

## Impact of the Regulatory Framework on the Bioeconomy

# CONSTRUCTION SECTOR

*“Since humans have built dwellings, they have used regenerative raw materials such as wood and straw as building materials.” [2]*

However nowadays, steel and concrete dominate the present-day architecture. This **fact sheet** discusses properties of wood as a construction material, its **regulatory framework** and **obstacles** which result from it. **Recommendations** to foster renewable materials in the construction sector are collected from scientific literature and evaluated.

### ► Advantages of Wood in Construction [3,5,6]

- substitution of emission-intensive materials (aluminium, steel, concrete) and protection of limited resources for future generations
- carbon sink
- less energy consumption during the production
- less weight (useful for building extensions)
- prefabrication enables quick construction (less noise and dirt emissions during construction)
- dismantlement, reuse and recyclability possible (recyclability depends on treatment processes)
- less potential of acidification, ozone formation, toxicity
- positive impact on the well-being of humans
- same or less costs than conventional building materials
- same durability than conventional building materials
- in case of fire and high temperatures wood is more stable than steel (due to a charcoal layer)



### Composition building materials (Germany): [6]

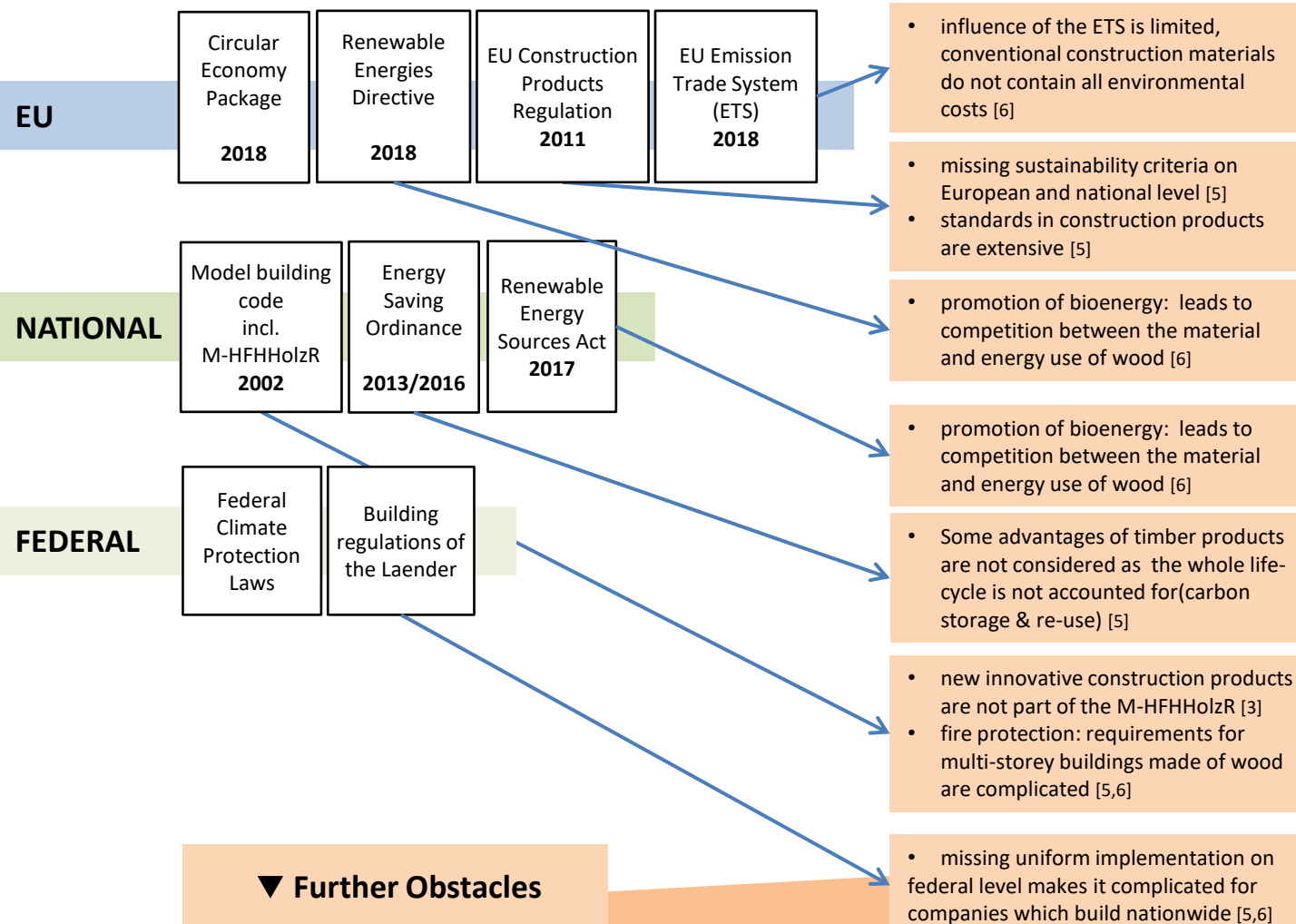
15% timber  
85% concrete, aluminium and steel

### ► Disadvantages of Wood in Construction [3,5,6]

- per se “less stable” than other construction materials (good construction necessary)
- sensitive for fungal infections and pests
- in case of water damage extensive restoration is necessary
- insulates better than concrete and stone, but stores heat less well (hotter in summer, rapidly colder in winter)
- fire protection standards are expensive
- wood preservatives block construction timber for further material use

## ▼ Regulatory Framework

## ▼ Obstacles





## ► Possible solutions

### **Renewable Energy Laws:**

- lower compensations, new introduction of area-wide calls for proposals may reduce the concurrence in-between the energetic and the material use (example: Germany 2017) [5]

### **Buildings Products Law : binding sustainability requirements**

- EN 15804 of the Environmental Product Declarations (EPDs) could be used as verification (it contains indicators based on the results of LCAs)
- binding sustainability criteria would help wood to yield its advantages over conventional building materials [5,6]

### **Federal Climate Protection Laws:**

- support construction with wood (example: Climate Protection Law of North Rhine Westphalia: §6 fosters the use of renewable resources in construction) [5]

### **EU ETS: internalization of environmental costs**

- A functioning EU ETS could foster timber to deliver its advantages in terms of climate protection (through the internalization of environmental costs of manufacturing steel, concrete and aluminium and the transfer of those costs to the consumers to incentivize the use of alternative materials [5,6])

### **Circular Economy Law:**

- Tightening of the requirements of future legal acts may bring out the advantages of timber in respect to the closing of material cycles [6]

### **Law adaption & Exnovation:**

- expansion of the material catalogue of the Model Building Code 2002 (+ composite materials, + renewable material for isolation) [3]
- fire standards should be revised [5,6]
- building law needs to be scanned and adapted in order to allow the development of innovations in niches and experiments related to more sustainable constructions materials, especially timber [5,6]
- standardization related to timber construction must be advanced [3, 6]
- restricting regulations for old, non-sustainable structures (example: primary taxes) [6]

## ► Potential

### **Information & Competences:**

- Path dependencies do not only depend on laws and policies but also on education (persons in charge in construction processes need advanced training) [3,4]
- informational instruments and research funding [5]

### **Biggest potential of innovative construction:**

- new construction of multi-flat houses
- restoration of nonresidential buildings [5]

### **Innovative construction materials:**

- bio-based binders
- new approaches in structural and ground engineering
- insulation moduls
- mycelium for building blocks and insulation [1,2]

### **EU Laws on state**

- subsidy for the use of wood in building constructions (example: "Co2-Bonus" in Hamburg and Munich), other subsidies for sustainable constructions [5]

### **Energy Saving Act should be extended:**

- should consider the life-cycle of timber products for construction (carbon storage of wood, low energy consumption during wood production, re-use of wood) [5]

### **Green Public Procurement**

- environmental criteria can be integrated in public procurement
- green procurement should be fostered [5,6]

## ► Conclusion & Forecast

The current legal framework for construction is tailored to mineral and metallic buildings products (such as steel, concrete, aluminium) and conventional technologies even though timber and other innovative materials are more sustainable. These **path dependencies** cause market distortions. Therefore, the legislative background of construction processes poses an obstacle to transformation to a more sustainable way of constructing buildings [6].

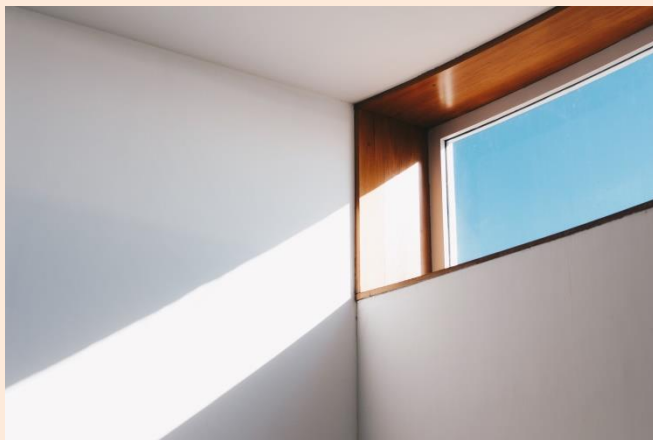
Furthermore, energy law (RED, EEG Germany) is currently favouring the energetic use of wood and lowers incentives for cascades use [5].

Law in combination with economics, planning and policy instruments has a big potential to guide transformation to sustainability. The legal framework can enable innovations (in niches) and experiments related to more sustainable constructions materials. Besides, it can restrict regulations for old non-sustainable structures (“**exnovation**”) [6].

As innovation advances quickly legislations need to **adapt and extend** regularly their catalogues and criteria [3,4].

During a process of legal adaptation it is important to **secure course stability**: the legislative framework of the construction sector is bedding the confidence of the market actors in the future framework conditions and provides even course stability for a renovated system [6].

A recast of legislation needs to be elaborated with a **systemic view** outside the box, thus including considerations on transformation processes as well as on life-cycles of timber products and innovative materials for construction (carbon storage of wood, low energy consumption during wood production, re-use of wood). Construction products should be evaluated with regard to LCA-based indicators [5,6].



### SOURCES:

[1] BIOCUM AG (2016): „Bauen mit Pilzen“, <https://biooekonomie.de/interview/bauen-mit-pilzen>.

[2] BIOCUM AG (2016): „Construction“, <https://biooekonomie.de/en/branche/construction-0>.

[3] Dederich, Ludger (2013): „Baurechtliche Hemmnisse und Ansatzpunkte zur Überwindung“

[4] Federal Ministry of Food and Agriculture BMEL (2018): „Mitigating climate change. Creating value. Utilising resources efficiently.- Charta for Wood 2.0“.

[5] Ludwig et. al. (2017): „Leipzig, Bauen mit Holz als Beitrag zum Klima- und Ressourcenschutz – Status quo des Rechtsrahmens und Gestaltungsvorschläge“.

[6] Ludwig, Grit (2019): The Role of Law in Transformative Environmental Policies—A Case Study of “Timber in Buildings Construction in Germany”. (Cabin photo by Simon Matzinger, beam photo by, Dakota Roos, timber photo by FW Studio, window photo by João Jesus)

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