

Low-Carbon, Climate-Resilient Development

NAMA Concepts for Trinidad and Tobago

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Summary

This policy brief presents the results of a screening exercise to identify nationally appropriate mitigation action (NAMA) concepts for Trinidad and Tobago. Multiple government planning documents were reviewed and applied to IISD's standardized NAMA quick screen process to identify NAMA concepts that could be further validated and turned into NAMA proposals for Trinidad and Tobago. In total, 26 NAMA concepts were identified. A next step would be to conduct more detailed analysis to first prioritize the NAMA concepts and then develop detailed proposals highlighting emission, cost and sustainable development outcomes for priority NAMAs.

This document is part of IISD's continued effort to promote low-carbon, climate-resilient development globally.

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1.0 Introduction

Countries are developing nationally appropriate mitigation actions (NAMAs) to communicate that they are preparing for increased climate mitigation financing and that they are contributing to lowering global greenhouse gas (GHG) emissions. The concept of NAMAs emerged from the United Nations Framework Convention on Climate Change (UNFCCC), and is broadly understood as a project, program or policy initiative that reduces GHG emissions in developing countries while contributing to sustainable development.

There is evidence that designing, evaluating and implementing NAMAs will be building blocks for the post-2012 mechanisms under the UNFCCC. There is therefore much attention being placed on a variety of capacity-building and pilot programs underway on NAMAs. Although the concept continues to evolve, donors have expressed an interest in funding first-generation NAMAs and are poised to do so through available fast-start climate change financing pledges. With the forthcoming introduction of a NAMA registry, it will be possible for developing countries to submit NAMAs to receive support for the preparation phase.

While NAMA activities are increasing, there continues to be an absence of guidance from the UNFCCC and the negotiations on modalities. A lack of overall clarity is not necessarily a bad outcome at this stage, given that NAMAs are inherently bottom-up mechanisms. In time, as learning occurs and more NAMAs are developed, the NAMA UNFCCC architecture can be trued up. In the interim, there is a need to share experiences and add to the information base.

To help inform this NAMA development process, the International Institute for Sustainable Development (IISD) is testing a standardized, country-driven approach to identify NAMA concepts across 13 countries. This document applies that framework to Trinidad and Tobago. The goal of this high-level country analysis is to identify NAMA concepts that align with Trinidad and Tobago's development aspirations, conform to pre-existing policy frameworks, and have associated sustainable development co-benefits.

The report begins with an overview of the methodology used in identifying NAMA concepts. Next, a brief overview of the economic and emissions context in Trinidad and Tobago is provided, along with a discussion of government priorities and policies. The subsequent two sections provide a long list and screened short list of NAMA concepts that could be taken forward by Trinidad and Tobago for further consideration.

2.0 Identifying NAMA Concepts: A Quick Screen Methodology

The process for prioritizing and implementing NAMAs involves first developing a NAMA concept, then a detailed **NAMA proposal** and finally a **NAMA implementation** plan. IISD's approach to NAMA development so far has focused on the first two steps:

1. The **NAMA quick screen** is used to conduct a rapid assessment that identifies a list of NAMA opportunities that can be developed into **NAMA concepts** to attract climate finance.
2. The **NAMA deep screen** is a more elaborate analysis using standard criteria to explore feasibility as well as possible emission, cost and sustainable development outcomes necessary to produce full-fledged **NAMA proposals**.

This document presents the results of the first step, the quick screen, applied to Trinidad and Tobago.

The purpose of the quick screen exercise is to develop a country report that outlines a list of potential NAMA concepts using a standardized set of criteria. The quick screen is a qualitative assessment that identifies potential NAMA concepts that have:

- Medium or high mitigation potential
- Alignment with government priorities
- Evidence of existing action
- Sustainable development (economic, environmental and social) co-benefits that outweigh any negative impacts
- Possible climate resilience (adaptation) co-benefits

The quick screen has five steps:

1. **Research and Categorization** – Collect, review and categorize relevant documents and data that provide country context, including a description of the socioeconomic context, information on greenhouse gas (GHG) emissions, government priorities and climate change-relevant actions.
2. **Long List** – Develop a comprehensive list of NAMA opportunities organized by the six UNFCCC mitigation sectors: agriculture, energy, forestry and other land use, industry, transportation and waste.
3. **Short List** – Screen the long list of potential NAMAs against a set of criteria to develop a short list of NAMAs with the greatest opportunity by UNFCCC sector.
4. **Country Report** – Develop the country report that provides context for NAMA identification and presents the long and short lists of NAMAs. Evaluate the short list using an analytical grid that examines NAMAs in the context of mitigation potential, government priorities, current actions and co-benefits.
5. **Validation and Finalization** – Validate the short list of priority NAMA opportunities with government authorities and key stakeholders; revise the short list and country report based on expert input.

Appendix A provides a detailed guide to the quick screen steps.

3.0 Country Overview

This country overview provides context relevant to the development of NAMAs, with a particular focus on the economic drivers of energy use and emissions.

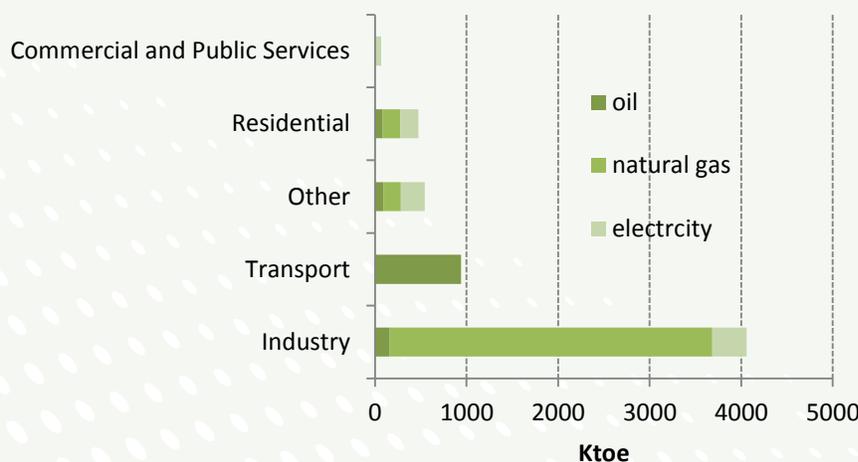
3.1 National Socioeconomic Overview

Trinidad and Tobago (T&T) has largely experienced stable and consistent economic growth, driven primarily by expansion in the energy sector with the discovery of substantial offshore gas reserves in the mid-1990s (Government of the Republic of Trinidad and Tobago [GRTT], 2008). However, while economic growth averaged over 8 per cent between 2000 and 2007, it has recently fallen in the wake of the 2008 financial crisis, with 2011’s growth rate estimated at only 1.1 per cent (Central Intelligence Agency [CIA], 2012).

T&T has the second highest per-capita income in Latin America and the Caribbean. Although the agriculture sector has been in rapid decline, economic growth in the country can be largely attributed to the natural gas and petrochemical sectors, which make the country the leading Caribbean producer of oil and gas (CIA, 2012). These sectors accounted for over 40 per cent of GDP and approximately 80 per cent of exports in 2011, but employed only 5 per cent of the population (CIA, 2012). There are also well developed industrial and financial sectors in the country, particularly ammonia, urea and steel (GRTT, 2008).

Oil production is largely for export. For 2010, production is estimated at 150,000 barrels per day, but consumption is only 40,000 per day. Natural gas, on the other hand, is mostly consumed in-country, with production at 42.38 billion cubic metres and consumption at only 31.97 billion cubic metres in 2010. Expansion of the natural gas sector in particular is expected going forward, with high investment in the sector and reserves of 408.2 billion cubic metres. At the current rate of exploitation, oil reserves are expected to last 11.6 more years, and natural gas reserves 16.3 more years (Renwick, n.d.). The country is self-sufficient in electricity, producing and consuming approximately 7.3 billion kilowatt hours per year. Because of the country’s major fossil fuel reserves and production, most of this electricity is produced from fossil fuel sources (CIA, 2012). Figure 1 provides an overview of energy use in the country.

FIGURE 1: OVERVIEW OF ENERGY USE IN TRINIDAD AND TOBAGO



Source: GRTT (2011a)

3.2 National GHG Emission Overview

The level of carbon dioxide (CO₂) emissions in T&T has been increasing significantly in recent years (United Nations [UN], 2010). Approximately 30 million tonnes of CO₂ are emitted per year in T&T, accounting for approximately 0.1 per cent of global GHG emissions (United Nations Development Programme [UNDP], 2006b). Despite contributing very minimally to overall emissions, as a direct consequence of the country’s heavy reliance on the petroleum industry, T&T has one of the highest per-capita emissions, ranking seventh globally. Figure 2 outlines GHG emissions by sector and illustrates the carbon intensive nature of T&T’s economy. Given the planned expansion of natural gas production and large and growing oil production in the country, GHG emissions are expected to continue to rise going forward.

While no emissions forecast is publicly available for T&T, we did use our Reference Case Projection Tool to forecast what might occur between now and 2030. Building on economic growth projections and activity levels, it is likely that T&T’s emissions will almost double between now and 2030 (Figure 3). Industry and electrical generation likely make up the largest increase. Note that this is a simple projection, and would need to be vetted locally to increase its usefulness for policy analysis.

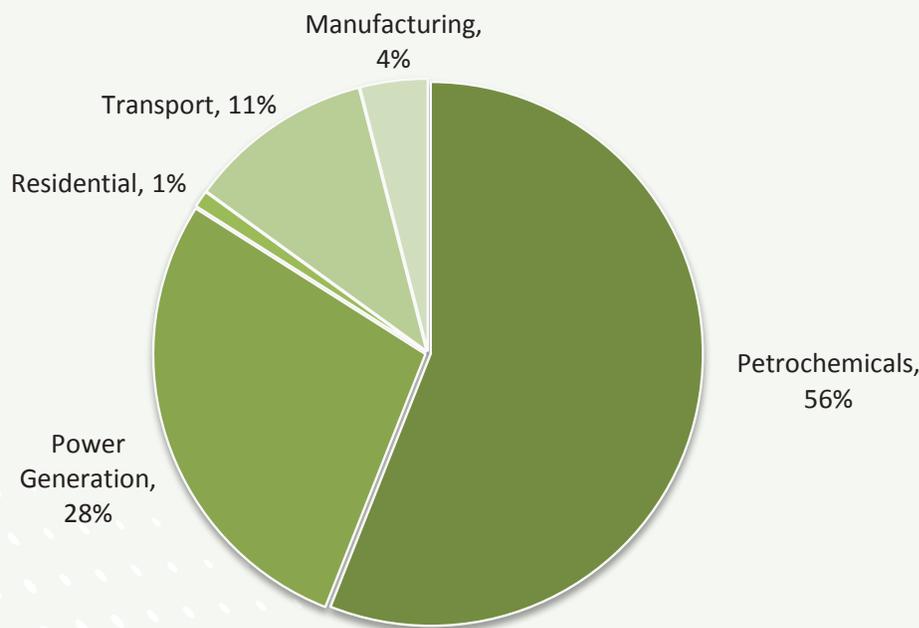


FIGURE 2: EMISSIONS BY SECTOR FOR 2007

Source: GRTT (2011a)

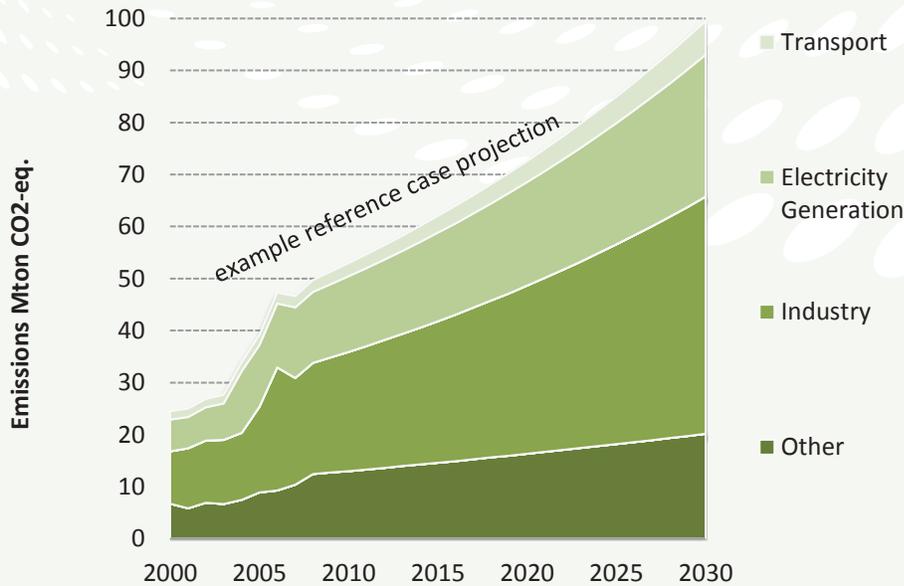


FIGURE 3: HISTORICAL AND FORECAST EMISSIONS IN T&T

Note: Mton CO₂-eq refers to million tones of CO₂ equivalent

3.3 Overview of Vulnerability to the Adverse Effects of Climate Change

3.3.1 Major Climate Change Effects

Climate change projections for T&T anticipate an increase in overall temperature and a decrease in rainfall. The mean annual temperature is projected to increase by 0.7 to 2.6°C by 2060, and anywhere between 1.1 and 4.3°C by 2090. Projections also indicate substantial increases in the frequency of “extreme heat” days with up to 66 per cent more hot days by the 2060s (GRTT, 2011b).

While there is wide disparity on projections regarding changes in the amplitude of future El Niño events, there is a high level of certainty that sea level will continue to rise (GRTT, 2011b). The Caribbean islands are especially vulnerable to sea-level rise and it is projected that this region will experience an increase between 0.13 and 0.56 metres by 2100 relative to 1980–1999 levels (Moonilal, 2011).

As a small island developing state, T&T is especially vulnerable to the effects of climate change. Its high population density, reliance on natural resources such as forest reserves and agriculture, and relatively fragile economy increase its vulnerability (GRTT, 2001). Sectors that are likely to be affected by climate change include agriculture, human health and settlements, coastal zones, and water resources, as well as cross-sectoral socioeconomic systems. Consequently, adaptation plans will be increasingly important in coping with major climate change effects (Moonilal, 2011).

3.4 National Government Priorities

T&T has articulated an interest in creating a “new growth dynamic” by pursuing low-carbon growth and stimulating the development of a green industry and alternative energy sources (GRTT, 2011a). The country also recognizes the many benefits that may be derived from the transition to a low-carbon economy, including job creation, economic diversification and energy security.

Table 1 summarizes the country’s priorities, as identified in a review of government literature.

TABLE 1: T&T GOVERNMENT PRIORITIES

| SECTOR | PRIORITY |
|------------------------------------|---|
| Overall development | <ul style="list-style-type: none"> a. Economic growth b. Job creation c. Competitiveness and innovation d. Poverty reduction e. Human capital development f. The application of cleaner technologies g. Protection of the natural environment and human health |
| Agriculture | <ul style="list-style-type: none"> 1. Reduce food import costs and food price inflation 2. Create sustainable, long-term employment in the sector 3. Increase the sector’s contribution to GDP 4. Create a food-secure nation 5. Enhanced production |
| Energy | <ul style="list-style-type: none"> 1. Increase use of renewable energy 2. Increase energy efficiency 3. Promote energy security 4. Increase the efficiency of generation plants |
| Forestry and other land use | <ul style="list-style-type: none"> 1. Enhance natural carbon sinks through forest conservation |
| Industry | <ul style="list-style-type: none"> 1. Enhance energy efficiency in the industry sector 2. Create a modern and efficient economic infrastructure base |
| Transport | <ul style="list-style-type: none"> 1. Develop an efficient, diverse transportation system 2. Increase use of alternative fuels and fuel switching |
| Waste | <ul style="list-style-type: none"> 1. Manage wastes to increase cities’ and towns’ liveability |

Sources: GRTT (2011a); GRTT (2011b); Moonilal (2011)

3.5 Identification of Existing National Policies

While T&T is not bound by UNFCCC obligations to reduce GHG emissions, they have voluntarily adopted policy measures to manage emissions. Action has been taken on a National Energy Policy, and a draft Sustainable Tourism Policy also exists (UN, 2010).

Through the *Medium Term Policy Framework*, *Renewable Energy Framework*, *Climate Change Policy* and other key documents, T&T has identified many of the mitigation actions that will allow it to reduce emissions from various sectors. These actions broadly focus on increasing the use of renewable energy, enhanced energy efficiency, use of alternative fuels in the transport sector, enhancing carbon sinks, and encouraging research and development investments, including through the carbon market.

The list below outlines some major policies, but many other legal, institutional, regulatory and policy frameworks exist to increase efforts toward sustainable development and climate change mitigation:

1. Vehicle Emissions Act
2. National Environmental Policy and Code
3. Air and Noise Pollution Management
4. Water Pollution Management
5. Waste Management
6. Management of Hazardous Substances
7. Designation of Environmentally Sensitive Areas and Species
8. Certificate of Environmental Clearance Rules
9. Environmental Management Act No. 34 (1995)
10. Forest Act (Revised 1980)

4.0 NAMAs Concepts by UNFCCC Sector

4.1 Agriculture

Agriculture is a major employer in the country, which provided 3.5 per cent of employment, but constituted only 0.4 per cent of GDP in 2010 (GRTT, 2011b). The sector faces major challenges, including poor agricultural practices and little use of technology; inadequate infrastructure in terms of poor access roads, water resources management and drainage systems; limited land availability; and the poor suitability of existing agricultural land (GRTT, 2011b). With proper investment, however, the sector could see major growth in terms of output, GDP contribution and employment (GRTT, 2011b).

The following table identifies the complete list of potential NAMAs that were generated based on a detailed literature review (Step 2 of the methodology described above).

TABLE 2: LONG-LISTED NAMA OPPORTUNITIES FOR THE AGRICULTURE SECTOR

| MEASURE | SOURCE |
|--------------------------------|---|
| Conservation agriculture | GRTT (2010) |
| Agroforestry | UN (2010); United States Environmental Protection Agency (US EPA, 2010) |
| Integrated nutrient management | GRTT (2010) |
| Livestock management | GRTT (2011a); GRTT (2011b) |

4.2 Energy

Unlike many other Caribbean countries, the energy sector in T&T is quite large, with 43 per cent of GDP derived from it. After Venezuela, it is the second largest energy producer in the Caribbean Sea (UN, 2010). The sector has seen strong growth in recent years in terms of production, investment and export. However, the sector is very much oil- and gas-based, and the government has encouraged diversification of the economy into non-energy sectors and development of renewable forms of energy (UN, 2010; GRTT, 2011a).

Table 3 identifies the complete list of potential NAMAs that were generated, based on the literature review (Step 2) of the methodology described above.

TABLE 3: LONG-LISTED NAMA OPPORTUNITIES FOR THE ENERGY SECTOR

| MEASURE | SOURCE |
|--|--|
| Green Building Index - Code for quality acceptance | GRTT (2011a); GRTT (2011b) |
| Retrofit existing building stock | GRTT (2011a); GRTT (2011b) |
| Carbon capture and storage | UN (2010) |
| Gas pricing policy | GRTT (2010) |
| Increase efficiency of natural gas generation plants | GRTT (2011b); Blechinger & Shah (2011) |
| Energy efficiency and pollution audits | GRTT (2011a) |
| Demand-side management policies | Blechinger & Shah (2011) |
| Phasing out incandescent light bulbs | GRTT (2011a) |
| Promoting energy-efficient appliances | GRTT (2011a) |
| Renewables - wind | GRTT (2011b) |
| Renewables - solar grid | GRTT (2011b) |
| Renewables - solar street lights | GRTT (2011b) |
| Renewables - solar water heaters | GRTT (2011a) |
| Renewables - wave | GRTT (2011b) |

4.3 Forestry and Other Land Use

Deforestation is a major issue in T&T and land-use practices are generally found to be poor (UNDP, n.d.). Flooding, waterway pollution and soil erosion are prominent issues.

The following table identifies the complete list of potential NAMAs that were generated in Step 2 of the methodology described above.

TABLE 4: LONG-LISTED NAMA OPPORTUNITIES FOR THE FORESTRY AND OTHER LAND USE SECTOR

| MEASURE | SOURCE |
|-------------------------|----------------------------|
| Reforestation (in-land) | GRTT (2010); US EPA (2010) |
| Coastal reforestation | US EPA (2010) |

4.4 Industry

Mining and manufacturing are important sectors in the country. However, manufacturing, while contributing 8 per cent of T&T's GDP, has a low import productivity profile, indicating overall productivity in the sector is poor (GRTT, 2011b). The country's heavy industry is one of the reasons T&T is among the top 10 globally in terms of emissions per capita (UNDP, n.d.).

Table 5 identifies the complete list of potential NAMAs that were generated in Step 2 of the methodology described above.

TABLE 5: LONG-LISTED NAMA OPPORTUNITIES FOR THE INDUSTRY SECTOR

| MEASURE | SOURCE |
|---|--------------------------|
| Green procurement | GRTT (2011b) |
| Enhanced efficiency of production processes | Blechinger & Shah (2011) |
| Leak detection and repair programs | US EPA (2010) |
| Flare gas recovery | US EPA (2010) |
| Waste heat recovery | US EPA (2010) |
| Cogeneration | US EPA (2010) |

4.5 Transport

Little data was available on the country’s transport sector; however, available information indicated that along with industry, the transport sector is one of the primary reasons T&T ranks so high globally in terms of per capita emissions (UNDP, n.d.).

Table 6 identifies the complete list of potential NAMAs that were generated in Step 2 of the methodology described above.

TABLE 6: LONG-LISTED NAMA OPPORTUNITIES FOR THE TRANSPORT SECTOR

| MEASURE | SOURCE |
|---|----------------------------|
| Ethanol and biofuels production | GRTT (2011a) |
| Greening of the priority bus route | GRTT (2011a); GRTT (2011b) |
| Natural gas for private and public transport | GRTT (2011a) |
| Promoting import of cars that run on alternative energy | GRTT (2011a) |

4.6 Waste

Minimal information was found on the current state of the waste sector, but a number of government planning documents make reference to this fact, indicating that much work needs to be done to make the sector efficient and ecologically sustainable.

Table 7 identifies the complete list of potential NAMAs that were generated in Step 2 of the methodology described above.

TABLE 7: LONG LISTED NAMA OPPORTUNITIES FOR THE WASTE SECTOR

| MEASURE | SOURCE |
|------------------------------|---------------------------|
| Solid waste program | GRTT (2010); GRTT (2011a) |
| Waste-to-energy technologies | GRTT (2011a) |

5.0 NAMA Concepts and Next Steps

Table 8 reflects the short-list of NAMA opportunities that were identified using an analytical grid that evaluates and includes only the NAMAs that have suitable mitigation potential and co-benefits, and align with government priorities and current actions. Twenty-six NAMA concepts were identified for T&T by applying this approach.

TABLE 8: NAMA CONCEPTS AND EVALUATION GRID

| MEASURE | SECTOR | REDUCTION POTENTIAL (L/M/H) | GOVERNMENT PRIORITIES (SEE TABLE 1) | EXISTING ACTION | CO-BENEFITS | | | |
|---|-------------------|-----------------------------|-------------------------------------|-----------------|-------------|----------|---------------|---------|
| | | | | | ADAPTATION | ECONOMIC | ENVIRONMENTAL | SOCIAL |
| Agroforestry | Agriculture | M | A, G, 2, 3, 4, 5 | Yes | + | + | + | + |
| Livestock management | Agriculture | M | G, 2, 3, 5 | Yes | + | + | + | neutral |
| Retrofit existing building stock | Energy | M | F, 2 | Yes | + | + | + | + |
| Carbon capture and storage | Energy | H | C, F | Yes | neutral | + | + | neutral |
| Gas pricing policy | Energy | M | 2 | Yes | neutral | + | + | neutral |
| Increase efficiency of natural gas generation | Energy | H | A, C, E, 4 | Yes | + | + | + | + |
| Energy efficiency and pollution audits | Energy | M | G, 2 | Yes | + | + | + | + |
| Demand-side management policies | Energy | M | C, 2 | Yes | + | + | + | neutral |
| Phasing out incandescent light bulbs | Energy | M | F, 2 | Yes | + | + | Neutral | neutral |
| Promoting energy-efficient appliances | Energy | M | C, F, 2 | Yes | + | + | + | + |
| Renewables - wind | Energy | H | C, F, G, 1, 3 | Yes | + | + | + | + |
| Renewables - solar grid | Energy | M | C, F, G, 1, 3 | Yes | + | + | + | + |
| Renewables - solar water heaters | Energy | M | C, F, G, 1, 3 | Yes | + | + | + | + |
| Reforestation (in-land) | Forestry/land use | M | G, 1 | Yes | + | + | + | + |
| Coastal reforestation | Forestry/land use | H | G, 1 | Yes | + | + | + | + |

| | | | | | | | | |
|--|-----------|---|------------|-----|---------|---|---------|---------|
| Enhanced process efficiency | Industry | H | F, G, 1, 2 | Yes | + | + | + | neutral |
| Leak detection and repair programs | Industry | H | F, G, 1, 2 | Yes | + | + | + | + |
| Flare gas recovery | Industry | M | F, G, 1, 2 | Yes | + | + | + | + |
| Waste heat recovery | Industry | M | F, G, 1, 2 | Yes | + | + | + | + |
| Cogeneration | Industry | H | F, G, 1, 2 | Yes | + | + | + | + |
| Ethanol and biofuels production | Transport | M | F, 2 | Yes | neutral | + | Neutral | + |
| Greening of the priority bus route | Transport | M | F, 1, 2 | Yes | + | + | + | + |
| Natural gas for private and public transport | Transport | M | F, 1, 2 | Yes | + | + | + | + |
| Alternative energy car imports | Transport | H | F, 1, 2 | Yes | + | + | + | + |
| Solid waste program | Waste | M | G, 1 | Yes | + | + | + | + |
| Waste-to-energy technologies | Waste | M | F, G, 1 | Yes | + | + | + | neutral |

Through IISD's screening exercise, 26 NAMA opportunities have been identified for T&T: two for the agricultural sector, 11 for the energy sector, two for the forestry sector, five for the industry sector, four for the transport sector and two for the waste sector. A next step would be to conduct more detailed analysis to first prioritize the NAMA concepts and then develop detailed proposals highlighting emission, cost and sustainable development outcomes for priority NAMA proposals.

References

- Blechinger, P.F.H. & Shah, K.U. (2011). A multi-criteria evaluation of policy instruments for climate change mitigation in the power generation sector of Trinidad and Tobago. *Energy Policy Journal*, 39 (10). Retrieved from <http://www.sciencedirect.com/science/article/pii/S0301421511005660>
- Central Intelligence Agency. (2012). Trinidad and Tobago. *The world factbook*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/td.html>
- Government of the Republic of Trinidad and Tobago. (2001). *Initial National Communication to the United Nations Framework Convention on Climate Change*. Environmental Management Authority. Retrieved from <http://unfccc.int/resource/docs/natc/ttonc1.pdf>
- Government of the Republic of Trinidad and Tobago. (2008). *Trinidad and Tobago Country Strategy Paper and National Indicative Program 2008–2013*. Ministry of Planning, Housing and the Environment. Retrieved from http://ec.europa.eu/development/icenter/repository/scanned_tt_csp10_en.pdf
- Government of the Republic of Trinidad and Tobago (2010). *Prosperity for all: Manifesto 2010*. Retrieved from <http://www.scribd.com/doc/31375068/UNC-Manifesto-2010>
- Government of the Republic of Trinidad and Tobago. (2011a). *Framework for development of a renewable energy policy for Trinidad and Tobago: A report of the Renewable Energy Committee*. Ministry of Energy and Energy Affairs. Retrieved from <http://energy.gov.tt/content/266.pdf>
- Government of the Republic of Trinidad and Tobago. (2011b). *Innovation for lasting prosperity: Medium-term policy framework 2011–2014*. Ministry of Planning, Housing and the Environment. Retrieved from <http://www.finance.gov.tt/content/Medium-Term-Policy-Framework-2011-14.pdf>
- Moonilal, R. (2011). *Trinidad and Tobago climate change policy: Summary statement*. Retrieved from <http://earthconsciousmagazine.com/?p=1658>
- Renwick, D. (n.d.). *Trinidad and Tobago energy industry*. Unit Trust Corporation Energy Fund. Retrieved from <http://www.ttutc.com/mutual-funds/pdf/Energy%20History.pdf>
- United Nations (2010). *Review of the Economics of Climate Change in the Caribbean Project: Phase 1. Climate change profiles in select Caribbean countries*. Economic Commission for Latin America and the Caribbean. Retrieved from <http://www.eclac.org/publicaciones/xml/8/39188/lcarl.250.pdf>
- United Nations Development Programme. (2006a). *Trinidad and Tobago: Creation of a rainwater harvesting model. Project description*. Retrieved from http://www.undp.org.tt/environment/Signed_PGTF%20Rainwater%20Harv.pdf
- United Nations Development Programme. (2006b). *Trinidad and Tobago- Port of Spain: Disaster Risk Reduction. Project description*. Retrieved from <http://www.undp.org.tt/environment/MoNS-ODPM%20DM%20prodoc%20WP%20Review%20Oct%2025.pdf>

United Nations Development Programme. (n.d.). *Trinidad and Tobago: Energy and environment profile*. Retrieved from <http://www.undp.org.tt/environment/index.html>

United States Environmental Protection Agency. (2010). *Available and emerging technologies for reducing greenhouse gas emissions from the petroleum refining industry*. Retrieved from <http://www.epa.gov/nsr/ghgdocs/refineries.pdf>

World Bank (2012). *BioCarbon Fund* (website). Retrieved from <http://wbcarbonfinance.org/Router.cfm?Page=BioCF>

Appendix A: Quick Screen Methodology

Step 1: Research and Categorization

Objective

The first step is to collect, review and categorize the information that underlies the identification of nationally appropriate mitigation action (NAMA) opportunities. This includes relevant documents and data that provide country context, information on GHG emissions, government priorities, and ongoing and planned actions in the six UNFCCC sectors.

Process

Collection

A desk review is undertaken to identify and access various information sources. The research will focus on assembling and categorizing information on the following topics:

- Economic growth and development (e.g. main economic sectors, growth trends)
- Social development (e.g., population and urbanization trends, percentage of rural population)
- GHG emissions inventory and forecast
- National government priorities and policies (e.g., from national development plans)
- Major government policies and priorities in the six mitigation sectors
- Sectoral context (e.g., trends, energy use and access to energy, modes of transport, forestry cover and rates of deforestation, main agricultural crops, technologies or interventions recommended for implementation)
- Major initiatives on the part of government, non-governmental organizations, private sector, multilateral institutions and donors in the six sectors
- Any other information that is potentially relevant to NAMAs

This review can include Internet research, and if possible and desirable, in-country research. Documentation that is not accessible on the Internet may be available in-country from bureaus of statistics and local experts. Government, donor, academic and multilateral organization publications may be useful. This information should be organized by the six UNFCCC mitigation sectors, in addition to one general climate change category (e.g., national development plans, national economic reports, etc.).

Researchers should note important documents that are not accessible at this stage, and major data and information gaps. There may be opportunity to locate the information at a later stage in the research (for example, through the validation process in Step 5), or through in-country consultations with experts.

The information collected during this stage will be used to develop the short list (Step 2), the long list (Step 3) and the country report (Step 4); and should be organized to allow researchers to find and access particular data, and identify sources. Mindjet's MindManager software is one way to organize the documentation, but a range of other data management products or techniques could potentially be used. This library can be a useful deliverable for the developing country.

Categorization

Categorization of information will be done concurrently with the document collection and review. To facilitate the identification of priority NAMAs, select information should be organized by the following categories:

- List of government priorities, overall and by sector (see Table 2 for an example of a list of government priorities identified in the NAMAs quick screen for Trinidad and Tobago)
- List of ongoing initiatives and activities by UNFCCC mitigation sector—including government, donor-funded, non-governmental organizations and private sector
- List of planned or needed actions in the six sectors, as articulated in government documents

The initiatives and actions should be those that have the potential to reduce GHG emissions or enhance sinks—that is to say, mitigation actions.

Outputs

Step 1 develops a collection of relevant documents regarding the country's economy, development priorities, national and sectoral policies and priorities, and major initiatives that are organized by the six UNFCCC mitigation sectors. The collection and categorization process will also result in three lists of important information needed to identify potential NAMAs: government policies and priorities, current initiatives by sector, and actions recommended in government documents.

Step 2: Long List of Potential NAMAs

Objective

The objective is to develop a credible long list of possible NAMAs for the country. This long list is the basis for the short-listing of NAMAs that occurs in Step 3.

Process

The lists of current initiatives and recommended actions developed in Step 1 are examined for actions that could be NAMAs—that is, that have the potential to lead to emissions reductions or enhance the sequestration or removal of carbon from the atmosphere (sinks). The actions could be policies, programs or projects. Examples of potential actions are listed below by sector:

- Energy supply - renewable energy (hydro, solar, wind, geothermal), clean coal, biofuels, electricity generation from landfill gas
- Energy demand - improved cookstoves, renewable lamps replacing kerosene, energy-efficient appliances, energy-efficient lighting, solar water heating, improved buildings, energy efficiency improvements in industry, co-generation in agriculture
- Transport - bus rapid transit, light rail transit, improved vehicle stock efficiency, improved heavy-duty vehicle stock efficiency, biodiesel, shift of freight to rail, improved non-motorized transport

- Industry – improved cement processing, charcoal production
- Waste – methane avoidance from landfill gas
- Agriculture – conservation tillage, agroforestry, livestock management, reduced burning of grazing and cropland
- Forestry – reducing deforestation and forest degradation, tree planting, restoration of degraded forests

The lists above are not complete and other options may be identified. Expert opinion is used to draw out the options from the lists developed in Step 1. The degree of specificity is also dependent on expert opinion. For example, public transport policies can be grouped as a single NAMA, or can be separated into different NAMAs to cover various programs and initiatives. Source information is indicated for each identified NAMA.

Outputs

The output of Step 2 of the quick screen is a comprehensive long list of potential NAMAs for a given country.

Step 3: Short List of NAMAs

Objective

The objective of Step 3 is to filter the long list to develop a short list of NAMAs that are potentially implementable in the developing country.

Process

The NAMAs on the long list are analyzed against the following screening criteria:

- **Significant mitigation potential** – Defined as 0.1 per cent of total 2010 emissions, or large enough to have a notable mitigation impact on sector emissions at the national level. The mitigation potential is estimated at this quick screen stage. Those actions with low mitigation potential are removed from the list.
- **Alignment with government priorities** – Actions must build on or contribute to the government’s national and/or sectoral priorities. Actions that are not in line with government priorities are removed from the list.
- **Evidence of existing action** – The NAMA should build upon and feed into existing initiatives to avoid duplication and demonstrate some in-country capacity to implement the action. Existing action could be enabling, planning or investment activities that directly relate to the NAMA. If there is no evidence of similar or complementary initiatives from either the government or major donors, the action is removed from the list.
- **Sustainable development and climate resilience co-benefits** – Recognizing that NAMAs are expected to contribute to sustainable development, and that development is a priority, all short-listed NAMAs are expected to have at least one clear economic, social, environmental or climate resilience benefit.
 - Economic benefits – economic growth, improved livelihoods, increased household income, improved energy security; negative impacts can be increases in energy prices
 - Social benefits – enhanced food security, decreased time for fuelwood collection, improved indoor air quality; negative impacts can be displaced populations, lack of access to forest and grazing lands

- Environmental benefits – improved local air quality, improved water quality, enhanced biodiversity; negative impacts can be flooding of land, monoculture in tree plantations
- Climate resilience – improved water availability, reduced soil erosion, reduced deforestation and forest degradation; maladaptation can result from land degradation

The process screens out those actions that do not meet all of the above criteria. In other words, a short-listed NAMA has significant mitigation potential, aligns with government priorities, has sustainable development benefits, and there is evidence of similar action in the country.

This is a high-level screen, where evidence of the above screening criteria is noted in the literature or understood through expert opinion. Analysts are not expected to undertake extensive additional research at this stage, but to use the understanding and knowledge gained in Step 1.

The results of the short list area are organized by UNFCCC mitigation sector, and can be displayed in an Excel spreadsheet. Table A1 provides an example of a short list of options.

TABLE A1. SHORT LIST FOR THE ENERGY SECTOR

| MEASURE | REDUCTION POTENTIAL (L/M/H) | GOVERNMENT PRIORITIES | EVIDENCE OF EXISTING ACTION | CO-BENEFITS (-/NEUTRAL/+) | | | |
|-------------------------------------|-----------------------------|-----------------------|-----------------------------|---------------------------|----------------------|---------------|---------|
| | | | | ADAPTATION TO CC | ECONOMIC DEVELOPMENT | ENVIRONMENTAL | SOCIAL |
| High-efficiency furnaces and stoves | H | | | + | + | + | + |
| Substituting other fuels for wood | H | | | + | + | + | + |
| Hydro-electricity | M | | | neutral | + | + | neutral |
| Geothermal energy | M | | | neutral | + | + | neutral |
| Biogas | M | | | neutral | + | + | neutral |
| Methane capture | M | | | neutral | + | + | neutral |

Outputs

The output of Step 3 is a short list of NAMA opportunities that have medium to high mitigation potential, sustainable development benefits, align with government priorities, and likely are feasible to implement because of existing initiatives.

Step 4: Review and Development of Draft Country Report

Objective

To evaluate the short list using an analytical grid that examines NAMAs in the context of mitigation potential, government priorities, current actions and co-benefits.

To prepare a report for country stakeholders that outlines the results of the analysis, including the short list of NAMAs.

Process

The country report can be developed concurrently with the collection and organization of information (Step 1) and the development of the lists of NAMAs (Steps 2 and 3). The report brings together information and context about the county that is relevant to NAMAs. The outline of the country report is set out below:

1. Introduction
2. Quick Screen Methodology
3. Country Overview
 - a. National Socioeconomic Overview
 - b. National GHG Emission Overview
 - c. Overview of Vulnerability to the Adverse Effects of Climate Change
 - d. National Government Priorities
 - e. Identification of Existing National Policies
4. List of Potential NAMAs
 - a. Agriculture
 - b. Energy
 - c. Forestry and Other Land Use
 - d. Industry
 - e. Transport
 - f. Waste
5. NAMAs Evaluation Grid
6. Results
7. References

This report of approximately 15–20 pages in length is an overview of the NAMAs in the developing country, providing context on the economy, government priorities and sectoral actions that inform the selection of priority NAMAs.

Outputs

The country report is the output of Step 4.

Step 5: Validation and Finalization

Objective

The objective of this step is to validate the selection of potential priority NAMAs, including analysis and assumptions, with country experts.

Process

There are various options for validating the NAMAs lists (Steps 2 and 3) and the country report (Step 4). The desired approach is through an in-country stakeholder meeting that includes experts from government, the private sector and civil society. Alternatives are reviewed by a select number of country experts, or reviewed by representatives from the climate change unit. A simple option is to discuss the results with representatives from select ministries or the climate change unit. The method of validation should be noted in the country report.

Discussions with country experts through the validation process will help to determine if actions align with government priorities, if there is sufficient “readiness” to prepare and implement the NAMA, if there are barriers that impact the feasibility of NAMA implementation and if additional actions should be considered in the analysis. Country experts will identify potential priority NAMAs. The NAMA lists and the country report will be revised after local validation and the final lists and report are developed.

Outputs

The final report, which is informed and improved by expert input, is the output of Step 5. The report can also be used for a variety of purposes, including: to form the basis for factsheets on high-priority NAMAs to attract funding to form the basis of information of a preparation proposal to submit to the UNFCCC’s prototype registry, and to raise awareness of NAMAs and NAMA opportunities.

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