

# HOW TO PLAN A BIG BENEFICIAL FOOTPRINT

*GUIDE TO INNOVATION TOOLS FOR  
CRADLE TO CRADLE®-INSPIRED VALUE  
IN BUILDING DEVELOPMENTS*



*For Architects, Developers, Investors & Planners*

*Familiar with Cradle to Cradle®*

Douglas Mulhall, Michael Braungart & Katja Hansen

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## Focus on the tools best for you!

These Innovation Tools are presented in a workbook style to encourage practical use. Please feel free to write your notes on the pages!

Tools are organized in a menu style so you can use what is best for you. Pick what works for you, but it is also recommended to use the tools in the framework described here.

You don't have to use everything! You can focus on doing a few things well.

As with any good menu, C2C-inspired innovation includes imagination, enjoyment, and making things beautiful. Enjoy the menu and add to it!

Every good menu can be improved. Please send us your examples and suggestions for improvement! Contact us at... Tammy Korndoerfer <[t.korndoerfer@tum.de](mailto:t.korndoerfer@tum.de)>.



Focus on the tools best for you.

## ACKNOWLEDGEMENTS

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Cradle to Cradle® co-founders Michael Braungart and William McDonough emphasise the importance of honouring contributors as they do in their publications. In this case, many individuals and organizations contributed to this publication. They include in alphabetical order;

Steven Beckers, Otto Friebel, David Gillanders, Hans Goverde, David Johnson, William Lavesson, Peter Luscuere, William McDonough, Alastair Reilly, Johan Sandberg, Leo Visser, Ljiljana Rodic-Wiersma, Coert Zachariasse, Owen Zachariasse, Rijksgebouwendienst personnel, as well as many others.

Apologies to contributors who might have been overlooked; please let us know so they can be added!



Developments like Park 20/20 in The Netherlands by Delta Developments, designed by William McDonough & Partners, are inspirations for this publication.

Image William McDonough & Partners

## ABOUT THE AUTHORS

Michael Braungart, Douglas Mulhall and Katja Hansen co-developed many of the scientific methods which serve as a basis for the Cradle to Cradle Design Framework®. They are working together since the 1990s at EPEA Internationale Umweltforschung, the founding scientific institute for C2C, as well as the Hamburg Environmental Institute and today collaborate at Prof. Braungart's Academic Chair, Cradle to Cradle for Innovation and Quality, Rotterdam School of Management and at the Technical University of Munich & Delft University of Technology. Douglas Mulhall is the lead author on this publication. Biographies can be found at this website;

<http://www.rsm.nl/research/decision-information-sciences/research/cradle-to-cradle-for-innovation-and-quality/>

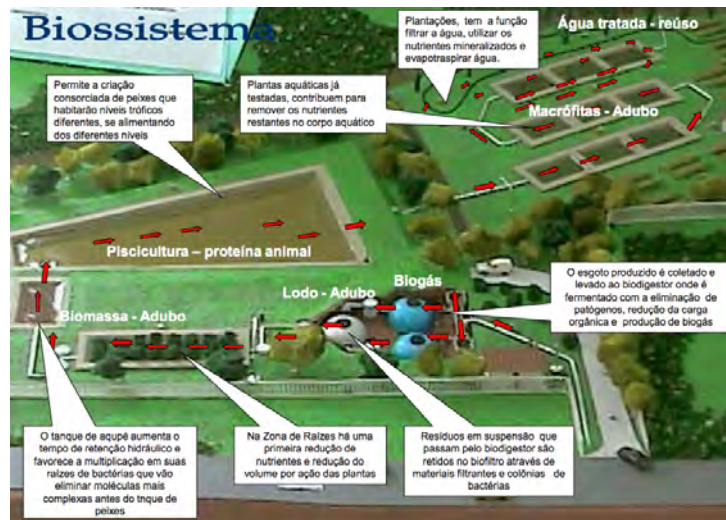
### For more information

For assistance implementing the Guide or to provide feedback contact; Tammy Korndoerfer <[t.korndoerfer@tum.de](mailto:t.korndoerfer@tum.de)>.

### HEALTHY BENEFICIAL FOOTPRINT IN PRACTICE

Since the 1992 Earth Summit in Rio de Janeiro the authors collaborated on bionutrient recycling in area developments. The systems pictured here provide energy, clean water and nutrients, and are adapted across South America and the Caribbean. The systems were practical laboratories for optimising and implementing the three Cradle to Cradle principles.

Image courtesy  
O Instituto Ambiental



## WHO CAN USE THIS GUIDE FOR WHAT?

The Guide is for practitioners familiar with the basics of Cradle to Cradle® so they can work with Stakeholders to integrate C2C® added value into building developments. The focus is on planning, financing and goal setting.

Sections of the Guide can be provided to Stakeholders who are just beginning with C2C, but it is advised to do this in a workshop where the context is explained as part of a systematic approach.

Innovation Tools are organized in Modules to plug into your building process. *Practical examples are highlighted throughout the Guide in italics*, and to find those you can do a text search for “example”.

### **Types of Buildings**

The Guide is for diverse developments in diverse geo-climatic zones;

- Education,
- Healthcare,
- Mixed use,
- Offices,
- Recreation,
- Residential,
- Shopping Centres
- Logistics

It is also a general guide for factory buildings.

### **Guide for Registry**

The Guide can be used as a basis to meet criteria for admission to *The Registry for Cradle to Cradle-Inspired Elements in Building Developments*.

### **IS THERE A CRADLE TO CRADLE BUILDING DEVELOPMENT?**

Hopefully soon there will be enough Cradle-to-Cradle-Inspired Elements in buildings to qualify the total development as C2C. However, there are yet no Cradle to Cradle buildings or developments. Instead there are C2C-Inspired Elements in Buildings and Developments, which are steps on the way to C2C. Those Elements are described on page 35 of this Guide and further in the *Registry for Cradle-to-Cradle-Inspired Elements in Building Developments* described on the next page.

## COMPANION PUBLICATIONS

Cradle to Cradle for the built environment is described in many publications. However, this Guide is part of a defined Framework of easy-to-read practical publications describing C2C philosophy, principles and tools for building developments. These publications can be found through this website;

<http://www.rsm.nl/research/decision-information-sciences/research/cradle-to-cradle-for-innovation-and-quality/registry/>

Start Here



### CRADLE-TO-CRADLE CRITERIA FOR THE BUILT ENVIRONMENT

**BASIC PRINCIPLES, CRITERIA & ROADMAPS.**

Prior to starting with this Guide please read; *Cradle to Cradle® Criteria for the Built Environment*, Douglas Mulhall & Michael Braungart, CEO Media 2010 (2<sup>nd</sup> Edition revised in Dutch & Swedish 2012). The Criteria are the basis for this Guide.



### INNOVATION TOOLS GUIDE

Congratulations, you are reading it!



### BUILDING SYSTEMS SUPPLEMENT

**OPTIONAL FOR ADVANCED USERS.**

A supplement to pages 16-19 of this Guide is available on request. The supplement describes C2C approaches for each building system category including spatial design, infrastructure services, mechanical, electrical, interiors and landscaping. The supplement is designed for advanced practitioners preferably in a development workshop. Contact; Tammy Korndoerfer <[t.korndoerfer@tum.de](mailto:t.korndoerfer@tum.de)>.



### THE REGISTRY

**WINNING RECOGNITION FOR YOUR DEVELOPMENT.**

After your development is built, *The Registry of Cradle to Cradle®-Inspired Elements for Building Developments* provides recognition with a peer-reviewed quality assurance repository and award so designers and builders can celebrate, evaluate and replicate Elements in buildings. The Registry publication gives examples of *Elements and Delights* additional to those on page 35 of this Guide. The Registry is governed by the Academic Chair, Cradle to Cradle for Innovation & Quality.



... to continuous improvement!

## WHY USE CRADLE TO CRADLE® IN BUILDINGS?

### PURPOSE. ADD VALUE FOR STAKEHOLDERS

Stakeholders use C2C-Inspired Innovation to generate a healthy footprint which adds quality and value by making buildings actively beneficial instead of just passive.

Added value is generated by;

- Improving the economic, social and ecological quality of materials, energy, and life.
- Constantly improving building systems during planning through operations until the building is disassembled and its materials used for other purposes.
- Going beyond the traditional sustainable approach of minimizing negative impacts of buildings.
- Being adaptable in the marketplace to processes already used by Stakeholders, instead of requiring added bureaucracy, regulation or certification.
- Being adaptable to most major climate regions, from tropical to temperate. For example, a kindergarten in Delhi might generate different types of added value from a high-rise office in Stockholm.

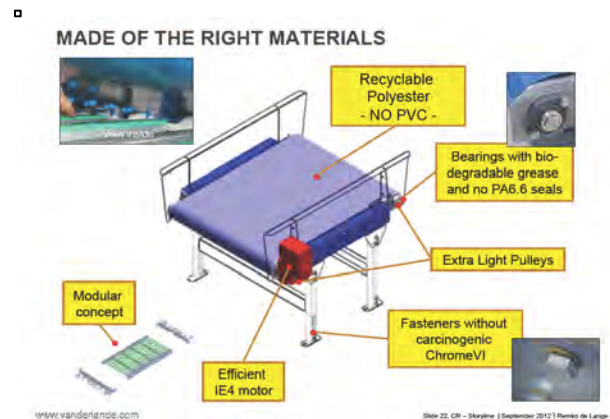


## USE HOLISTIC QUALITY TO GENERATE ADDED VALUE

The leading cause of cost overruns in building developments is focusing too much on low price for components and not enough on systems integration.

To solve this, C2C-Inspired Elements are used as connectors to integrate systems and generate added value by focusing on holistic quality.

Holistic quality is a theme because when systems are optimized together their integrated performance is greater than the sum of their individual parts.



## INTEGRATING MODULAR DESIGNS WITH HEALTHY MATERIALS TO ADD VALUE AND HOLISTIC QUALITY

**Example left.** Herman Miller Mirra Chair. Comes apart in seconds for profitable recovery of parts & materials for reuse & same-quality recycling. It also reduces assembly time and costs as well as improving the resale value and makes repair quicker and less expensive. The Mirra chair also shows that modular designs can be beautiful. The chair is featured in the Museum of Modern Art in New York.

Building designs can take many lessons from the Herman Miller Chair. Before Herman Miller applied those principles to its product, it already applied them to its factory with William McDonough Architects, resulting in improved productivity. Studies on Herman Miller designs are published by Harvard Business School and the Journal of Industrial Ecology. Image Herman Miller.

**Example right.** Vanderlande conveyor systems for factories, airports & logistics buildings. By working with EPEA Internationale Umweltforschung to use healthy materials and modular designs, Vanderlande Industries saved weight & energy costs by more than half, eliminated harmful off-gassing, and improved manufacturing. Image Vanderlande.

## THE QUICK MENU

There is a quick way to start Cradle to Cradle®-Inspired planning. It is not perfect, but it is better than doing nothing or doing the wrong thing perfectly right!

- Study C2C video and publication links described later in this publication to learn how C2C generates added value through holistic quality.
- Identify leading Stakeholders in your development, for example the owner, investor, builder, designer and occupants.
- See if they have their own aspirations or measurable Goals for the development, and identify which ones they share most closely.
- Compare those to Cradle to Cradle® Principles and examples of measurable Goals described in *Cradle to Cradle® Criteria for the Built Environment* and see which ones match best with C2C.
- Identify three shared stakeholder Goals that most closely match C2C criteria, i.e. where their Goals are already on the right path to C2C. Rephrase Goals in C2C terms using examples from this Guide as a basis.
- To reach those Goals measurably, work with leading Stakeholders to identify five C2C-Inspired Elements and five C2C-Inspired Delights, using as a guide *The Registry for Cradle to Cradle-Inspired Element in Building Developments*.
- Prioritize Elements and Delights using votes by leading Stakeholders. You can also use other stakeholder consultation methods described in this publication.
- Include the most popular Elements and Delights into the building development designs and be sure investors support them.
- Prior to starting construction send those Elements & Delights to the *Registry for Cradle to Cradle-Inspired Element in Building Developments* for an independent viewpoint.
- After the building is built apply to the Registry for an award!

## À LA CARTE!

The building industry is far from perfect. Processes get disrupted. Every extra step is seen as a bureaucratic cost, especially for managers who are asked to add traditional sustainability to their workload.

To adapt to this reality, innovation tools described here are modular so you can integrate them with your process and focus available resources. The result is an *a la carte* menu of options in the format of an *appetizer*, *main course* & *dessert* to give structure.

As with a good meal, the ingredients complement each other. A good meal begins with a good menu and the right ingredients, so enjoy!



## THE MENU À LA CARTE

*Getting Started*

*Financial Innovation*

*Inventory*

*Intentions & Goals*

*Add Value by Integrating Goals*

*Marketing*



### ELEMENTS TO ACHIEVE HOLISTIC QUALITY

Example of using C2C-inspired Elements to support holistic quality. The headquarters of Bionorica, a leading natural pharmaceuticals company, were partway through construction when C2C-inspired Elements were added.

The focus of the Elements was beneficially defined materials like concrete additives (with Heidelberg), healthy furniture and flooring materials (Herman Miller furniture, Backhausen fabrics, Desso carpets, and bionutrient air cleaning plants (Xeroflor moss)).

As well a leasing concept for solar-powered windows was described to reduce capital expenditures and encourage manufacturers to take back their products to recover the materials.

C2C-Inspired Elements let you use holistic quality without having to be perfect. They can be introduced throughout the use period of a building.

## APPETIZERS; GETTING STARTED



### **TIMEFRAME**

You can start at the planning, construction or operations stage.

### **WHO DOES IT**

Building Developer or Operator working with Stakeholders.

### **EXAMPLES OF TOOLS**

C2C Basic

Project Stage Identification

Stakeholder Identification

Financial Innovations

Describe Examples of Added Value

Quickscan Site Features

Baseline Analysis of C2C Features

Use Existing Inventories as Resources

Table 1 Financial Innovations

Annex A Examples of Stakeholders

Annex B Table 2 Examples Of Value-Added C2C-Inspired  
Qualities For Stakeholders

## C2C BASIC

### C2C PHILOSOPHY, PRINCIPLES & TOOLS

If you are already a C2C practitioner you know C2C is often seen as an inspirational philosophy, but it is far more. It operates at these diverse levels;

**PHILOSOPHY** Inspirational guidance for describing the positive role of human beings.

**PRINCIPLES** Basis for defining C2C *quality*.

**TOOLS** Innovation and application tools for achieving quality measurably.

Innovation Tools are the focus of this Guide. Philosophy and Principles are described in other publications such as the *C2C Criteria for the Built Environment*.

### C2C AND THE CIRCULAR ECONOMY

The 2013 publication *Towards the Circular Economy 2* by Ellen MacArthur Foundation and McKinsey, presented to the World Economic Forum in Davos, identified the Cradle to Cradle® biological and technical cycles as a basis for the Circular Economy. Quoting the report;

*The circular economy requires careful management of material flows, which are of two types. These are characterised by McDonough and Braungart in 'Cradle to Cradle: Remaking the Way We Make Things' as biological nutrients—materials designed to re-enter the biosphere safely and rebuild natural capital, and technical nutrients, designed to circulate at high quality without entering the biosphere.*

*Towards the Circular Economy 2 p. 27*

## EDUCATIONAL TOOLS

Because so many books are written about Cradle to Cradle in so many languages, it can be confusing to decide which ones to recommend to your Stakeholders. Here is a quick guide to basic outlines;

The booklet *Cradle to Cradle Criteria for the Built Environment* referred to earlier gives a brief introduction to C2C Principles & Roadmaps for buildings. As well many video introductions to C2C are on Youtube. The most informative ones with practical examples are;

*Cradle to Cradle What is That?*  
Developed by design firm Reggs with training by EPEA,  
<http://www.youtube.com/watch?v=4jORau0V62c>

*Business Value*  
[http://www.youtube.com/watch?v=AwBkc\\_2HuXg](http://www.youtube.com/watch?v=AwBkc_2HuXg)

*The Cradle to Cradle Concept in Detail*  
<http://www.youtube.com/watch?v=HM20zk8WvoM>

*Desso Airmaster - Advertisements for the U.S. market about how carpets preventing allergies.*  
<http://www.youtube.com/watch?v=v8wZnNolsE>

*Tarkett flooring*  
[http://www.youtube.com/watch?v=cTp\\_sSp\\_z1k](http://www.youtube.com/watch?v=cTp_sSp_z1k)

*Icestone surfaces - Includes hints on what to ask suppliers about how they manufacture and recover products.*  
<http://www.youtube.com/watch?v=PqRfO2CS8Z8>

*Hycrete waterproofing - Chemistry for concrete*  
<http://www.youtube.com/watch?v=zk-T-Avm774>

*Orangebox chair - How to design for healthy materials, quick assembly and recovery of materials.*  
<http://www.youtube.com/watch?v=09x1W-U4h28>

*Vanderlande conveyor systems.*  
<http://www.youtube.com/watch?v=pVbGhrng8co> .

*Gugler printing*  
<http://www.youtube.com/watch?v=UlrVWVcb4E8>

### **Describe C2C-Inspired Elements to Your Stakeholders**

For examples of Elements see Annex E Table 4 as well as *The Registry for Cradle to Cradle-Inspired Elements in Building Developments*. These Elements accelerate introduction of C2C without expensive and lengthy certification processes.



#### **FLEXIBLE VALUE**

Added value of C2C-Inspired Elements will vary depending on the geographic and climate zone your development is in. The same Element generates different added value depending on location. For example the rooftop garden shown here on a restaurant provides tropical fruits, sunshade and other benefits year-round due to high solar intensity in the tropics. However a green roof in temperate climates might provide heating insulation in winter and sunshade in summer

Photo Douglas Mulhall

## WHICH BUILDING STAGE DO YOU WANT TO START WITH?

C2C can be started during building planning, construction or operations;

- In many cases Stakeholders only learn about C2C when they are part way through the building development process, so it is important to identify at which stage you are starting and where C2C can be used.
- The focus will differ depending on when you start.

### STARTING POINT AFFECTS OVERALL PROCESS

The starting point affects the total process. Different stages have different focuses. For example, if you start later in the development process it is important to evaluate how to leverage existing features in your building development.

*Example of leveraging existing features; If a water recycling system is already designed into the building, it might make sense to negotiate tax breaks or extra building space with water authorities to take advantage of infrastructure savings from the building recycling its own water. In that case you can use an existing asset to generate C2C added value.*

On the other hand, it makes no sense to focus on optimizing concrete if the building is already in construction and concrete is in place.

Those examples show how identifying what is already on the way to C2C might generate hidden benefits as well as avoid reinventing the wheel.

The stage your project is at e.g. planning, tendering, or operations will also let you manage expectations by determining which C2C added values are realistic to achieve.

*For example, if you start at the post-design stage, structural Elements will already be fixed, so it makes sense to focus instead on C2C-Inspired Elements for interiors, landscaping and operations.*



### STARTING LATER?

SolarWind developed by IDL at Ecopark Windhof in Luxembourg began before stakeholders learned about C2C. However, due to its many innovations the developers were able to retroactively identify C2C – Inspired Elements and identify new added value. New interior Elements were also included late in the construction.



## EXAMPLES OF C2C-INSPIRED FOCUS FOR EACH STAGE

### ADAPT THIS FRAMEWORK TO YOUR OWN PROCESS

Building processes differ by countries and regions. The stages here are organized into modular frames which can be adapted to your own local situation.

*Annexes B & C provide more complete descriptions. Please refer to those annexes!*

### Early Planning for Financing & Go-Ahead

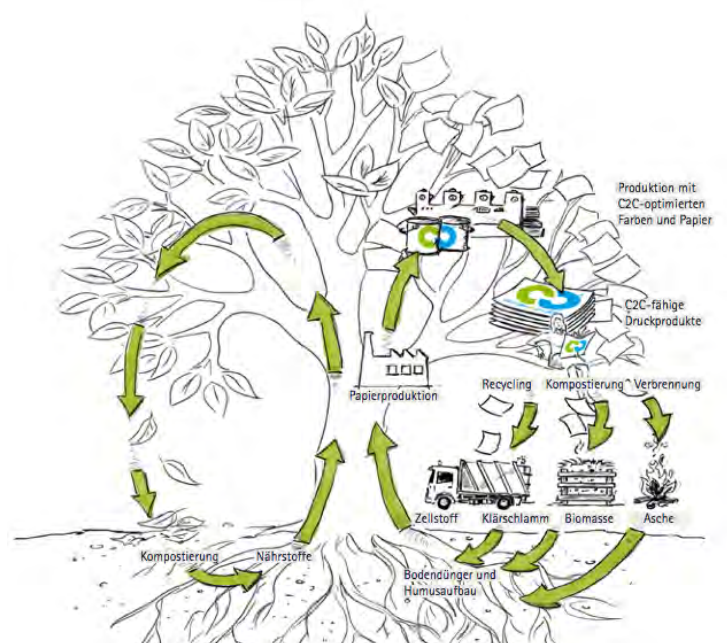
Focus on added value to improve chances for project permissions;

- Introduce C2C added value tools to Stakeholders by providing them with publications & video described in this Guide.
- Identify architects, planners & finance partners familiar with C2C. The C2C Chair at RSM can provide this information.
- Focus on financial innovation tools for added value. See Table 1.
- Organize stakeholder workshops on C2C-Inspired added value. Contact EPEA for information on how to do this.
- Involve the municipality, water agencies and energy suppliers in the early planning process to explore C2C-Inspired added value, which might positively affect the go-ahead decision.
- If the site is known, quick-scan site features for C2C potential. See Inventory section of this Guide. If it involves renovation, quick-scan the building to identify positive and problematic C2C areas.
- Develop *Statement of Intentions, C2C-Inspired Goals & Roadmap* using *C2C Criteria for the Built Environment* as a guide.
- Distinguish between being beneficial & being less bad. A C2C continuous improvement filter is available for this.
- Inventory new technologies among Stakeholders and local businesses to see which owners might support C2C-Inspired Elements.
- Describe the Business Case based on C2C added value.



### START EARLY WITH C2C-INSPIRED PRINTING & OFFICE SUPPLIES

Paper & file folders and inks used for planning & contracts can be C2C optimised & certified® so they are safe to be composted or used in a cascade of products. Example of C2C-inspired marketing slogan above and C2C printing process described in diagram, each by Gugler.



### Feasibility Analysis

- ❑ **Focus on Integration.** A leading cause of cost overruns is too much focus on pricing individual systems and too little focus on systems integration. *Systems engineering* can be combined with *systems integration* for more effective tendering and construction.

*For example, integrate C2C-Inspired added value considerations into your feasibility analysis by studying how to integrate nutrient recycling with energy production in wastewater purification systems. See Annex E Table 4 for an example of integration.*

#### MAXIMIZE BENEFITS BY COLLECTIVELY DEFINING THE SITE

If site definition for an area development is part of feasibility analysis, reorganize the process to support C2C-inspired innovation and get more for your money.

Traditionally when competing architects are asked to give site definition input they do not contribute their best concepts due to fear of losing them to competitors. As well, good ideas are often lost when one concept “wins” over the others.

Experience suggests it is more effective to pay a small number of architects to collectively define the site. Use the resulting platform as a level playing field to invite competing building designs later. It is more cost-effective for the owner & architects because it integrates the best concepts.

### Go/No Go Decision

- Use C2C-Inspired Added Value as criteria for the Go-No-Go decision process.

### Regulatory Approvals e.g. Site Services & Zoning

- Consider examples from other municipalities where C2C-Inspired features have been applied.
- Identify C2C added value that can benefit a broader range of Stakeholders like the municipality or water agencies, e.g. reducing stress on sewage systems.

### Preparing Tendering or Building Contract Selection Criteria

Focus on preparing potential suppliers for a new approach to specifications & tendering. Use the market consultation process to work with them and learn what they can deliver.



Identify stage where you want to start using C2C



**Designing for disassembly at every stage.**  
Partner with maintenance suppliers to develop a roadmap for continuous improvement for supplies like fasteners. For example reversible adhesives shown above allow quick removal of products fixed to walls and floors.

- Identify suppliers with previous C2C experience and talk to them.
- Use consultation meetings with potential suppliers to focus on C2C–Inspired added value.
- Include C2C focus in specifications to support your Goals.
- Include in tendering specifications earlier-developed approaches on design for disassembly to improve separation and recovery of construction residues, which make up to 30% of materials used.
- Co-operate with recyclers on specifications for materials separation & recovery.
- Integrate Technical and Biological Metabolisms into specifications.

### Site Preparation/Infrastructure

- Consider how to recover value from demolishing existing structures on site.
- Consider how to preserve topsoil and other existing ecological features on site.
- Consider design for disassembly of site services e.g. precast concrete, removable piping.

### Construction

- Inventory what might already be on the way to C2C.
- If you are beginning with C2C at this stage you might have time to focus on interior designs and materials because these contracts are awarded later in the process.

### Operations & Maintenance

- Focus on maintenance, supplies and monitoring. Start a C2C-inspired suppliers network for maintenance
- If you are starting with C2C only at this stage, inventory what might already be on the way to C2C. .
- Develop Roadmap for continuous improvement of supplies used during building maintenance & operation. If you are already working with C2C since the planning stage, monitor C2C-inspired performance factors that were set earlier in the process.
- Optimize biosphere flows for CO<sub>2</sub> & nutrient recycling e.g. landscaping, building-integrated greenhouses & cafeteria food waste.

### Disassembly & Reprocessing

- Focus on profitable materials recovery.
- Partner with new building developments on materials.

**For more information about each stage in each building system refer to supplement described on page 7.**



**INTERIOR INNOVATION**  
C2C certified® products like Thoma Holz wood can be introduced partway through construction for interiors.  
Photo Thoma Holz



**BEE SMART WITH A BEE PARKING LOT!**  
Support biodiversity by providing a home for bees at any time from construction through to demolition! For example, this modular street divider for a parking lot was designed as wood bee habitat to add value with aesthetics & biodiversity. Features like this can be added at the operations stage of a building and are quickly assembled and disassembled for use at other sites.  
Photo: Douglas Mulhall.

## ORGANISE BUILDINGS AS MATERIALS BANKS TO ADD VALUE

Materials often lose much of their value after they go into buildings because there is no way to get them back at the same level of quality. The good news; it can be redesigned so materials in buildings are assets instead of liabilities.

Buildings are like banks but instead of banking money they bank materials and unlike many banks you always know where your assets are!

As with banks, many materials are deposited then removed from a building during its use.

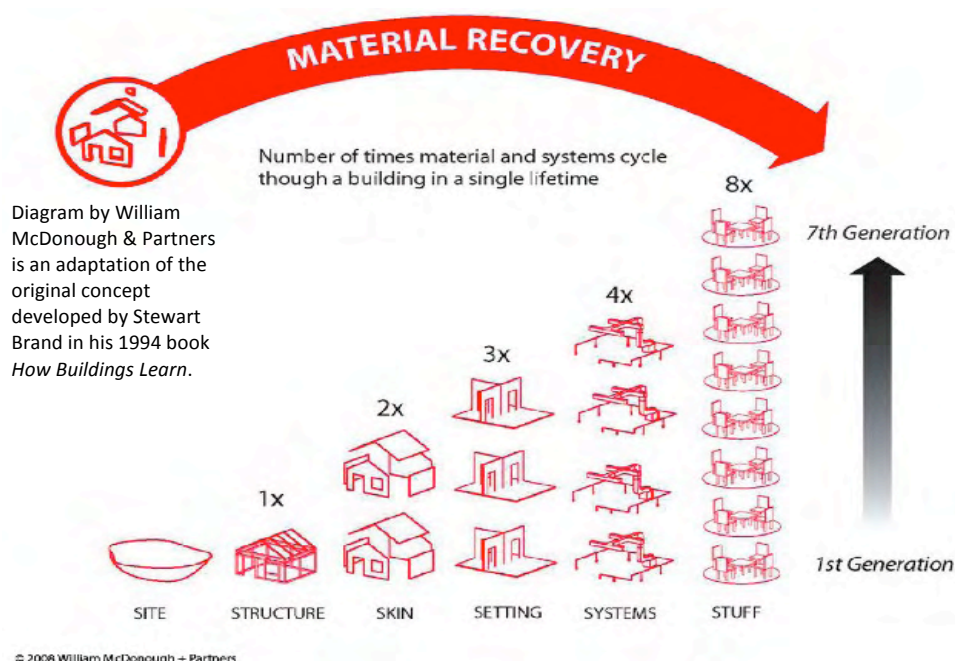
You can improve the quality of materials at every stage; planning, construction, maintenance, and for products that move through a building during operations and maintenance.

The approach can be an attractive value proposition for municipalities because when materials are profitably recoverable the local government is not stuck with empty or abandoned buildings.

### Materials Innovation Framework

Planners and architects sometimes do not consider innovation for products at the building operations stage, so it is important to focus their attention on this potential.

The diagram describes the velocity of materials moving through buildings in a human lifetime. The structure might be replaced once, but during its operation, products like furniture, carpet, filters, topsoil & plants cycle more quickly, providing more innovation opportunities as generations are replaced.



## FINANCIAL INNOVATION

Financial Innovation has two main functions here;

***Generate investment sources for C2C-Inspired Elements***

***Generate added value for Stakeholders***

It is important to establish the right financial conditions to maximize benefits. Refer to Table 1 as well as Annexes A, B & C to identify those conditions.

*Example.* In the 1990s, the solar industry was revolutionized when Power Purchase Agreements (PPA) used by traditional energy providers were adapted to solar. PPA replaced high up-front capital costs with low monthly payments. The innovation put solar on a level playing field with traditional energy and contributed to solar being competitive in many parts of the world.

Financial innovation can also save costs suffered by traditional sustainability. Reducing negative impacts is often seen as a cost rather than a benefit, because there is no added value for Stakeholders. By contrast, C2C-inspired approaches frequently generate early savings and revenues instead of costs. These can come at any stage, from planning through to operations and decommissioning. The biggest benefits are generated by the planning stage.

The following steps can be taken to use those benefits effectively;

### Identify Economic Stakeholders

Diverse Stakeholders influence building finance. In C2C, Stakeholders become partners for getting financial resources as well as benefitting from added value. *See Annex A Examples of Stakeholders.* It is surprising how often planners do not inventory Stakeholders, with the result that Stakeholders create barriers. *For example, local residents can block a development if they feel threatened by it or not consulted.*



Use Table 1 & Annexes A, B & C for financial innovation tools

## IDENTIFY INVESTMENT SOURCES TO SUPPORT C2C-INSPIRED ELEMENTS

### Identify Tools to Finance C2C-Inspired Elements

Every building development occurs in a financial framework where you can use diverse innovation tools to support C2C-Inspired added value. *For example*, use Table 1 *Financial Innovation Potential* for financing C2C-Inspired Elements. You might want to hold a special workshop to focus on those tools.

### Describe Priority for Attracting Occupants

If the building is designed for leasing, does the owner prefer occupants with good credit ratings, or getting the highest rent? A high-rated occupant can improve the capital value of a property. A low-rated occupant might pay higher rent but their lower rating might downgrade capital value by increasing uncertainty. High-rated occupants are more likely to want qualities that improve working and living conditions. Lower-rated occupants might focus on shorter-term considerations.

### Identify Innovative Ways to Get Resources For Planning

A main cause of mistakes in building developments is low resources for planning. To solve this, consider capitalizing investment for planning to spread the cost over years instead of treating it as a short-term operating expense. Consider applying for innovation subsidies which focus on optimising defined C2C-Inspired Elements in your development.

## IDENTIFY FINANCIAL TOOLS TO GENERATE ADDED STAKEHOLDER VALUE

### Describe Examples of C2C-Inspired Added Value

Probably the most important step in your financial planning. Added value takes many forms, and can benefit many Stakeholders. It can improve the value of capital assets, generate savings or revenues, or improve security.

Added value can be described in *hard* and *soft* terms, where a hard value fits into a financial balance sheet, and soft value is a quality which makes the development more attractive to occupants but might not have a defined financial value.

For examples of hard and soft added value, see *Annex B Table 2, Examples Of C2C Added Value For Stakeholders*. It is strongly recommended to hold a dedicated workshop with main Stakeholders to identify C2C-Inspired added values with them.



Identify your preferred financial tools.

**Use Financial Tools to Sharpen Your Focus**

The financial framework can improve your chances of achieving your Goals, or in other cases might restrict them, but in any case it plays a big role in determining your focus. The financial tools and potential added value available for your development play a big role in determining which focus is realistic.

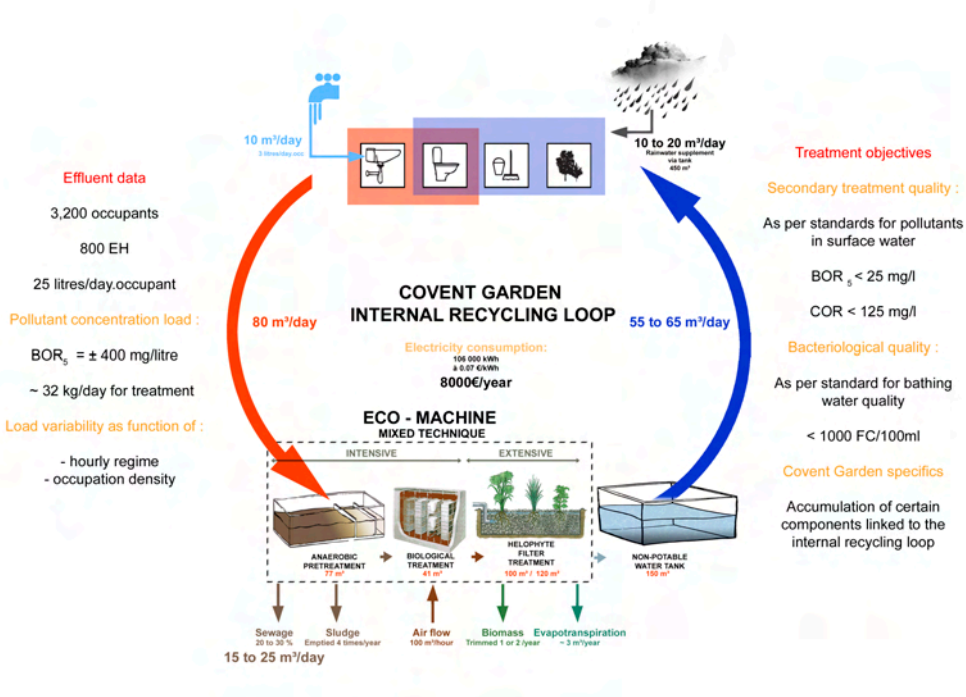
Throughout the planning process, refer back to your financial tools and added value potential to see how they can support your Goals and to make sure the resources are available to achieve them.

**Describe Value Propositions as Investments Instead of Costs**

Traditional sustainability is often seen as a cost rather than a financial benefit, so some Stakeholders might mistakenly apply the same thinking to C2C-inspired features. Because of this it is important to describe the investment value of C2C-Inspired value-added benefits to Stakeholders. See example this page.

Encourage them to see the process as an investment that pays back, instead of a cost. Describe to Stakeholders potential added value from the process. For examples use Annex B Table 2, Examples Of C2C Added Value For Stakeholders.

□



**USING WATER AUTONOMY TO GENERATE ADDED VALUE BY LEVERAGING MUNICIPAL ZONING REGULATIONS**

Bionutrient recycling system at one of the largest building developments in Brussels, Covent Garden, added value for the municipality by saving stress on the sewage infrastructure, and for the developer who was awarded added space on the site due to the beneficial contribution by the building. In this case, the goal of water autonomy was supported by a zoning revision which added value to the development. The system described in the diagram recycles nutrients into atrium landscaping shown right. However, to make those systems effective and guarantee continued operations, it is important to integrate capital and operating expenditure and gains, as well as integrate municipal or water agency incentives with operations so the benefits continue for Stakeholders.

Graphic: Art&Build + Montois architects; Photograph: Steven Beckers



**TABLE 1 - FINANCIAL INNOVATION POTENTIAL**

FINANCIAL INNOVATION TOOLS	INFORMATION TO INVENTORY	VALUE-ADDED POTENTIAL
<b>IDENTIFY STAKEHOLDERS &amp; EACH OF THEIR ECONOMIC GOALS</b>	See Annex A for examples of Stakeholders, then describe each of their economic Goals.	The main Stakeholders each have an economic stake in the development By identifying that stake you can use C2C to support their financial aims.
<b>EXAMPLES OF C2C-INSPIRED ADDED VALUE</b>	See Annex B Table 2. Also request the companion to this guide as referenced on page 7, or contact EPEA < <a href="http://www.epea.com">www.epea.com</a> > for other examples.	Added Value examples are an important way of showing Stakeholders the special contribution of C2C-Inspired Elements.
<b>ZONING INCENTIVES</b>	Incentives by local zoning authorities for beneficial features. e.g. does zoning allow replacing roofing & cladding with building-integrated PV?	Increase returns with beneficial features. E.g. Improve payback times on solar by replacing capital cost of facades & roof tiles with Building Integrated PV.
<b>INTEGRATE CAPITAL &amp; OPERATING COSTS.</b>	Is <i>Total Cost of Ownership financing</i> (TCO) possible? Identify if the Design-Build-Finance-Maintain-Operate framework (DBFMO) will be used?	Determine if TCO can be used to optimize operating & capital costs together, e.g. investing in C2C capital features that generate operational savings.
<b>OWNER OCCUPANCY</b>	Will owners be the occupants?	Identify if the owner has self-interest in a healthy building and wants to support that with TCO approaches.
<b>CAPITAL VALUE MODEL</b>	Do the owners plan to keep the building for a long time or sell it quickly?	(a) Recovering materials from demolishing can be a capital value proposition. (b) Integrate capital and operating costs.



**TABLE 1 - FINANCIAL INNOVATION POTENTIAL**

<b>FINANCIAL INNOVATION TOOLS</b>	<b>INFORMATION TO INVENTORY</b>	<b>VALUE-ADDED POTENTIAL</b>
<b>TYPE OF CAPITAL &amp; OPERATING COSTS FOR ENERGY PURCHASE AND GENERATION.</b>	Are energy Power Purchase Agreements (PPA) used in the region? If not, why not? Are third party PPAs used? Are cladding substitutions or residual value of materials included in payback calculations?	Determine if PPA can be used to save capital costs or generate revenues, and if third party PPA partners might be available.
<b>BUILDING LEASE STRUCTURE</b>	Who holds the lease on the building and for how long?	Determine who benefits from payback over what period.
<b>WHO PAYS UTILITY COSTS</b>	Do the occupants pay for energy and water?	Determine who benefits from water and energy recycling, savings & revenues.
<b>WATER INFRASTRUCTURE</b>	Which authority is responsible for drinking and wastewater infrastructure?	Determine who can gain from recycling water, e.g. local water agency, owner, occupants?
<b>DEMOLITION COSTING</b>	If an existing structure is scheduled for demolition has recovery of demolition costs been considered?	By defining and separating materials for trading and reuse some demolition costs can be recovered.
<b>INNOVATION FINANCE</b>	Are grant funds or subsidies available to let you focus on C2C-Inspired innovations? Check on funding for e.g. water & air quality innovation. In European legislation provisions allow no-bid tenders for pilot innovations. This can save money in tendering and encourage beneficial innovation.	Accelerate innovation while saving development costs.

## INVENTORY WHAT YOU ALREADY HAVE

Conventional inventories can be time-consuming and expensive. Especially Life Cycle Assessment inventories cost time and money. To solve that, here are C2C-Inspired tools to optimize your inventory process;

Inventories are used to show Stakeholders resources available to add value to their development. It is best to start your inventory after you know which stage of the building development you plan to start with.

*Example; if site services are already installed there is no point spending time and money inventorying materials for those.*

### Quick-Scan Site Features

If the site is known, identify if there a special challenge or positive feature where C2C value-added Goals might be developed from.

*Examples of Site-Specific Qualities;*

- For a renovation; existing feature e.g. atrium. Describe integrated water, air, nutrient and biodiversity benefits of the atrium so you know what it does now as a basis for optimizing.
- Innovative product manufactured in the building or area.
- Protected nature reserve on or near the site.

### Do Baseline Analysis. Identify What You Are Already Doing Right!

Identify what you are already doing that might be on the way to C2C. Analyse site qualities with C2C potential, especially existing structures and natural assets. Check traditional inventories to identify C2C value.

*Example; Check energy contracts, environmental impact statements, zoning submissions to regulatory authorities. e.g. Perhaps you already developed a power-purchase agreement for on-site renewable energy.*

*Example; The Ministry of Infrastructure and Environment in The Netherlands commissioned a baseline study to identify C2C-Inspired Elements for renovation of its headquarters in The Hague. The study found diverse Elements in the building already on the way to C2C. A sample table of contents showing main aspects of the study is available on request to the C2C Chair.*

### Inventory Systems You Might Want to Focus on for Integration

You can integrate building systems to generate added value by using a C2C-Inspired Element.

*Example; Atria can be used to integrate the benefits of HVAC, landscaping, and mechanical systems. See Annex E Table 4.*



Identify your preferred inventory tools

## THE MAIN COURSE; SETTING INTENTIONS & GOALS



### TIMEFRAME

Goal-setting can occur over a few days, weeks or months depending on complexity of the development and diversity of Stakeholders.

### WHO DOES IT

Project Developer or Operator working with Stakeholders. Support from an outside facilitator is advised.

### EXAMPLES OF TOOLS

Learn the Culture & Business of the Main Stakeholders

Imagineering

Quick Wins

Evaluate Measurability

Elements & Delights

Annex B Table 2 Examples Of Value Added C2C-Inspired Qualities For Stakeholders

Annex C Table 3 Examples Of Value-Added Intentions & Goals For Stakeholders

Annex E Table 4 Examples of C2C-Inspired Elements

## DO YOU KNOW WHERE ARE YOU GOING?

The purpose of setting intentions and Goals is so Stakeholders know where you are going and can join you. It is surprising how many building developments start without a clear description or common understanding by Stakeholders of Goals. It leads to big cost overruns later, so it is best to get it right from the start!

## DEFINITION OF INTENTIONS & GOALS

Diverse Stakeholders have diverse Intentions & Goals. They might call those “Mission” or “Vision” or “Ambition”. It is important to divide those into *Qualitative Intentions* and *Quantitative Goals*. This is important because Stakeholders often mix *qualitative and quantitative*.

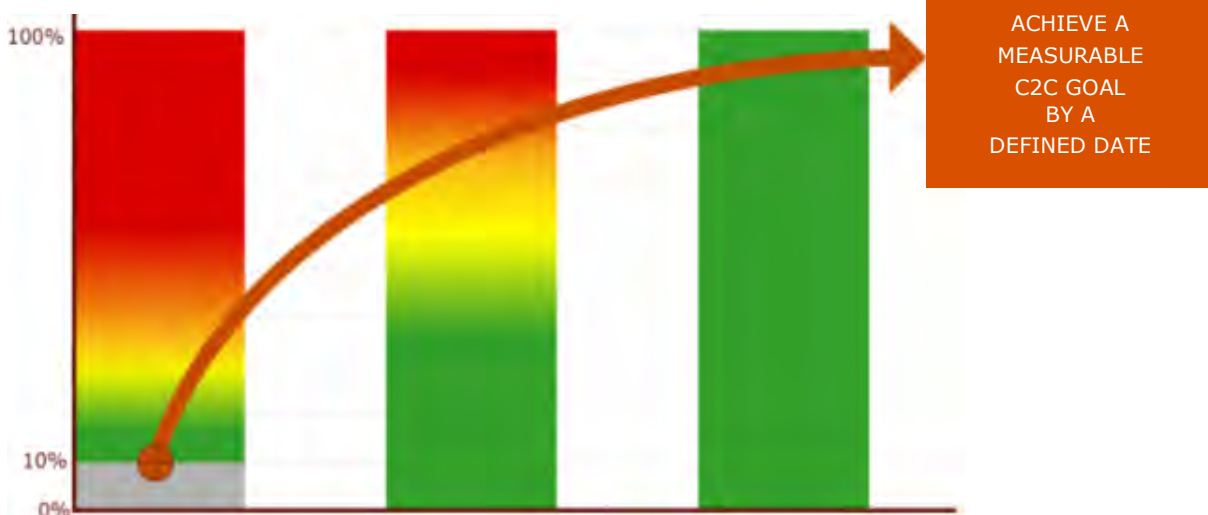
C2C Intentions and Goals are distinguished this way;

- ❖ **Intention.** *Quality Dimension.* The focus is quality rather than quantity. Intentions are also referred to as Aspirations or Ambitions but in practice they are the same. *Example of C2C-Inspired Intention or Aspiration; “Every Material Used in the Building will be Healthy for Occupants and the Environment”.*
- ❖ **Goal.** *Quantitative Target* to measurably achieve the quality dimension by a defined date. *Example of C2C-Inspired Goal; “Every material used to maintain the building is defined to 100ppm by year 3 of operation.”*

For other examples of Intentions & Goals see Annex C Table 3.

**INTENTIONS** DESCRIBE A QUALITY DIMENSION TO ACHIEVE. E.G. HEALTHY WATER.

**GOALS** MAKE THE QUALITY MEASURABLE. E.G. 85 % REUSE IN 5 YEARS.



## LEARN WHAT STAKEHOLDERS ACTUALLY WANT

***Facts are Facts but Perception is Reality!***

- Albert Einstein

Intentions & Goals can best be achieved if Stakeholders perceive they are formulating them as their own.

It is important to align C2C Intentions and Goals with Stakeholders' own perception so they work together positively.

Experience shows success come when Stakeholders voice their Intentions and Goals and adopt them instead of being told what the Goals are.

### Learn the Business and Organizational Culture of the Main Stakeholders

The culture of the organization plays an important role in defining Intentions and Goals then implementing them.

*Example of organizational culture questions to investigate;*

- Is the organization known as a frontrunner or as conservative?
- Is the organization proactive or reacting to outside pressure for changes e.g. new regulations or public pressure?
- Does the organization encourage input from outsiders or does it rely more on its own designers?
- Might part of the owner's business be tied to development or operation of the building to involve them directly, e.g. monitoring systems, construction materials, management systems?

### Convert stakeholder Goals into C2C value-added potential

Understanding Stakeholder Goals or lack of Goals is important so you can;

- Learn stakeholder expectations and perspective.
- See if Stakeholders already have Goals that can generate added value.
- Describe C2C added value connected to those Goals.

*Examples of converting stakeholder Goals into C2C value-added potential;*

- The owner might want to maximize returns by maximizing floor space, but there are other ways of maximizing value without occupying the whole site footprint. See Annex B Table 2.
- The employees' representatives might want good working conditions and can be introduced to benefits for the working environment of greenhouses and air-cleaning vegetation.
- The Corporate Social Responsibility department might want a transparent GRI-measurable process for involving Stakeholders and can be introduced to C2C-Inspired continuous improvement Roadmaps as a way of improving transparency.

### INTEGRATE THE INNOVATORS WITH ADOPTERS

In every group of Stakeholders there are usually two types of participants, Innovators and Adopters;

**Innovators** prefer taking risks with new approaches.

**Adopters** prefer "tell me what to do and I will make it work."

Innovators and adopters are each required to make C2C-inspired approaches successful. It is important to give them each tools for their particular skills. For example;

- Innovators might want a menu of inspirational ideas while adopters want a systematic formula for doing the work.
- Innovators might want to take inspiration from C2C Elements & Delights described in the *Registry of C2C-Inspired Elements in Building Developments*.
- Adopters in the finance department might want a list of defined "hard" values to calculate C2C benefits. For this you can refer them to hard values described in Annex B Table 2.

## INTEGRATE TRADITION, EVOLUTION AND REVOLUTION

Buildings often have problems due to conflicting aims of different Stakeholders; especially conflicts between innovators and adopters.

To solve this you can channel the personal skills and aspirations of innovators and adopters into distinct areas of the building where they can innovate or be more traditional.

To do that it is important to learn aspiration levels of each Stakeholder so you know which Stakeholders are committed to which parts of the project. For example, you can identify which level Stakeholders want:

### **Tradition**

Optimize traditional “less bad” sustainability but also learn more about what might be beneficial in your buildings.

### **Evolution**

Use an incrementally beneficial approach.

### **Revolution**

Use innovative beneficial approaches to be a frontrunner.

## TRADITION, EVOLUTION AND REVOLUTION CAN CO-EXIST

Stakeholders might want to be traditional in some areas and revolutionary in others. Local technologies or regulations might dictate how aggressive they can be in some areas. You can identify those areas and prioritise them.

*For example*, the builder might want to be conservative with structural concrete, but the occupants want to be frontrunners with innovative lighting systems and leasing that can save operating costs. Perhaps a local company is offering leasing systems that make it easier to implement leasing concepts.

Be sure you understand the reasoning by Stakeholders for their differing innovation levels.

After that you can develop a table showing innovation intentions for diverse parts of your development. The table is an important tool for managing expectations, describing your intentions to municipal officials, and for marketing your development. An example of the table is included in the companion publication referenced on page 7.

## UPGRADE FROM MINIMIZING DAMAGE TO MAXIMISING BENEFITS

Stakeholders working with traditional sustainability can easily confuse being less bad with being good. One of the greatest challenges of implementing C2C is to show Stakeholders the difference.

### **BEING BENEFICIAL**

Stakeholders often have functional aims, e.g. providing space for a given number of occupants. Those can be used as platforms to introduce beneficial Intentions like improving the air and materials quality in workspaces. Annex C Table 3 describes actively beneficial Intentions & Goals.

### **MINIMIZING IMPACTS**

Stakeholders often have traditional sustainability aims, e.g. reduce CO<sub>2</sub>. Sustainability often focuses on minimizing impacts instead of being actively beneficial.

### **THE CONNECTION**

Sometimes minimization can be translated into beneficial, e.g. instead of minimizing CO<sub>2</sub> you can maximize CO<sub>2</sub> captured and reused by plants. To distinguish between minimizing and being beneficial be familiar with technical aspects such as “breakthrough efficiency” which can be used to translate negatively stated Goals into beneficial Goals. See Annex D Glossary.



### **WHICH DO YOU PREFER; BIG HEALTHY FOOTPRINT OR SMALLER LESS-DESTRUCTIVE ONE?**

The smallest footprint is a building that doesn't exist! Traditional sustainability tries to reduce the footprint of a building, but buildings don't have small footprints. Instead, C2C-Inspiration aims for a big beneficial footprint. Right: Xeroflor air-and-water-cleaning moss rooftops in Japan. Left: Ford Motors factory. The integrated moss was developed from 20 years of research by Wolfgang Behrens' team. Images Xeroflor.



## EXPLORE C2C-INSPIRED INTENTIONS & GOALS WITH STAKEHOLDERS

### ADD VALUE BY CLARIFYING GOALS

Aligning Stakeholders Intentions & Goals with C2C Goals can be a challenge. However, if done effectively it adds value by getting everybody moving in the same direction.

There are different types of Goals so it is important to spend time identifying those. Examples;

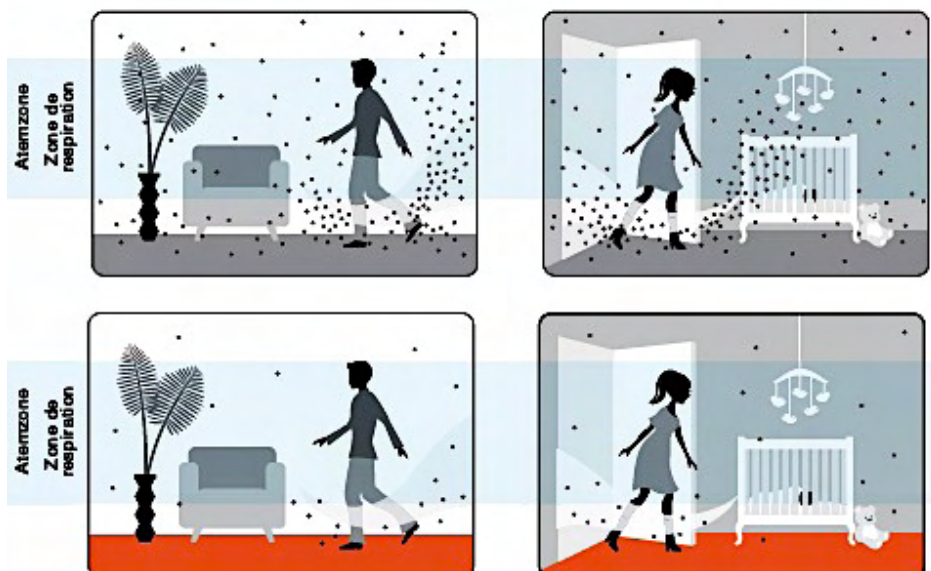
**Intentions & Goals Which Stakeholders Already Have**

**C2C-Inspired Goals Specific to Your Building Site**

**C2C-inspired Goals used at other building developments**

#### Imagineering

Conduct an “Imagineering” session where Stakeholders formulate their own beneficial Goals based on their own technical and economic strengths. The main purpose is to use Stakeholders imaginations to identify new opportunities. You might want support from a C2C-trained facilitator.



#### WHO WOULD IMAGINE ?

Carpets that clean the air!

Desso imagineered a new type of carpet that removes harmful particulates. The Airmaster is Desso’s best-selling product.

Image Desso.



**IS YOUR OFFICE OR FACTORY SUITABLE FOR YOUR CHILDREN TO PLAY IN?**

The question was asked at the Ford Motor factory, Ecopark Windhof and other C2C-inspired developments. In the end the answer was yes. Elements like greenhouse day-care centres for children can lead to new value-added perspectives for Stakeholders.

**Describe Quick Wins**

Quick wins are important application tools to demonstrate the value of C2C. Where can you generate immediate results to demonstrate added value of the C2C-Inspired approach? *For example, light leasing systems, C2C-workwear & design for quick assembly can generate instant benefits.*

**Is it Measurable?**

Check if the Goals are measurable in economic, technical or productivity terms. Do they have a defined delivery date? Are there measurable Milestones along the way to get to the goal? *Example; The floor covering company Desso has a ten-year Roadmap describing measurable Goals and milestones.* See next section of this Guide for an example, and contact Desso for the latest copy of their Roadmap [www.Desso.com](http://www.Desso.com).

**Consider Examples of Value-Added C2C-Inspired Intentions & Goals**

After Stakeholders draft their Goals, consider existing examples of C2C-Inspired features to complement those. *See Annex C Table 3; Examples Of Value-Added Intentions & Goals For Stakeholders.*

**Re-Evaluate Innovation Level**

Reality check with Stakeholders if they are comfortable with their innovation level for each part of the building development before finalizing Goals.

After Stakeholders see the added value from this process are they ready to raise their innovation level or apply it to other parts of the building? Or is the level too ambitious and do they want to lower it?

An important step for matching Goals with Stakeholder perceptions!

**Identify tools for setting Goals.**

### USE C2C-INSPIRED ELEMENTS TO INTEGRATE GOALS

C2C-Inspired Elements integrate diverse goals and features to achieve holistic quality. In this way it is not necessary for your whole development to be C2C. Instead you can focus on a few Elements that integrate your Goals to maximise their effectiveness.

Consider how to integrate Goals by selecting five Cradle to Cradle-Inspired Elements and five symbolic Delights. Those Elements and Delights will be finalized after Stakeholders consolidate their Goals.

Consider how your Elements & Delights tell a compelling story. For marketing and education Elements & Delights can tell a story about being beneficial, and be used to get support from regulatory authorities, investors and other Stakeholders.

### EXAMPLES OF ELEMENTS

Elements go beyond the traditional sustainability categories of water, air, and energy. They provide iconic examples which integrate healthy water, healthy air, and diversity.

See *Annex E Table 4* for an example of how an Element integrates C2C-Inspired Intentions and Goals. For further examples see photo this page as well as the *Registry of C2C-Inspired Elements in Building Developments*.



#### EXAMPLE OF ELEMENT

Atria like this one in The Hague, Netherlands integrate diverse C2C-inspired value-added features, e.g. enjoyment, natural light, biodiversity, energy savings. Atria can also actively demonstrate how your building is meeting diverse goals such as recycling 100% of grey water, and providing natural light to every occupant's workspace. Atria offer many possibilities for continuous improvement over the years to add value e.g. by improving the species of plants which clean the air and water.

Photo Douglas Mulhall.



Identify preferred Elements & Delights

## ADD VALUE BY INTEGRATING STAKEHOLDER GOALS WITH C2C-INSPIRED GOALS

### TIMEFRAME

Prior to drafting tenders at the construction, operations or renovations stage.

### WHO DOES IT

Principal Stakeholders together. Outside facilitator.

### EXAMPLES OF TOOLS

Goals Integration Process

Draft Roadmap Framework

The Healthy Abundance Reality Check

External Reality Check

Annex B Table 2 Examples Of Added Value For Stakeholders

Annex C Table 3 Examples Of Value-Added Intentions & Goals For Stakeholders

## GOALS INTEGRATION

In this stage, Stakeholder Goals are integrated with C2C-Inspired Goals then Stakeholders take ownership of them. It is preferable to do this stage in a focused workshop with a qualified facilitator;

### Review Stakeholders Goals

Be clear what Stakeholders want, then start to adapt C2C Goals to those priorities. It is one of the most challenging stages because sometimes what Stakeholders want seems different from C2C approaches. However, usually it is possible to put the two together.

### Describe Potential C2C Goals And Set A Timeline

Using information from Goal-setting sections of this guide, develop with Stakeholders potential C2C Goals by integrating their own Goals with generic C2C Goals and site-specific Goals. For *examples use Annexes B & C as guidelines.*

## □ Use C2C-Inspired Elements to Integrate Goals

Check C2C-Inspired Elements & Delights developed earlier. Describe;

- How each Element & Delight integrates Stakeholder Goals.
- How each Element & Delight generates financial and other added value.
- How Elements & Delights can be used for marketing to show how Goals translate into reality.

*After you complete the process, use those descriptions to begin developing a marketing plan highlighting the added value associated with Stakeholder Goals and Elements & Delights.*

### DRAFT ROADMAP OUTLINE

After Goals are drafted and Elements selected, organize them in a *Roadmap*. The Roadmap outline is described on pp. 13-17 of *Cradle to Cradle Criteria for the Built Environment*. A Roadmap process is also available from EPEA.

The draft Roadmap gives Stakeholders a guide for how their Intentions and Goals will develop. It shows which types of C2C-Inspired Innovation are Tradition, Evolution and Revolution.

To draft the Roadmap outline you can organise your Goals according to the following timeframes;

*Planning until tendering*

*Tendering until construction completion*

*Operations & Maintenance*

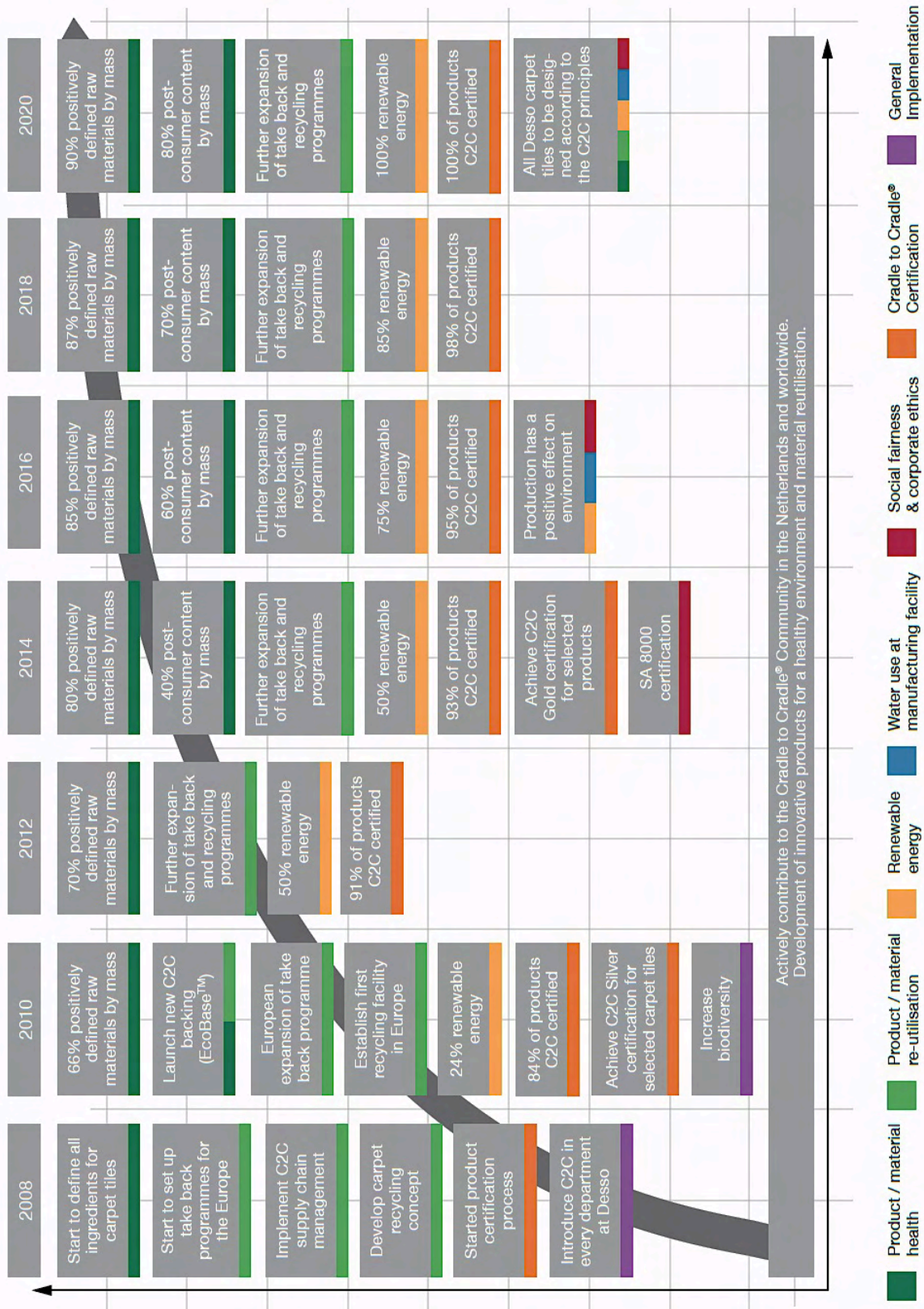
*Planned renovations*

*Decommissioning and Deconstruction*

The timeframes show Stakeholders when they receive added value from each Goal, and when the work is expected to occur.

Some Goals cut across timeframes. For example, if you want your building to be a materials bank, this will cut across site planning, construction, operations, maintenance and decommissioning.

It is not necessary to have a Goal for every timeframe. For example, if you start the process after the planning or construction stage you will want to focus less on structural aspects and more on operations and maintenance. The final Roadmap is drafted at the end of Planning and Goal-setting.



**ROADMAPS CAN TAKE MANY FORMS**

Example of Desso overall company roadmap for its floor covering products used in buildings ships and aircraft. Categories shown here differ from building roadmaps but the process is the same. Desso reached its 2008-2012 Goals a few years ahead of time. For more examples of roadmaps see *Cradle to Cradle Criteria for the Built Environment*. Image Desso.

## REALITY CHECK

### IS IT ON THE WAY TO HEALTHY ABUNDANCE?

In a marketplace where everybody claims to be sustainable it is important to be able to distinguish your development from the rest of the pack.

To validate whether your Intentions and Goals are just sustainable or on the way to healthy abundance, ask which of these questions seems to match your Goals;

#### TRADITIONAL SUSTAINABILITY QUESTION

How much did it cost to minimize the building footprint?

#### C2C-INSPIRED QUESTION

How much value was generated for Stakeholders by improving holistic quality with a healthy footprint?

You can highlight C2C-Inspired aspects which go beyond traditional sustainability by distinguishing between Goals that minimize impacts and Goals that generate added value through quality and healthy abundance.

#### External Reality Check

Communicate Goals to government agencies, suppliers and contractors to get feedback on how realistic they are, who might support which Goals, and who might present barriers to achieving them.

#### Financial Reality Check

Go back to the *Financial Innovation* section to see how the financial tools identified in that process support or limit Stakeholder Goals. Especially refer to Table 1 and Annex B Table 2 to re-check if you took advantage of the available tools and added value propositions.

## IS IT ENJOYABLE OR BEAUTIFUL?

In the construction business enjoyment and beauty are often left out, but they are an important part of C2C-inspiration, and an important part of marketing your development to Stakeholders. Check if any of your Goals refer to stakeholder enjoyment and aesthetic improvement.

### After Reality Check Finalize Stakeholders Agreement On Goals

Communicate feedback from external agencies to Stakeholders and consider if the Goals have to be revised.

After that, finalize the timeline for achieving each Goal. *See Annex C Table 3 for examples of timelines.*

### Complete the Roadmap

The Roadmap was drafted earlier. After Goals and Timeline are finalized you can use those to complete the Roadmap with Milestones toward those Goals. Further information on Roadmaps & Milestones is available in the *Cradle to Cradle® Criteria for the Built Environment* and from EPEA.

### Display the Roadmap in a Prominent Place

The Roadmap is the multi-year Guide for Stakeholders. Be sure it is prominently displayed where everybody can see it and make comments about it; on a website, in your project room, or in the lobby of your existing building. Communicate it!



Use your  
Roadmap  
for multi-  
year  
guidance



## DESSERT! CELEBRATE ACHIEVEMENTS WITH MARKETING



### DISTINGUISH YOURSELF IN THE MARKETPLACE

Throughout this process you collected examples of how Stakeholder Goals, Elements and Delights add value to your development.

The next step is to craft those into a marketing plan to distinguish your development in the marketplace, and show your Stakeholders the added value they generated with the C2C-Inspired process.

- The C2C-Inspired *Roadmap* with Goals and Milestones is an important tool for this. It becomes your guidance for continuous improvements which will make your development more attractive. Publish the Roadmap and use it as a marketing and management tool for Stakeholders throughout the building cycle.
- Celebrate your C2C-Inspired Elements and Delights by featuring them in your marketing.
- Ask agreement from Stakeholders to promote their Intentions in the marketplace to support innovation by sending the Roadmap to *The Registry for Cradle to Cradle-Inspired Elements in Building Developments*.
- After the building is completed apply to the *Registry of C2C-Inspired Elements in Building Developments* for an award!

## ANNEXES

### ANNEX A: EXAMPLES OF STAKEHOLDERS

#### GUIDANCE

The purpose is to identify and prioritise Stakeholders according to their roles, then use this to describe each of their Goals, or describe if they do not yet have Goals.

One stakeholder might play diverse roles and have diverse Goals, e.g. owner might also be occupier.

#### ECONOMIC STAKEHOLDERS

1. Investors
  - 1.1. Developer
  - 1.2. Landowners
  
2. Builders, Users, Operators
  - 2.1. Builder incl. Project Manager & Subcontractors
  - 2.2. Suppliers for Builders & Operations
  - 2.3. Service Providers, e.g. water agencies, energy providers, telecom
  - 2.4. Occupants, Users & Tenant association
  - 2.5. Customers who use the development but do not occupy it, e.g. store and restaurant customers, parents of students.
  - 2.6. Lease holder. If a third party, might be different from occupant.
  - 2.7. Property manager
  - 2.8. Technical maintenance manager
  
3. Government Planning & Regulatory Agencies
  - 3.1. National, Provincial/State, Regional Authorities who give approvals
    - 3.1.1. National & Provincial development authorities
    - 3.1.2. County development & zoning authorities
    - 3.1.3. National & Regional Environment & Safety



Identify your  
priority  
Stakeholders

### 3.2. Municipal Authorities

#### 3.2.1. City Council

#### 3.2.2. School Boards

#### 3.2.3. Municipal Architect & Planning Dept.

4. Taxpayers. Also ratepayers associations, property owners associations.

5. Non-Governmental & R&D Organizations with an economic stake

#### 5.1. Chamber of Commerce / Entrepreneur Association

#### 5.2. Research funding organizations

## **OTHER STAKEHOLDERS**

1. Neighbours & Neighbourhood associations. Might also be economic Stakeholders if property value is affected.

2. Environmental & Public Interest organizations

3. Media & Marketing

3.1. Local business media

3.2. PR departments of participating builders & suppliers

3.3. Municipal marketing team

ANNEX B TABLE 2		
EXAMPLES OF C2C-INSPIRED ADDED VALUE FOR STAKEHOLDERS*		
ADDED VALUE CATEGORY	ADDED VALUE EXAMPLE  Hard Value = Value that can be calculated using standard accounting methods. Soft Value = Requires subjective estimation of value to Stakeholders.	STAKEHOLDERS WHO BENEFIT
REVENUE	<p><b>Hard Value</b></p> <ul style="list-style-type: none"> <li>• <b>Selling C2C-defined renewable energy</b> into the grid or to other buildings</li> <li>• <b>Revenues from diverse spacial use</b> during different parts of the day, e.g. using foyers as event spaces after work hours.</li> <li>• <b>Carbon credits</b> from reusing CO<sub>2</sub> as a resource.</li> <li>• <b>Urban farming revenues</b> from leasing rooftop, walls, or atrium space &amp; growing food for building occupants or restaurants/cafeterias.</li> </ul>	<p><b>Owner</b></p> <p><b>Leaseholder</b></p> <p><b>Occupants</b></p>
CAPITAL VALUE	<p><b>Hard Value.</b></p> <ul style="list-style-type: none"> <li>• <b>Materials banking</b> to generate residual value instead of demolition costs throughout the building cycle.</li> <li>• <b>Innovative functional landscaping</b> can improve the capital value of a building.</li> </ul> <p><b>Soft Value</b></p> <ul style="list-style-type: none"> <li>• <b>Perceived value.</b> Capital value of the development increases due to perception that C2C-Inspired improvements make the building a desirable place to work or live.</li> <li>• <b>Lease value.</b> For tenants the added perceived value might improve the value of the lease if the tenants are considering sub-leasing.</li> <li>• <b>Municipality improves its own attractiveness</b> through high-value properties. Also helps municipality avoid derelict properties that harm taxes and attractiveness of the area.</li> </ul>	<p><b>Developer</b></p> <p><b>Owner</b></p> <p><b>Investors</b></p> <p><b>Leaseholder</b></p> <p><b>Municipality</b></p>

ANNEX B TABLE 2		
EXAMPLES OF C2C-INSPIRED ADDED VALUE FOR STAKEHOLDERS*		
ADDED VALUE CATEGORY	ADDED VALUE EXAMPLE	STAKEHOLDERS WHO BENEFIT
	<p><b>Hard Value</b> = Value that can be calculated using standard accounting methods.  <b>Soft Value</b> = Requires subjective estimation of value to Stakeholders.</p>	
<b>FINANCIAL &amp; SUPPLY CHAIN SECURITY</b>	<p><b>Hard Value.</b></p> <ul style="list-style-type: none"> <li>• <b>Reliable energy &amp; water costs</b> into the future. Energy and water costs are increasing in real and inflationary terms. Energy autonomy can be used to reliably calculate energy costs and revenues for the building into the future.</li> <li>• <b>Decoupling from materials price &amp; supply volatility</b> by being able to recover materials from buildings (For more information ref. Towards The Circular Economy 2 Report p. 84, Ellen MacArthur Foundation &amp; McKinsey 2013).</li> </ul> <p><b>Soft Value</b></p> <ul style="list-style-type: none"> <li>• <b>Energy security</b> from self-generated power.</li> <li>• <b>Water security</b> from capturing &amp; recycling water</li> </ul>	<p><b>Owner</b> <b>Leaseholder</b></p>
<b>CAPITAL AND CASH FLOW SAVINGS</b>	<p><b>Hard Value</b></p> <ul style="list-style-type: none"> <li>• <b>Improving value of available space per m<sup>2</sup></b> by including productive functions in under-utilized areas, e.g. rooftop greenhouses &amp; green walls.</li> <li>• <b>Increase investment available per m<sup>2</sup></b> through diverse use of the same space, which reduces floor space required, allowing more investment into a smaller physical footprint.</li> <li>• <b>Improve capital value from high credit-rated tenants.</b> Capital value is often determined by the quality of tenants' credit rating instead of how much rent they pay. A healthy building can attract more reliable tenants.</li> <li>• <b>Service and leasing concepts</b> to save capital costs or cash flow on systems &amp; equipment, e.g. leasing energy generating systems &amp; lighting systems.</li> <li>• <b>Improve energy investment payback times</b> with building integrated elements, e.g. BIPV.</li> </ul>	<p><b>Developer</b> <b>Owner</b> <b>Supplier</b> <b>Water Agencies</b> <b>Municipality</b></p>

ANNEX B TABLE 2

**EXAMPLES OF C2C-INSPIRED ADDED VALUE FOR STAKEHOLDERS\***

<b>ADDED VALUE CATEGORY</b>	<b>ADDED VALUE EXAMPLE</b>  Hard Value = Value that can be calculated using standard accounting methods. Soft Value = Requires subjective estimation of value to Stakeholders.	<b>STAKEHOLDERS WHO BENEFIT</b>
<b>CAPITAL AND CASH FLOW SAVINGS</b>	<ul style="list-style-type: none"> <li>• <b>Water cost savings</b> from capturing &amp; recycling water. Also reduces stress on municipal water systems and reduces requirements to build new infrastructure to service new buildings. An important consideration for municipal authorities when negotiating zoning for the building.</li> <li>• <b>Renovation &amp; next phase savings</b> with disassembly &amp; reassembly. (a) Recover materials as assets instead of demolition liabilities (b) Improve redemption value of land. (c) Make later renovations or additions less expensive.</li> <li>• <b>Collective purchasing savings</b> e.g. of C2C energy in deregulated markets, C2C paper with customers acting as suppliers of feedstock.</li> <li>• <b>Insurance savings</b> by defining safe materials &amp; improving security. e.g. tenants in an area development can pool resources to improve security. Insurers sometimes offer premium reductions for these features.</li> <li>• <b>Landscape maintenance savings</b> by reusing nutrients from e.g. wastewater recycling for fertilizer.</li> </ul> <p><b>Soft Value</b></p> <ul style="list-style-type: none"> <li>• <b>Use resource pooling savings &amp; productivity to improve marketing &amp; productivity</b>, e.g. clean-air pre-school at a business site, allowing parents to save time and money</li> </ul>	
<b>PRODUCTIVITY IMPROVEMENTS</b>	<ul style="list-style-type: none"> <li>• <b>Hard value. Improve spacial productivity</b> of rooftop and walls, as well as diverse after-hours uses.</li> <li>• <b>Soft value. Improve occupant productivity</b> via healthy air &amp; comfort. This feature is relatively new in the marketplace, but supported by studies on the negative impacts of sick building syndrome as well as studies on the positive impacts of healthy buildings on occupant performance, satisfaction and absentee rates.</li> </ul>	<b>Developer</b> <b>Owner</b> <b>Leaseholder</b> <b>Occupants</b> <b>Municipality</b>

ANNEX B TABLE 2		
EXAMPLES OF C2C-INSPIRED ADDED VALUE FOR STAKEHOLDERS*		
ADDED VALUE CATEGORY	ADDED VALUE EXAMPLE	STAKEHOLDERS WHO BENEFIT
	<p><b>Hard Value</b> = Value that can be calculated using standard accounting methods.  <b>Soft Value</b> = Requires subjective estimation of value to Stakeholders.</p>	
<b>RISK MANAGEMENT BENEFITS</b>	<p><b>Hard Value</b></p> <ul style="list-style-type: none"> <li>Adaptability to varying future heating and cooling requirements to allow variable uses of the building by designing modular heating and cooling instead of fixed systems. Buildings are often too hot or cold when their uses change and the number of occupants or heat-generating equipment are outside design specifications.</li> </ul> <p><b>Soft Value</b></p> <ul style="list-style-type: none"> <li><b>Improve risk management with trusted materials.</b> Regulations alone will not protect you from liability. C2C can provide added security, e.g. lead in valves of California building met specification but poisoned the water.</li> <li><b>Reliably forecast energy and water costs into the future.</b></li> <li><b>Security of energy &amp; water supply.</b></li> </ul>	<p><b>Owner</b>  <b>Architect</b>  <b>Builder</b>  <b>Lease holder</b>  <b>Occupants</b></p>
<b>KNOW-HOW &amp; INTELLECTUAL PROPERTY</b>	<ul style="list-style-type: none"> <li><b>Hard/Soft Value. License new innovations,</b> e.g. work with universities and private managers to develop new ways of measuring air quality. These methods might be licensable.</li> </ul>	<p><b>Owner</b>  <b>Builder</b></p>
<b>SUPPLEMENTARY FINANCING</b>	<ul style="list-style-type: none"> <li><b>Hard Value. Subsidies &amp; grant funding for innovation.</b> R&amp;D funding agencies are ready to finance innovations for improving air, water &amp; other qualities in buildings.</li> </ul>	<p><b>Architect</b>  <b>Owner</b>  <b>Builder</b></p>

ANNEX B TABLE 2		
EXAMPLES OF C2C-INSPIRED ADDED VALUE FOR STAKEHOLDERS*		
ADDED VALUE CATEGORY	ADDED VALUE EXAMPLE	STAKEHOLDERS WHO BENEFIT
	<p><b>Hard Value</b> = Value that can be calculated using standard accounting methods.  <b>Soft Value</b> = Requires subjective estimation of value to Stakeholders.</p>	
MARKETING	<ul style="list-style-type: none"> <li>• <b>Hard Value. Attracting high quality tenants</b> with high bond rating improves the value and credit worthiness of the building.</li> <li>• <b>Soft Value.</b></li> <li>• <b>Positive image</b> from improved perception by various Stakeholders.</li> <li>• <b>Frontrunner image.</b> Suppliers and contractors who meet the requirements can use the know-how to position themselves as frontrunners in a competitive marketplace.</li> </ul>	<p><b>Owner</b>  <b>Municipality</b>  <b>Contractors</b></p>
IMPROVING OCCUPANT BUSINESS	<p><b>Soft Value.</b></p> <ul style="list-style-type: none"> <li>• <b>Occupants add value to their own business</b> by learning about C2C benefits for their own business or participating in C2C aspects of the building design, construction or operations, e.g. instrumentation company provides sensing systems to improve building performance. e.g. Furniture company adapts modular building design principles to its products. This added value can also support the developer to market the building to occupants. Normally, this is not included in a conventional value approach to building developments, but in the case of C2C it can be an important financial consideration, also for marketing and competitiveness.</li> </ul>	<p><b>Developer</b>  <b>Occupant</b></p>

**\*For an example of how a C2C-Inspired Element integrates various added values please refer to Annex E Table 4.**



**ANNEX C TABLE 3**

**EXAMPLES OF C2C-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS**

**GUIDANCE.** Intentions and Goals described here are only examples. You are encouraged to develop your own ! For some of the stakeholders the goals are left blank so you can identify goals which match the needs of your stakeholders.

Blue row describes C2C Principles and the C2C-Inspired intentions they relate to in the table. Every principle applies in some way to every area, so this is just a general guide.

Multi-coloured columns describe examples of C2C-Inspired Intentions/Ambitions based on quality and healthy abundance.

Yellow highlighted headings represent measurable Goals for applying C2C Intentions and creating added value for Stakeholders. Also describes examples of which Stakeholders might share a goal.

Grey column on the left describes main Stakeholders who participate in and benefit from each measurable goal.

ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS								
<b>C2C PRINCIPLES</b> →→→	-----Waste=Food. Everything is a Resource for Something Else ----- -----Biodiversity, Conceptual Diversity, Cultural Diversity----- -----Current Solar Income-----							
<b>C2C QUALITY DIMENSION</b> (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/ Ambition For Quality ?
<b>STAKEHOLDER</b> ↓↓↓								

**ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS**

ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS								
C2C PRINCIPLES →→→	-----Waste=Food. Everything is a Resource for Something Else----- -----Biodiversity, Conceptual Diversity, Cultural Diversity----- -----Current Solar Income-----							
C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/Ambition For Quality ?
STAKEHOLDER ↓↓↓								
OWNER	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> Capture and reuse 90% of CO<sub>2</sub> &amp; NO<sub>x</sub> emissions from the building by year 3 of operations.</p> <p><b>ECONOMIC GOALS</b> Integrate CO<sub>2</sub> recovery with water &amp; nutrient recycling to profitably grow 5</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> Capture, reuse then purify for discharge into ecosystems 70% of rainwater falling on the site by end of year 1 operations, progressing to 90% by year 3.</p> <p><b>ECONOMIC GOALS</b> Estimate savings</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> 35% of high value systems e.g. HVAC, elevators, electronics designed for quick maintenance, removal and disassembly, by end of planning stage. By end of year 5 of operations 100 percent of</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> Declare 25% of exterior areas and 10% of interior as biodiversity zones by year 1 operations, e.g. fish habitat, roof bee habitat, landscaping soil manufacturing zone.</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> <i>Cultural diversity.</i> Integrate water recycling as art in 5 areas. e.g. water walls, fountains etc. year 1 operations  <i>Quality of Life &amp; Multi-functionality.</i> Clean-air kindergarten for children of</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> Provide renewably powered charging and reverse charging stations for 75 electric vehicles at preferred parking locations. Year 1 operations.</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL GOALS</b> Integrate modular energy systems to achieve energy-positive status in first five years of operations, e.g. activated concrete, energy storage, BIPV, heat chimneys, ground heat exchange, daylight, photovoltaic</p>	<p><b>MEASURABLE GOALS</b></p> <p><b>TECHNICAL / ECONOMIC GOALS</b> Describe here</p>

**ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS**

<p>-----Waste=Food. Everything is a Resource for Something Else-----                      -----Biodiversity, Conceptual Diversity, Cultural Diversity-----                      -----Current Solar Income-----</p>								
C2C PRINCIPLES →→→								
C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/ Ambition For Quality ?
STAKEHOLDER ↓↓↓								
<b>OWNER</b>	tonnes of vegetables by end of year 1 of operations. Determine if carbon credits can be claimed from this.  <b>ADDED VALUE TO STAKEHOLDER</b>  Use unused space.  Carbon credits.  Revenues or savings from	on water fees & processing costs prior to finalizing building plans.  Estimate savings on water for urban agriculture & landscaping.  <b>ADDED VALUE TO STAKEHOLDER</b>  Water security for water fees, processing costs, water for urban agriculture & landscaping.	replacement parts will meet those criteria.  <b>ECONOMIC GOALS</b>  Generate savings on maintenance & renovations through easier replacement of equipment & parts.  <b>ADDED VALUE TO STAKEHOLDER</b>  Savings on waste	<b>ECONOMIC GOALS</b>  Profitable agriculture products for restaurants or occupants.  Produce 50 kg honey annually from bee-keeping business.  <b>AESTHETIC</b>  Establish five beehives for kids to learn about pollination.	workers in the area. Year 1 operations.  <b>ECONOMIC GOALS</b>  Revenues from integrated use.  Enhance lease value with added services for occupants  <b>FUN !</b>  Include a waterpark for educational fun	<b>ECONOMIC GOALS</b>  Business model from charging electric vehicles.  <b>SOCIAL</b>  Kindergarten on site saves parents traveling to pick up their kids.  <b>ADDED VALUE TO STAKEHOLDER</b>  Charging	windows, stationary wind turbines, kinetic energy.  <b>ECONOMIC GOALS</b>  Integrate financial instruments to make renewable energy cost-competitive over the use period of the building.  <b>ADDED VALUE TO STAKEHOLDER</b>	

**ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS**

<p>-----Waste=Food. Everything is a Resource for Something Else-----                      -----Biodiversity, Conceptual Diversity, Cultural Diversity-----                      -----Current Solar Income-----</p>								
C2C PRINCIPLES →→→								
C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/ Ambition For Quality ?
STAKEHOLDER ↓↓↓								
OWNER	crops. PR value. <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupant	<b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Water Agencies Occupant	management costs during maintenance & renovations. Improve end-value of materials & structures. <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupant Suppliers	<b>ADDED VALUE TO STAKEHOLDER</b> Added productivity from unused spaces e.g. rooftops. Marketing claim. <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupant Environmental Agencies	for children <b>ADDED VALUE TO STAKEHOLDER</b> Added revenues from same space. <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupant Investors	stations; Added revenues Kindergarten; Improved productivity. Positive image for marketing. <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupants Investors	Energy costs security. Energy supply security <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b> Occupants Investors	

**ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS**

ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS								
C2C PRINCIPLES →→→	-----Waste=Food. Everything is a Resource for Something Else----- -----Biodiversity, Conceptual Diversity, Cultural Diversity----- -----Current Solar Income-----							
C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/ Ambition For Quality ?
STAKEHOLDER ↓↓↓								
OCCUPANT	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p>Integrate interior &amp; exterior systems, vegetation, HVAC, products to support healthy air quality.</p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Determine if air quality &amp; comfort improve</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	<p><b>TECHNICAL / ECONOMIC GOALS</b></p> <p><b>ADDED VALUE TO STAKEHOLDER</b></p> <p>Describe here.</p> <p><b>OTHER STAKEHOLDERS WHO SHARE GOAL</b></p> <p>Describe here.</p>	

ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS								
C2C PRINCIPLES →→→	<p>-----Waste=Food. Everything is a Resource for Something Else-----</p> <p>-----Biodiversity, Conceptual Diversity, Cultural Diversity-----</p> <p>-----Current Solar Income-----</p>							
C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/Ambition For Quality ?
STAKEHOLDER ↓↓↓								
OCCUPANT	productivity compared to competing buildings in the area or region.  <b>OTHER STAKEHOLDERS WHO SHARE GOAL</b>  Owner Municipality							
INVESTOR	Add goals here.							

ANNEX C TABLE 3 EXAMPLES OF CRADLE TO CRADLE-INSPIRED VALUE-ADDED INTENTIONS & GOALS FOR STAKEHOLDERS									
C2C PRINCIPLES →→→	-----Waste=Food. Everything is a Resource for Something Else----- -----Biodiversity, Conceptual Diversity, Cultural Diversity----- -----Current Solar Income-----								
	C2C QUALITY DIMENSION (also known as intention or ambition) →→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Healthy Quality of Life, & Multi-functionality	Mobility Enhancement	Renewable Energy-Positive	Other Intention/Ambition For Quality ?
STAKEHOLDER ↓↓↓									
MUNICIPALITY	Add goals here.								
To add other stakeholders see Annex A examples of Stakeholders	Add goals here.								

## ANNEX D: GLOSSARY OF TERMS

A quick web search will generate various glossaries of Cradle to Cradle® terms. The glossary here contains only limited descriptions of important terms for C2C-inspired aspects of building developments.

**Breakthrough Efficiency.** Technical improvements that improve energy or materials use in relation to use of renewables. *For example, improving lighting efficiency so the building can power 100 per cent of its lighting, compared to only reducing the amount of fossil fuels used for lighting.*

**C2C-Inspired Element.** Distinct feature which generates added value in a building development based on defined C2C Principles and Goals. The main aim of an Element is to integrate multiple C2C-Inspired Goals to maximize effectiveness. From a marketing perspective Elements can tell a story about being beneficial. For examples please refer to the *Registry of Cradle to Cradle®-Inspired Elements for Building Developments*.

**C2C-Inspired Goal.** Defined quantifiable aim with a date for achievement. See Annex C Table 3 for examples.

**C2C-Inspired Intention.** A statement describing qualitative direction. See *C2C Quality Intention/Aspiration* examples in Annex C Table 3.



**ANNEX E TABLE 4**

**EXAMPLE OF CRADLE TO CRADLE-INSPIRED ELEMENT**

**GUIDANCE**

Atria integrate diverse value-added features e.g. enjoyment, natural light, biodiversity, energy savings. Atria also offer many possibilities for continuous improvement to add value for Stakeholders. For more information on hard and soft value please refer to Annex B Table 2. The Element, Intentions and Goals described here are only examples. You are encouraged to develop your own!

White row describes C2C Principles. The three principles are positioned above multi-coloured C2C-Inspired Intentions they relate to most closely.

Multi-coloured columns e.g. Healthy Air & Climate describe examples of C2C Quality Dimension, also known as an Intention or Aspiration.

Yellow green & blue highlighted headings represent measurable Goals used to apply C2C Intentions and added value for Stakeholders.

Grey column at left side of table describes example of a C2C Element, in this case an Atrium.

TABLE 4 EXAMPLE OF HOW AN ELEMENT INTEGRATES C2C PRINCIPLES, QUALITY DIMENSIONS & GOALS							
<b>C2C PRINCIPLES</b> →→→	----- <b>Everything is a Resource for Something Else. "Waste=Food"</b> ----- ----- <b>Biodiversity, Conceptual Diversity, Cultural Diversity</b> ----- ----- <b>Current Solar Income</b> -----						
<b>C2C QUALITY DIMENSION</b> →→→	<b>Healthy Air &amp; Climate</b>	<b>Healthy Water &amp; Nutrient Recycling</b>	<b>Healthy Materials</b>	<b>Biodiversity Enhancement</b>	<b>Cultural Diversity, Quality of Life, &amp; Multifunctionality</b>	<b>Mobility Enhancement</b>	<b>Renewable Energy-Positive</b>

**TABLE 4 EXAMPLE OF HOW AN ELEMENT INTEGRATES C2C PRINCIPLES, QUALITY DIMENSIONS & GOALS**

C2C PRINCIPLES →→→	<p>----- <b>Everything is a Resource for Something Else. "Waste=Food"</b> -----</p> <p>----- <b>Biodiversity, Conceptual Diversity, Cultural Diversity</b> -----</p> <p>----- <b>Current Solar Income</b> -----</p>						
C2C QUALITY DIMENSION →→→	Healthy Air & Climate	Healthy Water & Nutrient Recycling	Healthy Materials	Biodiversity Enhancement	Cultural Diversity, Quality of Life, & Multifunctionality	Mobility Enhancement	Renewable Energy-Positive
<p><b>C2C-INSPIRED ELEMENT</b> ↓↓↓</p> <p><b>ATRIUM</b></p> <p>Also known as;</p> <p><b>BUILDING INTEGRATED GREENHOUSE</b></p> <p>or</p> <p><b>WINTERGARDEN</b></p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Bio-filters capture &amp; metabolise 50% of CO2 &amp; particulates from air in the building interior rising to 70% in 3 years, and re-introduce cleaner air to meeting rooms.</p> <p><b>FINANCIAL GOAL</b></p> <p>Evaluate savings from using CO2 and compost to profitably grow vegetables and gain carbon credits.</p> <p>Savings on HVAC filter maintenance &amp; replacement costs by using</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Capture 70% of rainwater on site for reuse &amp; discharge into ecosystems, rising to 90% over 3 years.</p> <p><b>FINANCIAL GOAL</b></p> <p>Quantify savings on water fees &amp; water reprocessing costs.</p> <p>Quantify savings on water for urban agriculture &amp; landscaping.</p> <p><b>ADDED VALUE</b></p> <p>Financial &amp; supply security for;</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Compost 50% of bionutrients used in the building, rising to 90% in 3 years.</p> <p>Nutrients for plants e.g. soil, fertilizer are defined for the whole cycle by year 3.</p> <p><b>FINANCIAL GOAL</b></p> <p>Capital savings by disassembling &amp; reassembling old greenhouses.</p> <p>Evaluate savings on maintenance &amp; renovations with easier replacement of</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Declare Atrium as biodiversity zone e.g; pond as fish habitat, trees as bee habitat, landscaping as topsoil enhancement zone. Date; Year 1 of operations.</p> <p><b>FINANCIAL GOAL</b></p> <p>Produce profitable urban agricultural products for restaurants or occupants. Year 1 of operations. Savings on landscaping topsoil by soil manufacturing.</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p><i>Cultural diversity.</i> Integrate water recycling as art e.g. water walls, fountains Date; By completion of construction.</p> <p><i>Quality of Life &amp; Multifunctionality.</i> Atrium is a clean-air pre-school for children of occupants. Date; Year 1 operations.</p> <p><b>FINANCIAL GOAL</b></p> <p>Revenues from integrated use. Date; Year 1 of operations.</p> <p>Enhance lease value by offering added services to</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Improve mobility between buildings in cold or hot climates by moderating temperatures and creating integrated spaces instead of divided ones. Date; By end of construction.</p> <p><b>FINANCIAL GOAL</b></p> <p>Business model from charging electric vehicles. Date; By beginning of construction.</p> <p><b>SOCIAL GOAL</b></p> <p>Use Atria to</p>	<p><b>MEASURABLE TECHNICAL GOAL</b></p> <p>Atrium is a functional part of the heating &amp; cooling system, using solar energy for photosynthesis, supporting heating and cooling of the building. Date; By year 1 of operations.</p> <p><b>FINANCIAL GOAL</b></p> <p>Lighting costs savings from integrating more natural light.</p> <p>By moderating temperature extremes, using current solar</p>

**TABLE 4 EXAMPLE OF HOW AN ELEMENT INTEGRATES C2C PRINCIPLES, QUALITY DIMENSIONS & GOALS**

<p><b>C2C PRINCIPLES</b>                      ----- <b>Everything is a Resource for Something Else. "Waste=Food"</b> -----                      ----- <b>Biodiversity, Conceptual Diversity, Cultural Diversity</b> -----                      ----- <b>Current Solar Income</b> -----</p>							
<p><b>C2C QUALITY DIMENSION</b>                      →→→</p>	<p><b>Healthy Air &amp; Climate</b></p>	<p><b>Healthy Water &amp; Nutrient Recycling</b></p>	<p><b>Healthy Materials</b></p>	<p><b>Biodiversity Enhancement</b></p>	<p><b>Cultural Diversity, Quality of Life, &amp; Multifunctionality</b></p>	<p><b>Mobility Enhancement</b></p>	<p><b>Renewable Energy-Positive</b></p>
<p><b>C2C-INSPIRED ELEMENT</b>                      ↓↓↓</p> <p><b>ATRIUM</b></p>	<p>plant based biofilters.</p> <p><b>ADDED VALUE</b></p> <p>Capital value appreciation from improved user perception.</p> <p>Evaluate productivity impacts.</p> <p>Use under-utilized rooftop or atrium space profitably.</p> <p>Carbon credits potential from reusing CO2.</p> <p>Savings or revenues from growing fruits &amp; vegetables</p>	<ul style="list-style-type: none"> <li>• Future water fees,</li> <li>• Wastewater processing costs,</li> <li>• Irrigation water for urban agriculture &amp; landscaping.</li> </ul>	<p>equipment &amp; parts designed for disassembly.</p> <p><b>ADDED VALUE</b></p> <p>Waste cost saving for maintenance &amp; renovations.</p> <p>Increase materials &amp; structures end value so the building becomes an appreciated asset instead of depreciated demolition expen</p>	<p><b>AESTHETIC GOAL</b></p> <p>Establish five beehives to keep away wasps from public areas &amp; for occupants to learn about pollination. Year 1 of operation.</p> <p><b>ADDED VALUE</b></p> <p>Added productivity from unused spaces e.g. rooftop</p>	<p>occupants.</p> <p><b>FUN GOAL</b></p> <p>Establish nice places to eat, work, &amp; relax.</p> <p><b>ADDED VALUE</b></p> <p>Rentable space for diverse uses.</p>	<p>establish diverse meeting zones.</p> <p><b>ADDED VALUE</b></p> <p>Improve mobility in the building for occupants.</p>	<p>income, and using excess heat for growth, atrium supports renewable energy cost-effectiveness. Date; Year 1 of operations.</p> <p><b>ADDED VALUE</b></p> <p>Savings on heating, cooling, ventilation &amp; lighting.</p>