



CENTRAL STATISTICAL OFFICE

# MUNICIPAL INFRASTRUCTURE IN 2011

WARSAW 2012

STATISTICAL INFORMATION AND ELABORATIONS

**Publication prepared by:**

**Central Statistical Office  
Trade and Services Department**

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**Publication available at: <http://www.stat.gov.pl>**

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## **PREFACE**

*The present publication is the subsequent edition of “Municipal Infrastructure”. It aims at presenting data recipients with the characteristic of municipal services market in Poland in 2011 and presentation of tendencies of changes taking place in surveyed area of activity.*

*The elaboration includes information on installations and municipal services in the scope of water-line and sewerage systems, heating management, distribution of electricity and gas from gas-line network as well as collection and treatment of municipal waste. The statistical data have been compiled regarding the location of facilities or the place of rendering municipal services and are presented for Poland as a total and with the breakdown into voivodships, urban, and rural areas.*

*The publication uses the results of compilations, got from statistical reports drawn up by entities, which scope of economic activities includes supplying of water to households and discharging waste water from them as well as collecting of municipal waste and liquid waste, treating and recycling of municipal waste, or distributing of electricity, heat energy, and gas from gas-line network.*

*The publication consists of four parts: methodical remarks including description of data sources, key terms, an analytical part with descriptive and graphic interpretation of results obtained from surveys on municipal management and, finally, a set of tables.*

*The authors of the publication will be grateful to all people and institutions for sending their comments, which will be used in the next edition of the publication as far as possible.*

*Director  
of Trade and Services Department  
Ewa Adach-Stankiewicz*

*Warsaw, October 2012 r.*

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## SYMBOLS

Dash /-/	– magnitude zero.
Zero /0/	– magnitude not zero, but less than 0,5 unit.
Dot /./	– data unavailable or unreliable.
Mark “x” /x/	– not applicable.
"Of which"	– indicates that not all elements of the sum are given.

## ABBREVIATIONS

thous.	thousand
mln	million
m	metre
m <sup>2</sup>	square metre
m <sup>3</sup>	cubic metre
hm <sup>3</sup>	cubic hectometre
km	kilometre
km <sup>2</sup>	square kilometre
ha	hectare
dam <sup>3</sup>	cubic decametre
kWh	kilowatt-hour
MWh	megawatt- hour
GWh	gigawatt-hour
J	joule
kJ	kilojoule
GJ	gigajoule
TJ	terajoule
cont.	continued
pc	piece

## **1. METHODOICAL REMARKS**

The results of statistical surveys carried out on reports M-06, M-09, and SG-01 part 3 as well as the secondary use of data from the survey on balance of energy carriers and heating infrastructure, and data coming from internal information systems of the Energy Market Agency S.A. are sources of information on municipal infrastructure in 2011.

Data on water-line and sewerage systems management are collected within the full survey which comprises units with a primary, secondary or ancillary activity in management of water-line and sewerage systems or liquid waste collection.

Data on energetics cover all units which were granted concessions to transmit and distribute fuels and electricity, including those entities for which the aforementioned services constitute secondary economic activity. Information on the number of consumers and consumption of electricity concern households and collective accommodation places that pay bills for consumption of electricity according to rates that households are due to pay. Data regarding the consumption of electricity are presented basing on the available information on advanced payments made by consumers.

Data regarding the number of consumers of gas from gas line-network were provided by entities which were granted concessions to sale gas and are based on information concerning the number of agreements signed by these entities with consumers of gas from gas line-network.

Information on heating include residential as well as office and institutional buildings with central heating provided by transmission thermal-line considered as the system of joint installations, co-operating with each other, used for transmitting and distribution of heating medium to the recipient. Information regarding the boiler-houses or boiler-rooms cover types of boilers, their power (i.e. maximum quantity of heat energy which can be produced by boilers in a defined unit of time), annual production, and installed facilities protecting atmosphere (limiting emission of pollutants to atmosphere).

Information on municipal waste comprise total quantity of waste collected during the year, (including waste from households, commerce, small business, offices and institutions as well as municipal services), municipal waste collected separately for recycling, waste deposited on controlled landfills and waste subject to biological and thermal treatment. The survey providing the above information is a full survey and covers entities involved in activities related to collection and treatment as well as recycling of municipal waste.

When computing data per capita (1,000 population, etc.) as of the end of a year (e.g., population using municipal installations), the actually living population as of 31 XII was adopted, whereas data describing the magnitude of a phenomenon within a year (e.g., consumption) as of 30 VI. For calculations of population, data prepared on the basis of the Population and Housing Census 2011 were used.

## 2. Glossary of key terms

### 2.1. DEFINITIONS OF GENERAL TERMS

**Municipal management** – a branch of national economy, which aim is to satisfy material and living needs of the population. In Poland municipal management includes enterprises conducting an economic activity in the scope of water-line and sewerage management, heating management as well as distribution of fuels and energy to households, and municipal waste management.

**Municipal infrastructure** – basic installations and service institutions, which are essential to functioning of the economy and population.

### 2.2. DEFINITIONS OF TERMS FROM WATER-LINE SYSTEM AND SEWERAGE MANAGEMENT AREA

**Water-line system** – a set of water network devices serving collection of surface and underground waters, public wells, devices serving storage and treatment of water, water supply networks, water pressure control devices.

**Water-line transmission network** – conduits bringing water from distant water intakes to distribution line.

**Water-line distribution network** – street conduits used for distribution of water to consumers by the connections to buildings and other objects.

**Water-line service line** – a segment of conduit connecting the water-line network with internal water-line installation in a property of consumer together with a valve past the main water-meter.

**Street outlets** are publicly available facilities directly connected to street water mains, serving the community for drawing water directly from the mains.

**Water delivered to households** is the quantity of water collected from water-line network using facilities installed in a building.

**Water delivered for production purposes** is water delivered to industrial, construction, transport enterprises (plants), etc., i.e. production plants in all divisions of national economy regardless of whether delivered water is used for technological purposes, or for social and living needs of staff (in lavatories, bathrooms, dining-rooms, canteens, day-rooms, and office buildings which are located within the plant).

**Sewerage system** is a complete sewage collection system serving discharging of wastewater, including sewerage network, outlets of devices used to emit sludge into the waters, or into the ground, sewage pretreatment and treatment facilities, and sewage pumping stations.

**Active sewerage network** – a system of covered (underground) conduits discharging sewage from buildings and other objects to collectors or sewage treatment facilities.

**Sewerage service line** – a segment of conduit connecting internal sewerage installations in a property of the services consumer with the sewerage network after a first inspection chamber from a side of a building, and in case of its lack – from a boundary of a property.

**Wastewater discharged** – household wastewater or a mixture of household wastewater with rainfall wastewater or a mixture of household wastewater with industrial wastewater and rainfall wastewater.

**Septic tank** – an installation and device intended for an accumulation of liquid waste where it is generated.

**Liquid waste** – sewage stored temporarily in septic tanks.

**Cast station** – an installation and device, placed near a sewer or a wastewater treatment plant, intended for a collecting of liquid waste transported by sewage disposal vehicles from where it is accumulated.

### 2.3. DEFINITIONS OF TERMS FROM ENERGY MANAGEMENT AND GAS ENGINEERING AREA

**Gas-line network** is a system of conduits providing gas, supplied by enterprises, which scope of economic activity includes transmission and distribution of gas to consumers. The system of conduits consists of:

- transmission and distribution network (with high-methane gas and nitrogenised gas) – street conduits used for distribution of gas to buildings or other objects by means of connections;
- service line – a system of conduits joining distribution gas-line system with buildings and other objects.

### 2.4. DEFINITIONS OF TERMS FROM HEATING MANAGEMENT AREA

**Boiler-house** or boiler-room is a building or a premise with boilers and installations used for production of heat energy for heating purposes or for simultaneous heating and supplying of warm water.

### 2.5. DEFINITIONS OF TERMS FROM WASTE MANAGEMENT AREA

**Municipal waste** is waste generated in households and by other producers of waste (excluding hazardous waste) which because of its character or composition is similar to waste from households.

Information regarding waste include total quantity of waste collected during the year, together with waste from: households, commerce, small business, offices and institutions as well as municipal services. This information is extended by data concerning waste collected separately for recycling, waste deposited on landfills and waste treated in biological, biological-mechanical and thermal processes.

**Biodegradable waste** – waste capable of undergoing anaerobic or aerobic decomposition.

**Neutralization of waste** – processes of biological, physical or chemical treatment as a result of which the nature of waste does not pose risks to human life and health or the environment.

**Landfill site** – a structure for the deposit of waste.



**Thermal waste treatment** – incineration of waste by oxidation and other processes of thermal treatment of waste including pyrolysis, gasification, and plasmic process provided that substances originating from these processes of thermal treatment of waste are incinerated afterwards.

**Composting of waste** – aerobic processing of municipal waste that are subject to biological decay in controlled conditions by using microorganisms in order to neutralize the waste.

**Waste management** – the collection, transport, recovery and disposal of waste, including the supervision of such operations and after-care of disposal sites.

**Waste collection** – the gathering, sorting and/or mixing of waste for the purpose of transport.

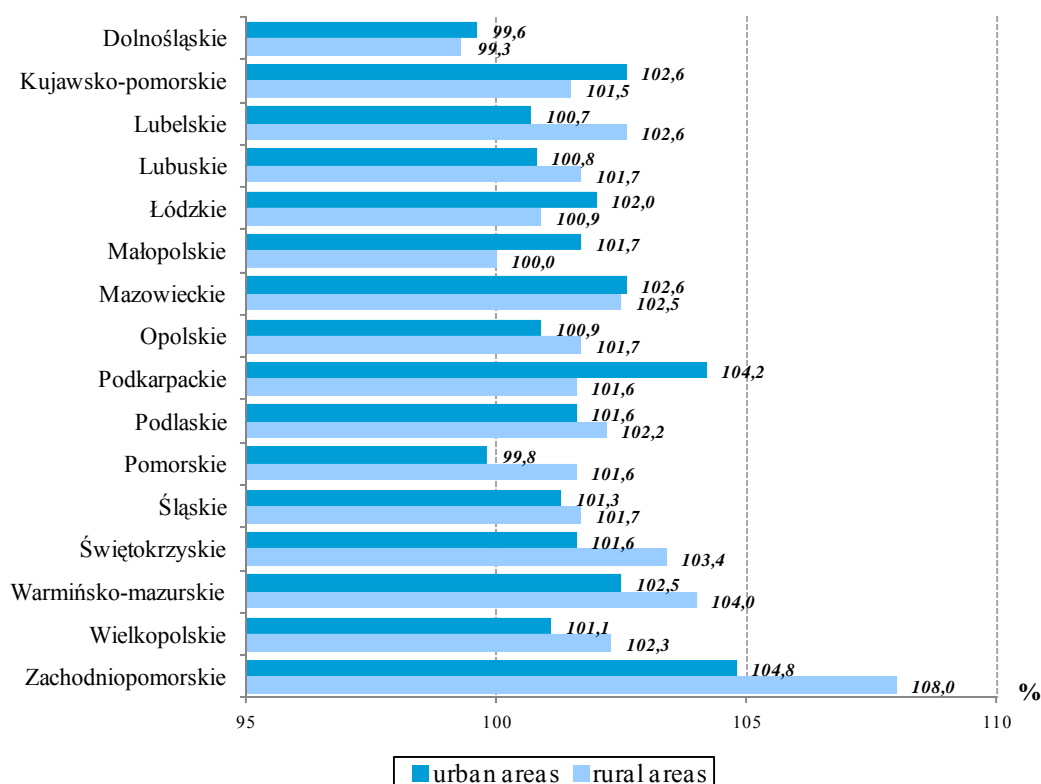
### 3. MUNICIPAL INFRASTRUCTURE IN 2011

#### 3.1. WATER-LINE SYSTEM AND SEWERAGE MANAGEMENT

At the end of 2011 the length of water-line distribution network amounted above 278 thous. km and rose by about 2% (i.e. by about 5 thous. km) in comparison to the previous year. The largest congestion of network according to territorial division [in km per 100 km<sup>2</sup>] was observed in śląskie (162.9), kujawsko-pomorskie (123.2), łódzkie (120.7), and małopolskie (116.6) voivodships and the smallest was observed in zachodniopomorskie (45.2) and lubuskie (46.8) voivodships.

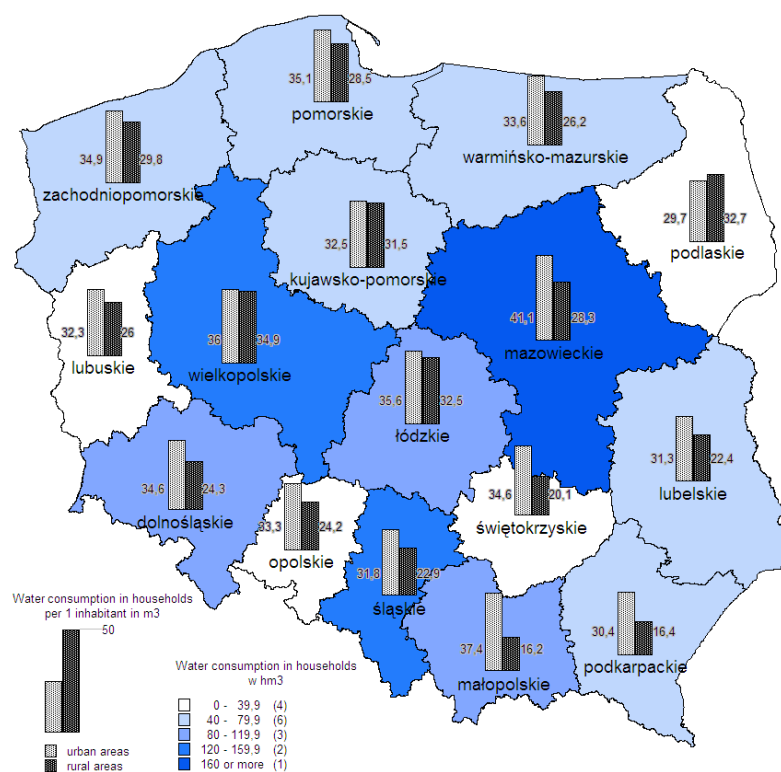
The network in the rural areas comprise almost 78%, of the total length of network in Poland. In 2011 in rural areas almost 4 thous. km of new network were built. The highest increase in the network [in km] in the rural areas concerned: mazowieckie (803.1), zachodniopomorskie (541.7), wielkopolskie (531.8) and warmińsko-mazurskie (467.2) voivodships. In opolskie, lubuskie and małopolskie voivodships the increase was below 100 km.

**Change of length of the water-line network in 2011 [%] [2010=100]**



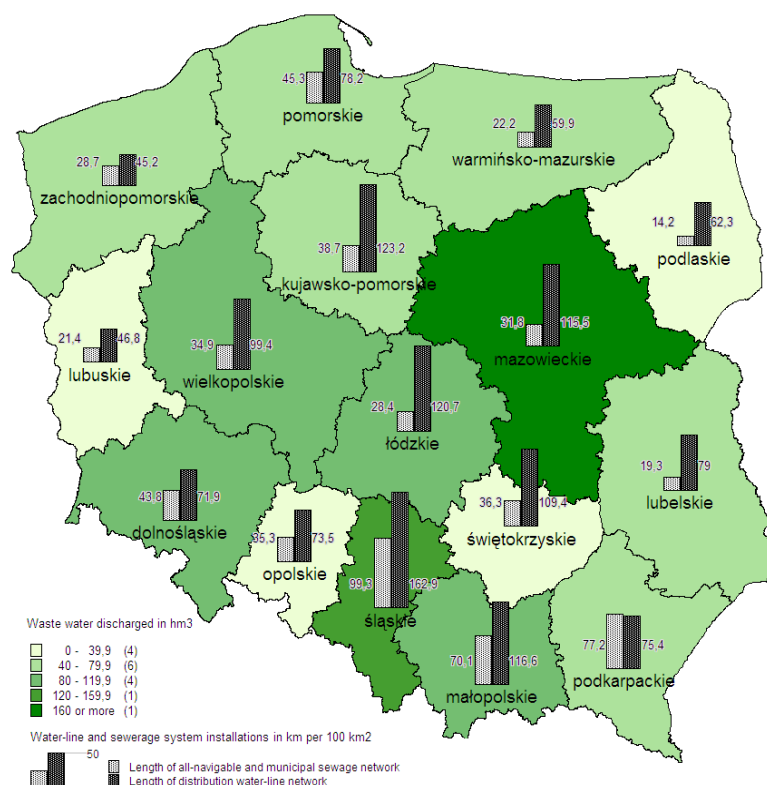
The biggest water consumption [in m<sup>3</sup>] by households per one inhabitant was recorded in: mazowieckie (36.5) and wielkopolskie (35.5) voivodships, whereas the lowest one in podkarpackie (22.2) and lubelskie (26.6) voivodships.

## Water consumption in 2011 by voivodships



The value of this indicator in urban areas ranged from 41.1 m<sup>3</sup> in mazowieckie to 29.7 m<sup>3</sup> in podlaskie voivodship, while in rural areas from 34.9 m<sup>3</sup> in wielkopolskie to 16.2 m<sup>3</sup> in małopolskie voivodship.

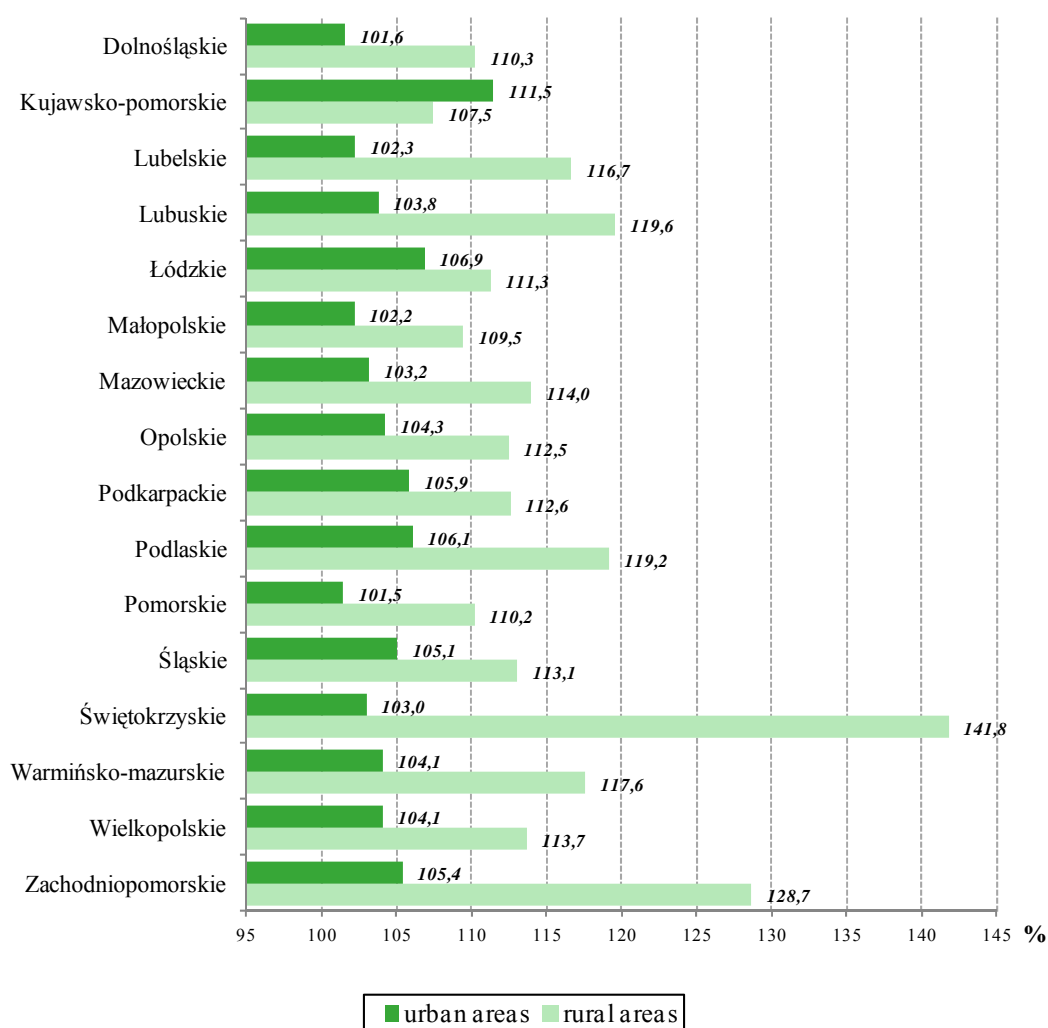
## Wastewater discharged in 2011 by voivodships



The length of sewerage system in 2011 amounted almost 118 thous. km and rose by above 9% in relation to the previous year (i.e. by about 10 thous. km). The largest congestion of sewerage network [in km per 100 km<sup>2</sup>] according to territorial division occurred in: śląskie (99.3), podkarpackie (77.2), małopolskie (70.1) and pomorskie (45.3) voivodships.

During 2011 in rural areas there was an increase of almost 8 thous. km of the new network (14.4%), and in urban areas above 2 thous. km (4,3%).

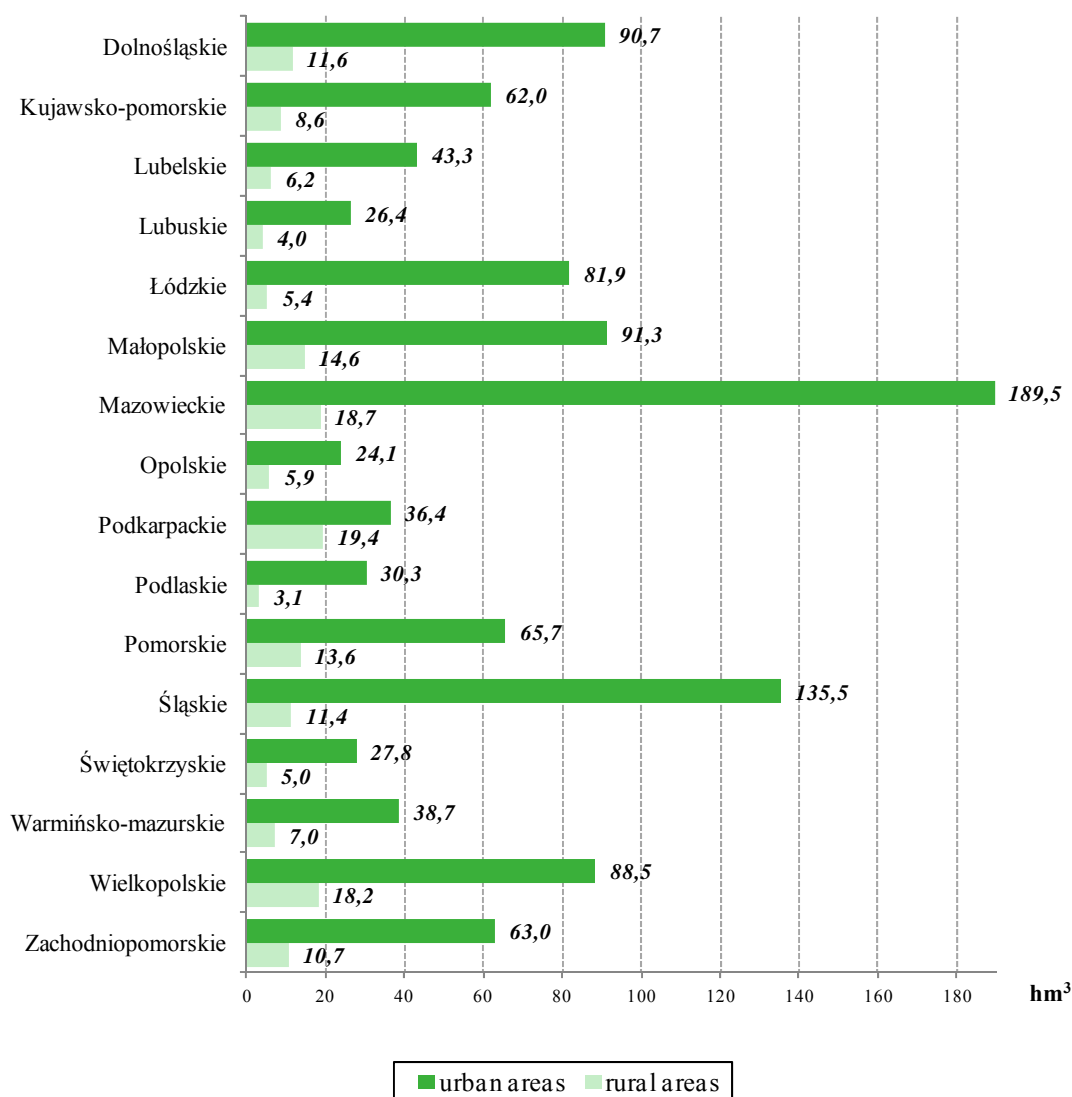
### Change of length of the sewerage system in 2011 [%] [2010=100]



The biggest increase in the newly-built sewerage system [in km] occurred in podkarpackie (1,365.1), zachodniopomorskie (994.4) and in wielkopolskie, świętokrzyskie, śląskie, mazowieckie voivodships was above 800 km. As for the remaining voivodships, it was below 650 km.

There are significant differences in amount of wastewater discharged, when it comes to particular voivodships. These quantities ranged from almost 208 hm<sup>3</sup> in mazowieckie voivodship to 30 hm<sup>3</sup> in opolskie voivodship.

**Wastewater discharged by voivodships in 2011 [hm<sup>3</sup>]**

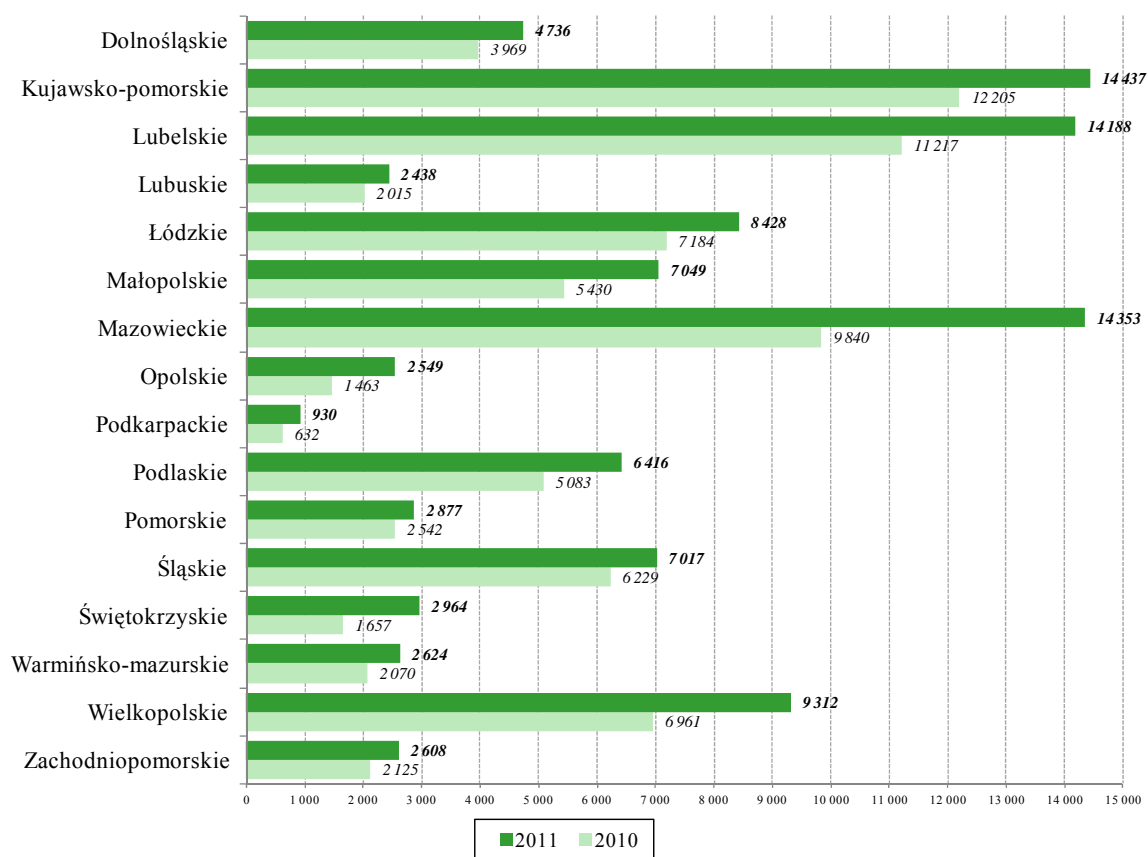


As not all settled areas have been connected to the sewage network yet, part of sewage is discharged into on-site wastewater disposal systems (septic tanks or on-site wastewater treatment facilities).

The number of septic tanks, in which liquid waste is temporarily stored, dropped from about 2,407 thous. in 2010 to 2,359 thous. in 2011, whereas the number of household wastewater treatment sites has risen from about 81 thous. in 2010 to about 103 thous. in 2011 (by 27.7%).

In 2011 about 70.0% of liquid waste was collected by private businesses (68.5% in 2010), 29.8% by firms from the public sector (31.2% in 2010) and the remaining 0.2% by entities of ownership mixed between private and public sector (similarly to 2010). The number of cast stations, which receive sewage from septic tanks' users, amounted to 2,196 compared with 2,175 in the previous year.

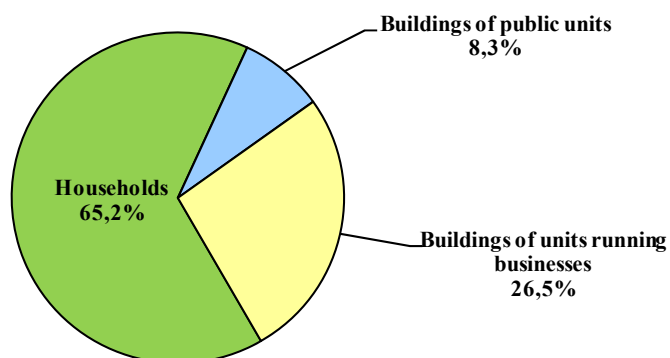
### Household wastewater treatment systems in 2011-2010 [pcs]



In 2011 about 24.9 thous.  $\text{dam}^3$  of liquid waste was collected, a 1% increase comparing with the previous year. About 65.2% of collected liquid waste originated from private households, 26.5% from buildings of units running businesses, and the remaining 8.3% from public buildings (in 2010 it was 65.7%, 26.2% and 8.1% respectively).

The most liquid waste [in  $\text{dam}^3$ ] was collected in mazowieckie (5,552.0) and wielkopolskie (3,341.4) voivodships, whereas the least in: podkarpackie (317.2), podlaskie (461.0) and opolskie (492.7) voivodships.

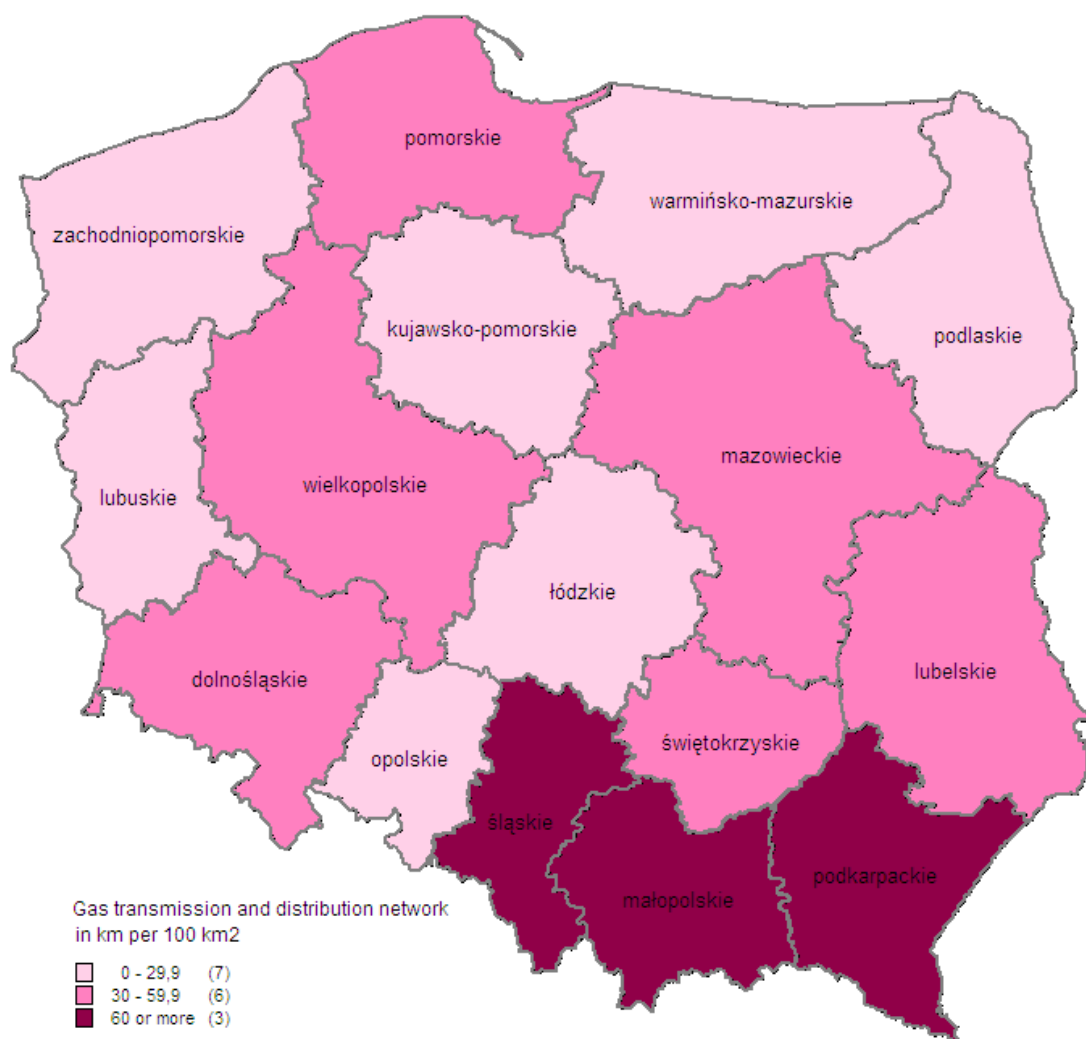
### Sources of liquid waste in 2011 [%]



### 3.2. ENERGY MANAGEMENT AND GAS ENGINEERING

The length of gas-line network amounted to almost 135 thous. km, of which almost 115 thous. km fell within the distribution gas network. The largest congestion of gas-line network [in km per 100 km<sup>2</sup>] occurred in małopolskie (136.9), śląskie (118.5) and podkarpackie (93.5) voivodships, of which 244.5 km in urban areas.

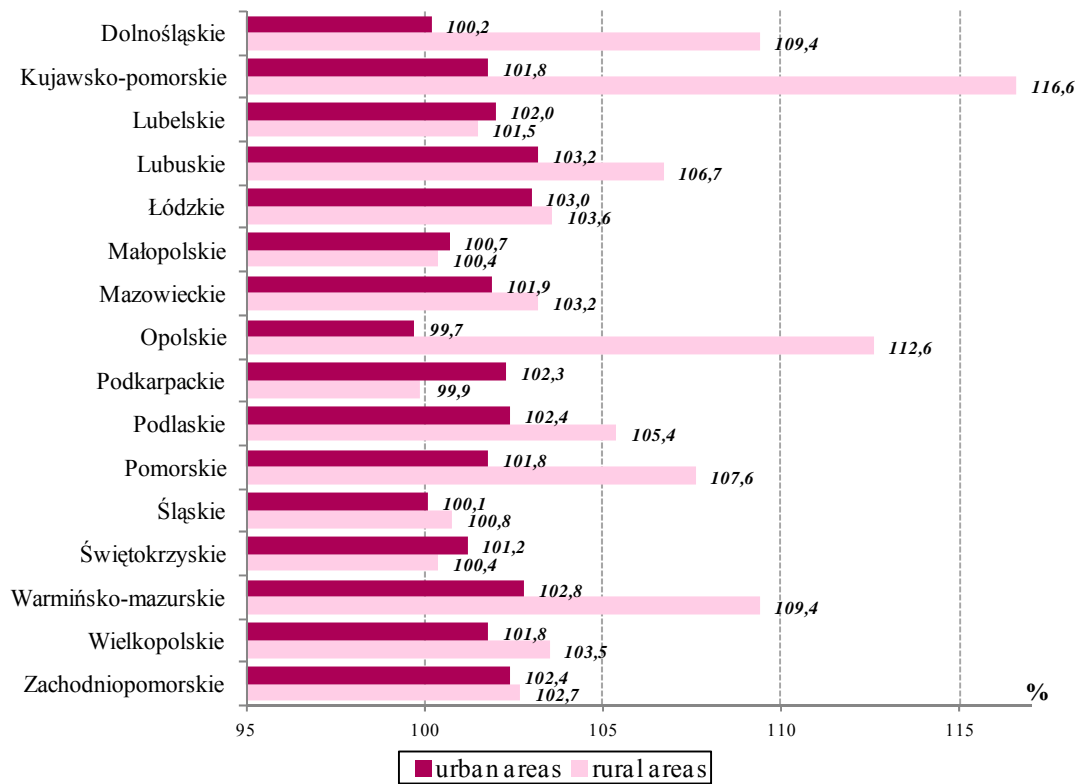
#### Gas infrastructure by voivodships in 2011



The highest increase in the length of gas distribution network in 2011 in comparison to the previous year was in mazowieckie voivodship (almost 310 km) and wielkopolskie (290 km), and for podlaskie, opolskie and świętokrzyskie voivodships the increase was below 50 km.

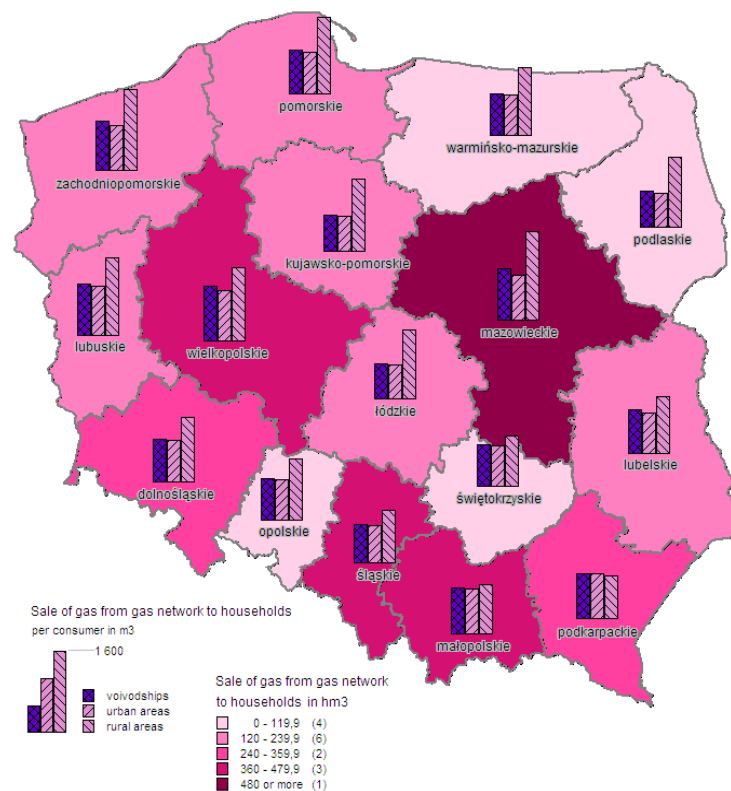
In 2011 the rate of infrastructural development was the almost identical in urban areas (101.2%) and in rural areas (101.7%).

### Change of length of gas-line network (distribution) in 2011 [%] [2010=100]



The most significant sales of gas from gas-network [in m<sup>3</sup>] to households (per one recipient) was noted in wielkopolskie (738.5), whereas the lowest in łódzkie (348.5) voivodship.

### Sale of gas by voivodships in 2011

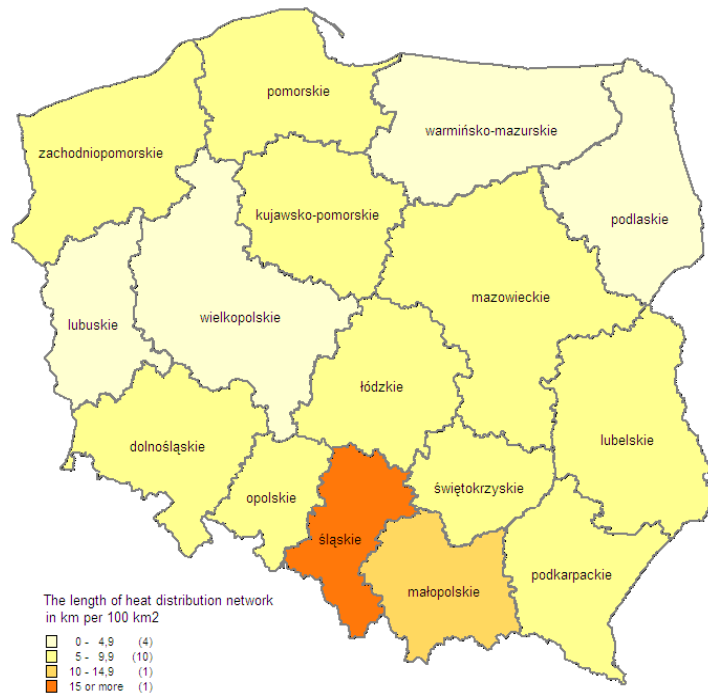




### 3.3. HEATING MANAGEMENT

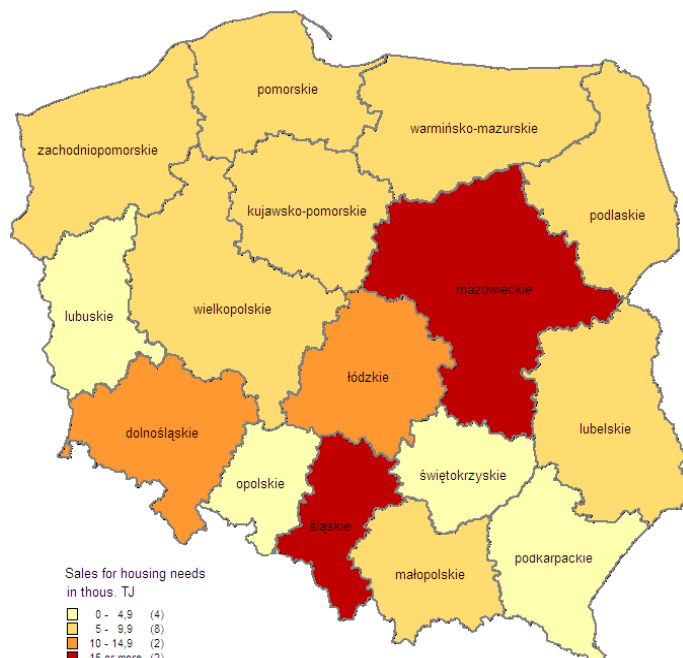
In the regional breakdown the largest congestion of heat network [in km per 100 km<sup>2</sup>] occurred in the following voivodships: śląskie (29.6), małopolskie (12.4), mazowieckie (9.8) and pomorskie (9.6). As for the remaining voivodships, it was below 9 km per 100 km<sup>2</sup>.

**Heat distribution network in km by voivodships in 2011**



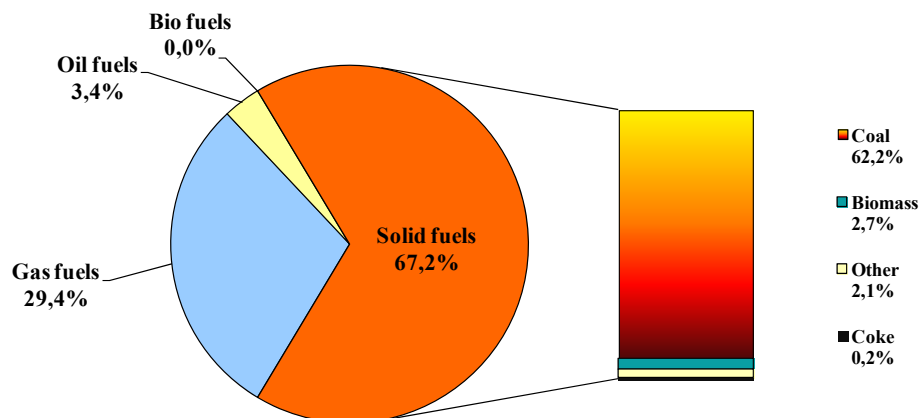
In 2011 the total sales of heat energy were below 196,640 TJ, of which the sales of heat energy for the housing heating needs were above 150,688 TJ. This allowed to provide heating to buildings with total cubic capacity of 2,007,538 thous. m<sup>3</sup>.

**Sales of heat energy by voivodships in 2011**



The most of heat energy was produced with the usage of solid fuel – 67,2%, then gas fuel – 29,4% and also oil fuel 3,4%.

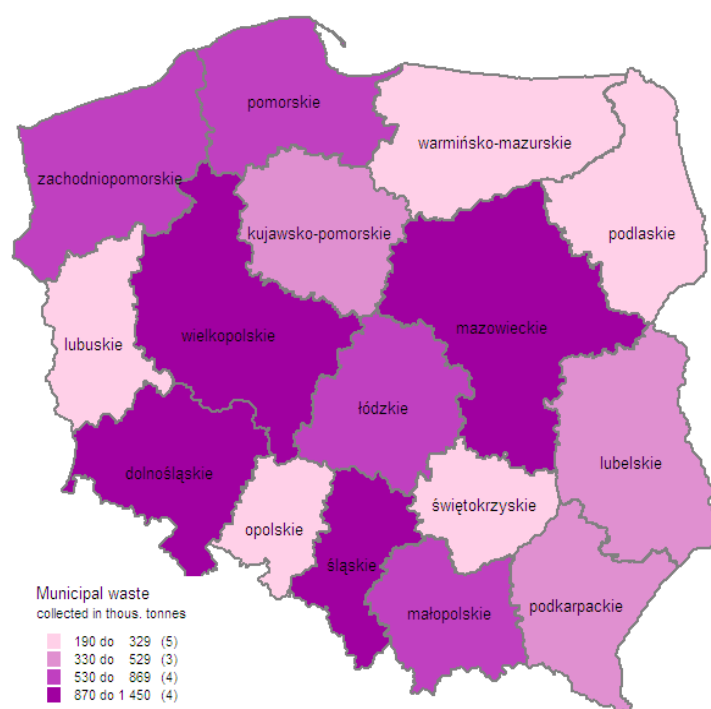
**The types of fuel used for production of heat energy in 2011 [%]**



### 3.4. MUNICIPAL WASTE MANAGEMENT

In 2011 in Poland 9,827.6 thous. tonnes of municipal waste were collected (in comparison to 2010 a 2.2% decrease). However, the amount of municipal waste generated increased – in 2011 it was 12,128.8 thous. tonnes, whereas in the previous year 12 038.4 thous. tonnes. The most municipal waste [in thous. tonnes] was collected in: mazowieckie (1,449.9), śląskie (1,360.5), wielkopolskie (928.4) and dolnośląskie (914.9) voivodships, whereas the least in: świętokrzyskie (195.6), podlaskie (252.1) and opolskie (256.8) voivodships.

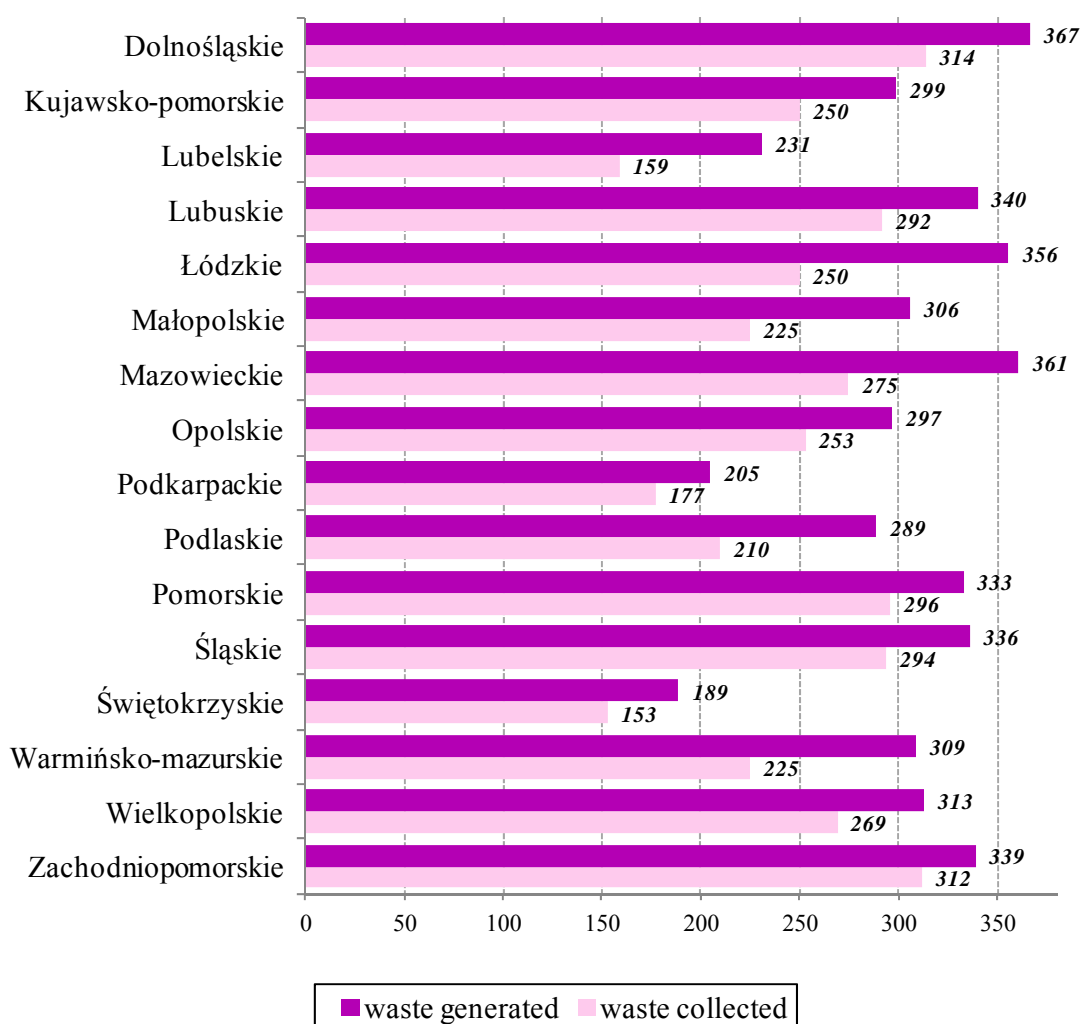
**Municipal waste collected in 2011 by voivodships**



In 2011 about 57.9% of municipal waste was collected by private units (58.3% in 2010), whereas 40.3% of municipal waste was collected by businesses from the public sector (39.9% in 2010) and remaining 1.8% by entities of ownership mixed between private and public sector (just as in 2010).

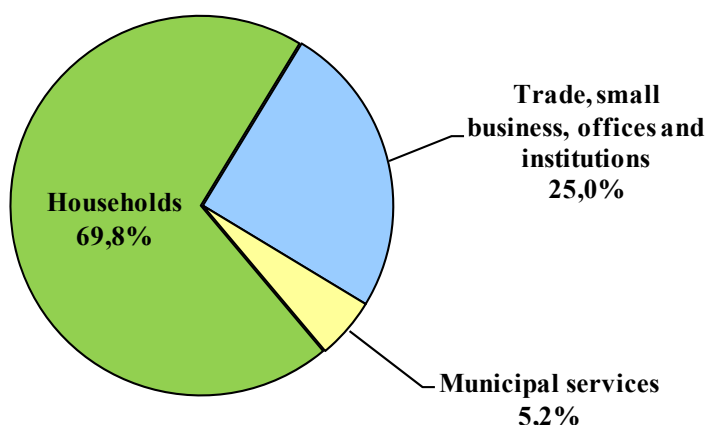
In 2011 there were about 315 kg of municipal waste generated per inhabitant, while the amount of municipal waste collected per inhabitant was at the level of about 255 kg.

### Municipal waste generated and collected per inhabitant in 2011 [kg]



In 2011 the majority (69.8%) of mixed municipal waste was collected from private households. The next significant source (25.0%) was commerce, small business, offices and institutions. Waste from municipal services, such as street cleaning or maintenance of parks or cemeteries, accounted for 5.2% of total arisings of mixed municipal waste collected (in 2010 it was 68.6%, 26.0%, and 5.4% respectively).

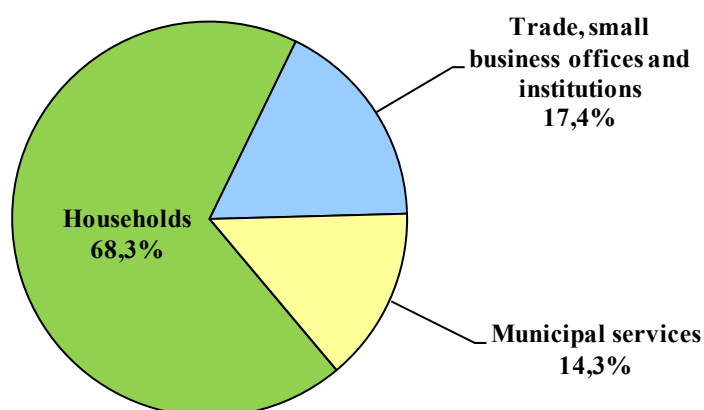
### Sources of mixed municipal waste in 2011 [%]



In 2011 separate collection of municipal waste was provided in 2,390 gminas, where biodegradable waste was collected in 1,031 gminas, and waste electrical and electronic equipment in 1,289 gminas (in 2010 that was 939 and 1,113 gminas respectively). In 89 gminas separate collection was not organized (in 2010 in 110 gminas).

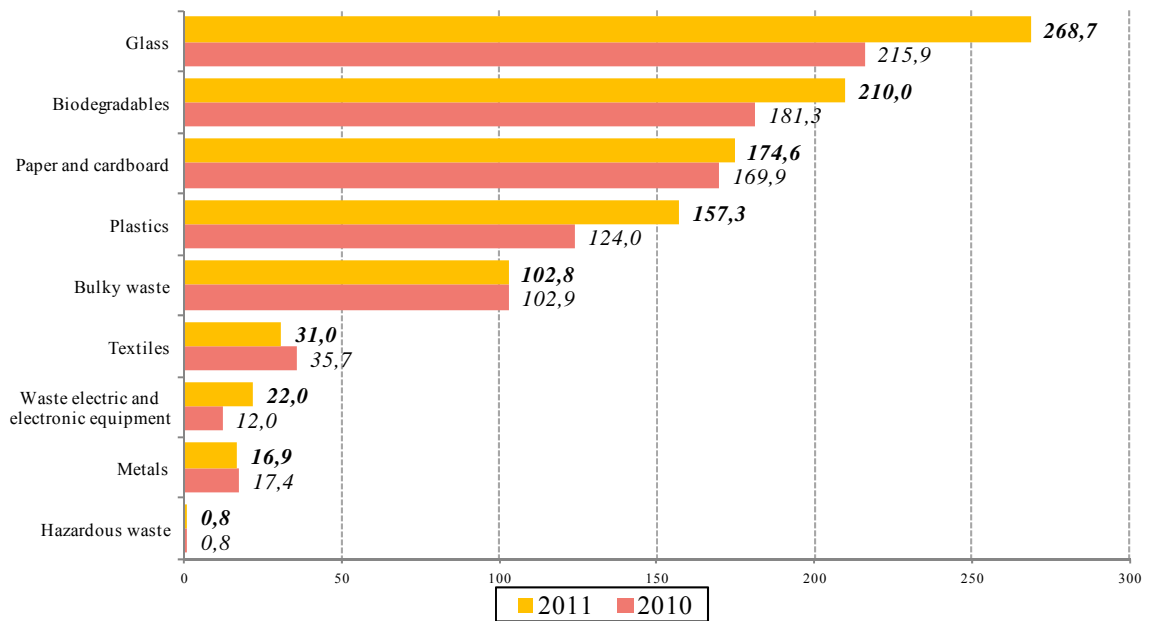
In 2011 most (68.3%) of separately collected municipal waste originated from households (mainly waste glass). Waste collected separately from commerce, small businesses, offices and institutions (mainly paper) accounted for 17.4%. Waste from municipal services (mainly biodegradable waste) was 14.3% of total arisings of municipal waste collected separately. In the previous year it was 69.4%, 17.0% and 13.6% respectively.

### Sources of municipal waste collected separately in 2011 [%]



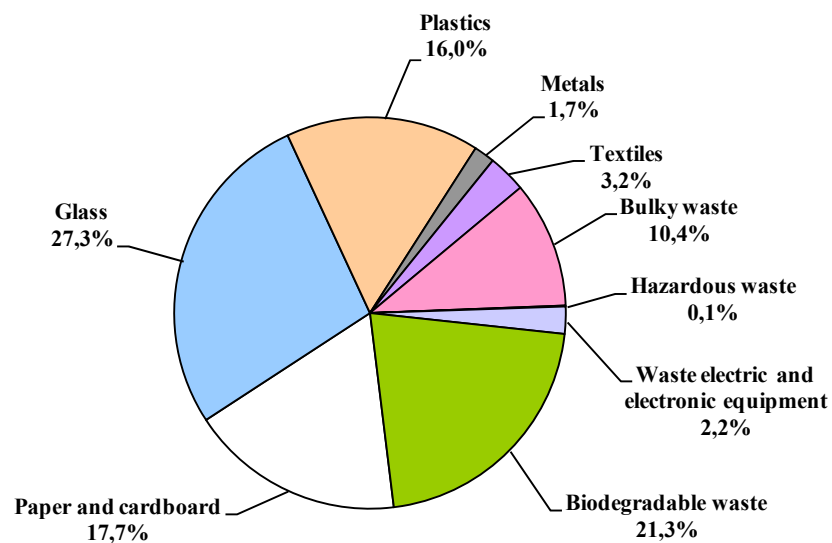
The share of separately collected waste in total amount of municipal waste collected increased from 8.6% in 2010 to 10.0% in 2011. Total tonnage of separately collected waste has increased from around 860 thous. tonnes in 2010 to around 984 thous. tonnes in 2011.

### Municipal waste collected separately in 2010-2011 [thous. t]



In 2011 total amount of glass collected for recycling was 268.7 thous. tonnes (27.3% of the total waste collected separately). The amount of paper and cardboard collected separately was 174.6 thous. tonnes (17.7%). The amount of collected separately biodegradable waste was 210.0 thous. tonnes (21.3%), and plastics 157.3 thous. tonnes (16.0%). Considering the most commonly recycled materials, the amount of glass collected for recycling has increased since 2010 by 24.4%, the amount of paper and cardboard increased by 2.8% and plastics by 26.9%. In 2011 there was collected 16.9 thous. tonnes of metal waste, a 2.8% less than in 2010.

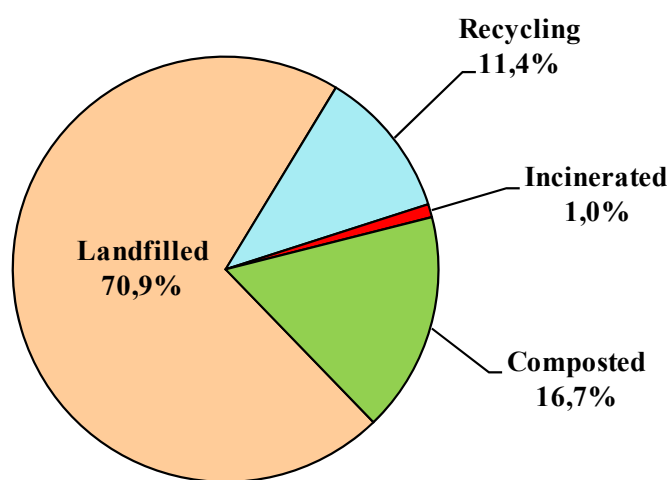
### Municipal waste collected separately in 2011 [%]



The proportion of municipal waste being landfilled fell from 73.4% in 2010 to 70.9% in 2011. However, the actual tonnage of waste being disposed of in this way decreased from 7,368.7 thous. tonnes in 2010 to 6,967.1 thous. tonnes in 2011 (by 5.5%).

In 2011 around 98.3 thous. tonnes of municipal waste were incinerated, which was 4.1% less than in 2010. However, the proportion of incinerated municipal waste in total tonnage of municipal waste collected, has remained constant at the level of 1%.

**Municipal waste management in 2011 [%]**

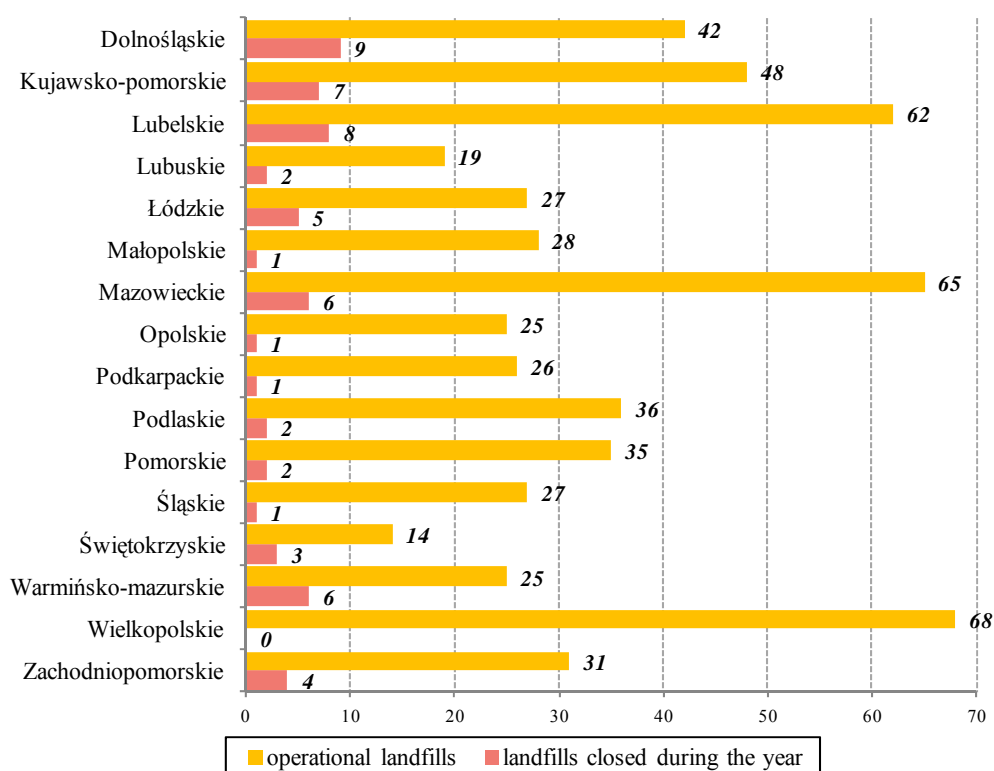


In 2011 about 1,643.9 thous. tonnes of municipal waste were treated by means of biological or biological–mechanical methods. There were mainly green waste from gardens, parks, and cemeteries, compostable wastes from markets, biodegradable wastes from kitchens and canteens. Compared to the previous year, the proportion of municipal waste being treated in that way has grown to the level of 16.7%. Around 344.2 thous. tonnes of materials designated for recycling were sorted out from mixed municipal waste.

At the end of 2011 there were 578 operating controlled landfill sites occupying an area of almost 2,350 ha. During 2011 there was closed 58 of such landfill sites, which occupied an area of above 190 ha.

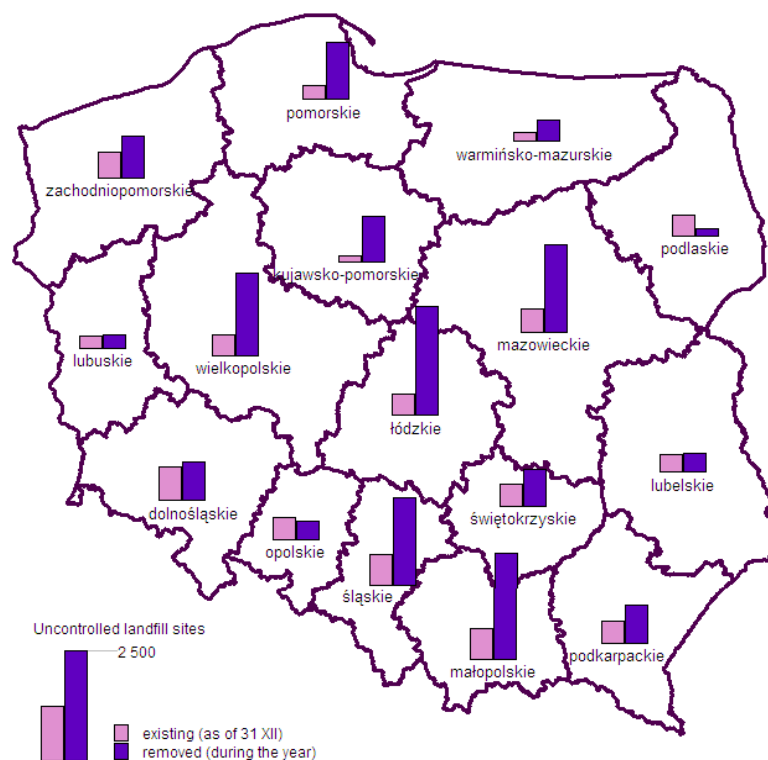
In 2011 among 428 of controlled landfill sites in operation the with degassing installations almost 64.5% were those with landfill gas escaping to the atmosphere. On the remaining landfills the collected gas was flared without energy recovery (a process for conversion of methane to carbon dioxide had been taking place) or with energy recovery. In 2011 about 73,244 thous. MJ of thermal energy and around 249,178 thous. kWh of electrical energy was recovered by the means of neutralisation the captured landfill gas by burning.

### Landfill sites in operation and closed during 2011 [pcs]



Growing number of cases of uncontrolled landfilling of municipal waste is still a major problem of waste management in Poland it causes damage to the environment and affect the aesthetic appeal of an area. At the end of 2011 in Poland there were 2,539 uncontrolled dumping sites, by 35% less than in the previous year.

### Uncontrolled landfill sites in 2011



At the end of 2011 about 75% of existing uncontrolled dumping sites was located in rural areas whereas almost 25% in urban areas. In 2010 it was 55% and 45% respectively. The number of uncontrolled dumping sites in urban areas in 2011 dropped by 64.2%, and in rural areas by 10.2% in comparison with 2010.

The types of land most commonly affected by uncontrolled dumping of waste include land near to waste management facilities, derelict land, roadsides, back alleys, private land (particularly on the outskirts of urban areas) and watercourses. During 2011 about 13,202 of such dumping sites were removed, from which 85.5% in urban and 14.5% in rural areas. Compared to the previous year, total number of removed illegal dumping sites has increased by about 36% (in urban areas it was an increase of about 45.3%, whereas in rural areas there was a decrease by 0.2%). During removal of illegal landfills about 53 thous. tonnes of municipal waste were collected, whereof 81% in urban and remaining 19% in rural areas.



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