

- Category : Optimization of an aquatic center
- Case study : Aquaval - Tarare



Project cofinanced by



European Regional  
Development Fund



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## ●●● Project Location



Project is located in West of Lyon, in the south-east quarter of France, at about 45 km from Lyon city center. Tarare is a town of 10 500 inhabitants in a 14 km<sup>2</sup> area. Site is located at the southern entrance of the town.

The climate is continental with below zero temperatures in winter and high temperatures in the summer months ( $\approx 25^{\circ}\text{C}$ ). The average rainfall precipitation ranges around 825mm/yr with peaks in May and during the fall months.

The major winds have North and South orientations (cold and dry from the North, hot and humid from the South).

The climate is inclined to a wide range of natural events, ranging from frost to snow to thunderstorms to fog and haze.





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## ●●● Project Goals



In 2002 the Community of Communes of Tarare built the aquatic center to offer its residents a quality leisure space.

Building on the success of this center, in 2007 the outdoor space is laid out by the creation of spaces shaded lawn, land sports (volleyball, children's play ...), a foot bath and toilet.

To anticipate the “Grenelle de l’Environment” law, the Community of Communes of Tarare wanted to have a debate on the energy performance of the center.

In 2010, the heat recovery system for wastewater is implemented.

The building of 4260 m<sup>2</sup> util, also has 4000m<sup>2</sup> of outdoor space.

The budget work is investing € 50 000



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## ●●● Project Details



The center Aquaval hosts 140,000 visitors per year (50% public, 25% education, 25% sports associations and educational health center).

The center employs 19 people year round, aided by six seasonal during summer.

The center offers three main activities:

- Indoor and outdoor pools with a shaded park,
- Rooms Fitness (fitness, cardio, strength training, ....)
- Relaxation: sauna, jacuzzi, hammam, spa.



The pool area is divided into:

- An interior fun pool 307 m<sup>2</sup>,
- A sports pool 25 \* 12.5 m,
- An indoor pool 37 m<sup>2</sup> for children,
- An outdoor pool of 72 m<sup>2</sup> for children.

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## ●●● Environnemental goals



Large pool



Fitness Center

Electricity provides light, ventilation and pump operation of the entire site.

Gas is used to heat water basins and domestic water (showers and sinks).

In 2009, the center has used:

- 786 MWh of electricity, € 82 000,
- 120 MWh of gas, € 72 000
- 13 436 m<sup>3</sup> of water (8 195m<sup>3</sup> for pools and 5419 m<sup>3</sup> for hot water) , € 45 000

Fluids account for 20% of the operating budget of the center.

The Community of Communes wants decrease all consumption, heat recovery of waste water is only the first step in a comprehensive plan to reduce energy consumption.

An audit was requested to electricity supplier to determine the electricity most important consumers in order to focus investment efforts.

Studies are conducted for wastewater reuse: is the site for watering or cleaning, either by the Community of Communes for other uses (road cleaning, ..).

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## ●●● Project details



Storage tank for hot water

### Historical

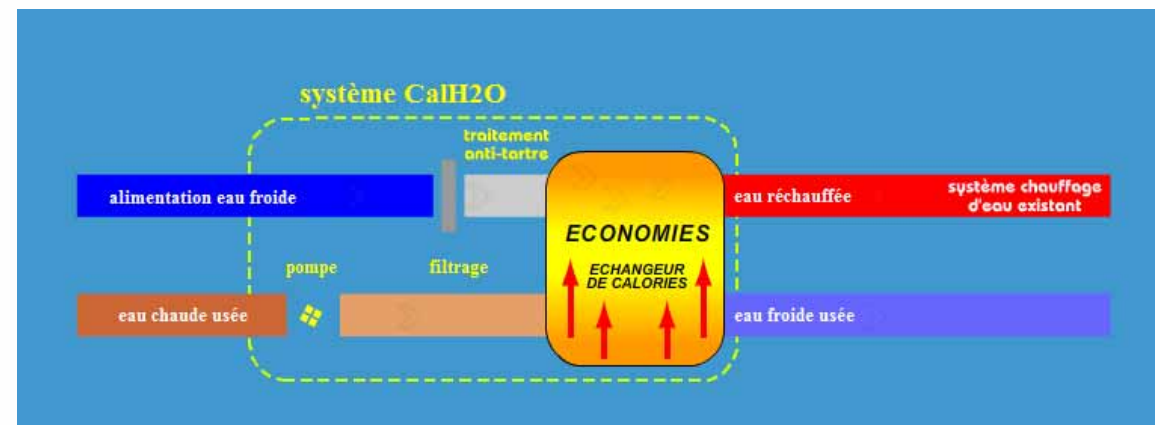
Technical Services met at a fair society, representatives of Domelys society based in Villefranche / Saône in the Rhône.

This young company proposed a system of heat recovery on wastewater, but had so far only implemented its solution for small volumes like hair salon.

At the request of technical services, Sté Domelys agrees to conduct a feasibility study on the center Aquaval.



Gas boiler





## ●●● Project details



Filter



Buffer tank for reclaimed water

## Operation

The center Aquaval uses more than 13 000 m<sup>3</sup> of water per year mainly to meet regulatory requirements for renewal of the water.

Most of the water is filtered, however, currently the two major sources of discharges of waste water are:

- The cleaning water filters (3 filters cleaned every two times per week)
- The water in the showers.

Cold water gets between 8 and 14 ° C depending on the season and is then heated to 29 ° C for pools and to 55 ° C for showers.

Water cleaning of sand filters is itself rejected at about 28 ° C, while the shower is about 30 ° C.

The showers are fed by a separate network, hot water loop.

The presence of technical underground, with enough space allowed to set up the equipment and use gravity to collect wastewater.

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## ●●● Project details



Exchanger system with pump and control



Plate heat exchanger

### Heat recovery

The filters are periodically cleaned two times a week by gravity, water passes through the sand beds.

During the cleaning of filters, pressurized water is injected in reverse mode. This water, overloaded with waste can not be used to retrieve calories.

But water by "re-compaction" of the filters can be used to retrieve calories. These water are added to water of footbaths.

Hot water intake, fluctuates depending on the attendance of the pool, so a buffer tank is needed. Water, which has a high inertia and which is stored an average of 4:00, allow not to insulate the buffer tank.

Once stored, the water passes through the heat exchanger to preheat fresh water to fed swimming pools.

### Domestic hot water

The showers are fed by a hot water loop. Needs and releases are simultaneous, there is no need to store water.



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## ●●● Project details



Shower système



Control panel

### Exploitation

The exchange system is used to preheat water arriving between 8 and 14 ° C, until 25 ° C.

The project is a first for Domelys Cie, it was followed by very sharp, to assess the real performance.

After a year of operating results are very satisfactory.

The first 3 months were used to break in the installation, including making adjustments to pump flow.

Then eight months of operation has saved 8,000 euros or the equivalent of 90 MWh a year of operation.

Maintenance is virtually zero, except for regular cleaning of filters before the heat exchanger. And power consumption of the pumps is very low.

The system has also automate the filling of foot baths which also decreased water consumption for this position.

### Raising awareness amongst users, tenants and owners

To inform clients of the center, a billboard is installed in the lobby giving:

- The temperature of each basin,
- Energy savings realized, equivalent housing consumption,
- The CO2 savings, equivalent car km.

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## ●●● Project transferability

For an investment of € 50 000, the system has saved € 8,000 on the first 8 months, return on investment is estimated at 4.2 years, without taking into account subsidies.

Today the company Suez-Lyonnaise des Eaux acquired the license at Domelys and markets the solution as the "Degré Bleu", proof that is a sustainable solution.

This operation had an exceptional return on investment, first due to its simple and efficient technical solution and due to the grants that the Community of Communes has benefited.

But even in an industrial approach, via the company Suez-Lyonnaise des Eaux and without subsidy, this system which requires a limited investment, shows a much better return on investment than solutions such as solar thermal panel or equivalent.

In more southern countries, where sunlight is more important, the system could possibly be coupled with solar panels.

This technical solution allows to consider interesting return on investment, since volume of hot water is important.

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