CHAIN APPROACH IN RAW MATERIALS AND WASTE

Summary

The Ministry of the Environment (VROM) of the Netherlands has launched a European multi-stakeholder process to develop a chain approach for a sustainable materials management (SMM). For this purpose the European Partners for the Environment (EPE) and the Wuppertal Institute for Climate, Environment and Energy, with the support of the Public Waste Agency of Flanders (OVAM), the UK Environmental Sustainability Knowledge Transfer Network (ES-KTN) and HOLCIM organized a series of so-called "laboratories" in which stakeholders assessed the environmental impacts along the value chain and discussed opportunities of improving Sustainable Materials Management (SMM). Most public and corporate environmental policies are traditionally segmented and thematic and not oriented along the production chain. Therefore, the project aimed at adapting both policy instruments and business models to move towards SMM for which a chain approach is an essential element.

The partners decided to test the chain approach by addressing two material flows of strategic importance for the building sector:

1. Concrete
2. Wood

Concrete

The laboratories took place in Brussels in December 2009 and March 2010. The first laboratory focused on the state-of-art of concrete management along the value chain and the possibilities and barriers for improving the performance along the life cycle. Four key areas for a sustainable materials management were identified: production optimization, demand side management, biodiversity and demolition & recycling. During the second workshop the four key areas for SMM identified at the first workshop as well as the possible actions for governments and actors to improve the overall performance along the value chain were addressed.

Participating stakeholders along the concrete value chain included:

- Cement industry (Holcim, Heidelberg Cement, European Aggregates Association, European Concrete Platform, European Federation for Precast Concrete),
- Research centres (Danish Technological Institute, Mineral Industry Research Organization, Belgian Building Research Institute, TNO, the Wuppertal Institute),
- Policy makers at EU level (DG Enterprise, DG Environment), at national level (Dutch Ministry of the Environment, German Federal Environment Agency, Flemish Government) and at regional level

(the Waste Agency of Flanders OVAM), at international level (ILO),
- Nature conservation agencies (IUCN),
- Financial organisations (BNP Paribas Asset Management),
- SMEs (Decistor, Aalborg Portland),
- Architects (CERAA),
- The Association of Cities and Regions for Recycling and sustainable Resource management (ACR+)

Best practice examples presented during the two laboratories

The Rotterdam CirkelStad
A joint value chain action of Holcim (cement producer), Woonbron (housing cooperation), Oranje (Demolition) and Roteb (Social service)

Green public procurement
- London 2012 Olympic site, UK
- Construction of the new NATO headquarters, Belgium

Criteria Development
Toolkit on a Common Language for Sustainable Construction by the Architects Council of Europe (ACE) and the European Concrete Platform (ECP) and Labeling and Forest Certification Schemes.

Innovations in construction of building and infrastructure
- FMO Tapiola Building, Finland
- Timber guardrail for highways, the Netherlands
- Wälludden Building, Sweden
- The Lifecycle Tower, Austria
- Murray Grove Tower, UK
- The construction of passive houses with wood, Belgium

Construction Wood

The laboratory on construction wood took place in Brussels on the 9th of March and the 29th of April of 2010. The first laboratory addressed the environmental impacts on construction wood, the advantages of applying an integrated approach for SMM as well as main innovation barriers. Stakeholders discussed opportunities for governmental and corporate action along the value chain. During the second workshop further attention was paid to the possibilities of reducing the environmental burden associated to construction wood in the production and end-of-life stages.

Stakeholders attending the two laboratories included:
- Wood industry (CEI-Bois, Confédération Européenne des Propriétaires Forestiers, European Panels Federation, Finnish Forest Association)
- Construction sector (Rhomberg Bau, RICS)
- Research centres and technology platforms (InnovaWood, Mid Sweden University, Forest based Sector Technology Platform, Delft University)
- Policy-makers at EU level (DG Enterprise, DG Environment) and at national level (Dutch and Flemish Ministries of the Environment), the Waste Agency of Flanders (OVAM)
- The UK Environmental Sustainability Knowledge Transfer Network (ES-KTN)
- Architects (Passiefhuis-Plattform, Waugh Thistleton Architects, CERAA)
- Forest certification organisation (PEFC)
- IT smart value chain (IBM)
- SMEs (Valbois, Foreco)

Policies for value chain management

Stakeholders have different positions along a value chain and different impacts are associated to each stage of a product's life. The chain management approach tested in the laboratories aimed at a better and shared understanding of interactions along the value chain as well as identification of possible improvements in collaboration with all stakeholders.

A systemic understanding along the value chain and a long-term vision among all stakeholders could provide the basis to improve decisions about investments and the necessary measures to participate in sustainable markets. Thus, the laboratories have addressed several approaches to improve sustainable materials management in order to minimize environmental impacts, mobilize capital, promote horizontal collaboration, increase and share knowledge.

The Chain Report

The report by EPE and the Wuppertal Institute (available at: www.epe.be) contains three documents:
1. Concrete, material flow and value chain management
2. Construction wood, material flow and value chain management
3. Conclusions for value management and resource efficiency, EU policies and a construction sector pilot action plan.

Lessons learned

Stakeholders can be attracted to actively participate

SMM plays an important role in most of the manufacturing industries and it will be more important in the near future when scarcity of some key resources and limits of the earth's carrying capacity will be faced. SMM offers the opportunity of improving a company's market position and the possibility of securing competitiveness is changing markets. The impressive list of participants during all the laboratories workshops shows that a broad range of stakeholders can be attracted to discuss sustainable materials management. Their contributions have demonstrated considerable potentials for innovations in improving environmental and economic performances along the value chain.

Material flow and life cycle assessments are a basis for consensus

Material flows analyses (MFA) and life cycle assessments (LCA) offer a good basis to introduce systemic thinking along the value chain. MFA provides basic knowledge about the strategic and global relevance of a specific material. LCAs of products help to identify major impacts along the value chain. This physical analysis is the foundation on which different stakeholders can discuss responsibilities along the value chain and the most effective actions for a sustainable materials management by avoiding problem shifting among different life cycle stages or countries. Nevertheless, there are impacts, which are difficult to quantify (e.g. loss of biodiversity, alterations of landscapes, etc.). Moreover, analysis and assessments need to address adequately hidden flows and impacts during extraction of natural resources, production processes, and end-of-life stage as well as the dynamics of consumption and production across the economy. The transport and manufacturing of materials can also require considerable amounts of energy. The more accurate information, the more (cost) effective measures can be chosen by operators and decision-makers. Using similar methodologies and tools allow the comparison between sectors and materials (e.g. life cycle impacts of different building materials).

Impacts depend on choices

Apart from the inherent properties of the material and its associated impacts the best choice of construction materials will also be determined by the functionality and durability of services provided by products, potentials for re-use and cascading, as well as the end of life

phase. All in all, completely different social and environmental impacts occur along the life cycle of building materials. The choices that need to be made to create sustainable consumption and production patterns will depend on a holistic vision to define opportunities and risks for business and society related to different materials and their combinations. By taking functionality as a starting point, when looking at used products and materials, a more systemic view can be taken and unexpected solutions can be found.

The right framing for analysis and value chain management

To set an appropriate framework for value chain management, all the stages of the life cycle of the products have to be taken into account (i.e. extraction, manufacturing, use stage and end of life). The geographic scale is also relevant in this context as completely different conditions can be found along different places. In combination with globalized production chains isolated analysis and decision-making can result to problem shifting. Moreover, it is also important to address the drivers of the demand and supply sides of and interdependencies between them before establishing a policy. Governments should in particular keep in mind that:

- Effective chain management needs mid-term framing and economic signals;
- It is important to organise a chain approach at the level of the operating stakeholders and this can vary for different materials or products;
- R&D&I programmes need adaptation to new challenges posed by resource efficiency objectives;
- Radical innovation and trade-offs around common agreed objectives might require government facilitation.

Actions for improving resource efficiency and chain management

Managing resource efficiency requires to all stakeholders along the value chain to:

1. Address systemic interdependence between energy, climate, biodiversity, water, food and raw materials use;
2. Mobilize economic actors and markets leverages along the value chain and focus on the systemic role of multipliers representing purchasers, investors, standards setters, trust builders, their leverages to fix rules (suppliers guidelines, standards), make choice (investment and purchasing power) disseminate knowledge, make the difference.

The final report addresses different types of instruments to improve the efficiency of value chain governance: new fora in charge of organizing knowledge transfer between regulators, investors, buyers, standards setters, trust builders and product and/or service suppliers), new role for government, new economic instruments. Several levels for a value chain strategy should be further developed:

1. Level of the supply chain: solution will require discipline along the value chain;
2. Cities are a critical level: a cities classification according to their potential leverage has been done by the WBCSD;
3. ICT will drive collaboration methods and Internet-based portals will provide information on material flows and life cycle assessments;
4. Co-creation with consumers of products and services and cooperation of all (most relevant) actors in the value chain;
5. Green public procurement has also a key role to play through value pricing;
6. The EU and national governments are requested to secure the internalization of costs (carbon, water, ecosystem services);
7. A "*European Covenant Sustainable Building*" to which an action plan would be attached would give vision (where we want to be by 2050 regarding sustainable building), focus (what needs to be done), a timetable and a monitoring mechanism. The Covenant should address *positive net energy buildings and sustainable material management*, involving *Front Runners* Building Professionals, Companies, Financiers, Cities, Owners and Tenants Organisations.