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## ECOLOGY AND THE PROBLEM OF RECYCLING HOUSEHOLD WASTE

*Ключевые слова: мусор, отходы, окружающая среда, полигон, электричество, двуокись, переработка.*

*Основа развития (оценка жизненного цикла). В этом исследовании были сравнены экологические показатели различных вариантов обращения с отходами. И затраты изменение энергии, отказавшись от выброса вредных газов в атмосферу.*

*Keywords: Garbage, Trash, Waste, Environment, Landfill, Electricity, dioxide, Recycling.*

*Development of an LCA (Live Cycle Assessment) In this study the environmental performance of different waste management options have been compared. And Waste change to energy, avoiding harmful gases in atmosphere.*

### Introduction

Garbage—also called trash, municipal waste, or refuse—is the by-product of our industrial age. It is also the result of an economic system that produces goods cheaply and encourages consumers to buy new products continually and consume foods in throwaway containers. We have truly become a disposable society; in Russian up to 80 percent of products are used once and then thrown away. In fact, according to the Russian Environmental Protection Agency (EPA), the average Russian throws away 4.62 pounds (2kg) of garbage a day. Much of this discarded material is paper and plastic used for packaging. And the amount of garbage we produce has increased, despite widespread recycling efforts. In 2007, for example, Russian generated about 150 million (230 million metric tons) of municipal solid waste (MSW), and almost two-thirds of this waste was not recycled.[1]

### The basic option's of garbage utilization filling, burning, recycling

Base Case – MRF, (Material Recycling Facility) landfilling and windrow composting, that show's in figure 1.

The Base Case shows the current situation of domestic waste management. Garbage and recyclables are disposed in separate garbage bins. The garbage is collected and trucked from the council to the Transfer Station. At the Transfer Station the garbage is compacted and reloaded into a larger landfill truck. These trucks transport the garbage to landfill. At the landfill the garbage is unloaded, placed and compacted. The organic fraction degrades to various extents and contributes to biogas and leachate generation. The biogas is partly captured and utilised for electricity production (avoided electricity production).

The recyclables are transported to a Material Recycling Facility (MRF). At the MRF the material is unloaded and separated into eight different material streams: paper, cardboard, old newsprint, liquid paper board, polyethylene terephthalate, high density polyethylene, aluminium and tin plate. Rejects and inappropriate material are also landfilled. After separation each recycling stream is transported to different locations where material reprocessing takes place. Each material replaces primary materials of different quality:

- Paper and old newsprint are reprocessed into newsprint (avoided product newsprint)
- Cardboard is reprocessed into cardboard (avoided product unbleached kraft pulp);
- Glass replaces primary glass melt;
- Reprocessed steel substitutes for pig iron;
- Aluminium replaces primary material; and
- polythylene and high density polyethylene replace the same virgin plastic resin.

Garden waste is collected separately in some councils and transported to a windrow composting facility. The compost product replaces N-, P- and Kfertilisers. Figure 1 shows the system diagram.

### Climate Change, burning the garbage increased emissions to atmosphere it's the reason of ecological challenges

Climate change is of national and international interest. Currently, is one main emitter of greenhouse gases, which promote climate change, worldwide. The effects of climate change on Russian can be seen as significant. Climate change is assumed to increase extreme weather phenomena This is not proven yet, but it is fact that since mid-years an increase events happened Models suggest a connection between emitted greenhouse gases and ENSO. With a doubled amount of atmospheric CO<sub>2</sub> it predicts more frequent ENSO Draught is an effect ENSO has on Russian. Another effect of climate change is a general increase in temperature in Russian. Simulations suggest a decrease of 0.4 to 2.0 °C by 2030, and 1.0 to 6.0 °C by 2070, relative to 1990.

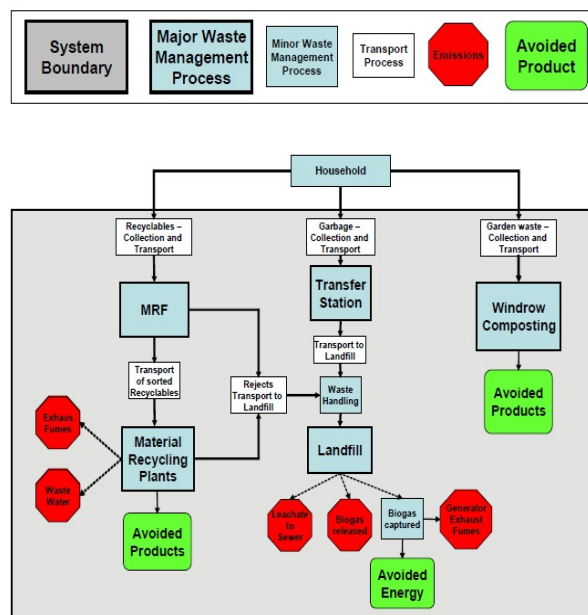
The impact category considers all emissions which have an impact on climate change. Main contributors to this category are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), halocarbons halons, chlorofluorocarbons (CFC), hydro chlorofluorocarbons (HCFCs), nitrogen oxides (NO<sub>x</sub>), including nitrogen dioxide (NO<sub>2</sub>), nitric oxide (NO), and nitrous oxide (NO<sub>2</sub>), non-methane volatile organic Compounds Non-methane volatile organic compounds (NMVOC) and particulate matter of various compositions and sizes. Climate change can be evaluated in an (LCA)Live Cycle Assessment on a time scale of 20, 100 or 500 years. Here, the most usual category of 100 years has been chosen. The equivalency factors, determined by the Intergovernmental Panel on climate change (IPCC),Intergovernmental Panel on Climate Change.[2]

Incineration, the combustion of organic material such as waste with energy recovery is the most common implementation. All new plants in countries must meet strict emission standards, including those on nitrogen oxides (NO), sulphur dioxide (SO<sub>2</sub>), heavy metals and dioxins. Hence, modern incineration plants are vastly different from the old types, some of which neither recovered energy nor materials. Modern incinerators reduce the volume of the original waste by 95-96 percent, depending upon composition and degree of recovery of materials such as metals from the ash for recycling.

Concerns regarding the operation of incinerators include fine particulate, heavy metals, trace dioxin and acid gas emissions, even though these emissions are relatively low from modern incinerators. Other concerns include toxic management. Discussions regarding waste resource ethics include the opinion that incinerators destroy valuable resources and the fear that they may reduce the incentives for recycling and waste minimization activities. This is open to question, however, as the Refuse Derived Fuel (RDF) is produced by recycling centres, who make their money from selling on recoverable material, and the name Residue Derived Fuel even suggests that it's made from what's left over, not the materials being pulled out. It is not in the interests of the operators to give away for free the very materials they could otherwise sell. Incinerators have electric efficiencies on the order of 14-28%. The rest of the energy can be utilized for e.g. district heating, but is otherwise lost as waste heat.

The method of using incineration to convert municipal solid waste (MSW) to energy is a relatively old method of waste-to-energy production. Incineration generally entails burning to boil water which powers steam generators that make electric energy to be used in homes and businesses. One problem associated with incinerating make electrical energy, is the potential for pollutants to enter the atmosphere with the flue gases from the boiler. These pollutants can be acidic and in the years were reported to cause environmental damage by turning rain into acid rain. Since then, the industry has removed this problem by the use of lime scrubbers and electro-static precipitators on smokestacks. The limestone mineral used in these scrubbers has a pH of approximately 8 which means it is a base. By passing the smoke through the lime scrubbers, any acids that may be in the smoke are neutralized which prevents the acid from reaching

the atmosphere and hurting our environment. (Field) According to the New York Times, modern incineration plants are so clean that "many times more dioxin is now released from home fireplaces and backyard barbecues than from incineration [3, 4, 5].



**Fig. 1 - Shows the system diagram**

### Bibliography

1. RESOURCE NSW (Publisher) (2003): Waste Avoidance and Resource Recovery Strategy 2003// [www.resource.nsw.gov.au](http://www.resource.nsw.gov.au)
2. IPCC Intergovernmental Panel On Climate Change (Publisher) (2001): IPCC Third Assessment Report – Climate Change.// [www.ipcc.ch](http://www.ipcc.ch)
3. Тимербаев, Н.Ф. Современное состояние процесса пиролизной переработки органических веществ / Н.Ф. Тимербаев, Р.Г. Сафин, И.И. Хуснуллин // Вестник Казан. Технол. Ун-та. -2011.-Т. 14, №3.- С.169-174.
4. Тимербаев, Н.Ф. Моделирование процесса очистки дымовых газов образованных при сжигании органических отходов /Н.Ф.Тимербаев, Р.Г.Сафин, А.Р. Садртдинов // Вестник Казан.технол.ун-та.-2010.- № 11.
5. NPI National Pollutant Inventory (2002): Emission Estimation Technique Manual for Municipal Solid Waste (MSW) Landfills, Version 1.1. // [www.npi.gov.au](http://www.npi.gov.au)