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STATISTICAL INFORMATION AND ELABORATIONS

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PREFACE

The present publication is a consecutive edition of "Municipal Infrastructure". It aims at presenting recipients with the characteristics of municipal services market in Poland in 2016 and tendencies of changes taking place in surveyed area of activity.

The elaboration includes information on installations and municipal services in the scope of water supply and sewage 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, and urban and rural areas.

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

Thematic scope was presented in voivodships breakdown. Information at lower levels of aggregation (poviats and gminas), and data broken down by urban and rural areas are available in Local Data Bank on the website of Central Statistical Office (http://www.stat.gov.pl).

The authors will be grateful to all people and institutions for sending their comments, which will shape and enhance the content of next editions of the publication.

Director
of Trade and Services Department
Ewa Adach-Stankiewicz

Warsaw, October 2017

CONTENTS

SYMBOLS

"."	– no information or no reliable information available.
"–"	– magnitude zero.
"0"	– magnitude not zero, but less than 0.5 unit.
"x"	– not applicable.
"*"	– indicates that data have been changed in relation to the data published in the previous edition of publication.
"of which"	– indicates that not all elements of the sum are given.

ABBREVIATIONS

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

1. METHODOLOGICAL NOTES

1.1. SOURCES AND SCOPE OF DATA

Sources of information on municipal infrastructure in 2016 are results of statistical surveys included in the Statistical Survey Programme of Official Statistics (PBSSP):

1.26.06 – Technical infrastructure of water supply and sewage systems, heating, gas and energy,

1.26.08 – Municipal waste and maintaining cleanliness and order in municipalities,

and the secondary use of data from the surveys:

1.44.01 – Fuel and energy balances,

1.44.02 – Power and heat industry.

The forms used for data collection are:

- M-06 Report on water supply network, sewage network and removal of liquid waste collected in septic tanks;
- M-09 Report on collection and treatment of municipal waste;
- SG-01 Part 3 – Municipal statistics: housing and municipal economy;
- Annex to SG-01 report – Statistics of municipality: housing and municipal economy. Maintaining cleanliness and order in municipalities;
- G-02g Report on infrastructure, consumers and the sales of gas from gas supply network;
- G-02b Questionnaire on energy commodities and heating infrastructure.

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

Data regarding population using water supply and sewage systems include people living in residential buildings and collective accommodation buildings connected to a specific network.

Data on gas users concern the population in dwellings equipped with network gas installations.

Data on population using water supply and sewage systems since 2014, due to a change in the estimation method, has not been not fully comparable with the data presented in the previous editions of the publication.

Data on energy management cover units which were granted concessions for transmission and distribution of fuels and energy. 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 the rates of “households” tariff group. Data on consumption of electricity are presented on the basis of information on advanced payments made by consumers.

Data regarding the number of consumers of gas fuels come from entities which have concessions for gas trade and are based on the number of contracts with consumers of gas from gas supply network.

Information on heating include residential buildings, office and institutional buildings with central heating provided by transmission thermic-line, considered as the system of interconnected installations cooperating with each other, used for transmission and distribution of heating medium to recipients. Information regarding boiler-houses or boiler-rooms cover types of boilers, their power (i.e. the 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 the atmosphere).

Data in the field of heating, referring to the sales of heat energy, the number of boiler houses, the cubic volume of a buildings with central heating, the characteristics of boilers and equipment protecting the atmosphere from the emission of air pollutants installed in boiler houses since 2014 has included a change in the subjective scope of the survey.

The survey providing information about municipal waste (M-09 form) is conducted as a full survey and includes entities operating in the field of collection or treatment of municipal waste. Results include: amount of waste collected (from households, from trade, small business, offices and institutions, and from municipal services), and amount of waste designated for recovery and disposal operations.

Due to the fact that since 1 July 2013 all real estate owners are covered by municipal waste management system, the amount of waste collected is considered to be waste generated. The reform of municipal waste management system has changed the organisation of collection of municipal waste from real estate owners. Currently, municipalities are obliged to organize tenders for collection of municipal waste from real estate owners, or tenders for collection and management of that waste. Real estate owners no longer conclude contracts with providers of municipal waste collection services from residents on their own.

For computing data per 1 inhabitant (1,000 population, etc.) as of the end of a year (e.g., population using municipal installations), population as of 31 XII was used, while data describing the magnitude of a phenomenon within a year (e.g., consumption) – as of 30 VI.

1.2. MAIN DEFINITIONS

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 supply and sewage 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.

Water supply 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, and water pressure control devices.

Water supply transmission network – conduits bringing water from distant water intakes to distribution network.

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

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

Street outlets are publicly available facilities connected directly 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 supply 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).

Sewage system is a complete sewage collection system serving discharging of wastewater, including sewage 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 sewage network – a system of covered (underground) conduits discharging sewage from buildings and other objects to collectors or sewage treatment facilities.

Sewage connection – a segment of conduit connecting internal sewage installations in a property of the services consumer with the sewage network after a first inspection chamber from a side of a building, and in case of its lack – from a boundary of the 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.

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

Gas supply 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;
- connections – a system of conduits joining distribution gas supply network with buildings and other objects.

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

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

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

Collection of waste – means the gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility.

Separate collection – the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment.

Municipal waste separate collection point – a stationary place where inhabitants can hand over various types of municipal waste, e.g. paper and cardboard, glass, composite packaging, plastics, or biodegradable municipal waste.

Waste management – the collection, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker.

Treatment – recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery – any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

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

Energy recovery – thermal waste treatment as a result of which energy is generated.

Recycling – any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal – any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy.

Landfill site – a structure for the deposit of waste.

Degassing of landfill sites – collection of biogas from landfills receiving biodegradable waste. Collected gas is cleaned and used for production of energy, and if it is not possible (e.g. when its quantity is too small for effective energy production), it is neutralized through combustion in burners.

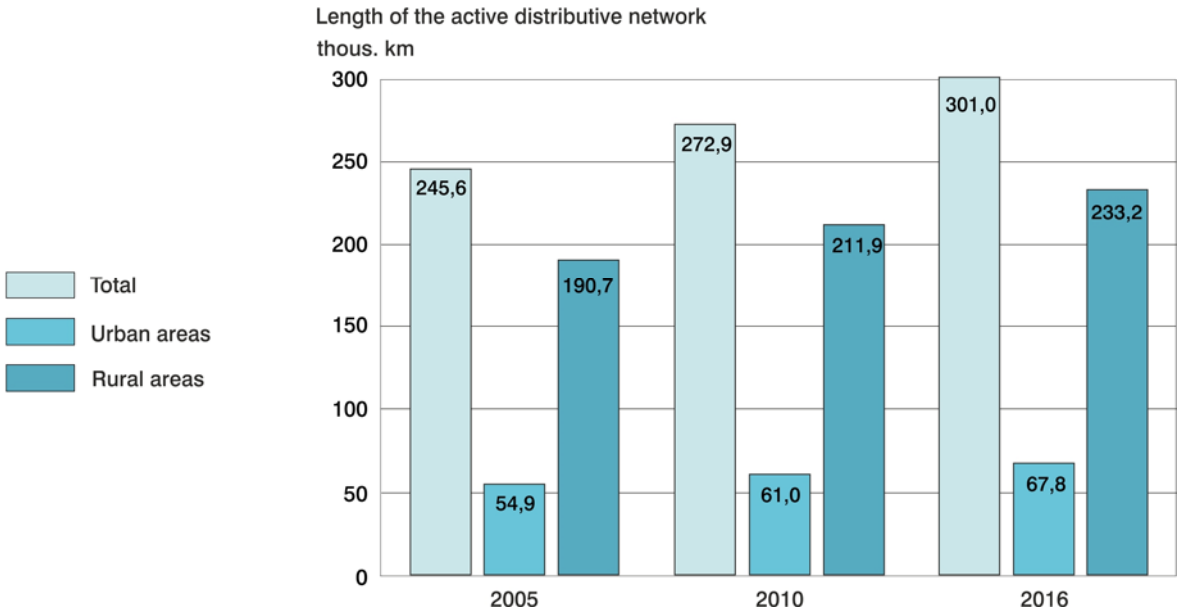
2. RESULTS OF SURVEYS – SYNTHESIS

2.1. WATER SUPPLY SYSTEM AND SEWAGE SYSTEM MANAGEMENT

In recent years in Poland there has been a significant increase in the investments in the area of technical and sanitary infrastructure. The length of the water supply network increased from 245.6 thous. km in 2005 to 301.0 thous. km in 2016, i.e. by 22.6%, of which in rural areas from 190.7 thous. km to 233,2 thous. km of the network, i.e. by 22.3%. However, the number of connections increased by almost 1,067 thous. pcs, i.e. by 23.7%, of which approx. 696.0 thous. pcs in rural areas, i.e. by 25.3%.

The most significant increase in the length of the water supply network was observed in the urban areas of the voivodships: podkarpackie – of over 55%, lubuskie – of over 42% and zachodniopomorskie – of approx. 32%, and in rural areas of the voivodships: zachodniopomorskie – of nearly 42%, warmińsko-mazurskie – of over 35% and mazowieckie – of nearly 34%.

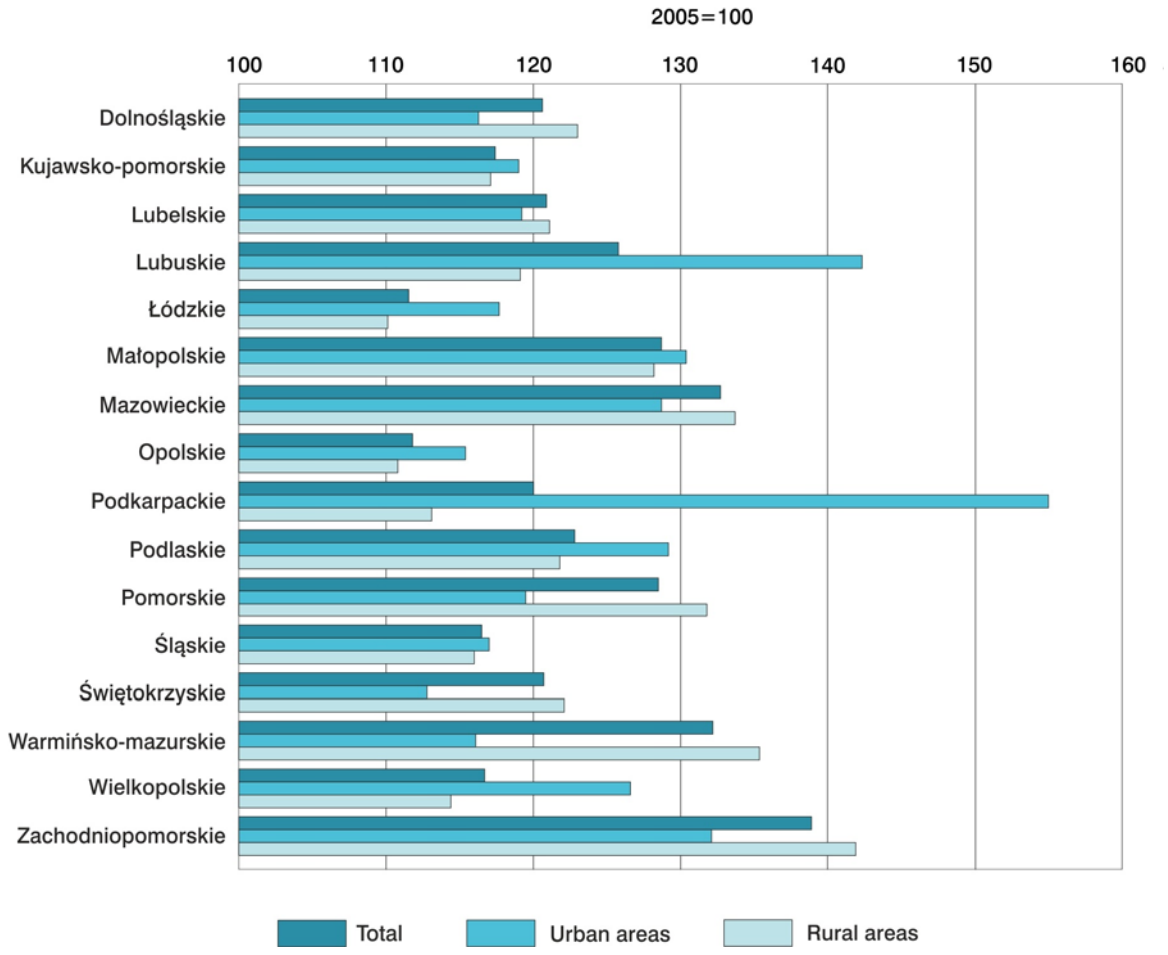
CONDITION OF WATER SUPPLY NETWORK IN 2005, 2010, 2016



In 2016, the length of **the water supply network** in Poland reached almost 301 thous. km and the number of connections – nearly 5.6 mln. In comparison to 2015, the length of the newly built or reconstructed water supply network increased by approx. 3.1 thous. km, with a simultaneous increase in the number of connections to buildings of over 97 thous. pcs.

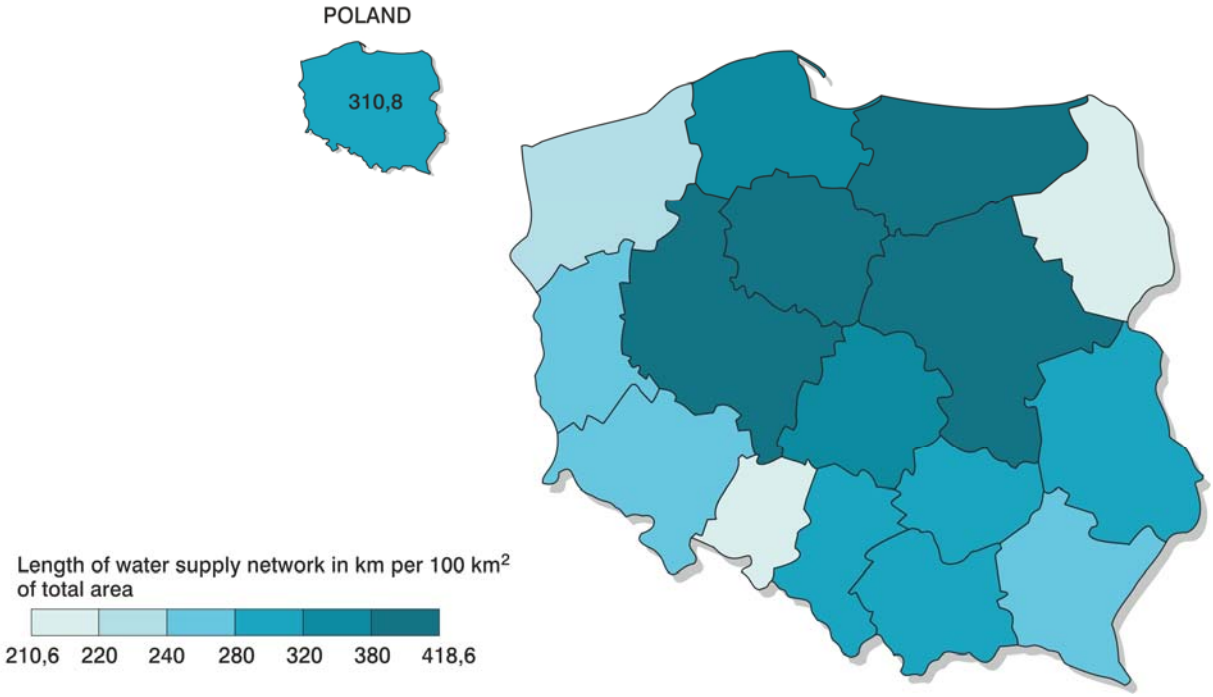
More than 77.5% of the length of the water supply network and approx. 61.8% of connections to buildings were located in rural areas. As compared to the previous year, the length of the water supply network increased in urban areas by over 0.9 thous. km, and the number of connections – by nearly 35.1 thous. pcs. In rural areas there were over 2.2 thous. km of new network, and the number of connections increased by nearly 62.2 thous. pcs.

CHANGE IN LENGTH OF WATER SUPPLY NETWORK IN 2005–2016



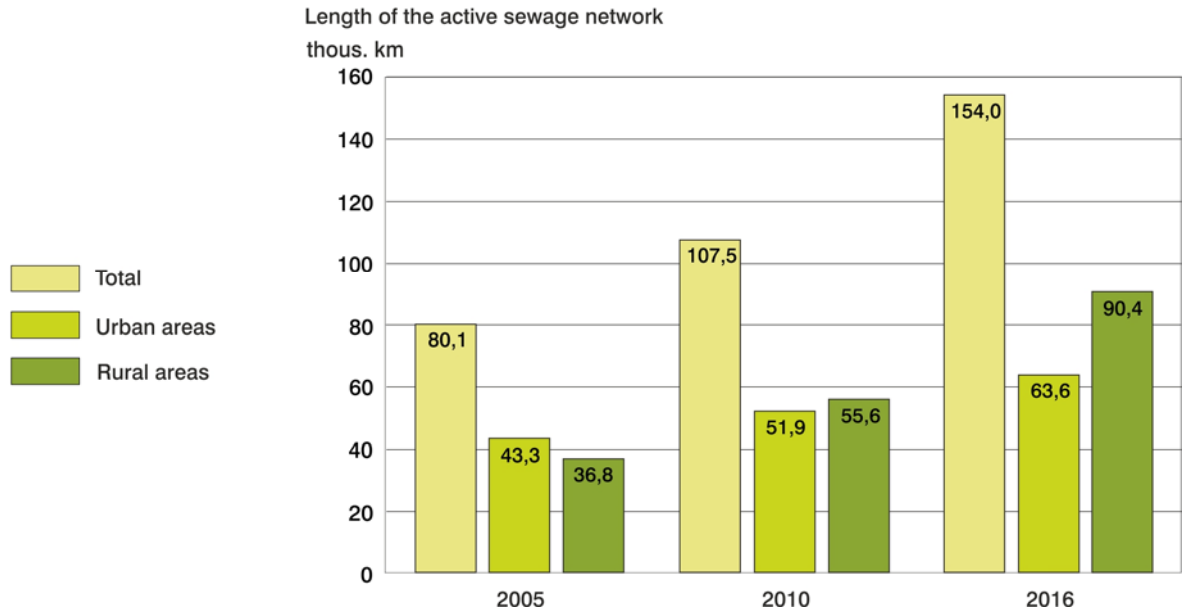
The highest **water supply network density** was observed in the voivodships: śląskie – 173.3 km per 100 km^2 (an increase of 2.6 km per 100 km^2 compared to 2015), małopolskie – 133.3 (of 3.0 km per 100 km^2), and the lowest in the zachodniopomorskie voivodship – 49.0 (of 0.5 km per 100 km^2).

DENSITY OF WATER SUPPLY NETWORK IN URBAN AREAS IN 2016



In 2005-2016, **the length of the sewage network** increased by 73.9 thous. km (by 92.2%), reaching 154.0 thous. km in 2016. In rural areas the network growth was higher by 53.0 thous. km (by 146%) than in urban areas, where an increase of 20.3 thous. km was observed (of 46.8%).

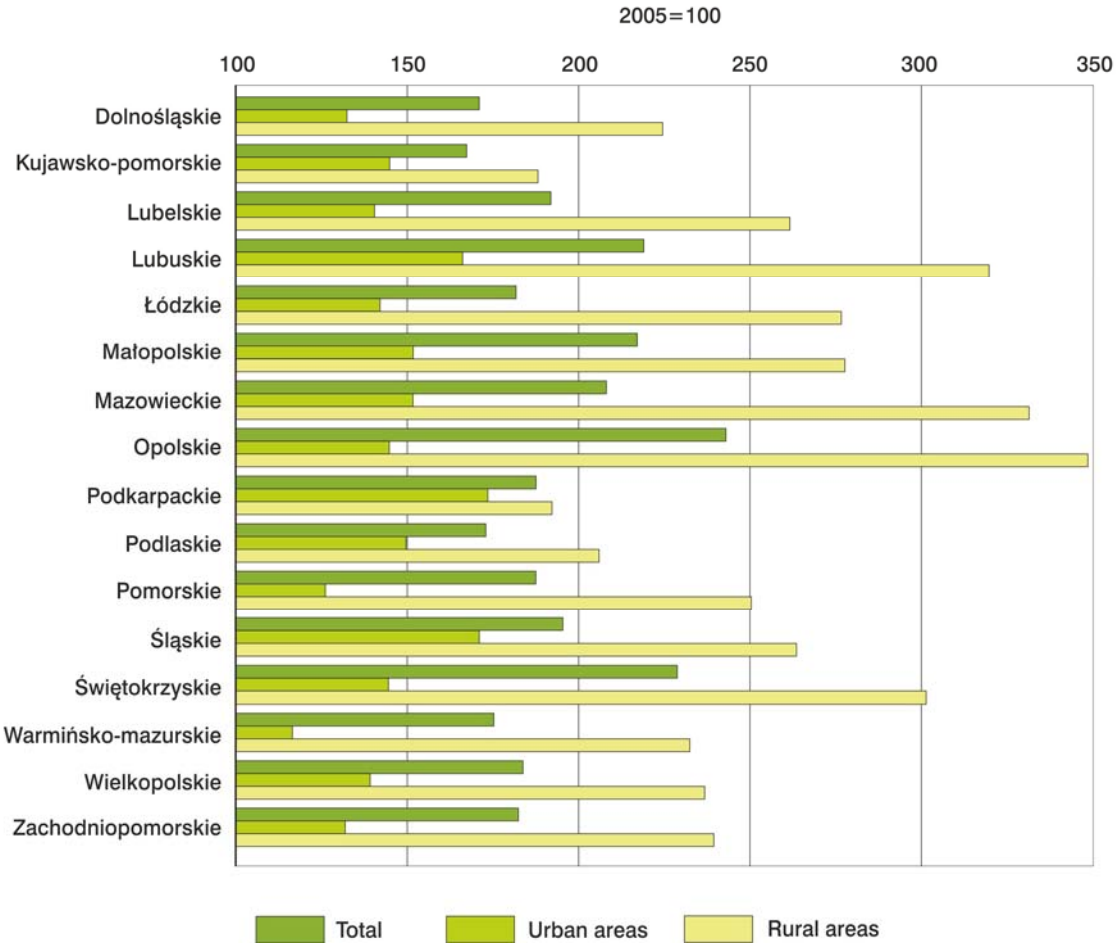
CONDITION OF SEWAGE NETWORK IN 2005, 2010, 2016



As far as individual voivodships are concerned, the most significant increase in the length of the sewage network in rural areas was observed in the voivodships: opolskie – of 248.5%,

mazowieckie – of 231.5%, lubuskie – of approx. 220%, and świetokrzyskie – of over 201%. However, in urban areas the highest increase in the length of the sewage network was observed in the voivodships: podkarpackie – of over 73%, śląskie – of approx., 71%, and lubuskie – of 66%.

CHANGE IN LENGTH OF SEWAGE NETWORK IN 2005–2016



In 2016, the length of the **sewage network** in Poland reached more than 154 thous. km, and the number of connections to buildings – approx. 3.2 mln pcs. As compared to 2015, the length of the newly built or reconstructed sewage network increased by approx. 4.3 thous. km, i.e. by 2.9%, with a simultaneous increase in the number of connections of over 152 thous. pcs, i.e. by 5.0%.

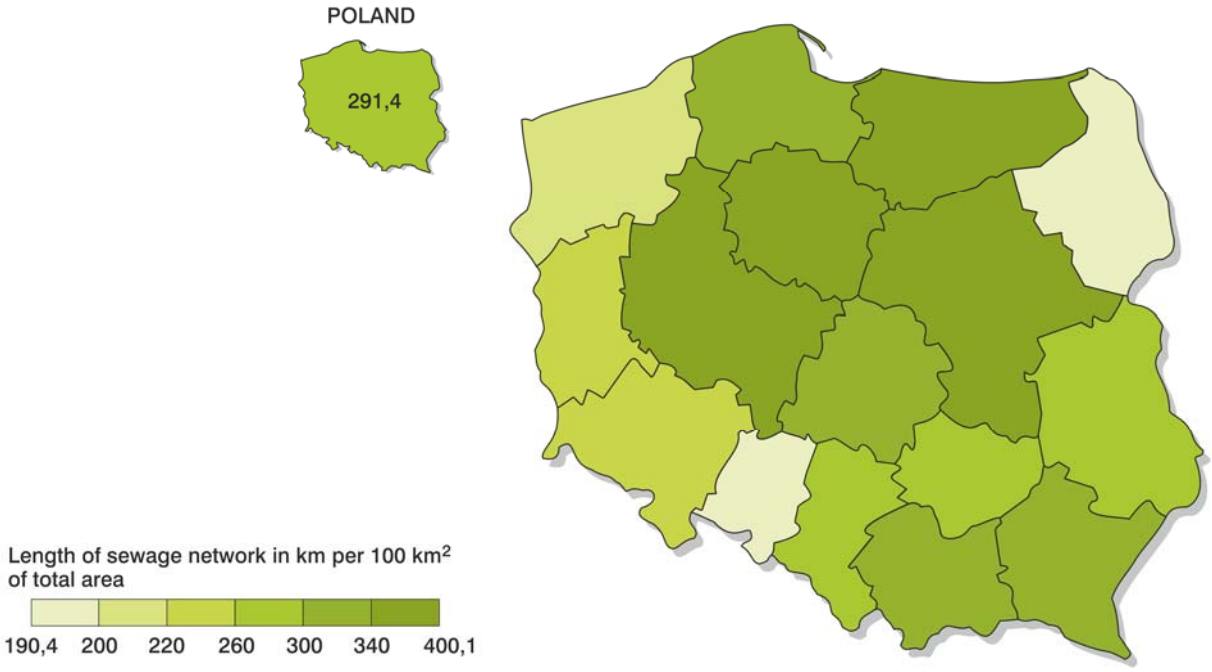
In rural areas there were 58.7% of the sewage network and 45.3% of the number of connections. As compared to 2015, the length of the network in urban areas increased by over 2.8 thous. km (by 3.2%), and the number of connections – by more than 81 thous. pcs. (by 6.0%). In the

corresponding period over 1.5 thous. km of network (an increase of 2.5 %) and approx. 71 thous. connections (an increase of 4.2%) were constructed in urban areas.

As compared to 2015, the highest increase in the length of the sewage network in total was observed in the voivodships: wielkopolskie – of 6.3% (in urban areas – of 6%), lubuskie – of 4.5% (in urban areas – of 5.2%), and mazowieckie – of 4.3% (in urban areas – of 2.7%), and the lowest increase – in the świętokrzyskie voivodship – of 1.2% (in urban areas – of 0.1%).

The highest **sewage network density in 2016** was observed in the voivodships: śląskie – 130.4 thous. km per 100 km^2, małopolskie – 102.3 thous. km per 100 km^2, and the lowest in podlaskie – 17.4 thous km per 100 km^2, and lubelskie voivodships – 25.7 thous. km per 100 km^2.

DENSITY OF SEWAGE NETWORK IN URBAN AREAS IN 2016



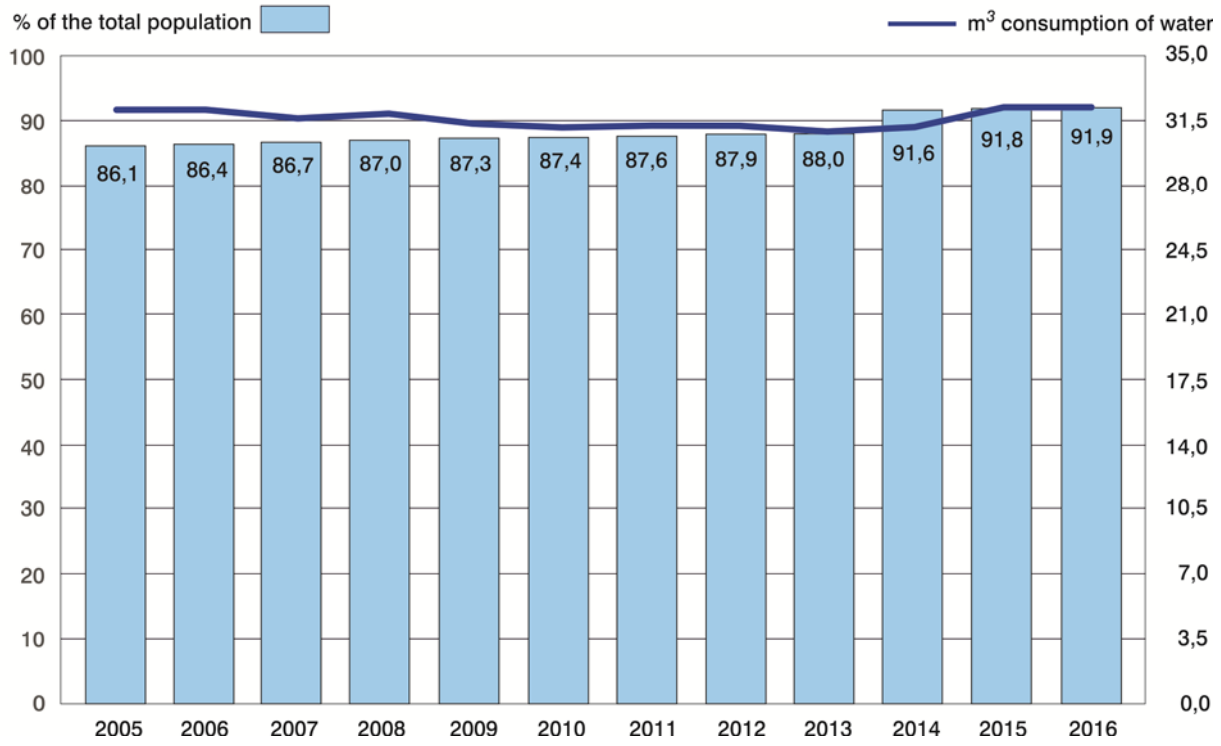
Along with the development of the water supply and sewage infrastructure during the period considered, the number of population using the aforementioned networks has also increased.

At the same time, there is a noticeable decline in the amount of water consumed per capita in Poland. Water saving by households results from changes in water prices per 1 m^3 and general metering of water consumption. Furthermore, the decrease in water consumption results from limiting network water losses due to the modernization of the existing networks.

In 2016, nearly 91.9% of the total population used the water supply system (an increase of 5.8 percentage points in comparison to 2005). In urban areas over 96.5% of the total population had

access to the water supply system (an increase of 1.2 percentage points as compared to 2005). In rural areas the share of the population using the water supply system was at the level of 85%.

POPULATION USING THE WATER SUPPLY SYSTEM AND CONSUMPTION OF WATER PER CAPITA IN 2005–2016

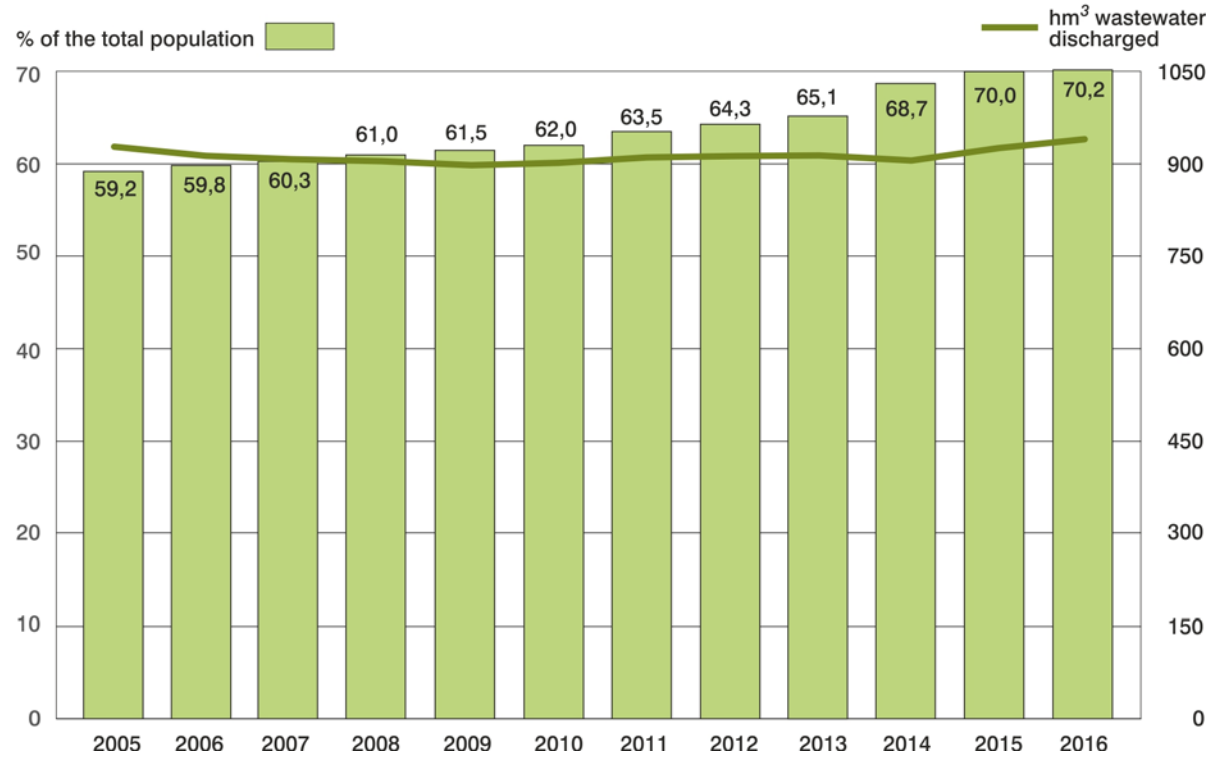


The average **water consumption by households** in 2016 amounted to 32.2 m^3 per capita, with 34.2 m^3 in urban areas, and 29.2 m^3 in rural areas. As compared to 2015, water consumption remained at the same level. In urban areas a slight decrease in water consumption was recorded – of 0.1 m^3, while in rural areas – an increase at level of 0.2 m^3. The highest water consumption increase was observed in łódzkie voivodship – of 1.4 m^3 per capita (of which in urban areas it was 0.5 m^3, and in rural areas – 2.9 m^3).

The percentage of **persons using the sewage system** in 2005-2016 increased from 59.2% to 70.2% (an increase of 11.0 percentage points). In urban areas the network was used by 90.0% of the population (an increase of 5.2 percentage points), and in rural areas by 40.3% (an increase of 21.5 percentage points).

The amount of wastewater discharged from households in 2016 amounted to 938.1 thous. hm^3 (in urban areas – 818.5 hm^3 and in rural areas – 119.6 hm^3), and increased by 12 hm^3 compared to 2015 (by 3 hm^3 and 9 hm^3, respectively).

POPULATION USING THE SEWAGE SYSTEM AND WASTEWATER DISCHARGED FROM HOUSEHOLDS IN 2005–2016

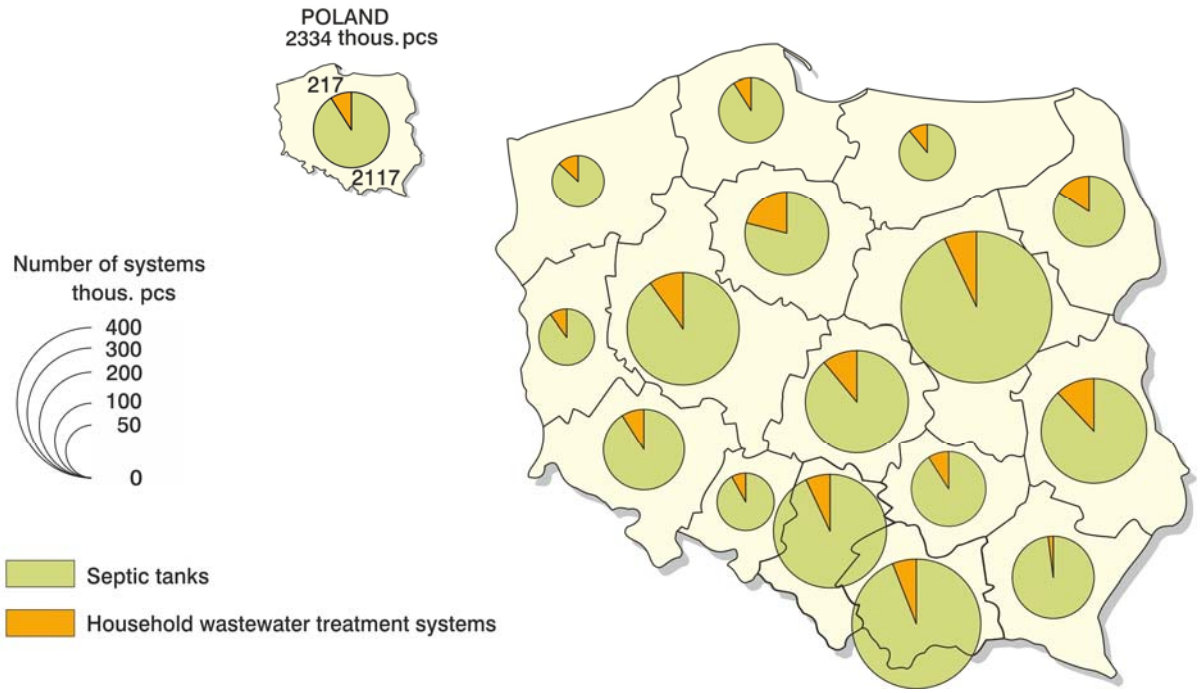


In the areas of the country with insufficiently developed sewage infrastructure some of the inhabitants use on-site systems for collection of liquid waste, which can be a cheaper alternative to the construction of sewage systems channelling sewage to wastewater treatment plants. These are septic tanks and household wastewater treatment systems. In 2016 in Poland, there were 2,333 thous. of such devices, of which approx. 91% were septic tanks.

For several years, a systematic decrease in the number of septic tanks has been observed, whereas the number of household wastewater treatment systems has been increasing. The number of septic tanks decreased from about 2,136 thous. in 2015 to 2,117 thous. in 2016 (by 0.9%), while the number of household wastewater treatment systems increased from about 203 thous. in 2015 to about 217 thous. in 2016 (by 6.8%).

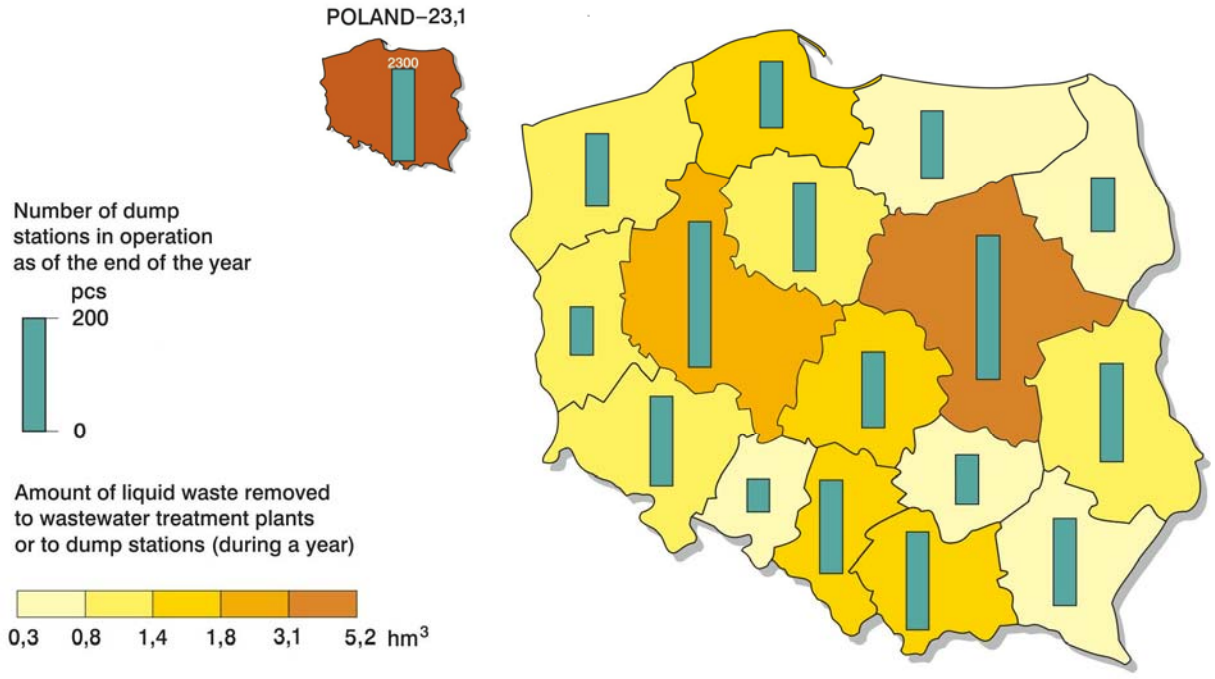
The majority i.e. nearly 86% of on-site systems for the collection of liquid waste were located in rural areas. About 85% of all septic tanks and approx. 92% of the total number of household wastewater treatment systems were located there. About 67.8% of liquid waste was collected from rural areas, while 32.2% of all transported liquid waste came from urban areas.

ON-SITE SYSTEMS FOR COLLECTION OF LIQUID WASTE IN 2016



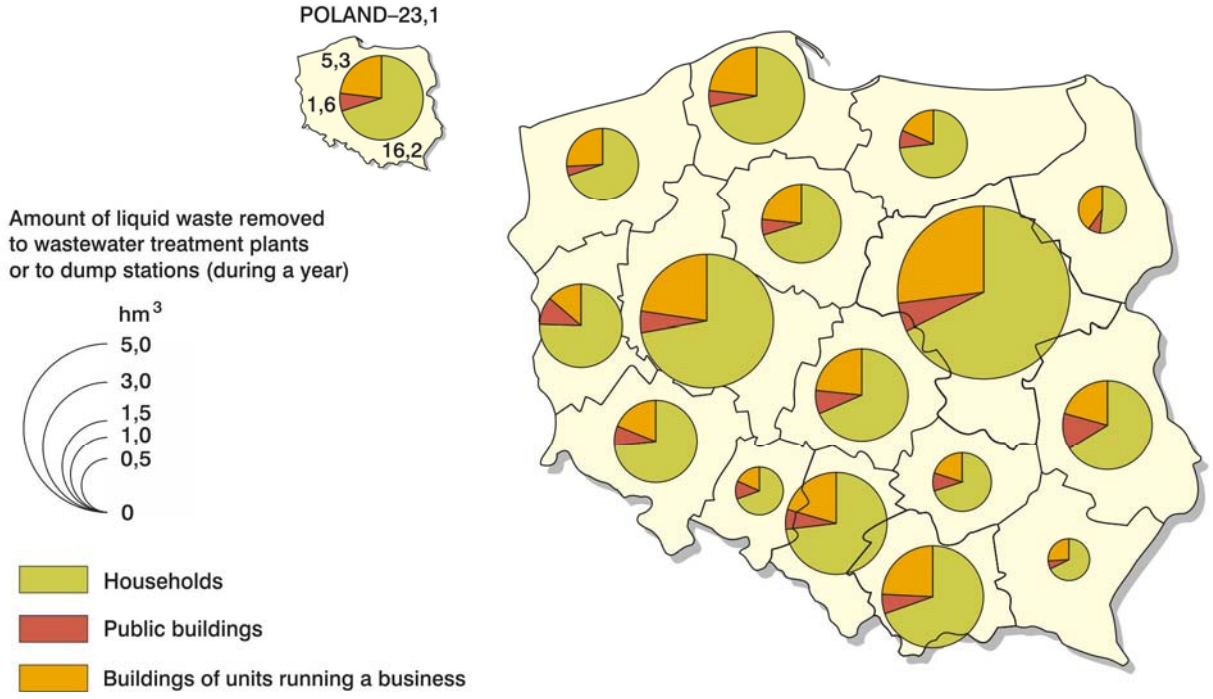
Liquid waste was collected from owners of septic tanks and delivered to wastewater treatment plants or to dump stations. In 2016, approx. 23.1 hm3 of liquid waste were collected (as in 2015), which accounts for approx. 2.1% of the total quantity of the wastewater discharged to the wastewater treatment plants by sewage system. About 68% of dump stations were located in rural areas. Their total number decreased from 2,311 in 2015 to 2,300 in 2016; in rural areas it declined by 0.8%, and in urban areas it grew by 0.3%.

DUMP STATIONS AND LIQUID WASTE REMOVED TO WASTEWATER TREATMENT PLANTS OR TO DUMP STATIONS IN 2016



Out of the total quantity of liquid waste transported to wastewater treatment plants or to dump stations in 2016, approx. 70.0% originated from households, 23.1% from buildings of business entities, and the remaining part of liquid waste (6.9%) from public utility buildings (in 2015, it was 69.0%, 24.0%, and 7.0%, respectively). In 2016, about 73.1% of liquid waste was transported by private enterprises (73.2% in 2015), whereas 26.9% by public sector companies (26.8% in 2015).

SOURCES OF LIQUID WASTE IN 2016

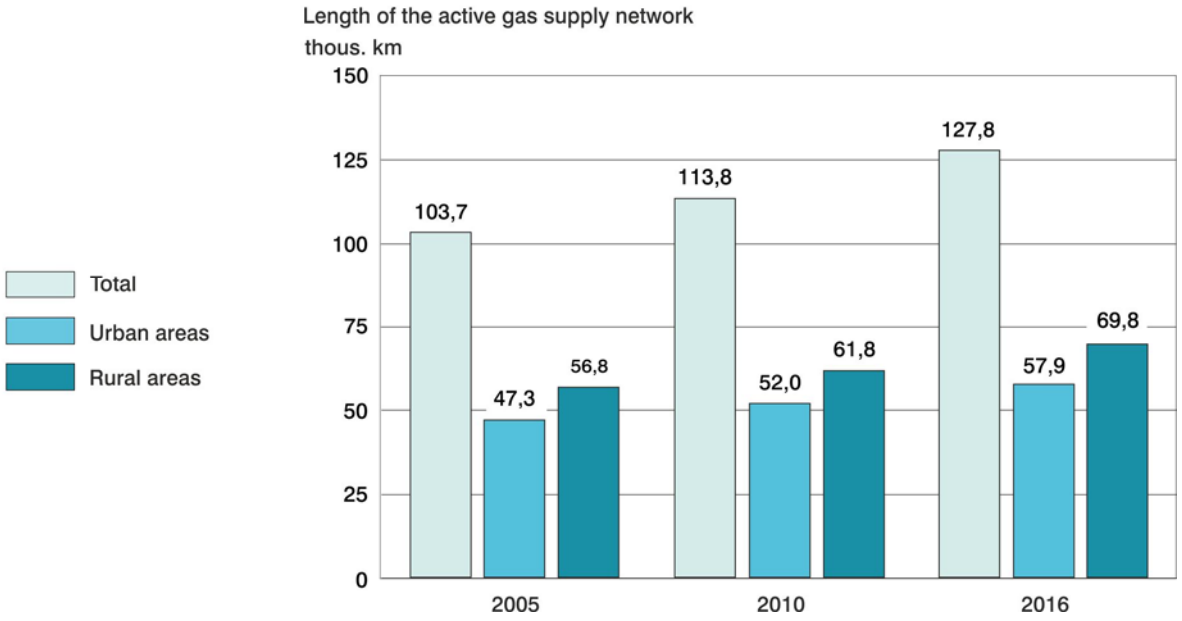


2.2. ENERGY MANAGEMENT AND GAS ENGINEERING

In the last decade there has been an increase in the investments in the area of **the natural gas system infrastructure**. Since 2005, the length of the gas network in total increased by 26.7 thous. km (by 21.8%) and in 2016 it reached the length of 149.0 thous km, of which 127.8 thous. km belonged to the distributive network. As compared to 2015, an increase in length of the gas network in total was observed – by nearly 3.1 thous. km (by 2.1%).

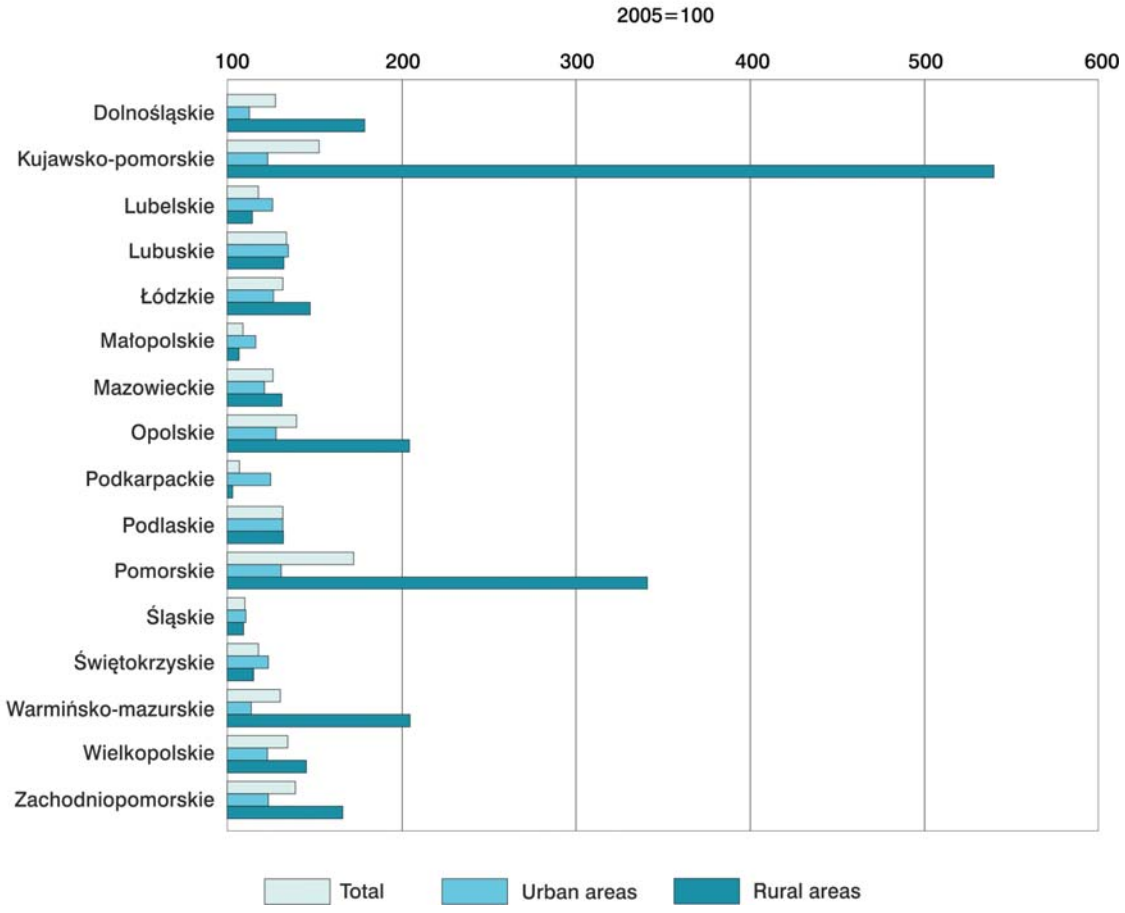
Since 2005 the length of the distributive gas network has increased by 24.1 thous. km (by 23.3%) and as of 31 December 2016 it amounted to 127.8 tous. km. In rural areas its length increased by 13.5 thous. km (by 23.9%) reaching 69.8 thous. km in 2016, and in urban areas an increase of 10.7 thous. km was recorded (of 22.5%), amounting to 57.9 thous. km. The number of connections in this period increased by approx. 568 thous. of which over 223 thous. in rural areas.

CONDITION OF GAS SUPPLY DISTRIBUTION NETWORK IN 2005, 2010, 2016



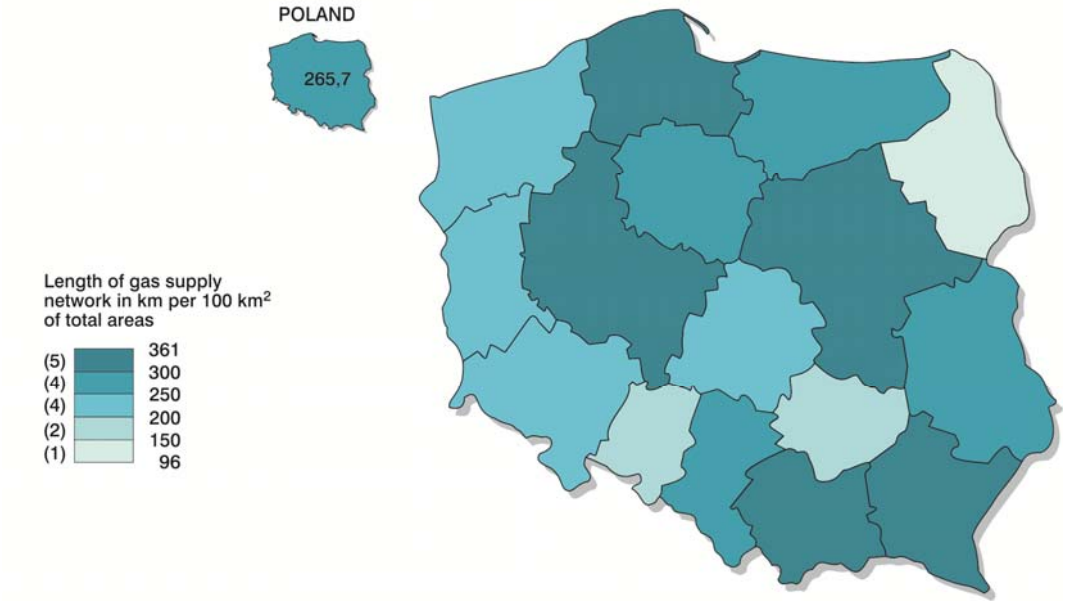
A significant increase in the length of the distributive gas network was observed in the urban areas of the voivodships: lubuskie – of over 46%, podlaskie – of 39.8%, and pomorskie – of 33.3%, and in rural areas of the voivodships: kujawsko-pomorskie – of 494%, pomorskie – of nearly 264% and warmińsko-mazurskie – of nearly 119%.

CHANGE IN LENGTH OF GAS SUPPLY DISTRIBUTION NETWORK IN 2005–2016



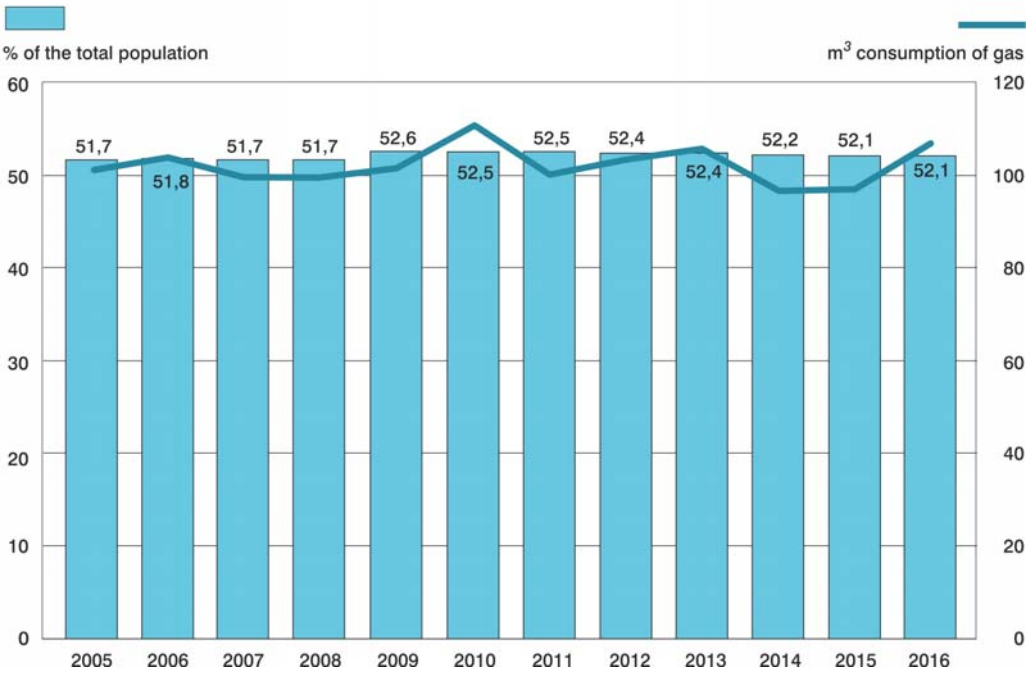
In the spatial arrangement in Poland at the end of 2016, as compared to the previous year, the highest increase in the length of the distributive network was recorded in the voivodships: kujawsko-pomorskie – of 6.8% (in urban areas – of 6.4%), lubuskie – of 5.6%, (in urban areas – of 8.5%), and pomorskie – of 4.0% (in urban areas – of 2,2%), and the lowest – in podkarpackie voivodship – of 1.7% (in urban areas – of 2.2%).

DENSITY OF GAS SUPPLY DISTRIBUTION NETWORK IN URBAN AREAS IN 2016



During the period considered, the number of **people using the gas from the gas supply system** in Poland has remained at the similar level. The percentage of the total population using the aforementioned network has increased since 2005 by 0.4 percentage point, of which in rural areas – by 6.2 percentage points.

POPULATION USING THE GAS SUPPLY SYSTEM AND COSUMPTION OF GAS PER CAPITA IN 2005–2016

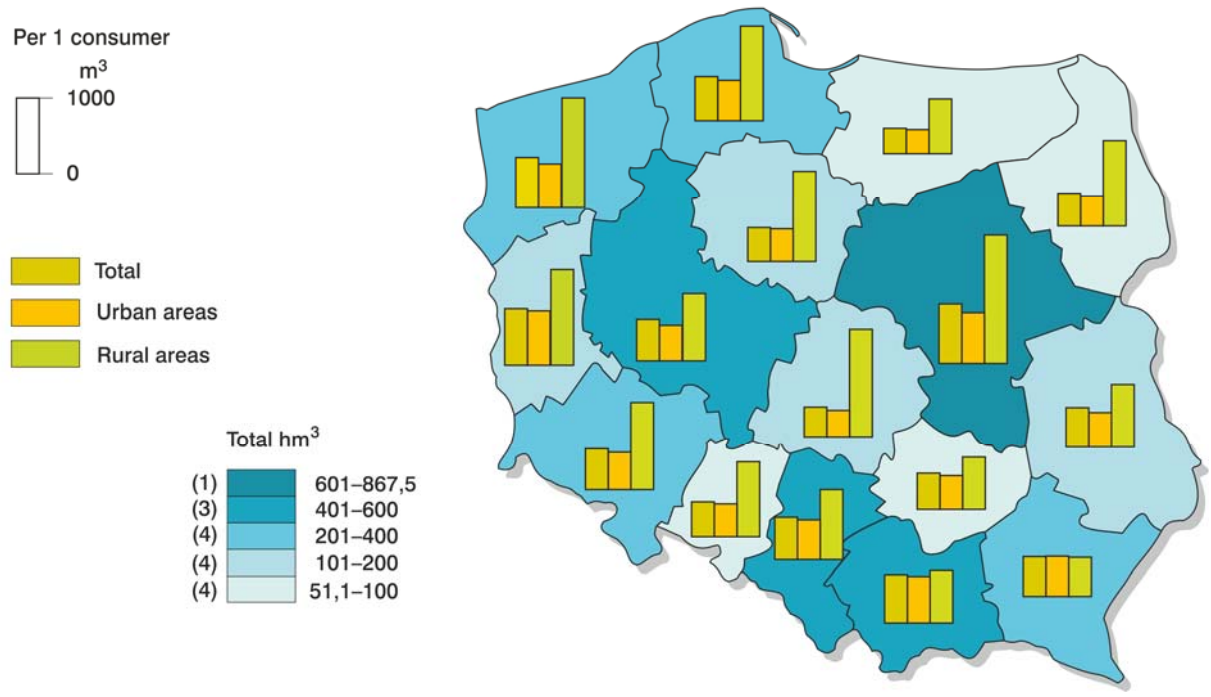


In 2016 in Poland, the **percentage of the total population using the gas system** remained at the same level as in 2015 i.e. 52.1%. In urban areas 71.4% of the total population used the gas system, while in rural areas – 23.0%. In comparison to 2015, the percentage of population using the gas system increased in rural areas by nearly 0.4 percentage point, with a decrease of 0.2 percentage point in urban areas.

In comparison to 2005, the consumption of gas from the gas supply system by households in Poland increased by 6.5%, with simultaneous increase in the number of consumers by 6.4%. In urban areas gas consumption decreased by 0.1%, with an increase in the number of consumers by 3.0%, while in rural areas an increase was observed both in the gas consumption (of 38.7%) and the number of consumers (of 34.9%).

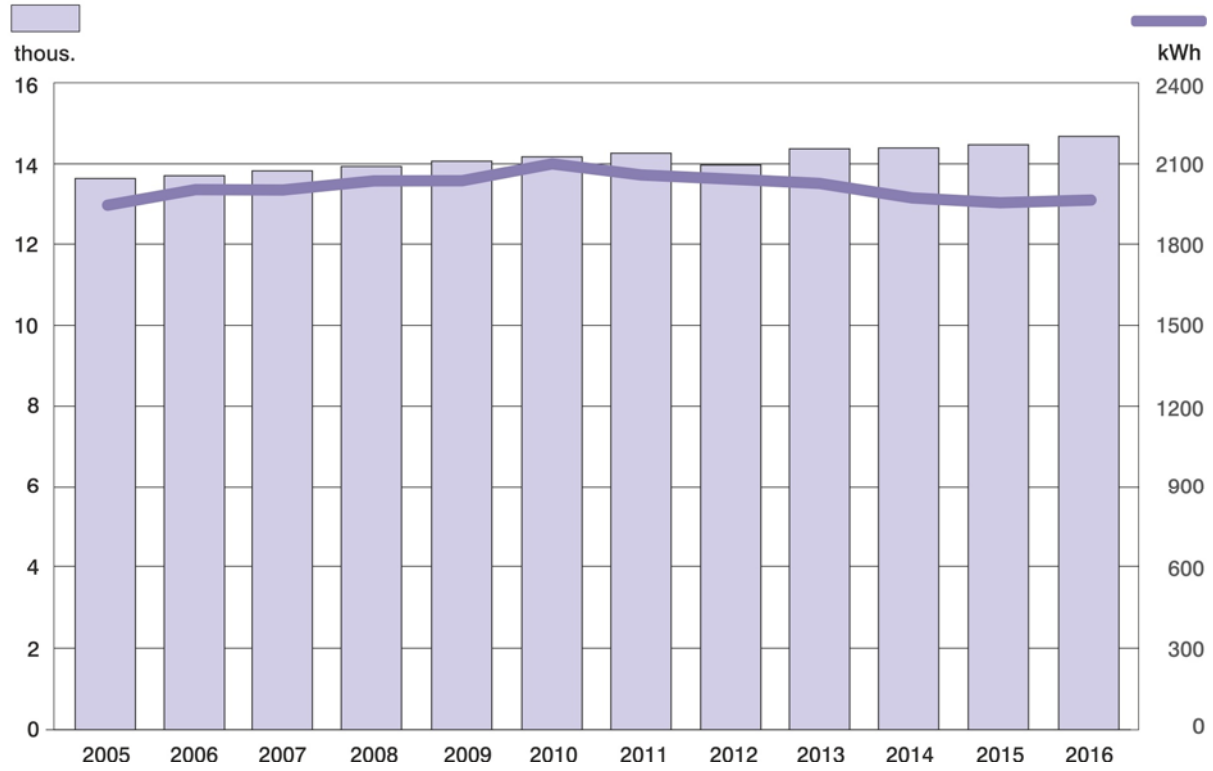
In 2016, **the consumption of gas from the gas supply system by households** was nearly 551 hm^3 per 1 consumer, and in urban areas it amounted to over 497 hm^3, while in rural areas – approx. 887 hm^3. As compared to 2015, the consumption of gas from the gas supply system increased by 8.9% (in rural areas by 7.0%, and in urban areas by 9.2%). The highest consumption of gas from the gas supply system by households per 1 consumer in Poland was recorded in wielkopolskie voivodship (760.3 hm^3 per 1 consumer), and the lowest in łódzkie voivodship (364.1 hm^3 per 1 consumer). In comparison to 2015, the consumption of gas from the gas supply system per 1 consumer increased in urban areas by approx. 42 hm^3, while in rural areas it increased by approx. 58 hm^3.

SALE OF GAS TO HOUSEHOLDS IN 2016



In 2005-2016 in Poland there has been a gradual decrease in the **electric energy consumption** by households. This is mainly a result of changes in the population's behaviour, i.e. increasing the energy efficiency of households, and also replacing household appliances with those with improved energy-saving parameters.

CONSUMERS AND CONSUMPTION OF ELECTRICITY IN HOUSEHOLDS IN 2005–2016



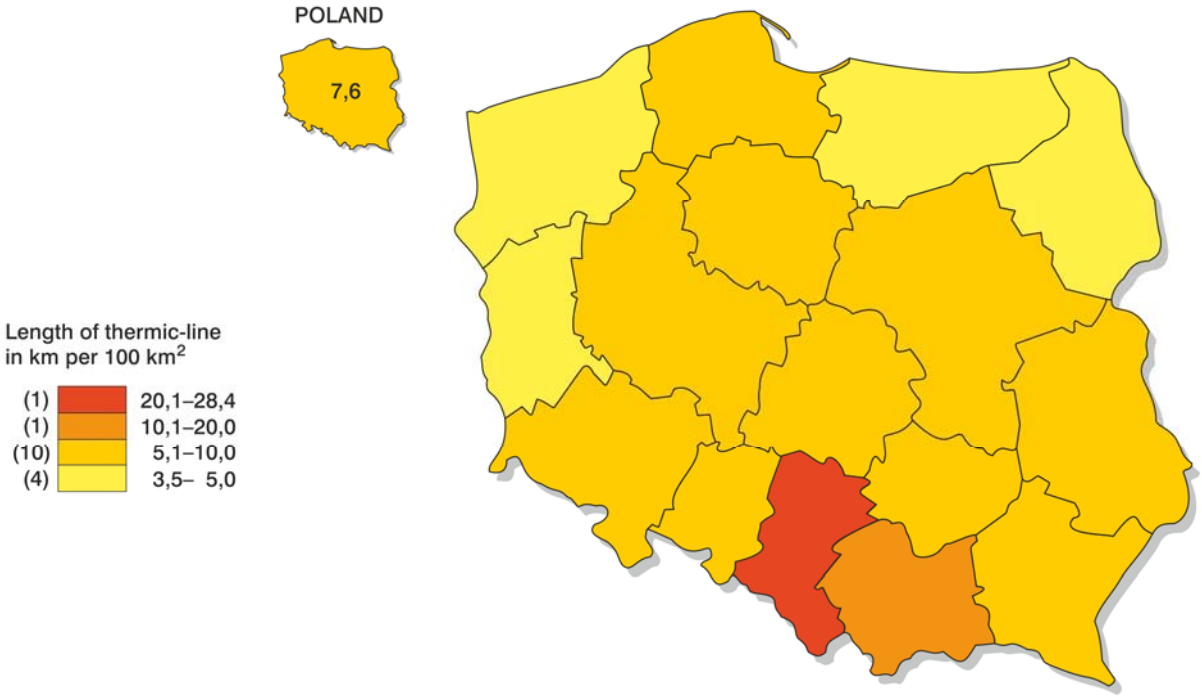
In 2016, **electric energy consumption per 1 consumer** was 1,966.6 kWh, and in urban areas it was lower (1,753.9 kWh per 1 consumer) than in rural areas (2,385.5 kWh). As compared to 2015, electric energy consumption per 1 consumer in Poland increased by 0.6%, and in urban areas it decreased by 0.3% while in rural areas it increased by 2%.

2.3. HEATING MANAGEMENT[1]

In 2016, the length of the **thermic-line transmission network** in total amounted to approx. 16 thous. km. The highest **thermic-line network density** was observed in the voivodships: śląskie (28.4 km per 100 km^2), małopolskie (12.5 km per 100 km^2), pomorskie (9.9 km per 100 km^2) and łódzkie (9.7 km per 100 km^2), and the lowest – in lubuskie voivodship – 3.5 km per 100 km^2.

[1] See methodological remarks on page 7.

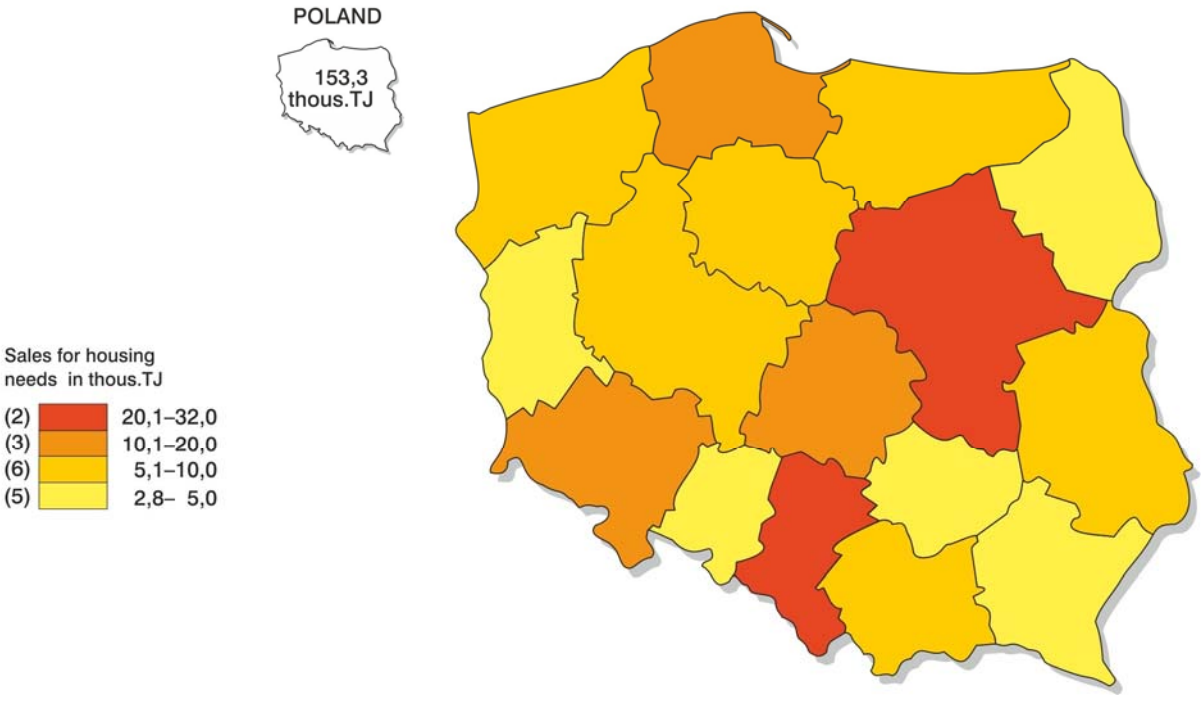
THERMIC-LINE DENSITY IN 2016



In 2016, over 197.1 thous. TJ of heat energy were sold, of which approx. 153.3 TJ (77.8%) for heating of residential buildings. This amount was used to provide heating to 2,399,641 m^3 of the cubic volume of buildings in total, of which 1,278,310 m^3 of the cubic volume of residential buildings.

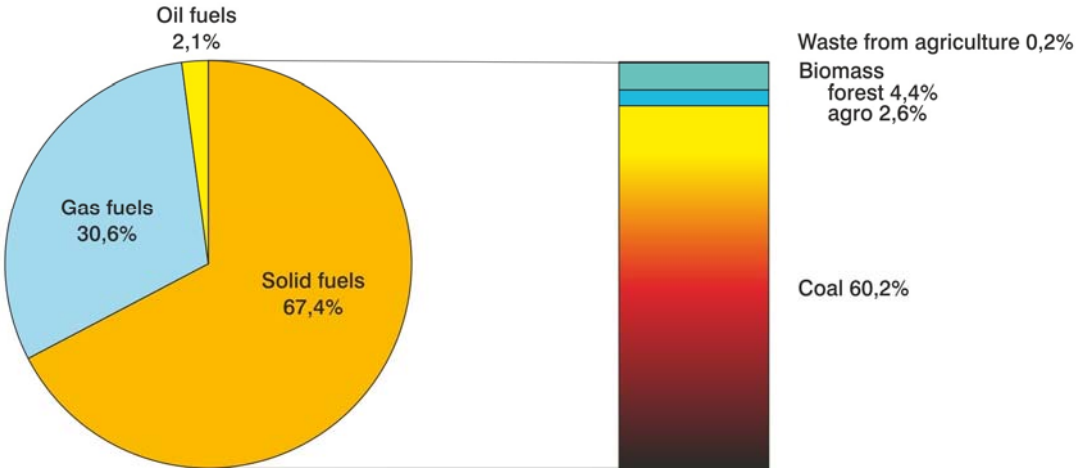
About 194.1 thous. TJ (98.5%) of the heat energy were sold in urban areas, of which approx. 151.4 thous. TJ (98.8%) for the purposes of heating of residential buildings.

SALES OF HEAT ENERGY IN 2016



The largest amount of thermal energy for heating purposes was generated using solid fuel – 67.4%, followed by gas – 30.6%, and oil – 2.1%.

TYPE OF FUELS USED FOR PRODUCION OF HEAT ENERGY IN 2016

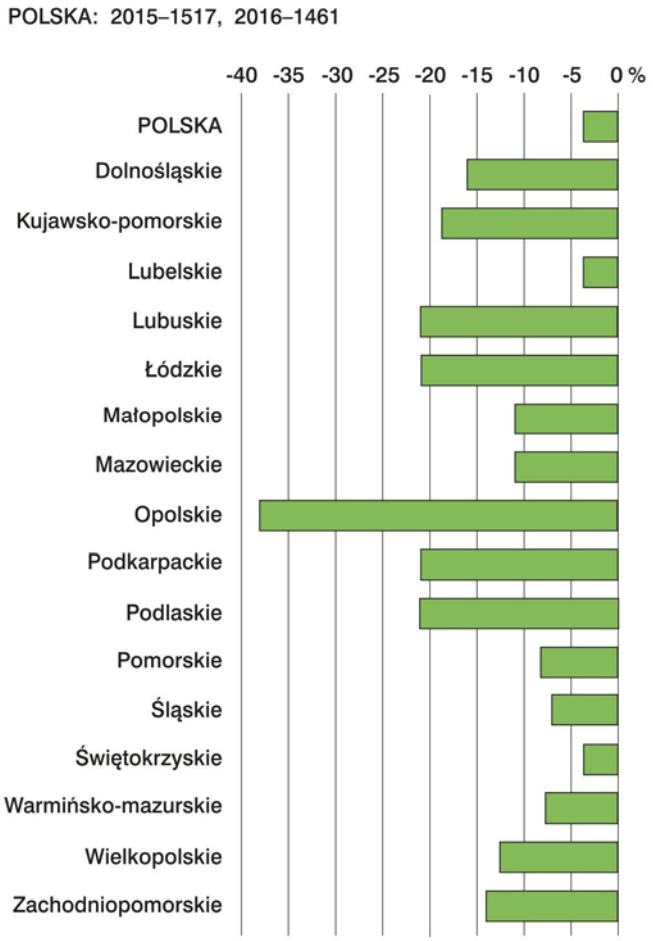


2.4. MUNICIPAL WASTE MANAGEMENT

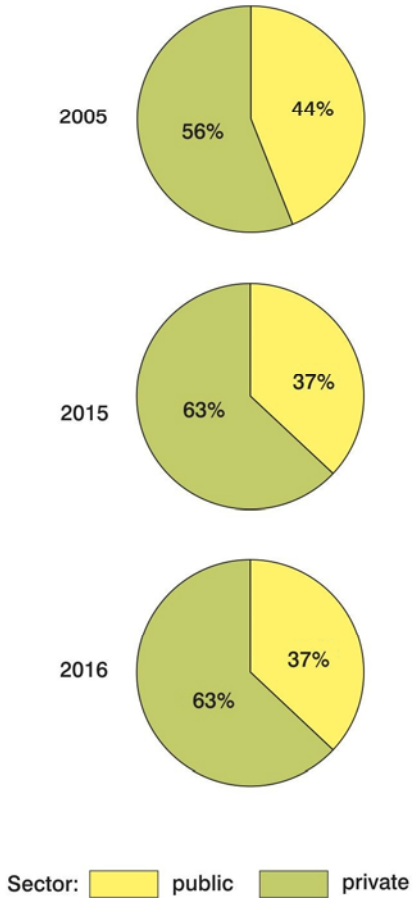
In 2016 in Poland, 11,654.3 thous. tonnes of municipal waste were collected (an increase of 7.3% compared to 2015). For one inhabitant of Poland there were on average 303 kg of collected municipal waste, the most in voivodships: dolnośląskie (361 kg), zachodniopomorskie, and śląskie (355 kg) and lubuskie (346 kg); the least in voivodships: świetokrzyskie (184 kg), lubelskie (196 kg), and podkarpackie (210 kg).

The total number of enterprises which in 2016 were collecting municipal waste from real estate owners amounted to 1,461 and decreased by 3.7% compared to the previous year. In 2016, private enterprises collected 62.7% of municipal waste (as in 2015). Foreign-owned entities collected the same amount of municipal waste as in the previous year (9.8%).

CHANGES IN NUMBER OF ENTITIES COLLECTING MUNICIPAL WASTE FROM REAL ESTATE OWNERS IN 2015 AND 2016

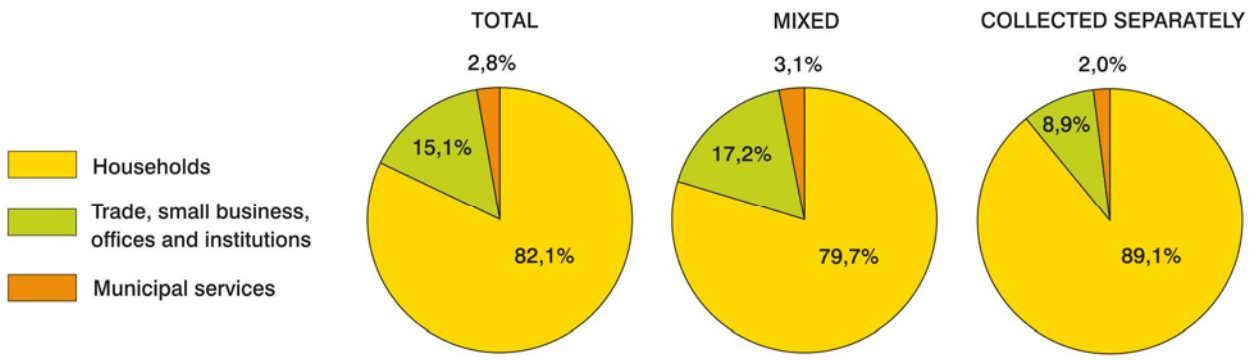


COLLECTED MUNICIPAL WASTE BY OWNERSHIP SECTOR IN 2005, 2015 AND 2016



The majority of municipal waste (82.1%) in 2016 was collected from households. In terms of quantity, it was 9,564.5 thous. tonnes – an increase of 7.6% compared to the previous year. The second significant source of origin of municipal waste (15.1%.) was trade, small business, offices and institutions. The quantity of waste collected from this source in 2016 amounted to 1,761.8 thous. tonnes (an increase of 4.9% compared to the previous year). Waste from municipal services, such as street cleaning or maintaining parks or cemeteries, accounted for 2.8% of the total mass of municipal waste collected in 2016 (328.1 thous. tonnes – an increase of 1.7% compared to 2015). In 2015, the share of these three sources in of the amount of municipal waste collected was 81.8%, 15.2% and 3.0%, respectively.

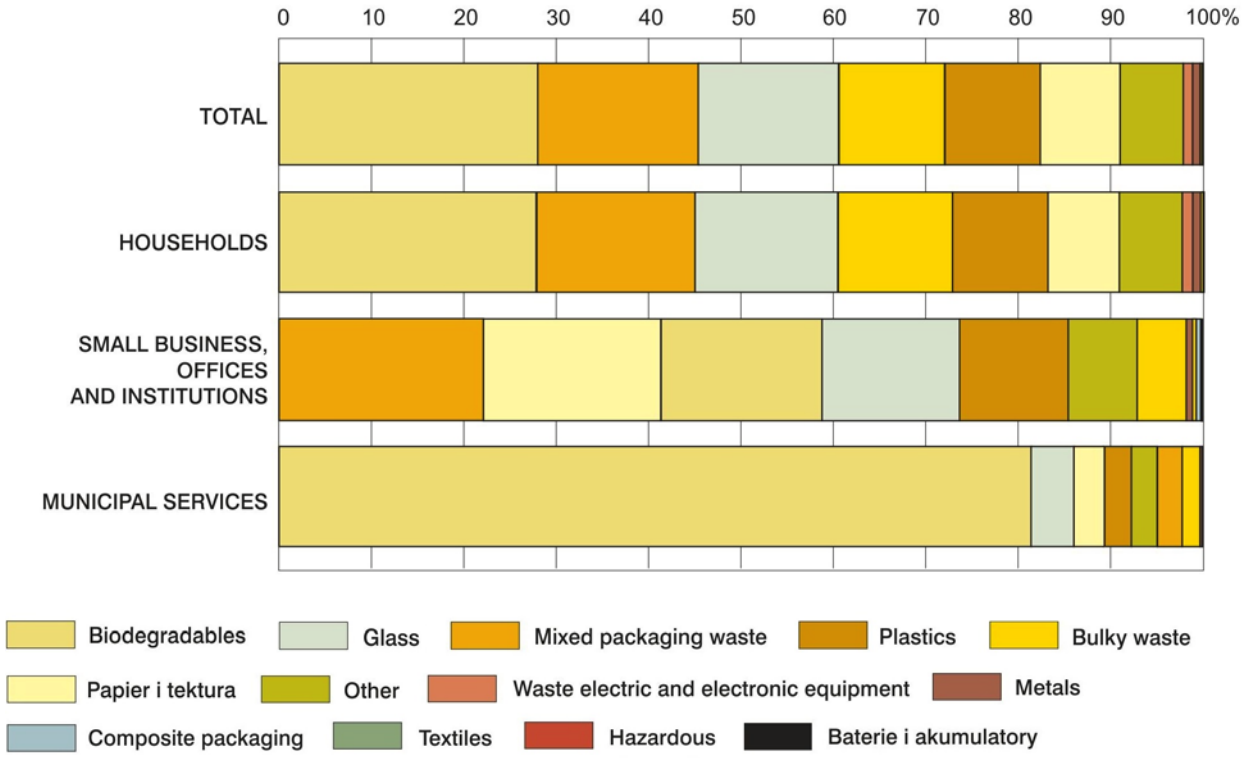
SOURCES OF MUNICIPAL WASTE COLLECTED IN 2016



In 2016, there was an increase in the share of separately collected waste in the total amount municipal waste collected – from 23.4% in 2015 to 25.2%. The total weight of separately collected waste increased from approx. 2,537 thous. tonnes in 2015 to approx. 2,942 thous. tonnes in 2016. There were about 77 kg of separately collected municipal waste per one inhabitant of Poland (a year before – 55 kg).

The most (89.1%) of separately collected municipal waste in 2016 came from households (mainly biodegradable waste, mixed packaging waste and glass waste), and compared to the previous year it was an increase of 17.5% (from 2,230.8 thous. tonnes to 2,621.2 thous. tonnes). Waste from trade and small business entities, from offices and institutions (mainly mixed packaging waste, and paper and cardboard) accounted for 8.9% of the amount of separately collected municipal waste, and their mass increased by 4.9% (from 249.2 thous. tonnes to 261.3 thous. tonnes). Separately collected waste from municipal services was 59.8 thous. tonnes (mainly biodegradable waste), which accounted for 2.0% of separately collected municipal waste (an increase of 4.0% as compared to 2015). In the previous year, the share of separately collected waste from the aforementioned groups amounted to 87.9%, 9.8%, and 2.3%, respectively.

MUNICIPAL WASTE COLLECTED SEPARATELY BY FRACTIONS AND SOURCES IN 2016



In 2016, the amount of separately collected glass waste amounted to 11.6 kg per capita, which was an increase of 5.5% compared to the previous year. In 2016, there were approx. 7.9 kg of separately collected plastics (similarly as in 2015) and approx. 6.6 kg of paper and cardboard waste (an increase of 4.5%) per one inhabitant of Poland. The amount of biodegradable waste collected separately per capita increased from 17.1 kg in 2015 to 21.4 kg in 2016 (by 25.2%), and bulky waste – from 6.8 kg to 8.8 kg (by 28.8%).

In 2016, there were 2,146 of municipal waste separate collection points (6.6% more than in the previous year), of which 802 (37.4%) were located in urban areas, and 1,344 (62.6%) in rural areas.

In 2016, a total of 11,654.3 thous. tonnes of municipal waste were collected, of which 7,247.7 thous. tonnes were designated for recovery operations (approx. 62.2% of the quantity of municipal waste collected). About 3,243.5 thous. tonnes of municipal waste were designated for recycling (27.8% of the amount of municipal waste collected). These included both separately collected municipal waste and secondary raw material waste sorted out from mixed municipal waste. In the previous year, 2,866.9 thous. tonnes of waste were recycled (26.4%).

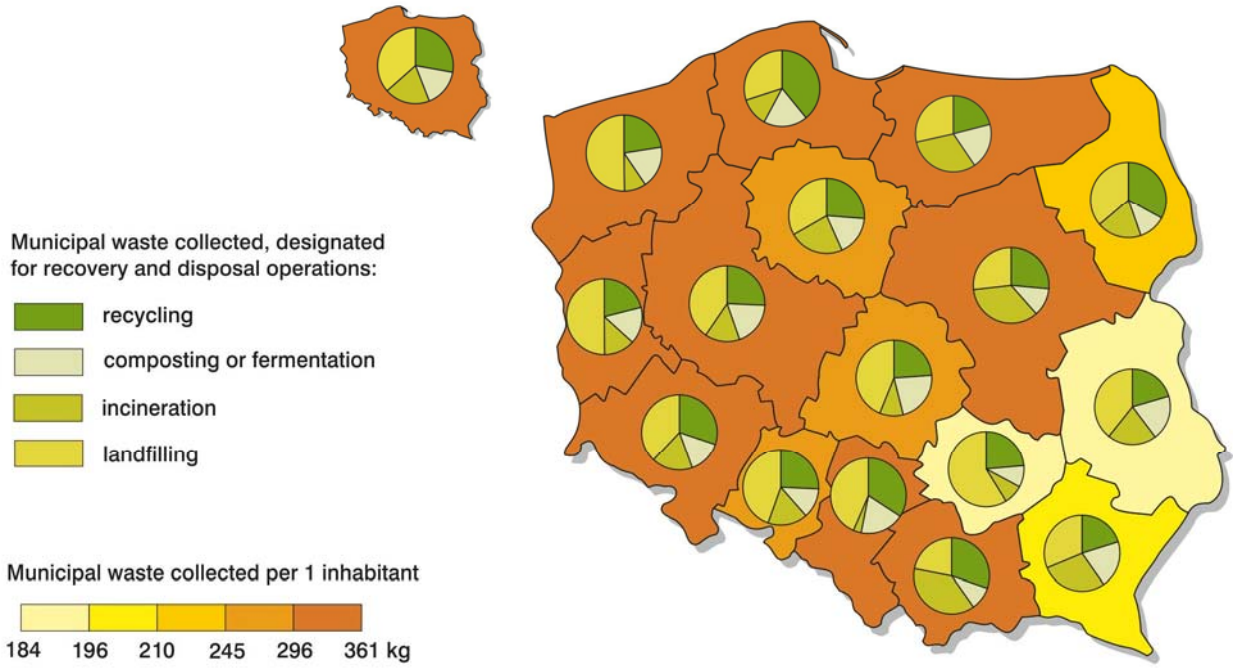
About 1,889.8 thous. tonnes of municipal waste were channelled to biological processes (composting or fermentation). These were mainly green waste from gardens, parks and cemeteries, waste from marketplaces, biodegradable kitchen waste, and waste from gastronomy.

As compared to the previous year, the share of waste designated for such treatment in the total of quantity of municipal waste collected grew by 0.1 percentage point to the level of 16.2%.

Almost 2,114.4 thous. tonnes of municipal waste (approx. 18.1%) were designated for incineration with energy recovery. In 2015, it was 1,317.7 thous. tonnes, which accounted for approx. 12.1% of the total quantity of municipal waste generated. This increase is a result of the investments in the area of incineration plants.

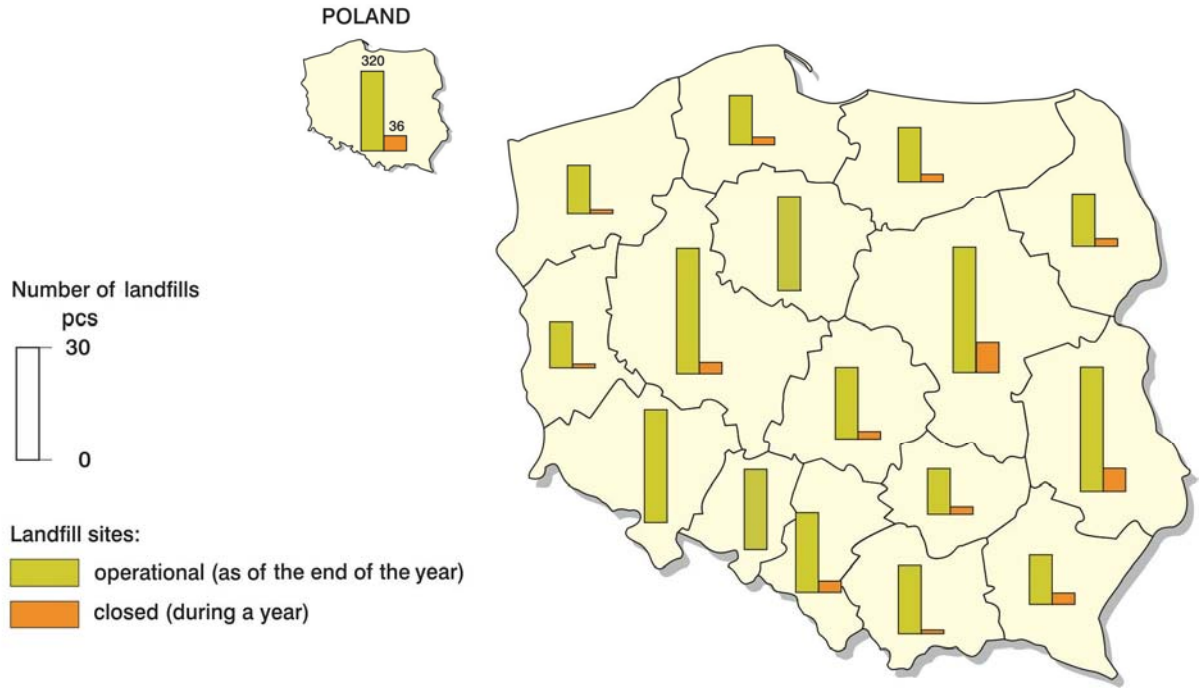
A total of 4,406.6 thous. tonnes of municipal waste was sent to disposal, of which 4,254.7 thous. tonnes (36.5% of the total waste collected) was designated for landfilling, and 151.9 thous. tonnes (1.3% of the total waste collected) – for disposal by incineration without energy recovery. As compared to 2015, a fall in the share of municipal waste designated for disposal by landfilling was recorded. In 2015, this waste accounted for 44.3% of the total amount of municipal waste collected (4,808.0 thous. tonnes).

MANAGEMENT OF MUNICIPAL WASTE COLLECTED IN 2016



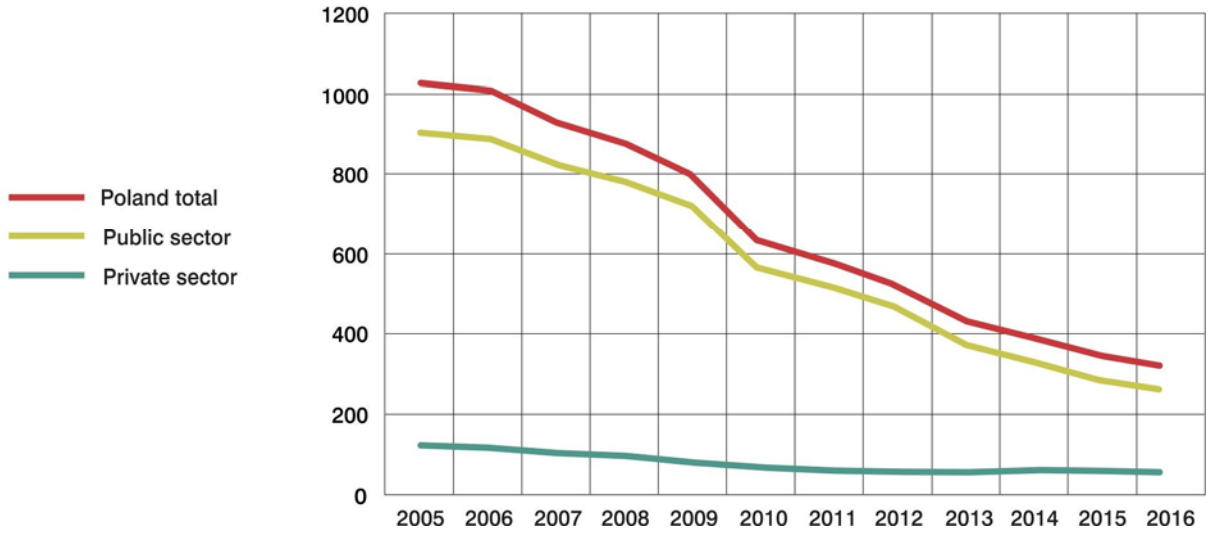
At the end of 2016, there were 320 operational landfill sites receiving municipal waste. These landfills occupied the total area of 1,806.8 ha. In 2016, a total of 36 such landfill sites were closed, with an area of approx. 79.5 ha.

CONTROLLED LANDFILLS IN 2016

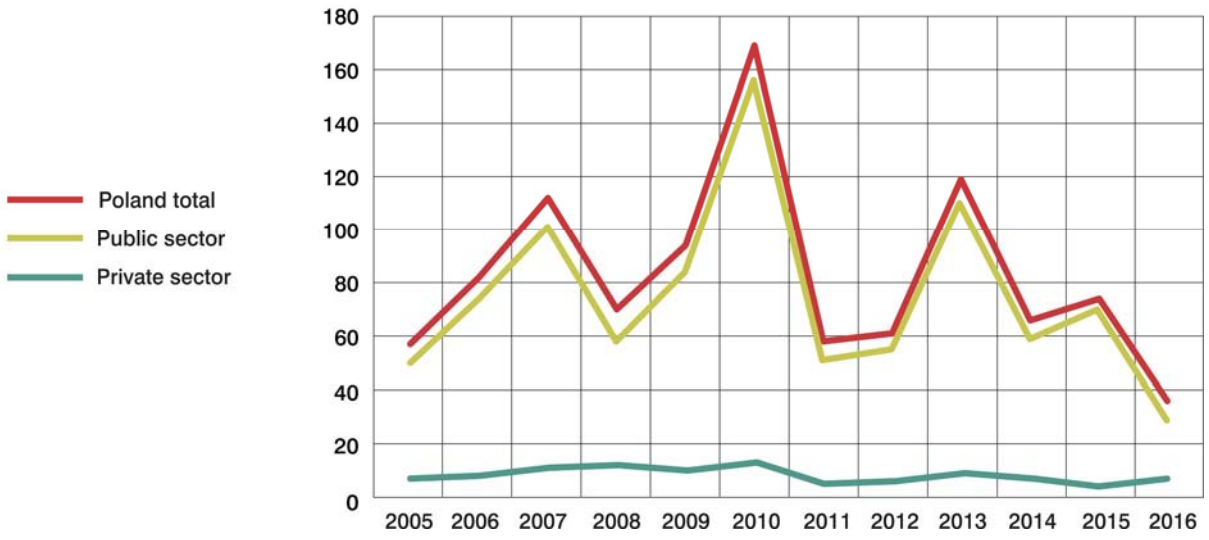


In order to adjust landfill sites to technical and organizational requirements resulting from legal regulations, the number of operating landfill sites has been systematically decreasing for over a dozen years now.

LANDFILL SITES IN OPERATION IN 2005–2016

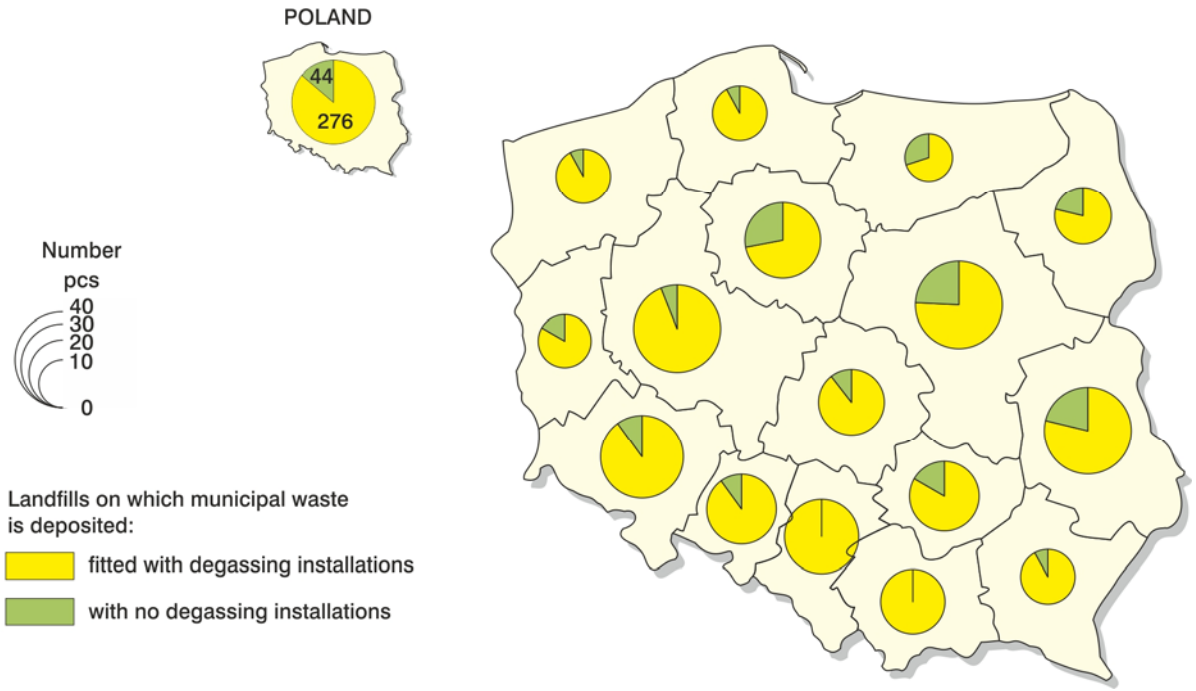


LANDFILLS CLOSED IN 2005–2016



In 2016, there were 276 landfill sites with degassing installations, which accounted for 86.3% of all operational landfill sites where municipal waste was deposited (87.3% in the previous year).

DEGASSING OF LANDFILLS IN 2016

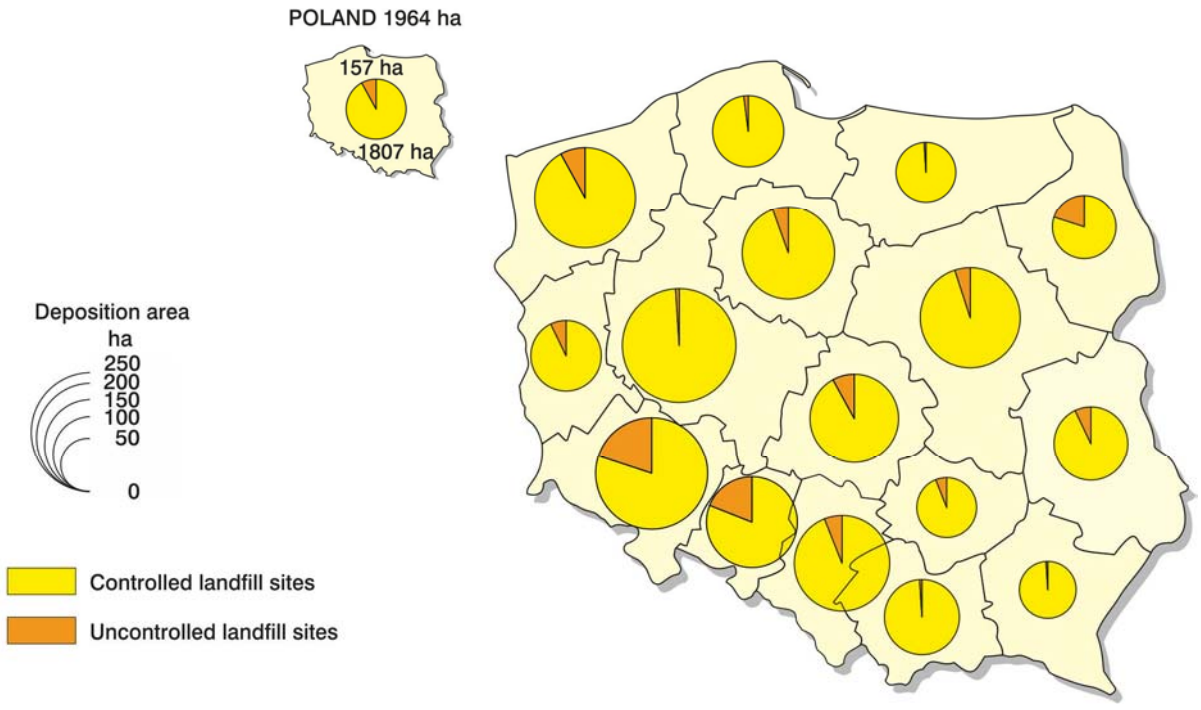


About 37% of degassing installations were installations where gas was channelled directly to the atmosphere (similarly as in 2015), while in 5.8% of installations landfill gas was neutralised with heat energy recovery (an increase of 0.5 percentage point). About 21.0% were installations where landfill gas was used for production of electrical energy (an increase of 1.7 percentage

points). In 2016, as a result of neutralization of landfill gas by incineration, about 83,973 thous. MJ of heat energy (13.4% more than in 2015), and approx. 133,661 thous. kWh of electrical energy (0.1% more than in 2015) was recovered.

About 92% of the municipal waste deposition area in Poland in 2016 was the area of operational controlled landfill sites (similarly as in 2015). The remaining part was the area of uncontrolled landfill sites, which are defined as places not intended for municipal waste deposition.

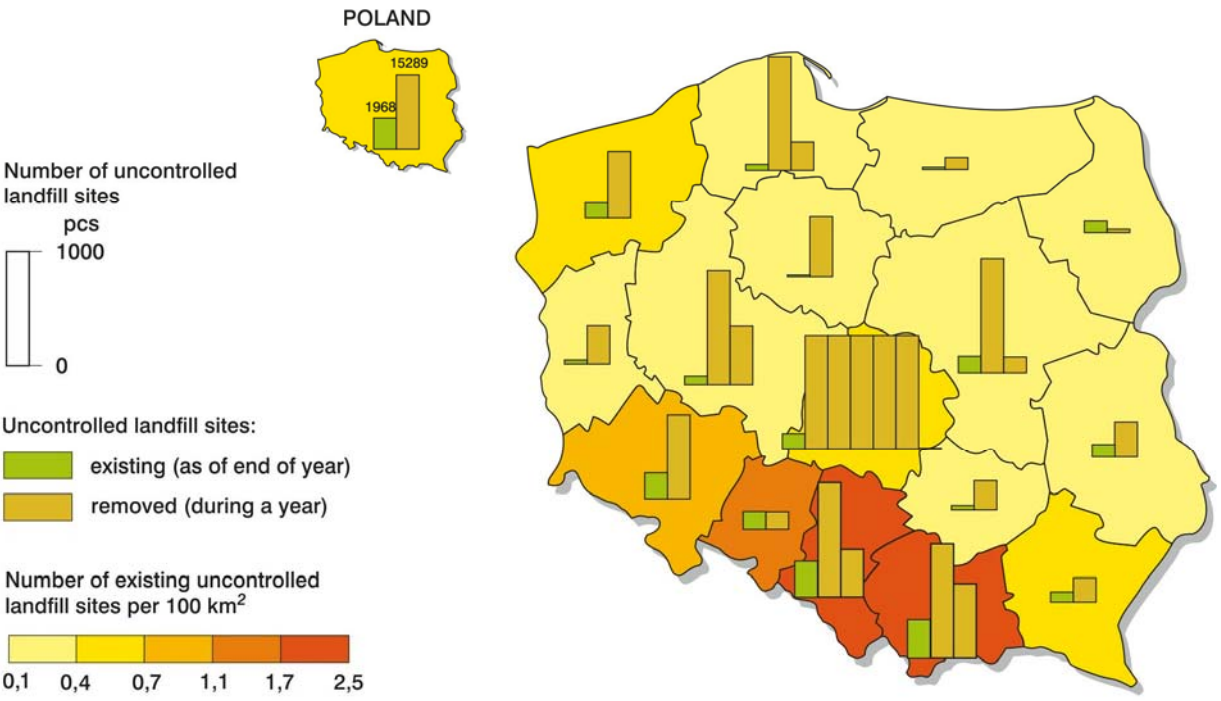
MUNICIPAL WASTE DEPOSITION AREA IN 2016



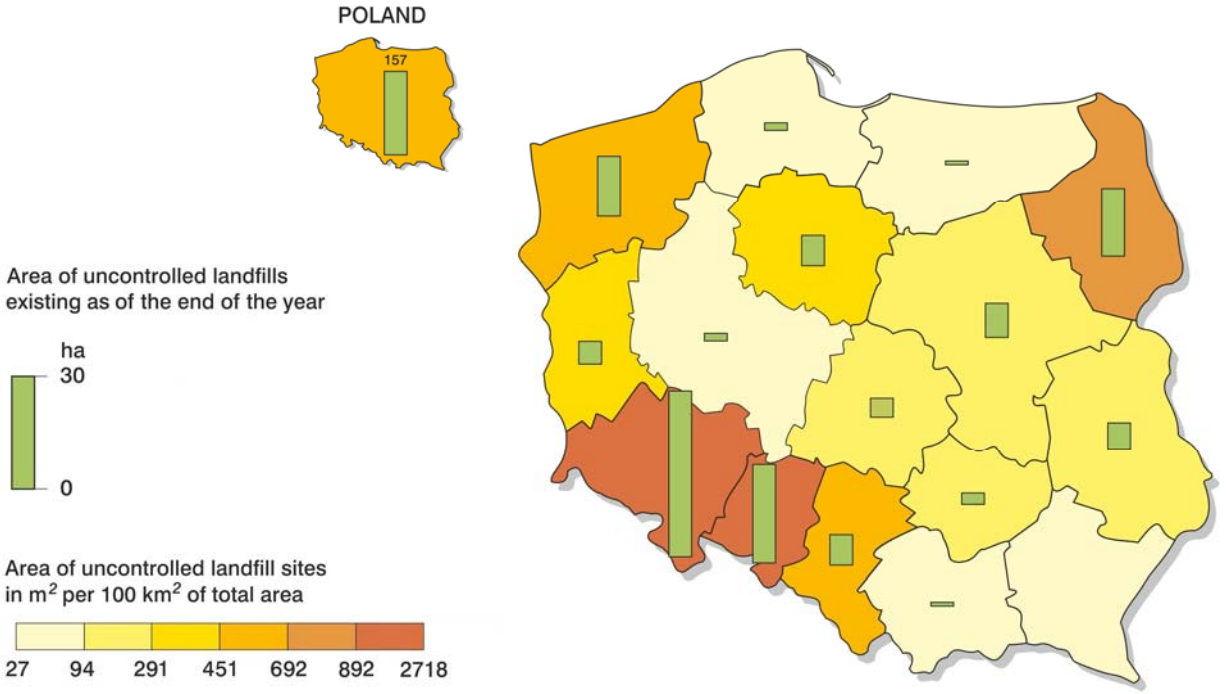
At the end of 2016, there were 1,968 illegal dumps in Poland, i.e. 0.5% less than in the previous year. In urban areas, there were 571 of such dumps (an increase of 18.2% as compared to 2015), and in rural areas – 1,397 (a drop of 6.6% as compared to 2015).

In 2016, 15,289 illegal dumps were removed, of which 87.0% in urban areas. As compared to the previous year, the total number of illegal waste disposal sites removed increased by approx. 6.8% (in urban areas the increase was 7.8%, and in rural areas – 0.2%). During the removals of uncontrolled landfill sites, approx. 51.3 thous. tonnes of municipal waste were collected (13.6% more than in 2015), of which 84.5% in urban areas (an increase of 0.3 percentage point compared with the previous year).

UNCONTROLLED LANDFILL SITES IN 2016



AREA OF UNCONTROLLED LANDFILL SITES IN 2016



GRAPHS AND MAPS