

# **A Brazilian Legal Perspective on Climate Change and Waste**

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## **EXECUTIVE SUMMARY**

This paper has been written in order to present a legal perspective of the contribution of wastes to the climate change, as well as of the instruments for the stimulation of scheduled practices capable of reducing the Greenhouse Effect Gases (GHG) emissions.

Our opinion is based on the specialized national and international doctrine, as well as on the observation and analysis of the cases that arise from the environmental legal assessment practice. We have dealt with this theme in many situations in Brazil, for national or multinational companies – or even the government, in the municipal, state and federal

levels –, providing legal opinions and presenting legal or administrative defenses.

As we demonstrate in this paper, the waste sector is an important contributor to climate change. Moreover, increasing emissions of GHG are expected due to the development of the emerging economies and the strengthening of the consumption society all over the world.

Industrial processes and transportation activities of the waste sector may generate CH<sub>4</sub>, CO<sub>2</sub> and N<sub>2</sub>O gases, amongst others GHGs. They also demand a great amount of energy.

As we also considered herein, we believe that legal and economic instruments are needed for the induction of scheduled practices, according to national and international examples. Some Brazilian initiatives were cited in this sense.

## **INTRODUCTION**

Worldwide cities fight against waste mismanagement and its uncontrollable emission of Greenhouse Effect Gases (GHGs), such as the flammable methane derived from landfills. These gases bring significant climate change ensued from their global warming potential. On this account, these indissociable matters are currently demanding special attention and legal assessment from public and private spheres, at regional, national and international levels. Both topics compose the main issues of the international community agenda.

Brazil, in this scope, has developed outstanding work, headed by its competent diplomacy and strengthened by its pioneering role in the discussions about environmental improvement.

A strict analysis of the cause-effect technical relationship between climate change and wastes cannot be made without evoking International Law and domestic experiences of some countries. Thus, a legal straightforward parallelism between these topics must be sought.

Since 1992, when Brazil held the United Nations Conference on Environment and Development (UNCED), climate change matters have become a topic of International Law, with important economic consequences. By force of the United Nations Framework Convention on Climate Change (UNFCCC), countries have set goals and obligations, and different mechanisms were created to reduce the emissions of greenhouse gases.

In its turn, even though each single human community all over the world has environmental, health, territorial, social and economic problems with waste, the topic has not received yet legal treatment by the international law. Reference is made to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and the Panel on the World Trade Organization (WTO) named “Brazil – Measures Affecting Imports of Retreaded Tires”, which have discussed just the transfer of residues through the boundaries of the countries, but not their proper transportation, management, storage and final disposal. Accordingly, special attention must be given to this important issue, in order to guarantee human survival and avoid liabilities.

By enforcing harmonic and economic initiatives to be carried out simultaneously by public and private entities, climate change and waste management issues can be mitigated and controlled, providing sustainable development. For that, international and domestic rules are needed, together with public policies of incentives for sound environmental practices.

## **WASTES**

The concept of waste is extremely broad, what may permit misunderstandings or even overstatements by national and international authorities. In the Brazilian legal doctrine, waste is defined as socioenvironmental goods capable of generating responsibility to its owner or possessor, by its importance to current and future generations (Lemos, 2011).

Experts have presented an uncountable number of classifications for wastes. As an example, we may divide them in (a) wastes composed by biological agents; (b) wastes composed by chemical substances; (c) radioactive wastes; and, (d) ordinary wastes (Lemos, 2011).

This paper is focused on solid wastes, mainly those related to the emissions of GHGs.

## **WASTES AND CLIMATE CHANGE**

The waste sector is an important contributor to climate change. CH<sub>4</sub> produced at solid waste disposal sites represents approximately 3 to 4 percent of the annual global anthropogenic GHG (Monni et al., 2006). Emissions from this source are expected to increase with increasing global population and Growth Domestic Product (GDP).

Increasing emissions are also expected due to the development of the emerging economies and the strengthening of the consumption society.

As widely known, waste management practices can impact GHG emissions by affecting energy consumption, methane generation, carbon sequestration and non-energy-related manufacturing emissions (Freed et al., 1997).

Energy is needed to transform raw material in product, and then product in waste. Energy is also necessary to transport raw material, products, wastes, fuel and many substances related to the management of waste. This energy consumption represents GHG emission – for example, through the fossil fuel combustion.

In this regard, experts have suggested that manufacturing from recycled inputs generally requires less energy than manufacturing from virgin inputs. Consequently, the first option results in lower GHG emissions – even though change in the fuel mix can result in higher emissions, in the case of some products, like paper (Freed et al., 1997).

Landfills are the most important source of GHG emission, in the waste management sphere. The waste decomposition process triggers the emission of methane, the highest Global Warming Potential<sup>1</sup> (GWP) GHG. Methane emissions from landfills depend on waste characteristics (composition, density, particle size), conditions in landfills (moisture, nutrients, microbes, temperature and pH), designs and maintenance of cover material, landfill operation and maintenance and special landfill gas controls (Monni et al., 2006).

We must also consider the GHG generated in the incineration and open burning of waste containing fossil carbon, which are important sources of CO<sub>2</sub>. These emissions are, however, a very small fraction of the total global CO<sub>2</sub> emissions.

Last, N<sub>2</sub>O is also produced as an intermediate gaseous product of microbial nitrogen cycling. The gas emissions depend on the type of waste treatment as well as conditions during the transport, storage and treatment. As well as CO<sub>2</sub>, the emissions are small compared to the total global emissions (Monni et al., 2006).

Accordingly, the effects of solid waste management options on GHG emissions may vary substantially. In this regard, Monni et al. (2006) point out, for example, that plastics do not degrade in landfills, but are stored yielding no GHG emissions. In combustion, fossil C in plastics is oxidized and yields fossil CO<sub>2</sub> emissions. On the other hand, food and paper would not contain fossil C and do not generate fossil emissions in combustion.

According to the Intergovernmental Panel on Climate Change (IPCC), GHG emissions are roughly comparable from landfilling and composting for yard waste, but for food waste,

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<sup>1</sup> The GWP reflects how much a certain gas can enhance the global warming in one hundred years, compared with the same amount of CO<sub>2</sub> emitted at the same time. For more information, see [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10.html).

composting yields significantly lower emissions than landfilling.

## **LEGAL AND ECONOMIC INSTRUMENTS FOR THE STIMULATION OF SCHEDULED PRACTICES**

The economic cost of avoiding environmental damages is by far smaller than the cost of investigating and repairing all the damages, especially when considered the expenses of the investigatory, administrative and judicial processes.

The concession of incentives to those who have a desired behavior (pro-environment) may cause a more significant positive effect on the environment and to the society than the imposition of penalties to the wrongdoers. Besides, the doctrine has reported that the legislation which contains some forms of incentive or some economic instruments tends to be more effective and it represents a lower economic cost to the government (Marinho, 2009).

Terence Dorneles Trennepohl (2011) identifies a current tendency of the society to valorize the honest behavior, instead of to perpetuate the idea by which the imposition of penalties would be an effective way to the resolution of conflicts. He states that the punishment by penalties like fines is currently in decline, due not only to the weakness of the punitive institutions, but also to the poor results of these penalties. The modern doctrine would expect the limitation of the Criminal Law, for example.

Accordingly, the application of an isolated penalty to the wrongdoer – which means that no incentive to the compliance have been given – could represent a poor result, mainly if considered the actual object of the Environmental Law: prevention and recuperation of the environmental damages.

Besides, it is not possible to state that the imposition of substantial fines could bring more beneficial effects. As already studied by respected people of the Law and the Economics, the effect of such fine might be perverse.

Therefore, the legal framework may sometimes impose some penalties for determined infractions, either as a punishment, or for educational purposes. However, this might not be the only instrument to be used, mainly in the cases when the recuperation of the damages is extremely hard.

As examples of this tendency in Brazil, we could point out (i) the Federal Law No. 11.428/2006, which creates economic incentives to stimulate the protection and the sustainable use of the Mata Atlântica biome; and, (ii) Federal Law No. 12.187/2009, which establishes fiscal and tax measures in order to stimulate the reduction and the clearance of GHG emissions, through instruments like differentiated tax rates, exemptions and tax compensations.

Also, we may see this tendency in the international sphere, like in the Convention on Biological Diversity, signed in the city of Rio de Janeiro (Brazil) in 1992. This treaty has created the possibility of constituting rights on the genetic resources (intellectual property) as a way of achieving the balance between the biotechnology-holder countries and the biodiversity-holder countries. One of the incentive tools would be the faculty of creating a patent on some genetic resources, what would render economic income originated from the royalties.

Another international treaty that we may highlight in this matter is the UNFCCC. After the Kyoto Protocol, this treaty would constitute market mechanisms that allow earning money by the reduction of GHG emissions. One example of such mechanisms is the Clean Development Mechanism, set forth by the article 12 of the Kyoto Protocol.

The stimulation of scheduled practices related to the waste management and the climate change is subject to variations. Data may vary with respect to quality, quantity, validity and robustness of the wastes. Many of the emissions are likely to vary considerably among sites. Also, many different emission

estimation methodologies are being employed to measure the impact of climate change mitigation activities.

The amounts, composition and management processes of waste generated may also vary depending on municipal, regional or national circumstances. For example, Monni et al. (2006) affirm that waste incineration is a favorable option in industrial countries, where there are space limitations and land costs are high. Furthermore, energy content of waste is high when compared to developing countries, due to higher portion of paper. In developing countries, on the contrary, lower land and labor costs, the lower heating value of waste due to higher content of putrescibles and the high capital cost of incinerators have discouraged waste combustion.

In short, waste management encompasses different treatment phases and techniques applied in parallel or in a chain. Hence, all the above mentioned variations will establish the pros and cons of all the proceedings that shall be adopted as scheduled practices.

## **BRAZILIAN INITIATIVES**

The Federal government has promulgated specific rules for waste and climate change matters, in a way that the country counts with the National Policy on Solid Wastes and National Policy on Climate Change. Also at federal level, committees were created for providing effectiveness of the public policies, involving the Ministries of Environment, Health, Development, International Relationship, Technology, amongst others.

Some Brazilian States have also promulgated their state policy on solid wastes and climate change, such as São Paulo and Rio de Janeiro.

Moreover, the government, society and the companies are currently debating the National Plan of Solid Wastes, in order to define legal and economic proceedings for each market sector.

Brazilian authorities are certainly concerned about the consequences of wastes to the climate change, mainly considering their role before the international community – the country received representatives from all over the world in 1992, year of the United Nation Conference on Environment and Development, and will receive them again this year, for the United Nation Conference on Sustainable Development.

## **CONCLUSION**

The waste sector is undeniably an important contributor to climate change. Increasing emissions of GHG are expected due to the development of the emerging economies and the strengthening of the consumption society all over the world.

Industrial processes and transportation activities of the waste sector may generate CH<sub>4</sub>, CO<sub>2</sub> and N<sub>2</sub>O gases, amongst others GHGs. They also demand a great amount of energy.

In this sense, we need legal and economic instruments for the stimulation of scheduled practices capable of reducing the GHG emissions, together with public policies with general and specific goals, articulating society, state and market.

A change in behavior is still of utmost importance in order to provide acceptable conditions of survival for the future generations.

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