



Waste management of towns and municipalities

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• Visegrad Fund



SEMINAR PROGRAM

- Development of legislation in handling of municipal waste
- Present state of handling of municipal waste in Czech Republic and Central Bohemian Region
- How is it possible to reduce waste production at municipal level
- Good practice examples (low waste production)



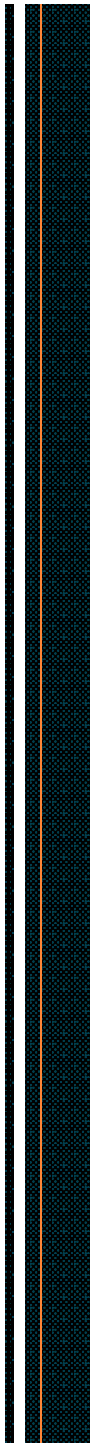
DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

Landfill directive 1999/31/EC – reduction of landfilling of biodegradable materials requirement – goal for years **2010, 2013 and 2020** to landfill max. **75/50/35** % of production of year 1995.

According to waste production evidence in 1995 production of biodegr. mat. was defined 1530000 tons (148 kg/inh.).

Production is defined according to handling with waste catalogue No. 200101 (paper, cardboard), 200108 (gastrowaste), 200110 + 200111 (textile), 200138 (wood), 200201 (bio), 200301 (mixed waste), 200302 (waste from marketplaces), 200303 (street garbage), 200307 (bulky waste), 150101 (paper packages).

Share of items – see Matematické vyjádření indikátorů POH ČR: http://mzp.cz/cz/odpady_podrubrika



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

Observance of the landfill direction:

2010: fulfilled- according ISOH 999047 tons – 65.30 %

2013: not fulfilled- according ISOH 1187920 tons – 76.36 %

2020: ?

In 2020 will be possible to landfill only 51.8 kg of biodegr. mat., about 100 kg of mixed waste per 1 inhabitant

Consequences of not observation of the directive (EC recommendation):

- decree 321/2014 Sb.
- adoption of a ban on landfill of mixed waste in 2024
- preparation of new waste law (increase of landfill tax, support of PAYT)



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

Directive 2008/98/EC on waste – request to recycle min. 50% of paper, plastic, glass, and metals that are in household waste. Higher data in mixed buildings - the impact of trades.

Waste composition – Benešová 2008/9

	sídlištní (%hm)	smíšená (%hm)	venkovská (%hm)	sídlištní (kg/ob)	smíšená (kg/ob)	venkovská (kg/ob)
papír	25,7	22,58	7,8	45	66	23
plasty	16,8	17,58	9,7	29	51	29
sklo	11,2	7,82	4,6	19	23	14
kovy	1,7	2,13	2,6	3	6	8

Waste production in housing estates is estimated at 170 kg /inh./year, in mixed and rural around 300 kg.



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

Requirements of the new strategy - circular economy (EP hearing 15.3.2017) –

- 60/70 % - recyclation and reuse in 2025/30 (So high levels of recycling do not yet reach any state – examples Germany, Austria – see next)
- 5 % - landfilling reduction – for the Czech Republic there may be a problem because of higher volume of ash
- 50 % - Reduction of waste from production and consumption of food throughout the production and consumption chain - projected decrease from 180 to 90 kg per 1 inh. - for the Czech Republic, there may be a problem because the reported production of this waste is now only 90 kg



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

- Demand for higher recycling of packaging
- Plastics + the role of bioplastics
- The EC issued an opinion on waste incineration and its role in the circulatory economy
- A number of steps to promote prevention and reuse
 - minimum warranty periods, warranty for repaired products, CE certification of compost (quality guarantee), green purchasing (GPP), ecodesign
- Economic tools (good / bad subsidies)
- Data reporting projects
- Considering the bio-recycling target (MOE proposal 40%)



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC – GERMANY AND AUSTRIA RESULTS

Eurostat data:

	SRN2015	Rakousko 2015
	(kg/ob)	(kg/ob)
Recyklace	299	138
Kompost	114	175
Spalování	196	215
Skládkováno	1	14
Mat. využito (%)	67,7	57,7

Germany: <https://www-genesis.destatis.de/genesis/online/link/tabelleErgebnis/32121-0001>

Production - MW – 160 kg/inh, VW – 28 kg/inh, SW – 147 kg/inh (higher data in Eurostat – more packaging perhaps) – 60 % recyclation

Austria: <https://www.bmlfuw.gv.at/greentec/bundes-abfallwirtschaftsplan/BAWP2017.html>

Production - MW – 166 kg/inh, VW – 28 kg/inh, SW – 168 kg/inh (impurities includes, part is burned), Bio – 108 kg/inh (higher No. „**175**“ includes household compost) - without thic recyclation is about 51 %.

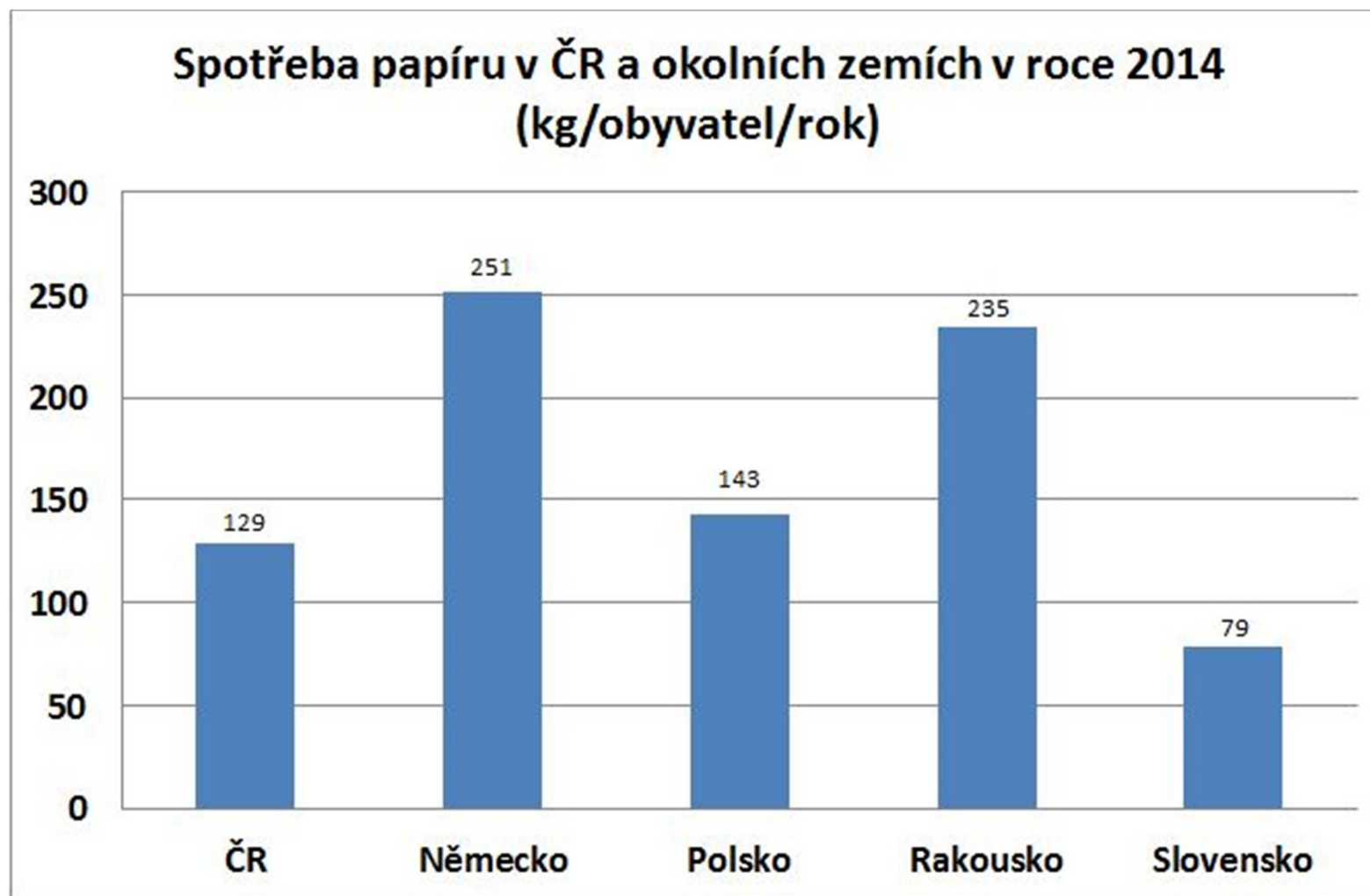
DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

TABELLE 16: GEMISCHTER SIEDLUNGSABFALL - AUFKOMMEN NACH BUNDESLÄNDERN

Bundesländer	Aufkommen [t]	Aufkommen [kg/EW]
Burgenland	35.000	121
Kärnten	97.300	174
Niederösterreich	230.900	141
Oberösterreich	167.300	116
Salzburg	93.300	172
Steiermark	155.900	127
Tirol	96.600	132
Vorarlberg	31.800	83
Wien	523.500	289
Österreich	1.431.600	166

Notes: Higher quantities of incinerated waste in Austria include impurities in sorted waste (30 kg/inh) and outputs from MBT.
In Austria municipal waste does not include supermarkets (large companies not connected to the city system).

DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC



DEVELOPMENT OF LEGISLATION IN HANDLING OF MUNICIPAL WASTE IN EU AND CZECH REPUBLIC

Taken measures:

- Decree 321/2014 Sb., which obliges municipalities to provide places for storing paper, plastics, glass, metal, bio and NO
- Prohibition of landfilling of MW from 2024, as specified by Decree 387/2016 Sb. With the exception of waste with low calorific value in the dry matter up to 6.5 MJ/kg and low respiratory activity AT4 up to 10 mg O₂/g dry matter (assessment of waste stability)
- Objectives set in the WFH of the Czech Republic and the WFP regions (reflects the requirements of EU legislation)



DEVELOPMENT OF WASTE LEGISLATION IN THE CZECH REPUBLIC

Taken measures:

- Target for recycling waste in 2025 at 60%
- Significant increase in landfill tax
- Adjusting the local fee so as to allow municipalities to introduce incentive payments (PAYT)

Payment by weight (max. 6 CZK/kg)

Payment by volume (max. CZK 1/liter)

The possibility of setting a minimum production / charge of - 10 kg / month or 60 liters / month

more: <http://www.tretiruka.cz/news/prezentace-mzp-k-predstaveni-novych-odpadovym-zakonu-ke-stazeni/>



SITUATION IN THE CZECH REPUBLIC

Information on municipal waste production is published by the Ministry of the Environment and the Czech Statistical Office

According to CSO production of municipal waste is about 300 kg/inh

<https://www.czso.cz/csu/czso/cris/produkce-vyuziti-a-odstraneni-odpadu-a-produkce-druhotnych-surovin-v-roce-2015>

According to MOE production of MW is about 500 kg/inh

http://www.mzp.cz/cz/odpady_podrubrika

Pardubice region	MW	VW	SW	BIO	Total	Rec (%)
PaR 2014	195.1	25.6	42.8	37.4	300.9	26.6
PaR 2015	193.2	27.3	42.9	45.3	308.7	28.6
VISOH2014-A00	240.6	30.5	128.3	42.6	442.0	38.7
VISOH2014-A00+BN30	241.4	32.2	188.6	44.3	506.5	46



SITUATION IN THE CZECH REPUBLIC (PARDUBICE REGION 2014)

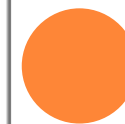
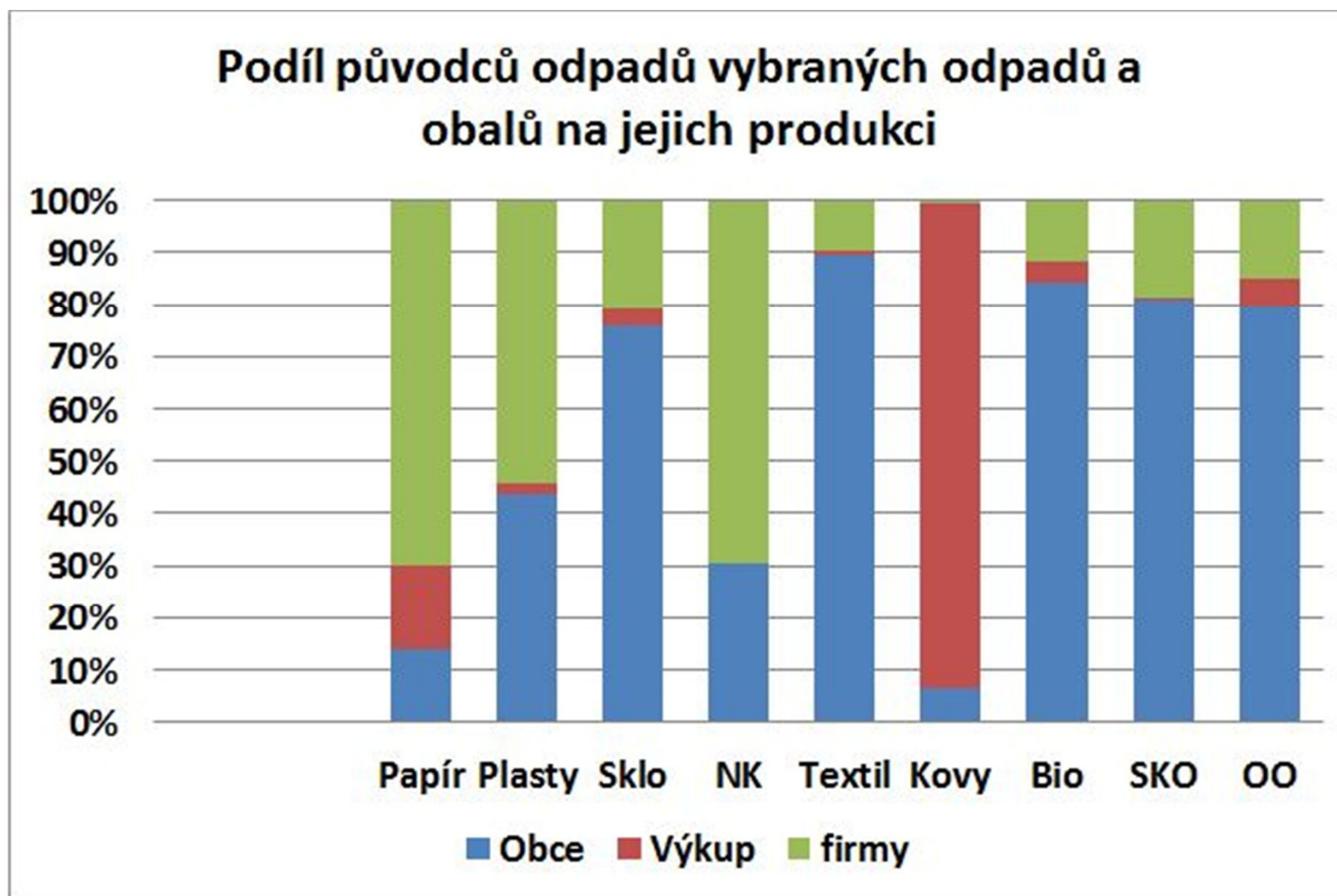
Producers of some of the waste kinds in the Pardubice Region (kg/inh) according to VISOH and according to data from municipalities.

Share	Paper	Plastic	Glass	Tetra	Textile	Metal	Bio	MW	VW
Munic.	13.0	12.2	11.6	0.2	1.3	3.1	38.8	195.1	25.6
Purch.	15.1	0.6	0.5	0.0	0.0	43.9	1.9	0.8	1.7
Busine.	65.6	15.2	3.2	0.5	0.1	0.3	5.4	45.5	4.9

Note: balance of sorted waste, not recycled



SITUATION IN THE CZECH REPUBLIC (PARDUBICE REGION 2014)



SITUATION IN THE CZECH REPUBLIC (RESULTS OF WASTE MANAGEMENT IN MUNICIPALITIES OF SELECTED REGIONS)

Regions 2015	Recyclation	MW in Total	Bio
	(%)	(kg/inh)	(kg/inh)
Liberec	19.4	261.0	17.8
Ústí nad Labem	24.2	320.6	35.0
Střední Čechy	25.9	363.7	50.9
Jižní Morava	26.2	298.4	39.7
Pardubice	28.6	308.7	45.3
Olomouc	29.2	319.3	50.6
Jižní Čechy	30.7	335.0	53.5

These are data from municipalities. Data on total production can be found at: <https://isoh.mzp.cz/VISOH/>.



SITUATION IN THE CZECH REPUBLIC (STŘEDNÍ ČECHY REGION 2015)

Average waste generation in municipalities (recycling 25.8%)

Stk2015	Paper	Plast.	Glass	Tetra	Textile	Metals	Bio	MuniW	VW
(kg/inh)	13.6	14.0	11.9	0.4	1.0	0.6	52.5	241.1	28.6

Average production of selected waste by ORP (kg/inh)

	Paper	Plastic	Glass	Tetra	Textile	Metals	Bio	MunicW	VW
Benešov	13.1	13.7	11.6	0.5	0.6	0.0	46.7	268.9	32.3
Beroun	13.6	15.8	13.5	0.0	0.4	0.3	38.8	239.3	14.2
Kladno	10.5	11.4	10.0	0.2	1.9	0.2	29.6	219.6	18.3
Kolín	11.9	14.0	10.0	0.3	0.3	0.7	81.3	255.3	41.8
Kutná Hora	9.3	13.4	11.5	0.7	0.7	0.3	72.0	282.4	22.4
MB	9.9	12.0	11.0	0.4	0.2	0.6	47.8	221.8	31.0
Mělník	11.3	12.2	10.4	0.3	1.8	1.5	52.7	241.2	47.2
Nymburk	13.8	13.0	10.9	0.3	0.7	0.7	46.2	255.7	40.4
Pha-východ	17.3	16.6	13.2	0.7	1.3	0.7	54.6	231.2	25.1
Pha-západ	22.4	19.2	16.4	0.5	1.1	0.4	91.8	245.8	29.2
Příbram	12.9	11.8	12.3	0.5	1.0	1.2	28.9	238.1	16.9
Rakovník	13.9	13.7	12.4	0.3	1.5	0.0	33.1	216.7	26.1

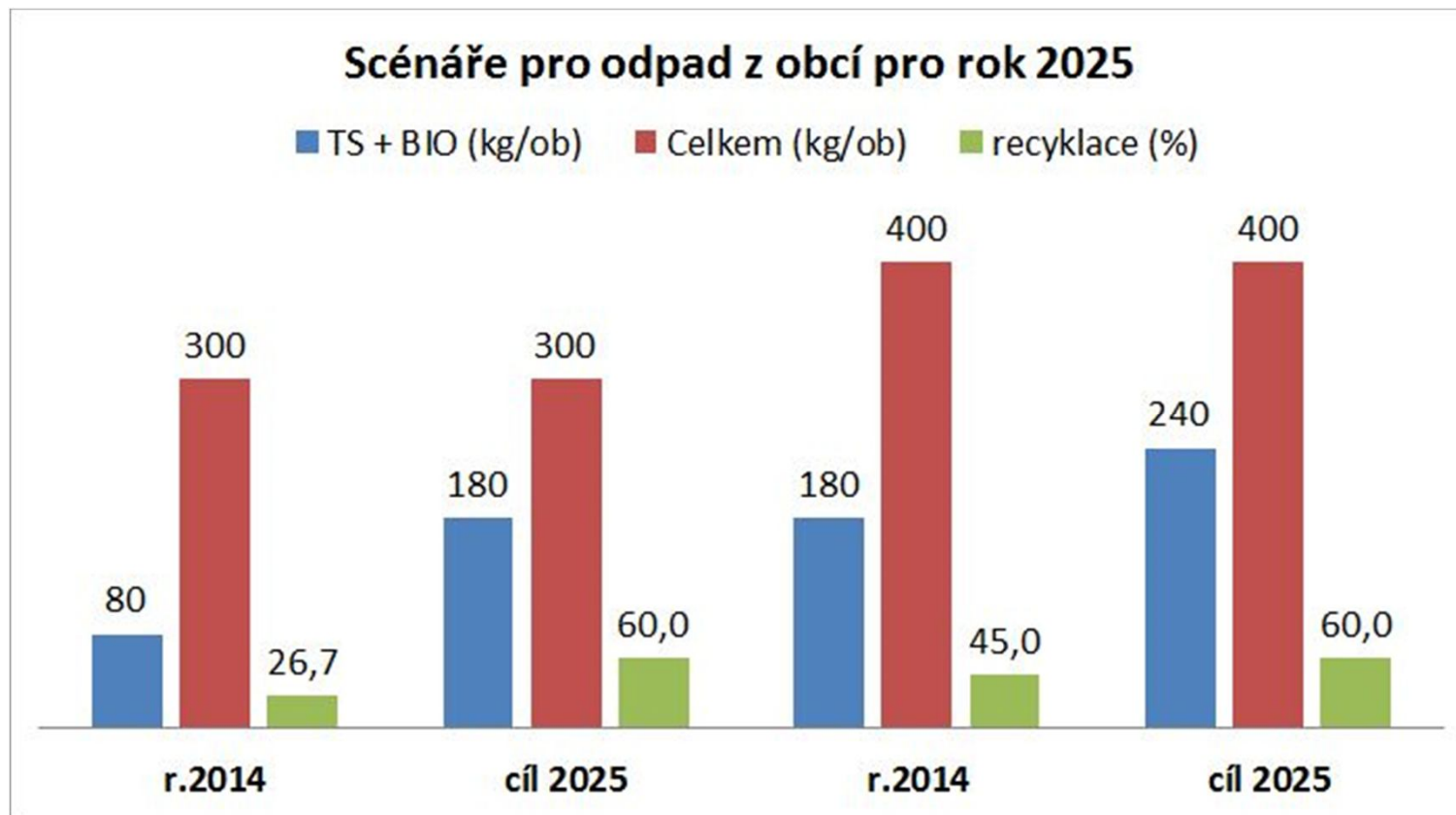
SITUATION IN THE CZECH REPUBLIC (STŘEDNÍ ČECHY REGION 2015)

Waste generation in Stk (municipalities)

	Sorted	Bio	Total	Recyclat.	VISOH-SKO	VISOH-total
Benešov	39.5	46.7	387.4	22.3	320.4	522.7
Beroun	43.6	38.8	335.8	24.5	304.4	520.9
Kladno	34.2	29.6	301.7	21.1	256.1	479.2
Kolín	37.2	81.3	415.6	28.5	341.7	592.3
Kutná Hora	36.0	72.0	412.8	26.2	334.8	536.6
MB	34.1	47.8	334.8	24.5	297.6	504.6
Mělník	37.4	52.7	378.5	23.8	300.7	567.3
Nymburk	39.4	46.2	381.8	22.4	324.7	502.3
Pha-východ	49.9	54.6	360.8	29.0	317.9	532.6
Pha-západ	60.0	91.8	426.8	35.6	294.5	667.6
Příbram	39.7	28.9	323.6	21.2	287.1	503.7
Rakovník	41.9	33.1	317.8	23.6	289.3	499.7

The VISOH data includes waste similar to comunal waste from buseínesses.

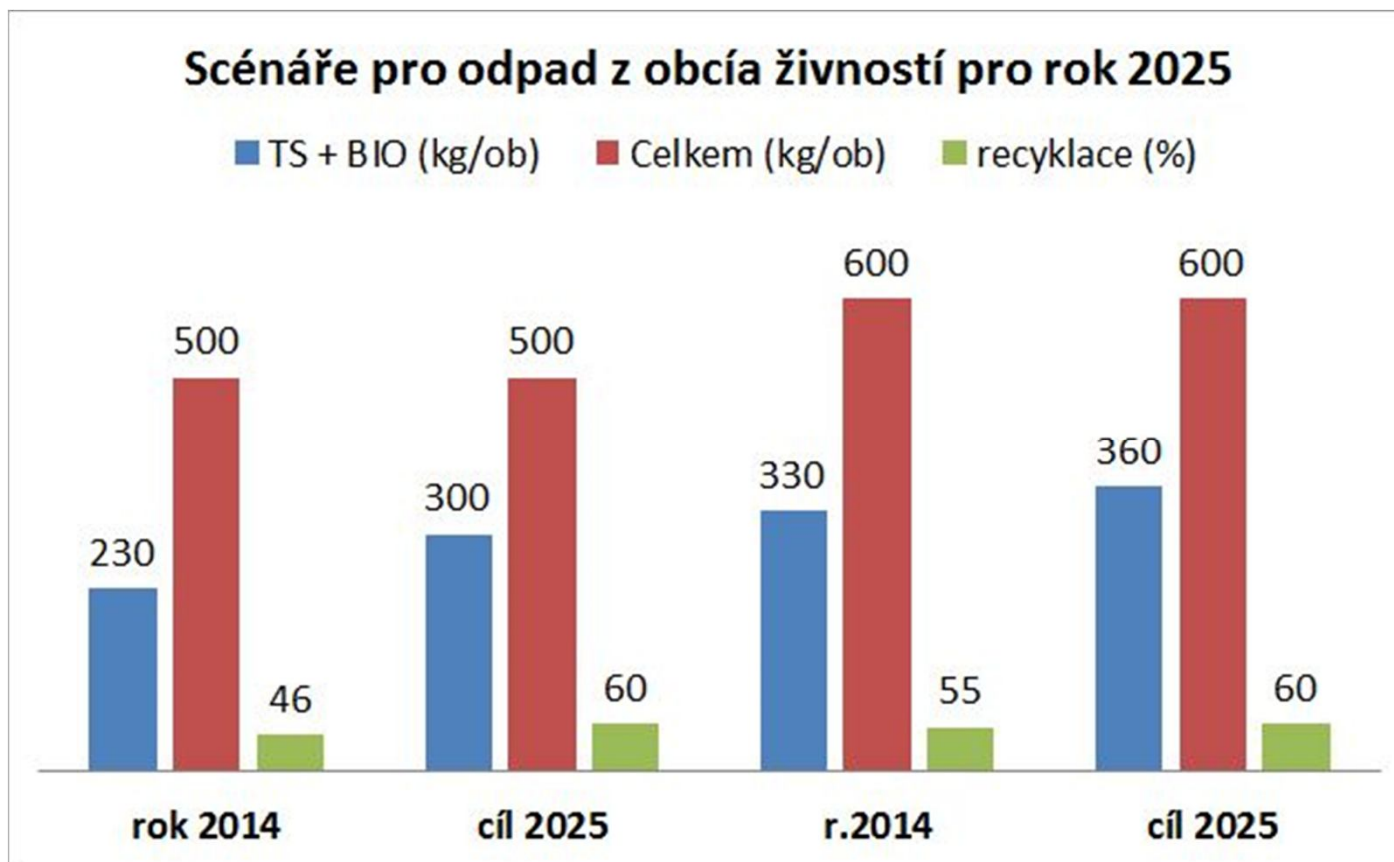
SITUATION IN THE CZECH REPUBLIC AND STK - PARTIAL CONCLUSIONS



The 400 kgs/inh version includes 100 kgs/inh of homemade compost as it is in Austria. The amount of MW + VW to be removed is 220/120/220/160 kgs/inh/year.



SITUATION IN THE CZECH REPUBLIC AND STK - PARTIAL CONCLUSIONS



The 400 kgs/inh version includes 100 kgs/inh of homemade compost as it is in Austria. The amount of MW + VW to be removed is 270/200/270/240 kgs/inh/year.



SITUATION IN THE CZECH REPUBLIC AND STK - PARTIAL CONCLUSIONS

- The Czech Republic has about 1/3 higher mixed waste production than Austria or Germany where it is about 160/170 kg. In the Czech Republic about 250/260 kg (per 1 inhabitant per year).
- Some influence is the higher production of ash from domestic furnaces (burning 1 tons of coal produces about 120 kg of ash). Per 1 person this may be around 30/40 kg (probably one of the reasons for higher waste production in Stk ???).
- Step to a reduction in the production of mixed waste is a lower volume of trash bins. It is currently estimated at 4 liters per person per day, we would need to get about 3 liters (the best municipalities in the Czech Republic are now reaching 2 liters).



SITUATION IN THE CZECH REPUBLIC AND STK - PARTIAL CONCLUSIONS

- The quantity of sorted raw materials in the Czech Republic is lower than Austria or Germany, which is due to the calculation method. In Germany it is about 100 kg more, but there is higher consumption. Austrian data does not include waste from supermarkets, so quantities from the Czech Republic exceed their values (Austrian data also include actually recycled and not collected materials).

	SRN2015	Rakousko 2015
	(kg/ob)	(kg/ob)
Recyklace	299	138
Kompost	114	175
Spalování	196	215
Skládkováno	1	14
Mat. využito (%)	67,7	57,7

SITUATION IN THE CZECH REPUBLIC AND STK - PARTIAL CONCLUSIONS

- If municipalities are to achieve 60% recycling in 2025, MW + VW production would need to be reduced to 120 to 160 kg/inh/year. Some regions have achieved that already, however no state as a whole have not managed that yet. This means sorting another more 60-100 kg in households. The greatest potential is kitchen waste.
- If we account waste from trades we would need to reduce MW + VW production to 200 to 240 kg/inh/year. It means to sort 30-70 kg. Waste from trades is also potential. This goal can be achieved also without including domestic composting. However, there are still 200 kg/inh/year waste to be removed.



SITUATION IN THE CZECH REPUBLIC - POSSIBILITIES OF PREVENTION AND INCREASE OF RECYCLING

Examples of savings:

- Plastic bags (2 kg/inh)
- Baby diapers (3 kg/inh/ 700-1000 kg per 1 child)
- Advertising flyers (8 kg/inh)
- Coal substitution (30-40 kg/inh/ 1 tonne of coal = 120 kg of ash)
- Kitchen waste (40-75 kg/inh)
- Garden waste (140-200 kg/inh)

Limiting ad flyers leads to a reduction in the amount of sorted paper, collecting garden waste increases overall production.



REDUCTION OF WASTE PRODUCTION IN MUNICIPALITIES

- Proper motivation of the population
- Reducing the production of bio-waste
- Limitation of combustion of coal
- Exchange markets, exchange sites, charity collections and shops
- Stop wasting food
- Ad rejection
- Support drinking water from the tap
- Use of reusable products (cloth bags, cloth diapers, returnable bottles, product rental)
- Supporting group or individual activities



REDUCTION OF MUNICIPAL WASTE PRODUCTION - POPULATION MOTIVATION SYSTEMS

- **PAYT-based payment systems**, the cost of sorted collection or collection of biowaste can be included in the payment
 - Payment per container / bag (not a given freight rate) - example of municipalities Chvalšiny, Dalešice, Ploskovice, Chýně ...
 - Fixed collecting system (once in 14 days), choice of containers - Staré Hradiště
 - combined system in terms of collection frequency and container size – Moravany, Fulnek
- **Systems with fixed payment per head (with discounts)**
 - Bar code systems (discount by sorting) - Letohrad
 - STKO Mikulov (Březí)
 - Other systems (Chochočná, Beřovice)
 - System without financial motivation, but with a convenient sorting system (Písek, Kyjov, Nenkovice)



HOW TO EVALUATE MUNICIPAL WASTE MANAGEMENT

- 1) **Production of mixed waste per capita.**
- 2) **Gains from EKO-KOM per capita.**
- 3) **Recycling level depending on the system.**
- 4) Total waste production per capita.
- 5) Costs of sorted collection.
- 6) Costs of liquidation of MW.
- 7) Total costs of waste management.
- 8) Municipal interest in waste management.
- 9)



HOW TO EVALUATE MUNICIPAL WASTE MANAGEMENT

- Mixed waste production

minimum municipalities – 40 to 60 kg/inh

minimum cities – up to 100 kg/inh

Czech Republic municip. approx. – 200 kg/inh

- Gains from EKO-KOM

Approx. gains about 100 CZK/inh.

max. gains in smaller munic. about 300 CZK/inh.

max. gains in bigger cities about 200 CZK/inh.

Note: In many municipalities, the cost of sorted collection exceeds the EKOKOM income. But, for example, in Letohrad, where they have a bag collection, costs are significantly lower (households buy bags, discounts are not included)



HOW TO EVALUATE MUNICIPAL WASTE MANAGEMENT

○ Recycling level

100%	Zbytkový odpad
90%	
80%	PAYT, platba dle produkce
70%	Integrovaný systém včetně sběru
60%	kychyňských bioodpadů
50%	Kontejnery na bioodpad na ulici
40%	
30%	Kontejnery na papír, plasty, sklo
20%	na ulici
10%	

Recycling over 50%
In municipalities which collect over 80 kg/inh/year biowaste. The indicator also applies to villages with high number of tourists (see, for example, Modrava - <http://arnika.org/kauzy-odpady>)



Dalešice – Liberec Reg. – 181 inh - 43 kg/inh/2013

In Dalešice, paper, PET bottles, glass and textiles are sorted into containers. Plastic (excluding PET), Tetra, metal packaging are collected into bags. Volume, hazardous, construction waste can be handed over by the inhabitants to the collection yard and the transfer station in Proseč nad Nisou. Maintenance of green areas for the village is provided by the fire brigade, and since 2014 also a public servant. The village purchased a mulching mower. As a result there is no biowaste. Households compost their own biowaste.

Druh odpadu	Produkce (t)	Produkce (kg/obyv)
papír	3,50	19,3
plast	2,73	15,1
NK	0,22	1,2
sklo	2,65	14,6
kovy	0,10	0,6
popelnice (SKO)	1,96	10,8
pytle (SKO)	5,84	32,3

Recyclation
54,1 %
without VW

Costs
300 – 500
CZK/inh.



Dalešice – Liberec Reg. – 181 inh - 43 kg/inh/2013



Mixed waste production - households using bags fill only 6 bags per year on average.



Chvalšiny – Jižní Č. Reg. – 1235 inh – 59,9 kg/inh/2013

Since 2005 there has been a so-called "pay-as-you-go" payment system for waste. The fix tax covers the costs associated with the sorting of waste and the operation of the collection yard (in 2015 - 150 CZK from the inhabitants aged 6 to 70, half tax from the tourists and people from the settlements). The variable tax is given by the number of stamps needed to collect the mixed waste bin (in 2015 - 60 CZK for one stamp).

The village has a collecting yard and there are containers for sorted collection of glass and paper (1500 liters) in the village and settlements. Other commodities are sorted into bags. PET bottles are collected in clear bags, plastic bags are poured into yellow bags, drinks cans are in orange bags. Bags are taken every Wednesday morning from home. Then receive a new one in the mailbox if asked. Citizens can also put bundles of paper together with bags, etc. The village has its community composting plant.



Chvalšiny – Jižní Č. Reg. – 1235 inh – 59,9 kg/inh/2013

Druh odpadu	2012	2013	2014
	(kg/obyv.)	(kg/obyv.)	(kg/obyv.)
papír	10,1	15,0	13,2
plast	7,0	10,2	8,9
sklo	10,3	10,1	8,2
jedlý olej	0,5	0,0	0,0
textil	0,0	1,4	0,4
směsný odpad	49,4	59,9	42,4
objemný odpad	6,1	9,3	20,5
nebezpečný odpad	0,0	0,6	0,7

Recyclation
33 - 34 %

Costs
about 320 CZK/inh/2013



Staré Hradiště – Pardubice Region – 1701 inh – 114,4 kg/obyv./2014

There is a collection of bags (house-to-house) in the village. Paper bags, plastics, beverage cartons and metals are weighed 14 times a year. Containers are for glass, less electrical waste, textiles. In the MO is a container for batteries, cartridges and toners. Bulky and construction waste is not considered by the municipality, it can be handed over to a collection yard in Dražkovice (the municipality is planning to build a collecting yard). Mixed municipal waste is weighed once in 14 days. The cost of taking it depends on the size of the household waste (80, 120, 240 liters). In 2016 it is 10 CZK per 1 liter (800,1200,2400 CZK depending on the size of the bin).

	2013	2014	2015	2013	2014	2015
	(t)	(t)	(t)	(kg/inh)	(kg/inh)	(kg/inh)
paper	43.16	60.38	49.86	26.3	35.5	28.9
plastics	60.0	64.29	61.08	36.5	37.8	35.4
glass	29.16	28.12	27.53	17.7	16.5	16.0
beverage cartons	2.77	1.52	1.47	1.7	0.9	0.9
bio waste	48.97	63.56	142.52	29.8	37.4	82.6
mixed waste	194.17	194.58	195	118.2	114.4	113.0
bulky waste	26.83	7.82	10.8	16.3	4.6	6.3
recyclation (%)				45.4	51.8	57.9

Moravany – Pardubice Region – 1819 inh – 54,7 kg/inh/2013

Containers are sorted by plastics, beverage cartons and glass. Other materials - waste from gardens, textiles, electrical waste, bulky waste, hazardous waste, people bring to a collection point in the premises of S-FIRMA s.r.o. It is open 6 days a week (Mon-Sat). The company buys paper, plastics ... Grass is taken to the SETRA composting plant in Dašice. The waste from the gardens will be parted by the City of Pardubice. Skoda SKO - at a 14-day or 28-day interval, the price is 1300 or 900 CZK, per person and recreational facility 450 CZK).

Počet obyvatel	2013	2014
	(kg/obyv.)	(kg/obyv.)
plast	16,0	16,4
sklo	11,1	8,9
NK	0,1	0,2
bio	98,8	235,3
SKO	54,7	58,1
OO	25,0	31,2

Recyclation 2013/2014
61,3/74,5 %

Costs 2013
531 CZK/inh



Moravany – Pardubice Region – 1819 inh – 54,7 kg/inh/2013



It is necessary to sort separately wood, garden waste (debris, mixture) and green waste (grass can be transported to the SETRA composting plant).

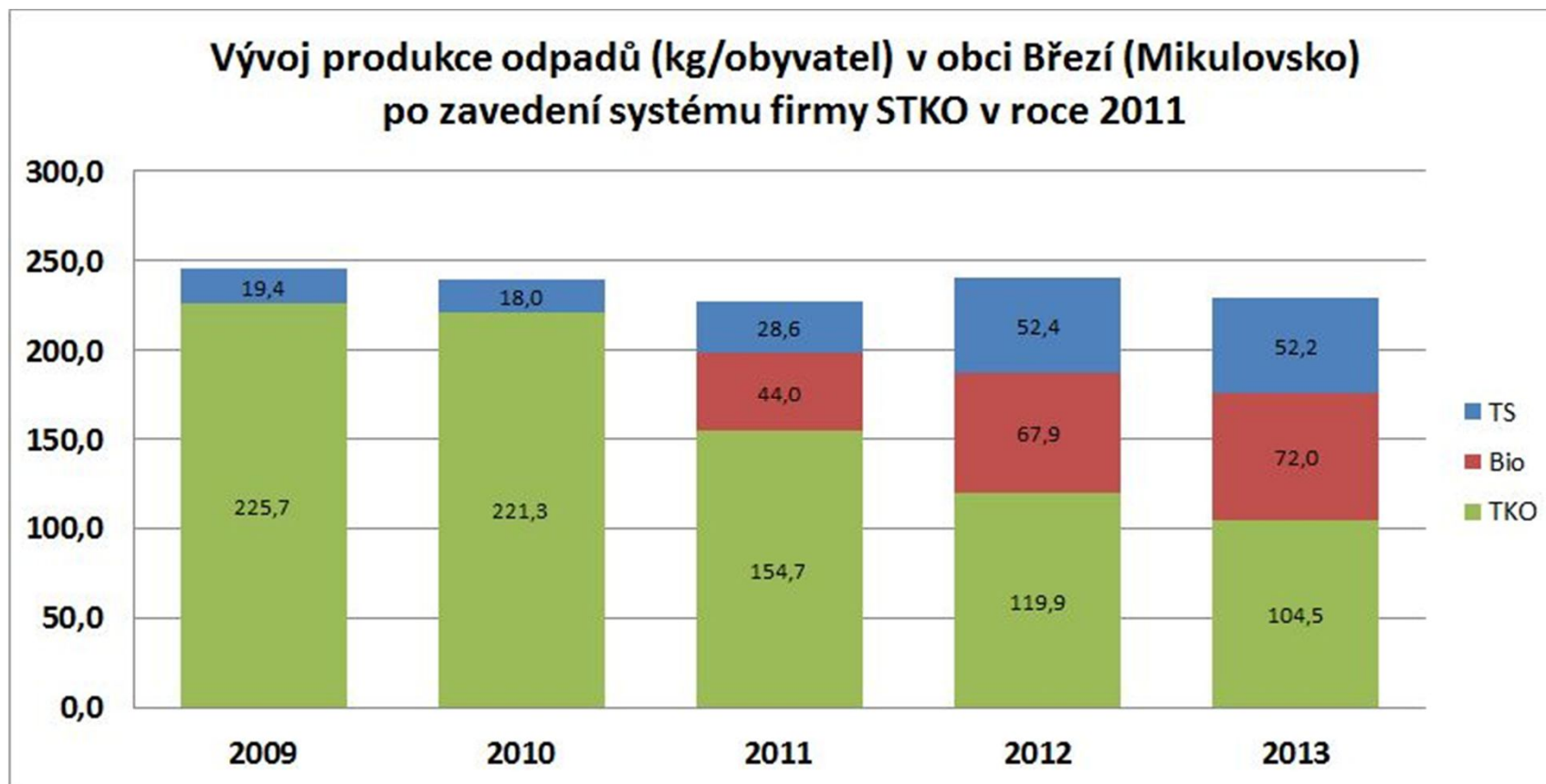


Březí – Jižní Morava region – 1547 inh – 104,5 kg/inh/2013

In Březí, there is an Intelligent Waste Management System (ISNO), implemented in Břeclav region by STKO Mikulov. The system is based on the maximum availability of waste containers and the specific bonding of households to the containers. The volume of containers is derived from a per capita discount system (+ behavior = prevention). Video <https://www.youtube.com/watch?v=T1i7CmY38TI&feature=youtu.be>
The system was introduced in 2011.

(kg/obyv)	2009	2010	2011	2012	2013
Papír	4,240	3,304	9,655	22,262	20,030
Plast	4,796	5,301	8,831	17,727	18,919
Sklo bílé	0,000	0,000	4,708	6,725	6,708
Sklo barevné	9,590	8,895	5,428	5,641	6,571
Tetrapak	0,783	0,465	0,000	0,000	0,000
Bio	0,000	0,000	44,035	67,850	71,981
TKO	225,701	221,332	154,725	119,870	104,462

Březí – Jižní Morava Region – 1547 inh – 104,5 kg/inh/2013



Březí has the smallest MMW production in towns and municipalities from 1001 to 5000 inhabitants in the South Morava Region.



Písek – Jižní Čechy Region – 29769 inh – 140,5 kg/inh/2013

The town of Písek develops its waste management in the long term and conceptually. It operates its own landfill, as part of a joint project with the town of Strakonice, the company ODPADY-PÍSEK s.r.o. operates the grading line for plastics and paper. Waste management in the town is provided by City Services Písek s.r.o., owned by the city. They provide the collection of individual components of municipal waste, the operation of collecting yards and the composting plant. In addition, they care for urban greenery and provide a host of other services.

In Písek, paper, plastic together with beverage cartons, mixed glass, biowaste, textiles, electrical waste are sorted. In the city, 145 collection points for separate waste, 12 containers for textiles and 12 containers for electrical waste. There are 2000 bio-containers (240 liters) in the city. The city operates 7 collection yards.



Písek – Jižní Čechy Region – 29769 inh – 140,5 kg/inh/2013

Rok / Druh odpadu	2010	2011	2012	2013	2014
	(kg/obyv.)	(kg/obyv.)	(kg/obyv.)	(kg/obyv.)	(kg/obyv.)
papír	32,9	32,2	28	26	24,4
plasty	16	16,8	14,9	14,7	14,5
sklo	10	9,3	8,1	8,6	11,2
bioodpad	45,6	39,2	69	150,5	215,9
směsný odpad	213,9	204,2	149,7	140,5	133,5
objemný odpad	-	-	29,3	29,1	32,2

It can be seen from the table that the amount of mixed waste is decreasing despite the fact that the city changed its way of paying for waste in 2012 to a local fee (in 2013 it was CZK 590). This is mainly due to the continuous education and the possibilities offered by the city to households. For example, about a quarter of sorted biowaste comes from households (1380 tonnes). The quality of the collection is good. To support this goal, 50 households of bio-waste are distributed each year to each household. Due to the increase in sorted waste, the level of recycling rises from approx. 32% in 2010 to 60% in 2014.



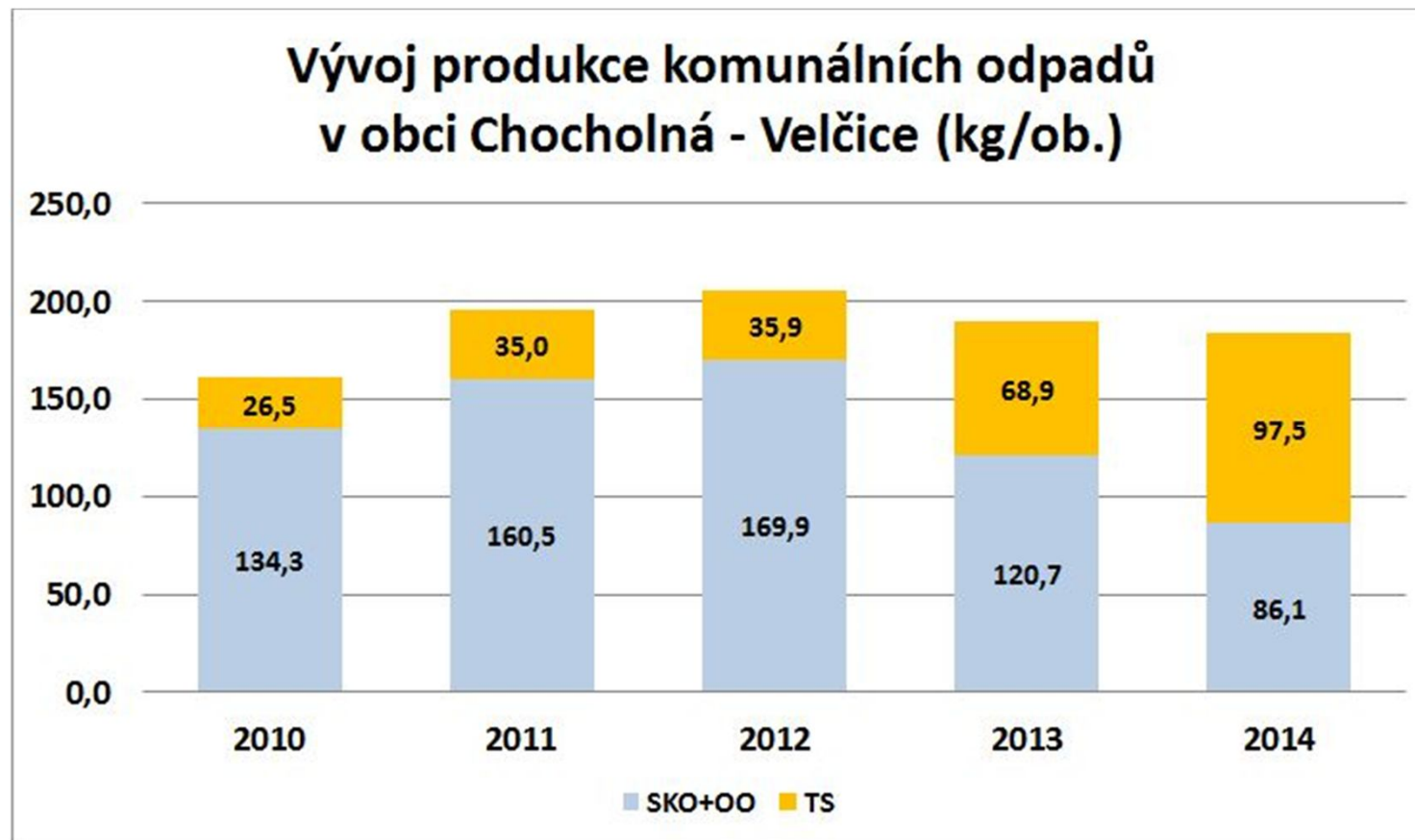
EXAMPLE CHOCHOLNÁ - VELČICE

- Slovakia, Trenčín district, 1732 inhabitants, rural area (518 family houses, 18 apartment building),
- Per capita payment (r.2011) of EUR 15 (did not cover costs, the 2012 surcharge was 9391 EUR)
- MMW collection – once in 14 days
- Collection of bulky waste (collecting yard, disposal is provided by municipalities)
- Collection of bulky waste (collecting yard, disposal is provided by municipalities)
- Glass – 10 containers in the village
- Plastics – (bag collection, bags to be handed over to the collection yard or to the warehouse for the office)
- Collection of paper – collections organized by the school – weighs external company, rewards are products (toilet paper...)
- Textile – charity collection twice a year
- Electrical waste – collection twice a year



EXAMPLE CHOCHOLNÁ - VELČICE

- In 2012, with the help of NGOs from Košice, they started to implement a project to reduce the production of mixed waste, increase the amount of sorted waste and improve the economy of waste management



EXAMPLE CHOCHOLNÁ - VELČICE

Implemented measures:

- A change in the fee, so that households pay full costs (from € 15 to € 25), offering a 40% discount to households signing a sorting agreement and domestic composting (signed by about 75% of households in 2014)
- Improvement of the waste management system - sacking of paper, plastics, metals, beverage cartons (removal from the house), paper also the old way
- 2 glass containers are added
- Textile containers in the village
- New bulk containers at the collection yard, sorted waste bins
- At the collection yard can be handed out sorted waste, electro, tires, edible oils, bio, construction waste, hazardous waste, things for further use
- A sorted collection was introduced in all municipalities (kindergarten, school, school canteen, office, firemen, cultural house)



EXAMPLE CHOCHOLNÁ - VELČICE

Implemented measures:

- BIO – a municipal composting plant for communal green waste, households composting (30% contribution to the composting), composting schools and offices, kitchen waste from school canteens are also composting in a special composting plant using bacteria (GG-02)
- Information campaign – education of house from house, educational materials (about composting, sorting, about the whole village system, waste incineration, waste collection calendar). Lectures at schools, excursions to waste processors, detailed information on the web and on the board in the collection yard.
- Evidence of bins and their control. Random analysis of several garbage bins at the collection yard (5 to 10).



EXAMPLE CHOCHOLNÁ - VELČICE

Year	2 012	2 013	2014
Incomes:	27 790 €	32 496 €	32 249 €
Costs:	37 181 €	34 038 €	30 471 €
Difference:	-9 391 €	-1 542 €	1 778 €

The difference in incomes and costs in 2013 is due to investments in improving waste management (collection yard, composting, bulk containers, glass sorting vessels, school sorting bags, office ...), the purchase of sorted bags.

The entire project was implemented without subsidies. Overall, the municipality / households have saved.



MORE INFORMATION

Manual for the prevention of waste in municipalities:

<http://arnika.org/predchazeni-vzniku-odpadu-v-obcich>

Examples of good practice (30 municipalities and towns):

<http://arnika.org/kauzy-odpady>

Web to prevent:

<http://pvo.arnika.org>

Exhibition to prevent:

<http://arnika.org/vystava-prevence-odpadu-srozumitelne>



MORE INFORMATION

Waste Prevention Conference:

<http://www.tretiruka.cz/media-a-odpady/predchazeni-vzniku-odpadu/konference-pvo-2016/>

SMOČR/IURMO/EKOKOM

<http://www.institut-urmo.cz/cz/projekty/18-odpadove-hospodarstvi>

EKOKOM: Conferences Municipalities and Waste

<http://www.ekokom.cz/cz/ostatni/o-spolecnosti/nase-projekty/odpady-a-obce-2>

Ministry of the Environment: Wastes + Records:

http://www.mzp.cz/cz/odpady_podrubrika

<https://isoh.mzp.cz/VISOH/>



AND THIS IS THE END?

(ON THE PICTURE IS MY MIXED WASTE FOR 1 MONTH IN TIME, WHEN I COULD SORT BIOWASTE)



Thanks for your attention

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