

# **EEA' indicator system**

- Potential new indicators related to water utilities and urban environments**

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## **Performance of Water Utilities beyond Compliance**

- sharing knowledge bases to support environmental and resource efficiency policies and technical improvements**

**13-14 Dec 2012, EEA Copenhagen**



# Global trends and policies on climate and emissions/energy

- Global Targets: 2 degree celsius
- Regional targets: EU 20-20-20 by year 2020
  - A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
  - 20% of EU energy consumption to come from renewable resources
  - A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency
- National Targets: e.g., Netherlands: 30-30-30
- **Utility targets?**
  - WWF6 targets: 20% improvement in energy efficiency (1990 level - 2020)



**Water** and **energy** sectors can have **several synergies** in the climate change context

Power consumption by European water utilities is "only" few % of use in society **but has reduction potentials**

- Like the rest of society, utilities need to reduce carbon footprints
- Population growth and higher quality standards makes this more difficult
- Technological solutions do exist - several good use case demonstrations
- wastewater sector has a potential to become CO2-neutral
- Fiscal incentives may accelerate implementation of sustainable technologies

**Targets** for water utilities should be set for **energy efficiency**

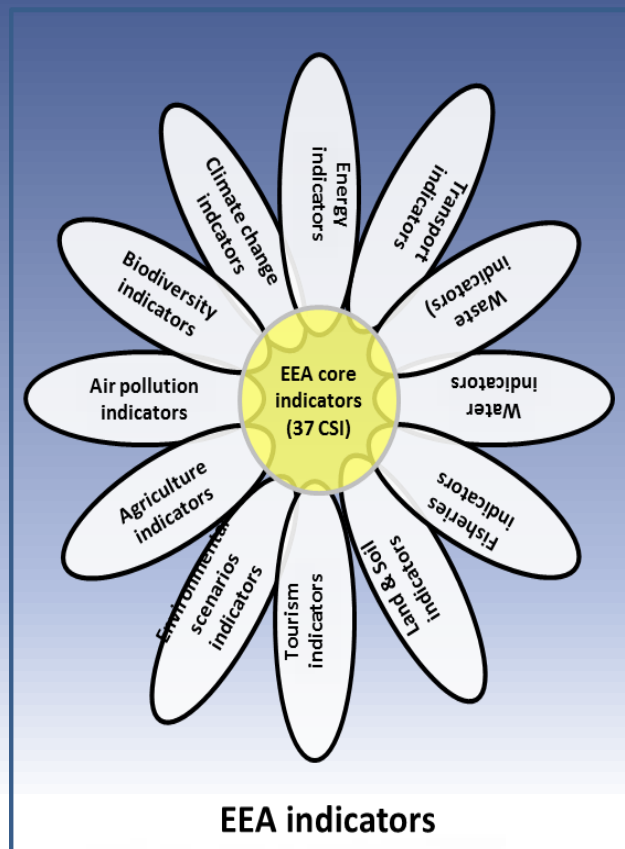
- WWF6 targets: 20% improved energy efficiency (1990-2020)
  - not enough for EU 20/20/20 targets (absolute reduction)
- Indicators are needed to provide status and to monitor progress
- Existing data infrastructures (WISE, Eye-on-Earth,..) may be helpful

**Multi-stakeholder** involvement needed

- Political level: policies, targets, support mechanisms
- Technical operating level: new technology implementation & optimisation
- User level: awareness and demand management



# Refresh of the EEA Core Set of Indicators and development of new sets



## Questions:

Which indicators provide the best overview of EU policy implementation?

Which indicators provide the best overview of sectoral integration?

Which indicators provide the best overview of of resilience?

Which indicators provide the best overview of of resource efficiency?

Which indicators provide the best overview of of wellbeing?

Which indicators allow for comparing environmental performance across countries?

## Tailored indicator sets

EU Policy Implementation

Sectoral Integration

Transition to a Green Economy

Country benchmarking (SENSE)



# How to derive indicators ?

Agree on a story and the important (policy) questions

- Identify relevant indicators (headlines) answering these
- Compare with currently available indicator assessments

Decide on assessment methods (targets, criteria)  
and data needed / available

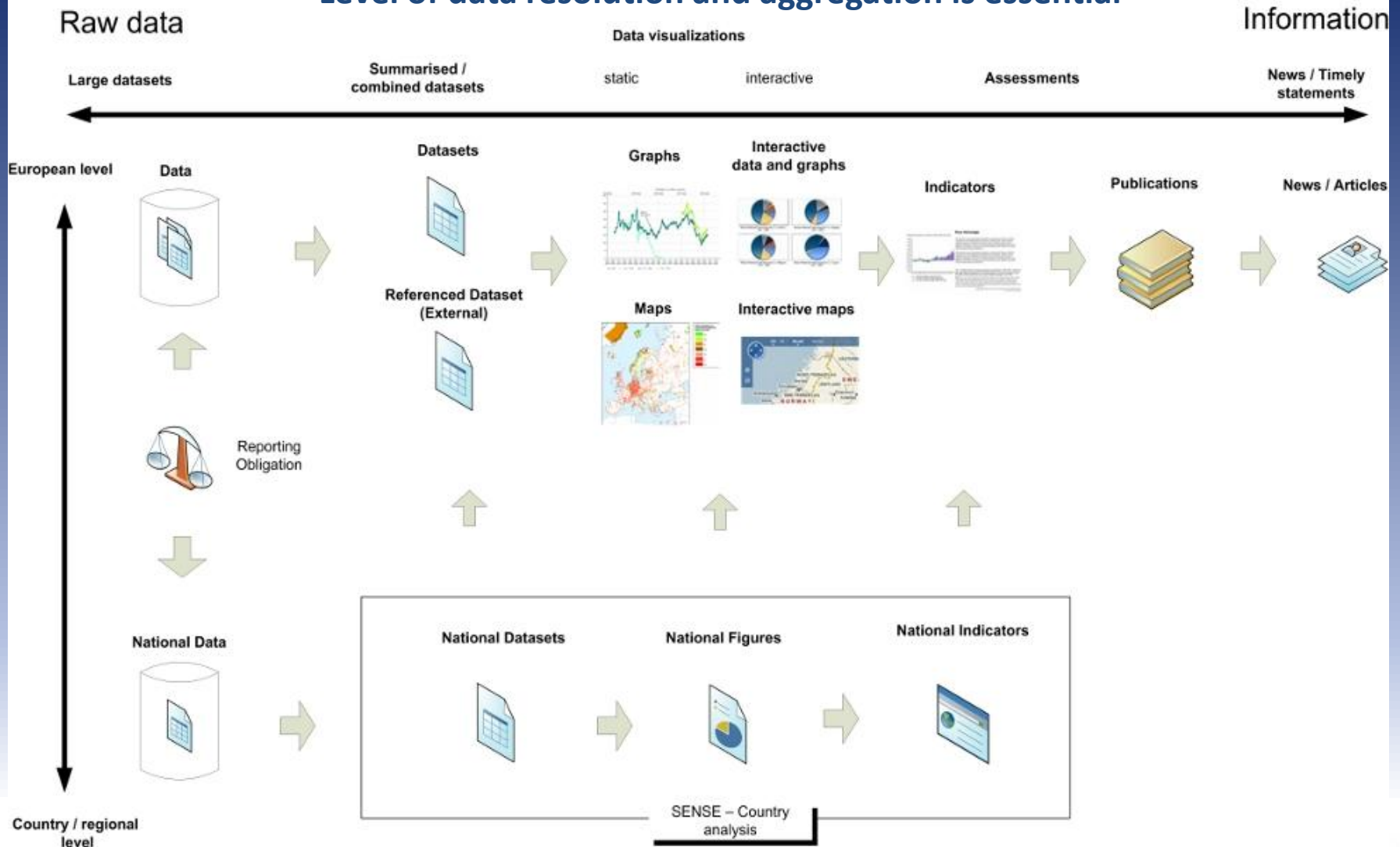
**Data compilation and Assessment**

Conclusion and communication of key messages

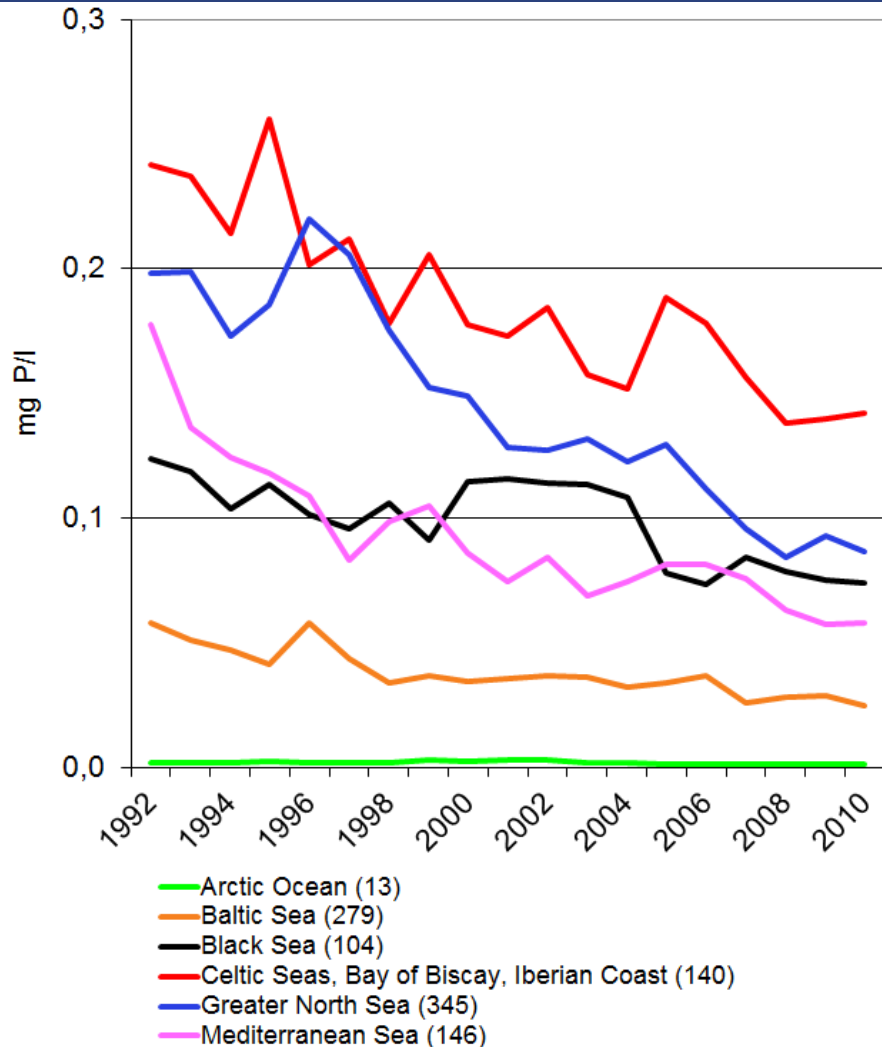


# EEA Website data-to-information chain model

Level of data resolution and aggregation is essential



# Trend for orto-P in European rivers



EEA has 11 Core set indicators (CSI) in water (incl. marine) category being updated

Several EEA Water CSIs relate to environmental water quality

[Source: EEA CSI020](#)



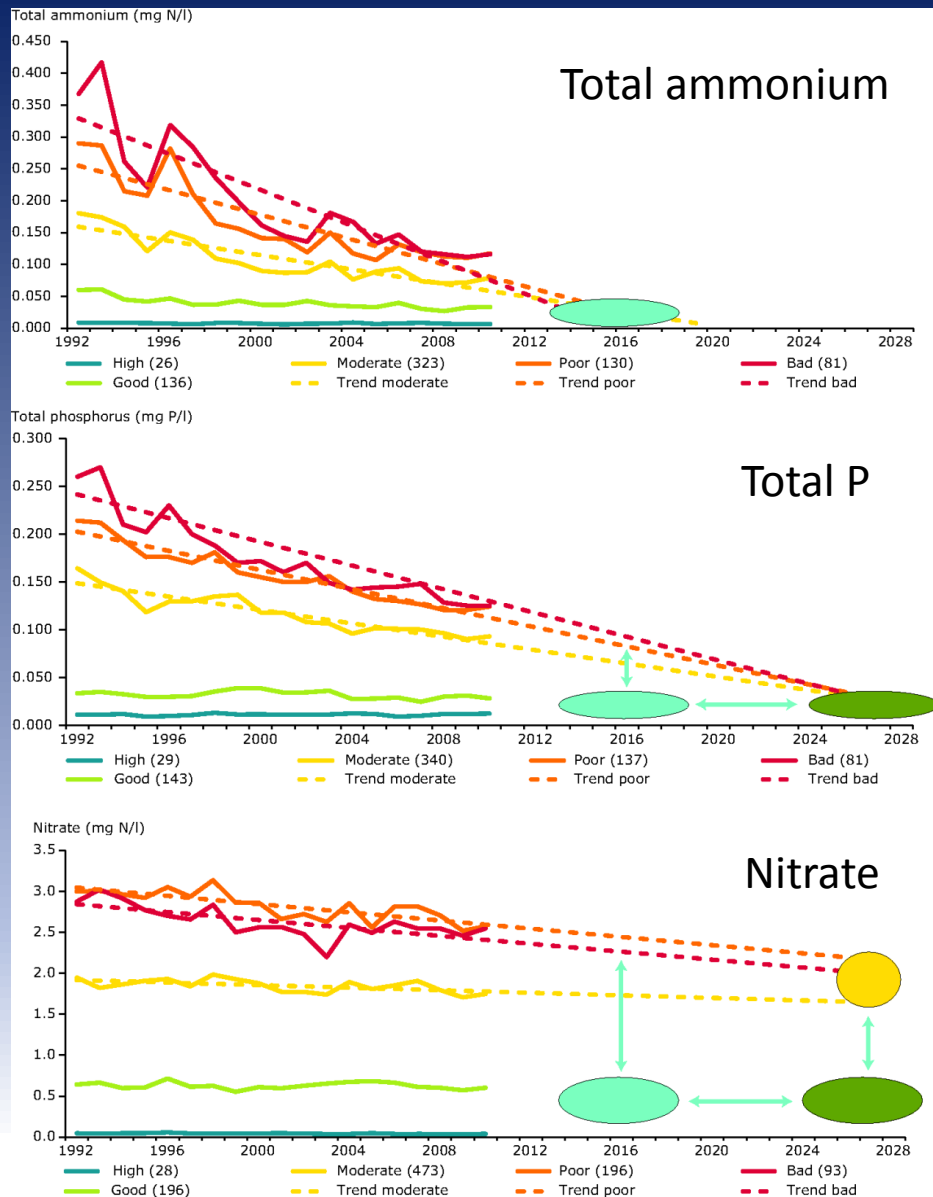


# Further assessment of indicator data (trend stations) in a WFD projection context

Trends for chemical parameters according to ecological status

Expectations for achieving good ecological status based on empirical relations and continued rates of improvements for:

- Ammonium: optimistic
- Total P: moderate
- Nitrate: pessimistic



Source: EEA report 8/2012

European Environment Agency



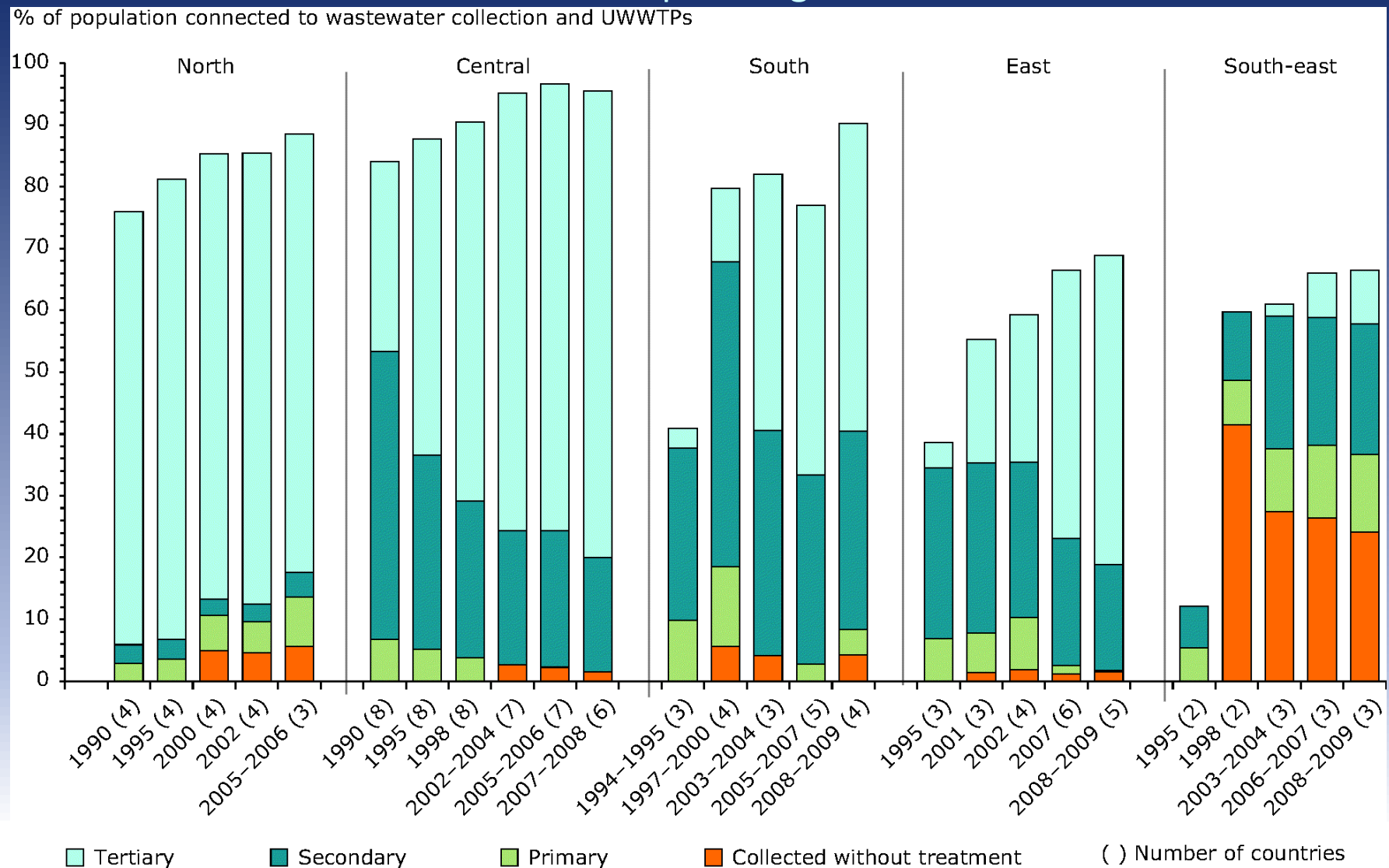
2012

Year of Water



# CSI024 – Urban Wastewater treatment - ww infrastructure service in 5 European regions

Key policy question only partly addressed ..



**key policy question: "How effective are existing policies in reducing loading discharges of nutrients and organic matter?"**

European Environment Agency



2012

Year of Water

# Specific influent loads

- resource efficiency indicator for service area ?

Influent loads - total UWWTP short name	ID	Q l/p/d	CODcr	BOD5 g/p/d	Total N	Total P	Inhabitants 1000 p
Lynetten	DK10105	379	203	114	15	2.8	535
Damhusåen	DK10106	423	135	68	12	2.2	230
Spv.Cent. Avedøre	DK1670001	389	166	69	13	2.4	235
Ejby Mølle Renseanlæg	DK4610302	534	271	112	15	2.6	119
Hagen	DETP_NW1206	505	116	49	13	1.7	190
Bochum-Olbachtal	DETP_NW1201	274	134	52	13	1.7	184
Menden	DETP_NW1247	652	116	46	12	1.7	73
Iserlohn-Baarbachtal	DETP_NW1237	474	107	46	14	1.7	69
Amsterdam West	NL11014	294	149	57	16	2.2	573
Westpoort	NL31005	184	119	53	10	1.9	291
Innsbruck	ATTP_7-710301	306	196	99	15	2.3	154
Helsinki/Espoo/Vantaa	FIJVP_o000000000101	363	190	70	15	2.3	780
Average		398	159	70	14	2.1	
std. Dev.		129	49	25	1.6	0.4	
rel. Std. Dev		0.32	0.31	0.36	0.12	0.18	

- Remarks:

- Q: may depend on water consumption, infiltration/inflow and stormwater management
- COD, BOD: may depend on industrial loads and pretreatment
- Total N: surprisingly alike
- Total : may depend on water hardness and policies for P in detergent

For illustration – not conclusive !

Source: data sharing with individual utilities,  
2007 situation

European Environment Agency



2012

Year of Water

# Specific power consumption at UWWTPs

- a candidate energy efficiency indicator ?
- only power ? total or net ? Carbon footprint or ? Per person or p.e.?

## Specific facility power consumption

Influent loads - total

ID

UWWTP short name

Power consumption		GHG emission
W/p		kg CO2-e/p/y
Total	Net	Net, fossile

Inhabitants  
1000 p

Lynetten	DK10105	7.2	7.2		535
Damhusåen	DK10106	4.7	2.5		230
Spv.Cent. Avedøre	DK1670001	7.7	4.4	23.6	235
Ejby Mølle Renseanlæg	DK4610302	9.1	9.1		119
Hagen	DETP_NW1206	4.0	0.0	0.2	190
Bochum-Olbachtal	DETP_NW1201	4.2	1.0	5.4	184
Menden	DETP_NW1247	4.2	1.9	10.3	73
Iserlohn-Baarbachtal	DETP_NW1237	4.5	2.3	12.4	69
Amsterdam West	NL11014	3.8	-0.5	0.0	573
Westpoort	NL31005	2.3	-1.3	0.0	291
Innsbruck	ATTP_7-710301	5.2	2.3		154
Helsinki/Espoo/Vantaa	FIJVP_o000000000101	10.7	2.8	0.2	780

This study: 4.9 W/p.e. (total)  
1.9 W/p.e. (net)  
EBC (median) 3.8 W/p.e.

Average	6	3	7
std. Dev.	2	3	9
rel. Std. Dev	0.44	1.14	1.31

For illustration – not conclusive !

Source: data sharing with individual utilities,  
2007 situation

European Environment Agency



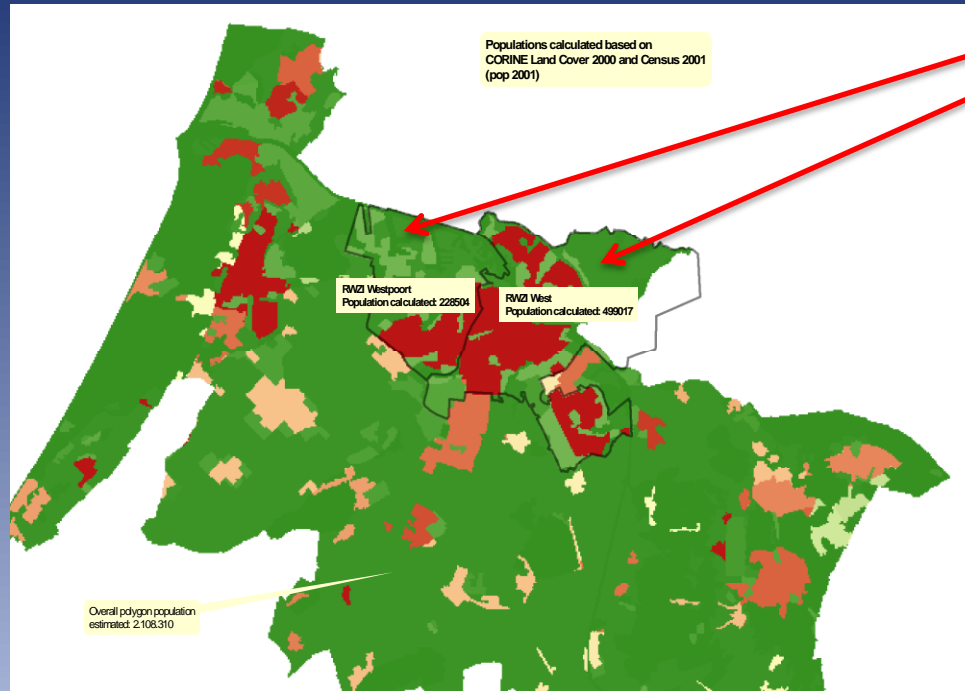
2012

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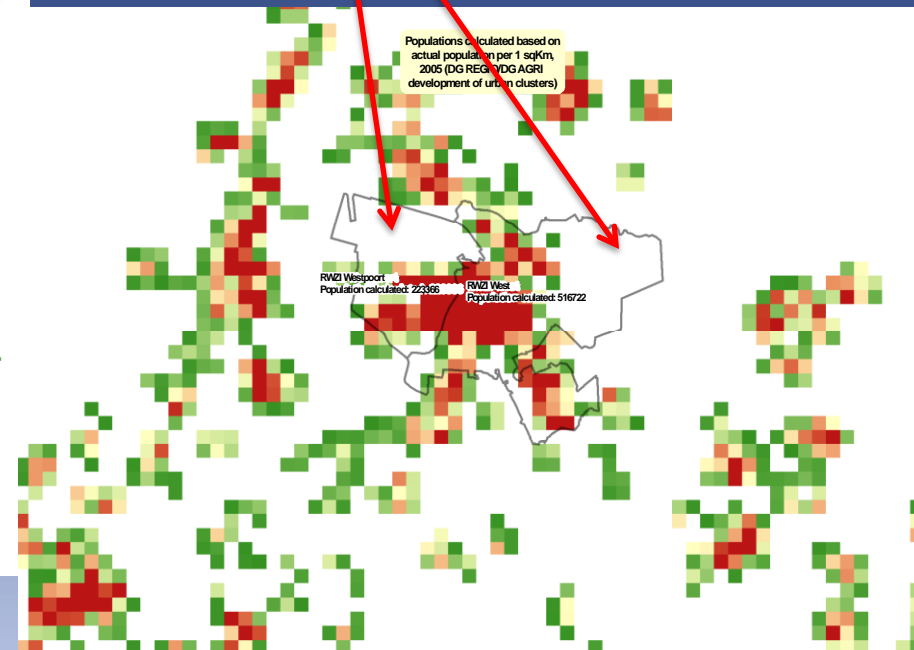
# GIS overlays for estimation of population

– use case: 2 UWWTPs in Amsterdam

Corine land cover 2000 and Census 2001



actual population per 1 sqKm 2005  
(DG REGIO / DG AGRI development of urban clusters)



Estimation of population (inhabitants)

UWWTP				
ID	Name	reported from Waternet	GIS overlay	
			Corine land cover 2000 and Census 2001	DG Regio/DG Agri
				Development of urban clusters
		2007-data	2001 data	2005 data
NL11014	Amsterdam West	573490	499017	516722
NL31005	Westpoort	290760	228504	223366

Relative to reported from Waternet ( % )

		reported from Waternet	GIS overlay	
			Corine land cover 2000 and Census 2001	DG Regio/DG Agri
				Development of urban clusters
		2007-data	2001 data	2005 data
NL11014	Amsterdam West	100	87	90
NL31005	Westpoort	100	79	77

Almost reasonable, even with low resolution reference layers

European Environment Agency

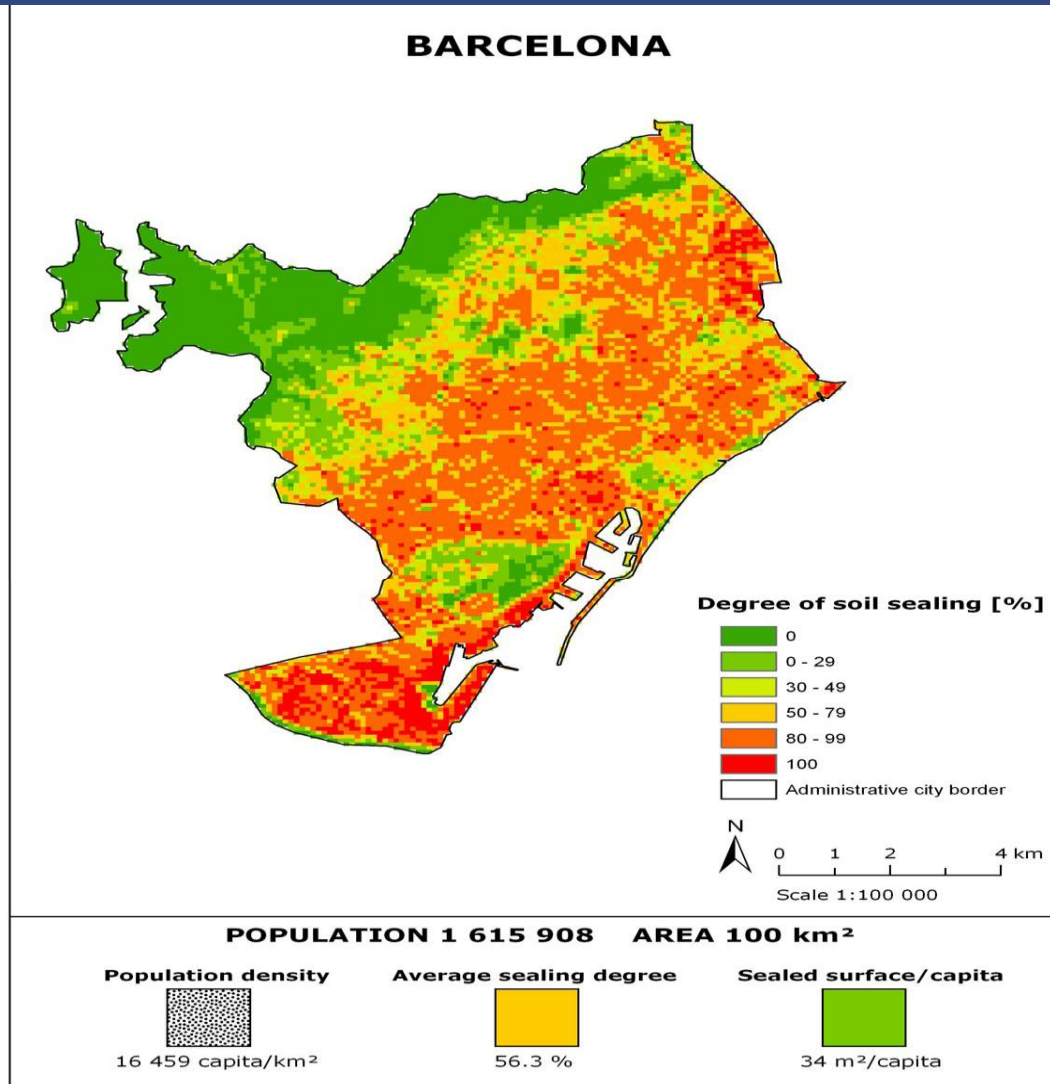


2012

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# More detailed GIS reference layers soil sealing for European cities

- useful for assessing population within GIS polygons and quantifying storm water runoff ?





# Other networks on **urban issues** also work with water related indicators / resource efficiency

## □ Urban Audit (Eurostat):

- Up-dated every 3 years - in the future every year for some variables
- Core city, Large Urban Zone, Sub-city district
- 258 cities – [4 indicators](#) – 2003, 2006

## ■ [Informed cities](#) (project FP7 - 2009 to 2012) about 20 cities

## ■ [Green city Index \(Siemens\)](#) (Research project - 2009 to ?) 30 cities

## ■ [ICLEI](#) (Local governments for sustainability)

## **Few relevant data are regularly updated – Problems**

- Limits of urban areas do not match with administrative areas

- Problems to define what is urban and what is not



- Existing Urban Audit indicators and variables, 258 cities  
(Eurostat – 2003, 2006)

#### Variables

Code	Variable	Spatial Unit
EN3001V	Total number of annual tests (on all parameters) on drinking water quality	A
EN3002V	Number of annual determinations which exceed the prescribed concentration values	A
EN3003V	Total consumption of water in m <sup>3</sup>	A
EN3004V	Number of dwellings connected to potable drinking water system	A
EN3006V	Number of dwellings connected to sewerage treatment system	A
EN3008V	Number of water rationing cases, days per year	A
EN3009V	Number of scheduled water cuts, days per year	A

#### Indicators

Code	Indicator	Numerator	Denominator	Spatial Unit
EN3003I	Consumption of water (m <sup>3</sup> per annum) per capita	EN3003V	DE1001V	A
EN3004I	% of dwellings connected to potable water system	EN3004V	SA1001V	A
EN3006I	% of dwellings connected to sewerage treatment system	EN3006V	SA1001V	A
EN3008I	Number of water rationing cases, days per year	EN3008V	-	A
EN3009I	Number of scheduled water stoppages, days per year	EN3009V	-	A





# Networks on **urban issues** :

## Proposed water related resource efficiency indicators:

### ☐ **Water self-sufficiency**

- Share of water extracted on urban territory / Year
- Amount of water used on urban territory / year (eventually per capita)
- % of water used on the territory that is extracted on urban territory

### ☐ **Water efficiency**

- Consumption per capita / year
- % of water losses in the distribution system



# Summary

- Few Water Core set indicators from Eionet priority data flows are targetted for resource efficiency (RE)
  - Need to further develop to support new policies
- Development in Urban RE indicators and water indicators for urban water cycle have same goal
- Utilities / utility associations may have timely, targetted, relevant and reliable data for resource efficiency indicators
  - potential for joining forces and data sources



Thank you  
for your attention!

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