

**“Heat loss in buildings and sustainability.
Local approaches to global problems”**

Introduction

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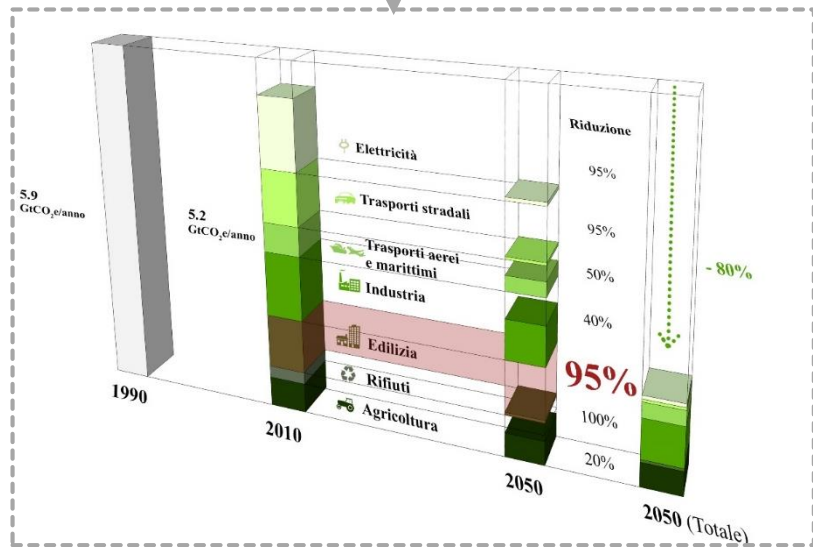
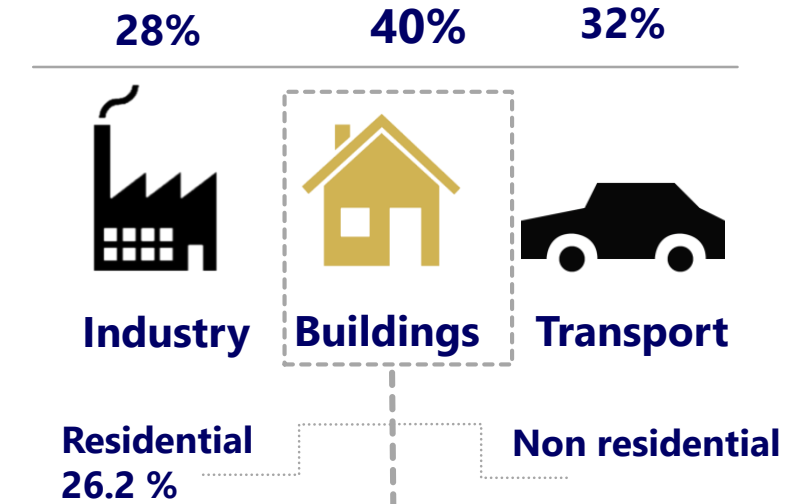
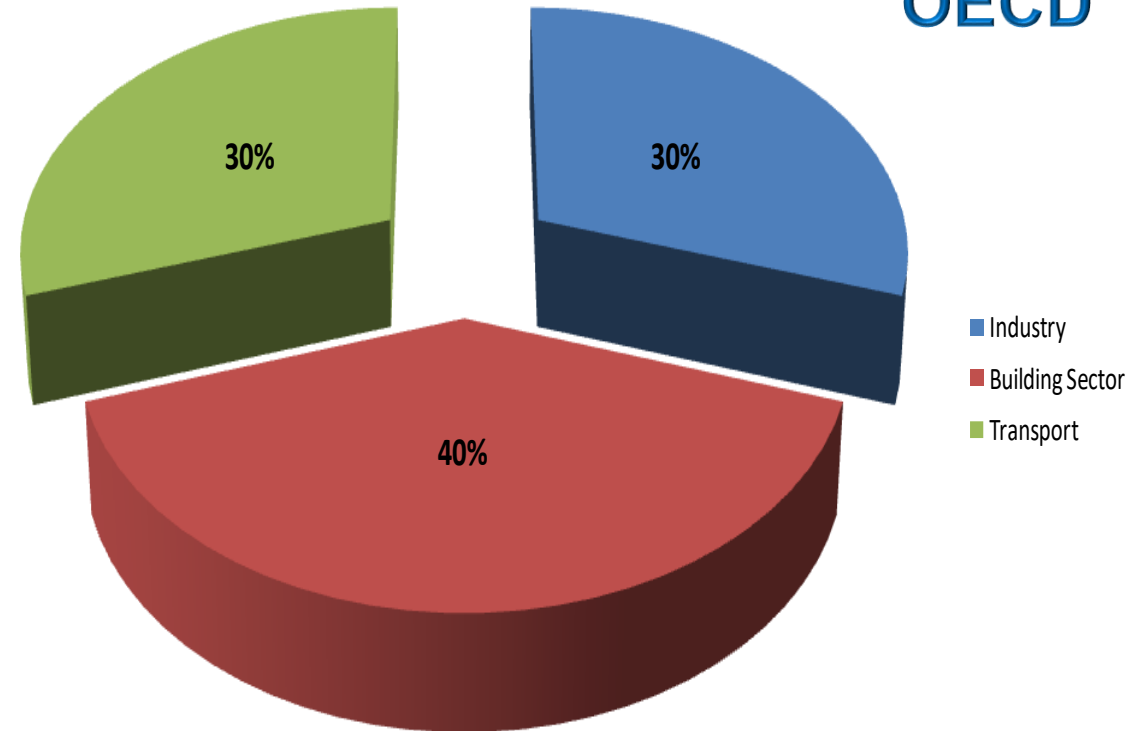
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Background

In many countries the building sector represents 40 % of the overall energy demand

➤ Buildings are the largest end users of energy

OECD

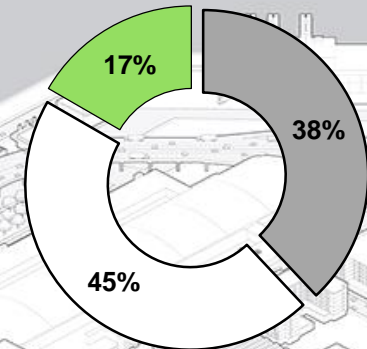


Background

• **~1%** is the new building per year
energy demand **30-50 kWh/m² year**

Building stock age in Europe

□ Pre 1960 □ 1961-1990 ■ 1991-2010



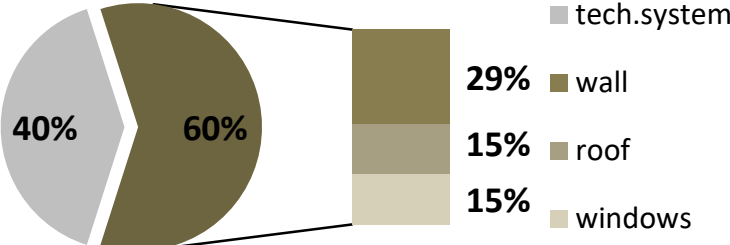
≈ 80% of the EU buildings were built before 1990

For existing buildings the energy demand is **150-250 kWh/m²**

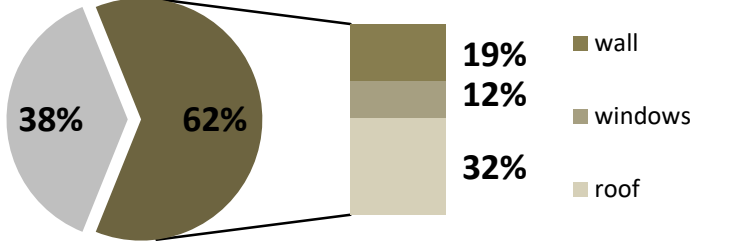
• Energy saving potential on existing buildings **> 60%**

Envelope retrofit in residential buildings accounts for ~60% of the energy saving potential

Residential multi-dwelling

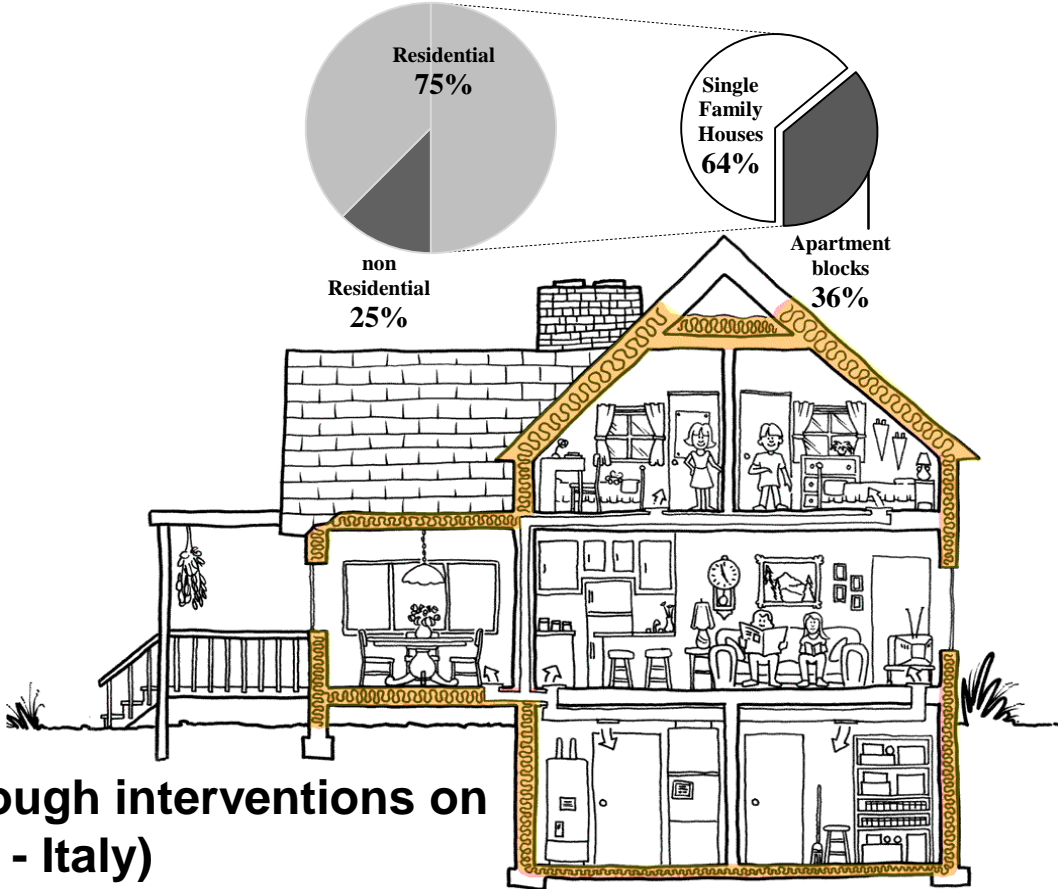


Residential single family



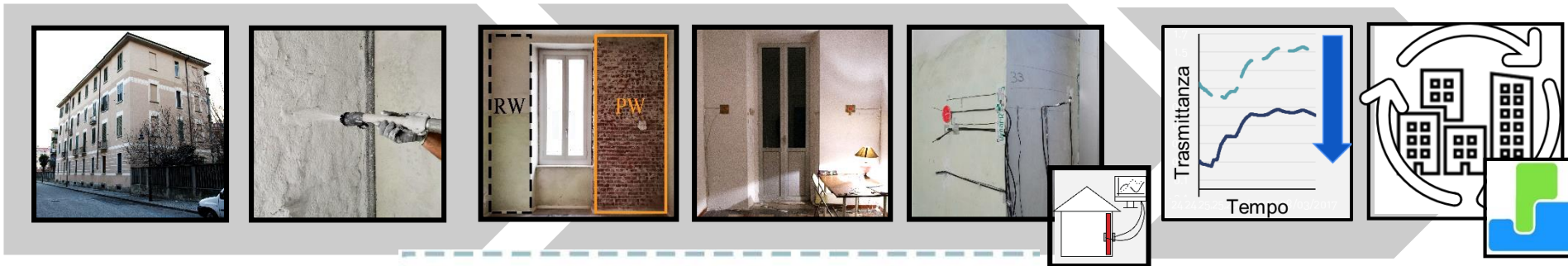
Energy demand reduction potential through interventions on residential buildings (partial renovation - Italy)

Residential building stock in EU



An example in Torino

Novel thermal insulating aerogel based plaster and other products

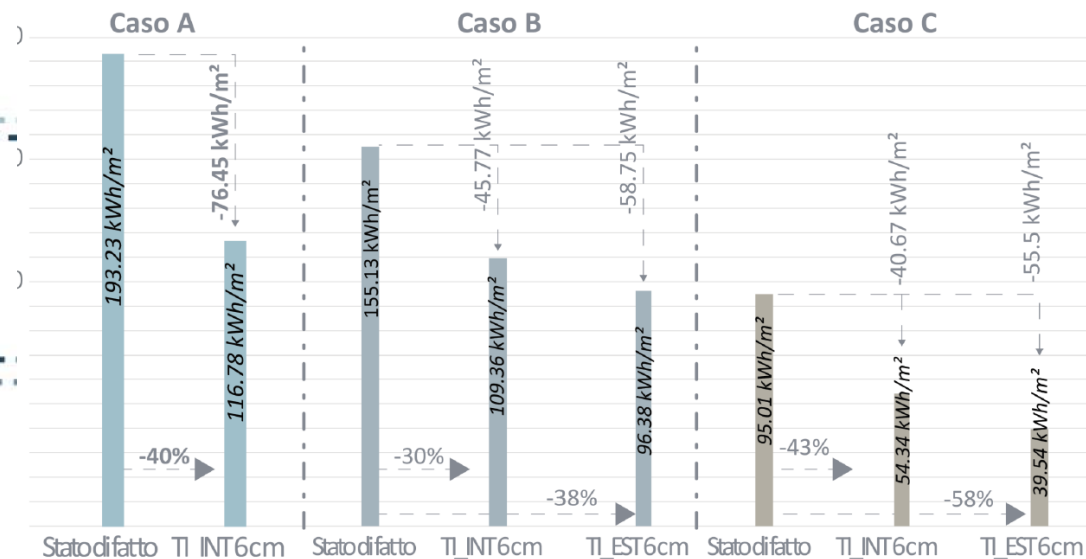


Simulation of selected case study building to assess the potential reduction of energy demand at neighbourhood scale

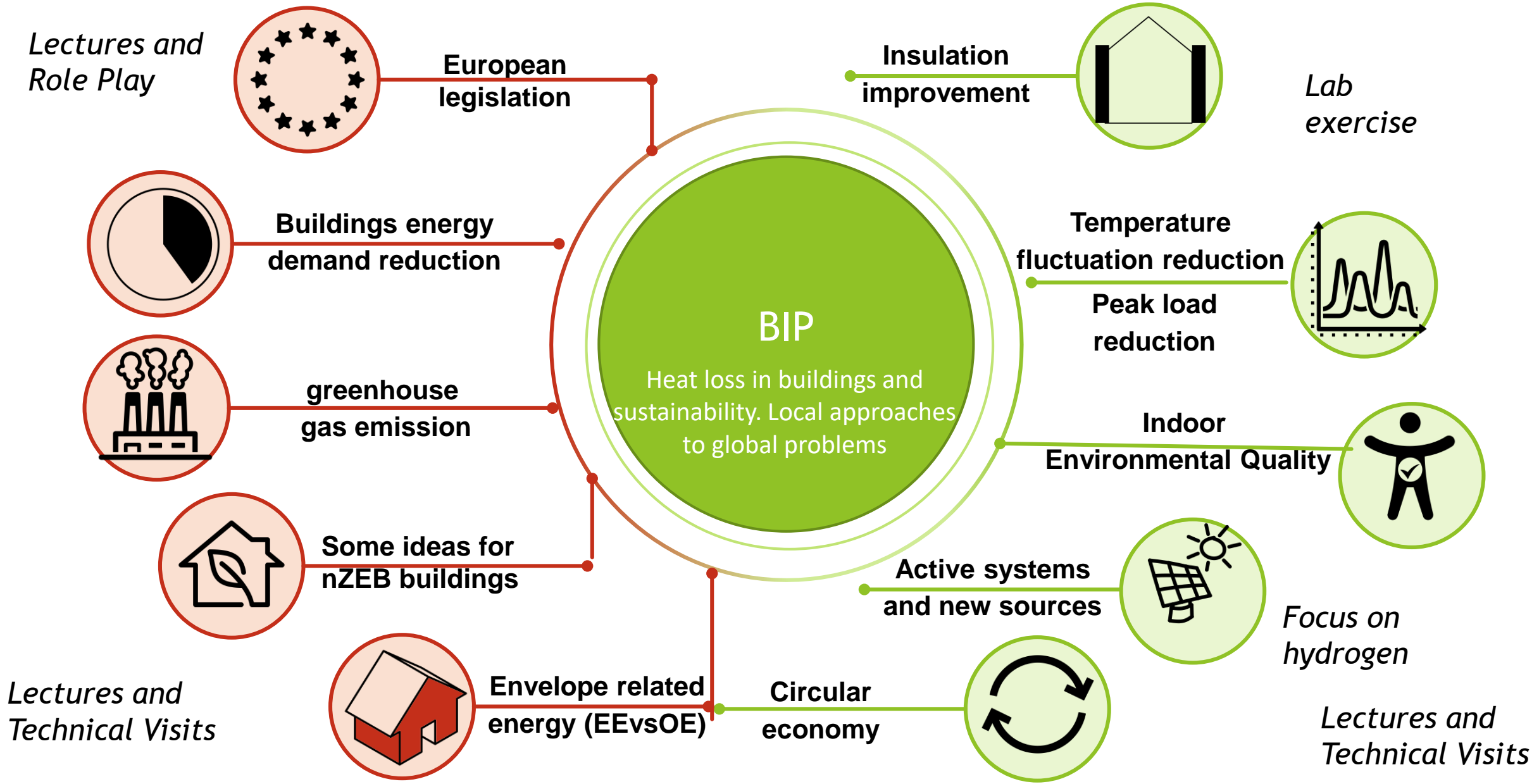
Caso A: Via Arquata			
Heating need [kWh/m ²]	Cooling need [kWh/m ²]	Total [kWh/m ²]	
193.23	13.23	206.46	
Area condizionata	Area vetrata	U chiusure	U fin
974.87 m ²	164 m ²	1.22 W/m ² K	5.73 W/m ² K

Caso B: Via delle Querce			
Heating need [kWh/m ²]	Cooling need [kWh/m ²]	Total [kWh/m ²]	
155.13	13.05	168.18	
Area condizionata	Area vetrata	U chiusure	U fin
1917 m ²	306 m ²	0.62 W/m ² K	4.45 W/m ² K

Caso C: Strada del Cascinotto			
Heating need [kWh/m ²]	Cooling need [kWh/m ²]	Total [kWh/m ²]	
95.01	11.52	106.53	
Area condizionata	Area vetrata	U chiusure	U fin
2675.3 m ²	314 m ²	0.57 W/m ² K	3.74 W/m ² K



In the course we/you will touch a number of issues....



ENJOY!