

# **SOUND WASTEWATER TREATMENT FOR YOUR HOMES**

Solutions for wastewater treatment in sparsely populated areas

**4<sup>th</sup> of October, Warsaw, Poland**

**Poland's situation in wastewater management  
in sparsely populated areas**



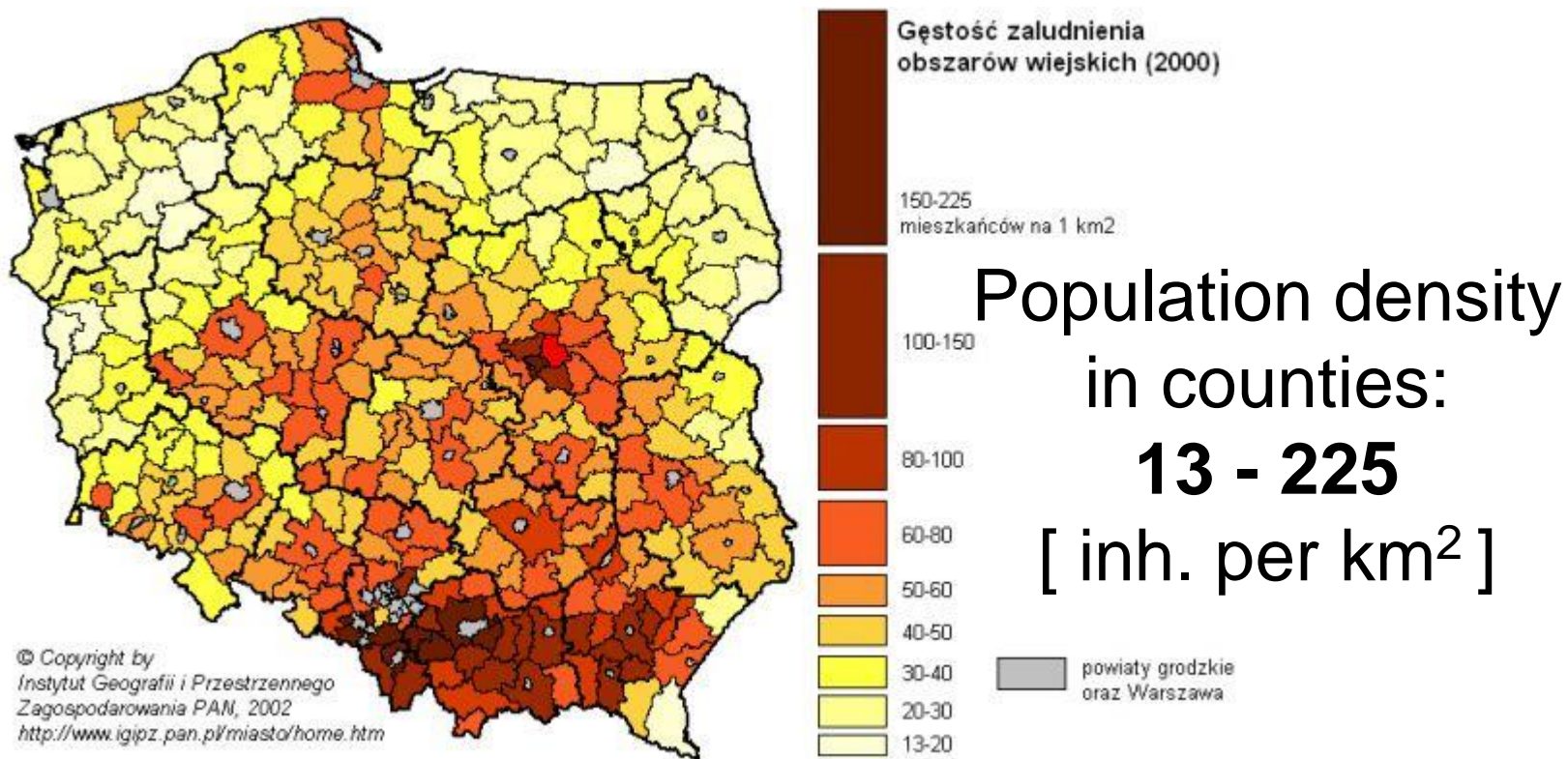
Prof. Ryszard Błażejowski,  
Poznań University of Life Sciences, Poland

# Outline

- Population in Polish rural areas
- % served by centralized sewerage
- Individual systems
- Emptying of holding tanks
- Treatment technologies
- Summary

# Population in Polish rural areas

- 15 mln inhabitants
- On average 125-891 inhabitants in a village



# Polish villages in statistics

Total number: **42,835 + 14 K** hamlets.

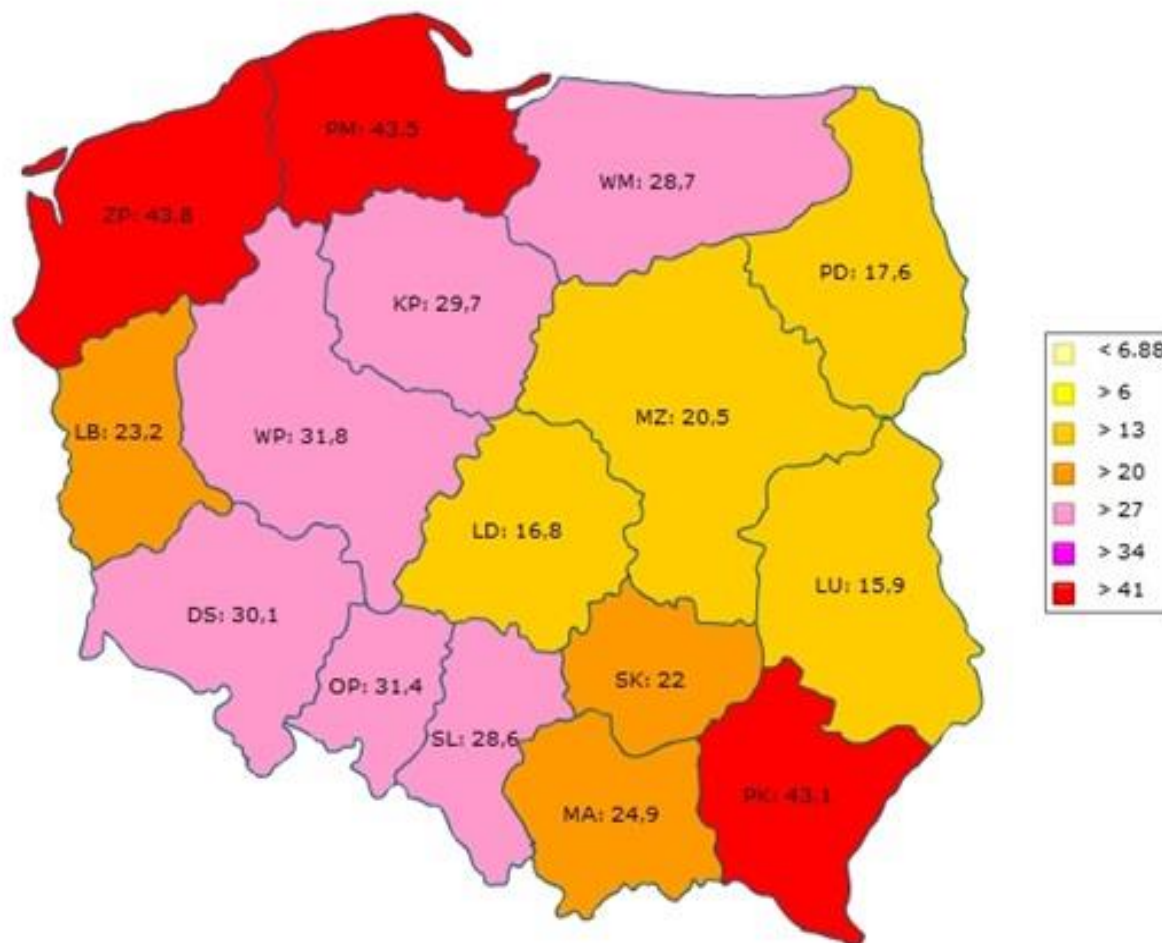
## Division by sizes:

- **Small villages** < 300 p. (ca. 40% of the total number)  
– mainly in central Poland;
- **Medium size villages**: 300 - 500 p. (ca. 40%);
- **Large villages** > 500 p. (20%) south of Poland.

**25% of villages is sparsely populated (mean distance between homesteads > 100 m ), but on-site systems are recommended already at population density < 25 p./ha.**

# % of rural population served by centralized sewerage systems (on avg. **25%** in 2010 and **40%** in 2015)

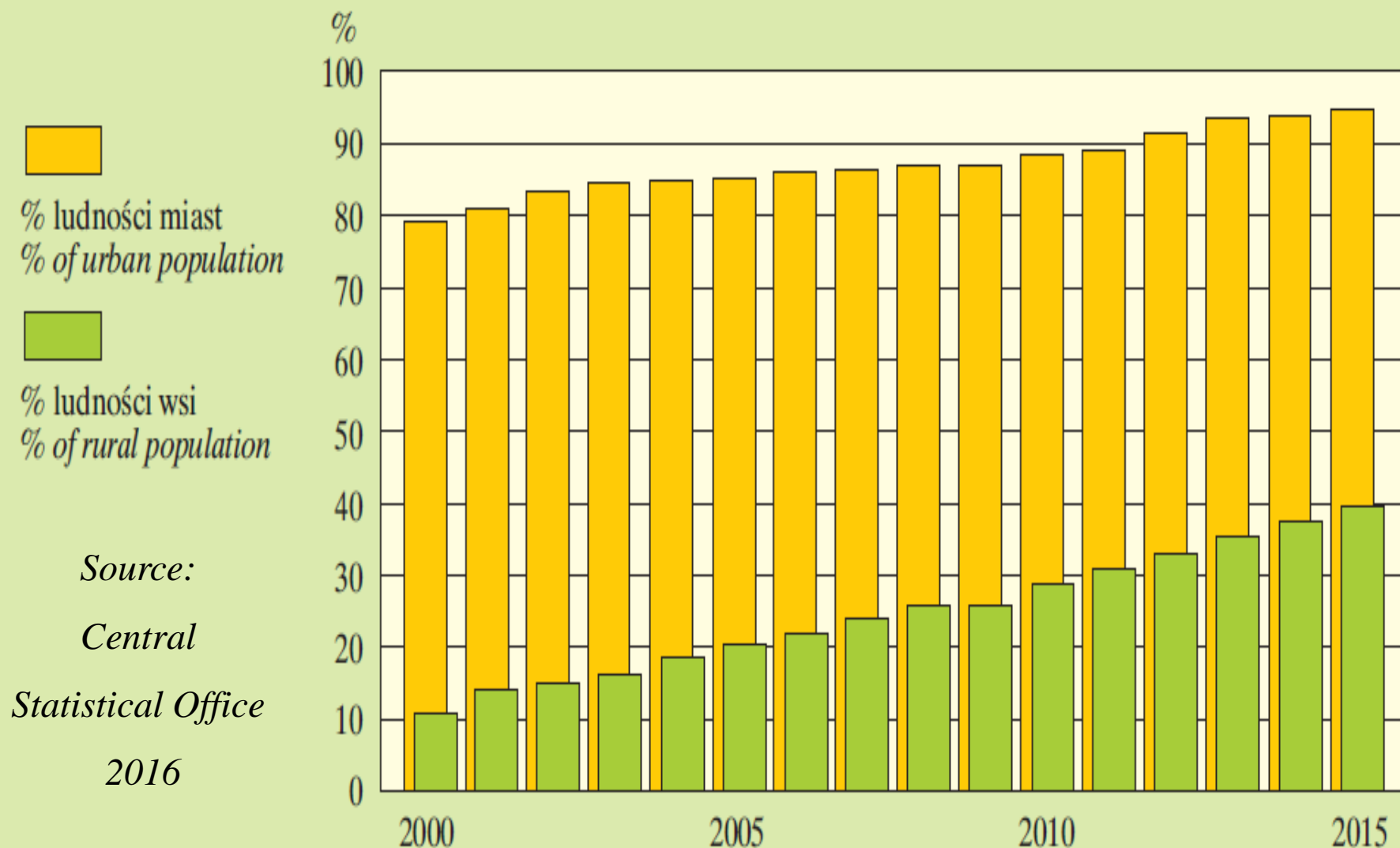
([www.monitorui.bodkarnackie.pl](http://www.monitorui.bodkarnackie.pl) 2011)



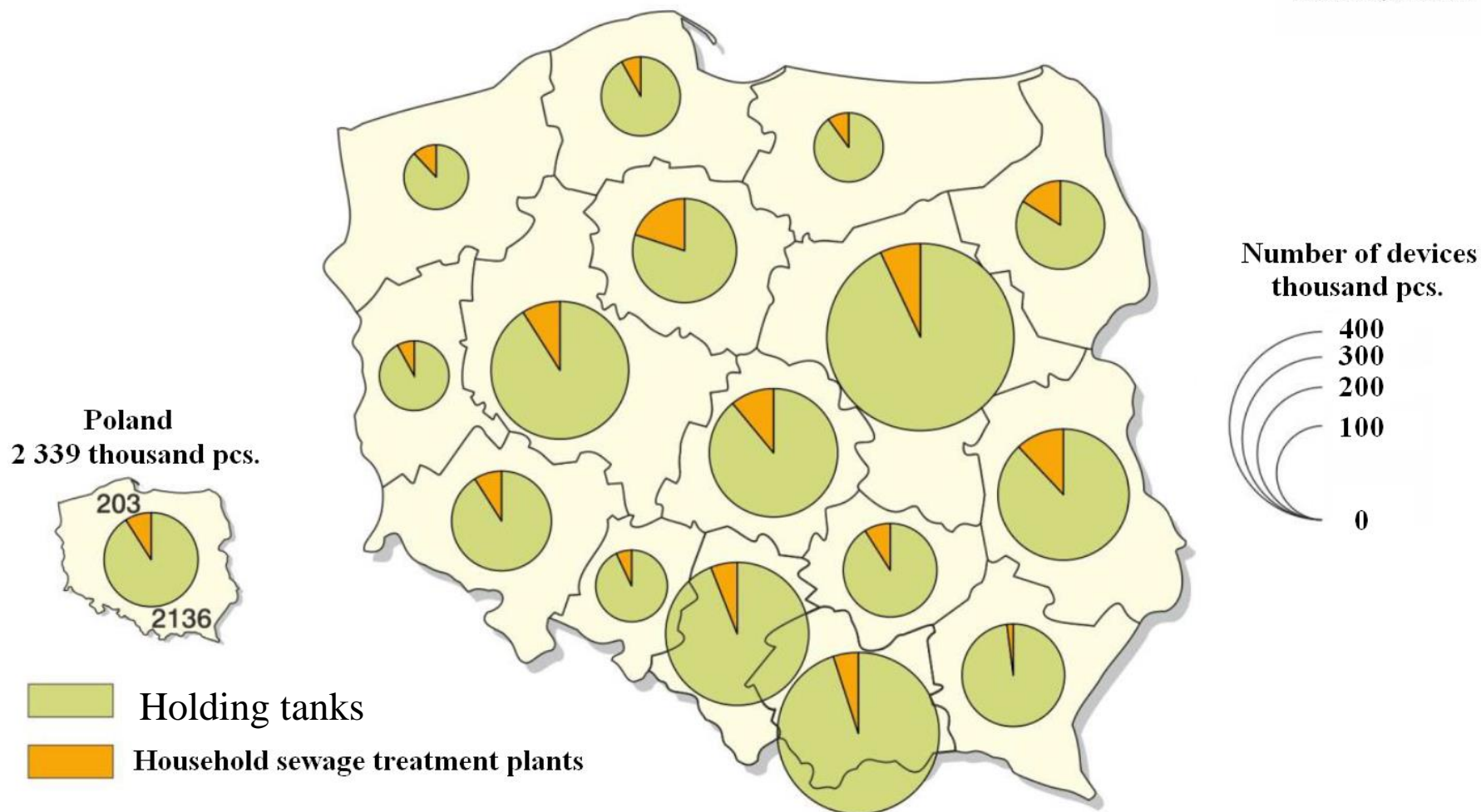


# ŁUDNOŚĆ KORZYSTAJĄCA Z OCZYSZCZALNI ŚCIEKÓW W LATACH 2000–2015

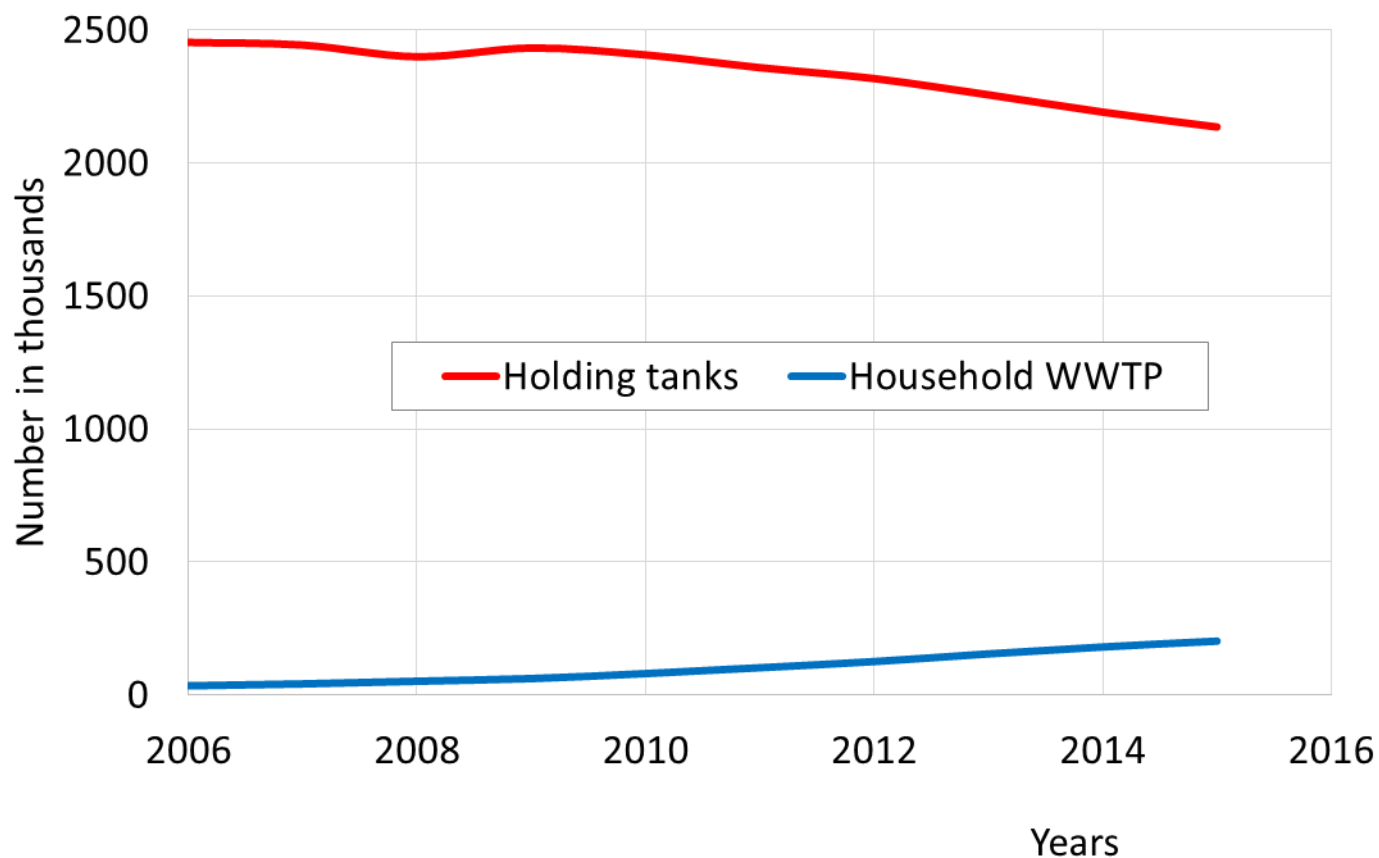
## POPULATION CONNECTED TO WASTEWATER TREATMENT PLANTS IN 2000–2015



## Household devices for liquid waste disposal in Poland in 2015



## Number of holding tanks and household WWTPs in Poland



Source: Central Statistical Office 2016



# Emptying of holding tanks

- 23 mln m<sup>3</sup> in the year 2015
- 8 mln p.\*0.05 m<sup>3</sup>/p. day \* 365 days/y-r =  
= 146 mln m<sup>3</sup>/y-r

$$23/146 = 0.16 = 16\%$$

- Leaky holding tanks;
- Grey market?

# Treated wastewater quality conditions

(according to Polish legislation for  $Q_d < 5 \text{ m}^3/\text{d}$ )

Parameter	Max. value mg/dm <sup>3</sup>	ST + SAS
Biochemical oxygen demand (BOD <sub>5</sub> )	<b>40</b>	Reduction in ST <b>≥ 20%</b>
Chemical oxygen demand (COD)	<b>150</b>	-
Total suspended solids	<b>50</b>	Reduction in ST <b>≥ 50%</b>
Total nitrogen	<b>30</b>	-
Total phosphorous	<b>5</b>	-

# Treatment technologies

- **Septic tank + soil adsorption system** (majority)
- Septic tank + Extended aeration AS
- **Extended aeration AS**
- AS + floating biomass carriers
- Trickling filters
- **Constructed wetlands (Vertical flow)**

# Summary

- Emptying of holding tanks is not fully controlled and should be improved;
- Due to sparsely populated villages the market of the small WWTP can grow by ca. 400-600 tho. plants in the next 20 years;
- There is a need to point out the best and relatively cheap solutions (**our goal!**).



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Thanks for your attention.