

## Energy efficient refurbishment of public tertiary buildings in Barcelona

### Smart solution 1 Energy retrofitting of buildings



#### Measured impacts

**48%**

reduction in heating energy consumption (Library Les Corts)

**12%**

reduction in cooling electricity consumption (Library Les Corts)

**84%**

reduction of CO<sub>2</sub> emissions by the heating system (Ca l'Alier)



## Barcelona

#### Technical partners

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## What is it?

Retrofitting older and worn down industrial properties can be a unique chance to turn them into energy efficient and innovative public buildings. A wide variety of measures are used to achieve this, including on-site energy generation, connection to district heating and cooling networks, smart energy management and more. The retrofitting must be done in accordance with the municipal regulation for industrial heritage protection.

## What did GrowSmarter do?

The Municipality of Barcelona has integrally retrofitted two abandoned textile factories to become new public buildings serving different purposes. One was transformed into the library Les Corts and the other into the urban innovation centre Ca l'Alier.

The retrofitting actions included both passive measures (natural ventilation, solar extractors, natural lighting, thermal



insulation, etc) and active measures (radiant floor heating and cooling systems, LEDs with photosensors, variable speed fans, photovoltaics, district heating and cooling, etc.). Both buildings obtained very good scores in internationally recognized building energy performance certificates..

The renovation investment of the urban innovation centre Ca l'Alier was proposed as a public-private partnership signed between the municipality and private companies, giving these companies a temporary right to use a part of the building.

## Lessons learnt

Energy-efficient renovation of heritage buildings provides a more attractive use and better occupation of these buildings while assuring a reduced energy bill. The integration of local energy generation respecting heritage preservation concerns has proven to be technically feasible. However, in order to ensure an optimal energy management of the building, it is crucial that staff receive training in the operations and maintenance of the innovative solutions in the building.

Working together with the urban planning department of the municipality already from the design phase of the project is strongly recommended in order to select the most appropriate innovative technologies that respect the historical value of buildings.

## Upscaling & replication potential

Due to the high initial investment, all externalities must be taken into consideration when assessing the replicability of this type of action. Public-Private partnerships can be one path to locate the required initial funding. Studying the potential role of the building in a local energy community is recommended, since this kind of buildings can normally host large energy generation plants (photovoltaics) which may bring economic benefits from selling or exchanging the surplus electricity in the neighbourhood.



Public heritage buildings can be used as energy efficiency showcases. Adapting local building regulations can foster their energy retrofitting.

## How did the measure work?

### Technical feasibility

Passive energy efficiency measures must be adapted as heritage buildings limit any retrofit action involving modification of the external envelope. Integration of local energy generation respecting heritage preservation has proven feasible.

### Economic feasibility

The economic driver is the creation of new public facilities while preserving the city identity through the revaluation of heritage. As such, the economic feasibility depends on a city's ability and desire to fund such projects.

### Replication potential

Public heritage buildings can be used as showcases for social awareness on energy efficiency. Adapting local building regulations can foster the replication of heritage buildings energy retrofitting.