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C2C NETWORK

PERSPECTIVE STUDY: GOVERNANCE FOR C2C

European Union
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INTERREG IVC
INNOVATION & ENVIRONMENT
REGIONS OF EUROPE SHARING SOLUTIONS

Colophon

This perspective study will serve as frame of reference for follow-up activities and exchanges both within and outside the Cradle to Cradle Network (C2CN) and it aims to reflect the current challenges and opportunities associated with implementing a Cradle to Cradle approach. In total, four perspective studies have been written, in the areas on industry, area spatial development, governance and on the build theme.

These studies are not formal academic literature reviews, but are written from a practical point of view and offer some general understanding and guidelines for those engaged in C2C initiatives, as well as policy-makers. They aim to consider 'on the ground' delivery of the C2C philosophy and reflect on both theory and practice. While the perspective studies focus on applications in one thematic area, a separate document – Theoretical Framework – provides more detailed information on the principles of the Cradle to Cradle concept and its implications at a theoretical level. The framework helps to develop a common language for the Network and underpins the perspective studies and the ongoing work of the C2CN.

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Disclaimer

The Cradle to Cradle concept was developed by W. McDonough and M. Braungart. The term Cradle to Cradle is a registered trademark.
The Cradle to Cradle Network project is not designed to develop a criteria-based evaluation tool to determine whether the applications are Cradle to Cradle. It considers that C2C is an approach designed to assist (the search for) better solutions (and ultimately (at) good solutions). Rather than being a score sheet for compliance, the Cradle to Cradle Network approach is oriented to help people understand what the wider implementation of Cradle to Cradle principles in the areas of industry, buildings, governance and area spatial development might look like; and, to disseminate and learn from current and emerging good practice.

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Introduction

This paper presents a perspective study on governance for Cradle to Cradle (C2C). The study aims to provide insight in governance aspects of C2C initiatives in various European regions that participated in the Interreg IVC C2C Network project (C2CN). It builds on the Governance for C2C Framework[1], presented at the C2CN thematic seminar on July 12-13th in Leuven, Belgium, and is a preparatory step towards the publication of a C2C Good Practices Handbook, recommendations on governance for C2C and further actions.

The purpose of this perspective study is to develop our understanding and effectiveness of governance for C2C in the different target areas, including industry (production processes, products and product-service systems), building design, area-specific spatial development and governance practices. Before presenting our findings, this paper clarifies the concepts of Cradle to Cradle (1) and governance (2). We propose that domains of broad societal innovation, such as C2C, benefit from a focus on multi-actor governance, explore different approaches to governing change in a multi-actor perspective and present a brief overview of corresponding lead-roles (3). We then briefly introduce how we proceeded in this study and present a range of governance practices that participating C2CN partners judged relevant and, to different degrees, effective in Cradle to Cradle and the broader context of sustainable development (4). Our overview of these practices is organized in three parts, covering initiatives that focus on spreading C2C ideas and knowledge (4.2.1), practices that focus on setting standards (4.2.2) and initiatives 'in the field', aiming to turn specific material chains into clean closed (continuous) loops (4.2.3). As a last step in this study, we explore four governance themes that appear important for C2C and / or sustainable development (5), i.e. the organizational conditions that support multi-actor governance for C2C (5.1), the role of government actors in such an approach (5.2), the tensions or dilemma's that may be involved (5.3) and issues related to policy transfer (5.4). We conclude with a brief review of the headlines of this perspective study and related reflections concerning governance for C2C.

As a last pointer: in order to not overload our analysis, the text itself does not present the governance practices in great detail. Instead, we include a selection of illustrative cases in frames on separate pages. These case descriptions rest on information provided by the case owners, i.e. representatives of the initiative-takers who presented the practice in the C2CN network (see 4.1). For further information about specific initiatives or projects, footnotes indicate the related websites whenever such a site is available.

1 Presentations by Johan Hovelynck and by Art Dewulf, C2CN Thematic Seminar Leuven, 12.7.2010.

1 Cradle to Cradle: from eco-efficiency to eco-effectiveness

The Interreg C2CN project aims to reduce the use of raw materials, production of waste and environmental pollution, and simultaneously enhance innovation and economic development. The best waste management is no more waste. In order to promote this, the project adopted the C2C philosophy, focusing on recycling in continuous material loops. Before we zoom-in on governance, we outline the basic tenets of C2C[2]. For a more elaborated introduction, we refer to the C2CN Cradle to Cradle Framework[3].

Cradle to Cradle (C2C) is an approach to materials management that proposes replacing linear material chains, from resource to waste, by clean closed cycles from resource to nutrient. It presents an alternative to the current 'cradle to grave' approach, which depletes finite natural resources at one end of the line and produces untenable amounts of waste at the other. C2C starts from the observation that 'eco-efficiency' measures, attempting to minimize resource/benefit and waste/benefit ratios, will not solve this problem, and advocates 'eco-effectiveness'. Instead of aiming at quantities of resources and waste, C2C focuses on material qualities: product components should be such that at the end of the product lifecycle, they become nutrients for the environment or for new production.

1.1 C2C principles

The C2C approach rests on three essential principles:

- waste equals food: inspired by nature, where the 'waste' of one lifecycle becomes a nutrient for a next cycle, C2C proposes to stop thinking in terms of (reducing) waste. If materials, at the end of a product lifecycle, become biological or technological nutrients for next natural and/or human production cycle, there is no point in reducing them.
- use of current solar income: again inspired by nature, where vegetation thrives on solar energy plants, C2C advocates the use of energy from continuous sources. This includes solar, wind and geothermal energy.
- celebrate diversity: design patterns in nature lead to diversity, in which biological systems are constantly evolving. The diversity is embedded in local conditions and builds resilience. While large-scale, standardizing human activity has been interfering with this over the last centuries, C2C promotes biological, cultural and conceptual diversity.

The condition to make waste equal food is that products are fully recycled and hence part of continuous material cycles, or the so-called 'closed loops'. C2C authors point out that current recycling practices are better understood as 'down-cycling': a very partial recycling process, in which materials are to some extent reused yet loose a lot of their original quality. The result is that the material lifetime prolonged, which may be eco-efficient, but ends in waste, which is not eco-effective. Closed loops require:

- selection of product components that allow recycling in the true sense of the word;
- design for disassembly of the product at the end of its lifetime;
- transport of the product or its components to the start of their new cycle – an activity commonly known as 'reverse logistics'[4].

In addition, these conditions are eco-effective only insofar the production, disassembly and logistics processes necessary to create continuous material cycles are based on sustainable materials and energy use as well. Hence the closed loops become 'clean closed loops'.

1.2 Interpretations of the C2C concept: from certification to Limburg Principles

C2C pioneers and later proponents translated the principles to inspire and guide various local initiatives. As a result, C2C has been promoted in different terms in different practices. The stricter use of 'Cradle to Cradle' or 'C2C' reserves the words exclusively for C2C-certified products and has the terms trademarked. Broader interpretations can be found in different sets of guiding principles that are C2C-based, such as the Hannover Principles or the Almere Principles. The C2CN project adopted the version of its initiative-taker, i.e. the Dutch Province Limburg, referred to as the Limburg Principles. We limit ourselves to a brief outline of the versions underlying C2C certification and the current C2CN project.

C2C-certification concerns materials, product parts or products. It is based on five modules, for which it offers an operational set of guidelines and criteria:

1. Safety and health aspects of materials used;
2. Reusability of materials, e.g. through recycling and composting;
3. Use of 'current solar income' and, additionally, wind and geothermal energy;
4. Water use;
5. Social responsibility.

2 This introduction is based on Braungart & McDonough, 2008, and Stouthuysen & Leroy, 2010. For a video introduction to C2C, see http://www.stichtingmilieunet.nl/andersbekekenblog/cradle-to-cradle/cradle-to-cradle-explained.html

3 Stouthuysen & Leroy, 2010

4 Rogers & Tibbe-Lembke, 1998:2

Certificates come in four levels, called ‘basic’, ‘silver’, ‘gold’ and ‘platinum’. The levels refer to the degree in which a certain material, part or product meets the criteria and reflect the continuous improvement that the certifying body expects.

The C2CN Interreg project adopts a broader C2C concept, including efforts to close material loops, whether certified or not. Guidelines for practice in this project are articulated in the Limburg Principles, proposed as charter for the C2CN Interreg project. These principles are:

- We are native to our place;
- Our waste is our food;
- The sun is our income;
- Our air, soil and water are healthy;
- We design enjoyment for all generations;
- We provide enjoyable mobility for all.

Although the idea of ‘becoming a native’ originates in C2C as well[5], it appears that the core idea of the original C2C concept is mostly expressed in the second and third lines of the Limburg Principles: clean closed material loops.

5 Braungart & McDonough, 2008:86.

2 Introduction to 'governance'

'Governance' is one of those words that is often used and rarely explained. Before inquiring into governance for Cradle to Cradle, we therefore briefly introduce this concept and its current meanings. In this section, we situate governance as a particular approach to governing. Apart from the 'government' tradition, we distinguish two broad directions in a search for alternative ways of governing, which we label 'governance within government' and 'governance beyond government'. We propose that domains of broad societal innovation, such as Cradle to Cradle, require going 'beyond government' and adopting a multi-actor perspective.

2.1 Governance: what's in a word?

Essentially, 'governance' refers to the act of governing. The word derives from the Greek verb 'κυβερνὰω' [kubernáo] which means 'to steer'. It passed on to the Latin 'gubernare', and further to – for example – the Spanish word 'gobernar', the French 'gouverner' or the English 'governing'. Governance, then, is what governments do: the exercise of political authority and institutional resources to 'steer' a society – typically at the level of the nation state.
More recently, 'governance' took a distinct meaning. The term has been increasingly used to depict an alternative to what governments traditionally do. It reflects a search for what they should do to respond to emerging challenges, including environmental issues. In this sense, governance is no longer a synonym for government. Rather, governance signifies a change in the meaning of government, referring to a new process of governing, or a new method by which society is governed[6]. The question then is how we can modify our systems of governance at local, national and supranational levels to better cope with these recent and more complex issues[7].
The literature further identifies a range of different, more or less separate uses of the term 'governance', each emphasizing different specific aspects of what governing could or should be[8]. For the purpose of this study, we summarize the spectrum in two main strands: 'governance within government' and 'governance beyond government'.

2.1.1 Governance within government:

This first strand includes such notions as 'good governance' and 'new public management', and is essentially a (quality) management approach to government. Its main characteristic is the introduction of private sector management forms, aiming at greater efficiency, more transparency and clearer accountability. It advocates a.o. explicit standards and measures of performance, result- and customer-orientation and value for money. Generally, this is to be achieved in a context of increased market competition in public service provision, introduced by privatization, franchising, contracting and customer choice[9].
Governance within government can be understood as an efficiency approach: it aims to re-establish the primacy of public service and / or representative government over bureaucracy[10], and has been referred to as improved, or better managed government[11]. In the 'new public management' approach, government actors are supposed to focus on their core business of developing policy. Executing policy or public service delivery can be outsourced to private actors, whose performance can then be monitored on the basis of predefined outcome criteria[12]. The underlying conception of the governing process, however, remains unchanged: the rule of society rests on the initiative of a government that makes and enforces decisions on all matters of public concern.

2.1.2 Governance beyond government:

The second strand implies a more radical change. It includes systems and network perspectives, and acknowledges that many initiatives that 'steer' a society are taken by actors outside the government. Hence, government control over complex issues is partial at best. This governance approach considers diverse and dispersed initiatives, with or without government involvement, and through formal and informal interactions. Governance, in this view, is a process of societal coordination and hence more encompassing than a focus on greater efficiency in the production of public services[13]. The central idea is to link actors, interests and perspectives through improving multi-actor decision-making[14].
Compared to the efficiency logic of governance within government, this second strand can be understood as an effectiveness approach. It is both more encompassing and differentiating, as it includes actors and relationships in the policy process beyond political-bureaucratic ones, and acknowledges the role of various communities and different types of networks.

6 Rhodes, 1996:653
7 Costanza et al., 2010:8
8 Rhodes, 1996; Stoker, 1998
9 Hood, 1991; Stoker, 1998
10 Aucoin, 1990:115
11 Breeman, Goverde & Termeer, 2009:15; Stoker, 1998:18
12 Koppenjan & Klijn, 2004
13 Breeman, Goverde & Termeer, 2009:4; Stoker, 1998:18
14 Koppenjan & Klijn, 2004

2.2 Governance versus government

To further clarify the concept of governance, we put it in contrast with a traditional notion of government. We will further use the word 'government' for all practices where governance refers to 'the act of governing' as we have mostly known it in the 20th century. Government, then, is understood as the formal and institutional processes to maintain public order and facilitate collective action, in particular at the level of the nation state. It is characterized by its capacity to make decisions and enforce them. Keywords that typify government in the literature include political bureaucracy, hierarchy, legal power and formal interaction. The legitimacy of this governing structure is rooted in periodical elections, which also is its formal feedback mechanism.

Reacting to the inadequacies of government, the essence of governance are its focus on governing mechanisms which do not rest on recourse to the authority and sanctions of government and its recognition of the interdependence of public, private and voluntary sectors[15]. As sketched earlier, this reaction broadly took two forms. The first one, which we labeled governance within government, proposes a relationship between government and public that is modeled upon supplier-customer relationships. Keywords that characterize this approach in the literature include public service, management, efficiency, transparency and accountability, The relationship between government and society becomes more horizontal. Customer choice provides more continuous feedback on the quality of public service and policy-making includes participative processes.
The second governance strand goes beyond government. It not only revises the nature of the interaction between the actors in the governing process, it also redefines the actors themselves. This approach differentiates between various government actors, and positions them among a larger number of stakeholders in any specific policy domain. Typifying keywords include stakeholders, networks, partnerships, informal interactions and legitimate interests. We will further refer to this approach as multi-actor governance.
Table 1 offers a overview of the line of thought we proposed. The left column represents the traditional governing concept in which government and governance are synonyms. The middle and right-hand columns present the two strands which we identified in the spectrum of more recent governance views, i.e. a quality management approach to government and a multi-actor approach to governance.

Table 1: Governance versus government

The act of governing: "what government does"	Alternative governing processes: "what government should or could do"	
Government	Governance within government	Governance beyond government or 'multi-actor governance'
• Political bureaucracy	• Public service and customers • Public service	• Multiple stakeholders and relationships
• Institutions	• Contractors	• Networks • Partnerships
• Formal interactions		• Informal interactions
• Top-down	• Participative	• Center-out (incl. bottom-up)
• Hierarchical	• Efficiency & accountability	• Multi-actor
• Authority	• Societal guidelines	• Collaboration & commitment
• Legal obligations		• Legitimate interests

The framework we propose further focuses on 'governance beyond government', which we will also refer to as multi-actor governance. Several authors argue that this approach provides an alternative to either hierarchy or market as conventional governing structures, i.e. networks[16]. They point out that the choice is not necessarily a matter of ideological conviction, but mostly a matter of finding out which governing structure is most effective under what conditions. In this regard, the literature indicates that 'governance within government' is especially useful for known problems in relatively stable environments[17]. So-called 'wicked problems' require intensive cooperation between governments and between governments and their societal environment, crossing the boundaries of the policy networks that have developed over time to include non-institutionalized interests and citizens[18]. Multi-actor governance appears to have definite advantages over hierarchy and market mechanism in contexts of environmental uncertainty and task complexity, especially under time pressure.

15 Stoker, 1998:17-18
16 Rhodes, 1996:635; Jones et al., 1997:913; Zaheer & Venkatraman, 1995; Rose, 1996:328
17 Koppenjan & Klijn, 2004; Jones et al., 1997
18 Taillieu et al,2008:4; van Zeijl-Rozema et al., 2008:411; Paredis, 2010:4-6

While the large-scale innovative change process involved in governance for Cradle to Cradle certainly justifies a focus on multi-actor governance, it does not imply that we deem hierarchy and market structures irrelevant. To the contrary. First, multi-actor governance does not exclude government and its governing role – it complements it[19]. Second, there are indications that combined structures are a promising approach[20]. We propose, however, that multi-actor governance is, in this context, most decisive yet least familiar.

19 Paredis, 2010:4
20 King & Lenox, 2000

3 Multi-actor governance and governing change

In the previous section, we introduced the notion of governance and proposed that the nature of the change involved in C2C gives reason for zooming-in on 'governance beyond government' of multi-actor governance. In this section, we look into three issues that, together, lay a foundation for inquiring into governance for C2C, i.e.:

- the role changes involved in a shift from government to multi-actor governance;
- assumptions about change that are embedded in multi-actor governance and related – at times overlapping – approaches;
- the possible roles for actors, in general, and government actors, more specifically, in facilitating and / or managing change.

3.1 Changing roles and interactions in an alternative governing structure

Governance beyond government implies a broad innovation in the public policy field. Focusing on policy networks and policy communities is both more encompassing and discriminating. It involves attention to informal, non-governmental as well as formal, governmental mechanisms, and further differentiation of actors and relationships within the government as well as in society[21]. In any policy domain, a variety of actors take initiatives to achieve their objectives and develop relationships to influence the outcomes. This multi-actor process shapes societal coordination. The patterns that emerge do not rest solely on government authority, but on a multiplicity of in(ter)dependent actors, specific to the policy arena[22]. As such, the networks that develop in this process are – at least to large extent – self-organizing. They function as informal social systems, rather than bureaucratic structures, based on mutual, open-ended commitment, rather than formal contracts[23].

Governance, then, is about managing such multi-actor processes and the networks involved. In the order that emerges through the interacting efforts off all involved, 'managing' necessarily means 'co-managing'. In this sense, multi-actor governance has been referred to as 'bottom-up politics'[24]. In the context of informal networks, however, 'center-out' may provide a more adequate picture than either 'top-down' or 'bottom-up': actors that are central players in a specific practice take initiative and influence surrounding stakeholders, thus 'steering' their policy domain.

Put more concisely, changes from government to multi-actor governance have an impact both on the actors to consider and on the nature of the interaction among these actors:

- Actors increase from a limited number of institutional players to a multiplicity of stakeholders in a policy domain;
- The nature of the interaction among actors shifts from a hierarchy- and / or contract-based coordination, in which directives and / or agreements are legally binding, to a relational engagement, in which commitments are primarily socially binding.

This shift implies a new emphasis on the responsibilities of all stakeholders for the state of affairs in the multiple and overlapping policy domains they're involved in and upon their obligation to take active steps to ensure a sustainable future in these domains. As such, multi-actor governance brings changes to the established balance between the state and civil society, and is related to notions of active citizenship and debates about community[25].

3.2 Governance and the nature of change

The proposal that multi-actor governance offers a suitable approach to governing C2C implies some basic assumptions about the nature of the change involved. Unable to articulate these assumptions here in detail, we offer a tentative overview of the central tenets. These include assumptions about the nature of change, change-paths, the main actors and how they relate to each other, the 'steering' of decisive factors and possible lead-roles for government and other actors.
Before focusing on multi-actor governance, Table 2 outlines the assumptions about change implied in the market, hierarchy and networks as basic governing mechanisms[26]. Approaches that call on the network mechanism are further differentiated in Table 3, which offers an overview of assumptions embedded in variations to governance beyond government.

21 Atkinson & Coleman, 2005
22 Kooiman, 1993:252-258; Rhodes, 1996:658; Stoker, 1998:17
23 Rose, 1996:331; Jones, Hesterly & Borgatti, 1997:914. Several authors (e.g. Jones et al., 1997) use the term 'network governance' specifically for inter-firm coordination. Networks in this paper also include other types of actors
24 Breeman et al., 2009:135.
25 Rose, 1997:327-328; Stoker, 1998:21
26 This overview is largely based on Dewulf et al., 2009:42-45; see also Powell, 1990.

Table 2: comparison of assumptions about change in different governance mechanisms

	Nature of change	Change trajectory	Main actors	Relationships	Steering / influencing	Leading actors	Role for government
Market Steering	Change is a reflection of new scarcities	Continuous, new techno-logies create shocks	Innovators, entrepreneurs	Market exchange: independence	'Invisible hand' Prices reflect scarcities through supply and demand	Entrepreneurs with creative destruction changing the markets	Correcting market failures Setting property rights
Hierarchy	Changing policies, structures and culture of society	Planned change, from one stable situation to a new stable situation	Government as decision-makers, ex-perts, citizens	Hierarchical relations: dependence	Routines, planning and control, power, external know-ledge, financi-al incentives	Change manager, assisted by change experts	Directing and enforcing the change
Networks	(Re)arranging network connections	See Table 3	Stakeholders in a specific policy domain	Network ties: interdepen-dence	Complemen-tary and / or conflicting interests	See Table 3	See Table 3

As our focus is on networks, we further differentiate the assumptions about change and the corresponding options for change management in Table 3. While the format of this table may suggest that the labels in the left-hand column represent separate (in the sense of mutually exclusive) approaches, they rather refer to distinct traditions and communities. In the field, approaches such as multi-actor collaboration, social learning and adaptive governance show ample overlap[27]: change agents take different perspectives and approaches with regard to different issues or in different stages of the change trajectory. Presenting these perspectives as different approaches, however, provides a clear and differentiated set of possible lead-roles which actors opt for. As such, Table 3 provides a rich theoretical background for understanding governance in the context of change.

27 E.g. Dewulf et al., 2007; Taillieu et al, 2008; Termeer & Kranendonk, 2009; Paredis, 2010:12

28 This overview is loosely based on Dewulf et al, 2009, p.42-44.

Table 3: comparison of government position and roles in different change theories[28]

	Nature of change	Change trajectory	Main actors	Relationships	Steering / influencing	Leading actors	Role for government
Transition Management	Long term structural change of a societal domain	S-shaped curve with pre-development, take-off, ac-celeration and stabilization phases, over a generation	Regime players; niche players (innovators); public authorities	Conflictive and competitive on the short term, shared long term goal of sustainability	Creating transition arenas, starting transition experiments; niche mana-gement	Transition manager; visionary innovators	Transition manager, creating support and conditions for a transition program
Multi-Actor Collaboration	Negotiated structure of an under-organized problem domain	Stepwise exploration, negotiation and imple-mentation over a number of years	Representati-ves of stake-holder organi-zations in the problem domain	Interdepen-dent, conflictive / collaborative	Leadership through participants, processes and structures. No single actor is in control	Convener	None, convener or participant
Network Governance	Change in policy and / or change in policy networks	Policy games in successive rounds in policy networks	Public and private actors linked in networks, supporting or hindering policy strategies	Sustainable interdepen-dencies be-tween actors engaged in overlapping policy networks	Providing incentives for co-operation, process management, network constitution,	Network manager or process manager	Partner, process manager, network builder or none
Policy Agenda Setting Theory	Change in policy input, agenda and output	Incremental changes punctuated by abrupt and large policy change	Politicians, administrators, media, interest organizations	Competitors and allies for attention on the policy agenda	Connecting problems and policies during windows of opportunity, framing of policy images, inserting these in policy venues	Policy entrepreneur	Policy entrepreneur, responsive to societal or political demands
Social Learning	Developing new under-standing in interaction with other societal actors	Gradual increase of understanding followed by change in actions	Societal actors	Co-creators of knowledge, partners in dialogue	Facilitating open commu-nication	Facilitator	None, organizer or participant
Adaptive Governance	Adaptation to the changing conditions in social-ecological systems	Dealing with gradual and abrupt change through close monitoring and learning	Scientists, policy makers, NGO's	In need of each other's knowledge, jointly adapting to changing circumstances	Bridging science and policy, bridging networks of actors	Adaptive network leaders, bridging organizations	One of the multiple decision-making units

3.3 Varied roles of government actors

While a shift from government to governance implies changes for all actors involved, the purpose of our study justifies particular attention to the role of government actors. In their search for new governing methods and tools, their task appears to start by recognizing the constraints that the shift to self-organizing networks imposes on central government action[29]. The literature has proposed several terms to capture the new 'light-touch' form of governing appropriate for multi-actor governance. 'Enabler', 'catalytic agent', 'commissioner' have all been offered[30] and added to the terms in Table 3, which include 'partner', 'organizer', 'convenor', 'facilitator', 'process manager' and 'transition manager'.

In general, the literature indicates the following:

- The prominent actors in steering change range from facilitators, who limit their influence to the process (e.g. in social learning), over conveners, who bring actors together and create a forum for connection and collaboration, or technical entrepreneurs with innovative ideas in a certain domain, to managerial figures, who direct planned change efforts from an overview position.
- Governmental actors are possible incumbents of these different lead-roles, while government actors also appear as participants amongst others[31]. The latter is the case in the schools of thought that are prominent in multi-actor governance as well as in schools that propose the market as governance structure.

Leadership in multi-actor situations comes in different shapes: through leadership roles as well as "leadership media" such as structures, processes and participant initiative[32]. Open versus closed membership structures, for example, influence agenda-setting. Work formats such as workshops, meetings or conferences influence the kind of people who participate and / or take prominent roles. Finally, any participant who has the resources (e.g. know-how, budget, network) to influence may enact leadership. None of the leadership media is under the exclusive control of specific networks or community members[33]. The ultimate act of power in multi-actor governance may well be the establishment of a viable regime, i.e. an informal yet relatively stable network with a sustained role in making governing decisions[34]. Overall, several theorists propose that government actors have a role with regard to both content, setting sustainability objectives, and process, mobilizing social actors, creating opportunities and challenges for participants, facilitating connections and conversations and creating boundary conditions within which the change process can operate.
The literature also contains a warning in this regard, i.e. networks should not be treated as a tool for government[35]. Two ideas underpin this warning. First, networks are not a mechanism for delivering services. Second, and possibly more important, multi-actor governance may blur transparency and democratic accountability – two standards emphasized by the 'governance within government' strand, and hence a potential source of tension.

29 See e.g. Rhodes, 1996:666; Paredis, 2010:9
30 Stoker, 1998:24
31 Termeer, 2007; Paredis, 2010
32 Huxham & Vangen, 2000.
33 Dewulf et al., 2009:37
34 Stoker, 1998:23
35 Rhodes, 1996:666; Stoker, 1998:23

4 Multi-actor governance for C2C

In this fourth section, we present our findings on governance practices in the C2CN project. The findings are based on the input of C2CN partners, who selected good practices in their region, proposed them for case study and – for a number of them – presented these practices at the C2CN Thematic Expert Seminars in Maastricht, Leuven, Milan or Cambridge. Rather than portray all of these cases in detail, we give a short overview and further use the data to illustrate the insights on governance for C2C that were developed at the seminars and in this study.

4.1 C2C practices in the member regions

Our further study is based largely on the presentation of 'good practices' through written reports and in presentations at the four C2CN Thematic Seminars. The written reports – 33 in total – consist of the answers of C2CN-partners to a set of 29 open questions listed in the C2CN Case Form. Table 4 presents an overview of these questions. Despite this effort to align the description of good practices by different C2CN partners and their local contact persons, the reports vary in format as much as in content. The length of the reports ranges from a single page to 10-page long, detailed accounts. More importantly, some reports contain multiple 'good practices' in one 'case'. The Municipality of Carugate, in the area of Milan, Italy, for example, took several initiatives which could each be regarded as a case, but are interrelated and will probably gain in impact because of efforts to coordinate them. It could be four cases just as well as one. In terms of presenting an overview, the end result is that it is impossible to sensibly summarize this information in numbers[36]. It would simply be misleading. The bottom-line is that C2CN partners proposed a series of practices demonstrating that a variety of actors are taking initiatives related to C2C.

Table 4: questions asked in the C2CN Case Form

Case Name

Case owner
- Name of the organization
- Contact person
- Contact address, phone numbers and e-mail

Detailed description of the case
- Vision and strategy
- Content of the case: what is the case about?
- Process: subsequent steps and phases
- Timescale: short (<2 years), medium and long term (>5 years) activities and consequences
- Actors involved: sectors, organizations and persons
- Financial framework (who contributed / in %)
- Implementation, project transferable
- Relationship with similar experiences in other EU member states
- Quantification of the results in the field of waste management and prevention
- Major innovative and economic opportunities for the business community
- Economic growth and cost-effectiveness; other (more options possible)

The relation with the Limburg C2C principles
- We are native to our place
- Our waste is our food
- The sun is our income
- Our air, soil and water are healthy
- We design enjoyment for all generations
- We provide enjoyable mobility for all

Evaluation and lessons learnt from the practice
- Demonstrated results
- Some examples of excellence
- Success factors
- Enabling conditions
- Difficulties encountered
- Other possible interesting information

36 In research jargon: the 'good practice' in this perspective study is an insufficiently clear unit of analysis to provide meaningful statistics

The presentations and study visits at the C2CN Thematic Seminars provided another source of data, richer in information than the reports because of the associated exchange of ideas. Some of these good practices were selected from the written reports. The development of a laptop sleeve by the Koekoek Qreamteam, in Venlo, Dutch Limburg, for example: the first product world-wide entirely made of C2C-certified materials. Others were not reported in written form, such as the Cameleon Shopping Center in Brussels. These 13 presentations and 15 site visits again illustrated the kinds of initiatives are taken by actors all over Europe in an effort to close material loops, or at least to reduce their ecological footprint. In this perspective study, we use the good practices to illustrate developing insights on governance for C2C. It is important to note that these practices don't necessarily meet all criteria of C2C in the strictest sense of the concept. In the area of construction, for example, a leading architect in 'green building' stated that it is impossible to design C2C buildings because the materials are not (yet) available. It is good practice, however, and possible to make all public buildings energy neutral, or even energy active, and CO2 neutral[37]. In the area of spatial development, a manager explained that it is impossible to close the materials loop when clearing industrial sites from the last century, which weren't designed for disassembly and recycling, yet he recycled wherever he thought feasible and tried to restore the site of a closing-down production plant as much as possible. It is debatable whether such practices belong in a study on governance for C2C. It was debated also. In a few cases, C2CN participants found the level of C2C-thinking in a specific practice insufficient. We have not included such practices in this document. But C2CN's concept of C2C remains broader than its interpretation in C2C certification. And finally, this perspective study focuses on governance practices that help the partner regions move in a C2C direction.

4.2 Governance practices

The good practices reported through written reports, seminar presentations and study visits provide a broad view of initiatives by diverse actors in the C2CN partner regions. Initiatives include different types of education, several learning and development networks, the set-up of support structures, the development of sustainability standards and regulatory efforts, the design of a range of products, the revision of supply chains, and the reconfiguration of infrastructure and product-service systems. While few practices fit in a single one of these categories, we pragmatically group them by their primary focus and will explore overlap and links from that vantage point.

4.2.1 Spreading the word and inspiring ideas

The good practices include different practices that primarily focus on disseminating and developing the C2C concept and associated knowledge. We grouped these initiatives into three subcategories, i.e. education, learning and development platforms and C2C show-cases.

37 Presentation by Thomas Rau, C2CN Thematic Seminar Maastricht, 9.7.2010.

36 In research jargon: the 'good practice' in this perspective study is an insufficiently clear unit of analysis to provide meaningful statistics

Carugate Municipal Building Code

Carugate prides itself of being the first municipality in Italy and the second in Europe that, as long ago as in 2003, approved an eco-sustainable Municipal Building Code, introducing regulations related to energy saving, the use of renewable energy sources and the use of bioclimatic technology. In particular, Carugate made solar systems for water heating compulsory on new buildings. The code, updated in December 2008, also defines rules for lighting, the use of drinking water, the collection of rainwater, boilers and air conditioners.

The new Building Code for Carugate defines both compulsory and optional interventions. The introduction of all these measures was based on a careful needs analysis and an upfront investigation of occurring problems. The introduction of the New Building Code was also paralleled by several awareness campaigns, addressed both to private enterprises (retail) and public parties (schools, associations, etc.) in the Carugate municipality. Important to mention is that once the prescriptions were introduced, coercive measures were taken to those who did not live up to the new regulations. So information campaigns and the motivational approach were complemented by correction mechanisms for behavioural change. To promote proper application of the rules defined by the Building Code, the Carugate Municipality organized technical meetings for business operators and citizens, together with 'Rete Punti Energia', the association of the energy agencies of the Lombardy Region, who provided the necessary technical support.

Key for Carugate's success was the deliberate choice for a participative design process, involving different local actors in the development of the Building Code. The building sector (architects, builders, etc.) was involved from the beginning. Other success factors for the Building Code are the extended communication, especially to end users and schools, and an explicit and transparent communication of the additional costs for building according to the code, complemented with the involvement of the local banks who offered low interest loans.
The Building Code was also promoted thanks to the introduction of EU policies for the energy efficiency of the buildings, the 'Ordenanza Solar' (solar ordinance) from Barcelona, Spain, and the increase of interest from the Regions and local authorities in general for the promotion of sustainable construction. Moreover, in July 2009, the town council of Carugate, formally adhered to the Covenant of Mayors that, in accordance to the Kyoto protocol, has the objective of reducing the emissions of greenhouse gases, responsible for global warming.

According to the data available on 2009, thanks to the Building Code more than 100 buildings in the municipal area installed technological solar and photovoltaic systems. Other installations are planned on public buildings. Management costs for public buildings and street lighting have been reduced through the design tactics (for reduction of electricity, hot water, heating and air conditioning) that the different rules in the Building Code call for. Architectural and technological solutions are now applied to use natural light to the utmost. The local Carosello mall has gotten an extension with grass covering on it's roof.

Besides the Building Code Carugate also installed an interesting Municipal Waste Management Model and a Sustainable Mobility Plan.

Website
www.comune.carugate.mi.it

Koekoek Qreamteam

The Koekoek Qreamteam is an incubator for the creative industries with its epicenter in Venlo, Limburg, The Netherlands. It engages in creative C2C design and provides start-up support for sustainable business. It is a highly creative group that actively worked with and on C2C ideas. They invested a lot in networking and in visibility and becoming recognized. The group undertook several actions going from raising awareness to giving lectures and organizing workshops. Not to forget of course, designing C2C products.

Koekoek's first C2C contacts and contracts originate from the International Furniture Fair in Cologne early 2008. By the end of 2008, at Nutec Fair, the team introduced the first laptop bag that is fully eco-effective. It is completely made of C2C certified materials and is an example of the design philosophy around reverse logistics, design for disassembly, social demands and certified C2C material use. With its composition of existing C2C fabrics and yarns, Koekoek's laptop sleeve probably is the first 'second order' C2C product. Material issues prove to be a real challenge and technical validation of C2C products is crucial for Koekoek. Certification of C2C products is, however, neither easy nor cheap. For this Koekoek Qreamteam worked directly with McDonough Braungart Design Chemistry (MBDC).

Other objects that the group designed and developed include a biodegradable apron and a green boomerang, made of bio-plastics, that served as a gadget symbolizing the cyclical essence of C2C with the notion of 'coming back'. Joost Backus provides a living example of C2C thinking by wearing a jacket made of 'Returnity', 'the fabric of many lives' by Backhausen, the Austrian producer of interior textiles. The gimmick of using ecological curtain tissue for his jacket makes it easy for him to transmit his C2C message when he goes to fairs, conferences etc.

It seems that Koekoek gathered a real creative community in their Q4 quarter in Venlo that lives the C2C philosophy. They strongly believe that change comes by trying things out. So they worked out catchy but intelligent publicity for commercial companies such as the paper producer Van Houtum. They demonstrated the concept of design for disassembly, showing an office chair in a window in a street, ready to sit on it, and just besides it the same chair laying disassembled in all its parts. To study how products are conceived (mostly not at all for recycling) – and, it has to be admitted, also for fun – they try to disassemble about anything they can get their hands on. Fully in line with cyclical thinking, Koekoek kindly recuperates 'Just do it' as its motto.

The Qreamteam's activities were funded by the Venlo City Council and the Province of Limburg until 2009, yet financial continuity is a challenge for the future. A total of 16 start-up companies take part in the Qreamteam, which brought together over 100 members from various companies. Over 100 articles and publications have spun off from Koekoek Qreamteam activities. The 'biz and buz' makes talent stay in Limburg and puts hold to the brain drain in the region. The project strengthens local industry, both traditional and non traditional. Along with other initiatives, it regenerated a run-down city neighborhood and attracted creative companies and new talent to the area. Koekoek appears to exemplify pure C2C product design embedded in local economy and community development efforts.

Website
www.koekoek.de
www.qreamteam.nl

Cameleon Shopping Center

Cameleon is a private outlet store located in Woluwe, Ixelles and Genval, Belgium. The group organizes exclusive members-only sales of new collections of fashion, accessories, and home furniture at exceptional prices. In March 2009, Cameleon opened its new commercial outlet in Woluwe, near Brussels. It is an eco-built store with 8.000m² of shopping space, aiming at natural comfort and harmony with the environment. It is easily accessible by public transport, for cyclists and pedestrians. Also for its staff, the company has a mobility policy encouraging carpooling, public transport or the bicycle.

Cameleon integrated environmental aspects in each stage of the project, from the initial design to the final implementation. They aimed for excellence in 5 areas: the choice of materials, biodiversity, the site location, the project conception and energy. This translates in a number of action points: natural ventilation, eco-friendly materials, optimum insulation (K26), solar panels, natural light, green roofing, etc. Spread out over a period of 30 years, the project will suppress 7.250 ton of CO2 emissions when compared to a standard modern-day building.

Taking into account the environment, for Cameleon also means blending into one's neighborhood and contributing to a city project. The new shop is a meeting place where visitors and residents can take advantage of the cafeteria and terraces which remain accessible outside normal opening hours. There is also a communal kindergarten for about 39 children. During construction, measures were taken to decrease nuisances for the local residents during the construction phase. The use of prefabricated cement sidewalls helped in this respect. This material reduces transport, construction delays and waste, and brings little pollution, both during its production in the factory and its installation on the building site. It is 98% recyclable and does away with many concrete machines and trucks.

Furthermore in terms of the selection of materials and materials savings, all the project's raw materials were selected in relation to their carbon footprint, meaning the energy used for producing, transporting, utilizing and recycling them. Adhesives, paints, solvents, etc. are all of natural origin when possible, also demonstrating consideration for staff and visitors' health. Most of the structures are made of local wood and, to offset the consumption thereof, 1.200 trees were replanted in the Ardennes. Most of the interior furniture comes from recycled sources (antique shops, old buildings, reclaimed planes, etc.).

Cameleon installed beehives on the roof and around its building to improve pollination. A beehives camera allows to observe the activity of the bee colonies in real-time all year round. The 2.000m² roof space is covered with a vegetable prairie-type substrate helping for rain water retention and evaporation. The building is supplied by a dual water network (rainwater / municipal water) to avoid wasteful consumption of drinking water. Other contributions to biodiversity are done by supporting specific nature projects. Also other associations working on societal or environmental interests are actively supported. These actions are the result of meeting, sharing and exchanging the Cameleon vision. Or as the company phrases it: 'We don't believe in luck, we believe in meetings.'

Cameleon is proud of the cooperation they established for their eco-built between a lot of different specialists and stakeholders, as clearly shows on their website. The Woluwe building has won several prices and the next new thing Cameleon already launched is a 'new branch with environmental concern, called: 'Do Something CO2OL'!

Website
www.cameleon.be

C2C Master Class at Fontys Hogeschool

In Limburg, the Netherlands, Fontys Hogeschool is organising a C2C master class to help professionals applying C2C principles in their practice. The course is organized in collaboration with the Province and industries in the region and was developed together with EPEA. Eight modules are given by lecturers from companies (DSM), universities (Fontys, Radboud Nijmegen), government agencies (SenterNovem) and EPEA, with additional involvement from members of sustainability networks (International Centre of Sustainable Excellence). Public Relations for the masters course was done by Province and Chamber of Commerce. Fontys Hogeschool and the Limburg Province are co-financing.

So far the class took place twice and 22 people graduated. A third master class started in autumn 2010 aiming at doubling the number of participants. These are mainly SME's from Limburg, representing different sectors.

The Master Class on C2C does not only provide knowledge in the form of theory, it also provides practical examples and participants make a translation of what they learned to their own practice. The class ends with an action plan for one's own company, based on assignments in the earlier modules. Many companies start up sustainable innovation projects after the course, which has stimulated them to seek partnerships within the chain of activities in their sector (with suppliers, customers, customers-of-their-customers, knowledge partners).

The course also brings opportunities to network around C2C issues. To that end a Linked-In Alumni group has been created. The Hogeschool also organises follow-up days, where participants of former classes can meet and share experience with their fellow class mates. From such exchanges co-operations between participants evolve. Important insights and lessons learned from the master class are also used by the Fontys University of Applied Science to translate them into the curriculum of the students.

For the future it is being considered to make an e-learning module of the whole master class, with visual clips and explanation by voice-over. This would make the course easy to translate to other languages and it would help to overcome the possible dependence on the availability of certain lecturers. A typical value chain from the Limburg region could work as an anchor to envision the whole course.

Website
www.wattmooi.nl/energieprogramma/duurzame-energie/masterclasses+cradle+to+cradle+voor+bedrijven?news=88

4.2.1.1 C2C education

A first type of practices is in education. Initiative-takers aim to disseminate the C2C concept and associated knowledge. Examples are the C2C Master Class at Fontys Hogeschool[38] and the Professional C2C Education program at Hogeschool Zuyd[39], both in the Netherlands. Both programs started in recent years and are oriented towards students with professional experience and practice. The Master Class focuses on SME's in particular.

A characteristic of both cases is their attention to practice and networking. The programs result from a collaboration with various industries – including petro-chemistry, energy distribution, waste management and others – and regional government agencies, from which they draw students as well as experts on certain sustainability topics. As a result, these educational initiatives do not limit themselves to conveying available knowledge: they provide a platform for several actors to network and actively seek to develop practice. As such, they illustrate the overlap between the categories we propose – a topic to which we will come back later.

4.2.1.2 C2C exchange and development networks

A second type of practices are learning and development networks. The networks come in a variety of forms and attract different groups of people. Membership may be more or less stable and formal. Examples include the 'eco-remediation' network in Dravinja Valley, in Slovenia, the Ecobooster project in Rhône-Alpes, France, the 'communities of practice' and the Round Tables on C2C in Limburg, Nether-lands, the learning networks Plan C and DuWoBo in Flanders, Belgium, and the sustainability-focused web-platform for design scholars LeNS, reported from Italy. Although these initiatives vary in focus and format, they all gather people with an interest in sustainability and offer them a platform to create C2C-type practices in their work or living environment. A short overview illustrates the range of activities involved:

- The Dravinja Valley project connects people and organizations who live and work in the same river basin. It focuses on intergenerational collaboration and linking rural and urban areas in the valley, with the aim to better understand the local eco-system in order to better support it[40].
- Ecobooster is an initiative to support eco-design in products and services of local SME's. It supports a service-based business model through a sequence of collective workshops, in-company project support, and a collective creative day for "the emergence of eco-innvative alternatives."
- The C2C Communities of Practice (CoP), initiated by the Limburg Chamber of Commerce, gathers professionals from industry, government agencies and education to develop C2C projects. It stimulates collaboration between community members through monthly meetings where C2C cases are discussed and improved[41].
- The C2C Round Tables are a similar initiative in the fields of sustainable industry, construction, road construction and procurement. Facilitated by the Province of Limburg, the Round Tables gather front-runners in each of these fields to share knowledge and experience with the intention to stimulate joint projects.
- Plan C is a transition network on sustainable materials management launched by the Flemish Public Waste Management Organization (OVAM). It brings together entrepreneurs, government officials, consultants, scientists and representatives of NGO's and consumer organizations, who formulated a vision on sustainable material use, identified transition paths and stimulate transition experiments[42].
- DuWoBo is a similar initiaitive in the field of sustainable housing and living, launched by the Flemish government as part of a sustainable development program. The network focuses on closing energy cycles, closing material cycles and creating vital cities and communities[43].
- LeNS stands for Learning Network on Sustainability. It connects teachers and researchers with an interest in design for sustainability to develop educational agendas and curricula in that area. The focus is on the design of product-service systems. LeNS includes an open-source learning e-package, abbreviated OLEP, and includes participants from Europe, Asia, Africa and South America[44].

Learning and development networks include the largest number of governance practices proposed in the C2CN project, also because initiatives in other categories include active networking to support their primary practice. A returning characteristic across cases is the use of social media: LeNS is a prime example, but the Limburg Chamber of Commerce and Plan C are also launching on-line CoP's. Examples of on-line networks in other categories include the Linked-in alumni group of the Fontys C2C Master class, or the "free E-bay" approach in the Peterborough Cathedral Square project.

Most of the networks or platforms in this category were initiated by government agencies: the Province, the regional agency for development and innovation, the public waste agency… The initiatives can be differentiated in terms of the type of network participants, being different mixtures of front-runners, 'captains of industry', researchers, educators, designers, producers, retailers, end-users and so on.

4.2.1.3 C2C show-cases

A third subgroup of governance practices aiming at spreading ideas and inspiring practice, are show cases: C2C products in use for a wide public, highlighting the necessity and possibility of sustainable alternatives for common practice. Examples include the C2C loft, the Bolwaterstraat project and the Summer Park Festival in Venlo, Netherlands, and the Amica dell'Ambiente award in Milan, Italy.

38 More information available at www.fontys.nl
39 More information available at www.hszuyd.nl
40 More information available at www.ucilnicavnaravi.si
41 More information available at www.concradle.com. Note that the concept of 'community of practice' in this case differs from the original notion proposed by Lave and Wenger (1991:29). It is more formalized work format than the socio-cultural community in a certain field of practice
42 More information is available at www.plan-c.eu, in Taillieu et al. (2008) and in Paredis (2010). See insert
43 More information is available at www.duwobo.be
44 More information is available at www.lens.polimi.it. See insert

The C2C loft is a project of the Koekoek Qreamteam. The plan is to have a small experimental, mobile loft as a demonstration building and space for experiments in developing C2C-based components for use in commercial buildings. The Bolwaterstraat is a street in Venlo, which the Qreamteam intends to transform into a sustainability-themed shopping street: an area in which a wide range of C2C products and services are exhibited and for sale, creating public awareness and developing a market for C2C items and approaches. The Summer Park Festival is a yearly event and one of the largest free festivals in the Netherlands. By adopting C2C-based practices, the festival has stimulated eco-innovation and 'green' awareness and innovations amongst hundreds of volunteers, who build up the site, and thousands of visitors[45]. The Amica dell'Ambiente award, finally, is an annual, national prize for innovations in products, services, technologies, processes and management systems that make a significant contribution to environmental quality and sustainable growth[46].

The above cases are not the only initiatives in this study that highlight eco-innovative practices: these are initiatives in which inspiring ideas appears as a primary function. There are additional practices in which show-casing is less on the foreground, but plays a similar role. Examples include the Qreamteam exhibiting its C2C-designed laptop sleeve at a commercial fair, or Backhausen presenting its C2C-designed textiles at a fashion show.

4.2.1.4 Creating support structures

A fourth subgroup of cases concerns the set-up of structures to support C2C and, more broadly, sustainable innovations. They facilitate access to relevant knowledge and actors, including experts, government agencies, banks, business support etc. Two initiatives represent this category in this study: the Innov'R project in Rhône-Alpes, France, and the C2C Expolab in Venlo, Netherlands.

The Innov'R initiative is a permanent call for eco-innovative projects, specifically in SME's, where limited resources represent a significant obstacle in the relative complexity of eco-innovation. In order to lower the threshold for local entrepreneurs, the regional agency for development and innovation (ARDI) set up Innov'R as a one-stop counter for eco-innovation[47]. The C2C Expolab, founded by the City of Venlo, is first and foremost a C2C product and solutions database, documenting, validating and archiving C2C practices. In addition, the lab can do research and give advice. Its work is based on open-source approaches to innovation[48].

These cases share some functions with the educational initiatives described earlier, yet offer a different type of gateway. Their infrastructure provides a central entrance in a dispersed field of practice, offering support on technical, legal and / or financial issues and pointing people in the direction of relevant networks, providers, classes etc.

4.2.2 Setting standards

A second broad category of governance practices concerns standards for sustainable, or more specifically C2C practice. In the C2CN project, guiding principles and certification schemes were not as such proposed as good governance practices, yet several initiatives refer to different types of standards. We pragmatically distinguish between guiding principles, certification schemes and regulatory efforts.

4.2.2.1 Guiding principles

Several C2CN partners refer to guiding principles when submitting their cases. Besides the C2C principles outlined earlier, such principles include the famous three P's of people, planet and profit (or prosperity) or three E's of ecology, economy and equity. Other principles referred to are the Trias Ecologica and the Ecopolis model, in the area of construction, and the ideas of the Slow Food movement, in the area of area-specific development.

The three P's or E's have become a conventional approach to corporate social responsibility (CSR) and are widely known as the 'triple bottom line', implying that corporate decision-makers should weigh their actions against social and ecological as well as economical criteria[49].
The Trias Ecologica is essentially a three-step strategy to sustainable construction. The idea is to minimize inputs and outputs of any building. At the input-side, the three steps are to use no more materials than necessary, use materials from renewable sources whenever possible, and use materials from finite sources as cleanly and efficiently as possible. At the output-side, the guideline is to reduce waste, to recycle waste (disassemble and avoid downcycling), and to process residual waste as cleanly and efficiently as possible[50].

The Ecopolis model proposes that the sustainability of cities as living environment hinges on a triple strategy, focusing on:

- a responsible city, closing material and energy loops;
- a vital city, promoting diversity through multi-functional neighborhoods and bringing 'green' and 'blue' (water) into the city;
- a participating city, involving all stakeholders in the design and development of their environment[51].

45 More information available at www.zomerparkfeest.nl. See insert
46 More information available at www.premioinnovazione.legambiente.org. See insert
47 More information available at www.rhonealpes.fr/TPL_CODE/TPL_AIDE/PAR_TPL_IDENTIFIANT/262/18-les-aides-de-la-region.htm. See insert
48 More information available at www.regiovenlo.nl/page/137/c2c-expolab.html
49 Elkington, 1997:72ff. Braungart and McDonough (2008:153) adopted the idea, yet present the three P's or E's as a triple base for value creation. The propose a 'triple top line', in which ecology and equity represent business opportunities, rather than "bonus points for eco-efficiency tacked on" to decisions based solely on profit considerations
50 Duijvestein (1990). Duijvestein also elaborated a similar three-step strategy for energy use – the Trias Energetica. More information is available at http://opensourcehouse.blogspot.com/2010/04/sustainable-building-material-approach.html
51 Tjallingii, 1995

Building a Sustainable Region in Dravinja Valley

In Slovenia, a number of municipalities in the Dravinja river basin set up a network to exchange intergenerational and rural-urban experience and knowledge on sustainable environmental practices.

The communities involved share the vision to live in harmony with nature and look for 'eco-remediation' as a preventive and curative approach to environmental protection. As they all live in similar natural conditions this stimulates to develop a common environmental knowledge base.

The project focuses on education. Teaching and research are carried out in close connection to the local natural environment. With the support from the International Centre for Eco-remediation, NGOs and other organizations and local people, traditions and natural resources in the river basin are studied. This leads to insights about the protection of the local resources and their possible integration in local development, being it tourism, agriculture or other local industries based on the environment refurbishment.

The generated knowledge became part of the minimum content of the educational system. It lead to mandatory practice for all levels of education, for research work by doctoral students, for educational tourism and other educational programs. Monthly about 50 up to 200 people participate in the educational polygon, in student research work, practical community work, or research for sustainable development together with local people.

A knowledge centre for recycling and composting is being developed relating to the principle of 'our waste is our food'. To live up to the principle that 'our air, soil and water are healthy' special attention is paid to the construction of wetlands, water retention, and protection against erosion. A specialized training site is dedicated to the study of land use and soil.

The Dravinja valley project explicitly links rural and urban areas, studying and promoting the different functions that rural areas can fulfill for urban areas. Local knowledge is therefore used to promote rural development. Also many efforts are paid to integrate different groups and local communities in the network, to provide work for the unemployed, and to link the project to local clubs and associations.

The main actors involved in this project are university research centers, Ministry of Education and Sport, municipalities, local companies, farmers, interested individuals and representatives from the tourism sector. Funding is mainly provided by the Ministry of Education complemented by private initiative. The Dravinja valley project finished in September 2009. The municipality of Poljčane and locals involved carry on the work in different ways. To stimulate future activities new calls for proposal are responded for.

The case shows how restoration of the local environment provides a learning ground for the development of new skills about the ways to survive in the 21st century. The project has stimulated the region to deliver competitively priced goods and services that meet customer demands and contribute to the quality and convenience of the life of the locals.

Website
www.ucilnicavnaravi.si

Learning Network on Sustainability (LeNS)

The Learning Network on Sustainability (LeNS) is a multi-polar international network aiming at curricula development in the field of design for sustainability. It contains 7 European and Asian universities and is funded by the European Commission within the Asia Link program. It focuses particularly on the design of product-service systems.

A trans-cultural educational process was set up in which the design schools involved became educational and experimental research labs. The project partners developed a pilot course to be implemented in each university. This was based on cross-cultural exchange and analysis. In a so-called 'contents flow', students coming from a European partner university made designs for the Asian context and vice versa. In the 'experts flow', European universities were hosting staff from Asian universities and vice versa.

The main result of the project is the Open Learning E-Package (OLEP), a web platform that allows the decentralized and collaborative production and use of knowledge. The platform contains a package of educational materials (slide show, texts, audio, video, etc.) and tools for designers, which can be downloaded, modified, remixed and reused for free. Researchers and design educators, as well as students, designers, entrepreneurs and other interested persons can all profit from this knowledge base.

Apart from the content, the web platform itself is also designed in an open source and copy left logic allowing it to be downloaded and reconfigured in relation to the specific needs, areas of interest and themes of a particular context. As such it supports the proliferation of new designer networks focused on specific topics or geographical regions, or in different languages. Two more networks have already been launched as a spin-off from this project: LeNS Africa and LeNS South America. The launch of LeNS Oceania is planned. The different networks, even as they function in an independent way, are interlinked. In fact any new generated web-platform will be linked to the others, establishing a global eco-designer community

The LeNS project runs over three years ending mid December 2010. Since it is an open package, continuous updating and development by users within the interconnected networks of design communities is expected after the termination of the project. As such the LeNS process foresees the development of new curricula reflecting both a shared macro agenda on sustainability and localized and contextual sustainability agendas. This leads to sharing and speeding up knowledge production to properly respond to global as well as local needs and demands in the economic, social and cultural spheres.

The LeNS project offers a new generation of designers the chance to play an active role in the transformation of the present production and consumption systems. It provides them with knowledge and skills to integrate C2C principles in their future design practice.

Website
www.lens.polimi.it

Amica dell'Ambiente Award

The Premio all'Innovazione Amica dell'Ambiente (Environmental Friendly Innovation Prize) is the first and unique national prize for contributions to environmental improvements in Italy. The Prize is awarded annually in Lombardy by Legambiente, an important scientific conservation group that defends the environment in the country since 1980.

The award was first given in 2001 and over its 10 consecutive years the initiative has attracted a growing number of projects (up to 180 in 2009) as well as an increasing overall quality of the innovations that candidate. In total about 1000 innovations have been collected, constituting a knowledge patrimony and a network for the diffusion of good practices and eco-initiatives in the area.

Original realizations with already first proven results and considerable future potential in environmental improvement can enter the contest. The prize is awarded to those companies, non-profit organizations, public bodies and institutions that combine ecological and economical competitiveness in the production of goods and/or services. Also citizens associations can participate. By choosing a yearly award theme the prize has also demonstrated to be not only an occasion to spread ideas, but also a lever to direct choices and open up new roads for environmental innovation. Innovations in the following areas have thus been considered: green technologies, energy efficiency, renewable sources, waste, energy, sustainable building, new materials, eco-design, green procurement, sustainable mobility.

Applicants need to take several evaluation criteria into account. In addition, efforts to improve information sharing about social and environmental data and the installation of a permanent communication is suggested to the projects. Also qualification by means of voluntary certifications (ISO 14000, EMAS, Ecolabel, SA8000, green energy, organic certification, green certificates/RECs) or the use of controlled management practices in relation to environmental and/or social criteria (like environmental or social reports) are stimulated.

The projects are evaluated by a jury of technicians and experts. A prize-giving ceremony in the headquarters of the Lombardy Region gives visibility to the award winning projects. Awarded participants may use the Amica dell'ambiente prize logo for one year. Winning showcases are also given extra publicity linking the prize related events to the Global Entrepreneurship Week, a worldwide event taking place simultaneously in 80 countries. Legambiente also partners with the Cleantech Open IDEAS Competition, a Californian contest dedicated to eco-sustainable technological innovations, providing the participants to Premio all'Innovazione Amica dell'Ambiente a great chance for international exposure.

The prize is supported and 'institutionalized' by several regional, national, and European bodies. The Lombardy Region and Legambiente strongly promotes the contest and support from two prestigious universities (Politecnico di Milano and Università Commerciale Luigi Bocconi) gives it scientific value. The initiative is also accredited by the collaboration with worldwide renowned private institutes and national renowned consortia and trade associations.
Financial support comes from the Lombardy Region and from regional foundations and the Milano chamber of commerce. Besides financial support also the communication support of the partners involved and related media networks helped spread the word to the larger research and business world.

Website
www.premioinnovazione.legambiente.org

A Green Focus at Venlo Summer Park Festival

The 'Zomerparkfeest' or Summer Park Festival is one of the largest free music festivals in the Netherlands. It runs for four days in Juliana Park in Venlo. Admission is free to the approximately 100 acts on five different stages, covering all genres of music as well as dance, theatre, film, literature, visual arts and science. The venue has a capacity of about 17.500 visitors. About 400 volunteers participate in setting up the festival, which has become a 'social hub' for cultural innovation in the greater Venlo area.

The last 2 years the festival has encouraged and practiced eco-innovation based on C2C, stimulating 'green' awareness and showing eco-innovations to the public. The festival represents one of seven interrelated actions implementing innovative C2C products and services, brought together under the umbrella of FOUR C. This project aims at combining creativity and innovation in an ecological and entrepreneurial spirit. Innovation is all too often considered as being only technical. And creativity is often linked to artistic expression. FOUR C wants to bring these two elements together in a physical and organizational hub of eco-creativity and eco-innovation. It therefore taps into the dynamics of a small region like the Venlo area where a well functioning social fabric, short distances to actual green areas, and a well woven local business network work as catalysts.

In 2008-09 the green focus at the Summer Park Festival was on low energy stage lighting (using LED), bio-plastics drink disposables (for more than 40.000 visitors), bio-based food disposables for staff and volunteers, and organic cotton shirts and clothing. For 2010-12, efforts are concentrated on the use of second generation bio-fuels for power generation, solar-based night and emergency lighting, bio-based food disposables (at all food stalls), organic cotton t-shirts for public purchase, optimized energy use for cooling systems, and expanding the use of innovative bio-based materials wherever possible.

The festival organizers want to work in accordance with the principles of corporate social responsibility and translate this into two domains of attention: sustainability and equal rights. Therefore Summer Park Festival works together with the 'Venlo Global Platform', 'FAIRliefd' (a fair-trade network), and 'NCDO' (the national centre for sustainable development) in order to support the Millennium Goals. Also a local housing foundation called Venlo-Blerick, is involved in this respect.

Equal rights are demonstrated in the efforts to make the festival as accessible as possible for people with disabilities. The stage is lifted so that visitors in wheel chairs can also fully enjoy the acts. The festival also programmed the Congolese musical band 'Staff Benda Bilili' in which a majority of the musicians have polio handicaps. This act surely personalized the idea of equal rights and inclusion.

Sustainability at the Summer Park Festival means: drinking out of bio-degradable cups made from corn, paid with sustainable vouchers while reading a sustainable program brochure, both printed on environmentally friendly paper and printed with ditto ink. Also your food is served on environmentally friendly material and with similar cutlery. And if you'd like to close your personal loop, even the toilet paper is Cradle-to-Cradle (by the Dutch Van Houtum company). All washing and cleaning is done using bio-detergents.

Website
www.zomerparkfeest.nl

The model inspired the Ecopolis project by the Flemish Institute for Bio-Ecological Building and Living (VIBE) in Belgium. The institute provides expert-advice to cities and municipalities, communities, developers and investors in urban renewal projects[52]. One of the central tenets is to bring developers and end-users together early in the process – an approach that proved fruitful in several projects.

A last example of guiding principles are the ideas of the Slow Food movement, referred to in the Feeding Milano project. Addressing the impact of nutritional habits on the environment and society, the Slow Food movement promotes a diet based on environmentally and socially sustainable products. It proposes that quality food is good, clean and fair – three prerequisites specified in its Slow Food Manifesto for Quality[53]. It includes sustainable farming practices, protecting ecosystems and biodiversity in every link of the supply chain and safeguarding the health of the consumer as well as the producer.

The above principles and models represent voluntary standards that actors in the C2CN governance practices refer to as a guidance in decision-making. These standards differ with regard to their level of detail and exactness, yet tend to remain quite general and leave ample space for interpretation.

4.2.2.2 Certification schemes

A second group of standard-setting practices are certification or accreditation schemes. Standards are more precise than the guiding principles discussed above. Participation remains voluntary, yet is more formalized. Actors apply for an audit process, in which they demonstrate that a certain product or project meets the criteria for approval. If this is indeed the case, the product or project is formally recognized as such.

The cases under study refer to several formal standards of this nature, including the C2C® certification for products, the Sistema Edificio® certification[54] for buildings, in Italy, and BREEAM and Zero Waste Places accreditation for buildings and built-up areas, in the UK.

The C2C® Certification is issued by McDonough Braungart Design Chemistry (MBDC), the consulting and certification firm owned by C2C's founders. They present the C2C certificate as an eco-label that assesses a product's safety to humans and the environment and design for future life cycles. The certification process provides guidelines for using safe materials that can be disassembled and recycled as technical nutrients or composted as biological nutrients[55]. In the context of this C2CN perspective study on governance, it is worth noting that MBDC presents C2C as a registered trademark (®) and hence privately owned.

The Sistema Edificio® Certification is issued by the Italian Istituto Certificazione e Marchio di Qualità (ICMQ). The label certifies that housing is built with materials and technologies that minimize energy use. ICQM offers project audits, certification of materials and certification of management systems[56].

BREEAM stands for the Environmental Assessment Method (EAM) of the Building Research Establishment (BRE), a former British government agency that was privatized. BREEAM offers certification for Eco-homes, including an instrument to evaluate the state of a building and a guidance document to work with before having a building assessed[57].

The Zero Waste Places accreditation is an joint initiative of the British Business Resource Efficiency and Waste Center for Local Authorities (BREW), the University of Northampton and the Department for Environment, Food and Rural Affairs (DEFRA). It aims to support innovative and exemplary practices in sustainable waste management, and to encourage local authorities to take a leadership role in this area. The Zero Waste Places scheme focuses on conserving, reusing and recycling resources. 'Places' can vary from a small street upwards to a street market, retail park, high street, village, town or a whole authority[58].

While some critique green certification as a way to pass on personal responsibility for a viable world to certifying bodies[59], most stakeholders appear to agree that certification provides useful information and criteria for decision-making in specific markets. The main downside mentioned by C2CN participants is that there is a multitude of labels, and it is often unclear what a certain label does and does not cover. Note that certificates such as the Sistema Edificio and BREEAM focus on energy efficiency, rather than on eco-effectiveness in the sense C2C proposes. Finally, it is suggested that labels privilege larger industrial groups over SME's, for reasons of cost and the certifying body's commercial interest.

52 More information is available at www.ecopolisvlaanderen.be
53 The Manifesto is available at www.slowfood.it/_2010_pagine/com/popup_pagina.lasso?-id_pg=30
54 More information available at www.arch-sis.com/energetica/sitema-edificio.
55 More information available at www.mbdc.com/detail.aspx?linkid=2&sublink=8
56 More information available at www.arch-sis.com/energetica/sitema-edificio
57 More information available at www.breeam.org/page.jsp?id=40
58 More information available at www.lga.gov.uk/lga/core/page.do?pageId=1212879
59 Presentation by Thomas Rau, C2CN Thematic Seminar Maastricht, 9.7.2010

4.2.2.3 Regulatory efforts

A third type of standard-setting is concerned with developing a legal framework. Standards are mandated by government actors and compliance is no longer voluntary. In the C2CN project, the government actors involved in these practices are local authorities. Examples include the Municipality of Carugate, in Italy, introducing an eco-sustainable building code and the Municipality of Peel en Maas, in the Netherlands, accepting a motion regarding green procurement.

Carugate is a municipality in the Milan area, in Lombardy, that introduced a local building code to reduce energy consumption. In addition to compulsory specifications, the code contains optional criteria for construction. The intervention is expected to reduce the overall energy consumption by 25%. The building code is part of a broader package of environmental measures.

Peel en Maas is a municipality in Limburg, in which the Municipal Council unanimously adopted a motion regarding C2C procurement. In practical terms, this means that the municipality has to explicitly include C2C criteria in all future decision-making. The motion specifies that proposals must be evaluated and justified in terms of its impact on waste (to be prevented by means of design; otherwise 100% recyclable), energy (fully self-sufficient systems, with preference for solar/earth heating), soil (cleaner after use than before), air (CO2 neutral, not polluting), water (cleaner after use than before), materials and logistics (as clean as possible, functioning material cycles), environment (impetus to lovelier surroundings) and social justice (fair chance for everyone).

4.2.3 Developing C2C practices

A whole different range of practices involves the actual start of C2C practice in the form of new products, revised supply chains and / or the reconfiguration of larger product-service systems, in order to increase sustainability. In several cases, such practices are set up as pilot projects or transition experiments.

4.2.3.1 Designing and manufacturing C2C products

A first subgroup in this category involves the design and manufacturing of C2C products, i.e. items that consist of fully recyclable components and are designed for disassembly, hence enabling clean, closed materials loops. Cases include production materials, such as the bioplastics by Galactic or interior fabrics by Backhausen[60], as well as finished consumption articles, such as a C2C laptop sleeve or apron, created by the Koekoek Qreamteam, carpet by Desso, paper by Van Houtum[61] or towels by Clarysse[62]. The range of products that are available in business-to-business as well as business-to-consumer markets is obviously wider. At the time of this perspective study the list of C2C-certified products contains several hundreds of items, including clothing, hygiene and health care articles, home and office furniture, interior and exterior building materials etc[63]. In addition, there is an unknown number of products that are not submitted for certification, e.g. for reasons mentioned earlier, or for which certification is in process. We will limit ourselves to a shortlist of cases that C2CN partners proposed as good practices, including C2C-certified products and others.

A first example of C2C practice is the work by the Qreamteam in Venlo, Netherlands. The Qreamteam is a design collective, that started as an urban development project to counter the brain-drain in the South-East of the country. A focus on C2C design attracted creative entrepreneurs and the Qreamteam, headed by the Koekoek firm, currently gathers 16 start-up companies. In a hands-on learning approach, the group started designing and refining products. Its work goes from design to prototype. Among its accomplishments a C2C park bench, an apron made of bio-plastics and a laptop sleeve, reported to be the first product worldwide entirely made of C2C-certified materials[64].

A larger scale example of C2C products are Galactic's PLA bioplastics from renewable vegetable sources. PLA stands for polylactic acid, which forms the base for biodegradable plastic granules. PLA is obtained from fermenting sugar, mainly from beets. Beside being biodegradable, PLA is reported to be 99% recyclable at the end of its life cycle through Galactic's Loopla® technology. Galactic started a pilot production plant in Belguim, as a joint venture with Total Petrochemicals[65].

A third example is the manufacturing of C2C carpet by Desso, a corporation with production plants in Belgium and the Netherlands. About 70 years after its foundation, Desso made a radical decision to pursue eco-effectiveness through C2C. Over the next few years it phased-out most ingredients that C2C rated unacceptable, developed a prototype carpet made of 'technical nutrients', started the C2C certification process for products and began the construction of its take-back system. During the same period, the company switched to 50% renewable energy for processing and manufacturing[66].

The comparison of these three examples sketches the variety in products, from raw materials to finished consumer products, scale and stages of operation. The Koekoek Qreamteam focuses on design and limits production to prototypes. Galactic started a pilot production unit. Desso runs a C2C manufacturing operation. The difference has implications for the complexity of reverse logistics, which remains a

60 More information is available at www.backhausen.com/index.php?m=produkte and www.returnity.at
61 More information is available at www.vanhoutumpapier.com/vanhoutum
62 More information is available at www.claryssejules.be and www.designatwork.be/jules-clarysse
63 The list of C2C-certified products is available at www.c2ccertified.com.
64 More information is available at www.koekoek.de
65 More information is available at www.lactic.be or on video at www.youtube.com/watch?v=dJEUf_mlNxY
66 More information is available at www.desso.com/Desso/home/EN

major issue in C2C: recyclable products contribute to eco-effectiveness only if, at the end of their life cycle, they are indeed recycled and if the recycling process itself is sustainable. That brings us to the next topic: supply change initiatives.

4.2.3.2 Developing C2C chains

A repeated critique on C2C during C2CN events is its focus on single products, regardless of next steps in the value chain. If Mosa's C2C-certified tiles, for example, are placed on a shower wall with mortars or glues that prevent clean disassembly, the tile will never be a nutrient in a C2C material loop. In other words: the necessity to pay attention not only to products, but also to their extended supply chains is evident.

The C2CN partners proposed two cases that bring the supply chain to the foreground. One of them deals with reverse logistics, as C2C initiatives would typically require. In addition, supply chain issues are an undeniable background in several other good practices. We will briefly discuss the two cases that focus on the chain rather than the product, and then expand on supply chain questions through practices that we discuss in other categories.

A first supply chain initiative is the Bosco Mobile project in Lombardy, Italy. Its purpose is to create a short supply chain in the wood-furniture sector in the region, applying eco-design principles throughout the line: it promotes the use of certified regional wood stock to produce furniture, analyzes the value chain to optimize material and energy flows, and designs a local system which is sustainable and competitive in the private and public markets. In order to do so, it taps into existing networks: consortia of SME's in forest work and in the furniture business.

A second supply chain initiative takes place in the Belgian carpet industry, where the Flemish Public Waste Agency (OVAM) brings different stakeholders together in order to collaborate on two lines of action: one, developing a fully recyclable polypropylene carpet for the European household market and, two, developing fully recyclable carpet tiles for the business-to-business market. Both actions include the development of the logistics needed to take the carpet back for recycling at the end of its first-life loop.

The difference between both cases seems significant. Bosco Mobile can be understood as a transition experiment. The revised supply chain is in action and the new furniture is marketed. The initiative ensures sustainable use of renewable resources, yet the supply chain remains essentially linear. The furniture remains an end-product, and the consumer an end-user. Reverse logistics remain out of scope. Not so in the Belgian carpet initiative, which aims to design take-back systems in the business-to-consumer as well as in the business-to-business market. It is hardly a coincidence that the project is not in action yet, as the reverse logistics involved in C2C remain one of its main challenges, especially in business-to-consumer markets.

Several other C2CN cases touch on reverse logistics. Over the last years, Desso has been collecting old carpet in order to learn about take-back chains[67]. On a different scale, Galactic's Loopla technology was used to recycle disposable cups and plates in 'The Big Ask Again' event, through which the Climate Coalition mobilized for the Copenhagen Climate Conference. The event, where thousands of people attended, was set up as an experiment in reverse logistics: the Flemish Federation for Music Festivals (FMiV) has the waste streams analyzed in order to optimize the post-consumer value chain.

4.2.3.3 Reconfiguring larger product-service systems

Finally, several C2CN cases address systems that go well beyond the supply chain of specific products, such as neighborhoods or cities. The urban development projects in Brescia and Carugate, both in Italy, and Cambridge and Peterborough, both in England, are prime examples. In addition, there are initiatives that aim to support this type of projects, such as the Ecopolis initiative, described earlier and the NGO-Network for advising in (r)urban and rural renewal projects, both in Belgium.

The city of Brescia was selected to conduct a pilot project in the regional Action Plan for Urban Waste Reduction (PARR, Piano di Azione per la Riduzione dei Rifiuti urbani). The plan primarily aims at systematic reduction of packaging through selling bulk products, the promotion of organic food delivered by local farmers, the donation of unsold food to solidarity organizations, the promotion of drinking tap water, of home composting, of reusable diapers, and the reduction of advertising through direct mail and of paper-use in the office. The initiative involves the collaboration and agreements between the Lombardy region, the Brescia Municipality, several supermarkets, solidarity organizations, suppliers of washable diapers, consumer and environmental organizations, the association of organic farmers, the Brescia waste treatment company etc. Optimizing supply chains is part of the project. Actions are still in the early phases of implementation, yet the combined actions are expected to reduce yearly waste production with a 100.000 tons per year.

67 Desso operates in a business-to-business environment; Nike has been collecting old shoes, learning about reverse logistics in a business-to-consumer market on its way toward a C2C manufacturing and product lifecycle system

Innov'R

Innov'R is a one-stop counter for eco-innovation in Rhône-Alpes ('guichet unique pour les éco-innovations), a unique gateway for corporate projects which are entitled to a subsidy, a reimbursable prepayment or simply advice related to eco-innovation. The project can be considered as a permanent call for projects focusing on eco-innovations geared towards SMEs.

If supported by the system, eco-innovations can generate new businesses and, consequently, new jobs. Many projects are presented to INNOV'R by young companies and start-ups. For them eco-innovation is a source of new activities. It orients them in re-conversion and represents an important drive for diversification and access to new markets. SMEs require financing to launch and support their innovation projects. It may concern research and development projects, or prototypes or demo's in fields like renewable energy, sustainable development in building, eco-effective processes, products and services, management of polluting emissions, environmental measurement and assessment, etc.

INNOV'R offers simple access to the different bodies dealing with financing and launching these entrepreneurial activities. It is an original partnership between different agencies that virtually pool their front offices and administration. The partners involved are: Rhône-Alpes Regional Government, OSEO (public organisation which supports and funds innovation and growth in SMEs), ADEME (French Environment and Energy Management Agency), ARDI, DIRECCTE (State). Other partners such as the local water agency (AERMC), INPI (French office for Industrial Property) and the Deposit and Consignment Office took part in the effort in the second half of 2010. Also private financial partners (banks, business angels, etc.) are scheduled to join at a later date.

Through the involvement of all these different agencies an eco-innovation project can be supported in a comprehensive and suitable manner, and can be responded to as quickly as possible. SMEs no longer need to work extensively on all different administrative regulations, applications, and forms that exist, neither need they look on their own for a way to fully finance their project. They can simply submit a preliminary file to the 'one-stop counter' to simplify the procedures. Each month, a technical committee selects projects and directs them to the appropriate system partner for further support.

Each year a budget of around €3 million is allocated to the system. These funds are brought together by the Regional Government and the OSEO who invests a considerable amount. Also the French Environment and Energy Management Agency contributes financially to the system. The other partners involved contribute by lending expertise or advice free of charge.

The INNOV'R system was launched in June 2008. Since then about 200 projects were registered. Over 100 projects have been accepted, among which are several projects concerning waste prevention, waste collection and processing. Of the 200 applications submitted in two years, 50% of applications cover the field "eco-innovative products, services and processes" and 35% cover the field "renewable energy, energy efficiency and eco-construction". 60% of candidate companies have fewer than 10 employees and 35% of the candidate companies are under 3 years old and have an annual turnover of less than €150,000. The system thus clearly targets regional SMEs and supports small projects. The average budget of a project is €300,000.

Website
www.rhonealpes.fr/TPL_CODE/TPL_AIDE/PAR_TPL_IDENTIFIANT/262/18-les-aides-de-la-region.htm

Ecopolis Flanders: Ecological and Social Spatial Planning

Ecopolis is an initiative aiming at sustainable urban development, based on the principles of closing the loop, diversity and vitality, and stakeholder involvement. It provides expert coaching for developers, explicitly complementing technological advice with consult regarding social aspects of urban development.

Spatial planning for cities and communities, neighborhoods and allotments are considered as an integrated process and a holistic approach of the eco-system in urban and rural development. This holistic approach of the city as an eco-system needs to be assessed from the regional to the city level, from the urban and rural area to district, allotment and building level. It is based on a basic triple strategy, focusing on: the responsible city (managing flows to close loops), the vital city (bringing diversity and livability to all areas), and the participating city (engaging all actors and stakeholders to get people's commitment).

Ecopolis brings in the knowledge of practical field experts to assist in developments across the borders of domains, scales and layers and going for real eco-system innovation.
Typically Ecopolis interventions include round table conferences, sounding boards, and feedback workshops to pool insights and disseminate study results. A group of specialists is brought together to provide assistance. This does not concern stand-alone suggestions, but a two year follow-up to the realization op a project. An on-line 'Ecopolis Do-Guidance' is available to guide urban planning and area-based development projects.

A lot of attention is paid to bringing producers and end users together early in a development process, as this is a crucial condition to detect real needs and prevent unwanted side-effects of spatial planning. In Maasmechelen, Belgian Limburg, initiatives called 'Living along the water' and 'Bio-ecological quarter' became a success. Projects with potential are easier to find on smaller scale (district, allotment) than in the overall structural planning for a city or region, where the eco-system planning has to start from scratch. In a project developing the Ecopolis-concept near the centre of Ieper, Belgium, the involvement of the inter-communal 'WVI' as a project partner shows substantial influence on this actors former decisions, approach and content concerning their allotment master plan. This is crucial to make an eco-effective design possible. Other partners in the project might impede progress because their organization and thinking proceed more slowly. Some projects and experiments presented as a case for assistance are not accepted by the Ecopolis advisory board because too much decision making is already done and can't be returned or reviewed. This often happens particularly in larger city development projects.

Ecopolis is an initiative of VIBE (Flemish Institute for Bio-Ecological building and living, being a non-profit organization) together with experts and partner organizations for the realizations in the field. It is a project of DuLoMi ('Duurzaam Lokaal Milieubeleid' – Sustainable Local Environmental Policy) from the Flemish Ministry of Environment, Nature and Energy.

Websites
www.ecopolisvlaanderen.be
www.vibe.be

C2C Certification

Cradle to Cradle® certification is a multi-attribute eco-label that assesses a product's safety to humans and the environment and it's design for future life cycles. The certification method, as well as the C2C concept and framework was developed by the architect William McDonough and chemist Dr. Michael Braungart, who started the company 'McDonough Braungart Design Chemistry' (MBDC) in 1995.

In the C2C certification process materials and manufacturing practices of products are assessed in five categories: Material Health, Material Reutilization, Renewable Energy Use, Water Stewardship, and Social Responsibility. The certification program recognizes varying levels of achievement towards the design and manufacturing of a C2C product as outlined in the vision formulated in the Cradle to Cradle® framework. Four levels can be reached in product certification: Basic, Silver, Gold, Platinum. In order to be certified at a certain level, a product must meet the minimum criteria for that level in all five C2C criteria categories (see above). A more detailed description of certification levels and C2C criteria can be found on MBDC's website.

Companies interested in certifying their products need to apply by handing in an application form, material lists, and mutual signing of nondisclosure agreements, after which they can engage in the certification process if allowed and if they wish. The first steps to take are then completing their certification packet and a site visit. Evidently an important part of the contracting also concerns estimating the cost price of the certification process. Once a company has decided to move forward with certification, the certification process starts and typically ranges from 2-6 months depending on the complexity of the product and its supply chain. After one calendar year that the certification is valid, a renewal process is started to update the product's certification for the next year.

As a result, the certification process offers companies external verification of a product's potential for recycling and its safety for human and environmental health, with expert assessment of toxicity hazards of all product ingredients throughout the supply chain down to 100 ppm (0.01%), and with a defined trajectory for optimizing product design and manufacturing processes towards C2C. Companies can thus benefit from the C2C certification process for their internal operations, as well as from the Cradle to Cradle CertifiedCM mark offering differentiation from competitors and enhancement of brand value and reputation. McDonough Braungart Design Chemistry (MBDC) provides a list with certified products, which offers promotion to C2C producers by MBDC and its partners as well as it may help companies in their search for qualified C2C components to design their own C2C certified products. Consumers can rely on the certification mark to identify and specify sustainable products for their homes, businesses, and buildings. In essence, it becomes possible to assemble one's own personal or business environment with the C2C ingredients.

Cradle to Cradle® and C2C® are registered trademarks of MBDC, LLC. Cradle to Cradle CertifiedCM is a certification mark of MBDC, LLC. Products or materials from any industry that are sold to consumers or other businesses are eligible for certification. Certification criteria are the same for all product types. The certification does not apply to people, businesses, buildings, or processes.

Website
www.mbdc.com

Loopla is Closing a Loop for Galactic

Galactic is a fully integrated multinational company founded in Belgium in 1994, active in green chemistry. It has facilities on different continents and manufacturing units in Europe (Belgium), Asia (China) and America (US). The company produces lactic acid through fermentation of biomass which can come from sugar beet or sugar cane. In the case of Galactic's Belgian plant in Escanaffles, all sugar comes from beet harvested within a radius of 40 kilometers.

Lactic acid is a natural product and is used in different applications in the food, cosmetic, pharmaceutical, and industrial sector. It is the basic material for the production of a wide range of products, from green solvents to polylactic acid or PLA, which is an eco-friendly, renewable biopolymer with attractive characteristics for packaging and other applications.

Galactic developed a patented green recycling technology called LOOPLA®. It is a chemical recycling process that goes back from PLA to lactic acid by depolymerization. The obtained lactic acid can become the starting ingredient to produce a new PLA with the exact same properties. It serves as raw material for as wide a range of products as solvents, detergents, textile, and various packaging. The LOOPLA® process does not need harmful chemicals and is optimized to lower CO2 foot-print. It is able to process PLA from any origin, produced by different manufacturers, and coming back by reversed logistics from different waste sources.

A well known example of chemically reused PLA is cups that feel like regular plastic, but are 100% recyclable, and can later become the starting material for carpets, bottles etc. In order to stimulate the use of PLA, and bring the closed loop system in place, more and more deals are now made with event organizers. Festivals serve beverages in PLA-cups along with their music. In the summer of 2010 about 600.000 cups were collected at Belgian and Dutch music festivals such as Couleur Café and Ieperfest. Also the ECO2Punch® carpet, used at the Copenhagen world conference on climate change, was recycled by Galactic's Loopla. This carpet is made from PLA and latex by De Sadeleir, a partner organization in Dendermonde, Flanders.

Galactic invested highly in research and development, and builds tight links with its distributors and customers pursuing an innovative and solution oriented approach. The success of the LOOPLA® concept now depends on the different actors or partners involved in the closed loop. The end user must be aware of the importance of sorting his waste. The sorting and recovery entities have to take a greater interest in the installation of new technologies able to sort PLA from other garbage. The lactic acid obtained by chemical recycling has to be included in the specifications required by PLA producers in order to manufacture new PLA objects. Alignment of all these stakeholders is crucial.

Governments can play an important role at several levels. At the state level, information campaigns and regulations for the public are wanted to learn them more about bioplastics, what they are and how they should be treated best waste-wise. At the European level, the directives on recycling could be adapted to include the potential of bio-plastics recovery. The 30% target now is only defined in terms of the recycling of plastics into plastics, leaving out the possibility of chemical recycling. But right now the volume of bio-plastics is still very low: between 0,1 and 0,5% of the total mass of plastics worldwide. Only when this share literally reaches critical mass, 'things will happen' in business, politics, and civil society.

Website
www.loopla.org

In the municipality of Carugate, mentioned earlier, the Waste Management Plan is part of a more encompassing project, including the introduction of a Municipal Building Code and a Sustainable Mobility Plan. Here too, the initiative involves intensive networking: it includes working with the Casa dell'Acqua to promote drinking tap water, rather than bottled water, supporting retailers to sell milk and other products in bulk, rather than pre-packaged, and collaborating with shopping centers to set up a system for the sharing of bikes and shopping carts that can be attached to them, to promote shopping by bike, rather than by car. The Carugate Waste Reduction initiative was positively evaluated: it has become more effective and cheaper than before. The result is attributed to the early involvement of diverse stakeholders. Similarly, the success of the Carugate Building Code is linked to a participative design process, involving local actors, and extensive communication, especially with end-users and schools.

The North West Cambridge Development Plan is an urban project to create a new university quarter in a 'green belt' around the city. Inhabitants strongly opposed to the plans initially, because the development area is situated in nature reserve. After public information and consultation, however, the plans were accepted because of their ambition to generate a positive environmental impact, rather than only reduce damage. Criteria included biodiversity, green open space, limited number of buildings, recycling of building materials, a carbon reduction strategy, focus on public transportation, and focus on transport by bike or on foot.

Another case is the redevelopment of Cathedral Square in the city center of Peterborough, in England. As mentioned earlier, it is a Zero Waste Places project, in this case implying contacting local shops and businesses to address waste management, limiting the use of construction materials through the use of a shallower sub-base, and re-housing redundant materials via a materials exchange program. The amount of waste avoided by these combined efforts add up to an estimated 3050 tons.

Similar redevelopment practices are the focus of the Ecopolis initiative, described earlier, and the NGO network for advising on sustainability in (r)urban renewal projects, both in Belgium. The latter network is the initiative of 12 non-governmental organizations that work in the domain of sustainable living and building. The network consults with project initiators and stakeholders, offering a support that covers the different aspects of sustainable urban planning: energy saving, use of materials, mobility, economy, grass root assistance etc. Initial strategic steps are guided by a web-tool. The intention is to include all stakeholders as much as possible, in order to reach local integrated solutions. Further steps include the collection of relevant documents for the project, a workshop with the client to clarify the project and an analysis and advice by members of the NGO network. The network has been recognized as a pilot project by the Flemish government and has consulted in various development projects.

The cases above include several practices that we presented under other categories: networking with a variety of stakeholders to avoid the use of unnecessary resources, find materials that are fully recyclable, optimize supply chains etc. The redesign of the related product-service systems involves a temporary work system to design and manage the transition, a so-called referent organization[68]. The roles of this referent system includes creating a shared sense of purpose, maintaining a project (infra)structure, appreciating trends and issues, and supporting collaborative relationships. In (r)urban redevelopment projects, initiatives such as Ecopolis and the NGO network assist referent organizations in some of these roles.

Reuse and re- or 'upcycling' practices remain limited in the C2CN cases. This results to some extent from the fact that existing infrastructure was not designed for clean closed material cycles. Given the estimates that much of the real estate that we will use this century is already constructed[69] and that 25% of the materials in current buildings are fit for reuse or recycling[70], this is unlikely to change rapidly. In addition, however, several good practices clearly view sustainability in terms of minimizing waste – which is not what C2C, in the stricter use of the term, proposes.

68 Trist, 1983
69 Presentation by Piet Eichholtz, C2CN Thematic Seminar Maastricht, 8.7.2010
70 Presentation C2CN Thematic Seminar Cambridge, 16.9.2010

4.3 Overall observations and reflections

A first review of the C2CN cases yields some general observations, which we list and briefly discuss in this section. Some of these impressions cannot directly be drawn from the above overview, yet stem from the more detailed study of the original Good Practice Forms and the conversations about the cases at Thematic Seminars. To start with, the cases present a wide range of practices, including initiatives in education, several types of networks, support structures, standard-setting and regulatory efforts, as well as product design, the revision of product lines and supply chains, and larger-scale urban development projects. It is clear that various people and organizations in the participating regions consider themselves stakeholders or even lead-actors in sustainable development issues, and are taking action.

The cases that C2CN partners submitted as governance practices include C2C practices, in which actors are de facto closing material loops, or moving in that direction, and mere governance practices, in which actors are mostly creating favorable conditions for closing loops, without actually doing so 'in the field' themselves. Desso and Galactic are examples of the first category, the C2C Expolab and Ecobooster examples of the second.

Many of the C2CN initiatives were taken in recent years, and are in their early project stages: planning, prototypes, pilot projects…[71] An evaluation of the results of their efforts is yet impossible. Governance practices in education, learning networks etc, are typically longer-term. They tend to document their results in terms of the numbers of actors that participate, yet will prove to be effective only if they show up among the success factors in actual C2C practices. Among the C2C practices 'in the field', only a few projects – such as the Carugate and Peterborough initiatives – report quantified results. These are mainly presented as amounts of avoided waste or CO2 reduction, hence reporting eco-efficiency rather than eco-effectiveness indicators. Overall, for these reasons, attempts to identify factors that drive practical C2C success, 'in the field', are preliminary.

The above also illustrates that the C2CN cases reflect a broadened concept of C2C. Eco-efficiency criteria remain prevalent especially in C2C practices that focus on supply chain issues or redevelop larger-scale product-service systems. Apparently, C2C is interpreted more strictly in education then in actual manufacturing practices, where actors deal with the practicalities of interwoven stakeholder networks and existing infrastructure that was not designed for closing material loops. Several C2CN cases show more commitment to energy efficiency and CO2 reduction than to eco-effectiveness. In terms of the C2C philosophy, they do 'less bad' rather than 'do good'[72]. While this may momentarily be the best option in their specific context, one of the observations at the C2CN Thematic Seminar on 'Build Design' was that the focus on (and subsidies for) energy efficiency got in the way of lifecycle thinking. This appears to be the case in other areas also. LED lights, for example, are promoted because of energy efficiency, despite being very demanding on limited resources and producing poisonous waste[73]. In general, there are trade-offs between different approaches to sustainability and, in specific cases, C2C principles may conflict with other goals, such as reduced CO2 emissions.

We appreciate the difficulties of C2C product development, including the challenges of identifying suitable nutrients and design for disassembly, yet from a governance perspective the case review suggests that supply chain issues may become the bottle neck in C2C innovation. This seems to be the case especially in consumer markets and in the 'post-consumer' chain. We observe that few C2CN 'practice cases' actively deal with the reverse logistics involved in closing material loops. Brescia plans a take-back system for food containers. Desso experiments with take-backs in order to be ready by the time their C2C carpets end their first life. Galactic learns about reverse logistics through the Big Ask event. Yet overall, such experiments remain limited in the C2CN cases. The Desso experience potentially showed a side-effect that may illustrate the complexity of the innovation: at the time the company started to take back old carpet for recycling, the incinerator of the Brussels waste agency lowered its prices for processing old carpets…[74]

In terms of underpinning change theory, several C2CN cases reflect the ideas and vocabulary of transition management[75]. This is markedly the case in projects from Flanders, Belgium, and Limburg, the Netherlands, presented in terms of transition arenas, involving front-runners or innovators in specific niches, developing shared long-term images, multi-level approaches and conducting transition experiments. Examples include the Round Tables, FourC initiatives by Koekoek, and the DuWoBo and Plan C networks.

Most of the cases presented are largely dependent on government funding. Taking into account the financial situation of several EU member states in recent years, one may wonder whether such dependency is in itself a sustainability issue. It seems relevant in this regard to point at cases that don't depend on public funding, such as Desso, Galactic or Mosa, or even save tax money, such as the Carugate waste reduction initiative. Additional examples can be found in other sustainability-related transitions[76]. We suspect that our finding related to government funding may be an artifact of how the cases were selected, e.g. by partners in local or regional government agencies who search for good practices in their network, and that self-supporting initiatives merit further study.

71 Besides the projects described in this report, networking at the Thematic Seminars also revealed some completely fresh start-ups such as Nicefiction, a concept of C2C 'wellness candle lighting' by Olivier Van Hamme
72 Braungart & McDonough, 2008:45ff
73 Input at C2CN Thematic Seminar Cambridge, 16.9.2010
74 Input at C2CN Thematic Seminar Leuven, 12.7.2010
75 Rotmans et al., 2001
76 E.g. Hopkins, 2008; van Leenders, 2009:25

Desso: 'The Floor Is Yours'

Desso is a producer of flooring for all types of applications, with origins in both the Netherlands and Belgium. The company has been in business for 80 years. After having started in 1930 with woven carpets for residential and commercial applications, the production of needle-felt carpets was introduced for the same markets. In 1980 Desso set up an artificial grass division, an important milestone which today makes Desso Sports Systems the world's largest manufacturer, supplying artificial grass surfaces for soccer, hockey, tennis, American football, rugby and multipurpose sports applications. Round the same time, Desso began to develop products in the hospitality sector, delivering quality carpeting to hoteliers. The combination with targeted supply for Marine and Aviation applications, brought Desso a reputation for manufacturing high quality products for demanding situations. Since beginning of 2007 the company is independent again following an acquisition by current management and a Dutch investment company. Desso has its headquarters is Waalwijk, The Netherlands and some production and the sports division in Dendermonde, Belgium.

After having seen the documentary 'Waste = food' on Dutch TV, presenting Michael Braungart and his work, Desso's current CEO Stef Kranendijk became intrigued by the C2C concept and convinced to fully go for this new approach. He discussed the possible transformation with the board of directors, contacted Braungart and Desso became the first carpet manufacturer in EMEA to adopt the Cradle to Cradle design.

The company consciously seeks to advance eco-effectiveness at a maximum. For the moment, about 70% of Desso's carpet tiles have a silver C2C certificate. The aim is to become a 100% C2C company. For older carpet, Desso developed a method to separate yarn and bitumen components. Bitumen is reused by companies in the roofing and asphalt business with whom Desso collaborate, while the yarn is recycled in-house. As the company needs substantial volume to make this recycling activity profitable, collaboration is needed with container parks and waste collectors, and with different private and public organizations to take back their old carpets directly. At the same time DESSO is developing a new product that will be 100 % recyclable into new carpet tiles. This requires a lot of R&D investments and collaboration with external research centers and universities. It also requires long term vision and real commitment as these new tiles will come back from the market in about 10 years offering the advantages of full recycling only then.

Another idea Desso is working on is leasing of carpets. 'Don't buy it but borrow it' is the motto. The business case for this project is ready, based on offering a 9 year leasing contract to big institutional players in office buildings, schools, government buildings, etc. A financial partner is ready to step on board once contracts for sufficiently large volumes are signed. In order to make that happen, still a lot of actions are needed on several fronts. All actors along the carpet life cycle need to be aligned: installers, maintenance, cleaning. Awareness campaigns must inform companies and the public at large. And simultaneous talks and negotiations with several stakeholders, among which certainly also government, need to take place. Desso knows that at no point in time, a single person nor one single organization is in the position to push progress, to make a phone call and change the sector. That's why they look with interest at the possibilities and impact of governance in a multi-actor field.

Website
www.desso.com

Bosco Mobile: from Forest to Sustainable Furniture

Bosco Mobile, Italian for 'Forest Furniture', is a project financed by the Region Lombardy in Italy, with the aim to create a short supply chain in the local wood-furniture sector, applying eco-design principles (LCD and C2C) throughout the whole supply chain. The project combines ecological and economical benefits, achieved through public-private partnerships and multi-actor collaboration.

The project brings together the efforts of two consortia of SMEs, Progetto Lissone (consisting of SMEs working on furniture design, production and sales) and Consorzio Forestale Lario Intelvese (consisting of SMEs working on forest management, harvesting and logging). It intends to integrate forest management, furniture production, recycling of production waste and energy production with the aim to optimize materials and energy flows and to reduce the overall impact on the environment. It raises awareness and responsibility of wood producers, manufacturing organizations, retailers and consumers.

The Bosco Mobile project includes an analysis of the type and quantity of wood available from certified local forests; sustainability assessment of harvesting and logging operations (with different levels of mechanization); sustainability assessment of prototypes trough LCA, supporting the choice of materials and best available technologies for production; production of prototypes; and dissemination of results through guidelines for establishing sustainable short supply chains in the wood sector.

The project runs from 2009 to 2011 and was initiated by "Progetto Lissone", a consortium including over 200 SMEs which is owned for 51% by the municipality of Lissone. It was developed in collaboration with the Research Unit on Sustainable Development (GRISS) of the University of Milano Bicocca, and Consorzio Forestale Lario Intelvese, a public-private consortium for the management of forestal resources in the Lario-Intelviese district (lake Como area). Funding (budgeted 217.000€) was provided for 80% by the Lombardia Region and for 20% by project Partners.

Among the results from this project we already find: a course about eco-design and labels that was organized for retailers, developments in standards for eco-labeling, a research survey on companies' needs related to eco-innovation, distributed to over 100 SMEs with results highlighting the importance of networking among firms, of involving the entire supply chain, and of providing a set of simplified tools and decision support systems to identify scenarios for business development. Environmental protection is realized through sustainable forest management at the regional level, offering FSC certified local wood and reduction of CO2 emission as a consequence of less transportation. Also wood residues from furniture production can be used as biomass fuel for heat and/or power generation.

Prototypes for C2C based school furniture have been developed and promoted. This furniture requires less raw materials, contains no toxic elements, and is easy to disassemble for repair, substitution and recycling. The prototypes were successfully show-cased during the Eco-Made Fuori Salone 2010 (Milan design and furniture week). Progetto Lissone will start production and selling in the near future.

Website
www.boscomobile.it

North-West Cambridge Development Plan

The North West Cambridge area in the U.K. launched an urban development project that creates a new university quarter and aims to meet the needs of the wider city community. It therefore proposed an action plan that takes into account the high ecological sustainability criteria. It focuses on green open spaces, promoting biodiversity. The plan includes a local center with community facilities and retail, a focus on public transport and cycling and walking facilities, reuse of construction waste during the development of the site, and a carbon reduction strategy for its operation.

Close collaboration between the municipality and the university has been decisive in the development of this urban development plan. Multiple disciplines are involved in the effort. Initially, there was a lot of opposition to the plans by local inhabitants, because the development area is situated in a natural reserve. Public consultation was organized, and the proposed plans were finally accepted because of their high environmental and sustainability criteria. The ambition is not only to reduce the environmental impact of the plan, but to generate a positive impact on the environment. The 'green belt' that will be developed, is at this point a rather poor and monotonous area in ecological terms. Dwellings will only occupy a small part of the area and the rest will be developed in such a way that the area becomes more rich and diverse, and also more attractive for the people. Furthermore, sustainability is not only a question of design, but has to do also with the use of buildings: sustainability depends on the life style of the people. For that reason information packages will be developed and distributed among the new inhabitants, explaining them how they can live in an ecological way in these new buildings and surroundings.

Website
www.cambridge.gov.uk/ccm/content/news-releases/2010/july/future-development-of-northwest-cambridge.en and www.arct.cam.ac.uk/ucpb/place.aspx?ix=22

Peterborough's Cathedral Square as Zero Waste Place

In the city of Peterborough, in England, the central Cathedral Square is redeveloped with a focus on reducing waste as much as possible, and on reusing and recycling excess material. This makes the square an accredited Zero Waste Place, an award that offers the benefit of country wide recognition.

The accreditation is a partnership project between Peterborough Environment City Trust (PECT) and Peterborough City Council and includes a 5 year action plan which acts as a catalyst for sustained and further action in the Zero Waste Place concerned. Councils in the area are encouraged to apply for the standard and numerous other schemes are underway.

The Zero Waste Place Standard has been developed by DEFRA, the BREW Center for Local Authorities and the University of Northampton. The standard is awarded to areas which seek to drive waste out and maximize the use of resources in their localities, aims to give recognition to such behavior and motivates to improve performance further. Accredited Zero Waste Places are expected to submit refreshed applications every two years to maintain their status.Underpinning the Zero Waste Places initiative is the Government's encouragement of local authorities to use their role as local community leaders in partnership with the private and third sectors to achieve a more integrated approach to resources and waste in their area. The initiative brings innovative and economic opportunities for the business community. Completed Zero Waste Place projects exist in Suffolk, Norfolk and Peterborough.

Website
www.wrap.org.uk/local_authorities/research_guidance/zero_waste_places/standard/index.html

5 Specific governance themes

After presenting the C2CN practices and our initial findings regarding governance for C2C, we look into four specific governance themes, i.e. organizational conditions for multi-actor governance, strategies of government actors, dilemma's and tensions implied in a governance approach and, finally, questions related to policy transfer. This section is based on existing research on governance for sustainability, close to the C2CN target areas, and related findings in the C2CN cases.

5.1 Organizational conditions for multi-actor governance

A first theme is concerned with the organizational conditions that can contribute to governance for C2C. Initial analysis of the C2C developments in the area of Venlo, in the Netherlands, indicates four principles and organizational conditions contributing to its success: new connections, minimal structures, communities of practice and loose couplings between adaptive and power networks[77]. We tie in our observations from C2CN cases that are part of that development and cases elsewhere.

5.1.1 New connections

This 'connecting' principle involves bringing people from different networks and communities of practice in contact with each other. In essence, this principle stimulates social learning through gatherings that bring in variety, such as new ideas, new people, new knowledge or new ways of relating. In other words: the new connection implies an interruption of routines. Well-known forms include conferences, inviting speakers, organizing debates or temporarily exchanging employees.

The connecting principle is a core characteristic of most C2CN cases. The various learning and development networks, such as the C2C Round Tables, C2C Communities of Practice, or Plan C, are obvious examples. Yet the one-stop counter for eco-innovation, provided by Innov'R, also rests on the connections between a variety of actors behind that counter. The Brescia Waste Reduction Plan involves city officials collaborating with bike manufacturers, shopping cart designers and representatives of several supermarkets to promote shopping by bike. The success of the Carugate Building Code involved local banks to co-promote sustainable building through lowering interest rates at specific conditions.

Many projects reflect a deliberate choice to cross the lines between conventional domains of practice, such as education, business, government etc. The Fontys and Hogeschool Zuyd C2C educational programs, for example, enable product design through students' project work. Both programs create networks by involving government actors and industry specialists as lecturers. In doing so, both initiatives create new connections – and blur the lines between our categories. Similarly, the Amica dell'Ambiente project connects regional and national government agencies, NGO's, industry and research. The Dravinja Valley initiative connects local industry, farmers, tourism representatives, research institutes, NGO's, government and interested residents. The initiative-takers describe the resulting forum as an "educational polygon": while its diversity may not always be easy, it does create momentum. Experience with introducing the Building Code in Carugate suggests that part of its success is due to the multi-stakeholder approach, in which a variety of local actors were involved early in the process and took responsibility. This allowed to cope with external resistances to the Building Code when it was adopted. Research on the Greenport Venlo initiative, finally, indicates a principle to involve actors from five domains, i.e.: research, business, education, government and environment. Experience in other domains suggests that such diversity is one of the success factors[78].
Overall, the C2CN cases support earlier findings that new connections are a key characteristic of governance for C2C. This generally implies bringing people together from a broad range of backgrounds. Depending on the purpose of the initiative and the stage of the project, connections may be sought after in more specific directions. Examples include the Innov'R case, in which the network behind the one-stop counter heavily leans toward public partners, or the Bosco Mobile supply chain initiative, facilitated by pointedly tapping into one consortium in the furniture and one consortium in the forestry sector.

5.1.2 Minimal structures

The Greenport Venlo project did not have pre-defined outcomes. Rather, it was / is a joint process en route to a more sustainable but still unknown future. The underlying organizing principle is best described as minimal structures and maximum flexibility[79]. In Greenport Venlo, the perception of what constitutes a minimal structure has changed over time: structure expanded with the increase in activities and participating actors, and with commitments to hard deadlines. At some point, the initiative appeared to require a Service Point; i.e. a front office, including representatives of public and private actors. The strategy group, however, remained an informal network of engaged and collaborating participants: it became a vital coalition purely by the participants' commitment and conviction. Only at the project level, where power and money come together, are traditional project planning and management applied.

77 Termeer & Kranendonk, 2010:6-9
78 E.g. van Leenders, 2009:25
79 See also Barrett, 1998:611

The principle of minimal structure is less salient in the C2CN cases. It remains recognizable in initiatives such as the Slovenian Dravinja Valley and the Dutch Round Tables and Communities of Practice, for example. Koekoek's Qreamteam works with minimal structure for maximal creative design space. The NGO network for consulting on sustainable housing and living adopted more structure, hence coordinating the activity of 12 partnering expert organizations in a specific consultation. The Innov'R one-stop counter simplifies (government) structure for SME's to facilitate access to its benefits. Hence, practices of creating a minimal structure to support coordinated action are certainly present in the C2CN cases. However, our data don't give sufficient information on how actors manage structure to allow further analysis.

5.1.3 Social learning

In the Greenport Venlo initiative, the strategy group set up learning communities including members of all stakeholder groups to stimulate joint learning. These communities provided a space for new ideas and collaboration. The open-platform structure allowed participants to more or less freely join and leave. Reasons for leaving included specialization (development of another 'daughter' community) or lack of interest in specific process stages. Important success factors included a general awareness of the necessity of learning and willingness to cooperate.

The learning and development networks reported in the C2CN project play a similar role. They act as temporary sense-making platforms, allowing stakeholders to understand their practices from a C2C perspective and explore alternatives. Examples include the monthly meetings in the Dravinja Valley, the Round Tables and Plan C. But several projects that took on another primary task, clearly transpire a learning perspective as well. The NGO network for consulting on sustainable housing and living allows not only their customer, but also the 12 partnering expert organizations to learn from each other's specialist input. Koekoek's initiative to create a hub for eco-innovators follows a similar logic. Overall, the focus on social learning is very present in the C2CN cases and the connecting principle plays a key role in it. A specific lesson in this regard is drawn by the Ecobooster initiative-takers: while new connections may facilitate learning, the presence of direct competitors in an eco-innovation workshop inhibit it. The same point seems valid for the C2C Expolab, the success of which depends on stakeholders' willingness to share information in an open-source approach – which may conflict with competitive interests and notions of intellectual property.

5.1.4 Loose couplings with power networks

A few studies indicate how networks with relatively low formal power can trigger project break-throughs by connecting to networks that do have access to formal power. It is suggested that both kinds of networks have a role to play and that connections are necessary but contamination is to be avoided[80]. In Greenport Venlo, the relationship between low power networks, such as the learning communities, and the existing power networks can be understood as 'loosely coupled'. Power networks were involved but had no formal role in the process of generating innovations. On the other hand, when innovation was delayed, the link with the power network could be activated to create supporting conditions.

This principle is recognizable is some of the C2CN cases, including the C2C Round Tables, the C2C Communities of Practice, the Amica dell'Ambiente Award, DuWoBo and Plan C. The latter two cases are interesting examples as these networks were initiated by government actors in the context of regional policy. Following the proposals of Transition Management (see 3.2 and table 3), the public initiative-taker opted for a 'transition arena' beyond the formal government structures. C2CN participants report several reasons for such loose coupling with formal structures, or between adaptive networks and power networks in general:

- Avoiding ("by-passing") the slow process of policy-making through long cycles of writing and revising documents: the procedural tradition of power networks doesn't 'drive';
- Avoiding (time) pressure from power networks on specific pilot practices, e.g. lead by electoral purposes;
- Avoiding signals that could be interpreted as a government approval of certain pilot practices in adaptive networks, triggered by the formal presence of government officials in the network.

80 Nooteboom, 2006; Termeer & Kranendonk, 2010

5.2 Roles and strategies of government actors

The shifts from government to governance and from governance within government to multi-actor governance, described earlier, may suggest that the role for government actors is dissolving. This is not the case. Research indicates that stakeholders in Greenport Venlo expect the government to take a leading role[81]. The shifts mentioned reflect changes in the nature of the role of government actors, rather than question its importance. In this section we look into the different roles government actors take in the C2CN cases and conclude with initial research findings about strategies of government actors.

The C2CN cases present government actors in different roles, which may or may not overlap. These roles include the following:

- Convenor: the convening role implies bringing together and chairing a meeting or formal gathering. The term is increasingly used in multi-actor theory, where the convenor is an initiative-taker without hierarchical power, hence in a leadership position that is highly dependent on the commitment and collaboration of other actors[82]. The coordinator's role at the Round Tables or in Plan C provide examples.
- Facilitator: the facilitators role is related to stimulating social learning and, possibly, decision-making amongst actors. The clearest example in the C2CN cases is the role taken by the Dutch public Service for Land and Water Management in the Sketching and Matching initiative. Sketching and Matching sessions bring together stakeholders in a specific project, mostly related to spatial planning, to identify and visualize potential development paths as a support to joint decision-making.
- Legislator: one of the roles of government actors remains to define policy and enact regulation. Examples in the C2CN cases include the municipality of Carugate introducing its Building Code and Brescia designing its Waste Reduction Plan. Government actions in both projects combine this role with important convening roles.

81 Van Zeijl-Rozema, forthcoming
82 Dewulf et al, 2009:42

A Municipal Waste Reduction Plan for Brescia

The municipality of Brescia in the Italian Lombardy Region piloted a project with regard to waste reduction. This was primarily done by systematic reduction of packaging (through bulk sales), and additionally through the encouragement of home composting and use of reusable diapers, as well as through the promotion of delivery of organic food by local farmers.

The Lombardy Region considers itself to be among the leading regions in Italy and in the European Union in terms of applying an efficient and advanced waste management model, recovering 82,2% of its materials and energy from waste. The region introduced the action plan for municipal waste reduction ('Piano di Azione per la Riduzione dei Rifiuti urbani', PARR) to prevent and reduce waste, for which Brescia was selected as a pilot city.

Actions in Brescia are set up in different areas such as: bulk sale in supermarkets and hypermarkets using dispensers, promotion of little packaged products; collection of unsold goods in the supermarkets and hypermarkets to be used by soup kitchens, short distance supply, direct delivery from farms, home composting, washable diapers, collection of recyclable household items, reduction of paper consumption in the offices, reduction of commercial advertising distributed to the houses, and the use of filtered draught water instead of bottled mineral water. All these actions were launched in a communication campaign with the slogan 'Let's reduce the waste in the city!' ('Riduciamo i rifiuti in città!').

The initiative has been promoted by the Lombardy Region, Brescia Municipality (particularly by the Ecology Councillorship), the A2A and Aprica Spa companies (A2A group) and ASM – Development office and waste observatory. The different districts of the city of Brescia have been involved from the very beginning of the activation phase, being very important for the diffusion of the information about the initiative and for the involvement of the citizens. For each waste reduction action different workgroups have been created to discuss about waste prevention, and different actors have been involved, such as: distribution chains, a cooperative for the collection and redistribution of unsold food, garden centers, farmers and the association of organic producers, different departments from Brescia Municipality, and for the reusable diapers: manufacturers, new parents, hospitals, pediatric associations, midwifes and other child care associations, up to the partnering chemist's shops.

For the large-scale retail trade it seemed not so easy to integrate the actions within the marketing strategy of each chain and each shop. Moreover it's hard to manage and align the activities of different chains. For farm delivery a lot of network building was needed among farmers and organic producers so that a certain service level and convenience could be reached by this new type of distribution. In sum, several actors needed to change their organisational routines and/or cultural habits.

One of the main success factors has been the support, including economical aid, by the public administrations (Lombardy Region, Brescia Municipality) and private institutions (A2A). This kept the citizens' financial contribution to a minimum. It is now the aim to spread best practices of the PARR to the whole Lombardy Region, providing other municipalities with concrete models for actions, practical handbooks, along with the reduction targets, organization modalities, a monitoring system and a forecast of economic costs and the environmental benefits. The project is clearly transferable.

Website
www.riduciamoirifiuti.bs.it

Plan C, Network for Sustainable Materials Management

Plan C is an initiative launched in 2006 by the Flemish Public Waste Agency (OVAM) and the Flemish government to start a transformation from waste control to sustainable materials management in Flanders, Belgium. Plan C is a multi-actor network, including members from government, industry, social profit organizations, scientists, consumers, specific communities and individual private persons. Over the years the network has broadened significantly and still organizes platform meetings and exchange events for innovative people and ideas.

The Plan C network aims for a society that deals responsibly and carefully with resources, materials and energy, and where resources and materials are viewed as common property. In the future vision of Plan C, materials are managed throughout their life cycles by cooperating networks or clusters of producers, processing companies and consumers. This implies a cyclical economy, where services have taken the place of property.

Plan C continues Flanders' position as a trend-setter in material management. After being a front-runner in selective waste collection and recycling, the region now invests in high level knowledge of 'intelligent use of materials' and the development of new materials and services. This also contributes to the goal of minimizing emissions. In October 2010, sustainable materials management is a central theme at the OECD/OESO global forum on environment, held in Mechelen, during the European Presidency of Belgium.

The name 'Plan C' refers to the need for a radical shift in our way of producing and consuming. A 'Plan B' with gradual improvements or partial or temporal solutions, as we often formulate today for the problems we encounter, will no longer suffice. The development of Plan C was designed according to the methodologies of transition management theory. A first phase consisted of visionary work in a transition arena focusing on a common problem definition and envisioning exercises. In a second phase, participants derived transition paths from the vision. Then, Plan C moved into an action phase developing experiments towards system changes. These experiments are running today and can be followed on the interactive website.

The 5 themes around which work groups have been formed in Plan C are: 'Smart Closing of Cycles', 'Tailor-made Materials', 'At Your Service', 'Alert Public' and 'Green Synthetics'. The themes are viewed as 'transition paths' towards the common future image ('leitbild'). They help to make the overall vision of the network more concrete and to develop specific knowledge and expertise, and collect cases and experiences to stimulate experimentation.

In order get a network such as Plan C up and running, the interrelations between the project managers, consultants, facilitators, and observers appeared to be an important asset. Nearly all of them have prior working experience with each other, either on a bilateral or multilateral basis. This stimulated the sharing of vision and ideas. In addition, OVAM's support in terms of technical expertise, the development of a sustainable materials management community and its financial aid is crucial.

Website
www.plan-c.eu

Sketching & Matching

The Dutch Government Service for Land and Water Management (DLG) brought together several government parties in four meetings to inspire, integrate and visualize C2C-ideas for the Limburg region in the Netherlands. The sessions followed a technique called 'Sketching & Matching' which draws on large group methodology and visual creativity for multi-party decision-making on regional land-use. DLG has worked with the method in three regions in the province of Limburg: in Venlo (twice), Helden and Maastricht.

Sketching & Matching is a method used to identify and visualize potential development paths and in doing so facilitate the decision-making process for managers, policy-makers and local stakeholders. The success the formula is that people tend to think and act differently by way of sketching or drawing than by spoken or written language. Drawing forces people to over-think the line they're putting on the paper sheet or map. It also puts people in a position of sharing their imaginations of a designated development area. Sketching and drawing together around a table helps to overcome contradictions and differences. In this sense it's a means for communication and for building interrelations between stakeholders in the C2C-community in a particular region. With Sketching & Matching, local residents, experts and policymakers together figuratively 'board a raft' to draft plans for their specific, well-defined area.

Most Sketching & Matching sessions last from one to three days. The program is tailored to the particular project at hand. Mostly the following 3 phases are included: registration and preparation, the actual sketching, and conclusions (if wanted also with a report). It must be clear in advance what information (reports, maps, etc.) participants will need to be able to work effectively. It is therefore advisable to reserve time with the IS/Mapping/Information departments of various institutes involved in the planning process, not only for the session itself but also for preparations towards the Sketching & Matching. Mostly spatial planners and/or other experts are required to (co-)facilitate the session.

For every region the assembly of actors will be different and depending on the situation. In the three Sketching & Matching sessions organised on C2C in Limburg, a large number of participants joined the party. By bringing people together in one room and discussing design challenges in maximum three days, pressure is turned on and the parties who work together mostly want to come out with results.

Since DLG implemented the Sketching & Matching method, it has organized sessions in several regions, even outside the Netherlands (e.g. in cooperation with the Flemish Land Development Service, in Estonia, Latvia and Romania). The method helps processes to accelerate, communication lines to shorten and gatherings to effectuate. A Sketching & Matching session is typically financed by the organizing party, e.g. a steering committee, a community or a province who request and contract the facilitator. It is easily transferable.

Website
www.minlnv.nl/portal/page?_pageid=120,3509799&_dad=portal&_schema=PORTAL and www.ruimtexmilieu.nl/index.php?nID=998

- Financer: as mentioned earlier, this role is very prominent in the C2CN cases. This is clearly the case in education, the various C2C networks and support structures, but also present in business contexts, such as the Bosco Mobile supply chain initiative. Forms of financing mentioned in the C2CN cases include employment, infrastructure, subsidies and tax reductions.
- Interface: cases such as the Innov'R and C2C Expolab place government actors in a position of interface between a variety of stakeholders. The Innov'R initiative interfaces mainly between SME's and regulators and/or financers. The Expolab offers an interface between a broader range of stakeholders, including business, research, education and government – potentially in different roles.
- Customer: several C2CN participants emphasize the potential of green public procurement in creating a market for C2C products and / or services, which places government actors in the position of customers. This role is most prevalent in the case of the Peel and Maas Municipality, yet also present in the practice of the Carugate Municipality, that privileged service providers who already invested in sustainable innovation. The customer role can be seen as a specific type of financing.
- Law enforcer: an additional role is related to the enforcement of regulation. The C2CN cases refer to this role only once, in the context of the Carugate Building Code. It is presented as a last resort after combining several other roles, including convening, financing and regulating.

This list is not exhaustive. The importance of communication is emphasized in several cases, both in terms of informing (meetings, brochures, handbooks, websites…) and gaining information (meetings, call centers, questionnaires..). We could list 'communicator' as a separate role, yet propose that it is a key characteristic for success in any of the roles mentioned. Overall, we note that these roles tie in with the three governance mechanisms presented under 3.2 and summarized in Table 2:

- Market: the roles of financer and customer represent ways to correct the market in the direction of 'green' innovation. One case presented a government actor, notably a regional waste agency, in a supplier role that interfered with market developments towards sustainable material loops.
- Hierarchy: legislation and law enforcement are key elements in conventional hierarchical steering. The interface provided by the Innov'R one-stop counter for eco-innovation also belongs in this category: it addresses the threshold of complex legislation in eco-innovation or the wider field of sustainable development – a topic we find back in the literature[83].
- Networks: the roles of convenor and facilitator represent network approaches to governance for C2C. Further distinctions in terms of the change theories summarized in Table 3 is difficult, yet some cases allow a careful attempt: the convenor in the Plan C initiative, for example, combines characteristics of the roles of transition manager and the organizer, as proposed by social learning theory; the convenors in the Limburg Round Tables enact some assumptions of the adaptive network approach; the councilor in Peel en Maas shows some characteristics of the policy entrepreneur as proposed by theory on policy agenda setting…

Overall, the roles of government actors in the C2CN cases cover and combine the three governance mechanisms. The hierarchical roles of regulator / legislator and law enforcer remain in the background, yet a study in Dutch Limburg suggests that these background roles may become crucial, be it additional, roles. Participants in the study seem to anticipate that sustainability issues will impose some difficult changes. While they appear willing to do their share, they suspect that not everyone will join the effort and they see the government as a key actor in preventing and / or penalizing free-riding[84].

Following this interpretation of the findings implies valuing the hierarchical government role as an important complement to potential lead-roles in multi-actor governance. Either way, government actors with formal hierarchical responsibility are faced with the question how to enable eco-innovation in a context stagnated by complex regulations. The emphasis on new connections in multi-actor governance for C2C often implies a confrontation with a multitude of regulations, originally developed for specific and somewhat separate domains, which innovators are now combining. Innov'R's one-stop counter may point eco-entrepreneurs in the right direction, it does not simplify the regulation. Consequently, the government actor at the next stop finds him- or herself wondering how to draw together, or buffer between, the rigidity of procedures with the flexibility required for innovation. In terms of the organizational conditions proposed under 5.1 the question is how to create minimal structure in a tightly procedurized context.

Participant observation in the Venlo Greenport initiative showed how representatives of ministries, provinces and municipalities displayed several strategies of 'bureaucratic entrepreneurship' to make innovation possible[85]. Initial analysis identified the following strategies: keying, improvising, certifying and integrating.

- 'Keying' comes into play when actors develop experiments that threaten to be swamped in bureaucracy[86]. Innovations often cross the boundaries between domains that are subject to different regulations and therefore require rearranging existing policies and routines. Keying consists of creatively searching for possibilities within the existing frameworks, through patterning the innovation and reinterpreting existing policies.
- 'Improvising' is much more active in the sense that government actors approach innovations by taking initiatives and risks, by introducing variations to existing policy and sometimes reworking it, seeing and using opportunities. Improvisers introduce new vocabulary and new alliances, and create new

83 Termeer & Kranendonk, 2010:9-11; Baez & Abolafia, 2002
84 Van Zeijl-Rozema, forthcoming
85 Termeer & Kranendonk, 2010:9-11
86 Baez & Abolafia, 2002:528. The term 'keying' has its origins in music, used as a metaphor for institutional change. Different keys may be used to transpose musical notation to fit voices or instruments without altering the basic melody or sense of a piece. While the music is essentially unchanged, performers' interpretations exhibit subtle differences. Keying involves the systematic transformation of an activity into something either closely or loosely patterned on that activity but seen by participants as significantly different

meaning supported by 'referring back', i.e. connecting with themes from earlier policy and presenting the new direction as a logical extension[87].

- 'Certifying' involves noticing what is happening in innovation processes and publicly validating it. It includes identifying 'best practices' in formal national and provincial government plans, complimentary speeches by government officials, showcasing projects to Euro-visitors etc. The risk involved in this strategy is 'seizing up', i.e. giving unwarranted public credit to a specific practice, exaggerating its innovative value[88].
- 'Integrating' is about connecting the new stories about innovation to the customary stories and identity of the existing organizations. It plays a role in legitimizing new practices and simultaneously roots in existing configurations.

The C2CN cases provide minimal data regarding these strategies. At the Flemish Public Waste Agency (OVAM), presentations that present the logic of developing from waste management to sustainable materials management can be seen as 'integrating' and / or 'referring back'. They help legitimize actions such as the Plan C network and the OVAM's supply chain initiative in the carpet sector, which are far removed from OVAM's earlier role in waste management. The certifying strategy, including the risk of seizing up, can be illustrated by the selection and presentation of 'good practices' in the C2CN Interreg project itself.

5.3 Dilemma's and tensions in governance practice

The above-mentioned organizational conditions, roles and strategies for multi-actor governance tend to imply tensions or dilemma's for the actors involved, The literature suggests that this may be the case especially for government actors, traditionally socialized towards organizing order and possibly held accountable for that. Participant observation at Greenport Venlo lead to identifying the following four 'dilemmas' or 'tensions' in this regard[89]:

- Change and variety versus stabilization: providing the four basic conditions for processes of learning, innovating and acting in a highly dynamic region, appears to be far from easy. Vitality also created unrest and impatience from participants, resulting at times in a loss of energy. The question is how to deal with the combination of drive and structure and the tension between change and stability.
- Humility versus heroism: the above-mentioned roles and strategies may contribute to radical innovations in the long run, but this requires time and patience. Multi-actor governance calls for humility as it is rooted in a recognition that institutions can shape policy outcomes but cannot determine them[90]. While some public leaders make sense of the small changes in the spirit of passionate humility, others are lead by a pressure to score, and possibly by the fear others would steal their glory. This dynamic is part of why it is counterproductive that the rules of the power network become dominant in the informal innovative networks[91].
- Multi-actor collaboration versus transparency and accountability: governance beyond government taps into the potential of collaborative efforts of a variety of stakeholders. In order to do so, it develops informal collaborative networks across public-private boundaries. While the dynamic in such networks may be highly generative in terms of their sustainability agenda, there is a risk that boundaries become blurred, and transparency and accountability decrease[92].
- Governing innovation versus innovating governance: government actors are still learning how they can contribute to regional innovation processes and deal with these new demands. Many of them are struggling to connect their usual routines to these new practices and vice-versa. We cannot expect the change to new modes of governance to occur overnight[93].

Based on the C2CN cases and this perspective study, we propose two additional tensions or paradoxes, i.e.:

- Stimulating versus sanctioning and penalizing: government actors have traditionally privileged hierarchical governance approaches, emphasizing the enactment and enforcement of legislation. As hierarchy proves insufficient do deal with the interdependencies of 'wicked' problems, the necessity of connection, commitment and coordination has become salient, yet the need for a sanctioning authority remains.
- Sharing versus trade-marking: many C2CN cases depend on the exchange and joint development of innovative ideas, generating commitment in the process. Hence governance for C2C benefits from open-source approaches. Simultaneously, some actors seek temporary forms of intellectual property protection (®, © or ™) in order to make investments in C2C products and services worthwhile.

Actors follow different strategies to deal with the above tensions. The Municipality of Carugate, for example, dealt with the paradox between stimulating and penalizing through 'sequencing' (stimulating first, sanctioning later – if needed) and 'layering' strategies (one agency stimulates, another agency sanctions)[94]. This may or may not be possible for the tension between open-source and intellectual property protection. The success of a project such as the C2C Expolab, on the one hand, hinges on an open-source approach. C2C-certification, on the other hand, requires some form of label protection. Several sources point at this tension[95]. Either way, to the extent that the C2C concept is indeed privately owned intellectual property, the spending of public money on developing it in the C2CN Interreg project is highly questionable by 'good governance' standards[96].

87 Baez & Abolafia, 2002: 240-42. The term 'improvisation' also has its sources in the music metaphor
88 Termeer & Kranendonk, 2010:10
89 Termeer & Kranendonk, 2010:14
90 Stoker, 1998:26
91 Termeer & Kranendonk, 2010:12
92 See Milward & Provan, 2000:364
93 Termeer & Kranendonk, 2010:12
94 Hovelynck et al, 2010:7
95 van Leenders, 2009:32, states that Braungart considers lifting the property rights on C2C. Wikipedia and other sources present Walter Stahel, director of the Product-Life Institute in Geneva, as the inventor of the term 'cradle to cradle'. On iNSnet, 09.10.2008, Stahel confirms that he first used the term in a report to the European Commission in 1976, in response to politicians' recommendation of a 'cradle to grave' model to solve the problems related to industrial economy
96 See Kaufmann et al, 1999:8

5.4 C2C and policy transfer: a perspective on replicating good practices

In an emerging field such as C2C, actors develop a variety of ideas and practices, often in the form of pilot projects or experiments. Finding out what does and does not work is a key concern for entrepreneurs, innovators and decision-makers. Hence successful cases provoke – and merit – much interest and the desire to replicate 'good practice' in other locations. In some cases, this can be understood as 'up-scaling'. The waste reduction project in Brescia provides a good example: it is a pilot project in a broader initiative that aims to spread successful practices to other municipalities in the Lombardy region. Ways to do so include action models and practical handbooks, with information on reduction targets, organizing modalities, monitoring systems, economic costs and environmental benefits. In other cases, such as the LeNS e-platform, the learning process comes more to the foreground: educators can download materials from the web, experiment with them, share experiences and upload new materials. Spreading C2C ideas and practice is the core of the initiative (see 4.2.1). In comparison, for Koekoek's Qreamteam the spreading of 'lessons learned' is secondary: their focus is on product design and the intention to make their experience available through a handbook comes later.

Literature on governance often refers to the issue of reproducing certain practices in a new context as 'transfer'[97], which then poses a double problem of technology and policy transfer. Technologies generally require a range of social, economic and organizational conditions to make them effective. When these conditions are not met, transferring technologies from one context to another tends to result in failure. Hence, spreading practice involves a broader effort than replicating technology. This broader effort is commonly thought of as policy transfer, i.e. a process by which experiences with policies, administrative arrangements, institutions and ideas in one socio-political system are used in the development of policies, arrangements, institutions and ideas in another system[98]. In the study of social learning, however, several authors have questioned the notion of 'transfer' and the implications of this metaphor. While technology may be transferable, the knowledge and arrangements involved in policies cannot be 'carried over': they require local re-developing, in interaction with stakeholders there[99]. The Carugate Building Code was inspired by, among other things, the 'Ordenanza Solar' in Barcelona, but did not copy it: the Municipality called on a range of local stakeholders and set up a participative design process. The Brescia Waste Reduction Plan shows overlap with the waste reduction initiative in Carugate, but is not a replica. Learning from successful cases elsewhere depends on an understanding of the parameters and dynamics at play in that practice, an assessment of how these could work in the destination context, with actors involved there, and re-developing local practice correspondingly. Strategies may include the use of evidence from abroad, but improvising and integrating remain essential…

It is clear that characteristics of the transfer and / or local re-development process affect results considerably. What is the intended degree of transfer[100]:

- Copying, which involves direct and complete transfer?
- Emulation, which involves transfer of the ideas behind a policy or program?
- Combinations, which involve mixtures of several different policies?
- Inspiration, where policy in another system may inspire a policy change, but where the final outcome does not strictly draw upon the original?

The understanding of differences and similarities between both contexts and the possibilities for adapting technologies, practices or policies to local conditions are essential. Different types of failures in policy transfer processes[101] remind us of the importance of context and the potential fallacies in the transfer metaphor:

- Uninformed transfer: when the borrowing country has insufficient information about the policy and how it operates in the country from which it is transferred;
- Incomplete transfer: when crucial elements of what made the policy or institutional structure a success in the originating country are not transferred or transferrable;
- Inappropriate transfer: when insufficient attention is paid to the differences between the economic, social, political and ideological contexts in the transferring and the borrowing country.

To conclude, it appears that processes to adopt technology, policy and / or practice from somewhere else imply a degree of local re-development of the technology, policy or practice involved. This may sound like 're-inventing the wheel' to some, yet it does support thorough understanding of what is at stake, the necessary adaptations to local conditions and a sense of ownership for something that was 'not invented here'[102].

97 E.g. the special issue of Governance: International Journal of Policy, Administration and Institutions, 13(1)
98 Dolowitz & March, 2002
99 Lave, 1988:14, 18ff; Hicks, 2010:137
100 Dolowitz & March, 2002
101 Dolowitz & March, 2002
102 Katz & Allen, 1982

6 Epilogue

Rather than a conclusion, this epilogue offers a brief overview of the headlines in this study and related reflections on governance for C2C. A first proposal concerns the nature of governance suited for contexts of uncertainty and task complexity such as sustainable development. We propose that such contexts require an emphasis on multi-actor governance rather than hierarchy and market mechanisms, especially when under time pressure. The choice for multi-actor approaches parallels the move from efficiency to effectiveness in C2C-thinking.

A key tenet of C2C is that improving input/output ratios related to fuel, CO2, temperature, etc. will not create a sustainable future. In practical terms, this means that waste reduction and energy saving measures are, by themselves, inadequate. Improving eco-efficiency will remain important, but not suffice. Eco-effectiveness hinges not on the quantity of materials and energy, but on qualities of products, production processes and product-service systems that support the creation of clean closed loops.

Multi-actor governance reflects a similar shift. Judged by short-term efficiency criteria, multi-actor processes may appear slow and involve too many people. In contexts of 'wicked' long-term interdependencies, however, multi-actor approaches appear to be more promising than 'governance within government'. Conventional government roles and strategies will remain important, yet not suffice. They generally fail to mobilize people. Legislation and enforcement strategies tend to result in compliance, in the best of cases. They may drive 'doing less bad', yet rarely attract to 'doing good'. They may therefore support eco-efficiency, but are highly unlikely to lead to eco-effectiveness.

A second headline is that various people and organizations in the C2CN partner regions actively engage in sustainable development issues. The practices that C2CN participants submitted for study include a wide range of initiatives in education, several types of networks, support structures, standard-setting and regulatory efforts, as well as product design, the revision of product lines and supply chains, and larger-scale (r)urban development projects. These initiatives include practices that focus on creating enabling conditions, such as learning platforms, support structures or regulation, and actual C2C practice in the field.

A third headline is that much of the practice that we studied remains guided by eco-efficiency principles. Many of the C2CN initiatives date from recent years and any evaluation of results and underlying success factors is preliminary. To date, we observe that eco-efficiency practices represent an important share of the cases reported. This seems due to some extent to the environment they operate in, i.e. an infrastructure that was by no means designed for disassembly and full recycling – let alone up-cycling – and in which closing material loops appears impossible. In such contexts, eco-efficiency may be the best option. Our observation may also reflect the number of actors engaged in sustainability issues who jumped on the C2C bandwagon that happened to come by. In terms of governance processes, this is one way in which new concepts and approaches commonly spread. It supports re-interpreting the practice of the actors involved and shaping their future action accordingly. The result of this dynamic is a broadened C2C concept, on the one hand, and a move in the intended direction, on the other hand. From a governance perspective, this seems quite acceptable as long as it doesn't result in 'certifying' (see 5.2) and / or financing practices that are not sustainable and don't show any intention to move in the direction of eco-effectiveness. In addition, however, this observation reflects the prevalence of eco-efficiency in our understanding of sustainability. Lifecycle-thinking, in the sense that C2C proposes, is not (yet) intuitive in the design of products, supply chains or product-service systems. Practices in this perspective study reflect notions of C2C in which eco-efficiency becomes more prevalent as complexity increases from the design of one product to the redesign of large-scale product-service systems.

A fourth proposal, however preliminary, concerns success factors and challenges in developing C2C practice. The organizational conditions for multi-actor governance (5.1) represent the key elements: new connections, minimal structure, social learning and a specific connection to power networks. We'll only highlight a few specific points based on conversations with case-owners, presenters and C2CN participants:

- One, related to minimal structure, is the need to minimize and / or simplify procedures and legislation. It is clear that the procedural logic in various (often government) projects represents a significant obstacle to sustainable development initiatives. Examples range from discouraging registration procedures and formal reports to inaccessible regulations. With regard to this last point: as eco-innovation often originates across the boundaries of traditionally separate domains, it tends to be confronted with multiple regulations and compliance issues may become a significant hurdle. One-stop counters (4.2.1.4) may offer a way around that problem, but don't solve it. Similarly, government actors using 'keying' or 'improvising' strategies (see 5.2) may buffer between entrepreneurial dynamics and procedural rigidity, but risk doing so at their own expense…
- Two, related to social learning and power networks, is the role of formal leadership. Several C2C successes appear related to decisive leadership. For clarity: 'decisive' is by no means similar to au-

tocratic leadership, or bossing people around. It refers to a decided choice for a sustainable future, credibly formulated by people with decision-making authority. In several cases, listeners reacted as if they had been waiting for permission to commit to more sustainable practices. The choice seemed to make sense and the 'permission' prompted the energy, creativity and exchange of experience necessary to invent sustainable products or turn an entire production process around. The examples suggest that SME's may be a favorable environment in this regard.

- An additional point is related to the potential role of 'green public procurement'. Several C2CN cases and participants in practices 'in the field' refer to the significant impulse that government actors may provide in creating a market, whether for C2C furniture or disposable cups. From a government perspective, this may be more sustainable than the financer role (see 5.2). From a perspective of governance for C2C, it seems essential for green (public) procurement practices to take into account the next point.

A condition and challenge not so much for multi-actor governance, but particularly for C2C, is the so-called reverse logistics. Producing recyclable products does not contribute to a sustainable future unless they are indeed recycled. Actually closing the material loop requires a functioning system to bring the presumed 'end-product', or its components, possibly many years after its purchase, to the start of its next lifecycle. One way to understand the transition from 'cradle to grave' to 'cradle to cradle' is that there is no end-user anymore. There is no 'end' in continuous loops. C2C proposes that every consumer becomes a supplier, albeit of recyclable disposables. Especially in business-to-consumer markets, this remain a crucial challenge for C2C practices in the stricter sense of the word. A shift from products to services – "don't buy lamps, lease light"[103] – is a common proposal in this regard, yet remains a highly uncertain answer. So far, experience with leasing, for example, does not indicate that it is more sustainable than buying…

A fifth proposal is related to the roles and strategies of government actors. We already clarified that the clear advantages of network governance in the C2C context do not discount the importance of hierarchy and markets as governance mechanisms. The conclusion, however tentative, that actors, count on the government to prevent and, if needed, penalize free-riding when it comes to sustainability efforts is possibly significant in two regards. One, it brings the hierarchical role of government actors to the foreground and, along with this role, the paradox of stimulating versus punishing (see 5.2). Two, it suggests that actors who are enthused by C2C's positive outlook on future opportunities, don't entirely buy C2C's positive message. This brings us to our closing reflections.

Our final proposal is related to the strengths and potential fallacies of C2C in terms of governance. Several interviewees and C2CN seminar participants propose that the attraction of C2C lies in its opportunity-orientation, i.e. a focus on positives and the future rather than on solving problems from the past. Its mobilizing capacity seems related to an ambitious shift from 'doing less bad' to 'doing good', or from 'minimizing negatives' to 'maximizing positives'. When comparing C2C to other approaches, its pull appears related to a reliance on technological growth and business innovation, its normative character, in the sense that C2C defines what to achieve without defining how to do so, and its call for creativity and initiative, rather than discipline and restraint. Hence the shift from efficiency to effectiveness, however sensible, moves another one to the background, i.e. the shift from efficiency to sufficiency, which may be less appealing but end up equally important.

To conclude: the potential shifts from efficiency to effectiveness and / or from efficiency to sufficiency may be indicative of the state of the sustainability debate. Sustainability is on the agenda: we're beyond the question whether or not it is an important issue[104]. The point that comes to the foreground now is how we interpret and imagine sustainability. Energy efficiency? Waste reduction? Closed loops? Less consumption? Trade-offs between different approaches come in focus. If all investment goes to energy efficiency, it slows down lifecycle-thinking. What amount of waste, for example, is produced by subsidized solar panels? Effectiveness criteria may mask sufficiency questions. Does C2C-certified synthetic grass, for example, justify the artificial surface of a soccer field? C2CN participants warn that it is crucial to keep an eye on the big picture and ponder the impact of certain actions from different perspectives. The LED lights mentioned earlier (see 4.3) provide an example. The story of bio-fuels does also. It is in this type of interdependencies that 'wicked problems' made their fame, diversity proves important, and multi-actor governance appears promising.

103 Presentation by Thomas Rau, C2CN Thematic Seminar Maastricht, 9.7.2010

104 Presentation by David Cooperrider, Leading Organizations of Tomorrow, London, 14.10.2010

Literature

- Aucoin, P. (1990). *Administrative reform in public management: paradigms, principles; paradoxes and pendulums. Governance: an International Journal of Policy and Administration*, 3(2), 115-137.
- Atkinson, M. & W.D. Coleman (2005). *Policy Networks, Policy Communities and the Problems of Governance. Governance: International Journal of Policy, Administration and Institutions*, 5(2), 154-180.
- Baez, B. & Abolafia, M. (2002). *Bureaucratic entrepreneurship and institutional change: a sense-making approach.* Journal of Public Administration Research and Theory, 12, 525-552.
- Barrett, F. (1998). *Creativity and improvisation in jazz and organizations: implications for organizational learning.* Organization Science, 9(5), 605-622.
- Bouwen, R. & Taillieu, T. (2004) *Multi-party collaboration as social learning for interdependence: developing relational knowing for sustainable natural resource management*. Journal of Community & Applied Social Psychology, 14(3), 137-153.
- Braungart, M. & McDonough, W. (2008). *Cradle to Cradle: remaking the way we make things*. London: Vintage.
- Breeman, G., H. Goverde & K. Termeer (2009). *Een zoektocht naar governance*. In: Breeman, G., H. Goverde & K. Termeer (Eds). *Governance in de groen-blauwe ruimte: handelingsperspectieven voor landbouw, landschap en water*. Assen: Van Gorcum.
- Considine, M. (2002). *The End of the Line? Accountable Governance in the Age of Networks, Partnerships, and Joined-Up Services*. Governance: International Journal of Policy, Administration and Institutions, 15(1), 21-40.
- Costanza, R., Andrade, F., Antunes, P., van den Belt, M., Boersma, D., Boesch, D., Catarino, F., Hanna, S., Limburg, K., Low, M., Molitor, M., Pereira, G., Rayner, S., Santos, R., Wilson, J. & Young, M. (1999). *Ecological economics and sustainable governance of the oceans*. Ecological Economics 31, 171-188.
- Costanza, R., Cumberland, J., Daly, H. Goodland, R. & Norgaard, R. (2007). *An introduction to ecological economics*. Boca Raton: St. Lucie Press.
- Dewulf, A., G. François, C. Pahl-Wostl, & T. Taillieu. 2007. *A framing approach to cross-disciplinary research collaboration: experiences from a large-scale research project on adaptive water management*. Ecology and Society, 12(2): 14.
- Dewulf, A., Termeer, C., Werkman, R., Breeman, G. & Poope, K. (2009). *Transition management for sustainability: to wards a multiple theory approach*. In: Poppe, K., Termeer, C. & Slingerland, M. (Eds). Transitions towards sustainable agriculture and food chains in peri-urban areas. Wageningen: Academic Publishers.
- Dolowitz, D. & D. Marsh (2002). *Learning from abroad: the role of policy transfer in contemporary policy-making. Governance: International Journal of Policy, Administration and Institutions*, 13(1), 5-23.
- Duijvestein, C. (1990). *An ecological approach to building. In Riedijk, W. (Ed). AppropriateTechnology*. Delft: Delft University Press.
- Hall, R. & Biersteker, T. (2002). *The emergence of private authority in the international system*. In: Hall, R. & Biersteker, T. (Eds). *The emergence of private authority in global governance*. Cambridge: Cambridge University Press.
- Hicks, J. (2010). *Co-constructive consulting: a pragmatic, relational constructionist approach. Twente: doctoral dissertation University of Twente*.
- Hopkins, R. (2008). *The transition handbook: from oil dependency to local resilience*. Totnes: Green Books.
- Hovelynck, J., Dewulf, A., Taillieu, T. & François, G. (2010). *Interdisciplinary knowledge integration through group model building: recognizing dualities and triadizing the conversation*. Environmentol Science & Policy, doi:10.1016/j.envsci.2010.04.002.
- Huxham, C. & Vangen, S. (2000). *Leadership in the shaping and implementation of collaboration agendas*. Academy of Management Journal, 43(6), 1159-1175.
- Jones, C. Hesterly, W. & Borgatti, S. (1977). *A general theory of network governance: Exchange conditions and social mechanisms*. Academy of Management Review, 22(2), 911-945.
- Katz, R. & Allen, T. (1982). *Investigating the Not Invented Here syndrome: a look at the performance, tenure, and communication patterns of 50 R&D Project Groups*. R&D Management, 12(1), 7-20.
- Kaufmann, D., Kraay, A. & Zoido, P. (1999). *Governance matters: policy research working paper 2772*. Washington: World Bank Development Research Group.
- King A. & Lenox M. (2000). *Industry self-regulation without sanctions: the chemical industry's Responsible Care program*. Academy of Management Journal, 43(4), 698-716.
- Kooiman, J. (1993) *Findings, speculations and recommendations*. In: Kooiman, J. (Ed). Modern governance. London: Sage (pp.249-262).

- Koppenjan, J. & Klijn, E. H. (2004). *Managing uncertainties in networks: a network approach to problem-solving and decision-making*. London: Routledge.
- Lave, J. (1988). *Cognition in practice*. New York: Cambridge University Press.
- Lave, J. & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. New York: Cambridge University Press.
- Loorbach, D., & Rotmans, J. (2006). *Managing transitions for sustainable development*. In: Wiczorak, A. & Olshoorn, X. (Eds.). Industrial Transformation – disciplinary approaches towards transformation research. Dordrecht: Kluwer Academic Publishers.
- Milward, B. & Provan, K. (2000). *Governing the hollow state*. Journal of Public Administration Research and Theory, 10(2), 359-379.
- Nooteboom, S. (2006). *The governance for sustainable development*. Delft: Eburon.
- Paredis, E. (2010). *Naar een verdere onderbouwing van het Vlaams beleid voor duurzaamheidstransities*. Gent: Centrum voor Duurzame Ontwikkeling, UG, & Steunpunt Duurzame Ontwikkeling.
- Pleijte, M. J. Vreke, A. Gerritsen, R. Kranendonck, F. van den Bosch & P. Kersten (2009). *Verdrogingsbestrijding in het ILG-tijdperk: tussen government en governance?* Wageningen: ---
- Powell, W. (1990). *Neither market nor hierarchy: network forms of organization*. In: Staw B. & Cummings, L. (Eds). Research in organizational behavior. Greenwich: JAI Press (pp. 295–336).
- Rhodes, R. (1996), *The New Governance, Governing Without Government.* Political Studies, 44, 652-667.
- Rhodes, R. (2002). *The new governance: governing without government. In: S. Osborne (Ed), Public management: critical perspectives*. London: Routledge (pp. 208-226).
- Rogers, D. & Tibben-Lembke, R. (1998). *Going backwards: reverse logistics trends and practices*. Reno: Reverse Logistics Executive Council.
- Rose, N. (1996). *The death of the social? Re-figuring the territory of government*. Economy and Society, 25(3), 327-356.
- Rotmans, J., Kemp, R., & Van Asselt, M. (2001). *Transition management: a promising perspective*. In: Decker, M. (Ed.). Interdisciplinarity in technology assessment. Berlin: Sprinter-Verlag (pp. 165-197).
- Stoker, G. (1998). *Governance as theory: five propositions*. International Social Science Journal, 155, 17-28.
- Stone, C. (1993), *Urban regimes and the capacity to govern: a political economy approach*. Journal of Urban Affairs, 15(1), 1-28.
- Stouthuysen, P. & Leroy, D. (2010). *Cradle to Cradle Framework*. Paper presented at the C2CN Thematic Seminar, July 8-9th, Maastricht, Netherlands.
- Taillieu, T., van Acker, K., Vincke, J. & Tempst, W. (2008). *Multi-party collaboration between business, government and social movements for the transition to sustainable material management*. Boston: presentation at the 15th International conference on Multi-Organizational Partnerships, Alliances and Networks.
- Termeer, C. (2007). *Vital differences. On public leadership and societal innovation*. Wageningen: Inaugural speech, WUR.
- Termeer, C. & Kranendonk, R. (2010). *Governance of regional innovations towards sustainability*. Wageningen: unpublished research report of the Public Administration and Policy Group, WUR.
- Tjallingii, S. (1995) *Ecopolis: strategies for ecologically sound urban development*. Leiden: Backhuys Publichers.
- Trist, E (1983). *Referent organizations and the development of interorganizational domains*. Human Relations 36(3), 269-284.
- van Leenders, C. (2009). *Tien tips voor slimme sturing*. – : Nieuw Akademia.
- Van Zeijl-Rozema, A., Cörvers, R., Kemp, R. & Partens, P. (2008). *Governance for sustainable development: a framework*. Sustainable Development, 16, 410-421.
- Van Zeijl-Rozema, A. (forthcoming). *Governance for sustainable development*: - . Maastricht: doctoral dissertation at Maastricht University.
- Wenger, E. (1998). *Communities of practice: learning, meaning and identity*. Cambridge: Cambridge University Press.
- Zaheer, A. & Venkatraman, N. (1995). *Relational Governance as an Interorganizational Strategy: An Empirical Test of the Role of Trust in Economic Exchange*. Strategic Management Journal, 16(5), 373-392.

The Cradle to Cradle Network (C2CN) is an Interreg IV C capitalisation project consisting of ten partners from ten European regions which aims to reduce raw materials' utilisation, to generate less waste and less environmental pollution, as well as to enhance innovation and economic development.

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