Unisanta Science and Technology, **2016, 6, July**
Published Online 2016 Vol.5 N°1 http://periodicos.unisanta.br/index.php/sat)

UNISANTA
Science and Technology
ISSN 2317-1316

Managing Emerging Hazardous Wastes in Brazil

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Received september, 2015

Abstract: Brazil is known as a great generator of hazardous waste, it generates the second greatest quantity of e-waste among emerging countries. The National Policy on Solid Waste provides for guidelines on joint and environmentally appropriate management of solid waste, and regulates issues such as joint management, proper allocation and disposal, and shared responsibilities. The poor management of hazardous waste may tend to cause high levels of exposure and allows a prediction of huge quantities of waste in the future. In this case, an understanding of waste segregation must also be created among the general public. The informal sector currently recycles some high-value e-waste; policies made should therefore involve and maximize the potential of the sector. This report has evaluated hazardous waste generation and physical characteristics, existing hazardous waste management system institutional and financial aspects, prediction of future waste quantities and major problems and issues associated with hazardous waste in Brazil.

Keywords: *WEEE, e-waste, solid waste*.

Gerenciamento de Resíduos Perigosos Emergentes no Brasil

Resumo: O Brasil é conhecido como um grande gerador de resíduos tóxicos, que produz a segunda maior quantidade de lixo eletrônico entre os países emergentes. A Política Nacional de Resíduos Sólidos prevê orientações sobre a gestão conjunta e ambientalmente adequada de resíduos sólidos, e regulamenta questões como a gestão conjunta, alocação adequada e descarte e responsabilidades compartilhadas. A má gestão dos resíduos tóxicos pode causar níveis elevados de exposição e permite uma previsão de enormes quantidades de resíduos no futuro. Neste caso, uma compreensão de segregação de resíduos também deve ser criada entre o público em geral. O setor informal recicla atualmente alguns resíduos eletrônicos de alto valor resíduos; políticas feitas, portanto, devem envolver e maximizar o potencial do sector. Este relatório avaliou a geração de resíduos perigosos e características físicas, aspectos institucionais e financeiros do sistema de gestão de resíduos perigosos existente, a previsão da quantidade de resíduos futuros e principais problemas e questões associadas com resíduos tóxicos no Brasil.

Palavras chave: WEEE, resíduo eletrônico, resíduo sólido

1. Profile of Brazil

Increasing population levels, booming economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries [1]. In Brazil it is not different and there is no reliable information available on illegal Waste Electrical and Electronic Equipment (WEEE) trading in Brazil. There is anecdotal evidence of a WEEE reuse market, but the size of this market is not easily measurable. Despite of that Brazil is known as a great generator of hazardous waste.

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2. Hazardous waste generation and physical characteristics

Statistics from the Brazilian Association of Waste Treatment Companies [2] showed that the volume of hazardous waste treated in Brazil reached 5.9 million metric tons, an increase of 30% over 2006. In 2007, the hazardous waste sector business in Brazil generated revenues of US$ 856 million (R$ 1.7 billion), of which 81% was related to industrial waste.

Another important fact is that according to Schluep et al. [3], Brazil generates the second greatest quantity of e-waste among emerging countries. In 2005, 96,800 tons of computer scrap were generated (0.5 kg/cap). This quantity is smaller than only the amount of computer scrap generated in China, which was 300,000 tons in 2007 (0.2 kg/cap). Countries such as Peru, Colombia and South Africa generate much less than China and Brazil.

In relation to the Physical Characteristics, the National definition of hazardous waste used in Brazil is given by the Law nº 12.305 from 02/08/2010 – National Policy on Solid Waste – (PNRS) [4] defines hazardous waste as "those who, due to its characteristics of flammability, corrosivity, reactivity, toxicity, pathogenicity, carcinogenicity, mutagenicity and teratogenicity, present significant risk to public health or environmental quality, according to law, regulation or technical standard."

Hazardous Waste - Class I - are those belonging to any category listed in the Annex 1-A to 1-C of the CONAMA Resolution no 23, from December 12, 1996 [5], unless they do not present any characteristics listed in Annex II of the same legislation. Furthermore, the Brazilian legislation defines as 'hazardous' all wastes listed in Annex 10-A (Hazardous Wastes - Class I - Importation Prohibited) of the CONAMA Resolution no 235, from January 7, 1998 [6], and as 'controlled' all the wastes listed in Annex 10-B (Non-Inert Wastes - Class II - Controlled by IBAMA) of the Resolution.

3. Existing hazardous waste management system institutional and financial aspects

Established by Federal Law n. 12,305/2010, the PNRS [4] provides for guidelines on joint and environmentally appropriate management of solid waste, and regulates issues such as joint management, proper allocation and disposal, and shared responsibilities.

According to the PNRS [4], waste management plans must be developed, implemented and operated by generators of waste resulting from industrial, health care, mining and public sanitation activities, as well as commercial establishments that generate hazardous waste.

Construction companies, transport terminals and agricultural enterprises are also required to develop, implement and operate such plans. Agrochemicals, batteries, tires and lubricant oils are among the products that create such obligations. Nevertheless, they may be extended to any product sold in plastic, metal or glass packages, pursuant to pending regulation or other legal instrument.

In the case of financial aspects Brazil is still behind the scenario of value in managements, however there are some evolutions. Brazil is the leading developing country that has exploited the CDM (Clean Development Mechanism) option for the waste sector with 72 registered projects and over 10 million CERs (Certified Emission Reductions).

Micro-financing and hybrid financing are particularly useful innovative financing mechanisms for supporting small-scale efforts. The "Participatory Sustainable Waste Management Project" established in Brazil in 2006, for example, created micro-credit funds from donations [7].

In community-based waste management programs, a community leader identifies a service provider and/or plans and manages the services. Micro and small enterprises are also taking shape in developing countries such as Brazil, which unlike CBOs (Community based organizations) and NGOs (Non-Governmental Organizations), engage in waste picking activities for-profit [8].

4. Prediction of future waste quantities

According to the Brazilian Institute of Geography and Statistics (IBGE) [9], the Brazilian population grew from 170 million to 191 million from 2000 to 2010, which represents a population growth rate of 1.17%. Considering the increasing number of houses with access to computers and the average lifetime of a computer from 5 to 8 years [3]., it is possible to predict that in the next 10 years 150 million personal computers will be replaced with new equipment, which will result in the generation of a significant quantity of e-waste from computer scrap.

This is just an example, however, there are a lot of different kinds of hazardous waste that associated with the combination of geographical concentration, relatively high generation rates, and generally poor management of hazardous waste may tend to cause high levels of exposure in countries such as Brazil, and allows a prediction of huge quantities of waste.

5. Major problems and issues

At The Global Partnership on Waste Management conference [10] in Osaka, Japan the minister of Environment in Brazil stated:

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Difficulties are being encountered in the development of hazardous waste policy in Brazil, including for healthcare and e-waste. A consensus on indicators and limits of hazardous substances in waste must first be reached, before policies and implementation strategies can be developed. Difficulties in policymaking thus reflect a lack of technical capacity. Methods of safe and efficient waste segregation, when dealing with hazardous wastes, need to be developed, including an inventory of best practices for e-waste management. Data on waste generation needs to be compiled, while preparation also needs to be made for the recovery of contaminated sites. An understanding of waste segregation must also be created among the general public. The informal sector currently recycles some high-value e-waste; policies made should therefore involve and maximize the potential of the sector.

6. Conclusions

It is possible to conclude with this search that Brazil is still behind some other countries in case of measurements, data and ideal management. However, from the ninety's to now a lot have been carried out and with an efficient application of the policies already implemented, this issue will be minimized.

Acknowledgement

The authors are grateful to Griffith University.

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