



# **Initiative for Climate Action Transparency Phase II**

## **National Transport Electrification Impact Assessment Antigua & Barbuda Project**

**Transport Model Data Collection Process Manual  
&  
LEAP and GACMO Data Collection Procedures Update**

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# **Transport Model Data Collection Process Manual & LEAP and GACMO Data Collection Procedures Update Initiative for Climate Action Transparency – ICAT**

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## **List of Abbreviations**

ABTB	Antigua & Barbuda Transport Board
ABWREC	Antigua & Barbuda Waste Recycling Corporation
BUR	Biennial Update Report
CAEP	Climate Action Enhancement Package
CBH	Central Board of Health
CBIT	Capacity Building Initiative Transparency
CCMRVH	Caribbean Cooperative Measurement, Reporting and Verification Hub
DMU	Monitoring, Evaluation and Data Management Unit
DOE	Department of Environment
EPMA	Environmental Protection and Management Act
EV	Electric Vehicle
GACMO	Greenhouse Gas Abatement Cost Model
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GHGMI	Greenhouse Gas Management Institute
GREET	Greenhouse gases, Regulated Emissions and Energy Use in Technology
ICAT	Initiative for Climate Action Transparency
ICE	Internal Combustion Engine
LDV	Light Duty Vehicle
LEAP	Low Emissions Analysis Platform
MRV	Monitoring, Reporting and Verification
NC	National Communications
NDC	National Determined Contribution
NGO	Non-Governmental Organization
NSWMA	National Solid Waste Management Authority
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SLIM	Sustainable Low Emission Island Mobility
TraCAD	Transport Climate Action Data Tool
TRACE	Transport Sector Climate Action Co-Benefit Evaluation Tool
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services
WIOC	West Indies Oil Company

## **Background**

The Initiative for Climate Action Transparency (ICAT) aims to help countries better assess the impacts of their climate policies and actions and fulfil their transparency commitments. It does this by increasing the overall transparency capacities of countries, including the capacity to assess the contribution of climate policies and actions on countries' development objectives, and providing appropriate methodological information and tools to support evidence-based policymaking. ICAT's innovative approach is to integrate these two aspects.

Antigua & Barbuda, a sovereign small island developing state (SIDS) in the Eastern Caribbean, has successfully completed a first phase ICAT project and has now embarked on a Phase II project. This first phase project produced national capacities for economy-wide GHG mitigation modelling using the Greenhouse Gas Abatement Cost Model (GACMO) and Low Emissions Analysis Platform (LEAP) modelling frameworks.

Antigua & Barbuda is committed to implementing measures to grow its economy in a low carbon and sustainable manner, as reflected in its revised National Determined Contribution (NDC) submission. As such, the country is a non-Annex 1 party to the United Nations Framework Convention on Climate Change (UNFCCC) and has completed and submitted four GHG inventories as part of their National Communications (NCs), Biennial Update Report (BUR), and National Inventory Report (NIR) to the UNFCCC. These were submitted across the following inventory reporting years: 1990 (NC1), 2000 (NC2), 2006 (NC3), and 2015 (BUR1/NIR1). A fifth GHG inventory will be submitted with the Fourth National Communication (NC4) covering inventory reporting years 2016-2019, and the country's sixth GHG inventory for 2020-2021 is currently being prepared under its first Biennial Transparency Report project. The Antigua & Barbuda Department of Environment (DOE), Ministry of Health, Wellness, Social Transformation and the Environment is responsible for climate MRV functions, which includes implementing climate change planning and management, monitoring all climate change issues within a national context, and reporting to the UNFCCC.

Emissions from electric power generation, which previously accounted for the largest portion of the energy sector, has now been surpassed by transport, which is dominated by on-road mobile. The latest draft inventory report for 2016 to 2019 indicates that the transport sector accounts for more than 50% of the total national GHG

emissions. The transport subsector relies mainly on imported petroleum-based fuels (i.e., petrol/diesel for vehicles).

The more specifically elaborated NDC measures (2021) call for added mitigation MRV analysis capabilities to quantify the ex-ante and ex-post GHG progress and other social and environmental impacts of policies. Currently, the country has newly developed economy-wide internal capability, through its ICAT phase 1 project, to quantitatively model the aggregate impacts of these policies and to examine longer-term mitigation scenarios involving a portfolio of policies and actions. However, the transport-specific resolution of this capability is limited by the existing economy-wide tools in use (i.e., GACMO and LEAP). The Transport Climate Action Data (TraCAD) modelling tool has recently been developed by partners of the ICAT Secretariat, Climate Smart Initiative (CSI), and will be used during implementation of the phase 2 project to produce model outputs and aid in the impact assessment; this will be the first application of the transport assessment tool in the Caribbean and among SIDS. The LEAP modelling tool will also be used during the phase of implementation to provide comparable and robust outputs and projections. In addition to using the LEAP and TraCAD tools to assess the transport sector, the LEAP and GACMO models produced in the first phase will be updated to reflect current policies and actions. Antigua & Barbuda's NDC target towards a complete transition to EVs, is demonstrated through its ongoing Global Environment Facility (GEF)-funded Sustainable Low-Emissions Island Mobility (SLIM) project and proposed GCF US\$35M transport project, the country is in need of dedicated analytical capabilities both to inform ongoing EV policy-making (ex-ante analysis) as well as embed in-country modelling tools to quantify impacts of these EV policies (ex-post analysis).

## **Introduction**

Data collection is critical for developing and updating a country's greenhouse gas (GHG) inventory of emissions and removals, GHG projections, and tracking of progress towards NDC commitments. Good data is important to support related MRV efforts. Further to this, good data is a vital component when developing models that project potential emissions and emissions reductions of a company or country.

This ICAT Phase 2 project has two objectives. Firstly, focusing on assessing the impacts of vehicle fleet electrification in Antigua & Barbuda as the country seeks to progress the transition from internal combustion engine (ICE) vehicles to electric

vehicles (EVs). Secondly, updating the tools and models used in the first phase of ICAT. Similar to the process undertaken during the first phase project, a combination of outreach engagements with key data providers was used to obtain the data necessary to complete the assessments. Formal and informal data requests were made, and in some cases, bilateral communications were also used to better engage data providers.

This manual seeks to highlight the data collection process throughout the Antigua & Barbuda model development process. It features how the data was screened, the types of data collected, and the channels utilised to facilitate these data. In addition, limitations in the data collection process and recommendations for improvement in the future are also outlined.

## **Methods of Data Collection**

The methodologies used to achieve the above objectives are similar, therefore, the approach for data collection follows the path previously outlined during the phase 1 project. The data needs for the modelling tools being used—LEAP, GACMO, and TraCAD—were identified along with the key data sources in the country. A OneDrive folder (an electronic file system to organize and archive project data) was created with all existing data resources (e.g., reports, databases) that were already within the DOE. A notable difference for this Phase 2 project is the availability of data that was collected under the Sustainable Low Emissions Island Mobility (SLIM) Project. This pilot project aims to progress the transition of the country to electric mobility through the introduction to and acquisition of two electric vehicles to be utilised by the local taxi and bus associations, installation of charging stations throughout the island, and foundational policy planning that can be used to influence policymakers to develop and implement new policies around electric mobility. Qualitative and quantitative data were both considered in the data collection process.

A number of datasets were acquired through the SLIM project in a cross-cutting capacity to;(i) prevent duplication of efforts and (ii) request data based on any gaps identified. As such, the SLIM data were supplemented as necessary to address any gaps in new data needs.

A channel of communication was kept open between the data collectors, model developers, and the data providers to better guide the data collection. Similar to Phase 1,



only secondary data was gathered from data providers in government and the private sectors. These data were shared with the model developers using the OneDrive system to allow ease of access to the data for thorough evaluation. The model developers determined whether the available input data required further granularity to achieve the desired modelling resolution. In some cases, further consultations were needed to clarify characteristics of the datasets, provide and/or to address apparent discrepancies, and/or to identify the feasibility or timeline for obtaining updated data. These consultations primarily occurred via virtual meetings.

In cases where there were limited or no national data available, regional data sources were used as an appropriate benchmark. A table highlighting the datasets that were requested/required by the CCMRVH team for developing the LEAP, TraCAD, and GACMO modelling framework for Antigua & Barbuda can be found in Annex 1.

Data to inform the models were mainly sought out by email and telephone requests. In some cases, desk review of policies were also used to identify relevant data that would inform the models. The overlap of key stakeholders between the Phase 1 and Phase 2 projects meant that the stakeholders were already aware of mitigation modelling efforts of the Department of Environment and, therefore, buy in was already favourable for the project. Virtual meeting consultations were mainly used to address any discrepancies or clarification that was needed about the data which was provided.

Additionally, with the diminished threat of the COVID-19 virus, the project team was afforded the opportunity to host an in-person training for the LEAP software and an in-person workshop (i.e. the Transport implementation project alignment workshop). This new face-to-face element in project implementation allowed stakeholders to (i) be more involved during the training sessions (LEAP), (ii) provide more insight/discussion into national priorities and activities, and (iii) appreciate the importance of data and data sharing. Further, because of participation in the TraCAD and LEAP trainings, stakeholders were exposed first hand to the software and how the data, which they provide, contributes to the outputs produced by the software.

Table 1 displays key stakeholder engagements that supported data collection efforts both directly and indirectly. All other data was acquired subsequent to email and/or telephone requests. The data sources are listed in Annex 1.

Table 1: Key stakeholder engagements used to promote data sharing

Name	Engagement Type
Inception Workshop	Workshop
TraCAD Software Training	Training
LEAP Software Training	Training
Transport implementation project alignment workshop	Workshop
ABTB ICAT PII Meeting	Bilateral Meeting

## **Limitations to data collection/model development**

The Antigua Barbuda Transport Board (ABTB) was the main source of data for much of the assessment, in addition to the data collected prior under the SLIM project. The ABTB collects data on vehicle stock, disaggregated into the types of vehicles within Antigua. These datasets were used in the project; however, a further detailed breakdown of the data would support more robust models. For example, availability of the life of these vehicles, the mileage and the number of vehicles per household. Further disaggregation would have allowed for an even more accurate model representation of road transport in Antigua.

- **Quality Assurance/Quality Control (QA/QC)** – Although not a regular occurrence, challenges were faced when discrepancies were discovered among datasets. It could be assumed that most organizations do not have an embedded Monitoring and Evaluation team that would track the progress and objectives of the data collectors. . Therefore, the discrepancies identified were resolved during the project period, however, the potential source could be linked to missed steps in the QA/QC process. With strict adherence to the QA/QC standards in place for both data providers and data receivers, these discrepancies can be limited to anomalies or detected in a more timely manner.
- **Data Disaggregation** – Data collection in the country has improved over time, however, there are cases where the level of disaggregation of the data received

does not provide the desired level of detail for modelling. Where this has occurred, assumptions must be made in modelling scenarios. An example of this is the registration of hybrid vehicles which are currently being registered as ICE vehicles, but with more accurate records, this type of data could provide a better outlook on potential GHG emissions in the transport sector in the models. Generally, greater levels of disaggregation in datasets reduces the number of assumptions made in modelling scenarios, increasing the reliability and accuracy of results produced.

- **Turnaround Time** – As the governing body with oversight of vehicle regulation and standards in the country, the ABTB regularly collects vehicle data and stores these data. These data, however, are not always readily accessible. As described by the data unit of the agency, retrieving data that is requested by any entity is a tedious process of manually sorting through files and pulling the desired pieces of information. This process often requires 4-5 weeks minimum to be completed. When combined with QA/QC challenges, the overall turnaround time for receiving data is quite extensive.
- **Human resources** – Generally, there has been difficulty allocating resources to conduct data collection throughout national government agencies in Antigua & Barbuda. These limitations often result in the lack of critical data to assist with the improvement of various processes within the agencies. For example, upon annual inspection of vehicles the mileage is collected, however, the data is not readily available. Therefore, it could be deduced that the ABTB may have inadequate human resources, to collate the data in an appropriate repository thereby losing valuable data and or create an extended c turnaround time for receiving data. This may ring true for many other agencies from whom data are requested.

In addition to the limitations listed that were evident during data collection, a lack of specific datasets was also for a factor that informed assumptions that were made during modelling. For instance, vehicle sales data were not readily available and were, therefore, assumed to be directly proportional to newly registered vehicles (a dataset that was available but limited). Such data would be valuable in informing sales projections that could provide a glimpse into social aspects to be considered with a large-scale transition to EVs. Despite these limitations in national data collection efforts,

improvements are being made and planned for future data collection and modelling. For instance, the ABTB is in the process of updating their data systems to improve efficiency in data retrieval.

## **Recommendations for future data collection**

With consideration of the improvements that have been achieved since completion of the Phase 1 project, there is still room to improve the quality and efficiency of data collection. Below are a few recommendations.

- i. *Institutional Arrangements* – To add to the existing MOU between the DOE and Statistics Division, additional MOUs have been implemented or are near completion for implementation between the Antigua and Barbuda Transport Board and private sector stakeholders (e.g., Will’s Recycling). While this is indicative of progress in the area of institutional arrangements between the DOE and other agencies, further agreements for data sharing are needed. Additional MOUs for data sharing with other important data providers such as car dealerships could be an approach used for improving institutional arrangements and more easily receiving data when requested. These agreements would help to standardize regular data exchanges and influence the quality control and quality assurance practices used for the data collected.
- ii. *Capacity Building* – Capacity building has been an important component of both ICAT projects that have been implemented with emphasis being placed on understanding mitigation modelling and the data requirements for producing the best possible outputs. The Monitoring, Evaluation and Data Management Unit (DMU) of the DOE should, when possible, continue to collaborate with other government agencies and private sector entities to build capacity in data collection methods, data storage and data management systems. In complement with the mitigation modelling skills being developed among key stakeholders, these skills will help to bolster efforts for future modelling needs. As their capacities are increased, even with limited human resources, these agencies will be able to improve the quality of the primary data collection tasks they administer.
- iii. *Ongoing Collections* – It is also recommended that the DOE keeps an active repository for the relevant data sets to complete transport assessments. Having built the capacity and understanding of the requirements for producing accurate

and relevant mitigation models, in line with the institutional arrangements, the DOE should seek to regularly receive updated datasets that would support the modelling process. The suggested frequency is bi-annually to annually.

## Annexes

**Annex 1** – The Data Requirements for Transport Modelling in LEAP and TraCAD as requested by the CCMRVH team can be accessed via the link below.

[Data Requirements table ANT Transport Models \(LEAP, TRACAD\).pdf](#)

**Annex 2** – Data collected for modelling in LEAP and TraCAD

Data Category	Data Collected	Data Source
<b>Demographics</b>	Total Population per year	Statistics Division
	Population Growth Rates	
	Population distribution by age and gender	United Nations World Population Prospects
	Total Households	Statistics Division
	Household Size	Global Health Data Exchange
<b>Economic</b>	GDP	Statistics Division
	GDP Growth Rate	
	GDP by Sector	IMF's World Economic Outlook
	Sectoral Contributions to GDP	Eastern Caribbean Central Bank
<b>Transportation</b>	Total registered vehicles per year by vehicle type (2011 – 2022)	Antigua and Barbuda Transport Board
	Registered vehicles by fuel type (2015-2022)	
	Vehicle type by registration category (2019-2022)	
	Vehicle age profile per year (2015-2020)	
	Total newly registered vehicles per year (2015-2019)	SLIM Project
	Vehicle Fuel Economy	
	Vehicle Cost	SLIM Project

		ICAT project team (Primary data collection)
	Vehicle mileage by vehicle type	SLIM Project Regional data sources
	Vehicles Emissions Factor	IPCC Guidelines 2016-2019 GHG Inventory (not yet published)
<b>Power</b>	Transmission and Distribution Losses	Antigua Public Utilities Authority
	Energy Generation Capacity by power plants	Antigua Power Company