



Riga
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The City of Warsaw –
The Department of Infrastructure



EUROPEAN
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FUND



Case: Warsaw Waterworks and Czajka WWTP



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City of Warsaw
Infrastructure Department



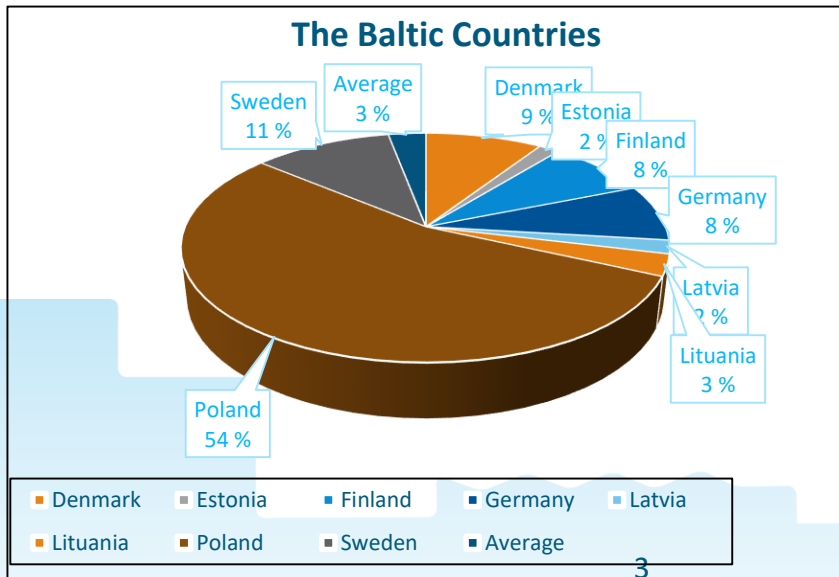
Case: Warsaw Waterworks and Czajka WWTP

Poland and The Baltic Sea



Poland:
 38,44 mln inhabitants (2016)
 1 290 hm³/year.....urban waste water (2016)
 1 587.....number of agglomerations (2017)
 41,16 mln.....p.e. in Poland (2011)

Country /	p.e.
Denmark	6 960
Estonia	1 228
Finland	6 127
Germany	6 054
Latvia	1 439
Lithuania	2 285
Poland	41 165
Sweden	8 267
Average	2 241



Poland is an absolute leader in the volume of urban waste water in the Baltic Sea Catchment

Case: Warsaw Waterworks and Czajka WWTP

Year 2004 – Poland becomes a Member State of EU



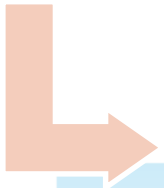
Urban Waste Water Treatment Directive
91/271/EEC

From 2004, Poland implements the EU regulations step by step .



Act of Polish Parliament

- Water Law Act
- Water Supply and Urban Waste Water Treatment Act
- Other Acts
- National Program of Urban Waste Water Treatment (KPOŚK with its 5 actualizations)



Regulation of Minister

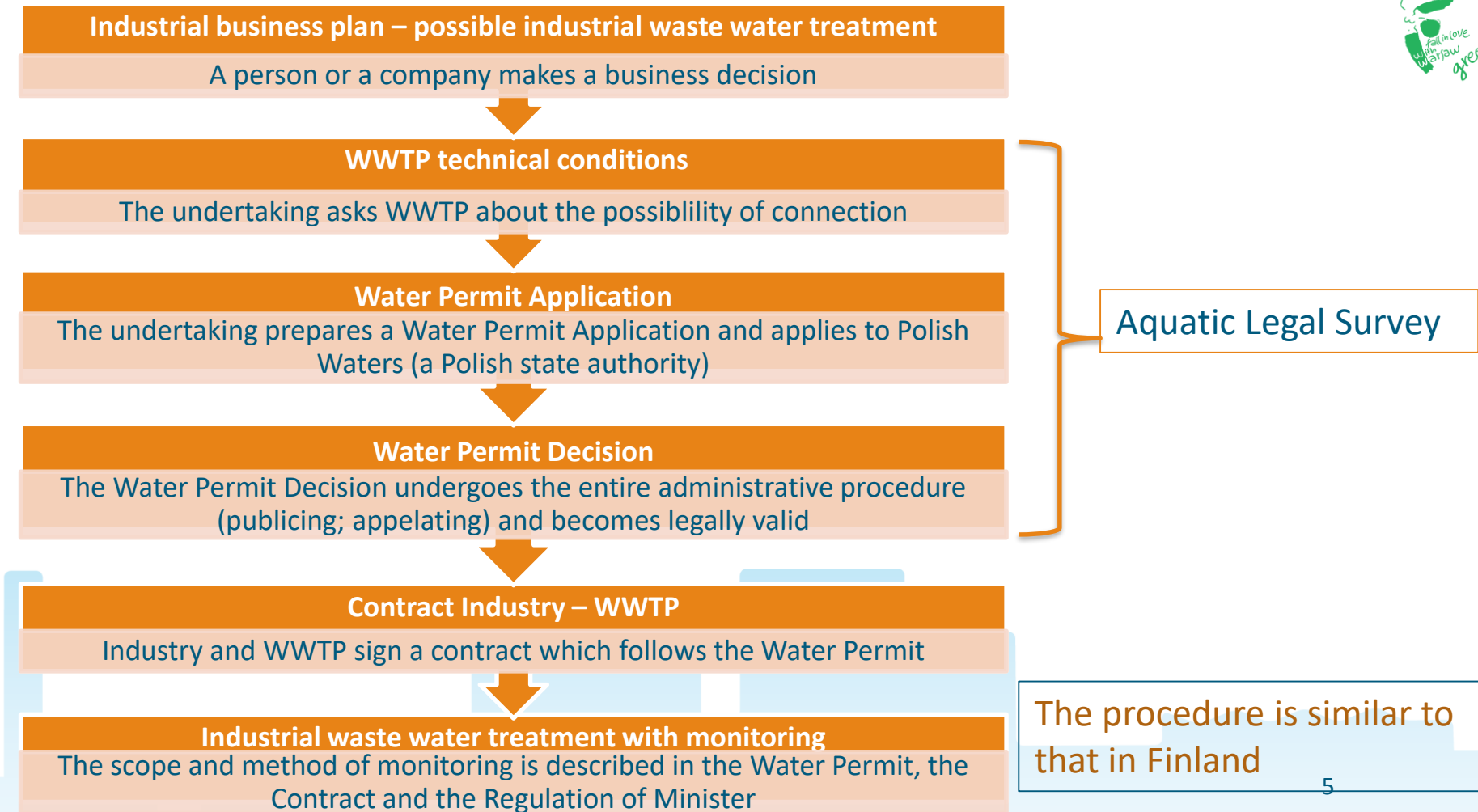
- Regulation of Minister of Construction (2006) concerning duties of industry with the list of hazardous substances and its max. levels

The Polish Law complies with UWWTD



Case: Warsaw Waterworks and Czajka WWTP

Water Permit and Contract: Industry – WWTP I



Case: Warsaw Waterworks and Czajka WWTP

Water Permit and Contract: Industry – WWTP II



Industrial business plan – possible industrial waste water treatment

A person or a company makes a business decision

WWTP technical conditions

Industry asks WWTP about the possibility of connection

Water Permit Application

Industry prepares a Water Permit Application and applies to Polish Waters

Water Permit Decision

Water Permit Decision undergoes the administrative procedure (publishing; appealing) and becomes legally valid

Contract Industry – WWTP

Industry and WWTP sign the contract which follows Water Permit

Industrial waste water treatment with monitoring

Monitoring is described in Water Permit, Contract, Regulation of Minister

The Aquatic Legal Survey describes conditions concerning sewage treatment:

The scope; quantity; contractual penalties !!!!!!!



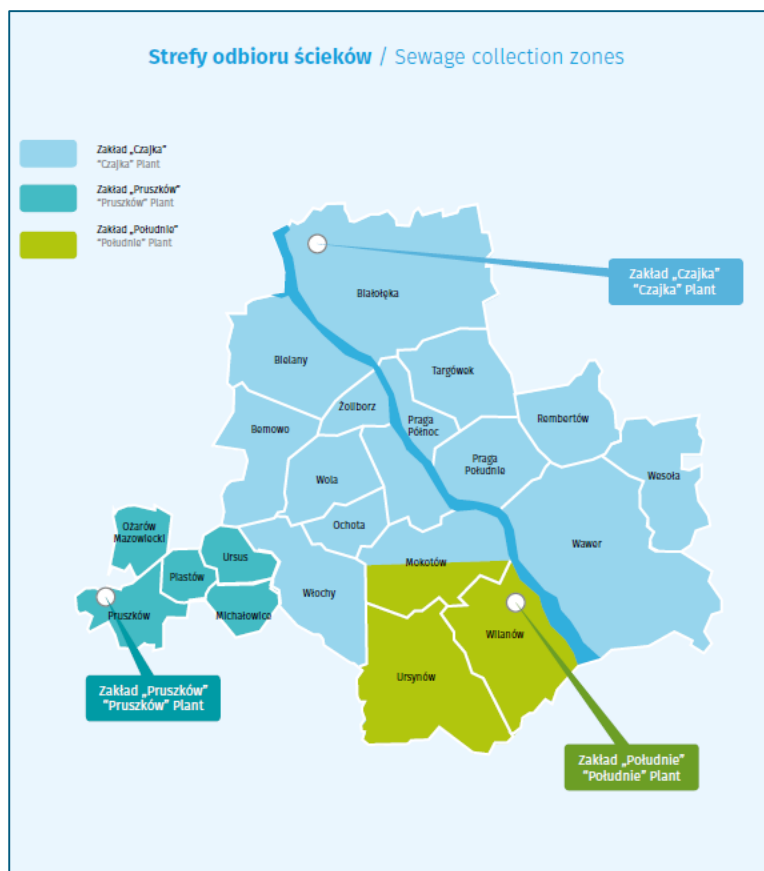
Scope !!!!
Quantity !!!!

Parties: Undertaking – WWTP with annex in accordance with the contents of the Water Permit Decision

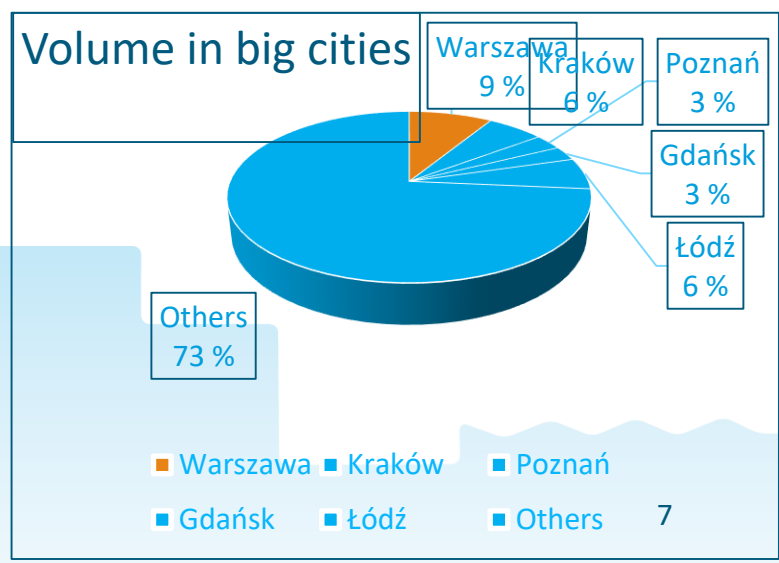
Regulation of Minister / July 6 2006



Warsaw vs Poland



Warsaw1 765 615 inhabitants (2017)
 3 WWTPs.....Czajka, Pruszków, Południe
 UWW volume113,8 hm³/year
 Percentage of industrial sewage : 9%
 Owner of the whole collection system –
 Warsaw Waterworks (since 1865)



Big cities are crucial for the quality of all kinds of sewage treatment in Poland



Industry description: Warsaw



Food Industry
Food Processing
Supermarket
Catering
Restaurant



Cars, Buses, Trams
Car wash
Petrol station
Car repair shop



Metallurgy
Arcelor Mittal Warszawa (Huta Warszawa)



Chemistry
Sznajder Baterrien



Cosmetics
Kosmepol



Paper industry
PWPW (Polish Security Printing Works)

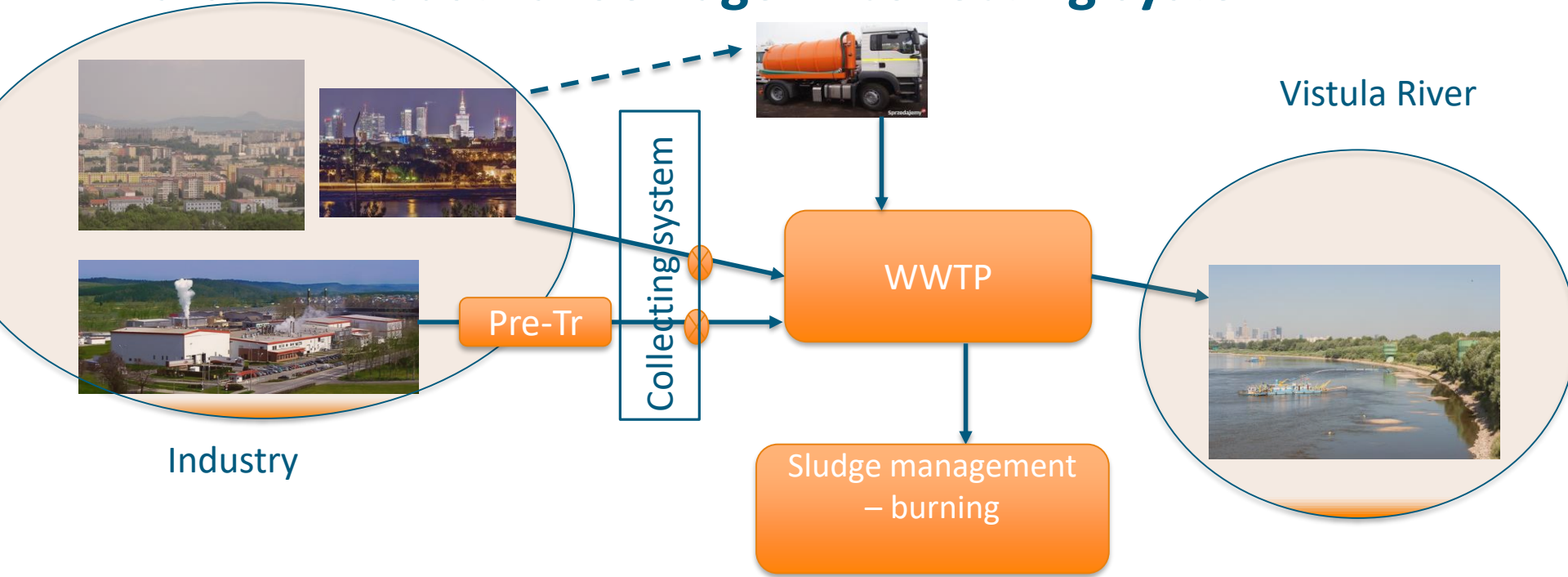


The percentage of industrial sewage is 9% of whole volume

279 contracts concerning industrial sewage covered by control procedures



Warsaw: Industrial Sewage in collecting system



In Warsaw the entire industry is connected to the collecting system: either with or without pretreatment

Case: Warsaw Waterworks and Czajka WWTP

Czajka Case I



- Year of modernization : 2012
- Average daily throughput : 435 300 m³/d
- Receiver – Vistula River
- Sludge management : burning
- Conected to the combined system? – YES
- Percentage of industrial sewage – approximately 9%

Czajka WWTP is crucial for the agglomeration of Warsaw

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Case: Warsaw Waterworks and Czajka WWTP

Czajka Case II



Indicator	Unit	Average concentration in treated sewage		
		Before modernization	After modernization	Maximum permissible indicator value
COD (COD Cr)	mgO2/l	39	28	125
BOD (5 day)	mgO2/l	7,4	2,5	15
Total suspensions	mg/l	19,3	5,3	35
Total nitrogen	mg N/l	26	6,8	10
Total phosphorus	mg P/l	0,46 (chem.)	0,50 (no chem.)	1

Type of waste	Average waste amount per day (tons of dry mass)	Maximum waste amount per day (tons of dry mass)
Sludge Czajka	128,0	149,5
Sludge Południe	13,1	16,9
Screenings Czajka	4,8	12,5
Sand Czajka	-	10,1
Fats Czajka	-	0,58

Czajka Case III: strong points

- Bio-denitro™ and Bio-denitro™ processes
- Incineration of sludge with on-line monitoring
- Rain water retention system with central management (currently under construction)
- On line monitoring everywhere where it is possible (exhaust !!!!!)
- Big capacity of Czajka with the current amount of industrial sewage which constitutes a small percentage of the total capacity



Overall value of modernization
571 000 000 euro
EU co- financing value
270 000 000 euro

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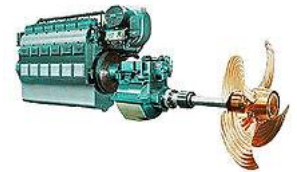
Czajka Case IV: Energy producing and sludge management



Heating for the whole Czajka plant



Cogeneration units



Sludge burning



Biogas burning



Heating



Electricity



Heating



Electricity

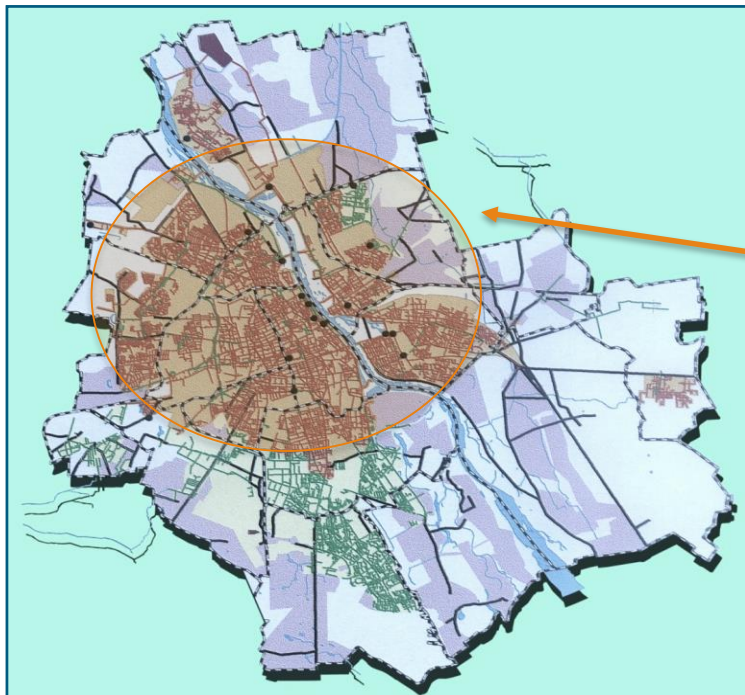
Electrical capacity : 1.96 MW

Electrical capacity : 5.66 MW

Czajka WWTP is a very good example of efficient Energy Recovery

Case: Warsaw Waterworks and Czajka WWTP

Czajka Case V: Combined System



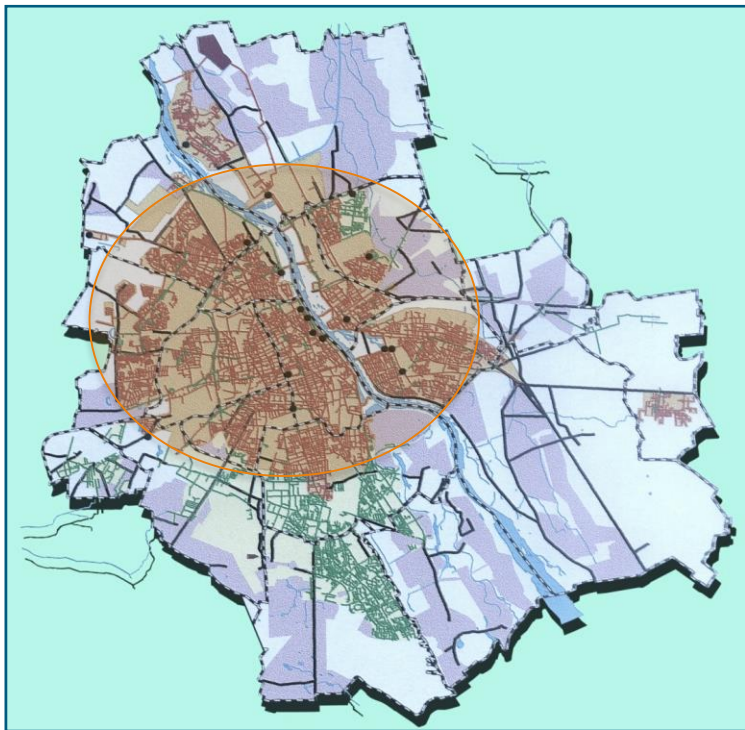
3 282 km – length of the whole sewage system
32% of the above - the combined sewage system (brown) which is connected with Czajka WWTP
Peak flow excl. rainwater $Q_h \text{ max } 25\,040 \text{ m}^3/\text{h}$
Peak flow incl. rainwater $Q_h \text{ max } 51\,120 \text{ m}^3/\text{h}$

From overflows the sewage is entering the river directly. And due to the combined sewage system the bioreactors of Czajka also have trouble with the huge amount of rain water.

During heavy rains and for a short time after storms water **overflows** are opened

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Czajka Case VI: Combined System; Retention



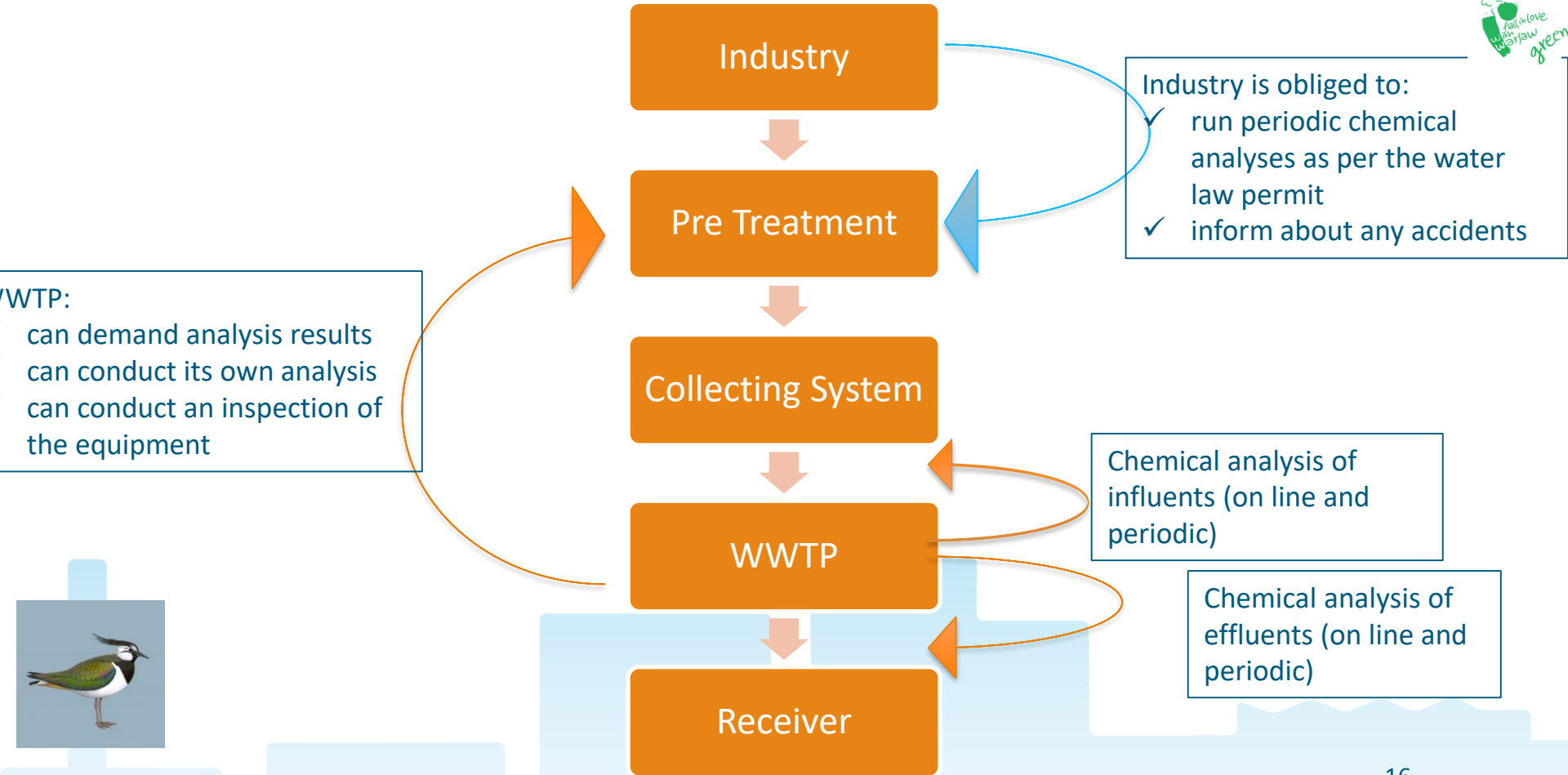
This is why the idea of retention improvement was conceived and is being implemented right now:

1. Wiślany 9,5 km length , 3,2 m diameter ; $V = 76\ 000\ m^3$
2. Linde Bis 4,7 km length, 1,8 m diameter; $V = 12\ 000\ m^3$
3. Mokotowski Bis 4,0 km length 2,8 m diameter; $V = 25\ 000\ m^3$
4. Container at Czajka $V = 78\ 000\ m^3$
5. Plus central management system of combined collectors



The volume of rainwater with sewage entering directly to the river will be limited.

Czajka Case VII: Monitoring of industrial sewage treatment



Case: Warsaw Waterworks and Czajka WWTP

Czajka Case VIII : Mercury Alert



- ✓ February 2013 – the level of mercury at the exhaust of the Incineration Plant caused an automatic shut down;
- ✓ The level of mercury in the sludge: 2mg/kg – 10 times more than limit.

- ✓ The source ?
- ✓ We are not sure ☹️
- ✓ Possible source: washing out of mercury in the area where in the past a factory producing electrical lightbulbs was located.



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Our expert contract



1. General characteristics of the industry in Warsaw, including how many plants, what kind of production, characteristics of the generated wastewater, among others number and types of pollution indicators.
2. How many of all industrial plants or service companies require water permits for sewage disposal, how many of them actually have, or how and in which way it controls?
3. What methods of treating industrial wastewater are used, who chooses them and whether the recipient of wastewater participates in this.
4. What is the procedure for the discharge of industrial wastewater in Warsaw? From the moment you decide to create an industrial company until the first sewage collection.
5. Are controls carried out on the wastewater discharged by enterprises, who carries out controls and how often, what penalties are possible and applied (examples).
6. What is the situation in Warsaw compared to another city with a higher share of industry or against the background of statistics in Poland.
7. What is the situation with sewage imported by septic tankers in legal and practical terms.
8. Are there protections against sudden, uncontrolled appearance of a large load of toxic sewage from various sources in the network.

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Thank you very much for your attention and
patience



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