

# The need for integrating Structural / Seismic upgrade of Existing Buildings, in parallel with Energy efficiency improvements

70<sup>TH</sup> ECCE GENERAL MEETING  
LISBON, PORTUGAL

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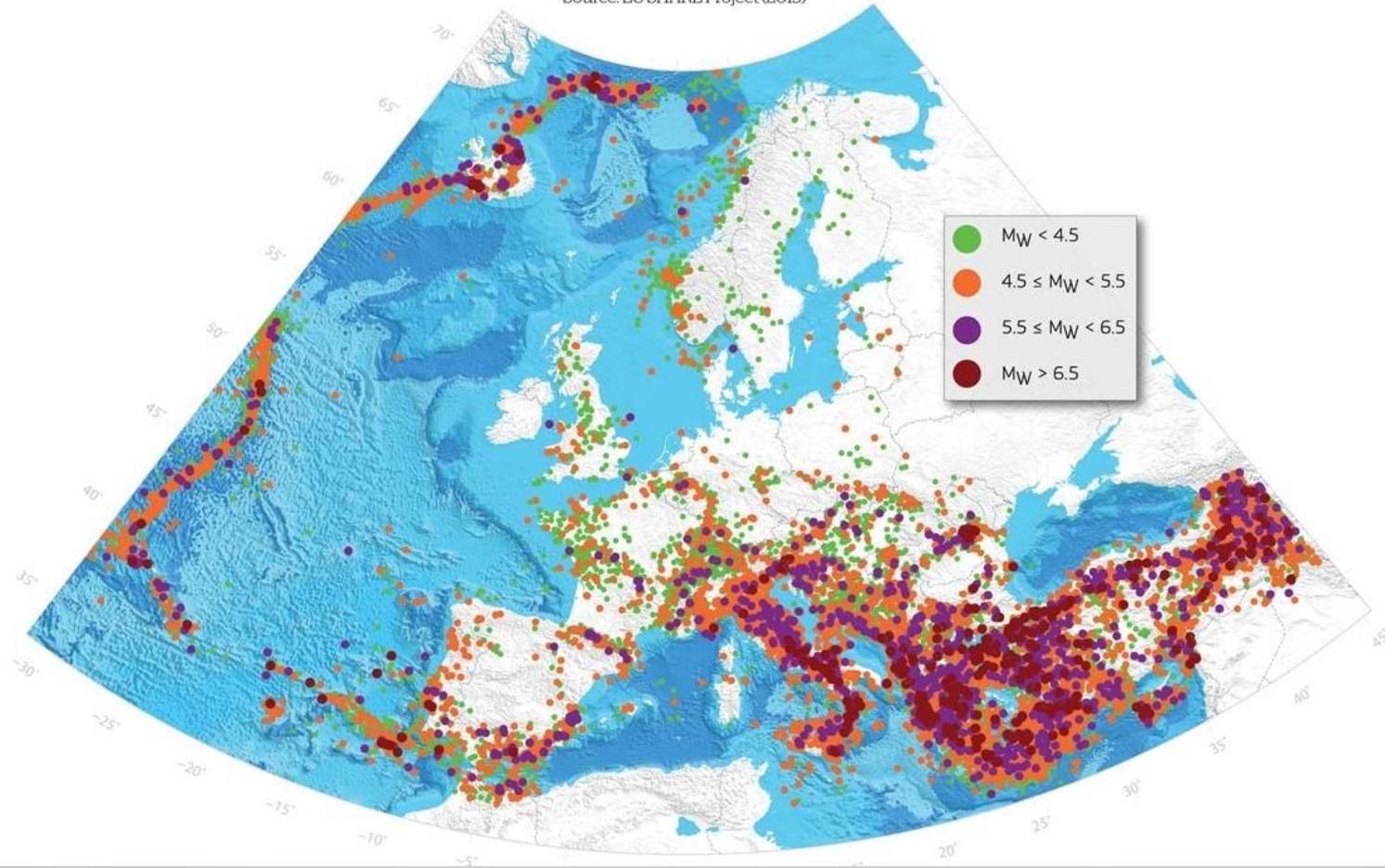
**“INTELLIGENT / SMART BUILDINGS =  
SAFE, SUSTAINABLE and SECURE BUILDINGS”**

**“ - The Three S Approach - ”**

# Earthquake history in Europe

Distribution of over 30,000 earthquakes  
with magnitudes larger or equal to 3.5 for the period 1000 to 2007

Source: EU SHARE Project (2013)



# 1. Position paper – final layout

## A. CONTENTS

1. Executive Summary
2. Introduction
3. Background/Existing knowledge: Sustainability and resilience of existing buildings
4. Scope, definition and objectives
5. Codes and policies on energy and seismic upgrading of existing buildings and review of requirements for new buildings
6. Retrofitting measures for seismic resistance upgrading
7. Recommendations and proposed solutions for integrated solutions for both seismic and energy efficiency upgrading

## 2. Working team

- The Basic Coordination Team is:

a) Eur. Ing. Platonas Stylianou – Cyprus, (P.S.), Coordinator of the working team,

b) Mr. Aris Chatzidakis – Greece, (A.C.)

c) Mr. Andreas Theodotou - Cyprus, (A.T.)

d) Dr Nicolas Kyriakides – Cyprus, (N.K.)

e) Mr. Daniel Bitca – Romania, (D.B.)

f) Mr. Andreas Brandner – Austria, (A.B.)

g) Dr. Branko Zadnik – Slovenia, (B.Z.)

h) Mr. Paul Coughlan – U.K. (P.C.)

i) Mr. Ivan Paska – Croatia (I.P.)

- But contribution from all Countries members of ECCE is needed, since many countries have Experts and Professionals, that can help and contribute in the preparation and appraisal of the position paper.

# 3. Scope

- Our aim is to ensure sustainability, resilience and safety of existing buildings through structural or seismic upgrading against seismic and other dynamic actions and also to enhance energy efficiency.
- The solution provided should follow **a holistic approach** to address these issues simultaneously and link individual retrofit/upgrading activities in an integrated procedure. One of the most important issue, which defines the way of living, **is safe, sound, and secure buildings (the three S approach).**
- That is why there is a need to for a firm position paper, in order to convince E.U. member states and Brussels to grant funding for the Structural and/or Seismic Upgrade of the buildings, together with the grants given for the upgrade of the energy performance of buildings, under Directive 2010/31/EM, of the European Parliament and of the Council of 19th of May 2010.



# 4. QUESTIONNAIRE

Ref: 151.GE.V05.2018

**QUESTIONNAIRE**

**Title:** "The need for integrating Structural / Seismic Upgrade of Existing Buildings, with Energy Efficiency Improvements".

**Dear Colleague, please complete the following questionnaire and give us all details available, Name and Surname:**

**Email:**

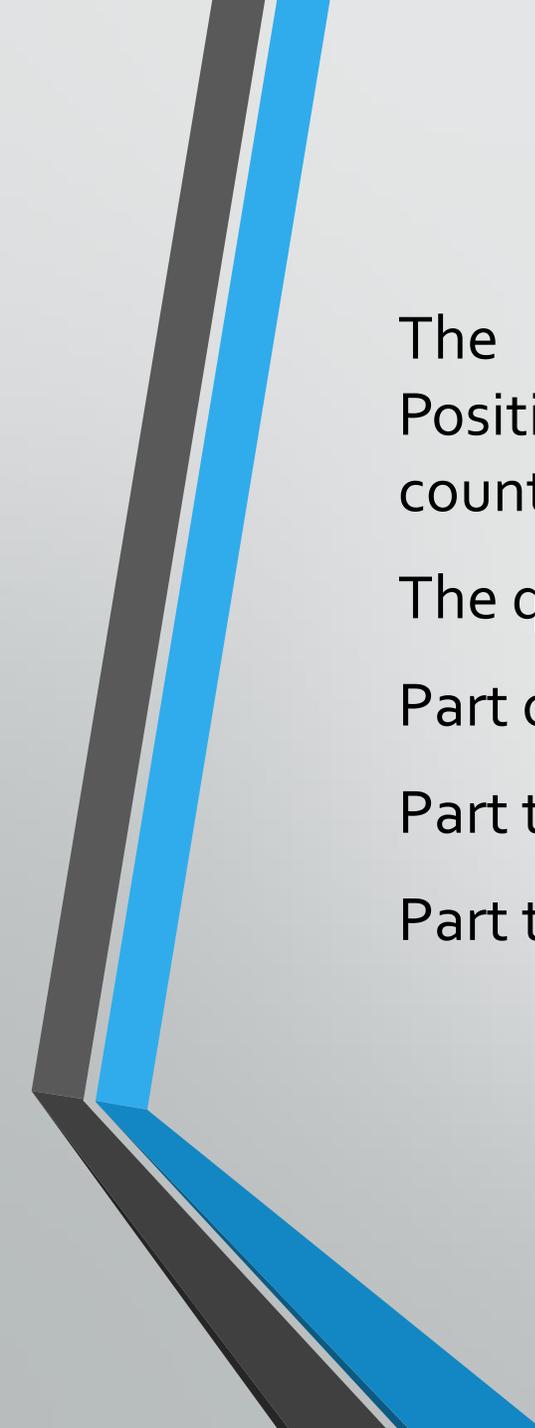
A/A	QUESTIONS
I. General	
1	Does your Country suffer from earthquake or other dynamic loading problem or other combination of dynamic loadings and if yes approximately how frequently –Please attach historical records, if possible.  <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....
2	When was the last major / serious earthquake or other dynamic event that took place in your Country that affected the stability of buildings and civil works? What was the intensity? ..... .....
3	Were the affected buildings or civil works repaired? Do you know what was the amount of money needed in order to repair the above? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....
4	Please briefly explain what damages does it causes (with regard to buildings, roads, bridges, etc.) ..... .....
5	Where there any fatalities or serious injuries? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give data. ..... .....

Ref: 151.GE.V05.2018

6	What was the time needed in order to fix the damages and to reinstate smoothly operation? ..... .....
7	Are you aware of any special measures or others means applied, to mitigate/prepare for these events in your Country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....
II. State regulations/legislations and concrete experiences.	
8	Is there a legal or technical guide/regulation on Energy Efficiency Upgrading of existing buildings in your Country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details (attach as well the Regulation or legislation). ..... .....
9	Are there any legal or technical regulations/codes related to Seismic or Structural strengthening or upgrades in your Country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details (please also attach the Regulation or legislation). ..... .....
10	Are the Eurocodes applied for seismic assessments and seismic/structural strengthening of existing buildings in your country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> if yes give details ..... .....
11	Are there incentives provided by the government, to individuals, for structural upgrades / renovations / seismic upgrades in your Country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....

Ref: 151.GE.V05.2018

12	Have you received any training related to seismic and energy efficiency upgrading? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....
13	Have you participated in a workshop/conference on the above topics? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes give details. ..... .....
III. from practice	
14	What are the most common building categories in your Country, regarding existing buildings build before 2000 and how many storeys are they? ..... .....
15	What is the most widely used construction material for those buildings? ..... .....
16	What is the common technique/material used for energy efficiency upgrading of existing buildings? ..... .....
17	What are the most widely used techniques/applications for seismic strengthening of existing buildings? ..... .....
18	Do you have unmaintained, deteriorated or abandoned buildings that suffer structural deficiencies/material degradation in your Country? <div style="text-align: right;"><input type="checkbox"/> Yes <input type="checkbox"/> No</div> If yes can you please give us numbers or percentage with regard to the total? ..... .....



The questionnaire contributed significantly to the elaboration of the Position Paper, with the results given representing the data from the ECCE countries.

The questionnaire was divided in three parts.

Part one, was the General part with 7 questions,

Part two, was the State Regulation/ legislation part with 6 questions, and

Part three, was the Practice experience and included 5 questions.

# 5. Feedback from countries

After the dissemination of the questionnaire the feedback was:

- from Greece,
- from Malta,
- from Slovenia,
- from Bulgaria,
- from Germany,
- from Poland,
- from Russia,
- from Serbia,
- from Cyprus, and
- From U.K.

# 6. Meetings and Presentations

- On 27<sup>th</sup> of November 2018 we had an important meeting with the European Commissioner Mr. Christos Stylianides regarding the topic of “intergrading structural upgrades with energy efficiency upgrades”.

## Participants:

Mr. Christos Stylianides (European Commissioner for Humanitarian Aid and Crisis Management),

Mr. Zacharias Giakoumis (Cabinet of Commissioner),

Mr. Aris Chatzidakis (President of ECCE),

Mr. Platonas Stylianou (ExBo ECCE member),

Mr. Andreas Theodotou (President of CYACE).



Memo regarding all topics discussed was created and send to EXBO on 12<sup>th</sup> of December 2018.

**MEMO of the meeting with the European Commissioner Mr. Christos Stylianides on the topic of "intergrading structural upgrade with energy efficiency".**

**Participants:**

Mr. Christos Stylianides (European Commissioner for Humanitarian Aid and Crisis Management),

Mr. Zacharias Giakoumis (Cabinet of Commissioner),

Mr. Aris Chatzidakis (President of ECCE),

Mr. Platonas Stylianou (EXBO member),

Mr. Andreas Theodotou (President of CYACE).

The European Commissioner for Humanitarian Aid and Crisis Management opened the meeting and welcomed the participants. He briefly explained his role and duties as an EU Commissioner and the new project named RescEU that he manages to achieve for prevention and preparedness (see attached documents).

The President of ECCE Mr. Aris Chatzidakis thanked the Commissioner for accepting us and made the necessary introduction explaining the ECCE organization, scope, members and history and make a short introduction to the problem of structural vulnerability and the necessity of structural and seismic upgrade in parallel with the necessary energy upgrades and to the scope of the meeting. Then he explained to the commissioner that we need to raise awareness for the safety of buildings.



Mr. Platonas Stylianou explained briefly the problem and that one of the most important issues, which defines the way of living, is Safe, Sound, and Secure building. He also explained the scope of the position paper and that the aim is to ensure sustainability, resilience, and safety of existing buildings through structural upgrading against seismic actions and enhanced energy efficiency. Then,

he briefly explained the questionnaire prepared and the feedback that we are waiting from ECCE members. He also explained that when the position paper will be finalized, it will be disseminated in various ways (conferences, publications, media presentations, national professional boards, etc.) to raise the attention and ensure its continuation as a major European project in order to understand the need of structural and seismic upgrade in parallel with the necessary energy upgrades and to attract EU funds for that purpose.

Mr. Andreas Theodotou analyzed the importance of structural upgrading of existing buildings against seismic actions for many European Countries and how it could be possible to be combined with the energy efficiency upgrading of the buildings. Finally, he pointed out that this target would be possible by European and National funding.

Finally, the Commissionaire explained to us that since elections are coming soon, it is not the time and

it's not easy for changes and a new era to occur. But he also explained to us that if we want to succeed then we need to continue with more pressure and more meetings with the country stakes of EU and the newly elected parliament members since it is a mere fact that we need and Europe needs Safe, Sound and Secure buildings and most probably a way will be found than EU grand to be given for that purpose. But the countries may need to contribute to that through their structural funds.

All participants agreed that lobbying is necessary in order for politicians and other people of influence, who are decision makers, to understand the necessity of "The need for Structural / Seismic Rehabilitation of Existing Buildings, in parallel with Energy Efficiency Improvements".

The conclusion of the day was made by the Commissioner saying that always "Prevention is better than Cure".



**ADDITIONAL COMMENTS:**

According to my personal opinion more need to be done in the future BUT the first step has been made. Lobbying needs to be continuously done and carried out toward that trend as well explained to the commissioner. Each country needs to do some lobbying

through their national European parliament members and all stakeholders need to understand and support the idea.

The arranged meeting was well prepared and explained to the Commissioner who was frank, really friendly and supported the idea. I strongly suggest to continue discussions with Parliament members and the EU commissioners regarding all issues that need to be supported and funded by EU and are within ECCE and Civil Engineering scope.

The memo was prepared by Platonas Stylianou, ECCE ExBo member.

08.12.2018

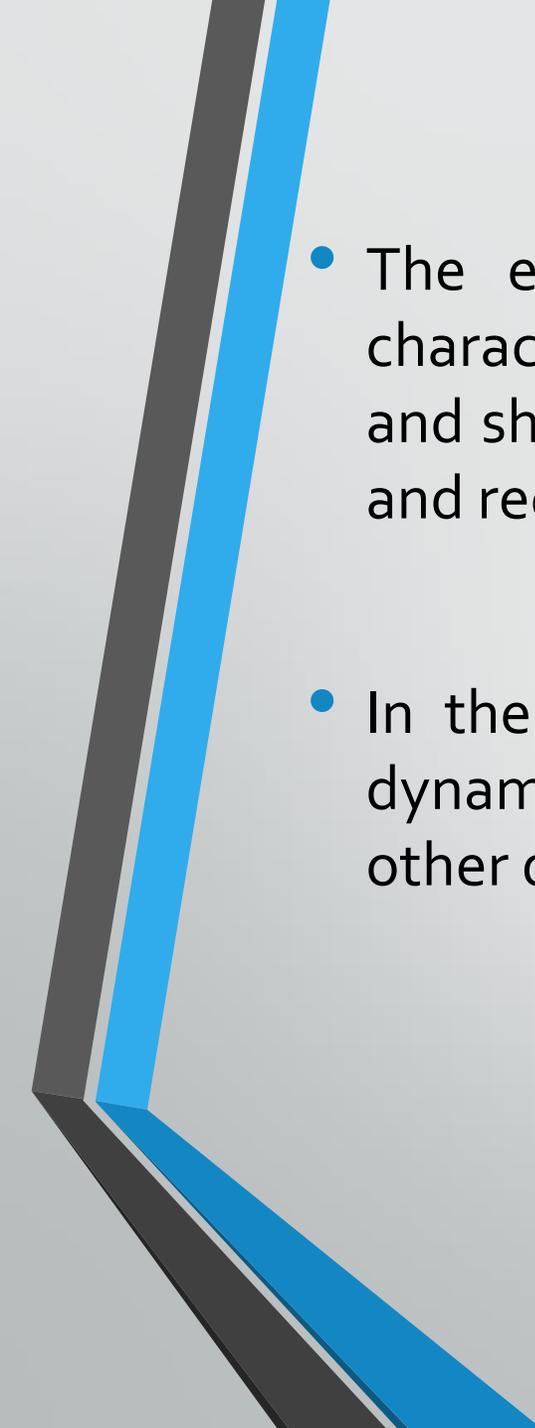
## PRESENTATION AT FEANI SOUTH REGIONAL MEETING that took place on 20<sup>th</sup> of May 2019

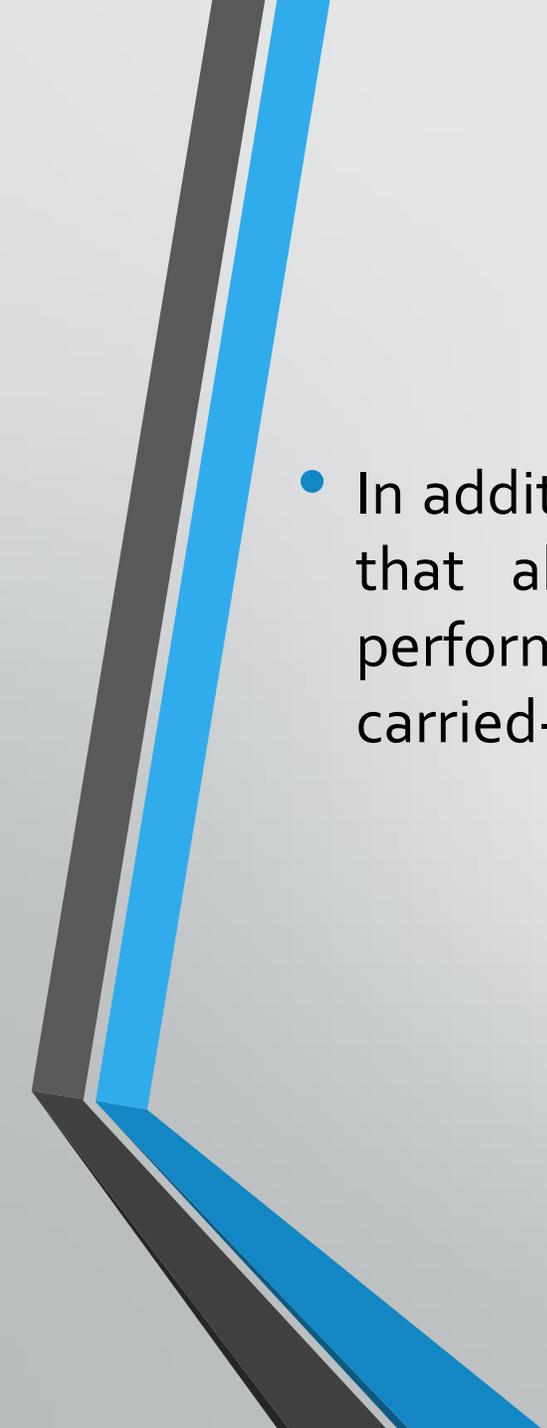
- During the framework of the above conference, I presented the work done for the creation of the Position Paper, which its target is to emphasize the need to assess and structurally upgrade (if needed) existing buildings, when they will be Energy Upgraded.
- Also explain that we have nothing against energy improvements, **actually we encourage energy improvement of Buildings**, But together with structural / seismic upgrade of buildings
- My presentation was disseminated by Mrs. Maria Karanasiou – ECCE General Secretary, to ExBo.

## 7. Proclamation letter / **Manifesto**

**“The need for integrating Structural / Seismic Upgrade of Existing Buildings, in parallel with Energy Efficiency Improvements”.**

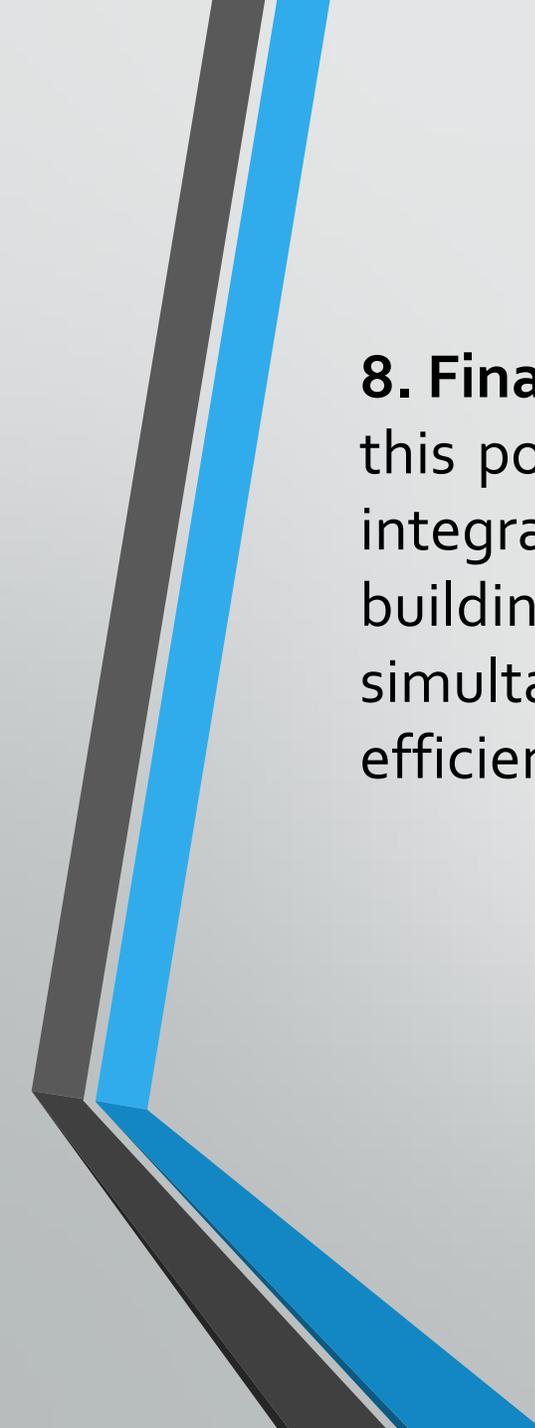
- The majority of the existing building stock in most European countries built in the 80s, 70s or earlier, lack of modern design standards including the requirements for seismic safety and energy efficiency. **One of the most important Human rights is to possess Safe, Sound and Secure building (the three S approach).**
- Thus, based on their date of construction, the vast majority are deficient both in terms of energy and seismic resistance. This creates the need for the society (public and engineers) to take actions to keep and maintain the building stock in operational, reliable and resilient state in order to ensure primarily the safety of the users.

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- The extent to which a building can resist loads, depends mainly on the characteristics of its lateral load resisting system – L.L.R.S. (i.e. columns, beams and shear walls). Most existing buildings do not pose significant lateral resistance and require upgrading to increase their structural efficiency.
  - In the case of the aging existing buildings, the lack of consideration for any dynamic effect means this building stock is more vulnerable to earthquakes and other dynamic effects.

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- In addition, as a building is exceeding its design life -of 50 years??., it means that along with strengthening interventions to improve the seismic performance, durability, structural and energy assessments should also be carried-out to ensure functionality and thus safety and comfort for the users.

- In the last decade the importance on the energy front has been highlighted. Increased energy consumption lead to adverse environmental impact (e.g. climate change). Therefore, for the building sector the energy efficiency term is introduced, which is highlighted by Europe's aim to reduce by 2020 the Greenhouse emissions by 20% and achieve 20% energy savings [EPBD recast, 2010/31/EU].
- The building sector accounts for large energy consumption in EU with the European households using nearly the 70% of the consumed energy in the form of electrical energy. Unfortunately, the importance of Safety has not been highlighted or considered enough.

- Currently, from a sustainability perspective, emphasis is placed on developing an integrated structural and energy design methodology for new buildings that should be preferred over individual actions to ensure a Sustainable Structural Design **(SSD)**. However, for existing buildings, especially of a certain construction age, the problem of seismic and energy inefficiency is of primary importance and a similar in concept approach is required to provide upgrading on both fronts.



## **8. Finally,**

this position paper aims to review and examine the parameters involved in an integrated holistic approach to enhance the overall performance of existing buildings and provide solutions to close the gap, regarding the beneficial simultaneous refurbishment of the structural / seismic capacity and energy efficiency of existing buildings.

The new trend nowadays is ... smart financing for smart buildings.

But, a building can only be called smart .... once it is "safe, sound and secure" the three S Approach.

So, as ECCE we PROPOSE to declare year 2020 as ... The Year of the three S Approach (ECCE Moto for 2020).



THANK YOU FOR YOUR  
ATTENTION!