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Governing carbon efficiency. The international regime of standards in wooden construction

Keywords: standardisation, governance, CEN, ISO, wooden Construction, life cycle analysis

One feature of globalisation is the increasing spread of international standards. In general, standards define benchmarks and rules for production. They can stem from a variety of sources ranging from NGOs to industries and governments. This article focuses on standard setting by international standards development organisations. We explore into the global regimes that govern standards for wooden products that are used in construction. Although the regimes are under the notion of "self-regulation", such forms of "private" governing are questionable from a democratic perspective. The article explores the composition and interest distribution of the actors steering standardisation in construction. Construction is one of the biggest producers of green house gas emissions. Since recently wood has been promoted as a means of carbon storage we focus on the norms that internationally are the most dominant with the intention to regulate sustainability and carbon efficiency for wood use in construction. Standardisation in this emerging field is still under development. The article aims to draw a comprehensive picture of the institutionalised rules and processes that up to now are globally most influential. In conclusion the process is best described as a "regulation of self-regulation" taking place mainly under the institutional umbrella of the private actors CEN and ISO, with some influence from governments.

CO_2-Effizienz regieren: Die internationale Regulierung von Standards im Holzbau

Schlüsselwörter: Standardisierung, Governance, CEN, ISO, Holzbau, Ökobilanzierung

Ein Merkmal von Globalisierung ist die steigende Anzahl an internationalen Standards. Die Aufgabe von Standards ist es, Maßstäbe und Regeln für Produkte festzulegen. Sie stammen aus unterschiedlichen Quellen wie NGOs, Branchenvertretungen oder Regierungsinstitutionen. Der Artikel beschäftigt sich mit der Normensetzung durch internationale Standardisierungsorganisationen in der Ökobilanzierung. Der Bausektor ist weltweit einer der größten Verursacher von Treibhausgasen. Der Artikel untersucht die diesbezüglichen internationalen politischen Entwicklungen, Holz für den Bausektor, unter anderem mittels Definitionen für Ökobilanzierungen zu normieren, letztendlich um das Material besser zu vermarkten. Aus politikwissenschaftlicher Perspektive finden diese Prozesse als gesellschaftliche „Selbstregulierung" statt. Die regulativen Funktionen werden zwar gerne als „staatsentlastend" dargestellt, sind aber unter demokratietheoretischen Gesichtspunkten kritikwürdig. Der Artikel untersucht die wesentlichsten Einflussnehmer in diesem Bereich genauer, nämlich die beiden offiziell „privaten" Organisationen CEN und ISO. Wir bezeichnen deren institutionalisierte Formen der Normierung als „Regulierung zur Selbstregulierung". Größere Industriezweige haben dabei in den oft jahrelang laufenden und für die beteiligten Firmen kostspieligen Standardisierungsprozesse höhere Durchsetzungsmöglichkeiten als kleinere Sparten; auch Regierungen sind letztendlich nicht unbeteiligt an den oft jahrelang laufenden Entscheidungsprozessen.

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1. Introduction

Worldwide, there is growing recognition of the potential for substituting fossil-fuel based materials such as concrete or steel with biomass-based materials such as wood. This is seen as a means for reducing a lot of environmental damage and impacts by the simple strategy of a change in product use. The main argument in the debate is that the use of wood instead of cement, steel and the many other non-renewable materials results in less greenhouse gas (GHG) emissions and in the support of national and international strategies for the mitigation of climate change. Thus, forests and wooden products have the potential for effective climate protection, an argument which has already been established in 1996 (IPPC 1996, 6).[1] Since the Kyoto-Protocol from 1997 at the latest, both forests and wooden products can be considered to be amongst key elements of the global carbon cycle in attempts at mitigation. The present paper will concentrate on one aspect in this field, namely building with wood. Buildings are of crucial importance for humanity not the least due to the amounts and functions for living, working and human existence, urban and rural alike.

We will examine the way the issue is tackled by politics; more precisely we will shed light on the regulatory measures that touch upon wooden products in the construction of buildings. Whilst recently there has emerged a bundle of literature that exemplifies the regulation of European telecommunications (Abbot/Snydal 2008, 355–356), pharmaceutical certifications (Gehring et al. 2008, 239–40.), foodstuffs (Gehring et al. 2008, 246–248) and toys (Gehring/Kerler 2008), product and technical standards generally tend to be relatively neglected in scholarly literature (see Nadvi 2008, 326).

This paper explores the way that carbon efficiency in wooden construction is regulated by standards. We want to map the kind of "regime" the related regulations constitute. What are the prevalent standards in this field, how are standards created, who is involved? How is the system of standardisation within crucial environmental issues built-up? Who are the ones that foremost decide and thus "rule" in this field? By this the article will contribute empirically to further assessments of global processes of standardisation. We are interested in the norms that regulate the use of wooden products in the light of carbon efficiency.

Therefore we will first sketch out the links between carbon efficiency, forests, wooden products and construction. We will second examine and describe in detail the set-up of the organisations as well as the processes behind standardisation. We will then outline our concept of governance and we will briefly introduce the most relevant standards in the field of carbon efficient construction. With the example of the recent stop in development of one of the most relevant standards (Carbon footprint of products, ISO 14067) we will discuss the specific challenges in regards to standard production. This example shows that it is not only competing interests in the different materials, but also technical diversities that can have a decisive impact on

standard development. We will also provide an outlook on the distribution of interests within the private-public regime that our findings imply.

2. Carbon Efficiency, Forests, Wood, Wooden Construction

This article stems from the general assumption that wood is one of the natural resources that have the potential to mitigate climate change. Yet we acknowledge that it rests upon producers, regulators and other stakeholders to organise the production and use of wood in a way that actually mitigates climate change and enforces sustainable development. First, it is forests that can play a role as "carbon net sinks"; meaning that trees convert CO_2 into solid carbon, as the material of wood. This way they currently absorb about 25% of global fossil fuels (see e.g. IPPC 1996). Thus far, forest management plays a crucial role with all activities which help to maintain this ability, furthermore help to expand its capacity and lastly help to reduce green house gas (GHG) emissions from forests.

Second, it is also wood itself that plays a role here, because of its Carbon footprint (CF) – also named Carbon profile – which is the overall amount of carbon dioxide (CO_2) and other greenhouse gas (GHG) emissions (e.g. methane, nitrous oxide, etc.) associated with a product[2]. In technical terms timber performs similarly to a standing forest as a carbon "store" and therefore has a positive contribution to mitigate climate change. However, it can only be an effective carbon store as long as the product remains intact within structures and buildings. Its effectiveness as a carbon store can be enhanced by firstly, using greater proportions of wood products; secondly, by longer periods of use-in-service and thirdly, by increased recycling. Globally, most wood is used in buildings (70%, see UNEP 2007). In Europe the entire construction industry as such is the largest industrial employer. Construction activities consume more (as much as 50%) raw materials by weight than any other industrial sector. The built environment as a whole accounts for the largest share of greenhouse gas emissions (about 40%, see UNEP 2009a) in terms of energy end usage. Measured by weight, construction and demolition activities, buildings also produce Europe's largest (between 40% and 50%) waste stream most of which though, is recyclable. All "cradle-to-grave" aspects linked to the creation, use and disposal of buildings taken together constitute major environmental impacts.

At the moment, many aspects that touch upon the regulation of the environmental performance of wood in construction are regulated by technical norms and standards. These should guide producers and users of wooden products through the "jungle" of products and services related to it. But where does a standard come from, who decides upon it, who monitors it and what are the costs of non-compliance?

3. Organisational Settings of Standardisation

Wooden product standards are guidelines and rules that help to define the performance and judging of products. One of their purposes is to facilitate free trade. Following these definitions, the first standards have been applied in norms for comparable weights and measures since the middle ages (see on this Spruyt 2008). More recently, after World War II, the International Standardisation Organisation (ISO), founded in 1947, followed the interwar International Standards Association (ISA) in order to assure that things such as the nuts and bolts of globalising trade

would fit together from country to country and industry to industry[3]. Yet, general questions like, "What is a standard? and What is it good for?" are not easily answered, because nowadays standards are also applied to "non-products" issues that have little in common, such are work processes (ISO 9000) or good practice in social responsibility (ISO 26000).

The two largest organisations that are internationally active in the concretisation of norms for wooden products and environmental construction are the International Standards Organisation (ISO)[4] and the Comité Européen de Normalisation (CEN). The members of ISO are almost congruent with the *World Trade Organisation* (WTO) member states. One important point here is that "members" does not mean member states but the respective national member institutions[5]. Likewise, the 33 members of CEN are not member states, but the national member institutions (that is the national standardisation institutes) of EU and EFTA countries. Because of these membership structures, there is overlap in national member organisations within CEN and ISO.

Both CEN and ISO work together in their standard developments. It is their so-called "Vienna Agreement" from 1991 that ensures technical cooperation by correspondence, mutual representation at meetings and coordination meetings. Most importantly the Vienna Agreement declares also *adoption of the same text*, as both an ISO Standard and a European Standard.[6] Because of the Vienna Agreement common European and international standards can be developed in parallel. Currently more than 30% of the European Standards adopted by CEN are identical to ISO standards. These EN/ISO standards (European *and* ISO standards) are intended to have the dual benefits of automatic and identical implementation in all 33 CEN countries represented by members and global applicability. In addition to the EN/ISO Standards, a number of European ENs developed by CEN are closely linked to ISO standards.

3.1 The process of standards adoption in ISO and CEN

Both international and European standards are adopted in a multi-step procedure that assigns functions to a number of bodies.[7] Within both, a norm can be initiated by any member of any of its national member institutions. Members are all legal entities that are concerned by norms: companies, trade and business organisations, consumer organisations as well as public authorities [Int. 2]. Within ISO, the suggestion is then handed over by its central secretary in Geneva to the relevant technical committee (TC). At the moment there are about 300 ISO-TCs and its subcommissions[8] around the globe. Every TC is lead by a secretary which stems from one of the national member institutions. The secretaries can have influence on speed and processes of standard development. It is the ISO-central committee that decides on which national member institution leads which TC. For instance TC 67 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries" was lead for many years by the Romanian member institution and was not very active. The biggest oil firms within ISO were US-American and they had no interest in "international" norms. When Norway found oil in its northern shores, the secretary was transferred to ANSI (American National Standards Institute) in order to have a hand in any new developments in standards [Int. 2].

To come back to the process, in case the technical committee has decided to pursue the project it will be dealt with by one of the respective working groups. A TC and its working groups are composed of technical experts sent from the relevant industries and companies who are members in one of the national standardisation institutes as well as experts from research organisations and universities. In the case of the companies, it is them who pay for travel ex-

penses. One of our interviewees is a technical expert from a technical university who takes part in national standardisation groups [Int. 3]. In his particular case participation (that is the working hours in the meetings but not the work on the drafts outside) was paid partly by the Austrian Chamber of Commerce (WKÖ) and another organisation close to the Austrian Ministry of Environment (BMLFUW). On the international level (ISO) the meetings rotate and are organised by the national member institutions and take place in their respective countries. Thus, travel expenses can get high and it is mostly companies who have the financial resources to support active participation.

CEN has a similar structure to ISO with very similar proceedings, yet CEN has more TCs (400 at the moment) and more than a hundred working groups.

Is there a difference between ISO and CEN in the nature of standards? According to Pelkmans (1987, 252) CEN-standards are "usually more precise" than ISO-standards. Our research on the texts of the single documents cannot confirm such an assumption in general for the case of environmental use of wooden products in construction. First, many EN standards do mirror the respective ISO standard, as is the case with the 14000 family (Environmental standards, see section 6 below) in order to foster internationally coherent norms. Second, the respective TCs in CEN use the ISO standards as a base for their work (Sustainable construction standards, see section 6 below). In this specific case the TC does not intend to render the ISO standards more "precise", but to develop European criteria for environmental products declarations. It is very well possible that such criteria might subsequently in a later stage contribute to a new generation of ISO standards. ISO and CEN seem to be well geared in this respect; their work does not overlap, but both TCs work hand-in-hand.

One should not forget however, that ISO operates globally, which includes also developing countries[9] with other needs than CEN, which covers European countries (EFTA and EU) that are financially better equipped within their transnational entities.

In its structural set-up, in contrast to ISO, CEN can operate as well under the mandates from the European Commission, declared in directives and regulations: "Where such conditions are not established by the Commission, they may be established by the European standardisation bodies in harmonised standards, on the basis of a revised mandate" (e.g. EU Directive 305/2011, Art. 28).

This is the case when the European Commission asked CEN to develop the "further technical specifications" for its directives under the "New Approach" in 1985, when the task of developing technical specifications was delegated to the three private European Standardisation organisations (CEN, CENELEC and ETSI, the two latter are in charge of electronics and telecommunications respectively). Via the respective EU directives and regulations, CEN standards become transformed into national laws or directly binding. In what concerns their communalities, both CEN and ISO standards are usually voluntary and both can become incorporated into treaties and national laws. Also in terms of their organisational structure, both, ISO and CEN, have a similar set-up, with general assemblies, rotating councils and rotating central secretaries. Finally, both have the same members, namely the national standardisation institutes. Subsequently the European national standardisation institutions are members of both CEN *and* ISO. This has been bemoaned by the US-institution ANSI, complaining that Europe has over representation in ISO, because within ISO the 25 CEN members have 25 voices and ANSI only one.

4. The aspects of governance in standardisation

The regulation of technical norms matters to political scientists because it touches upon more than just the interests of the actors actively involved in the production of standards. It concerns as well the interests of groups of persons who are *not* involved, mainly the public who must live with the norms. From a political scientist's perspective, technical steering through standardisation in private bodies is replacing governmental steering.[10] Such shifts have been called "self-regulation", meaning in short that "private organizations fulfil regulatory functions that are ultimately in the public interest" (see Mayntz 2003, 4).

Already in 1985 Streek and Schmitter have declared the German national standardisation institute (DIN) as a type of societal self-regulation, a *private government* (Streek/Schmitter 1985). Such private governments are organisations that impose norms and standards on their members which do not only serve their own but also *public interest* (ibid.) The problem we see here is that although some interpret these kinds of self-regulation as load-removal from complex technical issues for governmental authorities, the "privatisation" of public responsibilities must be strongly questioned from a perspective of democratic legitimacy and accountability especially if they involve such ways of self-regulation. In this article we aim to shed light on the characteristics of the specific "regime"[11] that defines and regulates, in other words: "governs" the use of wood for construction in environmental-friendly ways. The literature on "governance" (see e.g. Héritier/Eckert 2008; Hirst 2000; Mayntz 2003; Pierre 2000; Treib et al. 2005) supports debates on self-steering. The general idea behind concepts of governance is in simple terms: some aspects of political (operational) steering are taking place increasingly within the interaction of organisations, networks and associations that involve *both* public and private actors. In this setting, debates over "governing without government" have become very popular amongst political scientists who are interested in questions of democracy and changes in political ruling under the conditions of contemporary globalisation (another favoured concept for scholarly examinations, starting in the 1990s). Another aspect of globalisation is the intensification of global production, global goods and global trade. Here, standards play the role of defining some crucial "rules" or benchmarks for production. Wooden products in carbon efficient construction touch upon intersecting spheres: they are both environmental as well as quality assurance product standards. We are interested in the institutions and distribution actors involved in the related private processes of standardisation. We do not see these actors and institutions as "independent" from each other. Therefore we will also put emphasis on their interdependencies and influences. We define here as standards the guides, rules and norms for performance and judging of products and we will limit our analysis on "codified" standards. Those are standards that are decided by the international committees and boards in ISO and CEN. In order to grasp the kind of semi-private regime behind the production of standards, we will examine in the following the connections with governments and public authorities in the production of standards. Therefore we will exclude individual industry standards or other de facto standards in sustainable construction, such as "Leadership in Energy and Environmental Design" (LEED) or the "BRE Environmental Assessment Method" (BREEAM).

5. Two perspectives on standards in wooden construction

The issue of standardising carbon efficiency in wooden construction can be regarded from two perspectives: an economic one and a global environmentalist one. To us, put in very simple terms, in the first area standards serve to support marketing of products and in the second area standards serve to support efforts for enhancing energy and carbon efficiency through the marketing of the same products. We call the first one a "product"-view and the second one a "system"-view:

1. The *product view* within the *economic area of free trade for products*: The adoption of standards has been "boosted" (Mattli 2001, 329) within the Standards Code of the United Nations GATT's agreement (General Agreement on Tariffs and Trade's) until its annulment in 1993, followed by the TBT Agreement[12] (Agreement on Technical Barriers to Trade) within the WTO after 199513. In parallel, an analogical development took place within the European Single Market. On May 7, 1985, the EU Council of Ministers agreed on the council resolution "New approach to technical harmonization and standards"[14]. The "New Approach" established that all legislative harmonization should be limited to *requirements* that products have to meet in order to freely circulate within the Community. It says that the legislator should establish in a concise but precise enough form the objectives to be satisfied by the products. In more concrete terms this means that the task of developing detailed standards (or better: technical specifications) is delegated to three *private* European standardisation organisations. The objectives of the directives are in our case, for example, very general labels such as "safety", or "energy efficiency" or "carbon efficiency". Under this point of view, a building is a product or rather an "end product". It consists of clearly defined parts whose capabilities to bind carbon can be measured according the material it consists of.
2. The *system view* within the environmental area of *sustainable development, environmental and health protection*: We perceive this perspective as broader than the products perspective above. Under an environmental perspective, all wooden constructions have in-put-flows and out-put-flows of substances, energy, money-value, etc. E.g. the energy efficiency of a building is an important aspect in terms of environmental protection and eco-responsibility. But the aspect is also strongly connected with the aim to reduce carbon emissions. International conventions and agreements such as the United Nations Framework Convention on Climate Change (UNFCCC), the International Panel on Climate Change and the Kyoto Protocol, provide a framework for general undertakings of carbon efficiency. Within the UN-System there are two advisory bodies that offer support and information to stakeholders and policy-makers: the UNEP Sustainable Buildings and Climate Initiative (UNEP-SBCI) and the United Nations Economic Commission for Europe (UNECE) with currently 56 member states. The EU (and its member states) ratified the Kyoto Protocol in 2002. Overall, to us, under the environmental view, a building is a "system" that has in-puts and out-flows. The system view includes *more* aspects than the product view. It includes the forests that deliver the material (e.g. their "sustainability" aspects which can be certified as well), transportation emissions during production and construction processes as well as the recycling processes after the end-of-life of buildings and construction. Yet, moreover, the system can even include the parallel substitutions and recycling of energy during the production process. Some LCA-experts even include hypothetical assumptions about such substitutions and savings of energy that "would not have occurred" if another product than wood would have been used and/or produced in that instance. This implies that there are

varying functional units and system boundaries of the products that can be defined for all different production and construction chains. They differ according to single methodological definitions and assumptions. Such seems to be a challenging task for standards and rules that have the intention to be generic and cover more production processes. Indeed, the specific role of wooden buildings to store carbon during their life-times up to now is not considered in construction- and environment-related standards.

To sum it up, the difference between a "product perspective" and a "system perspective" implies a dichotomy that has different implications for standardisation as such. The dichotomy puts the standards purpose to the question: Can a standard in this field, which is obviously designed to tackle and regulate a product's purpose, regulate at the same time its environmental implications (the system)? The following sections will sketch out the existing regulations and then, with the example of the collapsed standardisation process of ISO-14067 (Carbon footprint of products-Requirements and guidelines for quantification and communication), discuss the effects of the antagonisms between the products versus the systems perspective when it comes to finding "generic" solutions.

6. The relevant standards for wooden construction

The above mentioned Technical Committees (TCs) have developed a wide range of technical norms in the field of construction, building, life cycle assessment and environment. Despite some efforts of classification for the building sector (König et al. 2009, 97[15]) up to now there are no existing publications with comprehensive overviews of standards for wooden construction. We deem useful to divide the relevant standards across the following two categories: A) Building and sustainable construction, B.) LCA and Carbon Efficiency; in the following we will provide an overview, each for both levels: the international (ISO) and the European (CEN).

A. *Sustainable Construction*: ISO 15391:2008 Sustainability in building construction: General principles together with ISO 21930:2007 Environmental declaration of building products. In the family of "Sustainability in construction works" at EU-level there exist the corresponding standards EN 15643:2010-11 (1, 2, 3) which is about the assessment of buildings, EN 15978 about the assessment of environmental performance and EN 15804 about the comparable environmental information – Environmental Product Declarations.

B. *Carbon Efficiency and LCA:* At the international level there exists currently only one standard in draft, that deals with the carbon footprint of products. It does this in a very general way and without regard to product type: ISO 14067 on Carbon footprint of products – requirements and guidelines for quantification and communication. Also very general at the moment within the ISO-140XX family of standards on "Environmental labels, declarations and environmental management" there are ISO 14040 on Life Cycle Assessment – principles and framework as well as ISO 14044 on Life Cycle Assessment – requirements and guidelines. At the EU level there is currently an ongoing initiative for harmonizing methodologies (ICLD) within the European Commission (European Commission 2010). These should be based on the above mentioned ISO-standards.

At this very moment, there are two ways of carrying out a carbon footprint assessment for buildings: Either using EN 15978 for whole buildings and EN 15804 for products in general (how-

ever, these do not declare wood) nor use the general (draft-)approach to carbon footprint assessment for products (ISO 14067) which in turn equally does not take into account the specific attributes of wooden products in a whole Life Cycle. In the following we will outline the problems behind the process of standardisation with this standard as an example for the difficulties of coordination between the many interests involved in the process.

6.1 Problems in deciding on ISO 14067 (Carbon Footprint of Products)

Development of ISO 14067 started with the first meeting of TC 207-SC 7 (Environmental Management, Greenhouse Gas Management and Related Activities) in April 2008 in Vienna, Austria. According to information by involved experts the process was stopped in summer 2012 at meeting No. 11 in Bangkok, Thailand. It is very unusual for an ongoing standardisation process to be blocked without possibilities for continuation, especially after lasting three years and real worldwide ongoing practical implementation of the draft standard within certification authorities for firms and enterprises as in this case. In sum, all voting results in the relevant working group have already several times indicated disapproval. As very often, countries such as India or China have fears of the standard affecting free trade; the standard could implement a non-tariff barrier to trade (NTB). However, the main argument against the standard and the main reason for disagreement are according to informants technical ones: the values for the measurement of Carbon Footprint (CFP) have too high levels of uncertainty with variations ranging from 50 to 300%. The reason for this is that the definition of system boundaries and the differences in data bases vary from case to case and it is obviously too difficult at the moment to agree on the definition of a common "shape all" solution for all purposes and needs. Thus, the difficulty lies in the idea of the standard itself: to find agreement for all. The opposing interests can be described as follows: on the one hand there are participating countries, where thorough calculation procedures with broad comprehensive documentation have developed over recent years. Those are very much in favour of detailed definitions and documentations of databases. Such documentations would e.g. also consider the quality of the wood used, transportation costs and energy efficiency in production. On the other hand others are against such detailed rules for measurement "for fear of being not competitive enough in the markets with their products" [Int. 4]. In other words: an extensive system perspective includes extensive documentation whilst a (narrower) product perspective avoids such efforts and thus can remain more on the surface. Hitting into the same vein, in ISO-14067 development a post-reviewing-process was planned, which is an innovation in the development of standards. This reviewing process should have included a check-list for controlling the quality of the data received by following the standard. The parties equally could not agree on this for the same reasons we have identified above.

The latest meeting of TC 207-SC7 took place in January 2013 (Vienna) and the next one is scheduled for June 2013. At the time of writing this article it looks as if the standard will be transformed into a Technical Specification (ISO-TS) if the committee can agree on it. A TS comes into play when a standard could not be produced due to insufficient support. The advantage is that technical specifications may compete and propose different technical solutions, under the condition that they do not conflict with existing standards. One informant bemoaned this development, because a TS is by far not as convincing nor powerful for customers as an ISO-standard. Also she would have "finally" liked at least some official international solution for finding com-

mon ground on measurements of CFP, including the review-process for enhancing the quality management of the processes. [Int. 4]

7. Discussion: The difficulties in agreement

Development of standards in the area of wooden construction itself, in general, seems not to be very political in terms of big disputes and conflicts over power distribution. It is very much the technical debate that drives the process at both the national and international levels [Int. 3 and Int.4]. Accordingly, in the type of standards we have examined here, the search for consensus seems to be the driving force in the single working groups and also seems to dominate in general in the committees. As was shown above, the rules of membership, modes of meeting and working as well as decision making are strongly institutionalised, starting from the national standardisation institutions[16] up to CEN and ISO.

Such discipline seems to support solution-oriented work and an aspiration towards consensus [Int. 2]. In the cases, where this concept is not working, like that we showed with the example of ISO-14067 either no standard is developed at all[17] or the results are watered down into a broad minimal common denominator-solution, as was the case with the European toys regulation (88/378/EWG, see Gehring et al. 2008, 245f.).

Earlier on (section 6) we divided the respective standards according to two spheres (sustainable construction and LCA). This division responds to the dichotomy between the initially proposed "system" and "product" view (section 5): the first view deals with the system as such and the second with the products, their marketing and the fostering of free trade. The division also mirrors the difficulties in combining both views into "generic" solutions for standards [Int. 2 and Int. 4]. The system view draws and defines the system boundaries in very detailed and specific way, whilst the product view prefers to stick to the products and the bounded carbon in their materials as such, non-regarding e.g. processes of production, transportation, construction practice (e.g. on-site use versus off-site), energy consumption or end-of-life cycles, reuse or recycling.

In terms of interest bargaining and coercion, all regulations are also cooperative solutions that reveal the divergent interests from the sides of actors concerning the regulations that touch upon the broad range of construction materials in general, not only wood. The results mirror agreements between several interest organisations and industries from different materials such as glass, aluminium, concrete or timber. Standardisation is easy for a rather homogenous group of actors with similar interests and similar levels of power, for instance, for supporting the free trade of products from one sector and from countries on a similar development level. It is rendered difficult if the involved parties have different interests. Producers, consumers and intermediate actors such as stakeholder organisations or public authorities most often are "actors" on behalf of one of these views. In the case of construction, the wood sector's asset is the sequestration of carbon in the building material. The wood sector is therefore interested in including this aspect in environmental assessments such as in Life Cycle Assessment or Carbon Footprint assessment methods. In the relevant standardisation processes the wood sector is only one sector among others, which makes it difficult to influence the methods accordingly. Although commenting on draft standards is generally open to all interested persons, collaboration in the TCs and their working groups goes only via invitation to related experts and to the fee-paying members of the national standards organisations.[18] The average composition of a TC is, according to estimations by our interviewees,[19] composed of around 50% from interest representatives of industry and

firms[20], around 25% from representatives of governmental authorities and research institutes such as universities and another 10 to 25% from small scale enterprises in the sector and technical-scientific associations [Int. 4 and in parts Int. 3]. According to another estimation [Int. 4] the average public support for the national (European) standardisation organisations is at most around 10 to 15%. Mostly 65% of the budgets are covered by selling of the standards and around 20% are covered by membership fees and other financial contributions from the economic sectors industry and firms.

Such compositions do not seem to be very unusual, yet we were surprised that there are no representatives and experts from consumer groups, end-users nor at least experts from (environmental) NGOs included into the processes, according to our interview partners these "civil society"-forces are always given the possibility to give comments on the (public) draft versions of the standards (afterwards). However one interviewee pointed out that there is lack of broadly accessible public information on this [Int. 3]. Still, within CEN, consumer interests are in part represented through (later) comments by AISBL (European Association for the Co-ordination of Consumer Representation in Standardisation) which is financed by the European Commission. Its international counterpart CI (Consumers International), standing for 200 consumer organisations from 100 countries is not included into the ISO-processes. In sum, the deciding TC members are usually comprised of three groupings industry representatives; scientists and researchers; and industry interest-group representatives. We have evidence to estimate the participants standing for the economic supply side of the products to be at least 50% in both ISO- and CEN-committees.

8. Conclusions: Regulated Self-Regulation

We identify within the international system of standards-development a formalised form of "self-regulation" with clearly defined rules and practices, similar to practices of self-steering (Mayntz/Scharpf 1995; Mayntz 2003). The organisations ISO and CEN are self-declared "private" organisations. To us, they are semi-private, better: two-thirds private. Their framework has been initiated by governments, they have, though minimal compared to their overall budget, financial support from national governments and the EU and they have links to legislation via direct mandates and laws. In the case of the European mandates via directives and regulations (such as the European Construction Regulation from 2012), the European Commission bears part of the costs [Int. 4].

In the case of European standard setting, the shift from "government" to "governance" was initiated by the European "New Approach" (section 3.1) since the 1980s, when CEN was founded and delegated the task of defining technical specifications. Such developments are reasoned to be driven by lack of resources and expertise by governmental authorities to deal with increasingly complex technical regulatory tasks (Hirst 2000; Pierre 2000). However, such forms of "private" governing have to be scrutinized from a democratic perspective as they touch upon the interests of many more than the actors and industries involved.

Nowadays, the technical standardisation organisations are financially backed up foremost via selling of their standards to their customers (firms and industry) and by membership fees from firms and economic interest organisations. The specific standards we have described above have all emerged within private market contexts. Nation states seem to intervene, only when national interests are threatened. In our case it is industry interests which merge with national

interests when it comes to countries with bigger wooden resources and prosperous timber industries (such as Austria or Finland).

In conclusion, the private market context of this "self-regulatory" regime leads to a strong focus on industry, which includes the broad range of industry interests and the economic goal to abandon trade barriers for goods and services. We have shown with the example of the blocked ISO-14067 (Carbon footprint of products-)process that sometimes difficulties in cooperation occur amongst the different interest groups. We mean here the interest groups of industry diverge in their views over construction material regulations. The case of ISO-14067 showed that on the antagonistic axes of a product versus a system perspective (section 5 and 6), it was not possible to reach agreement on a "one-shape-for-all" generally acceptable solution.

The "self-regulation" of standardisation, however, also implies that interests are not fairly included, both in regard to countries as well as to industry sectors and companies. Representatives from richer countries can afford more easily to participate in the many technical committees whose working groups take place around the globe. It is not only many developing countries who are not "full" members in ISO, but associate members, due to high participation costs, it is also Eastern or Southern European countries. States who, according to our documents, often abstain from comments on the draft standards because of a "lack of expertise", or in other words a lack of highly-qualified experts, a lack of organisational structures together with a lack of money.

Finally, large multinational companies within the building sector have more resources to represent their interests in the standardisation processes through sending their staff members as experts onto the technical committees. Smaller companies, which are typical for the forestry sector, must rely on their interest-groups to be active on their behalf. For the same lack of experts and financial means, other interest groups such as environmental NGOs and consumer groups are also barely taking part in the processes; they can give cosmetic consultations at late stages and merely by invite.

NOTES

1 "To the extent that forestation schemes yield wood products, which can substitute for fossil fuel-based material and energy, their carbon benefit can be up to four times higher than the carbon sequestered" (IPPC 1996, 6).
2 Our definition of a "product" in this connection draws on a standard: ISO 14040 defines the term "product" as both "goods" (e.g. consumer goods or intermediate goods) and "services". This general definition has the advantage of including as well services like whole events, conferences and exhibitions.
3 For a historical overview on the foundation of these two organisations see Yates/Murphy (2007).
4 Currently ISO has in total 164 members and 3,335 technical bodies to develop standards, its Central Secretariat is located in Geneva, Switzerland. Yet, amongst its members, only 111 count as "full members". The rest (mostly developing countries) are correspondent members or subscriber members (out of 206 countries in the world).
5 Such as the American National Standardisation Institute (ANSI) or DIN (Deutsches Institut für Normung) in Germany or Austrian Standards Institute (ASI), formerly ÖNORM.
6 http://www.iso.org/iso/home/about.htm (accessed: 11.3. 2013)
7 http://www.cen.eu/cen/AboutUs/Pages/default.aspx (accessed: 9.3. 2013)
8 Sub-commissions can be founded ad-hoc, in case there is no relevant existing TC on a subject. When the standard is finished, they are dissolved.
9 Many of them are not "full" members to ISO, most are correspondent or subscriber members.
10 For the notion of "steering" see e.g. Beyme 1995 and Mayntz and Sharpf 1995.
11 "Regime" for us comprises the set of formal and informal rules that steer the production and application of the above described norms.

12 The TBT Agreement is a refined version of the Standards Code that was adopted during the WTOs "Uruguay Round" (1986–1994).
13 The original GATT-text is still in effect, but since 1995 under the new WTO framework. In simpler terms: Whilst the GATT was a set of rules agreed upon by states, the WTO is an institutional body with today 159 member countries (2.3. 2013). Its purpose is the "substantial reduction of tariffs and other trade barriers and the elimination of preferences, on a reciprocal and mutually advantageous basis" (GATT-Agreement, preamble).
14 Under the "old" Approach apparently, the standards contained a very high degree of specification and it was very time-consuming to complete the technical work (see e.g. Mattli 2001, Fn. 1)
15 König et al. draw a distinction between buildings (ISO 21 931–1) and building products (ISO 21 930), however they leave out all standards that touch upon sustainability or LCA when it comes to wooden products for the building sector.
16 We had only insight into European institutions, but we have reason to assume that those rules are similar in all other ISO member institutes.
17 In this particular case it is planned to develop the working draft into a "lighter-weighted" technical specification, the outcome of the decision is to be expected after the next meeting in June 2013.
18 This is limited to juridical persons.
19 We are aware that these are personal estimations yet we could not receive official budgeting nor exact composition of committees' information from standardisation institutes themselves.
20 One French expert estimated the industry participation in the sustainable building groups at about 80%.

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INTERVIEWS

Interview 1: 11062012
Interview 2: 09102012
Interview 3: 04042013
Interview 4: 09042013

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