EC-LINK 中欧生态城
Europe-China Eco-Cities Link
中欧低碳生态城市合作项目

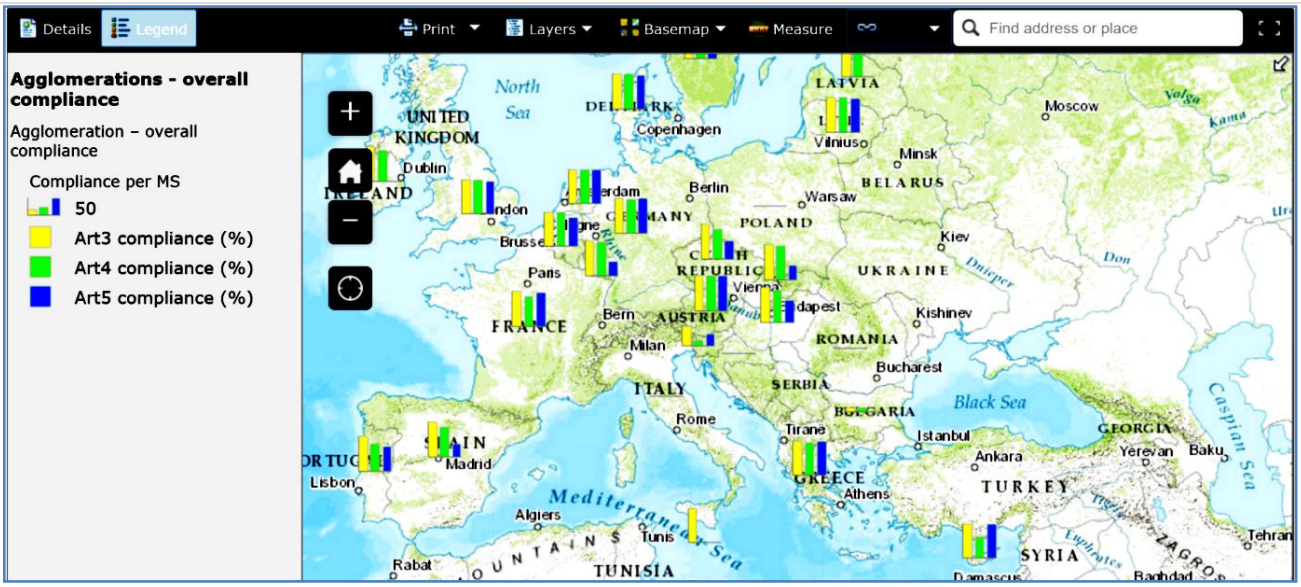
Performance Indicators

Water Management

Water Cycle Management indicators

Indicators

Indicators are used to assess whether certain achievements are attained or promises kept – without entering an extensive research into all details which would not be justifiable in terms of time and consts involved. If assessment against ***standards*** is to be achieved then it is essential to maintain high quality databases against key parameters. Monitoring programs must be in force for operational reasons and for assessment against standards – and the sources for verification must be identified. Quality assurance methodologies must in place to ensure the quality of data, including high quality laboratory facilities. This may be done through operator self-monitoring and reporting, or though regulatory monitoring programs and check monitoring. Compliance assessment and reporting is essential, to the operator and to the public/customers.[i] In many countries, all environmental and drinking water assessment information is in the public domain and annual reports are published.[ii]



Example Interactice map of Urban Waste Water Treatment Compliance[iii]

Indicator – Drinking Water Quality and Compliance with Regulations

Drinking water quality standards are set out in regulations and must be met at the point where consumers draw off water for use. In England, for example, the regulations for public supplies are the Water Supply (Water Quality) Regulations.. Most of the standards derive from the European Drinking Water Directive 98/83/EC. Water companies and local authorities take and analyze a prescribed number of samples, and drinking water inspectors check the results independently. Inspectors assess whether the actions taken by water companies and local authorities in response to any failures, operational events or consumer complaints are appropriate and sufficient to prevent a recurrence. Where improvements to water supplies are needed, this is confirmed in the form of a legal notice that must be complied with by the water company or by the relevant person in the case of a private water supply.

In respect to drinking water provision, typical quality standards are typically examined:

- Drinking Water Quality
- Customer reports of dirty water
- Microbiological Indicators
- Water losses in the distribution system

Indicators for Drinking Water Quality: a numerical standard that must be complied with, either at the consumer's tap or the point where water leaves a treatment works, treated water storage reservoir or tower.

Water Customer complaints about dirty water to Water Companies: for example discoloration of water is often reported by customers and can be an indicator of iron or manganese contamination at treatment works or in pipe systems. These are not normally a public health issue, but may indicate other risks.

Microbiological composition of drinking water: Microbiological indicators are important to assess public health risk and to address potential contamination. The point of drinking water compliance is where water is drawn off from taps by consumers and testing should take place daily at randomly selected consumer taps for some 50 parameters that have numerical standards. Sampling frequencies are determined by the size of the population in the water supply zone.

Leakage and 'non-revenue' water loss: All water networks leak - some of them so badly that up to 50% of the water never reaches the consumer. Old networks are particularly vulnerable to this. London is a good example where many of the pipes have been in place for hundreds of years. More than half of water mains are over 100 years old; around a third are over 150 years old. Leakage rates were high but substantial programs have been put in place to reduce these losses.

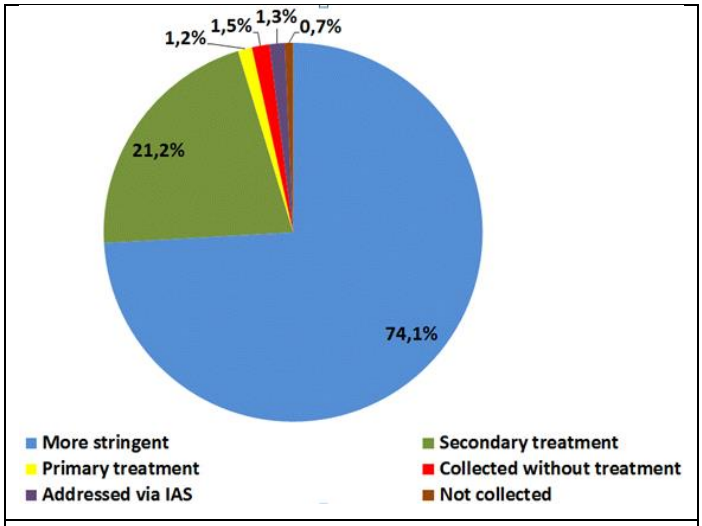
Indicators – Waste Water Treatment

It is important to maintain records of compliance against standards of effluent treatment and for this to be in the public domain. This maintains momentum for environmental improvement and pressure for municipal and industrial dischargers to meet permit conditions. Typical indicators for the quality of service include:

- Compliance with the established EU stadards
- The precentage of treated waste water
- Bathing Water Quality
- Diffuse Pollution Control

Compliance with the EU Urban Wastewater Treatment Directive (UWWTD): Compliance against the UWWTD standards is one indicator used across Europe. Member States must report this to the EU.[v] The ultimate indicator of compliance against the European Water Directives is the State of the Environment Reports compiled by the EEA.

Percentage of Wastewater Treatment: The level of treatment in European cities is shown in Figure on the right.



Type of treatment applied in the wastewater treatment plants of 586 big cities - 2011 data.[iv]

Bathing Water Quality: The quality of the bathing waters and the ability to indicate bathing water/microbiological quality is a core indicator. Data is collected in accordance with the Directive and is reported to the EU and the EEA report, (European Bathing Water Quality)[vi]. It indicates where the quality of bathing water is expected to be good in the forthcoming year. The report was compiled using information from more than 21 000 bathing waters in the 28 EU Member States plus Albania and Switzerland. The report is a joint production of the European Environment Agency (EEA) and the European Commission.

Diffuse Pollution Control: One of the major challenges for environmental regulation is in addressing the sources and causes of diffuse pollution. Conventional engineering and permitting-based regulation works well for point sources of pollution, but has been ineffective at addressing diffuse sources such as pollutant runoff from agricultural practice, forestry, and urban hard surfaces. It is clear that behaviour change is needed on the part of the people and organisations responsible for generating the diffuse pollution, often in complete ignorance of the impact their activity creates.

While in the EU there has been great progress in reducing point source pollution over recent decades, non-point / diffuse pollution, especially of nitrate and phosphorous from agricultural land, has generally remained stable or become worse. Awareness of this issue is often low with the majority of farmers not realising that they are major contributors to surface and groundwater pollution. There are often significant time lags between the application of fertiliser, pesticide or manures / sludge to land and its transport to rivers by surface or sub-surface routes. These will be dependent on weather, with site specific factors also affecting the pathways of pollutants to the receiving water. In addition, pollutant run off from cities and town is a significant problem.

It is certain that no single tool will deliver effective diffuse pollution control and that a variety of measures will be needed. The most directly acting are likely to be financial – taxes, levies, or subsidies – aimed at particular activities. But these are likely to generate resentment in some sectors of society, and may distort markets, leading to knock on environmental, social or economic problems.

Over the long term, innovation, education and instilling in the general population a higher appreciation of the value of a clean environment, are likely to be the most effective means of securing improvements. When activities that currently lead to diffuse pollution become seen as being seriously anti-social, the perpetrators of such pollution are far more likely to change their ways.

Sino-EU Key Performance Indicators for Eco-Cities

The EC-Link Project has compiled a set of (yet unpublished) water related indicators which are summarized in the following Table:

Water Management (Water Supply, Waste Water Treatment, Drainage and Storm Water Management)			
	Indicator Category	**Indicators: indicative values**	**Current achievements / Time frame for accomplishment**
1	Quality of water bodies [1]	Grade IV surface water quality standard GB 3838-2003 [1]	By 2020
2	Water quality at centralized source reaches standard [2]	100% [2]	
3	Water quality at user level [2] Services network coverage [1]	100% [2] 100% [1]	` By 2013 [1]
4	Water from taps with drinking water quality [1] Drinking water Grade III standard [3]	100% 100% [3]	immediate
5	In buildings: adoption of cost-effective water saving appliances [4] Water leakages as per standard CJJ92 [5]	100% [4] ≤8 % [5]	By 2020 [4]
6	Rate of reuse of reclaimed water (%) [2]	In water-scarce areas ≥25%: in areas without water scarcity ≥15% [2] ≥60% [6] Water deficient cities: ≥20% [7]	
7	Domestic water consumption [1]	≤ 120 liters / day.pers.[1] Not higher than the average of lower & upper limits of GB/T50331 [5]	By 2013 [1]
8	Water supply from non-traditional sources [1] Water supply from recycled wastewater or rainwater [4]	≥50% [1] 20-30%[4] ≥85% [18] ≥10% [5]	By 2020 [1]
9	Water permeability of surface areas [8]	≥50% [8]	
10	Wetland conservation [5]	≥80% [5]	
11	Sanitation coverage, waste water treatment [7]	100% [7]	By 2020 [7]
12	Grey water treatment and reuse	50%	By 2020
13	Sponge city infrastructure contributes to water harvesting	30% of water supply	By 2020
14	Drainage and sponge city measures eliminate urban flood events	100%	
Proposed Water Management KPIs [vii]			

Credentials:

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Editing: Kosta Mathey and Florian Steinberg.

References

[i] For environmental monitoring: Real Time (GIS supported) data disclosure – to be used for public data sharing (i.e. citizens' information) like in air quality data, eventually also to be extended to other environmental sectors like the water sector (for instance water bodies, rivers, lakes etc.) and waste water management.

[ii] UK Drinking Water Inspectorate annual reports can be found *at http://dwi.defra.gov.uk/about/annual-report/index.htm*

[iii] *Source: European Environment Agency, 2013, http://www.eea.europa.eu/data-and-maps/uwwtd/interactive-maps/urban-waste-water-treatment-maps-1*

[iv] Source: European Environment Agency, European Environment, Sate and Outlook 2015 *http://www.eea.europa.eu/data-and-maps/figures/number-of-eu15-agglomerations-of-more-than-150-000-p-e-by-treatment-level-situation-on-1st-january-1*

[v] The reporting requirements under Section 16 of the Directive can be found at http://ec.europa.eu/environment/water/water-urbanwaste/implementation/reportingrequirements_en.htm

[vi] European Environment Agency, EEA Report No 1/2015, European Bathing Water Quality 2015, *http://www.eea.europa.eu/publications/european-bathing-water-quality-in-2014#tab-data-visualisations*

[vii] These key performance indicators were prepared and compiled by the EC-Link Project. See: EC-Link. 2016. *Sino-EU Key Performance Indicators for Eco-Cities*. Beijing (unpublished draft).