



# ESTIMATED INVESTMENTS NEEDED TO ADDRESS CLIMATE CHANGE IN THE DOMINICAN REPUBLIC



<http://www.undpcc.org/en/dominican-republic>

The economy of the Dominican Republic is dependent on natural resources. Changes in water availability due to climate change can affect agricultural production. Photo: <http://www.oxfamblogs.org/lac/?p=1497>

→ Tourism and water are important contributors to the GDP of the Dominican Republic, and both will be affected by climate change. There is consensus among climate change scenarios that the region will see increases in temperature and sea-level rise, prolonged periods of drought and an increased frequency and intensity of tropical storms and hurricanes. At the same time, energy availability is the backbone of the country, and has significant potential not only for mitigating greenhouse gases (GHGs), but also for savings of expenditures. According to a recently finalized assessment, US\$ 4.45 billion will be needed to adapt to the impacts of climate change in the tourism and water sectors, while activities to mitigate greenhouse gas emissions in the energy sector will lead to savings of US\$ 7.10 billion.

The government of the Dominican Republic chose to conduct these assessments based on the strategic importance of these sectors as well as the potential impacts of climate change on economic activities and conservation efforts that can drive the country to achieve sustainable development.

The assessment of investment and financial flows (I&FF) is a key component of the UNDP global project, “*Capacity Development for Policy Makers to Address Climate Change*”, which seeks to strengthen national capacities for planning in the area of climate change, and improve policy coordination to address the issue. The Dominican Republic is one of 19 countries participating in the project.

The UNDP Latin American regional project, *Climate Policy 2012*, has provided additional technical and financial support to the Dominican Republic for further initiatives.

## Selection of key sectors

For climate change mitigation, the **energy** sector is of special importance, as it has the largest share of GHG emissions in the country. According to the national energy balance, 80% of primary energy supply is imported, almost all of it being crude oil and petroleum products. So there is potential to decrease the country’s dependency on energy imports while fostering renewable energy uptake.

Within the **water** sector, it is expected that the impacts of climate change, combined with the degradation of natural resources, will generate significant changes in the amount and quality of available water. Increased vulnerability to extreme events is also anticipated, which in turn may have a major impact on the economy and the country’s development. The sector is further affected by soil degradation, and inefficient water use.

**Tourism** is considered one of the most important sectors of national economy. It is the largest generator of employment (15% of population), currency (24% of country’s income) and one of the biggest generators of foreign investment (7.7% of total direct foreign investment, according to the Central Bank). Climate change will affect various tourist destinations and island states, and the Dominican Republic will be hardest hit in coastal marine areas, according to the World Tourism Organization.

## Institutional arrangements

An inter-institutional committee was established, covering the three key sectors that were analyzed, and included high-level technical representatives of key ministries, academia and the private sector, including the National Council for Climate Change and Clean Development Mechanism, Ministry of Environment, Ministry of Economic Planning and Development, National Statistical Office, the Ministry of Industry and Trade, as well as representatives of universities.

For the energy sector, institutions of specific relevance to the sector were engaged, such as the Coordinating Agency of the National Interconnected Electric System, the Dominican Corporation of State Electrical Companies, the Hydro Generation Company, the Regulation Authority of Electricity, and the Office for the Reorganization of Transportation.

For the water and tourism sectors, representatives of the Association of Hotels and Restaurants, the Ministry of Tourism, the Ministry of Agriculture, the Water and Sewerage Corporation, the National Institute of Water Resources, and other relevant institutions were involved.

UNDP and the Instituto Torcuato di Tella, a regional centre of excellence based in Argentina, provided technical assistance and training to the national teams.

## ASSESSMENT OF INVESTMENT AND FINANCIAL FLOWS

### Objectives of the Investment and Financial Flows

#### Assessment

The overall objective of the I&FF assessment is to determine the extent and sources of funds needed to address climate change at the national level, and builds directly on national government strategies, plans and programmes. In essence, the assessment seeks to answer the question: *“From a development perspective, what can my country do to address climate change in selected key sectors, and what level of financial contributions will be needed to achieve these objectives?”*

In this context, the I&FF team examined the questions:

- What are the main adaptation / mitigation measures for the selected sectors in the next 25 years?
- Who is investing in the sector / Who are the main stakeholders and sources?
- What changes / increase in I&FF will be needed in the sectors?
- What additional I&FF are needed to address climate change?

For each sector, a baseline scenario and an adaptation / mitigation scenario was developed to determine the investment flows (IF), financial flows (FF), and operation and maintenance costs (O&M) of the analysed measures between 2006-2030. The values are given in constant 2005 US\$ (1US\$ = 38.8DOP). The analyzed investment entities are: households, corporations (private and NGOs), as well as the government (public funds).

#### For the energy sector (mitigation of greenhouse gas emissions)

Two subsectors were considered: **electricity**, which comprises a major share of energy consumed, and **transport**, which accounts for 31 per cent of energy use. For the period 2006-

*“The results obtained during the process of preparing the I&FF assessments in the sectors water, tourism and energy in the Dominican Republic have identified priority measures to be implemented in national policies to mitigate climate change (energy sector) and to adapt to its impacts (water and tourism sector), and the assessment provided estimates for the future what investments will be needed to address it. It is a useful and important tool, thanks to our government team under the leadership of President Leonel Fernández, in the pursuit of economic development that is compatible with climate change”*  
*Omar Ramírez Tejada, Executive Vice-President, National Council for Climate Change and the Clean Development Mechanism.*

2030, there will be savings of US\$ 7.10 billion. The main measures selected were:

- For the **electricity** subsector, selected mitigation measures are divided into two fields of action: introduction of new capacities of renewable energy and thermal energy with improved efficiency, and using less carbon-intensive fuels. This will lead to a reduction of 114 million tons of CO<sub>2</sub>, requiring investments of US\$ 5.82 billion, while operation & maintenance will generate savings of US\$ 16.12 billion (a net saving of US\$ 10.30 billion);
- For the **transport** subsector, there are two fields of action: introduction of an improved fuel mix, and fostering of less carbon-intensive fuels. This will lead to a reduction of 6 million tons of CO<sub>2</sub>, requiring investments of US\$8.85 billion, while operation & maintenance will generate savings of US\$ 5.66 billion (a net saving of US\$ 3.19 billion).

Corporations will be responsible for US\$ 7.58 billion of investments and the government will need investments of US\$ 7.09 billion. Savings in operation and maintenance costs of US\$ 21.77 billion will be reached, leading to a total saving for the government of US\$14.68 billion.

#### For the water sector (adaptation to the impacts of climate change)

During the period 2011-2030, the sector will require approximately US\$ 2.79 billion. The main measures are:

- **Water and sanitation:** Reverse the loss of quality of water bodies in the country; increase the coverage of wastewater treatment from domestic, industrial and agriculture sources; establish a tariff system based on the management of water use (US\$ 1.30 billion);
- **Integrated water and irrigation management:**

Integrate water resources management to meet the demand of multiple users (US\$ 1.00 billion);

- **Environmental Management:** Protect and conserve environmental services of forests and aquatic ecosystems with an ecosystem approach (US\$ 490.55 million).

Under the reforms in the tariff system and under the improvement of the overall performance of the sector, the Water Department would cover 43 per cent of costs. Thirty-two per cent of costs would come from central government transfers, 6 per cent from official development assistance (bilateral and multilateral) and 19 per cent from foreign loans.

#### For the tourism sector (adaptation to the impacts of climate change)

During the period 2007-2030, the sector will require an estimated US\$ 1.66 billion. The main measures selected were:

- Infrastructure and techniques for coastal resource protection, institutional arrangements and an incentive

system to encourage the improvements, research and social awareness, promotion of sustainable management and risk management (US\$ 1.66 billion).

The investment flows for restoring beaches will be 100 per cent financed by the government. Financial flows for awareness and education are shared 50:50 by corporations and the government, while operation and maintenance costs for increased insurance costs are borne 100 per cent by corporations.

## POLICY IMPLICATIONS FROM THE I&FF ASSESSMENT

#### For the energy sector (mitigation of greenhouse gas emissions)

- It is possible to use the benefits of emission reductions to attract and catalyse financial resources, which can be in turn used for implementing mitigation measures.

## SUMMARY TABLES OF INCREMENTAL INVESTMENT COSTS

Table 1. Incremental discounted I&FF and O&M for all investments in each sector, by investment entity and funding source. Incremental cumulative sectoral investments, with a discount rate of 5% (million 2005 US\$). Period 2006-2030

Investment category	Sources of I&FF		Energy				Water				Tourism			
			ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal	ΔIF	ΔFF	ΔO&M	ΔTotal
Household	National	Savings and debt	-	-	-	-	283.9	423.2	417.0	1,124.1	-	-	-	-
	Total: household funds		-	-	-	-	283.9	423.2	417.0	1,124.1	-	-	-	-
Corporations	National	Domestic assets (including internal cash flow)	53.0	63.5	-	116.5	-	-	-	-	-	179.1	700.6	879.7
		Domestic debt (bonds and loans)	212.0	265.7	-	477.6	-	-	-	-	-	-	-	-
		Total: domestic sources	265.0	329.2	-	594.2	-	-	-	-	-	179.1	700.6	879.7
	Foreign	Foreign Direct Investment (FDI)	4,330.9	76.0	-	4,406.9	-	-	-	-	-	-	-	-
		Foreign loans	1,059.9	187.5	-	1,247.4	-	-	-	-	-	-	-	-
		External assistance (ODA)	973.0	359.4	-	1,332.4	-	-	-	-	-	-	-	-
		Total: foreign sources	6,363.8	623.0	-	6,986.8	-	-	-	-	-	-	-	-
	Total: corporation funds		6,628.8	952.2	-	7,580.9	-	-	-	-	-	179.1	700.6	879.7
Governments	National	Domestic funds (budget)	-	61.5	-21,774.3	-21,712.8	244.7	364.9	359.5	969.1	599.6	179.1	-	778.7
		Total: National sources	-	61.5	-21,774.3	-21,712.8	244.7	364.9	359.5	969.1	599.6	179.1	-	778.7
	Foreign	Foreign loans	1,238.0	57.3	-	1,295.3	129.0	192.3	189.4	510.6	-	-	-	-
		Bilateral foreign aid (bilateral ODA)	159.0	273.0	-	431.9	-	-	-	-	-	-	-	-
		Multilateral foreign aid (ODA multilateral)	4,354.4	948.0	-	5,302.4	47.6	71.0	70.0	188.7	-	-	-	-
		Total: foreign sources	5,751.4	1,278.3	-	7,029.6	176.6	263.3	259.4	699.3	-	-	-	-
	Total: government funds		5,751.4	1,339.7	-21,774.3	-14,683.2	421.3	628.2	618.9	1,668.5	599.6	179.1	-	778.7
Total			12,380.1	2,291.9	-21,774.3	-7,102.3	705.2	1,051.5	1,035.9	2,792.5	599.6	358.3	700.6	1,658.5

IF = Investment Flows, FF = Financial Flows, O&M = Operation and Maintenance costs  
 ΔI&FF = Change in Investment and Financial Flows; ΔO&M = Change in Operation and Maintenance costs  
 Negative values mean net savings.  
 Source: National I&FF assessments

- It is necessary to identify and remove structural barriers to promote the participation of public and private sectors in mitigation activities.
- It is important to strengthen the coordination of different agencies/mechanisms active in climate change mitigation and to actually implement existing projects and initiatives that are already in place.

#### For the water sector (adaptation to the impacts of climate change)

- A concerted effort is needed between institutional actors, the private sector, and civil society to improve water management. The legal and institutional framework reform for water management must be implemented.
- To ensure that the reform of the tariff system does not

generate social tension, society must be involved and shown that these reforms are aimed at the sustainable management of water resources.

#### For the tourism sector (adaptation to the impacts of climate change)

- The elaboration of a Land Use Master Plan is agreed. Strengthen and enforce environmental regulations, including the Strategic Environmental Assessment, which includes climate change adaptation.
- Diversify products and markets. Promote alternative tourism segments to beach tourism, such as gastronomy, sport, culture, health.
- Promote capacity building and educational programmes that incorporate environmental variables and adaptation to climate change.

Table 2. Annual incremental investment and financial flows for all investments in each sector. In millions of constant 2005 US\$ with a discount rate of 5%. Period 2006-2030.

Year	Energy			Water			Tourism		
	$\Delta$ IF	$\Delta$ FF	$\Delta$ O&M	$\Delta$ IF	$\Delta$ FF	$\Delta$ O&M	$\Delta$ IF	$\Delta$ FF	$\Delta$ O&M
2006	175.6	43.1	84.1	-	-	-	-	-	-
2007	157.2	41.5	160.0	-	-	-	16.2	-	-
2008	421.5	39.5	225.8	-	-	-	-	-	-
2009	124.1	39.3	295.1	-	-	-	-	-	-
2010	241.8	42.3	388.6	-	-	-	-	-	-
2011	-103.3	24.4	475.5	47.0	61.1	68.4	19.3	11.8	0.7
2012	1,124.4	43.6	114.4	47.0	61.1	68.4	20.1	12.3	3.2
2013	274.4	51.6	29.6	39.8	57.0	59.2	20.9	12.8	7.9
2014	-413.6	53.9	181.4	39.8	57.0	59.2	21.8	13.3	15.9
2015	208.6	63.1	291.5	34.0	52.2	50.4	22.7	13.9	26.8
2016	-945.2	60.1	-137.8	34.0	52.2	50.4	23.6	14.5	27.5
2017	-1,049.3	60.0	-632.0	31.0	50.0	46.2	24.6	15.1	29.5
2018	-1,129.8	59.2	-1,199.9	31.0	50.0	46.2	25.6	15.7	31.7
2019	-1,191.7	53.3	-1,896.4	33.1	50.7	48.5	26.7	16.4	33.5
2020	-31.6	84.1	-2,089.6	33.1	50.7	48.5	27.8	17.1	35.4
2021	1,740.5	184.5	-1,127.2	29.1	48.4	43.3	29.0	17.8	37.8
2022	1,812.6	182.9	-1,285.6	29.1	48.4	43.3	30.2	18.5	40.5
2023	1,874.1	181.2	-1,446.1	34.4	51.5	50.2	31.4	19.3	43.4
2024	1,935.4	179.4	-1,608.4	34.4	51.5	50.2	32.7	20.1	46.3
2025	2,009.5	177.9	-1,774.2	34.9	51.8	50.9	34.1	21.0	49.7
2026	848.4	99.9	-2,101.2	34.9	51.8	50.9	35.5	21.8	51.5
2027	938.3	112.2	-2,128.6	37.8	53.4	54.6	37.0	22.8	53.1
2028	1,026.1	124.9	-2,160.2	37.8	53.4	54.6	38.5	23.7	53.9
2029	1,112.2	138.0	-2,196.2	31.5	49.8	46.4	40.1	24.7	55.2
2030	1,209.9	152.0	-2,237.0	31.5	49.8	46.4	41.8	25.7	57.1
<b>Total</b>	<b>12,380.1</b>	<b>2,291.9</b>	<b>-21,774.3</b>	<b>705.2</b>	<b>1,051.5</b>	<b>1,035.9</b>	<b>599.6</b>	<b>358.3</b>	<b>700.6</b>



**Knowledge platform**  
The project website [www.undpcc.org](http://www.undpcc.org) contains information on the activities of the Dominican Republic, UNDP's I&FF methodology, and other resources.

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O&M = Operation and Maintenance costs  
 $\Delta$ I&FF = Change in Investment and Financial Flows;  
 $\Delta$ O&M = Change in Operation and Maintenance costs  
Negative values mean net savings.  
Source: National I&FF assessments

#### More information on activities in the Dominican Republic

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