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Carbon Footprint Analysis: Towards a Projects Evaluation Model for Promoting Sustainable Development

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Abstract

Climate change and global warming are internationally recognized as current issues, driving negative effects on humanity, and being mainly caused by GHG emissions generated both from industrial activities, and from other anthropogenic activities. Restoring the ecological balance requires urgent action to reduce GHG emissions. In this respect, the European Union has set the target to reduce the GHG emissions by 20% until 2020, compared to 1990 level. This paper presents a methodology to develop a model for carbon footprint calculation, for assessing and reducing GHG emissions generated by European funds financed projects.

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1. Introduction

Environmental protection has now become a major concern, especially following the significant negative consequences involved by the economic development promoted since the industrial revolution. People become

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progressively aware of their activities implications on the environment, and are increasingly interested in reducing and correcting the adverse effects.

A growing number of studies, research and collected data, reveal the existence of a direct relationship between climate change and carbon dioxide emissions (CO₂) (IEA, 2012). According to the Fourth Assessment Report prepared by Intergovernmental Panel on Climate Change (IPCC), activities of all nations generate increasingly more GHG emissions, having significant negative impacts on climate change due to alterations taking place in the compositional level of the atmosphere, and also on rising the average global temperature since the mid of the 20th Century (IPCC, 2007).

The main elements that generate large amounts of carbon dioxide are fossil fuels (especially oil and coal), through burning them for obtaining energy. Of all the greenhouse gases, CO₂ has the largest share. Thus, emissions of other greenhouse gases (CH₄, N₂O, HFC, PFC, SF₆) are converted in units of CO₂ equivalent (CO₂e), using the warming potential related to each gas.

Among the adverse effects of GHG emissions we can mention: global warming, decreasing water availability for humanity, pollution of air, water and soil, melting ice caps and increasing oceans level, degradation of the ozone layer, extreme weather events, changes of the seasons, reducing biodiversity, desertification.

The PWC Report (2012) "Low Carbon Economy Index" concludes that a 5.1% annual rate is required for decrease of GHG emissions by 2050, in order to achieve our target of planetary warming with maximum 2oC. In 2011, this rate was 0.7%, while the average starting from 2000 is 0.8%. The reduction target was not reached during the last period, on the one hand because of the increasing emissions in emerging countries and, on the other hand, due to insufficient involvement of other countries in objectives achieving, materialized in uncertain policies on national and international level, reduced efforts for low emissions technologies and even a decline in renewable energy field. In the relationship between economic growth and evolution of generated emissions, the latter has an asymmetrical trajectory, increasing with a higher rate than the economic growth, but more slowly decreasing compared with the economic decrease.

Currently, there are two methods to combat the effects of GHG emissions:

- Reducing the level of emissions;
- Flexible trading mechanisms in the carbon certificates market: acquiring the rights to emit GHGs by owning a carbon certificate/license.

Within the Kyoto Conference in 1997, the treaty to reduce the GHG emissions was established and for stabilizing the gases concentration in the atmosphere. A total of 192 countries have signed the agreement to reduce emissions by 2012, with an average of 5% compared to the 1990 level. If a country does not fulfill its reduction target, surpassing the assumed rate, it is forced to buy allowances from countries that have not consumed theirs. Thus, the mandatory market for carbon certificates was created.

The first cause concerned in generating GHG emissions is the energy industry. Burning fossil fuels to obtain energy generates most GHG emissions, so that enterprises in this area „must proactively develop technologies and processes to reduce emissions and play an active role in shaping the carbon trading mechanism to be used”. Some experts believe that the market for trading carbon emissions can be a beneficial demarche both for companies and also for the planet – in the long term, because it involves an efficient and rapid method for emissions reduction in the energy industry. (Deloitte, 2010)

Aichele and Felbermayr (2011) argue that the Kyoto Protocol has been ineffective or possibly even environmental harmful, due to the emergence of carbon leakage, through increasing of the emissions generated by imports and carbon emissions reallocation.

In parallel with the mandatory market for carbon certificates, the voluntary market for carbon certificates is operating, giving the owner of one certificate the right to offset one tonne of CO₂e emission, based on the fact that the certificate was issued after a project for reducing emissions with one tonne in atmosphere. Voluntary market has the advantage that supports financially the research-development- innovation projects, in the field of carbon emissions, having concrete results for new and sustainable technologies (renewable energy).

The emissions reduction can be achieved using technology and materials that generate fewer gases, but also through compensating the generated emission, by creating absorption capacity for carbon emissions. By photosynthesis process, trees convert carbon dioxide into oxygen and other organic compounds necessary for life. Thus, afforestation can reduced the effects involved by GHG emissions.

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