



Tunisia : A greenhouse gas mitigation mechanism for the cement sector

Paving the way for Tunisia's participation in the new mechanisms

1. Presentation of the initiative

The **National Agency for Energy Conservation (ANME)** has launched an initiative aimed at engaging the Tunisian cement sector in a voluntary programme to reduce greenhouse gas (GHG) emissions. This effort is supported by the **German Environment Ministry** through the German Development Cooperation (GIZ) in the context of the regional project "CDM Initiative". The preliminary phase of the Tunisian initiative started in February 2012 with a concept note. Building on this, the consultancies Ecofys and Apex Conseil developed in 2013 an in-depth study, which analyses the current state of the cement sector and proposes a GHG mitigation mechanism. The Tunisian government is currently planning the implementation of this mechanism.

The proposed mechanism aims to ease the various obstacles to the implementation of GHG mitigation measures in the cement sector, and boosting investment in less carbon-intensive technologies. This is likely to generate **emissions reductions of over 8 million tonnes CO₂ equivalent (MtCO₂e)** over the period 2014-2020, **via a mobilisation of 970 million Euros in investment**. Its implementation will help cement firms to reconcile economic development with GHG mitigation and it will prepare them for Tunisia's emissions reduction programmes under the emerging new mitigation mechanisms.

The mechanism has been designed with a view to being integrated into one of the mechanisms of the United Nations Framework Convention on Climate Change (UNFCCC), such as the **Nationally Appropriate Mitigation Actions (NAMAs)** and the **New Market Mechanism (NMM)**. It is aligned with Tunisia's National Strategy on Climate Change, which is focused on energy

efficiency, the promotion of renewable energies and the use of international policy instruments to combat climate change.

2. The Tunisian cement sector

2.1. How will the cement sector emissions develop by 2020 (baseline scenario) ?

In 2012, the cement sector, comprised of eight cement plants, produced 7.9 Mt of cement. A ninth plant, with an annual production capacity of 2.2 Mt cement, started production in October 2013.

Figure 1 : Baseline scenario of the cement sector (total emissions) over the period 2013 - 2020

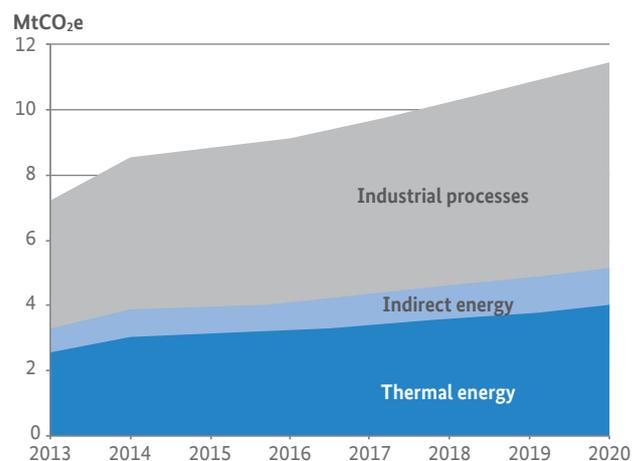
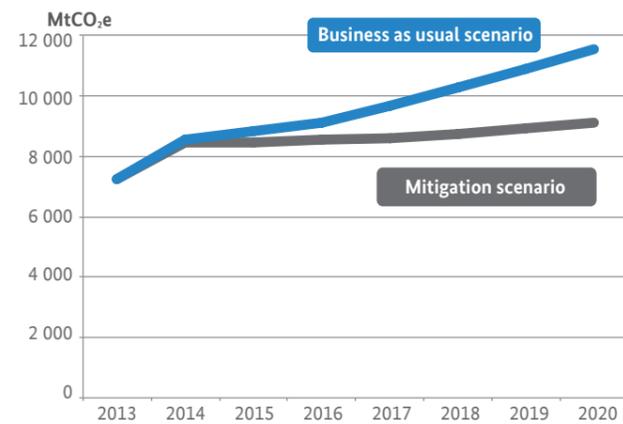


Figure 2: Comparative evolution of GHG emissions between baseline scenario and mitigation scenario (in tCO₂e)



With 6.4 MtCO₂e emitted and a carbon intensity of 0.810 tCO₂e/t cement¹, the cement sector accounts for around 10% of Tunisian GHG emissions.

The work conducted in 2012 and updated in 2013, in close cooperation with Tunisian cement producers, has led to establishing a baseline scenario for GHG emissions for the period 2013-2020. The following assumptions have been used:

- a) The production of cement is based on the expectations of producers for the period 2013-2016. Longer term projections are based on the average output indicator cement/GDP as derived from the period 2009-2012. This resulted in an expected cement production of 14.5 million tonnes in 2020.
- b) Specific thermal energy and electricity consumptions are assumed to equal the average levels of these indicators for the period 2009-2012.

According to this “business-as-usual” scenario, presented in Figure 1, the Tunisian cement sector is likely to emit around 11.5 MtCO₂e by 2020, with a carbon intensity of 0.793 tCO₂e/t cement produced.²

2.1 How can the emissions of the cement sector be reduced?

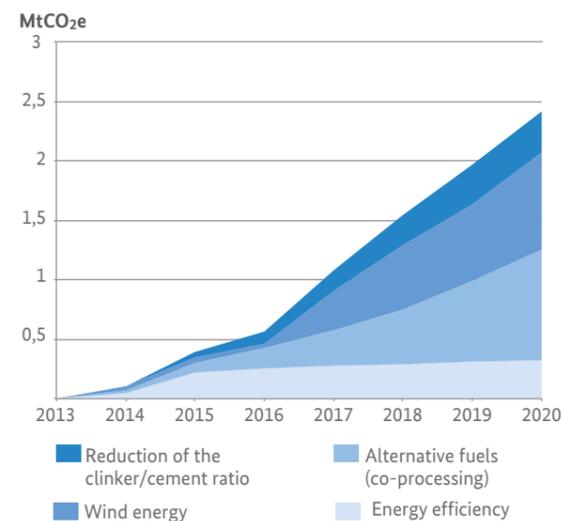
The discussions with Tunisian cement producers have helped identify a GHG emissions mitigation potential of over 8 MtCO₂e, based on the implementation of four types of emission reduction measures:

- **Energy efficiency** measures, with a mitigation potential of around 1.7 MtCO₂e for the period 2014-2020;
- **Renewable energy**, notably wind energy, with a mitigation potential of around 2.5 MtCO₂e for the period 2014-2020;
- Finer segmenting of the cement market, allowing a **reduction of the clinker/cement ratio**, thus mobilising a GHG emissions mitigation potential of around 1.2 MtCO₂e for the period 2014-2020;
- **Co-processing** (use of waste as a fuel), which could mobilise a GHG emissions mitigation potential of around 2.6 MtCO₂e over the period 2014-2020.

Implementing this mitigation scenario would **lower the carbon intensity of cement production**, which would drop from 0.793 tCO₂e/t cement produced in the business as usual scenario to 0.626 tCO₂e/t cement produced in the mitigation scenario, hence a decrease by 21% by 2020.

Figure 3 shows the evolution of the emissions reductions resulting from each of the types of measures. One notes the **rapid implementation of energy efficiency measures**, which are least costly in terms of investment. Co-processing and wind energy are more costly, and will only start to yield their full potential only as from 2017. Ultimately, **co-processing ranks first** with a third of the sector’s GHG mitigation potential, followed by wind energy (31%), energy efficiency (21%), and the reduction of the clinker/cement ratio (15%).

Figure 3: Respective contributions of the various types of mitigation measures



1- Of these emissions, 55% are due to processes, 35% due to thermal energy consumption, and 10% “indirect” emissions due to electricity consumption. Excluding indirect emissions would yield a carbon intensity of 0.731 tCO₂e/t cement for 2012.

2- In terms of tCO₂e per tonne of clinker produced, this corresponds to 0.945.

The Tunisian cement sector is willing to engage in mitigation efforts, but is currently faced with several **obstacles**:

- **Regulatory “bottlenecks”:**
 - o The current energy governance framework is not conducive to investments by cement firms, as the regulations lack clarity regarding selling back the electricity in excess to the grid, and they do not allow cement firms to involve specialized wind developers and investors.
 - o **Co-processing:** The air pollution limits for waste combustion are more stringent in Tunisia than in Europe. Constructing co-processing facilities compliant with such rigorous limits would require high investments and thereby undermine the economic feasibility of this option. Besides, co-processing is not yet part of Tunisia’s waste management strategy, which is why the country lacks waste collection and treatment units appropriate for co-processing.
 - o **Blended cements:** The regulations in force do not allow the sale of certain cements with low clinker content, which are however suitable for certain uses.
- **Common practice and awareness-raising:**
 - o Investments in actions involving waste and renewable energies are not part of the cement producers core business, and represent **risky investments** for them.

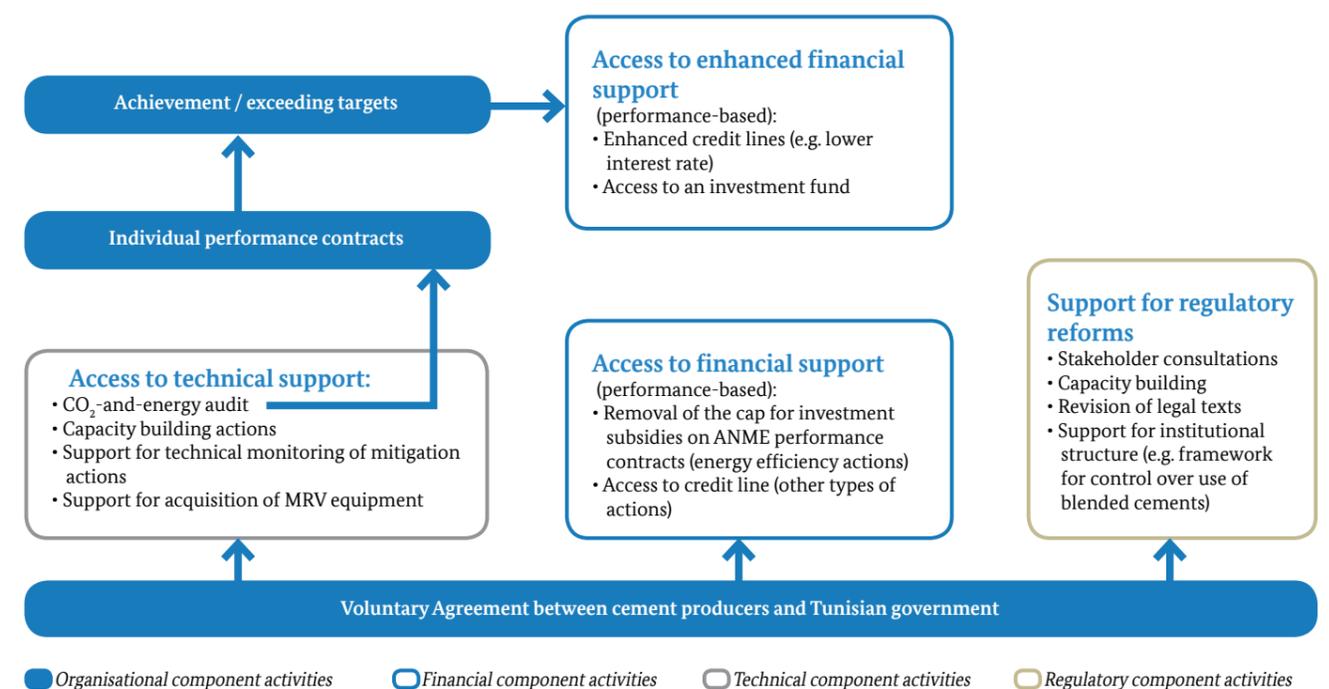
- o Cement users do not have the **necessary knowledge** about different cement types, which would otherwise allow a finer segmenting of the market.
- o Certain energy efficiency activities are complex and require **cutting-edge technical skills** in order to identify their mitigation potential and the approach to be adopted for their implementation.
- **Financial impediments:**
 - o Certain mitigation measures, such as wind farms and co-processing, require substantial investments and therefore **compete with operational investments**.

The mitigation mechanism proposed

The emissions mitigation mechanism proposed aims to ease these obstacles to the implementation of the reduction measures. It consists of four components:

- **Organisational component:** This component is the mechanism’s cornerstone. It comprises the setting up of a management unit at the ANME (see Figure 5) and development and implementation of a **voluntary agreement** between the Tunisian government and the cement sector. This agreement will be the basis for the activities of the other three components and the development of individual performance contracts for each cement plant.

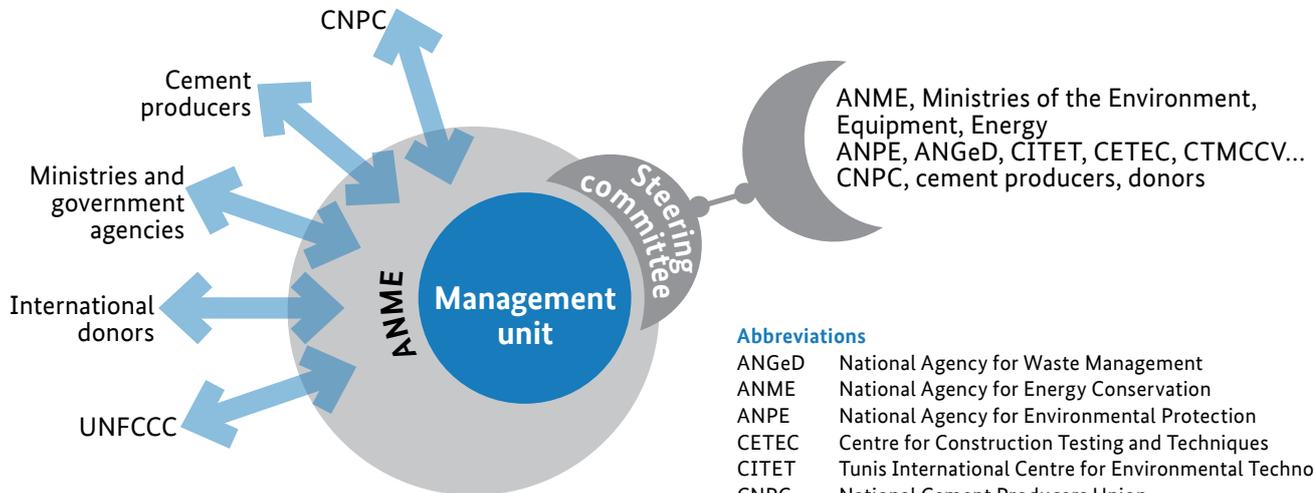
Figure 4: Structure of the mitigation mechanism



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Figure 5: Management unit of the mitigation mechanism



Abbreviations

- ANGeD National Agency for Waste Management
- ANME National Agency for Energy Conservation
- ANPE National Agency for Environmental Protection
- CETEC Centre for Construction Testing and Techniques
- CITET Tunis International Centre for Environmental Technologies
- CNPC National Cement Producers Union
- CTMCCV Technical Centre of Construction Material, Ceramics and Glass
- UNFCCC United Nations Framework Convention on Climate Change

- **Regulatory component:** This is a cross-cutting component, comprising various activities which are intended to remove the regulatory bottlenecks, such as stakeholder consultations and support for the revision of legal texts.
- **Technical component:** The activities of this component comprise an exhaustive CO₂-and-energy audit in each of the cement plants, capacity building actions, as well as support for the technical monitoring of mitigation actions and for the acquisition of measurement equipment for emissions monitoring (MRV: Measurement, Reporting and Verification) as well as the partial financing of a pilot waste treatment platform for co-processing.
- **Financial component:** This component aims to facilitate access to capital via investment subsidies for energy efficiency actions, a credit line, and an investment fund dedicated to the cement sector. The modalities of access and the amounts to be disbursed will be linked to the individual performance of the cement producers in terms

of GHG emissions reductions. This will prepare the sector for a possible future set up of a market mechanism under which carbon credits would be granted in exchange for the emissions reductions achieved.

3.1. The next steps

The implementation of the proposed mitigation mechanism would **cost around 7 million Euros**³ and would allow the **mobilisation of investments** in less carbon-intensive technologies amounting to around **970 million Euros**. ANME and GIZ are preparing the launch of the mechanism and are in dialogue with various international donors. On the national level, consultations with the cement sector and the Tunisian governmental institutions are ongoing, with a view to easing the regulatory obstacles in order to leverage the significant emissions mitigation potential in the cement sector in Tunisia.

3- The organisational component accounts for 11% of the estimated costs, the regulatory component for 15%, the technical component for 69% including 44% for the pilot platform, and the financial component for 5%. The costs estimated for the financial component cover the conception of the financial mechanism but do not include the financing needs for the implementation of the mechanism.