



# Municipal Level Carbon Emissions Assessment in Tunisia

## Advancing the city-level greenhouse gas (GHG) emissions assessment of the municipality of Sfax into a Nationally Appropriate Mitigation Action (NAMA)

As Tunisia's second largest municipality and widely known as a hot-spot for environmental pollution, the city of Sfax decided to undertake the country's first GHG emissions assessment at city level. This assessment, applying the Bilan Carbone® tool, now forms the basis for a municipal transport Nationally Appropriate Mitigation Action (NAMA). The case provides an example of bottom-up climate action led by a municipality and demonstrates the important role which cities can play as pioneers and "pushers" for climate action and innovation at national level.

### Background

The seaport of Sfax in western Tunisia accommodates a vibrant industrial centre and a busy commercial shipping port. Over recent years, the city has begun investing in environmentally sound industrial production and developing climate change policy to improve its reputation as an environmental pioneer and green city. This has also included the creation of a sustainable development observatory as part of its regional development strategy.

To enable effective measurement of its progress in these efforts, the municipality sort to undertake an assessment of its greenhouse gas (GHG) emissions. With assistance from GIZ, the Bilan Carbone® tool, developed by the French Agency for Environment and Energy Management (ADEME), was selected and used.

### National Background

Despite not being a major contributor to global greenhouse gas emissions, Tunisia is increasingly aware of its vulnerability to climate change impacts and was consequently among the first countries to ratify the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Supported by GIZ, the Ministry of Infrastructure,

Country	Tunisia, in Sfax and its greater region
Sector	Crosssectoral GHG Accounting
Duration	December 2012 – September 2013
Framework	The Bilan Carbone® Project by ADEME was part of the GIZ project 'Supporting the implementation of the UNFCCC' (financed by German Federal Ministry of Economic Cooperation and Development (BMZ)). Cost of Bilan Carbone® 33,000 €.
Coordinating entity	Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ)
Implementing agency	Technical Service of the Municipality of Sfax
Partners	National: National Agency for Energy Conservation (ANME) Municipality: Sfax

Spatial Planning and Sustainable Development has established a National Strategy on Climate Change. The strategy has not yet been adopted as politically binding, but serves as a guideline for the country's efforts in implementing climate change adaptation and mitigation policies. For example, Tunisia is currently improving its water management system and the country incorporated climate change measures into its forest management guidelines. In the field of climate change mitigation, Tunisia has developed NAMAs focused on energy, agriculture, cement and wastewater and has been an active participant in the Clean Development Mechanism (CDM). Tunisia aims to define a long-term mitigation target in its first biennial update report (BUR) in December 2014 based on a consolidated national greenhouse gas inventory.

On behalf of:

## Description of Activities

The Bilan Carbone® tool was provided by the National Agency for Energy Conservation in Tunisia (ANME), with support from GIZ. The tool provides a detailed overview of the main sources of local GHG emissions in the city of Sfax and its greater region.

### Objectives

The carbon assessment aimed to:

- Identify the biggest sources of GHG emissions of Sfax and its greater region;
- Determine sectoral distribution of GHG emissions in order to propose mitigation actions that might evolve into local NAMAs;
- Provide capacity to local actors in the measurement and analysis of GHG emissions;
- Strengthen Sfax’s efforts to transform from a pollution hot spot to a green city.

### Methodology & Findings

Two different modules of the Bilan Carbone® tool were used to measure GHG emissions in Sfax and its wider region.

Firstly, for the city of Sfax itself, the module for local authorities was applied. This assesses emissions for each individual service under the city’s control and then aggregates the data to produce a total emissions figure. For Sfax, the total emissions were calculated to be 5.2 million t CO<sub>2</sub>e (see table):

Figure 1 – Bilan Carbone of Municipality of Sfax

Sector of activity	Emissions	
	t CO <sub>2</sub> e	% Total
Energy	64,419	1%
Industry	791,110	15%
Tertiary sector	142,752	3%
Housing	318,299	6%
Fishing and agriculture	634,778	12%
Freight transport	2,155,936	42%
Passenger transport	640,428	12%
Buildings and railway system	5,515	0.1%
Waste management	415,019	8%
<b>Total :</b>	<b>5,168,256</b>	<b>100%</b>

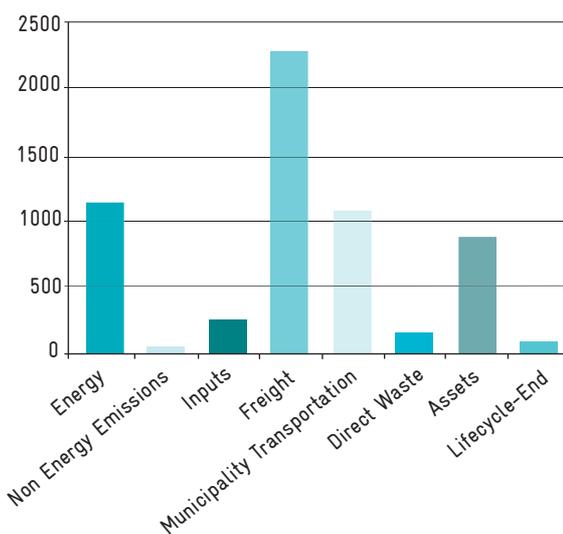
Secondly, for the wider Sfax region (covering seven municipalities including the city), the module for territorial GHG emission measures was used. This module divides

the total emissions into fields of activities. However, due to some limitations in accessing data, some estimations were required.

Total GHG emissions for Sfax and its greater region are around 6.1 million t CO<sub>2</sub>e compared to 5.2 million for the city alone. The most important source of emissions in both cases is from freight transportation which is responsible for 37% of the region’s total emissions (and 42% in the city).

Figure 2 –

Bilan Carbone® GHG emissions by Category, in tCO<sub>2</sub>



### Approach

Data collection required cooperation with a large number of actors in the respective sectors, through a process coordinated by the technical service of the municipality of Sfax. Officers in the city authority were also trained in using the tool and guided to identify areas of mitigation potential.

### Resulting Action plan

On the basis of the Bilan Carbone® assessment, working groups identified four key areas for reducing GHG emissions: transportation, waste management, energy/ industry and governance.

The measures to be undertaken in each sector have been classified on a time scale (priority actions, short term actions, long term actions and actions requiring further research). Based on this, an action plan has been developed, which if successfully implemented should lead to GHG reductions of 10% in comparison to the 2010 reference scenario.

### Priority actions include:

- Waste management (waste recovery and its transformation into biogas);
- Industry (consolidate energy audits);

**Short term actions** include:

- Transportation (reorganisation of freight traffic routes, reorganisation of the taxi transport system, delivery of urban transport programme 'Plan de Déplacement Urbain');
- Waste management (waste separation, recycling)
- Energy (energy audits in the tertiary sector, water heating with renewable energies, fridge replacement programme);

**Long term actions** include:

- Transportation (an ecologically viable public transport system);
- Waste management (management of controlled landfills, composting system);
- Traffic infrastructure (ring roads for travelling distance reduction, flyovers to avoid traffic jams);

**Actions requiring further reflection** include:

- Bus system and parking facility improvements;
- Waste collection optimization;
- Roof isolation for private housings;
- Road maintenance

## NAMA

In Sfax and its wider region, freight and passenger transport together account for more than half of local greenhouse gas emissions. Consequently, the city of Sfax in cooperation with GIZ decided to develop a NAMA in the transport sector. The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) through its International Climate Initiative (IKI) is co-financing the development of the NAMA together with the city of Sfax and the ANME.

The NAMA will build on the knowledge gained from the current GHG emissions assessment with further information from traffic censuses and simulations which will lead to concrete measures and confirm or adapt the transport sector activities proposed in the action plan. Some actions identified on the basis of the results of the carbon assessment are already underway and form a first stage of NAMA implementation. These include:

## Timeline and step-wise action towards the outcomes

October 2010	Seminar on the activities and initiatives of the municipality of Sfax in the building's energy efficiency sector. First contact with GIZ. The municipality of Sfax shows great interest in realizing a carbon assessment for their city and the region in order to boost the development of its territorial policy.
May 2011	First workshop conducted by an international expert. Presentation of different tools for the carbon assessment. The Bilan Carbone® tool selected as the most suitable for the case of Sfax.
Summer 2011	Request to ADEME (France) for using the Bilan Carbone® tool. ADEME already signed a contract with the National Agency for Energy Conservation (ANME) in Tunisia; decision of GIZ to work in cooperation with ANME. Selection of a French consultancy with Bilan Carbone®-experience.
December 2012	Kick-off workshop.
Since December 2012	Data acquisition by the municipality of Sfax, in cooperation with ANME in the industry and tertiary sectors along with other regional and national institutions and actors.

*In cooperation with the regional project 'Coopération des villes et des municipalités' (CoMun) (BMZ/GIZ):*

June 2013	Request for a fundraising guidelines that identifies and evaluates co-financing opportunities for local climate projects by the municipality of Sfax. Guidelines were presented at the project's final workshop.
September 2013	Study trip of a delegation of governmental actors from Sfax to Munich, Germany. Exchange of knowledge various topics including: greenhouse gas accounting tools used by the two cities; development and financing of measures to reduce greenhouse gas emissions; strategies for sustainable transportation; construction of energy efficient buildings and waste management.
September 2013	Final workshop including a presentation of the Bilan Carbone® assessment and an action plan established by working groups including all actors involved in the measures being implemented.
Spring 2014	Project on waste recovery and its transformation into biogas starts. Cooperation between the Municipality of Sfax and BMUB/GIZ, supported by the Tunisian National Agency for Waste Management.
April 2014	Development of transportation NAMA in Sfax starts. Agreement between the ANME, the municipality of Sfax and BMUB/GIZ on the co-financing of the project. The Tunisian institutions are financing complementary studies which are necessary for the execution of the action plan, especially the creation of the NAMA and the realization of the urban transport program ('Plan de déplacement urbain').

- Urban transport program for the wider Sfax region;
- Feasibility study for eight interchanges (bridges/flyovers with different exits in order to improve circulation fluidity) on the city's ring road;
- The NAMA also promises to delivery further benefits.

The NAMA also promises to delivery further benefits including:

- Health and wellbeing co-benefits from improving the region's transport system such as reduced air pollution and improved safety;
- Contribution to delivery of the national emissions reduction target through implementing local actions which have greenhouse gas mitigation effects.

### Capacity development and visibility

Additional to achieving its primary purpose of providing GHG emissions assessment and enabling the identification of future actions to be taken, the Bilan Carbone® approach actively involved municipal staff and other stakeholders in the carbon assessment process. This has resulted in important capacity development at the local level, enabling the municipality of Sfax to position itself in the international framework on climate change and to join the "Covenant of Mayors".

## Lessons Learnt and Recommendations

- The principal challenge for a carbon assessment at the local level is ensuring access to **valid information on greenhouse gas emissions**. Municipalities in Tunisia do not have the necessary information easily at their disposal, so the city of Sfax had to collect the data in cooperation with other actors and institutions. This was a time consuming task and there might be shortcomings in the accuracy of the data.
- It is necessary to **create a team within the municipality** that conducts the carbon assessment and makes sure that it will continue in the future. Training and education have to be provided in order to keep the actors motivated for the continuation of the work begun with the Bilan Carbone®. In the case of Sfax, the municipality recruited a young academic to keep this activity going in cooperation with the municipality's technical service.
- In order to ensure the implementation of concrete actions in a developing country municipality, **advice by GIZ or other development organizations** is highly recommended. Support is especially required in fund raising and delivery of the actions proposed in the action plan.
- The **carbon assessment is just a starting point** towards designing and delivering climate policy. Indeed, it serves as a first diagnosis, which proves useful only if its results lead to the implementation of concrete actions.



#### Published by

Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices  
Bonn and Eschborn, Germany  
T +49 228 44 60-0 (Bonn)  
T +49 61 96 79-0 (Eschborn)

Dag-Hammarskjöld-Weg 1-5  
65760 Eschborn, Germany  
T +49 61 96 79-0  
F +49 61 96 79-11 15

E [info@giz.de](mailto:info@giz.de)  
I [www.giz.de](http://www.giz.de)

#### Contact

Torsten Greis (GIZ)  
E [torsten.greis@giz.de](mailto:torsten.greis@giz.de)

Authors:  
Micha Knuth, Lena Hörnlein, Valeria Troudi (GIZ)

Contributions & Review:  
Tobias Zeller, Seif Derouiche (GIZ),  
Lara Esser, Nicholas Harrison (Ecofys)

All pictures and graphs: © GIZ



#### Contact

Riadh Haj Taieb  
Directeur Général, Municipalité de Sfax  
E [dtechnique.munisfax@gnet.tn](mailto:dtechnique.munisfax@gnet.tn)

ANME Tunisie  
National Agency for Energy Conservation

Le Bilan Carbone is an ADEME (Agency for the Environment and Energy Management) instrument.

GIZ Office Tunisia  
Rue Le Grand Boulevard de la Corniche Immeuble Le Grand Boulevard Cité les Pins  
2045 Berges du Lac II de Tunis  
T +216 71 967-220  
F +216 71 967-227  
E [giz-tunesien@giz.de](mailto:giz-tunesien@giz.de)  
I [www.giz.de/tunesien](http://www.giz.de/tunesien)