



step by step
renovation
towards nearly
zero energy
SPORT buildings

Savings achieved in Catalan sport complexes

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Brussels

Marc Torrentellé



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Programme of the European Union



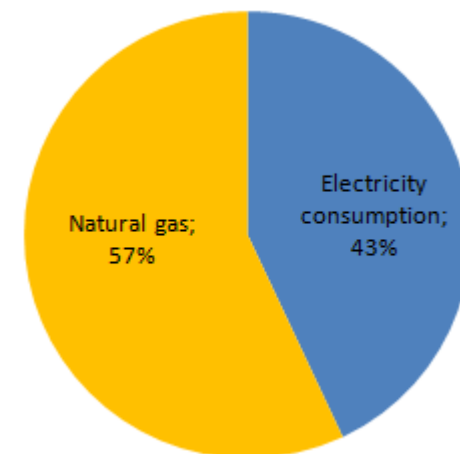
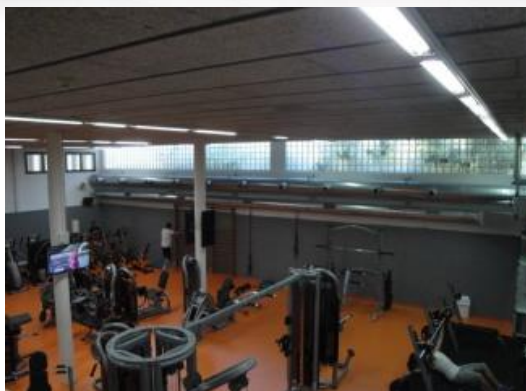
CEM Vallirana



Owner: city council of Vallirana
Sport facility manager: Grup Sintagma
Year of construction: 2003

Facilities:

1 semi-olympic indoor pool (25 x 12,5m)
1 indoor pool (12,5 x 4 m)
Fitness room
2 multiactivity rooms



1) CEM Vallirana

Energy measures implemented



- 1) Refurbished pool dehumidifier with energy efficient components
- 2) Low cost measures:
 - Step-by-step LED replacement





Energy measures implemented

2) Low cost measures:

- Insulation of the pool water compensation tank

The tank into which the water from the gutters or skimmer gutters flows. The tank serves to ensure that the pool has enough water to overflow regardless of the number of swimmers and independent of evaporation and splash-out losses.

Before



After





Energy measures implemented

2) Low cost measures:

Problem: the tap water has Calcium Hardness levels of over 500 ppm and water softening system was not working.

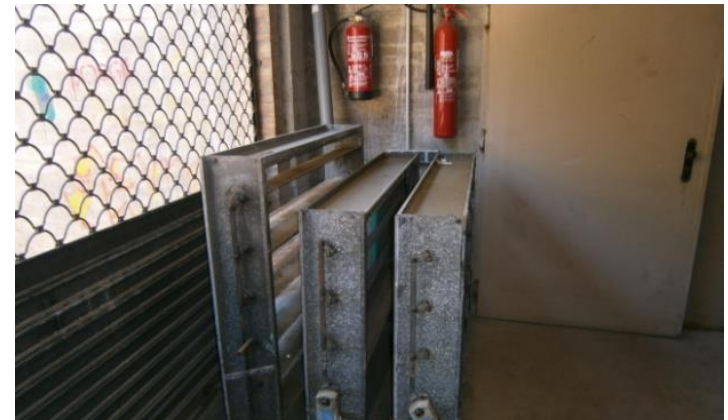


Actions taken:

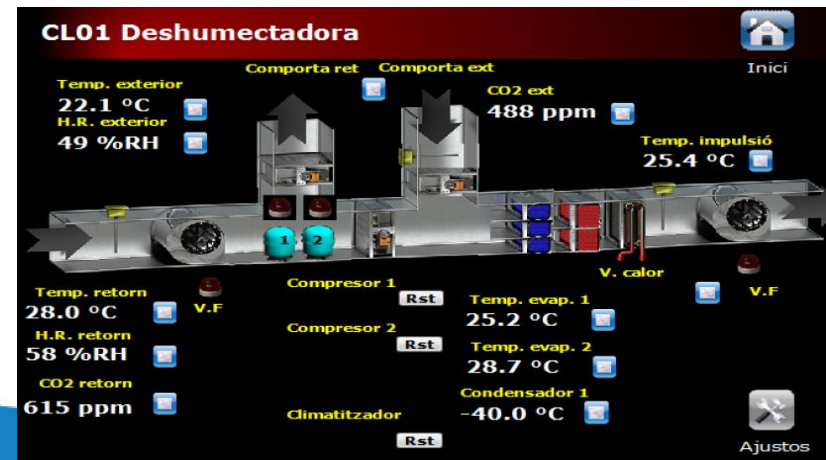
- Repair the water softening system
- Replacement of pipes and heat exchangers

1) Refurbished pool dehumidifier with energy efficient components:

- Demand-Controlled Ventilation system with CO₂ sensors
- VSDs in the supply and return fans
- Repair of refrigerant leaks in compressors
- Cleaning of filters and coils
- Replacement of free-cooling & recirculation dampers



1) Refurbished pool dehumidifier with energy efficient



Savings achieved:

Investment made so far: 47.710 €

**YEAR
2016**

**31%
thermal
savings**

**46 tn CO2
avoided**

**10.216 €
saved**

226.857 kWh/year



Improved indoor air
quality for swimmers!

1) CEM Vallirana

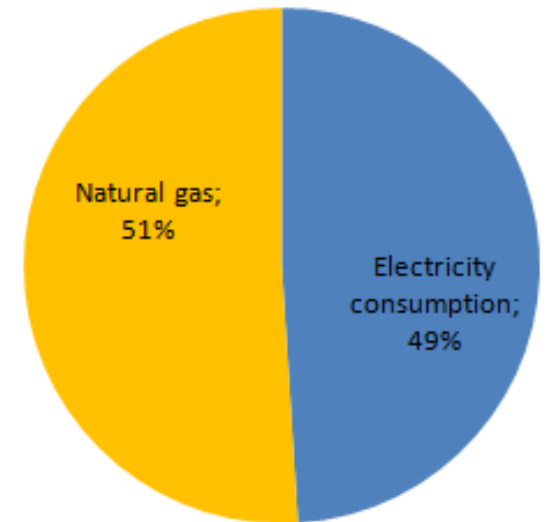
CEM LA BORDETA

Location: Barcelona

Owner: Institut Barcelona Esports (public body)

Year of construction: 2006

Gross floor area: 4.362 m²



2) CEM La Bordeta



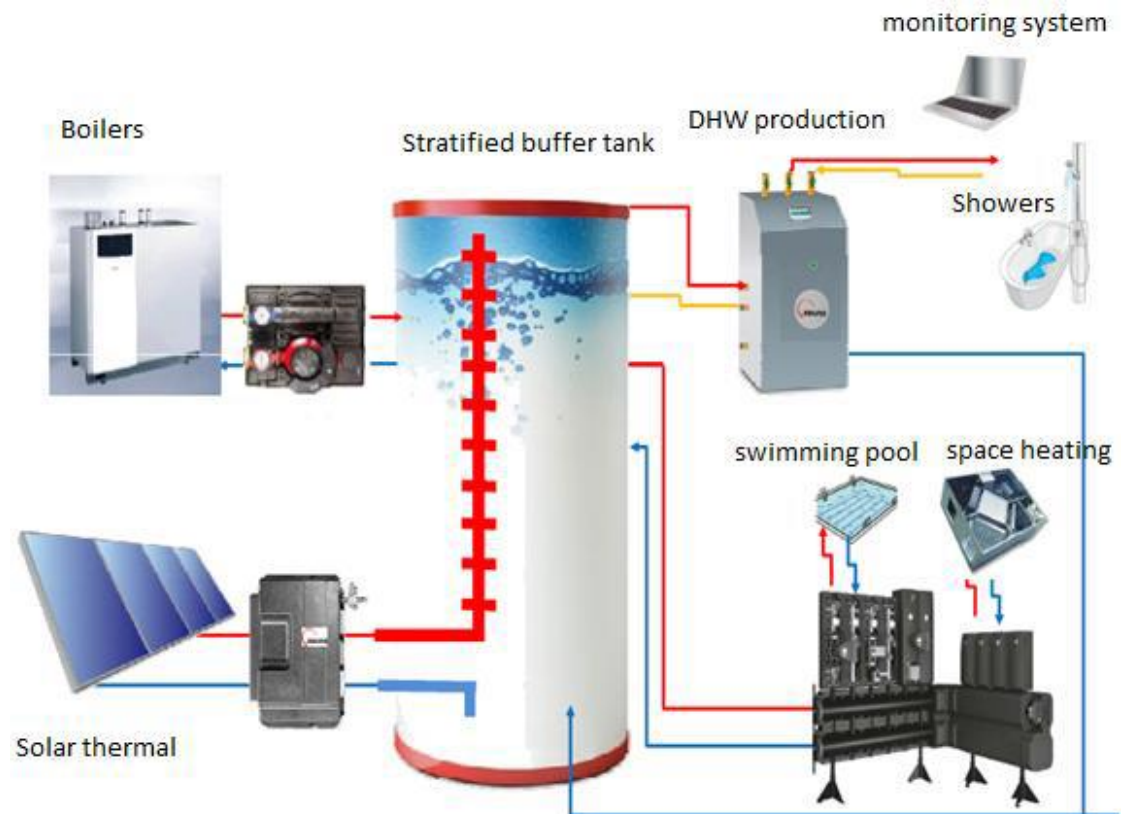
Energy measures implemented

- 1) Stratified buffer tank (December 2014)
- 2) Replacement of pumps for high energy efficiency ones (December 2014)
- 3) Replacement of the old boiler for a condensing boiler (December 2015)
- 4) Replacement of metal halides lamps for LED lighting in the swimming pool (August 2015)
- 5) Installment of time switches for turning off the lights at night (August 2015)
- 6) Occupancy sensors and LED lighting in locker rooms and corridors (July 2015 & August 2016)
- 7) Hydraulic balancing of the existing solar thermal plant (February 2016)

1) Stratified buffer tank: optimizes the heat storage efficiency through better thermal stratification inside the storage tank.

Advantages:

- Optimization of the thermal stratification, resulting in improved heating efficiency
- It avoids having a large accumulation of Domestic Hot Water 365 days a year
- Less starts and stops of boilers. Longer service life of boilers
- Reduction of energy losses in the boiler room
- Lower maintenance cost



2) CEM La Bordeta

Stratified buffer tank:

Before renovation



After renovation



2) Replacement of pumps for energy saving ones

Before



After renovation



3) Replacement of the old boilers for a condensing boiler

Before renovation

495 kW



77 kW



After renovation

300 kW





- 4) Replacement of metal halides lamps for LED lighting in the swimming pool +
- 5) installment of time switches for turning off the lights at night

Before renovation

15 Metal Halides of 250 W
Energy consumption: 32.497 kWh/year



After renovation

15 LEDs of 80 W & time switches
Energy consumption: 8.400 kWh/year
74% energy savings in lighting



6) LED lighting and occupancy sensors in locker rooms and corridors

Before renovation

Compact Fluorescent Lamps of 18 W
Problem: Low lighting levels



After renovation

LED downlight of 18 W & occupancy
sensors
Better lighting levels



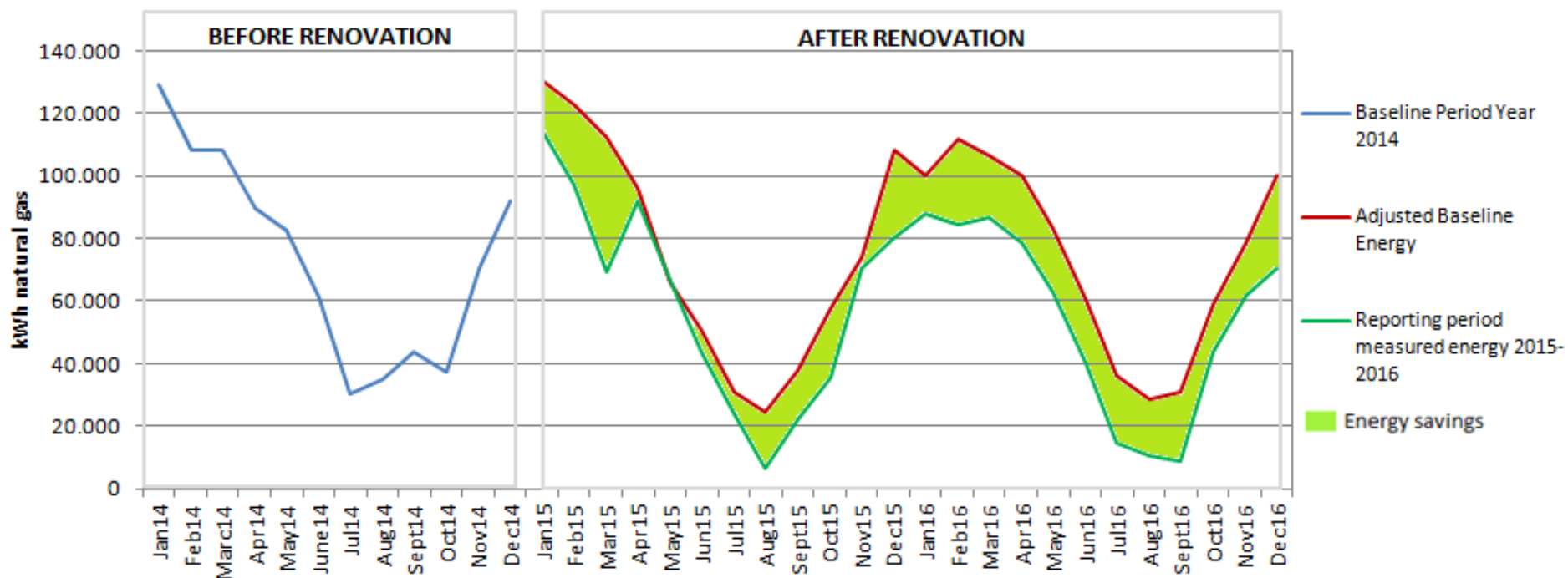


7) Hydraulic balancing of the existing solar thermal plant:



2) CEM La Bordeta

Thermal savings achieved:



2) CEM La Bordeta

Savings achieved:

Total investments made so far: 104.373 €

**YEAR
2015**

15%
electric
savings

21%
thermal
savings

68 tn CO₂
avoided

19.131 €
saved

280.412 kWh/year

**YEAR
2016**

18%
electric
savings

27%
thermal
savings

85 tn CO₂
avoided

21.966 €
saved

354.595 kWh/year

2) CEM La Bordeta

WHAT'S GOING NEXT?

Refurbished pool dehumidifier (2017)

Investment required: 42.000 €

Additional thermal savings: >35%





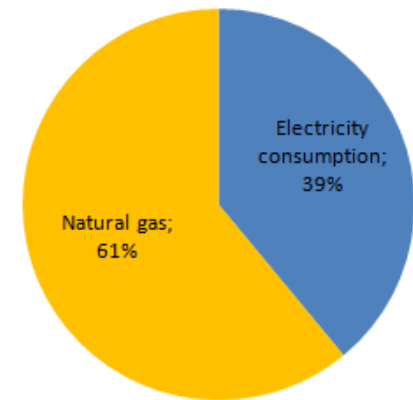
Owner: public body

Year of construction: 1993

Facilities:

- 2 indoor pools: 25 x 16,7m / 16,7 x 6 m
- Fitness rooms, squash
- Multiactivity rooms
- 1 Sport hall
- Outdoor sports facilities

Total sports area: 32.000 m²



3) SAF UAB

- End of 2015: A public tendering process for the installment of a **biomass boiler** was launched.
- February 2016: the contract was formalized.
- July 2016: installment of a 500 kW biomass boiler feed by wood chips.



Before renovation

3 natural gas boilers

Total heat power: 634 kW



After renovation

1 biomass boiler

Heat power: 500 kW



61% of the energy demand covered by RES

218 tn CO₂/year avoided

21.500 €/year saved

WHAT'S GOING NEXT?

60 metal halide lamps of 250 W will be replaced with 100 W LED lamps in the sport hall.



Expected energy savings: - 86% lighting consumption

PUIGCERDÀ SPORT COMPLEX



Owner: City Council of Puigcerdà

Year of construction: 1982

Gross floor area: 4.143 m²

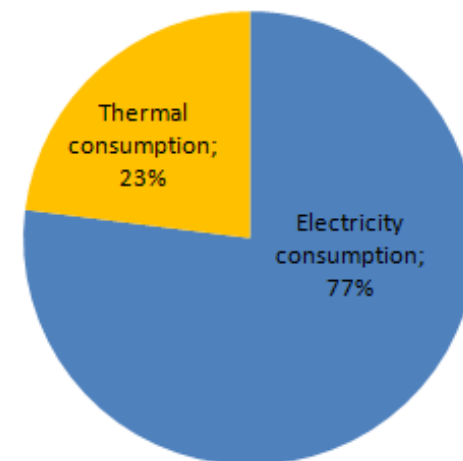
Facilities:

1 ice rink arena

2 indoor pools

Fitness room & multiactivity rooms

Sport hall



4) Puigcerdà sport complex



Energy measures implemented:

- 1) Partial renovation of the refrigeration plant:
 - Replacement of 2 of the 4 reciprocating compressors by screw compressors with capacity control stages.
 - R-22 replaced with R-134A
 - New heat recovery system for preheating pool water and DHW of the whole complex.
 - Replacement of pumps with more efficient ones (IE1 → IE3)
 - New control system

4) Puigcerdà ice rink



Before renovation



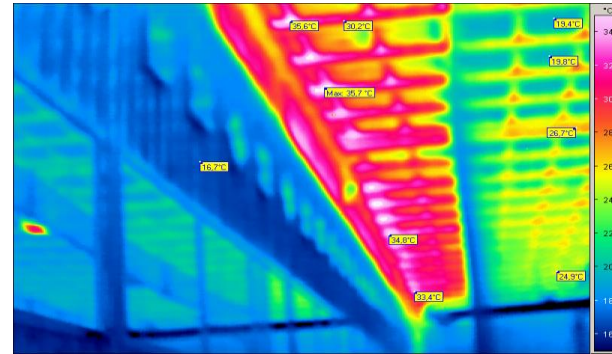
After renovation



4) Puigcerdà ice rink

What's going next?

- June 2017: Finalization of the new refrigeration plant
- 2018: replacement of the roof and lighting system of the ice rink arena.



41%
energy
savings

100 tn de
CO₂/year
avoided

50.000
€/year
saved

4) Puigcerdà ice rink

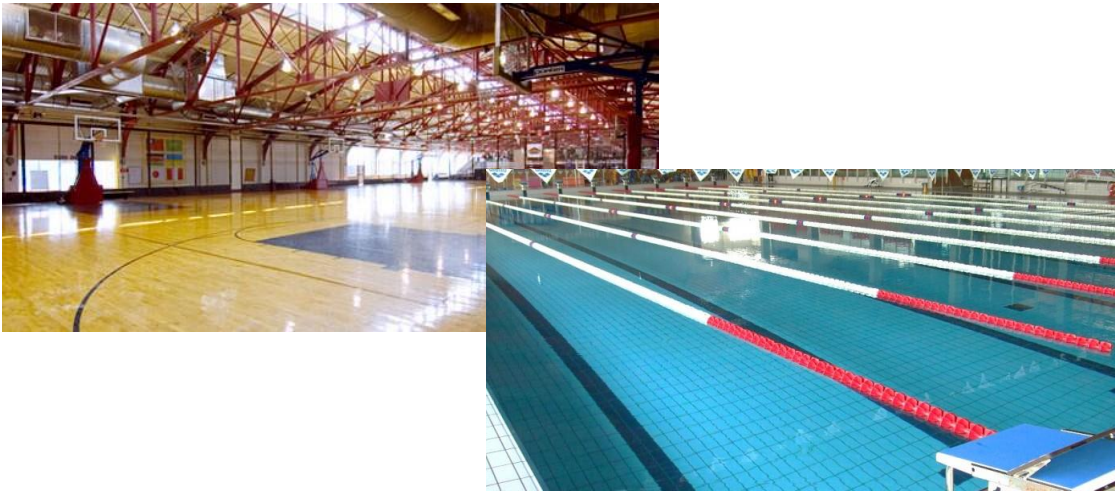
Thank you for your attention!

Contact details

LEITAT Technological Center

Marc Torrentellé

mtorrentelle@leitat.org



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