



## Energy efficiency interventions for public buildings and lighting systems

### Turin, Italy

#### IN A NUTSHELL

*The municipality has undertaken a fruitful collaboration with the University Politecnico of Turin to collect data on energy consumption and costs for the city building stock, with the aim of making more efficient technical and policy decisions. Renovation of public buildings and substitution of public lighting bulbs with LEDs are among the first actions implemented.*

#### BACKGROUND

The city of Turin has a very rich natural heritage. Surrounded by the Alps and crossed by four rivers, the city offers to its residents one of the highest rates of urban green area per inhabitant, a total of more than 18 km<sup>2</sup> in continuous expansion. Turin signed the Covenant of Mayors in 2009 and it consequently adopted two action plans, called TAPE: Turin Action Plan for Energy, in 2010 and 2015. In the first action plan the city set an emission reduction target of -30% by 2020, compared to the emissions in the baseline year 1991. The second action plan focuses on the monitoring of the actions undertaken in the first years, and identifies the next steps and the most suited actions to achieve the 2020 target.

Turin has a public building stock of 800 buildings with different uses, that represent 8% of total city buildings and are responsible for around 4% of the total CO<sub>2</sub> emissions. The majority of these public buildings were constructed before 1976, when the Italian legislation on energy efficiency entered into force. Since 2014 the city of Turin is implementing an Energy Management System (EMS) for the entire building stock, which is supported by Information and Communication Technology and Building Management Systems (BMS) for the detection, management, control and monitoring of energy consumption.

#### ENERGY EFFICIENCY STANDARDS FOR PUBLIC BUILDING RENOVATION

Between 2006 and 2011, Turin introduced in the building code specific energy and environmental requirements for the improvement of the façade and the thermal insulation of the roof when undertaking major renovation activities related to them. There are also minimum NOx requirements for the replacement of heating systems. The city is very committed to work on improving energy efficiency in the public building stock. One example is the energy requalification of the municipal police offices. The building covers an area of 22,000m<sup>2</sup> and its total energy consumption was calculated to be 987.8 TOE/year (11 million kWh). New technologies such as LED lights, thermostats and motion sensors were introduced. This is expected to lead to -30% in electricity consumption and -20% in consumption for heating and air conditioning. In November 2018 the requalification already led to 5% electricity savings and 30% savings in consumption for heating and air conditioning.



Municipal police offices in Turin, currently subject to energy requalification interventions.

### TURIN



**Population:**

910,504

**Area:**

130.2 km<sup>2</sup>

**Signatory to the Covenant of Mayors since:**

2009

**CO<sub>2</sub> emission reduction target:**

30% by 2020

## DATA COLLECTION TO IMPROVE ENERGY EFFICIENCY

The city, in partnership with the University Politecnico of Turin, carried out a study to identify the weak spots in the public buildings' energy systems and find the most suitable solutions to improve energy efficiency. The city took part in several projects that aimed at gathering all information about energy consumption and costs related to the public building stock. The databases created will inform the city administration and the Energy Management Office in order to take more effective technical and policy decisions.

The project 'Scuole 2.0' is currently gathering and analysing energy data on school buildings, collected through the installation of a system of environmental quality detectors inside and outside schools. The pilot project started in May 2017 with the installation of the monitoring system in a group of 14 schools. In 2019 the project will be extended to a total of 150 schools. The objectives of the pilot project are to highlight the benefits of a smart monitoring system, namely: analyse data on this specific type of buildings and estimate the maximum achievable amount of energy savings, raise awareness on the impact of consumers' behavioural change on energy saving and especially the impact of simple thoughtful actions. In a second phase of the project the data collected will be used to carry out specific interventions to improve energy efficiency in the school buildings, ultimately leading to significant economic savings.

## PUBLIC LIGHTING SYSTEMS

The public lighting system is another area of intervention that Turin has prioritised. Through the 'Torino Led' project, between 2013 and 2014 the city has substituted 55,000 public lighting bulbs with LEDs, leading to significantly lower energy consumption. The savings were calculated to be around 50%. The city administration is currently planning to expand this further and to extend the project to traffic signs.

## THE NEW INTEGRATED ENERGY CENTRE

The successful collaboration between the municipality and the University Politecnico of Turin for gathering data to improve energy efficiency in the public building stock, led to multiple positive outcomes. On the one hand, the city of Turin is now planning to extend the results of the research to private buildings. On the other hand, Turin has decided to take an important step to improve and continue working on innovative and efficient energy management. The municipality is currently working to create a single integrated centre, the Energy Centre, that will gather the regional and municipal administrative offices for energy management, private energy companies and the relevant University Politecnico offices and labs. Through the creation of this centre, the city is aiming at encouraging cooperation in the energy management sector and sharing knowledge between parties with different expertise.

### USEFUL LINKS

- ▶ 'Torino LED' Project: <https://bit.ly/2WZExdn>
- ▶ Energy efficiency standards for public buildings renovation: <https://bit.ly/2SD2dWo>
- ▶ Turin and the Covenant of Mayors: <https://bit.ly/2DIw1GG>



### KEY FIGURES

**-30% and -20%** in electric and heating/air conditioning consumption respectively: expected after renovation of municipal police offices

**14** schools have an energy consumption monitoring system

**55,000** public lighting bulbs substituted with LEDs

**50%** expected energy savings following the introduction of LED lamps



### FINANCING THE PROJECT

#### + Renovation of municipal police offices

**Financing sources:**

European funds, [Probis Project](#)

**Total amount:**

€ 400,000

**Payback period:**

6 years

#### + 'Torino LED' project

**Financing sources:**

IREN S.p.A (Energy Service Company)

**Total amount:** € 17,000,000

**Payback period:** 12 years

#### + 'Scuole 2.0' project

**Financing sources:** Fondazione

Bancaria "[Compagnia di San Paolo](#)"

**Total amount:** € 40,000 for the first 14 schools, € 350,000 for the extension to 150 schools



### CONTACTS

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