Forest-based Sector input to FP7 Work Programme 2013

Compilation of the topics by the Wood Value Chain

Draft 30 June 2011

List of Topics

Proposed Topic

1. ***Phytosanitary treatment and control methods for imported/exported wood-based raw materials and wood products***

Justification:

Free exchange of goods (raw materials as well as products) between continents and countries is an indispensable requisite of a globalized business environment. Utilisation of renewable resources will become more and more important in the near future. But, most of these renewable resources, as well as the resulting products, may carry harmful insects which when release at the place of delivery may cause serious problems to nature and environment.

Scope:

Research has to focus on ligno-cellulose raw materials such as wood, bamboo, hemp, etc. which is imported or exported to generate energy or to be processed into building materials or consumer goods. The treatment methods to be developed shall be safe, environmentally friendly, cost effective and applicable to large quantities, preferably in continuous form. The treatment methods proposed shall be capable of being integrated into certification schemes. Preferably the treated product should be distinguished from untreated or ineffectively treated material by a durable marking system or low cost measuring systems.

Recommended size (instrument) and duration:

Medium scale collaborative project - 3 to 4 years

Expected impact:

The results will lead to ready to use methods for phytosanitary treatment of large volumes of natural lingo-cellulose materials and products. After implementation the novel system will support the international trade of lingo-cellulose raw materials and products and reduce the risk of spreading harmful insects and pest.

Proposed Programme: KBBE

Proposed Topic

2. Acoustic solutions for light weight constructions

Justification:

In many European countries multi-storey timber buildings become more and more a reality. Timber as a structural material for multi-storey buildings includes many advantages. In contrast to buildings made of other materials, the dead load of buildings with timber-based structures is low implying a behavior different from heavy constructions when concerning vibrations and acoustics. In order to design and justify good acoustic and vibration behaviour of light weight buildings as for example timber buildings, it is important to develop evaluation methods as well as design methods.

Scope:

Interdisciplinary research and testing of full scale timber structures, roofs and their components will generate new knowledge that will facilitate the design process and the construction of high sound insulated buildings. The results of the project will lead to the development of evaluation criteria for light weight construction systems and new and efficient innovative constructions systems with respect to acoustics and vibrations.

Recommended size (instrument) and duration:

Large scale collaborative project, 3 years

Expected impact:

The development of common European evaluation criteria for light weight construction systems and the development of a number of efficient innovative constructions systems with respect to acoustics and vibrations will increase the use of light weight building materials. This will foster the use of timber as a renewable, energy efficient and CO_2 neutral building material.

Proposed Programme:

Proposed Topic

3. Fire safe use of wood

Justification:

Existing building regulations in Europe show a wide variation of concepts and requirements. This causes a major barrier for trade, complicates use of engineering tools and causes additional costs for the building industry.

The use of fire design concepts instead of large-scale and wide ranging testing programmes is the most time efficient and commercially viable way forward for timber products and their uses in construction. With the implementation of the Eurocodes suite all construction materials have the opportunity to prove their performance levels in a unified safety concept.

The new opportunities for timber are apparent and exciting but require back-up information to facilitate the implementation of their full potential. Currently designers are unclear about the use of the new possibilities and lack support data, mainly on the performance parameters of timber products to be used as input to the models.

Existing fire retardants can easily be leached from the wood and so are unsuitable for exterior use. At the same time, there is increasing pressure to use wood in construction and a growing acceptance of the use of wood for multi-storey buildings. Consequently, new fire retardant formulations are needed that can be used for the exterior of multi-storey wood-clad buildings.

Scope:

The project will develop comprehensive and scientifically robust fire related background data, which is presented in user-friendly and adapted tools for engineers and other stakeholders. A knowledge base will be built by promoting core competence and multidisciplinary research. Knowledge transfer between research and industry will be facilitated thanks to the project network. Environmentally benign fire retardant chemicals and fire retardant formulations for wood in exterior use shall be proposed.

Recommended size (instrument) and duration:

Collaborative project, 4 years

Expected impact:

The vision of the project is to ensure that the wider use of wood in buildings will be associated with improved fire safety. The programme and its outcome is to facilitate and lead to simplified and quicker approval processes for wood products in buildings. This will increase the general public's confidence and positive perception of and about wood products. This will foster the use of timber as a renewable, energy efficient and CO_2 neutral building material.

Proposed Programme:

Proposed Topic

4. Resource efficient use of wood; responsible recycling of wood products

Justification:

Waste wood has been recycled in to other products for many years. An obstacle preventing 100 % utilisation of recovered wood is ensuring its cleanliness and sorting of qualities for use as a raw material for another solid or engineered products or bioenergy products. Currently, the cleanliness of recovered wood is reliant on:

- Disposers and recyclers efficiently sorting treated (which includes all surface finishes and chemical treatments) and non-treated wood in to appropriate categories
- Manual "hand picking" stations to remove gross contaminations, i.e. metal, glass, plastic and treated wood
- Physical sorting, i.e. sieving, air classifying, magnets, eddy-current drums, etc. to remove smaller non-wood contamination

Unfortunately, current cleaning techniques are far from 100 % effective and the separation of contaminated from clean wood or chips from wood based value chains and building and packaging stocks is currently impossible. A system that could achieve this would make it very much easier to recycle wood because wood from all sources could be processed together. The amount of contaminated recovered wood on the market is expected to increase as well the demand for wood in the bioeconomy (raw materials, energy source, biorefinery). Better cleaning and sorting techniques are needed to augment the efficient use of recovered wood to its full potential.

Scope:

A thorough study on the quantities of wood present in different waste streams in order to estimate the amount of wood available for recycling or energy is needed, including an investigation of types and concentrations of contaminants (i.e. non-wood) present in wood recovered from different waste streams. Analytical systems that are capable of detecting different contaminants in real time shall be developed together with material and particle sorting systems enabling the sorting of clean from contaminated wood particles and impurities.

Recommended size (instrument) and duration:

Collaborative project, 3 years

Expected impact:

More recovered wood will be used as a raw material resource thanks to the improved cleanliness and the improved separation of materials suitable and unsuitable for recycling. The maximisation of the amount of recoverable wood will further increase the resource efficiency in the sector and reduce the volume of wood that should be sent to special incineration facilities.

Proposed Programme:

Proposed Topic

5. Building concepts for massive wood constructions

Justification:

In many European countries multi-storey timber buildings become more and more a reality. Timber as a structural material for multi-storey buildings includes manifold advantages. In contrast to buildings made of other materials, timber is an ecologically sustainable construction material and provides good properties in terms of building physics. Especially in cities new and massive timber constructions for public and private buildings become more and more popular. The statically highly stable and large-format prefabricated elements allow short construction periods and dry construction methods which offer a fast possibility for occupancy.

But compared to the building systems already available on the market these new products lack so far the possibility to be interlinked and used in one construction. There are needs for suitable interfaces and building systems and concepts to module constructions.

Scope:

The project should develop building concepts for massive wood constructions and open up the possibility to use different building systems with different construction materials in one construction.

Recommended size (instrument) and duration:

4 years

Expected impact:

Development of a modular system for massive construction systems.

Development of connectors and interlinks for those constructions

Based on such kind of systems open up the European market for massive wood and wood elements on a broad basis.

Proposed Programme:

Proposed Topic

6. VOC performance of building materials and overall VOC performance of buildings

Justification:

People in modern societies spend most of their time indoors; at home or work, in school and in transit. In average, we spend 90% of our time indoors. Consequently, it is easy to appreciate the quality of indoor environment - the environment where we mostly spend our time. Improving the quality of indoor environment enhances both our wellbeing and our performance. Building materials constitute an important emission source of volatile organic compounds (VOC) both in buildings several dozen years old as well as in newly constructed buildings. That is why attempts are constantly made to find construction materials that emit only small quantities of VOCs or those that release compounds which are neutral to our health and to our general physical and mental condition. There is the scientific evidence that indoor air quality (IAQ) and environment pollutants originate from multitude of sources. However, the current practices focus almost solely to individual building materials and their emissions. Due to that the scope of research needs to be extended to overall performance of buildings ensure the healthy and comfort indoor air environment.

Scope:

The research shall define the performance of building materials and buildings to ensure the healthy and comfort indoor air environment. In this way it will provide a comprehensive basis in order to result in valuable health data and planning tools to the building industry for the assessment of health related aspects of a building. The networking between research and industry and towards authorities will increase the knowledge transfer between all actors in the building sector.

Recommended size (instrument) and duration:

3 years

Expected impact:

The results will characterize human health performance of building materials widely used in public and private buildings. The creation of new tools and methods which support the safety design and use of buildings materials, especially with regard to the impact on the indoor air climate will ensure a healthy indoor air environment in buildings. The overall analysis of the factors affecting IAQ and toxicological and psychological evaluation of correlation of in-situ existing indoor environment and human health are essential for safeguarding the well being of European Citizens.

Proposed Programme:

ENV

Proposed Topic

7. ***Using the potential: development of cutting edge materials for a new generation of resource efficient sustainable consumer products with specific characteristics***

Justification:

Europe produces today already 35% of all forest-based products on the global scale but has only 5% of the world forest area. There is even much more potential to contribute to the sustainable development of Europe by developing and producing a new generation of resource efficient, sustainable and knowledge-based consumer goods. Large and growing parts of western, central and northern European forest area consist of hardwood with very specific features that builds a unique resource. To increase the sustainable use of the dominant species like oak, beech, birch and chestnut, their specific and unique wood characteristics should be taken into consideration in technology and product development and marketing planning.

Scope:

Consumer and industrial products based upon the specific features and new materials for indoor and outdoor applications like e.g. furniture, leisure products, building materials, functional components in vehicles etc, must include functional and aesthetic designaspects as well as enhanced end of life use. A cross-sectoral and cross-disciplinary research will lead to a new generation of knowledge-based eco- and consumer friendly consumables and building, packaging and transportationmaterials.

Recommended size (instrument) and duration:

4 years

Expected impact:

The project shall develop knowledge-based eco- and consumer friendly products and superior technical products for industrial users in which eco-design and aesthetic aspects are integrated in the requested functionalities and the technical-economical competence of consumer and industrial products. The competitiveness of the European hardwood species will be strengthened together with the rural areas with high potential where these species grow and that are currently underdeveloped.

Proposed Programme:

Proposed Topic

8. Seismic research in timber structures and roofs

Justification:

In many European countries multi-storey timber buildings become more and more a reality. Timber as a structural material for multi-storey buildings includes manifold advantages. In contrast to buildings made of other materials, the dead load of buildings with timber-based structures is low implying high requirements on anchoring against wind loads as well as earthquakes, but the performance of timber structures to resist or adjust to earthquakes are unique compared to other building materials and structures.

In order to secure a good performance of timber buildings it is important to understand the structural behavior of buildings and roofs under different exceptional environments and conditions (earthquakes, storms). Interdisciplinary research and testing of full scale timber structures, roofs and their components will generate new knowledge that leads to a new generation of optimized safe buildings in areas with high risks of earthquakes and storms.

Scope:

Optimisation of the building and roof structures (light-weight building concepts) through better understanding of their structural behavior

Recommended size (instrument) and duration:

4 years

Expected impact:

development of new wood-based structural elements for the use in multi-storey buildings with in areas of high risks for earthquakes and storms .

development of a new generation of resource efficient, sustainable building products guaranteeing best performances for specific applications

strengthening the competitiveness of timber structures especially in high risk areas with regard to wind and earthquakes

Proposed Programme: