

# Deep Renovation of Historic Buildings towards lowest possible energy demand and CO<sub>2</sub> emission (NZEB)

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## New Task proposal

Deep Renovation of Historic Buildings  
towards lowest possible energy demand  
and CO<sub>2</sub> emission (NZEB)

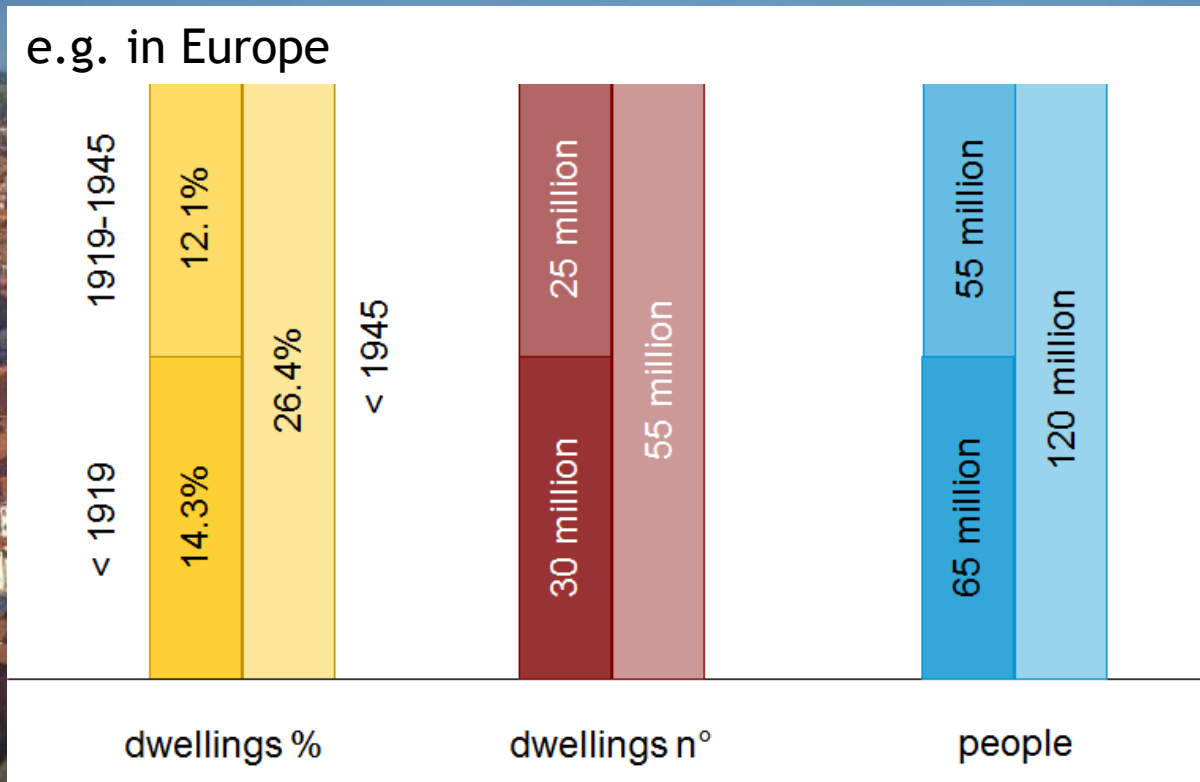
Based on Task 37 & Task 47 experiences

EURAC takes over the initiative in agreement with Fritjof Salvesen (OA Task 47) and Sophie Trachte UC Louvain

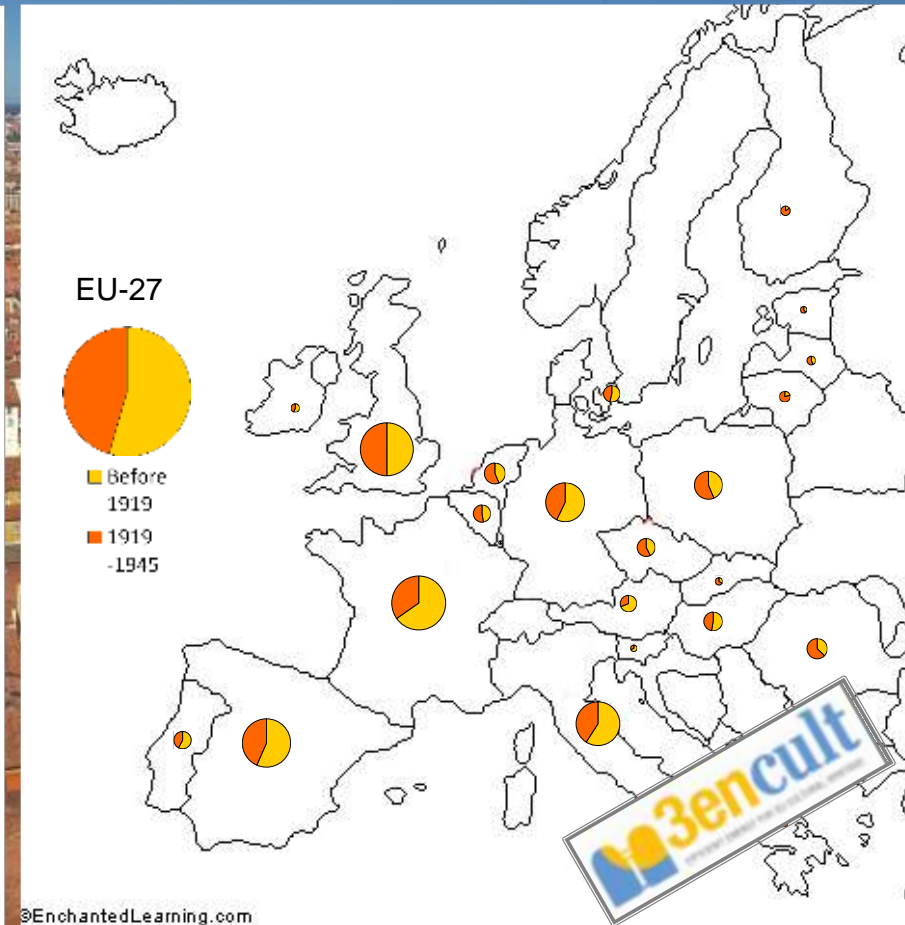
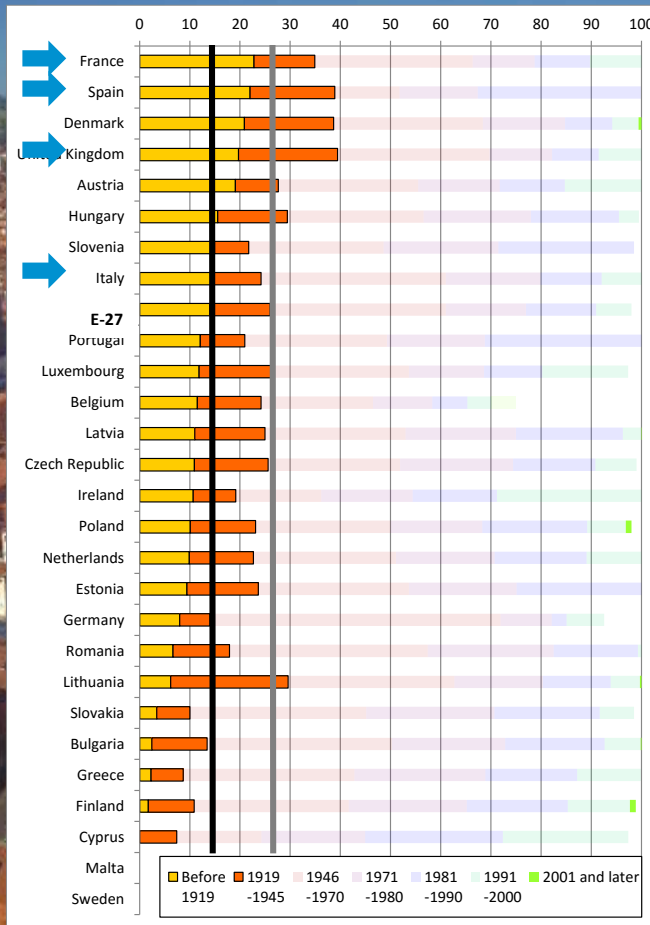
# Short presentation



# There is a need!



# There is a need!



Bologna



## Two possible approaches

reduce energy demand to a close to NZEB standard,  
but do this with a focus on preserving  
*as much as possible* of the buildings  
historic/aesthetic value

reduce the energy demand as much as possible  
while preserving *all* the buildings  
historic/aesthetic values.

DIALOGUE!

good solutions!

## Now is an important moment

In the last 10 years a shift in paradigm could be observed

“don’t touch our buildings”

→ “let’s find the right solutions together”

Examples

- ICOMOS scientific committee
- Standardisation initiative from Heritage TC in CEN





## International Scientific Committee for Energy and Sustainability

There is an urgent need to introduce well considered guidelines in the short term and **European Standards** in the long term on understanding and **improving energy efficiency in heritage and traditional buildings**. The building stock of any nation is not only important from a cultural heritage point of view but is also an invaluable sustainable resource of embedded energy. Protection is required from unnecessary intervention when considering energy efficiency in order to safeguard both environmental and heritage values.

We believe that the original and now revised "Directive 2010/31/EU of the European Parliament and of the Council of 19th May 2010" on the energy performance of buildings is flawed when applied to historic and traditional buildings. The fact that most heritage assets are exempted actually **increases the risk** to those buildings mainly due to lack of understanding of historic buildings.

Regardless of any exemptions or derogations that may exist for historic buildings in different countries of the EU, fuel poverty and a desire for improved living conditions mean that owners will still want to upgrade **the energy performance of their**



### Calendar

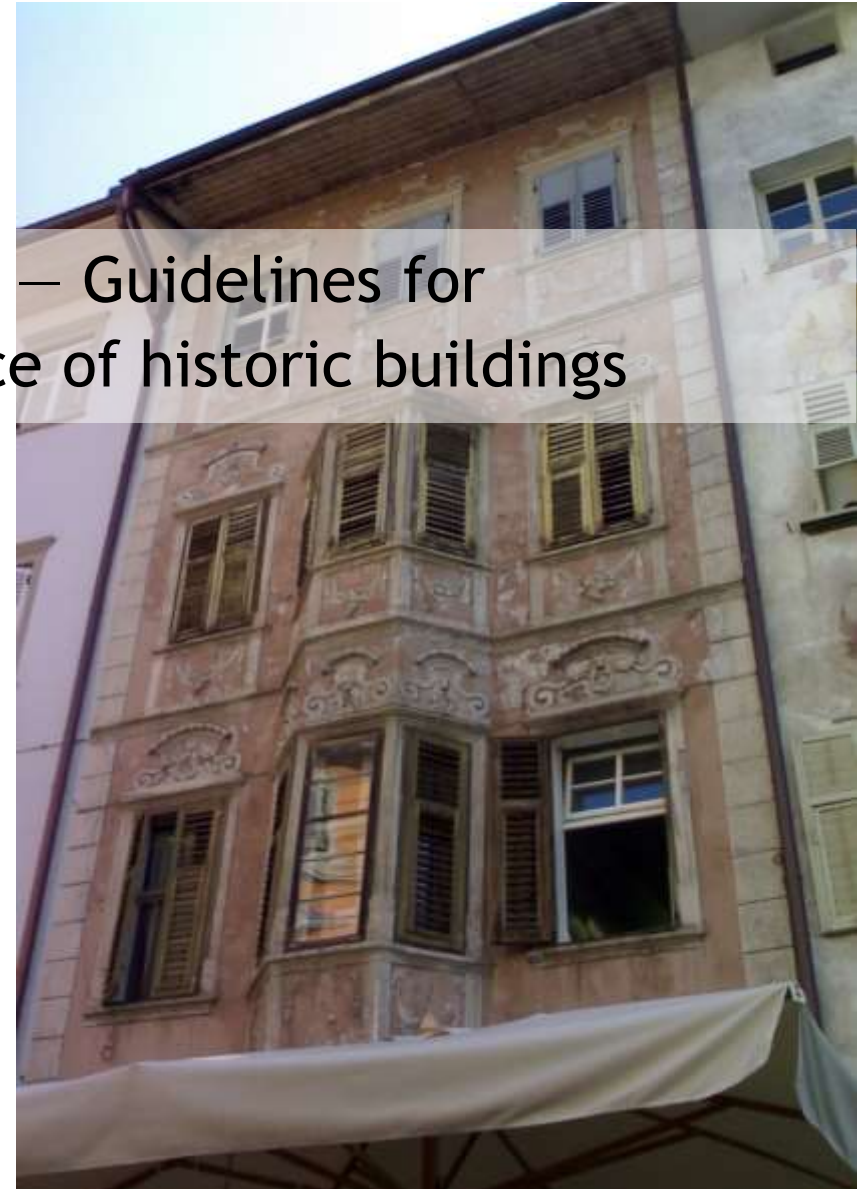
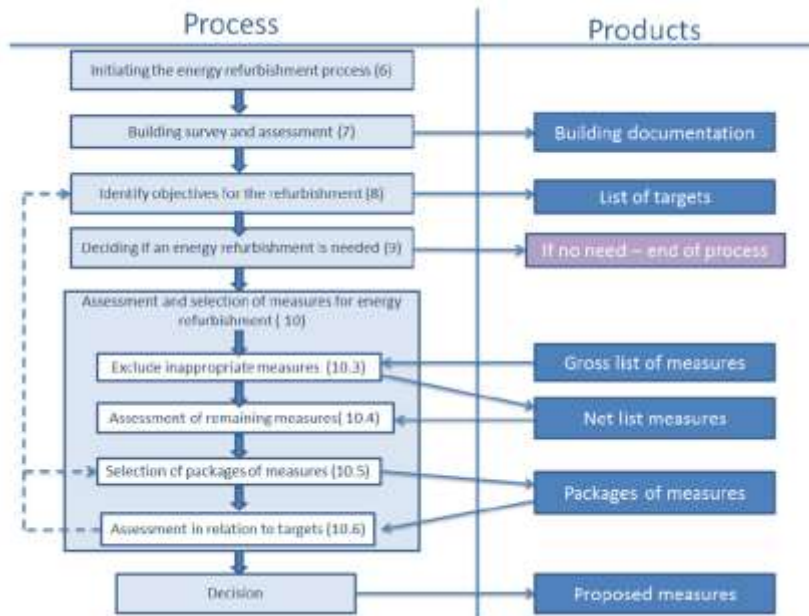
< > **May 2016**

Mon	Tue	Wed	Thu	Fri	Sat	Sun
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5



# CEN TC 346 WG8 - FprEN 16883

Conservation of cultural heritage – Guidelines for improving the energy performance of historic buildings

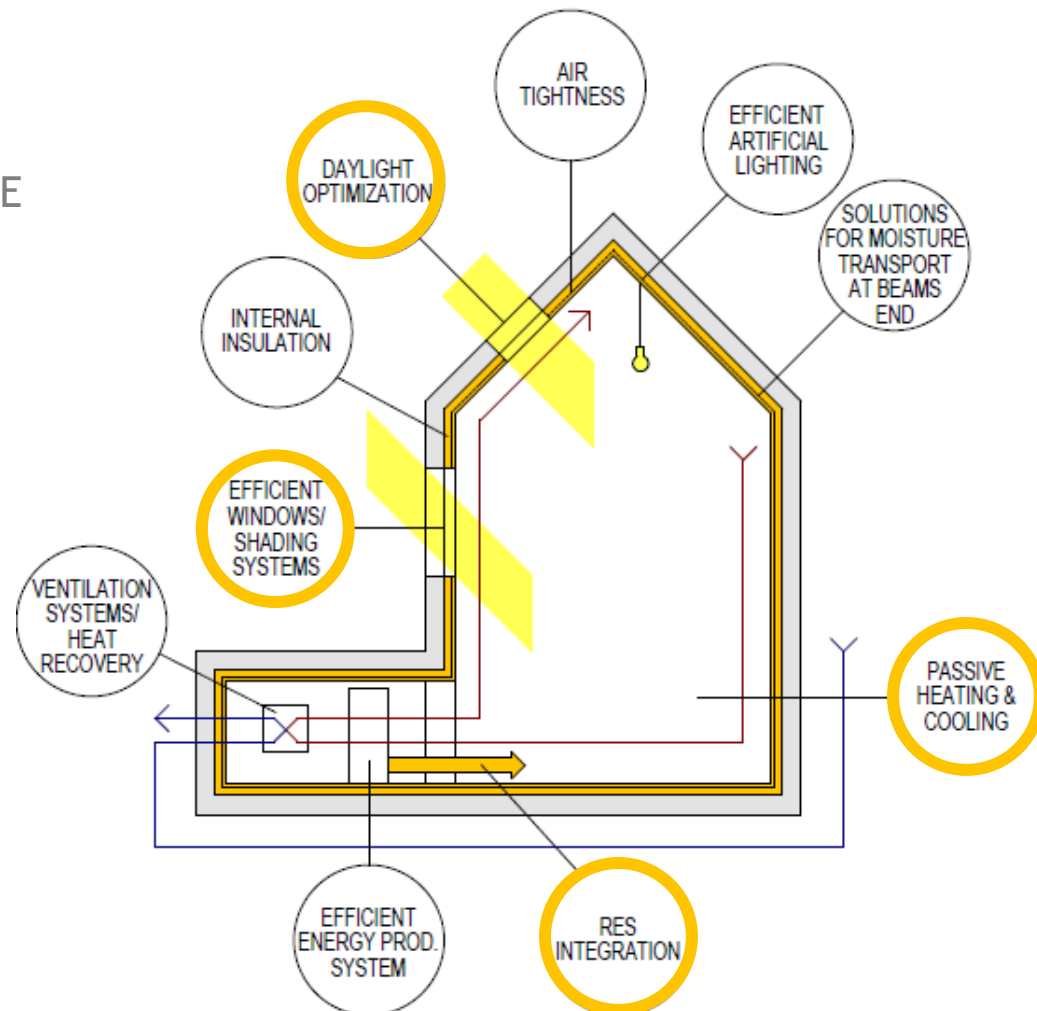


# Holistic approach

- ① REDUCE DEMAND
- ② PROVIDE FROM SUSTAINABLE SOURCES

Whole range of solar!

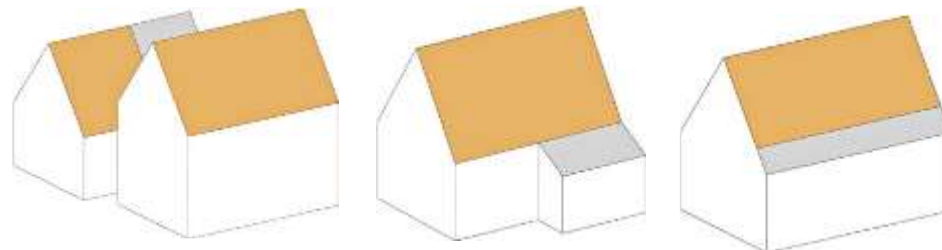
- Daylighting
- Passive solar energy
- Solar thermal
- Photovoltaics
- Hybrid



# Solar energy in historic buildings

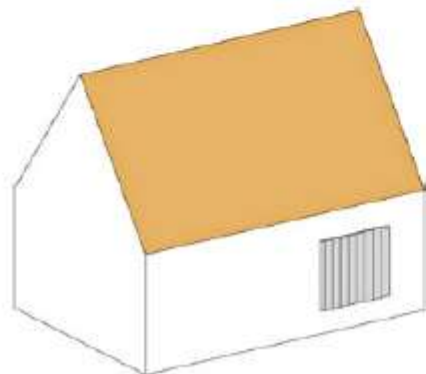
if solar panels/collectors

- are compatible in colour and design to established roof material
- are integrated in an architecturally attractive way
- can be positioned on flat roofs (not as visible as on sloped roofs)
- can be positioned in building parts where they are not as visible
- panels and mounting systems are reversible
- stand-alone solar systems are not interfering aesthetically with the building itself are possible



# Solar energy in historic buildings

Im Einzelfall kann auch die Anbringung von Kollektoren an der Fassade am verträglichsten für das Erscheinungsbild des Baudenkmals sein, beispielsweise wenn es hier weniger einsehbare Bereiche gibt, als auf den Dachflächen. Wichtig ist auch hier, dass sich die Anlage optisch unterordnet und farblich eine Einheit mit der Fassade bildet. Sie muss außerdem plan in der Ebene der Fassade liegen und kann nicht aufgeständert werden. Diese Möglichkeit eignet sich besonders für Solarthermieanlagen mit Röhrenkollektoren.



# Solar energy in historic buildings



The small facility for the  
**own requirement** is not  
visible from the public area



Franziska Haas, Historic  
Preservation TU Dresden,  
@ Energy Forum 2013

# Solar energy in historic buildings

& deep renovation

Villa Castelli  
Lago di Como

solar  
raum | architecture  
energy  
mobility

Energy concept:


- ① Low energy demand 18kWh/m<sup>2</sup>a
- ② High solar gains ~30%
- ③ covered by heat pump with
- ④ electricity from PV

# Proposed Task Structure

- A.** Knowledge Base
- B.** Multidisciplinary planning process
- C.** Conservation compatible retrofit solutions
- D.** Demonstration and dissemination



## Key objectives

- 
- Develop a **solid knowledge base** on how to save energy in renovation of historic and protected buildings in a cost efficient way.
  - Identify the energy saving **potential** for protected and historic buildings
  - Identify and assess **replicable procedures** on how experts can work together with integrated design
  - Identify **conservation compatible retrofit solutions**
  - Identify specifically the potential for the use of **solar energy** and promote best practice solutions
  - Identify the policy and marketing **strategies** to implement the energy saving potential
  - **Demonstrate** good energy solutions in case studies.



## Build upon experience from ...

### IEA SHC Task 47

renovation of non-residential  
towards NZEB, including  
integration of solar energy.  
5 buildings historic & protected  
2 of these integrated solar  
energy.

### IEA SHC Task 37

advanced housing renovation in  
domestic buildings  
4 houses historic  
3 of these integrated solar  
energy.

### Historic Building in Modena, IT



IEA SHC Task 37

Advanced Housing Renovation with Solar & Conservation

# Overlap with projects & initiatives

The interested experts are involved in numerous local, national and international R&D projects which are related to the topic of energy retrofit of historic buildings. The Task will provide them a platform to share results, interact and create added value from exploited synergies.

Just some examples for programmes and projects on different spatial level:

- Sweden: national research funding programme “spara och bevara”.
- European level:
  - historic buildings are identified as a priority area in the *EeB PPP (Energy Efficient Buildings Private Public Partnership) roadmap*.
  - In several *Horizon 2020* calls up to now, historic buildings have been either mentioned in the title or within the topic description.
  - 3ENCULT → EFFESUS → RIBUILD
- The US National Trust for Historic Preservation has developed a design [guideline](#) for solar installation in historic buildings.

# Cross Cutting with other implementation agreements

Building renovation is also related to *IEA EBC*, but we have not identified any ongoing or previous projects related specifically to historic and protected buildings in this IEA.

There are, however, synergies on specific themes, as e.g. ventilative cooling (annex 62), HT cooling and LT heating (annex 59), embodied energy (annex 57), long term performance of insulation materials (annex 66), deep retrofit of public buildings (annex 61) occupant behaviour (annex 66), adaptive thermal comfort (annex 69), whole building heat, air and moisture response, where **exchange will be supported** with initiatives like **common workshops and reciprocal invitations to expert meetings**. Collaboration is facilitated also by experts participating in respective IEA EBC annexes.



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SUPSI

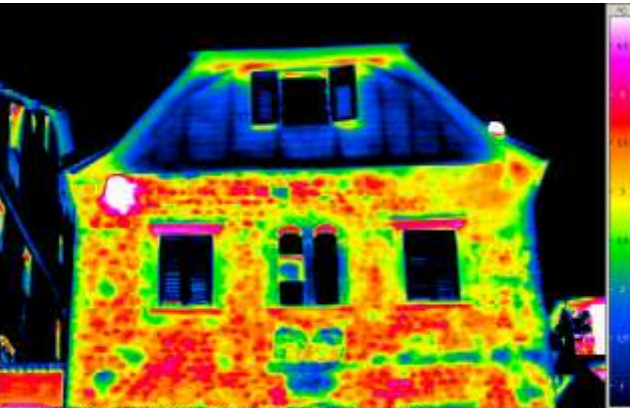


## Time line

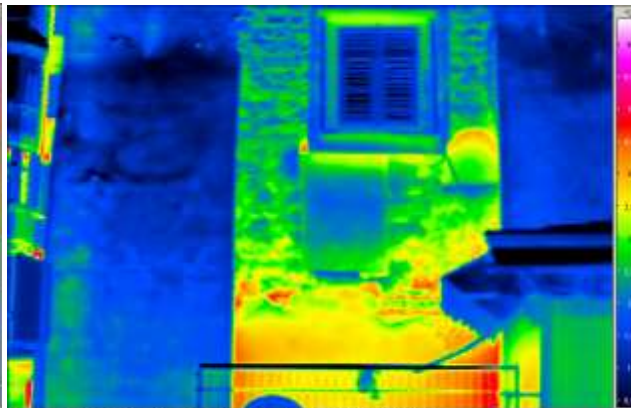
- 1 year Task Definition Phase
  - 2 preparation meeting



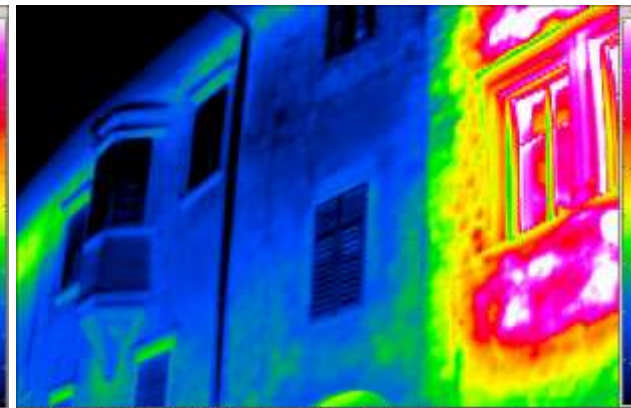
- 3-5 years Task duration from mid 2017



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Thank you for your attention

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