

# **MALDIVES' INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC)**



## Vision

To recognize the status of Maldives as a nation suffering from the adverse impacts of climate change and to build its capacity to ensure a safe, sustainable and resilient and prosperous future

## National Circumstances and Challenges

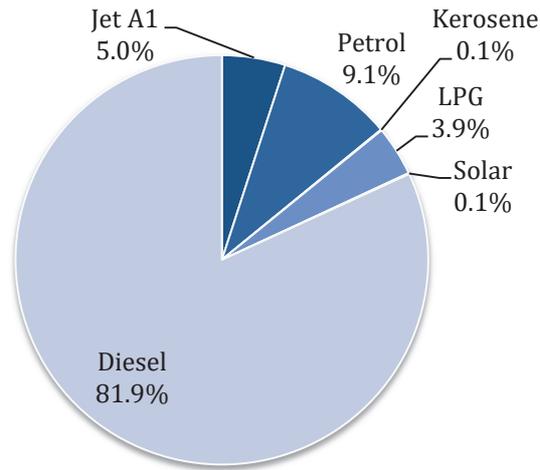
The Maldives is a low lying island nation in the Indian Ocean with a population of 341,256 (2014). The country consists of about 1190 islands and the population is distributed over approximately 197 inhabited islands. The country's main economic sectors are tourism and fisheries, both of which are extremely climate-sensitive.

The challenges Maldives faces in the context of climate change and development are similar to other small island nations. These challenges include, but are not limited to, the low lying nature of the islands, high population density, high levels of poverty, and a dispersed geography. Because Maldives is a small low lying island nation, its vulnerability to climate change impacts and associated extreme weather events and disasters are significantly greater due to limited ecological, socio-economic, and technological capacities. Maldives' geography also makes communication difficult and transport expensive. Maldives' small, physically isolated economy is highly susceptible to global influences and shocks.

Continuous efforts are being undertaken to increase adaptation actions and opportunities, and to undertake low emission development. However, limited financial resources, capacity and technology remain as major challenges in addressing the impacts of climate change.

Maldives' high level of fuel imports poses a number of challenges. The country's energy demand is completely met by imported fossil fuel. Therefore it is imperative that the Maldives explore, develop and deploy indigenous, clean and renewable sources to meet energy demand and ensure energy security.

Maldives' 2011 energy balance shows that there was approximately 313 kilo tonnes of oil equivalent (ktoe) of energy consumed in the Maldives of which over 80% was from imported diesel oil as shown in Figure 1. Energy consumption contributes to about 1.04 million tonnes of CO<sub>2</sub> emissions in 2011 which is about 0.003% of global emissions. Energy consumption in various sectors constitutes a major share of the country's GHG emissions. Although there has been some solar photovoltaic (PV) penetration, this amount is insignificant compared to the country's energy demand.



**Figure 1. Energy consumption by source in the Maldives for 2011**

Considering the growth rate of the imported fossil fuel usage in the country, it is estimated that under the BAU scenario will generate about 3.3 million tonnes CO<sub>2</sub> equivalent by year 2030. Maldives intends to take actions and undertakings to reduce unconditionally 10% of its GHG emissions (under a BAU) by the year 2030. These actions and undertakings could be scaled-up to 24% in a conditional manner, in the context of sustainable development, supported and enabled by availability of financial resources, technology transfer and capacity building.

These scenarios are depicted in the Figure 3 below.



**Figure 3. Projected GHG emissions from energy consumption for the Maldives 2011-2030**

## Mitigation Contribution

Maldives aims to achieve a low emission development future and ensure energy security.

<p><b>Unconditional Reduction</b></p> <p>“In accordance with Decisions 1/CP.19 and 1/CP.20, Maldives communicates that it intends to reduce unconditionally 10% of its Greenhouse Gases (below BAU) for the year 2030”</p> <p><b>Conditional Reduction</b></p> <p>“The 10% reduction expressed above could be increased up to 24% in a conditional manner, in the context of sustainable development, supported and enabled by availability of financial resources, technology transfer and capacity building.</p>	
<b>Timeframe</b>	2021 – 2030
<b>Type of Contribution</b>	Maldives is focusing its efforts, actions and undertakings in reducing its GHG emissions in the energy sector. These actions and undertakings will be based on strategies and sectoral action plans designed, amongst others, for the following areas of intervention: energy, tourism, waste, water, and building sectors.
<b>Sectors</b>	<ul style="list-style-type: none"> <li>• Energy <ul style="list-style-type: none"> <li><i>Electricity generation</i></li> <li><i>Energy Efficiency – domestic consumption</i></li> <li><i>Energy Efficiency – processes and product use</i></li> </ul> </li> <li>• Transportation</li> <li>• Waste</li> </ul>
<b>Gases</b>	CO <sub>2</sub> , CH <sub>4</sub> Contribution of other GHGs like Sulphur hexafluorides (SF <sub>6</sub> ) and Nitrous oxides (N <sub>2</sub> O) are significantly low and hence not considered
<b>Accounting Methodologies</b>	For the purpose of this INDC GHG emissions have been derived using the 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories based on the Sectoral approach. Further, the following methodology was adopted for the GHG abatement costs analysis. <ol style="list-style-type: none"> <li>a. Establishing an energy balance as disaggregated as possible, based on the latest available data which was derived from 2011.</li> </ol>

	<p>The energy balance was converted to GHG-emissions for 2011 by use of IPCC conversion factors.</p> <p>b. Energy balance of 2011 was projected to 2030 under a BAU. As the 2030 projection describes the business as usual (BAU) scenario, energy services by 2030 were assumed to be produced and consumed with the same technologies and efficiencies as were assumed for the 2011-energy balance. The growth assumptions used for Maldives national planning were taken into account in developing the 2030-projection.</p> <p>c. Based on inter alia existing studies mitigation options in various sectors of the economy were identified and further analysis was undertaken by the “Greenhouse Gas Costing Model” (GACMO).</p>
<p><b>Fairness and Ambition</b></p>	<p>Despite the Maldives' dependence on fossil fuels, its global GHG contribution is only 0.003%. However, Maldives is taking actions and undertakings in accordance with common but differentiated responsibilities and respective capabilities to achieve the ultimate objective of United Nations Convention Framework on Climate Change.</p> <p>The main area of focus for mitigation is fuel switching to alternative energy options, which is severely constrained by the limited land area, geographic isolation of islands and geographic dispersion of populations. Solar irradiance is available in the country throughout the year, however due to lack of technical capacity, limited land area, already established diesel based power generation systems and high investment costs pose a major challenge to the introduction of solar PV systems in the country. Although ocean currents and the waves surrounding each island might be the perfect renewable energy resource for the Maldives and other SIDS, the technologies to harness them are still at pilot stages around the world and commercially not available. Wind resources are low due to the low lying and flat nature of the country, but efforts are ongoing to incorporate it into the energy mix.</p> <p>These unfavorable conditions and barriers severely</p>

	<p>limit the use of alternative energy sources in the Maldives and have resulted in Maldives being heavily dependent on imported fossil fuels.</p> <p>As Maldives is already facing the consequences of extreme and slow onset events, there is a need for urgent and immediate adaptation actions. Maldives is undertaking a number of adaptation actions through the use of domestic and international resources most of which addresses immediate needs of the country.</p> <p>Considering these constraints, challenges and the increasing vulnerabilities to the adverse impacts of climate change and the insignificant share of global GHG emissions, the Maldives' INDC is highly equitable and ambitious.</p>
<p><b>Institutional Arrangement</b></p>	<p>The Maldives' Intended Nationally Determined Contributions (INDC) was developed through extensive consultations with representatives of the general public, government institutions, the private sector, non-governmental organizations and other relevant stakeholders.</p> <p>The Ministry of Environment and Energy is the main executing agency of the INDC process in close collaboration with other ministries and stakeholders.</p> <p>The executing agency will undertake monitoring, reporting and verification (MRV).</p> <p>Public awareness, capacity building, development of strategies, supportive mechanisms, and monitoring of financial flow for implementation will be undertaken by the executing agency.</p>
<p><b>Means of implementation</b></p>	<p>Actions and undertakings in this INDC will be carried out through synergizing international and domestic support.</p> <p>The successful implementation of both adaptation and mitigation actions and undertakings of the Maldives require provisions of adequate and predictable financial resources, transfer of environmentally sound technologies and capacity building support.</p>

## Adaptation Contribution

Maldives aims to undertake adaptation actions and opportunities and build climate resilient infrastructure to address the current and future impacts of climate change.

As a minimal contributor to global GHG emissions, Maldives places a significant priority on adapting to the adverse impacts of climate change.

Adaptation Contribution	
<b>Enhancing Food Security</b>	<p>Agriculture and food production is very limited in the Maldives due to land scarcity, poor soil conditions and limited water resources.</p> <p>The Maldives, is a highly import oriented economy with respect to its staple food requirements. Moreover, the extensively scattered and irregular geography results in tremendous barriers and added risks towards adequate storage and distribution facilities especially in order to handle unexpected market irregularities.</p> <ul style="list-style-type: none"> <li>• <i>Strengthen existing climate risk insurance mechanism to protect the farmers and reduce the income losses from extreme weather events.</i></li> <li>• <i>Establishment of strategic food storage facilities and distribution centres across the country as an adaptive measure to increase accessibility and reduce the risk of food shortages during extreme events.</i></li> <li>• <i>Promotion and introduction of alternative technologies to make local agriculture more resilient.</i></li> <li>• <i>Establish mechanisms to ensure food security to citizens in case of extreme events and market irregularities.</i></li> </ul>
<b>Infrastructure Resilience</b>	<p>Considering the highly vulnerable nature of the Maldives the critical infrastructure in the country require additional protection from the potential adverse impacts of climate change. The Ibrahim Nasir International Airport, and other international and domestic airports and sea-ports are crucial infrastructure in the Maldives. Increasing resilience of island communities is a critical challenge, which needs to be addressed to meet the adverse impacts of climate change.</p> <ul style="list-style-type: none"> <li>• <i>The Ibrahim Nasir International Airport is planned for</i></li> </ul>

	<p><i>expansion to handle additional passenger capacity along with an additional runway. Moreover, coastal protection measure would be carried out to protect the shoreline of Hulhule (the Airport Island) as well as for other air and sea ports.</i></p> <ul style="list-style-type: none"> <li>• <i>Malé Commercial Port that handles more than 90 percent of the imported cargo. To increase the capacity and reduce the impacts of high winds and seas to the operation of the port, the commercial port would be relocated to a different island called Thilafushi.</i></li> <li>• <i>Increase resilience and climate proofing of all critical infrastructures across the country including utility services, health care facilities, and telecommunications.</i></li> <li>• <i>A National Building Code will be established to provide guidance to the planners, architects and engineers to integrate climate and weather related factors into the designs of buildings and facilities. The building code will help to increase resilience and climate proofing.</i></li> <li>• <i>Establishment of National Development Act to facilitate integration of climate change into development planning, considering the economies of scale for public services, land use planning and population consolidation.</i></li> </ul>
<p><b>Public Health</b></p>	<p>Mortalities due to vector borne diseases have been identified as an emerging health challenge while water borne disease incidences are high during extreme weather events as a result of inadequate access to safe water and sanitation. However, with present data management methods, it is difficult to use existing health records to research the effects of climate change on human health. There is an urgent need to study the effects of climate change on the prevalence of vector borne diseases in the Maldives.</p> <ul style="list-style-type: none"> <li>• <i>Vector surveillance program covering all the islands to address the emergence and re-emergence of vector borne diseases will be formulated and implemented.</i></li> <li>• <i>Nationwide vector control programs will be developed and implemented.</i></li> <li>• <i>Food safety increased through appropriate policies and monitoring mechanisms.</i></li> </ul>

<p><b>Enhancing Water Security</b></p>	<p>The Maldives has very limited freshwater resources. The country's freshwater resources exist as groundwater in the form of a thin fresh water lenses. In most of the islands, the groundwater is not suitable for potable use due to saltwater intrusion and poor water quality. Climate change is expected to pose further risks to availability, accessibility and quality of water sources.</p> <p>Rainwater is the main source of drinking water in more than 90% of the outer islands. Groundwater is used for other domestic purposes and agriculture. Changes in average annual and temporal patterns of the rainfall have led to localised water stress in a large number of islands requiring augmentation by desalination alternatives and transportation of water resources to water stressed locations.</p> <ul style="list-style-type: none"> <li>• <i>Desalinisation has been widely used in the Maldives as an adaptation technology to supplement the existing water resources. Cost effective desalination techniques will be explored in the future.</i></li> <li>• <i>Provision of Integrated Water Resource Management Schemes which includes rainwater harvesting, groundwater recharging and desalination.</i></li> <li>• <i>Develop appropriate policies and implement programs to address water security and water shortages facing the islands during the dry periods.</i></li> </ul>
<p><b>Coastal Protection</b></p>	<p>The islands of the Maldives are low lying and beach erosion is widespread causing significant loss of land and costal infrastructure. Priority is given to protect the human settlements and infrastructure of inhabited and resort islands.</p> <ul style="list-style-type: none"> <li>• <i>Facilitate and continue to invest in coastal protection of inhabited islands and resorts.</i></li> <li>• <i>Include land elevation, shore protection and reclamation as an adaptation measures to increase resilience of vulnerable islands.</i></li> </ul>
<p><b>Safeguarding coral reef and its biodiversity</b></p>	<p>Coral reefs are an important contributor the economy supporting tourism and fisheries. The reefs support rich biodiversity providing food and livelihoods to island communities. This vital ecosystem is highly sensitive to changing sea surface temperature and other climatic factors. The evidence from the reefs of the Maldives</p>

	<p>supports that warming of the ocean surface leads to significant coral bleaching. In some instances, coral reefs surrounding the islands are stressed due to land based sources of pollution.</p> <ul style="list-style-type: none"> <li>• <i>Coral reefs conservation through ecosystem approach as an adaptation measure to increase the resilience of the coral reef ecosystem.</i></li> <li>• <i>Reduction of sources of pollution through appropriate policies, development of appropriate sewage treatment systems on the islands, management and safe disposal of solid waste are considered as an adaption measures to protect the coral reefs.</i></li> </ul>
<b>Tourism</b>	<p>Climate change would have implications on the tourism industry developed around the clear water surrounding the islands, white sandy beaches and vibrant coral reefs.</p> <p>Protection of resort island's beach and its coastal infrastructure is important to safeguard the tourist product and tourist facilities, which represent massive capital investments.</p> <ul style="list-style-type: none"> <li>• <i>Establish an insurance mechanism to reduce the impacts on the tourism sector through risk sharing and risk management.</i></li> <li>• <i>Establish a Green Tax on tourism to finance for environmental management including adaptation.</i></li> </ul>
<b>Fisheries</b>	<p>Tuna fisheries are an important economic sector in the Maldives. Live bait is a prerequisite for the unique pole and line fishery which is sensitive to the monsoonal changes and climate variability. Tuna is expected to move deeper waters due to impacts of climate change.</p> <ul style="list-style-type: none"> <li>• <i>Facilitate fisheries industry to adapt tuna catch from shallow water to deep water.</i></li> <li>• <i>Diversification of the fisheries sector to sustainable use of available marine resources.</i></li> <li>• <i>Facilitation and increase access to finance to develop mariculture.</i></li> <li>• <i>Strengthen fisherman insurance mechanism to ensure</i></li> </ul>

	<i>minimum monthly income from fishing activities for lost fishing due extreme events.</i>
<b>Early warning and Systematic Observation</b>	<p>Climatological measurements are limited due to capacity constraints and inadequate resources. Improvement of climate data collection, management and forecasting remains a critical gap area.</p> <ul style="list-style-type: none"> <li>• <i>Expand and strengthen the meteorological network and weather related early warning system to cover all the communities of the Maldives.</i></li> <li>• <i>Improve climate forecasting using climate modeling to provide information to support decision making sectors affected by weather and climate variability.</i></li> <li>• <i>Develop appropriate early warning systems and risk management tools.</i></li> </ul>
<b>Cross Cutting Issues</b>	<p><b>Finance</b></p> <p>Sustainable finance remains a major challenge in addressing climate. Domestic budgetary spending on addressing climate change remains an additional burden towards the achievement of sustainable development. Nevertheless public finance is being allocated to meet urgent and immediate adaptation actions. However International support is necessary to address the adverse impacts of climate change facing the islands of the Maldives.</p> <ul style="list-style-type: none"> <li>• <i>Creating sustainable financing mechanisms for programmes related to climate change activities.</i></li> <li>• <i>Establishment of a Maldives Climate Resilient Fund to finance climate change adaptation and mitigation programs.</i></li> </ul> <p><b>Climate governance and capacity building</b></p> <p>Addressing the adverse impacts of climate change requires good governance and adequate capacity. Education, training and public awareness remain a key priority. Climate change research and technology transfer remains an area, which needs to be strengthened.</p> <ul style="list-style-type: none"> <li>• <i>Develop National Adaptation Plans to address immediate, medium and long term adaptation</i></li> </ul>

	<p><i>programmes with support from international community.</i></p> <ul style="list-style-type: none"><li>• <i>Develop Climate Change Act for addressing climate change.</i></li><li>• <i>Continue to build national capacity with support from international community</i></li><li>• <i>Develop and promote appropriate technologies to address climate change impacts with support from international community.</i></li><li>• <i>Implement appropriate policies and strategies to address the impacts of climate change on vulnerable groups.</i></li></ul>
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