Measures to Implement an Advanced Waste Management System in the Czech Republic

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The Czech Republic is now preparing the new complete revision of waste law. The transformation of the waste management into the circular economy started through the legislative process in June 2016. Waste management plan of the Czech Republic for 2015 to 2024 clearly specifies waste strategy and priorities for the country. Thus, in the Act on waste the ban on landfilling of recyclable and recoverable waste in 2024, obligatory separate collection of main municipal waste streams including biowaste since 2015 and currently proposed increase of waste landfilling tax with strict recycling targets already in 2018 are only the first milestones leading to smarter waste future in the Czech Republic.
1. Legal waste management framework of the Czech Republic

Ministry of the Environment (MoE) is the central government authority for the waste management. It performs the ultimate state supervision of waste management, prepares and proposes legislative standards for the waste management and national waste plan. There are two major acts in the area of the waste – Act No. 185/2001 Coll., on waste and Act No. 477/2001 Coll., on packaging and several decrees describing details of the waste management in the country.

Czech Republic’s waste management hierarchy is according to the EU Directive 2008/98/EC on Waste defined in the Act on Waste with the top focus on waste prevention, waste reuse preparation, waste recycling, other uses or recovery of waste, e.g. energy recovery and the minimum preference of waste disposal by landfilling.

Figure 1:

Czech Republic’s waste management hierarchy

2. Waste management plan of the Czech Republic 2015 to 2024


The main Czech waste management priorities are:

- Prevention and reduction of specific waste production.
- Minimizing of adverse effects of waste generation and waste management on human health and the environment.
- Sustainable development of the society and moving closer towards the European recycling society.
- Maximum utilization of waste as a substitute for primary sources and the transition to the circular economy.

Secondary waste management objectives are to prepare waste prevention programme, to significantly decrease the ratio of waste disposed in landfills and to increase the material and energy use of the household waste and other similar types of waste.
3. Main priorities of waste management in the Czech Republic for the period 2015 to 2024

- Waste prevention and reducing of hazardous properties of waste.
- End-of-life product reuse.
- Quality recycling and maximum recovery of suitable waste (material, energy, biological) and especially in relation to industrial segments in the regions (agriculture, energy, construction).
- Optimizing the management of biodegradable municipal waste (BDMW) and other biodegradable waste (BDW) on the territory of the Czech Republic, with an emphasis on the compulsory introduction of separate collection of BDW.
- Mandatory introduction of separate collection for waste consisting, at minimum, of the following: paper, metal, plastic, and glass by 2015.
- Energy recovery from waste, municipal waste, particularly mixed municipal waste.
- Substantial reduction of landfilling on the territory the Czech Republic.
- Optimization of all activities in waste management with regard to the protection of human health and the environment.
- Optimization of all activities in waste management with regard to the costs incurred and the economic and social sustainability.
- Clarification of the state when waste ceases to be waste.
- Ensuring the long-term stability and sustainability of waste management in the regions and in the Czech Republic.

4. Czech regional waste management plans

Each of 14 regions of the Czech Republic adopted its Regional WMP in 2016. Strategy and priorities in the regions shall be in accordance with the National WMP and are set for next ten years. Regions are responsible for waste management in its areas. All Regional WMPs are available on the official website of the MoE [2].

Figure 2: Structure of total waste generation in the Czech Republic, 2014

Source: MoE, CENIA – WMIS (JSOH – Informační systém odpadového hospodářství), MoE.
5. Waste prevention programme of the Czech Republic

Waste prevention programme adopted by Government Decision No. 869 from 27. 10. 2014 on Waste prevention programme of the Czech Republic (WPP) is divided into analytical part which presents an outline of the strategic and legislative framework, describes the start-of-programme situation regarding the implementation of measures and steps concerned with the issues of preventing the production of wastes. WPP presents more detailed analysis and overview of the following priority prevention streams of municipal waste, biodegradable waste, food waste and food, waste and end-of-life products (packaging, electric and electronic waste, batteries and accumulators, end-of-life vehicles), construction waste and building materials, textile waste/textiles intended for re-use [3].

6. Financial sources for development of waste management projects in the Czech Republic

Waste projects of both municipal and private investor’s interest could be financially supported from different sources and funds available for the Czech Republic. Budget of the country, funding from the State Environmental Fund of the Czech Republic, financial mechanisms of Norway Cooperation, programmes of the Swiss-Czech Cooperation and the European Union cohesion funds – Operational Programme Environment 2014 to 2020 (OPE 2014+) are the main sources.

<table>
<thead>
<tr>
<th>2014 to 2020 OPE</th>
<th>Proportion %</th>
<th>2014 to 2020 OPE Allocation EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>100.0</td>
<td>2,636,592,864</td>
</tr>
<tr>
<td>Priority Axis 1</td>
<td>29.15</td>
<td>768,767,183</td>
</tr>
<tr>
<td>Priority Axis 2</td>
<td>17.21</td>
<td>453,819,065</td>
</tr>
<tr>
<td>Priority Axis 3</td>
<td>17.41</td>
<td>458,819,995</td>
</tr>
<tr>
<td>Priority Axis 4</td>
<td>13.34</td>
<td>351,735,069</td>
</tr>
<tr>
<td>Priority Axis 5</td>
<td>20.09</td>
<td>529,626,952</td>
</tr>
<tr>
<td>Priority Axis 6</td>
<td>2.80</td>
<td>73,824,600</td>
</tr>
</tbody>
</table>

Table 1: Operational Programme Environment 2014 to 2020, Priority Axis 3 Waste management and material flows, environmental burden and risks – allocation of funds

Priorities of Priority Axis 3 (PA3) for waste in the country is preserving and protecting the environment and promoting the efficient use of resources through investments in waste management [4].

PA3 is divided into specific objectives linked with the Waste Management Plan 2015 to 2024 as follows:

- Waste prevention,
- Increase the share of material and energy recovery of waste and
- Remediation of old landfills.

The priority support of material waste recovery in the Czech Republic will contribute to the reduction of primary source consumption by promoting the separate collection of
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waste, construction waste sorting lines and waste recycling facilities, as well as systems to support separately collected and subsequently utilised specific waste types such as paper, plastic, glass, metals and biodegradable municipal wastes.

Support for waste-to-energy recovery facilities is to be withheld until it will be re-considered by the European Commission (EC) once the WMP for 2015 to 2024 and the 14 Regional WMP are adopted and submitted to the EC services and they are found in full compliance with Waste Framework Directive (WFD).

In the Czech Republic waste-to-energy recovery projects will be supported only for waste types that can no longer be adequately materially recovered – e.g. due to their level of pollution and possible contamination – and assuming that there is no risk for fulfilling recycling targets under the WFD.

7. Overview of waste treatment, recovery and disposal of waste

Czech total waste generation of non-hazardous and hazardous waste [thous. tons], total waste generation per capita [kg per capita] and total generation of non-hazardous and hazardous waste per capita [kg per capita], 2009–2014 [thous. tons]

![Figure 3: Total generation of non-hazardous and hazardous waste in the Czech Republic, 2009 to 2014](image)

Source: MoE, CENIA – WMIS (ISOH – Informační systém odpadové hospodářství). The data was determined according to the methodology Mathematical Expression of Calculating the Waste Management Indicator Set is applicable for a given year by the Ministry of the Environment.
Figure 4: Total generation of municipal waste in the Czech Republic, generation of municipal and mixed municipal waste per capita in the Czech Republic, 2009 to 2014

Source: MoE, CENIA – WMIS (ISOH – Informační systém odpadového hospodářství). The data was determined according to the methodology Mathematical Expression of Calculating the Waste Management Indicator Set is applicable for a given year by the Ministry of the Environment.

Figure 5: Municipal waste management in the Czech Republic 2009 to 2014 [set of waste management indicators] and the outlook for 2020 and 2024 according to the Waste Management Plan of the Czech Republic 2015 to 2024

Source: MoE, Waste Management Department, CENIA – WMIS (ISOH – Informační systém odpadového hospodářství). The data was determined according to the methodology Mathematical Expression of Calculating the Waste Management Indicator Set is applicable for a given year by the Ministry of the Environment.
This comprehensive text and practical handbook thoroughly presents the control of air pollutant emissions from combustion processes focusing on waste incinerators. Special characteristics are emphasised and the differences to emission control from combustion processes with other fuels are explained.

The author illustrates the origin and effects of air pollutants from incineration processes, the mechanics of their appearance in the incineration process, primary and secondary measures for their reduction, processes of measuring the emissions as well as the methods of disposing the residues. In particular, the pros and cons of procedural steps and their appropriate combination under various conditions are emphasised.

Moreover, the book contains information and analyses of the emissions situation, the consumption of operating materials and of backlog quantities as well as of the cost structure of waste incinerators with regard to their applied control system. Furthermore, the author explicates the contemporary legal, scientific and technological developments and their influence on air pollutant emission control. An evaluation of the status quo of air pollutant control at waste incinerators in Germany, practical examples about possible combinations and typical performance data complete the content.

Accordingly, this book is a guideline for planning a reasonable overall concept of an air pollutant control that takes the practical examples about possible combinations and typical performance data complete the content.

It is absolutely obvious that landfilling capacities dominate waste-to-energy capacities in the country. In 2014 Czech Government adopted prediction of waste-to-energy capacities needed for mixed municipal waste and waste which is not suitable for recycling in 2024. Current capacities of municipal waste-to-energy installations are 769,000 t/year available for energy recovery. Prognosis of WMP forecast to double waste-to-energy capacities to 1,400,000 t/year in 2024 [6].

<table>
<thead>
<tr>
<th>Waste-to-energy/Incinerators/Co-Incinerators in the Czech Republic 2016</th>
<th>Locations</th>
<th>Capacity t/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal W2E</td>
<td>4</td>
<td>769,000</td>
</tr>
<tr>
<td>Industrial, hazardous, health care waste incinerators/W2E</td>
<td>23</td>
<td>95,604</td>
</tr>
<tr>
<td>Co-Incinerators – cement kilns</td>
<td>5</td>
<td>416,800</td>
</tr>
<tr>
<td>Total</td>
<td>178</td>
<td>1,281,404</td>
</tr>
</tbody>
</table>

Table 2: Waste-to-energy plants, incinerators and co-incinerators in the Czech Republic 2016

<table>
<thead>
<tr>
<th>Landfills in the Czech Republic 2016</th>
<th>Location</th>
<th>Expected planned capacity m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inert waste landfills</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Hazardous/combined waste landfills</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Non-hazardous/municipal waste landfills</td>
<td>152</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>178</td>
<td>100,000,000 to 120,000,000</td>
</tr>
</tbody>
</table>

Table 3: Landfills in the Czech Republic 2016

9. The way from linear to circular economy in the Czech Republic

MoE already implemented active steps that would enable the transformation of the Czech Republic waste management into reuse of waste which is the essential part of implementing the principles of the circular economy.

Inter-ministerial and stakeholders discussions during the last 6 months were projected into the new Waste Act proposal of the changes of economic instruments, in particular, into the tax on landfilling or so called increased fee for depositing waste in landfills in the Czech Republic.

According to the findings of the available studies, it is clear that the high cost of landfilling creates important gaps for much better technologies of waste management (technologies from the higher levels of waste hierarchy – prevention, recycling, energy recovery of waste) than just landfilling.
Figure 6: Recycling and composting of MSW 2014

Figure 7: Landfilling of MSW 2014
Low price for landfilling in the Czech Republic does not allow for adequate development of the circular economy, competing technologies and the related creation of new jobs.

Landfilling in the Czech Republic is the cheapest and wrong way to dispose of waste and in addition it represents a permanent degradation of usable materials from waste and pollution of the environment from leachate and landfill emissions.

MoE wants to prevent the above mentioned during the upcoming Waste Act revision in autumn and winter 2016 and aims to divert waste from landfills to waste processing and recovery technologies.

However, the strategic issue needed to be resolved – the position of energy recovery in the circular economy.

According to MoE energy recovery of waste is not overly emphasized, but it fits into the concept of circular economy and may even be considered as an integral part of the concept.

Energy recovery or waste-to-energy is the way of waste utilization which allows savings of primary energy resources, technological progress and innovation, as opposed to landfilling, strengthens the energy security of the European Union – stable supply, which originates on the territory of the respective state.

Figure 8: Waste-to-Energy of MSW 2014
10. Current landfilling and waste-to-energy fee

Current landfilling fee and typical gate fee

Table 4: Landfilling fee in the Czech Republic 2002 to 2016

Landfilling fee or landfill tax was introduced in the Czech Republic in 1992. In 2016 it is still extremely low with the price of 19 EUR/t of municipal or non-hazardous waste. Landfilling fee is excluded from VAT.

The average landfill gate fee for municipal or non-hazardous waste is 36 EUR/t but it differs Region by Region in Czech. According to information in 2016 landfilling gate fees range from 25 to 50 EUR/t. Final price for landfilling depends on the contracted year amount between waste producer and landfill operator.

2016 – waste revolution increase of landfilling fees for 2017 to 2030 in the Czech Republic

Planning foresees to gradually increase the landfill fee, doubled in 2020 and almost tripled in 2025 – highest possible fee discussed by the Czech Chamber of Commerce, the Union of Towns and Municipalities of the Czech Republic, the Confederation of Industry of the Czech Republic and the Ministry of the Environment – is the proposal currently discussed by the Government of the Czech Republic.

To start the waste revolution and to push waste generators to change the current waste habit – just to landfill is the key step from waste-to-landfill to smart waste management. Gradual increase of landfill tax is the crucial most important political decision which may only lead to higher separation and meeting the recycling targets in the Czech Republic. And thanks to the Ministry of the Environment it just happens in the Czech Republic.

Table 5: Proposal of the new landfilling fee in the Czech Republic 2018 to 2030
Current waste-to-energy fee and typical gate fee

The incineration or waste-to-energy fee is not in place in the Czech Republic. Until ban on landfilling comes into force in 2024 MoE is not planning to apply the incineration tax. The average gate fee for the incineration of municipal waste is 40 EUR/t, ranging from 32 to 58 EUR/t.

No fee for other waste management operations


11. Upcoming legal changes in the Czech Republic in 2016 and 2017

The main targets of the upcoming legal changes in the Czech Republic are:

- landfilling reduction,
- increase landfilling fees,
- waste prevention,
- increase of recycling and material recovery especially of municipal waste,
- set up the real recycling targets for priority waste streams,
- increase energy recovery of waste which is not suitable for recycling and material recovery,
- reduce consumption of primary sources,
- motivate businesses to invest in the Czech Republic,
- support waste process and utilisation activities in the Czech Republic and
- transform waste management into the circular economy.

The adoption process of the new Czech Waste Act

07 to 08/2016 Government Legislative Council
09/2016 Adoption by Czech Government
10 to 12/2016 – 1Q-2Q/2017 Parliament and Senate discussions
2Q/2017 validity of the new Act on Waste
01.01. 2018 entry into force

12. References
