the Brief
N°3 - October 2011


# Status report on wastewater-treatment plant compliance with standards

A national action plan to upgrade the wastewater-treatment plants (WWTP) of French cities and towns was launched in October 2007 by the Ecology ministry. The government committed to bringing into compliance by the end of 2011 (taking into account reasonable technical lead times) all urban treatment plants that were not up to standards in 2006. The WWTPs that no longer met standards in 2007 and 2008, notably following their classification in sensitive zones for the treatment of nitrogen and phosphorous, were granted an additional two years to comply, i.e. until the end of 2013. This document reports on the degree of compliance achieved by wastewater-treatment plants.

## The Urban wastewater-treatment directive

The 1991 Urban wastewater-treatment directive[1] governs sanitation services in Europe. It imposes standards for the collection, treatment and discharge of urban wastewater, as well as for the treatment and discharge of wastewater from certain industrial sectors. The objectives in terms of performance and the treated parameters (carbon, suspended matter, nitrogen, phosphorus) set by the directive depend on the type of area where the treated water is discharged and on the size of the agglomeration[2] served by the sanitation system. The directive set deadlines for compliance with standards:

> 31 December 1998 for agglomerations representing more than 10 000 population equivalents (PE)[3] discharging to «sensitive areas» (risk of eutrophication);
> 31 December 2000 for agglomerations representing more than 15 000 PE;
> 31 December 2005 for agglomerations representing between 2 000 and 15 000 PE;
> 31 December 2005 for agglomerations representing less than 2 000 PE if the agglomeration has a collecting system.

An agglomeration is said to be compliant if its collecting system and treatment plants meet the following requirements:

> **collection compliance**, i.e. no discharge or overflow representing more than 5% of the volumes generated by the agglomeration during dry weather is observed in the storm drains and all collecting systems within the agglomeration are connected to a treatment plant;
> **facility compliance**, i.e. treatment plants are equipped with the necessary material and systems to treat the received wastewater;
> **performance compliance**, i.e. plants respect all environmental requirements stipulated by the directive over the entire year.

[1] Directive 91/271/EEC (21 May 1991)
[2] Urban area having collective sanitation facilities made up of one or more collecting networks and one or more wastewater-treatment plants, constituting a coherent system.
[3] Unit used to evaluate pollution produced by inhabitants. The pollution handled in wastewater-treatment plants is quantified in population-equivalent units which correspond to that produced by one inhabitant each day, on average.

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# Upgraded WWTPs capable of meeting regulatory requirements

As of 31 December 2008, there existed in France (continental and overseas) 18 884 wastewater-treatment plants, of which 83.1% had a capacity of less than 2 000 PE, 11.45% a capacity of 2 000 to 10 000 PE and 5.45% a capacity of more than 10 000 PE. The 16.9% of WWTPs having a capacity of more than 2 000 PE treat almost 94% of the total pollution produced by agglomerations (75 million PE). The obvious first step towards minimising the impact of the effluents discharged to aquatic environments is to ensure that the latter WWTPs comply with European and national standards. However, upgrading of the smaller plants is also in the process of being accelerated in the effort to meet the 2015 objectives for water status set by the Water framework directive[4].

The directive requires three types of treatment:

> **primary treatment**, for carbon and suspended matter, using physical and/or chemical processes;

> **secondary or appropriate treatment**, for further treatment of carbon and suspended matter, by a process generally involving biological treatment. This is mandatory for agglomerations representing more than 2 000 PE;

> **«more stringent» treatment**, for nitrogen and phosphorous. This is mandatory for agglomerations representing more than 10 000 PE that discharge effluents to areas sensitive to eutrophication.

At the end of 2008, approximately:

> 98% of WWTPs with capacity exceeding 2 000 PE complied with the obligation concerning secondary treatment;

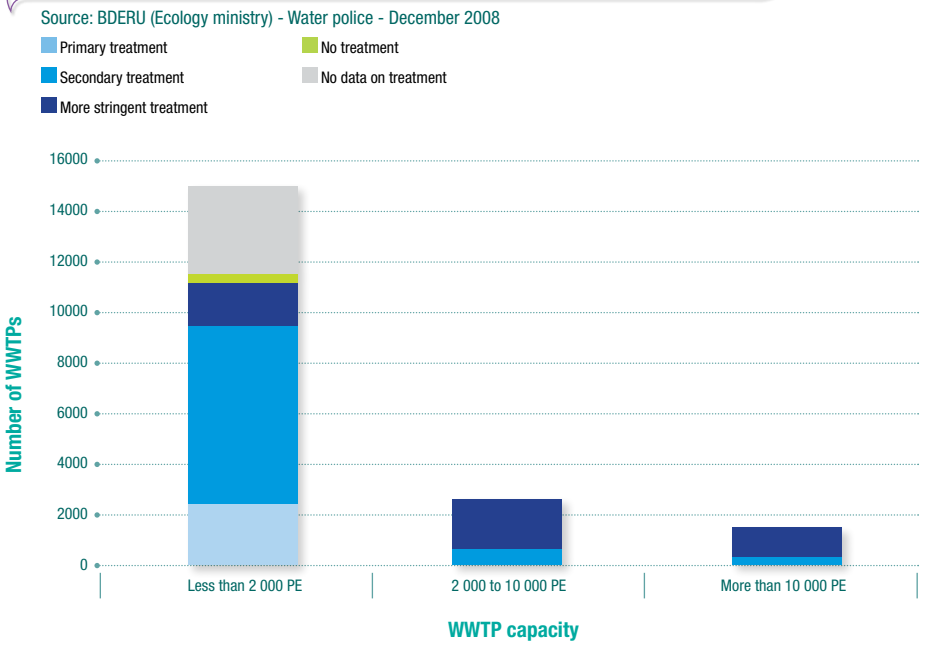
> 60% of WWTPs with capacity under 2 000 PE implemented secondary treatment even though there was no obligation to do so;

> 83% of WWTPs with capacity exceeding 10 000 PE implemented more stringent treatment;

> 78% of WWTPs discharging to sensitive areas, i.e. obliged to implement more stringent treatment, were compliant, on the whole.

## Breakdown of WWTPs according to capacity and the level of treatment in 2008

Source: BDERU (Ecology ministry) - Water police - December 2008



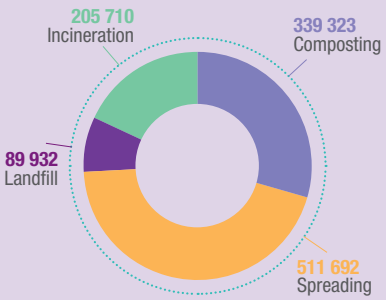

## Use of sludge

In treating wastewater, WWTPs produce sludge that is disposed of in different manners.

In France as a whole in 2008, wastewater treatment produced 1 053 598 metric tons of dry matter. The political decision was made to use the sludge primarily (74%) for spreading (either directly or following composting) as fertiliser in fields.

However, very large WWTPs often incinerate the dry matter because the investment costs for this type of treatment can be written off more rapidly.

## Breakdown of sludge destinations in 2008 (in tons of dry matter)




Source: BDERU (Ecology ministry) - Water police - December 2008

[4] Directive 2000/60/EC (23 October 2000)



## Activated sludge is the preferred treatment

There are a number of techniques to treat wastewater.

> Activated sludge, where the wastewater is put into contact with a bacteria- and oxygen-rich mixture to accelerate degradation of the organic matter. Techniques vary depending on the quantity of bacteria in the basin (moderate or high bacterial load, more or less aeration).

> Rotating biological contactors on a shaft, in contact with both the oxygen in the air and the wastewater, to enhance the development of bacterial flora.

> Natural basins through which the wastewater transits.

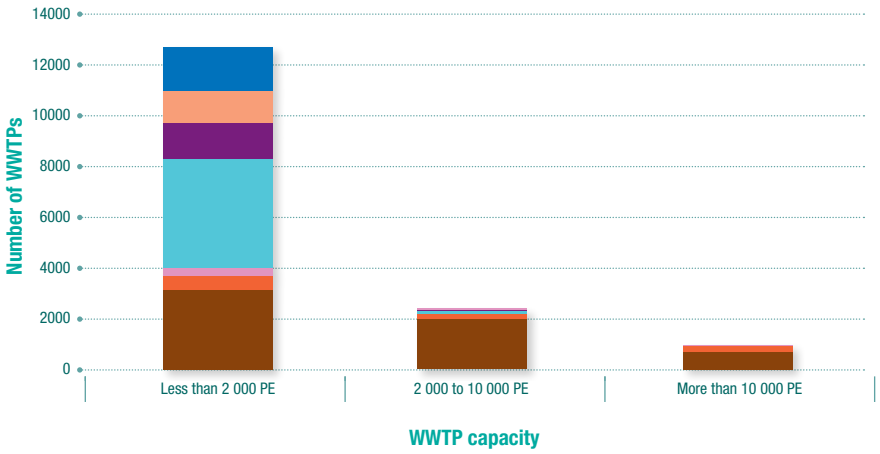
> Filter beds, where the wastewater flows over natural or synthetic media on which bacteria tend to accumulate.

> Biological filters, where the wastewater is injected through layers of granular materials (sand, activated carbon, clay, etc.) and filtered.

> Reed beds, where plants (generally reeds) are installed on sand and gravel filters. The roots aerate the filter and encourage the development of the micro-organisms that treat the water.

### Breakdown of WWTPs according to capacity and the treatment technique in 2008

Source: BDERU (Ecology ministry) - Water police - December 2008




The activated-sludge technique is used in 44% of all French agglomerations. More precisely:

> 91% of WWTPs with capacity greater than 2 000 PE use the technique;

> among WWTPs with capacity less than 2 000 PE, there is greater diversity, i.e. 35% use natural basins, 25% activated sludge with extended aeration, 12% filter beds, 11% reed beds and 10% biological filters. The other types of technique are not commonly used.

Clearly, two main types of wastewater-treatment technique are used:

> activated sludge, because this technique effectively treats the parameters targeted by the Urban wastewater-treatment directive;

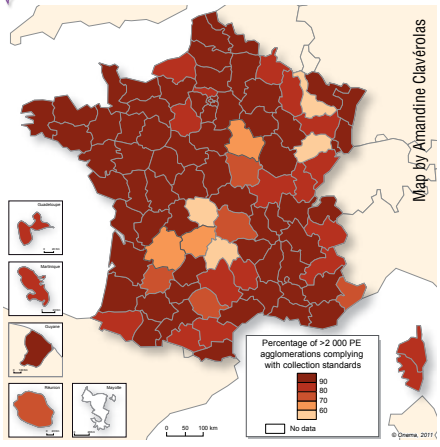
> natural basins, because this technique is easy to set up and it can treat both rainwater and wastewater.

## Generally compliant agglomerations

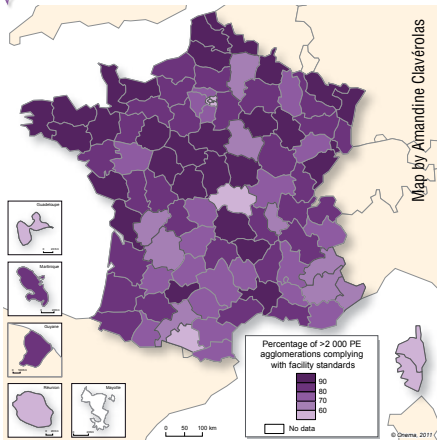
In terms of collecting systems, 99% of agglomerations were compliant as of 31 December 2008. The few non-complying agglomerations have launched work programmes to upgrade their installations.

In terms of facilities, the level of agglomeration compliance is somewhat lower in that 89% were compliant as of 31 December 2008.

### Percentage of >2 000 PE agglomerations complying with collection standards in 2008



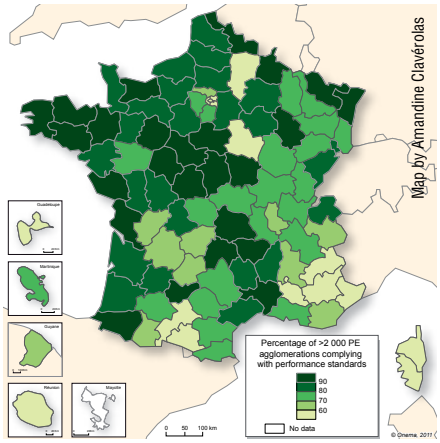

### Percentage of >2 000 PE agglomerations complying with facility standards in 2008




Source: BDERU (Ecology ministry) - Water police - December 2008

**Percentage of >2 000 PE agglomerations complying with performance standards in 2008**

Source: BDERU (Ecology ministry) - Water police - December 2008




Finally, in terms of performance, 80% of agglomerations were compliant as of 31 December 2008. The geographical distribution of agglomerations complying with performance standards was more or less similar to that of agglomerations complying with facility standards given that insufficient facilities generally lead to poor performance.

However, a WWTP may not comply during a given year due to an operational problem not related to the compliance of the facility. In addition, it is necessary to wait a full year following facility upgrades before the performance level can be assessed. That explains the 9% difference between the facility and the performance compliance levels.

## Local differences, but general compliance

There are significant differences between the major French river basins with:

- high compliance rates in the Artois-Picardie basin (in spite of the Aisne department) and the Seine-Normandie basin, the latter being pulled up by the average rates in the Île-de-France (Paris) region;
- average compliance rates for the Rhin-Meuse and Loire-Bretagne basins;
- compliance rates below the national average in the Adour-Garonne basin (the Aquitaine region is in fact above, but the Midi-Pyrénées region is significantly below), Rhône-Méditerranée-Corse (in spite of the Haute-Savoie department), Martinique, Guadeloupe, Guiana and Réunion Island.

Generally speaking, compliance is highest for collecting systems, with much higher rates throughout France than for facilities and performance. Just a few departments, all in very rural areas, have relatively low compliance rates for collection (< 80%). On the whole, WWTPs in France have implemented the required treatment levels and achieved fairly high compliance levels, however progress is still required, particularly in older WWTPs. The action plan launched in 2007 to ensure compliance of WWTPs by 2011 should improve the situation.

### Note on methods

The information presented briefly here is drawn from a study report that may be consulted on the EauFrance portal. The report is based on methods developed jointly by Onema, the Water and biodiversity directorate of the Ecology ministry (in charge of implementing the Urban wastewater-treatment directive and storing sanitation data) and IOWater (the producer of the study).

The numerical data in this document are drawn exclusively from BDERU (national database for urban wastewater-treatment data), which centralises the data collected by the water police and validated by the regional directorates of the Ecology ministry and the Water agencies. The data presented here concern the year 2008.

### For more information

Find technical information on treatment techniques on internet at http://www.fndae.fr/documentation/doc_technique.htm#N°22

See data on urban wastewater at http://assainissement.developpement-durable.gouv.fr/

Find this document on the internet at http://www.eaufrance.fr/IMG/pdf/assainissement2008_201110_EN.pdf or www.documentation.eaufrance.fr

Find the complete study on sanitation services, in french language, on the internet at http://www.eaufrance.fr/IMG/pdf/assainissement2008_201007.pdf or www.documentation.eaufrance.fr

eaufrance The French water-information portal at www.eaufrance.fr

Publisher: Patrick Lavarde (Onema)
Editor: Christian Jourdan, WIS-FR coordinator (Onema)
Coordination: Gaëlle Deronzier and Janik Michon (Onema), Stéphanie Laronde (IOWater)
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Translation: Bartsch & Cie

This document was drafted in accordance with the national master plan for water data (SNDE) and was submitted to the concerned WIS-FR partners.

the Brief

Production: Communicate department, Onema, 5 square Félix-Nadar, 94300 Vincennes - Layout design: Bluelife - Printed on paper from sustainably managed forests by Panoply.