

Recent development of building materials



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General drivers

- Energy efficiency
- Material efficiency
- Indoor environment
- Health issues
- Service life



Energy efficiency

- Buildings use less and less energy during the service life
- This is achieved by using better insulation materials and building services
 - New insulation materials
 - Closed cell foams
 - New barriers
- Effect of embodied energy increased
 - Normal building <10 %, passive house ~50 %, zero energy house XX%



Material efficiency

- Use of non-renewable material should be lowered
- Renewable, recycled and bio materials are more and more interested
- Natural materials and processed bio-based
- Natural fibres
- Bio-polymers
- Composites



Indoor environment

- Thermal comfort
- Acoustic comfort
- Odour comfort
- Lighting comfort
- Performance of buildings is in higher level



Health issues

- Volatile Organic Compound, VOC
- Formaldehyde, Radon, Particles, Fibres
- Bio-activity and biocides
- Impurities from outside and human activity
- Fire behaviour



Service life, Durability and maintenance

- Material efficiency and embodied energy needs many time long service life
- Service life expectations 50, 100 or 200 years
- Maintenance must be designed and easy to perform
- Chance of components not the whole structure - if needed

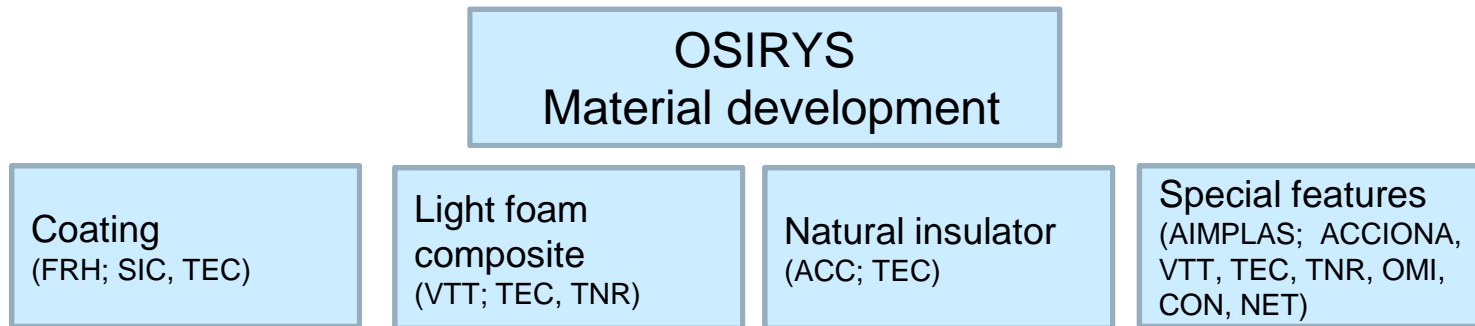


OSIRYS

- Project will look to improve indoor environmental quality and energy efficiency by developing forest-based bio-composites and products for facades and interior partitions. These new technologies can then be applied in retrofitting and new building construction.
- It is expected that biomass feedstock in each building element will be >75%, what allows to reduce embodied energy on building materials by more than 25%.
- Research activities will include:
 - development and testing of the new eco-innovative materials;
 - design and engineering to ensure the technical viability, aesthetical aspect and ease to incorporate the system in building retrofit actions;
 - LCA and evaluation of the reuse and recycling;
 - study on the adequateness to the requirements of the Building Code;
 - demonstration activities by applying the final system in a test building and in two new buildings in Spain and Sweden to make validation in two different climates and cost effectiveness assessment.



Stakeholder Panel Meeting, 9th May 2014, Paterna (Spain)



- Active coating able to eliminate VOCs and mould from indoor air. The solutions will be based on titanium dioxide using additives/doping. Adaptation of such coatings to biocomposite surfaces.
- Development of insulation products based in foaming of biocomposite and fibres, to improve both thermal and acoustic performance.
- Cork panels with better fire and fungi resistance, to improve both thermal and acoustic performance.
- Functionalization of biocomposites:
 - improvement of durability of biocomposites with coatings,
 - development of biocomposites with high mechanical performance by means of long natural fibres and graphene,
 - development of biocomposites with fire performance by means of additives and chemical modifications.

Thank you for your attention

