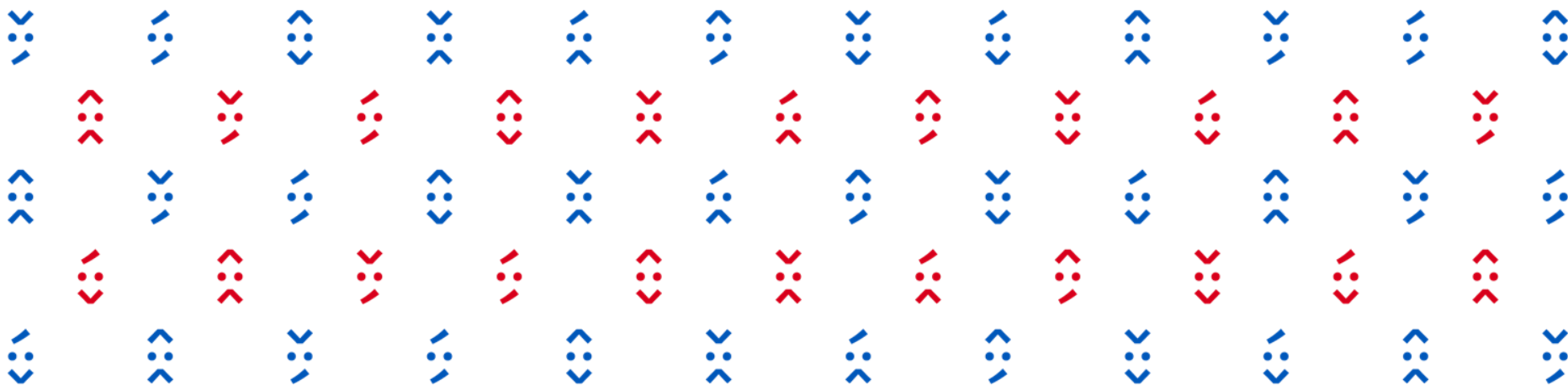




Slovak Presidency of the Council  
of the European Union



# WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT IN EUROPE VERSUS CIRCULAR ECONOMY

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SUSTAINABILITY OF MINERAL RESOURCES AND THE ENVIRONMENT

Bratislava, 21 – 22 November 2016



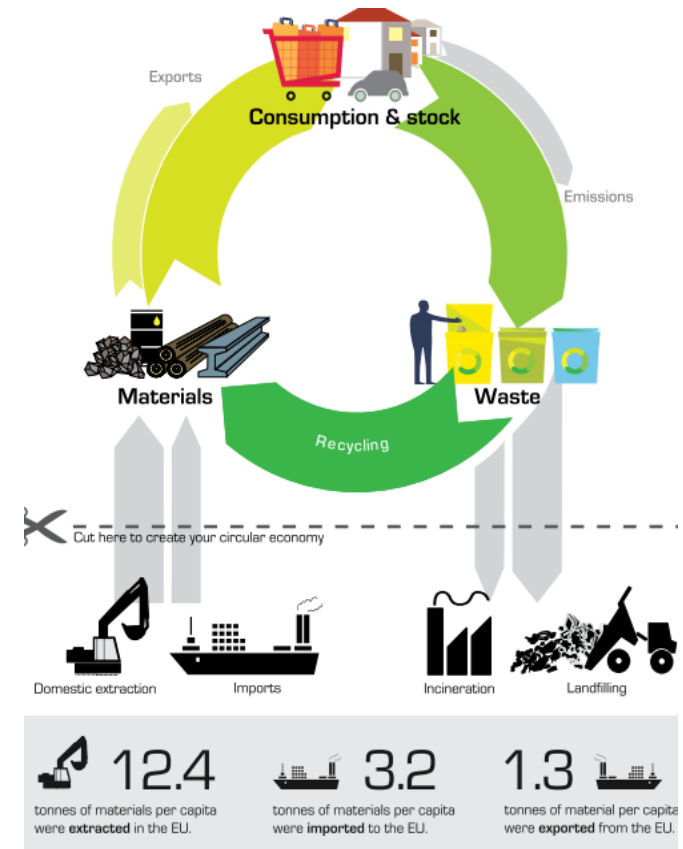
# Circular economy - recycling

## Europe:

- the world's largest net importer of resources.
- significant consumer of materials – 44 kg per day – 16 ton per year of which 6 ton waste.

## Recycling:

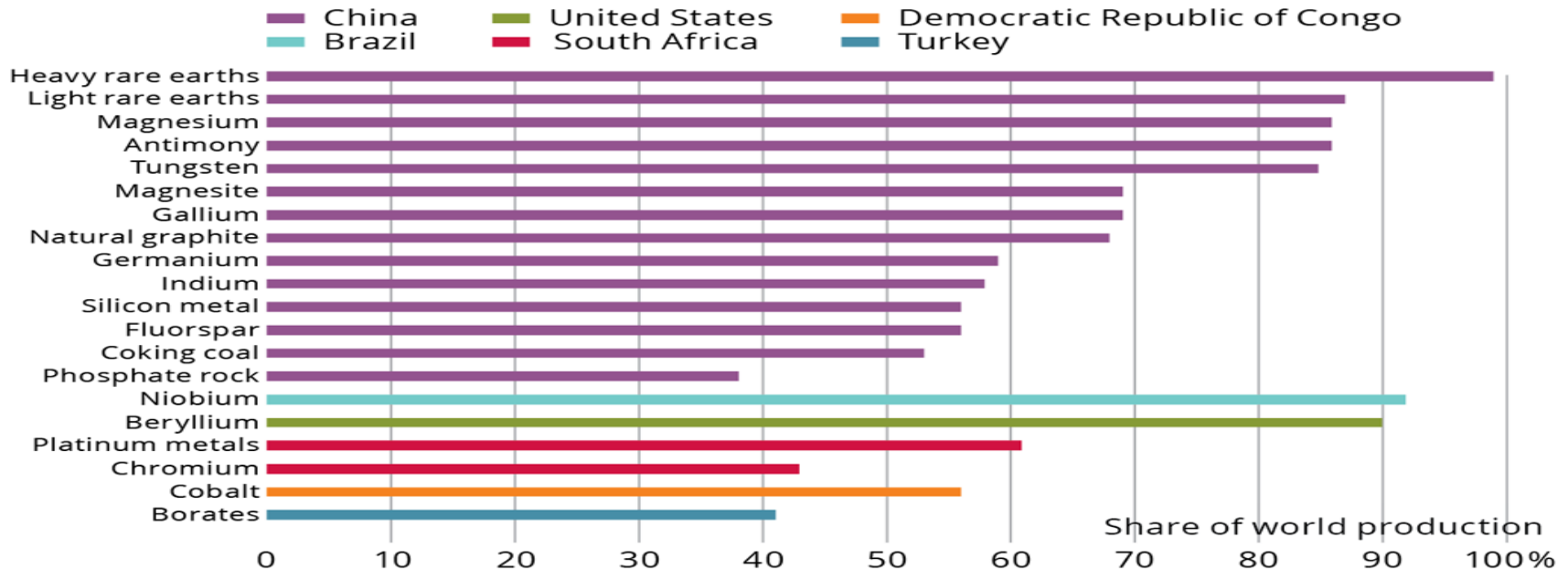
- moderates dependencies on natural resources,
- ensures sustainable access to potentially scarce metals.
- creates new jobs and income.



Source: Image developed by the Ellen MacArthur Foundation's graphic designer Graham Pritchard



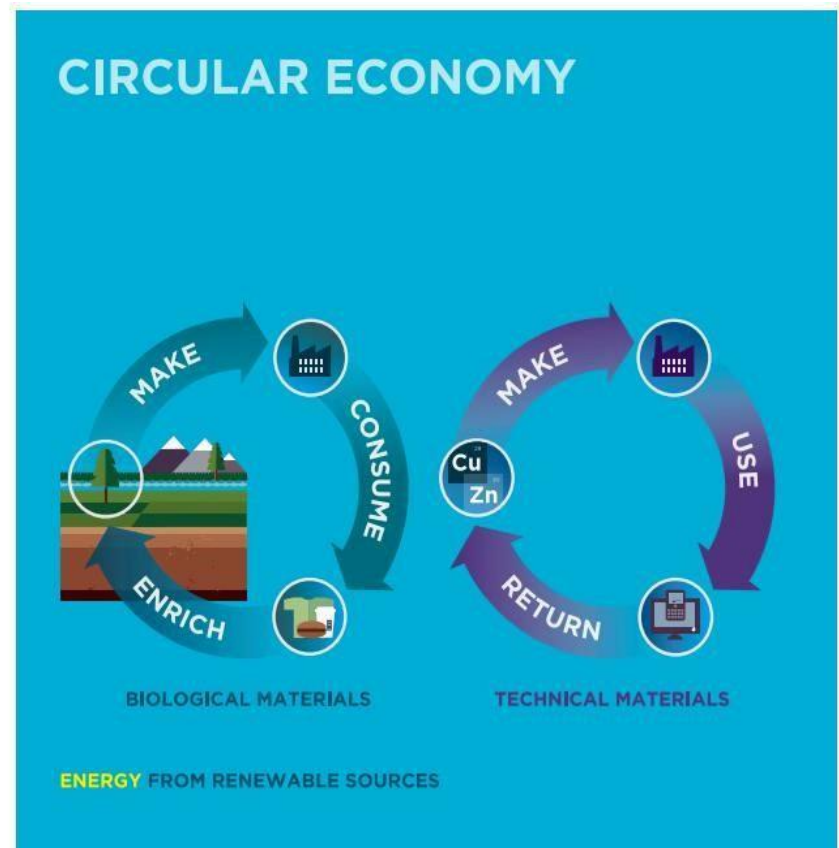
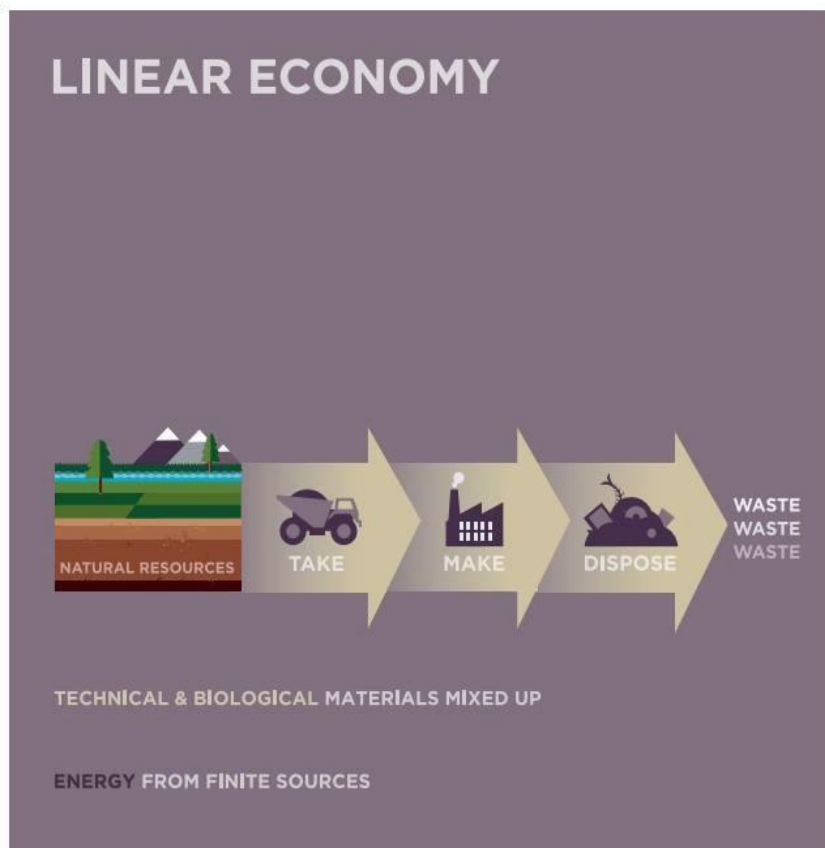
# Shared of world production of minerals



Source: European Commission 2014. The European Environment State and Outlook 2015; EEA

The sustainable production and use of primary and secondary raw materials continue to play a fundamental role in maintaining the economic sector activities and competitiveness of industry in EU.

# Linear versus circular economy



Source: Image developed by the Ellen MacArthur Foundation's graphic designer Graham Pritchard

# Poland – mineral policy

Poland is working now on integrated Raw Materials Policy, that could be interpreted as a long-term document that ensures access to the strategic national resources.

## Infrastructure

### Environment • Geology II

No. 212, April 20, 2015



Poland has no policy on raw materials.

A discussion over such a policy is only beginning now.

The Government's approach to the raw materials policy is full of legal confusion and chaos in decision making process.

Problems related to this policy are almost totally unnoticed in strategic documents.

**Focus: Poland**

## Strategy building

Poland must develop a comprehensive mineral strategy to help identify new resources

**Joanna Kulczycka and Elżbieta Pietrzyk-Sokulska**  
Special Correspondents

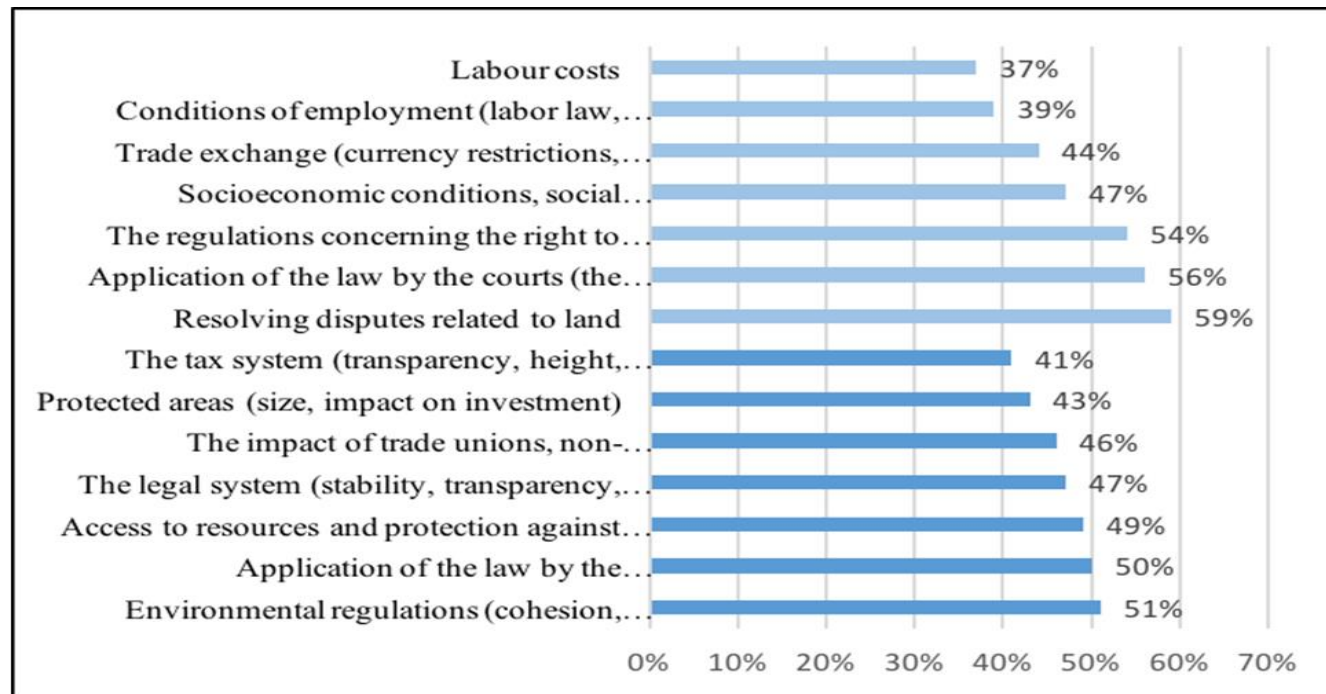
**P**oland is a major European producer of minerals such as copper, silver, lead, zinc, rare met-



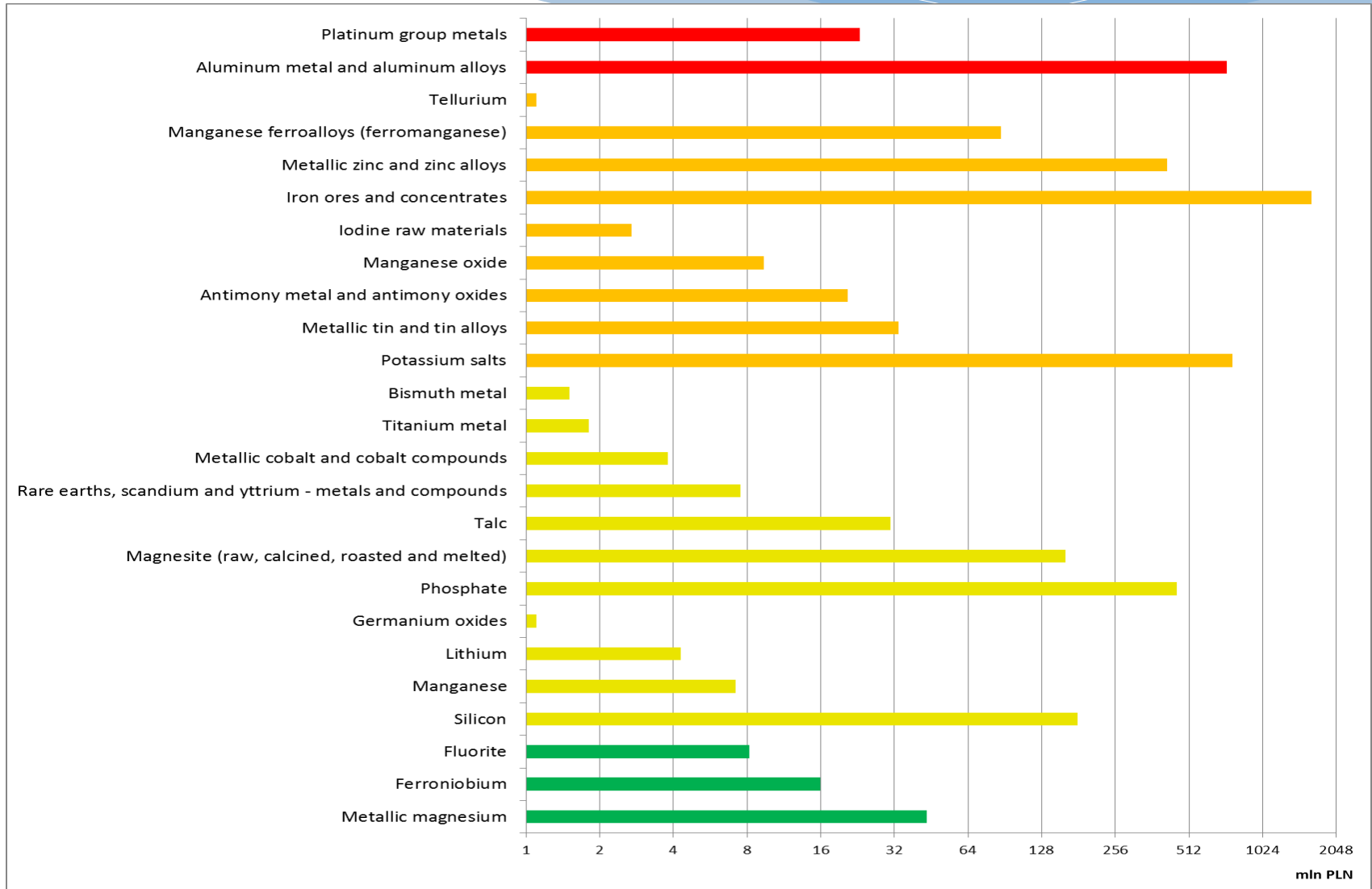


# Investment attractiveness - barriers

As the factor most unfavorable for investment respondents chose the environmental regulations including consistency, procedures, length (51%) and application of the law by the administration in this time-absorbing procedures and predictability of decisions (50%), access to resources, protecting area, current tax system.



# Key non-energy raw materials for Polish economy

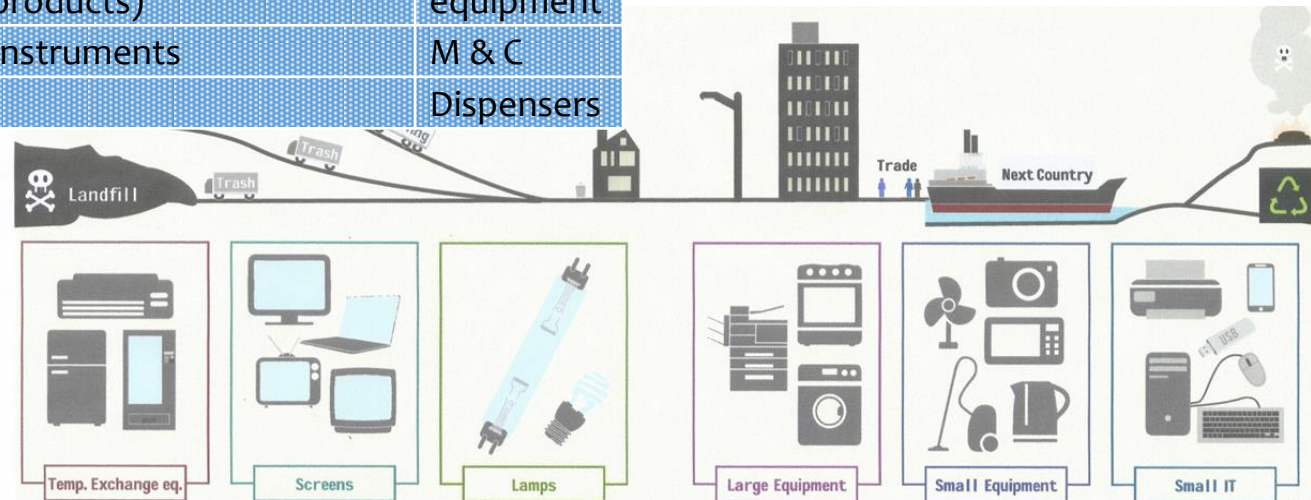




# Definitions of e-waste (WEEE)

E-waste categories according to the EU directive on WEEE:

Category	Label
Large household appliances	Large HH
Small household appliances	Small HH
IT and telecommunications equipment	ICT
Consumer equipment	CE
Lighting equipment	Lighting
Electrical and electronic tools (with the exceptions of large-scale stationary industrial tools)	E & E tools
Toys, leisure and sport equipment	Toys
Medical devices (with the exception of all implanted and infected products)	Medical equipment
Monitoring and control instruments	M & C
Automatic dispensers	Dispensers



after; Baldé, C.P., Wang, F., Kuehr, R., Huisman, J. (2015), The global e-waste monitor – 2014, United Nations University, IAS – SCYCLE, Bonn, Germany

Source; EP; Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE). Off. J. Eur. Union 2003, EP; Directive 2012/19/EU of the EP and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

# Report: THE GLOBAL e-WASTE MONITOR; 2014 Quantities, flows and resources.

## 1. Global e-waste: 41.8 million tonnes

- 1.15 million trucks
- 23,000 km long



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2. **60% are household items** such as fridges, washing machines - only 1/6 is recycled

## 3. Value of the material: € 48.5 billion

- 300 million tonnes of gold or 11% of annual production
- 2.2 million tonnes of dangerous lead components

## 4. e-waste per person:

Norway: 28.4kg/person,

France, Austria, Iceland Switzerland, Denmark, UK: 22-26kg/person,

Poland: 14 kg/person.

# WEEE management in EU and Poland

## EUROPE (EU):

- generated 11,6 Mt of which Germany -1.8 Mt, the UK -1.5 Mt, France - 1.4 Mt
- 17 kg/person of WEEE - 24 kg/person in 2020,
- 25% of the mass of WEEE produced is collected and processed – Sweden - 16 kg/person, UK - 8.2 kg/person, Austria - 6.5 kg/person
- In 2019 – in EU collect 85 % of generated e-waste.

## Poland:

- generate 0.52 Mt – 14 kg/person
- 4 kg/person recovered (150.000 tons per year).
- in 2021 it will be obliged to recover 11 kg/person

**e-waste is exported**



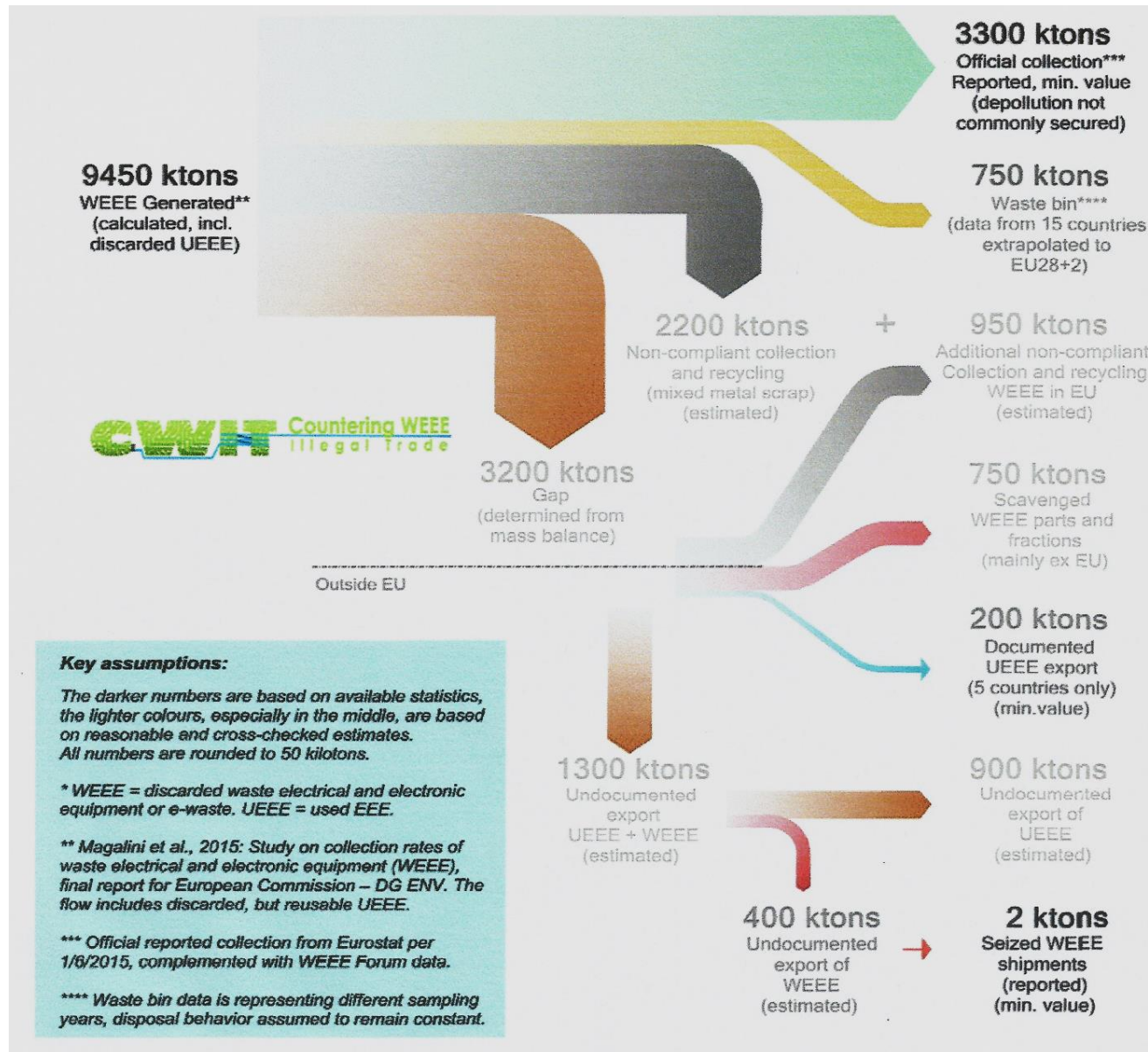
# Polish market for the recovery of WEEE

- The market for the recovery of WEEE is growing steadily, mainly due to the activity of SMEs
- However, dynamic growth will only occur after legal solutions compatible with Directive 2012/19/UE have been transposed into legal arrangements since this will result in better enforcement of regulations.





# The EU 2012 WEEE flows



# UK – report – EEE placed on market

Category	Household EEE (tonnes)	Non-Household EEE (tonnes)
Large Household Appliances	556 800,719	18 512,870
Small Household Appliances	172 002,047	6 736,977
IT and Telcomms Equipment	95 888,276	75 269,530
Consumer Equipment	55 919,620	6 871,188
Lighting Equipment	48,842	44 759,187
Electrical and Electronic Tools	74 247,616	30 255,856
Toys Leisure and Sports	46 760,778	8 788,018
Medical Devices	3 043,516	18 019,917
Monitoring and Control Instruments	9 897,735	69 546,352
Automatic Dispensers	31,478	13 135,250
Display Equipment	76 010,726	10 509,539
Cooling Appliances Containing Refrigerants	216 836,452	32 723,370
Gas Discharge Lamps and LED Light Sources	11 413,644	807,539
Photovoltaic Panels	114 324,472	2,640
Totals	1 433 225,921	335 938,233

# WEEE market in Poland in 2008-2014

<b>WEEE</b> <i>[kg per person]</i>	<b>2008</b>	<b>2009</b>	<b>2 010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Generated</b>	14.79	11.73	12.75	13.50	12.44	12,63	13,48
<b>Processed</b>	1.31	2.65	2.71	3.98	4.12	4,14	4,22
<b>Collected</b>	1.48	2.85	2.94	3.75	4.06	4,44	4,39
<b>Recovered</b>	0.02	0.04	0.01	0.02	0.03	0,02	0,03
<b>Recycled</b>	0.58	2.30	2.31	3.38	3.46	3,35	3,31
<b>Re-used</b>	0.00	0.02	0.01	0.02	0.02	0.03	0.02
<b>Polish population</b> [thd people]	38.13	38.20	38. 20	38.20	38.69	38.49	38.48



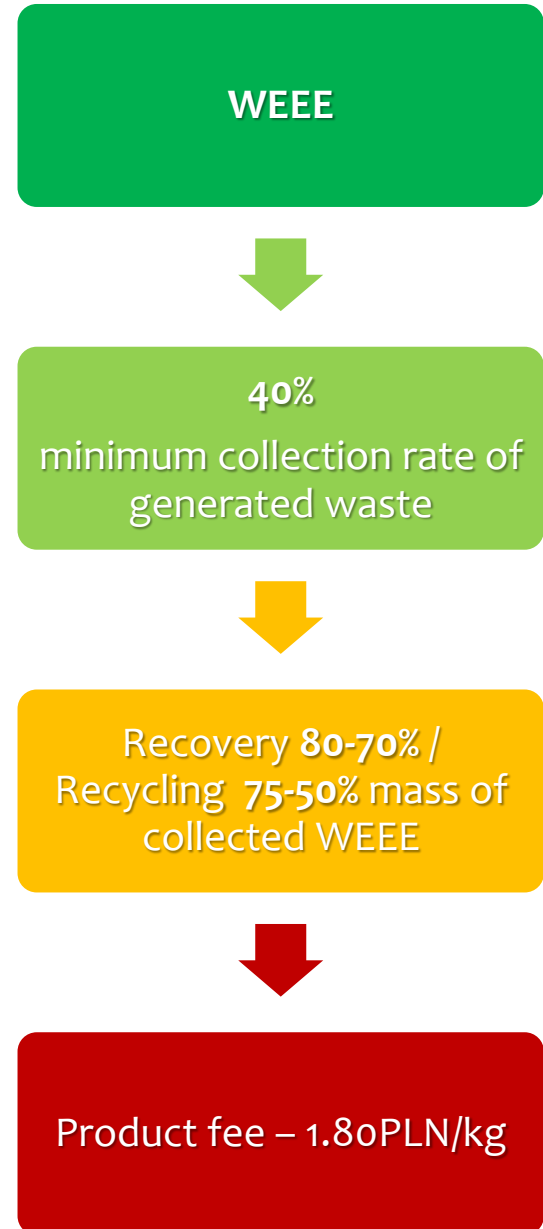
Source: Own study based on: Reports of the Chief Inspectorate for Environmental Protection (2006-2012). and Central Statistical Office (CSO) database.



# Economic and legal instruments

Extended Producer Responsibility system - making sure businesses that manufacture, import and sell these products are responsible for their end of life environmental impact.

- product fee for bodies introducing household equipment which must be paid in the case of failure to achieve an appropriate rate of collection (financial deposit),
- The obligation can be done by company themselves or by recycling organizations - document confirm the level of collection is required.



# Economic and legal instruments

- Enterprises are obliged to carry out educational campaigns for consumers – min. 0.1 % of the revenue from equipment introduced on the market.
- Shops are obliged to take WEEE from citizen (1:1) and large shops must take small WEEE.
- Landfill ban – fine for illegal disposal 5000 PLN (about 1 200 EUR).
- About 16 000 companies and organizations dealing with EEE.
- 9 Organization of Electronic Equipment Recovery (OEEER) - are responsible for fulfilling the collecting and recycling obligation on behalf of enterprises.

# The number and structure of the companies involved in the EEE trade in Poland

<i>Date</i>	<i>Entrepreneurs</i>					
	<i>Introduction of EEE</i>	<i>Recovery</i>	<i>Collection</i>	<i>Processing R12</i>	<i>Processing other R1-R9</i>	<i>Recycling R2-R9</i>
31.12.2012	5 160	9	11 494	172	13	110
24.02.2015	5 872	9	13 863	170	15	128

Source: Own study based on: Reports of the Chief Inspectorate for Environmental Protection (2012). and Register of companies and organizations recovery of electrical and electronic (Report 2016).



# Market of WEEE in Poland

- It can be distinguished three processes involved in the treatment of WEEE: R12 – processing in treatment facilities. recovery other than recycling (R1- R9), recycling (R2 - R9).
- The market for the recovery of WEEE is growing steadily. mainly due to the activity of SMEs.
- „Grey zone” – issuing false document – realisation of obligation for processing of 1 kg WEEE of was 0,90 PLN/kg in 2008, 0,07 PLN/kg in 2015.
- Total cost of collecting, transport and recycling – 0,97 PLN/kg (J. Okonska –Kubica, Cluster)
- Export ?



# Foreign trade of waste contained precious metals

<b>Direction of Import/Export</b>	<b>Import [kg]</b>			<b>Export [kg]</b>		
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Developing countries	0	0	16 377	52	0	1 596
Other developed countries	0	0	863	0	159	79
Central and East European Countries	0	0	509	0	0	0
European Union	809	4 464	26 074	591 915	746 190	772 964
<b>Total</b>	<b>809</b>	<b>4 464</b>	<b>43 823</b>	<b>591 967</b>	<b>746 349</b>	<b>307 770</b>

**CN code: 7112030. 91. 92. 99**

Source: Own study based on: CSO database.

# WEEE processing in Poland

## Technological aspects:

- manual disassembly
- mechanical methods: grinding and multi-separation of particulate materials.
- specialized technologies: processing dismantled components. pyrolysis.

## Environmental and social aspects:

- Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA).
- ISO 14001 Easy-Emas. LCA.

## Market aspects:

- SMEs high competitive market in collection stage. domestic and foreign market.





# Waste Management and Recycling Cluster

- Founded in 2011 by the companies from the WEEE sector. and covers the area 10 polish voivodships.
- Formed by companies, research - scientific units, business environment institutions, consulting firms and foundations.
- Cluster activities aims to increase competitiveness, efficiency use of resources and the exchange of knowledge. It gives the possibility of introducing innovative products to the market by companies belonging to the cluster.



Klaster Gospodarki  
Odpadowej i Recyklingu





# Conlusions

- The potential for increasing recovery and recycling of WEEE in Poland is significant.
- On Polish market there are mainly SMEs which process e-waste, but now they offer mainly semi-pocessed materials.
- There is growing domestic and global demand for products and services related to recycling.
- Active national and EU policies concerning recycling create significant opportunitites for development.
- Some companies have already started to cooperate, i.e. the Waste Management and Recycling Cluster – [www.klasterodpadowy.com](http://www.klasterodpadowy.com).
- The exisiting barriers are: price varaibility, legal changes and relatively (for SMEs) high cost of investment for introduction new innovative and environmental friendly technological solutions.



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**Thank you for attention!**

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