



**Economic models for water  
management and pricing in Europe:  
the case of France**

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**On behalf of Europa**

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## 1. INTRODUCTION

This document presents the situation in France in terms of water management and pricing. It is part of a global project which includes the analysis of the situation in seven European countries carried out with the aim of producing a publication intended for territorial decision-makers and whose subject is the following: ***"The management of economic models and pricing of drinking water services confronted with the need to save water"***.

## 2. THE POLITICAL FRAMEWORK

### 2.1 Local institutional organisation in France

In France, water is above all a local competence. The two main relevant levels for water management at the local level are:

- the municipality,
- and the Public Establishment for Inter-municipal Cooperation, defined as groups of municipalities jointly developing "common development projects within solidarity perimeters".

This competence embeds the entire small water cycle from storage of raw water, abstraction, transport, treatment and storage of treated water and distribution to users, but also the collection and treatment of wastewater until its discharge into the natural environment. Competences can be distributed between the two levels or exercised by one of the two.

### 2.2 Small water cycle institutions and companies

#### 2.2.1 *The public drinking water supply utility.*

Pursuant to Article [L. 2224-7](#) of the French General Code for Local Authorities (CGCT), a public drinking water service is a "service providing all or part of the production by catchment or pumping, protection of the point of abstraction, treatment, transport, storage and distribution of water intended for human consumption".

#### 2.2.2 *Compulsory responsibility of local authorities: drinking water distribution*

Article [L. 2224-7-1](#) of the CGCT establishes the principle of compulsory competence of the local authorities for the distribution of drinking water.

This principle is accompanied by the obligation to draw up a drinking water distribution plan in order to delimit the areas served by the distribution network and therefore, *in fine*, the areas in which a service obligation applies.

In addition, municipal drinking water supplies must ensure compliance with the requirements set out in article [R. 1321-2](#) of the public health code for water intended for human consumption (quality limits, etc.).

### *2.2.3 Optional responsibilities of local authorities: production, transport and storage of drinking water*

The production of drinking water, its transport and storage are optional responsibilities of the local authorities.

## **2.3 The public sanitation utilities**

Prior to take over sanitation responsibility, the municipalities or EPCIs (établissement public de coopération intercommunale – [public establishment of inter-municipal cooperation]) define the boundaries of the following areas (sewerage zoning):

- areas where collective sanitation is or will be implemented;
- areas where non-collective sanitation is to be implemented;
- areas where measures must be taken to limit soil sealing and to control the flow and runoff of rainwater
- areas where it is necessary to provide for installations to ensure the collection, the possible storage and, as far as necessary, the treatment of rainwater and runoff when the pollution they bring to the aquatic environment create serious risk of harming the efficiency of the sanitation systems.

### *2.3.1 Compulsory responsibilities of local authorities*

Article [L. 2224-8](#) of the CGCT establishes the principle of compulsory competence for municipalities in matters of sanitation. This competence includes the control of connections to the public collection network, the collection, transport and treatment of wastewater, as well as the disposal of the sludge produced.

Article [L. 1331-1](#) of the public health code requires buildings to be connected to the public sewer designed to receive domestic wastewater within two years of the network being put into service.

In terms of non-collective sanitation, the local authority has a mission to control non-collective sanitation installations through the public non-collective sanitation services (SPANC).

### *2.3.2 The optional responsibilities of the local authorities in the area of non-collective sanitation*

In terms of non-collective sanitation (on-site disposals), the local authorities can, on an optional basis and at the request of the owner, ensure the maintenance, the construction and rehabilitation of the installations, the treatment of the emptied materials, and even set technical prescriptions for the soil studies or for the choice of the technical solution to treat wastewater, with in view the establishment or the rehabilitation of an installation.

## 2.4 Implementation of public water and sanitation utility services

### 2.4.1 *Management mode of operations*

The choice of management mode of operations is based on the principle of free administration of local authorities.

The local authority or EPCI may operate the service on a self-governing basis, i.e., manage it directly with its own staff and equipment, and, if necessary, award one or more public contracts for the execution of the service.

The municipality may also opt for indirect management, i.e. entrusting the entire execution of the service to a third party in the form of a public service delegation agreement (concession, leasing, public service company). (Source: Article [L. 1411-1 et seq.](#) and Articles [L. 2224-11-3 et seq.](#) of the CGCT)

### 2.4.2 *Utilities rules and regulations*

"The local authorities and groups of local authorities, after consultation with the local public utilities advisory commission ([commission consultative des services publics locaux]), draw up, for each water or sanitation utilities for which they are responsible, utilities regulations defining, according to local conditions, the services provided by the utilities as well as the respective obligations of the operator, subscribers, users and owners". Article [L. 2224-12](#) of the CGCT

The utilities rules and regulation governs the relations between the different actors of the public water or sanitation service, in compliance with the applicable legislative provisions.

It is an administrative act, composed of a set of provisions of a regulatory nature. It is also considered as an integral part of the subscription contract to which it constitutes the general conditions.

### 2.4.3 *The annual report on the price and quality of the public drinking water service and the public sanitation utility.*

The report on the price and quality of the public utility (RPQS) is a document produced every year to report to users the price and quality of the service provided for the past year. It is a key element in the local implementation of transparency and governance of water and sanitation services.

It includes technical, financial and performance indicators grouped according to the following themes

- technical characteristics of the service,
- **tariffs and service revenues,**
- performance indicators,
- **financing of investments,**



- solidarity and decentralized cooperation actions.

The National Observatory of Water and Sanitation Services (<http://www.services.eaufrance.fr/>) allows the automated edition of a RPQS framework and lists the monitoring indicators that cover drinking water and collective and non-collective sanitation (<https://www.services.eaufrance.fr/indicateurs/indicateurs>).

Performance indicators are therefore published in the annual report of the delegated authority ([RAD – Rapport Annuel du Déléguataire]) and/or the report on the prices and quality of service (RPQS) each year to monitor the public service delegation or to report on the management of the public service. Some indicators have an economic and financial dimension:

- Price of water service per m<sup>3</sup> for 120 m<sup>3</sup> including VAT
- Price per m<sup>3</sup> for public sewerage service, including tax, for 120 m<sup>3</sup>.
- Duration of the community's debt extinction
- Rate of unpaid water bills for the previous year.

The list of economic variables collected for this report is as follows:

- DC.184 : Amount of revenue related to invoicing
- DC.195 : Financial amount (excl. tax) of the work committed
- VP.068: Volume billed
- VP.119: Sum of debt waivers and payments to a solidarity fund
- VP.177: Amount of the 120m<sup>3</sup> bill due to the operator
- VP.178: Amount of the 120m<sup>3</sup> bill due to the community
- VP.179: Total amount of taxes and fees related to the service in the 120m<sup>3</sup> bill
- VP.182: Total outstanding debt
- VP.183: Gross annual savings
- VP.185: Invoiced sales (including VAT) (excluding works) for year N-1 as of 31/12/N
- VP.190: Amount of the flat portion due to the operator
- VP.191: Amount of the flat portion due to the local authority
- VP.213: VAT rate applicable to the entire invoice
- VP.214: Voies Navigables de France (VNF) levies
- VP.215: Water agencies (resource protection)
- VP.216: Water agencies (pollution charges)
- VP.217 Water agencies (network modernization fee)
- VP.218 Voies Navigables de France (VNF [Service in charge of navigation pathways]) Discharges
- VP.219: Other taxes and fees applicable to the tariff (excluding VAT).

## 2.5 The NOTRE law and its principles

Within the framework of the NOTRE law (*Loi no 2015-991 du 7 août 2015 portant nouvelle organisation territoriale de la République* – [Law no. 2015-991 of August 7, 2015 relating to the new territorial organization of the Republic]), the competences of water and sanitation,

among others, must be transferred from the communes to the intercommunities (communities of communes and agglomerations). Similarly, GEMAPI (Gestion des milieux aquatiques et prévention des inondations – [Aquatic environment management and flood prevention]) and stormwater management must be transferred to the intercommunities.

Water and sanitation are major competencies of EPCIs with their own tax status, which intervene either within their own perimeter or by joining forces with other public partners (municipalities, EPCIs) within mixed unions.

Initially compulsory from January 2020 and then January 2026, this transfer has been made more flexible by the “loi engagement et proximité” [Commitment and Proximity Law] and can now be entrusted to one of the member municipalities of the EPCI.

### **3. THE ECONOMIC MODEL OF WATER UTILITIES**

#### **3.1 The principles of the SPIC**

Drinking water utilities and wastewater utilities are industrial and commercial utilities (services publics industriels et commerciaux - SPIC) which are *financed by fees collected from users of the service provided* (Articles [L. 2224-11](#) and [L. 2224-12-3](#) of the CGCT)

Financing through a fee-based system requires balancing the budget in terms of revenue and expenditure and specializing the budget for the utility. The revenues generated by the activity must cover its expenses, in principle no subsidy from the general budget of the local authority must be added to the utility (article [L. 2224-1](#) and [subsequent](#) and article [L. 2224-12-3](#) of the CGCT).

However, this is a general rule which may have exceptions on the following points:

- avoid an excessive increase in tariffs linked to the realization of massive investments;
- this rule does not apply to water and sanitation services in municipalities with less than 3,000 inhabitants and
- this rule does not apply either to the water and sanitation services of public establishments for inter-municipal cooperation (EPCI) in which no member municipality has more than 3,000 inhabitants.

In addition, the water supply service and the wastewater service are two separate activities, each of which is accounted for in a separate budget.

However, municipalities with less than 3,000 inhabitants and EPCIs of which no member municipality has more than 3,000 inhabitants may establish a single budget for these services if they are subject to the same rules of liability to value tax. added and if their mode of management is identical.

#### **3.2 Water charge for services provided**

This charge, collected by the local authority, is the payment for the service provided to the users. It allows the community to cover the various costs of the service (operating and capital costs).

Any supply of drinking water is subject to billing, except for water consumption from fire hydrants placed on the public domain (Article [L. 2224-12-1](#) of the CGCT)

The amount of the fee is set by the Local Authority Board or the deliberative body of the competent EPCI. The fee includes a proportional part and may include a flat part (Article [L. 2224-12-4](#) of the CGCT)

The proportional part is determined according to the volume actually consumed by the customer, either on the basis of a uniform rate per cubic meter or on the basis of a progressive rate. In exceptional cases, the municipality may set a flat rate, with the

authorization of the departmental prefect. It may also, under certain conditions, establish a sliding scale of charges.

The flat part, which is optional, corresponds to the flat costs of the service and to the characteristics of the connection, particularly the number of dwellings served. The maximum amount of this subscription may not exceed, per dwelling served and for a period of twelve months, for both water and sanitation, 30% of the cost of the service for a water consumption of 120 cubic meters, and 40% for tourist communities.

On the other hand, different tariffs may be defined according to the periods of the year in municipalities where the balance between water resources and consumption is threatened on a seasonal basis (*IV of the article [L. 2224-12-4](#) of the CGCT*)

### 3.3 The sanitation service charge for service provided

Any public sanitation service, regardless of its mode of operation, gives rise to the collection of a charge for (*Article [R. 2224-19](#) and subsequent du CGCT*)

The Local Authority Board or the deliberating body of the competent public institution sets the fee for the part of the service it provides and sets the tariff.

When the sanitation utility concerns both collective sanitation and non-collective sanitation (on site disposals), two separate charges are instituted.

The collective sanitation charge includes a variable part and, if necessary, a flat part (*Article [R. 2224-19-2](#) and subsequent du CGCT*)

The variable part is determined according to the volume of water withdrawn by the user from the public distribution network or from any other source, the use of which generates the discharge of wastewater collected by the sanitation service. However, when water consumption is calculated on a flat-rate basis, the sanitation charge can also be calculated on a flat-rate basis. The flat charge is calculated to cover all or part of the fixed costs of the sanitation utility. The maximum amount of this subscription cannot exceed, per household served and for a period of twelve months, for both water and sanitation, 30% of the cost of the service for a water consumption of 120 cubic meters, or 40% for tourist municipalities.

The non-collective sanitation fee includes a portion intended to cover the costs of inspection (mandatory responsibility of the municipality) and, where applicable, a portion intended to cover the costs of maintaining the installations (optional responsibility of the local authority) (*Article [R. 2224-19-5](#) of the CGCT*).

The portion representing inspection operations is calculated according to criteria that take into account the location, nature and size of the facilities. These operations can give rise to a flat charge;

The maintenance fee is only due if the user uses the maintenance service. The pricing methods must take into account the nature of the services provided.



## **4. PRINCIPLES OF WATER PRICING FOR HOUSEHOLDS IN FRANCE**

### **4.1 Water pays for water?**

Water is a common good and is therefore not subject to appropriation. It cannot therefore be sold as a commodity.

On the other hand, the services rendered to make it drinkable, to distribute it, and to purify it after use have a cost. Water is billed to the subscribers of the water utility, and the money collected must, in principle, cover the cost of the services.

This is the stated principle that “water pays for water”.

This principle introduced by the State is based on the idea that local authority expenditure must be balanced by revenue collected from users (water bills). Consumers must therefore, according to this principle, thus pay their municipality for the financing of equipment and the maintenance of drinking water and sanitation networks. However, more and more water stakeholders are finding that this principle has never really been applied and is more than ever threatened by misuse.

"Water pays for water" is, above all, a formula or even a slogan that has never been fully applied. In fact, we are even moving further and further away from it, particularly on the following points:

- The treatment of rainwater normally covered by the general budget, is sometimes partly financed via the sanitation service. In other cases, it is the opposite, a part of the general budget finances part of the waste water disposal in the case of unit pipes (in CAPEX or OPEX).
- The initial investment has often at least partly been made from the general budget and the question now arises of the return on large investments (extension / replacement of the network, improvement of processing, etc.). It seems difficult to achieve them without appealing at least in part to the general budget.

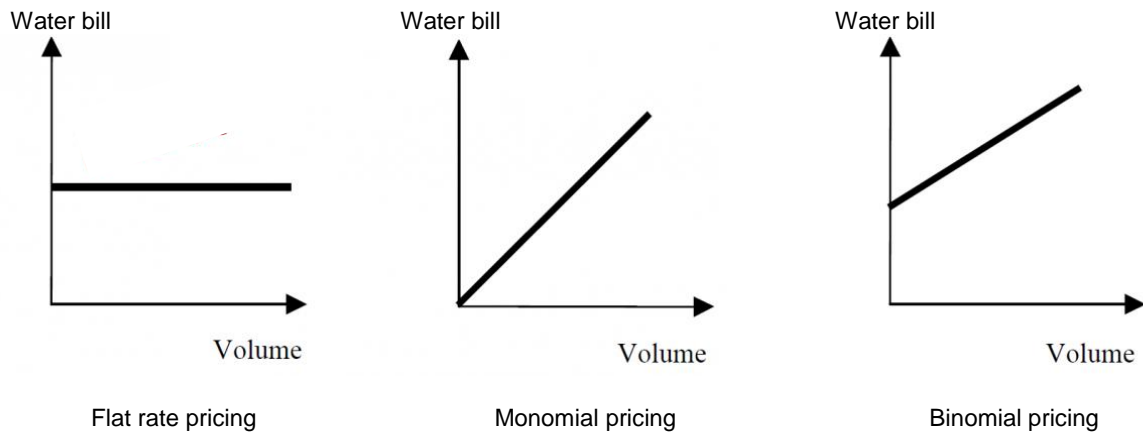
Maintaining the investment in operational conditions also raises questions: Are we renewing enough to avoid any consumption of fixed capital?

While a significant part of the bill is made up of royalties (paid to water agencies in order to provide subsidies to communities for investment), these latter royalties are increasingly used for other actions. The agencies finance measures to protect aquatic environment, various studies on fauna and flora, on floods or other studies and works. It is enough that the subject relates directly or indirectly to water to justify the aid. The water we drink also pays for part of the biodiversity of aquatic ecosystems, which is threatened by things other than the only withdrawals for water intended for human consumption (agricultural or industrial pollution, hydraulic works, etc.).

Water price can vary on the territory according to many parameters in particular local factors:

- Resource Quality;
- Location of the resource ;
- Type of Water and Waste Water Treatment plants ;
- Density of the population served...

## 4.2 The different types of tariffs



The different pricing structures

Note: in the graphs above, the flat pricing and the variable part of the binomial pricing are proportional to the volume of water consumed. As described above, there may also be progressive tariffs or even decreasing tariffs.

- **Proportional or "monomial" pricing**

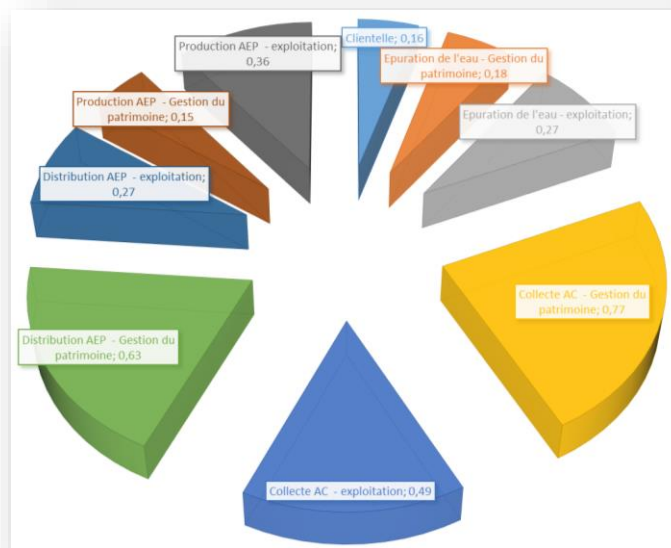
In this case, the price per cubic meter is unique, except for the fixed part related to rental of the meter. The billing to the customer is the product of the price per cubic meter and the consumption measured by the meter. This proportional mode is used for the billing of other components of the water bill (taxes, fees, etc.).

- **"Binomial" pricing**

The price has two parts:

- a fixed part independent of consumption, but depending on the size of the connection,
- a variable part proportional to the volume of water consumed.

### 3.2 Details of a water bill (based on a consumption of 120 m<sup>3</sup>/year)



Details of a water bill for a fictive city with a water price of 3,28€/m<sup>3</sup> (based on a consumption of 120 m<sup>3</sup>/year)

(Source: according to Drinking water and sanitation: at what price? CGEDD report n° 010151-01, IGA n°16006-15010-01 drawn up by Marie-Louise SIMONI, François GUERBER, Jean-Pierre NICOL and Pierre-Alain ROCHE (coordinator) with the support of Aurore TUAL, intern at the CGEDD - February 2016)

### 4.3 Depreciation rules

The depreciation method of a fixed asset reflects the decrease in its value as it is used. In effect, the depreciation of a fixed asset is the systematic distribution of its depreciable amount according to its use.

However, because of the difficulties in measuring the rate of consumption of economic benefits, depreciation generally consists of spreading the value of depreciable fixed assets over the probable period of use. As a result, depreciation is normally straight-line (i.e., depreciation is spread evenly over the life of the asset) and is taken from the time the buildings and equipment are put into service.

Therefore, the depreciation schedule is not adjusted to the budgetary situation. The depreciable value of an asset does not take into account the borrowing of funds (source: [la gazette des communes](#)).

On the other hand, if the asset has been subsidized for example at 50%, when €100 of expenditure is allocated for the depreciation of the asset, €50 of revenue from the subsidy will be allocated at the same time.



## 4.4 Costs supported by water utilities (OPEX / CAPEX)

### 4.4.1 Capital costs

There are three types of **investments**:

- Investments in new facilities, which correspond to new equipment: network extension, new drinking water treatment plant, new wastewater treatment plant, etc.
- Investments to comply with European or national regulations (water quality, wastewater treatment, bathing water, etc.).
- Renewal investments, which correspond to the replacement of existing equipment. These investments are of two kinds:
  - functional renewal, which is necessary for the continuity of the service (electromechanical breakdowns, leaks, blocked meters, etc.)
  - asset renewal, which the community sets itself according to its knowledge of the performance and condition of the service's equipment.

### 4.4.2 Operating costs

Operating costs are generally decomposed by major functions as follows:

- technical management (information systems, dashboards) ;
- maintenance (electromechanical equipment, connections, meters, pipes)
- customer management (billing, customer relations)
- administrative management (reporting, certifications);
- studies (engineering, vulnerability studies)
- risk management (on-call duty, crisis management, certification)
- analysis and control;
- research and development;
- taxes, duties and fees.

The cost of each function can be detailed by type. For example, the technical management of a drinking water utility will require:

- manpower (whose costs include salaries and social charges, which vary according to qualifications);
- consumables, to operate the equipment (energy and treatment products)
- water purchases and disposal
- valorization of by-products (sludge, grease, sand, etc.).

## 4.5 The elasticity of household water demand to the price of water

It is assumed that by raising the price to an optimal point, consumers (households, industries and agriculture) are led to adopt environmentally friendly behaviour:

- lower consumption ;
- lower energy consumption (essential to operate the water and sanitation systems);
- reduction of polluting discharges...

The impact of volumetric pricing on the amount of water consumed or pollution discharged is, however, negligible when the total bill represents only a small proportion of a user's production costs or income. In theory, therefore, to be effective, the price level charged must be sufficiently high. However, the effectiveness of a water tariff is limited when the user has no other choice, due to technical, social or economic constraints. The likelihood that a pricing policy will have an impact on water demand can be measured by the elasticity of price on demand.

The price elasticity of demand can be defined as the percentage change in water consumption if the price per m<sup>3</sup> is increased by 1%. In general, the elasticity of domestic water consumption is very low, because most uses (drinking water, hygiene, etc.) are not very compressible. On the other hand, outdoor consumption (watering, car washing, etc.) is much more elastic (strong decrease in case of price increase) because it satisfies non-essential needs (source: Eaufrance, glossary on water)

A statistical study carried out by BRGM in the framework of the WAT (Water And Territory) project (BRGM RP-59056 FR report) has made it possible to quantify the relationship between the average consumption of drinking water per inhabitant and the main factors that determine it. The study showed that the price elasticity is between -0.18 and -0.26.

A value of -0.2 means that if two municipalities have strictly the same characteristics (household income, climate, urban planning, etc.) but their prices differ by 10%, then their consumption will differ by 2%. By extension of the reasoning, it is assumed that a 10% increase in the price of water leads to a 2% decrease in water consumption.

Furthermore, the analysis confirms that water consumption is positively correlated with income. The measured elasticity is between 0.4 and 0.6 (depending on the form of the demand function chosen: linear, log-linear, logarithmic).

This means that if two municipalities have strictly the same characteristics (water price, climate, urban planning, etc.) but the average income of their inhabitants differs by 10%, their consumption will differ by 4 to 6%. This is a very important variable.

Similarly, the study established a statistical relationship between the level of water consumption per capita and the local climate, as well as with the geology that determines the cost of building an individual borehole.

## **5. ACTIONS TO BE TAKEN**

### **5.1 Consequences for utilities of the decline in water consumptions in France**

In France, after an increase observed between 1998 and 2004, the consumption of domestic drinking water fell between 2004 and 2011 and has since stabilized (Source: EauFrance – syspea). Several reasons could be mentioned:

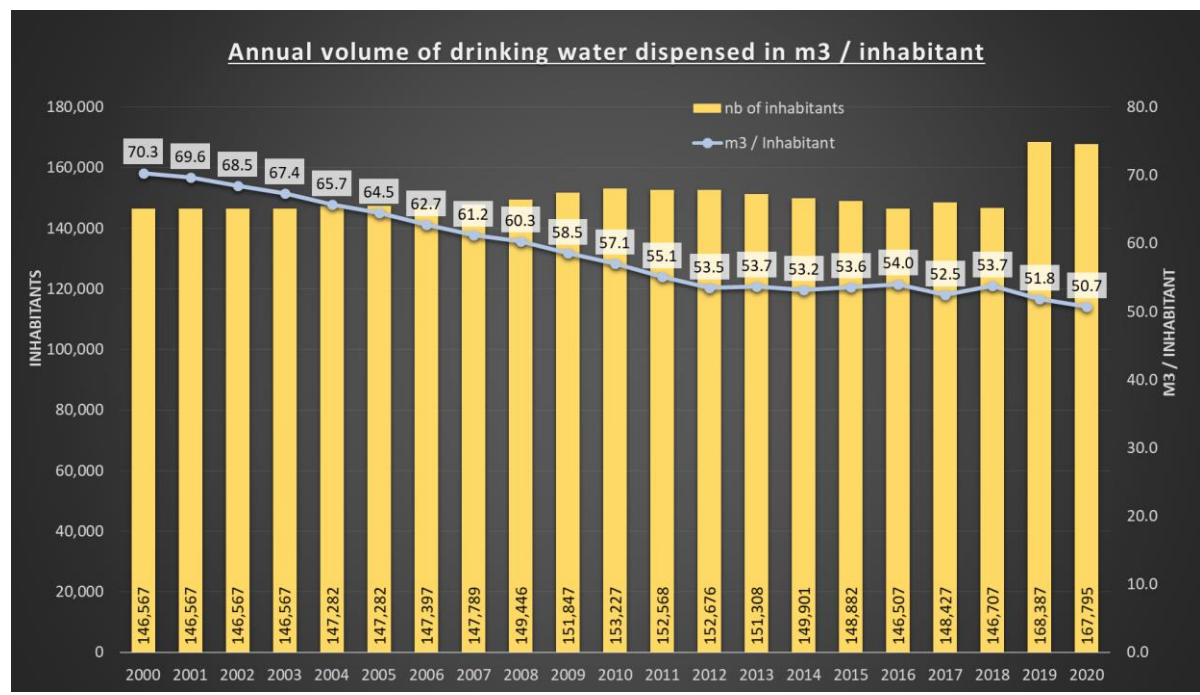
- Progressive replacement of domestic equipment (dishwashers; washing machines; taps) with more water-efficient equipment;
- Sensitivity of domestic users to price;
- Sensitivity of domestic users to environmental concerns;
- Reduction of domestic-related production activities ([activités de production assimilées domestiques – APAD]);
- Progressive replacement of APAD equipment with more water-efficient equipment;
- Also, sensitivity of APAD to price and environmental concerns.

The drop in water consumption is still a strong trend in a number of French communities such as Limoges (see box on next page). This drop is now so significant that it can threaten the financial equilibrium of water and sanitation utilities. They then have no choice but to increase their water prices.

The paradox is that the involvement of households and APADs in reducing water consumption leads to an increase in the price of water and that their water budget does not decrease significantly. A virtuous attitude is sanctioned by an increase in the price of water. The increase in the price of water is also leading some water services to set up social assistance schemes for the payment of bills for households with too low incomes.

### Limoges metropolis: a continuous drop in consumption for 20 years

The graph below illustrates the evolution of the volumes of drinking water distributed in an intermediate-sized agglomeration (146,000 inhabitants). There was a very significant drop until 2013 (-24%) but which has continued since, despite an extension of the number of inhabitants covered by the service (-4%).



## 5.2 Possible options for changes in water pricing

Increasing the price of water while keeping its structure and continuing to consider the principle that water pays for water leads to the need to increase the price of water while users have a virtuous behaviour of lowering consumption. In the long run, this may be difficult to justify, and even counter-productive if users start, as is already the case in the southern regions of France, to use private boreholes for watering their gardens or filling their private swimming pools. The pressure exerted by these private drillings on the natural water tables is, and will be even more so in the future, difficult to control and master.

The following options could be proposed. They are not exclusive but complementary.

- Authorize transfers from the municipalities or intercommunities general budget to the water and sanitation budgets;
- Recognize that the control of collective sanitation systems (sewer network and plants) and conformity of private connections to water and sanitation networks is not a service to the user but a police power to prevent nuisances and therefore finance it through taxation (in fact for this last it is separated from water price and invoiced);

- Take into account the quality of service. For example, if the water distributed is constantly above the standards with regard to nitrates to the point that it is strongly advised not to use it for baby bottles, can all the costs be borne by the user. It would be normal, according to the polluter pays principle, for those responsible for this pollution to pay for the damage and the corrective actions to bring the nitrate level below the standards.
- The possibility of equalization mechanisms at the national or regional level is a possibility that should not be refrained from studying.

It should be noted that the current French regulatory framework does not allow the development of such approaches.

✓ **The specific case of the possible evolution of the pricing of the sanitation service**

The pricing of sanitation, if we want to be logical, should not be based on the volume of water consumed, but on the pollution discharged, in order to be truly incentive. The feasibility of a flat rate sanitation tariff, based on the number of inhabitants per household, on their water-intensive equipment (swimming pools, gardens, etc.) or on the type of activity in the case of APADs, could be studied. Such a pricing structure could be correlated to the cost of the service by calculating the flat rate to cover the operating and investment costs of the sanitation service.

This separation between the billing of sanitation and drinking water supply would also make it possible to better take into account the case of users using alternative resources (boreholes, rainwater, etc.), whose volumes of water consumed from the drinking water supply do not always reflect the effective volumes discharged.