



# Building with wood

“Wood and wood products to become the leading material in construction and interior solutions by 2010” (Vision Roadmap)

## Status report

### 1st workshop – Implementation of the Slovenian Strategic Research Agenda

Ljubljana  
June 7th 2006



## Vision

- “Wood and wood products to become one of the leading materials in construction and interior solutions in terms of value by 2010”

## Mission

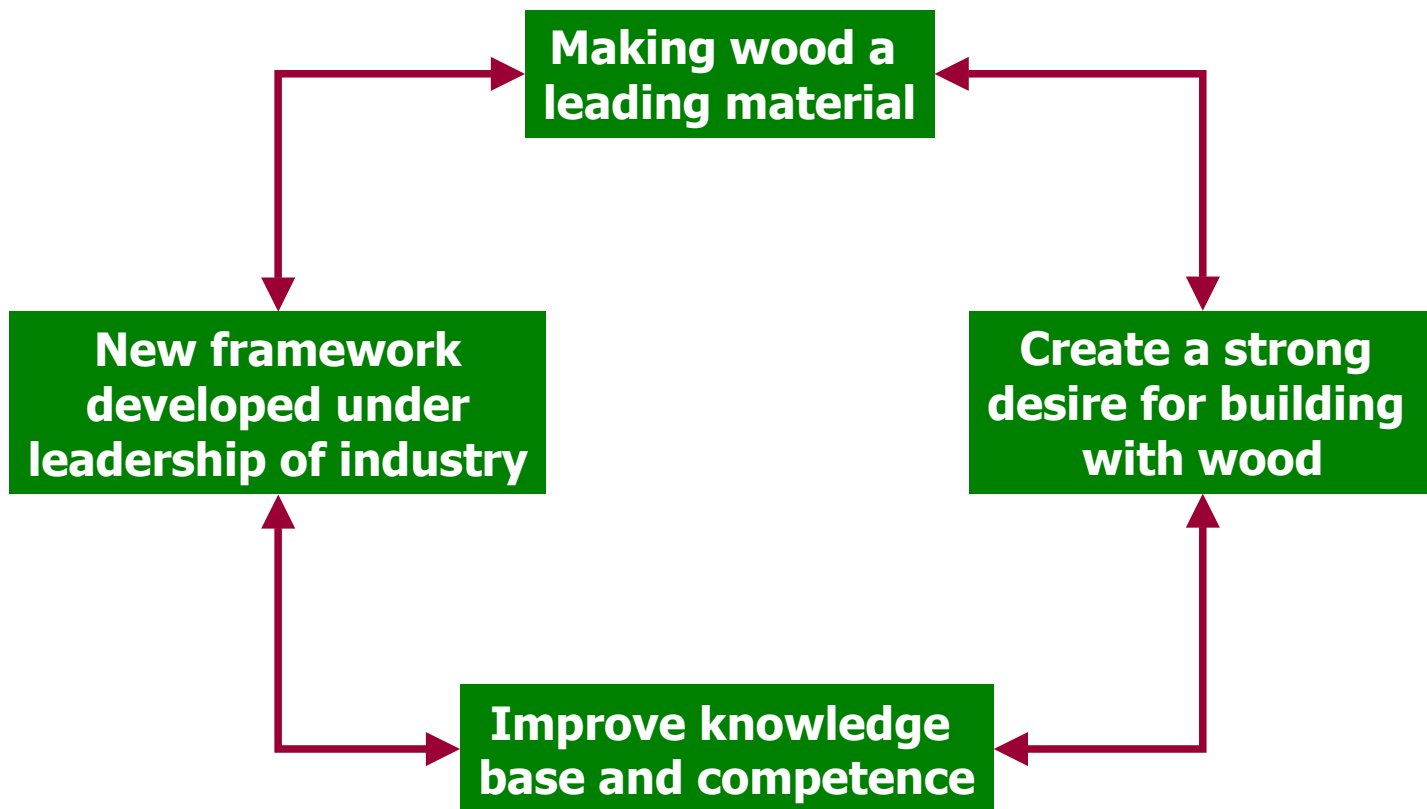
- „The industry takes the lead to promote wood as a sustainable building material by establishing a new European framework for the use of wood for mass market development and for high standard engineered and architectural solutions.“

## Objectives

- “Double the market share of wood and wood products in terms of value in construction in Europe by 2010 ”



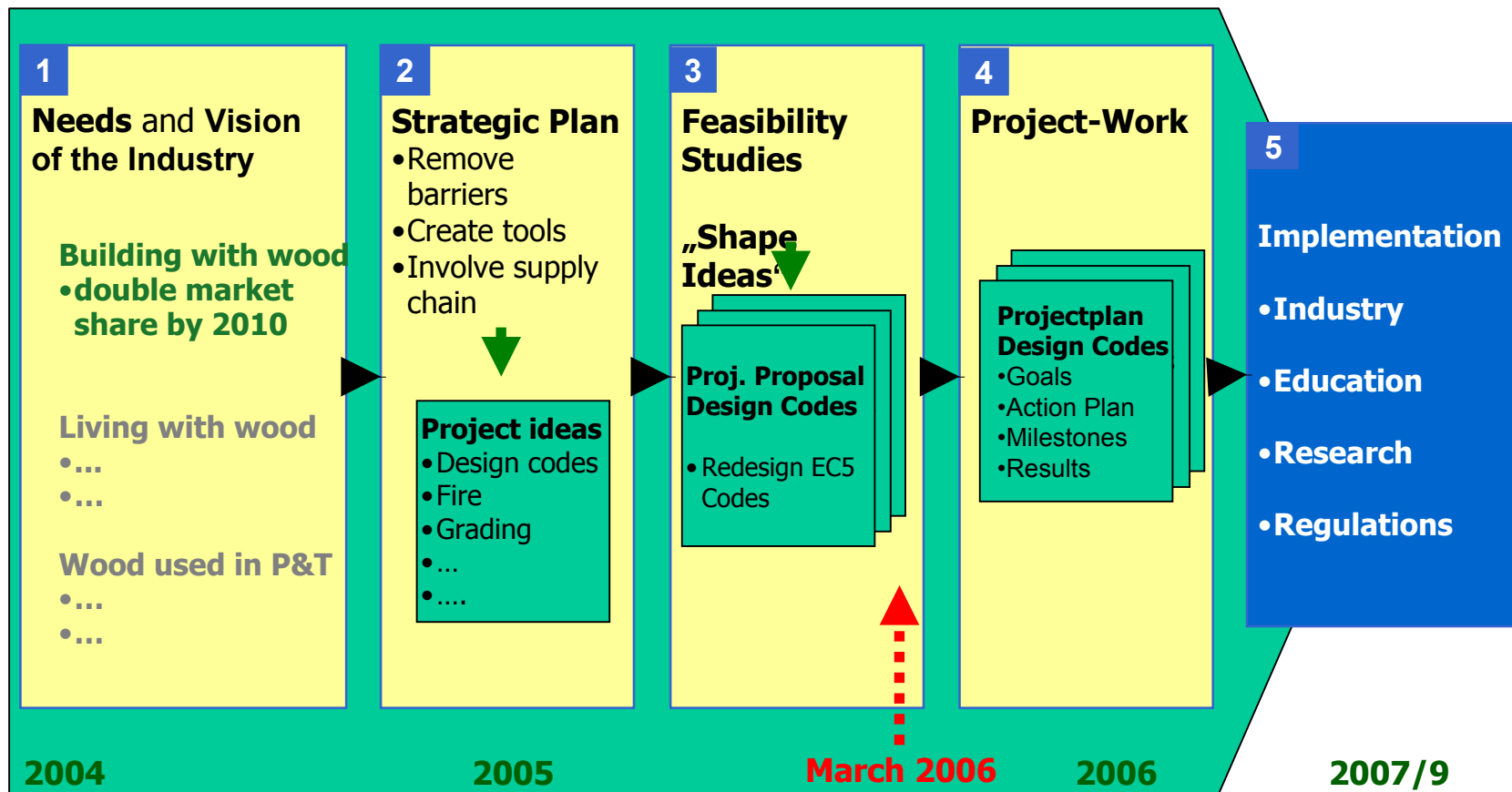
## Core Strategies





# Building with wood: Process

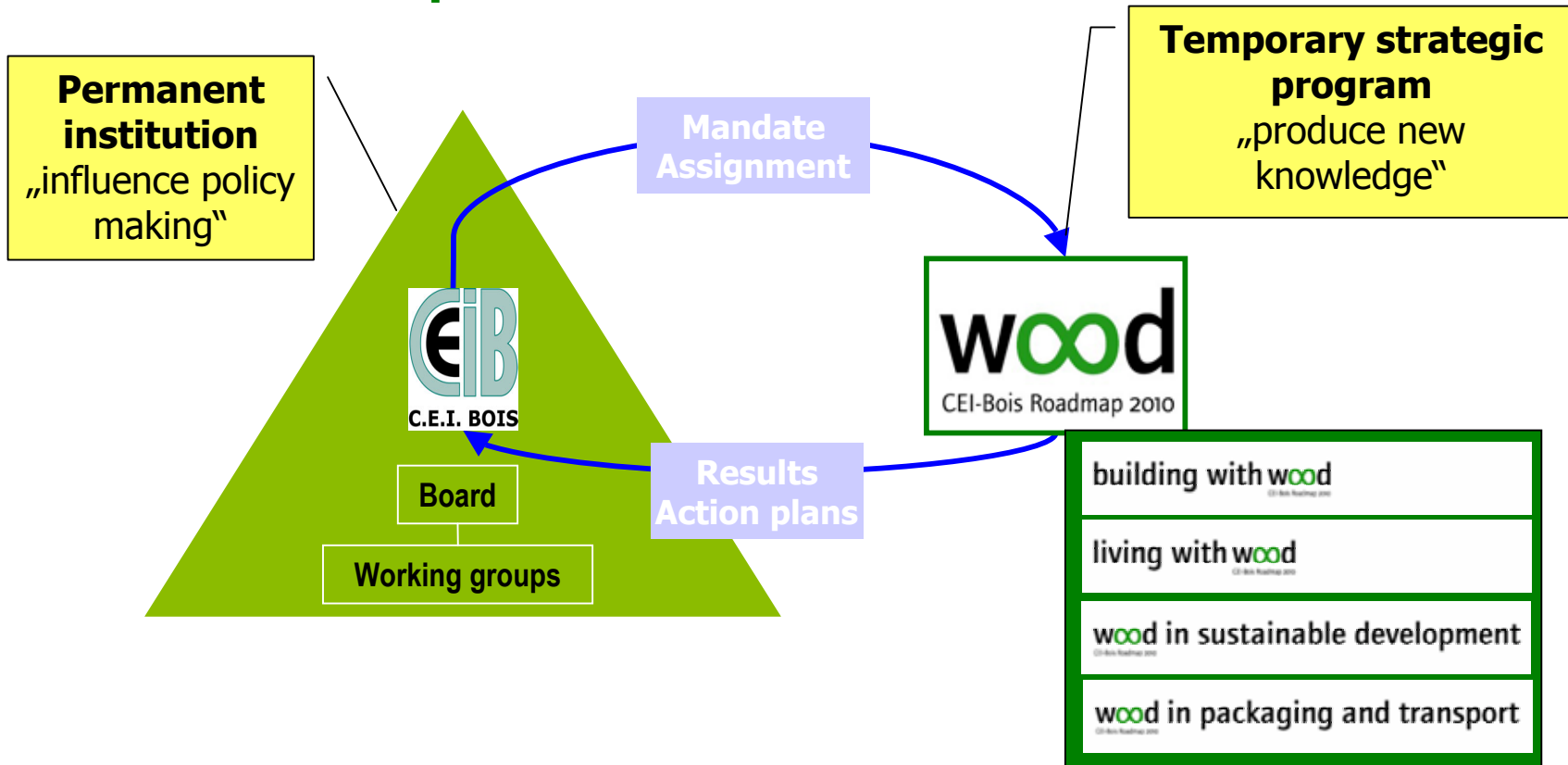
Building with wood: program overview





# CEI-Bois Roadmap

Building with wood: program overview



**Important:**

- **Branding:** CEI-Bois + Roadmap 2010 should be closely connected
- **Core message:** Wood is a **safe** building material, you can **trust** in



## Steering Group

- Laura **Lares**, UPM Kymmene
- Josef **Rettenmeier**, Rettenmeier
- Georg **Erlacher**, ÖBF
- Erich **Wiesner**, WIEHAG
- Jan **Söderlind**, NTC
- Torbjörn **Björstrand**, Södra Building Systems
- Peter **Kickinger**/Matti **Mikkola**, Stora-Enso
- Alfred **Jechart**, MM Holz; EOS
- Bo **Borgström**, Cei Bois
- Michael **Menz**, Finnforest
- Thomas **Burger**, Rubner Holzbau
- Laszlo **Döry**, EPF
- Matti **Sihvonen**, Roadmap-Chairman
- Dieter **Lechner**, Fachverband der Holzindustrie Österreichs

### Tasks of the Steering Group:

- Overall Strategy of the BWW process
- Decisions on projects and budgets
- Evaluation, audit, control
- Support to the Expert Group and Projects
- Reports to Roadmap Board and CEI-Bois Board

6 meetings 2004 -2006



## Technical Expert Group

- Vahik **Enjily**, BRE
- Uno **Andersson**, Södra Building Systems
- Georg **Hochreiner**, WIEHAG
- Jouko **Silen**, Stora-Enso
- Reinhold **Steinmaurer**, Europäische Vereinigung des Holzbaus
- Mikko **Viljakainen**, Wood Focus Oy
- Tobias **Wiegand**, Studiengemeinschaft Holzleimbau
- Jens **Jamnitzky**, Finnforest Merk
- Dieter **Kuhlenkamp**, Bund Deutscher Zimmermeister
- Dieter **Lechner**, Fachverband der Holzindustrie Österreichs
- Oscar **Rainer**, Rubner Holzbau
- Raimund **Mauritz**, Doka/Umdasch
- Pekka **Peura**, UPM Kymmene
- Thomas **Rohner**, Holzbau Schweiz

### Tasks of Expert Group:

- Consult the Steering Group
- Define (prepare) projects
- Lead projects: Members of the expert group head the projects

12 meetings 2004-2006



## TEG: Technical Expert Group - Roles

**1st step:**  
**Industry Braintrust**  
 (Adv. Board to Industry)













**2nd step:**  
**European Braintrust**  
 (CeIBois Adv. Board;  
 With official status)




- Support roadmap 2010
- Coordinate pre-competitive research
- Foster core competencies in wood industry
- Obtain high profile in emerging markets (China, Eastern Europe)

- Recommend industrial standards
- Define European research programs
- Build up network with European scientific community (e.g.: Universities, R&D- and testing institutes)
- Troubleshooting → technical risks/problems
- Partner/ advisor for national institutions





Project Area	Phase I - in progress	Phase II – starting ....	Phase III - starting ...
<b>1. Standardisation &amp; Eurocodes</b>	1.1. Testing standards 		
	1.2 Product standards 		
	1.3 Design codes 		
	1.4 Validated material law 		
	1.5 Grading 		
	1.6 Fire 		
	1.7 Quality management code 		
		Durability (incl. Performances)	
		Bill of quantities	
		Acoustic performances	
<b>2. Knowledge base</b>	2.1 Web site 		
	• Content management 		
	• Translation 		
		Application docu (user manuals)	
		Software	
<b>3. Training and education</b>			Training for the industry
			Academic training
			Professional development
			Scholarship Post Grad
<b>4. Construction process</b>		Clients needs and requirement	
		Foster supply chain	
<b>5. New Markets</b>			Market analysis

 Feasibility study finished  
 Feasibility study in progress  
 No feasibility study necessary



## Project: Testing standards

### Feasibility study: Conclusion

- Developing and introducing swift and cost effective products
- Eliminating longwinded test programmes, replicated in various European countries
- Unifying and simplifying information on how to conduct and report the outcome of a test for the practical applications of the test result and portraying the performance of a product in its end use conditions
- Obtaining safe performance figures using appropriate safety factors
- Developing superior competitive edges for timber buildings by means of product standardisation



## Project: Testing standards

### Project plan

Work packages	Months											
	1 - 3	4 - 6	7 - 9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
WP 0. Coordination												
WP 1. Network				M1								
WP 2. Collate				M2								
WP 3. Draft stand.										M3		
WP 4. Design by Testing											M4	
WP 5. Simplify												M5
WP 6. Manuals												M6



## Project: Testing standards

### Action plan

- |              |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 1/ WP1 | Create the expert network and engage in critical standards committees                                                                                                                                                                                                                                                                                                                                                 |
| Phase 1/ WP2 | Collate testing standards in groups for a range of products                                                                                                                                                                                                                                                                                                                                                           |
| Phase 2/ WP3 | Draft industry performance/ testing standards. Re-work and include relevant testing standards for solid timber products, glulam and LVL products, board products, trussed rafters, joints with different connectors, glues, walls, floors and roofs, VOC testing and performance, durability performance, external and internal claddings, infill panels & fire performance standards. Prioritise, combine and trial. |
| Phase 3/ WP4 | Produce common industry "design by testing" guidance and standards                                                                                                                                                                                                                                                                                                                                                    |
| Phase 4/ WP5 | Improve, simplify and reduce numbers (where appropriate) of the testing standards and produce fast, reliable results for industry                                                                                                                                                                                                                                                                                     |
| Phase 5/ WP6 | Provide user manual in clear language, presenting unified and simplified information on how to conduct and report the outcome of a test                                                                                                                                                                                                                                                                               |

#### **Research resources which will be involved:**

Holzforschung Austria, VTT, TU Delft, SP Tratek, DTI & BRE



## Project: Product standards

### Feasibility study: Conclusions

- Standards are entangled – excessive cross references
- Standardisation process is slow – structural timber took 20 years
- Classification of standards unclear – material, product, convenience, performance
- Users not identified – hard to read and to understand
- Missing product standards – ex: walls, floors
- Obsolete product, material and testing standards – different methods for different materials
- Information resources lacking – difficult to get an overview of the standardisation system



## Project: Product standards

### Project proposal

Work packages	Months											
	1 - 3	4 - 6	7 - 9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
Sub-Project 1 – A master Plan												
Sub-Project 2 – The User Perspective												
Sub-Project 3 – Education and information mat.												



## Project: Product standards

### Subprojekt 1: A master plan

- Task 1  
Revisiting current standards  
Missing standards, obsolete standards, re-writing, technical and logical flaws
- Task 2  
Performance- and convenience standards  
Draft performance standard and convenience standard
- Task 3  
Organise the standards in a more slim fashion  
Standards self-contained, gain overview and user-friendliness.
- Task 4  
Drafting pilot product standards Glulam, sawn timber



## Project: Product standards

### Subproject 2: The user perspective

- Task 1:  
Identify end-users, guidelines for clear writing incl. information about the end-user

### Subproject 3: Educational and information material

- Task 1 :  
Inventory information sources, evaluation, suggestions for traditional and new information resources, funding

### Partners involved

Holzforschung Austria (project leader), BRE , SP Trätek , VTT, other partners



## Project: Validated Material law

### Carry out feasibility study

#### Objectives:

Development of material models to be used for

- numerical structural analysis (dimensioning, 3D-simulation, joints, ...) with less testing,
- quantification of the influence of technological parameters.

#### Benefit:

Availability and application of material models result in

- reduction of (large-scale) tests,
- understanding of structural behaviour,
- increased confidence in wood as building material,
- economic benefit for wood-processing industry.



## Project Validated Material law

### What is clear:

Wood properties under **simple conditions** (e.g. column or beam without connectors)

- uniaxial loading,
- short-term loading,
- constant environmental conditions.

Suitable (**multi-purpose**) **software** for material characterisation and structural analysis is **available** (FEM-codes, mathematical software).

### What is open:

Wood properties under **complex conditions** (e.g. large-span roofs & bridges)

- multiaxial loading,
- Long-term and cyclic loading,
- changing environmental conditions,

and, beyond this, their combinations ⇒ **but that's reality!**



## Project Validated Material law

**Modelling expense increases with complexity of the material behaviour ...**



**steel:** isotropic, homogeneous



**concrete:** isotropic, heterogeneous microstructure, different strength in tension and compression



**wood:** anisotropic, inhomogeneous (growth irregularities), multiscale structure, large variation between individual tissues, different strength in tension and compression

**Expense and complexity of modelling**





## Project Validated Material law

### Cost reduction by numerical simulation

Saving of costs, tests, and time / increase of product quality

- Example – building industry;  
investment volume in concrete structural engineering and bridge work in Austria: 12.000 Mio. € / year
  - saving** of development **costs**: 1.5 %
  - saving** of planning **costs**: 1.0 %
 } ~ 300 Mio. € / year
- Example – automotive industry
- costs for development of new tire line: 2 Mio. €  
requires 4 prototype cycles  
**saving** of 1-2 **prototype test cycles** by simulations → ~ 0.6 Mio. €
- introduction of CAD/CAM in automobile production  
**saving** of 80 % of **time** in product design & manufacturing



## Project: Grading

### Feasibility study: Conclusions

In order to secure and increase the market share of timber as structural material the following strategic objectives are set:

- Improvement of reputation of timber as structural material
- Improvement of competitiveness of timber in construction
- Application of new technology in strength grading

A research plan is written to support such future development.



# Project: Grading

## Project proposal

Work packages	Months											
	1 - 3	4 - 6	7 - 9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33	34-36
WP1. Activation				M1								
WP2. Data bank			M2									
WP3. Test program						M3						
WP4. Analysis									M4			
WP5. Dissemination											M5	
WP6. Coordination												



## Project: Grading

### Project proposal

#### Action plan

Work will consist of following work packages which are grouped in 3 phases:

- Phase 1 / WP1: Activation of partners
- Phase 1/ WP2: Joint data bank
- Phase 2 / WP3: Test program
- Phase 3 / WP4: Analysis of results
- Phase 3 / WP5: Dissemination, education and utilization of results

#### Research resources engaged

VTT , SP, Technical University of Ljubljana, Technical University of Munich, Holzforschung Austria, CTBA, BRE



## **Other projects in this project area:**

- Fire**
- Eurocode EC5**
- Quality management code**



## Project in this project area:

- **Web site**



## Budget 2006 - 2008

in € 1.000

Project	Total expenses	Budget 2006	Budget 2007	Budget 2008	Budget 2009
Testing standards	1.125	205	415	505	
Product standards	550	200	200	150	
Design codes (feasibility)	77	77	?	?	
Validated material law (feasibility)	80	80	?	?	
Grading	610	180	220	210	
Fire	2.695	525	950	665	555
Web site - THE portal for wood	250	100	100	50	
Content management and Translation	100	30	30	30	
Quality management code	130	45	45	40	
<b>Total expenses</b>	<b>5.517</b>	<b>1.442</b>	<b>1.960</b>	<b>1.650</b>	