



**AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF POWER ENGINEERING AND ENVIRONMENTAL
PROTECTION**



IFAT ENTSORGA 2010 – MESSEKONGRESS ITAD

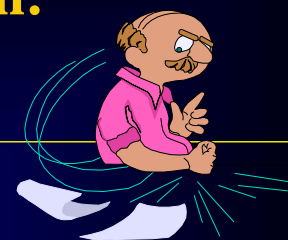


IMPLEMENTATION OF THE WASTE FRAMEWORK DIRECTIVE IN POLAND – THE ROLE OF WASTE-TO-ENERGY



**Tadeusz Pająk
Munich – 16th September 2010**

Content of the presentation:



- **Conditions and challenges for municipal waste management in Poland,**
- **Municipal waste management in Poland – current situation,**
- **Municipal waste management in Poland in comparison with other EU countries,**
- **Amount and composition of municipal waste,**
- **Politically desired waste treatment technologies,**
- **Progress in construction of waste incineration projects in Poland, analysis and assessment,**
- **Municipal waste management in Poland in 2020,**
- **Landfill – current state and future,**
- **Summary.**

MUNICIPAL WASTE MANAGEMENT IN POLAND – THE MOST IMPORTANT CHALLENGES

- **Implementation of the new waste framework directive by December 12, 2010,**
- **Treatment of municipal waste is based on 90% landfilling,**
- **Not sufficient waste treatment capacity, with the exception of landfill sites,**
- **Still slowly growing effects of separate waste collection,**
- **Waste collection and disposal charges to private businesses and not to municipalities,**
- **Low environmental awareness, problems with social acceptance of waste incineration plants,**
- **Tight deadlines for meeting the requirements of the EU law, e.g. meeting the aims of reducing the biodegradable waste destined for landfilling,**
- **The risk of loss of the EU money for subsidies and the risk of paying the penalties.**



CURRENT STATUS OF MUNICIPAL WASTE MANAGEMENT IN POLAND

**according to information from the Central Statistical Office
for the year 2008**

- **10.04 million tonnes of municipal waste are being generated every year,**
- **In the big cities 320 kg/person/year, on average 260 kg/person/year,**
- **87% of waste streams are landfilled on approx. 800 landfill sites, (about 300 landfill sites must be shut down by the end of the year 2011).**

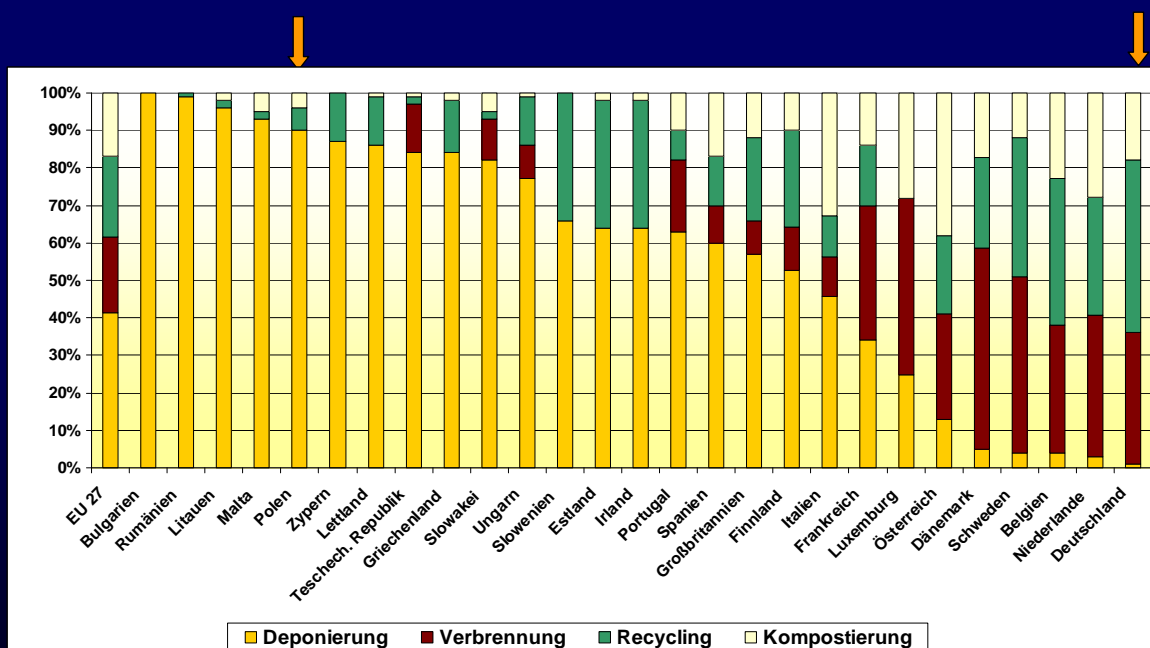


CURRENT STATUS

according to data from the Central Statistical Office 2008

- 87% waste streams are landfilled,
- 2,6% are composted (262 000 Mg/year),
- 10,3%, that is 6,8% are collected separately and additionally approx. 3,5% are sorted from mixed waste,
- 0,4% thermal treatment (only one waste incineration plant - ZUSOK Warsaw),
- Waste treatment plants :
 - 120 sorting plants
 - 60 composting plants
 - 22 MBT plants („Polish Type”)
 - 2 RDF-Plants (Refuse Derived Fuel)
 - 1 waste incineration plant approx. 40 000 tonnes/year.

METHODS OF MUNICIPAL WASTE TREATMENT IN THE EU COUNTRIES (2007)



Source: EUROSTAT, <http://ec.europa.eu/eurostat>, Status for 2007

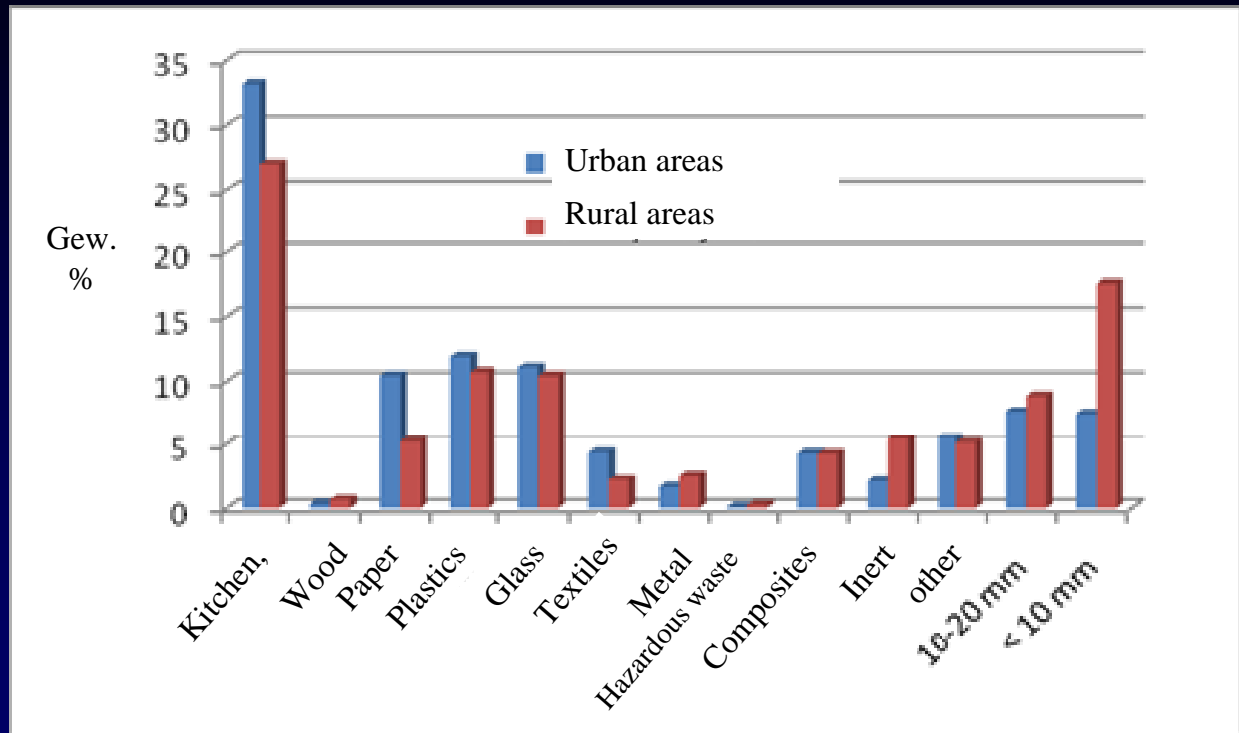
WASTE COMPOSITION

WASTE COMPOSITION (2008)

Waste fraction	Urban areas		Rural areas	
	%	kg/E, a	%	kg/E, a
Kitchen and garden	39, 84	126, 97	34, 43	77, 43
Paper, cardboard, carton	10, 42	33, 21	5, 18	11, 65
Plastics	11, 92	37, 99	10, 68	24, 02
Glass	11, 08	35, 31	10, 39	23, 37
Metal	1, 67	5, 32	2, 53	5, 69
Composite materials	4, 29	13, 67	4, 25	9, 56
Other	20, 78	66, 23	32, 54	73, 18
<i>Other – fraction ≤ 10 mm (incl.)</i>	7, 43	23, 68	17, 53	39, 42
Total	100, 00	318, 7	100, 00	224, 9
Specific weight	148 kg/m³		234 kg/m³	

Source: Dr. R. Szpadt, TU Wrocław 2008

WASTE COMPOSITION (2008)



Source: Dr. R. Szpadt, TU Wrocław 2008

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BIODEGRADABLE WASTE (2008)

BIODEGRADABLE FRACTION	Urban areas		Rural areas	
	Range %	Approx. %	Range %	Approx. %
Kitchen, garden and wood (100% organic)	23,5 ÷ 38,1	32,3	18,2 ÷ 39,4	26,5
Paper, cardboard (100%)	4,9 ÷ 18,5	10,9	1,1 ÷ 14,9	6,2
Textils (50%)	0,8 ÷ 3,4	1,9	0,4 ÷ 2,3	1,1
Fraction 10 to 20 mm (85 to 88%)	4,6 ÷ 7,7	6,2	2,7 ÷ 8,9	7,2
Fraction ≤ 10 mm (50%)	1,2 ÷ 13,2	4,6	1,2 ÷ 21,8	9,6
Packaging waste (ca. 50%)	0,7 ÷ 1,3	0,9	0,3 ÷ 1,2	0,7
Total	50,4 ÷ 68,4	56,8	39,9 ÷ 68,5	51,3

Source: Dr. R. Szpadt, TU Wrocław 2008

BIODEGRADABLE WASTE (2008)

Municipal waste	Urban areas		Rural areas	
	%	kg/person, annually	%	kg/person, annually
Biodegradable waste	57	106 ÷ 239 (176)	51	33 ÷ 203 (112)
Organic waste	43	80 ÷ 179 (132)	43	28 ÷ 171 (94)
Total in Poland	4,47 t/year (2008)			

Source: Dr. R. Szpadt, TU Wrocław 2008

BIODEGRADABLE WASTE (2008)

Biodegradable waste streams per person in 1995 (1995 is base year):

Urban areas – 155 kg/person, year
Rural areas – 47 kg/person, year

According to Art. 5.2. Landfill Directive 99/31/EC:

2010 → 75% → 116,25 kg/p, year *

2013 → 50% → 77,50 kg/p, year *

2020 → 35% → 54,25 kg/p, year *

* – in urban areas

BIODEGRADABLE WASTE REDUCTION REQUIRED

Year	Urban areas				
	Landfill allowed	Landfill ban Base year - 1995 155 kg/person, year		Landfill ban Year 2008 176 kg/person, year	
		kg/p, year	%	kg/p, year	%
2010	116,25	25	38,75	33,9	59,75
2013	77,50	50	77,50	56	98,50
2020	54,25	65	100,75	69	121,75

BIODEGRADABLE WASTE REDUCTION REQUIRED

Year	Rural areas				
	Landfill allowed	Landfill ban Base year - 1995 47 kg/person, year		Landfill ban Year 2008 112 kg/person, year	
		kg/p, year	%	kg/p, year	%
2010	35,25	25	11,75	68,5	76,75
2013	23,50	50	23,50	79	88,50
2020	16,45	65	30,55	85	95,75

A LOOK AT POLITICALLY DESIRED WASTE TREATMENT PLANTS

CURRENT WASTE INCINERATION PLANT PROJECTS IN POLAND

REQUIREMENTS AND CHALLENGES FOR THE WASTE INCINERATION PLANT-PROJECTS

- **Municipal waste incineration plant projects should be an essential component of modern municipal waste management systems conform with the EU law and with the domestic law, widely implemented in the 15 Member States of the EU. It is still a rare case in the new EU Member States,**
- **The designed municipal waste incineration plants in Poland are necessary, especially in waste management systems of big Polish cities, in order to fulfill the accession treaty obligations as well as to meet the legal requirements regarding the reduction of biodegradable waste sent to landfills,**
- **Poland must use its unique opportunity, that is the financial means reserved in the Cohesion Fund for construction of waste incineration plants within the frame of the operational program “Infrastructure and Environment“ and commence the construction, in order to change the monoculture of the waste management.**

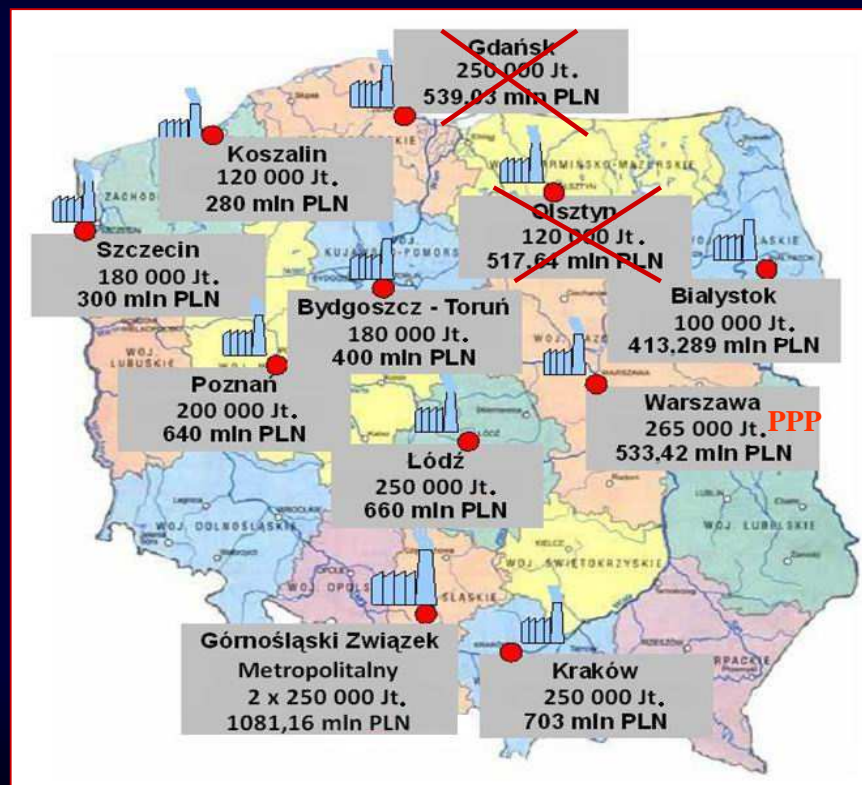
ZUSOK, WARSAW – THE ONLY WASTE INCINERATION PLANT IN POLAND



Basic parameters	Unit	Value
Amount of waste incinerates	Mg/year	39 729
Average caloric value of waste	kJ/kg	10 057
Working hours annually	h/a	7372
Electrical output of the generators	MW _e	2,4
Electricity generated	MWh _e	10 545,3
Current thermal performance	MW _{th}	9
Planned thermal output of the new plant	MW _{th}	2 X 25
Thermal output to the heat grid	GJ	243 010
	MW _{th}	67 500
Particles emissions annually - average	mg/m ³ _N	0,56
SO ₂ -emissions annually - average	mg/m ³ _N	4,22
NO ₂ -emissions annually - average	mg/m ³ _N	114,56
CO –emissions annually - average	mg/m ³ _N	0,29
PCDD/PCDF– emissions annually - average	ng TEQ /m ³ _N	0,052

**Only 8 % of
the surveyed
Warsaw
residents are
aware that the
Waste
Incineration
Plant ZUSOK
exists and
operates**

PROJECTS OF WASTE INCINERATION PLANTS ON THE MAP – after verification on June 30, 2010



CURRENT WASTE INCINERATION PLANTS PROJECTS after verification on June 30, 2010

Location	Planned Capacity Mg/year (number of lines)	Technology	Time frame	Financing structure	Planned Power MWeI/MWth
Szczecin	150 000 (2)	grate	2014	Public + EU Fund	8,1/27
Koszalin	92 000 (1)	grate	2014	Public + EU Fund	3,0/16
Białystok	120 000 (2)	grate	2015	Public + EU Fund	3,0/20
Bydgoszcz& Toruń	180 000 (2)	grate	2014	Public + EU Fund	9,2/27,5
Poznań	240 000 (2)	grate	2014	Public + EU Fund	10/40
Łódź	200 000 (2)	grate	2014	Public + EU Fund	7,3/35
GZM Katowice	500 000 (2)	grate	2015	Public + EU Fund	27/82
Kraków	220 000 (2)	grate	2014	Public + EU Fund	8,7/35
Warszawa*	320 000 (2)	grate	2015	PPP	18/30

WASTE INCINERATION PLANT CONSTRUCTION PROJECTS IN POLAND SUMMARY

**Σ planned waste incineration plants =
8 (EU projects) + 1 (Warsaw)**

Σ Efficiency= (1,7 + 0,32) Mg/year

**Σ Capital expenditure = 4,75 billion PLN
(+ 0,6 billion PLN)**

Σ EU subvention = 3,5 billion PLN (61%)

ANALYSIS AND ASSESSMENT OF WASTE INCINERATION PLANT CONSTRUCTION PROJECTS

Basic assumptions for the assessment:

- **the sole assessment criterion is the advancement stage of the preparation of the documents for the application according to the presented scale :**
- **completed projects after the verification on the level of the European Commission (EC) (*****)**
- **completed projects with the positive environmental impact assessment and during the verification on the country level (***).**

ANALYSIS AND ASSESSMENT OF WASTE INCINERATION PLANT CONSTRUCTION PROJECTS

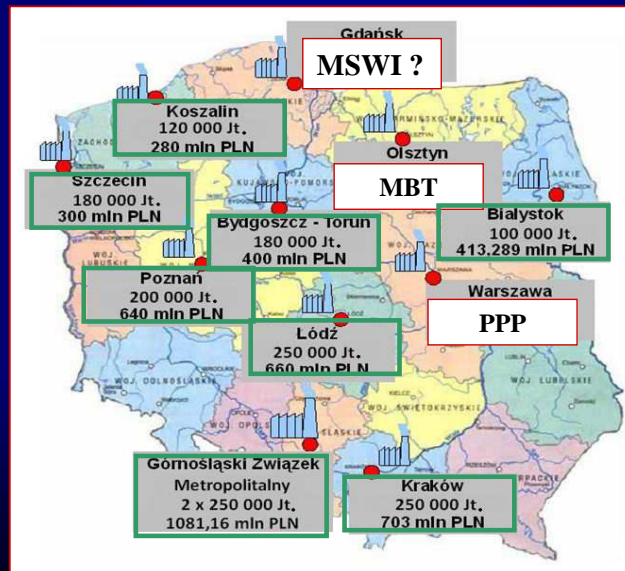
**Completed projects after the verification on the level of the
European Commission (EC)**

PROJECTS *****

**There are no advanced
projects until now**

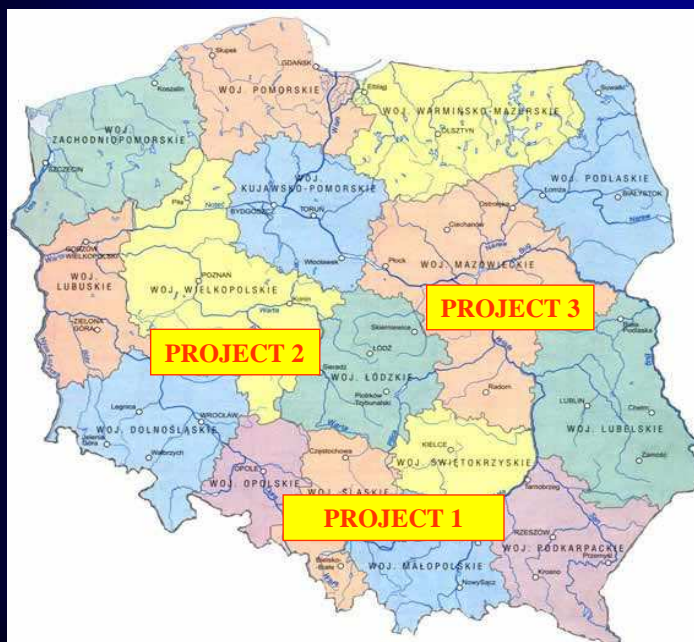
ASSESSMENT OF WASTE INCINERATION PLANT CONSTRUCTION PROJECTS

Completed projects with prepared application for the EU subsidy of the European Commission, but with ongoing verification process on the national level **PROJECTS******



ANALYSIS AND ASSESSMENT OF WASTE INCINERATION PLANT CONSTRUCTION PROJECTS

CANDIDATES FOR THE INDICATIVE LIST



There are 2 or 3 projects not mentioned on this indicative list that are relatively well-advanced and aim to have their applications included on the indicative list for the “Operational Program Infrastructure and Environment” for the years 2007-2013.

**THE MOST IMPORTANT
CONDITIONS AND HINDRANCES
FOR DEVELOPMENT OF WASTE
INCINERATION PLANT PROJECTS**



**THE MOST IMPORTANT
HINDRANCE FOR THE
IMPLEMENTATION OF
WASTE INCINERATION
PLANTS PROJECTS IN
POLAND IS STILL
SOCIAL ACCEPTANCE**



**EXPERIENCED AND
PROFESSIONAL SOCIAL
CONSULTATIONS, SO-CALLED
“ROUND TABLE” DISCUSSIONS
(According to the AARHUS-
CONVENTION and relevant EU- and
domestic law) TAKE PLACE WITH
REGARDA TO ALL PROJECTS**

TIME PRESSURE FOR FILING DOCUMENTS FOR WASTE INCINERATION PLANT PROJECTS

BASIC DATES :

- 1. 30.06.2010 – Deadline for finishing work and application documents.**
- 2. 31.12.2015 – Final deadline for finishing construction investment for waste incineration plants with respect to the EC.**

And also deadlines for legal requirements :

- 1. 01.01.2013 – Ban on landfilling of untreated waste.**
- 2. 31.12.2010 – 25% reduction of landfilled biodegradable waste.**
- 3. 31.12.2013 – 50% reduction of landfilled biodegradable waste.**

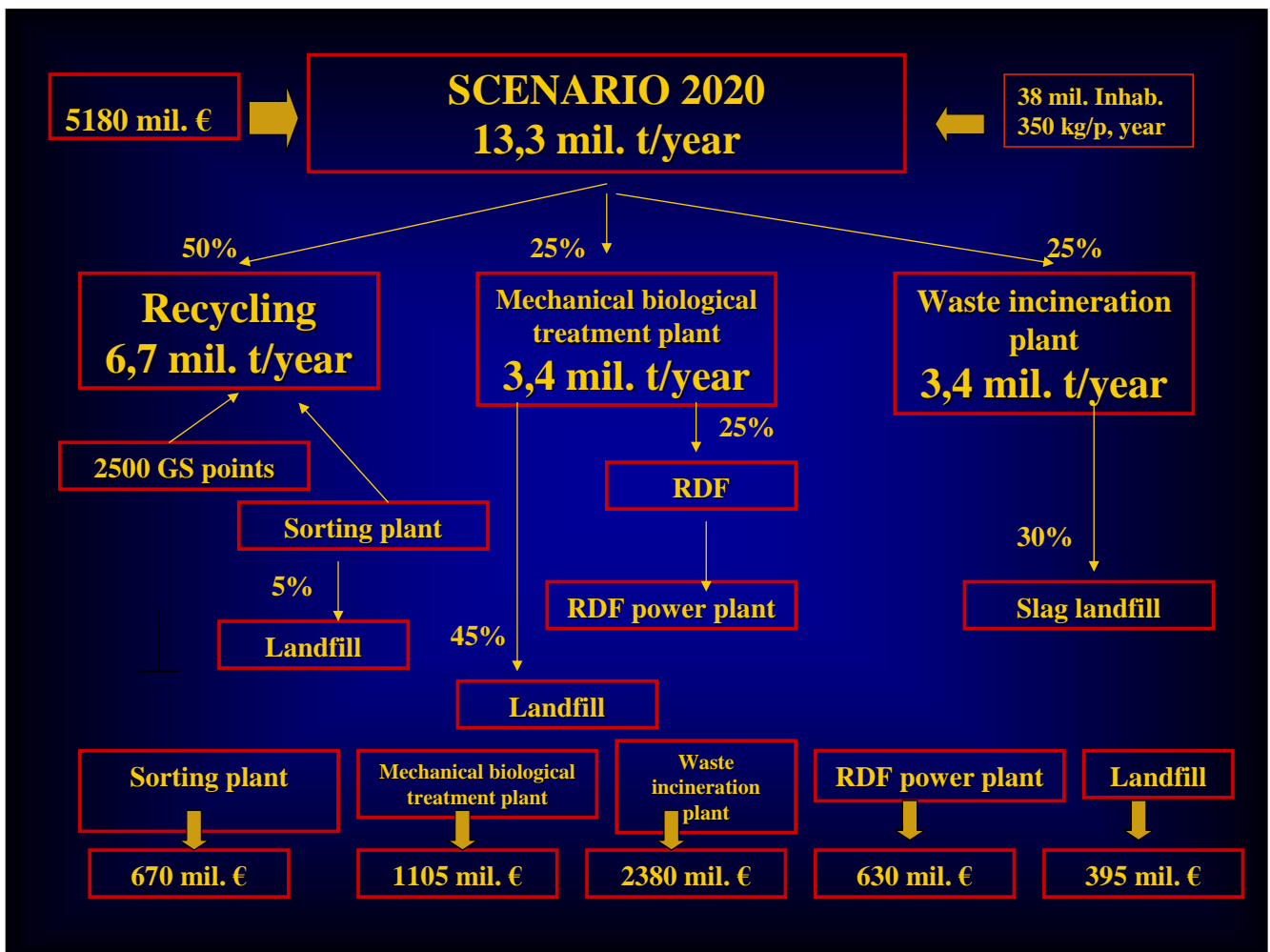
ENERGY FROM WASTE AS RENEWABLE ENERGY

**Ordinance of the Minister of the Environment of June 2, 2010
on detailed technical provisions for the categorization of energy
from thermal treatment of municipal waste**

(Dz. U. [Journal of Laws] of 2010, No. 117, it. 788)

**According to the ordinance, 42% of electric energy generated
by a waste incineration plant is classified as energy from a
renewable energy source.**

MUNICIPAL WASTE MANAGEMENT IN POLAND 2020 OUTLOOK according to the MŚ DGO



LANDFILL for municipal waste – current state and prognosis for 2020

Current state: approx. 800 landfills, approx. 3100 ha

Future of the landfills - 2020:

Closure and revegetation of all landfills

Costs:

3100 ha x 0,25 mil. €/ha = 800 mil. €

**LANDFILL for industrial waste
– current state and prognosis for 2020**

Current state: approx. 9000 ha

Future of the landfills - 2020 :

Closure and revegetation of all landfills

Costs:

9000 ha x 0,25 mil. €/ha = 2300 mil. €

**LANDFILL for asbestos
– current state and prognosis for 2020**

Current state: not sufficient landfill areas

Future:

- **approx. 15 mil. tonnes of asbestos to be landilled,**
- **approx. 200 ha deposit areas required,**
- **1 ha of landfill costs approx. 0,4 mil. €/ha,**
- **Costs: approx. 80 mil. €**

SUMMARY

- 1. Waste incineration plant projects in Poland are an important and a real step towards implementation of the new Waste Framework Directive, the Landfill Directive and the development of modern municipal waste treatment systems.**
- 2. By 2020 Poland needs extension of separate waste collection and new waste treatment plants, sorting plants in particular, MBT plants, waste incineration plants, RDF power plants and landfill sites for treated waste.**
- 3. It all needs a lot of acceptance and a lot of money.**



Thank you for your
attention
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