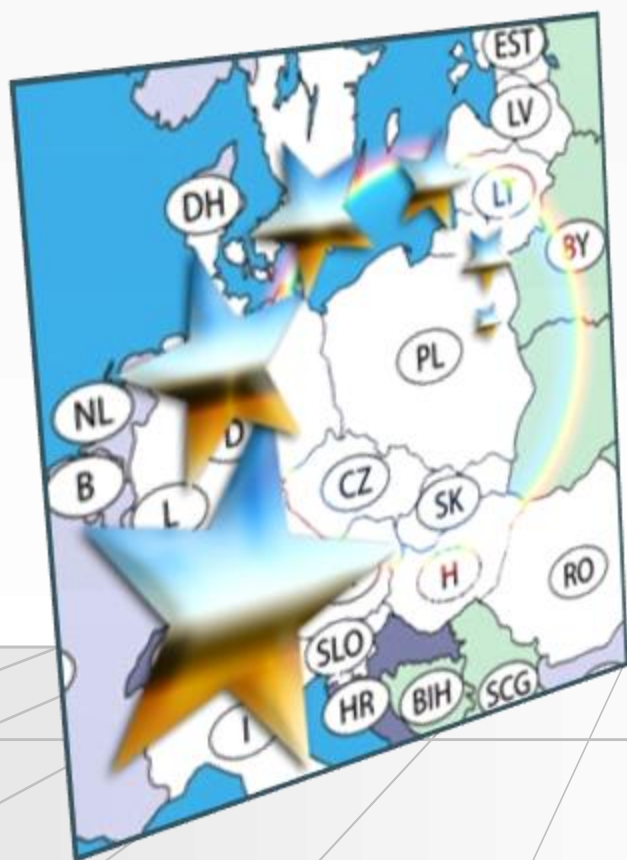




# INTERNSHIP REPORT 2010

## Prospects for investment on waste management in Poland



[Name of the author name]

Shirai Group Co.Ltd. 5-16-28 Iriya, Adachiku, Tokyo  
121-0836 Japan  
11/1/2010

## Table of Contents

Investment opportunities in Poland/CEE .....	3
Poland as one of CEE countries .....	3
Advantages of doing business in Poland: .....	3
Investment incentives in Poland: .....	5
European vs Japanese style of business .....	7
Waste management law in Poland .....	8
Raport about management of municipal waste in poland, .....	10
Current waste management situation in Poland .....	15
Waste per capita .....	16
Poland on EU waste management statistics .....	18
Production of biodiesel in the EU (Ml/yr) .....	28
Production of bioethanol in the UE (Ml/yr) .....	28
Renewable energy production in Europe and Central Asia 2004 (heat production and electricity generation) .....	30
Doing waste management business in .....	33
Example of a waste management company in Warsaw .....	37
Comparison of some waste management issues between Tokyo and Warsaw .....	41



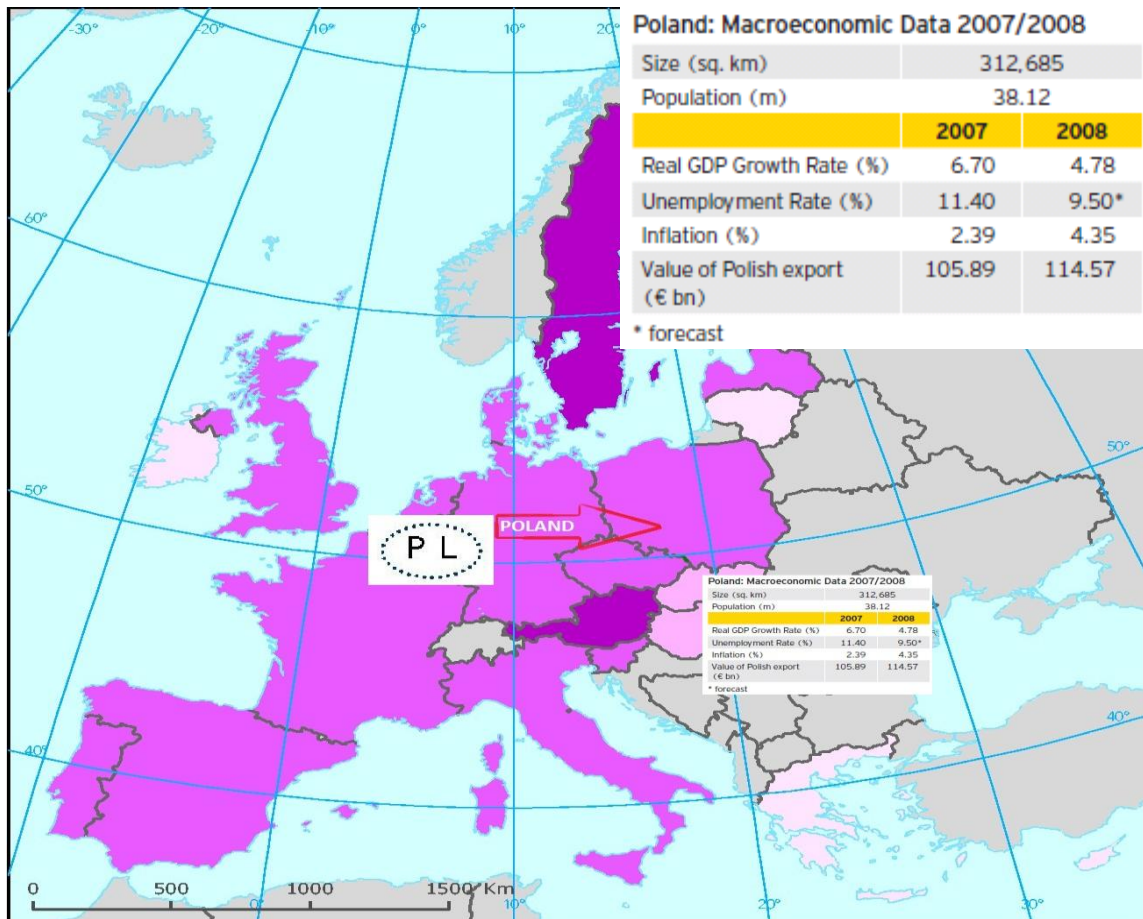
## Investment opportunities in Poland/CEE

Poland as one of CEE countries

**The political, economic, and cultural environments among CEE (Central and Eastern Europe) countries differ so the differences must be taken into consideration when multinational corporations do business there.**

Advantages of doing business in Poland:

1. **Access the market of EU**
2. **EU membership guarantees stability and dynamic development.**
3. **Investors from outside the EU can also benefit from Poland's accession to the EU by investing in Poland they get access not only to the Polish but also to the UE market while taking advantage of lower production costs than in the "old" EU countries**



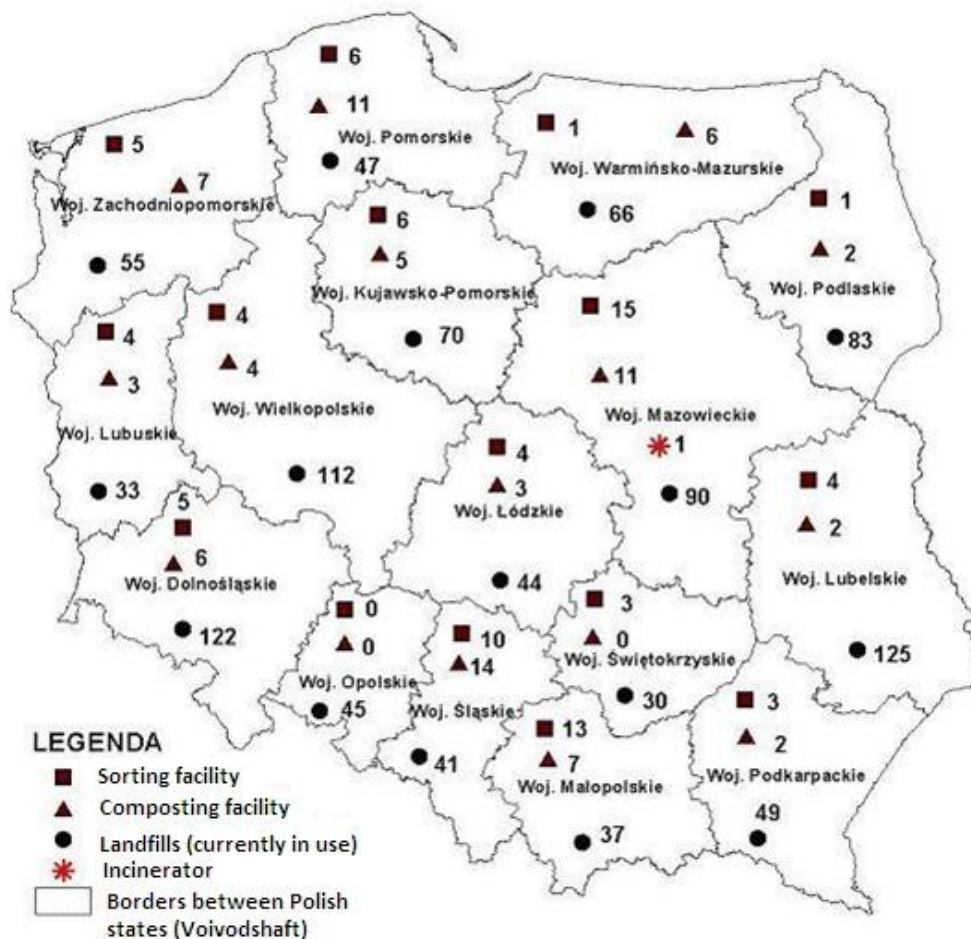
### Recent trends in municipal waste incineration with energy recovery, 2000–2005

% change    No incineration    Reduction  
 0–3    > 3    Outside data coverage



4. costs (incl. labour costs and costs of living) and the possibility of decreasing them. Costs of conducting business in Poland are lower than in Western European countries
5. size of the Polish market
6. human capital – availability of labour, qualified workforce
4. political and economic environment favorable to foreign investment; beneficial tax rates – Corporate Income Tax rate of 19% of taxable base, Personal Income Tax at 18% and 32% from 2009 on (decrease from 19%, 30% and 40%); low inflation rate; strong orientation towards joining the Euro zone.

Sorting facilities, composting facilities, incinerators and landfills in Poland, 2006.

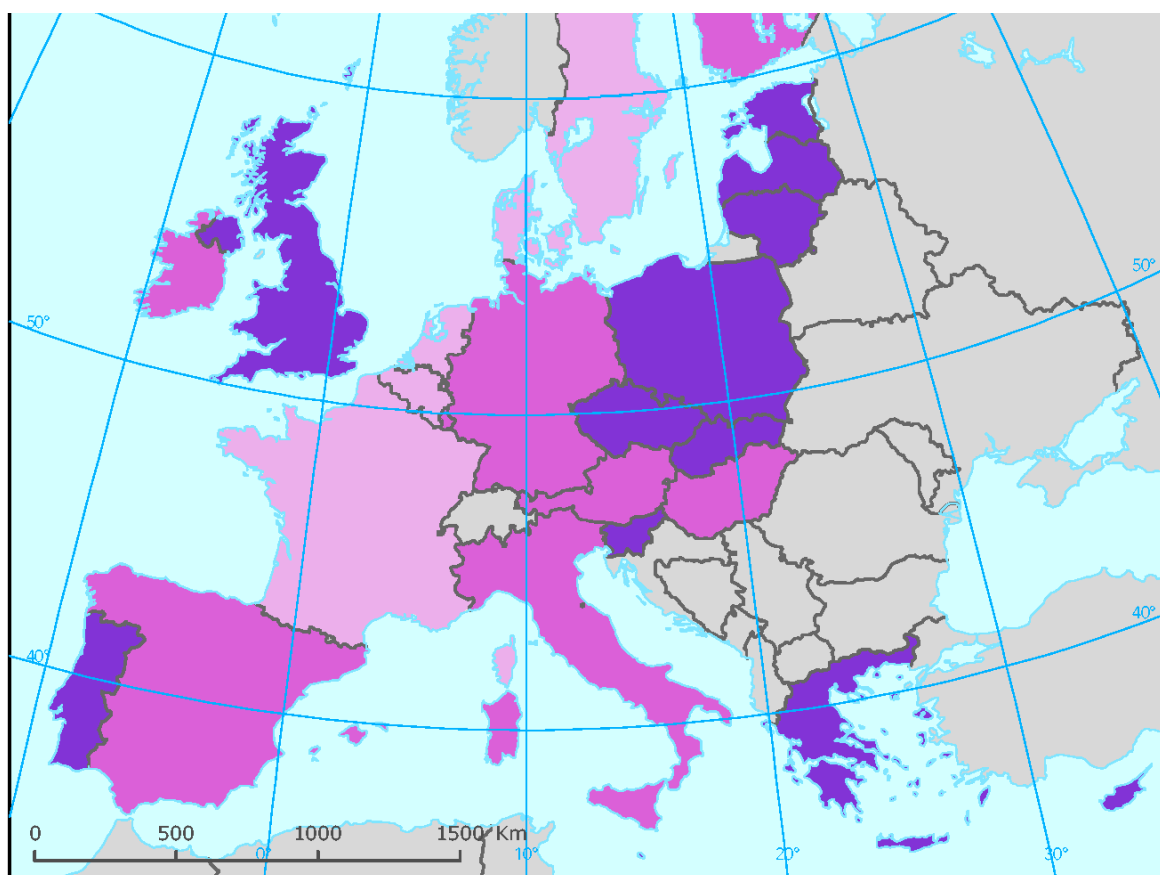


## Investment incentives in Poland:

The investment incentive system in Poland is compliant with the requirements of European Community law and consists of three main types of public aid: regional, horizontal and sectoral aid. The amount of public aid that may be awarded to an investment cannot exceed certain levels set separately for each category of state aid.

The biggest investors in Poland in 2008<sup>2</sup>

Investor	Country of origin	Business Activity
Advanced Diesel Particular Filters (Bosch + Denso)	Germany / Japan	Automotive
Cadbury	United Kingdom	Food
Jabil	United States	Electronic equipment
Lafarge	France	Construction

**Three country groupings defined by diversion strategy**

- 1: incineration > 25 % and material recovery > 25 %
- 2: incineration < 25 % and material recovery > 25 %
- 3: incineration < 25 % and material recovery < 25 %
- Outside data coverage





## Regional aid

Regional aid is aimed at supporting initial investments, which are generally defined as investments related to setting up a new enterprise, extension of an existing enterprise, diversification of the output into new, additional products or a fundamental change in the overall production process of an existing enterprise

One of the conditions which must be satisfied in order to benefit from this kind of aid is the maintenance of the investment and/or new jobs for a minimum of 5 years (in order to prevent relocation of companies after the aid has been granted).

## Aid intensity

Generally, the regional aid for initial investments can be awarded up to the maximum aid intensity, understood as a percentage of costs eligible for funding, e.g. investment or job creation costs.

## Methods of calculating available aids:

The amount of aid available for an investment project is generally based either on the costs of the investment or the costs of creating new jobs.

### Maximum aid intensity levels in Poland\*

Region	Aid Intensity
Voivodships: Lubelskie, Podkarpackie, Warmińsko-Mazurskie, Podlaskie, Świętokrzyskie, Opolskie, Małopolskie, Lubuskie, Łódzkie, Kujawsko-Pomorskie	50%
Voivodships: Pomorskie, Zachodniopomorskie, Dolnośląskie, Wielkopolskie, Śląskie	40%
Voivodship: Mazowieckie	40% until 31.12.2010 30% from 01.01.2011
Warsaw	30%

\* As a rule, the aid intensity levels are higher for Small (by 20 percentage points) and Medium Enterprises (by 10 percentage points). These bonuses, however, do not apply to aid awarded in the transport sector.



## European vs Japanese style of business

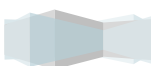
**Culture difference often underestimated, may sometimes cause big problem in setting up new business or new branch in other countries. Doing business in Europe or in Japan require some common understanding in order to avoid further misunderstanding and discouragement.**

**Japan**

- + the very concrete and stable long-term relationships that are a direct result of the conservative Japanese faithfulness and sense of loyalty to partners**
- + people are all extremely service-oriented and you probably know by now that service is the backbone of the Japanese business culture.**
- + Japanese business principles are being closely related to tradition.**
- + Type of place important for business meeting**
- + Alcohol is key for business social events**
- + Greetings and goodbyes are prolonged with many times repeated words and gestures**
- + Modest way for expression of oneself**
- + Gift giving after business meetings**
- + place more importance on the “human aspects of business”, on making an honest effort to develop long-lasting personal relationships with both the people of their own company and those of the companies they are cooperating with.**

**Europe**

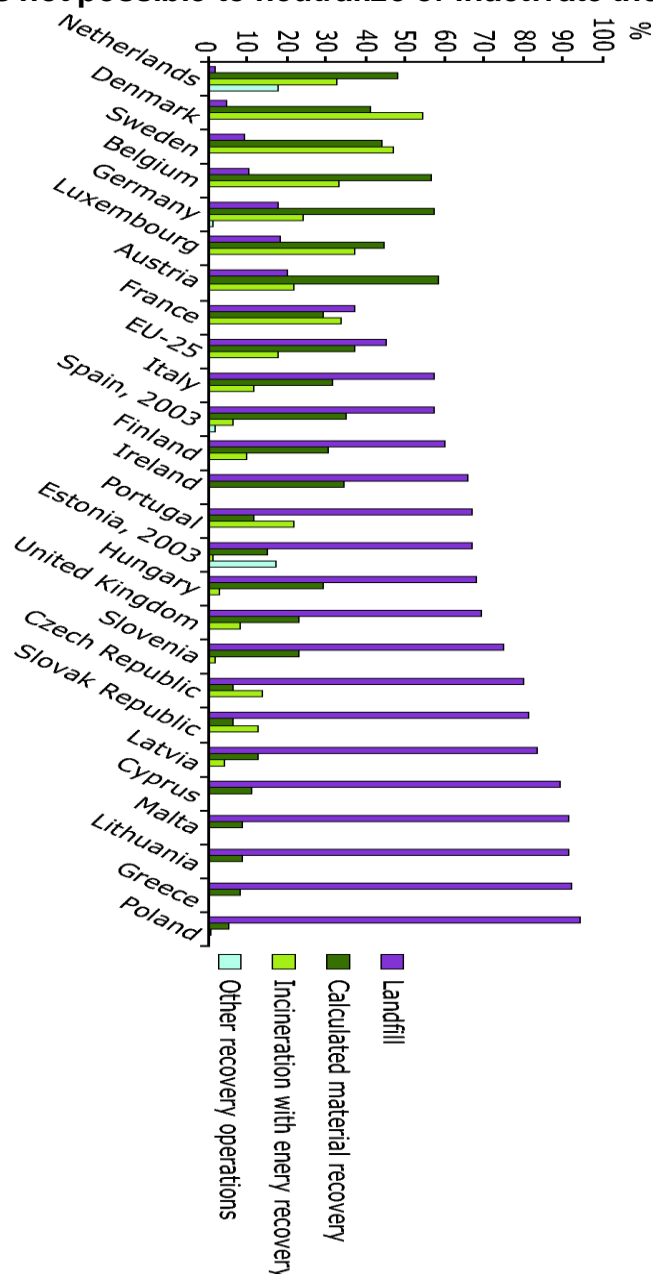
- + service is something that people are required to pay for. But, in Japan, service is just a part of the whole business, there is no need for tipping.**
- + Whichever place is good for business meeting**
- + In Europe business meetings do not combine social events after the formal meeting is finished, it is just formal meeting**
- + Greetings and ends of meetings are very short**
- + Open and brave way of expression of oneself**
- + No Gift giving after business meetings**
- + More focus is placed on a simple business transaction and instant profitability for both parties**



## Waste management law in Poland

Most important rules for investors:

1. Holder or producer of wastes is obligated to recycle/recover them or if it is not possible to neutralize or inactivate them.



2. Local government is obligated to ensure that all inhabitants have access to organized system of municipal waste collection. Their task is to ensure reducing of landfill of biodegradable waste, a release of hazardous wastes from municipal wastes, achievement of the recovery and recycling level of packaging waste.

3. To the local government belongs a task of initiating and facilitating of creation of collection points for electrical and electronic wastes or indicating the location in which such a waste can be disposed. Local government informs and educates the inhabitants about these actions and places.

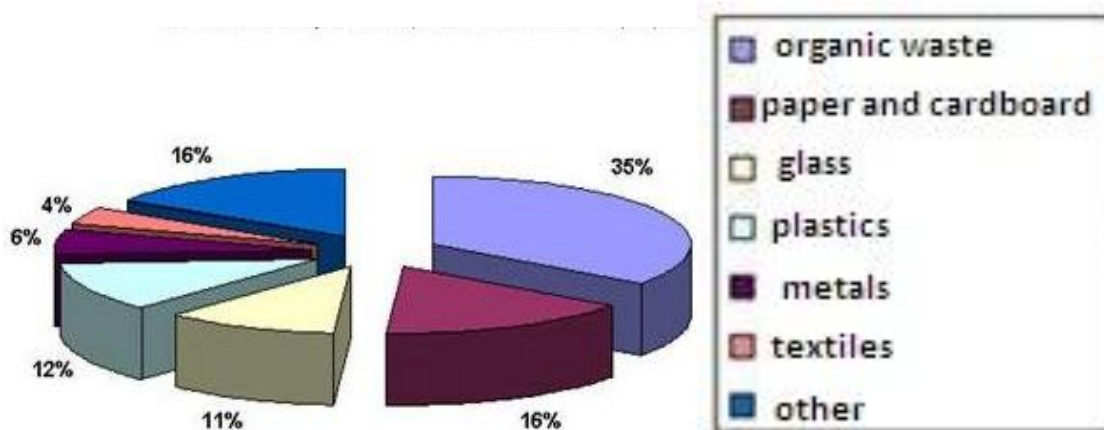
4. The mandatory task of Voivodshaft (state, prefecture) is to provide construction, maintenance

and operation of the plants for recovery and disposal of the hazardous wastes separated from municipal wastes.





5. If the producer of the wastes is not able to manage the wastes by himself, he is obligated to pass the obligation to the company which by transportation, recycling activities etc. is able to appropriately manage the wastes.
6. It is very important for producers of packaging goods to reach some levels of recycling or recovery of packaging wastes, if they do not reach the right level they need to pay "packaging product fee" to government.
7. Retailers of lead acid battery are required to adopt old battery from customer. The retailer is obliged to charge customer deposit if by selling new battery he did not receive the old used battery from customer.
8. Users of used electrical or electronic devices are obliged to lodge the use devices in right points for collection for such kind of wastes. It is forbidden to lodge such kind of waste together with other types of wastes.
9. Points for collection of electrical and electronic devices are required to conduct selective collection of wastes. They adopt the used devices from household without receiving any payment from the users. The points for collection pass the wastes to an organization of recovery of electrical and electronic wastes.
10. The organization of recovery of electrical and electronic wastes operates as public company formed by units/companies which introduce electrical and electronic devices into the market or their work union members so that realization of suitable norms and obligations indicated by waste management law is secured. Only units which form this organization can be her rightful stockholders.
11. It is very important for companies which introduce the electrical or electronic devices into the market to reach some levels of recovery of such used devices, if not, there will be put suitable "product fees" on them.
12. Local government employs non-governmental units in order to manage wastes from households.
13. The rule of "polluter pays".



The average composition of municipal waste in Poland

## Report about management of municipal waste in Poland,

Polish waste management is operating accordingly to EU law. Not only public but also private companies are involved in waste market. There are also joint-stock companies (private company connected with local governments) which achieved economical and ecological success. There is seen improvement of quality of waste collection, transportation, selection etc. since in the waste management market higher competitiveness among private companies is being observed. Within this more advanced equipment and solutions have been developed. The private companies as the first introduced into waste management market systems of selective collection of garbage, sorting facilities, installations for production of bio-fuels and modern landfills.

In 2005 private sector takes 56% of waste market and 75% in selective waste collection (thus 3 times more than public sector). It was public sector which ensured agreed upon treaty with EU levels for recovery and recycling of packaging wastes. Also private sector now a days is being involved in investment for elaboration of system for collection of electrical and electronical wastes and modern plants for recovery of such wastes.

Private associations and recovery organizations in 90% ensure every-year "turn away" to recycling of 1,5 million tons of wastes – what fulfills and even exceeds requirements of EU waste management law. Where in waste management service prices offered by private sector in Poland is 20 times cheaper (1 Euro/1person/year) than that average of old EU member countries. This follows from the principle of free competition and a lack of market monopolies in waste management.

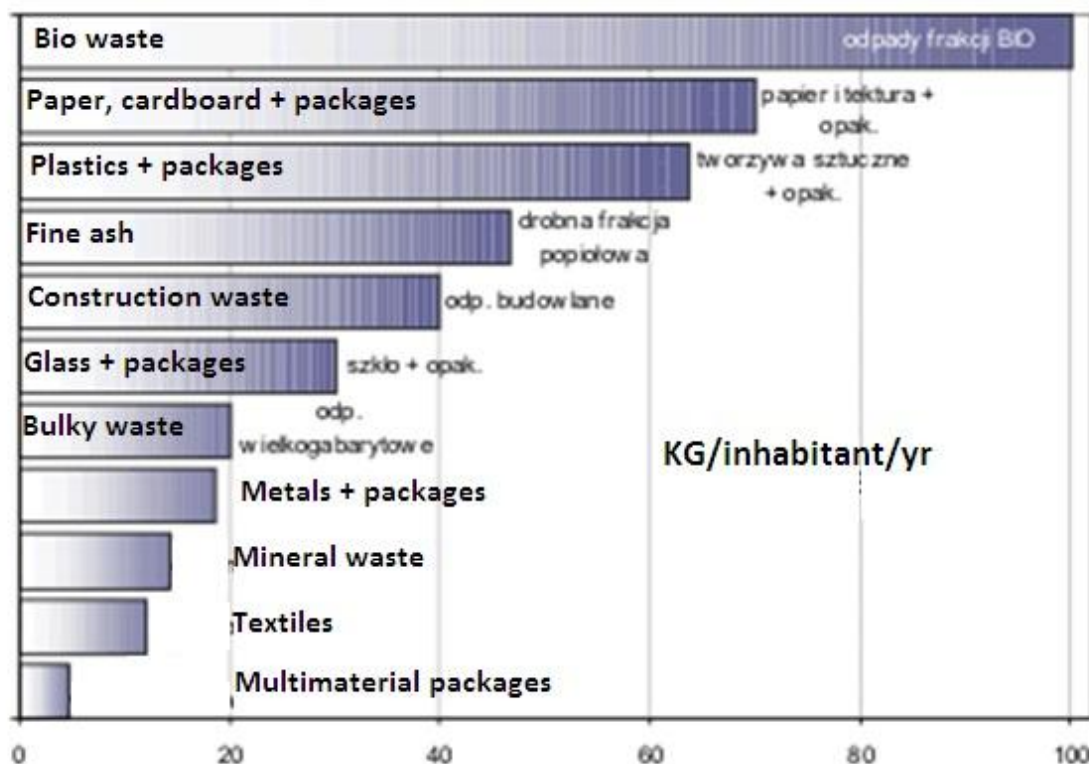
Assumptions about system of municipal waste management in Poland:

1. **Government through law and waste management plans defines the basic objectives, duties and tasks for local governments, entrepreneurs and producers of wastes. By means of economical instruments ("product fees", deposits, garbage disposing fee) the government stimulates development of recovery and recycling of wastes.**



2. Local government or local government unions organize local markets of waste management: they enact local plans for waste management, rules for keeping cleanliness and orderliness, requirements for companies involved in waste collection, give away permissions for entrepreneurs to work in the field of waste collection/reception, indicate places of recovery and disposal of wastes, determine the maximum rate of charge for residents for waste disposal.
3. Public companies, factories and local government unions compete in the market for municipal waste collection and based on civil law contract provide services to residents in the disposal of wastes from their properties (based on principles defined in the permits granted by municipality).
4. Municipality (local government) enforces inhabitants to contractual obligation (agreement between private company and inhabitant – waste disposer) on waste collection and controls waste management activities held by private companies.
5. Local governments and private entrepreneurs build plants for recovery and waste disposal/neutralization (sorting plants, incineration and landfill) and manage them.
6. Private sector ensures recycling of the waste.

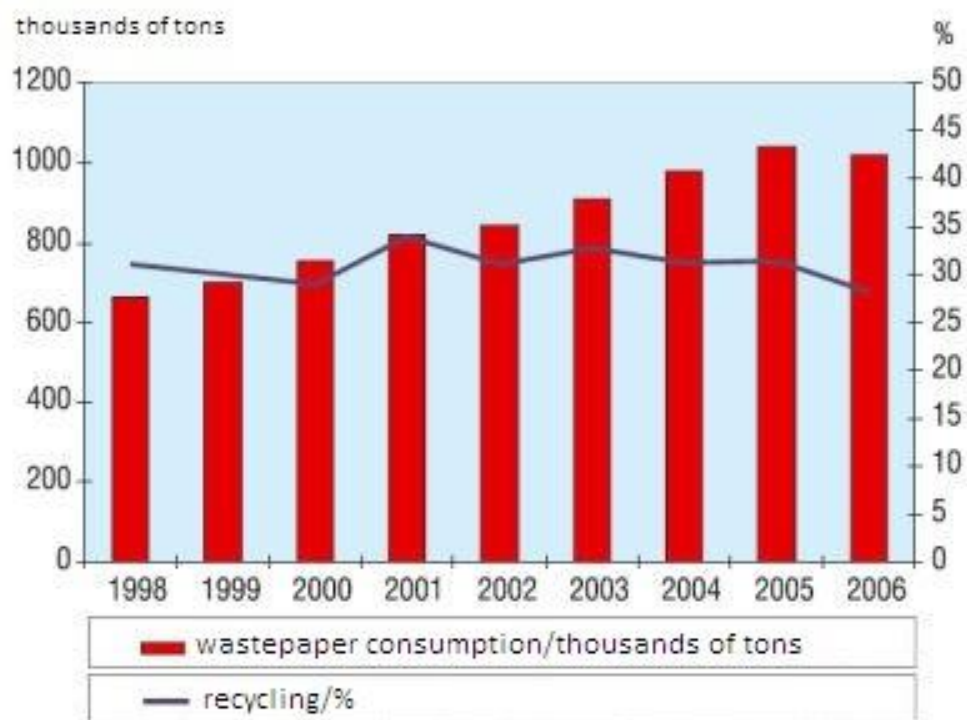
### Municipal waste stream in Poland



Problems in Polish waste management market:

1. **Polish waste management legislation is well developed and consistent with EU law, but the problem lies in poor introduction of the waste management law into the life and its execution. The municipalities fail in implementation of enacted rules for keeping cleanliness and orderliness and the requirements for entrepreneurs seeking authorization for the activities on waste collection.**
2. **Inappropriate use of financial instruments. Fee for disposing waste on landfills is so cheap that it is the best and most economic method to rid of the garbage. Thus selective collection of waste, recycling and recovery are not enough popular. Most people are just likely to choose landfills.**
3. **Poor involvement of local government in creating local government unions which would result in development of better waste management system and bigger investment on waste management utilities that would support small population area.**
4. **The most universal principle in small local governments is the lowest cost – the best option. That is why there are chosen very ‘poor quality’ companies to take care of waste management and many times disposal of the waste does not conform to ecological requirements (i.e. wild landfills).**

Wastepaper consumption and its recycling indicators in Poland in years: 1998-2006





5. Local landfills does not meet the technical standards (only 30% of legally operating landfills are equipped with a weight). That is why it is no possible to balance the quantities of wastes received and disposed on landfills, local governments' loose money for paying fees for waste disposal on landfills, loose for Government because of spending money on "environmental usage fee".
6. Keeping to dispose the wastes on intended to close local landfills which do not meet environmental standards ("nobody knows' called landfills).

Fot. 1. Pamphlet about sorting the garbages in Warsaw, part 1.

### NASZE OBOWIĄZKI DOTYCZĄCE SEGREGACJI ODPADÓW

- Odpady komunalne powstające na terenie nieruchomości **MUSZA** być zbierane selektywnie.
- Za selektywną zbiórkę odpadów komunalnych odpowiada właściciel nieruchomości (np. właściciel domu, wspólnota, spółdzielnia mieszkaniowa)
- Odpady surowcowe **MUSZA** być wyrzucane do specjalnie oznakowanych pojemników.

### CO I GDZIE WYRZUCAĆ:



**Niebieski**  
opakowania z papieru i tektury oraz papier i tekturę nieopakowaniowe



**Zielony**  
szkło kolorowe



**Biały**  
szkło bezbarwne



**Żółty**  
opakowania z metalu, plastiku oraz wielomateriałowe



**Czerwony**  
wszystkie odpady surowcowe (kontener zbiorczy)

**UWAGA!**  
Zabrania się wyrzucania odpadów niebezpiecznych do śmietników!

**Odpady niebezpieczne gromadzi się następująco:**

- Leki przeterminowane** – w punktach zlokalizowanych w aptekach
- Termometry rtęciowe** – w wyznaczonych aptekach można oddać farmaceutyce
- Zużyte baterie** – w wyznaczonych punktach zbiórki
- Zużyte akumulatory** – w placówkach handlowych oraz stacjach obsługi i naprawy pojazdów
- Inne odpady niebezpieczne** (m.in. RTV/AGD) – w specjalnych punktach zbiórki

**DODATKOWE INFORMACJE – BEZPŁATNA INFOLINIA CZYSTOŚĆ 0-800-800-117**

### Szanowni Mieszkańcy Warszawy,

od września 2006 roku obowiązuje na terenie naszego miasta „Regulamin utrzymania czystości i porządku na terenie m.st. Warszawy”. Jest on zgodny z obowiązującym w naszym kraju prawem. Jednym z podstawowych jego wymogów jest prowadzenie przez mieszkańców Stolicy selektywnej zbiórki odpadów surowcowych.

Warszawa jako stolica Rzeczypospolitej Polskiej i ważna europejska metropolia powinna dawać przykład innym miastom, jak dbać o czystość i być wzorem postaw proekologicznych. Jeszcze wiele musimy wspólnie uczynić, by tak się stało. Obecnie na terenie naszego miasta jest zbieranych selektywnie zaledwie 2% odpadów. To stanowczo za mało! Wspólnie z Państwem możemy ich zebrać aż 27%. Są to odpady opakowaniowe, które dzięki procesowi recyklingu mogą zostać ponownie wykorzystane, dzięki czemu ograniczymy zużycie surowców naturalnych, jak również energii.

Mieszkańcy bloków i kamienic powinni zgłosić chęć prowadzenia selektywnej zbiórki swojej administracji. To ona ma obowiązek ustawienia dla Państwa pojemników na surowce wtórne. Mieszkańcy domków jednorodzinnych powinni zawrzeć, z uprawnioną firmą, umowę lub aneks do umowy na odbieranie odpadów zbieranych selektywnie. Pamiętajmy, że za odpady zbierane selektywnie płacimy mniej, w związku z czym segregacja odpadów to oszczędność pieniędzy oraz pozytywne działanie na rzecz środowiska naturalnego.

Niniejsza broszura to praktyczny poradnik, który podpowie jak i gdzie segregować odpady surowcowe oraz jak dbać o ochronę środowiska w naszym mieście. W razie jakichkolwiek wątpliwości lub pytań prosimy o kontakt z bezpłatnym numerem infolinii **CZYSTOŚĆ: 0-800-800-117**.

Biuro Ochrony Środowiska  
Urząd m. st. Warszawy



### RACJONALNA GOSPODARKA ODPADAMI W WARSZAWIE

Biuro Ochrony Środowiska  
Urząd Miasta Stołecznego Warszawy

7. Local authorities do not fully control individual people if they have signed contracts upon disposal of waste with waste management company or not. This way statutory obligation for people to have such a contracts signed is not being observed and wild landfills arise.
8. Lack of appreciation of energy from waste incineration as renewable energy. The result of it is a less interest in investment in waste incineration facilities, thus reduced opportunities of achievement of EU production levels of energy from renewable resources.
9. Insufficient control by the relevant state services, low penalties for rule violations, non-application of sanctions for environmental crimes. The



**results: illegal disposal of wastes, disappointing levels of recycling and materials recovery, uncontrolled smuggling of waste from other EU countries.**

**Fot. 2. Pamphlet about sorting the garbages in Warsaw, part 2. From 2011 Polish government wants to start more strict system for sorting the wastes; Poland still is far away behind other EU countries in sorting and recycling of the wastes.**

**SEGREGACJA  
A NORMY  
UNII EUROPEJSKIEJ**



Musimy, pod groźbą surowych kar finansowych, zwiększyć ilość segregowanych odpadów surowcowych w Warszawie, tak aby na składowisko trafiało zdecydowanie mniej odpadów:

- w 2010 roku – **75%** (wagowo) całkowitej ilości odpadów komunalnych ulegających biodegradacji wytworzonych w 1995 roku,
- w 2013 roku – **50%** (wagowo) całkowitej ilości odpadów komunalnych ulegających biodegradacji wytworzonych w 1995 roku,
- w 2020 roku – **35%** (wagowo) całkowitej ilości odpadów komunalnych ulegających biodegradacji wytworzonych w 1995 roku.

**ODPADY BIODEGRADOWALNE**

papier i tektura, odpadki spożywcze, drewno, odpady zielone (np. trawa, liście, gałęzie)



**ZUŻYTY SPRZĘT  
ELEKTRYCZNY I ELEKTRONICZNY**

AGD/RTV, komputery, telefony, baterie, żarówki/świełtówki



**GDZIE MOŻNA BEZPŁATNIE  
ODDAĆ ZUŻYTY SPRZĘT**

Punkty zbiórki czynne w soboty w godzinach 10-16:

Bemowo	wzdłuż ul. Piastów Śląskich pomiędzy ul. Otawską i ul. Omarczka
Białogłowa	ul. Modlińska 197, obok U.S. Cywilnego
Bielany	ul. Wólczyńskiego (Parking Omentarza Północnego od ul. Pułkowej)
Mokotów	parking przy ul. Blacharskiej 1 róg Lotników 5
Ochota	przy ul. Korotyńskiego róg Grębskiej
Praga Północ	ul. Mińska róg ul. Stanisławowskiej 7
Praga Południe	wzdłuż ul. Szwedzkiej róg Stalowej 8
Rembertów	ul. Standańców 2 (wjazd od Chrusciela), obok AON 9
Śródmieście	ul. Mysiecka róg ul. Łazienkowskiej 10
Targówek	przy Urzędzie Dzielnicy ul. Kondratowicza 20, obok stacji TRAF 11
Ursus	przy Urzędzie Dzielnicy, Błoc Czerwca 1976 r. 1
Ursynów	obok ul. Gandhi przy kortach
Wawer	ul. Żeglarska 1, parking przy Urzędzie Dzielnicy
Wesoła	ul. 1. Praskiego Pułku 33 przy Urzędzie Dzielnicy
Wilanów	przy Urzędzie Dzielnicy róg ul. Stanisława Kostki Potockiego 11
Włochy	przy Urzędzie Dzielnicy róg ul. Podborskiej przy wjeździe na parking
Wola	złotka parkingowa przy ul. Działna/Smocza naprzeciw Dzielnej 13
Żoliborz	ul. Powązkowska przy Omentarzu Komunalnym - na pięci

"W tygodniu „elektrośmieci” można oddać w punktach prowadzonych przez firmy wywozowe. Szczegółowe informacje uzyskacie Państwo pod adresem:  
[www.bip.warszawa.pl/bos](http://www.bip.warszawa.pl/bos) lub pod numerem infolinii  
**CZYSTOŚĆ: 0-800-800-117**

**SPRZĘTU AGD/RTV NIE WOLNO  
WYRZUCAĆ DO ŚMİETNIKA!**

**ZBIERAJ OPAKOWANIA  
I MAKULATURĘ SELEKTYWNIE!**

Zebrań selektywnie odpady opakowaniowe można powtórnie przetworzyć, oszczędzając energię i surowce naturalne. Z odzyskanych poprzez recykling surowców wytwarza się ponownie szkło, metal, papier, a także granulaty PET, który służy m.in. do produkcji polarów, szczoteczek do zębów, włókien sztucznych, a nawet ropy.

- Wyprodukowanie 1 tony papieru wymaga ścięcia ok. 17 drzew
- Ponowne wykorzystanie szkła oszczędza surowce naturalne takie jak piasek i wapień, a także energię
- Ponowne wykorzystanie opakowań aluminiowych oszczędza surowiec naturalny – rudę aluminium, a także energię
- Plastikowe opakowania ulegają biodegradacji dopiero po 100-1000 lat

**ODPADY, KTÓRE MOŻEMY  
POWTÓRNIE WYKORZYSTAĆ**

butełki szklane, makulatura, karton, tektura, butelki plastikowe, kartony po sokach, puszki, inne odpady opakowaniowe



**10. Defect in the law on public-private partnership so there are difficulties in investment in modern waste management facilities. The result: local governments build by themselves their own facilities but it is too expensive, often the facilities are under- or oversized and poorly managed.**

## Conclusions

**The biggest drawback of Polish waste law and waste market is their instability and unpredictability what for many years effectively discourages private entrepreneurs to invest in this sector (i.e. changing law).**





## Current waste management situation in Poland

Today, 97% of municipal waste in Poland is stored in landfills without any pre-sorting. Although EU legislation is now in force in Poland, this is still the most popular means of waste disposal. Systematic approaches to waste management are lacking, and there are not enough waste recovery and recycling plants.

At present, the issues of standards of conduct and means of providing services are confined to small, local areas. Decisions about who transports waste are taken locally, which means that the KPGO (National Waste Management Plan) reference document is a dead letter - decision-making powers are not clearly defined, and are divided between provinces, districts and communes, i.e. between different administrative levels. It should be added here that municipal waste in Poland is not the responsibility of local authorities, and is subject to free competition.

Today, in the Warsaw urban area alone, 80 companies have obtained a permit for disposing of waste collected from households, resulting in very low standards of service. In Poland there is only one incineration plant. Some other are planned to be build in near future. Such installations could be financed from structural funds, but they encounter strong opposition from residents and ecological organizations.

In the Appendix to the National Waste Management Plan until 2010, adopted by a resolution of the Council of Ministers in December 2006, there is a list of authorized landfills for waste other than hazardous or inert waste, where municipal waste is stored. According to the government, as of 31 December 2005, this list includes 764 authorized municipal landfills; as of 16 October 2007, all these landfills should have an integrated permit according to the IPPC directive.

This is obligatory for all waste facilities, except those for inert waste, with a reception capacity of over 10 tons of waste per day, or with a total volume of over 2,000 tons. From information obtained from the Environmental Impact Assessment Department at the Polish Ministry of Environment, which issues integrated permits, it appears that out of about 500 facilities that should apply for a permit, only 260 submitted applications, and roughly 200 obtained the licence (i.e. integrated permit). Yes, 200. This means that, as of today, less than 30% of waste storage facilities in Poland meet European standards.

Poland probably has the highest potential for waste storage in Europe, but it is a pity that it so far from meeting European standards.

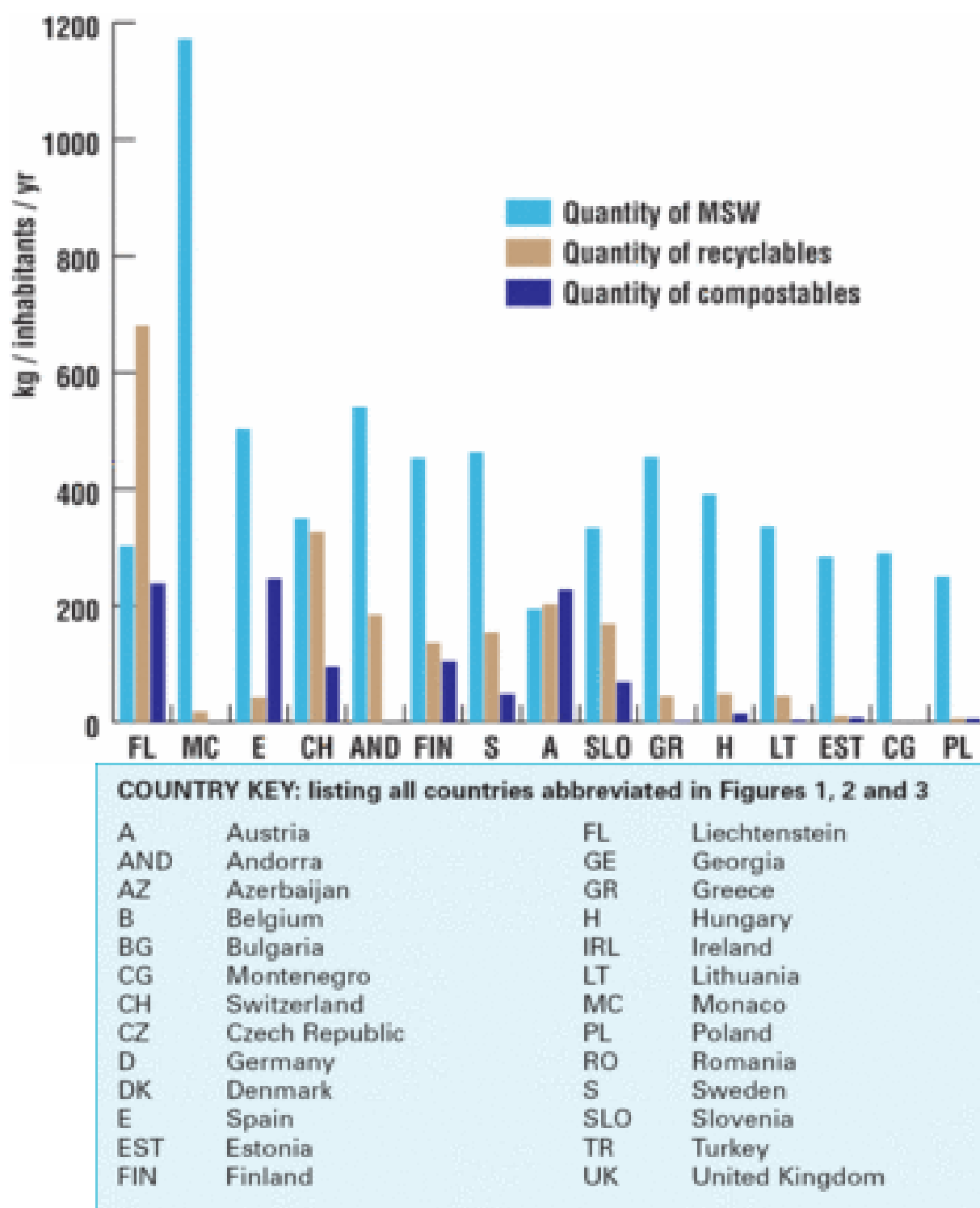


Innovative example of garbage container in Poland



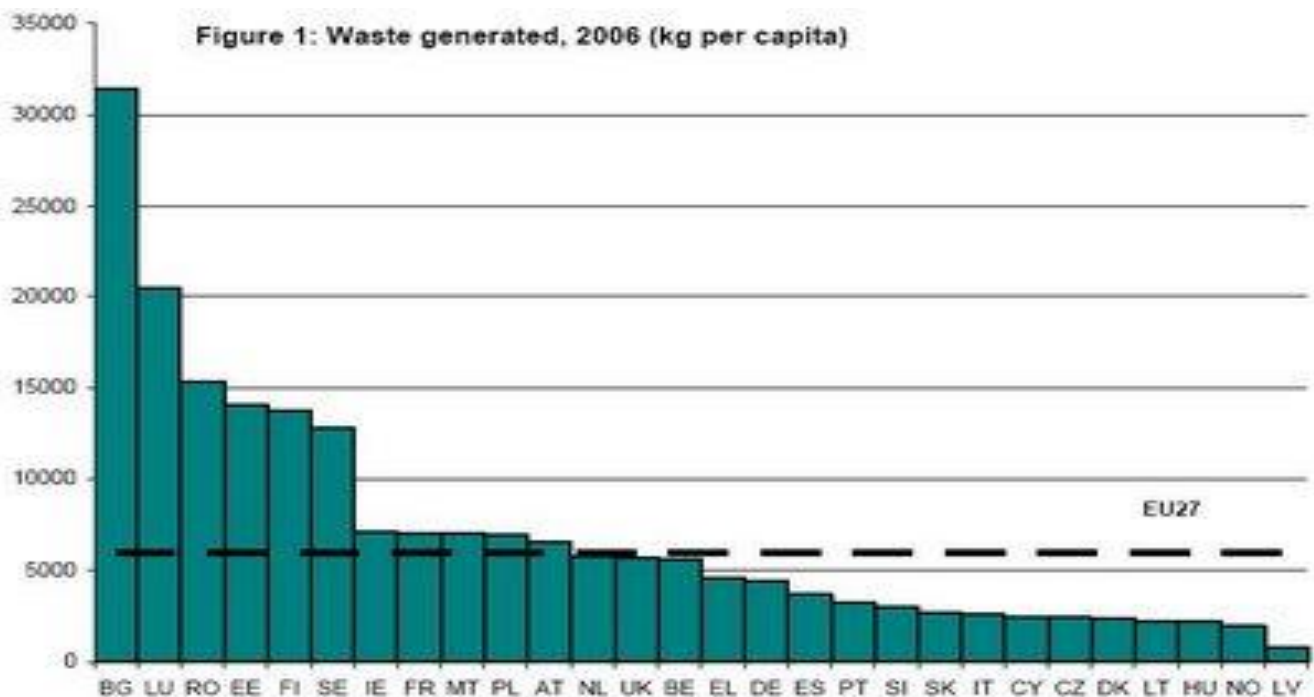
## Waste per capita

A graph below shows the quantities of MSW (Municipal Solid Waste) plus separately collected materials per capita for a selection of countries. It is evident from the remaining values that countries with long-established waste management systems show higher proportions of separately collected materials compared with the countries in the right-hand third of the graph.



## Generation and treatment of waste

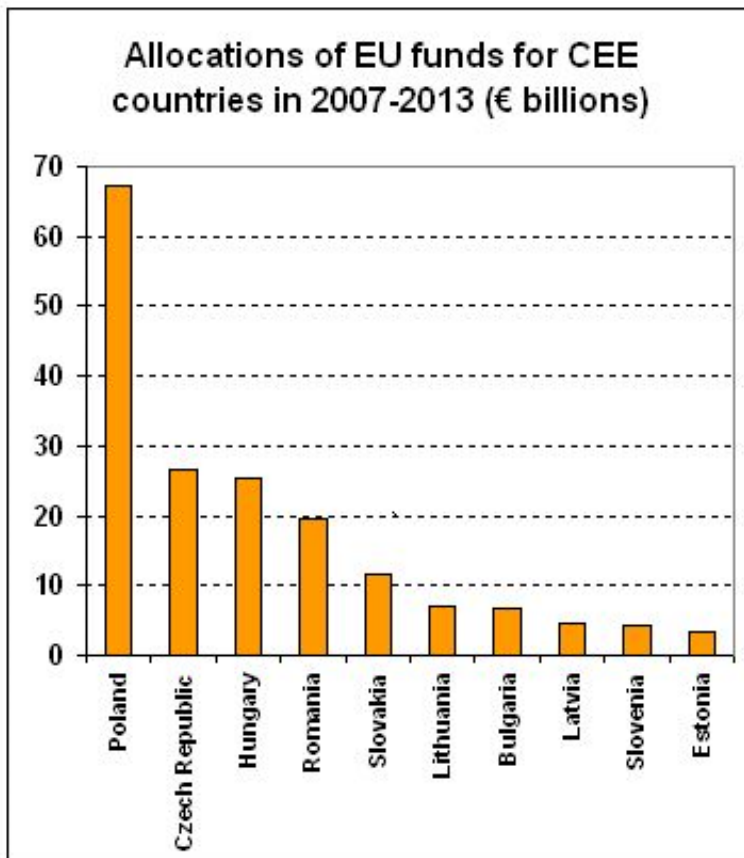
Households and businesses in the European Union (EU27) produced over six tonnes of waste per person in 2006; over 400 kg was household waste. More than half of the waste generated by businesses was produced by industry and construction. Mining produced more than half of the waste generated by the industrial sector. Mining, and as a consequence mining waste, is unevenly spread over the countries. Around 3% of waste generated in EU27 was hazardous, meaning harmful for health or the environment. The main treatment types were disposal and recovery; incineration is important for the treatment of household waste.



*Aura – Polish proecological magazine.*



## Poland on EU waste management statistics



The European Union is injecting billions of euros into the development of the countries of Central and Eastern Europe via the structural and cohesion funds as well as the European Investment Bank. Waste management business units also can apply for that fund although amount of money appointed to this field is very small. The financial aid aimed at reuniting Europe and healing its Cold War divisions is necessary and laudable. Yet there is an unfortunate downside: as this map starkly illustrates, much of the development driven by EU money is reckless, destructive and ineffective. The potential of EU finance to deliver

benefits is being unnecessarily undermined.

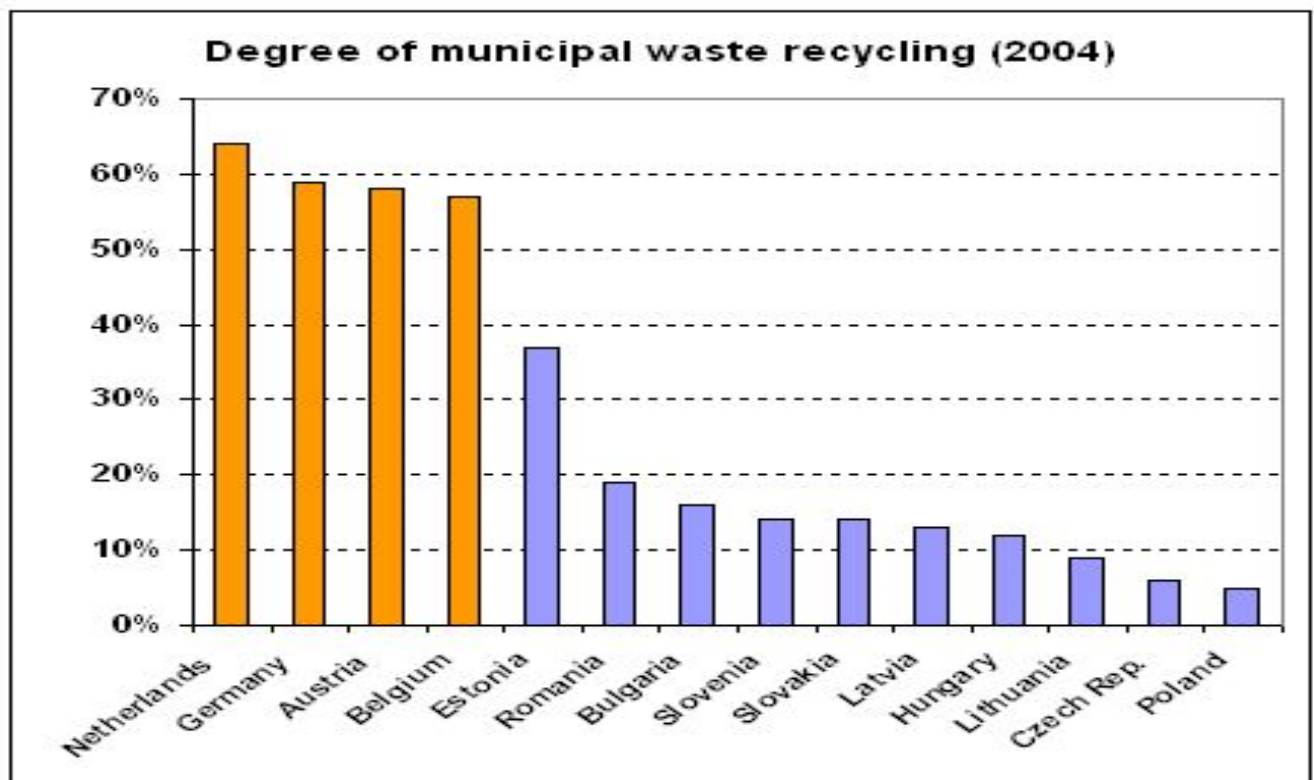


New container in the centre of Warsaw, 2010

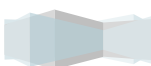


## Waste

EU funds are an opportunity to improve recycling services... The average CEE household still produces much less waste than one in Western Europe. At the same time, most CEE countries recycle only 10% or less of their municipal waste, compared with more than 50% in Germany or the Netherlands. The priority for CEE countries in the upcoming years should be to prevent increases in waste volumes, while rapidly increasing recycling. With a focused effort and investment of EU funds, the new member states could develop into recycling societies within a decade. ...but incineration companies are eyeing the money EU waste policy explicitly promotes prevention and recycling of waste over



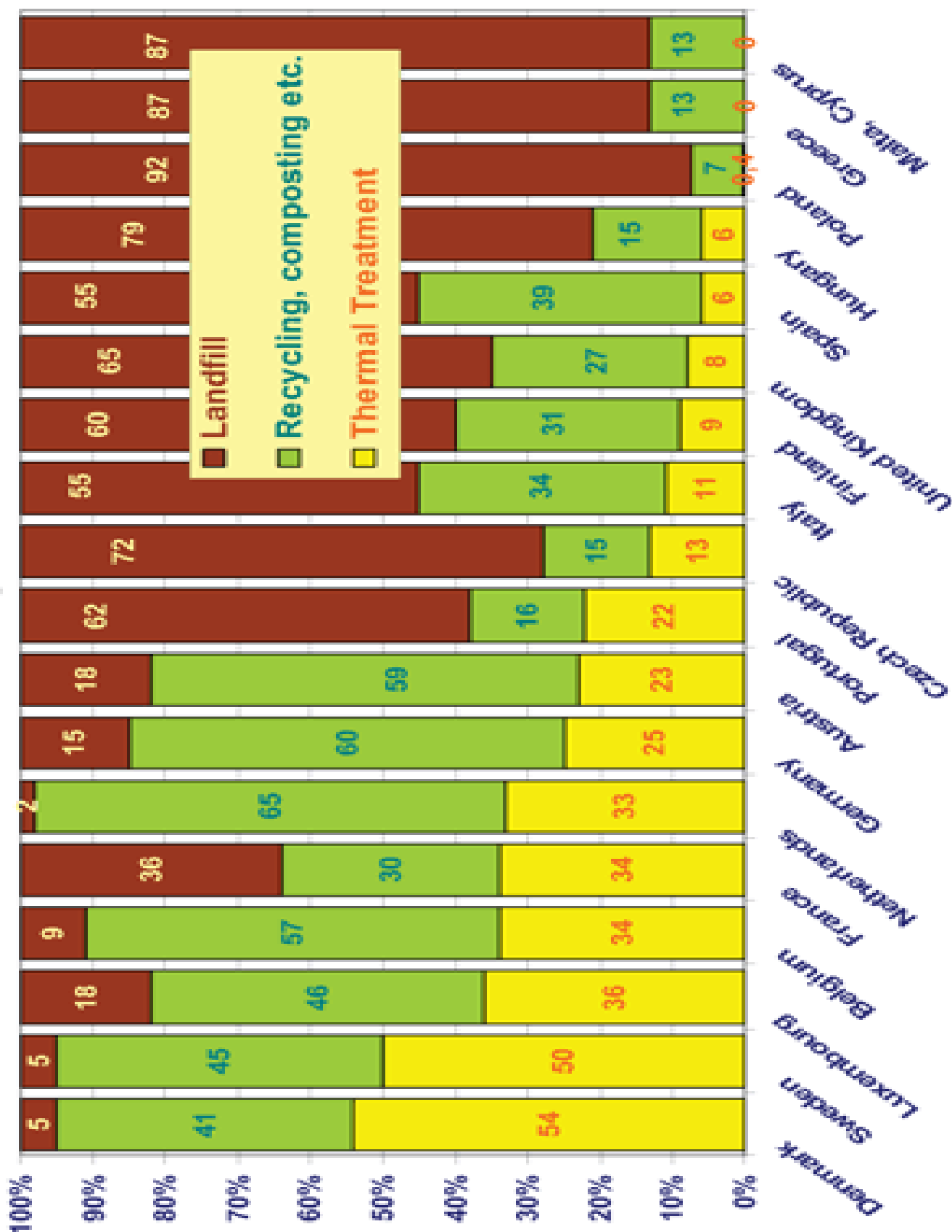
incineration and landfilling. However, there are pressures to instead divert much of the EU money into promoting waste incineration, which would perpetuate an unsustainable and uneconomic approach to waste for many years to come. In Poland, for example, there is a plan to spend EU funds on nine large municipal waste incinerators at a cost of over €1bn in the 2007-2013 period – this would consume most of Poland's Cohesion Fund money for waste management. The EU should prevent such misguided investment.



## Treatment of municipal waste in Europe for 2005

## Treatment of Municipal Waste in Europe - 2005 (in %)

Data source : Eurostat - diagram : CEWEP + SNIDE





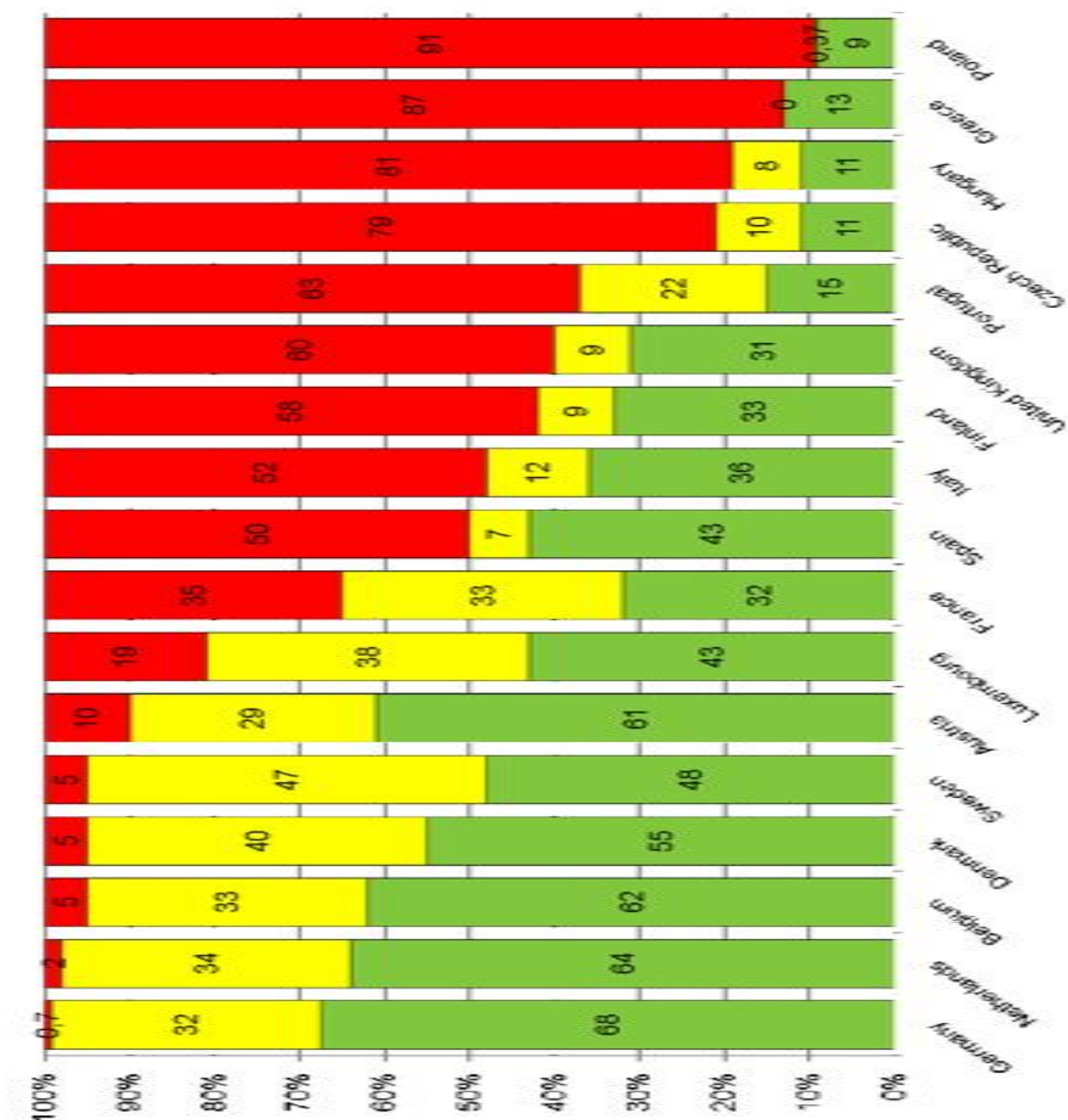
## Treatment of Household Waste in the EU27 in 2007

green = recycling

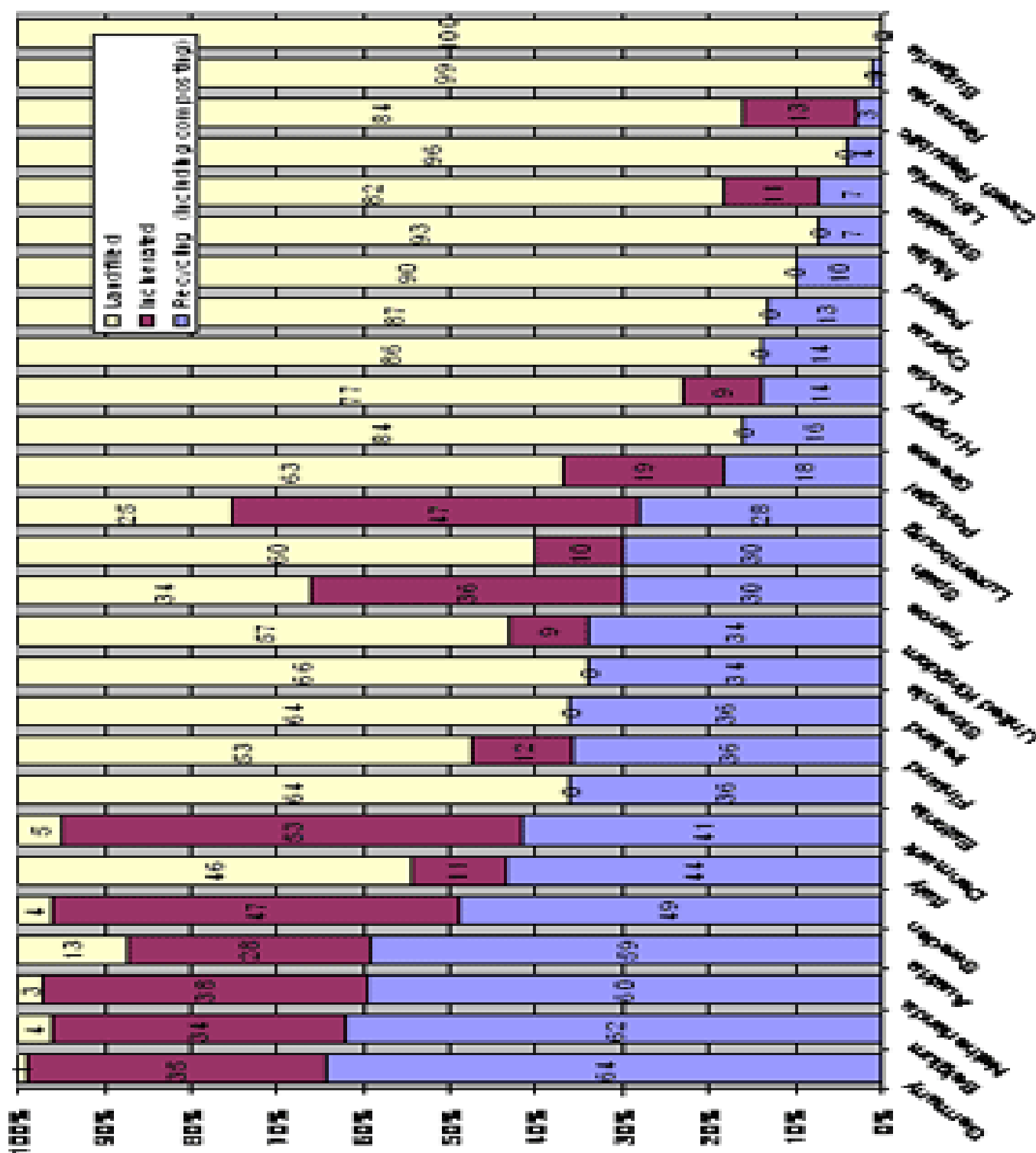
yellow = EfW (energy from wastes)

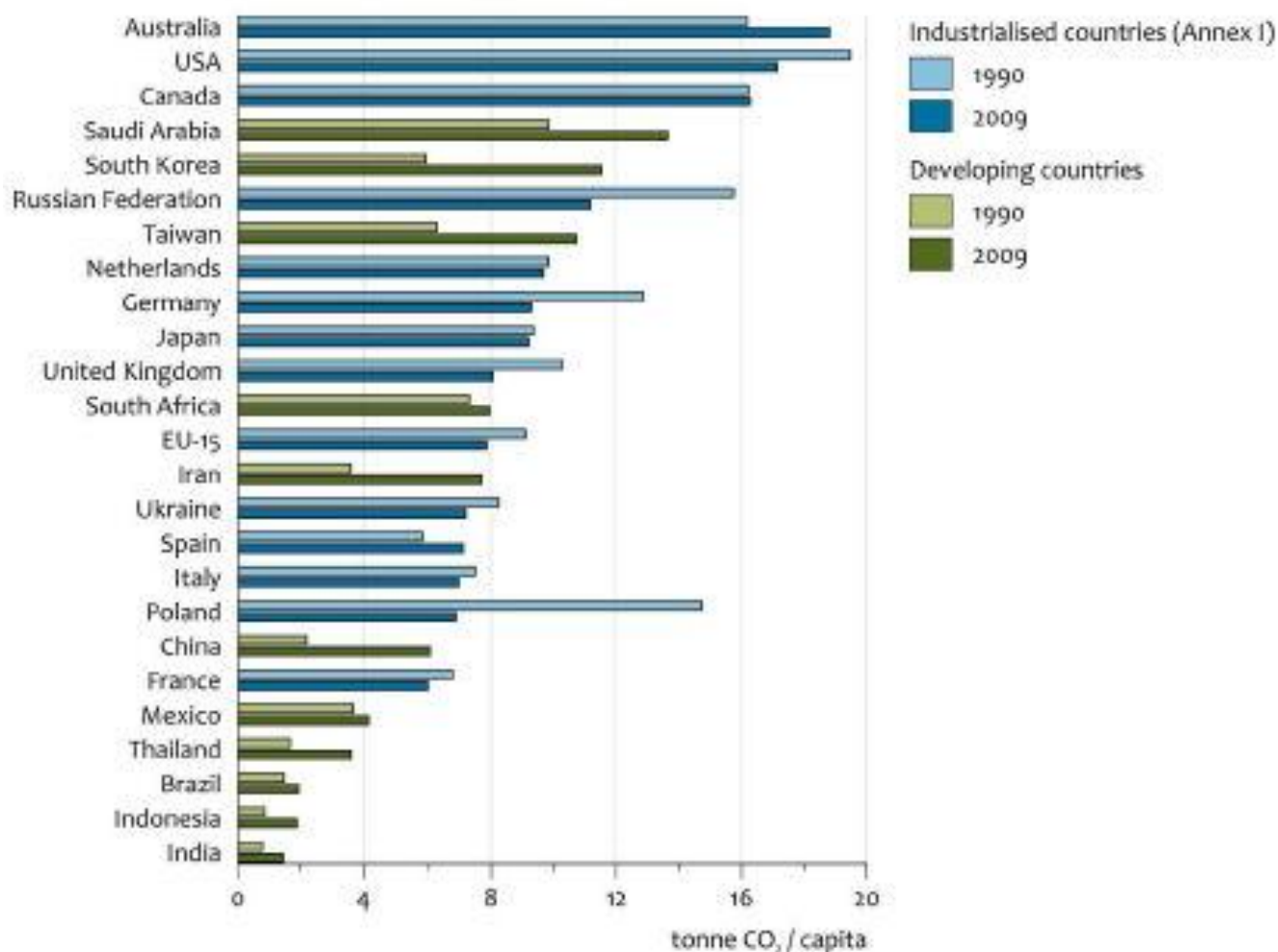
red = landfilling

Source: Eurostat = provides EU statistical data



## Recycling and Thermal Treatment Rates in the EU (Eurostat, 2009)



CO<sub>2</sub> emissions per capita

According to a study by Eurostat – the statistical office of the European Union – 524 kg of municipal waste was generated per person in 2008 across the EU27 countries. This figure was similar to the 2007 figure of 525 kg per person.

When looking at how this waste was dealt with the figures show that 40% was landfilled, 20% incinerated, 23% recycled and 17% composted.

The amount generated per person varies greatly across the different countries in the EU, from 306 kg in the Czech Republic to 802 kg in Denmark. This reflects the different consumption patterns and the ways each country calculates their totals. Some, for instance, include waste from small businesses and public institutions.

Austria, Germany and the Netherlands recycled or composted between 60 and 70% of their municipal waste, but in ten Member States recycling and composting was used to treat less than 10% of the waste.

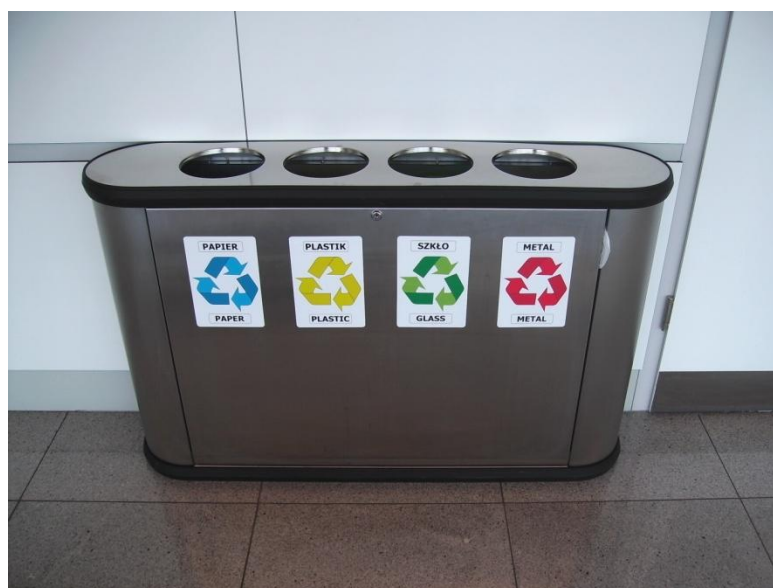


**Member States with the highest rates of landfill were Bulgaria (100%), Romania (98%), Malta (97%), Lithuania (96%) and Latvia (93%).**

Totals for countries:	
More than 700kg per person	Denmark, Ireland, Cyprus and Luxembourg.
600-700 kg	Malta, the Netherlands and Austria.
500-600 kg	Germany, Estonia, Spain, France, Italy, Finland, Sweden and the United Kingdom
400-500 kg	Belgium, Bulgaria, Greece, Lithuania, Hungary, Portugal and Slovenia
Below 400kg	Czech Republic, Latvia, Poland, Romania and Slovakia

**The highest numbers for incineration were Denmark (54%), Sweden (49%), the Netherlands (39%), Belgium and Luxemburg (36%), Germany (35%) and France (32%). Ten countries have rates of less than 1% incineration.**

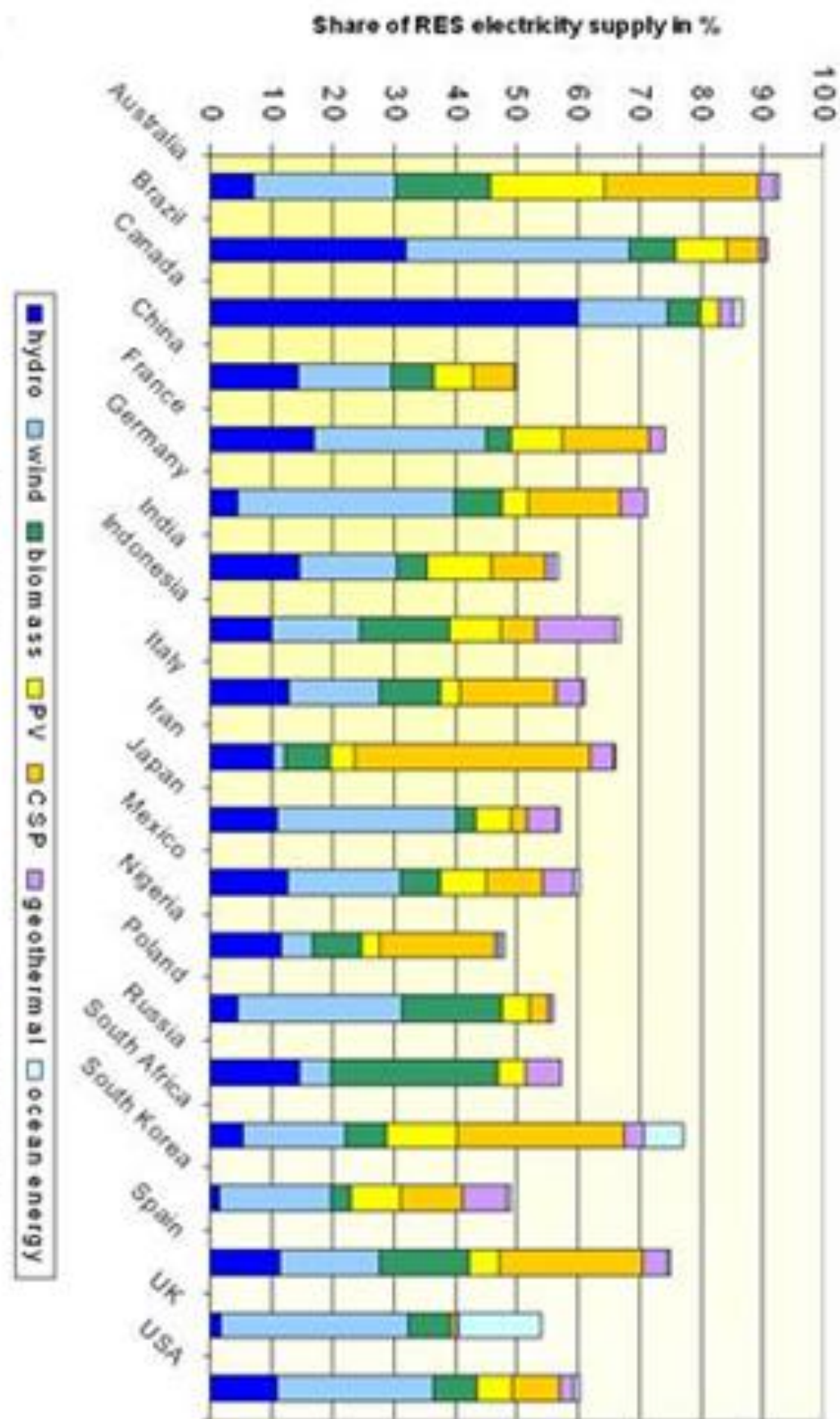
**The importance of these two treatment categories varies considerably between Member States. The Member States with the highest recycling rates for municipal waste were Germany (48% of waste treated), Belgium and Sweden (both 35%), Ireland and the Netherlands (both 32%) and Slovenia (31%). Composting of municipal waste was most common in Austria (40%), Italy (34%), the Netherlands (27%), Belgium (25%), Spain and Luxembourg (both 20%).**



Small trash containers on the airport in Warsaw. Each of bags for different types of garbage has its own colour.



## Renewable Energy Market Share by 2050





**WEEE collection Rate, kg per capita**

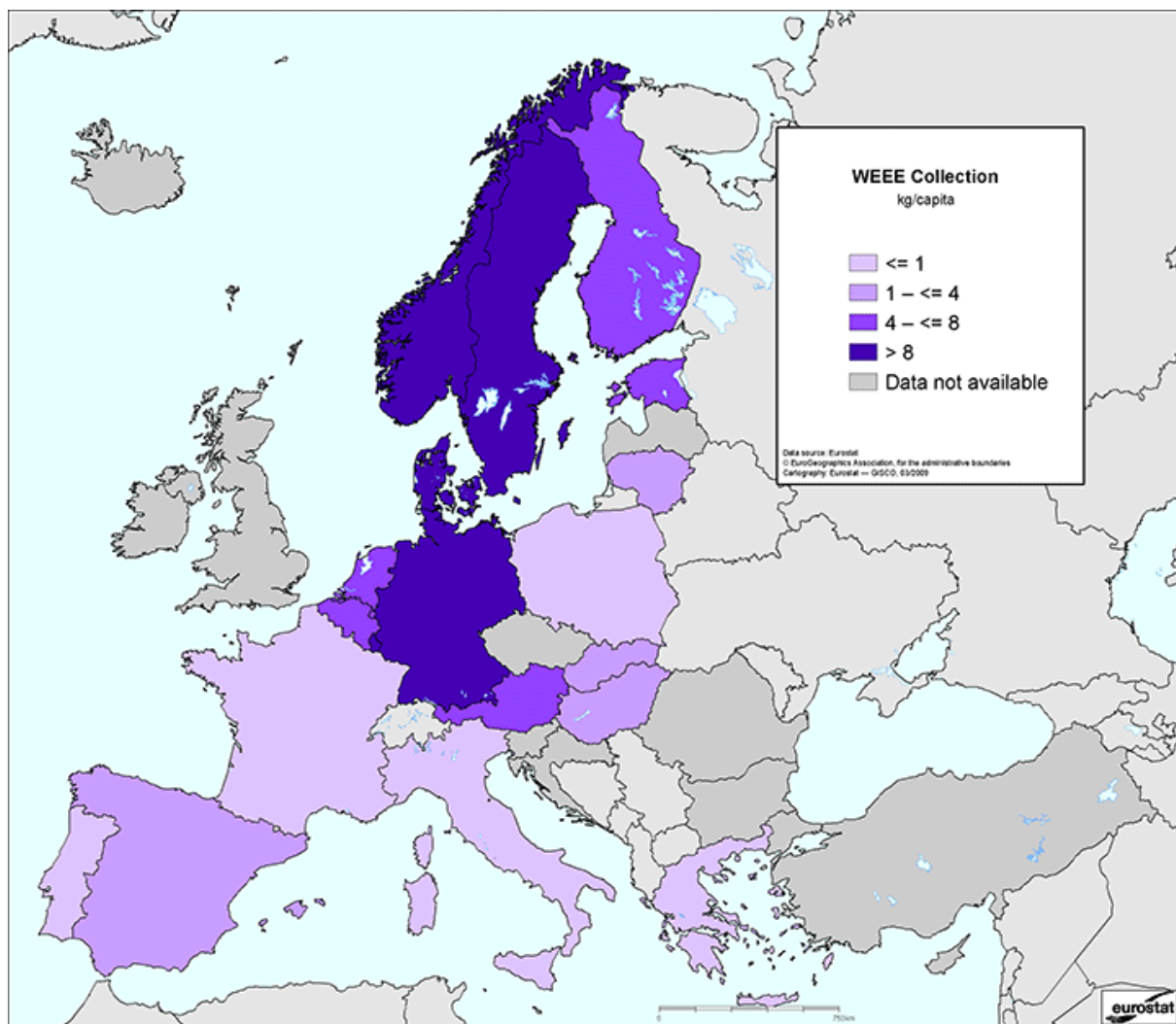
As a rapidly growing waste stream it is of great importance that recycling rates improve in order to

reduce disposal through common routes such as landfill and incineration.

Waste electrical and electronic equipment (WEEE) is currently considered to be one of the fastest-growing waste streams. The EU WEEE Directive strongly focuses on producer responsibility as a key policy mechanism for reducing the quantity of WEEE going to end disposal treatment facilities.

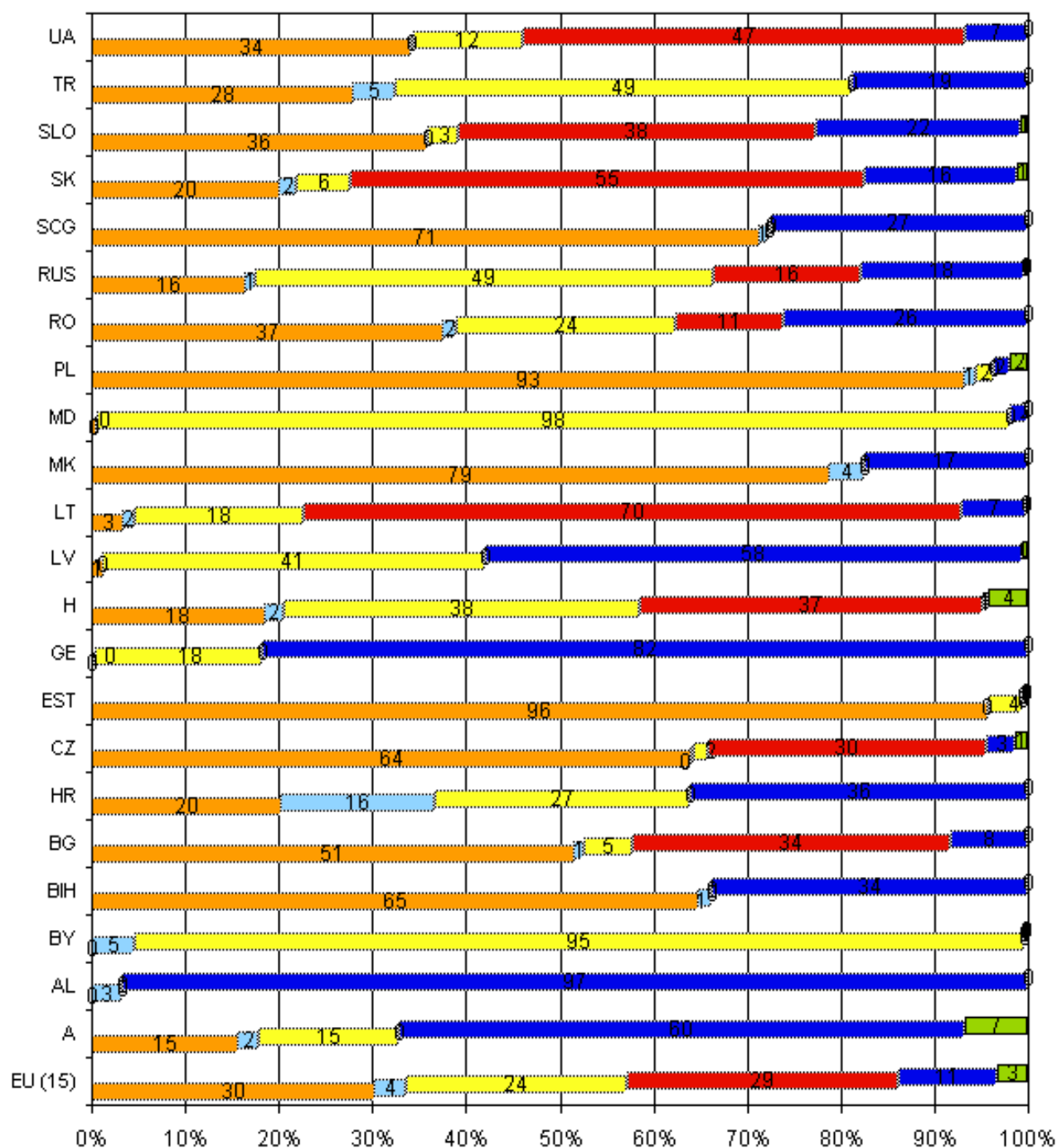
Keeping a close interest in WEEE recycling is important considering the hazardous substances contained in many of the products in this waste stream, and that currently a large quantity of waste is being sent to third world countries where workers can be subjected to these substances in unregulated recycling operations.

The map below shows data for 2006 in kg per capita.

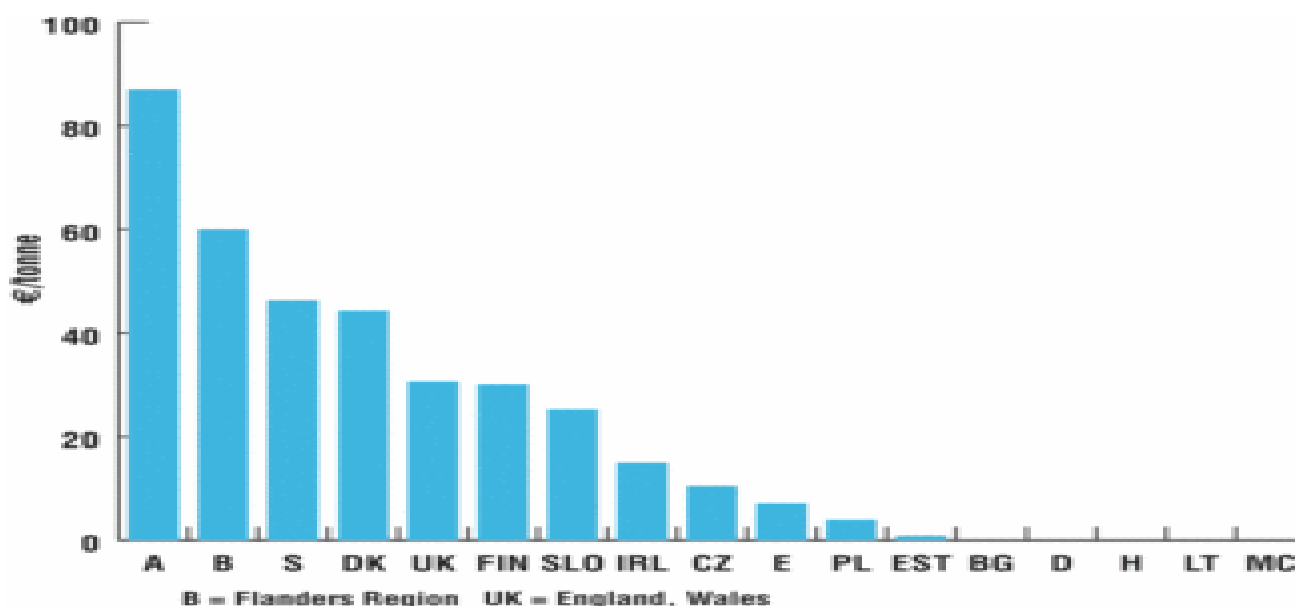




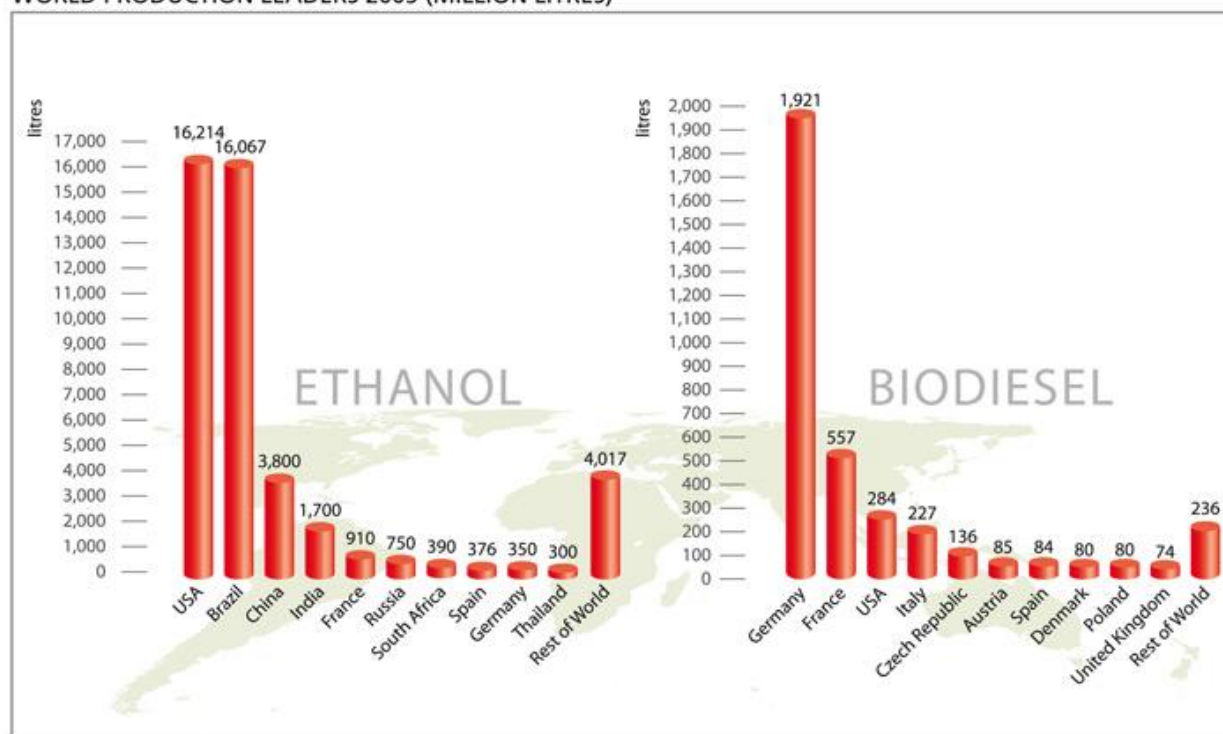
Production of Electricity in 2007 according to energy sources in Latvia, as compared to other countries in Central and Eastern Europe, Austria and the European Union 15

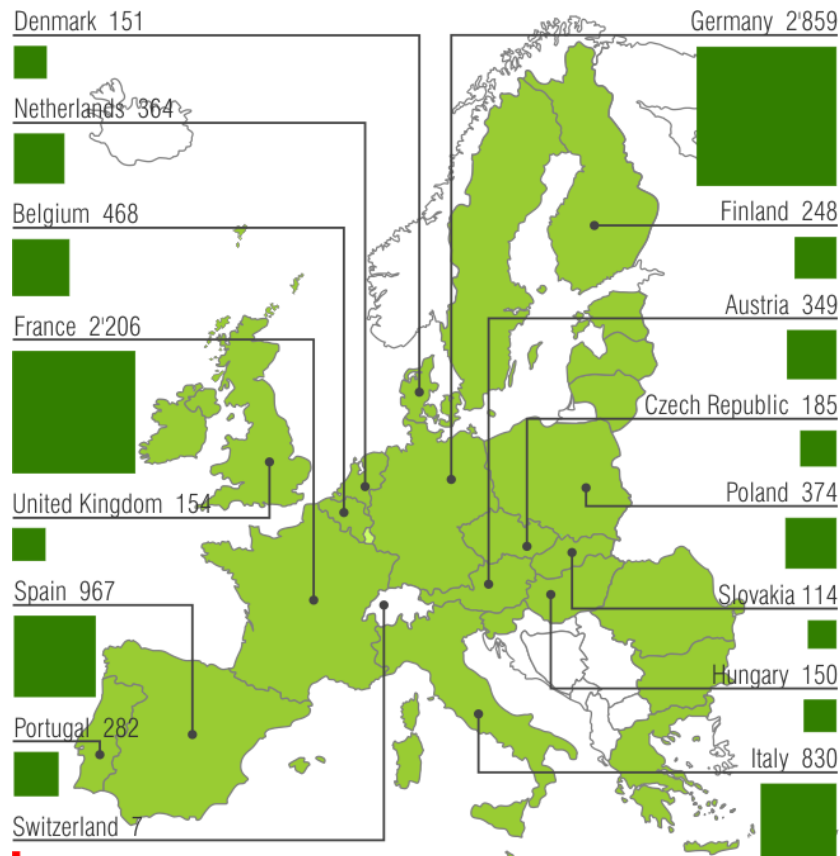


Data on landfill lies on municipal or national level by responding European countries



WORLD PRODUCTION LEADERS 2005 (MILLION LITRES)



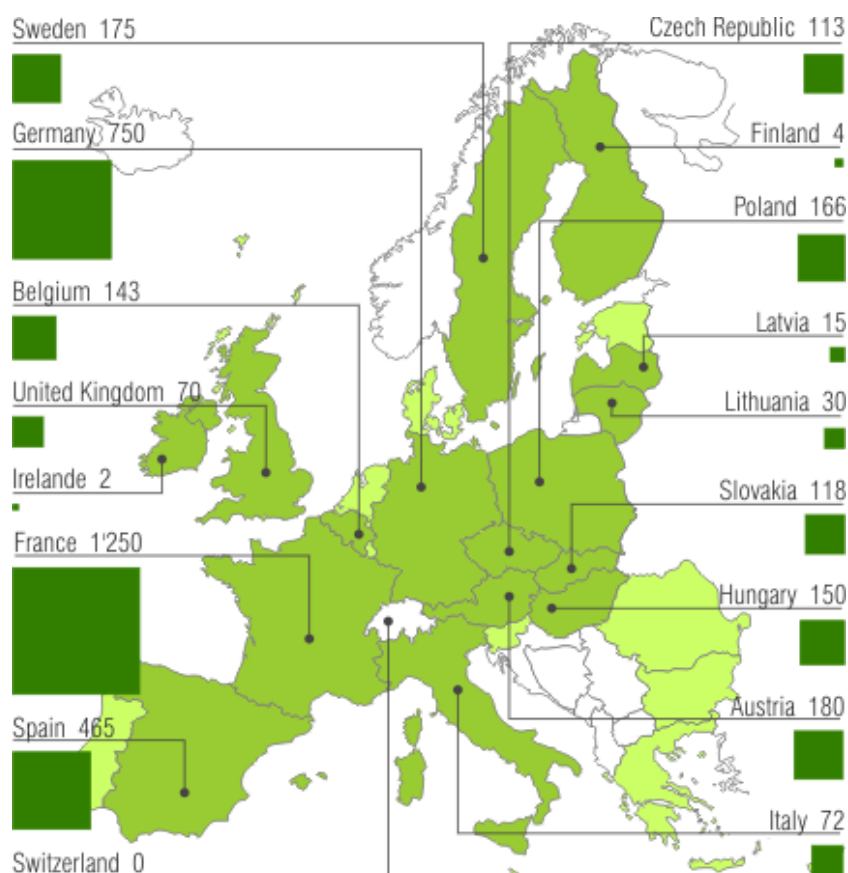


## Biodiesel production in EU

**Figure 9-6** Biodiesel: production (thousand tonnes)

Sources: European Biodiesel Board; Malaysian Palm Oil Board; National Biodiesel Board, USA

	2004	2005	2006
Germany	1 035	1 669	2 681
France	348	492	775
Italy	320	396	857
Malaysia		260	600
USA	83	250	826
Czech Republic	60	133	203
Poland		100	150
Austria	57	85	134
Slovakia	15	78	89
Spain	13	73	224
Denmark	70	71	81
UK	9	51	445
Other EU	6	36	430
<b>Total</b>	<b>2 016</b>	<b>3 694</b>	<b>7 495</b>

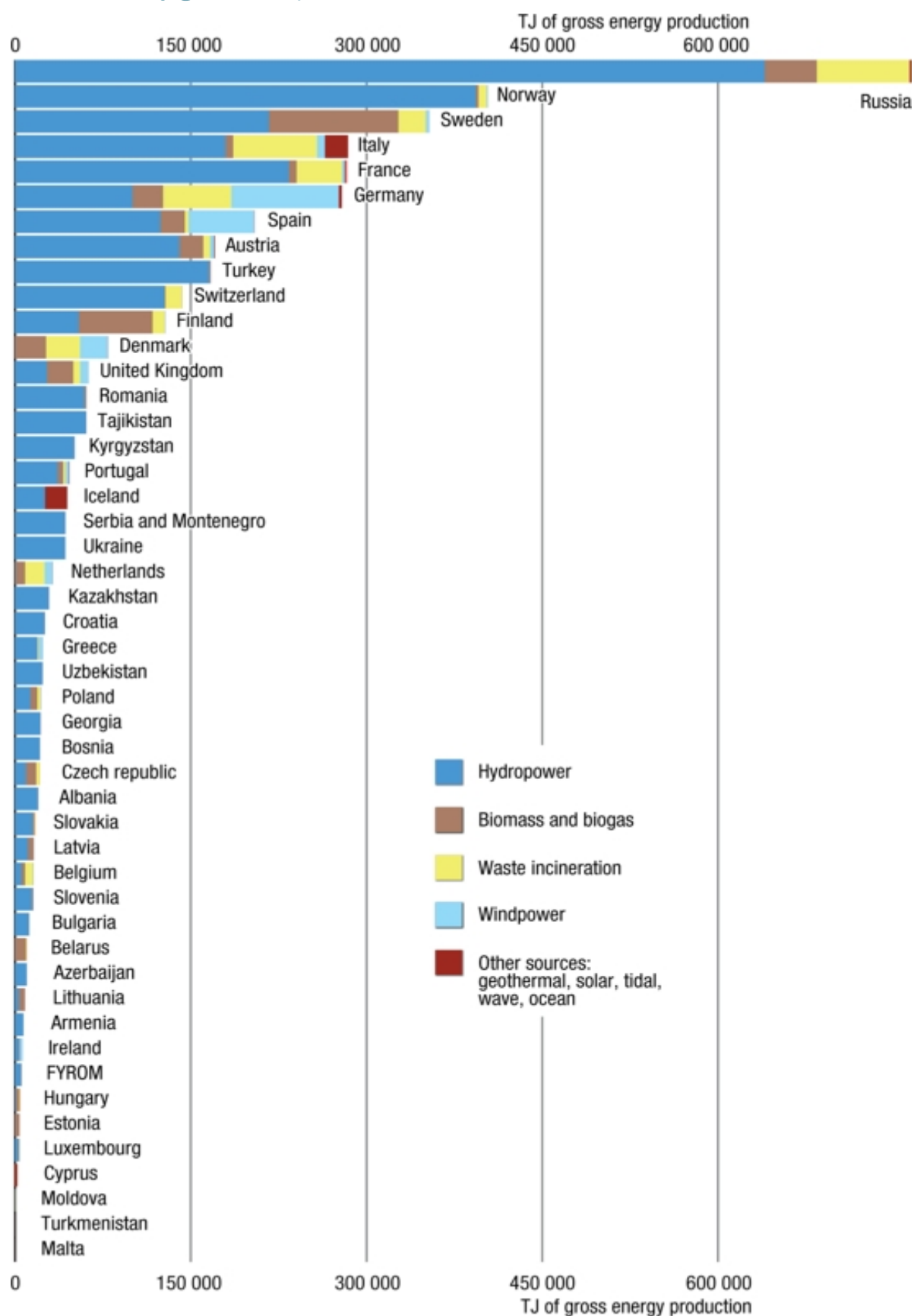


## Bioethanol production in EU

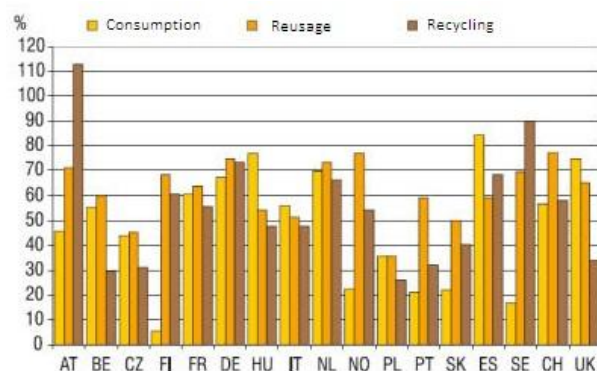
Copyright © ENERS Energy Concept



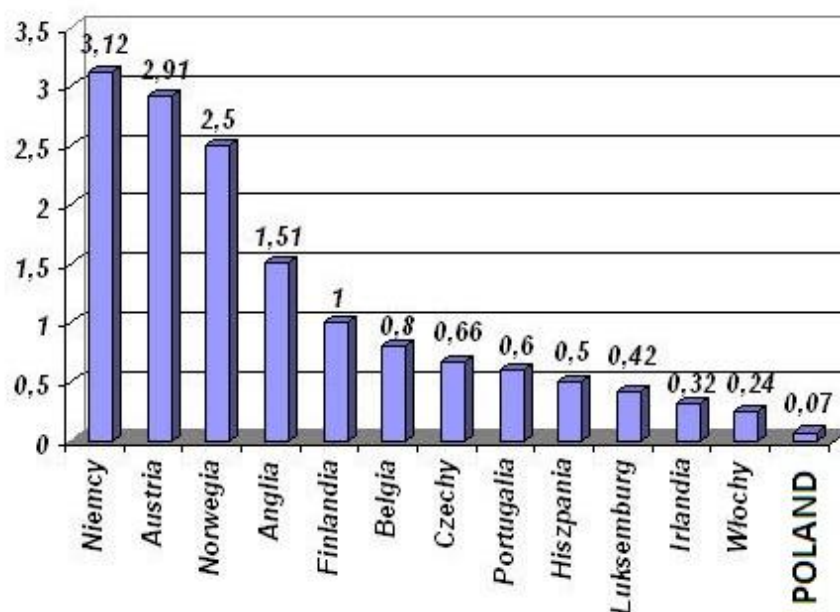
## Renewable energy production in Europe and Central Asia 2004 (heat production and electricity generation)



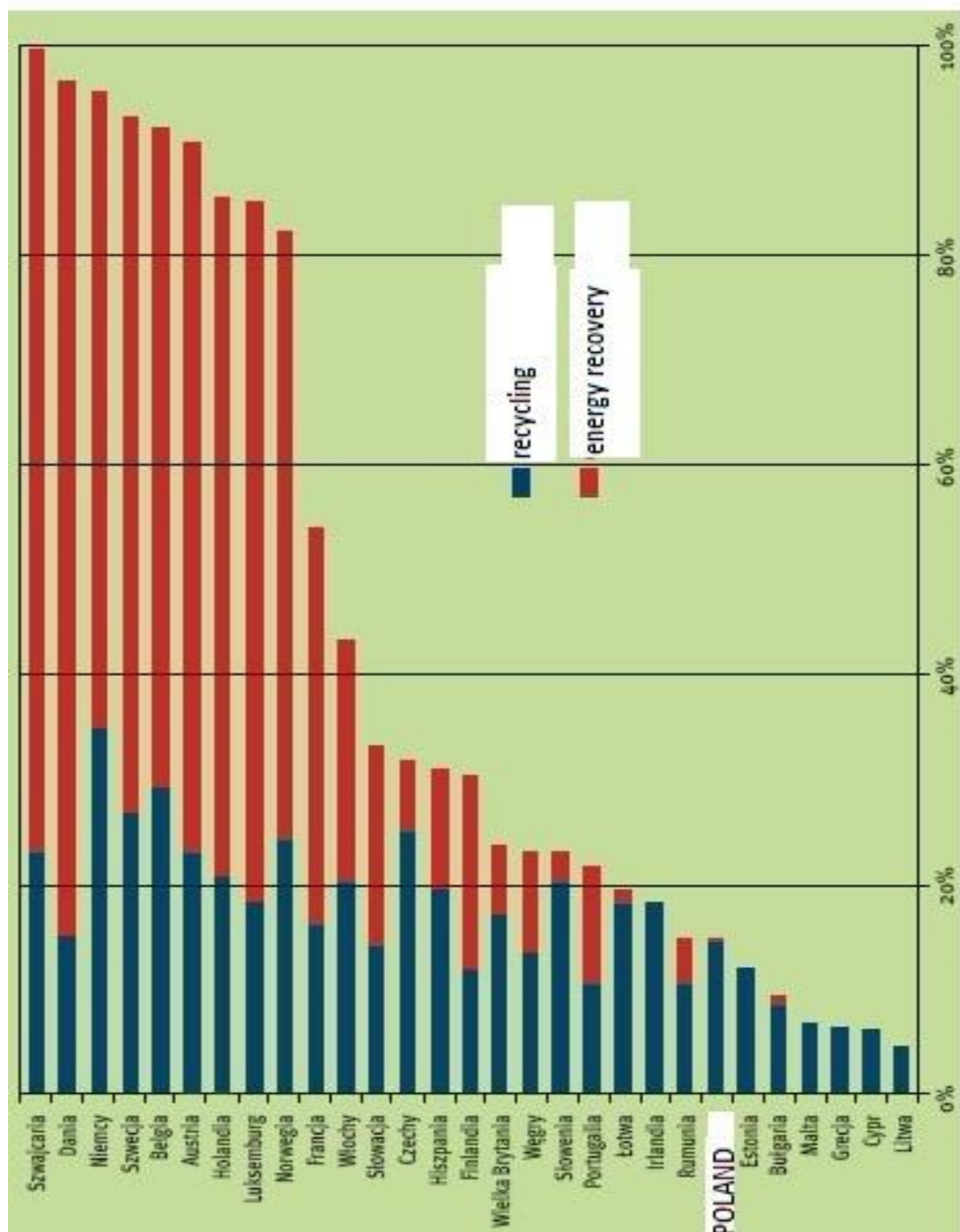
## Consumption, reuse and recycling indicators of wastepaper in European countries



## Recycling cost of 1 glass bottle in European countries in EUR (2002)



## Recycling and recovery in European countries in 2007





## Doing waste management business in Warsaw

**Warsaw** It is located on the Vistula River roughly 360 kilometers (224 mi) from the Baltic Sea and 300 kilometers (186 mi) from the Carpathian Mountains. Its population as of June 2009 was estimated at 1,711,466, and the Warsaw metropolitan area at approximately 2,785,000. The city area is 516.9 square kilometers (199.6 sq mi), with an agglomeration of 6,100.43 square kilometers (2,355.4 sq mi) (Warsaw Metro Area – Obszar Metropolitalny Warszawy). Warsaw is the 9th largest city in the European Union by population.



Warsaw lies in east-central Poland about 300 km (190 mi) from Carpathian Mountains and about 260 km (160 mi) from Baltic Sea, 523 km (325 mi) east of Berlin, Germany. The city straddles the Vistula River. It is located in the heartland of the Masovian Plain, and its average elevation is 100 metres (330 ft) above sea level, although there are some hills (mostly artificial) located within the confines of the city.

Warsaw is located on two main geomorphologic forms: the plain moraine plateau and the Vistula Valley with its asymmetrical pattern of different terraces. The Vistula River is the specific axis of Warsaw, which divides the city into two parts, left and right. The left one is situated both on the moraine plateau (10 to 25 m (32.81 to 82.02 ft) above Vistula level) and on the Vistula terraces (max. 6.5 m (21.33 ft) above Vistula level). The significant element of the relief, in this part of Warsaw, is the edge of moraine plateau called Warsaw Escarpment. It is 20 to 25 m (65.62 to 82.02 ft) high in the Old Town and Central district and about 10 m (32.81 ft) in the north and south of Warsaw. It goes through the city and plays an important role as a landmark.

The plain moraine plateau has only few natural and artificial ponds and also groups of clay pits. The pattern of the Vistula terraces is unsymmetrical. The left side consist mainly of two levels: the highest one former flooded terraces and the lowest one the flood plain terrace. The contemporary flooded terrace



has still visible valleys and ground depressions with water systems coming from Vistula old - riverbed. They consist of still quite natural streams and lakes as well as the pattern of drainage ditches. The right side of Warsaw has different pattern of geomorphological forms. There are several levels of the plain Vistula terraces (flooded as well as former flooded once) and only small part and not so visible moraine escarpment. Aeolian sand with number of dunes parted by peat swamps or small ponds cover the highest terrace. These are mainly forested areas (pine forest).

Currently there are about 83 waste collection and recycling companies. Below you can see the list of all of them.



No.	Licence valid till	Company and address
1	30 listopad 2014 r.	PRIMA 01-248 Warszawa, ul. Jana Kazimierza 1/29
2	31 grudnia 2014 r.	Przedsiębiorstwo Higieny Komunalnej TRANS-FORMERS w Warszawie Sp. z o.o. 03-236 Warszawa, ul. Annopol 18
3	31 sieronia 2015 r.	Studencka Spółdzielnia Pracy UNIVERSITAS 02-536 Warszawa, ul. Narbutta 25a
4	31 grudnia 2014r.	"BESTJA" Sp. z o.o. 01-216 Warszawa, ul. Bryłowska 33
5	31 grudnia 2014r.	"OZON" Elżbieta Zielińska, Jacek Ostrowski Sp. jaw na 03-255 Warszawa, ul. Warzelnicza 10
6	31 grudnia 2014r.	FIRST RECYCLING Sp. z o.o. 04-458 Warszawa, ul. Chełmska 249
7	31 grudnia 2014 r.	KAJA 2000 Jacek Kaczor 01-390 Warszawa, ul. Sucharskiego 2 m. 99
8	31 grudnia 2014r.	Usługi Transportowe "ASIK" 01-966 Warszawa, ul. Prozy 20A Joanna Domańska
9	31 grudnia 2014r.	REMONDIS OTWOCK Sp.z o.o. 05-400 Otwock, ul. J.Lennona 4
10	1 listopad 2014 r.	Przedsiębiorstwo Usług Komunalnych Sita Piaseczno Sp.z o.o. 04-500 Piaseczno, ul. Techniczna 6



11	31 grudnia 2014 r.	Przedsiębiorstwo Produkcyjno Handlowo Usługowe Łapiński Sp.jaw na 05-075 Wesola, ul. Niemcewicza 8a
12	31 grudnia 2014r.	SITA POLSKA Sp. z o.o. 01-443 Warszawa, ul. Ciołka 16
13	31 grudnia 2014r.	Zakład Usług Komunalnych "Błysk" Sp.z o.o. 05-400 Otwock, ul. Piastowa 2
14	31 grudnia 2014r.	"REMONDIS Sp. z o.o." 02-981 Warszawa, ul. Zawodzie 16
Lp.	Ważna do	Firma - adres
15	31 grudnia 2014r.	BYŚ Wojciech Byśkiniewicz 01-934 Warszawa, ul. Arkuszowa 43
16	31 grudnia 2014r.	FUKS ALTVATER SUŁO POLSKA Sp.z o.o. 07-410 Ostrołęka, ul. Kurpiowska 12
17	31 grudnia 2014r.	SKROMAK Sp.z o.o. 02-212 Warszawa, ul. Bakalarska 11 a
18	31 grudnia 2014r.	Spółka Wodna Obwodu Wawerskiego 03-727 Warszawa, Al. Zieleniecka 12
19	31 grudnia 2014r.	PPHU "Lekaro" 05-462 Wiązowna, Dziechciniec 7
20	31 grudnia 2014r.	"ZORA" 00-321 Warszawa, ul. Bednarska 23 m.95
21	31 grudnia 2014r.	PPHU DELFA 03-242 Warszawa, ul. Bazylińska 7/69
22	31 grudnia 2014r.	PPHU "KRIX-POOL" 05-092 Warszawa, Izabelin-Dziekanów ek 2
23	31 grudnia 2014r.	"PAKA" 04-118 Warszawa, ul. Ostrobramska 120 m.15
24	31 grudnia 2014r.	"OSMEL" s.c. 05-077 Warszawa, ul. Cyklamienowa 24
25	31 grudnia 2014r.	ZROB 01-164 Warszawa, ul. Radziewie 13
26	31 grudnia 2014r.	TOITOI - Systemy Sanitarne Sp.z o.o. 03-044 Warszawa, ul. Płochocińska 29
27	31 grudnia 2014r.	RS SERWIS WYWOZ NIECZYSTOŚCI 05-091 Ząbki, ul. Szwoleżerów 38 Robert Szczepaniak
28	31 grudnia 2014r.	Zakład Kształtowania Terenów Zielonych 05-140 Serock, ul. Nasielska 26
29	31 grudnia 2014r.	Zakład Usług Asenizacyjnych /Marek Bakun/ 05-075 Warszawa-Wesola, ul. Sółkiewskiego 11
30	31 grudnia 2014r.	AGAdendron s.c. 05-090 Raszyn, ul. Rybna 26
31	31 grudnia 2014r.	Zomis Sp.z o.o. 00-992 Warszawa, ul. Jagiellońska 88
32	31 grudnia 2014r.	ASPEN PLUS Sp.z o.o. 31-222 Kraków, ul. Bularnia 5
33	31 grudnia 2014r.	Usługi transportowo-porządkowe J.Dąbrowski 06-121 Pokrzywnica, Zaborze 9
Lp.	Ważna do	Firma - adres
34	31 grudnia 2014r.	TRANSNEC-Sylwester Nerc 04-923 Warszawa, ul. Bartoszycka 23 m.4
35	31 grudnia 2014r.	P.P.H.U. "WTORPOL" ZPCh. 26-110 Skarżysko Kamienna, ul. Śurawia 1
36	31 grudnia 2014r.	Usługi Transportowe "REGA" 02-658 Warszawa, ul. Okęcka 12 m.59
37	31 grudnia 2014r.	Usługi Transportowe Wywóz Nieczystości Stałych Krzysztof Jurczyński 02-432 Warszawa, ul. Rybnicka 63 m.5
38	31 grudnia 2014r.	Przedsiębiorstwo Usług Ogrodniczych "FLORA" Sp.z o.o. 03-574 Warszawa, ul. Radzymińska 116



39	31 grudnia 2014r.	Miejski Zakład Oczyszczania Sp. z o.o. 05-800 Pruszków, ul. Stefana Bryły 6
40	31 grudnia 2014r.	Przedsiębiorstwo Usługowe "HETMAN" Sp.z o.o. 02-256 Warszawa, al. Krakowska 110/114
41	31 grudnia 2014r.	PEGAZ 05-820 Piastów, ul. Reymonta 56
42	31 grudnia 2014r.	TEXPOL Sp. z o.o. 05-240 Tłuszcz, ul. Przemysłowa 21
43	31 grudnia 2014r.	Przedsiębiorstwo Usługowo Handlowe "EKO-SAM" BIS
44	31 grudnia 2014r.	Przedsiębiorstwo Higieny Komunalnej Trans-Formers Sp. z o.o. 50-210 Wrocław, ul. Kurkowa 14
45	31 grudnia 2014r.	AURA Usługi Ogrodnicze i Porządkowe Kazimierz Jakubczak 05-075 Warszawa-Wesoła, ul. Reja 5
46	31 grudnia 2014r.	"AG-COMPLEX" Sp. z o.o. 03-042 Warszawa, ul. Marywilska 44
47	30 listopad 2014r.	CR. OGRODY M.CARLI I R.RAFALSKI Sp.jaw na 00-950 Warszawa, ul. Marszałkowska 20/22 lok.21
48	31 grudnia 2014r.	"CLEAN WORLD" FIRMA HANDLOWO-USŁUGOWA 05-230 Kobyłka, ul.Gen.T.Kościuszki 28
49	31 grudnia 2014r.	"TRANS-KAM"-Andrzej Kamiński 02-762 Warszawa, ul. Kartaginy 1 m. 325
50	31 grudnia 2014r.	"WIDAR" Dariusz Wiśniewski 04-101 Warszawa, ul. Zagójska 14 m. 100
51	20 luty 2015r.	Przedsiębiorstwo Usługowe "Czysty Świat" 07-206 Wola Mysłkowska
52	31 grudnia 2014r.	"LARIX" Krzysztof Rasiński 05-250 Radzymin, ul. Broniewskiego 16
Lp.	Ważna do	Firma - adres
53	31 grudnia 2014r.	EKO-TAB Joanna Tabor 01-216 Warszawa, ul. Bryłowska 33
54	31 stycznia 2015r	ZAKŁAD URZĄDZANIA I UTRZYMYWANIA ZIELENCÓW – NATUROWITA 00-781 Warszawa, ul. Kartonowa 18
55	31 stycznia 2015r	STVEKO PHU Marcin Stefański 85-156 Bydgoszcz ul. Skorupki 27
56	31 stycznia 2015r	Eko Bilans Gospodarka Odpadami Tomasz Drzazga 00-389 Warszawa, ul. Smulikowskiego 1/3 m. 1
57	31 stycznia 2015r	"SIR-COM" Stanisław Zajączkowski 05-500 Nowa Iwiczna, ul. Krasickiego 65
58	31 stycznia 2015r	Zakład Usług Ogrodniczych "CHABER" Włazło - Michałowicz Sp.Jaw na 03-138 Warszawa, ul.Strumykowa 49 A
59	31 stycznia 2015r	"MATRANS" - Usługi Transportowe, Wywóz Nieczystości Stałych i Płynnych 08-117 Wodzinie, Oleśnica 128
60	31 stycznia 2015r	"GARDEN - PARKI" Marcin Chruściński 02-785 Warszawa, ul. Surowieckiego 8 m. 43
61	31 stycznia 2015r	Usługi Transport Towarowy Krzysztof Iwanowski 07-300 Ostrów Mazowiecka, ul.Targowa 26
62	28 lutego 2015r.	Eko Standard - Usługi Komunalne - M.Szymański 05-500 Piaseczno, ul. Tetmajera 32
63	28 lutego 2015r.	"AKAN" - Anna Kania 08-412 Borowie, Wilcza 36 A
64	28 lutego 2015r.	PIREM Sp. z o.o. 02-828 Warszawa, ul. Wantule 8
65	28 lutego 2015r.	Zakład Urządzania i Utrzymywania Zieleni 96-512 Młodzieszyn, ul. Wyszogrodzka 61
66	28 lutego 2015r.	P.P.H.U."MIRMAR" 96-300 Śyrardów, ul. Chojńskiego 6
67	28 lutego 2015r.	DE-LUX 05-532 Baniocza, ul. Zakole 11
68	31 marca 2015r.	"TESTA" 02-798 Warszawa, ul.Wańkowicza 4 m. 116
69	31 marca 2015r.	Firma Usługowa-"PRACUS" Robert Talarek 08-400 Garwolin, ul. Narutowicza 28



70	31 marca 2015r.	KLON-R Dariusz Szumacher 01- 737 Warszawa, ul. Elbląska 59 m. 21
71	7 września 2014r.	CHIMIREC - SEPTOS Sp. z o.o. ul. Chełmżyńska 180, 04-464 Warszawa
72	31 grudnia 2012r.	ALBA EKOSERWIS Sp. z o.o. ul. Sikorskiego 5, 41-922 Radzionków
Lp.	Ważna do	Firma - adres
73	31 grudnia 2010r.	PWNS "ALMAX" Sp.z o.o. ul. Wrocławska 3, 26-600 Radom
74	31 marca 2007r.	"JARPER" Sp. z o.o. Al. Krakowska 108 A, 05-552 Wólka Kosowska
75	31 marca 2007r.	"ALGADER HOFMAN" Sp. z o.o. ul. Wólczyńska 133, lok. 11 B, 01-919 Warszawa
76	31 marca 2013r.	"MELBUD" Melioracja i Budownictwo-Wodne T.Stalewski i B.Stalewski ul. Kościelna 10 A, 05-124 Skrzyszew
77	31 marca 2007r.	Wywóz Nieczystości Stałych "BŁYSK" A.Krawczyk ul. Solskiego 21, 05-230 Kobylka
78	31 marca 2013r.	USŁUGI Wywozu Nieczystości Stałych A.Matusiak ul. Piotra Skargi 63/81, 03-516 Warszawa
79	31 marca 2013r.	POLSUPER Sp. z o.o. ul. Krakowskie Przedmieście 4/6, 00-333 Warszawa
80	31 marca 2013r.	"EKO-TRANS" Sp. z o.o. ul. Rejtana 16, 05-270 Marki
81	30 października 2015r.	Miejskie Przedsiębiorstwo Oczyszczania w m.st. Warszawie Sp. z o.o. ul. Obozowa 43, 01-161 Warszawa
82	31 stycznia 2016r.	Miejskie Przedsiębiorstwo Robót Ogrodniczych Sp. z o.o. ul. J.J. Rostafińskich 1, 02-593 Warszawa
83	28 lutego 2016r.	PARTNER Dariusz Apelski ul. Daszyńskiego 98/22, 06-100 Pułtusk

### Example of a waste management company in Warsaw.

Out of all 83 companies 5 following are the most important ones: Sita Polska, Remondis, MPO, Byś and Ag-Complex.

I have made interview with Remondis about their business and they agreed with disclosing some of their waste system information.

Remondis Service includes:

- Collection and transportation of wastes both municipal and industrial
- Collection of electrical and electronic appliances
- Resources managing: sorting, storing and processing of packaging wastes
- Clean City Service: maintenance of roads and streets, mechanical and manual walkway sweeping in parks, car parks and production facilities areas
- Maintenance and building green areas
- Collection and destruction of documents
- Service provided to individual clients, companies and government units

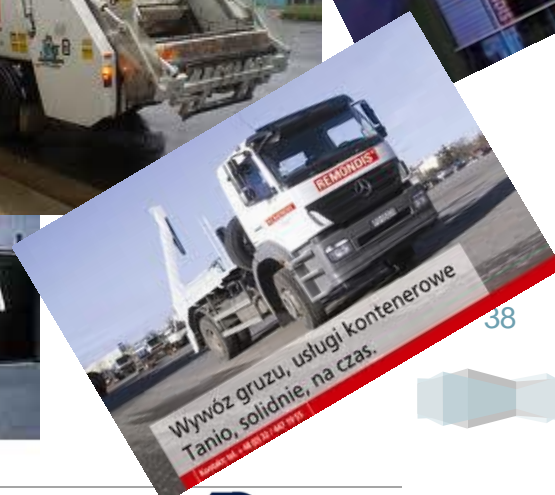




- They own 30 waste collection trucks, they use also other companies' trucks for waste transporting



**REMUNDIS®**







- Depending on individual approach the business process consists of following steps: waste collection and transport, manual sorting of packaging wastes, mechanical sorting of municipal wastes, production of biofuel from municipal and residual waste, transport of recyclables to recycle companies, giving away recoverable wastes to other interested companies, waste transport to landfills
- The newest solution of Remondis for waste disposal is a line for alternative fuel (biofuel) production. For this production the municipal wastes and the remains left after the recyclables sorting process are used. The biofuel is used as an additional ingredient for conventional fuel in cement production company
- Service prices depend on 3 main conditions: garbage amount, garbage weight and its localization. Request about prices example was denied because it is critical information for the company
- They collect also hazardous waste
- Electrical and electric appliances collection is offered not only in Poland but across Europe as well
- Disposal and deterioration of documents, discs, hard discs, tapes, microtapes and many other utilities with confidential information is also available
- The company does not use biodiesel for their trucks





## Comparison of some waste management issues between Tokyo and Warsaw

Comparison	City			
Subject of interest	Tokyo		Warsaw	
Population (m)	12.0		2.0	
Amount of waste (T/year)			758,000	
Cost Responsibility by sector	Residential	Governemnt (municipal)	Residential	„polluter pays”
	Commercial	„polluter pays”	Commercial	„polluter pays”
Sorting Classification of garbages	Burnable		Paper and cardboard	
	Unburnable		Plastics	
	Recyclable: bottle Can Plastic bottle Paper		Glass (colored, white)	
	Danger waste		Bulky waste	
	Other		Recyclable : Steel and aluminum	
	Bulky waste		Danger waste	
	Electronic and electrical appliances		Electronic and electrical appliances	
			Organic waste (recyclable, other)	
			Other	
Recycling rates			35% organic waste 16% paper and cardboard 12% plastics 11% glass 6% metals 4% textiles 16% other	
No. of waste collection companies	500		83 <sup>1</sup>	
Current issues			Changing law, weak execution of waste management law	

<sup>1</sup> Data for 2008.