



The Syndicat des Eaux d'Ile-de-France

**Industry
harnessed
to efficiently
serve the public**



SYNDICAT
DES EAUX
D'ILE DE
FRANCE

SEDIF

SERVICE PUBLIC DE L'EAU

1923

SEDIF founded

7 Ile de France
départements on
the outskirts of Paris

4.4 millions
of consumers

149 « municipalités »
supplied with
drinking water

3 main drinking
water plants

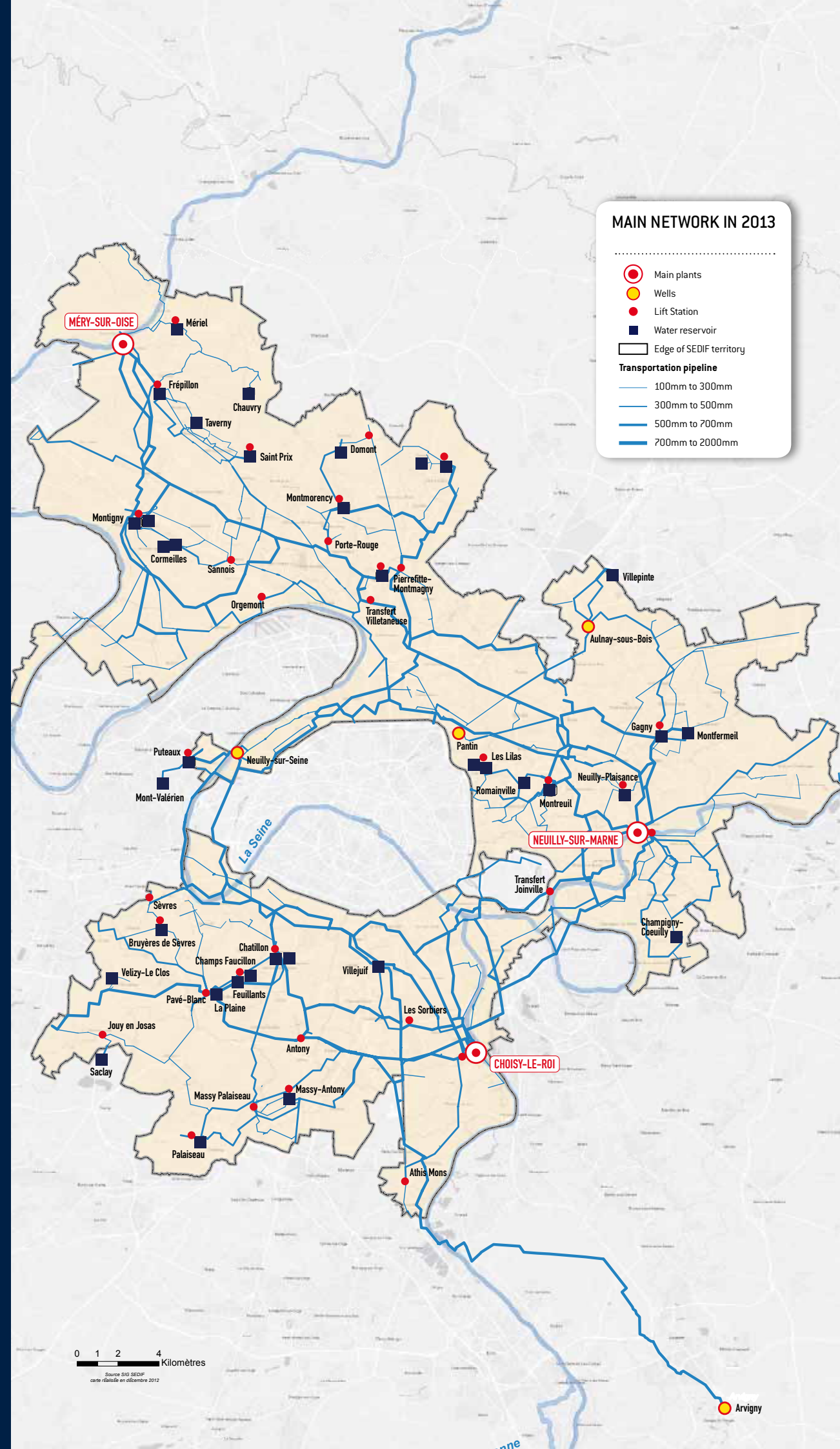
4 well water
treatment plants

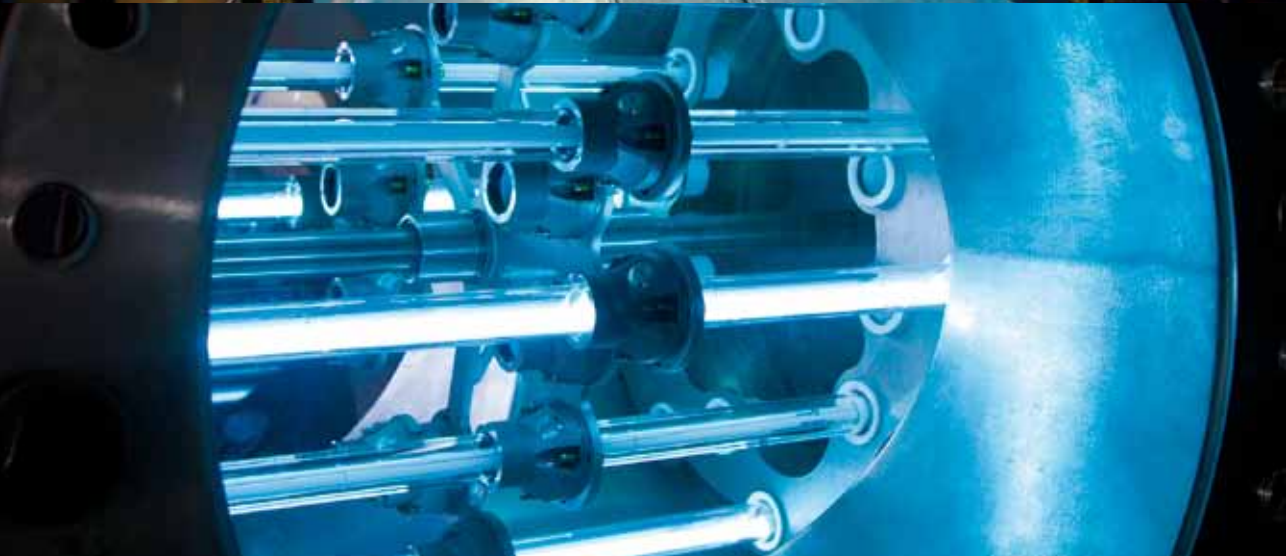
67 water reservoirs

48 relay plants

750,000 m³ distributed
every day

8,386 kilometres
of pipeline





Méry-sur-Oise
water treatment plant

EDITORIAL



Founded in 1923 and serving 149 « municipalités » in 7 départements in the Ile-de-France region around Paris, SEDIF treats and then distributes drinking water to 4.4 million people.*



André SANTINI
President of SEDIF
Former Minister
Mayor of Issy-Les-Moulineaux
Chairman of the Seine-Normandy Basin
Committee

SEDIF guarantees a quality public service through both its size and its consistent investment to the tune of €130 million every year, and its modernisation and renewal strategy has equipped its industrial facilities with cutting-edge technology.

90 years of investments within the region have affirmed SEDIF's role as a major stakeholder in public industry, alongside other great French water companies, and a centre for excellence within the sector. It was in 1960 that SEDIF began to modernise its three water treatment plants with rapid filtration technology. In parallel to the modernisation of its facilities and the gradual increase of production capacity to reach almost 240,000,000m³ of drinking water every year, SEDIF has also developed a transportation and distribution network spanning over 8,386 kilometres which is now being modernised using more environmentally friendly techniques.

This constant optimisation of the region's drinking water network has made SEDIF one of the best performing public services providers, with expertise that is recognised nationally and throughout Europe and the rest of the world.

Investments that suit our challenges, for best possible water prices

This drive for performance is on display in the operations planned as part of the 15-year roadmap, as well as SEDIF's five-year plans. Indeed, the 14th five-year investment plan (2011-2015), part of the Roadmap 2011-2025, includes over €500 million (excl. tax) of expenditure earmarked for equipment. This is in addition to the delegation's investment estimated at around €150 million over five years, intended to cover regulatory requirements and provide for the design of innovative projects to serve the community and the environment. At a time when the water industry is facing major challenges from several sides – technological, industrial, economic and environmental – SEDIF continues to place innovation at the heart of its work to meet the goals of urban development, a growing regional population, and ever-denser population clusters.

The key to this exemplary management, a shining example of French water expertise, is the balance found between cutting-edge technology and sustainable investments, with the ultimate aim of securing the best possible pricing.



By investing
almost €130
million every year,
SEDIF supplies its
facilities with the
latest industrial
developments



* Figures as of 1 January 2013 - Insee Database.

Ensemble
Avec

CUTTING-EDGE INDUSTRIAL FACILITIES



Water treatment is a complex process. From its main water treatment plants to the consumer's tap, SEDIF designs, develops and runs efficient installations that ensure perfect water quality.

The main treatment plants collect surface water from the three main water courses in Ile de France (the Seine, Marne, and Oise Rivers), accounting for 99% of the water produced. Our wells are designed to collect water from well-protected groundwater. They can be used as back up in case of unavailability of surface resources.

Once processed, the water is pressurised using pumps, and stored in water reservoirs (buried or above ground) with a total maximum capacity of 644,300m³.

Water is transported using pipelines with a diameter of between 300mm and 2m. It is then delivered to customers via a distribution network (80mm - 300mm pipes), branch lines (566,906), and meters (564,849).

DRINKING WATER PRODUCTION AND DISTRIBUTION MAP

4 warning stations

Located in the river, upstream of the three main treatment plants, they monitor water quality and prevent accidental pollution by constantly monitoring water composition.

3 water treatment plants

Located on the Seine, Marne and Oise Rivers, upstream from Paris, SEDIF's three main plants produce an average of 750,000m³ of water per day.

45 chlorination plants

A powerful disinfectant, chlorine is added to the water in the main treatment plants. To obtain uniform chlorine distribution and guarantee water quality throughout the network, rechlorination plants are included at the relay stations and water reservoirs.

4 well water treatment plants

In addition to the main treatment plants, SEDIF has accessed subterranean water reserves with a total production capacity of 70,000m³/day. The wells are drilled as far down as 878m, and are able to cover the water supply in case of an emergency affecting the main plants.

67 water reservoirs

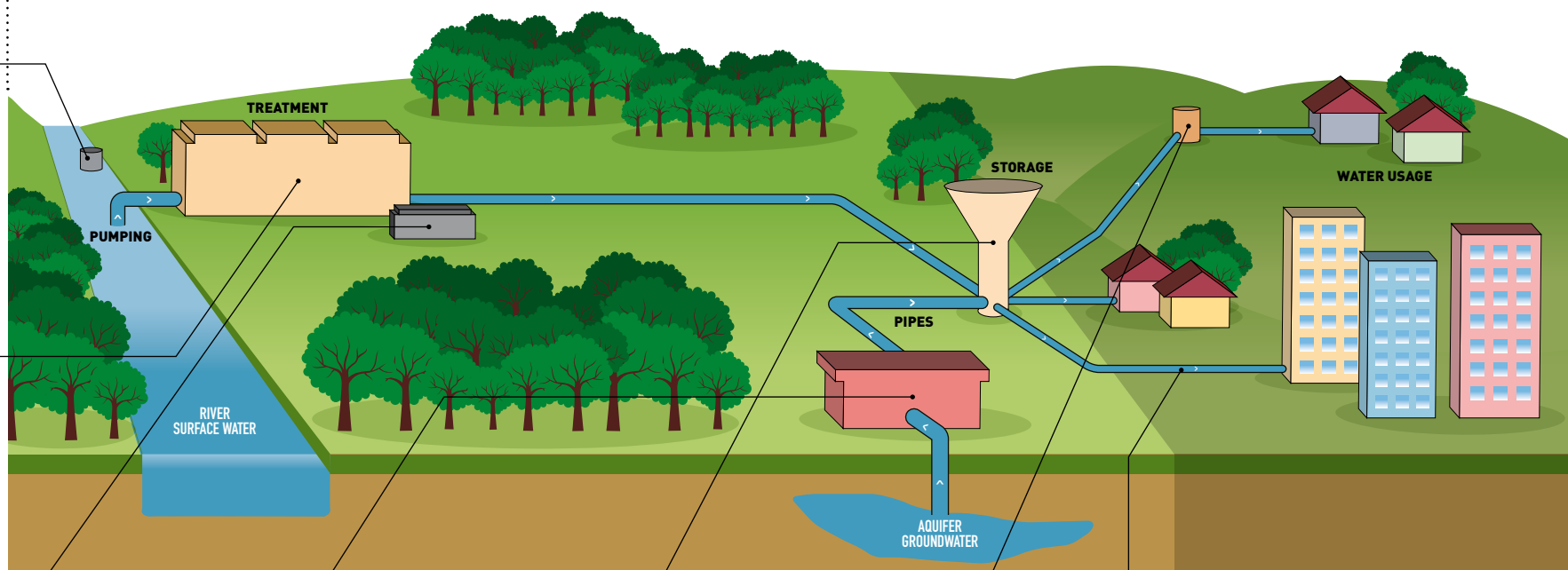
Spread throughout SEDIF's territory, reservoirs are used to store 644,300m³ of water and ensure that the water is always pressurised, whatever the time at which it is used.

48 Relay stations

Spread throughout the distribution network, they transport almost 300 million m³ of water throughout the pipeline, at any altitude.

8386 kilometres of pipeline

The SEDIF network is made up of large diameter "transportation" pipelines that carry water towards water reservoirs and safety junctions connecting the three treatment plants. Running for 798 kilometres, the network is made up of pipeline whose diameter can be as much as two metres. The distribution network is made up of over 7,588 kilometres of pipeline with a smaller diameter, ranging from 80mm to 300mm. It delivers water to customers via the 566,906 branch lines and 564,849 meters.



ALMOST 90% OF SEDIF INVESTMENT IS SPENT ON ASSETS

127 MODERNISATION PROJECTS:

SEDIF's assets have our full attention 127 modernisation projects should be complete by 2015, standing testament to SEDIF's visionary commitment to the pursuit of efficiency and a safe, sustainable water supply. The renovation of the sand filtration step, together with improved water treatment using UV technology to safely eliminate microorganisms in the Choisy-le-Roi and Neuilly-sur-Marne plants, offers just one example of this drive to modernise.

COMMITTED PROJECT MANAGEMENT:

As part of the work to renew its network's branch lines, SEDIF has consolidated its role as a public project manager, developing its network while complying with a general sustainable development policy. €130 million have been allocated to the replacement of almost 200 kilometres of out-dates pipeline. For example, using trenchless techniques to fit pipelines reduces sound pollution and leads to savings on raw materials, and this commitment to sustainable development is further proven by new facilities designed to consume less energy. Any new technique should be firmly future-oriented.

SEDIF's facilities form an infrastructure that is essential to the Paris region's development.

The public water authority manages a collection of large scale and high-tech assets that supply almost half of the region's inhabitants with safe water.

The treatment and distribution of drinking water requires constant investment. Cutting-edge technology is required to maintain quality, safe, drinking water, and the treatments needed to ensure quality drinking water at the tap are increasingly complex. While water is free in its natural state, the production of drinking water and its delivery to 4 million consumers demands major infrastructure that must always be kept in perfect working order. The cost of maintaining this infrastructure estimated at over €10 billion, is accounting for the lion's share of the investments made by SEDIF, who must also support the urban development of Greater Paris.

SEDIF ready to face new challenges

SEDIF boasts the largest and most modern facilities in the region to the north, east, and south of the capital, as well as all of the strengths necessary to continue to provide a service that blends a quality, safe water supply with affordable costs for the region's people.

As a regional economic stakeholder due to its investments, and drawing upon its 2011-2025 roadmap, SEDIF is able to take intelligent decisions in a timely fashion, ensuring that customers receive a sustainable, responsible drinking water service in the short-, mid-, and long-term.

SOME OF THE WORLD'S MOST MODERN DRINKING WATER TREATMENT PLANTS

The Choisy-le-Roi plant: a flagship for innovation since 1861



Covering 16 hectares, the Edmond Pépin plant in Choisy-le-Roi is one of the world's largest water treatment plants. Built at the end of the 19th century, the plant has undergone several modernisation projects, making it a technical, industrial and environmental model for France and Europe. **For over 10 years, €150 million have been invested** in Choisy-le-Roi to renovate its facilities, keep industrial machinery up to date and to meet increasingly stringent regulations with room to spare. In a constant state of evolution, the Choisy-le-Roi plant continues to undergo modernisation work with the renovation of its sand filtration units scheduled as part of the 15th five-year investment plan (2016-2020).

300,000m³/day
1.84 million residents covereds

Maximum capacity of
600,000m³/day

ULTRAVIOLET HAS ARRIVED: IMPROVED QUALITY AND SAFETY



In order to improve water treatment safety, and being always attentive to the quality of the water produced, SEDIF will boost the effectiveness of its Choisy-le-Roi water treatment plant with the addition of an ultraviolet treatment stage, just as it has for Neuilly-sur-Marne (which serves the east of Paris). Representing a total of €9.5 million excluding tax, these two facilities are the last of three disinfection stages made up of chlorination, ozonisation, and ultraviolet. This process has been around for years, but has never been used on in France on the same scale as Choisy-le-Roi.

Renovated emergency safeguards

The water obtained from deep subterranean reserves in Ile-de-France is kept secure in order to provide an emergency water supply.

SEDIF has several emergency wells, drilled down into the Albian layer (at depths of around 1000m), the Ypresian layer (at around 100m deep) and the Champigny layer.

The main wells are exploited by 4 well plants that use special treatment processes to meet the region's key needs as part of the Emergency Safeguard Plan. In order to maintain the reliability of this resource, SEDIF has begun to modernise all facilities, including the complete electricity backup generator system.

Aulnay-sous-Bois Plant:

- 1 well to Albian layer
- 3 wells in the Ypresian layer (around 100 metres).
- Renovation underway - Facility operational in 2015

Neuilly-sur-Seine Plant:

- 2 Albian wells operating in turn
- Renovation complete - Operational since 2012.

Pantin Plant:

- 1 operational Albian well
- 3 new wells in the Ypresian
- Renovation underway - Facility operational in 2015

Arvigny Facility

- Since 1 January 2013, SEDIF harnessed the Arvigny plant with its seven wells. These facilities form an essential aquatic resource (50,000m³/day), thereby consolidating the emergency safeguard facilities.

The Neuilly sur marne plant: spanning the Marne



The Neuilly-sur-Marne/Noisy-le-Grand plant is one of the largest water treatment plants in the world, and supplies the area around Paris. Located on the banks of the Marne River, just over 20 kilometres upstream of where the river meets the Seine, **the site covers 25 hectares.**

It is unique in that it occupies both banks of the Marne River connected in 1967 by a 105m viaduct that transfers treated water from one bank of the Marne to the other. Since 2010, this exceptional facility has included an inter-plant pipeline.

255,000m³/day
1.78 million residents covered
 Maximum capacity of **600,000m³/day**

NEW LIFTING UNIT IN NEUILLY-SUR-MARNE: A UNIQUE FACILITY

Worth €31.15 million, the renovation work on the Neuilly-sur-Marne lift unit constituted one of the largest projects in the 13th SEDIF investment plan.

The project ran for 10 years and led to the development of unique facilities to replace the outdated machinery for a safer water supply. Its main role is to pump drinking water to clearing tanks and up towards the transportation network and the first water reservoirs. With its impressive machinery that can generate a maximum capacity equal to 33,000m³ per hour, this is an iconic project.



The Méry-sur-Oise plant: a cutting-edge facility



The Méry-sur-Oise plant provides 151,000m³ of water every day to 840,000 customers in the northern Parisian suburbs. By dealing with the chronically polluted Oise, a river exposed to major risks of agricultural and industrial pollution, the Méry site offers a **model technical solution.**

The plant combines a number of cutting-edge technologies: multi-barrier treatment have been improved since 1965, nanofiltration since 1999, and since 2009 effluent is treated to further improve water quality of discharge to the river.

151,000m³/day
840,000 residents covered

Maximum capacity
 of **340,000m³/day**

NANOFILTRATION: CUTTING-EDGE TECHNOLOGY



Nanofiltration is the technology best suited for treating the water of the Oise.

After trials with a prototype launched in 1993, SEDIF decided to roll out the technology on a larger scale, becoming the first water provider in the world to use nanofilters to produce drinking water from surface water.

The Méry-sur-Oise plant uses this treatment method for 70% of its production, with the remaining 30% using "multi-barrier treatments". The water produced by these two methods is mixed before network distribution, for a fresher water of an exceptional quality.

CONSTANTLY MODERNISED AND SAFER INFRASTRUCTURES



A high level of reliability guarantees the continuity of the public water service

Every day, SEDIF must rise to the challenge of providing 4.4 million customers with an uninterrupted water supply 24 hours a day, 365 days a year.

- **There are two key factors to this objective:**
The design of the infrastructure and its components.
- Constant modernisation and increases in reliability.

SEDIF produces drinking water from the three main rivers in Ile de France, thereby reducing the impact of any accidental pollution on one of the three resources. Each plant has been designed to meet seasonal consumption spikes while providing mutual support as needed. Particularly thorough treatment processes, such multi-barrier treatments membrane filtration treatments are effective to deal with accidental pollution.

The treatment plants are connected by dedicated transportation pipelines, almost all of which are backed up. The transportation network has been designed so that a burst pipeline does not compromise continuity of service. This is even truer of the distribution network. The electricity supply is backed up in partnership with ERDF, using stationary or mobile generators.

For greater security the quantity of water stored in the various water reservoirs is slightly more than that consumed on a daily basis, for greater security. In the event of a severe emergency, SEDIF can call upon its subterranean reserves to instantly cover the minimum water supply, which can also be topped up by the various connections with neighbouring networks, including that of Paris.

Essential assets to understand and protect

SEDIF's industrial assets represent a considerable operational and financial value, and if it had to be rebuilt today, the estimated cost stands at €10 billion. Underground networks represent almost 80% of this value. Over time, SEDIF has acquired the tools needed to understand and manage these assets, including a Geographic Information System (GIS). These tools are used to identify long-term objectives, renovation priorities and the corresponding annual programmes. Using an "epidemiological" approach to analysing leakage statistics, they are able to develop a repair program that optimises expenditure on reducing future leakages while controlling the layers of sections of different ages.



1 Geographic Information System (GIS): 3 objectives:

- To map and manage pipelines
- An accurate description of property assets
- Availability of a map exchange portal for member authorities

AN INNOVATIVE NETWORK IN CONSTANT COMMUNICATION

Major cities are facing increasingly demanding challenges due to the scarcity of resources and the need to reduce their environmental impact. In this context, and thanks to advances in information technology, "smart cities" are coming into being.

Remote readings place the customer at the heart of the service

This new strategy means that all traditional public services must be optimised in order to produce "total management" of a city. The smart water network will use cutting-edge computer technology to optimise resource management, production, distribution, and consumption by enabling real-time communications between supply and demand from providers and consumers, backed up by mid- and long-term forecast.

One innovative development that is essential to providing remote readers is SEDIF's TELEO. In addition to it being easier to read meters without disturbing the customer, it will be possible to detect changes in use in real time, and therefore post-meter leakages.

It will also be possible to provide an accurate map of usage in order to better predict and adapt to usage on a local level, all while respecting the privacy of all of our users.

This decentralized technology brings the customer to the heart of innovation for significantly increased service quality.



The network, our 4th facility

SEDIF's delegation contract is marked by several other innovative components which also contribute towards a "smart network": remote transmission or leak detection as part of the RES'ECHO project, real-time monitoring to enact the network restriction and pressure modulation to limit the water lost locally, or even controlling water quality from source to distribution with the QUALIO project.

This project uses probes built into the network. With these tools positioned within the SERV'O system (see box) for centralized network monitoring and management, SEDIF has a comprehensive overview of the system to make more informed decisions, providing the network's 4th plant.

This innovative mechanisms make SEDIF a French and international pioneer in "smart networks". However, this type of technology is still in its infancy and is set to undergo drastic evolution.



Serv'o: maximum facilities coordination

All of SEDIF's facilities are equipped with an automated system and an IT control centre at the heart of the main plants. Genuine control towers, these advanced command posts monitor the network's performance to predict malfunctions and approve the best strategies to adopt.

These mechanisms are backed up by the "SERV'O" that consolidates the reliability of the facility. Operational since 1 January 2011, Serv'o is the result of a joint effort between SEDIF and its delegation.

The tool paves the way for centralized coordination between SEDIF facilities, and provides constant monitoring of the entire network by following the movement of water as it travels through pipelines and facilities. Every facility, treatment plant, relay station, well, and water reservoir can be located and viewed 24/7. This automated IS management means that complex information flows can be managed, works scheduled, and the processes needed to maintain the water supply from the facility to the end customer can be harnessed. A number of water professionals have visited this unique structure which is a model example of how to manage hydraulic facilities in France and throughout Europe.

AN ODE TO INDUSTRIAL ARCHITECTURE



Clamart Pavé-Blanc relay plant

By applying its policy to promote urban integration and landscaping, SEDIF is developing a new generation of installations that fit in seamlessly with their surroundings, whether in « municipalité » or more industrial settings. The importance given to environmental and architectural criteria in building specifications forms part of SEDIF's ambition to develop facilities that are very acceptable to local residents and that care for the environment.

City centre facilities

Modern, compact **and designed with architecture in mind** to form an integral part of the urban landscape, SEDIF's recent construction work combines operational requirements with aesthetic ambition. The Clamart Pavé-Blanc relay station is a good example of successful « municipalité » planning. Located in an extremely built-up area, and with most of its facilities underground, it was designed to occupy minimal space and to fit in with the surrounding residential buildings. Coated in lacquered aluminium panelling, with a laser cut design, it bears witness to the architectural quality of SEDIF's assets while not compromising on function: it provides constant water to 48,000 people and supports the Antony or Clamart plants if necessary.

Architectural and environmental balance

The Choisy-le-Roi effluent treatment unit, scheduled to be operational in 2015, deftly combines architectural and environmental criteria. Erected in a highly developed environment, the building fits in seamlessly and displays SEDIF's environmentally friendly approach to promoting biodiversity, local residents' interests and environmental management.

In addition to **reduced noise pollution and visual disruption**, it positively blends in with the landscape and aims to reduce the environmental impact of its operations by preventing risk through pollution-free processes.

Choisy-le-Roi effluent unit



Méry-sur-Oise water treatment plant

A SOLUTION FOR THE FUTURE: SUSTAINABLE DEVELOPMENT

By signing the Sustainable Development charter in late 2011, in an economic context marked by reduced water consumption, SEDIF made clear its commitment to provide consumers with an environmentally responsible public water service that cares for the community it serves. Over 10 years after earning ISO 14001 certification, the environment is still a key factor when deciding on the technical side of a project. Controlling energy, waste, and architectural quality, respecting biodiversity, and promoting trenchless methods have come to form the essential criteria when designing and completing developments.



PHOTOVOLTAICS COME TO SEDIF

SEDIF's facilities include large expanses of flat rooftops at the main plants, and our water reservoirs are also suitable for installing energy traps. SEDIF will reduce its energy consumption at these facilities by installing solar panels. In total, 10,000m² of panels will be installed on the rooftops of the Villejuif and Châtillon water reservoirs. 5000m² will be fitted to the new Villejuif R7 water reservoir, and another 5000m² fitted to the Châtillon R6 water reservoir.

FACILITIES PROMOTING BIODIVERSITY

The renovation of the Puteaux facilities offer a perfect illustration of SEDIF's desire to ensure that all new investments are environmentally sustainable. With a little help from the weather, seeds spread by birds and seeds sown by man, over time plant life will flourish. It will be based on a new style of management, one where planned sowing of seeds and planting (60 tall-trunked trees will be planted) will work alongside the spontaneous contribution made by nature, promoting greater biodiversity.



