

ABC Department  
Architecture, Built Environment  
and Construction Engineering



# CHANGES

**Cultural Heritage Activities: New Goals and benefits for Economy and Society**

**Work Package 6**

**Economic analysis of costs and benefits of preventive conservation practices (monitoring and maintenance systems)**

Stefano Della Torre



“Data gathered in previous WPs will provide the basis for a model to analyze **costs and benefits**, mainly related to the **single property** and its management. ....

**The aim is to go beyond the popular sentence that maintenance is better than cure and less expensive, to understand which are the conditions which affect the decision making.”**



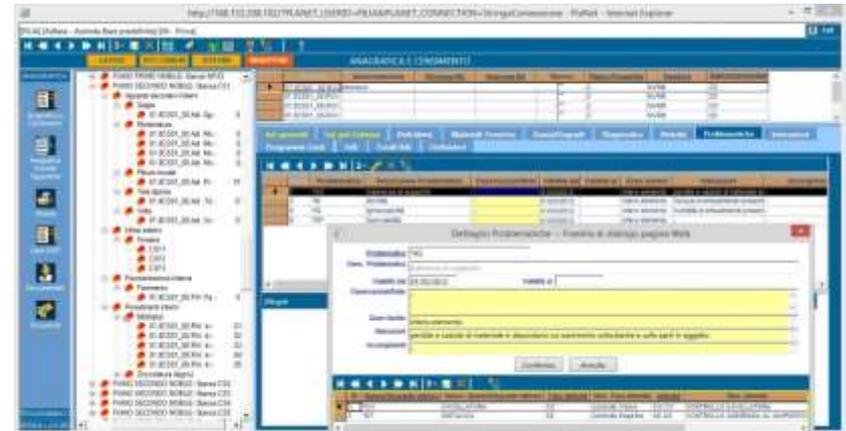
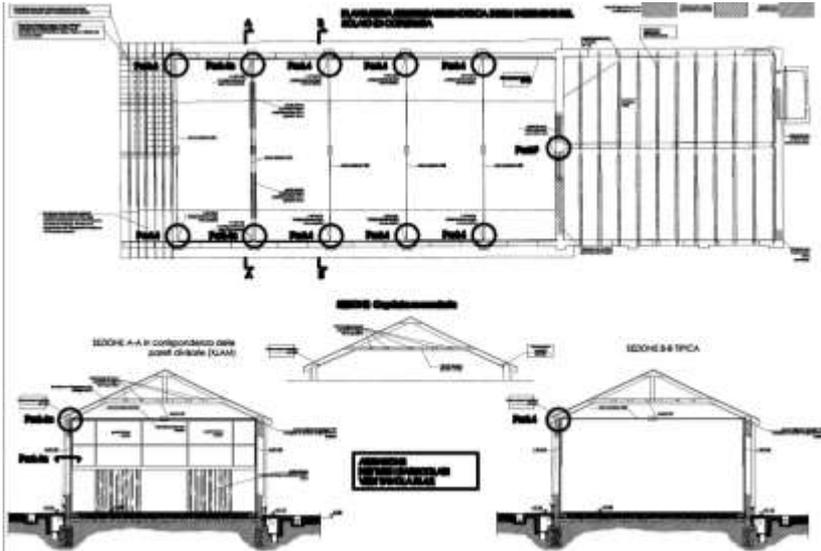
***The focus is just on maintenance/monitoring, the test should cut off at once (for the sake of this research phase) other factors (such as incentives, spillovers, upstream agreements...), which will be taken into account later***

***In this exercise the quality of conservation will be taken into account in a second step: we obviously agree that any intervention on the vulnerability (or any enhancement) of a heritage building can affect its authenticity, and our task is just to optimize the balance between upgrade of performance and loss of authenticity***



# Data from Italy (WP5)

## Case studies from Monza and Brianza district



Comparison of IT tools for conservation plans



# Data from Italy activities carried out by FMeA (Dario)





Data from research on Monumentenwacht systems in Noord-Brabant and Belgium

Analysis of the Maintenance Cost Analysis service implemented by the Associate Partner Monumentenwacht Flanders, which offers tailor-made maintenance plans to calculate the costs of recommendations of the architectural inspections for building owners and managers.

Comparison with «Prospetto degli oneri economici» introduced in Lombardy guidelines (Della Torre 2003)



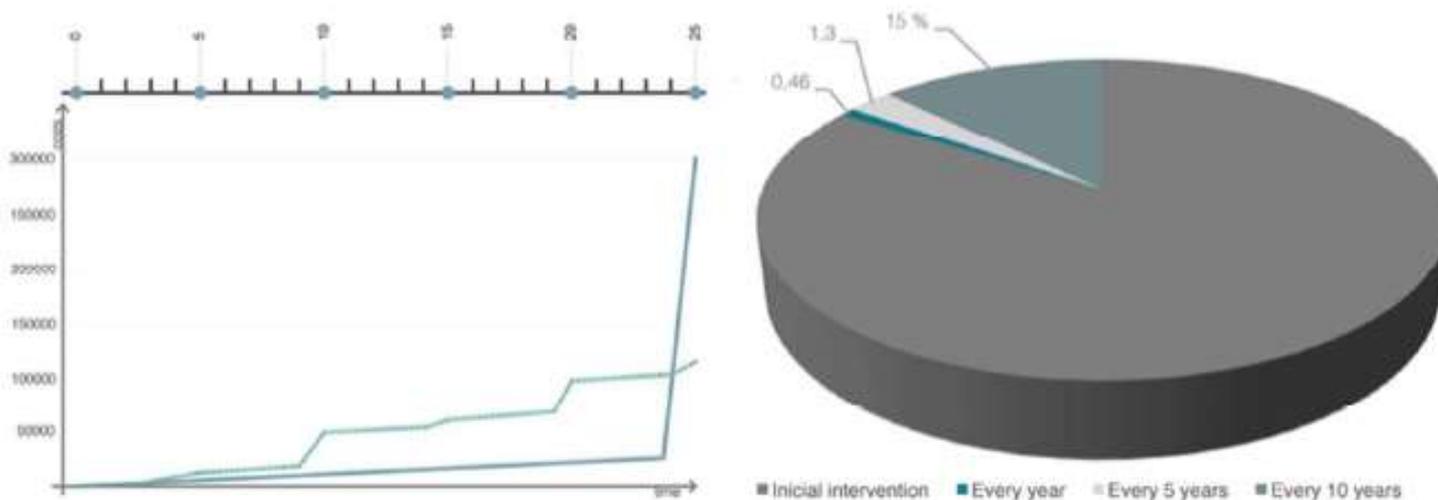
Literature on planned maintenance, owners' attitude (Dann 2004), Net Present Value (Rypkema), ...

Research in Portugal, presented by Teresa Ferreira at Thematic Week 2017

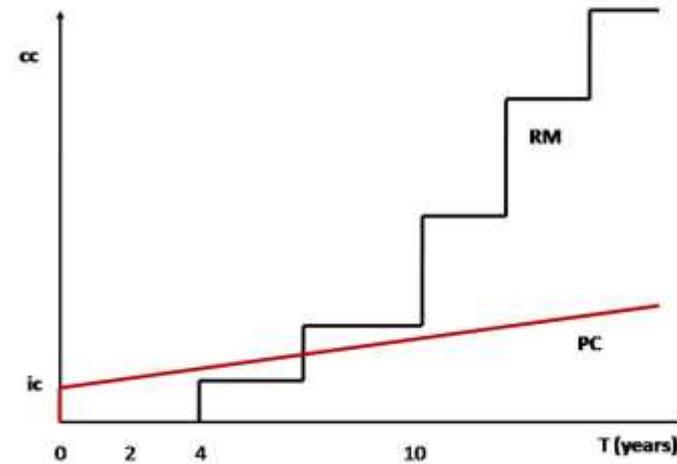
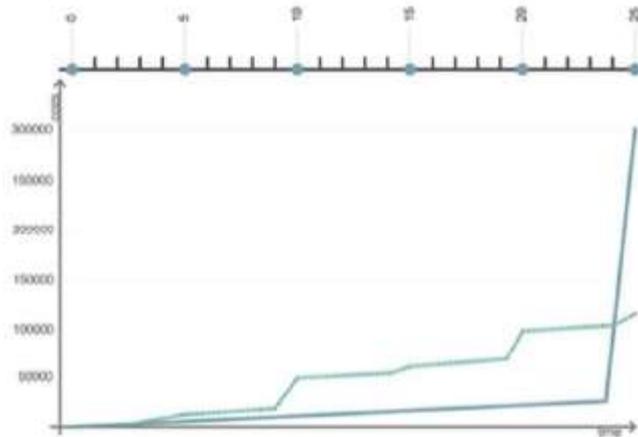


# Long time to break even

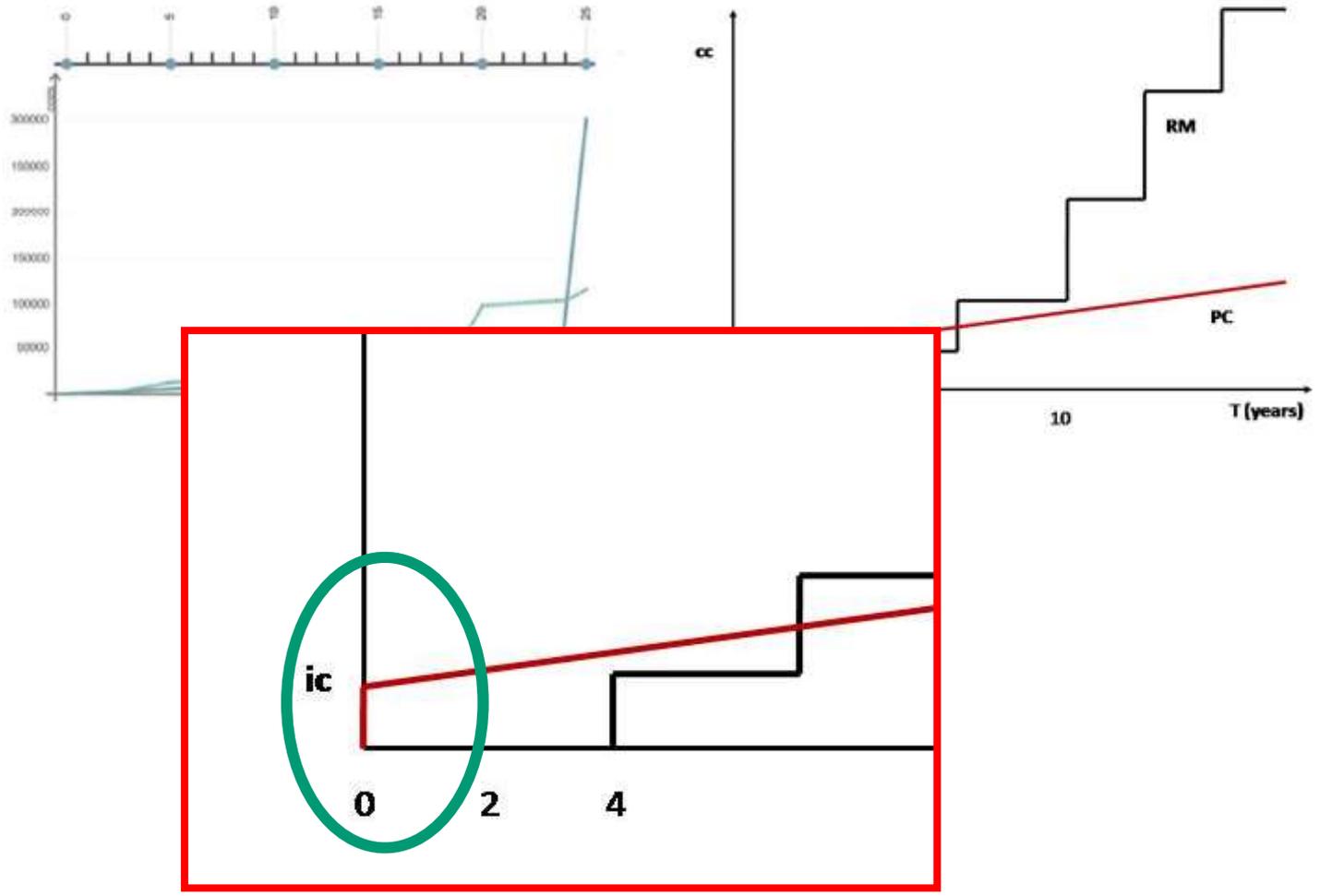
Ferreira: benefits can be seen not before 25 years!



a) Chart comparing two scenarios of the accumulated costs of maintaining a religious building over 25 years: (1) without a Maintenance Plan (solid line); (2) with a Maintenance Plan (dashed line); b) Chart showing the percentage shares of the periodical maintenance interventions compared with the cost of a single profound intervention. (source: the author)



The two lines represent the costs of planned and unplanned activities. They can be shaped in different ways: so we have to analyze the factors that can influence spending times





- It is worthy thinking of micro-perspective (care of a single building, paid by the owner) and macro-perspective (management of the territory, legal framework, wide prevention systems paid by public money)

### MICRO-PERSPECTIVE

- After-restoration maintenance pays, but only after several years: this influences owner's attitude
- Continuous care requires Knowledge Management, so there is an higher **initial cost**
- Prevention meant as risk management is a matter of interaction with external factors, so it requires to merge micro and macro perspectives

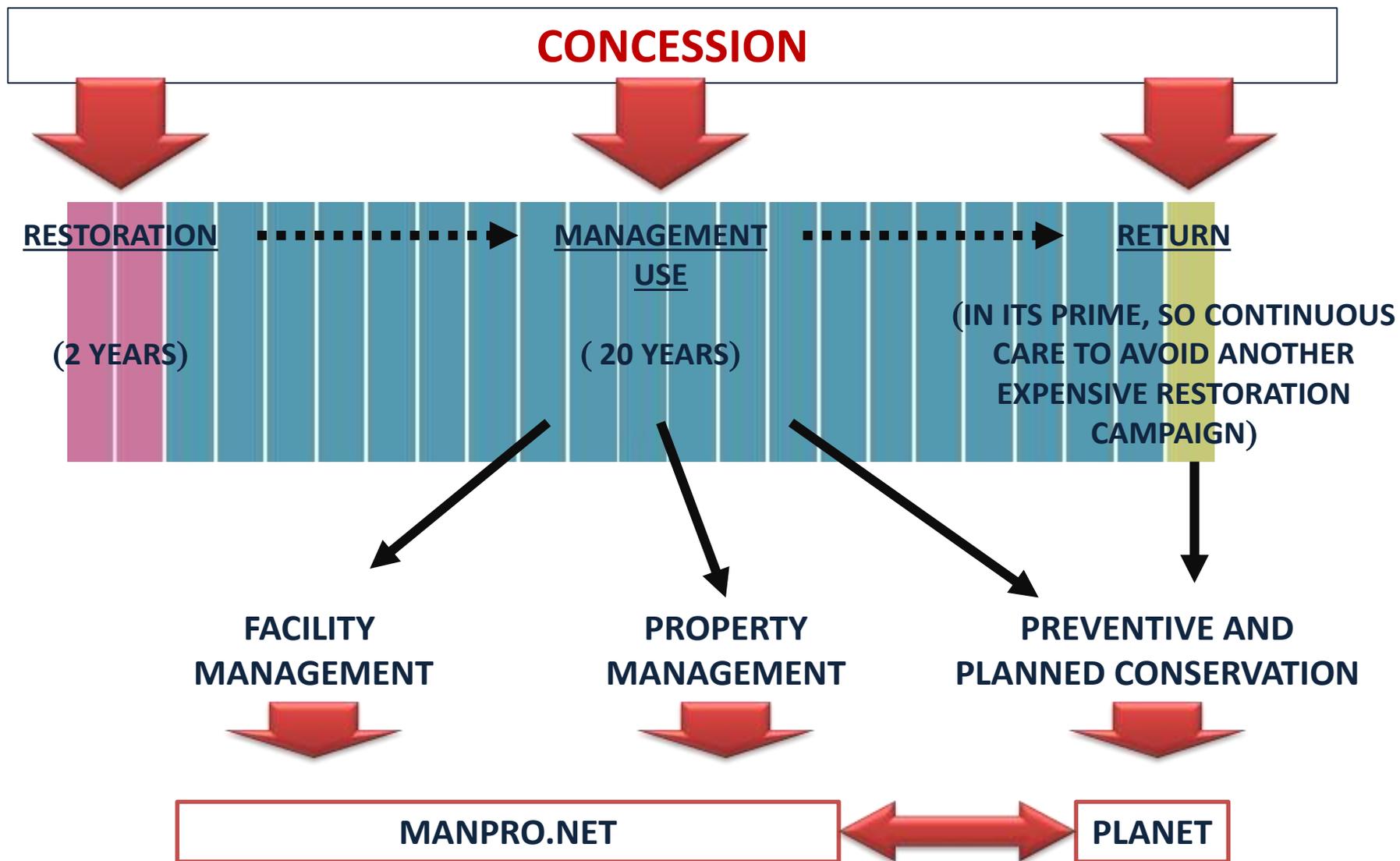


# Villa Reale, Monza: may PPP Concession trigger planned conservation?





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**INSPECTION CAMPAIGN 2016**



# Villa Reale, Monza: may PPP Concession trigger planned conservation?

## Remarks

- An Information System was required already by the Concession bid
- The tools implemented in the following phases were not interoperable (as built saved as pdf file, relational database to be populated...)
- The Information System was not expensive in itself (given the dimensions of the property) but the handmade population was very long and therefore expensive
- **Interoperable tools** could solve the problem, saving «survey to as-built» information in a **Common Data Environment**
- Concessionaire paid for the Information System and started planned conservation (Inspection Campaign 2016 with data filing in the IS), but frankly tends to avoid these expenses if not forced by the Public Owner
- **Lessons learned are related to: program, agreements, IT tools**



# A positive case: Zillis (GR, CH)





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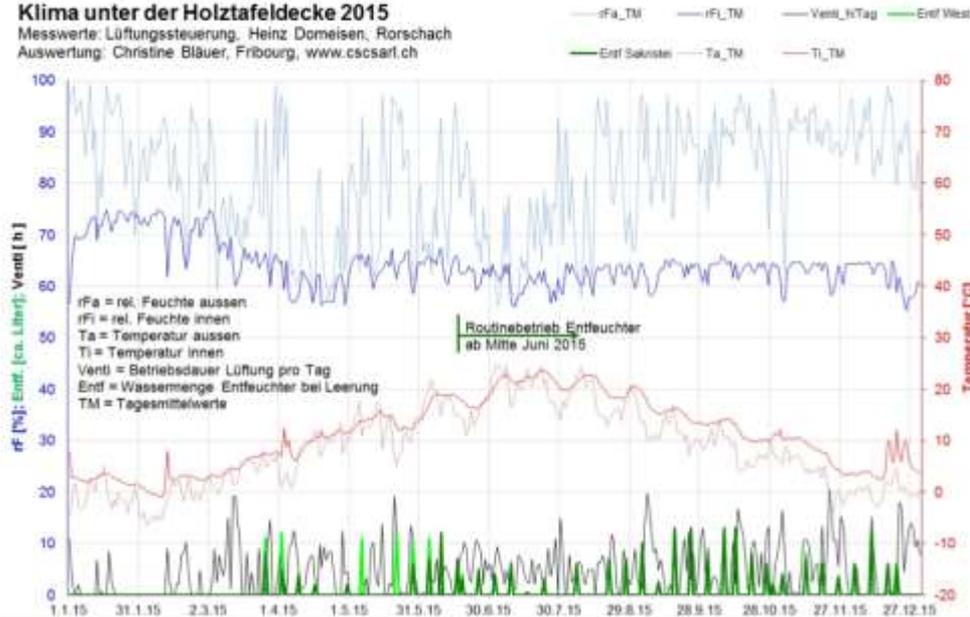




# A positive case: Zillis (GR, CH)

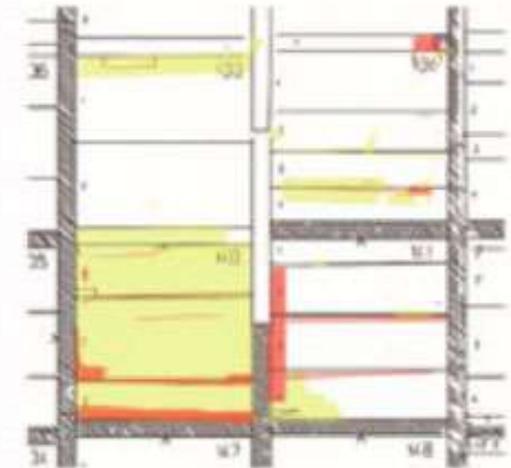
## Klima unter der Holztafeldecke 2015

Messwerte: Lüftungssteuerung, Heinz Domeisen, Rorschach  
Auswertung: Christine Bläuer, Fribourg, www.cscsarf.ch



Continuous control and monitoring of microclimate, structural concerns (leaning belltower), regular gutter cleaning...

Detailed inspection on mobile scaffolding every third year, collected data filed in an Information System





## A positive case: Zillis (GR, CH)

### The costs

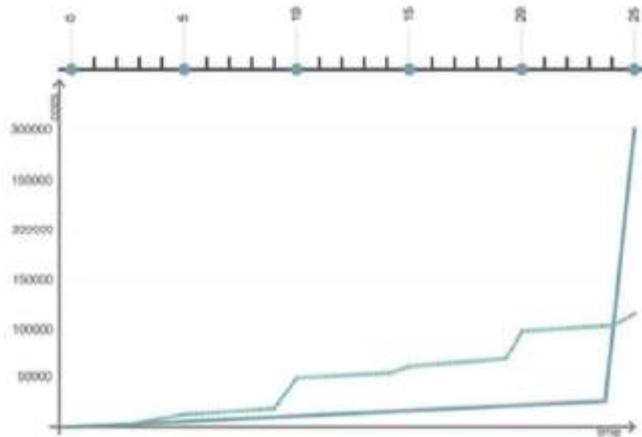
The cost per year is very high ( € 295.000 / three years), as very high are the required skills, as well as the quality of prevention (they are conserving a huge work of art, more than the part of a building)

The cost of the conservation carried out in 2002-2003 has been 4 millions euros (1 for the investigation and project, 3 for the works, paid by the Foundation *Stiftung Kirchendecke Zillis* )

Costs are covered by fundraising (the Stiftung has a person who works for that)

Fundraising has been possible (already for 12 years) because of the **existence value and authenticity value** acknowledged in this unique Romanesque painted ceiling

# Costs of «unplanned» conservation and Risk management



This scheme takes into account decay due to ordinary agents, not extraordinary events (systems failure, natural hazards, climate change...)

We should go to **risk management**, and introduce the **insurance costs** and the activities of **preparedness to risk**.

Systems (electricity, heating, water supply, sewage...) failure can be considered at MICRO level (the owner)

Natural hazards tend to concern the MACRO level (the Public Sector)



*Presidenza del Consiglio dei Ministri*

Struttura di Missione Casa Italia

Rapporto sulla Promozione della sicurezza dai Rischi naturali  
del Patrimonio abitativo

Seismic risk is very high in Italy. Recent events pushed Italian government towards an effort on prevention (safety versus natural hazards) at the largest scale, reasoning of decision making, state investments and insurance strategies

This approach can be inspiring about blending MICRO and MACRO levels



## Damages and financial shocks due to seismic events

I recenti eventi sismici<sup>126</sup> nel Centro Italia (estate 2016 - gennaio 2017) hanno assorbito uno stanziamento di risorse per le aree colpite di circa 9 miliardi di euro<sup>127</sup> per il periodo 2016-2019. La Protezione Civile nel rapporto predisposto al fine di accedere ai finanziamenti del Fondo di Solidarietà dell'Unione Europea (FSUE) ha stimato tuttavia in circa 23,5 miliardi di euro i costi dell'emergenza e dei danni causati dagli eventi sismici in Centro Italia<sup>128</sup>.

In particolare, circa 12,9 miliardi di euro riguardano i danni relativi agli edifici privati, circa 1,1 miliardi di euro quelli relativi agli edifici pubblici e oltre 3 miliardi di euro sono riconducibili a danni per il patrimonio culturale.



# Strategies: awareness, education, financial tools





### WP6 Report may include:

- State of the art: the way planned conservation costs are currently foreseen: expected break even, NPV and owner's attitude
- On field activities carried out and measure of actual costs (WP3. 4 and 5), comparisons and differences due to local factors
- The costs (and required quality) of planned activities (including the costs of ICT tools to support long-term activities and the making of interoperable tools
- Acknowledgment of values and WTP for effective care
- The perception of risk by owners and decision makers
- Good practices for compatible uses and preventive attitudes
- A more comprehensive understanding (public policies, financial instruments and owner's attitude, insurance and incentives, education, externalities, resilient communities...): **link to WP7**



**THANK YOU**  
**for your contribution to**

**changes**