



ENERGY TRANSITION: POLICIES FOR BUILDINGS AND URBAN REGENERATION

PadovaFIT Expanded: Final Conference



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l'ambiente e le reti

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The Paris agreement: building sector role



Achieving the GHG emissions mitigation potential of the building sector is essential to limit global warming to $<2^{\circ}\text{C}$.

This means:

- **near or net-zero energy and energy-plus new buildings**
- **deep renovation of existing buildings**

However, there is still no mainstream demand for low-GHG emissions buildings. Available technical and financial resources are therefore not fully mobilized, despite the many effective technologies, materials and design concepts, and proven policy measures available.

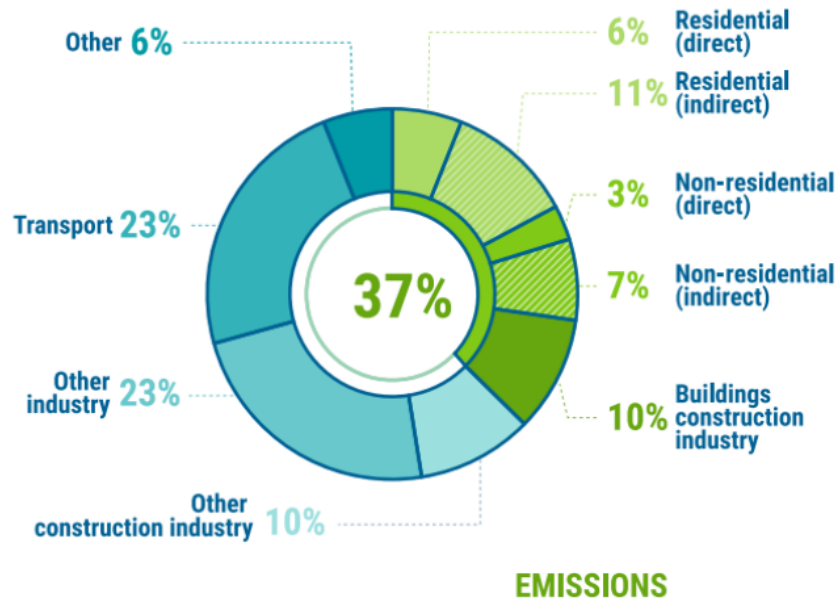
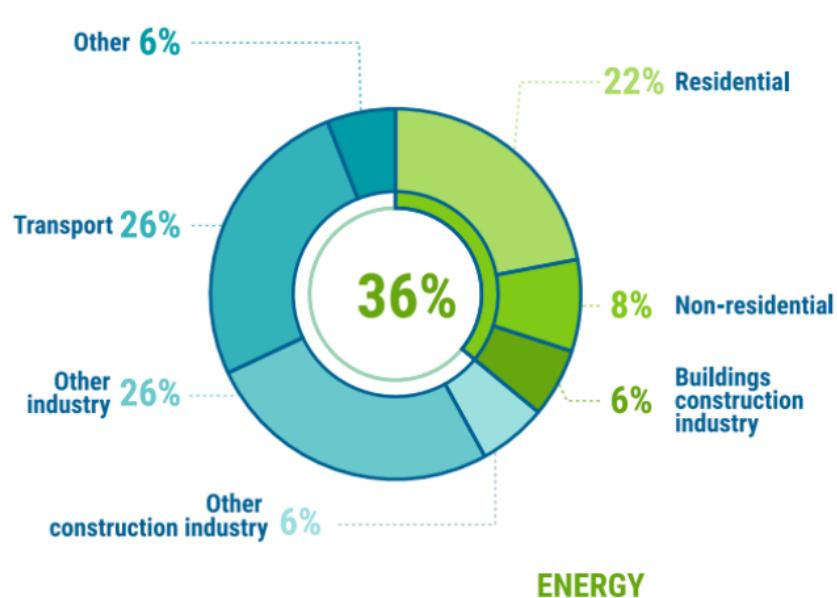


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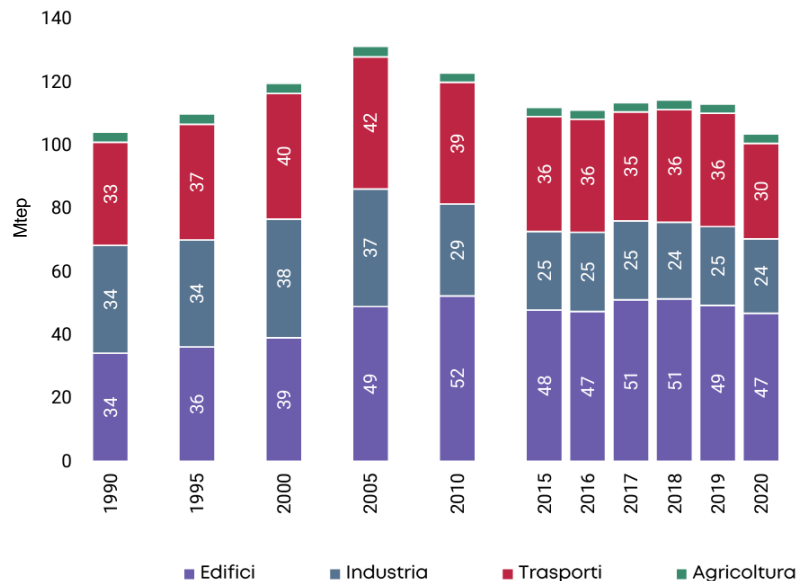
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Global building sector energy consumption and CO₂ emissions

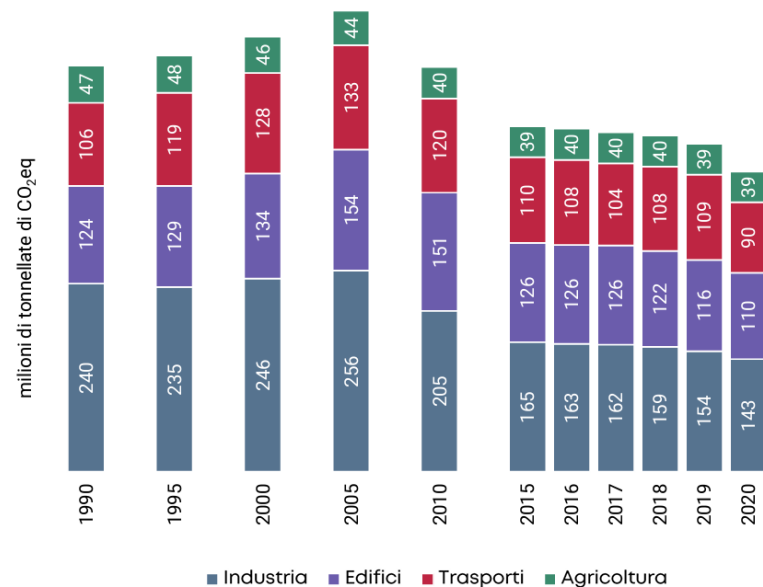


Italian building sector energy consumption and emissions

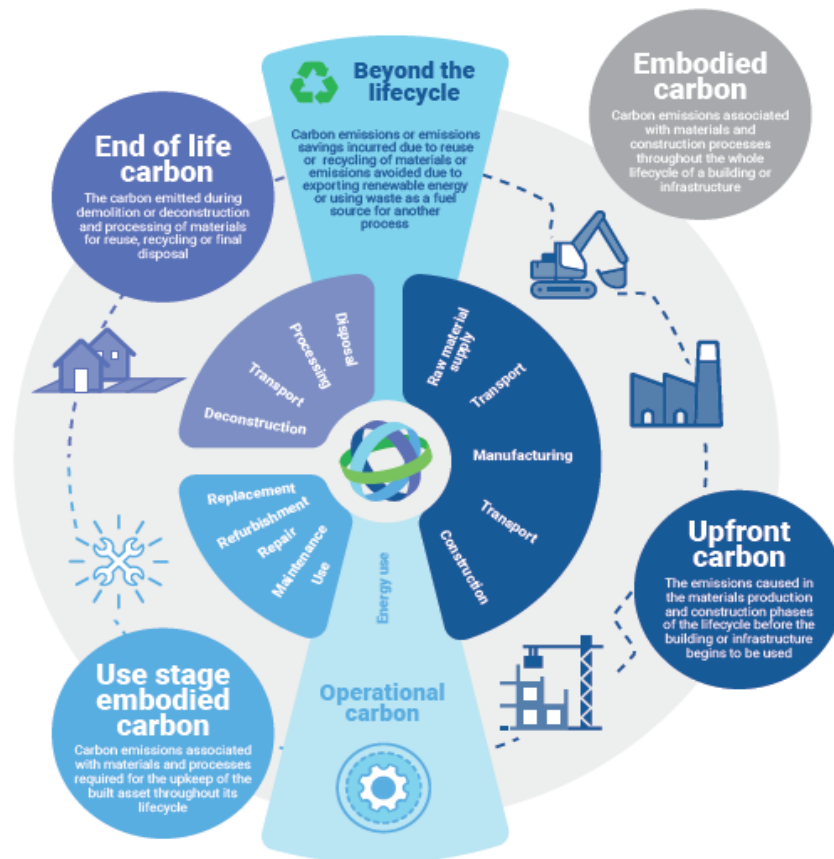
Energy consumption by sector (Mtep)



Emission by sector (CO₂-eq)



Embodied carbon emissions in buildings



Embodied carbon emission in buildings accounts for 11% of global emissions.



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Energy poverty

50 million households in the European Union experiencing energy poverty to various degrees and inadequate levels of essential energy services.

The surge in energy prices raised with Russia's invasion of Ukraine, along with the impact of the COVID-19 crisis, are likely to have worsened an already difficult situation for many EU citizens.

Three most commonly identified **causes**:

- Low income levels,
- Low **energy performance of buildings**,
- High energy prices

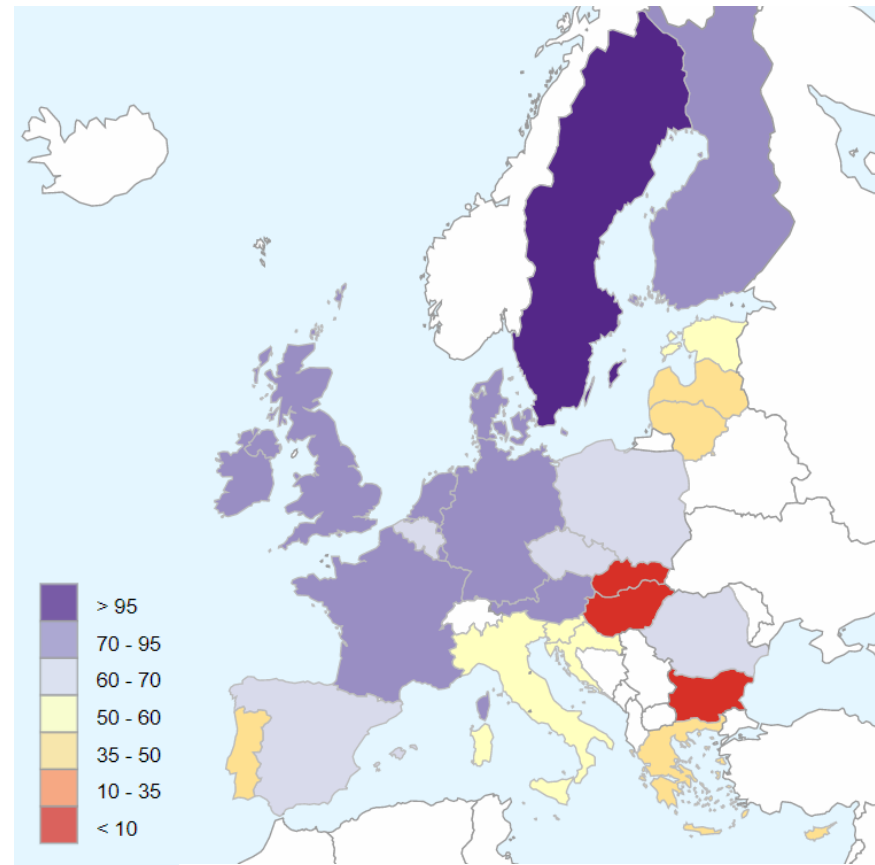


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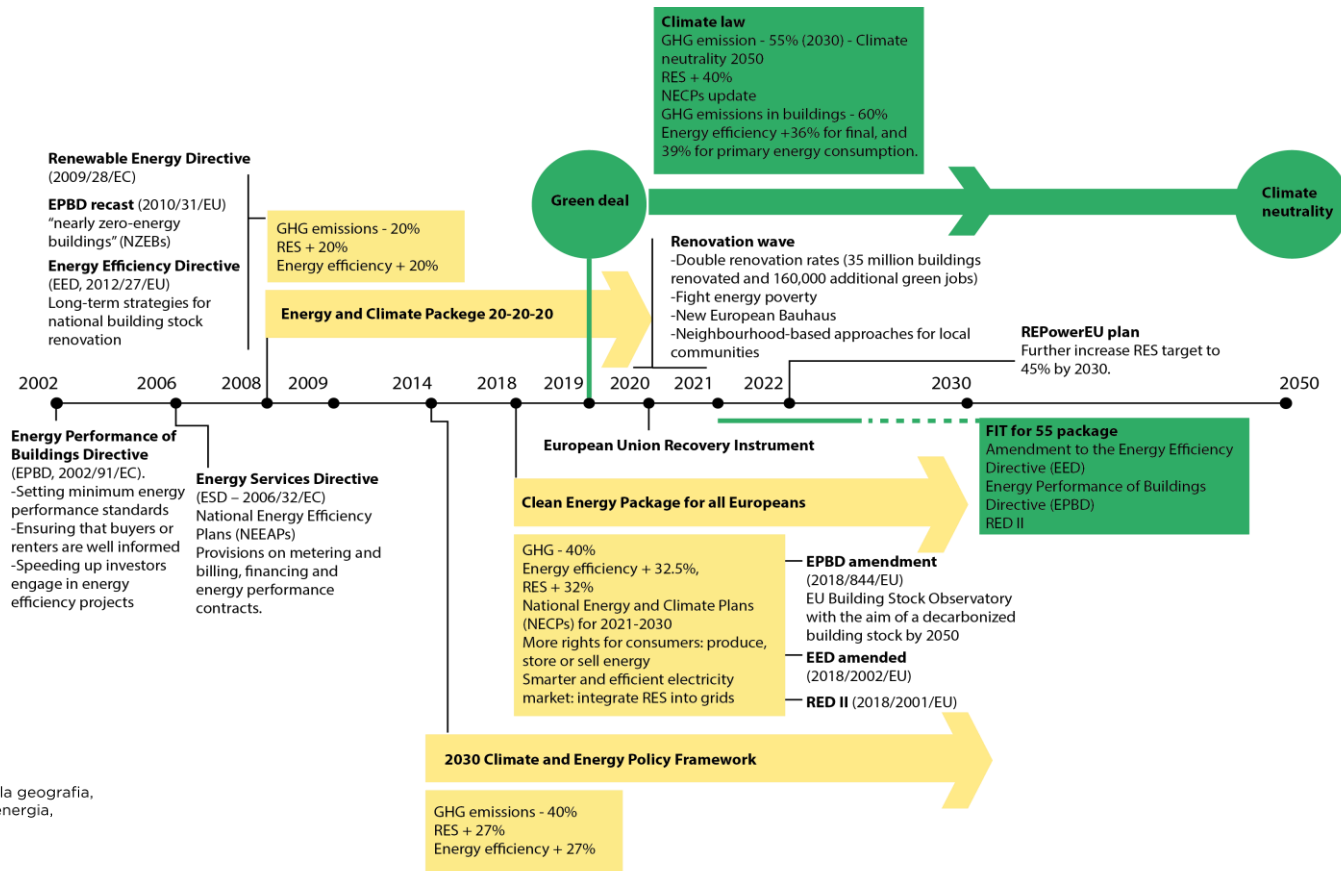
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European Domestic Energy Poverty Index (EDEPI, 2022)



EU regulatory framework – Buildings focus

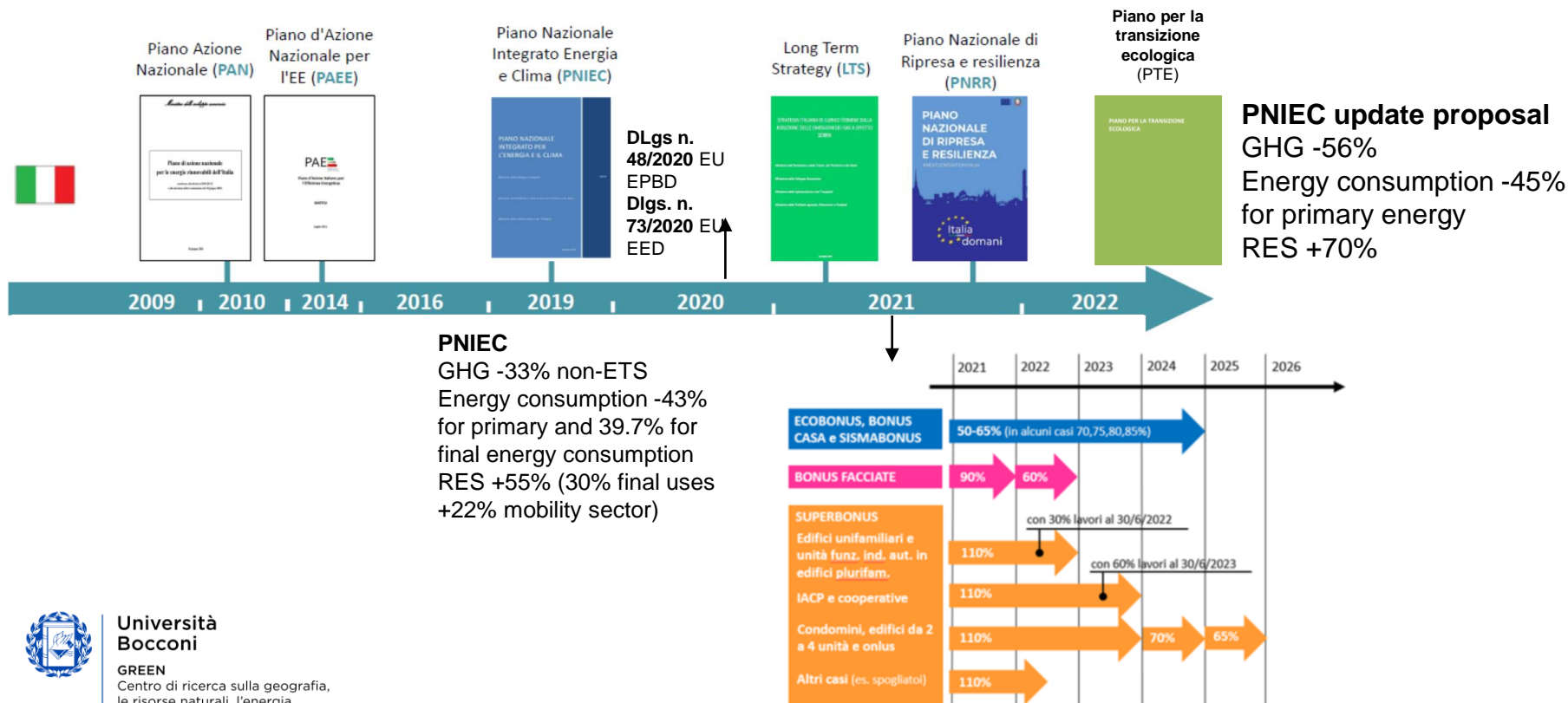


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Italian regulatory framework – Buildings focus



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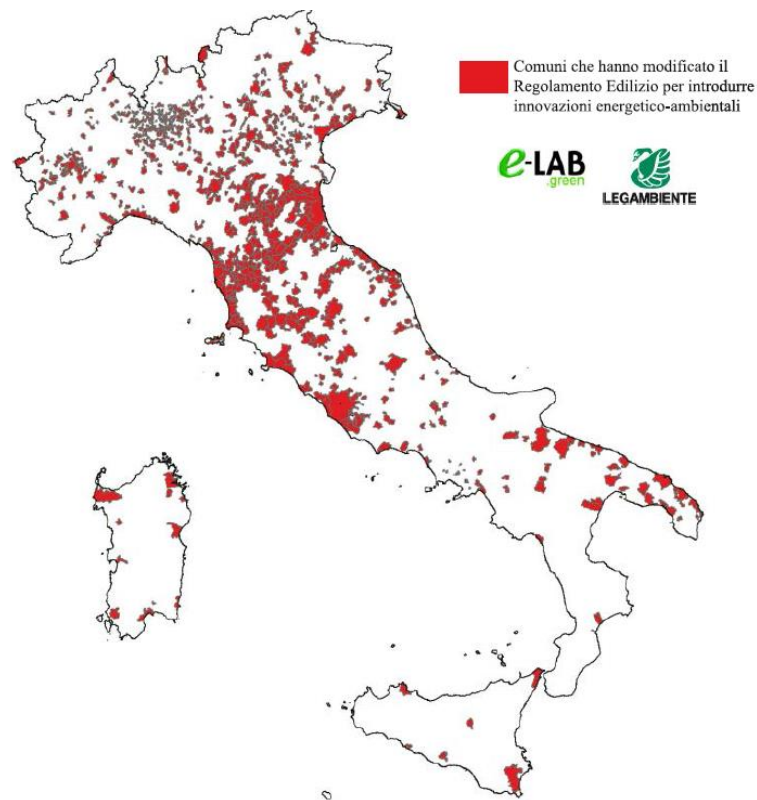
Building codes

Building codes represent a key tool to guide energy transition in the building sector.

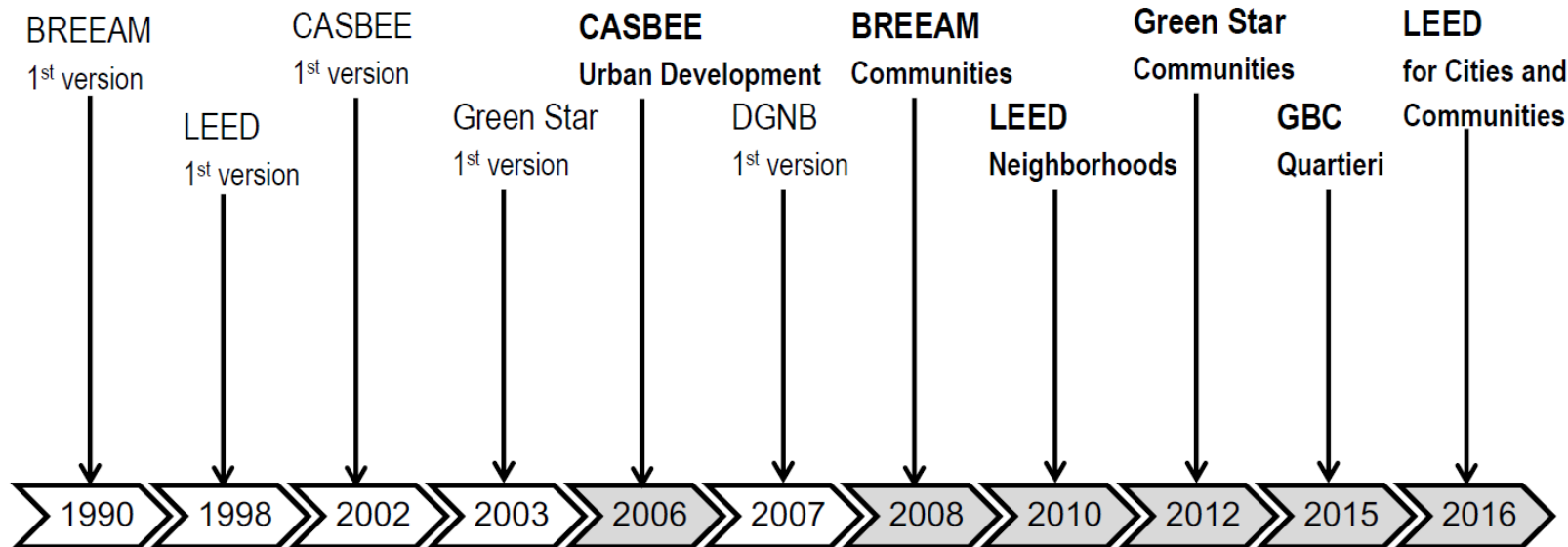
In Italy about 15% of Municipalities have introduced **sustainability and energy performance parameters** in building codes.

Member States shall also introduce measures in their building codes to **increase the share of all kinds of energy from renewable sources** (RED II), including **minimum requirements for the use of RES** in new and renovated buildings.

In 2016, the Joint Conference (State, regions, autonomous provinces and local authorities) approved the **National Building Code Scheme**, including a “unique vocabulary” valid for all local authorities. Local authorities can integrate the scheme with their own measures, for example in the field of energy performance or materials.



Green buildings rating and certification systems

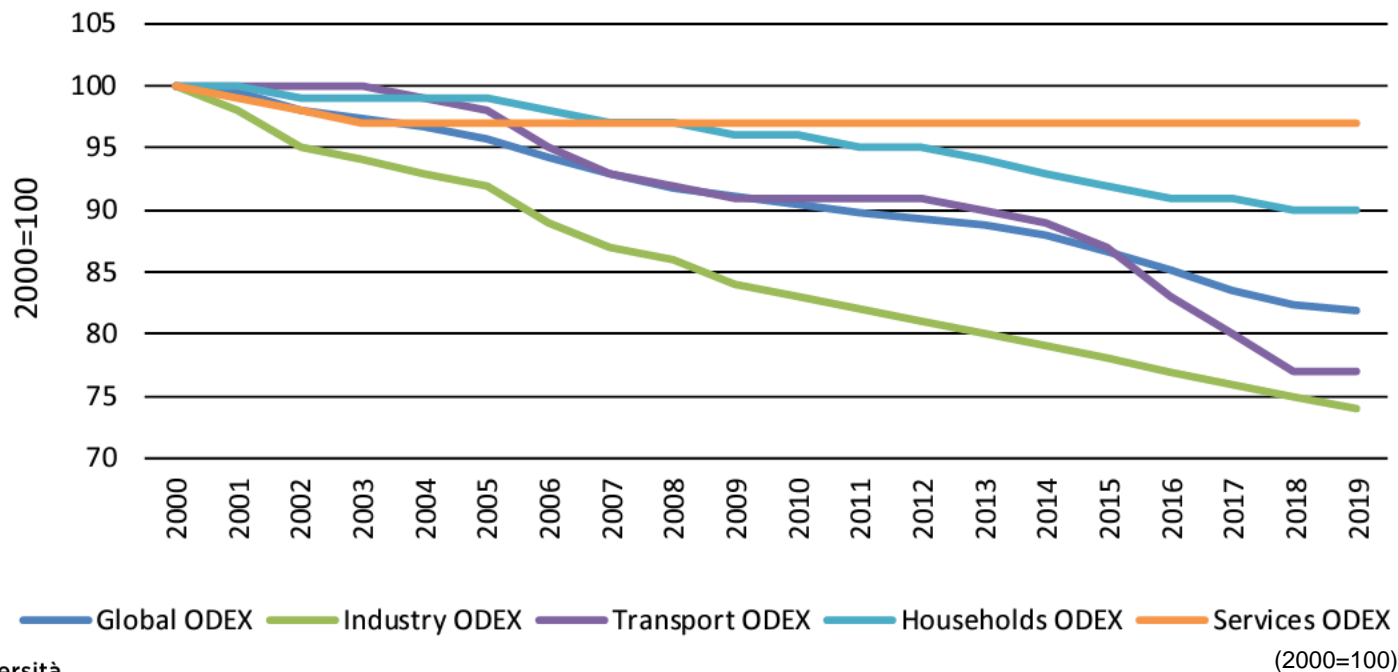


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Energy efficiency index - ODEX index – in Italy

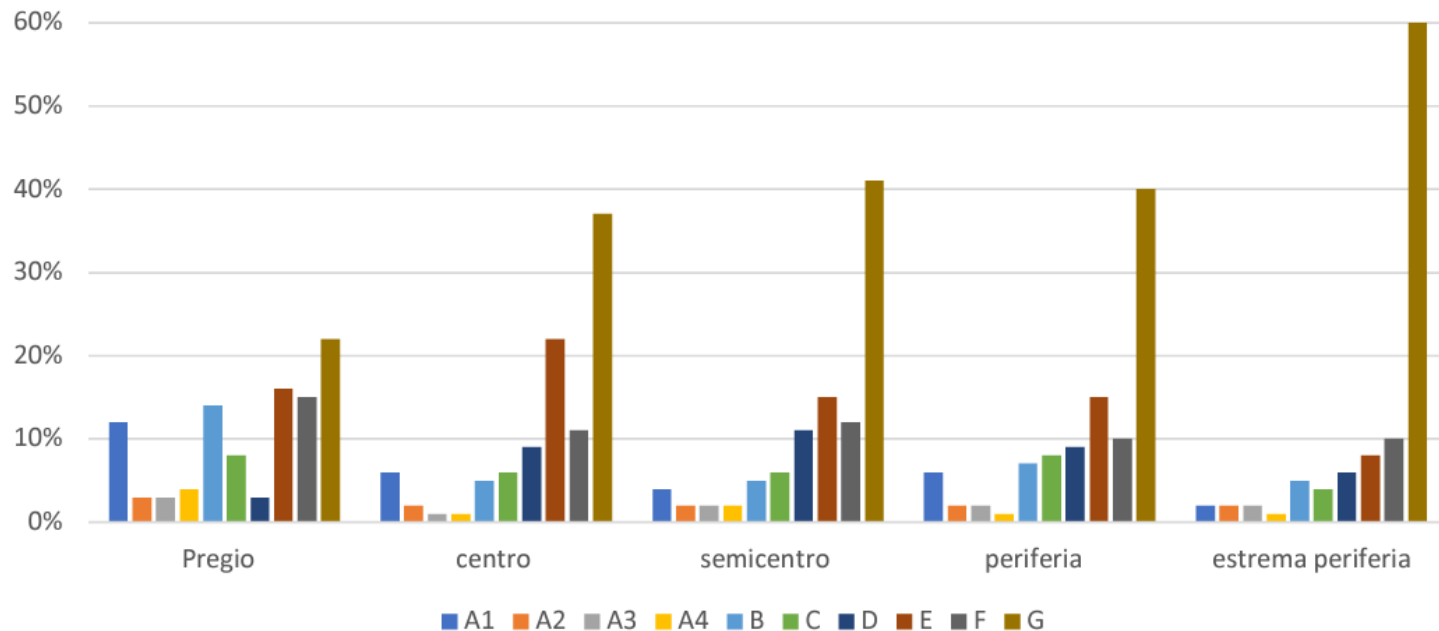


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Real estate transactions in Italy by energy performance and location



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Barriers to energy efficiency in the building sector

Building sector barriers

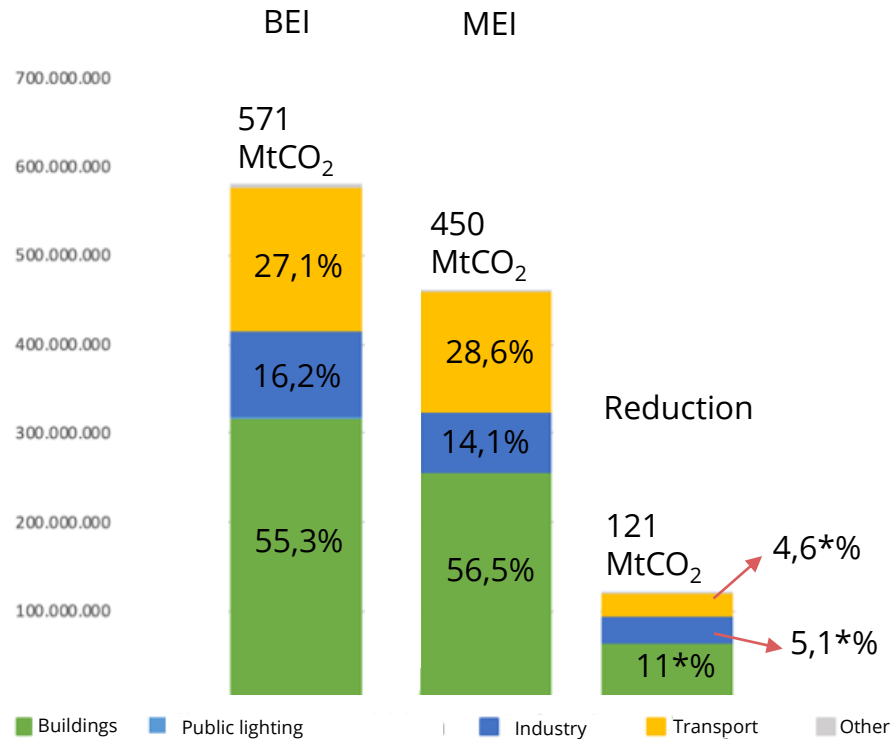


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CO2 emissions and reductions obtained with the implementation of SEAPs in Europe



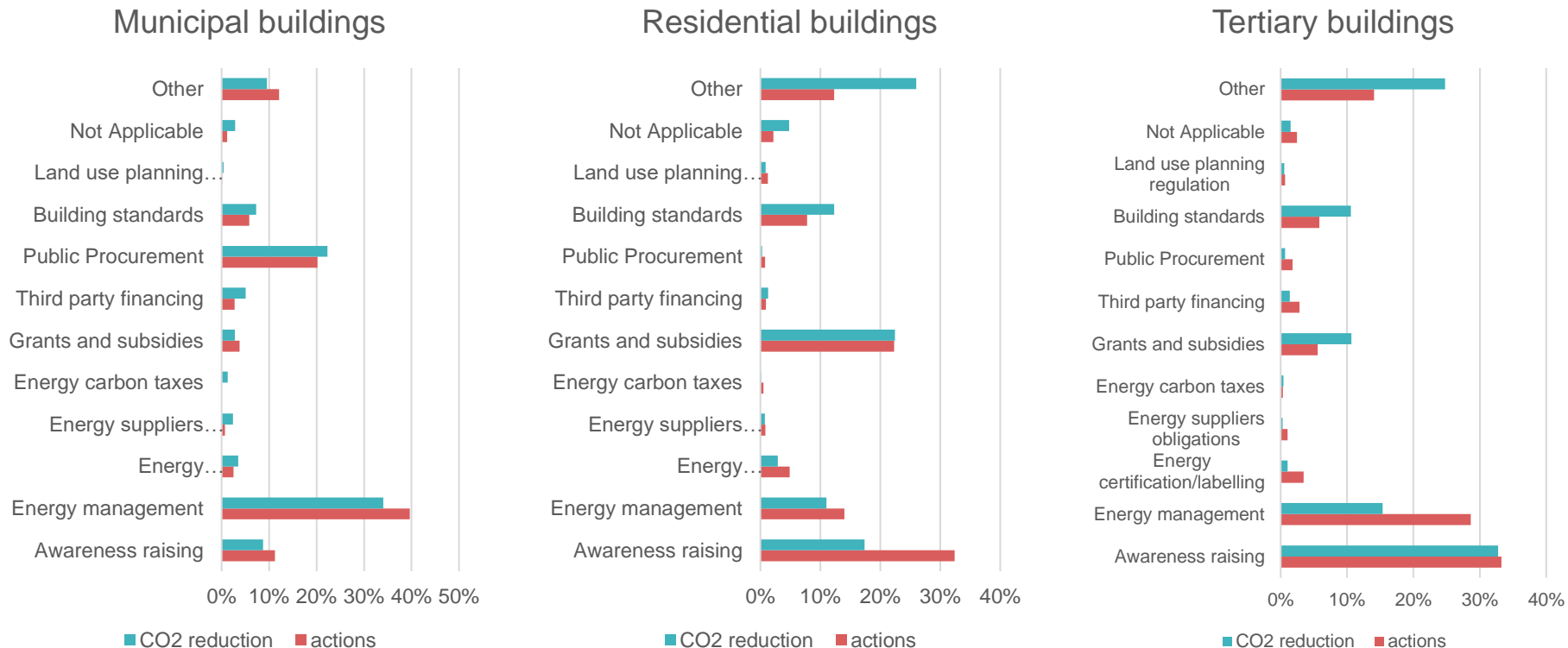
*% of reduction on total emissions of BEI



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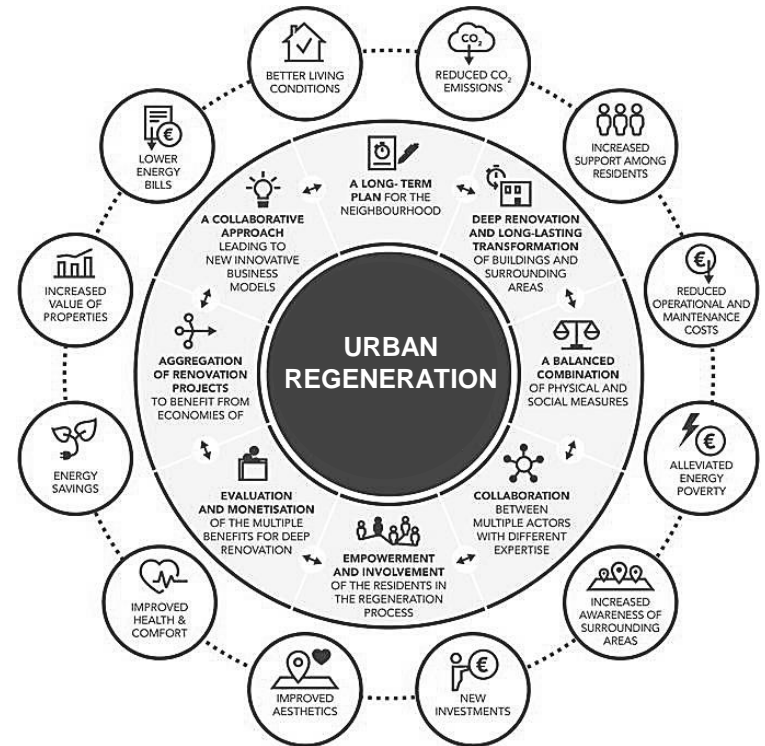
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Policy instruments used in the building sector



From buildings renovation to urban regeneration

Urban regeneration – often synonymous with urban renewal, urban redevelopment, or urban revitalization – generally indicates a **multiscale and multifunctional process** that involves the retrofit of existing infrastructures and **buildings**, the rehabilitation of districts and sites, and/or the restoration of urban land, involving communities, as well as sociocultural infrastructures, at different stages of the planning, decision-making, design, and implementation process (Andreucci, 2021).



Urban regeneration values

ECONOMIC VALUE

INCREASE VALUE OF PROPERTIES

- **Property price growth by 30%** after regeneration (UK, 2014-2019)
- **House prices** within a 750-metre radius of a regeneration zone **grow faster** than the wider market, **by up to 3.6% per annum on average** (London, 2018)
- The average **rent of houses** that have seen **substantial regeneration increases by 21%** (UK, 2014-2019).
- **+20% market value** of **BREEAM** certified buildings
- **+20% market value** thanks to **green areas proximity** (Greater London Authority, 2010)

ENVIRONMENTAL VALUE

REDUCE EMISSIONS ENERGY CONSUMPTION and INCREASE AIR QUALITY

- **34% energy reduction and 50% CO2 reduction** through low energy districts, smart mobility and ICT solutions (Valladolid, Tepebaşı, Nottingham)
- **53% CO2 reduction per year after home renovation** (Chen et al, 2021)
- **30% decrease in levels of ultra-fine particles** by switching on-street with green areas (Copenhagen).
- Enhancing building use and reusing materials **reduce emissions in the construction chain by 26% in Milan** (ENEL, GREEN et al, 2021)

SOCIAL VALUE

REDUCE ENERGY POVERTY

- **70% decrease in energy costs** for the residents (Porto)

INCREASE QUALITY OF LIFE AND HEALTH CONDITIONS

- **10% in green space increase** is associated with diseases reduction, equivalent to an **increase of five years of life expectancy** (EEA)

INCREASE PEOPLE EMPOWERMENT AND INVOLVEMENT

- **50% of house stock destined to affordable and social housing** (London)

54 billions form the Italian NRRP with impacts on urban regeneration

Mission		Componente	Risorse
1	Digitalizzazione, innovazione, competitività, cultura e turismo	Digitalizzazione, innovazione e sicurezza nella PA	10,6 mld
		Digitalizzazione, innovazione e competitività nel sistema produttivo	
		Turismo e cultura 4.0	
2	Rivoluzione verde e transizione ecologica	Agricoltura sostenibile ed economia circolare	16,2 mld
		Transizione energetica e mobilità sostenibile	
		Efficienza energetica e riqualificazione degli edifici	
		Tutela del territorio e della risorsa idrica	
3	Infrastrutture per la mobilità sostenibile	Rete ferroviaria	0,2 mld
		Intermodalità e logistica integrata	
4	Istruzione e ricerca	Potenziamento dell'offerta di servizi	12,2 mld
		Dalla ricerca all'impresa	
5	Inclusione e coesione	Politiche per il lavoro	10,8 mld
		Infrastrutture sociali, famiglie, comunità	
		Interventi speciali per la coesione territoriale	
6	Salute	Reti di prossimità, assistenza sanitaria territoriale	4,6 mld
		Innovazione, ricerca e digitalizzazione	
Università Bocconi		PNRR impatti diretti/indiretti sulla rigenerazione urbana	54,6 mld



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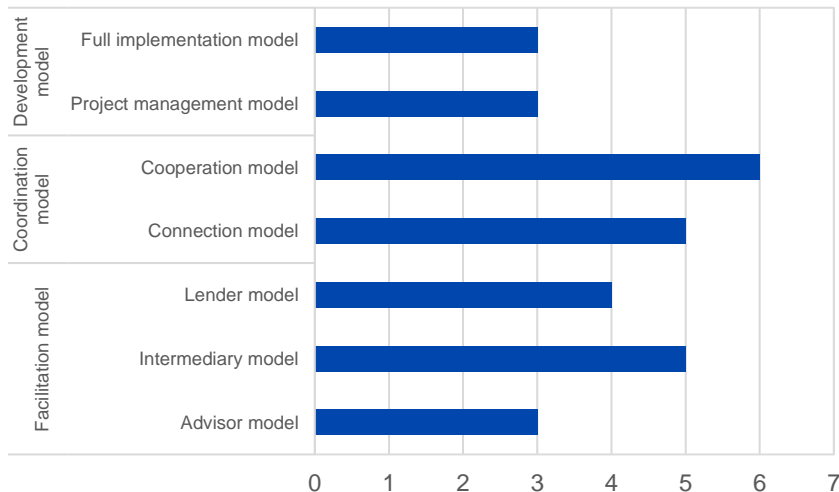
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M5C2.2 Urban regeneration and social housing: 9 billions

Bocconi contribution in PadovaFIT Expanded One-Stop-Shop business modelling

3 BUSINESS MODEL archetypes and 7 subcategories

1. Facilitation model
2. Coordination model
3. Development model



Journal of Cleaner Production

Volume 331, 10 January 2022, 129990



Boosting energy home renovation through innovative business models: ONE-STOP-SHOP solutions assessment

Annamaria Bagaini , Edoardo Croci , Tania Molteni

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