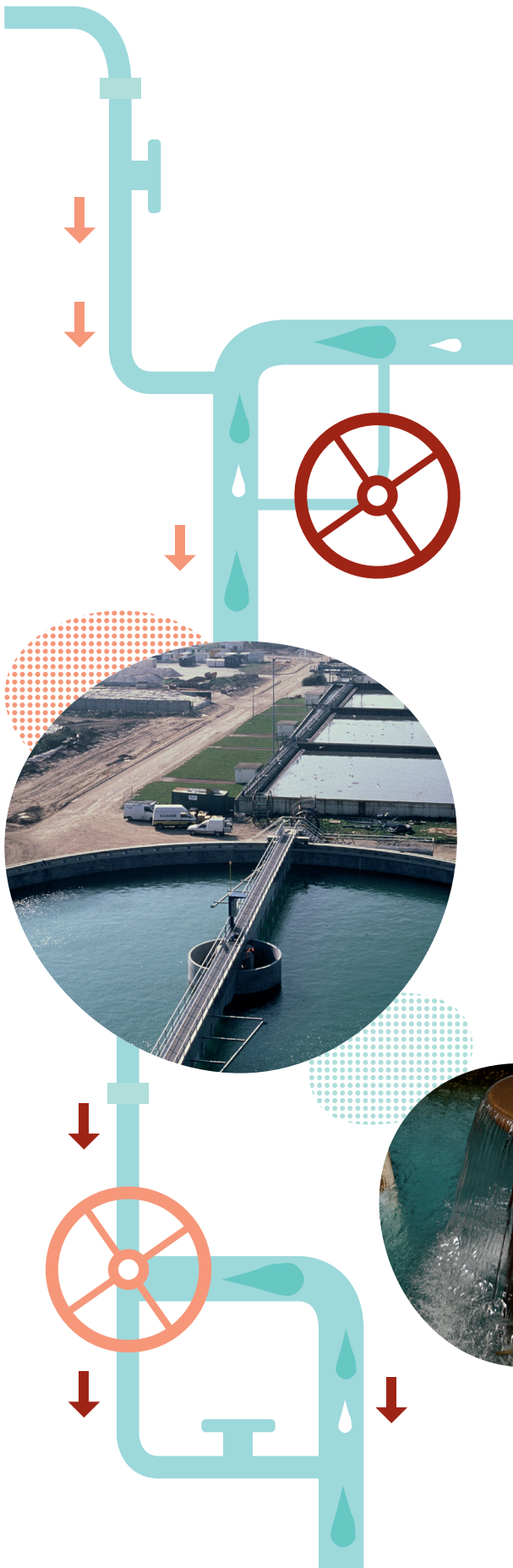
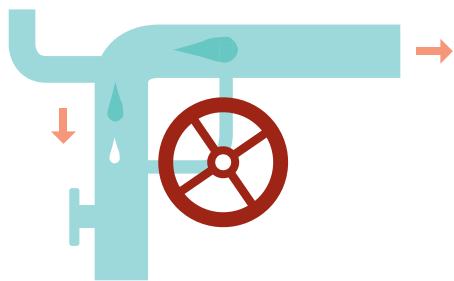


chap **10**

WASTE WATER TREATMENT





10 A

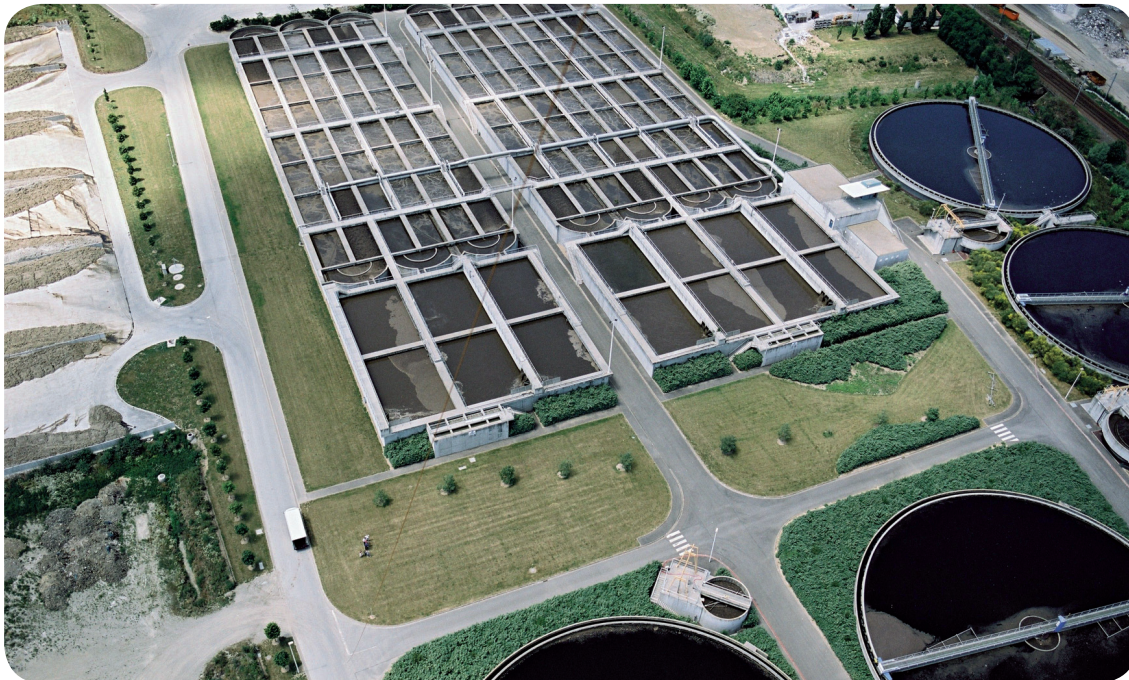
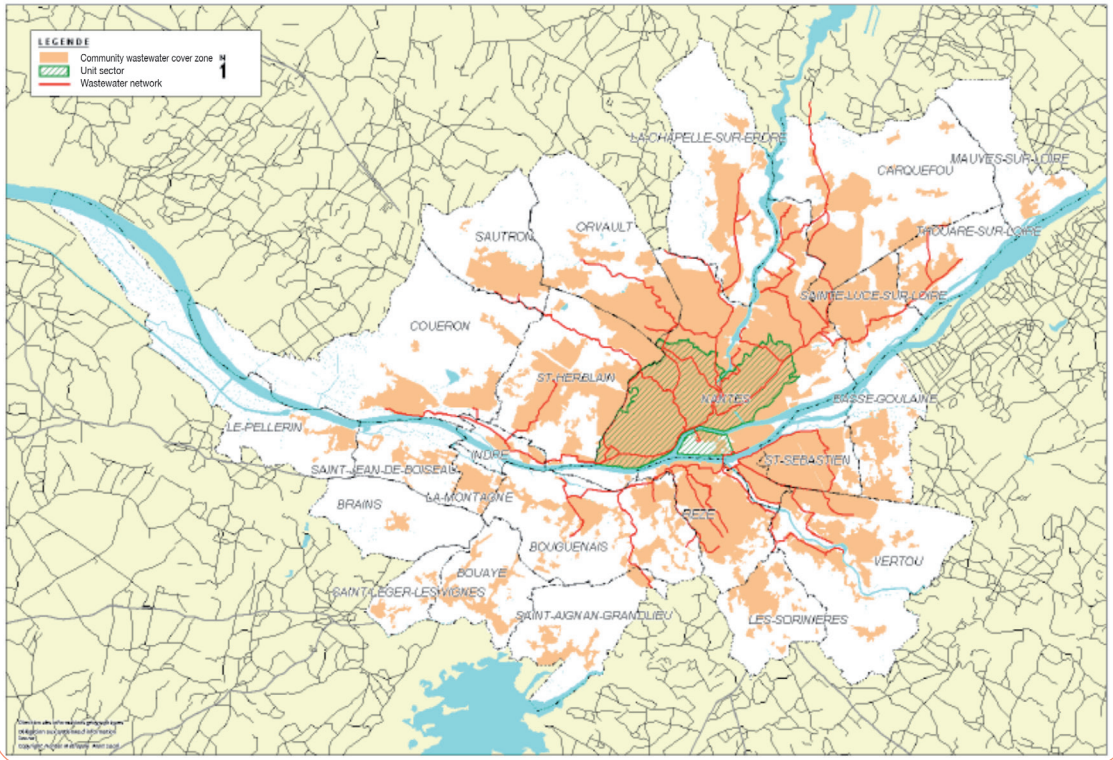
Present situation.

Waste water in the Nantes metropolitan area (575,000 h) is treated in twelve purification plants, with capacities that vary from 1,200 inhabitant equivalent (Vertou – Pégères Reigners) to 600,000 inhabitant equivalent (Vallée de Tougas - Nord Loire). Together, they have a total capacity of 780,000 inhabitant equivalent, which will increase to 840,000 population equivalent when the updated biological treatment process at the Petite Californie (Sud Loire) purification plant comes into service (at the end of 2010).

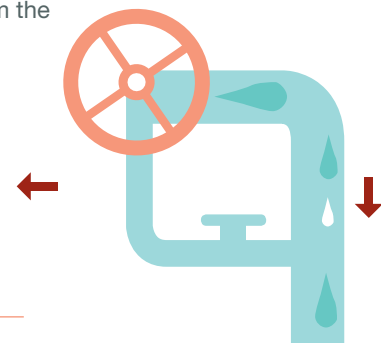
This capacity means that expansion of the metropolitan area presents no fears and industrial waste-water discharges containing biodegradable effluent can be treated (102 agreements signed in 2009, 477 authorisations, 2,094 files opened). There is systematic and regular monitoring of industrial discharges. In addition, waste water from villages far removed from the transfer networks is treated by nine semi-public treatment plants.



Community wastewater zones in the urban community



The design of the Tougas purification plant makes it possible to treat effluent from the unitary part of the network (345 km out of 1,953 km) and therefore rainwater from this sector.



European Green Capital Award Nantes 2012 2013



All the purification plants comply with European and domestic standards. Since Nantes Métropole was created in 2001, the Mauves-sur-Loire, Le Pellerin and La Montagne purification plants have been rebuilt and made compliant.



The Tougas wastewater treatment plant.

In 2009, all the purification equipment was fully compliant, with a 100 % performance compliance rate for purification works.

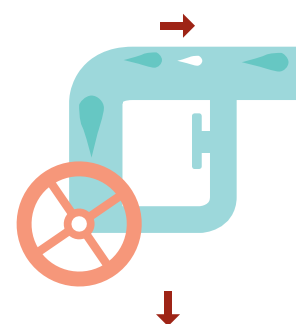
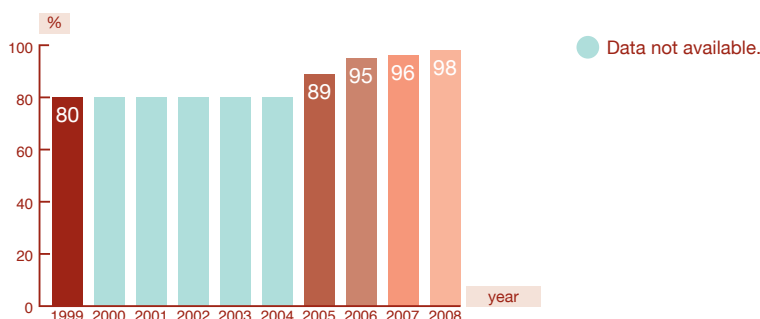
STATION D'ÉPURATION	Number of assessments	Number of assessments revealing compliance	Compliance rate	Wastewater treatment facility compliance (%)	Wastewater treatment facility performance compliance (%)
Basse-Goulaine	23	23	100 %	100	100
Bouaye	11	10	91 %	100	100
La Montagne	6	6	100 %	100	100
Le Pellerin	12	11	92 %	100	100
Mauves-sur-Loire	12	12	100 %	100	100
Petite Californie	258	257	99,6 %	100	100
St-Aignan de-Grand-Lieu	12	11	92 %	100	100
St-Jean-de-Boiseau	12	10	83 %	100	100
Tougas	365	364	99,7 %	100	100
Vertou (Pégères)	4	3	100 %	100	100
Vertou (Thébaudières)	4	3	99,7 %	100	100



The sludge from purification plants is recovered for application to agricultural land, either in the form of a paste, treated with lime for application under plans authorised and controlled by government departments, or of approved compost. The land is subject to agricultural monitoring. A solar sludge dryer will be put into service in 2011, making it possible to move from a 20 % sludge dryness to 85 % dryness, which will reduce the tonnages transported for application to agricultural land.

The “Water-treatment” zoning plans for the 24 cities were approved in 2007, as were local urban development plans. They set out the current and future public treatment sectors and those where non-public treatment will continue (i.e. 4,500 customers).

Changes in wastewater service cover



In 2008 (the latest available figures), the city wastewater treatment public service counted 173,250 subscribers, i.e. 98% cover (the number of city wastewater service subscribers over the number of drinking water service subscribers - ANC subscribers). The table below shows how this rate has evolved since 2005 :

	2005	2006	2007	2008
Number of subscribers to the drinking water network	156100	166020	176370	181690
Number of subscribers to the wastewater treatment network	134190	154407	165649	173252
Number of ANC subscribers	4500	4500	4500	4500
Cover rate	89 %	96 %	96 %	98 %

In 1999, the cover rate was 80%.

In 2009, 37,920,954 m³ of water were processed. The wastewater treatment system's hydraulic yield was 92%. That yield will improve considerably when a storage and restitution pool is built on the unit network from 2011 to 2020, as it will turn monthly dumping rates into decennial rates in the case of the most active spillways (Duchesse Anne, which releases waste into Canal Saint Félix) and biennial rates in the other cases.

The proportion of treated wastewater in relation to total wastewater over the past 10 years

The percentage of wastewater treated in relation to residual water over the past 20 years. This indicator is not available as it is impossible to determine given the percentage of the unit network.

It is therefore established indirectly using two other indicators : cover rate and the population covered in relation to the population to cover under the zoning plans, and overall hydraulic yield, which provides the percentage of water treated in wastewater treatment plants in relation to that volume, and water released into the natural environment through the storm overflows in the unit network. So, given the presence of a unit network, yield fluctuates according to the weather conditions (96% in 2008).

Strict network control

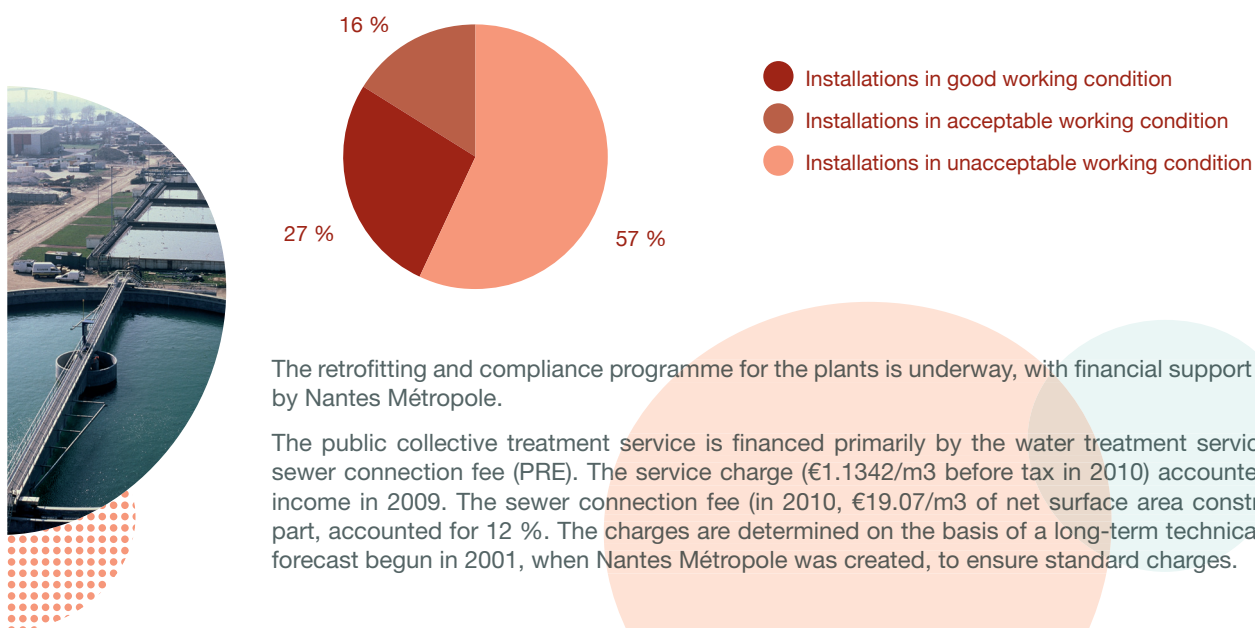
A system for measuring the flow rate, duration and volumes of overflow ensures that operation of the purification network and plants is monitored at all times. For the networks, this consists of :

31 flow rate and volume measurement points on the transfer network, 18 points for measuring the flow rate and weir discharge volume, 14 overflow detectors on the weirs, 1 flow rate measurement device for the Chézine brook, and 14 rain gauges.

In addition, 80 % of the 374 measurement stations are remotely controlled and can, if necessary, alert a round-the-clock fault-clearance team within a maximum period of one hour.

In addition, Nantes Métropole has, since 2005, undertaken a vast campaign to check connections to the public network, to reduce seepage water and direct discharges into the natural environment.

The 4,500 non-public treatment plants that will be retained in the 24 zoning plans approved in 2007 have undergone an initial diagnostic inspection, the results of which are as follows.



The retrofitting and compliance programme for the plants is underway, with financial support being granted by Nantes Métropole.

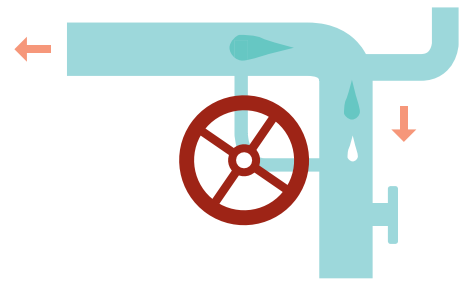
The public collective treatment service is financed primarily by the water treatment service charge and sewer connection fee (PRE). The service charge (€1.1342/m³ before tax in 2010) accounted for 77 % of income in 2009. The sewer connection fee (in 2010, €19.07/m³ of net surface area constructed), for its part, accounted for 12 %. The charges are determined on the basis of a long-term technical and financial forecast begun in 2001, when Nantes Métropole was created, to ensure standard charges.

This forecast made it possible to undertake the investment necessary to allow for development of the metropolitan area, maintain the assets and achieve local government objectives for environmental protection and sustainable development of the community by controlling price rises.



APPENDIX

The 2008 annual report on the price and quality of the wastewater treatment service
http://www.cmaintenance.eu/files/file/Rapport_annuel_2008_assainissement.pdf



10 B

Initiatives undertaken in the past five to ten years.

Gradual resource sharing

The treatment projects for the metropolitan area form part of the Neptune programme, launched in 1990 to consolidate the different players (cities, public consortia, the Department, etc.) with disparate responsibilities, who were brought under a single umbrella in 2001 with the creation of the Urban Community, prompting fewer piecemeal initiatives.

Intended for the long term (1990-2015), this programme, which is designed to reclaim the quality of the natural environment, has made it possible to undertake the following investments during its various stages : €131,716,000 (Neptune I : 1994-1998), €59,760,000 (Neptune II : 1999-2004) in treatment works. More recently, Neptune III (2004-2009) involved an investment of €50,600,000, which included the retrofitting of the Mauves-sur-Loire, Le Pellerin and La Montagne purification plants and the launch of reconstruction and extension of biological treatment at the Petite Californie purification plant.

APPENDIX

The 2015 Neptune programme

http://www.cmaintenant.eu/files/file/programme_neptune_2015.pdf

The ongoing reconstruction is being undertaken in line with rigorous criteria for performance (particularly in terms of water treatment and elimination of pollution) and sustainable development.

Compact, odourless, inaudible, energy-efficient and innovative, the new Petite Californie purification plant (180,000 inhabitant equivalent) will become one of the most modern and efficient in Europe by 2011.

The sludge digestion process will make it possible to reduce the volumes produced by one third, which means 6,000 tonnes that will not be transported. It will also make it possible to produce biogas to be used for heating premises (440 MWh/year) and to generate electricity through cogeneration (2.9 MWh/year). In total, the project (biogas, photovoltaic, etc.) will avoid 434 tonnes of CO₂ being emitted per year.

The Non-Collective Public Water-Treatment Service (Service Public d'Assainissement Non Collectif) was created (2005) during the Neptune III phase to monitor independent facilities. A diagnostic inspection of the 4,500 users who will not be connected to a public network under the zoning plans has been undertaken; this showed that 2,800 plants were not functioning properly and repair work has now begun.

In addition, campaigns involving systematic checks of residential connections have been launched (7,000) to reduce direct discharges into the natural environment and water seepage into the waste water networks to prevent overflows at backflow stations and reduce energy consumption by those stations.

Network modelling, based on ongoing permanent diagnostic metrological measurements and studies to identify improvements to the transport network and in particular the unitary network, has made it possible to determine the scale of the works required to regulate overflows.

Now, as part of projects aimed at reducing spills into the river Erdre, the crests of the two weirs most affected have been raised, putting a stop to the discharges of rain .water other than monthly rains.

A campaign to systematically inspect the networks, intended to cover all of the waste water networks over a ten-year period, was begun in 2006. It makes it possible to program structural restoration work on the sewers. To date, 500 km of the network have been inspected since 2006 and network restoration works amounting to €7.2 million have been undertaken.

The Water Treatment Regulation, prohibiting an increase in discharges during restoration works, has provided momentum for the territory to implement solutions that retain the water at its source. The proposals are checked by systematically examining the solutions proposed when construction and development permits are granted for works that would result in more than 1,000 m² of land becoming impermeable to water.

APPENDIX

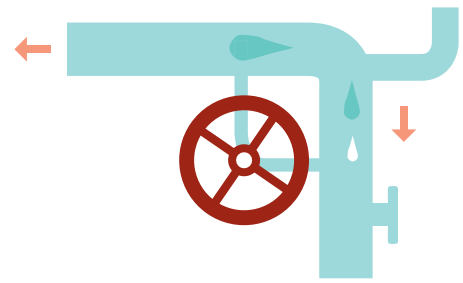
The regulations governing community wastewater treatment
http://www.cmaintenant.eu/files/file/reglement_assainissement_collectif.pdf

The 2008 annual report on the price and quality of the wastewater treatment service
http://www.cmaintenant.eu/files/file/Rapport_annuel_2008_assainissement.pdf

In 2008, the acquisition of a first water-recycling jetter truck prompted the public operating body to take action to reduce drinking-water consumption and the number of journeys. A review after two years shows a 30 % reduction in the number of journeys and a fall in the annual consumption of drinking water from 2,000 m³ to 100 m³.

The treatment projects are scheduled in line with the technical and financial forecast drawn up in 2001, when Nantes Métropole, was created to achieve standard charges. This forecast makes it possible to determine with clarity the local authority's short, medium and long-term investment capacity.





10 C

Short and long-term measures scheduled.

Planning.

Under the Neptune IV programme (2010-2015), the Nantes Métropole's multi-annual plan for public policy initiatives on water includes strategic studies to determine the main policy lines for waste-water and rainwater treatment. The objectives of these policy documents (master plan for waste-water treatment and rain water master plan), which are due to be completed at the end of 2010 and the end of 2011 respectively, are as follows.

- Waste water master plan : makes allowance for future development of the metropolitan area, supplements the existing diagnostic studies with a view to making the best possible use of the architecture and operation of the networks and treatment, forecasts expenditure and ensures an efficient programme of investments. Consideration is also given to how full advantage can be taken of the large number of backflow stations which are a feature of the Nantes Métropole infrastructure. Reducing the number of stations might make it possible to reduce energy consumption and the risks of hydrogen sulphide formation.
- Rainwater master plan : ensures that it is clear what investments must be made for rainwater from the point of view of both the qualitative aspects (discharges into the natural environment) and quantitative aspects (flooding) and ensures consistency with the European Framework Directive, the Water Treatment and Management Master Plan for the Loire basin and the Water Treatment and Management Plan for the water catchment sub-areas (Erdre, Sèvre Nantaise, Lac de Grand Lieu, Estuaire) with a view to prioritising operations against a backdrop of reductions in financial resources and to potentially making changes to the treatment regulation.

In addition, projects already approved and covered by the multi-annual investment programme will be undertaken.

Continuing the operations already undertaken to protect the Erdre river, the first storage-outlet basin (Ceineray-Maquis de Saffré) will be built in 2011 and 2012. With a capacity of 6,000 m³, it will make it possible to reduce discharges along the left bank of the Erdre of rainwater, other than a six-monthly frequency (currently monthly). It will be followed by the construction of two other basins, scheduled for after 2015, on the left bank of the Erdre and to protect the Loire.

Energy valuation of residus

From June 2010, a solar dryer facility for sludge generated by waste water treatment will be built on the Tougas valley site. When it is put into service in 2011, it will make it possible to increase sludge dryness from 20 % to at least 50 %, reducing the tonnages transported and therefore the distances travelled to land application sites.

In addition, the possibility of incinerating the sludge in household waste incineration units will be incorporated into future operating contracts as a variant.

An extension of the agricultural land application plan to sludge from the Tougas and Petite Californie purification plants is being examined.

Extension of the biological network at the Petite Californie purification plant from 180,000 inhabitant equivalent is underway and this high-quality environmental project will make it possible to put the ground-breaking biofiltration process into wide-scale use.

APPENDIX

Petite Californie wastewater treatment plant
http://www.cmaintenant.eu/files/file/usine_assainissement_petite_californie.pdf

Treatment of phosphorus at all the purification plants will be fully compliant with the requisite directives and standards following completion of the modifications necessary to the Tougas treatment unit, scheduled for 2012.

A feasibility study will be undertaken on the methanisation of sludge at the Tougas purification plant. Initial analysis indicates that the digestion of 8,000 tonnes of sludge (TDM : dry matter tonnes) would reduce the tonnage by one-fifth, cutting back on the tonnages transported. The biogas products could be used to generate electricity. Based on the ratios for the Petite Californie purification plant, this would mean a total of 738 tonnes of CO₂ avoided every year.

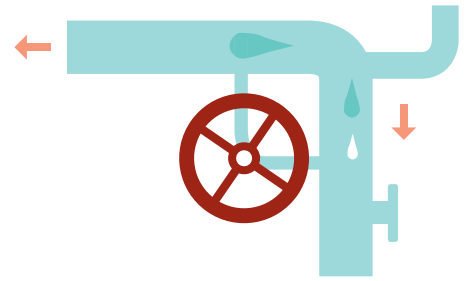
We will also continue to put variable power settings in place on the treatment pumps. The installation of 14 variable power settings on treatment pumps in 2007 and 2008 made it possible to reduce electricity consumption by those pumps by 15 %.

Extensions of the networks will be continued with a view to supplying all the sectors set out in the zoning plans. The multi-annual programme covers Priority A and Priority B urbanised areas as well as the areas scheduled for urbanisation in 2014, calling for an investment of €20 million.

In terms of operation, the acquisition of a water-recycling jetter truck by the public operating company will continue and add to the reduction in water consumption (reducing by a factor of 20 (2,000 m³ to 100 m³) the annual drinking water consumption of a jetter truck). The second will be acquired in 2010.

Analysis is being undertaken of the feasibility of recovering waste-water thermal energy from existing networks with a diameter of more than 800 mm. An urban development for the Pellerin city includes plans for such recovery from the networks that will be built. It will serve as a pilot project for possible extensions of this initiative.





From April 2010, the findings from diagnostic inspections of the 4,500 non-public purification plants will be notified to the owners concerned. This gradual notification, scheduled to take place over four years and based on criteria relating to hygiene and environmental protection, will be followed by the requisite restoration works with financial support committed by Nantes Métropole in 2007.

Compliance checks on connections to the public network will continue at a steady pace (9,000/year).

Finally, the carbon inventory for the Nantes Métropole public treatment service (collection, transport and treatment) will be undertaken from 2010. Initiatives contributing to a reduction in greenhouse gases deriving from this will be implemented.

10 D

Geographical and historical factors that have a negative impact on the indicators.

Prior to 2001, the date on which Nantes Métropole was created, responsibility for waste and rain water treatment was fragmented and lay with the (24) cities and three public consortia. Without a holistic master plan, the treatment networks developed without any overall consistency and based on disparate operating principles. This resulted, notably, in the existence in the territory of more than 300 backflow stations, sites with potential for failure and discharges into the natural environment and consuming energy, as well facilities on an inadequate scale in certain sectors. The initiatives launched and undertaken to complete the master plans in 2010 and 2011, and the initiatives deriving from these plans proposed in the years thereafter, should lead to a significant improvement in the organization and operation of the infrastructures.

