






National Solid Waste Management Programme (NSWMP) Egypt

Side Document: Climate Aspects of the Programme

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Part A: Climate Mitigation

1 Introduction

Climate changes are being observed as a result of the global warming taking place from greenhouse effects caused by greenhouse gases (GHG) such carbon dioxide emitted into the atmosphere. Although Egypt's contribution to the global GHG release is only about 0.5%, Egypt is considered to be highly vulnerable to impacts of climate changes in several ways:

- Deficit in water resources due to changing rain fall patterns and ground water availability;
- Decrease in crop productivity due to changes in temperature and humidity distribution around the year;
- Considerable loss of agricultural land due to rising level of sea water.

There are two strategic actions to confront climate changes. One is mitigation of GHG release, and second the adaptation to anticipated impacts. While mitigation refers to interventions to reduce emissions or enhance the sinks of greenhouse gases, adaptation refers to policies and actions to minimize the predicted impacts of climate changes.

In 1992 Egypt signed the international treaty - United Nations Framework Convention on Climate Change (UNFCCC), in 1994 the treaty was ratified. In 1995 Egypt was declared as one of the most vulnerable countries to climate changes impact. One year later in 1996 Egypt signed the Kyoto Protocol which has more powerful measures (and legally binding) to developed countries (classified as Annex I) to reduce GHG emissions by certain levels considering 1990 as the base year. The major distinction between the Protocol and the Convention is that while the Convention **encouraged** industrialized countries to stabilize GHG emissions, the Protocol **commits** them to do so.

The assessment of GHG emissions for Egypt between 1990 and 2000 represented an average increase of 5.1% annually. Estimated total GHG emissions in 2008 are about 288 $MtCO_2eq$, with CO_2 represents 66% , CH_4 20% , and N_2O 13% of emissions. The energy sector is the primary contributor to emissions of GHGs in Egypt, followed by agriculture, industrial processes and then the waste sector. GHG emissions per capita show 37% increase in the year 2000 relative to 1990. The share of Egypt in the total world GHG emissions in 1990 was 0.4% and was still limited to 0.58% in 2000.

2 National policy

The UNFCCC convention divides countries into three main groups according to differing commitments:

Annex I
Parties include the industrialized countries that were members of the OECD (Organization for Economic Co-operation and Development) in 1992, plus countries with economies in transition (EIT Parties).These parties have commitments to: achieve country specific emission reduction goals.

Annex II
Parties consist of the OECD members of Annex I, excluding the EIT parties.

They are required to provide financial resources to enable developing countries to undertake emissions reduction activities under the Convention and to help them adapting to adverse effects of climate change. In addition, they have to "take all practicable steps" to promote the development and transfer of environmentally friendly technologies to EIT Parties and developing countries. Funding provided by Annex II Parties is channeled mostly through the Convention's financial mechanism.

Non-Annex I
Parties are mostly developing countries. Certain groups of developing countries are recognized by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil fuel production and commerce) feel more vulnerable to the potential economic impacts of climate change response measures. The Convention emphasizes activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance and technology transfer.

Egypt is a Non-Annex I party.

49 Parties classified as **least developed countries** (LDCs) by the United Nations are given special consideration under the Convention on account of their limited capacity to respond to climate change and adapt to its adverse effects. Parties are urged to take full account of the special situation of LDCs when considering funding and technology-transfer activities.
As a non-annex I country, Egypt is not required to meet any specific emission reduction or limitation targets in terms of its commitments under the UNFCCC or the Kyoto protocol. However, realizing the possible challenges of impacts of climate change, Egypt has considered the issue as one of its national priorities. Acting accordingly, in 1996 Egypt established a unit within the Egyptian Environmental Affairs Agency (EEAA) to be responsible for issues of Climate Changes. In 1997 the National Committee for Climate Change was established by the Prime Minister, the Committee was renewed in 2007.

Egypt has undertaken a Climate Change Risk Management Action Program, with EEAA as focal point for the UN convention. The program aims on:

- Strengthen institutional capacity and policies to help mitigating Egypt's contribution to emissions and to help providing tools to make strategic decisions for the adaptation to Climate Change;
- Develop a National Program that is cross-cutting all ministries and all sectors;
- A National Inter-Ministerial Steering Committee on Climate Change exists for coordination work, chaired by MSEA Minister.

The program addresses adaptation as well as mitigation measures. Adaptation actions are top priority since Egypt is the most vulnerable nation to Climate Change impacts in the Mediterranean region. **Adaptation** measures are addressed mainly by the Ministry of Water Resources and Irrigation (MWRI) and by the Ministry of Agriculture and Land Reclamation (MALR). On the water resources side the intention is to develop a regional circulation model for the river Nile, while on the agricultural side the aim is to develop stress tolerate crops, to identify optional cropping patterns, and to optimize the use of water resources. **Mitigation** actions address emissions in sectors of energy, industry, agriculture, and waste. The Supreme Council for Energy is a cabinet council consisting of several ministers covering the sectors of high utilization of energy. The Council sets energy policies for introducing renewable sources of energy, for fuel switching in industry and transport from oil to natural gas, for the implementation of domestic and industrial energy efficiency programs, for energy-efficient buildings, and for agriculture and plantation schemes enhancing public participation and cooperation with the aim of creating low carbon economic structure that prioritizes energy efficiency.

In October 2007, the Supreme Council for Energy adopted a strategy for energy supply and use, which comprehensively integrates the main policies and measures that could meet the longer term challenges facing the national energy industry. The strategy confirms the ongoing activities, adding to them nuclear power generation, carbon capture and storage, the reduction of electricity losses through transmission and distribution systems and demand-side management. Over years, a series of policies and measures have been adopted to result in a general decrease in GHG emissions per unit of product in industrial processes and product use (excluding those related to energy). The main barriers that currently prevent the industrial sector from achieving full energy conservation and considerable GHG emissions reduction include a lack of information about GHG emissions reduction opportunities in the sector, long payback periods on some GHG emissions reduction investments, and financial barriers such as the lack of access to investment capital and/ or high interest rate on investments.
Mitigation of GHG emissions is addressed by the Climate Change Unit at EEAA. Main sectors addressed for GHG mitigation are listed in order of their contribution to CO^2 emissions (*2000 figures):

- Energy Sector 61%
- Industrial 14%
- Agricultural 16%
- Waste 9%

Since the late 1990s the most significant mitigation measures implemented were in the **energy sector**, mainly by fuel substitution such as oil being substituted by natural gas in the electricity generation.
In the **industrial sector** the following measures had a significant impact:

- combined heat and power generation;
- efficient lighting systems;
- the use of large-scale grid-connected wind farms in electricity generation;
- steam condensate recovery;
- the use of solar thermal energy in electricity generation;
- the use of natural gas in commercial vehicles; as well as
- extending the underground metro lines;
- mitigation of CO2 and CH4 emissions from rice cultivation and livestock; and
- increasing the country's CO2 absorptive capacity through planting trees.

Mitigation measures in the **waste sector** were limited to municipal solid waste projects.

The National Committee on Climate Change, established in 1997, formulated and promoted a number of policy options for combating impact of GHG emissions. To strengthen the institutional framework for adaptation on the sector level, two committees were established in Ministry of Agriculture and Land Reclamation and in Ministry of Water Resources and Irrigation, in addition to establishing a climate change information centre for Agriculture Sector, and conducting an adaptation program in Agriculture Sustainable Development Strategy up to 2030. On the mitigation side, policies and measures were implemented for GHG emissions reduction in Egypt during the last decade.

For solid waste the implemented measures have entailed the establishment of a special administrative department within the Environmental Management Units (EMUs) for SWM in each Governorate and city. Those units have the responsibility for:

- the selection of locations and the design of sanitary landfills;
- producing statistics and surveys of waste types (eg agricultural vs. municipal), quantities, and properties such as composition and moisture content in Governorates;
- promoting waste collection and waste recycling; and
- encouraging private sector companies and investors to take over waste recycling and composting projects.

For liquid waste the implemented measures include the maintenance of newly developed primary and pre-treatment systems; clarification of lines of command and communications between different pertinent entities; and the development of institutional and enforcement capabilities of the local authorities of new industrial cities.

At present there is no single policy for management of solid waste that could be labelled as national policy. A number of policies related to SWM were developed for different waste sub-sectors, by different stakeholders at national, regional and local level. A national strategy for Integrated Municipal Solid Waste Management was developed in the year 2000, however so far there has been insufficient implementation of the strategy.

3 Institutional set up

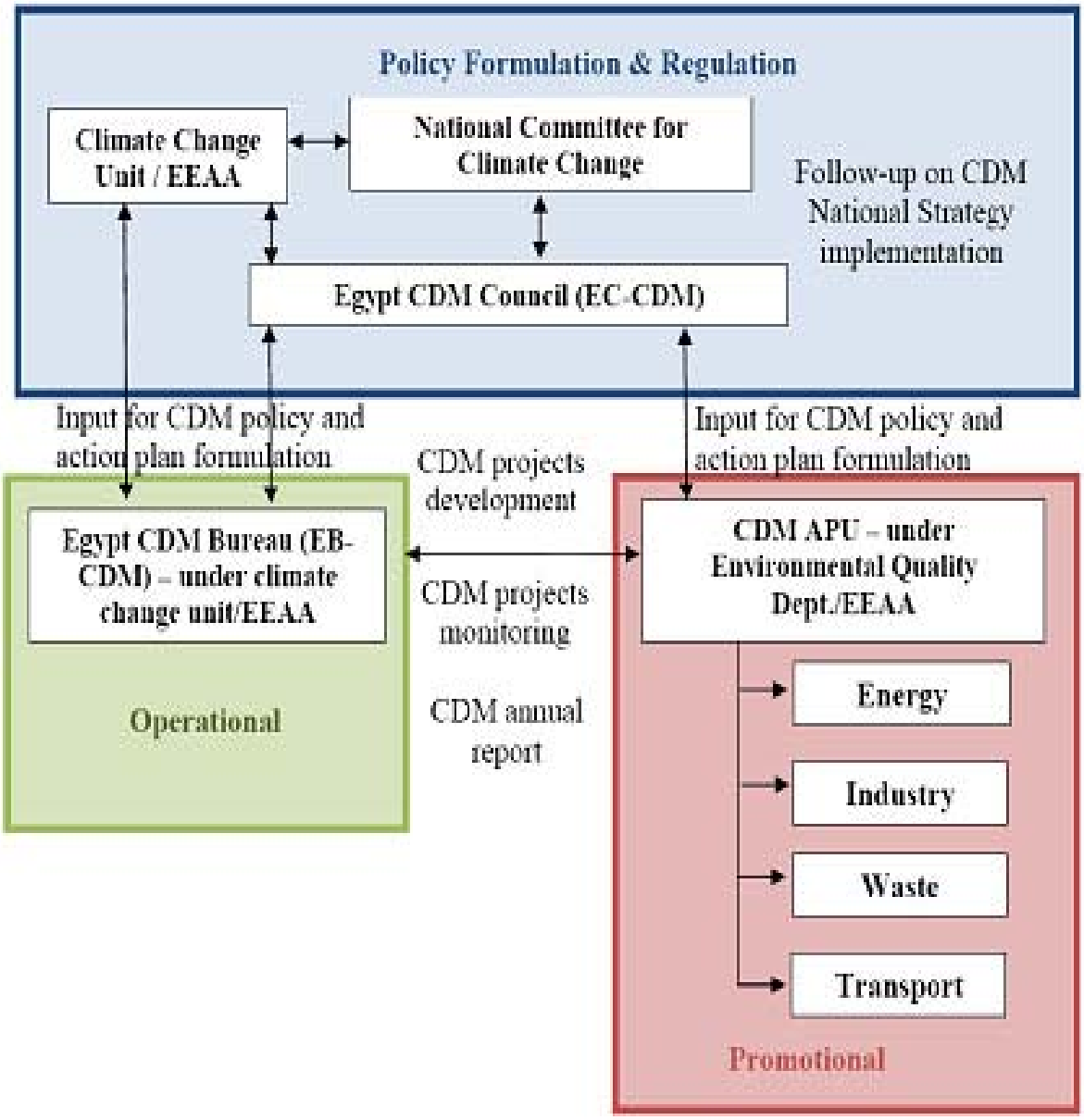
In 1996 Egypt established an administrative unit for Climate Change issues within EEAA. The "National Committee for Climate Change" was also formed in 1997. The Committee was renewed in 2007 by a Prime Minister Decree No. 272. The MSEA heads the new National Committee for Climate Change. The members represent a wide range of governmental officials, experts and non-governmental stakeholders. In the modified organizational structure for EEAA approved in 2006, the Climate Change Unit was upgraded to the General Department of Climate Change within the Central Department of "Industrial Environmental Improvement, Protection and Climate Change"; which itself consists of three departments: the Ozone Department, the Vulnerability and Adaptation Department and the Cleaner Production Mechanism Department. In 2009 the MSEA scaled up the "Climate Change Unit" to strengthen the climate change institutional framework on the national level. The Unit's organizational level was elevated to be "Central Department of Climate Change and Ozone", which encompasses the following three general departments:

- General Department on Mitigation and CDM,
- General Department on Risks and Adaptation, and
- General Department on Climate Change Technologies and Researches.

Concurrently, since May 2009 the CDM/APU Unit (Awareness and Promotion Unit) was established under the CDM Component of the Joint Program of Climate Change Risk Management in Egypt CCRMP. The following figure illustrates the organization of the Egyptian Designated National Authority (DNA). The "Egypt Bureau for CDM– EB CDM" and the "Promotional and Awareness Unit CDM APU" are interrelated to EEAA organization structure as indicated in the figure.

The EB CDM is under the Central Department for Climate Change and Ozone, while the CDM/APU unit is affiliated to the Environmental Quality Sector. The CDM/APU unit is mandated to:

- Promoting, propagating, and marketing for CDM projects;
- Building CDM national capacity;
- Providing technical assistance "CDM Helpdesk";
- Guiding financial and legal support for CDM projects;
- Setting mechanisms for cooperation between project participants; and
- Supporting CDM policy making and regulatory organizations.



For the national approval part of the CDM project cycle, Egypt has established a two-step procedure to evaluate and approve project proposals and ensure that proposed projects satisfy the two elementary UNFCCC criteria of additionally and Egypt's sustainable development targets.

In the first step, the project participant submits a Project Idea Note (PIN); the EB-CDM evaluates the PIN for conformity of the proposed project with international requirements and national sustainable development criteria. Based on the results of this check, the project participant will be issued either a letter of "No Objection", or receives a negative response. The aim of this preliminary evaluation is to provide a clear indication at early stage of project preparation whether the project might be nationally acceptable as a CDM project. Upon receiving the "no objection" letter, the next step will be for the project participant to prepare the Project Design Document PDD based on the templates provided by CDM Executive Board. After checking the PDD, the CDM Council issues a preliminary host approval. The PDD is then submitted by the participant to a designated Operational Entity DOE for validation. A validated PDD is then submitted to the DNA for issuing the final host approval thus permitting the project proponent to proceed for registration under UNFCCC by the CDM Executive Board.

The latest study on Egypt's national environmental, economic, and development data indicated the strong need for a competent system for data monitoring, collection and analysis:

- Although a National Committee for Climate Change was established since 1997 to set policies to help mitigate emissions in Egypt and provide tools for the adaptation to impacts of Climate Change. It was realized that one of the most significant constraint to effective environmental policy making and implementation in Egypt is the lack of reliable and timely information, indicating how various sectors of society impact the environment and whether development is becoming more sustainable or not.
- There are constraints related to the processes of environmental information collection, production and dissemination, these include uncoordinated institutional set-ups for monitoring activities, the absence of a common information system for monitoring organizations to feed data and findings into, the absence of comprehensive systematic methodologies for monitoring, the absence of valuation, and/or the undervaluation, of many natural resources, and the lack of financial resources for maintaining monitoring processes.
- Updating inventories of GHG emissions in Egypt will have enabling effect on :
  - Evaluating the effectiveness of polices and measures,
  - Making long term emission projections, and
  - Assessing mitigation options.

- There is need for Egypt to develop a National Adaptation Program of Actions (NAPA) which will serve the needs of policy level decision makers as well as planners and implementers and provide basis for effective public awareness.
- At the Governorate level there is a need to enhance the capacity of the Governorate's Environmental Management Units (EMU) in several ways:
  - To regularly update the Governorate's Environmental Profiles as a means of reporting changes in environmental data at the base level;
  - To be capable of preparing pre-feasibility studies for potential CDM projects, collaborate with professional entities (private sector and civic society) to execute promotional campaigns with the purpose of attracting investors for potential CDM projects.

- To support the development of local competence of Operational Entities and encourage such entities to qualify for being internationally designated by the CDM Executive Board.
- To incorporate CDM needs in the investment law and build incentive for investing in CDM projects, with particular emphasis on projects in solid waste sector due to the direct impact of this sector on health and environment.
- There is need to remove financial barriers on investing in environment related projects, such as the lack of access to investment capital and/ or high interest rate on investments.
- Because of the cross-sectoral nature of environmental issues, significant coordination within respective Ministries is required to reach comprehensive and integrated environmental activities.

4 Carbon trade financing opportunities

4.1 International framework

Various anticipated measures of the NSWMP will result in reductions of climate relevant emissions. Under certain circumstances emission reductions can become tradable leading to carbon trade revenues. The main trading schemes currently in place are:

- Clean Development Mechanism (CDM); and
- Voluntary carbon market.

The CDM is a multinational trading scheme regulated under the United Nations Framework Convention on Climate Change (UNFCCC). With regard to the NSWMP the CDM has two major aspects, on one hand the procedure to determine emission reductions (methodologies, baseline definitions, monitoring requirements), on the other hand the marketing of certificates about emission reductions. Beside regular adjustments a clear break is expected for the time after 2012, when recent political decisions will most likely fully transform the mechanism and the markets. The major change result from the EU decision not to accept CDM certificates in the EU emission trading scheme (ETS) anymore, unless generated in LDCs or in projects registered before 2012 (Programmatic Activities -PoAs- are also still bankable, even if a single activity was started after 2012). Thus, the market for CDM certificates (CERs) stemming from emerging market countries is expected to collapse since the major buyer disappears.
The EU decision is part of a new climate mitigation policy of the industrial countries which aims on promoting (enforcing) national mitigation measures and emission reduction goals in the emerging market countries rather than simply "switching" emission reductions. However, the conference of parties (COP) was not yet able to settle on procedures or incentives for those mitigation programs, just the title was fixed: NAMAs (National Appropriate Mitigation Actions). The future development in climate policy is difficult to predict, but experts expect incentives for national mitigation programs by means of either direct co-financing (what is not appreciated by Annex II-countries since it may interfere or overlap with ODA funding) or by means of bilateral contracts on accepting certified emission reductions in the EU ETS, which are generally eligible. However, a gap of 2-3 years starting in 2013 will probably arise, because the political process and the follow up administrative activities are time consuming. Moreover, granting incentives require clear definitions and procedures for NAMAs which are still far away from being done.
Taking the horizon of the NSWMP into account a reasonable source of carbon trade funding for selected SWM measures are expected only from CDM projects and PoAs (both if registered before 2012), projects targeting the voluntary carbon market and projects, which contribute to a future NAMA. Hence, the NSWMP considers the "classic" project related CDM as suspended. For the first wave investments outlined in the NSWMP revenues from carbon trading are not expected at all. However, the envisaged projects are set up in a way allowing best to merge it later into a programmatic approach. In detail, secure revenues can be expected for:

- Already registered CDM projects to jump on, such as co-incineration in cement plants with open capacity (e.g. cement plant Assiut);
- Already registered PoAs, which can be integrated into or linked to SWM systems, such as the Egyptian taxi scrapping program;
- New PoAs (e.g. decentralized composting, SSC) which need to be registered before end of 2012 and can later be joined by single project activities. The timeline for PoA registration is critical; and
- Voluntary carbon market.

4.2 Current CDM projects in Egypt

Although the first letter of "No Objection" was issued by the Egyptian DNA in 2005, there are only few projects that are registered yet by the CDM Executive Board. The Egyptian CDM Project Portfolio, updated in August 2010 shows only 5 registered projects. The following Table 1 was published by EEAA:

Table 1: Analysis of Egyptian CDM Portfolio

Sector	Project Status				
	Registered (CDM EB approval)	Approved*	Accepted**	Pipeline***	Total
Renewable Energy	*2*	*2*	*5*	*4*	*13*
Afforestation	*-*	*-*	*2*	*1*	*3*
Waste	*1*	*2*	*3*	*2*	*8*
Fuel Switching	*-*	*6*	*33*	*9*	*48*
Energy Efficiency	*1*	*2*	*9*	*5*	*17*
Industry	*1*	*-*	*5*	*-*	*6*
Total	*5*	*12*	*57*	*21*	*95*

*Approved : DNA issued Letter of Approval
**Accepted : DNA issued Letter of No Objection
****Pipeline : In phase of preparing PIN*

The following Table 2 summarizes the estimated CERs for the Egyptian CDM project portfolio in 2010. Total CER amount is estimated to be 34,135,404 units with registered projects amount to only about 5.8% of this figure. The total CER estimate represents potential revenue of 436,933,170 Euro under a current trade value of 12.8 Euro per ton CO_2.

Table 2 Estimated CERs for Egyptian CDM project portfolio of 2010

Sector	CERs t CO^2				Average CER per project
	Registered Projects	Approved projects	Accepted Projects	Total	
Renewable Energy	420,109	352,194	521,388	1,293,691	134,743
Afforestation	-	-	110,100	110,100	55,050
Waste	370,903	171,471	753,840	1,296,214	216,035
Fuel Switching	--	27,781,048	771,724	28,552,772	48,684*
Energy Efficiency	109,514	79,220	859,988	1,048,722	87,393
Industry	1,065,881	--	76,8024	1,833,905	305,650
Total	1,966,407	28,383,933	3,785,064	34,135,404	101,813

* Excluding the "Vehicle scrapping and recycling" project

It is noticed that CERs for projects in the fuel switching sector amount to about 28.55 million CERs and represent about 80% of the total value. This is mainly due to one single project, the "Vehicle Scrapping and Recycling Project" which is estimated to carry alone 26.7 million CER units. The last column of the table calculates the average CERs per project in each sector. It has to be noted that in calculating the average CER for the Fuel Switching Sector the Vehicle Scrapping and Recycling Project was excluded.
Recently, the Egyptian DNA has established a fee scheme to be collected from project participants upon receiving the issuance of CERs by the CDM EB. The fees collected are directed to the Environmental Protection Fund (EPF) and used for support of the DNA operating costs, training of DNA staff, awareness and promotion of CDM concepts, and research activities. The fee structure is determined as percentage of the project's CER trade value as follows:

- 1% for renewable energy projects;
- 3% for industrial and energy efficiency;
- 6% for SW landfill /composting;
- 8% N2O, Ozone depleting gases.

4.3 Voluntary market

Due to the above mentioned constraints with CDM, the voluntary carbon market provides the only reliable opportunity to trade carbon emission reductions after 2012. Since the voluntary market is a free floating market, the expected revenues from emission reduction certificates depend on various parameters and they are difficult to predict. The buyers in the market are companies or institutions which are not legally required to reduce emissions in contrast to those parties active in the "compliance" (CDM) market. Since the companies anticipate emission reductions voluntarily, they regularly check certificates by other criteria rather than simply the amount of emission reductions, but also the location, sector, type of project, compliance to social standards, project developer etc. Without a market analysis it is almost impossible to predict, whether certificates are sellable and, if at all, what price can be expected. It should be noted that the voluntary carbon market is 15 times smaller than the compliance market, but has recently grown very rapidly [Guigon et al., 2009]. However, the impact of not accepting most CERs in the EU ETS anymore will put pressure on the prices, because the provision of emission reductions is expected to increase rapidly after 2012 due to the fact that CDM projects in the pipeline will not have been registered on time and will bypass to the voluntary market.
The market analysis started from a recently finalized study for SWM projects in the West Bank [KFW, 2011] which followed a similar approach. The question poll concerning the marketability of voluntary carbon standards generated through the National Solid Waste Management Program (NSWMP) was comparable to the West Bank question poll. One additional standard was added to the questionnaire: the Social Carbon Standard (http://www.socialcarbon.org). Other than that the participants were asked if the fact that the standards will be generated through a national scheme will have a positive influence in the marketability.

The results of the question poll are presented below:

Participant	GS VER	VCS	VER+	SocialCarbon	Location	National
myclimate	7-12 Euro/VER	no	no	no	positive	neutral
atmosfair	(8-12 Euro/VER)	no	no	no	neutral	neutral
ecogood	8 Euro/VER	3,50 Euro/VER	no	4 Euro/VER	neutral	positive
CarbonFund	6-8 Euro/VER	2-3 Euro/VER	2-3 Euro/VER	3-4 Euro/VER	negative	positive
Tricorona	no	no	no	no	-	-
Climat Mundi	10 Euro/VER	no	no	no	positive	neutral
soutpole carbon	yes (no price)	yes (no price)	no	yes (no price)	neutral	neutral
	# 5/6 (Ø 8,75€)	# 3/6 (Ø 3,00€)	# 1/6 (Ø2,50€)	# 3/6 (Ø3,75€)		

Goldstandard (GS), VCS and Social Standard are the most attractive standards for carbon investors and described in more detail below:

- **GS - Gold Standard VER**

The Gold Standard Label (GS) is a non-profit organization supported by 60 NGOs that provides methodologies for renewable energy and end-user energy efficiency projects. Unless otherwise indicated within the Gold Standard documentation, all projects submitted to the Gold Standard for certification must be consistent with applicable UNFCCC rules for Clean Development Mechanism (CDM) or Joint Implementation (JI) projects, as periodically updated. As the GS intends to be a highly reputable Emission Reduction Label (ERL) some additional restrictions exist in contrast to conventional CDM projects [Gold Standard, 2009]:

- Only project activities that reduce CO_2, CH_4 and/or N_2O are eligible for GS registration and crediting.
- Only two categories of project activities are eligible for GS registration: Renewable Energy Supply and End-use Energy Efficiency Improvement project activities.

In order to gain eligibility to generate GS certificates, LFG-Projects have to use at least 65% of the captured methane for energy production [Gold Standard, 2010]. It should be noted that a partly implementation of a gas extraction and flaring system only, does not meet Gold Standard requirements.

- **VCS - Voluntary Carbon Standard**

The Voluntary Carbon Standard (VCS) is a full-fledged global standard for validation and verification of voluntary emission reductions. The VCS is broadly supported by the carbon offset industry and might very well establish itself as the main standard for voluntary offsets in the future [New Carbon Finance, 2009]. It is a base-level-quality standard that aims to keep costs for validation and verification low while still ensuring basic quality requirements. Credits certified via the VCS are called Voluntary Carbon Units (VCUs). Beside methodologies approved under the CDM and Joint Implementation Mechanism (JI) also certain special VCS methodologies qualify under the VCS Scheme. Concerning LFG Projects (Sector 13) there are no approved special VCS methodologies until now resulting in usage of CDM-methodology ACM0001[VCS, 2010].

- **Social Carbon Standard**

The Social Carbon Standard is a methodology that focuses on enhancing co-benefits such as biodiversity and active participation of local communities. It does not verify quantified carbon offsets and is therefore usually used in conjunction with another program, such as the VCS or CDM. Therefore Social Carbon does not set its own crediting period restrictions. Rather projects must comply with a Social Carbon-approved offset-verifying program (e.g. VCS, CDM).
The Social Carbon Standard is designed to ensure that offset projects make significant contributions to sustainable development throughout their lifetime and uses a set of analytical tools to assess the social, environmental and economic conditions of stakeholders affected by the project. Co-benefit criteria are established and monitored through the following process:

1. Selection of Social Carbon Indicators for the Project: Sustainability indicators are chosen to monitor the project's contribution to sustainable development during its expected lifetime. These indicators are project specific and based on the description of the social and environmental impacts and/or benchmark analysis.
2. Social Carbon Report: Project developers must report how the selected indicators are measured and monitored. The report must include the results from the site visit, and interviews with stakeholders. Annual reports are recommended, although other documents might be accepted, according to the periods of verification of emission reductions.
3. Verification: Periodic verifications must be carried out to assess a project's co-benefits. The project must show that at least some of the identified co-benefits are being developed and that the project has not lead to a decrease in sustainability benefits.

There are currently 43 projects registered for the Social Carbon Standard[1]. Social Carbon has a market share of approximately 1% of the voluntary carbon market[2].
The main results of the poll can be summarized:

- Compared to the West Bank projects the percentage of companies interested in acquiring the different standards as well as the prices these companies would be willing to pay are quite similar. The average price offer is 8,75 € for GS and 3,00-4,00 € for the other standards.
- Most of the contacted companies are willing to purchase (6 out of 7).
- Concerning the influence of the project location, (2 positive, 1 negative, 4 neutral answers from companies) Egypt has a smaller positive impact than the West Bank (5 positive, 1 negative, 4 neutral). Some companies pointed out uncertainties in the political situation, other referred to higher media attention in the West Bank than in Egypt, what may cause a better marketability to end-customers. Carbon Fund, the only company that views the project location Egypt as having a negative influence, justifies this decision with a high political risk. Climate Mundi values the project location as positive without telling a specific reason. The other participants define Egypt as project location neutral.
- The participants were asked about the fact whether the certificates will be generated through a national scheme will have a positive influence. 1/3 saw a positive influence while the other 2/3 didn't see any influence. So the national background could have a positive influence on the marketability of the standards.
- The participants were asked about the marketability of the Social Carbon Standard for the first time. The results show a similarity to the VCS Standard with slightly higher price willingness.
- The question poll asked the participants to estimate the price they are willing to pay for certificates with a post-2015 vintage. No participant wanted to answer this question and thereby give a future outlook concerning the price development of the different standards. This gives a hint on how unpredictable the price development is.
- The fact, that Egypt is a tourist destination, in contrast to the West Bank, can be considered as a positive aspect. MyClimate, the carbon marketing partner for the TUI climate initiative, considers the project location very positive. Project locations in Egypt as a tourist destination is expected to have a positive influence on the marketability since e.g. German travel agent TUI customers prefer to offset carbon emissions through projects located in the travel destination.

4.4 Carbon trade prospects for the NSWMP

PoA "composting plants"

For various reasons composting is still considered a main future element of SWM in Egypt. The current situation of composting is not satisfying. The overall action plan as announced in the Solid Waste Management Strategy of 2000 did not accomplish the goal to increase the number of composting facilities to 100 in 2003. Moreover, the working capacity of the facilities decreased by half down to < 5.000 t/day; the number of facilities decreased to 46. Opportunities to co-finance new plants or upgrades by CDM funding were missed during peak time of CDM between 2005 and 2010. The institutional set-up on Governorate level is not strong enough to rapidly realize CDM projects to a significant extent prior to the 2012 deadline. However, through a PoA CERs can be generated on a wider base. Thus, a PoA on a national level shall be registered as soon as possible, which would allow to include all future composting facilities to be established or rehabilitated under the NSWMP. This PoA offers the last chance to generate credits under CDM for selling to the compliance market. Missing this opportunity will significantly shorten the prospective financial contribution from carbon credits. On the other hand, the Government has realized that this task is not easy to accomplish due to the tight timeline and due to capacity constraints. Since this PoA is considered of highest priority, the Government anticipates making the required financial and personal means available. Major preparatory work has already been conducted by other project developers providing a blueprint for this type of activity. Thus, an on time registration is expected to be possible. The project shall be developed by the Government with assistance from international CDM consultants. Total efforts for elaboration of the required CDM documents and for the registration are estimated to 50,000 € for consulting services plus a one year full working position within the Government to support the work with adequate

[1] see http://www.co2offsetresearch.org/policy/SocialCarbon.html#MarketSize (1/2011)
[2] see http://www.forest-trends.org/documents/files/doc_2829.pdf, page vi

manpower. Because of the end-of-2012 deadline the elaboration has to start not later than December 2011.

A calculation using the UNFCCC-tool "avoidance of methane through composting" shows that increasing the composting capacity from currently 4.664 t/day to 17.600 t/day (equal to 110 properly working facilities) will result in emission reductions of more than 10 million CO_2eq within a 10 years period, able to refinancing 120 million € of costs at CER price level in July 2011. The price development for the certificates at the compliance market is difficult to predict. In the third quarter 2011 the CER price came under pressure due to various reasons such as high provision of non utilized EU allowances and a significant increase in CDM projects. In October 2011 the price reached an all time low of 8 €/CER., Analysts are still convinced of a price increase for the third EU trading phase (2013-2020), when the number of free allowances will be further reduced. However, compared to the predictions a year before the analysts cut their expectations down. The following table displays the latest results (September 2011) of a frequent questionnaire under analysts (market analysis published at www.acs-carbon.de).

Year	Dec 2011	Dec 2012	Dec 2013	2013-2020
Expected Price [€/CER]	11,21	12,13	14,69	18,64

The predictions illustrate that the analysts do not expect the price persisting on the current low but resuming to levels equal or higher than in recent years. However, more enthusiastic price expectations of 25-40 €/CER as published earlier disappeared.

Voluntary market project "digester"

Questionnaires under market participants (carbon funds, project developers) indicate that some locations and project types are of special interest for voluntary buyers. Generally, projects including renewable energy components such as bio digester and landfill gas (certifiable under Gold Standard) and tourist locations appear attractive to the market with strong buyers like international tourist companies in place. It is important to understand that price for voluntary certificates depends stricter than CERs, what makes visibility, attractively, social relevance and other aspects strong selling points. Investments aiming on the voluntary market will therefore designed accordingly with preference giving to digester (rather than landfill gas) and proper involvement of informal sector activities. A potential prospective project could be a digester plant for Hurghada Governorate. Such a plant with an annual capacity of 40.000 t MSW would produce 22 million kWh of electric energy and generate emission reductions of 220.000 t CO_2eq over a period of 10 years, worth according to current market prices (average 8,75 €/t CO_2eq) 1,9 million €.

NAMA

The recent development in international climate policy shows significant signs for making NAMAs a co-financing instrument. The conference of parties has not taken any decision yet on the procedure how to facilitate a NAMA or on the mechanism of how and to which extent make the achieved emission reductions tradable. Thus, the financial contribution can only be estimated. A model calculation has been conducted to determine the amount of emission reductions of implementing a NAMA-based NSWMP strategy. For the calculations the KfW GHG-calculator was used. The following table summarizes the main calculation parameter for the current situation and for a future NAMA. The total amount of MSW has been calculated based on the results of the Governorates survey. The data needs verification, but it offers sufficient accuracy for a first calculation of the national emission reduction potential. The organic content as well as the waste composition is not known for the entire country, just for single spots, only. Thus the default values for low income economies from the GHG calculator were utilized for the emission calculation. For a first estimation on the future NAMA potential the data seems to be sufficient.

Parameter	Status quo	NAMA goal
waste amount [t/year]	14.120.025	
portion food and garden waste [%]	55,4 + 9,2	
Recycling rates [%]		
Paper, cardboard	20	40
Glass	10	30
Ferrous metals, Aluminium	50	60
Composting [%]	10	20
Disposal [%]		
Scattered waste not burned	15	0
Open burning of scattered waste	20	0
Wild dumps/unmanaged disposal site	35	0
Controlled dump w/o gas collection	27	20
Sanitary landfill with gas collection	3	55
MBT + further treatment + landfill	0	25

The criteria list reflect the strategic goal to increase recycling rates, extend the composting of organic waste and improve the disposal situation significantly by stopping all irregular waste dumping and closing or upgrading uncontrolled dumpsites. The GHG calculation result shows overall emissions in the current situation of 12,1 million t CO_2eq per year what closely matches the results of the GHG inventory calculation as presented in the National Communication (NAPA 2010: 11,7 million t CO_2eq). In case that the ambitious NAMA goals can be achieved, the CO^2 emissions will cut almost by half to 6,4 million t CO_2eq. The financial revenues finally depend on the pending political decisions, which portion of emission reductions will become eligible to be turned into bankable certificates for trading in the EU ETS or selling to other buyers.
It should be understood that implementing a NAMA is far more than setting up an emission reduction project or even a larger program of activities. A NAMA reflects a national effort to systematically change the emission situation in a whole sector or at least a part of it. This task cannot be accomplished within a couple of years. It requires political will, awareness and participation of the society, solid administrative capacity and sufficient financial means. The waste sector in Egypt is far away from offering those conditions. Thus, the Government considers a NAMA a long term future goal or a political vision. For now, all potential investment projects under the NSWMP will incorporate a climate consideration and are seen as options to be later merged in a NAMA "stream". In the meantime the NSWMP strategy aims on improving the framework for a NAMA implementation, particularly regarding the administrative capacity as a genuine Government task.

4.5 Action and Gaps

Since the NAMA procedures are not regulated, yet, the carbon trade opportunities source currently from bottom up project types such as CDM and PoA only. Thus the project development is in hands of local or regional public institutions and/or commercial developers (carbon funds, direct investors etc.), while national government is in charge with maintaining the registration process through the DNA. The government has some concerns about both the capacity of local project developers and the commitment of foreign investors to very soon engage in Egypt. Those companies may consider the present political conditions as still fragile and may by pass to countries with a presumably safer investment environment such as Turkey or India.
Acknowledging the extraordinary time pressure in launching CDM and PoA activities the government see a serious demand for supporting measures for this task. It deems unlikely that the

project developers will match the 2012 deadline without support from the national government. The minimum financial demand for the required carbon trade registration activities is estimated to 500,000 to 800,000 € (L.E. 4 to 6.4 million). The budget should be channelled through ESWA because EEAA is already party (DNA) in the process.

Even with the support of experienced project developers and consultants the task to set up last minute carbon trade activities remains ambitious. A strict streamlining is required from all parties involved including the DNA. Activities should focus on rehabilitation/upgrading measures or on projects with already existing plans in order to limit potential stakeholder constraints. Only UNFCCC approved methodologies must be used. Activities should rather focus on PoA, since most of the financially attractive, easy to realize CDM projects are already claimed. A pre selection of PoA starting locations (and CDM respectively) is strongly recommended to avoid wasting the budget on non prosperous, difficult locations and projects.

The roadmap for any last minute carbon trade project is tight, but achievable: the milestones should be considered as deadlines, since no reserve time periods are available.

- Contracting CDM consultant: Beginning of November 2011
- Identification of projects, locations and participants: January 2012
- Elaboration of PoAs for composting and other: March 2012
- Start of registration process: Beginning of April 2012

A clear set up of responsibilities is required to manage the last minute CDM activities. For the PoAs the applicant should be a national authority, preferably ESWA or the MoLD. Within the authority a person must be appointed, who renders the application process, acts as counterpart to the consultant, allocates the budget, and moderate the communication to the regional and local governments. The starting project for the program should be located in a governorate, which has an appropriate institutional capacity, preferably a centralized waste management and beautification department. The project site should be situated in a municipality with a committed local government in order to streamline the stakeholder comments process. A mandatory requirement is a guaranteed budget provision to cover local activities, consulting costs and registration fees. It should be clearly understood that last minute carbon trade activities requires expertise and commitment. Without a clear, effective and unconditionally committed institutional set up in particular at the side of the program agency (ESWA or MoLD) those activities will definitely fail.

Part B: Climate Check

1 Background

The NSWMP will be partly financed by other international donors. International financing involvements are subject for certain compliance checks in order to make sure that the impact of anticipated investments is not in contradiction to common goals regarding social, environmental, development and climate aspects. This section summarizes the results of the climate check for the NSWMP according to the KfW guideline FI142 (climate check).

2 Framework

Egypt is one of the most vulnerable countries to the potential impacts and risks of climate change, even though it produces less than 1% of the world's total emission of GHG, with a vulnerability of all sectors of development and a low resilience of the majority of stakeholders. The sectors of water resources, agricultural resources and food security, coastal resources, tourism, and health are highly vulnerable with serious socioeconomic implications [NC, 2010].
On national level various climate adaptation activities have been triggered such as building institutional capacities, enforcing environmental regulations, identifying and carrying out protection measures for vulnerable touristic and archaeological sites, building capacities on planning, coastal zone management etc., upgrading resilience of stakeholders, improving health and socio-economic infrastructure, establishing employment opportunities in safe areas, strengthening research institutions in areas of renewable energies and improving the management of Red Sea diving areas.

As a Non-Annex I country, Egypt is not required to meet any specific emission reduction targets under the UNFCCC or the Kyoto protocol. However, mitigation measures based on national plans are in progress introducing renewable sources of energy, fuel switching in industry and change from oil to gas, implementing domestic and industrial energy efficiency programs enhancing public participation with the aim of creating low carbon economic structure that prioritizes energy efficiency. In the waste sector the Government in collaboration with concerned Governorates has developed several plans and programs to improve the process of collection, reuse and recycling, yet there are several barriers to achieving the goals of these programs. This include financial constraints for the mitigation of GHG emissions from the waste sector, the significant dependence on external financial support, which is slowing down implementation, limited public awareness, and weak enforcement of laws.

The main institution in the country dealing with climate issues is EEAA.

3 Screening

- Climate proofing

The NSWMP addresses the waste sector, which is climate relevant (UNFCCC sector 13). The program measures and their impact are not significantly depending on parameters which are expected to change directly (wind, temperature, and precipitation) or subsequently (sea level, water provision). Vulnerable locations are basically not considered for facilities to be established under the program, but cannot definitely avoided, particularly in the Nile Delta, where alternative sites are rare. In these cases, the specific project proposals need additional proofing. Changes in precipitation, temperature and water provision are mitigated by appropriate engineering for facilities which render biological processes (composting, MBT) or which are open to the sky (landfills). In terms of engineering the expected change in climate parameters is comparably small and does not lead to serious design problems.

Regarding the adaptation on climate change the program generally contributes positively to the capacity of the eco-systems. Upgrading landfills, reducing irregular waste dumping and improving the carbon content in the soil by using compost reduces water pollution and erosion. This will contribute to the mitigation of water resources problems and to food security. However, the current impact of improper waste management practices on those vulnerable resources is small, thus the program's contribution will be more or less negligible.

- Emission saving

The NSWMP promotes several project measures in the sector of waste management, which currently contributes 9% of entire GHG emissions in Egypt, predominantly by releasing methane uncontrolled to the atmosphere. Methane has significantly higher climate relevance than CO_2 indicated by a greenhouse warming potential factor of 21 to 25 depending on the scientific source. The main measures drafted in the program aim on improving landfill standards, recycling and composting. All measures will result in significant reductions of those methane emissions either due to biological stabilization prior to landfilling (avoidance of methane) or the capture and destruction of methane during the landfill operation. Additional emission reductions are expected from recycling measures due to replacement of virgin raw materials, energy savings or energy shift.

On the other hand, waste management measures can result in slightly higher energy consumption (e.g. by increased collection and transportation traffic).
According to the screening results the NSWMP measures are subject to advanced climate check regarding the emission saving potential.

4 Advanced climate check

KfW guideline FI142 requires an advanced proofing of the emission saving potential through the program. Since the NSWMP is an open program final technical measures are not yet determined. However, the main goals of the program have been postulated so far. In order to evaluate the climate relevance of the program several scenarios were investigated regarding their climate mitigation impact and were compared to the status quo situation. The calculation refers to the first wave of investments in 4 Governorates (exemplarily Kafr El Sheik, Qena, Sharkeya and Red Sea Governorates have been selected). The basic data for waste amount and population was taken from the Governorates survey. Default values from the GHG calculator were used for the waste composition. Each scenario reflects a certain overall strategy with a different focus for certain specific waste management measures. The costs for the various scenarios are significantly different with scenario 1 as the cheapest and scenario 3 as the most expensive one.

Scenario 1: Area oriented program with technically rather low level measures.
Main measures: Increasing recycling rates, establishing controlled dumpsites and reducing scattering and open burning of waste.

Scenario 2: Area oriented program with higher technical efforts on disposal.
Main measures: partly closing illegal dumpsites, establishing sanitary landfills.

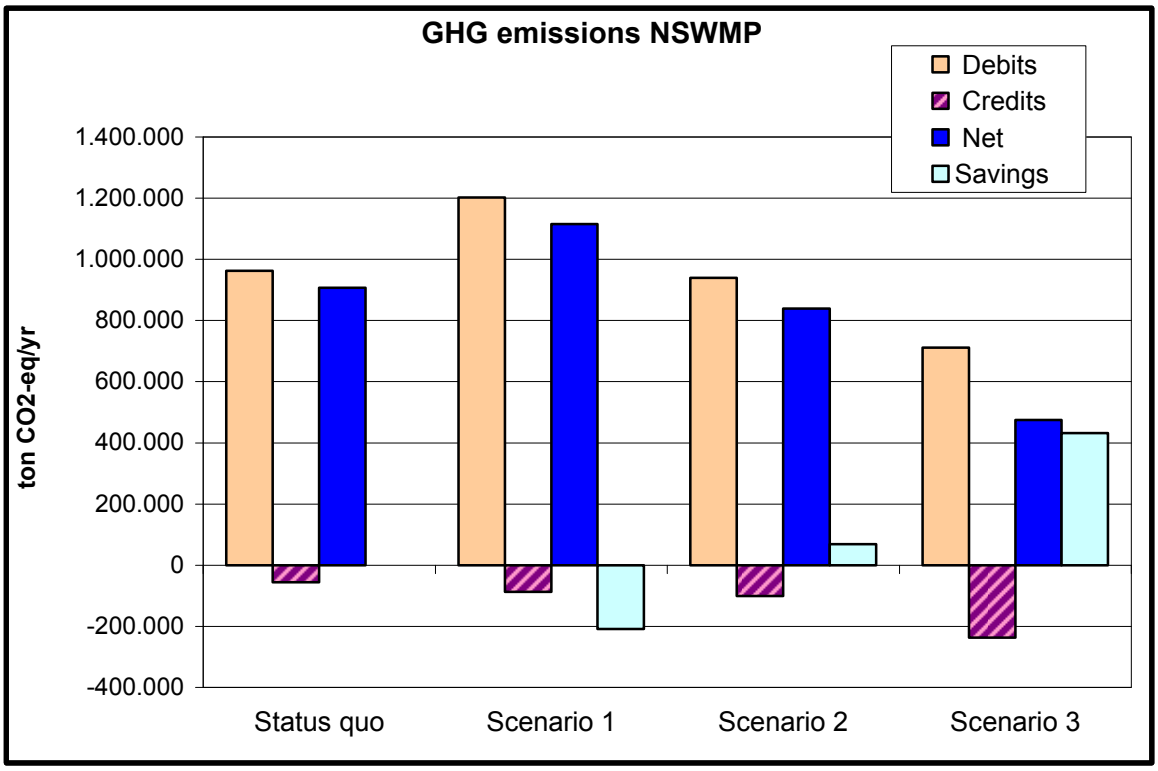
Scenario 3: Technical program focusing on MBT, sanitary landfill and composting.
Main measures: Avoidance of irregular waste disposal (open burning, scattering, dumpsites), upgrade of composting, MBT and digestion, establishing sanitary landfills.

The following table provides an overview which key parameter impacts the three scenarios:

Parameter	Status quo	Scenario		
		1	2	3
waste amount [t/year]	1.054.850			
population	11.503.000			
portion food and garden waste [%]	55,4 + 9,2			
Recycling rates [%]				
Paper, cardboard	20	40	40	40
Glass	10	30	30	30
Ferrous metals, Aluminium	50	60	60	60
Composting [%]	10	10	15	20
Disposal [%]				
Scattered waste not burned	15	7,5	7,5	0
Open burning of scattered waste	20	5	5	0
Wild dumps/unmanaged disposal site	35	35	20	0
Controlled dump w/o gas collection	30	52,5	30	20
Sanitary landfill with gas collection	0	0	37,5	55
MBT + further treatment + landfill	0	0	0	25

The climate mitigation impact varies significantly for the three scenarios. The following figure illustrates the results for the emission calculation.

GHG emissions for different NSWMP scenarios



In the first scenario GHG emissions increased by 23 % from 907.187 to 1,115,845 t CO_2eq, mainly due to the fact that scattered or open burning of waste generates less methane than a controlled dumpsite without gas collection/destruction systems. This result makes clear that useful waste management measures do not necessarily have positive impact on the climate. The emission reduction in scenario 2 is negligibly small with 68.331 t CO_2eq equal to 7.5 % of status quo emissions. In fact, in scenario 2 still 50 % of the solid waste is directed to facilities which do not achieve any methane avoidance. Like in scenario 1 the technical measures in scenario 2 still aim on cost effective waste management measures rather than addressing climate mitigation effects.
Scenario 3 would have a significant impact on the emission situation. The anticipated measures cut the GHG generation by half, basically by avoiding methane intensive waste disposal strategies. It should be noticed that the three investigated scenarios refer to different SWM goals and investment strategies and that they require different financial efforts.

The costs for the various measures have been calculated using thumb unit values (DPC) for annual costs as listed below:

Measure	Dynamic prime costs	
	[€/t]	[LE/t]
Controlled dump/landfill without gas collection	**3**	**24**
Sanitary landfill with gas collection	**10**	**80**
MBT + further treatment + landfill	**45**	**360**
Recycling of dry waste	**3**	**24**
Composting	**30**	**240**
Digestion	**70**	**560**

The following table summarizes the emission results and indicates the annual costs:

Parameter	Status quo	Scenario		
		1	2	3
Total GHG emissions [t CO2-eq/yr]	907.187	1.115.845	838.856	475.015
Total costs [€/yr] [LE/yr]	2.994.981 23.959.848	3.677.429 29.419.432	7.404.651 59.237.208	19.611.064 156.888.512
Difference GHG to SQ [t CO2-eq/yr]	0	208.658	-68.331	-432.172
Difference costs to SQ [€/yr] [LE/yr]	0 0	682.448 5.459.584	4.409.671 35.277.368	16.616.084 132.928.672
Mitigation unit costs [€/t CO2-eq] [LE/ t CO2-eq]		**-**	**65 520**	**38 304**

The table provides further the mitigation unit costs, a value which indicates the financial efforts to reduce 1 t CO_2eq emissions. The high unit costs in scenario 2 (65 €/t CO_2eq) reflect the fact that the program measures in this case are not preferably used for emission reducing activities, but on genuine waste management measures. Scenario 3 is the only scenario which includes to larger extent technical measures with a significant GHG emission reduction effect. Consequently, the mitigation unit costs are significantly lower.
As a conclusion, the program will have most likely a mitigation effect, unless the program focuses on methane intensive technologies. The mitigation effect can not be finally quantified yet.
In order to evaluate the impact of the program measures on the countrywide emission situation, scenario 3 has been extrapolated to the national level assuming that the measures described below are implemented. The results are compared to the status quo situation as well as to intermediate conditions with only parts of the NSWMP being implemented (first wave and priority

investments). During the project development other measures may be proposed by the consultants. However, the measures below reflect a rather climate oriented option for the future projects:

- Establishment of new and upgrading of existing recycling systems for valuable goods, in particular for paper, glass, and plastics;
- Establishment of new and extension or rehabilitation of existing composting facilities;
- Establishment of digester for organic waste;
- Construction of new sanitary landfills with gas extraction and energy recovery systems;
- Upgrading of controlled dumpsites;
- Establishment of MBT plants; and
- Establishment of systems for production of RDF material for co-incineration.

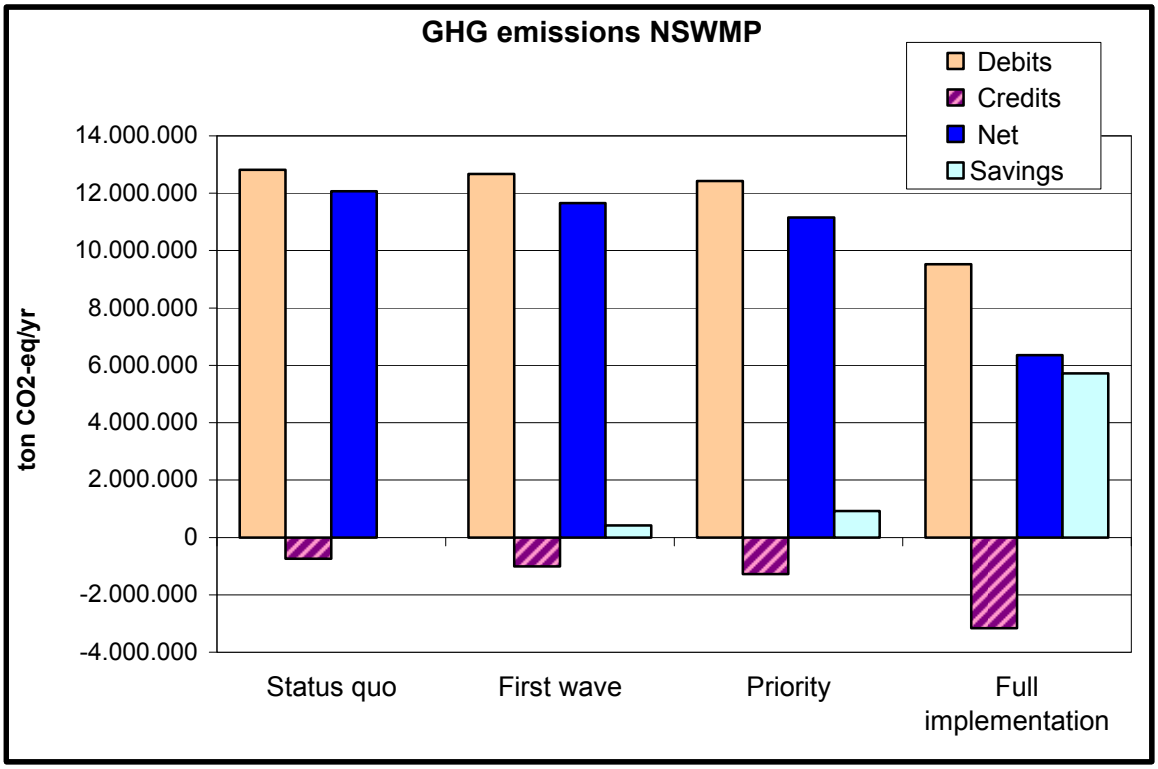
The lay out of the specific facilities has not been designed, yet. However, the number of projects and the anticipated locations are preliminarily decided for the two starting phases of the program. Hence, the number of population and the amount of waste addressed by the program measures can roughly be estimated. The first wave of investments (4 projects) targeting approximately 2.900 t/day of waste equal to 7-8 % of the entire waste generated in Egypt. The priority investments to be executed in the second stage of the NSWMP will address the needs of approximately 25 % of the population handling about 9.600 t/day of MSW.
The impact on the emission situation has been calculated for all scenarios (first wave and priority investments as well as full implementation) using the KfW GHG-Calculator. The results are being compared to the current emission situation (inventory) of the SWM sector. The parameters applied to the GHG calculator are summarized in the following table below:

Parameter	**Status quo**	**First wave investment**	**priority investments**	**full implementation**
waste amount [t/year]	14.120.025			
portion food and garden waste [%]	55,4 + 9,2			
Recycling rates [%]				
Paper, cardboard	20	22	25	40
Glass	10	11	13	30
Ferrous metals, Aluminium	50	50	50	60
Composting [%]	10	11	13	20
Disposal [%]				
Scattered waste not burned	15	14	12	0
Open burning of scattered waste	20	18	16	0
Wild dumps/unmanaged disposal site	35	33	27	0
Controlled dump w/o gas collection	27	26	24	20
Sanitary landfill with gas collection	3	6	15,5	55
MBT + further treatment + landfill	0	3	5,5	25

The impact of the first NSWMP's measures (priority investments) on the key criteria appears to be small, since for 75 % of the population the situation remains unchanged.

The next table and graphic illustrates the results of the GHG calculation. The calculator considers direct GHG savings (e.g. methane avoidance through composting, methane destruction in LFG systems) as well as indirect savings (energy savings from material shifts to secondary raw materials by recycling). The total savings amount to 432.000 t CO_2eq for the first wave investments and 923.000 t CO_2eq for the priority investments. The full implementation will lead to emission reductions of 5.7 million t CO_2eq. Compared to the full implementation the emission reductions of the first stage of the NSWMP are small, but still significant.

	Status Quo	**First wave**	**Priority invest**	**full implementation**
Total GHG emissions [t CO_2-eq/yr]	12.072.331	11.655.002	11.148.807	6.356.599
Emission savings compared to SQ [t CO_2-eq/yr]	0	432.172	923.523	-5.715.732



The program aims primarily on the development of the SWM in Egypt and anticipates progress in SWM measures, technologies, attitudes, institutional capacity and awareness. The NSWMP will contribute to the protection of the environment and natural resources as well to climate mitigation. The climate relevance of the anticipated measures in the waste sector is evaluated as a minor goal. Though the emissions of the sector are highly relevant, probably not all measures of the program will contribute to climate mitigation. In conflicting situations waste management goals will have higher priority. Additionally, the high mitigation unit costs of at least 38 €/t CO_2eq indicate that the anticipated waste management measures can not be genuinely considered as cost effective climate mitigation instruments, achieved emission reductions seem rather to be a side effect.

As part of the climate check the anticipated program will be labelled indicating the goals of the program measures with regard to climate mitigation (KLM) and climate adaptation (KLA). The climate labels allow a quick understanding of the program's climate goals. The classification of the climate labels ranges from 0 (out of focus) via 1 (secondary goal) to 2 (primary goal). The goals are basically defined by the program initiators in cooperation with the donors in advance. In open programs with not yet defined project measures the results of the climate check can later affect the classification of the goals and may trigger shifts, for example when realizing that extraordinary large emission savings can be achieved or that the measures will significantly help beneficiaries to adopt to climate change.

Concluded from the program's major idea (improving waste management) and acknowledging its calculated potential emission savings the program is classified to the label **KLM 1.** Emission saving is considered a secondary goal mainly due to the limited cost effective saving potential. In terms of adaptation the impact of the program is small and negligible, thus the classification of **KLA 0** (contribution to adaptation out of focus) is appropriate.