GrowSmarter
Transforming cities for a smart, sustainable Europe

FACTSHEET

Energy efficient swimming pools

PART OF SMART SOLUTION 1: EFFICIENT AND SMART CLIMATE SHELL REFURBISHMENT

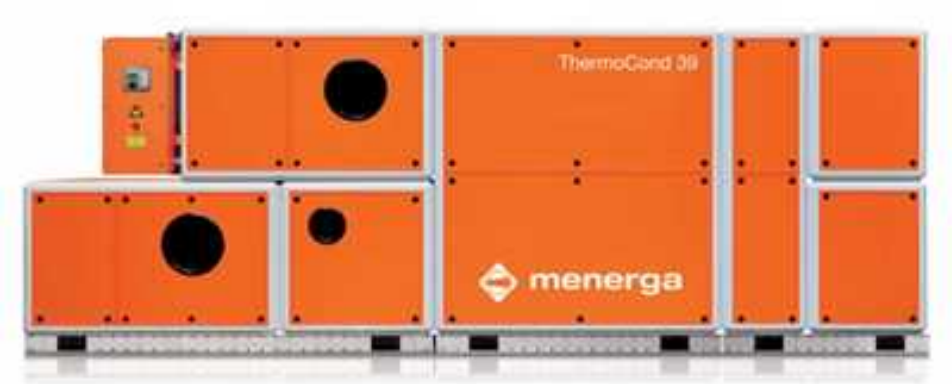

Fig 1: Menerga swimming pool dehumidifier (Source: Menerga)

- Indoor swimming pools are large energy consumers within sports centres. Air must be continuously treated to maintain low humidity and high temperature.
- A significant part of this energy is lost in the form of heat transfer through roof and walls. Reducing these losses has a strong impact in overall demand.
- Energy loss also stems from ventilation, which involves driving out hot air and replacing it with cold air which must be heated. Recovering part of this wasted heat reduces overall thermal demand.

LOW ENERGY DISTRICT

Barcelona

Technical partner:

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City contact:

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What is the solution?

This solution includes passive and active energy refurbishment of systems affecting pool space heating and electricity needs.

As a passive measure, insulating the pool roof (over 600 m² area) will lead to reduced heat transfer through the surface.

As an active measure, the current dehumidifier will be replaced with a new high-efficiency unit that allows recovering heat from exhaust air.

How does it work?

Pool roof insulation (passive measure)

Pool halls are kept at a warm temperature throughout the year, and therefore have a very large thermal demand. This solution consists of a layer of insulating material placed over the dropped roof of the swimming pool, reducing thermal losses through the roof. This significantly reduces thermal demand.

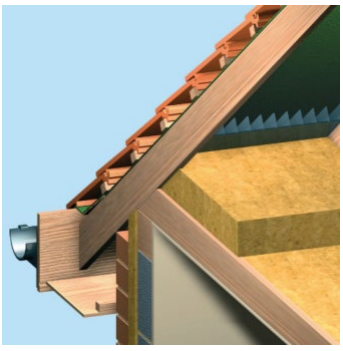

Fig 2: Pool roof insulation illustration (Source: Rockwool)

Installation of dehumidifier allowing heat recovery

In indoor heated pools, water is constantly evaporating into the air from the pool surface. To maintain user comfort and avoid unwanted condensation on surfaces, it is necessary to maintain humidity at a relatively low level. This is done through a thermodynamic cycle that consumes an significant amount of electricity. Electricity consumption for dehumidification can be reduced significantly by replacing existing equipment with a new high-efficiency unit. The electrical consumption for ventilation is also optimised due to the use of variable speed fans to adjust the recirculation airflow. The system automatically adjusts operation parameters (flow rates, air recirculation/mixture) depending on internal and external conditions to minimize energy consumption.

The new dehumidifier (Fig 1) will be equipped with a heat recovery module that pre-heats outside air entering the building using heat from inside air going out. This way, energy demand due to air renovation is minimized.

Fig 3: Ventilation process (Source: Northern Fans)

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Business Model Used

The business model used is an ESCO model, where Gas Natural Fenosa acts as an energy services company. In this model the end customer will have a single interlocutor, which manages and coordinates all the agents needed to execute the refurbishment.

The savings guaranteed by the refurbishment will cover the investment of the energy services for the works during a contractual relationship agreed with the energy services company.

The ESCO guarantees the energy savings and assumes the operation and maintenance costs during the duration of the contract. At the end of the contract, the energy savings will be a direct benefit for the customer.

Integration with other smart solutions

This solution is integrated with the smart solution "Efficient and smart climate shell and equipment refurbishment of tertiary buildings", and will be implemented together with different active and passive measures.

- Replacement of thermal energy generation equipment (boilers, heat pump for heating and cooling)
- Installation of solar thermal system
- Installation of Building Energy Management System (BEMS)

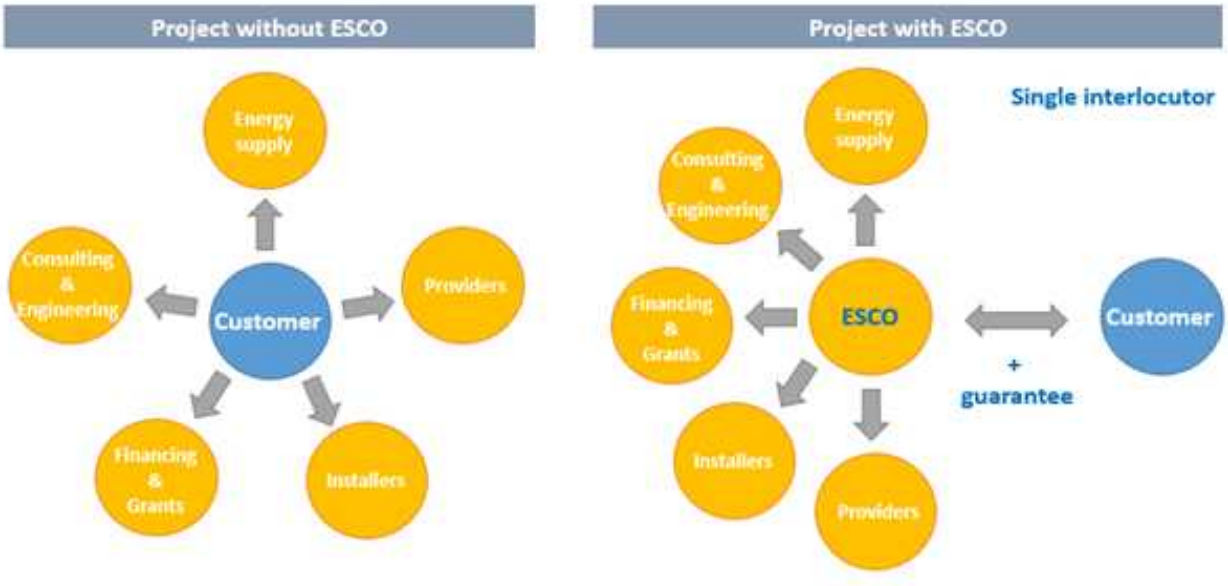

Fig 4: Business model used, with ESCO and without ESCO

Expected Impacts

Positive impacts expected to bring to the city in terms of the key GrowSmarter objectives:

Improving quality of life:

Precise and automated control of ambient conditions to ensure thermal comfort.

Reducing environmental impact:

- Reduction of pool space thermal demand of around 60% and dehumidifier consumption around 30%
- Reduction of CO2 emissions, owing to the reduction of consumptions and to waste heat recovery
- Better conditioning of external air

Promoting sustainable economic development:
Increase of market value of buildings and consequent increase of visibility in the market and customer attraction.

Potential for replication

The main precondition for replication of this measure is the existence of a stock of indoor swimming pools with relevant thermal and dehumidification needs that have not been recently refurbished.

Organizational resources and knowledge required:
Public administrations should be conscious of the high potential of consumption and emission reduction of different solution applied in passive and active energy refurbishment. They should propose ways of promoting amortization of rehabilitations, through grants or tax incentives; particularly, it should update grants and incentives to the newest technologies of generation, distribution and management of energy.

Public administrations need to know the conditions for a public-private collaboration within an ESCO business model and should take them into account when designing concession policies to foster investment in energy efficiency through Energy Services contracts.

Stakeholders to be involved:
- Sports centres/pool owners or managers
- Energy Services Companies (ESCos)
- Public Administration (if pool is publicly owned)
- Architects, Engineers
- Manufacturers and distributors of products for the generation, distribution, management and control of thermal and electric energy
- Final users of the building

Challenges to replication:
For pools owned by Public Administrations and operated by private companies through a concession scheme, it may be problematic to be able to provide net savings to the operator before their exploitation period is over (generally part/all of the economic savings for the duration of the Energy Services contract are transferred to the ESCo as compensation for its investment).

Convincing owners/managers to invest in actions with higher payback (passive measures) than the ones they use to accept for investing.

Convincing owners/managers of the importance of integrated passive and active refurbishment.