**Aim:**
Demonstrate the feasibility of “Factor 4” to “Factor 10” reduction in energy demand of historic buildings, depending on the case and the heritage value

**Achievements:**
Specific energy efficiency solutions (e.g. window prototype installed, low impact ventilation system, high efficiency capillary active insulation), technical guidelines and tools for the multidisciplinary analysis and design approach (e.g. conservation “Raumbuch” integrated with energy issues and specific setting for energy simulations).

Link with both EPBD related CEN groups and CEN TC 346 on cultural heritage

**Why does it matter?**
Historic buildings will only survive if maintained as living/working space. Effective energy retrofit is useful for structural protection as well as for comfort of the users
... are the **trademark** of numerous European cities
... are a living symbol of Europe’s **rich cultural heritage & diversity**
... reflect the society's identity and need **to be protected**

... show a high level of **energy inefficiency**
... contribute with considerable **CO₂ emissions** to climate change
... do not always offer “**comfort**” – to people as well as to artworks

**Factor 4 to 10 of reduction in energy demand** is achievable, also in historic buildings, respecting their heritage value, if a multi-disciplinary approach guarantees the implementation of high quality interventions, specifically targeted and adapted to the specific case.
Impact

- 1919-1945
  - 12.1% dwellings %
  - 26.4% dwellings n.
  - < 1945
  - < 1919

- 30 million dwellings
  - 25 million dwellings
  - 55 million dwellings
  - 120 million dwellings

→ 240 Mt CO₂

↓ 180 Mt CO₂
"To include all stakeholder in the design process of the energy retrofit of a historic building is a base principle postulated by 3ENCULT"
## Within the project team ...

<table>
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<tr>
<th>Study Area</th>
<th>Case study</th>
<th>“Technical solutions”</th>
<th>“Urban context”</th>
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8 case studies

CS1: Public Weigh House, Bozen
CS2: Palazzo d'Accursio, Bologna
CS3: Palazzina della Viola, Bologna
CS4: The Material Court of the Fortress, Copenhagen
CS5: Monumental School, Innsbruck
CS6: Warehouse City Potsdam and other, Germany
CS7: Industrial Engineering School, Salamanca
CS8: Strickbau Appenzell, Switzerland
Contribution to European Economy

- developing and demonstrating **retrofit approach** as well as
- providing guidelines on how to use **existing products** for built heritage retrofit

3ENCULT opens a wide field for **sustainable intervention and business** to the large number of **construction enterprises across Europe**.

- developing **specific new solutions** with a number of **innovative European enterprises**

3ENCULT enforces **Europe’s leading role** in field of technologies applied to cultural heritage.
Contribution to European objectives

- 3ENCULT triggers significant energy saving in historic buildings [20-20-20]
- 3ENCULT leads to substantial CO$_2$ emission reduction [20-20-20]
- 3ENCULT fosters sustainable renovation and long term conservation [ECTP-FACH]
- 3ENCULT support SRA of ECTP and FACH [ECTP-FACH]
- 3ENCULT leads to improved quality management of historic cities [CCP campaign]
- 3ENCULT contributes to Europe’s Economic Recovery
- 3ENCULT contributes to EU energy policy
Contribution to policy & standards - Specific Tas

- **WP2 – Analysis & Diagnosis**
- **D2.3 – Generic replicable factors for Aalborg Commitments** M38
- **D2.4 – Position Paper: EIA** M18|M36
- **WP7 – Normative & Guidance integration**
- **D7.7 – Relation of historic buildings | EPBD | CEN standards** M12
- **D7.8 – Proposal for integration in EPBD & advice to CEN groups** M18|M30
- **D7.9 – Contributing to CEN TC 346** M18|M30
- **D7.10 – Local governments: integration in planning & regulation** M30
- **D7.11 – Replicability of low emission concept Görlitz** M30
RESEARCH & DEVELOPMENT
... JUST A “TASTE”
“I do have overall a positive impression as regards frame & sash bar dimension as well as subdivision & proportions. The optic of the outer glazing seems to me exaggerated, both the too irregular reflection from outside, and distortion from inside. And I ask whether a 3-pane glazing for Bolzano climate is really needed.
• Basic knowledge review and application guidelines for internal insulation
• Prototype panels foam glass and aerogel panels
• Optimization of filling material
• Panels with capillary-action abilities
Development and documentation of ventilation concepts for historic buildings:

- Minimal invasive central system (vertical distribution)
- Wall integrated distributed heat recovery
- Active overflow elements
Virtual library
Matrix of all energy efficient solutions in a virtual library by EURAC
Interlink 3ENCULT with BUILD UP-Homepage
Thank you for your attention!
roberto.lollini@eurac.edu

www.3encult.eu

coordinator contact:
alexandra.troi@eurac.edu