping
Electricity	Reduce energy losses from 18% to 9%	Power distribution network upgrades, smart meter installation, interconnection upgrades and energy efficiency programmes for residential and commercial customers
Agriculture	No specific objective	Greater water availability to livestock, improvements in feed quality and improve soil management practices
Transport	No specific objective	Expand use of biofuels

Note: Tonga NDC (2015), Draft Tonga Energy Efficiency Plan, various sector plans.

⁷ Tonga Third National Communication (forthcoming).

13. **Clear targets have been set for renewable energy generation, but overall mitigation objectives and measures for transportation and other sectors have not been finalized.**⁸

- **Tonga’s NDC sets out a target of 50 percent renewable energy generation by 2020 and 70 percent renewable energy generation by 2030.** Following this commitment, the JNAP2 aims to have 100 percent renewable energy generation by 2035. In addition, Tonga has committed to reducing electricity line losses by half—from 18 percent in 2010 to 9 percent by 2020 (in 2018/19 parasitic and line losses were 11 percent).
- **Mitigation targets and policies for the transportation sector are outlined in the Tonga Energy Efficiency Master Plan, which will be presented to Cabinet in 2020.** Reducing emissions from transportation focuses on greater use of public transportation, walking, biking, and improving fuel economy of passenger vehicles through reforming vehicle taxation.
- **Within the LULUCF sector, mitigation policies form part of the national management plan for forest and tree resources, finalized in 2017.** Policies include developing a program to provide incentives for landholders to plant native trees or sandalwood in abandoned allotments and promotion of traditional agro-forestry practices. Implementation of these policies have moved up in terms of the government’s priorities for 2020-23.

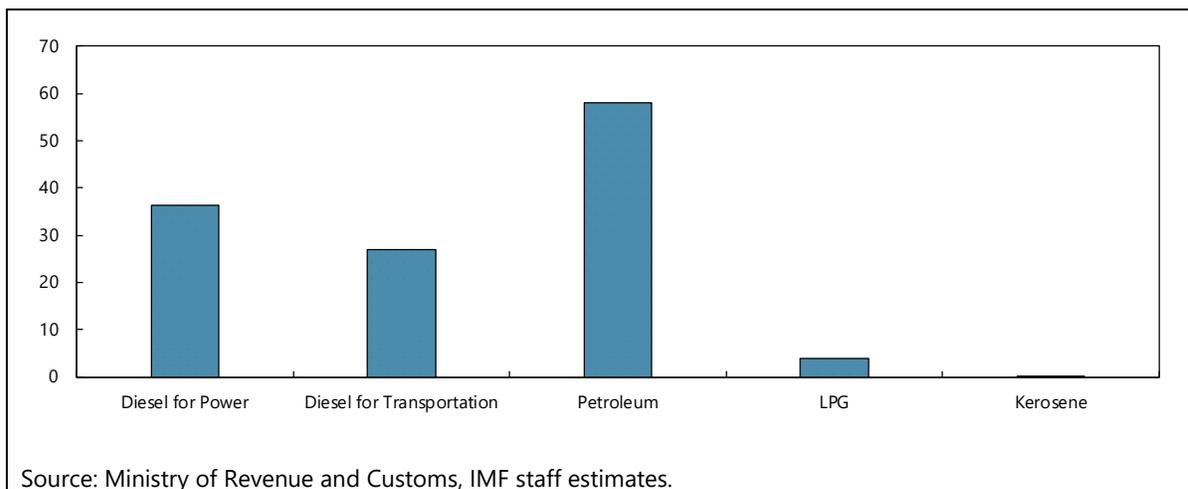
A. Clean Energy Plans

14. **The main energy sources in Tonga are imported petroleum, biomass, and renewable energy.** In 2006, the most recent year of the GHG inventory, imported petroleum products accounted for 53 percent of energy demand, being used mainly for electricity generation and transportation (VNR 2019). As such, the majority of GHG emissions come from diesel (Figure 3). Biomass is used mainly for cooking and accounted for 47percent of energy demand. In 2006, the use of renewable energy in the form of solar electricity generation was low, leading to a negligible contribution to total energy demand. Since then, the increased penetration of renewable energy for electricity generation has boosted the share of renewables electricity generation to around 10 percent of the total (6 percent of total energy demand) in 2017.⁹ Similarly, the use of biomass for cooking has been replaced by kerosene and Liquefied Petroleum Gas (LPG)—around 64 percent of households now use LPG for cooking.

⁸ Individual development projects, in the transport sector for example, have some climate mitigation co-benefits.

⁹ Final energy consumption includes energy used for electricity, transportation and cooking. Hence renewable energy, used mainly in electricity generation, is a smaller proportion of overall energy consumption (compared to its share in electricity generation).

Figure 3. Energy-Related CO₂ Emissions by Fuel Type 2018/19 (kt CO₂e)

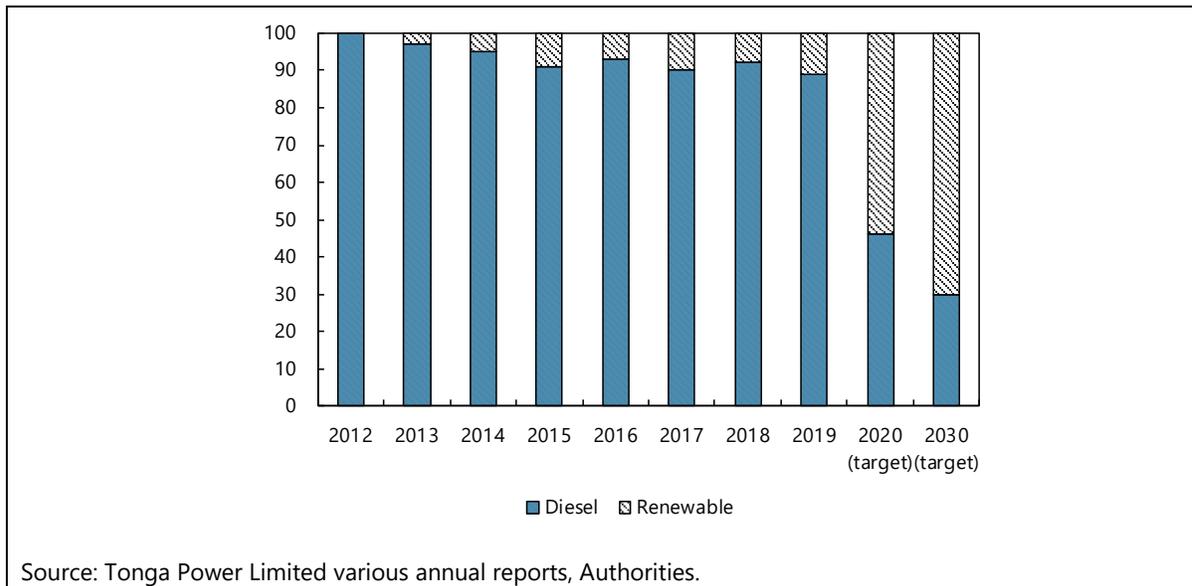


15. **Continuing the expansion of renewables is critical, and progress is planned to accelerate in coming years.**

- **Increasing the share of renewables in electricity generation to 70 percent by 2030 would reduce CO₂ emissions by 44 ktCO₂e**, a 14 percent reduction compared to 2006 (UN Climate Technology Center and Network). This shift is appropriate, as switching the fuel mix of electricity generation is one of the more cost-efficient mitigation options. For Tonga, it would have other macroeconomic benefits by reducing Tonga’s exposure to oil price volatility, and—when construction costs of renewable energy are covered by grants—it could reduce the cost of electricity.
- **Historically, the share of renewables in generation has fluctuated between 7 to 11 percent** (Figure 4). The share of renewables in the generation mix has increased more slowly than expected due to faster growth in electricity demand compared to growth in renewable generation and insufficient Battery Energy Storage Systems (BESS) capacity.¹⁰ The renewable generation share is expanding under the Tonga Energy Road Map and subsequent sector plans clarified further the necessary technical requirement, including BESS needs. Phase 1 delivered an additional 3 percent of generation from renewable energy and additional BESS capacity. Phase 2 is scheduled for completion in 2020 and would deliver an additional 16 percent. Finally, Phase 3 construction will begin in early 2020 and will provide the remaining 27 percent to bring the share of renewable energy generation to 54 percent.

¹⁰ BESS capacity is needed to integrate renewable energy into the grid because of the intermittent nature of renewable energy and because TPL’s grid cannot fully absorb the intermittent electricity that will be generated by the planned IPP renewable energy generation facilities (GCF proposal, 2019).

Figure 4. Share of Electricity Generation from Renewables



16. **Grant funding has now been secured for Phase 3, but financing delays impeded implementation of renewable energy projects.**¹¹ Tonga relies on grant financing to implement its renewable energy projects. The government’s contribution to the project is an exemption from applicable taxes for material inputs used by the project.

- **Phase 1** of the renewable energy expansion cost US\$29 million (6 percent of 2018 GDP), of which US\$25 million were grants from the ADB, the Government of Australia and the European Union, as well as other development partners.
- **Phase 2** is expected to cost between US\$13 million (3 percent of 2018 GDP) and will be funded by JICA, the Government of China and the private sector (an Independent Power Providers, IPPs).
- **Phase 3** requires the largest funding requirement, at around US\$53 million (11 percent of 2018 GDP), of which US\$44.6 million will be grants, with the remaining coming from Tonga Power Limited and the Government of Tonga.

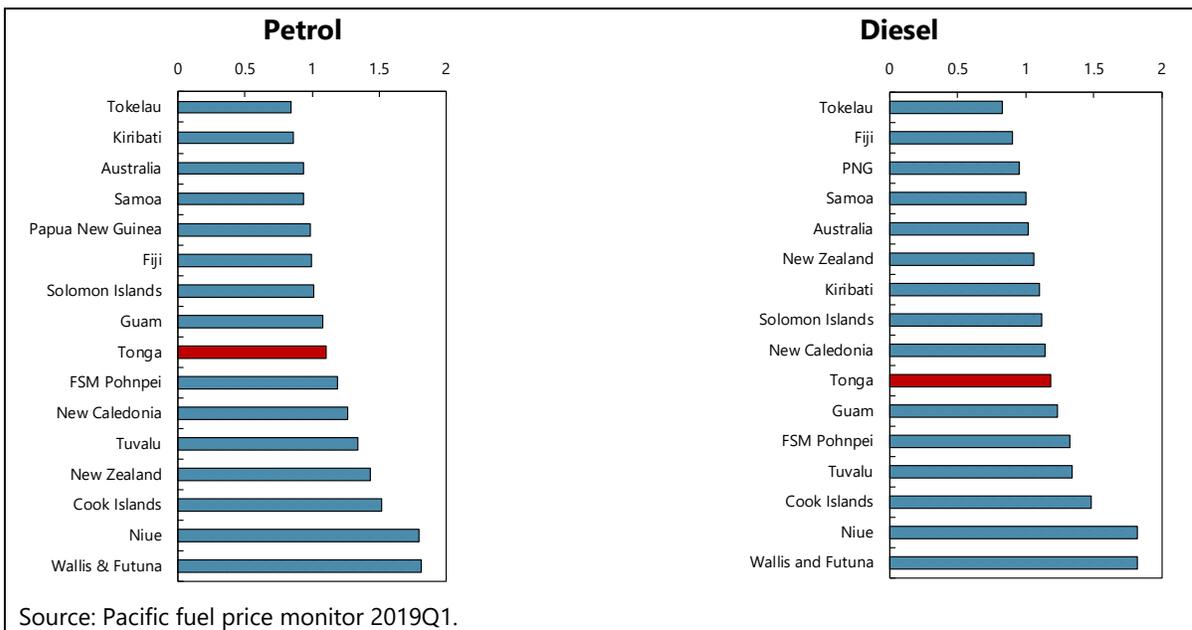
17. **Development partners have demonstrated a willingness to fund renewable energy projects.** Meeting the requirements of development partners (such as design specifications and private sector participation) with Tonga’s capacity constraints, mean that securing funding can be slow. This has contributed to the delay in implementing the Tonga Energy Road Map (TERM).

¹¹ Grants were conditioned on private sector participation (IPP) in the project. The first solar IPP under this project will begin construction in 2020.

B. Fuel/Carbon Taxation

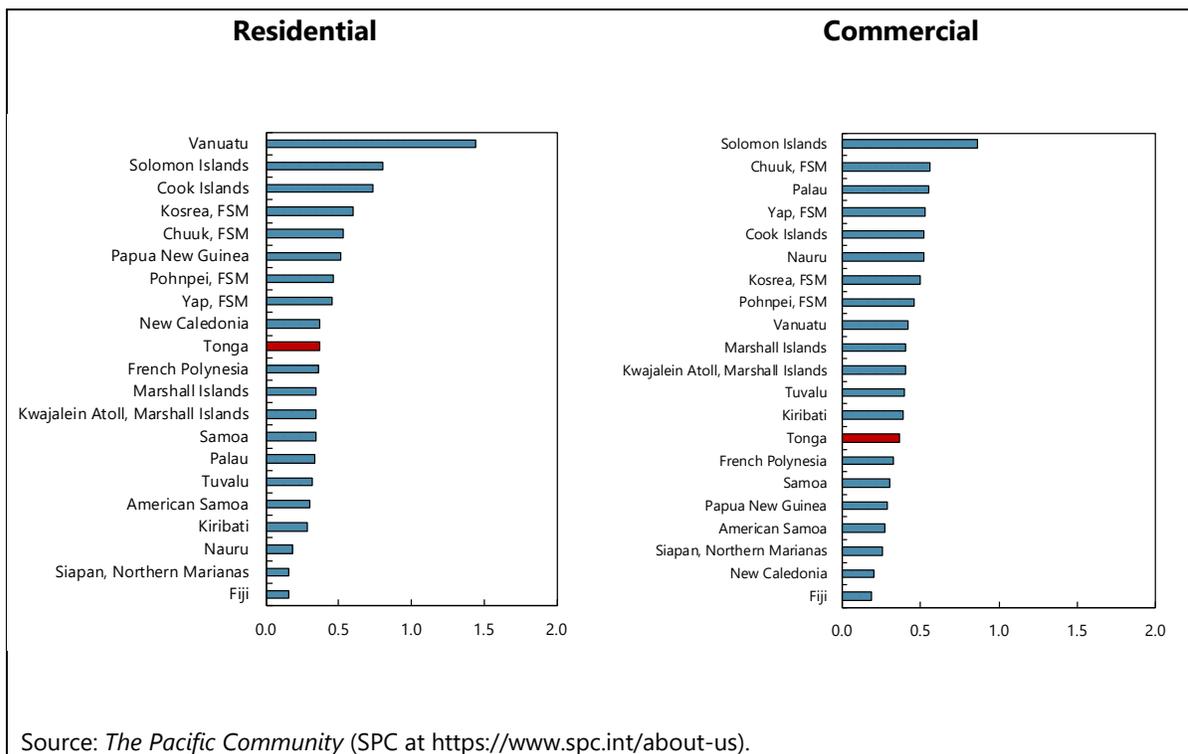
18. **Electricity and road fuel prices in Tonga are in the mid-range of comparable prices in the Pacific** (Figures 5 and 6). The electricity tariff is standardized across the four main islands at US\$0.34/kWh. The cost of automotive diesel and petroleum is approximately US\$ 1.2/liter and US\$ 1.1/liter, respectively. The Tonga Competent Authority regulates the prices of petrol, kerosene and diesel in line with changes in international fuel prices every three months.¹²

Figure 5. Retail Petroleum and Diesel Prices (US\$/liter): Tonga vs. Pacific Peers



¹² The Tonga Competent Authority is the regulatory body that sets the landed fuel price for imported petroleum products.

Figure 6. Residential and Commercial Electricity Prices (USD/kWh): Tonga vs. Pacific Peers



Does the Current Tax/Subsidy System Deliver Appropriate Carbon Pricing?

19. **Tonga’s tax/subsidy system delivers appropriate carbon pricing for road fuels.**
20. **Road fuels are subject to an excise tax and a consumption tax, but no import tariffs are levied on petroleum products.** The excise tax rate is US 28 cents/liter, while the consumption tax is levied at the standard rate of 15 percent. Excise taxation of road fuels is designed to correct for negative externalities associated with its use, including GHG emissions, air pollution, accidents and congestion. The level of excise taxation in Tonga is close to its efficient level of between US 30 to 40 cents/liter (Coady et al, 2019), of which US 12 cents/liter is to reflect the cost of GHG emissions priced at US\$ 50/tCO_{2e}. An exemption from the excise tax on diesel is provided to domestic ferry operators, fishing boats and Tonga Power Limited (TPL).
21. **Motor vehicles are subject to an import tariff, an excise tax and a consumption tax.** Passenger motor vehicles have no tariff, but vehicles used for the transportation of goods have a tariff rate of three percent. Buses used for public transportation with ten seats or more can be imported duty free. These tariff rates will be removed under the PACER plus agreement for imports from participating countries. All motor vehicles are subject to the standard consumption tax rate of 15 percent. Prior to July 2019, for vehicles with the same engine size, the excise rate for new or used vehicles less than 10 years old was twice the rate paid by vehicles older than 10 years (Table 4). From July 2019, the excise tax no longer varies by age. An excise tax based on

engine size encourages the take up of smaller, more fuel-efficient cars. Similarly, the removal of the lower rate for older used vehicles is appropriate because newer vehicles generally have better fuel efficiency than a comparable older vehicle.

Table 4. Excise Tax Rates for Passenger Motor Vehicles (seniti per cc)

Cylinder Capacity	Prior to July	
	2019	Current
< 1000cc		
New	50	50
Used, < 10 years	50	50
Used, > 10 years	25	50
1000cc - 1500cc		
New	50	50
Used, < 10 years	50	50
Used, > 10 years	25	50
1500cc - 3000cc		
New	75	75
Used, < 10 years	75	75
Used, > 10 years	38	75
> 3000 cc		
New	100	100
Used, < 10 years	100	100
Used, > 10 years	50	100

Note: 'Current' reflects Tonga current excise tax rates described in paragraph 21.
Source: Ministry of Revenue and Customs; IMF staff estimates.

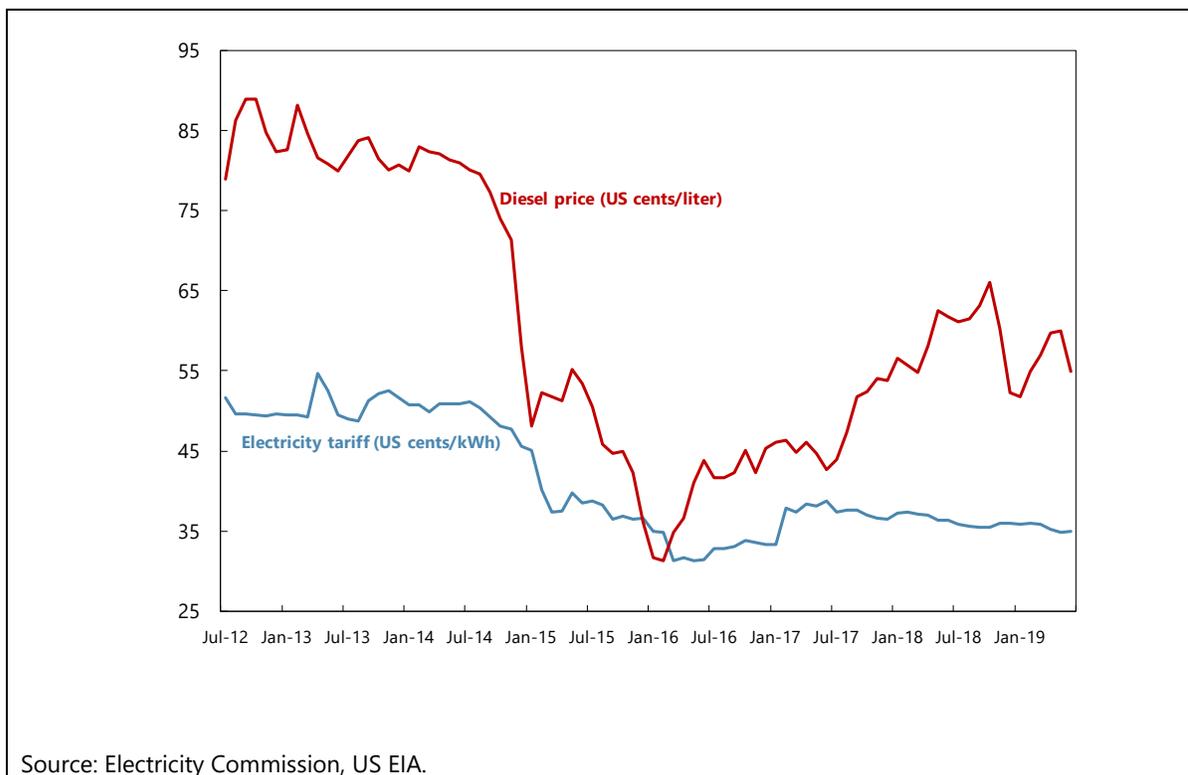
22. **Electricity receives favorable tax treatment, as well as implicit subsidies.**

- **Electricity is zero rated under the consumption tax, hence there is no tax on sales of electricity, but electricity providers receive a tax credit for any consumption tax paid for their inputs.** Zero-rating under a consumption tax should be applied only to exported products. The government has not passed on increases in fuel costs to consumers since July 2017, to reduce price volatility (Figure 10). Prior to July 2017, the fuel component of the fuel tariff was adjusted every three months, in line with international oil prices. This implicit subsidy was partly financed through withholding the government dividend from TPL. In 2018/19 the shortfall between TPL's fuel costs and fuel revenue was 0.5 percent of GDP (TPL Annual Report 2018/19).
- **TPL also has an exemption from excise taxation and import duties for diesel and other purchases** (e.g. vehicles, machinery and equipment). In 2018/19 the foregone excise tax revenue from diesel used by TPL was 0.9 percent of GDP¹³, while in 2017/18 the revenue

¹³ This assumes that diesel used by TPL is subject to an excise tax of 65 seniti/litre.

foregone from other TPL purchases was 1.2 percent of GDP.¹⁴ Two IIPs also have exemptions in the form of a 10-year income tax holiday, as well as duty, excise and consumption tax exemptions for installation and maintenance of the solar electricity generation equipment.

Figure 7. Electricity Tariff and Diesel Prices



23. **Under the current system, GHG emissions from electricity and road transportation are expected to increase from 140 ktCO₂e in 2017 to around 210 ktCO₂e by 2030** (UN Climate Technology Center and Network). Of these emissions, around 120 ktCO₂e are from transportation, whilst the remaining 90 ktCO₂e are from electricity generation. While emissions remain very small by global standards, this represents a 50 percent increase in emissions from these two sectors. In particular, it underscores the need to develop policy measures to reduce emissions from the transport sector.

What Would the Tax System Look Like with Recommended Carbon Pricing?

24. **Tonga has a menu of options to improve carbon pricing in the future.** These tax reforms should be complemented by compensation for low-income households, including through an expansion of alternatives to private vehicle use (e.g. public transportation).

¹⁴ Specifically, revenue foregone from excise tax and import duties. The level of foregone revenue may be higher than normal due to reconstruction efforts following TC Gita.

25. **Correctly pricing electricity to reflect supply costs would provide an incentive for households and businesses to invest in energy efficiency measures.** To begin, the authorities should return to the previous policy of adjusting the fuel component of the tariff in line with diesel prices every three months. This would increase the current tariff by 4 percent to US 36 cents/kWh (Figure 8). This can be followed by imposing excise taxation on imported diesel used for electricity generation to reflect the cost of GHG emissions. An implied carbon tax of USD 50/tCO_{2e} would raise electricity prices by an additional 9 percent, bringing the overall price to US 39 cents/kWh.

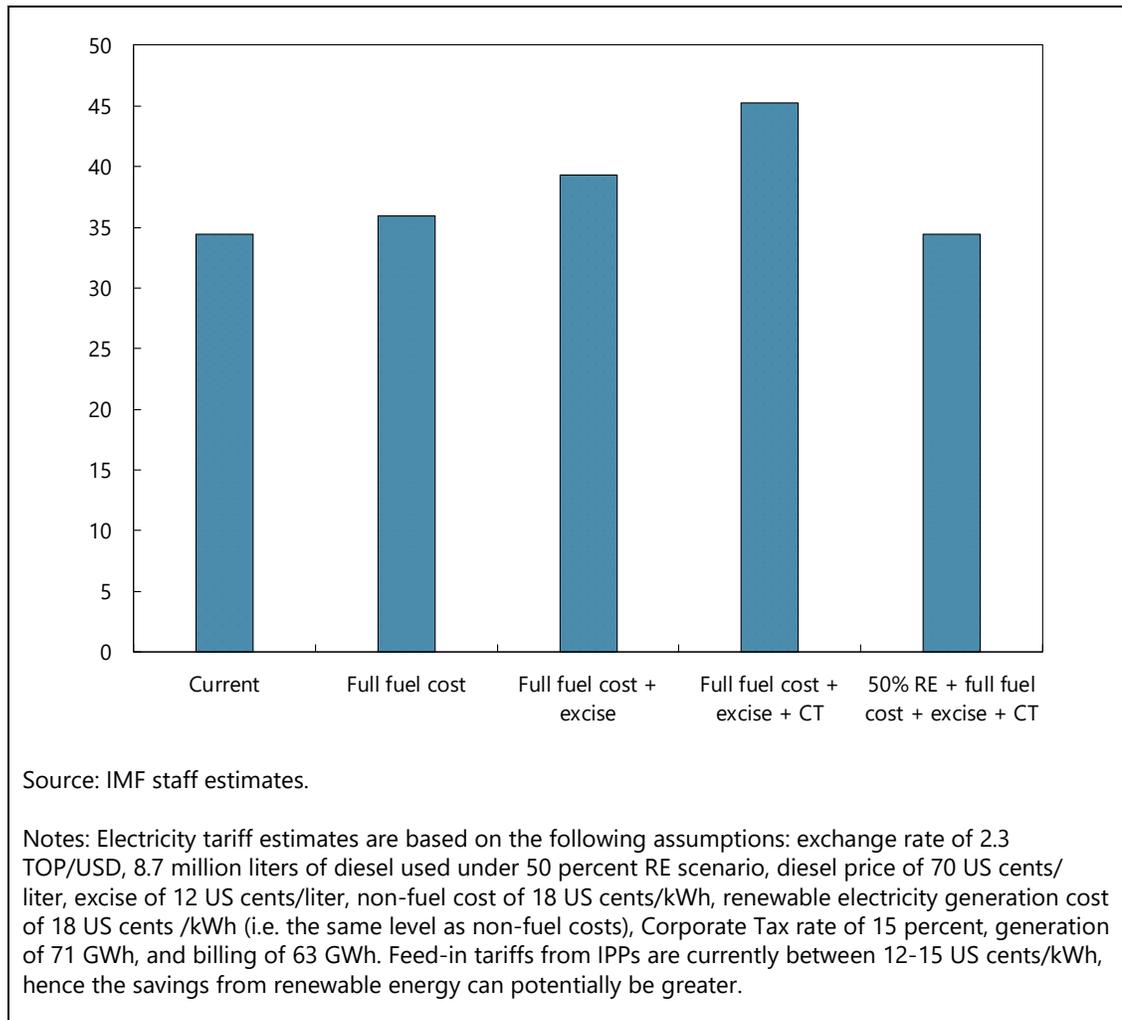
26. **Support for the poor should be better targeted.** A subsidy on the electricity tariff benefits both high- and low-income households. In Tonga, high income households benefit more from these subsidies compared to low-income households both as a share of their expenditure and in absolute terms.¹⁵ Cash transfers are a better method to protect the poor, though a lifeline tariff can be an alternative when a social safety net is lacking and thus cash transfers to the poor are not feasible.¹⁶ The authorities introduced a lifeline tariff in April 2017, whereby the first 100kWh of electricity is sold at a lower rate of 30 cents/kWh. In 2018/19, this lifeline tariff cost the government around 0.2 percent of GDP. For better targeting, the subsidy should only be applied to those with consumption below the threshold.¹⁷

¹⁵ According to the 2015/16 Household Income and Expenditure Survey, the share of expenditure on housing, water, electricity and gas is 18 percent for households in the lowest quintile and 22 percent for households in the top quintile. In absolute terms, high-income households would benefit even more because they have a higher level of expenditure.

¹⁶ Transfer payments are provided only to the elderly and persons with disabilities.

¹⁷ For example, the original policy design developed by the World Bank and a proposal on Electricity Lifeline Tariff Targeting Low Income Households submitted to Cabinet August 2014. The authorities limited the costs of the subsidy by gradually 'clawing back' the subsidy benefits such that electricity users consuming above 200kWh would pay the regular tariff and not benefit from any subsidy.

Figure 8. Electricity Tariff Under Various Policy Options (US cents/kWh)



What Other Policies Should Complement Carbon Pricing?

27. **The government should discourage carbon-intensive uses and promote renewable energy sources in key, if not all, emitting sectors. Short term solutions could focus on:**

- **Introducing a higher rate of taxation on older vehicles would encourage the uptake of fuel-efficient vehicles.** Tonga has already taken the first step by removing the discount on older vehicles (Table 4), the next step could be to introduce a higher excise rate on older vehicles, which are less fuel efficient. Taking account of this, the excise on older cars could be around 30 percent higher than the excise on newer cars to equalize costs on emissions. The excise regime can also have differentiated rates between hybrid cars and non-hybrid cars.
- **An alternative would be to introduce feebates, which can be designed so that they do not impose a new tax burden on the average household.** Feebates increase the price of

vehicles with relatively low fuel efficiency while decreasing them for vehicles with relatively high fuel efficiency. Feebates can be designed to be revenue neutral (meaning that revenues from fees collected on low efficiency products balance outlays for rebates on high efficiency products), or they can be designed to collect the same amount of revenue as the current motor vehicle excise tax. However, feebates would be a larger departure from the current motor vehicle tax regime. MEIDECC, MOF and Ministry of Revenue and Customs could usefully work together to improve motor vehicle taxation, bringing together their expertise in climate change mitigation, tax policy and tax administration.

Recommendations for Mitigation	Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)	
<ul style="list-style-type: none"> Accelerate expansion of renewables, as planned 	Short to Medium term
<ul style="list-style-type: none"> While protecting the poor, remove electricity subsidies by passing on the full cost of diesel used for generation in the electricity tariff 	Short to Medium term
<ul style="list-style-type: none"> Apply excise duty on diesel used for generation 	Short term
<ul style="list-style-type: none"> Apply the standard rate of consumption tax on electricity 	Short term
<ul style="list-style-type: none"> Introduce a higher excise tax on older vehicles, or, alternatively, "feebates" to encourage uptake of fuel-efficient vehicles 	Short term

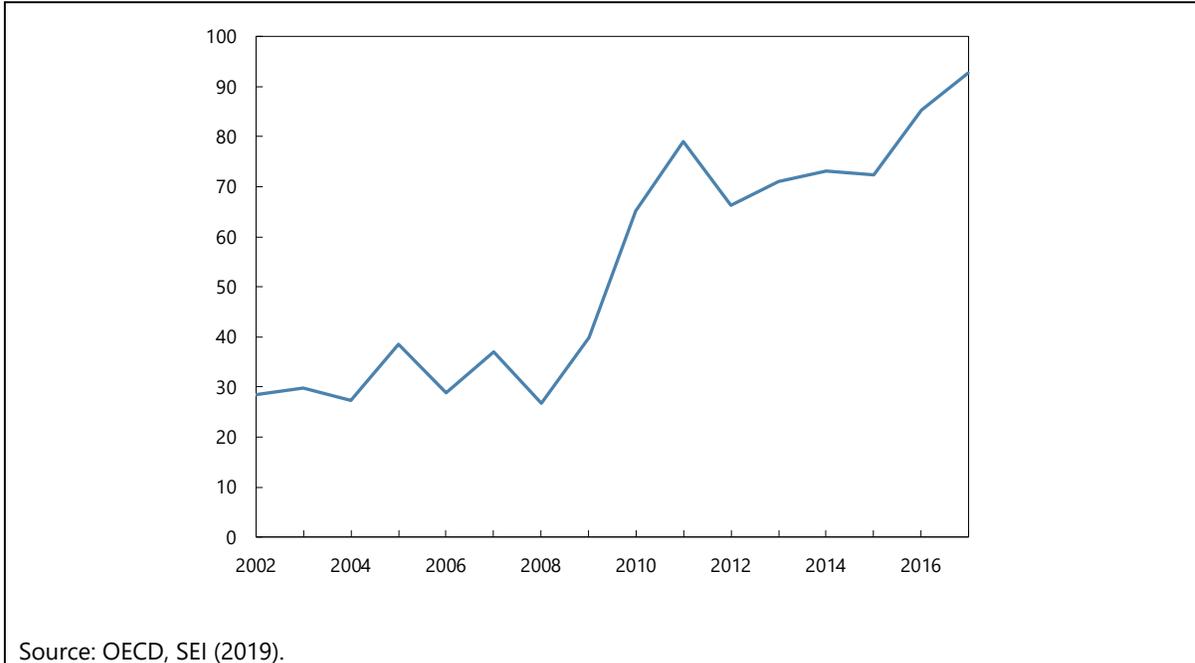
III. ADAPTATION PLANS

Adaptation spending has increased, and should continue to do so, as Tonga's needs are large. To meet its ambitious SDG and climate-resilience targets, Tonga would benefit from more fully incorporating adaptation needs beyond infrastructure (to, e.g., health, education), greater use of international firms, where appropriate as a complement to local capacity, improving regulations (building code, housing recovery and reconstruction policy, land use regulations), and promoting private and public disaster insurance.

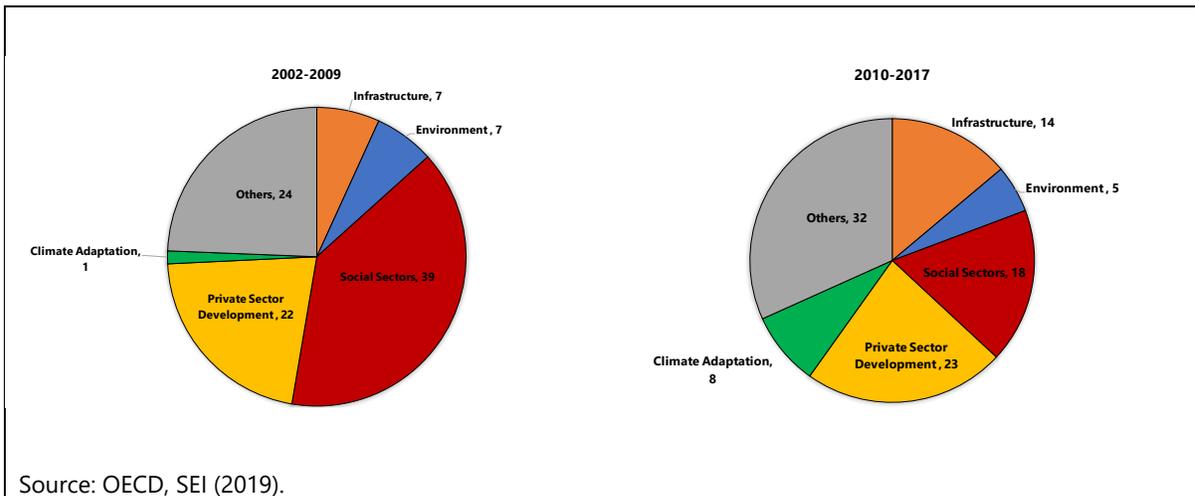
A. Public Spending and Investment

28. **Tonga's spending on climate adaptation—and climate change more generally—has increased, supported mainly by development partners.** Official development assistance for Tonga between 2002-2017 (Figure 9) increased to reach cumulatively about US\$864 million (180 percent of 2018 GDP). The projects directly targeting climate adaptation also increased (Figure 10). Other sector development projects also indirectly focused on climate adaptation, but the share of adaptation remains difficult to estimate. These projects include investment in physical infrastructure, environment and ecosystem resilience, social sectors (e.g., health, education, social protection), and overall private sector development.

**Figure 9. Development Spending
(2002-2017, US\$ million)**



**Figure 10. Sectoral Development Spending
(2002-2017; percent of total)**



Has Tonga Developed an Adequate Spending Strategy to Adapt to Climate Change?

29. **Tonga is progressing towards an adequate adaptation spending strategy.**

- **Tonga’s adaptation approach has been mainly project-based.** The JNAP2 provided general ‘resilient’ plans for infrastructure, agriculture, health, education, gender, biodiversity, and various other sectors to be implemented over the 10 years until 2028. The JNAP2 indicates costs of US\$147 million (31 percent of 2018 GDP) for its six priority objectives: mainstreaming, monitoring, capacity building, sectoral actions, financing, international, and regional cooperation.^{18, 19} Recently, the GCF Country Program (2018) broadly consolidated the JNAP2 plans and sectoral project costing in line with Tonga’s development and climate objectives. The GCF indicates spending needs for mitigation and adaptation of about US\$548 million (114 percent of 2018 GDP) but does not yet include recent sectoral projects (e.g., agriculture and fishery, roads, safe schools and resilience).
- **The CCPA mission estimated consolidated costs of currently identified climate-related projects at about US\$671 million** (139 percent of 2018 GDP; Table 5). Climate adaptation accounts for a major part of these needs. Investment in resilient transport, public building, coastal protection, water, and waste management, and renewable energy account for about 60 percent of the total. Projects aiming at improving Public Finance Management (PFM) practices in the government units in charge of climate-related projects, ICT, and Early Warning System account for about 13 percent. The other projects include investment in resilient housing, education and health programs.

Table 5. Cumulative Cost of Currently Identified Climate-Related Projects (US\$ million)

Project Type	Estimated Costs
Renewable Energy	76
Resilient Transport Infrastructure	130
Resilient Public Buildings (inc. Schools)	100
WASH + Waste Management	16
Coastal Protection	81
Agriculture, Fishery, Food, Ecosystem	70
Public Finance Management	52
ICT	12
Early Warning System	25
Others (inc. housing)	109
Total	671

Note: excludes projects completed in 2019.

Source: GCF (2018), World Bank (2019), ADB, Tonga’s Budget Strategy 2020, Staff estimates.

¹⁸ To compare, the original JNAP 5-year period (2010-15) Tonga secured donor funding for adaptation and DRM totaling about US\$195 million.

¹⁹ For more details see Annex 2 of the JNAP 2.

The projects are at different preparation stages, and some are expected to start in 2020 (Chapter IV discussed financing sources). The overall timeframe, however, is not specified. The upcoming update of the GCF and development partners' work programs, as well as the 2020/21 Budget Strategy, should collectively provide more comprehensive prioritization of the activities over the medium term.

What, If Anything is Missing from the Adaptation Strategy?

30. **This costing—predominately of physical infrastructure—is a lower-bound estimate for adaptation needs.**

- **The additional needs to meet Tonga's SDG goals and increase resilience by 2030 — beyond those that are already identified—could be significant.** The IMF SDG Costing approach adapted to countries with high climate vulnerabilities is used to estimate the additional annual financing needs in health, education, WASH, electricity, and roads by 2030 (Annex 1). Even after accounting for existing projects in these sectors (Table 5) annualized over the next 11 years, additional spending requirements for achieving Tonga's selected SDG targets are substantial.²⁰ The estimates show that only to meet these selected SDG goals, annual additional spending needs could amount to about 5 percent of GDP by 2030 (Figure 11).
- **Adapting health services and education to climate change to meet Tonga's SDGs requires more substantial efforts.** Currently identified climate-related projects (Table 5) include some development projects in health and education. Additional efforts are needed in these and other social sectors to adapt to more indirect climate change effects, support mitigation, and improve disaster preparedness. These include developing public health services (including the provision of medical goods and medical personnel to monitor and control climate-health risks and react to health emergencies), integrated climate curricula in schools, training and awareness programs, and technical skills (project design and implementation, infrastructure construction, maintenance, and post-disaster rehabilitation and upgrades).²¹ Also, the current projects cover only partially the needs for climate-resilient infrastructure, particularly in other-than-Tongatapu islands.

31. **Like its peers, Tonga faces limited human resource capacity, with only a small number of skilled officials to implement the adaptation strategy.** Sector staff acknowledged a lack of human and financial capacity, particularly for project preparation and feasibility studies

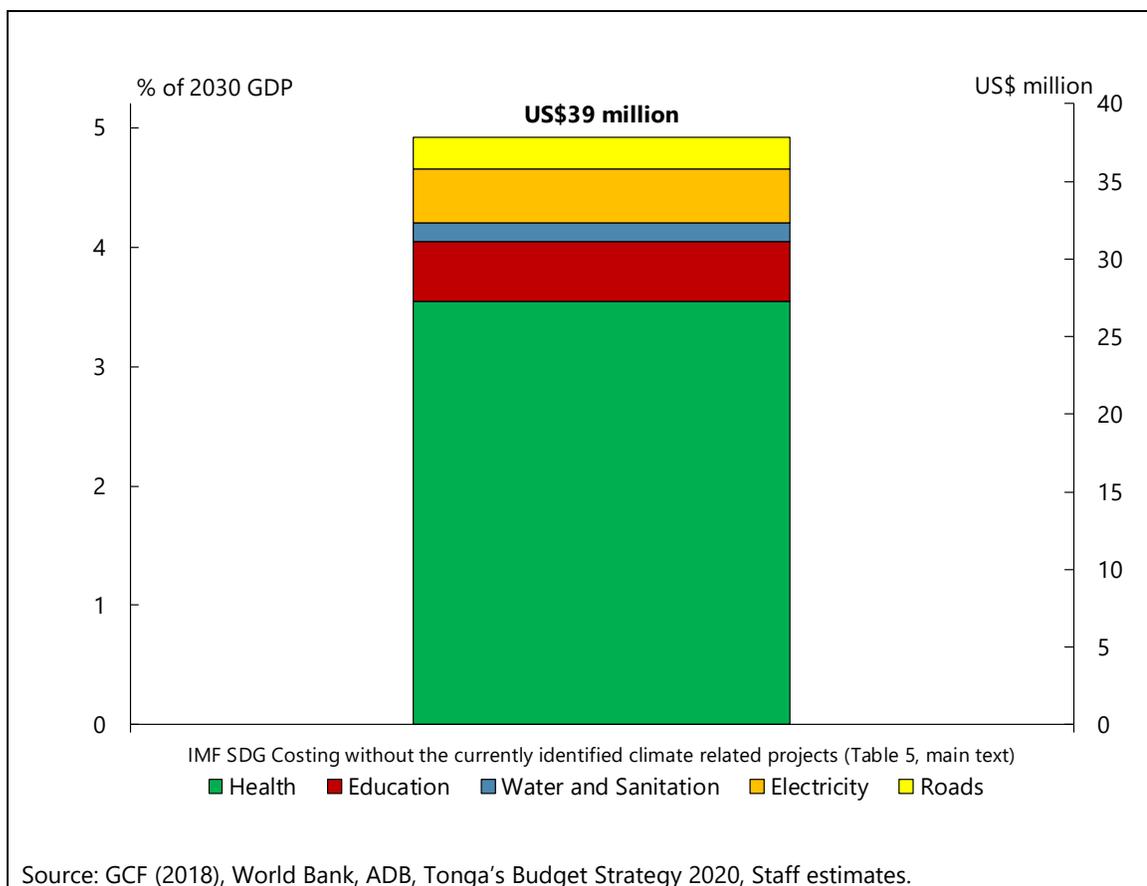
²⁰ For ongoing projects, the exercise broadly considers their corresponding implementation timeline. The current identified projects with a committed financing are assumed to be implemented over the 4-6 years. The implementation of the remaining projects is extended beyond 2025. The exercise assumes the annual costs of the currently identified projects (Table 5) at about 8 percent of 2030 GDP.

²¹ Direct effects are related to the health impact of extreme weather events and heat-related illnesses. Indirect effects include control of water-, food-, vector-borne diseases, respiratory illness, etc. Diffuse effects are linked to an increase in noncommunicable diseases, psychological health issues following extreme weather events or temperature increases (WHO 2015, 2018).

that adequately respond to global climate financing mechanisms. The international community could usefully continue to help Tonga with providing targeted human and financial resources to strengthen project preparation and feasibility studies.

32. **The shallowness of the domestic private sector is also a constraint, for example, of skilled labor and construction firms.** While domestic capacity is, and needs to keep growing, this will take time and Tonga’s climate needs are urgent. This calls for improving communications on the pipeline of priority projects so the market can prepare, and for strengthening procurement measures, potentially including framework agreements or, where appropriate, bundling contracts to attract international firms as a complement to local capacity. More can be done to improve business environment for private sector investment to attract private sector investment in high-priority adaptation projects (see forthcoming 2020 Article IV Report for Tonga).

Figure 11. Additional Spending to Meet SDGs and Climate Resilience by 2030



B. Other Programs

Adaptation isn't Just a Matter of Spending; What Regulations Support It?

33. Tonga's climate change adaptation efforts would benefit from:

- **Formalizing and implementing the updates to the building code.** Tonga's Building Act, Regulations, and Building Code provide the legal basis for construction. Recent proposed revisions to the Building Code include climate resilience measures for the type of construction materials used, design and construction methods. The updates have yet to be approved by Cabinet. Compliance with the existing regulations is limited due to weak regulatory supervision, lack of budget and a shortage of expertise for enforcement, and high construction and maintenance costs. The lack of compliance with the building code affects—as shown during TC Gita—both public and private buildings. It also affects future rehabilitation costs as some insurers require engineering certificates to be provided to ensure cyclone standards. Enacting and monitoring enforcement of the improved, climate-informed Building Code are important next steps.
- **Further improving and supporting housing recovery and reconstruction policies.** Following TC Ian and TC Gita, the government of Tonga provided disaster-specific housing recovery support for residential reconstruction, repairs and retrofitting of affected houses. However, the lack of an overarching policy and the intensity of relief efforts contributed to long delays in decision-making, exacerbating uncertainties for communities. A Housing Recovery and Resilience Policy and House Identification Guide have been developed to provide clearer guidance for building back better and self-recovery for more rapid and efficient support. Swift establishment by the Ministry of Infrastructure of an effective Housing Sector Resilience Office would support post-disaster reconstruction efforts and promote a whole-of-government approach to resilience building in the housing stock during non-disaster periods.
- **Strengthening hazard and disaster risk-informed land use planning and regulations.** Although there are some climate change risks considered in national infrastructure planning and Environmental Impact Assessments, including foreshore protection and using long-term modelling of inundation areas to assist with spatial planning to support relocation of key public infrastructure, efforts are generally ad-hoc and information is not comprehensively shared. Hazard and risk-informed land use planning information could usefully be strengthened and better disseminated. The information that does exist is scattered across several Ministries including MEIDECC, Ministry of Lands and Natural Resources and the Ministry of Infrastructure. Strengthening information and awareness of climate and disaster risks can help ministries prioritize, plan and potentially minimize costs of reconstruction,

particularly for assets located in high-risk areas Future land planning and management could take into account how CCA and DRM measures are included in other critical legislation, for example the Towns Regulations Act.²²

C. Financial Sector Preparedness

How is the Financial Sector Contributing to the Climate Change Effort?

34. **The financial sector’s contribution to Tonga’s climate change effort has been small, reflecting the financial sector’s narrow scope.** Banks have a narrow business model because of structural challenges that limit the expansion of lending. They largely lend to households for real estate, although the share of commercial lending has increased recently. The insurance sector is small, comprising four companies. Penetration is low because of weak financial literacy and limited awareness of the need, benefits and availability of insurance. Two insurers cover cyclones and earthquakes. Premium amounts are reportedly small—1 percent for the average insurance policy—and stable. Both banks and nonbanks generally do not lend for infrastructure, although commercial banks are considering lending to renewable energy projects recently. The public sector pension fund has recently started lending to a utility company, a state-owned enterprise.

35. **Tonga’s financial sector is increasingly supporting climate change efforts.** Banks require adequate insurance with broad coverage for natural disasters and earthquakes and adherence to the building code (which became legally mandatory after TC Gita in FY2018) before they lend. These requirements have increased the penetration of insurance products. They have also improved climate resilience with regard to private homes as owners are now required to certify that buildings are built to code before they can access loans. In the event of natural disasters, banks support recovery by being flexible about loan repayments at no charge until insurance claims and/or remittances have come through (loan repayments can be deferred by 3-6 months on average, at no charge). Banks have also refused loans for purposes that could damage the environment unless applicants provide an Environmental Impact Assessment Report. Insurance claims are settled promptly, generally within 1-2 months. For example, the majority of claims after TCG have been settled.

36. **Insurance firms and the National Reserve Bank of Tonga (NRBT) are taking further measures to strengthen awareness and improve options for disaster responsive insurance.** Insurance firms are planning to step up an awareness campaign to increase the number of clients. They have begun a door-to-door campaign in the main island, where their business is focused, to explain and sell their products more widely. Insurance companies plan to extend their operations to outer islands via a local language campaign and with products and insurance premiums designed to appeal to rural communities. The NRBT, the regulator of the insurance

²² This has also been proposed under the Kingdom of Tonga’s Climate Financing and Risk Governance Assessment (CFRGA 2016).

market, also plans to take steps to improve financial literacy and awareness once its new insurance regulations are finalized.

Recommendations for Adaptation	Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)	
<ul style="list-style-type: none"> • Extend coverage of adaptation strategies and plans to current and capital projects in more sectors (especially health and education) 	Short to Medium term
<ul style="list-style-type: none"> • Use international firms as a complement to local capacity 	
<ul style="list-style-type: none"> • Improve, enact and enforce the climate-informed building and land-use codes 	Short to Medium term
<ul style="list-style-type: none"> • Establish the Housing Sector Resilience Office 	Short term
<ul style="list-style-type: none"> • Explore options to further develop the private insurance market for homes and businesses including by raising awareness and improving financial literacy to include natural disasters. 	Short term
	Short to Medium term

IV. FINANCING STRATEGY FOR MITIGATION AND ADAPTATION PROGRAMS

Tonga needs to close the large financing gap between its climate plans and identified financing, which should be through grants to avoid worsening debt dynamics. Access to climate finance has been reasonable, but international climate funds are difficult for Tonga to access. Limited capacity constrains access to financing and disbursement.

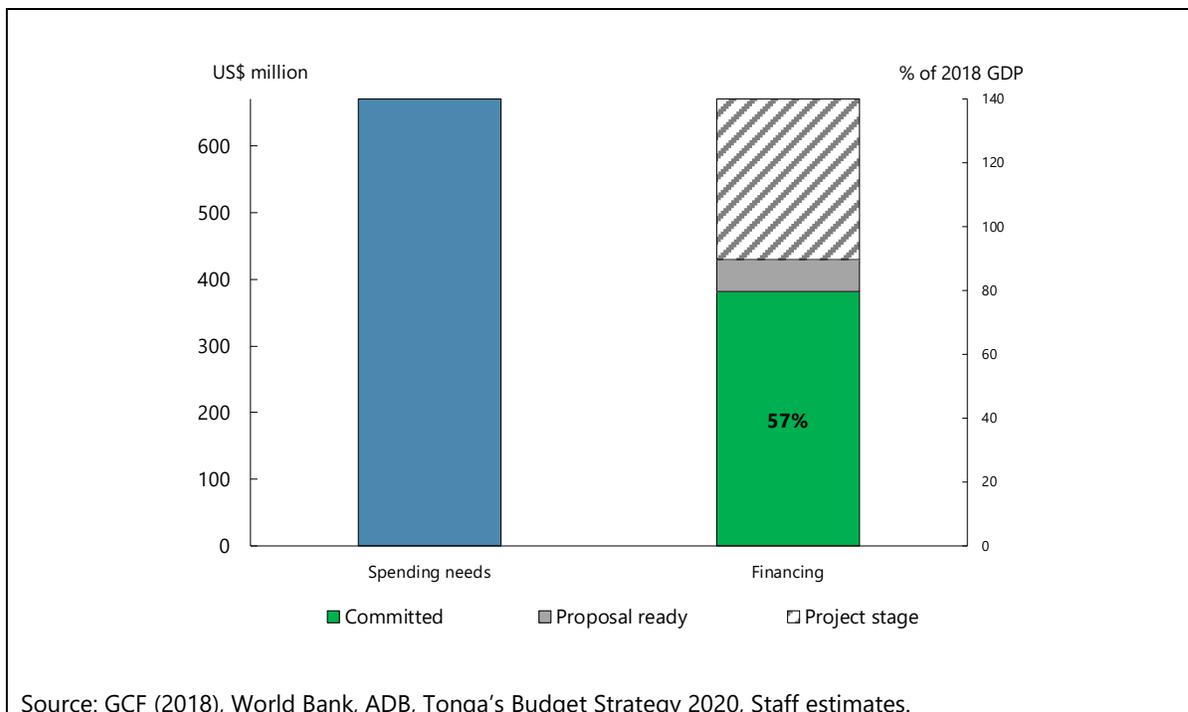
A. Current State of Financing

Does Tonga Have Adequate Financing to Meet the Needs of its Climate Change Strategy?

37. **Only about half of the identified climate-related projects have committed financing.** Within the total identified spending needs of about US\$671 million (Table 4), about 57 percent have committed, mainly external, financing either through a signed or advance financial agreement (Figure 12). Grants are expected to constitute the main source of funds. About an additional 7 percent of the total climate-related projects have a well-advanced proposal ready for submission and financing sources are broadly identified, but with no firm commitment. The financing gap is estimated at about US\$289 million (60 percent of 2018 GDP).

Filling this gap will require additional grant financing that—based on the past trends and current development partners’ policies—seems to have a reasonable possibility of being met.

Figure 12. Cumulative Cost and Financing of Currently Identified Climate-Related Projects



38. **Tonga relies on a broad range of external financing sources.** The NDC envisages relying on climate funds, such as the GCF, Climate Technology Centre and Network, Global Environment Facility, and recurrent budget financing. The GCF program consolidates these strategies mainly through pooled and bilateral development partner financing with corresponding budget or public enterprise (e.g., TPL) contributions.

B. Consistency of Climate Change Spending and Financing Plans with Fiscal and External Debt Sustainability

Are Tonga’s Climate Change Plans Consistent with Fiscal and External Debt Sustainability?

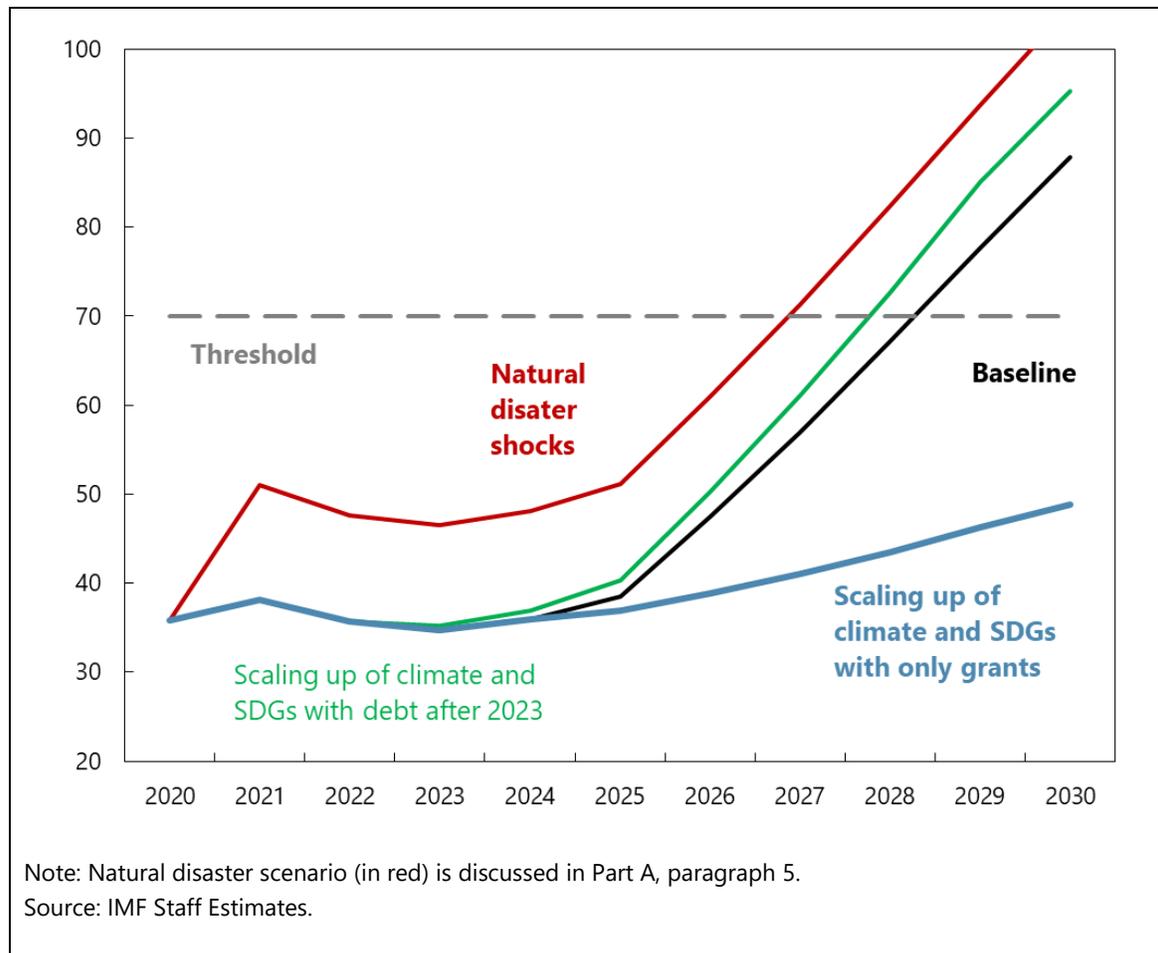
39. **Tonga faces high debt distress risk.** Even without increasing development and climate spending, The IMF staff estimates indicate that debt ratios are already expected to reach high-risk of debt distress levels by 2029 (Figure 13). The PV of the public debt-to-GDP ratio is expected to breach 70 percent in 2029 and increase to 88 percent of GDP at the end of the projection period.²³ A deteriorating current account balance—owing to weak export

²³ In the IMF/World Bank Debt Sustainability Analysis (DSA), the policy-relevant threshold beyond which the risk of debt distress increases significantly for Tonga is estimated at 70 percent of GDP.

competitiveness and large import dependence—and growing external borrowing to fulfill upcoming debt obligations, and the impact of the COVID-19 pandemic in 2020 are the main drivers of the current adverse debt dynamics. Additional fiscal consolidation and new grant financing are needed to put debt back on a sustainable path, even without taking into account additional spending needs due to climate resilience and development plans.

40. **Achieving development and climate-resilience goals by 2030 therefore requires financing to be in the form of grants to avoid worsening debt dynamics.** Rationalizing current spending (in particular the wage bill), greater PFM efficiency, and further domestic revenue mobilization, could help generate some savings over time. However, even modest increases in SDG- and climate-related spending beyond those already incorporated in the baseline will require additional external grants to avoid further worsening debt dynamics. Debt financing would accelerate risks of debt distress with the PV of public debt-to GDP ratio exceeding 95 percent of GDP in 2030. Going forward, a more durable solution to overcoming these financing constraints, in addition to further fiscal consolidation, would be to grow the private sector, which could expand the tax base over time.

Figure 13. Public Debt to GDP (in present value, 2020-2030)



C. Institutional (Capacity, Regulatory, Coordination) Issues

How Well is Tonga Accessing Climate Financing, Both Public and Private (e.g. the GCF), and How Could this Improve?

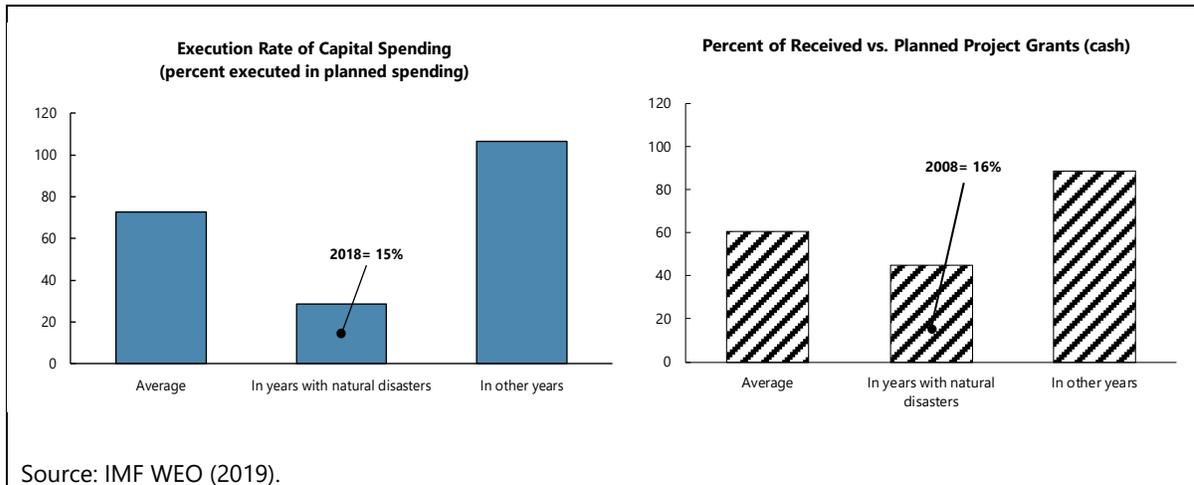
41. **There has been reasonable climate funding available for Tonga, mainly through existing development partners.** Previous trends and current policies suggest continued availability of grant and concessional funds for Tonga. Development financing has increased, and grants represented more than 90 percent of the total funding. Tonga has also successfully increased and reconfigured development bank finance provided for emergency events towards reconstruction purposes. Discussions with development partners suggest funding to Tonga will likely continue to increase, especially if policy implementation continues to improve.²⁴

42. **Improving absorption capacity—including by managing effectively resources—and coordination are key to increase access to financing and reduce delays in disbursements.** Tonga has a relatively strong public investment framework (Chapter VI). Spending execution, however, hinges on still limited domestic capacity in planning, budgeting, managing, and implementing projects, which cause delays in project implementation and external disbursements. Weak coordination among the government and non-government agencies, the local community, the private sector, and local contractors responsible for asset maintenance impede effective allocation and disbursement of financing. Similar to the peers, capacity and coordination issues are particularly visible during the years of natural disasters when the execution of capital spending and project grant support drops significantly (Figure 14), mainly because of the disrupted functioning of government operations.

43. **In practice, access to international climate funds is difficult.** International financing sources are varied and include international partners and donor funds (such as the GCF, ADB, JICA, and WB). But access to financing is constrained by the procedural requirements, which are particularly heavy for small states. Financing options and processes can be overwhelming and awareness across ministries is low. The international community (including regional institutions) could support Tonga with greater capacity building and information sharing to improve access to existing financing instruments. Support could also usefully be provided to Tonga to access GCF funding through existing relationships with accredited entities. Development partners, who are already supporting climate change and disaster risk management priorities, could further coordinate in terms of the policy advice and project co-funding, as well and harmonize processes (e.g., funding requirements) amongst themselves.

²⁴ It is also in line with the Paris Agreement that “ [...] indicates that developed country parties shall provide financial resources to assist developing country parties and that the provision of scaled-up financial resources should aim to achieve a balance between adaptation and mitigation, and priority would be given to small-island developing states that are particularly vulnerable to climate change impacts.”

Figure 14. Capital Spending and Grant Execution (2011-2018)



Recommendations for Financing	Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)	
<ul style="list-style-type: none"> • Continue project preparation and dialogue with development partners to secure donor financing for unmet climate and development goals <ul style="list-style-type: none"> ➢ Given Tonga's high debt distress risk, this financing should be in the form of grants to avoid worsening debt dynamics, complemented by fiscal consolidation ➢ Improve visibility across ministries on international climate financing and application procedures ➢ Improve administrative capacities in planning, project implementation, monitoring ➢ International community to streamline access to climate funds, and assist Tonga to apply 	<p>Short to Medium term</p> <p>Short to Medium term</p> <p>Short term</p> <p>Short term</p> <p>Short term</p>

V. RISK MANAGEMENT STRATEGY

Tonga has several important elements of a risk-layering strategy, but there are significant gaps and no overarching strategy. Some national level contingency and emergency funds exist, but the funds are not sufficient to cover immediate recovery needs for 'small' natural disasters. Government fixed assets are generally not insured, and the social protection system could be improved to help target post-disaster assistance to the most vulnerable.

A. Risk Assessment Procedures

How Well Does the Government Assess Risk?

44. **Tonga has some disaster and climate risk identification processes in place, but falls short of a comprehensive risk assessment.** Tonga—often supported by development partners and regional climate change entities—has put in place some disaster and climate change risk identification (e.g., the forthcoming Third National Communication). However, the risk identification processes fall short of a comprehensive risk assessment, and currently no systematic assessment of the government’s contingent liabilities arising from disaster exists. Risk assessments are predominantly conducted on an ad-hoc basis and at project-level, and few programs or plans reflect comprehensive financial risks associated with climate hazards and natural disasters.

45. **Support is required to strengthen data, analysis and integration of climate and natural disaster risk in planning, prioritizing and budgeting processes.** Standardization of collection and use of data on damages across sectors could be improved to inform planning for relief, recovery and reconstruction costs. Tonga could also benefit from the catastrophe models developed under the Pacific Catastrophe and Risk Financing Initiative (PCRAFI) to estimate financial risks and costs associated with natural disasters. Current efforts to strengthen and update the 10-year old exposure mapping and development of other possible models for additional hazards such as drought or excess rainfall will be useful to improve risk analysis.

B. Self-Insurance (Government Financing Buffers Including Contingency Provisions, Reserves, and Beyond)

46. **Tonga has built a layered approach to disaster risk financing, reflecting international good practice.** The World Bank’s risk-layering framework suggests that countries benefit from a mix of financial instruments to address their contingent liabilities. The financing mix should rely on both risk retention and risk transfer instruments, which can be cheaper than only one instrument. To avoid excessive delay or expense, it is crucial to consider the timing of financing arrangements (before or after event) and how long it takes to mobilize and execute the funds (Figure 15). In practice, this often means that—having taken stock of their risks—governments should consider covering the costs of small, frequent disasters through reserve funds. Medium-sized disasters will require financing beyond reasonably-sized domestic savings and can be financed by ex-ante contingent financing arrangement and sovereign insurance instruments. The largest disasters can be partially covered by insurance, but the remaining risk will need to be covered by ad hoc support from the international community.

To What Extent Does the Government Self-Insure Against Risks?

47. **Tonga has taken several important steps toward improving the self-insurance, however gaps remain (Figure 16).**

- **Post disaster practices include budget reallocations, capital budget realignments, and temporary targeted tax exemptions.** Under the Public Financial Management Act (2002), discretionary budget program funds may be reallocated within a ministry at the request of the minister and with the approval of the minister of finance (PCRAFI 2015). Other mechanisms include capital budget realignment, allowing for a re-direction of public funds. The government can put in place temporary targeted tax exemptions. For example, consumption tax exemptions for imported construction materials and capital goods to support reconstruction were in place for two years after TC Gita.

Figure 15. Response and Recovery Timeframe for Disaster Risk Financing

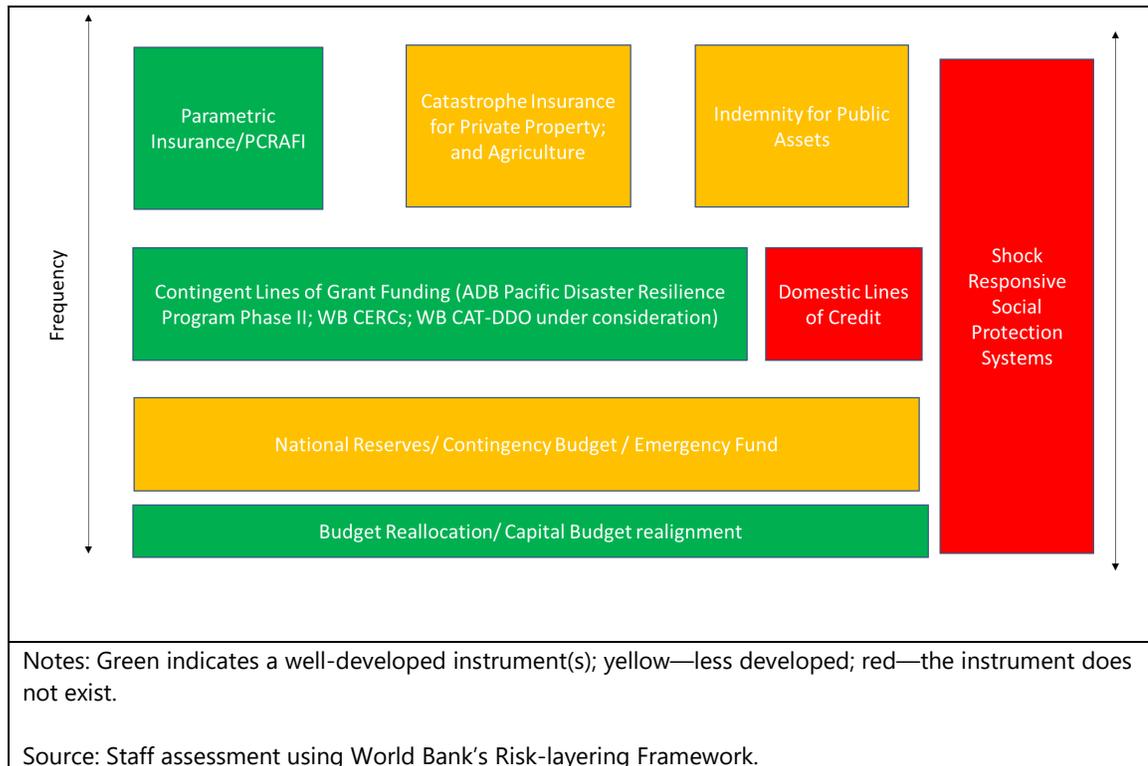
	Short Term (1-3 Months)	Medium Term (3-9 Months)	Long Term (over 9 months)
Ex-post financing			
Donor Assistance (relief)	█	█	
Budget Reallocation	█	█	█
Domestic Credit		█	█
External Credit		█	█
Capital Budget Realignment		█	█
Donor Assistance (reconstruction)			█
Tax Increase		█	█
Tax Incentives (Flash Appeal)	█	█	
Ex-ante Financing			
Reserve Fund	█	█	
Contingency Budget	█	█	
Contingent Credit	█	█	
Sovereign (parametric)	█	█	
Catastrophe Risk Insurance	█	█	
Traditional Disaster Insurance	█	█	█

Note: Table shows international best practices. Appropriate disaster risk strategy for Tonga would need to give due attention to the impact of various financing measures on debt sustainability.
Source: World Bank 2013

- **Tonga has arranged instruments that include a contingency budget, and each year the level of the contingency budget is agreed upon by the Legislative Assembly.** It is stipulated that the level must not exceed 5 percent of the government's total spending. The Minister may release funds as necessary while ensuring they remain within the limits set by

the contingency (PCRAFI 2015). The contingency budget has not historically been used for responding to emergency natural disasters and is not exclusively used for that category of needs.

Figure 16. Disaster Risk Finance Instruments by Risk Layers



- The National Emergency Fund provides relief and response needs following an emergency, including natural disasters.** In 2008, Tonga established a National Emergency Fund with an annual appropriation up to at least TOP \$5 million (about US\$ 2 million). The Emergency Fund is a core source of funding for all disaster management and response operations through NEMO. The Emergency Fund and international donor support (grants or in-kind) are also the core funding sources for weather-related events that do not trigger the thresholds for contingent financing and Tonga’s parametric sovereign insurance instrument. The Emergency Fund facilitated the purchase of food rations and electrical supplies after TC Ian. Ahead of the start of the 2019-2020 Cyclone season, the National Emergency Management Committee pre-emptively unlocked \$TOP 500,000 (US\$208,000) for fast release to meet immediate needs, which officials note has already benefited their response before and after the storm surges of TC Tino which hit the Ha’apai islands in January 2020. Several officials, however, highlighted a funding gap for immediate pre-disaster preparedness and immediate post-disaster response needs.

- **There are limited formal options for protection of vulnerable households after a natural disaster.** Tonga’s current social protection system consists of a disability benefit scheme (through the Ministry of Internal Affairs) and a social pension scheme (through the national retirement benefits fund). Work is underway for a national disability survey. There are no consistent measures to target coverage for vulnerable communities after a natural disaster, though a database of the poorest and most vulnerable populations is being developed under the Skills and Employment for Tongans Project with World Bank technical assistance. After TC Gita, international bilateral aid was provided to support a one-off top up of both the disability benefit and social pension scheme (around \$TOP 225 (US\$94) per beneficiary for 3000 elderly and \$TOP400 (US\$ 167) for the disabled in the islands of Tongatapu and Eua). These schemes are ad hoc and there is no comprehensive shock or disaster-responsive social protection mechanisms in place. However, the existing systems provide an important initial base for developing a scheme that can target the most vulnerable (beyond the disabled and pensioners) after shocks, and channel funds to them through a modern payments infrastructure.

C. Risk Reduction and Transfer (Other Insurance and Pooling) Arrangements

To What Extent Does Tonga Transfer Risk?

48. **Tonga has taken several important steps toward transferring risk, but could usefully consider further risk retention and transfer instruments:**

- **Tonga has put in place contingent financing arrangements offered by development partners.** This includes the current Contingent Emergency Response Component (CERC) in the World Bank International Development Association (IDA) grant for the Climate Resilience Transport Project (which allows for redirection of any uncommitted amount in the project) and the Pacific Resilience Program (PREP, which was drawn down for \$US500,000 after TC Gita). However, in the case of the CERCs, the funds originally intended for development purposes are not used for the planned investment. Tonga also has access to the ADB’s Policy-Based Contingent Finance Instrument with a maximum amount available per year of roughly US\$6 million. This provides policy-based concessional loans and grant contingency financing in times of an emergency which allows for rapid access to financing to respond to a crisis or emergency.

- **The Government of Tonga is currently in discussions with the World Bank on the World Bank’s Catastrophe Deferred Drawdown Option (CAT-DDO, Box 4)** which could provide another source of quickly disbursing finance following an official declaration of emergency or disaster (the exact trigger would need to be defined).²⁵

Box 4. The World Bank’s Catastrophe Drawdown Option

The World Bank’s Development Policy Loan with a Catastrophe Drawdown Option (CAT-DDO) is a contingent credit line that provides immediate liquidity after a natural disaster. The instrument contributes to policy and institutional reforms while enhancing preparedness for natural disasters, as gaining access to the Cat-DDO requires implementing certain prior actions and results that are related to Hazard Risk Management. The World Bank provides support for key disaster risk management policies and institutional actions, and the results from the prior actions aligned with government programs and are used to monitor and evaluate impact.

Funds disburse rapidly once a pre-agreed “soft” trigger(s), as opposed to ‘parametric’ triggers, have been met. These are typically linked to the declaration of a state of emergency after a natural catastrophe.

50 percent of a CAT-DDO is funded by the core IDA allocation for a country, and the remaining 50 percent is matched by IDA’s global resources, doubling the amount accessible. IDA clients such as Tonga can request up to US\$20 million. IDA concessional rates apply to both the national and global IDA upon drawdown. The amounts repaid during the drawdown period are available for subsequent withdrawal. A three-year drawdown period may be renewed up to four times, for a maximum of 15 years.

- **Tonga has access to sovereign parametric insurance coverage through the Pacific Catastrophe Risk Insurance Company (PCRIC)**, though coverage of some significant risks is not offered. PCRIC’s coverage focuses on emergency losses which are estimated using a modeled representation of the event based on hazard parameters and a calculation of total physical damages. Based on the actual coverage, the maximum possible payout is of US\$7.1 million per year for Tonga. Tonga’s annual premiums for PCRIC are covered by the World Bank funded PREP at \$US0.5 million per year, and the government makes additional counterpart payments (roughly \$US 70,000 for 2020). Payouts were received within ten days after TC Ian (US\$1.3 million, equivalent to Tonga’s 2013 contingency budget) and TC Gita (US\$ 3.5 million). The insurance policy covers some climate (tropical cyclone) and geo-hazards (earthquakes/tsunamis) but does not cover other important climate risks for Tonga,

²⁵ In addition, IMF’s Rapid Credit Facility and Rapid Financing Instrument can provide rapid and low-access financing to address actual and urgent balance of payments needs arising from exogenous shocks, such natural disasters.

such as storm surges and damaging winds if caused from storms other than tropical cyclones. PCRIC is currently working on developing new insurance products to cover additional perils.

- **Access to external credit is limited.** Tonga predominantly receives in-kind assistance or international grants (development banks, UN, Red Cross). Given the low population and access to other funding arrangements, Tonga was not eligible for UN CERF support after TC Gita. However, it had access to the WB Crisis Response Window through IDA (for US\$10 million) following TC Gita. Nonetheless, after a disaster event, Tonga has successfully increased and reconfigured development bank finance for reconstruction purposes. Tonga is also eligible for the IMF's Rapid Credit Facility.²⁶
- **Some public property insurance covering natural disasters is available, but coverage and penetration is low and falls short of expected damages.** SOEs such as the airports and Tonga's Water Board have property insurance, but this is not mandatory, and coverage is low. Most public assets are not insured and there is little coordination with public asset management.

How to Improve Risk Layers in Tonga?

49. **Tonga needs to put in place an adequate mix of financial instruments to provide timely financing for natural disasters.** Drawing on grant financing to increase investment in resilient infrastructure would, over time, reduce the needed amount of pre-arranged finance. The layered instruments should include risk retention mechanisms, private sector insurance, and contingent financing. The level of international reserves should be maintained above the current 6½ months of imports to provide an adequate buffer against natural disaster shocks (see the Concluding Statement to 2020 Article IV Consultation).

50. **There are still significant opportunities that Tonga could usefully consider exploiting to improve its risk financing and management strategies:**

- **Increase and strengthen the Emergency Fund.** Tonga could: (i) increase level of the Emergency Fund to about 1 percent of GDP, supported ideally by international donors; (ii) review the Emergency Fund's Act and implementing framework to ensure the funding is made available effectively and efficiently to meet needs for disaster preparedness and immediate response; and (iii) provide clear guidance through an operations manual.²⁷

²⁶ <https://www.imf.org/en/About/Factsheets/Sheets/2016/08/02/21/08/Rapid-Credit-Facility>.

²⁷ The size of the Emergency Fund is calibrated using the estimates of the past fiscal impact of the severe natural disasters (median scenario) in the region and Tonga-specific annual fiscal costs per disasters that varies between the range of 0.7-1.1 percent of GDP (Nishizawa and others 2019). The proposed range (size of the Fund) should be fully evaluated by the government and key disaster risk finance experts to determine the costs and scale of climate change impacts.

- **Assess the feasibility and cost-effectiveness of increased public property insurance coverage.** This could result in consolidating coverage into larger policies that reduce premiums, and the development of an updated and comprehensive asset registry including necessary data for insurance (such as replacement values).
- **Consider options for shock-responsive social protection systems that can be scaled for different severity of events and circumstances.** The ongoing work to develop a registry of poor households will enable more effective and efficient transfers to vulnerable populations in the wake of natural disasters.
- **All the above would require further analysis that could be part of the ongoing work to develop the National Disaster Risk Financing Strategy.** This government strategy could usefully (i) specify high-level objectives including measures for institutional strengthening, (ii) identify and quantify risks, (iii) outline measures to strengthen risk retention and transfer instruments, and (iv) promote transparency and efficiency of post-disaster spending. Such a strategy can help build complementarity between various instruments and help identify policy measures to ensure any quick liquidity from such instruments after a disaster can be spent efficiently and in a transparent manner. Work on the strategy has commenced—supported by the World Bank PREP and PCRAFI projects.

Recommendations for Risk Management	Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)	
<ul style="list-style-type: none"> • Develop a comprehensive National Disaster Risk Financing Strategy that could usefully consider: 	Short to Medium term
<ul style="list-style-type: none"> ➤ Increasing the Emergency Fund’s size to about 1 percent of GDP with a review of the Emergency Fund Act 	Short to Medium term
<ul style="list-style-type: none"> ➤ Insuring more government infrastructure assets 	Short to Medium term
<ul style="list-style-type: none"> ➤ Continuing to expand the social safety net to cover more vulnerable households, and ensure it can be effectively used after disasters 	Short to Medium term
<ul style="list-style-type: none"> • The international and regional community could usefully continue broadening the offer of sovereign insurance solutions, building on existing initiatives/platforms (such as PCRIC) 	Short term

VI. NATIONAL PROCESSES

Tonga has made relatively good progress in integrating climate change into national plans, but less in mainstreaming into ministries' plans and the regular budget process. Public investment management is generally adequate, reflecting donors' systems, and public financial management is relatively sound. The JNAP2 is an important start for climate resilience planning. More comprehensive and prioritized planning is needed across all ministries. Other steps include preparing an updated register the government fixed assets and ensuring their adequate maintenance.

A. Integration of Climate Change into National Planning Processes

Have Climate-Related Projects Been Mainstreamed into National Planning?

51. **Broadly yes, at the national level, but less in sectoral plans.** The TSDF, NIIP, TCCP and JNAP2 successfully raise risk awareness and stress financing needs to improve overall resilience, but no overarching climate change plan exists. The TSDF establishes the initial case for improving resilience, with other subsequent strategies such as the NIIP and JNAP2 specifying projects that would improve resilience. However, the approach has been fragmented with various strategies outlining different projects. This has undermined somewhat the stability of policy priorities and partly contributed to weak linkages between national planning processes and, ultimately, budget outcomes. The lack of a consolidated, costed and appraised pipeline of prospective adaptation or mitigation projects has led to uncertainty around the profile of future public investments and spending plans. Appropriately, forecasts in the budget are realistic as they reflect only projects that development partners have agreed to fund.

52. **The imminent renewal of the NIIP presents an opportunity for the government to finalize an overarching climate resilience plan for infrastructure with coverage of the entire public sector.** The GCF Country Program consolidates to some extent large-scale and cross-sectoral priority projects. When updated, it should be used as a base for a renewed NIIP that would focus on consolidating proposed projects across sectors. This will require a high level of involvement and coordination from the MOF, MoI and MEIDECC. The renewed and extended NIIP should align with guidelines—which would be expanded to include climate resilience considerations—to assist government in appraising, prioritizing and sequencing projects.²⁸

53. **MEIDECC should take the lead and cooperate with the MOF in facilitating the mainstreaming of climate change awareness across government agencies and planning processes.** Direct responsibility for functions such as meteorological forecasting, climate change

²⁸ One example from previous studies is the 2016 Climate Financing and Risk Governance Assessment (CFRGA) recommendation to adopt a coding system for tracking climate sensitive expenditures/programs across the Government budget and programs.

awareness, and disaster response functions allow MEIDECC to have a well-informed understanding of the country's overall climate adaptation and disaster response needs. Greater involvement by MEIDECC in initial planning processes at the whole of government level will further strengthen planning linkages with the budget process. MEIDECC should be involved in an initial screening process of proposed projects to ensure consistency with the climate change adaptation. MEIDECC will need to work more closely with MoF and implementing ministries: (i) to develop a prioritized plan of costed adaptation activities across government—based on an improved and updated JNAP2; and (ii) to screen proposed activities and corporate plans to advise as to what level they contribute towards the government's climate change adaptation objectives, prior to consideration by Cabinet Coordination Development Committee (CDCC) for inclusion in the budget.

54. **The MoF should manage the overall process of sourcing, funding, prioritizing, and sequencing projects in the budget to ensure coordination and effective monitoring and reporting.** The MoF is the sole agency responsible for overall budget, procurement and financial reporting processes. It is also the focal point for the major development banks and has responsibility for overall coordination of assistance from development partners. The MOF has a strong understanding of various development partner processes and funds availability, but greater capacity will need to be built in the newly created Climate Change Financing unit of MOF (which will enable it to improve its overall readiness to access specific climate change funds, particularly the GCF). Tonga also needs a clear financing strategy for adaption investment needs, designed in close collaboration with the MEIDECC, development partners, and the private sector.

55. **Line ministries' planning processes should more closely align with national climate change objectives to strengthen the link between planning and budget outcomes.** This should be enforced during the annual budget development process where the Prime Minister's Office assesses the three-year corporate plans which then underpin the budget submission provided to MOF. MEIDECC should be consulted on whether climate change considerations have been considered by ministries in the development of their three-year rolling corporate plans. This is particularly the case where cross-portfolio coordination is important to achieving stated objectives. These additions could usefully strengthen the existing JNAP document.

56. **Future implementation plans across government agencies would benefit from considering previous implementation delays arising from natural disasters.** Systemic planning and implementation have been heavily disrupted in recent years as government and development partners responded (with delays) to natural disasters. Promptly responding to these events required the government to change focus and re-allocate scarce administrative and human resources away from implementing planned activities and towards disaster response efforts. This results in overall lower levels of implementation in planned projects and weakens budget reliability. Future planning efforts need to acknowledge the probability of disruption and accordingly build some redundancy into timeframes.

B. Adequacy of Public Investment Management System

Are Adequate Public Investment Management Systems in Place to Ensure Climate-Related Investments will be Well-Spent?

57. **Yes—however, public investment systems reflect largely the involvement of development partners.** All major projects undergo robust economic, environmental, social, cost benefit assessments consistent with development partners' guidelines. National guidelines for developing project proposals exist but are not publicly available and are used for projects below TOP\$ 1 million (US\$ 0.4 million). Projects are selected through CDCC. Responsibility for ongoing project implementation and monitoring rests with line ministries. The availability of project management units (PMUs) funded by development partners to support specific ministries has helped implementation. However, there is a need for greater central involvement to assist PMUs with required processes as well as to improve reporting. The Central Services Unit (CSU), funded jointly by the World Bank and the government of Australia, has been established in the MOF to provide services for World Bank projects.

58. **More funds should be provided for maintenance.** Even with limited information, most likely not enough funding is being made available for maintenance costs in the operating budgets of responsible line ministries. Further, execution rates for maintenance funding remain low, with maintenance funding being transferred for other priorities.

59. **Tonga's management of public investment has similar strengths and weaknesses as peers** (Figure 17). An indicative assessment using the IMF's Public Investment Management Assessment (PIMA) tool shows Tonga's PIM has strengths, largely reflecting development partners' practices, in project appraisal, budgeting and financing availability. The main weaknesses are in coordination across government entities, maintenance funding, and monitoring of public assets.

Planning Sustainable Levels of Public Investment

- **Public investment levels are driven by the availability of development partner resources to fund public investment needs.** There are fiscal rules on maintaining external debt below 50 percent of GDP, domestic revenue above 22 percent of GDP, and the compensation of employees below 45 percent of operating expenditure.
- **Plans prepared in the past decade vary regarding details on projects, their timing and coverage.** The NIIP (and subsequent review) identified, prioritized and broadly costed economic infrastructure investments for the ten-year period to 2023. JNAP2 identified an initial budget requirement for a variety of activities but did not demarcate which ones were proposed public investments. The TREM provides some indicative costings for various mitigation activities.

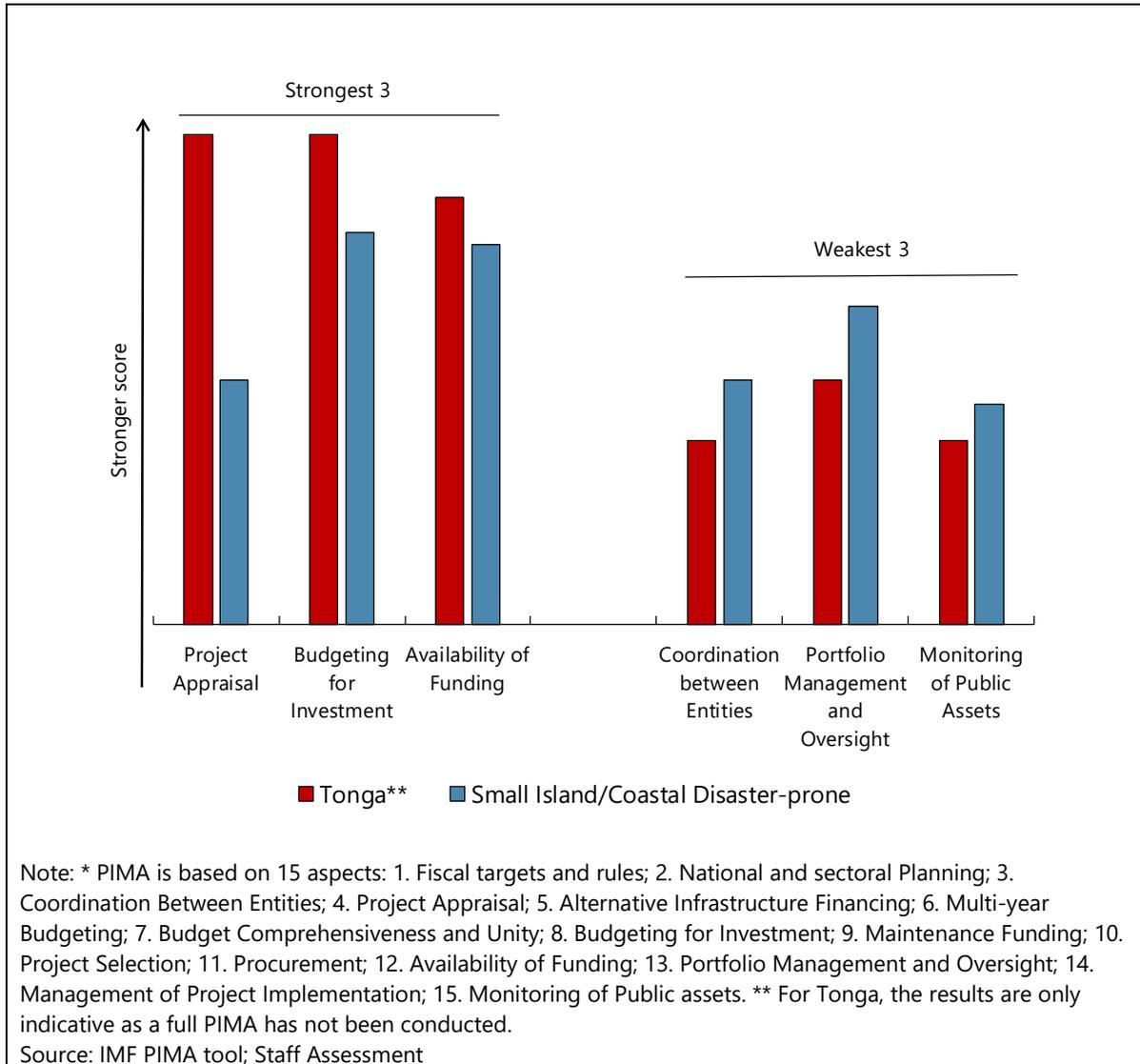
- **Public investments projects are subject to robust technical, economic, risk and financial analysis, which are undertaken by development partners.** Central support is provided by the MOF through the Aid Coordination Division. However, no standard central methodology exists to appraise projects to assist in prioritization,
- **Alternate sources of financing for infrastructure exist, but access to them is limited.** Public corporations provide most utility services. Two PPPs have been established between Tonga Power and private renewable energy generators, and there are expectations of further PPP's for power generation. Public corporations can borrow, but their capacity is limited, and they must be approved by government. The Ministry of Public Enterprises provides a general oversight of public corporations.

Ensuring Public Investment is Allocated to the Right Sectors and Projects

- **With support from the MOF and the Prime Minister's Office, the CDCC approves selection of public investment activities which are incorporated into the budget.** All development partner projects (both current and investment) are presented in the Development Budget. The selection of which projects are presented to CDCC is guided by discussions held between development partners and government.
- **Project selection guidelines provided in the NIIP are not used to select projects.** While several proposed projects can be identified in the various strategies which have been produced, there is no established pipeline of appraised projects ready for implementation. In previous years the development budget has included a small number of projects identified as a priority by government, but for which no identified development partner had committed resourcing. Authority is provided for additional development partner funds which may not have been included in the initial budget, but are received ex post.
- **The budget prepared solely by MOF, with involvement from line ministries, is comprehensive, covering both operating and capital expenditure.** The Chart of Accounts differentiates between operating and capital expenditure by classifying capital as a single code ("buildings"). Funds for maintenance are appropriated in the budget to ministries, although maintenance costs associated with new assets are not calculated in a standardized manner.
- **A multi-year budgeting framework exists, but there is a lack of detail around the make-up of public investment in each year.** The Budget provides a summary of total actual expenditure on buildings and structures for the current and previous year while estimates are provided for the budget year and two subsequent forward years.
- **The Development Budget (a component of the Budget) outlines development partner activities and provides details on total funding.** But there is no demarcation of whether activities are programmatic in nature (e.g. technical assistance) or actual investments. A

limited number of capital projects undertaken by public corporations which are not financed by development partners, (e.g. self-financed or PPPs) are also excluded in budget documentation.

Figure 17. Public Investment Management Assessment: Tonga vs. Peers*



Delivering Productive and Durable Public Assets

- **Transparent public procurement process is undertaken by development partners, however, these differ to accommodate varying development partners' requirements.** A central procurement database is kept for local government procurement. There is no database for external-funded projects as development partners monitor—and publish—their own procurement outcomes. Cash resources are available as some development partner

funds from the Development Budget are deposited into commercial operating accounts accessible to government for making payments. Implementation has not been restricted by a lack of cash flow in recent years.

- **Individual PMUs are established to monitor the financial and physical progress of major investment projects.** Standard development partner procedures and rules for project implementation are in place for all major projects with project adjustments either in scope or for changes in the budget dealt with at the project level with the development partner. Project funds are protected as development partner funds from one project cannot be transferred to another. No entity provides overall monitoring to ensure consistency across the implementation of investment projects, although a CSU to be financed jointly by Australia and the World Bank will provide that for World Bank projects being implemented across government.
- **The existing asset register covers mobile assets such as cars and furniture, but has very limited information on fixed assets such as buildings or roads.** Ex-post reviews are conducted if a development partner's processes require.

C. Adequacy of PFM Systems for Managing Climate Change Funding and Outlays

Are Adequate Public Financial Management Systems in Place to Protect Climate-Related Funding?

60. **The 2019 PEFA identified relatively sound PFM processes.** Budget preparation processes are generally sound, weak budget reliability evidenced in recent years resulted from the overestimation and/or underspending of budget support and development partner funds which were significantly increased in response to TC Gita.

61. **The activities of the recently developed Climate Change Trust Fund (CCTF) should be incorporated into the government's ongoing public investment and PFM processes.** While the CCTF's general objectives and purpose may be outlined in legislation, it should not be excluded from the PFM processes, such as budgeting, reporting, and auditing which apply to the governance of public monies. Grants financed through the CCTF should be appropriated annually in the budget and subject to the same processes which apply for other government activities, e.g. procurement if government is purchasing goods, services or works on behalf of a community group, and grant outcomes (i.e. to whom, how much and what for) should be reported regularly.

62. **There is a need to complete a single, comprehensive and up-to-date public fixed-asset registry.** This would be used to determine the value and state of the assets, and to adequately plan for their maintenance and replacement/repair following a natural disaster. A policy framework for the management of the public fixed-asset registry is under preparation. The first step involves developing a comprehensive and regularly-updated public asset register. This

could also include geo-referenced public assets, mapping out those that are climate-resilient and those that still need retrofitting. There is also a need to develop the capacity of line ministries to plan and implement routine maintenance, which should form part of the budget submission process.

63. **Expanding the monitoring of all public investment at a whole-of-government level through the annual budget process would strengthen links to planning outcomes.** All stakeholders, particularly government and development partners, would benefit from the annual budget providing details of the projects underlying the Development Budget. This detailed information would identify (beyond the currently published total costs) details on the multi-year allocations, source of funds, and whether a project is programmatic or capital in nature. A follow up mid-year progress report could then inform the budget strategy for the subsequent budget year.

64. **The degree to which public investment projects are related to climate change (mitigation or adaptation) is not identified—ideally this is best done at the planning stage.** The capacity to identify and report on types of infrastructure (e.g. roads, buildings, health facilities and schools) is limited. An improved understanding of the public investment profile could be achieved by expanding the single chart of accounts code which currently identifies capital expenditure under one code. However, rather than identifying climate change projects or transactions in the Chart of Accounts, projects should be identified to what degree they contribute towards climate change adaptation/mitigation. For example, the renewal of a road would be classified as a road, but the initial planning stage would identify what proportion of extra cost over and above the renewal of the asset is attributable to adaptation factors, (e.g. thickened road base). This could also help with attracting donor funding.

Recommendations for National Process	Priority
(Short term: within 1-2 years; Medium term: within 2-5 years)	
<ul style="list-style-type: none"> Enhance the NIIP with costed, prioritized, sequenced whole of government investment projects and update in the annual budget 	Short to Medium term
<ul style="list-style-type: none"> Better integrate climate into ministries’ plans and regular budget process—greater involvement of MEIDECC would help 	Short term
<ul style="list-style-type: none"> The MOF should be responsible for managing climate financing, but needs to build capacity in climate financing and collaborate with MEIDECC 	Short term
<ul style="list-style-type: none"> Prepare and keep updated a registry of public fixed assets including geo-references to ensure they are maintained, and plan for their replacement/repair after a disaster 	Short to Medium term
<ul style="list-style-type: none"> Incorporate the Climate Change Trust Fund into the regular budget/public financial management system 	Short term
<ul style="list-style-type: none"> Expand the classification of capital spending and better identify the climate component 	Short term

VII. TAKING STOCK: PRIORITY NEEDS TO BE MET

By Tonga

- Update the NIIP country program with costed, prioritized, sequenced, and whole-of-government investment and other projects, and provide updates in the annual budget.
- Mainstream climate awareness more fully into all government priorities and activities. For example, by involving MEIDECC in project and budget planning, building capacity in the MOF and complementing domestic capacity with international firms.
- Improve disaster management by providing an overarching framework, a clearer role for NEMO, continuing to develop a fully-integrated multi-hazard early warning system, building up human and financial resources for key functions across MEIDECC and MLSNR, and financial resources at the Emergency Fund.
- Implement structural economic reforms, such as improving and enforcing land-use and building codes, building out social protection and insurance coverage.
- Continue with scaling up renewable power, and price electricity correctly.
- Plan for the long-term, consider tail risks and potentially transformative approaches.

By the international community:

- Reduce emissions to stabilize global warming
- Fully recognize the already-occurring impact of climate change on Tonga and the existential threat it poses
- Help finance (via grants) Tonga's climate agenda (the current project list has a financing gap of about \$300m), especially adaptation, maintenance, and insurance
- Streamline access to international climate funds and assist Tonga in applying
- Coordinate better on projects and support Tonga's own public financial management systems
- Broaden coverage of regional parametric insurance schemes (e.g., to cover storm surges)
- Partner with Tonga and other Pacific Island Countries in considering longer-term, and potentially transformative, approaches, including supporting migration from at-risk areas

Annex I. Spending Needs to Achieve Sustainable Development Goals (SDGs) and Climate Resilience.¹

Tonga remains highly committed to achieving its development plans and reduce vulnerabilities to climate. But progress is mixed. Tonga lags in providing access to quality physical infrastructure, safe schools, health services, and safely managed water, sanitation and hygiene (WASH). Financial and technical constraints, and natural disasters are the main obstacles. This annex extends the IMF's costing methodology for five selected SDGs to Tonga, accounting for its extensive climate vulnerabilities. Estimates shows that additional spending needs—beyond those already included in the currently identified climate-related projects—are substantial. The largest requirements are in social sectors: health and education. Well-designed sectoral plans, supportive fiscal policies, constant capacity building, and further external financial and technical support are key to ensure progress.

1. Tonga has included SDGs and climate resilience into its national development plans.

The Tonga Strategic Development Framework (TDSF II) already captures many elements of the SDGs and climate resilience objectives. The Government's current priorities focus on enhancing human capital and private sector development and improving physical infrastructure. The National Climate Change Policy, TCCP, and JNAP2 single out climate resilience as an 'integral component' of Tonga's development strategy. As a result, climate change and disaster risk management are integrated at the sectoral level into all sectoral aspects of TDSF II (Table 1, main text). Voluntary National Review (2019) confirms critical role of climate resilience in meeting Tonga SDGs.

2. Progress in meeting SDGs is mixed and reaching 2030 targets will be a challenge—in part because of natural disaster disruptions and climate change vulnerabilities.²

- **Health.** Public spending on health has increased, and collaboration between the government and CSOs strengthened, which led to improved access. Health services are free with limited formal out-of-pocket expenses. External financing accounts for about 20 percent of the total health spending. Tonga scores relatively highly in some Universal Health Converge Indicators (e.g., tuberculous treatment, access to medical care, density of health workers). But more is needed to improve the quality of health services that are particularly affected by extreme weather events and climate change (Figure A1). Meeting Tonga's health SDGs requires a

¹ This annex benefited greatly from the discussion with Tonga's authorities, Maude Ruest, Susan Ivatts, Andrew Hurley, Pierre Graftieaux, Stephane Hallegatte (all World Bank), Cindy Cisneros Tiangco (ADB), Annette Bolton and Matthew Ashworth (ESR), Kevin Petrini (UNDP), M. Garcia-Escribano and D. Prady (IMF), and participants of various IMF FAD seminars.

² Data availability and the capacity of the National Bureau of Statistics has improved but remains limited. Many of SDG- and most climate-related indicators are classified as Tier 3 and not developed for Tonga, which impede monitoring and policy design.

consistent multisectoral (health, WASH, education, transportation) approach to climate change.

Figure A1. Effects of Climate on Health and the Health System

	Cyclones/ severe storms	Increased average and extreme temperature	Flooding (incl. landslides)	Drought	Wildfire
Direct Health Impact	Dark Green	Dark Green	Dark Green	Light Green	Light Green
Health System Impact	Light Green	Light Green	Light Green	Light Green	Light Green
Environmental Impact on Health	Dark Green	Dark Green	Light Green	Dark Green	Light Green

Note: Darker shade indicates more direct health, health system, and environmental issues affected by each climate change aspect. Environmental Impact on Health includes access and quality of water, safety and security of food, air pollution.
Source: Selected summary of Tonga’s Health Expert findings using a Natural Hazard and Climate Change Vulnerability and Adaptation Tool. Bolton and others (2020).

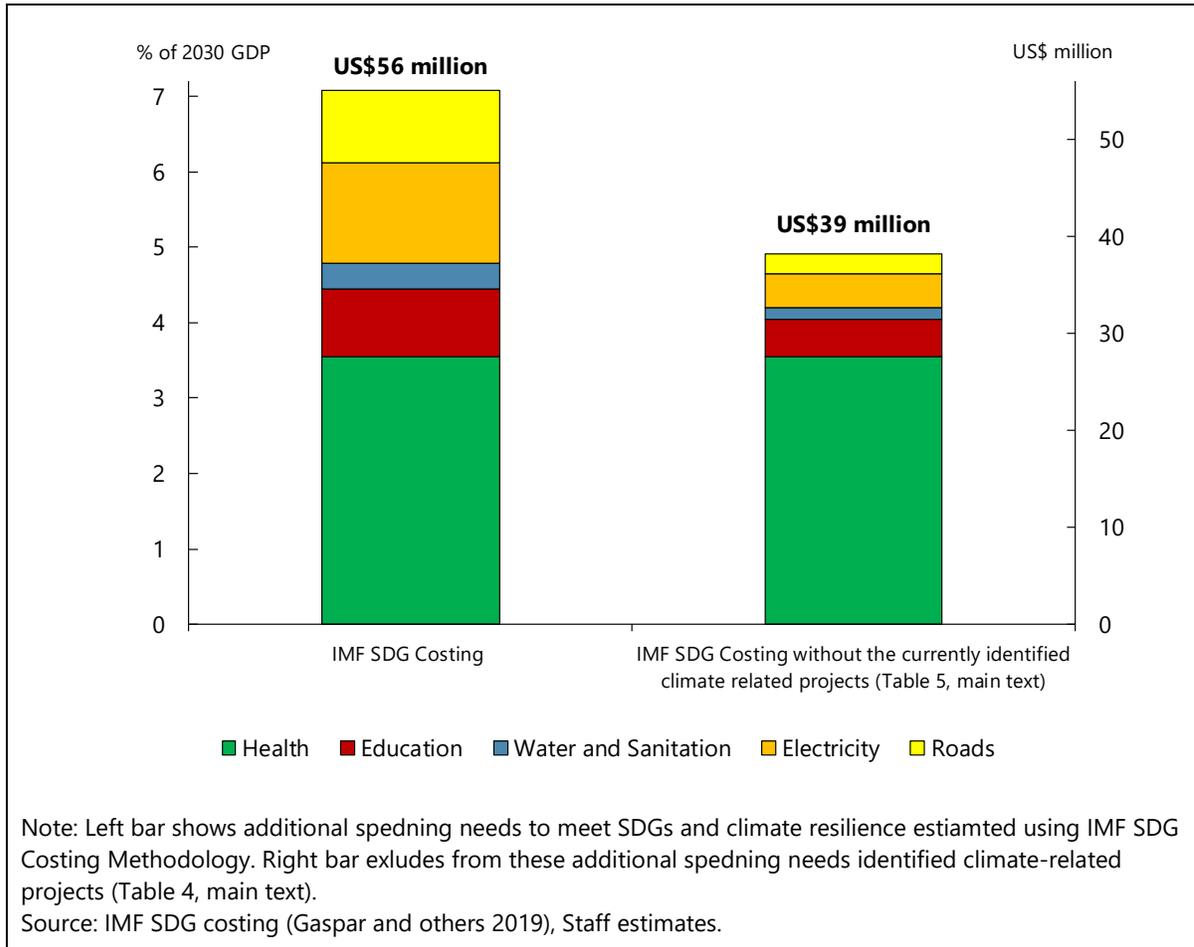
- Education.** Education quality is good, particularly primary education and public schools. But Tonga lags compared to the peers in the pre-school enrollment rate and teacher-to-pupil ratio. There is also a limited visibility on the rate of drop-offs from tertiary education. It is too early to assess the impact of recent efforts (e.g., the extension of compensatory education, early child centers, targeted education and teacher mobility programs). The destruction of school infrastructure during TC Gita and the lengthy reconstruction may have affected education outcomes. To meet education SDGs, building safe schools and ensuring their proper maintenance is an immediate priority. Further integrating climate components into school curricula (e.g., preparedness for natural disasters, environmental education) and developing appropriate trainings and technical skills (e.g., climate resilient project design and construction, meteorology and early warning systems, economic transition) are longer-term objectives of the sector.
- WASH.** Access to WASH varies between urban and rural populations. Most of the urban population has access to basic water and sanitation services. The ratios are lower but still significant in the rural areas. While access to improved and safety managed water and sanitation is still good in the urban areas, it is less so for rural areas. Access to even basic water is particularly limited during natural disasters (e.g., drought, floods). Going forward, climate change and SLR will reduced even more the availability of fresh water and groundwater recharges (projected to decline by 10 and 30 percent, respectively, by 2050 (GEF, 2007).
- Electricity.** Most of the population has some access to electricity on and off grid. Access to reliable and modern energy services has improved. Resilience of energy infrastructure to climate issues has increased with new investment and technology, and better maintenance. More effort is needed to increase the share of renewable energy and guarantee more affordable energy access by 2030. This includes improving network coverage, its transmission efficiency, and renewable energy storage capacity.

- **Road and transport infrastructure.** Transport infrastructure (e.g., external airports and ports) have improved with post TC Ian and Gita investment. Access to road infrastructure is good. However, its physical condition and resilience to climate shocks (e.g., drought, floods and SLR) is weak. With the support of development partners, the government stepped up actions to improve road quality and extend road infrastructure (e.g., evacuation bridges). Longer term adaptation actions (e.g., rerouting) are needed to ensure infrastructure access and quality. Capacity and resource constraints (e.g., limited number of construction firms) hamper this progress.

3. Additional spending requirements for achieving the selected five SDGs are substantial. Estimates (Box A1) indicate that additional annual spending needed to achieve selected SDGs in health, education, and physical infrastructure (WASH, roads, energy) amount to at least 7 percent of GDP in 2030 (Figure A2; left bar chart).

- **Even after reconciling with current projects.** Tonga’s mitigation and adaptation plans (Table 5, main text) already include projects to scale up road, water, schools, and energy infrastructure. A limited number of projects also relate to improving education and health outcomes through training and better public financing management. Reconciling the cost of these projects with additional spending estimates for selected SDGs indicates a significant overlap of 2 percent of GDP in 2030. In other worlds, additional spending needs to meet Tonga’s SDG targets in health, education, WASH, electricity, and roads, beyond the currently identified climate-related projects, amount to about 5 percent of GDP in 2030 (Figure 2, right bar).
- **Social sectors account for the largest part of additional spending.** Health and education account for more than two thirds of these remaining needs. They include additional spending on investment in safe schools (beyond the PREP) and medical buildings. The coverage of teacher and medical personnel is still relatively low compared to the peer countries. Other (non wage) current spending is also lower, particularly directed to maintenance and training.
- **Further physical investment is still needed.** Annual spending requirements to reach universal access to safely managed WASH are more moderate. Improving the quality of and access to electricity and roads requires additional annual spending of about 0.7 percent of GDP in 2030 on the top of the current projects. These additional estimates account for the authorities' renewable energy plans. For roads, this additional spending requirement also accounts for rehabilitation, upgrading, and maintenance costs of the existing infrastructure. The estimates do not include additional investment to build additional energy transition grids or other transport infrastructure (bridges, ports, airports).

Figure A2. Estimates of Additional Annual Spending Needs for SDGs in 2030



4. Continued external support is critical to meet development goals, but Tonga also needs better-designed sectoral strategies and fiscal policies. Achieving SDGs and increasing climate resilience without exacerbating already-high debt levels would require additional grant support. Additional external support in providing technology, technical skills, capacity building, and statistics are also key. Tonga—within its national overarching framework (Section B, main text)—needs to improve sectoral strategies and develop new national health, education, and investment strategic plans. These strategies should clearly define and prioritize development objectives and channel financial and technical resources. Improving spending efficiency and public investment management practices—including through better budgeting, planning, and coordination across government units and development partners—is essential. Further domestic revenue mobilization is also needed.

Box A1. IMF SDG Methodology: Estimating Spending Needs for Countries with Vulnerabilities to Climate Change and Natural Disasters

IMF SDG Costing (Gaspar and others 2019) derived a methodology for estimating spending needs to achieve high performance across health, education, and physical infrastructure (5 of 17 SDGs) and applied to 155 countries. The approach consists of three steps:

- Each sector performance (outcome indicator) is a function of a mix of inputs and associated unit costs.
- The reference values for those inputs and unit costs are set at the (median) values observed in countries with similar GDP per capita that reach high development outcomes today.
- For the country of interest, additional spending in 2030 is computed by assigning these values to the cost drivers and controlling for country-specific factors such as demographics and the level of GDP per capita projected in 2030.

The methodology is applied to each of the four sectors. The cost estimates for water and sanitation are taken from the WASH World Bank model. For WASH, electricity, and roads, the estimates show additional annual spending needed to reach targets by 2030. For health and education, they indicate additional (non-annualized) spending required to achieve the targeted outcomes between now and 2030. 'Total' refers to public and private spending.

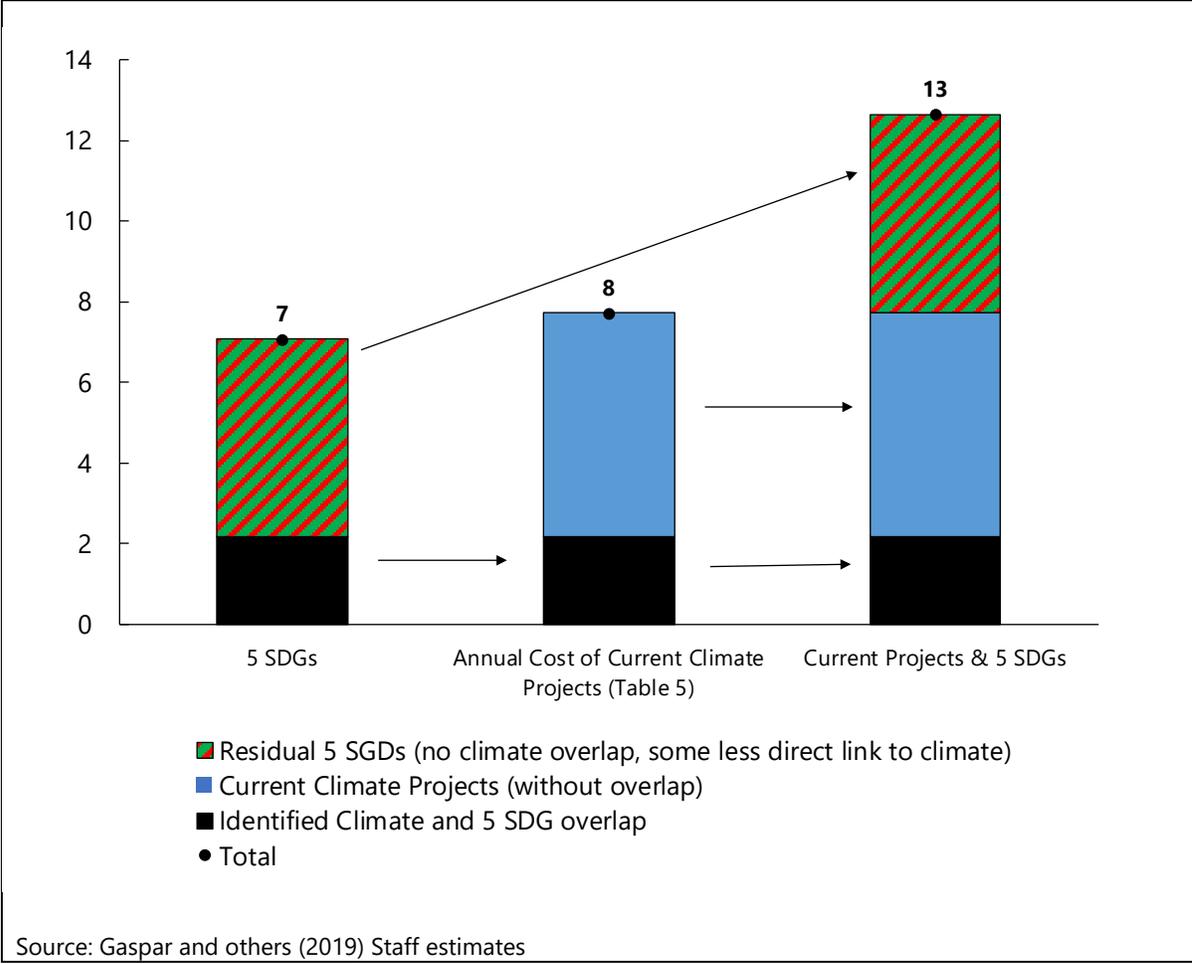
This annex extends IMF SDG Costing exercise to small-states, highly vulnerable to the adverse effects of climate changes and natural disasters. In particular:

- For health and education, setting the reference value of inputs and unit costs at the (median) values observed in countries with similar GDP per capita and vulnerabilities to climate change and natural disasters (Chen et al, 2015) that in addition also to attain better health and education outcomes.
- For infrastructure, by assigning the values to the cost drivers considering that building climate-resilient infrastructure is more expensive. Additional spending in 2030 is computed by assigning these values to the cost drivers and controlling for country-specific factors.
- In estimating additional spending, it accounts for higher maintenance requirements (i.e., faster capital depreciation). Also, it also adds the cost of rehabilitating and upgrading existing infrastructure. The latter varies across countries and state of infrastructure.[#]

Tonga-specific estimates indicate that additional annual spending needed to meet the selected 5 SDGs and climate resilience is about 7 percent of GDP in 2030 (Figure, left bar). In addition, the exercise for Tonga reconciles the additional spending needs to meet the selected 5 SDGs with cost estimates of Tonga's currently identified climate-related projects (middle bar).^{##} It detects overlapping sectoral needs (e.g., subtracting the identified renewable energy projects from additional energy spending in the IMF SDG Costing). The overlap is mainly in physical infrastructure (black part). The reconciliation shows the additional annual spending—on the top of currently identified projects (Table 4, main text)—to meet the selected 5 SDGs and increase climate resilience in Tonga is about 5 percent of GDP in 2030. Two-thirds of these needs is in health and education, with direct and indirect links to climate. Combining the 5 SDGs with the currently identified climate-related plans gives the annual cost of 13 percent of 2030 GDP (right bar) to meet both Tonga's climate and 5 SDG targets.

[#]The poor state of infrastructure can require new construction rather than rehabilitation or upgrade of the existing one. ^{##} For ongoing projects, the exercise broadly considers their corresponding implementation timeline. The current identified projects with a committed financing are assumed to be implemented over the 4-6 years. The implementation of the remaining projects is extended beyond 2025.

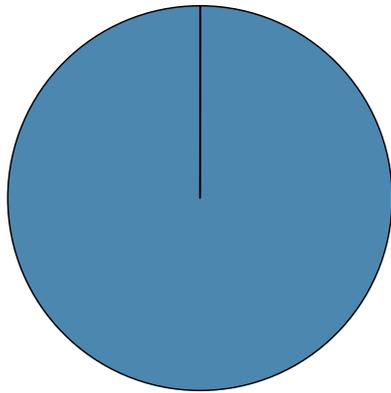
Figure A3. Annual Additional Spending Needs to Meet SDGs and Climate Resilience
(percent of 2030 GDP in 2030)



Annex II. Tonga vs. Other CCPA Pilots: Selected Issues

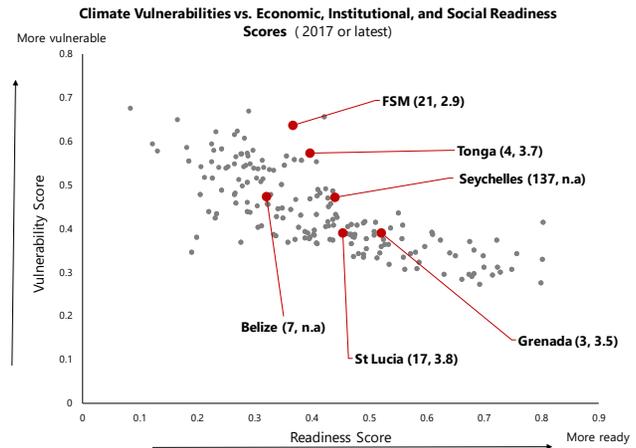
CCPA pilot countries' contribution to Global GHG Emission is minimal¹

CCPA countries' contribution to global GHG emission



¹CCPA dates are FYM (Nov 2019), Tonga (Feb 2020), Grenada (July 2019), Seychelles (May 2017), Belize (Nov 2018), and St Lucia (June 2018). Their contribution varies 0.001 (Tonga) to 0.02 (Belize). Source: CCPA reports

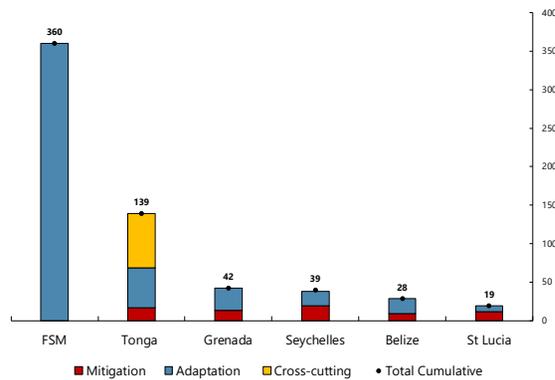
Their high climate vulnerabilities require further policy actions



The numbers in (a,b) indicates: a—Global Climate Risk ranking in terms of GDP losses resulted from natural disasters for 1999-2018; b—WB World Development Indicator (WDI) for Public Policies and Institutions ranking from 1 (low) to 6 (high). Source: Notre Dame Global Adaptation Initiative, WDI, Global Climate Risk

Financing needs for climate resilience are large

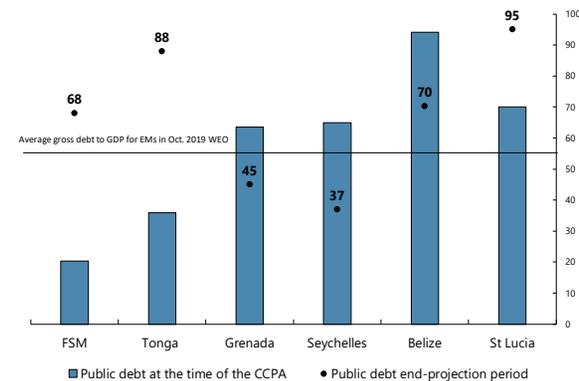
Climate change financing needs (until 2030, in percent of 2018 GDP)



Source: CCPA reports

But debt levels are already high

Current and Projected Public Debt (in percent of GDP, at the time of the CCPA)



Source: CCPA reports. Blue bars indicate the current debt-to-GDP ratio at the time of the CCPA; Dots—debt ratio at end-projection period is usually 10 years since the CCPA reports,

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