

Assessing the impact of building renovation  
actions at the local scale:

**BUILD UPON<sup>2</sup>**

A multi-level energy renovation Impact  
Framework

#BUIL DUPON





# Main objective

The project aims at supporting Public Administrations in guiding the decarbonization of the building stock at 2050 by the definition of **a multilevel impact framework to assess the impact of local renovation actions to national LTRS's objectives**

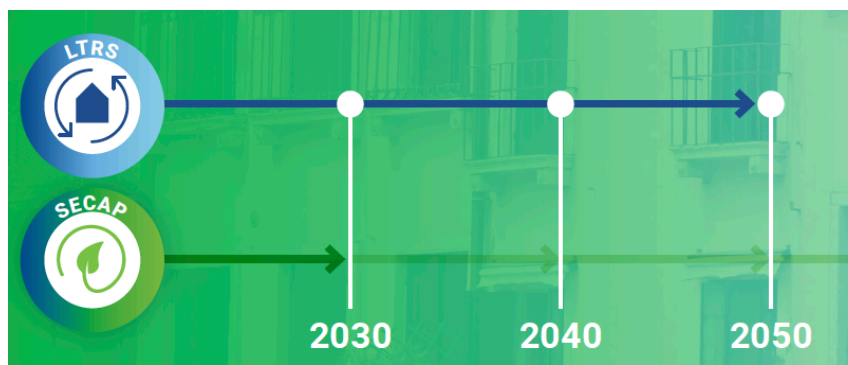
Long-term  
renovation  
strategies

**2020**

EPBD  
(Art 2a)



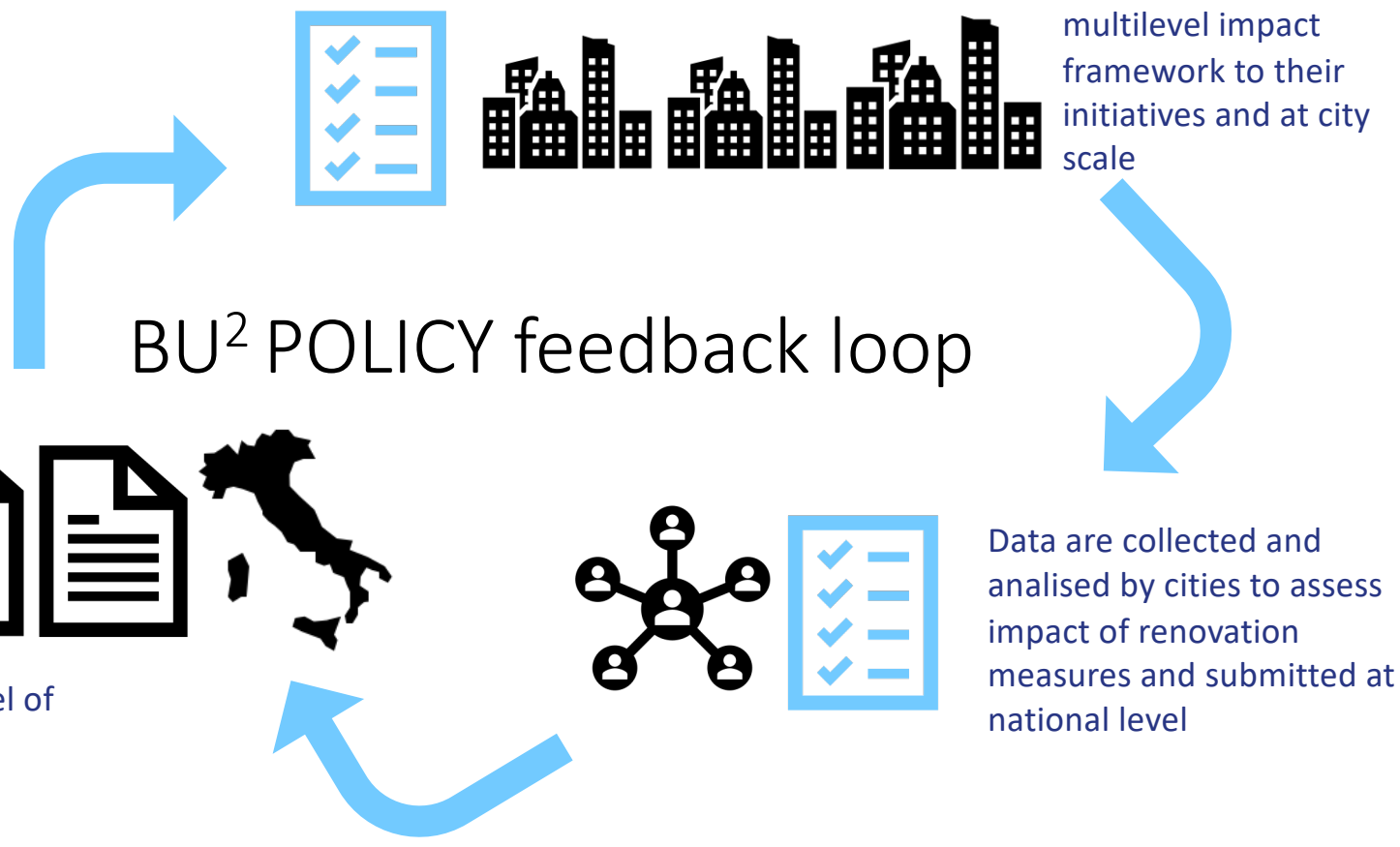
# Aligning objectives at different government levels and with SECAPs



• BUILD UPON<sup>2</sup>

## CONCEPT

Cities are provided  
with new and more  
efficient policy  
objectives







**SUSTAINABLE  
PLACES 2020**

October 27-30, 2020  
Digital Event

[HTTPS://WWW.GBCITALIA.OR  
G/WEB/GUEST/BUILD-UPON-2](https://www.gbcitalia.or<br/>g/web/guest/build-upon-2)

# BUILD UPON<sup>2</sup> supports cities with strategies and solutions for scaling renovation

#BUILDUPON

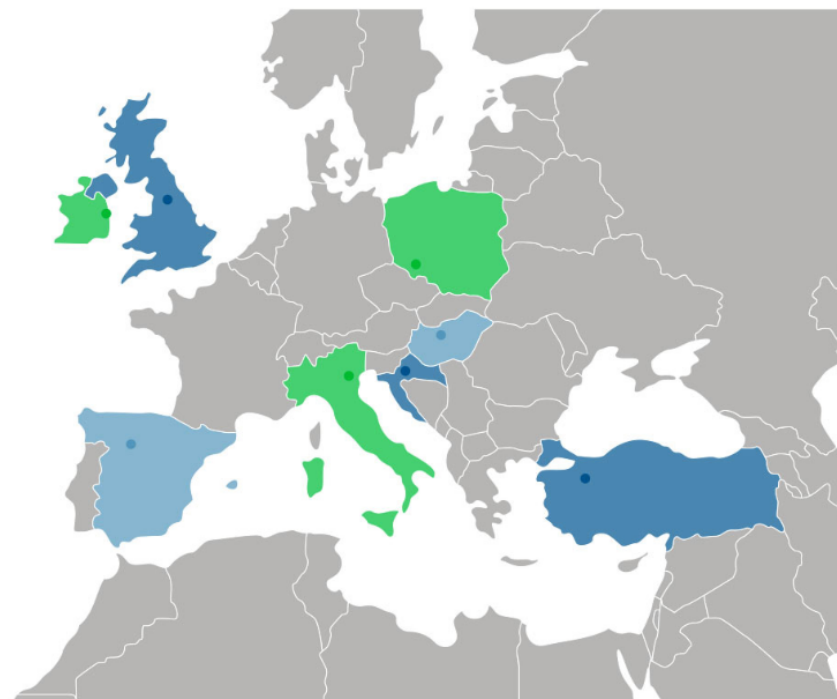




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# Our pilot cities

- Velika Gorica, Croatia
- Budaörs, Hungary
- Dublin, Ireland
- Padova, Italy
- Wroclaw, Poland
- Valladolid, Spain
- Eskişehir, Turkey
- Leeds, UK



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# Project partners







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# Who we work with

EU



Croatia



Hungary



Ireland



Italy



Poland



Spain



Turkey



UK





# The Italian steering group

## Pilot city:

- Padova

## Follower city:

- Brescia
- Pesaro
- Roma

### Italy National Steering Group



**ENEA**  
Alessandro Federici



**ISTITUTO SUPERIORE  
SANITÀ**  
Gaetano Settimo



**ISPRA AMBIENTE**  
Alfredo Pini



**POLITECNICO DI  
TORINO**  
Roberto Pagani



**PROVINCIA AUTONOMA  
DI TRENTO**  
Sara Verones



**COMUNE DI  
PADOVA**  
Daniela Luise



**UNIVERSITÀ  
BOCCONI – IEFE**  
Edoardo Croci



**EDISON**  
Paolo Quaini



**EDISON**  
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**RETE IRENE  
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Virginio Trivella



**SINLOC SRL**  
Andrea Martinez



**UNIVERSITY OF  
ARKANSAS ROMA**  
Francesco Bedeschi



**GBC ITALIA**  
Marco Caffi



**GBC ITALIA**  
Marco Mari



**GBC ITALIA**  
Valentina Marino

# BU<sup>2</sup> Framework's structure

SDGs and EU  
priorities

National  
objectives  
and LTRS  
targets

Local  
objectives  
and targets





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# BU<sup>2</sup> Framework's structure

Environmental indicators

Social indicators

Economic indicators

# Environmental indicators at local scale

## GOAL - which contribute to EU targets

## MUNICIPAL - Progress Indicators

ENVIRONMENTAL	Greenhouse gas emission reduction: 50% by 2030 compared with 1990 level and carbon neutrality by 2050 <i>Source: EU Green Deal</i>	Reduction in direct annual CO2 emissions from <b>renovation</b> compared to the municipality's baseline year as per CoM reporting - P - T - R
	At least 32.5% improvement in energy efficiency by 2030 relative to the 2007 modelling projections for 2030. <i>Source: Energy Efficiency Directive (2018/2002)</i>	Final energy consumption reduction from renovation - P - T - R
		Improvement in <b>Net Space Heating &amp; Cooling Demand</b> due to energy <b>renovation</b> - P - T - R
		Total annual energy <b>renovation rate</b> % - P - T - R > Of which <b>light renovation</b> > Of which <b>medium renovation</b> > Of which <b>deep renovation</b>
	At least 32% share of <b>renewable energy</b> by 2030 <i>Source: Renewable Energy Directive (2018/2001)</i>	% of renovated buildings reaching <b>nZEB standard</b> annually - P - T - R % of the total floor area of buildings owned and occupied by the municipality retrofitted each year - M Total additional energy produced from <b>renewable</b> resources on site or nearby as a result of <b>renovation</b> - P - T - R

# Social indicators at local scale

## SOCIAL

Reduction of **energy poverty** - R - SH

% of households having arrears on utility bills - R - SH

Provide safe buildings to people (**Indoor Air Quality** and **Thermal Comfort**)

# households living in renovated dwellings with commissioned ventilation system - R - SH

# non-residential renovated buildings with a commissioned ventilation system - M - T

# households living in renovated dwellings where EPC demonstrates that post renovation condition will satisfy heating requirements - R - SH

# households living in renovated dwellings where actions have been taken to minimise summer overheating risk - R - SH

# non-residential renovated buildings where EPC demonstrates that post renovation condition will satisfy heating requirements - T - M

# non-residential renovated buildings where actions have been taken to minimise summer overheating risk - T - M

Empowering citizens - Ensuring citizens are at the centre of the transition

# private households retrofitting their homes / year - R

# sq. m<sup>2</sup> commercial buildings retrofited annually - T



# Economic indicators at local scale

## ECONOMIC

Increasing **investment in energy renovation**

- > Total annual **investment in energy renovation** - R - SH - M - T
- > Total annual **public investment in energy renovation** (of which % directed to renovating public building and % invested in grants/subsidies) - R - SH - M - T
- > Total annual **private investment in energy renovation** - R - SH - M - T

Increasing number of **people directly working on energy renovation**

- # **companies involved in energy renovation** - T- R-SH - M
- # **graduates from 3rd level courses and technical training courses with focus on energy renovation** - T- SH - P - M
- # **building professionals and construction workers taking part in energy renovation upskilling** - T - SH - M - R
- > of which # **Municipality staff upskilling in energy renovation**



## ► 8 National reports on the analysis of data availability to use the indicators of the Framework

8 GBCs analysed data availability at national and local level for each core indicator of V2 and V3 of the Framework

A reference table is provided to highlight difference between V3 and V4 indicators

Data availability was ranked as:

- Available
- Partially Available
- Non-Available

A short SWOT Analysis highlights barriers and strenghts for each country



## Overview of data collected at national and local level

### National level:

Category	Indicator	Croatia	Hungary	Ireland	Italy	Poland	Spain	Turkey
Environmental	Reduction in direct annual CO2 emissions from renovation compared to 1990 levels - P - T - R	✓	✗	✗	✗	✗	✗	✗
	Final energy consumption reduction from renovation - P - T - R	✗	✗	✗	✓	✗	✗	✗
	Improvement of Net Space Heating & Cooling Demand due to energy renovation - P - T - R	✗	✗	✗	✗	✗	✗	✗
	Total annual energy renovation rate % - P - T - R	✗	✗	✗	✓	✗	✗	✗
	> Of which light renovation > of which medium renovation > of which deep renovation	✗	✗	✗	✓	✗	✗	✗
Social	Total additional energy produced from renewable resources on site or nearby as a result of renovation - P - T - R	✗	✗	✗	✗	✗	✗	✗
	% of households having arrears on utility bills - R - SH	✓	✗	✗	✗	✗	✗	✓
	Actions to Improve Indoor Air Quality post Renovation Works - R - SH - P - T	✗	✓	✓	✗	✗	✗	✗
	Actions to Improve average thermal Comfort Post Renovation Works - R - SH - P - T	✗	✗	✗	✗	✗	✗	✗
	# private households retrofitting their homes / year - T	✓	✗	✗	✓	✗	✗	✗
Economic	# sq. m² commercial buildings retrofitted annually - T	✓	✗	✗	✗	✗	✗	✗
	> Total annual investment in energy renovation - R - SH - P - T	✓	✗	✗	✓	✗	✗	✗
	> Total annual public investment in energy renovation (of which % directed to renovating public building and % invested in grants/subsidies) - R - SH - P - T	✓	✗	✗	✓	✗	✗	✗
	> Total annual private investment in energy renovation - R - SH - P - T	✓	✗	✗	✓	✗	✗	✗
	# companies involved in energy renovation - T - R - SH - P	✗	✗	✗	✓	✗	✗	✗
	# graduates from 3rd level courses and technical training courses with focus on energy renovation - T - SH - P - R	✓	✓	✗	✗	✗	✗	✓
	# building professionals and construction workers taking part in energy renovation upskilling - T - SH - P - R	✓	✗	✗	✗	✗	✗	✗





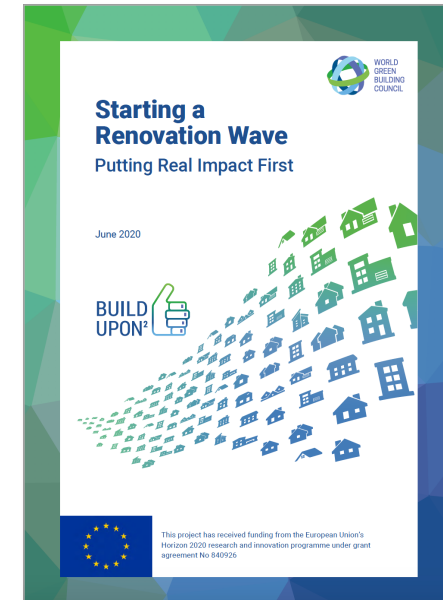
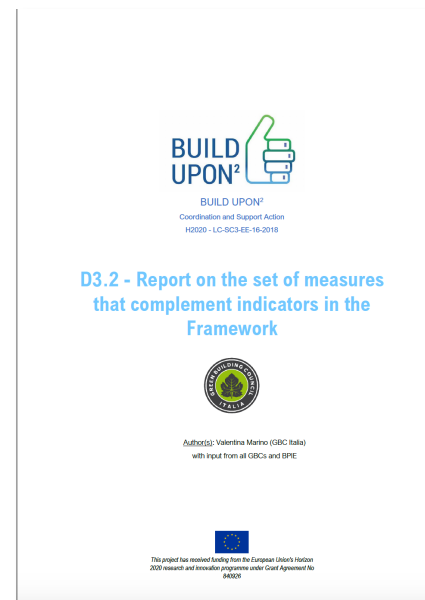
## Overview of data collected at national and local level

### Local level:

Category	Indicator	Croatia	Hungary	Ireland	Italy	Poland	Spain	Turkey	UK
Environmental	Reduction in direct annual CO2 emissions from renovation compared to the municipality's base-line year as per CoM reporting - M - T - R	✓	✗	✗	✗	✗	✗	✗	✗
	Final energy consumption reduction from renovation - M - T - R	✗	✗	✗	✗	✗	✗	✗	✗
	Improvement of Net Space Heating & Cooling Demand due to energy renovation - M - T - R	✗	✗	✗	✗	✗	✗	✗	✗
	Total annual energy renovation rate % - M - T - R								
	> Of which light renovation	✗	✗	✗	✗	✗	✗	✗	✗
	> of which medium renovation								
	> of which deep renovation								
Social	% of the total floor area of buildings owned and occupied by the municipality retrofitted each year - M	✓	✓	✗	✓	✓	✗	✗	✓
	Total additional energy produced from renewable resources on site or nearby as a result of renovation - M - T - R	✗	✗	✗	✗	✓	✗	✗	✗
	% of households having arrears on utility bills - R - SH	✓	✗	✗	✗	✗	✗	✗	✗
	# households living in renovated dwellings with commissioned ventilation system - R - SH	✗	✗	✗	✗	✗	✗	✗	✗
	# non-residential renovated buildings with a commissioned ventilation system - R - SH	✗	✓	✗	✗	✗	✗	✗	✗
	# households living in renovated dwellings where calculation demonstrates that post renovation condition will satisfy both heating requirements and minimise summer overheating risk	✗	✓	✗	✗	✗	✗	✗	✗
Economic	# non-residential renovated buildings where calculation demonstrates that post renovation condition will satisfy both heating requirements and minimise summer overheating risk	✗	✓	✗	✗	✗	✗	✗	✗
	# private households retrofitting their homes / year - R	✓	✗	✗	✗	✗	✗	✗	✗
	# sq. m² commercial buildings retrofitted annually - T	✓	✗	✗	✗	✓	✗	✗	✗
	> Total annual investment in energy renovation - R - SH - M - T								
	> Total annual public investment in energy renovation (of which % directed to renovating public building and % invested in grants/subsidies) - R - SH - M - T	✓	✗	✗	✗	✗	✗	✗	✗
	> Total annual private investment in energy renovation - R - SH - P - T								
Economic	# companies involved in energy renovation - T - R - SH - M	✗	✗	✗	✗	✗	✗	✗	✗
	# graduates from 3rd level courses and technical training courses with focus on energy renovation - T - SH - M - R	✓	✗	✗	✗	✗	✗	✗	✗
	# building professionals and construction workers taking part in energy renovation upskilling - T - SH - M - R	✓	✗	✗	✓	✗	✗	✗	✗
	> of which # Municipality staff upskilling in energy renovation								

- A collection of measures to support specific indicators of the Framework with pathways to overcome lack of data
- A collection of best practices on renovation measures at local scale supported by the assessment of impact

- Collection and share of selected measures and best practices across Europe to support the use of the Framework and of its indicators





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**D3.2 - Report on the set of measures  
that complement indicators in the  
Framework**



Author(s): Valentina Marino (GBC Italia)  
with input from all GBCs and BPIE



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## ► Measures to support the use of indicators

GBCs and BPIE shared +70 measures at local and national level that proposed solutions to support the use of indicators  
GBC Italia analysed them all and expanded the collection of information on  
**37 selected measures** :

Type of measure	How many? (some have a double use)	Environmental	Social	Economic
Questionnaire	2	X		
Web portal/web software	4	X	X	
Database	18	X		X
Register	2	X		X
Statistic	2		X	X
Plan	1	X		
Interactive Map	5	X	X	X
Report	2	X		X
Methodology	2		X	
Design tool	6	X		



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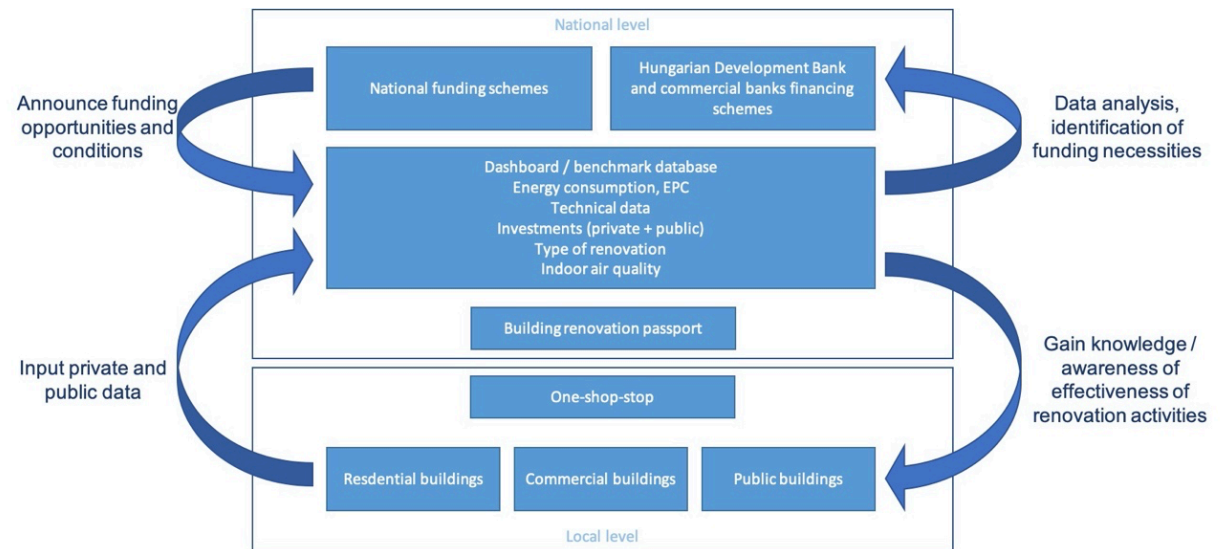
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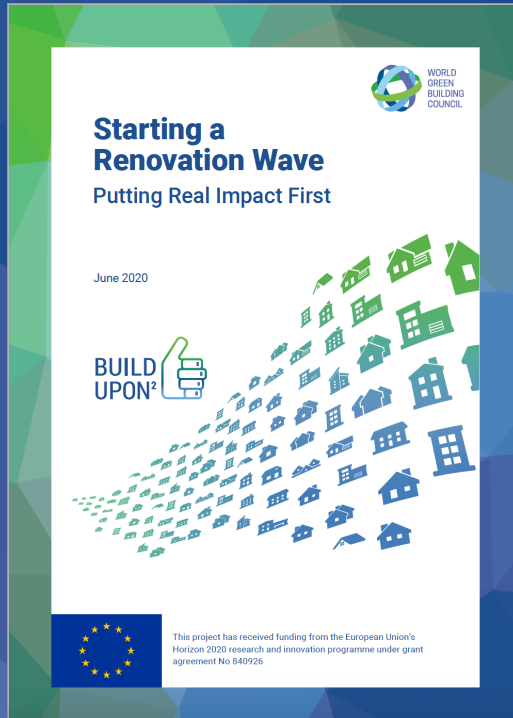
## ► Measures to support the use of indicators

GBCs proposed **26 pathways** to overcome barriers in data availability for  
one or more indicators at the same time



Pathway for multiple social indicators by Hungarian GBC





## ► Measures to support the use of indicators

EERN with project partners collaborated in the collection of best practices on renovation activity across Europe that were supported by impact analysis

The report was published to support the launch of the Renovation Wave by the European Commission within the EU Green Deal

### Il Tuo Condominio Green

**Where is it?** Province of Trento, Italy

**Who is it for?** Owners and tenants of multi-family apartment blocks

**Impacts**

- Over 1500 ICD, saved as of April 2019
- €5 million public funding, leveraging €30 million of private finance invested in renovations.
- (€2) million of which is disbursed through mortgages).

**Dates** 2016 to present

**Key lessons**

- Combine financial incentives with technical support for maximum impact.
- Tackle systemic barriers collaboratively by converting diverse stakeholders across the renovation value chain.
- Programmes take time to mature and the impact they can deliver will increase as they do.
- Impact tracking could be improved by creating links between different data sets that are managed by different government agencies.

Multi-family dwellings and apartment blocks represent a specific set of challenges for renovation. So the Autonomous Province of Trento set out to boost the renovation rate with a scheme combining technical support with economic incentives.

Key barriers that the Province wanted to overcome included:

- The difficulty of decision making - especially where large investments are concerned due to different expectations of landlords and tenants and people with different backgrounds living in the same building.
- Willingness of building managers to engage - due to increased responsibilities and workload that may not be matched by an adequate return in terms of wage, satisfaction and visibility.
- Challenging relationships with the other professionals involved in the building renovation chain, the technicians and firms that can increase the duration of intervention and investment costs.

The scheme offers financial incentives to support with the costs of interventions. These can be combined with other national incentives and include reimbursement of:

- 90% of design and assistance cost;
- 90% of interest payments on loans or mortgages to cover capital costs of renovations
- 90% of interest payments on commercial loans taken by investors and SMEs carrying out renovation works

Importantly, these incentives are combined with technical support. The Province has convened a cross-sector group of stakeholders with a management board appointed to provide oversight. The group includes SME associations, technicians, apartment managers, and banks involved in the renovation process.

This collaboration is a key element of the initiative in supporting the renovation of private buildings by providing a common approach, tools and materials. The Provincial Board has identified that building managers are a critical stakeholder in the process and so created tailored products to support them such as draft contracts and procedural guidance for decision making by apartment block tenant and owner's groups.

Supplementary training materials were also developed, aimed at developing professional expertise among all actors along the value chain. This was financed through an EU co-funded programme.

To date, over 200 apartment blocks have started a renovation project under the scheme. The Province aims to push for deeper renovations through retraining and improving the type of interventions financed. They also plan to mobilise those professionals who have been trained to act as ambassadors that can promote the programme to building managers and residents.

Plans are developing to improve impact tracking by integrating or linking data sets such as energy performance certificates and energy consumption data. But achieving this will require another barrier to be overcome, the different data sets are owned and managed by different government agencies.

**Putting Real Impact First**

Over time, the programme has matured. At the start, only around 10% of enquiries resulted in successful applications but now almost two thirds of assessments are resulting in energy renovations. We're also seeing increased depth of renovations catalysed by the programme. To begin with almost all funding was for improvements to the heating system, and only around 20% also tackled the building envelope. In 2019 the percentages reversed with almost 80% of projects involving insulation or a combination of fabric and systems upgrades.

Sara Veronesi  
Planning and European Projects, Autonomous Province of Trento

"Actions undertaken locally, in close cooperation with other actors in the energy renovation value chain, are reaping the efforts of the provincial administration. With about €2 million of investments in the form of public support, to date €24 million worth of renovation has been undertaken and €16 million in loans have been granted."

Mario Tesitore  
Vice President & Councilor for the Environment & Urban Planning, Autonomous Province of Trento



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### D3.3. Definition of a methodology for reporting and monitoring the implementation of the Framework

Author(s): Valentina Marino (GBC Italia)

  
This project has received funding from the European Union's Horizon 2020  
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► 1<sup>st</sup> version of the methodology for reporting and monitoring the use of the Framework

All GBCs, BPIE and Climate Alliance, coordinated by GBC italia proposed a 1° version of a reporting and monitoring methodology :

- to support municipalities on the use of the Framework
- to align the Framework to SEAP/SECAPS reporting activity



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### D3.3. Definition of a methodology for reporting and monitoring the implementation of the Framework

Author(s): Valerina Marino (GBC Italia)

  
This project has received funding from the European Union's Horizon 2020  
research and innovation programme under Grant Agreement No 840928

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## ► 1<sup>st</sup> version of the methodology for reporting and monitoring the use of the Framework

The methodology includes the following topics:

- Scope of the Framework
- Supporting procedures and tools:
  - Align the framework to current procedures and integrate in current reporting activity for municipalities
- Monitoring and reporting:
  - It is suggested a continuous monitoring of indicators and a reporting every 2 years as for SECAP/SEAP
- Data availability and harmonization:
  - Monitored data are to be preferred to calculated data in the long term
- The Framework after the project end
  - Who is taking care of the update of the indicators and methodology?  
Who is going to monitor the use of the Framework by different countries?

# Testing phase

Indicators are under a testing phase at european level: all pilot cities will test indicators' reporting

- On a specific initiative
- At city level

Results of the testing phase will support the improvement of indicators and of the methodology and will help understanding how european cities can integrate the framework on their practice along with their training needs



We must **ACT  
NOW**  
to hit net zero  
carbon by 2050 —  
cities can lead



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GREEN  
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UPON<sup>2</sup>** 



**Valentina Marino**  
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# Thank you!



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