

Waste Management in the Republic of Ireland and its comparison with the Czech Republic

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ABSTRAKT

Cílem této bakalářské práce je srovnání odpadového hospodářství dvou vybraných zemí Evropské unie – České republiky a Irska.

Z důvodu pochopení základních souvislostí, teoretická část uvozuje do problematiky odpadového hospodářství. První část teorie definuje odpad, jeho složení a také životní cyklus produktu. Další část se týká hierarchie odpadového hospodářství a možných alternativ odpadového hospodářství.

Praktická část obsahuje srovnání odpadového hospodářství obou zemí dle pěti různých srovnatelných aspektů.

Klíčová slova: odpad, odpadové hospodářství, hierarchie odpadového hospodářství, životní prostředí, recyklační kultura

ABSTRACT

The aim of this bachelor thesis is to compare the waste management of two chosen EU countries – the Czech Republic and the Republic of Ireland.

As it is necessary to know the basic context, theoretical part introduces the issue of waste management. The first part of theory deals with the definition of waste, its composition and also the product life cycle. The next part refers to the waste management hierarchy and possible waste management alternatives.

In the practical part of the thesis waste management of both countries is compared according to five different comparable aspects.

Keywords: waste, waste management, waste management hierarchy, environment, recycling culture

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DECLARATION OF ORIGINALITY

I hereby declare that the work presented in this thesis is my own and certify that any secondary material used has been acknowledged in the text and listed in the bibliography.

February 21, 2009

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INTRODUCTION

I have chosen this topic as I have been twice in Ireland and I am not indifferent to the theme of healthy environment. Each country has its specifics and it is interesting to compare them on the basis of waste management.

The main aim of my bachelor thesis is to make the waste management comparison of two chosen countries – Ireland and the Czech Republic.

The theoretical part is divided into two parts. At first the waste is defined, its composition and the product life cycle. In the second part of theory waste management is defined and waste management alternatives are introduced according to the waste management hierarchy.

After the theoretical introduction to the waste management theme, the practical part takes place. Waste management in Ireland and the Czech Republic is compared according to five comparable aspects. The aim is to make the analysis of waste management according to these aspects and find out possible similarities or differences concerning the waste management in both countries. On the basis of results of the analysis some recommendations and warnings are made.

I. THEORY

1 INTRODUCING WASTE MANAGEMENT

1.1 Waste

When introducing waste management it is necessary to start with the definition of waste, its types and the product life cycle. The problem of waste is going to be outlined as well.

1.1.1 Definition of waste

Various waste definitions can be found. In most cases the waste is defined as a substance or energy produced during the metabolism process of the society, which is for it unwanted, no utilisable or even toxic and is spurned to the external environment. Therefore, in the light of the environment quality preservation the trend is to care about the amount of waste and its future disposal. (Božek, Urban a Zemánek 2003) No organism, no matter how simple, is fully efficient. Every time, some wastage is generated. (BBC: Waste 2005) Therefore waste has become one of the most discussed problems these days from the environmental and economical point of view.

1.2 Problem with waste

Problems with the waste disposal can be seen worldwide. However, the analysis of this bachelor thesis compares two members of the European Union – the Czech Republic and the Republic of Ireland. As European society has grown wealthier it has created more and more waste. Each year in the European Union alone there are thrown away 1.3 billion tonnes of waste - some 40 million tonnes of it hazardous. This amounts to about 3.5 tonnes of solid waste per person, according to European Environment Agency statistics. Adding to this total a further 700 million tonnes of agricultural waste it is clear that treating and disposing of all this material - without harming the environment - becomes a serious problem. (Environment: Waste 2009)

It is possible to say that there are two main problems with the waste:

1. **The huge waste generation means that the resources are used inefficiently.**
Every plastic bottle or newspapers recycled saves the amount of natural resource that would have otherwise been necessary to make it.
2. **The waste management is not efficient or clean.** Although the standards are improving, waste management facilities are still serious polluters. Landfills, incinerators, recycling and composting plants can contribute to pollution, if badly run. (BBC: Waste 2005)

1.3 Composition of waste

1.3.1 Non-hazardous waste

- **Municipal waste** – includes commercial and household waste
 - **Commercial** – municipal waste without the household part, e.g. waste from the street cleaning
 - **Household** – food and organic waste, plastic, paper, glass e.g.
- **Industrial** – waste formed during the industrial processes
 - **Mining and Quarrying**
 - **Manufacturing** (Microphilox: Waste Alternatives 2005)

1.3.2 Hazardous waste

Hazardous waste, such as batteries or motor oil, is a potential threat to the human health and therefore it has to be disposed of with special attention.

1.4 Product life cycle

Every day consumers make decisions directly connected to the amount of waste they produce. Users usually care about the product in the final phase, just when it is useful for them. However, users should consider how a product is made, used and then disposed of to understand how much waste they are producing and how financially and environmentally

demanding the waste is. Only by understanding these, sustainable waste management and healthy environment can be developed. The product life cycle is the total process of creating, using and disposing of products made from the natural resources. (Barber a Halbach 2002)

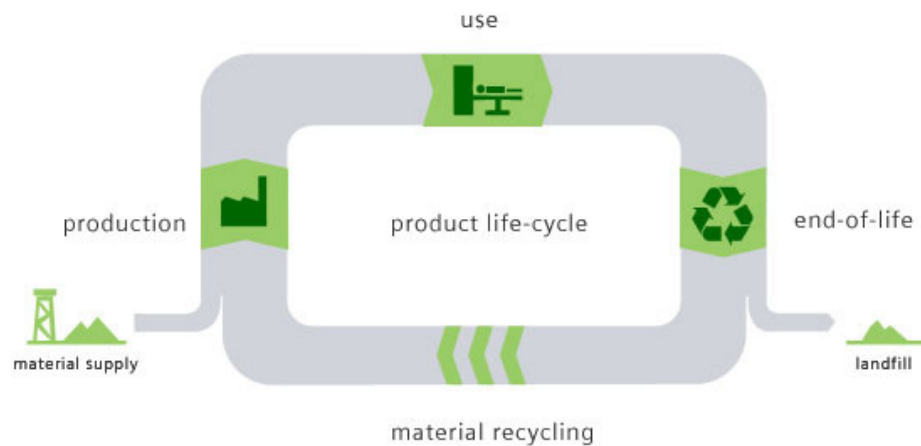


Figure 1: The product life cycle

(Siemens, 2009)

1.4.1 Life cycle steps

Step 1 – Material supply

Here the product life begins with the direct dependence on the natural environment. Some energy is always needed to extract the natural resources from the earth.

Step 2 – Production

Raw materials are further processed or refined by the use of energy. Materials move through the manufacturing and assembly processes.

Step 3 – Use

Final products are transported to stores and are ready to purchase. They remain at this point as long as they are usable.

Step 4 – End of life

The product is no more usable and it is disposed of.

Step 5 – Waste management

Many possibilities of waste disposal are available, product material can be recycled, land filled etc.

(Barber a Halbach 2002)

2 WASTE MANAGEMENT

Waste management is a process of disposal, processing, controlling, recycling and reusing the solid, liquid and gaseous waste produced by humans, animals, plants and other organism in order to protect the environment. (Biology online: Waste Management 2005)

2.1 Waste management hierarchy

Waste management hierarchy shows the priorities of the waste management, with the most favoured options on the top (prevention, minimisation) and the least favoured ones at the bottom (energy recovery, disposal). Everybody should be acquainted with the waste management hierarchy in order to develop an environment-friendly culture.

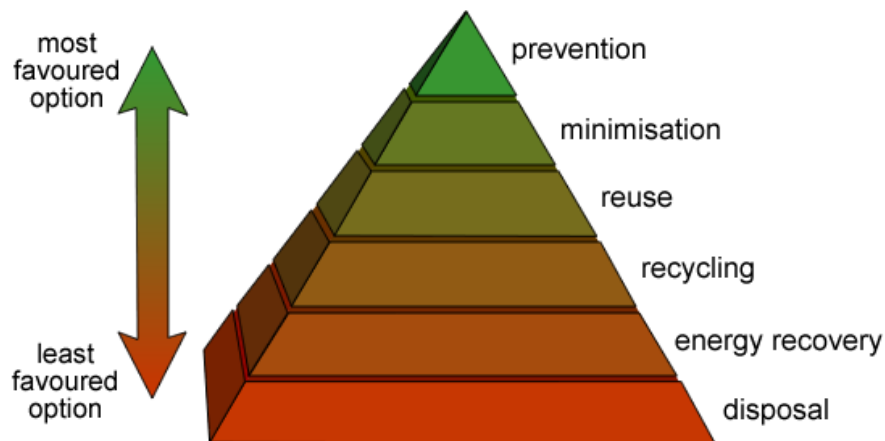


Figure 2: Waste management hierarchy

(Waste Hierarchy, 2009)

2.2 Waste management alternatives

Waste management is an ongoing activity as the waste is managed every day. Different managing alternatives can be found, depending on the waste characteristics. To the most important and frequently used there belong prevention, minimisation, reuse, recycling, energy recovery or land filling. (Microphilox: Waste Alternatives 2005)

2.2.1 Prevention

Prevention is the most desirable and a key factor in any waste management strategy. Waste prevention is closely linked with the improving manufacturing methods and influencing consumers to demand greener products and less packaging. (Environment: Waste 2009)

Prevention strategy is often called the cleaner production. Cleaner production means optimal use of raw materials and reduced use of dangerous substances outflow as well as waste directly at its production. If the formation of dangerous substances and waste is prevented at this point, not so much equipment will be needed for the final cleaning and for the waste recovery. Cleaner production could bring producers lower investment and operational expenses and it would be economically effective. (Amundsen 1995)

2.2.1.1 *Principal hierarchy for achieving cleaner production*

Cleaner Production means solving environmental problems according to these priorities:

- 1) Prevent creation of harmful substances and waste in production
- 2) Decrease the amount of harmful substances and waste
- 3) Internal recycling of as much waste as possible
- 4) External recycling of waste, which cannot be recycled internally
- 5) Use the waste for the by-products production
- 6) Use the waste not suitable for by-products production to energy recovery
- 7) Landfill waste and harmful substances which cannot be treated according to possibilities above (Amundsen 1995)

Briefly speaking, the prevention option appeals to the producers to think about the waste at the beginning of the product life cycle – **before** the production. This requires the development of technologies that improve the processes during the production and mean less waste as a secondary product. However, also individuals should think about the prevention, especially when deciding about the goods they are buying and through this indirectly influencing the waste they will produce. One possibility is to look for eco-labelled or organic labelled products that are usually more sensibly packaged. (BBC: Waste 2005)

2.2.2 Minimisation

The waste minimisation is closely linked with the prevention and therefore these two options belong to the top of the waste management hierarchy. By course of the waste minimisation producers try to reduce the amount of waste and its toxicity. Many benefits of the waste minimisation can be found. These are:

- Reduced need of the landfill space
- Saving natural resources and energy
- Reducing environmental pollution
- Increasing of the production effectiveness (EPA: Waste minimisation 2008)

2.2.3 Re-use

Re-use is a waste management alternative when the product or its part is used more than once. This option is in the middle of the waste management hierarchy. Two main types of organizations that specialise in the re-use activities can be found. Firstly the charity shops or second-hands collecting clothes, books or toys, which are still in good condition and reselling or giving them to the public. Legally, these products never become waste at all. Next example can be found when the organisations collect mainly unwanted electronic goods, repair them and sell them once again. When doing this, the organisations have to check the quality of the products they are repairing. (BBC: Waste 2005) A nice example of the re-use alternative can be found also in every-day life, when returning glass bottles to the distributor to be refilled.

2.2.4 Recycling

If waste cannot be prevented, minimised or re-used, it should be recovered, mainly by recycling. (Environment: Waste 2009)

The waste recycling is the re-usage of the manufacturing and consumer wastes, substances and energies as secondary raw material sources in the original or amended form, in disregard of the place or time of the waste creation. (Božek, Urban a Zemánek 2003)

2.2.4.1 The process of recycling

People are asked to sort their waste by the use of different containers. The collection centres make for the right sorting process. Two types of municipal waste are collected at the collection centres:

- **Household waste:** packaging (glass, cardboard, plastic, aluminium) but also magazines newspapers etc.
- **Commercial and industrial waste:** paper, wood, metal, plastic, card etc.

After the waste is accumulated at the collection centre, then it is subjected to the initial pre-sorting and the first phase of mechanical sorting. Furthermore the manual process is applied and the waste is separated in two groups:

- **Reusable material** - is packed and sent to recycling facilities or to industry for reuse, e.g. card for the paper industry
- **Non-recyclable material** - normally is sent to the incineration where it is recovered to energy (Microphilox: Waste Alternatives 2005)

2.2.4.2 The recycling culture

Some countries have already achieved a high level of municipal waste recycling, e.g. some EU countries are already recycling more than 50 % of packaging waste. (Environment: Waste 2009) They have managed to do so, because they have been able to create a recycling culture. (BBC: Waste 2005) Nice example of the recycling culture creation can be found in Germany, where already children at schools are taught how important the proper waste sorting is. Educate the population in the theme of waste management is very important and unavoidable. Obviously, waste sorting bins with four different compartments: paper, plastic, glass and other, are unavailing, when people do not respect the categories. And by return - they do not respect them, when there is no recycling culture in the country. (BBC: Waste 2005)

2.2.4.3 Composting

Living organism exists within cycles of nature. They are born, grown and eventually die and are returned to the earth. The composting functions rightly on this basis. (Peasgood a Mark 2007)

Composting is a special kind of recycling. It is a natural process when organic matter is broken down into a rich dark, soil-like material under controlled conditions, by the help of a huge range of organism in the presence of oxygen. (Peasgood a Mark 2007) The result of this natural process is a stable organic product, which is both hygienic and rich in humus. The process of composting usually takes several months, but can be speeded up and controlled using various techniques. The originated composting is a great way of regenerating soils impoverished by intensive farming. (Microphilox: Waste Alternatives 2005)

These days, composting attracts more and more people when composting their household waste. Composting in this case is highly efficient as it is estimated that up to half of household waste can be composted which makes it a great contribution to the waste reduction. (Peasgood a Mark 2007)

2.2.5 Energy recovery

Energy recovery is not a preferable way according to the waste management hierarchy, but nowadays it is very common. There are many ways of getting energy from waste – incineration, gasification, anaerobic digestion etc.

2.2.5.1 Incineration

The most used energy recovery option is the incineration which allows obtaining energy at the same time that the volume of waste is reduced. The waste is partially converted to energy with the help of high combustion temperature and the energy is used for heating, industrial applications and electricity production. (Microphilox: Waste Alternatives 2005) Unlike many other alternatives of waste management, the incineration is a permanent solution and actually destroys most of the waste rather than just disposing of or storing it. (Pollution issues: Incineration 2007)

Types of waste suitable for incineration:

- Municipal waste
- Industrial waste
- Medical waste

- Sewage
- Hazardous waste (Pollution issues: Incineration 2007)

During the incineration process, the waste is dumped in huge trenches, where it is mixed and transferred to an oven. The waste is then burnt at temperatures reaching 1000°C. While burning, the steam is produced that turns turbines which in their turn produce electricity. The fumes produced during the incineration process are treated by the dry or wet method. Incurred ashes can be used in civil engineering. (Microphilox: Waste Alternatives nedatováno)

2.2.5.2 Anaerobic digestion

Anaerobic digestion is another waste-to-energy process. It is a natural breakdown of organic materials into biogas. This process takes place naturally, or in a sealed reactor. (Organic Power: What is Anaerobic Digestion 2009) Basically, the anaerobic digestion process is similar to the one that occurs naturally in landfills. (Microphilox: Waste Alternatives 2005) In the reactor the organic material has to be fully mixed and warmed, and by the help of bacteria without oxygen, the biogas is produced. (Pollution issues: Incineration 2007) Biogas can be used as a fuel to produce electricity. (Microphilox: Waste Alternatives 2005)

2.2.6 Land filling

Land filling is the least preferable waste management option. Waste that cannot be recycled or in other way processed is stored in landfills. A landfill requires strict technical standards and must fulfil safety norms in order to protect the environment and local communities. (Microphilox: Waste Alternatives 2005)

Few factors should be taken into account:

- The landfill location and the surrounding land
- The protection of groundwater
- The collection, treatment and elimination of leakages

- The capture, treatment and recovery of biogas
- The covering construction, in order to prevent rainwater penetration (Microphilox: Waste Alternatives 2005)

Although there are strict EU regulations concerning the land filling, thousands illegal landfills can still be found in the EU. (BBC: Waste 2005) Land filling not only takes up more and more land space, but also causes air, water and soil pollution. Landfills also discharge carbon dioxide (CO₂) and methane (CH₄) into the atmosphere and chemicals, pesticides to the earth and groundwater. Taking into account all these disadvantages, landfills are harmful to the human health, as well as to the nature. Thus other waste management alternatives should be applied. (Environment: Waste 2009)

II. ANALYSIS

3 WASTE MANAGEMENT COMPARISON – IRELAND VERSUS CZECH REPUBLIC

In the analysis part I am going to compare waste management of two chosen countries – the Czech Republic and the Republic of Ireland. For this comparison various comparable aspects have been chosen. I will start with the broad comparison based on the basic facts and waste development in both countries. The next and most important part of this analysis is a comparison based on the Irish Waste Management Analysis 2008. Especially for this comparison I have created figures comparing data of both countries to make differences more visually clear. In the next part of the analysis the domestic waste services in both countries are compared and finally, in the last part, I have compared the implementation of the plastic bag environmental levy in both countries.

3.1 Comparison based on the basic facts of both countries

In this part both countries are briefly introduced. I have chosen information and facts that may be relevant for the waste management comparison of both countries.

IRELAND

Land area: 68,889 sq km; **total area:** 70,280 sq km

Population (2008 est.): 4,156,119, density per sq km: 60

Capital (2003 est.): Dublin, 1,018,500

Other large cities: Cork, 193,400; Limerick, 84,900; Galway, 67,200

GDP/PPP (2007 est.): \$187.5 billion; per capita \$45,600.

Year of EU entry: 1973

(Info Please: Ireland 2008)

CZECH REPUBLIC

Land area: 77,276 sq km; **total area:** 78,866 sq km

Population (2008 est.): 10,220,911, density per sq km: 132

Capital and largest city (2003 est.): Prague, 1,378,700 (metro. area), 1,169,800 (city proper)

Other large cities: Brno, 376,400; Ostrava, 317,700; Plzen, 164,900; Olomouc, 102,900

GDP/PPP (2007 est.): \$249 billion; per capita \$24,400.

Year of EU entry: 2004

(Info Please: Czech Republic 2009)

ANALYSIS

When the basic facts are stated, next step is to analyse and compare data that can be relevant for the waste management of both countries.

From these facts it can be seen that the land area is almost the same in both countries. Therefore it can be stated that the conditions for land filling are nearly identical. However this is not completely clear as the population together with density should be taken into account. Speaking about population, which is more than twice greater in the Czech Republic than in Ireland, significant difference can be found. It is very positive fact concerning waste management, because municipal waste findings in 2006 were 295 kg per capita comparing with Ireland's 798 kg per capita. (Forfás 2008) As well as population, density per sq km in the Czech Republic is, more than twice greater than in Ireland. Consequently the Czech Republic with greater population has to care more about their waste management as it has not as much space for landfill disposal. The number of larger cities definitely also relates with the production of waste. A very important aspect is also the different entry to the EU as its regulations directly affect the waste management operation.

3.2 Comparison based on the waste management development

This comparison is based on the process of waste management implemented in both countries. The moment when the waste management was firstly introduced is crucial for each country. Further development and building-up of the waste management culture shows how the country is experienced in this sphere. In this part waste management development of both countries is introduced by the timeline with the most significant moments in their waste management history.

IRELAND

1982

Apart from the Litter Act, 1982, primary legislation on solid waste related to the public health functions of local authorities, 87 sanitary authorities were involved in "traditional" waste functions - i.e. street cleansing, and collection and disposal of municipal waste. (Department of the Environment, Heritage and Local Government: Waste 2006)

Pre 1990's

These times municipal waste was mainly disposed of to landfill. The land filling as a waste management option was mainly chosen due to its traditionally low relative cost. Local authorities were responsible for permitting the disposal of waste by the private sector, though there was no external regulation of their own collection and disposal activities. (Department of the Environment, Heritage and Local Government: Waste 2006)

1992

The Environmental Protection Agency was established. The EPA introduced a system of integrated pollution control (IPC) which addressed the generation, recovery and disposal of waste by relevant activities emphasizing progressive waste minimisation. The EPA was required to specify and publish criteria and procedures for the selection, management, operation and termination of use of landfill sites; and it enabled the establishment of a national waste database by the EPA. (Department of the Environment, Heritage and Local Government: Waste 2006)

1994

National Recycling - 'Recycling for Ireland' published. The strategy focused on packaging waste, newsprint and organic waste. It set an overall, minimum target recovery rate of 30% for waste packaging, and the network of collection points for recyclable materials throughout the country. The principle of producer responsibility was adopted, whereby producers take responsibility for the waste produced by their products. The role of local authorities was also addressed. (Department of the Environment, Heritage and Local Government: Waste 2006)

1996

Waste Management Act published. This Act was subsequently amended by the Waste Management Act 2001 and the Protection of the Environment Act 2003. These Acts are the legislative basis for all waste management issues. (Department of the Environment, Heritage and Local Government: Waste 2006)

1998

National policy on waste management was introduced in October 1998 as policy statement on waste management - **Changing our Ways**. It outlines the Government's policy objectives in relation to waste management, and suggests some key issues that must be addressed to achieve these objectives. The policy is based on an internationally recognised hierarchy of waste management options. (Department of the Environment, Heritage and Local Government: Waste 2006)

Changing our Ways sets the following targets for achievement over a fifteen year timescale:

- a diversion of 50% of overall household waste away from landfill,
- a minimum 65% reduction in biodegradable municipal wastes consigned to landfill,
- material recycling of 35% of municipal waste,
- recovery of at least 50% of construction and demolition waste within a five year period, with a progressive increase to at least 85% over fifteen years, and

- rationalisation of municipal waste landfills, with progressive and sustained reductions in numbers, leading to an integrated network of some 20 or so state-of-the-art facilities incorporating energy recovery and high standards of environmental protection. (Department of the Environment, Heritage and Local Government: Waste 2006)

2002 Delivering Change – Preventing and Recycling Waste

This document points the way forward and provides for a range of actions to be taken which will affect the way in which we deal with goods and materials at all stages from production to disposal. (Department of the Environment, Heritage and Local Government: Waste 2006)

2004 Waste Management – Taking Stock and Moving Forward

This document is a review of progress on waste management modernisation since 1998 and a programme of key points to underpin future progress. (Department of the Environment, Heritage and Local Government: Waste 2006)

2004 National Overview of Waste Management

This document was published in association with “Waste Management – Taking Stock and Moving Forward“ and details for each of the 10 waste management planning regions/areas, the waste management plan’s projections for future waste arising, the waste management plan’s objectives in terms of recycling, thermal treatment and landfill, and the potential implications of changes (e.g. demographic changes, revised waste projections) for the implementation of the waste management plan.

(Department of the Environment, Heritage and Local Government: Waste 2006)

CZECH REPUBLIC

1991

The first Act on Waste in the Czech Republic entered into effect, imposing on waste generators the duty to draw up waste management programmes. This duty applied to some business entities and municipalities (according to the limit of waste production), districts and the state. (Křenek, 2003)

1995

The Waste Management Program of the Czech Republic was discussed by the Government, based on the waste management programmes of districts. (Křenek, 2003)

1998

The new Act on Waste, stipulating the duty to draw up the Waste Management Conception of the Czech Republic, entered into effect on January 1. This fact corresponded with the decision of the Czech Republic, made in 1996, to apply for accession to EU. This was also crucial step as EC Directive already imposed on the member countries the duty to draw up plans in the area of waste management (Křenek, 2003)

1999

The Waste Management Conception of the Czech Republic was drawn up and work was commenced on Regional Waste Management Conceptions - RWMC intended as basic documents for drawing up WMP CR and regional waste management plans. (Křenek, 2003)

2000

PRO EUROPE grants EKO-KOM, a.s. a licence to use the Green Dot mark in the Czech Republic. (Eko-kom: Jak třídit 2009)

2001

Preparatory work was commenced on draft WMP CR.

2002

On December 27, the draft Government Regulation on WMP CR was submitted to the Government for discussion. (Křenek, 2003)

2003

On July 1, Government Regulation on Waste Management Plan of the Czech Republic entered into effect, facilitating the process leading to sustainable waste management. This waste management plan is effectual till 2013. One of the most important targets is to

increase the material usage of municipal waste to 50 % till 2010 in comparison with 2000. Another objective is to recover 75 % of the construction and demolition waste till 2012.

2004

The First overview of the Waste Management Plan of the Czech Republic was for the year 2004. (Křenek, 2003)

2006

The Next overview of the waste management plan was for the years 2005 and 2006.

2007

Evaluation of fulfilling the selected waste management plans by counties was published. (Křenek 2003)

ANALYSIS

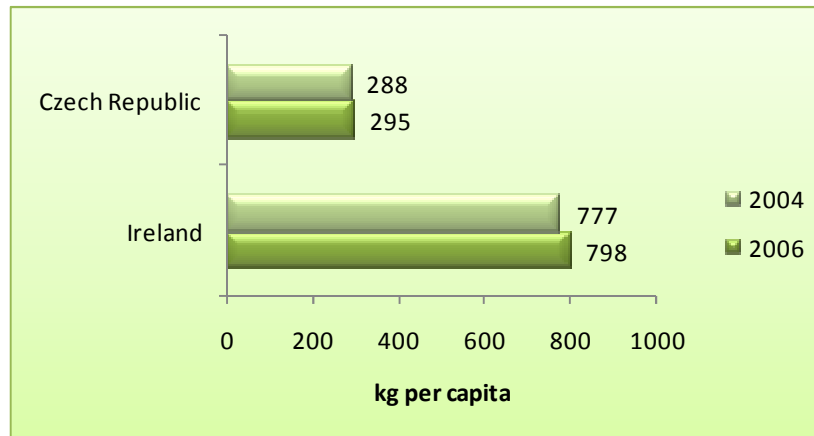
Ireland has longer history when speaking about waste management. The cornerstone of the process was the document published in 1998, **Changing our Ways**, first waste management policy in Ireland for achievement over a fifteen year timescale. The first steps to the sustainable waste management in the Czech Republic were taken after the year 1989, and the formation of the Czech Republic. The first waste management plan with the effectiveness for ten years was introduced in 2003.

3.3 Comparison based on the Waste Management Analysis

This report presents most recent waste management findings in Ireland, based on the ten-year-old publication of the Government policy on waste management, **Changing our Ways**. This study focuses on the priority waste streams of the highest relevance from an enterprise perspective, namely municipal, industrial and hazardous waste. Ireland findings are then further compared with other European countries' data. From this data, only values concerning the Czech Republic and Ireland have been selected for our study. (Forfás 2008)

3.3.1 Waste generation

3.3.1.1 Municipal waste generation per capita (kg per capita), 2004 versus 2006



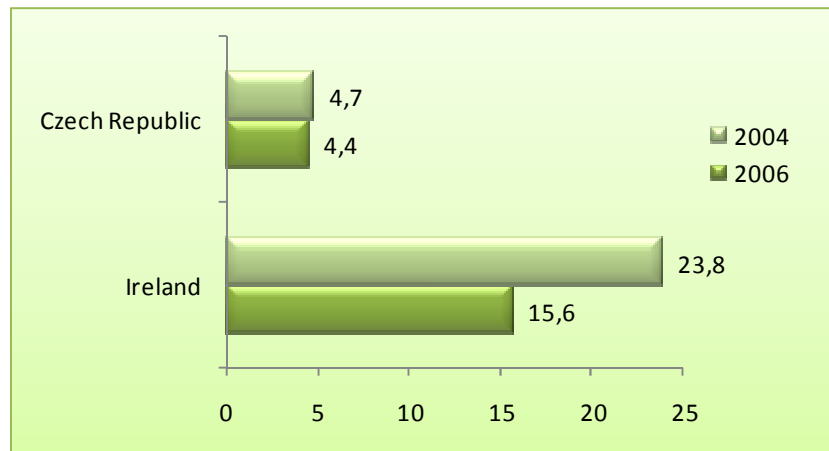
Notes:

1. 2004 data for Ireland is based on the 2002 Census population
2. Data sourcing and data quality for the Czech Republic has improved and the data has been revised accordingly. Reported data is for 2005 and 2006. (Forfás 2008)

ANALYSIS

This figure shows municipal waste findings, which comprises commercial and household waste. Although data for the Czech Republic is lower and thus more positive, from the graph it can be seen that the municipal waste increased in both Ireland and the Czech Republic. These results reflect the waste generation and increased production of municipal waste in all European countries. On the other hand this figure can correspond with continually growing population.

3.3.1.2 Manufacturing waste per employee (tonnes), 2004 versus 2006



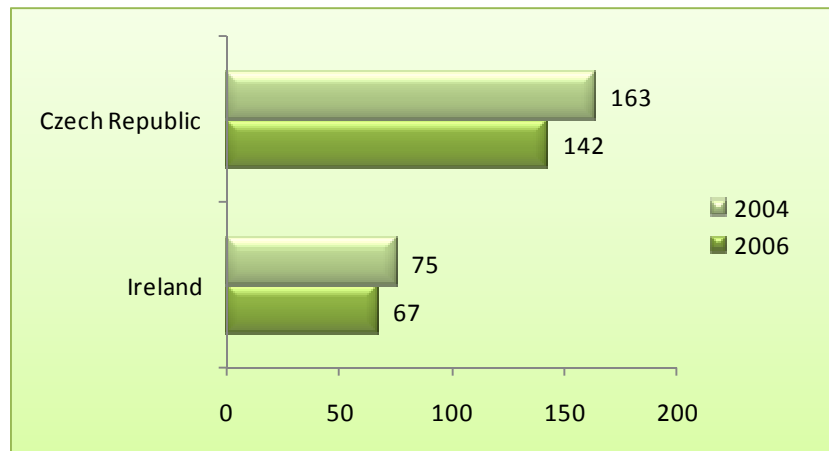
Note:

1. *Manufacturing waste includes hazardous and non-hazardous waste*
2. *It should be noted that industrial structure (e.g. dependence on heavy versus light industry) plays an important role in determining manufacturing waste per employee.*
3. *Data for the Czech Republic has been revised due to improvements in data collection and quality. Reported data is for 2005 and 2006. (Forfás 2008)*

ANALYSIS

Manufacturing Waste figure shows completely different data for Ireland and the Czech Republic. Surprisingly, the results of manufacturing waste per employee for the Czech Republic are almost 20 tonnes lower when compared to 2004 results. There can be seen great improvement in Ireland, from 23.8 tonnes in 2004 to 15.6 in 2006. It is a very positive fact that shows the effectiveness and fulfilling of the waste management plan. Data for the Czech Republic is almost the same for 2004 and 2006. However, it is not a negative fact as these results are very low.

3.3.1.3 Hazardous waste generation per capita (tonnes), 2004 versus 2006



Note:

1. Data for the Czech Republic has been revised due to improvements in data collection and quality. Reported data is for 2005 and 2006. (Forfás 2008)

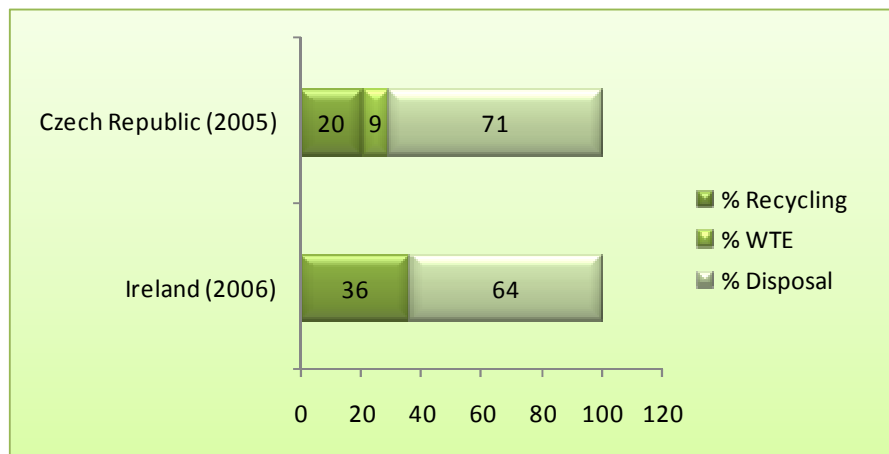
ANALYSIS

Hazardous waste is a very serious problem for each country and should be effectively managed not to harm the environment and population. The results described above suggest that the situation in the Czech Republic concerning hazardous waste is very alarming. Although data improved from 163 tonnes in 2004 to 142 tonnes in 2006, comparing with Ireland's results these are more than twice greater. This is probably caused by greater heavy industrial production in the Czech Republic where more hazardous waste is produced.

3.3.2 Waste treatment options

A competitive economy needs a choice of secure waste management ways along the waste hierarchy. Each country tries to choose the most effective way of waste management, but these vary according to the countries' possibilities. In this part municipal and industrial waste treatment options of both countries are compared. (Forfás 2008)

3.3.2.1 *Municipal waste treatment options*

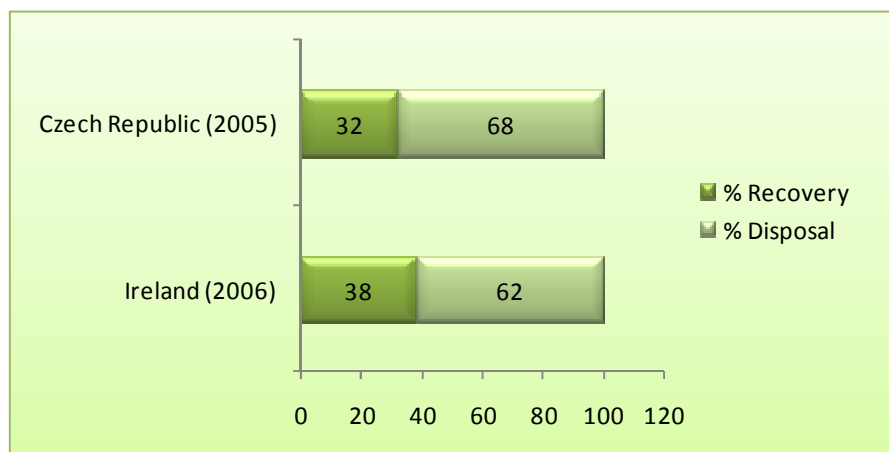


(Forfás 2008)

ANALYSIS

The figure showing Irish data is more positive overall. 64 % of municipal waste in Ireland is disposed compared with 71 % in the Czech Republic. Moreover 36 % of Irish municipal waste is recycled, in the Czech Republic only 20 %. There is missing index WTE (waste to energy) for Ireland and I attribute this to a higher number of waste incineration plants in the Czech Republic than in Ireland.

3.3.2.2 *Industrial waste treatment options*



Note:

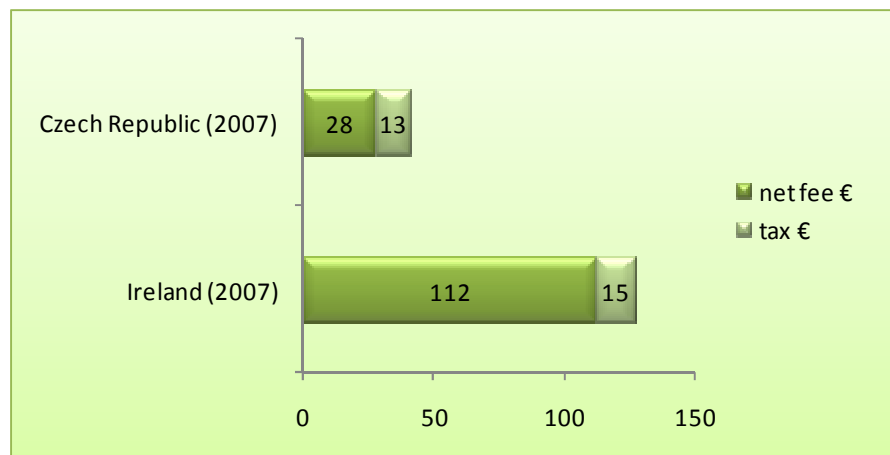
Recovery includes WTE (waste to energy) treatment facilities. (Forfás 2008)

ANALYSIS

As well as the previous one, this figure shows more positive data for Ireland. 68 % of industrial waste in the Czech Republic is disposed, compared with 62% in Ireland. In waste recovery Ireland is up to 6 % more successful than the Czech Republic.

3.3.3 Waste management costs

3.3.3.1 Landfill gate fees (including levy), 2007, (€ per tonne)



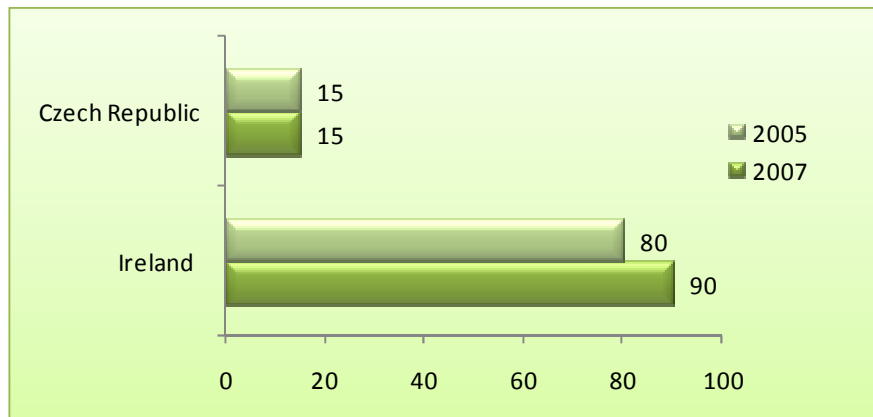
(Forfás 2008)

ANALYSIS

This figure shows completely different data for the Czech Republic and Ireland. Landfill gate fee in Ireland is 127 € (tax included) per tonne compared with 41 € per tonne in the Czech Republic. This huge difference between prices of land filling is probably caused by different economic level in both countries. Despite this fact, landfill gate fees in Ireland seem to be rather high. However, high landfill gate fees can be crucial when provoking population and companies to find alternative way of waste manipulation. Obviously, in the Czech Republic there cannot be seen such an effect, as the landfill gate fees are more than three times lower than in Ireland. Considering higher landfill gate fees as a great

motivation to try alternative ways of waste processing, the Czech Republic should think about this kind of waste management policy.

3.3.3.2 *Biological gate fees, 2005 versus 2007, (€ per tonne)*



(Forfás 2008)

ANALYSIS

Biological gate fees for the year 2005 and 2007 of both countries are shown in this figure. As can be seen, the biological gate fee in Ireland increased from 80 to 90 €, whereas in the Czech Republic it remained at 15 € per tonne. Reasons for this significant difference are almost the same as for the landfill gate fees.

3.4 Comparison based on the domestic waste services in both countries

In this part, both countries are going to be analysed in the light of the existing waste management practices in Ireland and the Czech Republic. It is interesting to compare how the waste is managed differently and what methods are used when speaking about the domestic waste services. Of course that the basic process of waste treatment is almost the same in each country, but some differences can be found and these may be very important.

IRELAND

There is a range of recycling services and facilities throughout Ireland that recycle domestic waste.

Kerbside collection

This collection of separated waste can be run by local authorities or by private companies. In areas where the kerbside collection is not in use, waste producers have to bring the waste material to local bring centres or civic amenity centres, described hereunder.

Bring centres

Unstaffed collection points where recyclable materials like glass, paper, textiles, food and drink cans are concentrated. These are common in many areas.

Civic amenity centres (or recycling centres)

Similar to the bring centres, but are usually staffed and accept wider variety of items, among others also the waste electrical and electronic goods, white goods and hazardous items. (Citizens information: Domestic Recycling Services 2008)

Bulk waste collection

Some local authorities operate occasional bulk waste collections. Also a private company can be hired for the purpose of bulk waste collection. (Citizens Information: Domestic Refuse Services 2008)

Composting

Most local authorities provide home composters at subsidised rates for people who are interested in composting their household waste. Organic materials can also be brought to civic amenity centres to be composted. (Citizens information: Domestic Recycling Services 2008)

Local authorities provide free recycling services to the public as there are no charges for bringing waste to bring centres or civic amenity centres. However, small charge for kerbside collection may be included in the domestic waste charges. All charges vary from region to region. (Citizens information: Domestic Recycling Services 2008)

When recycling and composting, people in Ireland can save money on their weekly domestic waste collection charges. They can do this through the pre-paid bin tags system, which means that they pay only for the waste sent to the landfill, but not for the waste they recycle. All they have to do is to place the pre-paid tag with their name and address to the bin. These tags can be bought at local shops and charges vary from region to region,

usually around 5 € for a 240-litre bin. Charges are lower for small bins and for areas where there is not kerbside collection. (Citizens Information: Domestic Refuse Services 2008)

However, the situation concerning domestic waste services in Ireland differs from region to region and depends on the local authority's bye-laws. E.g. where there is a wheelie bin system in use, people have to collect their waste into these bins; or it will not be collected. (Citizens Information: Domestic Refuse Services 2008)

CZECH REPUBLIC

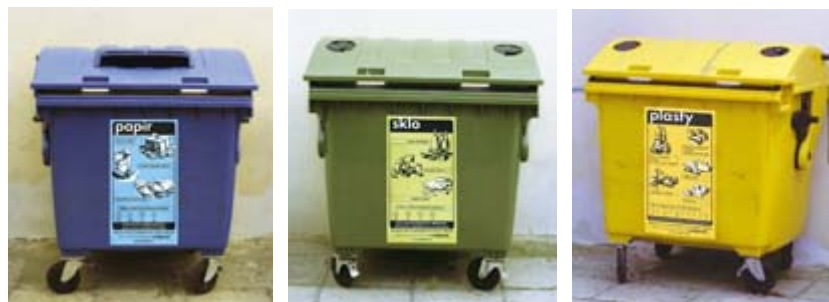
Bins and containers

Municipal waste containers

Containers for the municipal waste are metal or plastic containers of the volume from 70 to 1.100 litres, usually of black or grey colour.

Sorted waste containers

Plastic or metal coloured containers. The most common containers for sorted waste are shown below.



Collection of paper Collection of glass Collection of plastics

Figure 3: Sorted waste containers

(Eko-kom: Jak třídit 2009)

Collection of beverage cartons



Figure 4: Beverage cartons

Beverage cartons are collected to the bins or bags labelled with this mark. However, the collection of these cartons is not effect in all Czech counties. (Eko-kom: Jak třídit 2009)

Collection centre

Collection centre is a place where the waste, which cannot go into common containers, is concentrated. Collection centres in the Czech Republic are staffed; therefore people are told where to put the waste they bring into.

Bulk waste containers

These containers can be found in the collection centres or in the cities and villages during the spring-cleaning. The apposition of the bulk cargo containers is usually arranged by local authorities. (Eko-kom: Jak třídit 2005)

Collection of hazardous waste

The collection of hazardous waste is arranged similarly as the bulk waste collection but must be done minimally twice a year. (Komunální odpady 2005)

ANALYSIS

Rates for the municipal waste services in the Czech Republic are usually defined by local authorities and vary from region to region. The law defines just upper boundary, which is 500 Czech Crowns. Though these rates are also regulated by local authorities in Ireland, one difference can be found. It is the possibility to pay less, when people recycle or compost their waste. This system is practiced by the use of pre-paid tags, when waste producers pay as much money, as much waste they produce. (Citizens Information: Domestic Refuse Services 2008) I appreciate this pre-paid system as highly effective as it can motivate people to produce less waste and thereby think about an alternative way of waste fabrication. A nice example can be found also in the Czech Republic. In Letohrad near Pardubice people save money when recycling plastic bottles and old paper products to special plastic bags, which they get from their local authority. (Baroch 2009) The implementation of this benefit for those who recycle can be highly effective and should be established all over the Czech Republic.

The next interesting subject in Ireland is that some local authorities provide composters at reduced prices for those who want compost their organic waste. Although it is well known that Ireland is a farming country and thereby the possibility to compost the household waste is more preferable than in the Czech Republic, surely lot of Czech would be also interested in this kind of benefit. An interesting example comes from the Czech capital city, where people from the Řepy housing estate agreed on the collective composters. Reportedly, four composters are constantly full and originated compost is immediately used by the

inhabitants of the estate. However, despite their effort to recycle their municipal waste, the local authority has not come with any type of waste charges reduction. (Baroch 2009)

When speaking about waste sorting containers and availability of these, I would appreciate the Czech Republic more positively than Ireland. I can draw on the experience of my stay in Ireland, Letterkenny town, which counts round 16 000 people. There are no containers for waste sorting around Letterkenny, the only way how to sort the waste is to bring it to the one of three collection centres. On the other hand, bins for waste sorting are more extended in Ireland, especially in various institutions, such as universities, hospitals and other public buildings, which definitely contribute to higher waste sorting. As these bins are directly at the place of waste production, their usage is highly efficient.

Not just praising the Irish example, I judge positively the fact that in the Czech Republic there is a movement to the expansion of beverage cartons sorting. Annually, everyone in the Czech Republic throws away 1-3 kilograms of beverage cartons. Many people do not know that the cartons from milk, juices, wine and other beverages are not just made of paper, but they are laminated wraps combined from three materials: paper, aluminium foil and polyethylene foil. That is why these cartons are processed differently than usual paper waste and grounded cartons are used for the beaverboard production etc. However, the separated collection of beverage cartons is not effect all over the Czech Republic but I forecast improving of the situation. (Št'astná 2007)

3.5 Comparison based on the plastic bag environmental levy

A comparison based on the plastic bag levy can be a very interesting aspect concerning the waste management in both countries. Plastic bag levy is already in operation in Ireland, whereas in the Czech Republic it is so far a part of the waste act proposal and is going to be discussed by the Czech government.

IRELAND

The Plastic Bag Environmental Levy is a charge on plastic shopping bags, firstly introduced in Ireland on 4th March 2002. This charge is effect in shops, supermarkets, service stations and all sales outlets. The levy is 22 cents per bag carrying goods that are not exception. Retailers are obliged to impose on customers the plastic bag charge and this

has to be reflected on the receipt. (Citizens Information: Plastic Bag Environmental Levy 2008)

However, there are some exceptions from the levy. Plastic bags that are not charged are:

- Smaller plastic bags which are used for non-packed goods such as:
 - Dairy products
 - Fruit, vegetables and nuts
 - Confectionery
 - Cooked food, hot or cold
 - Ice
- Small plastic bags which are used to store fresh meat, fish and poultry.
- Reusable bags costing more than 70 cents
- Items sold in the duty-free zone of airports in Ireland (Citizens Information: Plastic Bag Environmental Levy 2008)

Before the levy introduction it was found that 1.2 billion plastic bags were distributed for free to costumers in shops annually. This figure was alarming because it was not necessary. The plastic bag charge was introduced with the view of reducing the usage of plastic bags and encouraging the use of reusable bags. Revenue from the plastic bag levy will go into the Environmental fund, which is used to support waste management and other environmental initiatives. (Citizens Information: Plastic Bag Environmental Levy 2008)

Since the introduction of this regulation in Ireland it has registered great success. The use of plastic bags has been cut by 93 percent compared with previous level. Moreover, plastic bags levy has attracted many people and the Irish population soon supported new regulation. (Johnston 2009)

CZECH REPUBLIC

The Plastic Bag Environmental Levy is not in operation in the Czech Republic yet, but it is one part of the new amendment to the waste act. However, the new amendment has not been passed by the Czech government yet.

According to Martin Bursík, Minister of the Environment in demission and the Head of Green Party, retailers in the Czech Republic give the customers for free almost 3 billion plastic bags, which is 9,000 tonnes of plastics. Retailers will be able to make decisions about the exact amount of the charge. However, as Martin Bursík proposed, the amendment should include the information about the minimum charge for plastic bags. (Ekolist 2009)

Some retailers in the Czech Republic are already prepared for the new arrangement and give customers the choice between plastic bags for free and ecologic reusable ones. (Sušanka 2009) Surprisingly, some supermarket chains already charge plastic bags and do not give them for free. These are for example Kaufland or Lidl. However, supermarket or hypermarket chains with plastic bags for free still can be found – Tesco, Hypernova and Globus. Definitely it is a kind of marketing trick how to attract customers, but not really environment-friendly. (Johnston 2009)

ANALYSIS

Very interesting for my analysis is the fact that Martin Bursík's inspiration for this proposal comes right from Ireland and their decision to impose a charge on plastic bags. On Irish example he tries to introduce and point out the achievement of the plastic bags levy. Bursík is also convinced that this arrangement will bring the same results as in Ireland. (Johnston 2009)

However, the proposal of the new waste act is experiencing difficulties in the Czech Republic. Entrepreneurs are extremely dissatisfied and argue that the new proposal will increase the administrative and economical seriousness of their businesses. They are not comfortable with the part of proposal concerning the plastic bags levy either. (Ekolist 2009)

For instance, Hypernova's spokesman Mr. Kyrýr argues that most people re-use free plastic bags from retailers as bin bags. And when the plastic bags will not be for free, the usage of bin bags will increase. Surprisingly, Irish example supports this point. The Irish Ministry of

Environment admits that consumers started to buy more bin bags when the shopping bag levy came into effect. Moreover, the overall amount of plastic waste land filled has not gone down. (Johnston 2009)

Very interesting is the idea that plastic bags are one of the most visible symbols of the post-communist Czech consumer society. (Johnston 2009) It is true that plastic bags can be seen almost everywhere and they are not used just for the shopping purposes. Czech people are able to transfer almost everything in plastic bags. It would be very difficult to change their way of thinking and motivate them to use rather ecological reusable bags. As I could eyewitness the reusable bags have become common practice in Ireland. Irish are used to carry these bags with them when shopping and they look satisfied with them. Reusable bags have many advantages compared with the plastic ones. They are firmer, more comfortable and moreover these days they can be kind of fashionable accessory.

As it was already mentioned, charges on plastic bags do not necessarily cause a decrease of the amount of plastics concentrated to landfills or incinerated. On the other hand, this regulation can help Czech people to start thinking carefully about the waste they are producing and motivate them to minimize it. Because changing the way population thinks and the creation of environment-friendly culture is a key problem when building the sustainable waste management.

CONCLUSION

The aim of this bachelor thesis was to compare the waste management in Ireland and the Czech Republic. The objective was acquired by the help of selection of five various aspects which I have considered interesting and relevant for my thesis. It was interesting to compare these countries from the waste management point of view. The quality and level of waste management predicate a lot about the environmental, economical but also social standards in each country and therefore it is an effective indicator of these.

Many differences between the waste management of Ireland and the Czech Republic can be found in this analysis, however many of them originated from different economical level of both countries, e.g. landfill gate fees.

Although Ireland has longer waste management history in comparison with the Czech Republic, the Czech waste management is quite successfully developed. More than twice lower municipal waste figure of the Czech Republic compared with Ireland is nice evidence. However, Ireland seems to be still a step ahead. Many future changes from the Czech waste management amendment are already in use in Ireland. These are for example the possibility to pay less when people recycle their household waste or the plastic bag environmental levy. Hopefully, the Czech government will soon manage to apply these highly effective regulations which contribute to the protection of environment.

When speaking about developing of the recycling and environment-friendly culture, both countries seem to be at the same level. According to my opinion, situation in both countries is not alarming, but they definitely should care more about the waste management promotion and improve the education of population in the theme of waste processing.

I'd like to conclude with the positive quotation of the Nobel Price in Chemistry winner G.T. Seaborg, where the main idea of the waste management effort is reflected:

“Not far is a society, where all the waste, which is now considered as a secondary raw material, will become the main source of raw materials and the untouched natural sources will become the reserve of consumption.”

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