

# Net Zero Carbon Cities Building Value Framework



## *Case Study*

**Building:** San Mauro Torinese

**Company:** Enel X

**Location:** Turin, Italy

January 2022

In collaboration with Accenture

# Accelerating the transition to a greener built environment

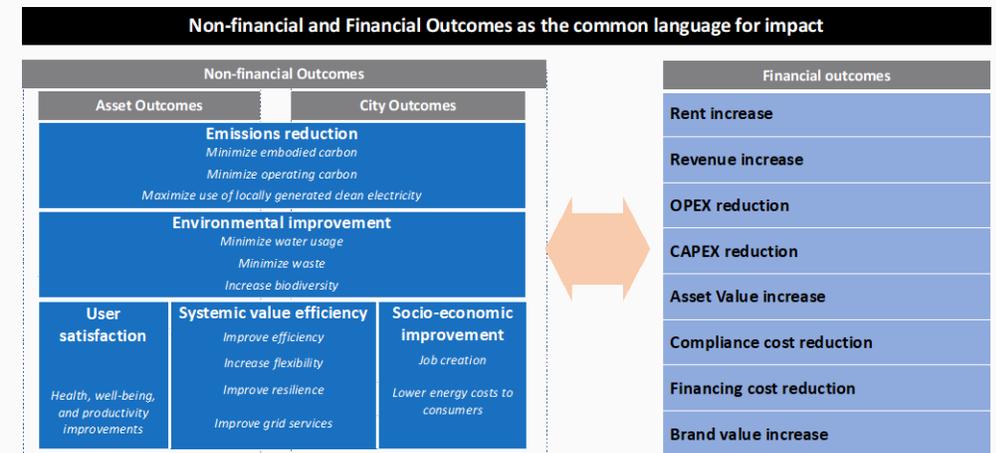
## About the Building Value Framework initiative

*The Building Value Framework has been developed in collaboration with World Economic Forum's stakeholders, multi-sector and cross-industry leaders from the building ecosystem, to accelerate flow of capital investment towards decarbonization of the urban built environment.*

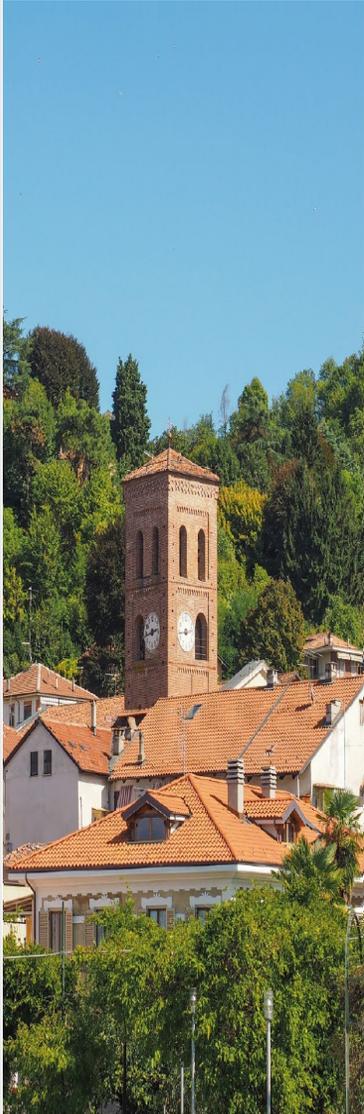
*The framework aims to shift how the value of decarbonization is perceived and defined by proposing a more holistic decision-making approach, which recognizes the importance of social and environmental outcomes and system performance. It guides decision-makers in linking holistic performance outcomes to traditional financial outcomes (e.g. improved tenant satisfaction increases rental value).*

*Case studies on new-construction and renovation/retrofit building projects were conducted to demonstrate and map how applying the BVF methodology can accelerate decarbonization while generating more value for project stakeholders.*

## The Building Value Framework



***[Click here](#) to learn more about the framework methodology, to read the briefing paper, and to find additional case studies.***



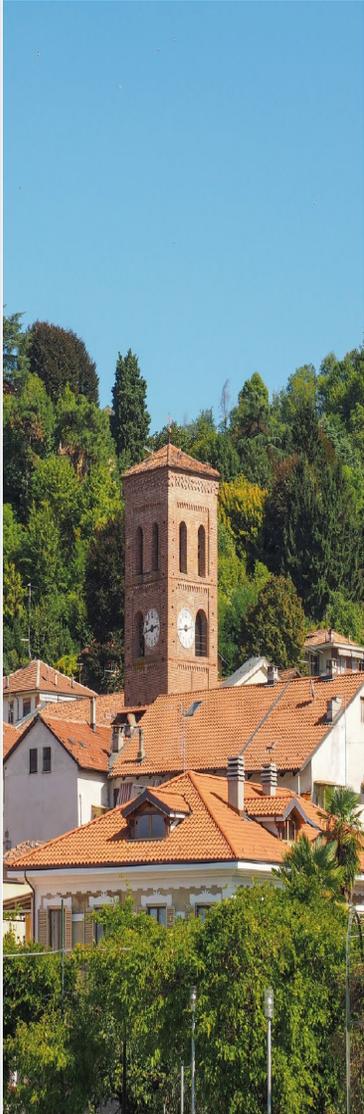
# Enel X helped its municipal client to optimize system performance and public service delivery

## Project background and vision

- Enel X delivered an integrated building project under a public-private partnership with the Municipality of San Mauro Torinese located in a temperate climate zone in Northern Italy
- The municipality aimed to digitalize and retrofit their portfolio of buildings incl. public offices, townhall and sport facilities while maintaining the historical architecture of the city
- The project's main objectives were to reduce municipal operating expenses and increase energy efficiency at both building and portfolio levels while maximizing the quality of life and public services for residents and city customers
- **Hybrid heating systems** and an **IoT platform**, alongside thermal insulation, PV panels and street lamp replacement (LED lighting), were some of the key technologies used

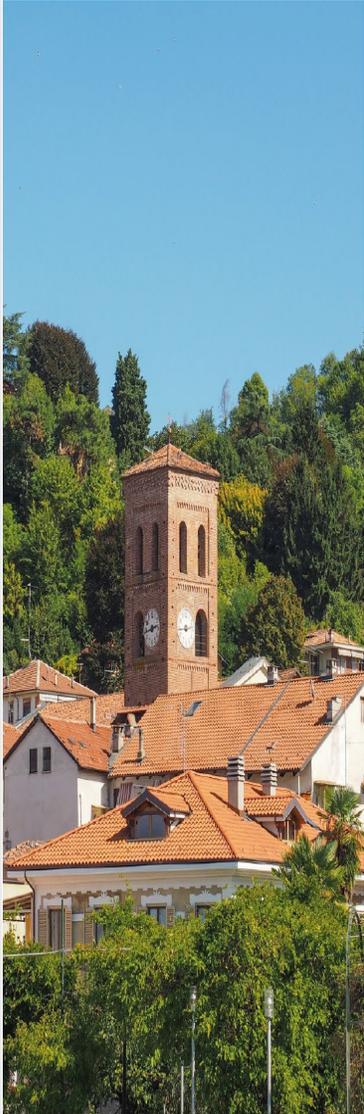
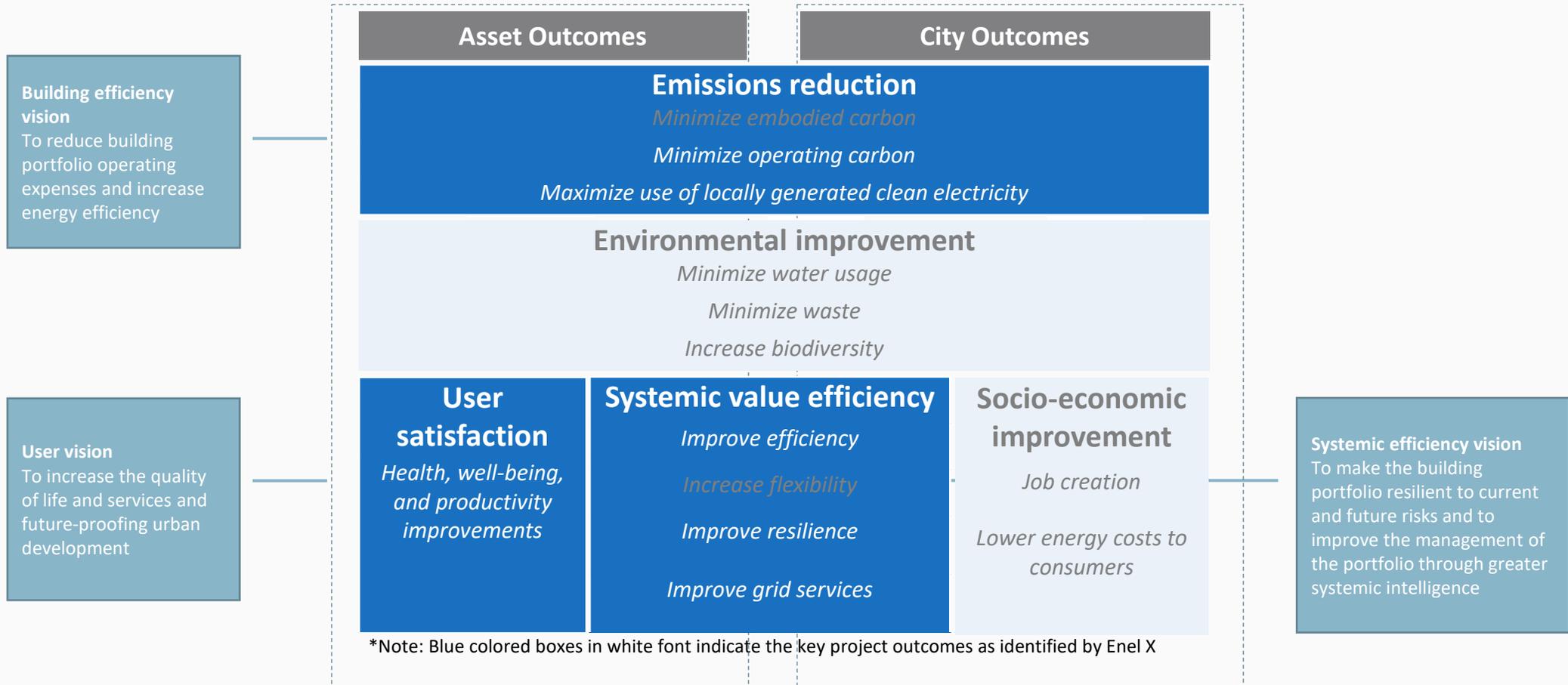
## Key investments to make the vision reality

Hybrid heating systems	IoT platform
 <ul style="list-style-type: none"><li>• Combination of ultra-efficient gas boilers, air-sourced heatpumps and micro co-generation plants with interventions at 17 buildings</li><li>• Building thermal insulation created an ideal internal temperature range to maximize efficiency of heat pumps. The gas boiler operates in certain temperature ranges to support heat pumps or serve as backup if exceptionally low outdoor temperature limits heat pump efficiency.</li></ul>	 <ul style="list-style-type: none"><li>• IoT Platform integrating various types of data sources incl. weather forecast, internal real time environmental data (temperature, humidity, etc.), hardware performance, and energy consumption</li><li>• Enables planning of time to reach temperature setpoints, as well as early detection of operating anomalies and system malfunction</li><li>• Assists in the management of 32 buildings</li></ul>



# Identifying outcomes that maximize the value of building investments

The framework brings together a set of holistic outcomes that optimize the value of building investments. Enel client's building, user and system vision resulted in achieving the following featured outcomes:



# Hybrid heating systems create user satisfaction and enable access to lower financing cost

Hybrid heating systems increase building energy efficiency, thermal comfort and resilience linking to public approval and constituent user satisfaction, as well as reduced financing and compliance cost

## Hybrid heating systems (Combination of gas boilers and air-sourced heat pumps)

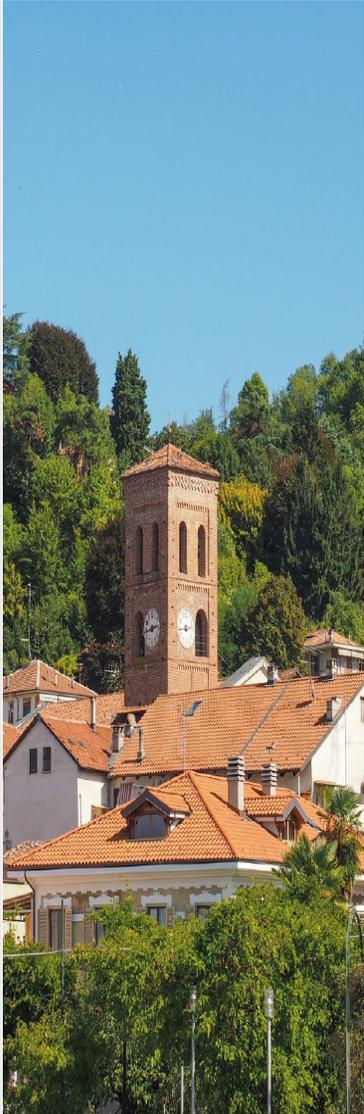
Non-financial Outcomes	
Asset Outcomes	
<b>Minimize operating carbon</b>	<ul style="list-style-type: none"> <li>Usage of electrified and more efficient heating as heat pumps cover bulk of energy usage</li> </ul>
<b>Health, well-being and productivity improvements</b>	<ul style="list-style-type: none"> <li>Increased heating performance enables higher thermal comfort at lower tenant energy cost</li> </ul>
<b>Improve resilience</b>	<ul style="list-style-type: none"> <li>Increased portfolio efficiency reduces grid load and risks of disruptions</li> </ul>



Financial Outcomes
✓ Rent increase
Revenue increase
✓ OPEX reduction
CAPEX reduction
✓ Asset Value increase
✓ Compliance cost reduction
✓ Financing cost reduction
✓ Brand value increase

Reaching certain energy efficiency targets is linked to compliance cost, and is subsidized by the national government for additional efficiency gains

Public user satisfaction resulting from investments are of highest priority to government. In this context, reputational value results from higher quality of service for constituents at affordable cost. The investments made increased thermal comfort through well-heated public indoor spaces, lower operating expenses and lower risk of service disruption



# IoT platform enables leap in tenant quality of life while building operating efficiency

Digitalization of the building portfolio increases efficiency of operations and maintenance and lower operating cost, while providing citizens with better services improves public approval

## IoT platform

### Non-financial Outcomes

#### Asset Outcomes

#### Minimize operating carbon

- Machine learning for smart regulation of heating activation time and level based on collected evidence from previous days combined with weather forecast
- Monitoring of consumption data

#### Health, well-being and productivity improvements

- Auto-diagnostic for early detection of malfunctioning for planned and combined maintenance interventions – reduces or prevents downtime and minimizes service disruption for citizens



### Financial Outcomes

Rent increase

Revenue increase

✓ OPEX reduction

✓ CAPEX reduction

✓ Asset Value increase

✓ Compliance cost reduction

✓ Financing cost reduction

✓ Brand value increase

Data-driven maintenance and operation of buildings and building equipment increases energy efficiency and reduces operating expenses. Furthermore reduces CAPEX and improves quality of service due to reduced downtime

Automation and digitalization of building operation and building services improves citizen experience and thermal comfort while freeing up resources and time for building managers to focus on high-priority tasks. The uplift in quality of life and services leads to significant gain in public approval for the municipality

