17 The Greenhouse Gas Emissions Inventory

Abengoa's Policy on Halting Climate Change and Global Emissions Accounting

Climate change is an unquestionable scientific reality that has been brought on by human activity. The Kyoto Protocol therefore established the target of achieving a 5% reduction by 2012 of the 1990 Greenhouse Gas (GHG) emission levels of the world's developed countries.

GHG emissions are related to industrial activity. Therefore, the countries with the highest degree of industrialization are those with the highest emissions levels. Lowering these emissions without affecting GDP requires, among other initiatives, the development of clean industrial technologies, substitution of fossil energy consumption for renewable energies, and modification of citizens' consumption habits. This poses a challenge not only for governments, but for businesses and citizens alike.

Photo taken by **Si Liu,** from Telvent, to the 1st Edition of the Abengoa Sustainability Photography Contest

Agenda 21 of the United Nations establishes a comprehensive blueprint of action to be taken in facing the challenges of the new century through the integration of development and the environment.

The role of the business community in the struggle against climate change is synthesized in managing clean production and promoting responsible engagements, and is implemented through a range of actions:

- Management of the knowledge of an entity's own emissions: emissions accounting and balance sheet, with traceability to the different inputs.
- Plan for reducing and minimizing emissions, raw materials and inputs utilized, as well as waste and discharges, through suitable management.
- Product labeling.

- Analysis of product and business life cycles, including assessments of the potential for improvement.
- Innovation.
- Alignment of new businesses with sustainable development.
- A business can voluntarily become a neutral emitter by purchasing carbon funds to compensate its emission balance.

In keeping with the above, in 2008 Abengoa implemented the inventory of greenhouse gas emissions for its activities conducted worldwide in order to gain in-depth knowledge of the direct and indirect GHG emissions associated with each company activity, evaluate the situation, and identify improvement options.

Abengoa's emissions accounting system is a pioneer in the inclusion into the inventory of emissions derived from goods and services acquired for carrying out its activities. Abengoa suppliers, representing a figure which now totals more than 14,000, have added their own pledge to the company's commitment to perform accounting of their emissions in order to report them each time they submit an invoice to Abengoa companies throughout the world. This not only enables Abengoa to obtain exhaustive global emissions accounting, incorporating Scope 3 of the GHG Protocol, but also promotes the company's commitment to the most progressive policies for combating climate change and its impacts.

The results of Abengoa's 2009 GHG inventory, then, constitute a complete picture of the greenhouse gases associated with the company's activity, structured around scopes and sources, differentiating and including emissions deriving from biomass operations, and disclosed publicly in order to facilitate reflection and comparison to other companies that place climate change policies at the core of their activity and interests.

Thus, the inventory enables Abengoa to progress in two undertakings in which the company is deeply immersed: rigorous reduction target-setting for lowering the company's carbon footprint, and stringent product labeling, providing reliable, contrasted and verified information to the market and society. Both developments and its results are going to be published along 2010.

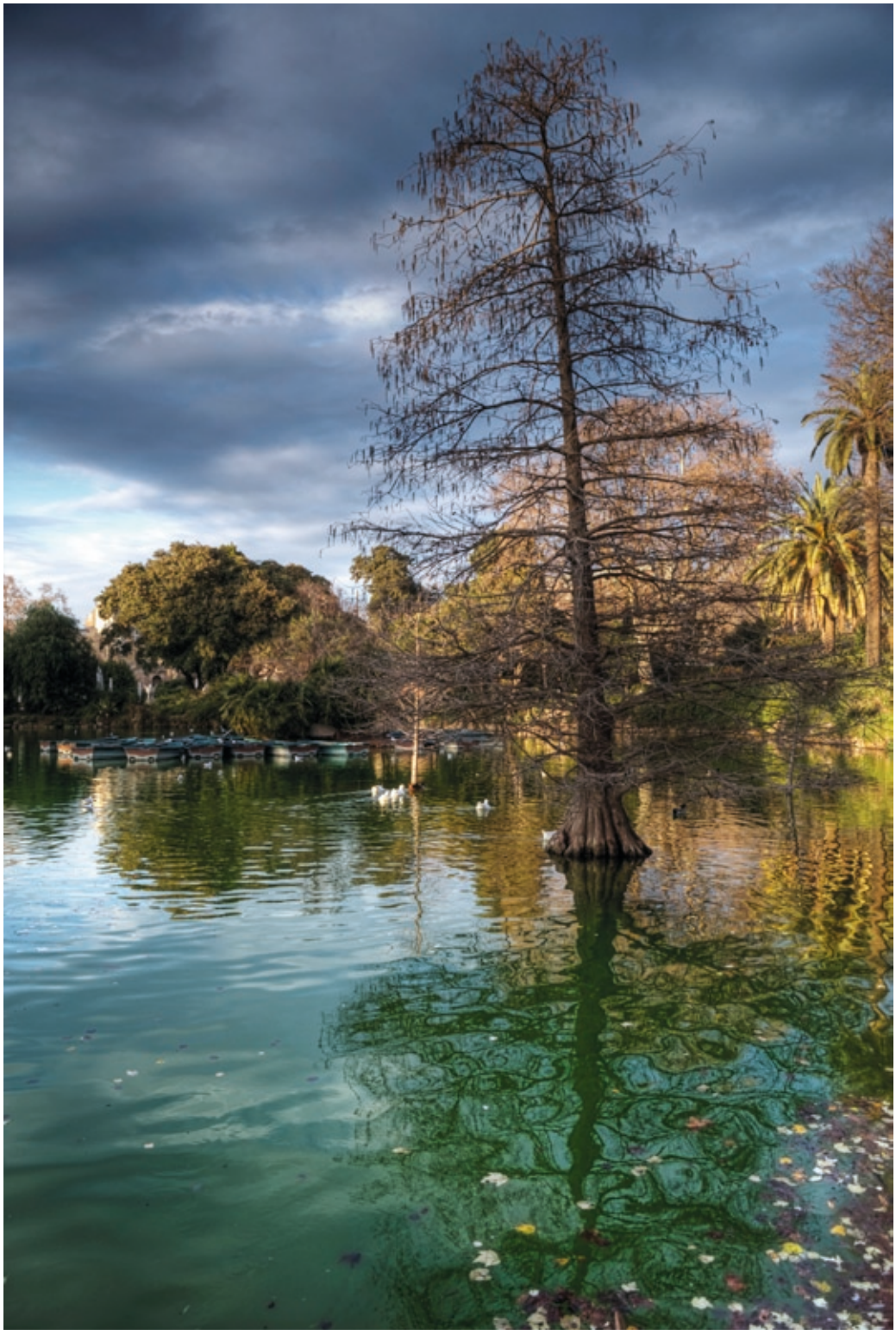
The Greenhouse Gas Emissions Inventory. Annual Invetory	
Scope 1	**2009 (t CO_2 eq)**
Stationary combustion	1,030,041
Mobile combustion	55,437
Process	255,898
Fugitive	11,575
Deriving from the use of biomass	1,843,259
Scope 1 Total	**3,196,210**
Scope 2	**2009 (t CO_2 eq)**
Electrical consumption	294,967
Consumption of other types of energy	97,396
Scope 2 Total	**392,363**
Scope 3	**2009 (t CO_2 eq)**
Suppliers for third parts	4,737,125
Business trips	29,114
Work Commutes	23,077
Electrical power distribution losses	24,271
Value chain losses for fuels use in adquired energy	36,781
Scope 3 Total	**4,850,368**
Total	**8,438,941**

Inventory Generation and Maintenance Standard

Historically, Abengoa has demonstrated its firm commitment to the environment. Consequently, the aspects of sustainability have always been taken into consideration in the activities conducted by the Company. In 2007, under the direction of the Chairman's office, a work group consisting of a team from the Abengoa Quality and the Environment Department and by business unit coordinators was set up with the purpose of developing a standard for generating and maintaining Abengoa's greenhouse gas emissions inventory (Common Management Systems Standard).

The Greenhouse Gas Emissions Inventory

Photo taken by **José Alejandro Avilés Flores,** from Telvent, to the 1st Edition of the Abengoa Sustainability Photography Contest



As a product of this effort, NOC-05/003 was published in June 2008. The aim of this internal norm is to define the methodology for the generation and maintenance of an emissions inventory to enable monitoring and reporting of greenhouse gas emissions in all Abengoa companies. This inventory includes both direct and indirect emissions.

There are very few companies with robust methodologies for quantification of their Scope 3 emissions. Considered to be best practice, Abengoa has incorporated into its standard the methodology for calculating these Scope 3 emissions by integrating the entire chain of suppliers of goods and services.

Scope

NOC-05/003 applies to all Abengoa companies governed by the Common Management Systems. It is also applicable to JVs, EIGs and other consortiums or concession companies in which an Abengoa company has control of management.

For purposes of the inventory, the following activity segments have been established: production, execution of works and maintenance, offices, factories and workshops, warehouses, and transportation.

Each company's inventory includes both direct and indirect emissions. In other words, the emissions associated with sources under the control of the company (Scope 1 of the Kyoto Protocol), emissions associated with the generation of the acquired electrical power and thermal energy consumed (Scope 2), emissions deriving from the chain of value of acquired energy consumed, losses in the transmission and distribution of acquired energy consumed, emissions resulting from acquired goods and services, emissions associated with business trips, and emissions linked to commutes to the work place (Scope 3). Direct CO_2 emissions from biomass combustion or transformation covered under the inventory are reported separately.

The GHGs listed in the inventory are the gases included under the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Main Emission Sources

To facilitate and standardize GHG emission computation, the NOC includes in-depth methodology for calculating the emissions of the three Kyoto Protocol scopes. The main sources taken into consideration are those shown below:

Scope 1	Scope 2	Scope 3
Stationary combustion	Acquired electricity	Chain of value of acquired energy and fuels
Mobile combustion	Acquired thermal energy	Acquired goods and services
Flares	-	Business trips
Metal recovery process	-	Work commutes
Bioethanol production process	-	Losses in electrical power transmission and distribution
Composting process	-	
Dump site emissions	-	-
Water treatment plants	-	-

Scope 1	Scope 2	Scope 3
Fugitive natural gas emissions	-	-
Cooling systems (HFC)	-	-
Electrical switch gear (SF6)	-	-
Aerosols (HFC/PFC)	-	-
Foam blowing (HFC/PFC)	-	-
Lubricants	-	-
Paraffin wax	-	-
Use of gases containing GHGs		
Biomass combustion or transformation		

Bases for Calculating Emissions

Emissions can be determined by applying a methodology based on either calculation or metering. The former is the chief methodology for determining emissions, and the latter is restricted to determining channelized emissions.

It is important to point out the bases for calculating the emissions corresponding to acquired goods and services (Scope 3). All purchase orders include the obligation of the supplier to provide details on the emissions associated with the requested goods or services. Suppliers are also under the obligation to sign up in writing to the Social Responsibility Code for Abengoa suppliers and subcontractors. In order to facilitate the adaptation of all suppliers to the new purchasing conditions a transition period has been established for those who are not immediately in a position to submit their emission details, but who undertake in writing to implement an emissions reporting system. The duration of the transition period is six months. Suppliers who do not report their emissions or do not commit to implementing a reporting system within this time period are excluded, with the exception of exclusions processed via NOC authorization, with companies being responsible for estimating the significant emissions of the goods or services provided in these cases.

Given that the inventory is in the process of being implemented among company suppliers, in calculating Abengoa's 2009 GHG inventory, there was an exceptional allowance provided for the estimation of emissions associated with products or services (Scope 3) from suppliers who were not able to report their emissions immediately. Estimations in these cases were made by Abengoa companies according to emission factors and the databases of internationally recognized sources and bodies. Thus, approximately 50% of the Scope 3 supply chain emissions were estimated directly by Abengoa in the 2009 Abengoa GHG inventory.

The NOC establishes that each piece of emission data be accompanied by a quality index. This quality index is associated with the emissions data for each source and greenhouse gas, as well as each parameter involved in the calculation. This quality index shows the degree of reliability of the data and is always expressed with a standardization basis of 10.

Minimum quality requirements are established under this standard for each emission source, according to the emitting potential of the center and whether it is a main, secondary or minimal source.

Recording and Reporting Information

At present, the companies are reporting their emissions by means of the corporate reporting system, which contains a GHG emissions section that is accessible to the persons in charge of the inventory. This section enables access to the monthly GHG emissions report of each company (Scope 1, 2 and 3 details) and to the list of suppliers and their degree of commitment to the NOC (provision-related emission inputs).

Abengoa is in the process of completing the implementation of a computer application that has been specifically designed to calculate GHG emissions and which will also enable data consolidation and enhanced inventory functionality.

Attributing Emissions to Products and Services

The NOC covers future attribution of emissions to products. This allocation shall be performed through the methodology for main and auxiliary emissions distribution centers, which is similar to that of cost centers. GHG emissions were not attributed to products or services in the 2009 inventory.

Defined Control Tools

The NOC establishes the obligation of all Abengoa companies to implement an internal auditing process in order to verify proper execution of the requirements included under this standard.

This auditing process planning must be thoroughly documented on an annual basis.

Furthermore, each company's inventory is subject to evaluation within the control and monitoring visit program managed by Abengoa's Department of Quality and the Environment.

Photo taken by **José Ángel Molina Reyes,** from Inabensa, to the 1st Edition of the Abengoa Sustainability Photography Contest

Implementation Methodology

During the second half of 2008, Abengoa companies implemented the emissions inventory by applying these stages:

- Identification of battery limits
- Selection of the emissions quantification methodology
- Data compilation
- Methodology application
- Reporting

With the ultimate aim of ensuring proper implementation of the NOC in all of the group companies, Abengoa conducted training/feedback sessions for first- and second-level managers (approximately 1,000 people). In 2009, Abengoa proceeded to consolidate 2008 emissions from the different companies.