Table of Contents Annexes

Annex A. Terms Of Reference & Stakeholders

Terms of Reference in Brief

Describe the pros and cons of why and how Luxembourg uses and might use materials productivity and quality in the circular economy to raise employment, competitiveness and savings, and improve environmental impacts.

Goals

The terms of reference provided by the Ministry describe the following goals;

The main goals of the study are to inventory, assess and evaluate potential for;

Raising industry competitiveness and cost reductions and reducing env. Impact.

The economic potential for Luxembourg, include the existing activities into a wider and more structured national strategy while identifying the missing links, competencies and actors to implement such a strategy.

Scope

The geographic scope is first Luxembourg, next the Greater Region, and finally relevant examples from everywhere else.

Methods to reach the goals

The terms of reference describe a wide range of methods;

The inventory and mapping will focus on the greater region in general and Luxembourg in detail and will include;

- Ongoing and upcoming projects in general

- Public actors relevant for a circular economy approach

- Private actors active in the field of circular economy and related topics

- Companies developing or planning to develop a circular economy business model

- Companies offering products and services relevant for a circular economy approach

- Research, development and innovation institutions and activities

A description and classification of the actors according to their relevance and importance for a circular economy in Luxembourg will be dressed.

A SWOT analysis will be included in the study which will allow Luxembourg to efficiently position itself inside the greater region and a prediction will be made about future developments in case no coordinated action is taken.

The study will furthermore propose a roadmap towards a circular economy in Luxembourg, including priority areas, next steps, low hanging fruits and political actions that are required for a successful implementation. A first estimation of the economic impact and initial costs for the required infrastructure will be provided.

Based on the existing actors and activities short-, mid- and long-term goals to be reached should be identified as well as the fields and niches in which Luxembourg should position itself as a centre of excellence to maximise the positive impacts of a circular economy whilst optimising the benefits to cost ratio. Value chains to be set up will be identified, described and evaluated. The economic impact of implementing as circular economy in Luxembourg will be assessed and presented.

Scoping boundaries imposed by study Steering Committee

Focus on materials

Because the initial scope of the study was so wide and the budget limited, the Steering Committee guiding the study with the Ministry of the Economy imposed a strict limitation for the study to focus on materials rather than the wider circular economy definitions involving e.g. energy and social aspects (with the exception of job creation).

The Greater Region

Because the Greater Region is 20 times larger by population than Luxembourg itself, and because unified statistics on the Greater Region are only now being gathered by a dedicated committee on the topic, the Steering Committee recognised the practical limitations of attempting a complete inventory.

Study stakeholders

The customer is the Ministry of the Economy but who are the main Stakeholders?

- The study was commissioned by the Ministry of the Economy but the stakeholders in the study are broader. For example educational institutions and innovation clusters as well as MDDI are represented on the study Steering Committee. As well the many interviewees, companies, and other institutions consulted for the study are considered as stakeholders for implementation, and an approach is described in the study for further involving them.
- Because the study is asked to identify examples and opportunities in the Greater Region, it is important to define who exactly are the stakeholders in relation to the Greater Region, because the study is focused on a "national strategy" rather than a regional strategy. Because the Greater region is so large compared to Luxembourg it is important to be clear on this point; the study is directed at examining benefits primarily for Luxembourg rather than for the Greater Region. Nonetheless, the study was able to focus on areas where Luxembourg and the Greater Region already co-operate; secondary raw materials supplier chains, R&D, and Greater Region residents who shop in Luxembourg.
- The definition of "national" in the case of Luxembourg is complicated by the 200,000 persons who commute to work daily from outside the country, representing a doubling of the workforce of the country every day and a 40% increase in consumers. Those commuters who come from the Greater Region are important stakeholders for CE in Luxembourg, and for example do a lot of their shopping in Luxembourg; a trend considered in the study approach to made-in-Luxembourg products.

Annex B. Products certified for circularity cycles & available in or near Luxembourg. Systems & services connected to products certified for circularity cycles

Enclosed examples describe products available in the Greater Luxembourg region, which are certified by an independent institute for the Biosphere and Technosphere cycles.

The systems described in an accompanying table were selected due to their focus on take-back services for those types of products.

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Accsys Technologies PLC	Accoya wood	Wood	Accoya® is a world leading high technology wood with properties that surpass the best tropical hardwood -thus reducing their depletion. Accoya® wood is manufactured via a non-toxic treatment and uses fast growing timber from sustainable sources. The wood has very high durability and dimensional stability allowing for reduced maintenance and a viable alternative to even high-energy man-made materials.	http://www.accsysplc.com	Also in Lux	Accoya through BAUMANN HolzhandelGmbH. Fruchtbahnhofstraße 3, 68159 Mannheim, Germany Tel: +49 621 3009920	
AGC Glass Europe	Stratobel and Stratophone	Glass	Stratobel is the range of AGC laminated glass. Laminated glass consists of an assembly of two or more sheets of glass and one or more PVB (polyvinyl butyral) interlayers. If the glass is broken, most of the fragments remain stuck to the interlayer. With Stratobel, it is possible to combine safety with other functions (thermal insulation, solar control, protection from UV radiation, acoustics, design) in a single glass product.	http://www.agc-glass.eu/English/Homepage/Home/page.aspx/1583	Also in Lux	AGC glass through AGC Energypane. Rue de Houtain, 32 4280 Grand-Hallet - Belgium Tel: +32 19 625060	
AGC Glass Europe	Float glass and magnetron coated glass	Glass	World demand for flat glass is around 45 million tonnes per year, of which 50% is supplied by Asia, 27% by Europe and 15% by North America. Of this total, 70% is used for construction, 20% for interior furnishing and decoration, and 10% for the automotive and transport industries. Float technology is now universally used for making flat glass. With around 13% of world production capacity	http://www.agc-glass.eu/English/Homepage/Home/page.aspx/1583	Also in Lux	AGC glass through AGC Energypane. Rue de Houtain, 32 4280 Grand-Hallet - Belgium Tel: +32 19 625060	
AGC Glass Europe	Lacobel, Lacobel T, Matelux, Matelac and Mirox	Architectural glass	Lacobel An extensive range of painted glass featuring 25 trendy colours. Lacobel has a high quality paint layer on the back of the glass. This protects it form any damage and keeps the colour and glossy appearance of the glass in brilliant shape. Lacobel glass can only be used for interior applications, such as furnishings, wall cladding, cupboards or	http://www.agc-glass.eu/English/Homepage/Home/page.aspx/1583	Also in Lux	AGC glass through AGC Energypane. Rue de Houtain, 32 4280 Grand-Hallet - Belgium Tel: +32 19 625060	
Ahrend	A2020 desk chairs, A230 desk chairs	Office furniture	Ahrend 2020 The Ahrend 2020 was designed by British designer Paul Brooks and has a dignified look. Its transparent backrest and sleek design make this chair a recognisable Ahrend product that looks good in all environments. The chair fully fits in with the Ahrend tradition: sustainable design, 'less is more', functional and aesthetic.	http://www.ahrend.com/en/Products/Seating/	Also in Lux	Ahrend. Romboutsstraat 9 1932 Sint Stevens Woluwe Belgium. Tel: +32 (0)27 16 22 00	
Ahrend	A500 table series	Office furniture	Ahrend 500 is an innovative range of conference tables, flexible in all areas and easy to adapt. Whether you are looking for permanent conference situations at boardroom level or flexible, mobile solutions in training rooms, Ahrend 500 has the solution. Main features:	http://www.ahrend.com/en/	Also in Lux	Ahrend. Romboutsstraat 9 1932 Sint Stevens Woluwe Belgium. Tel: +32 (0)27 16 22 00	
Ardagh	Ardagh Paint can and 400 g Infant Formula can	Can	Paint can The strength and rigidity of metal makes it the material of choice for paints and coatings which require safety and robustness in handling, filling, distribution and use in the home. The ''Three Fingers'' and ''Waisted'' cans are examples of how functional shapes can also be used to create differentiation and shelf impact. Special textures and finishes such as Ultra Matt™ are also being developed to	http://www.ardaghgroup.com/	Also in Lux	Ardagh. Bahnhofstrasse 16/17 56575 Weißenthurm Germany Tel: +49 2637 6010	
Armstrong building products	Alpina, Parla OP 0.95, Ultima+	Ceiling products	Wet Felt Mineral Fibre Ceiling Tile	http://www.armstrong.nl/	Also in Lux	Armstrong building products through BATI-C. Rue de l'industrie 22 Bertrange 8069 Luxembourg	
Aveda Corporation Inc.	Multiple products	Personal care products	Aveda Men Pure-formance™ Conditioner, Aveda Men Pure-formance™ Shampoo, Dry Remedy Conditioner, Dry Remedy Daily Moisturizing Oil, Dry Remedy Masque, Dry Remedy Shampoo, Invati Conditioner, Invati Shampoo, Smooth Infusion™ Conditioner, Smooth Infusion™ Shampoo, Invati Scalp Revitalizer	http://www.aveda.nl/	Also in Lux	30 RUE ADOLPHE FISHER LUXEMBOURG, 1520 Luxembourg More locations available	
Backhausen	Returnity	Textile	The company Backhausen interior textiles GmbH has always been very innovative and has done pioneer work with introducing the first permanent flame retardant fabrics or three dimensional pleated fabrics, which correlate to the vision of Cradle to Cradle®. For over 160 years, Backhausen has developed and produced top-quality and design-driven upholstery and curtain fabrics across a wide range of styles. Textiles from the house of Backhausen are available in forty countries worldwide through speciality shops, interior work contractors and	http://www.backhausen.com/startseite/	Currently no certified products	Backhausen through Adrian Polstermöbel. Im Rotental 6-8 56751 Polch Germany	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Baufritz-GmbH & CO. KG	HOIZ Insulation	Insulation	The first sustainable natural insulation in the world, made from wood chips “HOIZ“ by Baufritz, the eco-house pioneer has been certified Gold by the Cradle to Cradle Products Innovation Institute “Cradle” means - amongst others - “origin“. But what exactly hides behind the melodious “Cradle to Cradle” principle, developed by the US-American architect William McDonough and the German professor and eco-	http://www.baufritz.com/en	Also in Lux	Roermonderstraße 418 52072 Aachen Germany Tel.: +49 (0) 241 - 608 597 03	
Bauwerk Parquet	Cleverpark Silente	Parquet	Bauwerk Cleverpark Silente featuring the new Silente technology Bauwerk’s Cleverpark Silente technology is an innovative system solution that guarantees reduced footfall sound and optimum impact sound improvement thanks to the successful combination of the Cleverpark series with Bauwerk’s patented Silente footfall and impact sound insulation.	http://www.bauwerk-parkett.com/en/parquet/new-products/cleverpark-silente.html	Dealer on the border of G.R. in Wiesbaden, Germany.	Bauwerk parquet through klk (No Suggestions) GmbH. Dostojewskistraße 12 DE-65187 Wiesbaden Germany	
BB lightconcepts	BB LEDlightpipe	Led lightpipe/tube	Light pipes / tubes with LED technology for park garage and office application. Good design for disassembly, no PVC.	www.bb-lightconcepts.eu	No certified products yet. Dealer just outside of G.R. in Erftstadt, Germany.	BB lightconcepts through FliXenergy Bertolt-Brecht-Str. 43 50374 Erftstadt Germany	Certification in progress
Brabantia	Flatback + (30L and 40L)	Paper Bin	The Brabantia FlatBack+ (30 litre and 40 litre) is a space-efficient waste solution: a durable pedal bin with a flat back shape to closely fit the wall or kitchen cupboard. The FlatBack+ is available in Fingerprint Proof Matt Steel. Flatback + 30L and Flatback + 40L and in two versions: FPP coated and uncoated.	http://www.brabantia.com/nl/	Brabantia in G.R. and Luxembourg	Brabantia Belux office: Stuifzandstraat 31 B-3900 Overpelt info.belgium@brabantia.com Tel: +32 (0) 11 - 809600	
Cabot Corporation	Cabot Aerogel	Aerogel, Insulation	Sometimes called 'frozen smoke', aerogels are the lightest and best insulation solids in the world. Cabot's aerogel, sold as Enova® aerogel and Lumira® aerogel, is a hydrophobic aerogel consisting of approximately 95% air, contained in nano-sized pores that inhibit heat transfer through the aerogel material. Plaster, boards, daylighting systems, tensile roofing, and coatings comprise the current suite of energy efficient materials enabled by Cabot’s aerogel products. In new construction, rehabs, and historical buildings of all types, these	http://www.cabot-corp.com/	Cabot in G.R. and Luxembourg	Rue Prévochamps, 78 Pepinster B - 4860 Belgium Phone+32 8 739 2711	
Cosentino S.A.	ECO by Cosentino	Surfaces	ECO™ by Cosentino is a new line of countertop and surfacing materials composed of 75% recycled material and eco-friendly materials bound with a resin, part of which is coming from corn-oil.	http://www.ecobycosentino.com/	Cosentino center in Merchtem, Belgium. Close to G.R.	Koeweidestraat 44 CP: B-1785, Merchtem, Belgium Tel: +32 (0) 52/21 66 73	
Daas Baksteen	ClickBrick	Bricks	The ClickBrick® range is manufactured at our factory in Zeddam. These special extruded bricks are custom milled and grooved to size after being fired in the kiln, resulting in the exact shape and size, with a tolerance of less than +/- 0.1 mm on the quoted height. The resulting built finish of the external wall is very smooth and clean, requiring little or no maintenance.	http://www.daasbaksteen.nl/Engels/home/page.aspx/66	No offices outside of NL but can deliver in Luxembourg and G.R.	Daas Baksteen Zeddam B.V. Terborgseweg 30 7045 AL Azewijn The Netherlands T +31 (0)314 - 65 16 44	
Daas Baksteen	Waterstruck bricks	Bricks	The Waterstruck bricks are manufactured at our De Volharding factory in Zeddam. All our products are KOMO certified (BRL 1007) and comply with the CE standard. Technical specifications can be found at CE. This certification includes only the following products: Product Groups:	http://www.daasbaksteen.nl/Engels/home/page.aspx/66	No offices outside of NL but can deliver in Luxembourg and G.R.	Daas Baksteen Zeddam B.V. Terborgseweg 30 7045 AL Azewijn The Netherlands T +31 (0)314 - 65 16 44	
Daas Baksteen	Handmade Bricks	Bricks	Machine assisted Hand-formed bricks are produced at our De Vlijt factory in Winterwijk and since mid 2006 also at our De Volharding factory in Zeddam. All our products are KOMO certified (BRL 1007) and comply with the CE standard. Technical specifications can be found at CE. This certification includes only the following products:	http://www.daasbaksteen.nl/Engels/home/page.aspx/66	No offices outside of NL but can deliver in Luxembourg and G.R.	Daas Baksteen Zeddam B.V. Terborgseweg 30 7045 AL Azewijn The Netherlands T +31 (0)314 - 65 16 44	
Daas Baksteen	Extruded Bricks	Bricks	Extruded bricks are produced at our "De Nijverheid" factory in Zeddam. All bricks are delivered under the KOMO quality mark according to BRL 1007 and meet CE standards. Technical specifications can be found at CE. This certification includes only the following products: Product groups:	http://www.daasbaksteen.nl/Engels/home/page.aspx/66	No offices outside of NL but can deliver in Luxembourg and G.R.	Daas Baksteen Zeddam B.V. Terborgseweg 30 7045 AL Azewijn The Netherlands T +31 (0)314 - 65 16 44	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
DEJO Metaalindustrie B.V. (Also known under Staco Holding B.V.)	Hot-Dip Galvanized Steel Gratings, Stair Treads, and Perfo Planks	Metal decking	DEJO offers a complete line of high quality, hot-dip galvanized, gratings, stair treads, and perfo planks.	http://www.dejo.nl/	Staco represented in Sint-Niklaas, Belgium	DEJO through Staco Belgium NV Industriepark-Noord 19 B-9100 Sint-Niklaas Belgium Tel: +32 (0)3 711 36 23	
Desso B.V.	Perpetual® Brochure	Brochure	Perpetual EcoBase® brochure - part of DESSO's range of brochures In signing a partnership agreement with the Hamburg-based Environmental Protection Encouragement Agency (EPEA), DESSO has become the first carpet manufacturer in EMEA to adopt the Cradle to Cradle® design principles. It marks DESSO's radical decision to move beyond 'mere' sustainability in producing its carpets and artificial grass, making a fundamental, sweeping advance in its already impressive environmental credentials. DESSO goes a step further with Eco Effectiveness –	http://www.desso.com/	To be confirmed	Borsigstrasse 36 65205 Wiesbaden Germany Tel: +49 6122 58 73 410 service.de@desso.com	
Desso B.V.	Ecobase™ Carpet Tile Backing, Ecobase™ PA 6 Continuous Dyed Carpet Tiles, Ecobase™ PA 6.6 Continuous Dyed	Flooring, carpets, carpet tiles	Cradle to Cradle® requires quality products which are safe for human use and which contribute not only to comfort and beauty, but also to a healthy environment. At Desso we take this very seriously. In our partnership with the Environmental Protection Encouragement Agency (EPEA) we are committed to a rigorous material assessment program which forms part of our overall implementation plan. We have committed ourselves to designing products containing only positively defined1) materials which are safe for human use and are	http://www.desso.com/	Yes, office in Wiesbaden, Germany. Close to G.R.	Borsigstrasse 36 65205 Wiesbaden Germany Tel: +49 6122 58 73 410 service.de@desso.com	
Desso Sports Systems	Synthetic Turf Latex Coated	Artificial Grass	Desso Sports Systems is the European pioneer and market leader in innovative artificial and hybrid grass systems. Known for its high- grade sports surfaces for football, hockey, American Football, rugby, tennis and multi-functional purpose, Desso Sports has now added another quality dimension to its products: the Cradle to Cradle® quality. The best quality artificial grass pitches will also be the best artificial grass pitches for people and the	http://www.dessosports.com/sports	Global projects	Borsigstrasse 36 65205 Wiesbaden Germany Tel: +49 6122 58 73 410 service.de@desso.com	
Desso Sports Systems	Grassmaster	Artificial Grass	Desso GrassMaster is a hybrid natural grass system, based on a 100 % natural grass pitch reinforced by some 20 million artificial grass fibers. The system is successful at both stadiums (including Wembley, Arsenal FC, Tottenham Hotspur, Denver Broncos, Green Bay Packers) and training centers worldwide. After their useful life, the artificial grass fibers of the Desso GrassMaster system are recuperated and used into new applications. Desso GrassMaster is patented by Desso Sports Systems	http://www.dessosports.com/sports	Projects in whole world	Borsigstrasse 36 65205 Wiesbaden Germany Tel: +49 6122 58 73 410 service.de@desso.com	
Details® a steelcase brand	Multiple products	Office furniture	SOTO™ Tool Box (DSTB) SOTO™ Pile Box (DSSPB) SOTO™ Utility Box (DSUB) SOTO™ Personal Box (DSPB) SOTO™ Diagonal File Box (DSDFB) SOTO™ Landscape Letter Box (DSLLB). SOTO™ II Worktools: Functional Screen, Personal Pocket, Mobile Caddy.	http://www.steelcase.com/en/products/brands/pages/details.aspx	Steelcase in Luxembourg and G.R.	Steelcase through Felten-Stein 14 rue des Joncs Howald L-1818 Luxembourg Tel: +352 4 02353	
DOW Building solutions	Styrofoam XPS Insulation	Insulation	STYROFOAM(tm) Brand Extruded Polystyrene Foam Insulation has been recognized as a high performance building insulation for over 60 years in-service. One example in garden rooftop designs where Dow scientists pioneered a new kind of assembly in 1968 featuring STYROFOAM(TM) XPS, Dow's flagship brand, which has a higher compressive strength and moisture resistance to enable this sustainable design. Proprietary manufacturing processes produce boards with uniform, closed-cell structures and high long-term stable R-	http://building.dow.com/	In G.R.	Am Kronberger Hang 4 D-65824 Schwalbach Tel: 06196-566 0 E-mail: baustoffe@dow.com	
DSM	Arnitel EM & EL grades	Engineering Plastic	Arnitel is family of unique ThermoPlastic Copolyesters (TPC) which create a world of living solutions. Are you looking for a material that bends, squeezes, breaths, seals, bounces? The Arnitel team is happy to find the best solution for you. Arnitel EM400, Arnitel EM460, Arnitel EM550, Arnitel EM630, Arnitel EM740, Arnitel EL250, Arnitel EL550	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	Akulon Ultraflow grades	Engineering Plastic	Akulon® Ultraflow® offers improved flow, fast cycling behavior, and excellent surface appearance. Akulon Ultraflow is an easy to process PA6 that offers up to 80% improved flow and up to a 40% reduction in injection molding cycle times with no significant effect on mechanical properties compared to standard PA6 grades. Akulon Ultraflow K-FG2, Akulon Ultraflow K-FG5, Ultraflow K-FG6, Akulon Ultraflow K-FG7, Akulon Ultraflow K-	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	Akulon K224 grades	Engineering Plastic	Akulon polyamide resins represent the best value in all-purpose engineering materials. For molded parts, they offer an excellent balance of easy design and processing with outstanding mechanical properties over a wide temperature range and in diverse operating environments. For extrusion uses, the toughness, resilience and processability of Akulon set the market standards.	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
DSM	Akulon F and K grades	Engineering Plastic	Akulon F130, Akulon F132, Akulon F136, Akulon F126-C, Akulon F130-C1, Akulon F132-C1, Akulon F136-C1, Akulon K122, Akulon K123, Akulon K125, Akulon F130-E1, Akulon F132-E1, Akulon F136-E1, Akulon F223-D, Akulon F232-D, Akulon F236-D, Akulon K222-D	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	Arnitel ECO grades	Engineering Plastic	DSM is passionate about playing a leading role in the change of a fossil fuel dependant economy to a more sustainable, bio-based one. One of our green solutions is Arnitel Eco. A unique addition to our Arnitel TPE family. The material is up to 50% made of renewable resources, using rapeseed oil instead of mineral oil. Only the following products are considered Certified Product(s) within the scope of this certification and the	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	Arnitel XG grades	Engineering Plastic	Arnitel are a family of thermoplastic copolyester based elastomers. They are available in a wide range of hardnesses and can be used to replace metals, leather, rubber and other thermoplastics. Arnitel XG, the subject of certification, is aimed at the application of cables, plugs and connectors in the electronics industry. It is a possible replacement for PVC.	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	EcopaXX grades	Engineering Plastic	Newly-introduced EcoPaXX™ is a green, bio-based material: approximately 70% of the polymer consists of building blocks derived from castor oil as a renewable resource. Castor oil is a unique natural material and is obtained from the Ricinus Communis plant, which grows in tropical regions. It is grown in relatively poor soil conditions, and its production does not compete with the food-chain.	http://www.dsm.com/corporate/home.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
DSM	Arnitel VT Series	Engineering Plastic	How does a manufacturer of outdoor clothing produce high-performance, waterproof and comfortable textiles that are also kind to the environment? The answer: Arnitel® VT – a proven thermoplastic copolyester elastomer for more sustainable outdoor clothing that's free of perfluorinated chemicals (PFC). The secret behind the suitability of Arnitel VT for outdoor clothing applications is that instead of being	http://www.dsm.com/products/arnitel/en_US/cases/Arnitel-for-outdoor-clothing.html	No offices close to GR. HQ in Heerlen, the Netherlands	DSM Het Overloon 1 6411 TE Heerlen Tel: +31 (45) 578 81 11 The Netherlands	
Eastman Chemical Company	Multiple products	Copolyesters and approved additives	Eastman CADENCE™ resins for calendered films Eastman Cadence™ resins for calendered films are specialty plastics developed to meet your specifications for ease of processing, high-melt strength, aesthetics, clarity and gloss. These resins can be used on existing calendering lines with little to no modification required and no drying needed prior to the calendering process	http://www.eastman.com/brands/eastar/Pages/Overview.aspx	Sales office in Köln, close to G.R.	Charlottenstrasse 61 51149 Köln Germany Tel: +49 2203 17050	
Eco-Point	Ad Clip 15	Cleaning agent	Add Cip 15 is a highly concentrated product, containing natural detergents and complexing agents. Add Cip 15 is meant to be used with CIP systems. Add Cip 15 is particularly qualified for internal cleaning of tanks, pipes, tubes, filling machines and other equipment.	http://uk.eco-point.com/	Office close to G.R.	Prins Boudewijnlaan 97 B-9100 Sint-Niklaas Belgium Tel: +32 37 66 32 15 E-mail:be@eco-point.com	
EcoSmart Nederland B.V.	SmartBin2.0	Waste bin	The SmartBin 2.0 is a waste bin that is intended for the collection of separate waste fractions. It is produced in three different models. All models contain the same ingredients and include a metal frame coated with a powder coating, in which are placed but not attached containers made out of a polyolefin. The bins allow for different combinations of containers according to customer request. The three different models have different frame	http://www.ecosmart.eu/	EcoSmart in Lux	EcoSmart Belgium NV Nijverheidsstraat 1-2 B-2870 Puurs Belgium Tel: +32 (0) 3 443 25 00	
Ecover Belgium N.V.	Techno/Multi Spray	Cleaning Agents	Citop Zero, Cream Clean, Inox Polish, Multi Daily, Multi Forte, Multi Spray (Techno spray), San Daily, Spray Clean, Strong Clean, Swan WC Daily.	http://www.ecover-professional.com/	Also in Lux	Ecover through Distributor Gebr. Franz GmbH Naturkost GH Pavilonstraße 45, Saarlouis Germany	
Egetaepper A/S	Barcode ecoline modular	Carpet tiles	With a guaranteed minimum content of 100% recycled fibres Barcode Ecoline is a very unique and sustainable collection of carpet tiles, Barcode Ecoline Modular has the ege patented backing made of 100% recycled material and as all of eges tile backings, the MOD750 does not contain PVC or bitumen. With Barcode Ecoline you get a product made of recycled materials. The collection is specially manufactured to	http://www.egecarpets.com/carpets/tiles.aspx?t=&PFC_KOLLEKTION=0631	Sales office close to G.R.	Kartuizersweg 1A B-2550 Kontich Belgium Tel: 0032 3 459 85 38	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Emco Bau - und Klimatechnik GmbH & Co. KG	Emco ECOLINE® Pioneer	Entrance Cleaning Mats	Sustainable building – from the ground up Today, sustainable building is a hot topic – and as a result, building certification has become one too. These are subjects that are as complex as they are important, however: designing a sustainable building is an ambitious task requiring a comprehensive approach that takes into account the role of every single component – right	http://www.emco-bau.com/produkte/eingangsmattensysteme/neu-emco-ecoliner-pionier.html	Representative office for Luxembourg	Representative office for Luxembourg Emco Bau- und Klimatechnik GmbH & Co. KG Breslauer Straße 34-38	
Excluton B.V.	ExcluNatura Basic	Concrete paver	Excluton in the Netherlands has been aware of the growing need for environmentally friendly masonry and road paving products in Europe. The ExcluNatura Basic paver product line is the first Cradle to Cradle Certified(TM) Silver concrete paver in Europe. ExcluNatura Basic is a range of concrete pavers in several colors (black, grey, and red) that are used in the	http://www.excluton.nl/	No offices outside of NL but can deliver in certain regions of G.R.	Waalbandijk 155 6651 KD Druten The Netherlands www.excluton.nl Tel: 0487 590 391	
Flos SPA	Soft Architecture with Under-Cover Composite	Lighting	Soft architecture is designed to last and to minimize the harmful effects on the natural environment during production. sustainability, innovation and quality are our main goals, inspired by nature.	http://www.flos.com/en/home	Also in Lux	Flos through Burotrend Sa RUE DE L'EGLISE 5 L-1418 Luxembourg Tel: 00352 48 25 68 email: info@burotrend.lu	
Gessner AG	Climatex® Lifecycle™ and Lifeguard FR™ and Climatex® Dualcycle™	Textile	Climatex® Lifecycle™ - Product Redesign for Nature: The development of a compostable upholstery fabric After scraps of victuals, small-pet litter and grass, covers of office chairs and other upholstered furniture can likewise be fully composted. Climatex® Lifecycle™ is produced in Switzerland by Rohner Textil AG. One of its most essential constituents is the ramie fibre, which, when mixed with wool, makes a product well	http://www.gessner.ch/home.html	No offices close to GR	Gessner AG Florhofstrasse 13, 8820 Wädenswil, Switzerland Tel: +41 44 789 86 00 Fax: +41 44 789 86 01	
Gugler	Multiple products	Printing product group	Pureprint 1 and Pureprint 2 are offset printing product groups. All of the constituent materials in Pureprint printing products have been tested for their environmental and health impact by the EPEA environmental research institute, and were selected and developed especially for holistic recycling and composting. On the basis of the Pureprint components, Gugler* can offer a wide range of offset printing products such as folders, brochures, notepads, notebooks, letter paper, magazines, business reports	http://www.printthechange.com/	No offices close to or in G.R. Ordering possible	No offices close to G.R. Ordering is possible.	
Herman Miller	Multiple products	Office furniture	Aeron® Chairs, Canvas Office Landscape - Wall Based, Canvas Office Landscape – Private Office, Canvas Office Landscape – Wood Filing & Storage, Canvas Office Landscape® - Metal Filing & Storage, Caper Stacking Chair, Celle® Chairs, Embody Chairs, Everywhere Tables, Mirra 2, Mirra® Task Chair, My Studio Environments, Sayl Side Chair and Sayl Task Chair, Sense™ Desking System, Setu.	http://www.hermanmiller.com/products.html	Also in Lux	Herman Miller through Burotrend Sa RUE DE L'EGLISE 5 L-1418 Luxembourg Tel: 00352 48 25 68	
Holonite	Cast composite stone	Cast composite stone	Holonite products are available in many different sizes, colors and textures. In addition to standard sizes, Holonite delivers sills and other facade elements exactly matched to the dimensions of the project. Since its establishment in 1969 Holonite has been leading the way in producing cast composite stone products for the building industry. Holonite provides doorsteps, window sills, wall covers and facade elements for both	http://www.holonite.nl/	To be confirmed. No offices close to or in G.R.	No offices close to G.R.	
Hunter Douglas	GreenScreen	Window Shades	Environmentally responsible GreenScreen fabrics deliver superior light and glare control with the most color and openness choices in the industry. All deliver the durability and dimensional stability you demand, with flame retardance that meets the strictest international standards. PVC-free and sustainable -- completely recyclable and environmentally safe to produce Superb performance -- Outstanding thermal and solar properties	http://www.hunterdouglascontract.com/landing/greenscreen.jsp	Luxembourg representative office in Lokeren, Belgium	Hunter Douglas Belgium Dijkstraat 26 9160 Lokeren Tel: 09 348 90 00 http://www.hunterdouglas.be	
I:CO	I:CO	Take back system for apparel and shoes	In partnership with retailers, I:CO collects used shoes and textiles directly on the sales floor, and organizes the complete operation of collecting and sorting, right up to professional recycling worldwide. Why is the recycling of fabrics a big business for them? Because nearly 150 million tons of shoes and clothing are sold worldwide every year. Today, only a small percentage of that is reintroduced into the production cycle as reclaimed and renewed materials. The good news is that this percentage is rapidly increasing. Nevertheless, the planet suffers	http://www.ico-spirit.com/de/startseite/	Counters in Luxembourg	I:CO through H&M Avenue de la gare 42-44 1610 Luxembourg More counters available	
Imperbel SA	Derbipure®	Roof membrane	A revolutionary step, a non-bituminous vegetable roofing membrane «Green» on the inside. The membrane's raw material is mainly composed of « green » substances, this makes Derbipure the first vegetable roofing membrane in the world. Thanks to its ecological composition of vegetable oils and pine-resin, this roofing membrane offers a pure and safe future. White on top, Cool underneath !	http://www.derbigum.com/en/eco-solutions/pure-vegetal	Luxembourg representative office in Belgium	IMPERBEL SA Bergensesteenweg 32 B-1651 LOT - BRUSSELS - BELGIUM	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Interwand	Interline S0 and Intersmart® (Interior Wall System)	Indoor wall system	Interline S0: The Interline wall system is a partition with very clean structural lines and yet a high sound insulation. The panels are invisibly clicked into the uprights, leaving a fine joint. Within the Interline system you can vary with materials: can be combined seamlessly with steel, glass or wood. At the end of the product life cycle, parts can be disassembled for a new life or put back in the warehouse.	http://www.interwand.com/lang/EN/quickjump.php	Also in Lux	Interwand GmbH Industriestraße 12 74677 Dörzbach Tel : +49 (0) 7937 9140-0 Fax : +49 (0) 7937 9140-20	
Jalema	Jalema Sustainable Files	Office storing/filing	Jalema Sustainable Files are grouped into four main classes: Arnato, Jaleco, Secolor, and Infinio. The Arnato range consists of five different styles. These meet any possible requirements, from thin to thick files, bound or loose-leaf. The Arnato files are suitable for both dynamic and static archiving, and they can contain any type of document (up to A4 format). The files are made from 270 gram Colorkraft card. The handling edge	http://www.jalema.com/en	Also in Lux	Erasmus Business Park J. Wybranlaan 45c 1070 BRUSSEL Tel: 02 520 81 86 E. jalema@jalema.be	
JBC	Revive-bio and Revive-tech	Clothing	JBC Belgium is Belgium's first fashion store to launch a Cradle to Cradle Certified(TM) Basic collection. This is the first step in their long-term plan to develop clothes whose materials can be reused without any quality loss. This unique REVIVE-clothing line contains clothes for recreational sportsmen. Belgian sportsmen, such as Sven Nys and Kim Clijsters, are linked to this project. JBC is a family-owned company, which sets people central in their business. Sustainability and CSR are very	http://www.jbc.be/nl/	Also in Lux	Route de Diekirch 150 7220 Walferdange Luxembourg Many distributors available.	
Jules Clarysse	Infinity Towel	Cotton towels	Our Cradle to Cradle towel is one of the first compostable European bath linens. Jules Clarysse achieves this by using 100% pure organic cotton and by carefully selecting dyes that leave no harmful substances behind after being composted. The absorbency and softness of the Cradle to Cradle towel is guaranteed as well. A perfect and smart	http://www.julesclarysse.com/en/towel-cradle-to-cradle.htm	To be confirmed.	Jules Clarysse Brugsesteenweg 106 8740 Pittem Tel: +32 51 46 65 31 Fax: +32 51 46 54 21	
KE Fibertec A/S	CradleVent®	HVAC	CradleVent® is the world's first Cradle to Cradle CertifiedCM ventilation duct. CradleVent is our contribution to a future-proof and sustainable product for air distribution in office buildings, schools, laboratories, sports arenas, public buildings, and other comfort zones. The increasing demands in terms of sustainability and resource efficiency make it attractive for contractors and architects to use the well-documented CradleVent building component. Textile ducts are tailored to fit each room and come in all shapes	http://www.ke-fibertec.com/en/products/cradlevent/	To be confirmed. No offices close to or in G.R.	KE Fibertec Deutschland GmbH Lise-Meitner-Str. 10 D-31515 Wunstorf Tel: 05031 / 703988 - 0 Fax: 05031 / 703988-30	
Knauf	Mineral wool with Ecose technology	Insulation material	The insulation material is used in the Intersmart Interior Wall System from Interwand. It is the first glass wool insulation material formaldehyde free > the glass fiber is recommended against the stone wool.	http://www.knauf.nl/	Offices in G.R.	Rue du Parc Industriel, 1 4480 Engis Belgium http://www.knauf.be	Not certified (yet) but already good intended material optimization.
Knauf Isolava B.V.	Standaardplaat 13 A	Gypsum plates	Standaard plaat 13 type A is a plasterboard plate made from gypsum and with a lining of paper.	http://www.isolava.be/	Not yet certified. Knauf has offices in G.R.	Rue du Parc Industriel, 1 4480 Engis Belgium http://www.knauf.be	Certification in progress
Koninklijke Auping B.V.	Auping AVS Mattress Series	Mattress	A good nights' sleep requires a good mattress. As the oldest bed manufacturer in the Netherlands, Auping has a wealth of knowledge and experience. Also when it comes to mattresses. An Auping mattress is synonymous for quality, comfort and proper ventilation. Because Auping knows what is good. Auping regularly carries out innovations by keeping the unique Auping quality up-to-date. For that reason we now introduce a complete new mattress range of 7 improved C2C® Silver certified mattresses. Different types of tension, heights, sizes	http://www.auping.com/	Auping also in Luxembourg	Auping through KANDEL Route De Luxembourg 1 007240 BERELDANGE Luxembourg Tel: 00352336740	
Koninklijke Auping B.V.	Auping Auronde and Auping Essential	Bed (furniture)	The Auronde: The Auronde (designed by Frans de la Haye). The design itself has therefore not changed much since the introduction in 1973, retaining its distinctive 'eye' and curvy shape. Over the years, however, new colours, accessories, innovations and the newest techniques have been added. And even after 40 years this timeless bed is still successful with consumers!	http://www.auping.com/	Auping also in Luxembourg	Auping through KANDEL Route De Luxembourg 1 007240 BERELDANGE Luxembourg Tel: 00352336740	
Koninklijke Mosa BV	Wall Tile Group (details see certificate)	Wall Tiles	Royal Mosa is a successful Dutch tile company that manufactures its entire collection with sustainable production methods. The company employs 600 and earned sales of approximately 120 million euro in 2011. Mosa is highly innovative and leading in the design of ceramic tiles. Mosa tiles have been awarded many international design awards. The company intends to also be a leader in sustainability, and in the pursuit of this goal partners with a number of relevant parties, such as knowledge institute EPEA. Mosa's products are ideal	http://www.mosa.nl/us/	Also in Lux	Mosa through Maroldt Carrelages Rue Kalchesbruck 5, 1852 LUXEMBOURG Tel: 00352 43 67 61	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Koninklijke Mosa BV	Floor Tile Group (details see certificate)	Floor Tiles	Royal Mosa is a successful Dutch tile company that manufactures its entire collection with sustainable production methods. The company employs 600 and earned sales of approximately 120 million euro in 2011. Mosa is highly innovative and leading in the design of ceramic tiles. Mosa tiles have been awarded many international design awards. The company intends to also be a leader in sustainability, and in the pursuit of this goal partners with a number of relevant parties, such as knowledge institute EPEA. Mosa's products are ideal	http://www.mosa.nl/us/	Also in Lux	Mosa through Maroldt Carrelages Rue Kalchesbruck 5, 1852 LUXEMBOURG Tel: 00352 43 67 61	
Mermet Corporation	Exomatt XT700E, Greenscreen® Revive and Greenscreen® Evolve	Polyester fabric	EcoMatt is a projection screen textile that is PVC free, and made of 100% polyester yarn. In addition to being fully recyclable, EcoMatt XT700E offers a pleasant image with accurate color balance over a full 180° field. Reasonable control of ambient light is recommended. Flame retardant and mildew resistant. This surface is GREENGUARD Children and SchoolsSM certified and ROHS compliant.	http://www.draperinc.com/Green/index.asp http://www.hunterdouglascontract.com/windowcoverings/greenscreenRevive.jsp	No offices close to G.R. See Distributor in France.	Mermet S.A.S. 58 chemin du Mont Maurin 38630 Veyrins France	
Mosa Façades BV	Mosa Cradle to Cradle® Ceramic Façade System	Façades	Many milestones have been reached since Royal Mosa began implementing the Cradle to Cradle® philosophy in 2007. As a result, 99% of the floor and wall tile collection is Cradle to Cradle® certified and Mosa has become one of the world's few Cradle to Cradle companies. Mosa continues to innovate and the following milestone has now been reached for the Mosa Group: Mosa Facades has received Cradle to Cradle® Silver certification for its ventilated ceramic facade system	http://www.mosa.nl/en/	Mosa in Lux.	Mosa through Maroldt Carrelages Rue Kalchesbruck 5, 1852 LUXEMBOURG Tel: 00352 43 67 61	
Neputherm	NeptuTherm®	Insulation material	From the website: NeptuTherm ® is the only insulation material that meets all legal requirements without any additives that really is 100% natural. And not only that: the sum of the properties NeptuTherm ® is incomparable and in almost all respects, better than all other products. Inter alia it has the best environmental performance and the best storage capacity of all insulation materials	http://www.neptutherm.com/index.php?home	Currently no certified products. Offices in G.R.	Neputherm through Eiwa Lehm GmbH Haupstraße 29 67806 Bisterschied Tel: 06364 92 10 0	Not certified but innovative and good product.
Orangebox	Ara chair, Ara mesh chair	Office furniture	Ara is a task chair developed and manufactured to achieve Cradle to Cradle® accreditation. In the ARA chair you will already find a high percentage of recycled materials. The goal was to make Ara as simple as possible, both visually and functionally. Therefore Orangebox has established a relationship with EPEA to develop the Ara chair. For the company it is important to ensure that the materials they are using are truly safe, for humans and for the environment alike, and are also successful in technical cycles of reuse and recycling. This means looking	http://www.orangebox.com/	Currently no certified products. Orangebox in Luxembourg	Orangebox through SV Eikerlandstraat 118 B-2870 ruisbroek	
Polyvision® a steelcase brand	E3™ Ceramicsteel	Whiteboard surface	The new e3 environmental Ceramicsteel™ surface is the first and only ecologically intelligent whiteboard surface to receive Cradle to Cradle certification. e3 delivers the properties of PolyVision's best selling writing surface, P3 Ceramicsteel®, and complies with Cradle to Cradle Certified Silve criteria. Features of e3 environmental Ceramicsteel include: * Forever Warranty on the surface	http://polyvision.com/	Steelcase in Luxembourg and G.R.	Steelcase through Felten-Stein 14 rue des Joncs Howald L-1818 Luxembourg Tel: +352 4 02353	
Puma	Puma Biodegradable Apparel and Puma Recyclable Apparel	Apparel	Puma Biodegradable Apparel This shirt has a bright future ahead. First, it serves you. Then, it goes back to nature. Bring it to any PUMA Store when you're done and we'll ensure that it is composted through industrial composting. Features: Learn how to give this product a proper second life at www.puma.com/bringmeback	http://eu.puma.com/de_LU/home	Puma sales points in GR	Sales Point 199, route d'Arlon Messancy, 6780 Belgium	
Radium Foam BV	Natural Talalay	Latex Foam	The Vita Talalay® Natural product consists of 100% natural latex without additives. Its latex is extracted from the Hevea Brasiliensis latex tree that grows in South-East Asia. An additional benefit of having a 100% natural latex mattress is that it is eco-friendly.	http://www.radiumfoam.nl/products/natural	Also in Lux	Fort Willemweg 61 6219 PA Maastricht The Netherlands Phone: +31 43 3288788 E-mail: info@radiumfoam.nl	
Rheinzink	RHEINZINK-prePATINA® Roof and Façade	Roof and Façade	The strong aesthetic appeal of RHEINZINK architecture lies especially in its incredible diversity: from Alpine cabins to modern museums and homes; from the avant-garde to the traditional. Roofs and façades made of RHEINZINK titanium zinc offer more than just aesthetic advantages. Roofs and façades made of this diverse material are also environmentally friendly.	http://www.rheinzink.de/	Also in G.R.	Carl-Billand-Straße 12 Kaiserslautern Germany	
Rheinzink	RHEINZINK-prePATINA® Gutter and Downspouts	Gutter and Downspouts	Nothing exists without water. Environmentally friendly rainwater management is a RHEINZINK tradition. Gutter systems, rainwater collectors and accessories made of RHEINZINK titanium zinc stand out, due to innovative technology, simple assembly and installation, aesthetic individuality and for it's longevity.	http://www.rheinzink.de/	To be confirmed	Carl-Billand-Straße 12 Kaiserslautern Germany	

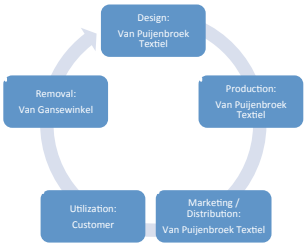
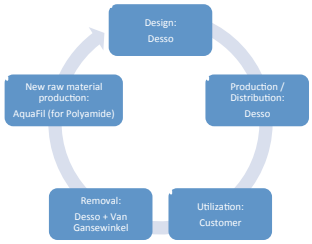
Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Saint-Gobain Construction Products Belgium NV/SA	Gyproc®- platen / Plaques Gyproc® - 9.5, 12.5, 15, 18 mm	Plasterboards	Today's Gyproc plasterboards satisfy requirements from space division to demanding fire, sound, thermal, moisture and impact resistance, providing durable, high quality linings for walls and ceilings, lift shafts and stairwells, corridors and auditoria. The certification includes Gyproc A Plaat in 12.5mm, 9mm, and 15mm thicknesses.	www.gyproc.be	Office in Belgium with an appointed Luxembourg greater region manager.	Sint-Jansweg 9 Beveren Belgium www.gyproc.be Tel: 03 260 22 11	
Schott	PYRAN® Platinum	Platinum fire-rated glass-ceramic	SCHOTT PYRAN® Platinum fire-rated glass-ceramic SCHOTT announces a revolutionary development with its PYRAN® Platinum fire-rated glass-ceramic. Because it is produced by an innovative patented process, PYRAN® Platinum fire-rated glass-ceramic offers stunning optical quality with superior clarity, no unwanted amber tints, and virtually no distortion. It was designed	www.schott.com	Schott in Benelux.	Schott Benelux: Randweg 3A 4104 AC Culemborg Netherlands Tel: +31 (0)345 470640	
Schwan-STABILO Schwanhäußer GmbH & Co. KG	Stabilo® GREENpoint®	Pens	98% RECYCLED, 100% CLEAR CONSCIENCE. The target group * Environmentally-aware school children, teachers, parents and office workers. The pen * Manufactured from 98% recycled plastic	http://www.stabilo.com/com/product/54/writing/stabilo-greenpoint	Also in G.R.	STABILO International GmbH - Sales Office Belgium Rue André Dumont 3 1435 Mont-Saint-Guibert Tel: 0032-10-483 880	
Shaw Industries	Multiple products	Flooring and carpeting	Anso and Unbranded Type 6 Nylon Residential Carpet, EcoFiber Touch™ Carpet Pad, EcoMade® Rugs, EcoWorx® Broadloom Carpets, EcoWorx® Carpet Tiles, Shaw Commercial Broadloom Carpets, Shaw Hardwood Flooring Products, Zeftron Nylon Fiber	http://www.shawgreenedge.com/index.shtml	Shaw Contract Group Sales representatives in Luxembourg and GR. Europe Carpet Group in Darmstadt,	Europe Carpet Group GmbH Rossdoerfer Strasse 3 Darmstadt 64287 Germany Tel: +49 6151 359265	
Staco Holding B.V. (Also under DEJO Metaalindustrie B.V.)	Staco hot-dip galvanized steel gratings, stair treads and perfo planks; Dejo hot-dip galvanized steel	Grid	Staco offers a complete line of high quality, hot-dip galvanized, gratings, stair treads, and perfo planks.	http://www.stacoredman.co.uk/en-gb/products.aspx	Office in Sint-Niklaas, Belgium, close to G.R.	Staco Belgium NV Industriepark-Noord 19 B-9100 Sint-Niklaas Belgium Tel:+32 (0)3 711 36 23	
Steelcase	Multiple products	Office furniture	The Cogent™ Group, 19" Keyboard Platform, 26" Keyboard Platform and Enviro Board, Amia™ Chair and Stool, Answer® Panel System, c:scape®, Elective Elements® 6, Garland™, and Walden™, ēno Interactive Whiteboards, Eyesite™ and Plurio, Groupwork® Tables, Leap Chair, Montage® Systems, Move Chair, Node™ with worksurface, Post and Beam, Premium Whiteboards, Privacy Wall / Glass Selections, Siento™ Chair, Slatshelf, Slatrail, Slatwall, Slatrail Stanchions, Steelcase Storage, Stella Computer Support Mechanism, Think® Chairs and Stools	http://www.steelcase.com/en/pages/homepage.aspx	Steelcase in Luxembourg and G.R.	Steelcase through Felten-Stein 14 rue des Joncs Howald L-1818 Luxembourg Tel: +352 4 02353	
Steinbeis Papier GmbH	Copy paper	Paper	Steinbeis Papier Copy Paper in the styles: Classic White, Trend White, Pure White and Evolution White	http://www.stp.de/en/office-papers/range/classicwhite/	Also in G.R. and Luxembourg	Steinbeis Papier GmbH Stadtstraße 20 25348 Glückstadt Germany Tel: +49 (0) 4124 911 0	
Steinbeis Papier GmbH	Inkjet paper	Paper	Steinbeis Papier Inkjet Paper in the styles: Innojet HC Premium, Innojet Universal/Light	http://www.stp.de/en/inkjet-papers/range/	Steinbeis paper available in Lux	Steinbeis Papier GmbH Stadtstraße 20 25348 Glückstadt Germany Tel: +49 (0) 4124 911 0	
Steinbeis Papier GmbH	Magazine paper	Paper	Steinbeis Papier Magazine Paper	http://www.stp.de/en/magazine-papers/	Steinbeis paper available in Lux	Steinbeis Papier GmbH Stadtstraße 20 25348 Glückstadt Germany Tel: +49 (0) 4124 911 0	
Steinzeug-Keramo GmbH	Vitrified Clay Pipe System	Pipe	Steinzeug-Keramo specialises in the production and development of vitrified clay pipes and fittings. Steinzeug-Keramo offers a complete range of pipes and fittings in diameters from DN 100 mm to 1400 mm. Along with the traditional pipes and fittings with spigot and socket joints, microtunnelling pipes, inliner pipes, drainage pipes, inspection manholes and cladding sheets are all part of the product range. Vitrified clay is a material that arises after firing high quality clay in controlled circumstances at a	http://www.steinzeug-keramo.com/CMS/all_Homepage_en.mfpx?noiso=yes&ActiveID=2848	Office in Hasselt, Belgium, close to GR.	Keramo Steinzeug N.V. Paalsteenstraat 36 3500 Hasselt BELGIUM Tel: +32 (0)11 21 02 22	

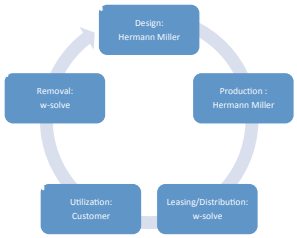
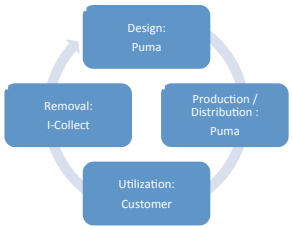
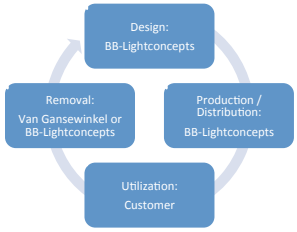
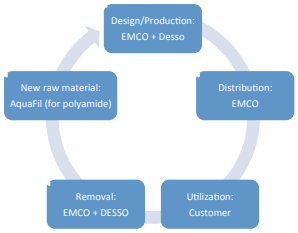
Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Stoll Giroflex AG	G353 Office Chair and Giroflex G 656 Office Chair	Office Chairs	Giroflex G 656: Company founder Albert Stoll I already emphasised sustainability. Back then he built his factory opposite Koblenz railway station in Switzerland and to this day many raw materials still arrive by train. Since the 1980s already the Swiss seating furniture specialist Stoll Giroflex AG has focused consistently on using and recycling low-emission materials, so that in 1992 it succeeded in bringing to market the first nearly one hundred per cent	http://www.giroflex.com/en/home.html	Also in Lux	Stoll Giroflex through Burotrend Sa RUE DE L'EGLISE 5 L-1418 Luxembourg Tel: 00352 48 25 68	
Superior Products INT. II INC:	Industrial coatings (Omega Fire™, HPC® Coating, SP Ceramic Stucco, Super Therm®, HSC® Coating,	Seal and cover surfaces, Ceramics insulation coating, Surface coatings (Curtain Wall	Omega Fire™: Build extra safety into structures with Omega Fire™, a ceramic-loaded, water-borne fireproofing coating. Omega Fire™ stays intact above 2000 degrees F (1100 degrees C) and has a 2 to 3 hour fire rating. Benefits of Omega Fire™:	http://www.spicoatings.com/	Distributor in Wuustwezel, Belgium, just outside of the region	Superior Products Europe N.V. Kampweg 123, 2990 Wuustwezel Tel: 32.(0)3 690 02 40 Fax: 32.(0)3 690 02 41	
Superior Products INT. II INC:	Rust grip	Surface coatings	Seal virtually any surface and protect it against corrosion, weather and physical wear with Rust Grip®. Rust Grip® is a three-coats-in-one system that acts as a primer, intermediate, and topcoat with a single application. Rust Grip® is a metallic-based, moisture-cure polyurethane encapsulating coating designed to coat and seal air, moisture, and minerals out of surfaces. Rust Grip® stands up to acids, salts and caustic materials with no loss of	http://www.spicoatings.com/	Distributor in Wuustwezel, Belgium, just outside of the region	Superior Products Europe N.V. Kampweg 123, 2990 Wuustwezel Tel: 32.(0)3 690 02 40 Fax: 32.(0)3 690 02 41	
Superior Products INT. II INC:	Enamo grip	Surface coatings	ENAMO GRIP is a tough, moisture curing, two-component polyurethane enamel, which produces a uniquely hard and durable coating film. ENAMO GRIP will demonstrate unsurpassed semi-gloss retention, color-retention, graffiti-resistance, and chalk resistance when utilized for exterior coating situations. ENAMO GRIP will also provide outstanding resistance to water and humidity, stains, chemicals, and solvents, as well as exceptional scuff, mark, and impact resistance	http://www.spicoatings.com/	Distributor in Wuustwezel, Belgium, just outside of the region	Superior Products Europe N.V. Kampweg 123, 2990 Wuustwezel Tel: 32.(0)3 690 02 40 Fax: 32.(0)3 690 02 41	
Synbra Technology BV	BioFoam	PLA	Synbra Group has a leading position in Europe regarding Expandable Polystyrene (EPS) for Sustainable Insulation Systems and Industrial Products & Solutions for a wide diversity of markets. Synbra Technology bv in Etten-Leur, The Netherlands, is the in-house polymerisation and R&D facility 'Technology & Innovation' and the centre of excellence in materials and product development. A recent example of the Synbra group's innovations is BioFoam®	http://www.biofoam.nl/index.php	Synbra Holding also in G.R.	Synbra through IsoBouw Dämmtechnik GmbH Etrastraβe 74232 Abstatt Tel: +49 70626780	
Tana Chemie GmbH and Werner & Mertz Group	green care PROFESSIONAL Cleaning & Care Range	Cleaning Products	This selection of 8 cleaning and care products out of the green care PROFESSIONAL assortment of the Werner & Mertz Group reflect outstanding innovative and sustainably developed products designed for all professional institutional- and industrial sectors like food service, healthcare, lodging and building service contractors. The complete range guarantees a holistic sustainable cleaning approach for:	http://www.c2ccertified.org/products/scorecard/green_care_professional_cleaning_care_range	Also in G.R.	Tana through Hofmann GmbH 65399 Kiedrich Eltviller Strasse 3 Tel: 06123/ 7 93 70 www.adam-hofmann.de	
Tarkett	Veneto Essenza 100% linen / Veneto Essenza Natural Clay	Flooring	The real nature of linoleum by Linoville: Our 100% linen linoleum, made without pigment, is the most authentic colour made by nature. The ONLY linoleum that is Cradle to Cradle Certified GOLD Veneto Essenza 100% linen Veneto Essenza Natural Clay	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
Tarkett	Linoleum / Linosom	Flooring	For more than a hundred years, Linoleum flooring from Tarkett, a worldwide leader in innovative flooring and sports surface solutions, has been made with care using the same manufacturing process and renewable raw materials like linseed oil, resin, jute, wood and corks flour. Tarkett's Linoleum xf is the first linoleum in the world awarded with the Cradle to Cradle® Silver Certificate.	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
Tarkett	Parquet	Flooring	Tarkett Parquet produced at Hanaskog (Sweden), Orzechowo (Poland), and Backa Palanka (Serbia) in the following styles: Tango, Tango Art, Flamenco, Salsa, Samba, Profesional, Bolero, Sinteros Europarquet, Sinteros Europlank, Sinteros, Eurostandard	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
Tarkett	Evolay	Flooring	Tarkett Evolay is a new step in resilient flooring. It is Cradle to Cradle Certified(TM) Bronze, developed using a high-performing resin which provides this product with outstanding environmental properties, ideal for projects in schools, hospitals, aged care facilities, and other public areas.	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	

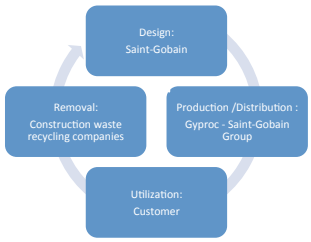
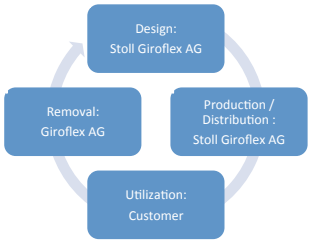
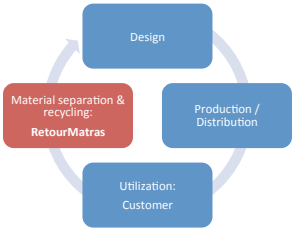
Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Tarkett	Artificial Turf	Flooring	Tarkett Artificial Turf in the following variations: FieldTurf Revolution, FieldTurf Revolution Cooplay, FieldTurf Classic HD, FieldTurf Classic HD Coolplay, FieldTurf Vertex , FieldTurf Vertex Prime, FieldTurf XM6, FieldTurf XT, FieldTurf, EasyTurf Select, EasyTurf Select Blend, EasyTurf Olive Lush, EasyTurf Nutmeg Lush, EasyTurf VersaLush, Easyturf Signature Professional Putting Green, EasyTurf Easyplay, EasyTurf Olive Ultra, EasyTurf Nutmeg Ultra, EasyTurf Ultimate Grass Multipurpose, EasyTurf Ultimate Grass Landscape, EasyTurf Ultimate	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
Tarkett	Johnsonite Rubber Tile	Flooring	Johnsonite Rubber Tile	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
Tarkett	Silencio xf² 18, Linosom Silencio 18, Acoustic fx² 18	Flooring	To reduce impact and ambient noise and enhance underfoot comfort and wellbeing, Tarkett's Silencio xf™2 offers an acoustic linoleum solution with sound reduction of 18dB. With a total thickness of 3.8mm, it's made in a two-layer construction of 2.5mm linoleum with a 1.3mm pre-bonded foam underlay. Available in all design options.	http://professionals.tarkett.be/	Belux office in Belgium as well as a retail office in Luxembourg	Tarkett Belux Wingepark 27C 3110 Rotselaar Tel: +32 (0) 16/35 98 80 Email: info.be@tarkett.com	
TGM	HV60	façade system	TGM developed the innovative and sustainable façade system HV60-C2C, a hybrid façade: the warm look-and-feel of timber on the inside and the durability and low maintenance of aluminum on the outside. This system is applicable in any form and to every type of building. All the materials used in HV60-C2C hybrid façade system are sustainable and/or reusable.	http://www.tgm.nl/nl/hv60/C2C	No offices close to G.R.	TGM Head Quarters Heesakkerweg 19 5721 KM Asten Postbus 198 5720 AD Asten	
Thoma Holz GmbH	Thoma Holz100	Wooden building elements	Vertical and horizontal wood elements are densely layered, without gaps, to become solid and compact construction elements. Bone-dry wooden dowels penetrate these layers in the full strength of the wall element. Once in position, the dowels soak up any residual moisture and swell like growing branches into the surrounding wood. Thanks to the strong connecting power of the dowels, a massive, solid whole is created out of the individual parts	http://www.thoma.at/	Sales representative for Luxembourg	No offices close to G.R, there is a sales representative for Luxembourg: Sales At, It, Lux, Sl, CZ Florian Thoma Tel: 0043 6415 /	
Trigema	Trigema eco-effective cotton apparel	Cotton apparel collection	Apparel fashion collection of comfortable, high quality sports-, street- and underwear. Made of choice organic cotton. Provided with carefully optimized dyestuffs and additions, according to the Cradle to Cradle® standards for the biological cycle and safe for the human body. Developed and produced under clean and fair conditions in Germany.	http://www.trigema.de/	"Test" sales points in G.R.	Trigema Testgeschäft Mettlach Marktplatz 6 66693 Mettlach Tel: (06864) 270 334	
Troldtekt	Troldtekt Acoustic Panels (Stertekt in Benelux)	Interior ceiling products	Troldtekt panels are made from 100% natural materials; wood from Danish forests and cement produced by Aalborg Portland, Denmark. The structure of Troldtekt panels provides a basis for excellent sound absorption, and using Troldtekt ceilings will, therefore, reduce noise and provide optimal room acoustics. Other product properties are: efficient fireproofing, healthy indoor climate, simple installation, and high durability. Architecturally, the characteristic	http://www.troldtekt.com/	Troldtekt is available as Stertekt in Benelux	No offices in G.R. Troldtekt available as Stertekt in G.R. through Isolco Benelux representative office: Dan Engelsman 5	
Turnstone® a steelcase brand	Scoop Stool	Office furniture	Simple form and clean lines add style to any environment. Designed by Kirt Martin. Versatile. Perfect for conference rooms, team spaces, cafe areas and other gathering places	http://myturnstone.com/	Steelcase in Luxembourg and G.R.	Steelcase through Felten-Stein 14 rue des Joncs Howald L-1818 Luxembourg Tel: +352 4 02352	
Van Gansewinkel groep	Van Gansewinkel Office Paper	Printing Paper	For a lot of people waste is "just waste" – something without any value. We think differently! We want to make something beautiful out of it. In today's waste we can find the seeds of tomorrow's products. This vision, built upon the Cradle to Cradle philosophy, resulted in our most recent innovation:	http://www.vangansewinkel.com/sitecore/content/Merksites/officepaper/Home.aspx	Also in Lux	Rue de Manage 59-61 B-7181 Famillereux Tel: +32 64 55 58 25 Fax: +32 64 55 57 81	
Van Gansewinkel groep		Waste management services	Waste no more – That is the credo of the van Gansewinkel Groep. The van Gansewinkel Groep is a waste management services provider and supplier of raw materials. The specialty of the company consists of different fields of activities: Every day hundreds of trucks are on the road collecting waste from customers and transporting it to the different processing locations of van Gansewinkel. As supplier of raw materials the company is specialized in the separation and recycling of waste. Separation takes place using innovative	http://www.vangansewinkel.nl/	Also in Lux	Rue de Manage 59-61 B-7181 Famillereux Tel: +32 64 55 58 25 Fax: +32 64 55 57 81	

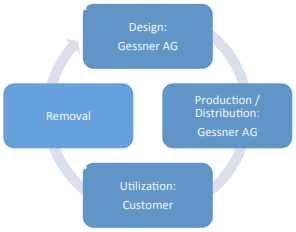
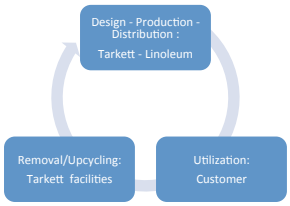
Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
Van Houtum B.V.	Multiple products	Washroom supplies	Satino Black Alcohol Hand Gel, Satino Black Foam Soap, Satino Black Hand Soap, Satino Black Hand Towels Super White, Satino Black Toilet Paper Super White, Satino Black Toilet Seat Cleaner, Satino Black Dispenser.	http://www.vanhoutum.nl/en/	Also in Lux.	Boutestraat 125 Business area nr. 942 6071 JR SWALMEN	
Van Puijenbroek Textiel (VPTex)	REWORK - workwear by Van Puijenbroek Textiel	Apparel	*Sustainable with a good price/quality ratio* REWORK Cradle to Cradle workwear is the result of a unique partnership between workwear producer Van Puijenbroek Textiel, textile service companies Berendsen and Lavans and waste management services provider Van Gansewinkel. The workwear is designed in such a way that all its constituent parts can be reused. Old and worn REWORK workwear can be used to spin new yarn or to make compost. The concept is innovative as well	http://www.vptex.com/en/	Van Puijenbroek textiel through HaVeP in Luxembourg and GR	VPTex Bergstraat 50 Goirle 5051 HC Nederland	
Van Swaay Duurzaam Hout	H2H® Products	Wood	This new wood product brings the benefits of European pine and tropical hardwood together. Providing a solution that fits seamlessly with the building requirements and environmental needs of our time. The major advantages: - Saving tropical hardwood	http://www.vanswaay.nl/gww-hout/h2h/	To be confirmed	Vlagheide 2 5482 NM Schijndel Tel: +31 (0)413 312727 Fax: +31 (0)413 367870 info@vanswaay.nl	
Vanderlande	Blueveyor	Conveyor belt	We have developed the BLUEVEYOR according to Cradle to Cradle® principles for a sustainable future. The system was first tested at Amsterdam Airport Schiphol, and its deployment is planned at several other locations. "We are the first airport in the world to test the BLUEVEYOR because we take sustainability very seriously. The BLUEVEYOR not only promises 30% energy savings, but it is also 100% recyclable." Mark Lakerveld, Senior Manager Baggage Amsterdam Airport Schiphol	http://www.vanderlande.nl/	Currently no certified products. Vanderlande in Belgium, The Netherlands, France	Schaliënhoevedreef 20J 2800 Mechelen Belgium Tel: +32 (0)15 21 19 88 Fax: +32 (0)15 21 91 36	
Vendor	Vendor cream soap	Cream soap	Refill container for hand soap dispensers.	http://www.vendor.nl/nl/	Vendor in The Netherlands, Belgium, Germany and France	Kapelanielaan 33 9140 Temse Tel: 0800 - 12525 Fax: +32 (0)3 771 38 35 E-mail: welkom@vendor.be	
Voigt & Schweitzer	duroZINQ	Metal coating	duroZINQ® hot-dip galvanizing produce zinc coatings for the purpose of corrosion protection and design of steel structures that are characterized by high quality in both appearance and function, as well as an extraordinary lifespan. duroZINQ® surfaces on steel will last a lifetime and protect steel from corrosion permanently and safely.	http://www.zinq.com/index.php	Many offices in Belgium and Germany, including offices in G.R.	Voigt & Schweitzer Henssler GmbH & Co. KG Forstbergweg 15 D- 71717 Beilstein Tel: +49 7062 262-0	
Wienerberger NV	Porotherm @ Rumst	Clay blocks	The Porotherm range of clay blocks is very extensive. It includes all current dimensions as well as blocks with specific qualities and special formats with regards to acoustic and thermal insulation, including blocks with increased load-bearing capabilities. Thus, Porotherm is able to offer a product for every application - one that is at the same time the most suitable	http://www.wienerberger.com/	Wienerberger in NL & Lux	Wienerberger afd. Zonnebeke Ieperstraat 186 8980 ZONNEBEKE Tel: 051 78 80 60 Fax: 051 77 10 28	
Wienerberger NV	Porotherm @ Beerse	Clay blocks	The Porotherm range of clay blocks is very extensive. It includes all current dimensions as well as blocks with specific qualities and special formats with regards to acoustic and thermal insulation, including blocks with increased load-bearing capabilities. Thus, Porotherm is able to offer a product for every application - one that is at the same time the most suitable	http://www.wienerberger.com/	Wienerberger in NL & Lux	Wienerberger afd. Zonnebeke Ieperstraat 186 8980 ZONNEBEKE Tel: 051 78 80 60 Fax: 051 77 10 28	
Wienerberger NV	Porotherm @ Zonnebeke	Clay blocks	The Porotherm range of clay blocks is very extensive. It includes all current dimensions as well as blocks with specific qualities and special formats with regards to acoustic and thermal insulation, including blocks with increased load-bearing capabilities. Thus, Porotherm is able to offer a product for every application - one that is at the same time the most suitable	http://www.wienerberger.com/	Wienerberger in NL & Lux	Wienerberger afd. Zonnebeke Ieperstraat 186 8980 ZONNEBEKE Tel: 051 78 80 60 Fax: 051 77 10 28	
Xella Deutschland GmbH	Xella Ytong Energy Plus	Aerated concrete	Ytong aerated concrete is a brand of the century: Now, one of the strongest brands in the building materials market, that has long been a guarantee for the best thermal insulation and solid quality, also numbers among the premium group of top German products.	http://www.xella.com/en/content/ytong.php	Ytong in G.R.	Xella Deutschland GmbH Düsseldorfer Landstraße 395 47259 Duisburg Tel: 0800 5235665 Fax: 0800 5356578	

Company	Product Name	Product Type	Product description	Website	Market presence Greater Region	Distributor or sales point close to or in GR	Listed on C2CCertified.org (Nov 2014)
XeroFlor International GmbH	Xero flor® vegetation	Green roof	Building owners, urban planners, environmentalists - xero flor provides all of them with good reasons for the green on the roof. Building owners will appreciate the fact that due to the green roof the lifespan of their roof will be twice as long. It is protected from UV radiation, mechanical and, in particular, thermal stress: over the year there is a difference in temperature of approx. 100°C on a conventional roof - on a green roof it is just 40°C. Accordingly	http://www.xeroflor.com/?&L=2	In Benelux, Germany and France	Xero Flor Benelux BV Torenlaan 14 7231 CB Warnsveld The Netherlands Tel: 0031 575 523 008	

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
White paper recycling	The company Steinbeis is working with different partners is order to create a closed-loop system. The design and production steps are made by Steinbeis. The marketing and distribution steps are partly done in cooperation with Océ (Canon Group). The use phase is done by the customer. DestraData is collecting safety paper from the customer and sending it with the help from Van Gansewinkel to Steinbeis. 	Substance optimization Closing the loop for safety paper	Van Gansewinkel + DestraData and EcoSmart (Paper collection, recycling, logistic) Océ - Canon (Marketing and Distribution)	No disposal costs for the producer. Less primary raw materials costs	http://www.stp.de/en/returnity-cycle/cradle-to-cradler/ http://www.vangansewinkel.com/sitecore/content/Merksites/officepaper/Home.aspx
Rework workwear textiles	The company Van Puijenbroek Textiel is working with different partners is order to create a closed-loop system. Van Puijenbroek Textiel is in charge of the design, production and marketing/distribution steps. After the use phase by the customer the company Van Gansewinkel organise the take back logistic. 	Design for disassembly Improved quality of the materials for recycling, through EPEA assessments	Berendsen Lavans Van Gansewinkel	Less primary raw materials costs for the producer Take back and washing is included in the service contract for the customer	http://www.c2certified.org/products/scorecard/rework_-_workwear_by_van_puijenbroek_textiel
Desso takeback system for carpets	The company DESSO is working with different partners in order to create a closed reverse-logistics system. DESSO is fully in charge of the design, production and distribution steps. During the installation of the carpets, there is a first collection step for carpet waste. At the end of the use phase, Van Gansewinkel is the logistic partner from DESSO for the material collection. The material is separated from the backing and the polyamide part is going to the AquaFil company in order to upcycled new Polyamide 6 yarns again. 	Design for disassembly Improved quality of the materials for recycling, through EPEA assessments	Van Gansewinkel AquaFil (Polyamide 6 yarn)	Less raw material costs for the producer No end of life costs for the customer	http://www.desso.co.uk/c2c-corporate-responsibility/cradle-to-cradle-achievements/
Carlsberg Circular Community Project start: February 2013	Carlsberg and selected global suppliers have joined forces to rethink the design and production of packaging material, to develop the next generation of packaging products that are optimised for recycling and reuse, while, at the same time, retaining or improving their quality and value. The approach is increasingly referred to as 'up-cycling'. The cooperation has been formalised through the Carlsberg Circular Community as part of the Carlsberg Group's work on Sustainable Packaging. 	Improved quality of the materials for recycling, through EPEA assessments	Rexam: Cans O-I: Glass bottles Arkema: Glass coating RKW: Shrink Wrap MWV (MeadWestVaco): Paperboard Multipacks Petainer: PET kegs fro draught beer	Less primary raw material costs for the producer. Customer retention for the producer.	http://www.carlsberggroup.com/investor/news/Pages/Carlsbergjoinsforceswithsupplierstoeliminatewastebydevelopingnextgenerationofpackagingforhigh-quality%E2%80%98upcycling%E2%80%99.aspx

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
Furniture leasing	The furniture leasing program is defined within different steps. The design and production phase are done by the company Hermann Miller. The leasing and distribution steps are made by w-solve. W-solve assumes the costs of the investment and the economic risks and continues to be owner of the furnishing elements. After the using phase by the customer, w-solve take the furniture back to Hermann Miller for recycling. 	Some of the Hermann chairs used by w-solve in their furniture program are Cradle to Cradle certified and designed to be upcycled in the technical cycle.	Hermann Miller	Low monthly costs for the consumer, no investment needed.	http://www.w-solve.com/
Puma shoes takeback	The company PUMA brought the bring me back program to reduce waste and keep products out of landfills. The company PUMA is in charge of the product design and also the production and distribution. After the use phase, the customers brings their products back to the "Bring Me Back" bins directly in the PUMA shop. I-CO is then in charge of the removal and recycling of the collected products. 	Design for recycling Biological and technical cycle separation Dye positive list	I-Collect	Less primary raw material costs for the producer Discount voucher for the customer by I-CO systems	http://brand.puma.com/bringmeback?lang=enhttp://www.ico-spirit.com/en/homepage/ http://www.ico-spirit.com/en/homepage/
BB-Lightconcepts takeback	BB Lightconcepts is a lighting systems provider. The company is in charge of the design, production and distribution of the product. During the use phase, the customers have the choice even to buy or to lease the products. In the case of buying, a recycling service provider like Van Gansewinkel manage this steps or in case of leasing by the customer, BB Lightconcepts is owner and manage the take back step. 	PVC free product Design for disassembly	TKH Group (Building, Telecom and Industrial Application) Van Gansewinkel	60% energy saving, quick ROI, less cleaning costs for the consumer	http://www.bb-lightconcepts.eu/en/advantages
Building entrance mat	The company EMCO is working with different partners in order to produce an entrance mat that can be totally recycled within the technical cycle. EMCO and DESSO worked together in order to create a mat with an aluminium profile, the DESSO EcoBase backing material and the polyamide insert that can be upcycled and create raw materials over and over again. Already in the design and production steps DESSO and EMCO are working together. The distribution is done by EMCO. After the use phase a take back program collect and separate the materials in order to create raw materials again. The company AquaFil is in charge of the polyamide recovering. 	AirMaster layer from DESSO Design for disassembly Adhesive-free components	DESSO AquaFil	Less raw material costs for the producer	http://www.c2certified.org/products/scorecard/emco_ecoline_pionier_emco_ecoline_pioneer http://www.emco-bau.com/de-en/products/entrance-mat-systems.html

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
Plasterboards	The company Gyproc which is member of the Saint-Gobain group, as developed in cooperation with EPEA a cradle to cradle® plasterboard. This plasterboard is already a by-product from an upcycling process made by flue gas desulphurization units for around 80-90% and by recycled plasterboards for around 10-20%. This process takes place in a so called "second loop". 	Plasterboards with air quality improvement features Heavy metals and product health controlling.	Gypsum to Gypsum	Energy and secondary raw material cost reduction for the producer Sells of a by-products for facilities using flue gas desulphurization units.	http://www.c2ccertified.org/products/scorecard/gyproc_a_plaat
Office furniture	The company Stoll Giroflex AG is producing office swivel, conference and visitor's chair, fully conforms with the "Cradle to Cradle" principle and is in charge of every step of the chain, from the design to the upcycling. Stoll Giroflex AG as also developed a leasing program in order to control every step of the use phase of their products and to be able to simplified the tack back process. 	C2C plastics C2C seat covers Take back program and plastic separation		Less primary raw material costs for the producer Less furniture costs for the customer (extended product life)	http://www.giroflex.com/en/added-value/ecology-and-sustainability.html
Mattress	The Auping company is working with different companies in order to create a closed loop in the mattress sector. Auping is in charge of the design, production and distribution steps. After the using phase, the company Van Gansewinkel is in charge of the collection of the mattress. The recycling step is done by the company RetourMatras. 	C2C certified latex foam (Natural Talalay)	Van Gansewinkel RetourMatras	Less material costs for the producer	http://www.auping.com/aboutauping/cradle2cradle/cradle2cradle.html
Mattress Material separation and recycling	The company RetourMatras is in charge of matrass collection and material separation and recycling. 		Van Gansewinkel	Less raw materials costs for the customer of recycled matrass materials	http://www.retourmatras.nl/?lang=en

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
Climatex Dualcycle	The company Gessner AG as developed a textile that can be used for application in the office furniture and the commercial property sectors. As the product is new on the market there are for now no need for investment in upcycling facilities. 	Improved quality of the materials for recycling, through EPEA assessments		Less raw materials costs for the producer	http://www.c2ccertified.org/products/scorecard/climatex_dualcycle
Linoleum, Parquet Tarkett ReUse Program	The Tarkett company is working since many years in partnership with the company EPEA. Tarkett developed their own recycling facilities in order to be able to create a closed loop for their products. The company has many contracts with institutional partners which allow them to have a good control on the use phase of their products. Since 1966 Tarkett has collected post-installation waste in different countries to recycle into new floor coverings, as well as recycle flooring at the end of its life into products ranging from road signs to piping. Tarkett recycles over 77,000 tonnes per year. Two Tarkett factory are specialized in recycling Ronneby (Sweden) and Clervaux (Luxemburg). 	Design for upcycling for the Linoleum Water stewardship Material content optimization Work in progress for the rubber and wood floors from Tarkett		Flooring waste collection and transportation is free of charge for the consumer. Less primary raw materials costs and less empty trucks for the producer.	http://professionals.tarkett.com/content/cradle-cradle-certificates
Venlo City Hall - supplier community and C2C Elements in buildings	Venlo City Hall - supplier community and C2C Elements in buildings. Resulted in 5 mio Euro savings on mortgage due to improved materials quality for residual value.				http://www.venlovernieuwt.nl/en/stadskantoor/venlo-is-building-a-new-city-hall
C2CExpolab	C2C Expolab - leasing and procurement for integrated office interiors. Educational showroom for circularity community.				http://www.c2cexpolab.eu/en/index.php
Park 2020 - C2C inspired area development with dedicated supplier community of 40+ companies	Park 2020 - C2C inspired area development with dedicated supplier community of 40+ companies. Co-developed with EPEA and William McDonough Architects				http://www.park2020.com/
Ronneby Backsippan Preschool	Ronneby Backsippan Preschool - C2C goal setting process, C2C supplier community. The community focused on air quality, light quality, materials quality, nutrition quality and links to the outdoors, resulting in the building being selected as one of the				http://www.ronneby.se/backsippanfsk (in Swedish)
Cefur Showroom	Cefur Showroom - C2C educational tool and meeting location for local circular communities & suppliers.				http://www.ronneby.se/sv/sidowebbplatser/cefur/showroom/

Name	C2C Certification benefits for LEED, BREAAM-NL and NL Investment Credits	Websites
Leedv4	LEED v4 – criteria Materials & Resources: Credit Building Disclosure and Optimization - Material Ingredients, worth up to 2 points. Option 1 - Materials Ingredient Reporting (1 point): awards projects with at least 20 permanently installed products (from 5 different manufacturers) that meet at least one of a list of criteria. One of these criteria is Cradle to Cradle certification. The product must be classified in the certification category Material Health “Cradle to Cradle v2 Basic level or higher or Cradle to Cradle v3 Bronze level or higher” to be eligible. All products currently certified at these levels will contribute to the credit. Option 2 - Material Ingredient Optimization (1 point): rewards projects that use products that document their material ingredients at least 25% by cost of the total value of permanently installed products in the project. Cradle to Cradle v3 Silver certified products are valued at 100% of cost, recognizing that they contain neither Cradle to Cradle banned list chemicals nor substances considered carcinogens, mutagens, or reproductive toxins. Cradle to Cradle v2 Platinum and v2 and v3 Gold and Platinum products are valued at 150% of cost, recognizing that these products’ chemicals have been fully optimized.	http://www.usgbc.org/node/2616399?view=language http://www.c2ccertified.org/get-certified/leed http://www.c2ccertified.org/news/article/leed-v4-recognizes-the-cradle-to-cradle-material-health-attribute-achieveme http://www.c2ccertified.org/news/article/architecture_industry_leader_hks_embraces_cradle_to_cradle_product_certific http://www.c2ccertified.org/news/article/leed_v4_includes_credits_for_cradle_to_cradle_certified
BREAAM-NL 2014v1.0	BREEAM-NL 2014v1.0 rewards the use of Cradle to Cradle Certified products in two different credits. For the credit Construction Materials, points can be earned with the significant reduction of the environmental impact of used construction materials. The credit Responsible Sourcing awards points for the use of responsibly sourced construction materials.	http://www.c2ccertified.org/news/article/new-breeam-nl-rewards-use-of-cradle-to-cradle-certified-products
Mia en Vamil (Respectively Milieu Investeringsaftrek and Willekeurige afschrijving milieu-investeringen)	Mia and Vamil represent fiscal advantages for environmentally friendly technology investments for entrepreneurs. The "ministerie van Infrastructuur en Milieu" encourages environmentally friendly investments with these schemes. With MIA you can profit from a tax deduction of up to 36% of the total investment. This is in addition to the usual deductions. Vamil offers the possibility to write off 75% of the investment cost at a moment which you decide for yourself. Mia and Vamil can be used together.	http://www.rvo.nl/subsidies-regelingen/mia-en-vamil http://www.rvo.nl/subsidies-regelingen/milieulijst-en-energielijst/miavamil/milieuvriendelijk-product-met-certificaat

Annex C. Bibliography of Bibliographies

Circular Economy Bibliographies

As described in the main body of the present study, a range of other studies and reports already contain bibliographies about the circular economy. Instead of re-inventing those, here are descriptions of where to find them;

A New Vision of Value: Connecting corporate and societal value creation. KPMG International (2014). KPMG International**:** Bibliography pp. 106 - 109. http://www.kpmg.com/global/en/topics/climate-change-sustainability-services/pages/a-new-vision-connecting-corporate.aspx

Opportunities for a circular economy in The Netherlands. Bastein, T., E. Roelofs, E. Rietveld and A. Hoogendoorn (2013). TNO**:** Notes pp. 104-109. http://www.government.nl/documents-and-publications/reports/2013/10/04/opportunities-for-a-circular-economy-in-the-netherlands.html

Reinventing the wheel: A circular economy for resource security. Hislop, H. and J. Hill (2011). Green Alliance**:** Notes and references p. 50. http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCMQFjAA&url=http%3A%2F%2Fwww.sita.co.uk%2Fdownloads%2FReinventingTheWheel-1110-web.pdf&ei=_aKMVJWiAsLDPMeEgOgI&usg=AFQjCNGWfBgiXqZ0K3dE994kpfbCIhpwog&bvm=bv.81828268,d.ZWU

Scoping study to identify potential circular economy actions, priority sectors, material flows & value chains. European Commission (2014). European Commission, Funded under DG Environment's Framework contract for economic analysis ENV.F.1/FRA/2010/0044 Bibliography p. 72. References pp. 134, 138-139, 147, 151-152, 157, 162-164, 174.

Towards the circular economy: Accelerating the scale-up across global supply chains. World Economic Forum (2014). World Economic Forum**:** Literature http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/literature/ [Accessed 28/10/14], Endnotes http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/references/ [Accessed 28/10/14].

Early circularity history;

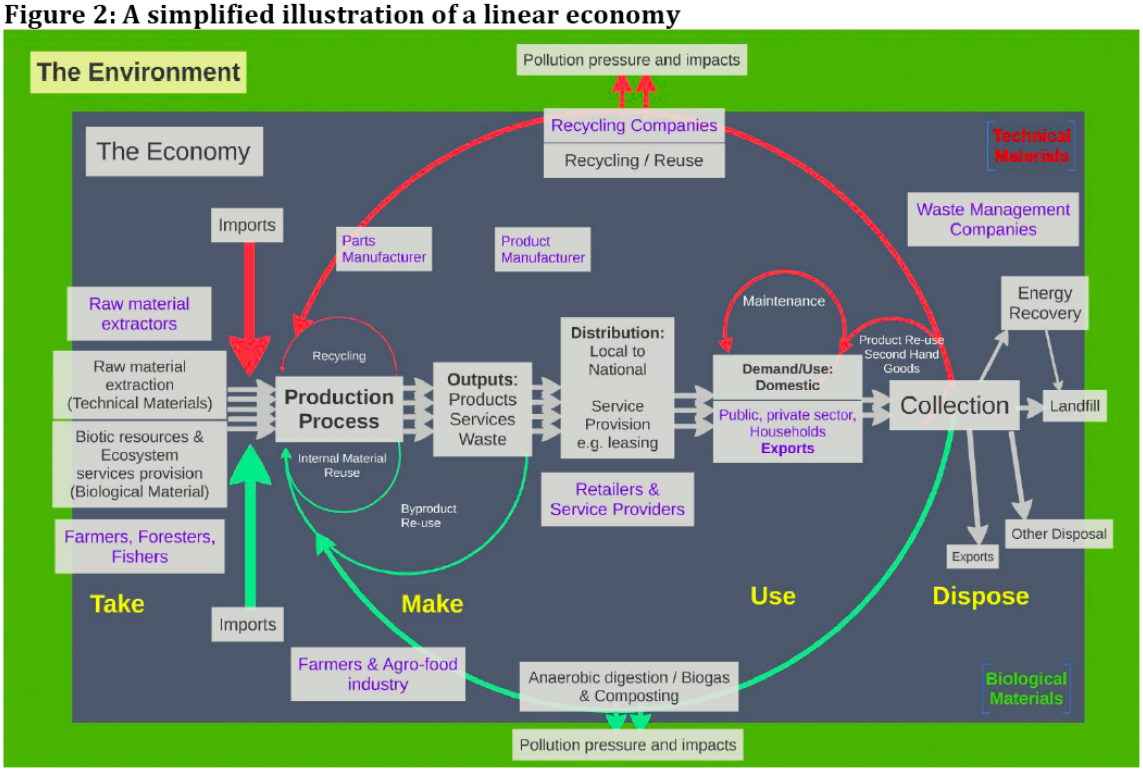
The Emergence of the Modern Circular Economy. Product Life Institute. Retrieved 28.10.2014, from http://www.product-life.org/en/circular-economy.

Publications relating to the development of Cradle to Cradle. Academic Chair Cradle to Cradle for Innovation and Quality (RSM). Retrieved 28.10.2014, from http://www.rsm.nl/research/departments/technology-and-operations-management/research/cradle-to-cradle-for-innovation-and-quality/c2c-publications-by-chair-members/.

Annex D. Examples Of Illustrations Of The Circular Economy

Figures D.1 and D.2 show the EC scoping study version for the linear and the circular economy after they examined many contemporary diagrams.

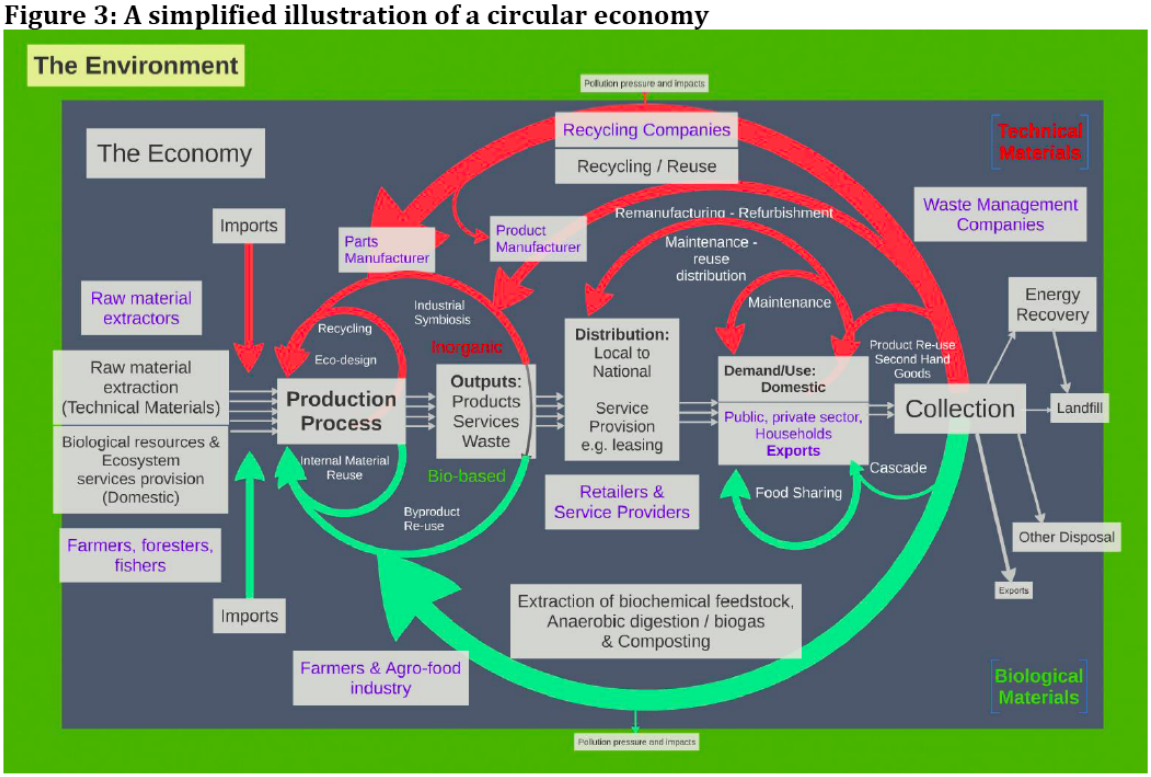
Figure 2: A simplified illustration of a linear economy



Source: Own representation, P. ten Brink, P. Razzini, S. Withana and E. van Dijl (IEEPa), 2014

Figure D.1: Linear from EU scoping study

Figure 3: A simplified illustration of a circular economy

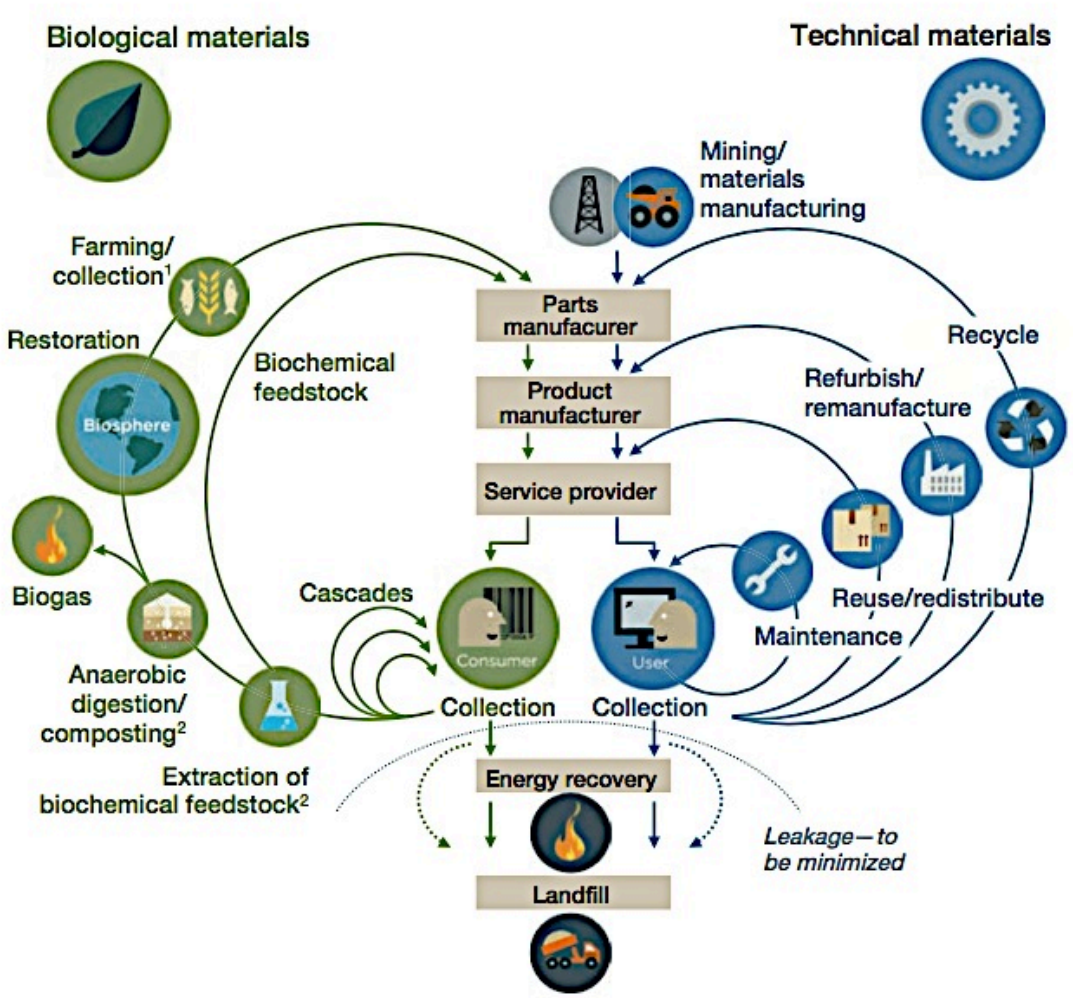


Source: Own representation, P. ten Brink, P. Razzini, S. Withana and E. van Dijl (IEEPa), 2014

Figure D.2: Circular from EU scoping study

Figure D.3 shows the representation by Ellen MacArthur Foundation/McKinsey/ World Economic Forum.

Figure 2: The circular economy—an industrial system that is restorative by design



[1] Hunting and fishing
[2] Can take both postharvest and postconsumer waste as an input

Source: Ellen MacArthur Foundation circular economy team drawing from Braungart & McDonough and Cradle to Cradle (C2C)

Figure D.3: Source; World Economic Forum, Towards the Circular Economy 2014

Figure D.4 is from Accenture 2014.

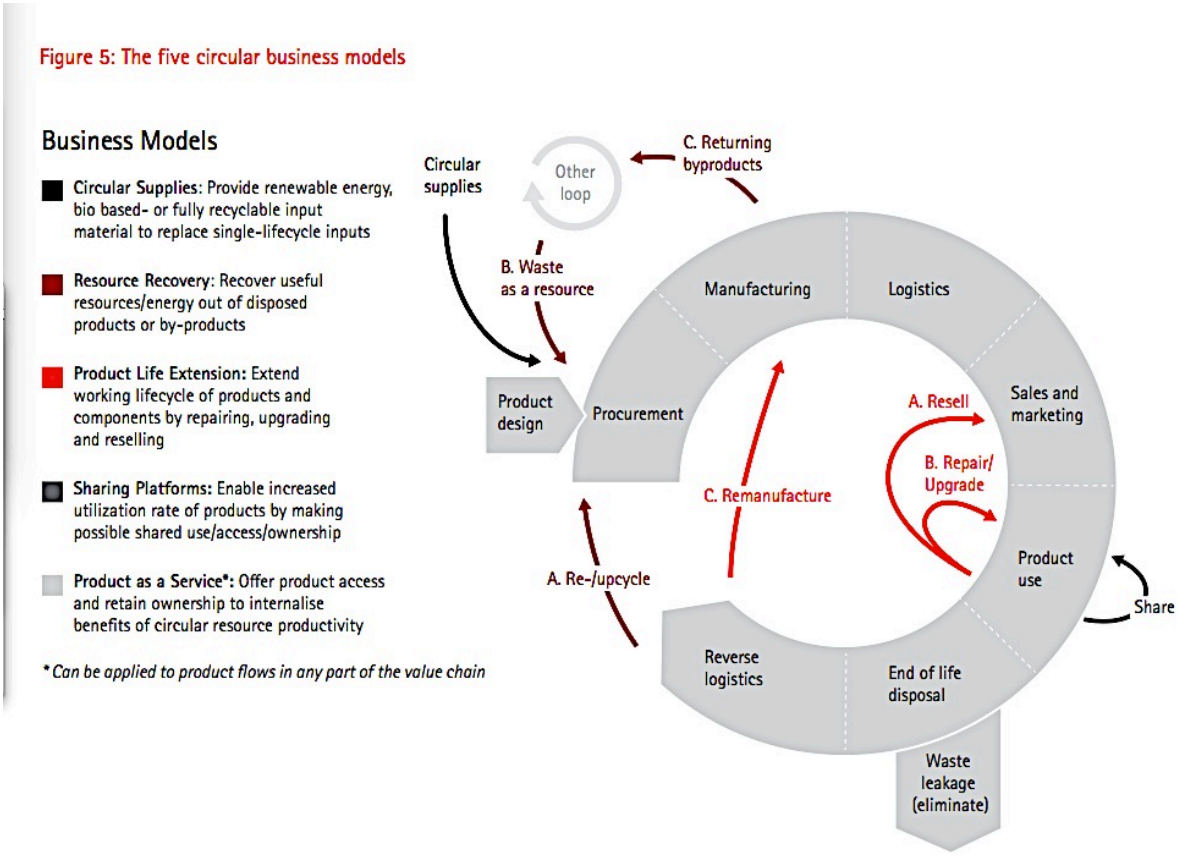


Figure D.4: Source; Accenture Circular Advantage 2014

Similarities of diagrams

- Those diagrams each describe the flow of materials through the process from extraction to manufacturing, distribution, use and disposal.
- Each describes circularity loops like repair, remanufacturing and recycling.
- The EC and EMF diagrams describe reprocessing of 'biological materials' and their use in cascades, as well as the use of technical materials in inner & outer loops.

The diagrams are also similar because none describe the largest potential for materials flow growth; using biobased feedstock & materials in technical cycles.

Annex E. Brief Description Of Cradle To Cradle

CRADLE TO CRADLE IN BRIEF

Cradle to Cradle (C2C) is an innovation platform for quality based on a protocol pioneered by scientists at EPEA. Its authors won the U.S.E.P.A. Presidential Challenge Award, The Oce van der Grinten Prize for Economics, the B.A.U.M. award, and many others. C2C is generating improvements for billions of Euros worth of products and systems due to this distinguishing characteristic;

> The traditional approach of government and industry is to minimize the environmental impacts of their activities by being "less bad" as products go from "Cradle to Grave". The approach often involves extra costs for stakeholders without many quantifiable economic benefits. However, the Cradle to Cradle® Design Protocol takes a different approach by going beyond the "grave" and conventional interpretations of "environment" to generate positive benefits for stakeholders.

Cradle to Cradle is a design paradigm for innovation to enhance the quality of products so they are:

- more practical for the user
- healthier for everyone affected by the product
- beneficial for the economy and the environment.

Cradle to Cradle was developed in the 1990s by Michael Braungart, William McDonough et al., based on research at EPEA in Hamburg Germany, for designing beneficial economic, social and environmental features into products, processes and systems. Cradle to Cradle® is primarily an innovation framework that starts by determining the intended benefits of a product or service.

To enhance quality and add value for stakeholders, C2C promotes innovation partnerships along the entire chain of a product, including manufacturing, distribution, use, disassembly, recovery and reuse. By characterizing hundreds of products and thousands of materials for their human and environmental health attributes, as well as defining systems to safely and fully cycle materials into new products, C2C has already provided a practical yet inspirational scientific and business model for improving quality.

C2C CATEGORIES

Cradle to Cradle can be divided into these categories that together make up the C2C Framework;

1. *Philosophy* e.g., a quality-based innovation platform for economy, ecology and social equity.
2. *Principles* that are translated into measurable criteria.
3. *Application tools*.

THE THREE PRINCIPLES OF CRADLE TO CRADLE

Quality is achieved by focusing on three innovation principles:

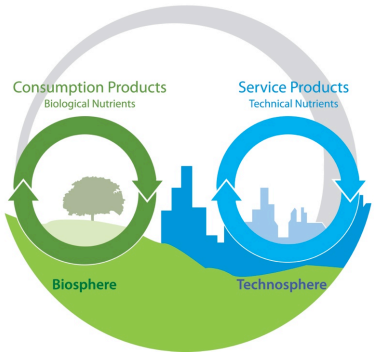
- *Everything is Designed as a Nutrient for Something Else.*
- *Use Current Solar Income. Energy that can be Renewed as it is Used.*
- *Celebrate Diversity. Species, Cultural, and Innovation Diversity.*

Biosphere and Technosphere
The circular economy focuses on systems, products, components, materials and ingredients designed for two main pathways: consumption pathways in the *Biosphere* where products are designed to safely enter biological systems, and service pathways in the *Technosphere* where products safely enter technical systems to be part of new future product generations.

Biosphere Products for consumption are designed so that degradation by-products generated during their use (e.g. abrasion or dilution in air, water or soil) support the biological systems they enter in the Biosphere. Those resources can be renewed through agriculture, reforestation, aquaculture or other ecosystem processes, each leading to next generations of products.
Examples of consumption products are: biodegradable textiles, cosmetics, or vehicle brake pads that wear out. However consumption products also contain inert materials like sand, which do not biodegrade but support bio-processes like soil formation. As well, metals like zinc and magnesium are usable in the Biosphere if designed for compatibility with biosystems.

Technosphere Products for service are designed to be chemically stable during use and get dismantled into Technosphere resources, known as´nutrients´ after they fulfill their function. The ingredients in these renewed technical nutrients are carefully defined as resources for next generations of service products. Examples of technical nutrients are found in electronic appliances, although these might sometimes contain biosphere products like coatings, which are designed to wear off into the environment during use. Technosphere products also often contain bio-based materials. Those are designed for continuous use instead of being consumed at once.

Diagram. Cradle to Cradle metabolisms and product types.



ABOUT THE NAME

Extensive books, cover stories and documentary films are published and broadcasted about C2C since the 1990s. The books *Cradle to Cradle* as well as its sequel *Upcycling* are translated into many languages. *Everybody everywhere is permitted to apply C2C philosophy and principles, using normally practiced academic citations. The use of C2C terminology in academic, reporting and governance contexts is permitted and encouraged.* For services, processes and products, the terms Cradle to Cradle® and C2C® are registered marks of McDonough Braungart Design Chemistry LLC. The marks are used for quality assurance to be sure organisations making C2C claims about products, processes or services use the C2C Design Protocol® accurately. Similar quality assurance mechanisms are used for other broadly-adopted standards by governments and companies, e.g. International Standards Organisation (ISO) standards. Protocols governing C2C usage are similar to the protocols governing those standards.

For more information on C2C refer to these links;

OVERVIEWS

Cradle to Cradle What is That? Developed by design firm Reggs with training by EPEA
https://www.youtube.com/watch?v=APGkIrQc-H0&list=UUSx4JJPC1q5P4LKgNYeNdtg

Business Value
http://www.youtube.com/watch?v=AwBkc_2HuXg

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

Ellen Macarthur C2C Tour
https://www.youtube.com/watch?v=zEyF-aq4F94

Gugler printing
http://www.youtube.com/watch?v=UIrvWVcb4E8

MANUFACTURING

DSM C2C Plastics
Describes materials for office chairs but the same plastics are used in automotive as well as some in 3D manufacturing
http://www.youtube.com/watch?v=NFfu5GHW-5U

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

Maersk C2C Passports
http://www.youtube.com/watch?v=Axs4MT8QCcg

Automotive glass
https://www.youtube.com/watch?v=5aHjpOGMWTY

BUILDINGS & PRODUCTS IN BUILDINGS

Designs for Assembly & Disassembly
Clickbrick (Dutch language)
http://www.youtube.com/watch?v=jMy5qTeWqKQ

Venlo City Hall
http://www.youtube.com/watch?v=FWDGgoTLYGA
http://www.youtube.com/watch?NR=1&v=JmY0QtRh9I0

Desso Airmaster --- Advertisements for the U.S. market about how carpets prevent allergies http://www.youtube.com/watch?v=v8wZnNoIssE

Tarkett flooring
http://www.youtube.com/watch?v=cTp_sSp_z1k

Icestone surfaces.
http://www.youtube.com/watch?v=PqRfO2CS8Z8

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

Orangebox chair
http://www.youtube.com/watch?v=09x1W---U4h28

RAPID-CYCLE PRODUCTS

Goodbaby
Strollers http://www.youtube.com/watch?v=SXL-yDH8Stk

Method Cleaners
https://www.youtube.com/watch?v=l9C9uFUZILY

Puma Incycle
https://www.youtube.com/watch?v=j9zfkYHtuMc

Annex F. Circularity Principles For New Legislation

PRINCIPLES FOR NEW LEGISLATION ON AID SCHEMES TO ENCOURAGE

ENVIRONMENTAL PROTECTION AND RATIONAL USE OF RESOURCES

INTRODUCTION

The European Union recently introduced new legislative approaches for R&D and for aid to encourage environmental protection and rational use of resources, and requested member states to integrate those into national legislation.

As part of a study for the Ministry of the Economy on circular economy (CE) inventory and potential, EPEA was requested by the Ministry to provide draft guidelines for CE aspects of legislation for co-financing R&D as well as supporting companies on clean technologies. The aim is to guide the legislation to support the right type of CE activities, and not accidentally discourage them.

The following draft guidelines resulted from the Ministry's request. It is aimed more at applied R&D than basic research although basic researchers might gain insights from the guidelines. Feedback from the Study Steering Committee suggested that the guidelines might also be practical for other legislation as well as procurement and financing.

CONTEXT

The Ministry provided EPEA with the following background information;

The European legal framework that Luxembourg has to respect and that we base our national laws on when it comes to granting aid to companies can be found under the following link:
http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0651&from=EN
Article 47 page 61 may be of particular interest. It is also an article that was not in the law before;

Investment aid for waste recycling and re-utilisation

1. Investment aid for waste recycling and re-utilisation shall be compatible with the internal market within the meaning of Article 107(3) of the Treaty and shall be exempted from the notification requirement of Article 108(3) of the Treaty, provided that the conditions laid down in this Article and in Chapter I are fulfilled.
2. The investment aid shall be granted for the recycling and re-utilisation of waste generated by other undertakings.
3. The recycled or re-used materials treated would otherwise be disposed of, or be treated in a less environmentally friendly manner. Aid to waste recovery operations other than recycling shall not be block exempted under this Article.
4. The aid shall not indirectly relieve the polluters from a burden that should be borne by them under Union law, or from a burden that should be considered a normal company cost.
5. The investment shall not merely increase demand for the materials to be recycled without increasing collection of those materials.
6. The investment shall go beyond the state of the art.
7. The eligible costs shall be the extra investment costs necessary to realise an investment leading to better or more efficient recycling or re-use activities compared to a conventional process of re-use and recycling activities with the same capacity that would be constructed in the absence the aid.
8. The aid intensity shall not exceed 35 % of the eligible costs. The aid intensity may be increased by 20 percentage points for aid granted to small undertakings and by 10 percentage points for aid granted to medium-sized undertakings.
9. The aid intensity may be increased by 15 percentage points for investments located in assisted areas fulfilling the conditions of Article 107(3)(a) of the Treaty and by 5 percentage points for investments located in assisted areas fulfilling the conditions of Article 107(3)(c) of the Treaty.

26.6.2014 EN Official Journal of the European Union L 187/61

10. Aid for investments relating to the recycling and re-utilisation of the beneficiary's own waste shall not be exempt from the notification requirement under this Article.

CIRCULARITY PRINCIPLES FOR LEGISLATION SUMMARIZED

SYSTEMS SUPPORT

Focus on redesigning materials, products and systems to boost higher value preserving material loops, by driving more qualitative inner circle activities, esp. remanufacturing, refurbishment, maintenance, re-commerce, compared to only recycling and byproduct valorization.

Qualify practical activities focused on business model innovation which would allow many SMEs to qualify once they can show that they want to convert their business into CE-transformer e.g. material intensive business line, which transforms into performance-based contracts e.g. Good Year on tire lease, Hein on air-conditioning by degree of temperature controlled) or they want to offer services to others, who in return can adopt/develop CE business models e.g. financing services, repair services, reverse logistics management services. Use those to support R&D type of activities with a focus on material or product innovation).

Provide for consortium-based research support instead of single entity funding e.g., for industrial symbiosis in food-byproduct valorization, cluster initiatives for training.

LEGISLATIVE FRAMEWORK

Clarify Terminology
Support Positive Impacts
Support integration of Technology with Systems, Business Models and Financial Tools
Support CE Tools which increase job creation
Focus on Human/Robot Interactions

MATERIALS

Recover Critical Materials by Improving Residual Value
Support Designs for Biological and Technical Cycles
Support Defined Content
Integrate Rapid Assembly, Flexible Use & Disassembly
Support Cascades
Transform Incineration from Mixed Waste to Purpose-Built and Modular
Support Biocompatible Pharmaceutical**s**

EMISSIONS & ENERGY

Support Emissions Re-use
Support Threshold Efficiency

DIVERSITY

Support Biodiversity

ACTIVITIES TO AVOID

Mixed waste incineration
Composites with no recycling solution
Undefined recycled materials
Eco-efficiencies which generate a negative rebound effect

Non-renewable fuel subsidies

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
LEGISLATIVE FRAMEWORK		
Clarify Terms Used for Describing Circular R&D	**Description.** Every discipline has its own terminology. Terms used for the circular economy are sometimes the same as those used by researchers but might have different usage depending on the discipline. To align the terminologies it is advisable to have, or add to, a Glossary of terms especially for qualitative aspects. **Actions.** In the preamble to legislation, include in a Glossary the terms used for the circular economy. If the terminology is broadly understood it will facilitate implementation of R&D legislation and funding.	Glossaries are available describing e.g. • Biological & Technical metabolisms. • Biobased, biodegradable, and biomaterials. • Cascades. • Consumption Product • Defined content. • Defined use scenarios. • Eco-effective. • Reverse logistics. • Service concept. • Performance economy. • Renewable energy
Support Positive Impacts	**Description.** Experience suggests greater added value is generated by maximizing positive impacts which add value to products and services, compared to the traditional regulatory approach of minimizing negative environmental impacts. The approaches share some characteristics but start from a different set of assumptions. **Actions.** Develop a practical definition of CE *Positive Impacts* for R&D, based on examples in the markets today. **Actions.** Support R&D into systems, which add value by being actively positive for the environment in measurable ways.	**Materials**. Enka Moss®, TiO2 coatings, and Desso Airmaster® carpets which actively clean the air by capturing or metabolizing pollutants. Those each result from R&D projects and replace energy-intensive air filters. **Renewable energy**. Positive energy residential & office buildings in e.g. Stuttgart. **Biodiversity**. Urban greywater recycling systems which serve as habitats e.g. at Park 2020, Venlo.
Integration	**Description.** In the circular economy, technologies have to function across	**Logistics.** Steinbeis and its partners have a reverse

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
Integrate Technology & Materials R&D with Business Models, Enabling Tools & Financial Levers to Scale Up Technologies. **Integrate R&D for Products with Development of Services to Deliver those Products**	diverse value chains in diverse business models to add value. Today there are limited links between R&D on materials, industrial product design and business models & financial tools. Government can speed the process by funding R&D for services, systems & enabling tools, together with technologies & products. Services like leasing, renting, sharing, logistics & take-back systems encourage producers to keep responsibility for materials and improve residual value by optimising designs. **Actions**. In the R&D funding framework, integrate direct funding support for R&D with support for levers such as securing loans, guaranteeing seed volumes, and supplier community chains. As well support R&D projects across institutions like Tudor, Luxembourg School of Finance, and Luxembourg Business Academy. **Actions.** Scaling up. Support R&D activities which integrate applied research with R&D into scaling up feedstock and marketing, as well as delivering products as a service.	logistics system for destroying confidential documents, collecting and transporting it for high-quality recycling, then shipping it back to customers who purchase the finished product. The system provides high quality feedstock for innovative technologies to optimise white paper recycling. VanDerLande Blueveyor® system designed for disassembly, offline maintenance, safe materials, biocompatible lubricants, and using ~50% less energy and materials than earlier models. The systems innovations make baggage handling safer and less expensive to operate. **Information Systems.** Information platforms are being developed which allow participants across the value chain to see the same information about materials in real time for every product installed in a building, to improve residual value. **Financial Levers**. Government procurement which promotes circular activities but meets open competition stipulations. C2CBizz has various examples. **Supplier Communities.** Carlsberg Circular Community. Venlo supplier community, Park 2020 supplier community.
Support Circular Tools Which Improve Job Creation and encourage SMEs	**Description.** Luxembourg has a structural unemployment challenge for unskilled workers. Luxembourg also depends heavily on SMEs for job	Mercedes & BMW each have automotive disassembly facilities.

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
	creation. CE tools like reverse logistics & disassembly provide meaningful work for those workers and support creation of new enterprises. **Actions**. Support R&D, which describes potential job creation for low-skilled workers and opportunities for SMEs.	Belgium's MIP programme financed a furniture disassembly pilot with Steelcase and an employment agency. Algae wastewater purification systems as well as phosphate recovery systems developed by SMEs together with universities generate fertiliser for agriculture.
Support Robot/Human Interactions for Rapid Assembly & Disassembly	**Description.** Robotics are leading technologies for product manufacturing, logistics, and disassembly, as well as enhancing human performance and operating in hazardous environments. The interaction between humans and robots is especially important for combining intuitive innovation with repetitive tasks to add value. Because Luxembourg is focusing on logistics, robotics are especially important. **Actions.** Support R&D into human/robot interactions across the R&D universe.	Scientists at CRP Henri Tudor work on human robot interactions and while the activity is still small in scope it is promising.
MATERIALS		
Recover Critical Materials by Improving Residual Value	**Description.** The EU as well as national governments bordering on Luxembourg have critical raw materials lists which are focuses for added value methods of recovering materials. **Actions.** Support designs for quick assembly, disassembly, and recovering resources on critical materials lists. **Actions.** Specify smart designs for improving materials recovery, instead of designs, which minimise materials use but as a result of minimisation make	Crystal Green® technology based on R&D at University of British Columbia which recovers phosphate from wastewater systems for re-use as fertiliser. Philips redesigned its Senseo® coffee maker so the polymers can be easily removed and recycled at a similar level of quality.

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
	those materials un-economic to recover.	
Support Designs for Biological and Technical Cycles.	**Description**. The Circular Economy is based on Biological and Technical cycles for materials. Innovative products are designed for those cycles. **Actions.** Support designs of materials in products and processes to be compatible with biological or technical cycles to add value for the circular economy, with special focus on materials for composites, additive manufacturing, and nanomaterials.	The CleanGredients® online database, sections of the Materials Conexxion database, and open source C2C Certified protocols support defined use of ingredients. Companies like Nike have positive lists where ingredients are described as suitable for biological or technical cycles, instead of only lists of banned chemicals, which only exclude certain ingredients but do not deal with thousands of other undefined substances.
Support Defined Content	**Description.** Surprisingly many researchers and manufacturers do not know exactly everything in their products. Contamination from formulation processes, undefined recycled content, as well as different materials from different suppliers lead to unknown content which reduces residual value . As well green criteria often reward undefined recycled content over defined content. The practice leads to virgin materials being contaminated, which complicates recycling and reduces residual value. **Actions.** Focus on R&D which defines materials to 100 ppm, so the materials are safe and re-usable instead of undefined and downcycled content.	Thousands of product components and ingredients in markets today are defined to 100ppm because they conform with the Cradle to Cradle Design Protocol. These include a range of construction and consumer products. Examples include construction materials, home and office furniture, floor coverings, textiles, cleaning products, office supplies and packaging (See Annex xx for products availabel in the Benelux.)
Integrate Rapid Assembly, Flexible Use & Disassembly	**Description.** Manufacturing costs as well as operational and residual value of products is improved when designs for disassembly also account for flexible use	Fibertec Cradle Vent® is a 100% defined fabric-based air handling duct quickly installed, removable for flex use,

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
	and rapid assembly. **Actions.** Support R&D which describes a plan for integrating designs for disassembly with rapid assembly and flexible use in environments like buildings.	washable, and contains materials which can be recycled at the same level of quality.
Support Cascades	**Description.** Studies show cascades are one of the leading drivers of added value and employment generation. Cascades are mechanisms for innovation and materials re-use in the circular economy, where materials from one product or process become resources for another. The cascade encourages diverse value chain solutions and customers compared to more restrictive closed loops. In order for cascades to succeed it is preferable to redesign materials as high quality resources along the cascade chain. **Actions.** Support R&D as well as business research, which describe how materials are designed for use in cascades and generated added value. Support R&D into systematic approaches to cascades across value chains where multiple materials users interact.	The paper cascade from high quality office paper to lower quality paper then tissue paper is working in some areas of Europe with e.g. Van Houtum and Steinbeiss, but only at a low level. A more systematic approach is warranted.
Transform Incineration from Mixed Waste to Purpose-Built and Modular	**Description.** Mixed waste incineration is a leading barrier to recycling innovation. It creates a suction effect and distorts markets due to overcapacity across Europe. It degrades residual value. **Actions.** Support technologies, which transform mixed waste incineration into modular incineration which destroys materials not suitable for recycling.	Older types of PVC are heavily contaminated and are best separated from newer types then incinerated.
Support Biocompatible	**Description.** Bio-compatible platforms	Vesicle-based therapies. A new

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
Pharmaceuticals	are being developed which eliminate water pollution from excreted pharmaceuticals. River systems and drinking water in most European cities are contaminated with pharmaceuticals residues. Luxembourg has advanced nano-technologies with a capacity to support R&D into biocompatible therapies. **Actions.** Support R&D which develops biocompatible pharmaceuticals including metabolisation rate and degradation in ecosystems.	generation of vesicle based vaccines and therapies are underway. The vesicles are metabolised or biodegradable when excreted. E.g. The Outer Membrane Vesicle vaccine developed in Norway and Cuba wiped out bacterial meningitis in many countries and is adapted by Novartis.
EMISSIONS & ENERGY		
Support Emissions Re-use	**Description.** Carbon capture on its own is often too expensive, but becomes profitable if integrated with e.g. wastewater treatment. **Actions.** Support R&D which optimises re-use of emissions like CO2 and methane as raw materials for manufacturing, energy storage & generation.	Ecoduna in Austria installed 3 pilot projects using algae in pipes to capture and reuse CO_2 to grow biomass. Nike is replacing billion of liters of water with Dyecoo® CO_2 Dye systems for its fabrics. Mitsubishi Heavy Industries is capturing CO_2 from chemicals operations and reusing it to manufacture fertiliser.
Support Threshold Efficiency (also known as breakthrough efficiency).	**Description.** Threshold efficiency is defined as integrating energy efficiency improvements with renewable energy technologies to make renewable energy more cost-effective and scalable. **Actions.** Support R&D, which integrates efficiency with renewable energy scale-up, instead of only reducing non-renewable energy use.	Integrating LED lighting and energy monitorin gsystems to reduce energy consumption so it is cost-effective to run lighting from photovoltaic panels on the roof of a building.
Clarify Definition of Renewable Energy	**Description.** Renewable energy definitions sometimes include energy from burning fuels or products, which require decades or millions of years for	Solar, wind, gravitational and geothermal energy are renewable in the time period when they are used.

CIRCULARITY GUIDELINE	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
	nature to replace, so are unsustainable. **Actions.** Clarify in R&D criteria that renewable energy is energy whose fuel sources are renewable at a sufficient speed to continue generating the same level of energy or greater without depleting a resource.	Energy recovery from incineration only recovers a small fraction of the embodied energy in products, whereas cascade use of products maximise the use of the same embodied energy.
DIVERSITY		
Support Biodiversity	**Description.** Technologies which support biodiverse habitats for e.g. beneficial insects & other species as well as soil regeneration are becoming increasingly important to add value in urban and rural areas. **Actions.** Support R&D proposals which describe how results will improve biodiversity, regardless if the main aim is to improve biodiversity or not.	Palaterra® topsoil manufacturing to regenerate degraded agricultural soils by capturing and retaining carbon and nutrients. Functional landscaping, phosphate recycling, and biofuels generated from sources like algae oils which do not compete with soil-based food crops.

ACTIVITIES TO AVOID

ACTIVITY TO AVOID	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
Mixed waste incineration	**Description.** Mixed waste incineration is a leading barrier to recycling innovation. It creates a suction effect and distorts markets due to overcapacity across Europe. **Actions.** Support R&D for recycling instead of incinerating products used in Luxembourg by integrating designs for disassembly with reverse logistics and high quality residual value of materials.	The City of Copenhagen recently commissioned a 4 billion euro incinerator at a time when there is overcapacity in Scandinavia and Europe. At the same time the Danish environment ministry adopted a circular programme for materials. The initiatives conflict, resulting in wasted public investment and loss of valuable materials.
Undefined primary &	**Description.** Businesses in Luxembourg	Various building and LCA

ACTIVITY TO AVOID	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
secondary materials	are having trouble accessing high quality steel and aluminum due to low quality undefined recycled metals. **Actions.** Support redefinition of "recycled" to include defined materials. Support maximal separation of high value materials prior to recycling, as well as materials banking which keeps track of e.g. steel products manufactured in Luxembourg and exported so the steel can be recovered at high quality. Probably involves a supplier community with the automotive industry.	standards reward undefined recycled materials.
Composites with no recycling solution	**Description.** Composites especially in additive manufacturing are one of the fastest growing areas of R&D. However, many composites are being introduced to markets with no technologies to recover the component materials or ingredients. **Actions.** See 'Support Designs for Biological and Technical Cycles'.	B2B 3D printing technology companies sometimes do not allow users to know what is in the material printing cartridges, which creates a potential contingent liability for companies using the feedstock materials.
Eco-efficiencies which generate a negative rebound effect	**Description.** The rebound effect occurs where eco-efficiencies unintentionally accelerate consumption of non-renewable resources. **Actions.** Support R&D applications which describe how to avoid a negative the rebound effect when the technologies are scaled up.	Minimising metals use in motors and electronic devices but not allowing for easy disassembly and recovery of metals for economic re-use.
Subsidies for non-renewable fuels	**Description.** Non-renewable fuels are described as "undesirable leakage" of materials in the circular economy. Subsidies for non-renewable fuels have been identified by various international agencies as one of the leading barriers to adoption of renewables.	R&D on clean coal, nuclear fuels & fracking.

ACTIVITY TO AVOID	DESCRIPTION & ACTIONS	EXAMPLES IN THE MARKETPLACE TODAY
	Actions. Phase out support for R&D into non-renewable fuels, except for re-using emissions as resources.	

Annex G. S.W.O.T. Context & Barriers/ Obstacles To The Circular Economy

SPECIAL NOTE.

The 8 page Annex is excluded at the request of the Ministry until the Ministry determines if it wants to gain permission from the authors of other studies to reproduce extensive sections of their studies.

Annex H. Academic Courses In The Greater Region Relevant For Circularity

The following image is a screenshot of an Excel workpage which is available to the Ministry on request. The links are to academic courses or R&D programmes at Greater Region Universities which have links to topics of relevance for circularity in Luxembourg, for example biomaterials, biochemicals, designs for reversibility.

The list is intended as a brief overview and requires further investigation to complete; something which might be done by the new Ecoinnovation group recently created in the Greater Region.

University	Courses					
Saarland U.						
U. Kaiserslautern	Ressourceneffiziente Abwasserbehandlung - Stiftungsprofessur	Umweltverträglichkeit von Baustoffen (Sekundaerrohstoffe)	Tailored & Smart Composites (Werkstoffe, recycled materials)	AG Werkstoff und Oberflaechentechnik (AWOK, also recycling)	Workshop Rezyklierter Beton	
Trier	Sekundärrohstoffe					
U. Liege	Reverse metallurgy	Recycling of sewage sludge (recycled materials)	Maybe: Chemical and Materials Engineering	Maybe: Master's degree in Geology and Mining Engineering	Master Environmental Management (waste recovery)	Master in Agriculture and bio-industries
U. Lorraine	Chemicals					
U. Luxembourg	Master civil engineering	Master Sustainable product creation				
U. Greater Region	Materials Science					

Annex I. Results From Ecoinnovation/ KPMG Finance Workshop October 2014

The following results were reported by KPMG from a workshop held with representatives of Luxembourg's financial industry October 9, 2014.

Key messages and challenges identified during the October 9 workshop;

Principles:

1. Show the risks of not developing businesses further to circularity
2. Society tends to moving from "ownership of assets" to "use of services"
3. Present Luxembourg's potential role in creating strategic material security partnerships; Could Luxembourg develop a framework and take the lead in driving such partnerships?
4. Business Opportunities available for all sectors in Luxembourg

Implementation:

5. How do we retain a high quality of materials or products with better technology (to prevent downgrading of reused materials or products)?
6. How can we certify secondary materials and their quality and thus determine their value (standards, labels, certification, etc.)?
7. How can we certify the quality of "final products" and "services" respecting the circular economy? Is such a certification necessary for the finance industry?
8. How can we assess the value of materials used in a building, which basically takes the function of a "materials bank" (standards, certification, assessment of market movements between the construction and the demolition of the building, deconstruction that allows guaranteed separation of the materials, etc.)?
9. How should additional costs, e.g. due to disassembly work, be assessed and incorporated into a profit and loss calculation?
10. Luxembourg's potential in a labor intensive sector (disassembly, repair, reuse) despite high labor cost
11. Show the potential involvement of Luxembourg's research community like the Luxembourg Institute of Science and Technology - LIST, the University of Luxembourg and others. They could search for cooperation with companies with the aim to co-develop and test products and services for new business models. An interdisciplinary and trans-sectorial approach would contribute to develop science-based standards and labels, e.g. for materials but also companies and business models.

12. Present specific examples that are already working in Luxembourg or the Greater Region
13. How is the reverse logistic working if the product was produced in China or elsewhere far away? What is the alternative to send back the product to the original producer? Would a local treatment (disassembly, refurbishment and reuse) be sufficient to close the loop?
14. Present advantages along the production and supply chain
15. Luxembourg's fiscal and legal environment – existing benefits and required development

Financing:

16. Many opportunities; focus on innovative products / innovative firms involved in circular economy
17. Are the already existing leasing schemes appropriate to further encourage and enable material flows?
18. Structured approach needed to show finance opportunities for circular economy initiatives
19. Opportunities from EU program Horizon 2020
20. Potential of Luxembourg Future Fund to attract companies that are involved in circular economy initiatives to Luxembourg
21. Develop exchange platform for knowledge sharing and as investor – industry meeting platform
22. Explore the possibility to develop a Circular Economy specific fund vehicle
23. Build up on existing Responsible Investment policies and standards

Annex J. Priority Interviewees For The Study

SPECIAL NOTE.

Annex J is excluded at the request of the Ministry for personal privacy reasons until the Ministry determines if it wants to gain permission from the interviewees to have their names listed here.

Annex K. Circularity-Inspired Systems

The following is a selection of diverse systems approaches to the circular economy. A few of the systems are still in development. A few use some products certified for circularity cycles while others do not.

The columns describing aspects of those systems are incomplete due to a lack of information on the marketplace results of those systems, or because the systems are not available in the Luxembourg Greater Region so were only a secondary focus for the study under the terms of reference.

However, those incomplete descriptions are not intended to discount the potential value of those systems for circularity.

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
Circular Systems and Communities under development (Source Circle Economy NL)		see column "description of programme"	see column "description of programme"	see column "description of programme"	
NL - RACE - Realisation of Acceleration towards a Circular Economy -- Netherlands as a Circular Hotspot (NLCH) iconic projects	The unique collaboration between government, NGOs and businesses enables multidisciplinary innovation, marrying technological progress with social and system innovation. The RACE program consists of the following activities: - Defining and stimulating circular design - Studying and stimulating high-quality reuse - Making an inventory of (perceived) barriers - Stimulating and accelerating new value chains - Creating a portfolio of circular project examples - Raising public awareness around the topic of circular economy				http://www.circle-economy.com/news/multidisciplinary-coalition-transforms-the-netherlands-into-a-global-circular-hotspot;
Amsterdam Metropolitan Region	First a general scan was made of the overall material flows that go through the harbour. Second, current state map was made of city flows, followed by a future state map showing the future vision of city flows.				
Urban metabolism Rotterdam	urban metabolism analyses for various material flows in Rotterdam				
Province of North Holland	Develop biodiversity and ecosystem services (BES) plan, based on circle scan of agrifood sector and its impacts on BES. The analysis will be build on the a current state map of The Netherlands (and the world) and a future state map of the agricultural sector, carried out for the Rabobank. Similar to the approach taken for the Rabobank CE Challenge, the outcomes of the scan can be used to contact companies (and other organisations) and identify opportunities for them in a circular economy - with positive impacts on BES.				
Textiles	Approach is coalition forming after sector scan was made highlighting the 'hotspots'.				
PGGM pension fund working toward criteria for circular investments	PGGM pension fund working toward criteria for circular investments; Circle Economy is developing assessment criteria for circular investment, first results expected mid-2015; pilot conducted with Interface				
Rabobank Circular Challenge	Rabobank sees circularly entrepreneurship as the leading enterprise of the future. Together with a number of partners Rabobank Circular Economy Challenge is developed: a one-year program that helps our customers to capitalize on the opportunities of circular economy. Nine large companies from the food & agriculture and automotive have met this challenge.				https://www.rabobank.com/nl/about-rabobank/sustainability/circular-economy-challenge/index.ht
Circle Economy and Friesland Campina to develop circular dairy system for NL Dairy	kick-off for mono-digestion pilot which will be deployed for 100 farms in NL				https://prezi.com/hjhsccath6h0/ce-example-projects-2013/

Community	Description of programme. Following are examples of circular inspired communities. In some cases the information requires further investigation.	Quality Improvement	Programme partners	Financial advantages to customers & producers	Website link
Other selected systems		see column "description of programme"	see column "description of programme"	see column "description of programme"	
Pharmafilter - Hospitals, Water Agencies, Municipalities	Pharmafilter integrates front-end product design for hospital sanitary products e.g. bed pans with back-end recovery of nutrients, separation of contaminants and bio energy generation. It generates drinkable water which is used as process water or discharged into the municipal sewage system and prevents pharmaceuticals contamination of waste water and drinking	Generates drinkable water which is used as process water or discharged into the municipal sewage system and prevents pharmaceuticals contamination of	Pharmafilter, ZorgSaam, Hoogheemraadschap Delfland, Rabobank, Reinier de Graaf Gasthuis, Erasmus MC.		http://www.pharmafilter.nl/
De Lage Landen	De Lage Landen - Desso (and other products) - life cycle asset management LCAM (see video on their website). LCAM at DLL is the economical management of assets throughout their entire technical life. This is accomplished by providing tailored financial services (like operational lease, swapping of assets, extended usage, redeployment, 2nd life finance etc)				http://www.delagelanden.com/sustainability/sustainable_solutions/LCAM/
Philips light leasing	Philips/ Rau office light leasing in Amsterdam; As a result of cooperation initiated with EPEA between Philips Lighting and Rau architects in Amsterdam, Philips started to roll out a light-leasing program starting with Rau offices and now extending to				http://www.lighting.philips.com/main/projects/rau.wpd
Turntoo	Turntoo; a special platform which advocates and facilitates “performance-based consumption”, in which manufacturers retain ownership of – and responsibility for – products such as carpets, furniture, tiles and more. Consumers pay just for the “performance” of these materials, which can later be reused or recycled by the manufacturer for other customers.				http://turntoo.com
Icollect	Ico - Icollect - textiles				http://www.ico-spirit.com/en/homepage/
Remondis Take-back systems	The company Remondis is a take-back and logistic partner for companies who want to develop their take-back programs. Remondis is specialized in electronical and electronic equipment, waste from private households or directly from industrial/commercial final consumers. Remondis also have a collective take-back management system and a special IT interface in order to optimize take-back models for manufacturers.			Take back program implementation possibility for the customer. Less primary raw material consumption for the customer	http://www.remondis.com/en/rgw/homepage/#recycling http://www.remondis-electrorecycling.de/en/er/about-us/

Annex L. Draft Examples Of Potential Roadmaps Towards Circular Economy Objectives

The following Annex provides potential examples of roadmaps for Objectives described in the present study. It is for guidance only. The final selection of objectives, goals and roadmaps as well as leading organisations is determined by stakeholders after a goal-setting process moderated by practitioners in the field.

The roadmaps suggested in this Annex include several actors that were identified as potential actors to implement the roadmaps. They are nevertheless only cited as examples for a better understanding by the reader. They are not in any way legally responsible for the content of the roadmaps and they have not committed to participate in the listed projects. Actors who are not mentioned in the roadmaps are not excluded and are invited to participate.

For each Objective in the Circularity Framework a table includes;

- Qualitative Objective for 7 – 10 years.
- Potential Goals, Milestones, Primary Responsible Stakeholder, and Ambition Level
- Relevant sectors involved.
- Potential for improving competitiveness & savings and reducing environmental impacts in accordance with the study Terms of Reference.
- Justifications & Background. Highlights from other sections of the study.

Attached to each table is an *illustrative Roadmap* describing potential goals and milestones. The purpose is to give stakeholders a starting point for designing their own roadmaps. Normally EPEA co-develops roadmaps with stakeholders in a defined process, so the examples are illustrative only.

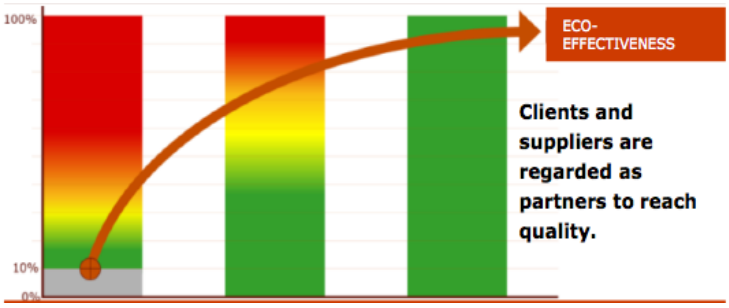


Figure L.1: Roadmap concept. Improvement over time. Government, industry & suppliers working towards a positive Objective.

Objective. Education & Training Hub.

Table L.1: Education & Training Hub

Category	Objective. Luxembourg with the Greater Region will be Europe's leading education & training hub for creating new jobs and improving competitiveness using circularity skills and technologies.
Goals & Milestones	Education and training in Luxembourg involve a range of players including; Chambres des Metiers, Chamber of Skilled Crafts, LuxBuild2020, IFSB, Ministry of Education, Ministry of Labour, most leading R&D departments of companies based in Luxembourg, the CRPs, Univ. of Luxembourg, Greater Region Universities group, Secolux, Pall Center, and many others. One approach to gain quick acceptance and support from them is to establish an education and training platform which lets them plug in circularity modules to their existing programmes. The following goals and milestones aim to develop tools for that. There is no need to start from the beginning, as many circularity training courses exist already. For example the education and training chapter contains a sampling of circularity-related courses. The challenge is to take the best and leave the rest. **Goal** By end of 2017 establish a national portfolio of training & education modules adaptable to every academic and training level. *Primary Responsible; Eco-Innovation Cluster in consultation with a range of stakeholders.*

Category	Objective. Luxembourg with the Greater Region will be Europe's leading education & training hub for creating new jobs and improving competitiveness using circularity skills and technologies.
	Milestone *Pilot announcement.* By 3rd quarter-2015 jointly declare CE education & training pilot for materials quality with the Ministry of Education, CRPs, University of Luxembourg, Chambre des Metiers, Skilled Crafts Cluster, Chamber of Commerce, Luxreal, LuxBuild 2020, IFSB, Secolux, Learning Factory, Futurelab, Fablab, and IntermatGR, supported by manufacturers. Emphasise the focus is economy but aligning with sustainability & green initiatives. **Goal** *Scale up Circular Supplier Communities*. By 2016 develop an education and training pilot based on supplier communities already running in the markets, focusing on primary manufacturing with secondary raw materials in Luxembourg and the Greater Region, possibly extending to construction. *Primary Responsible*; *Ecoinnovation.* **Milestones** • *Circular supplier community best practices*. By end of 2015 hold at least one workshop based on examples in the Sectorial Snapshots chapter; o For trainers bring in hands-on practitioners from e.g. Tarkett/Desso, Park2020, Carlsberg who developed circular communities in the private sector. See Fig. 1.2 for example. o Involve players in existing Luxembourg supplier chains who have a motivation to improve secondary raw materials quality e.g. Aluminium, Construction, Paper, Steel, Speciality Glass. o Consider potential for one workshop per supply chain, or one introductory workshop then work with rapid adapters to break into industry-specific workgroups. o Practically explore how to structure supplier communities to improve materials quality. *Primary Responsible. Ministry of the Economy with companies and Skilled Crafts Cluster, Chambre des Metiers, Chamber of Commerce.* o Consider a separate workshop for the public sector. • If companies agree, by end of 2016 at least 3 circular supplier communities in place with programmes for improving materials quality, savings, & functionality. *Primary Responsible; Participating companies with University of Luxembourg, Chambre de Metieres, Skilled Crafts Cluster.*

Category	Objective. Luxembourg with the Greater Region will be Europe's leading education & training hub for creating new jobs and improving competitiveness using circularity skills and technologies.
	Goal *Circularity Training Space* (CTS). By 2016 implement a CTS with the aim of accelerating skills retention rates through hands-on training with products & systems. Co-operate with circularity product showrooms in The Netherlands and Sweden, as well as high schools working with the Ellen MacArthur Foundation. **Milestone** By end of 2015, identify candidate sectors e.g. construction, and establish a CTS pilot in co-operation with existing training and education centers in Luxembourg, with at least 200 participants registered to take training. *Primary Responsible. Ecoinnovation with Chambre des Metiers with IFSB, LuxBuild2020, LearningFactory, FutureLab, Fablab, CRPs, University of Luxembourg.* *Ambition level.* Supports traditional assembly, disassembly, repair, remanufacturing. Support transition to new deconstruction techniques. Supports transformation for robotic/human interaction on disassembly. *Quick win potential.* See Quick Win #3 Circularity Training Space (CTS) in the Roadmaps chapter of the study. **Milestone** By end of 2015. Integrate Pall Academy education for youth with CTS programme to show students how things come apart. *Primary Responsible. Pall Center, Chambre des Metiers.* **Goal** *Secondary Raw Materials Quality Pilot.* By end of 2015 establish a pilot to inventory and improve secondary raw materials quality by integrating the competencies of Luxembourg & Greater Region companies with the competencies of academic institutions. *Primary Responsible. Materials Innovation Cluster with materials science departments of CRPs, R&D departments of companies in Luxembourg*. **Milestone** By late-2015 establish an inventory of secondary raw materials focuses & competencies at Luxembourg and Greater Region companies, agencies and academic institutions. Cross-reference work by e.g. Aluminium, Speciality Glass & Steel industries and integrate with already running work by IntermatGR. *Ambition level.* Supports traditional business and transition to new materials . *Quick win potential.* Savings for companies by coordinating expertise in Luxembourg and the Greater Region for secondary raw materials. Programme is low cost because

Category	Objective. Luxembourg with the Greater Region will be Europe's leading education & training hub for creating new jobs and improving competitiveness using circularity skills and technologies.
	it is a coordinating mechanism for existing competencies to encourage cross-pollination of expertise. **Goal** By mid-2015 introduce circularity into academic courses though a *circularity working group of the leadership and student body of University of Luxembourg* with the Ecoinnovation Cluster, Materials Cluster, Cimalux, steel industry & biomaterials researchers. *Primary Responsible. Ecoinnovation with stakeholders.* **Milestones** • *Assessment of circularity potential of academic courses.* As a low-cost educational exercise ask students to perform a *Circularity Potential* assessment of courses offered by U. of Luxembourg, cross referencing circularity skills against existing courses, and report back to the working group*. Primary Responsible. University of Luxembourg, Ecoinnovation.* • *Inter-university network for positively defined additives and coatings*. As part of the existing Greater Region Universities group UniGR, and with IntermatGR pilot a network. Use information gathered by the present study on academic courses as a starting point. *Primary Responsible. GR University group with Ministry of Education, Materials Cluster, CRPs, R&D divisions of Luxembourg based companies.* **Goal** *Pilot a National Quality Co-Brand to accelerate sales of local products.* By end 2017 implement a national quality co-brand for circularity to distinguish & promote Luxembourg products nationally, in the greater Region, and internationally. Use it as a public education and awareness tool to generate a sense of national participation in circularity. See national co-branding objective for details. The aim is to develop enthusiasm from existing label owners for circularity as a sales accelerator.
Potential Competitiveness Gains Savings, Job Creation & Preservation Environmental Impacts	**Competitiveness & Jobs** Designs for disassembly, knowledge of secondary raw materials sourcing and utilisation, hands-on experience with circular products are critical skills for competing in the circular economy. As described in Chapter 4, the potential is to create 2,200 jobs short-term in this field, but it is only possible with the required skills. Circular supplier communities are becoming recognised as a leading tool for implementing circularity cost-effectively.

Category	Objective. Luxembourg with the Greater Region will be Europe's leading education & training hub for creating new jobs and improving competitiveness using circularity skills and technologies.
	Environment A fast route to environmental savings is accelerating secondary raw materials use.
Justification/Background information	• Circular supplier communities. Experience suggests that educating and involving suppliers is core to improving value in supply chains. • Because Luxembourg has no recycling facilities for fast moving consumer goods there is perhaps a misperception that Luxembourg has no recycling competencies. At the industrial level, companies like ArcelorMittal, Eurofoil, Guardian, Tarkett have high competency level in secondary raw materials. • Additives and coatings make industrial society run but presently there is no competency center for additives and coatings designed for circularity.

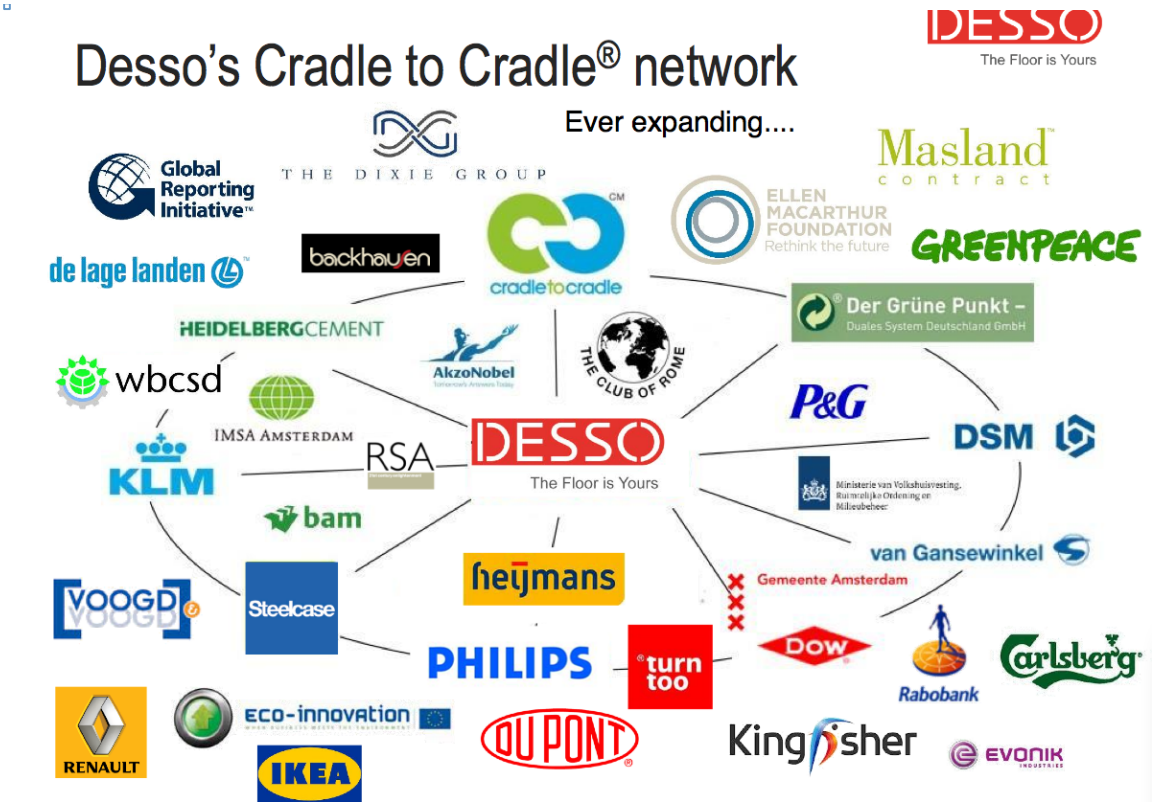


Figure L.2: Use customer supplier communities as educational tools.

Desso customer supplier community already works with architects in Luxembourg in a "Circle of Architects". Since Tarkett recently acquired Desso, the network might be expanded in Luxembourg. Image Desso.

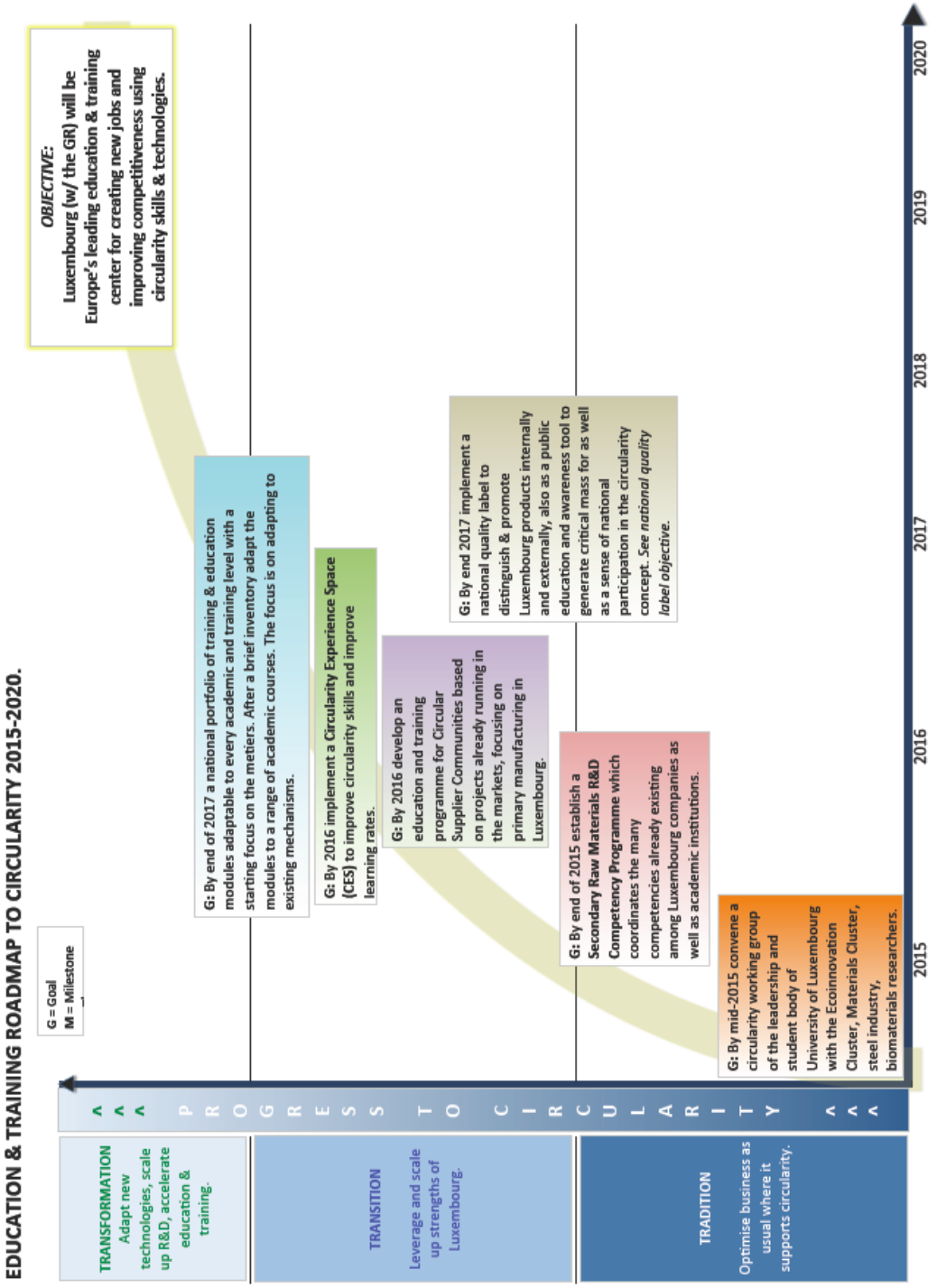


Figure L.3: Education & Training Roadmap

Objective. National Circularity Quality Co-Brand

Table L.2: Marketing & Messaging

Category	Objective. National quality co-brand for circularity-inspired products by leveraging existing Luxembourg labels
Goals & Milestones	**The concept of a national quality co-brand comprises these parts;** • Quality assurance label for secondary raw materials. • Co-brand label to support sales through existing Luxembourg labels. **Goal**. *Quality assurance label for secondary raw materials*. By end of 2016, develop a pilot. *Primary Responsible. Materials cluster, ArcelorMittal, Guardian Industries, Eurofoil, Norsk, Scrap dealers, SDK, Valorlux. KPMG, selected investment funds.* *Potential Quick Win*; See quick win #7 in the Roadmap chapter. **Milestone.** By mid-2015 co-pilot a Municipal Solid Waste valorisation tool for municipalities. The mechanism integrates quality assurance with valorisation. See Upcycling chapter; *Systematic real-time valorizing and tracking.* **Goal**. By end of 2017 establish a national circularity co-brand to support sales. In order to maximise leverage for existing labels, consider an *Intel Inside* model from the ICT industry. Use the co-brand as a public awareness tool to generate national participation in circularity. See Chapter 7.1 national co-branding. *Primary Responsible; Ministry of Economy through LuxInnovation, frontrunner retailers like Pall, Cactus, Oikopolis. Industrial manufacturers already using the 'made in Luxembourg' label.* **Milestones**. • By end of 2015, bring food labels by retailers like Cactus, Oikopolis and The Pall Center into a co-brand like; *Crafted in Luxembourg for Circularity*. Primary Responsible; Ministry of agriculture, agricultural producers, and related retailers. • Based on results, analyse if or how it is feasible to establish a circularity quality co-brand for other existing labels.

Category	Objective. National quality co-brand for circularity-inspired products by leveraging existing Luxembourg labels
	Ambition level. Supports traditional industries to leverage their existing assets in a transition to circularity. *Quick win potential. See Quick win #2 and Chapter 7.1 National Co-branding. Primary Responsible; Circularity working group through Ministry of Economy.* Crafted for Circularity 
Leading Stakeholders and Sectors Involved	**Manufacturing**. Tarkett, Guardian Industries, ArcelorMittal, Automotive Cluster, Automotive manufacturers association. Federation of Metiers. **Retailing.** Oikopolis, The Pall Center, Cactus. **Agriculture**. Ministry of Agriculture, local dairy, vegetable and meat producers. **Innovation Cluster.** Ecoinnovation. Materials. Automotive Components.
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental**	**Competitiveness & Jobs** • **For agriculture & retailing**; Measurable increase in sales of local products. Overcome the price differential for Luxembourg agricultural products by competing on local quality instead of just price. Experience suggests many customers are ready to pay a premium or buy on the basis of locality. Preserve and increase local agricultural producer jobs.

Category	Objective. National quality co-brand for circularity-inspired products by leveraging existing Luxembourg labels
Impacts	Strengthening the local producer/customer cycle reduces environmental impacts by reducing transport and other inputs. • **For manufacturing.** Preserve & increase market share by establishing the high residual value of Luxembourg-made products by demonstrating their designs for materials recovery, disassembly, repair, remanufacturing and recycling. Improve residual value to increase competitiveness & sales. Improved quality is shown to reduce environmental impacts by improving recyclability potential. • **For recycling.** Upgrade the marketplace for secondary raw materials by improving quality standards. Improve the separation and valorisation of secondary raw materials. Use the methodology to develop new competencies in secondary raw materials management.
Justification/ Background information	**Agricultural production** is under price competition from neighbours and has difficulty competing on the basis of price alone. Luxembourg consumers are among the wealthiest and while some look only for price, others focus on quality. A significant percentage of foreigners who shop in Luxembourg come for a mix of price and quality in the grocery sector. **Manufactured goods purchasers** already differentiate products based on their potential for high-residual-value. The steel, aluminium, glass and flooring sectors are using circularity innovations to improve their competitiveness and quality but those are not as well known as they might be. A Luxembourg circularity label might have similar benefits as e.g. Swiss-made label. **Recycling**. Presently there is no recognised quality standard for certain types of secondary raw materials, or the standards are confusing.

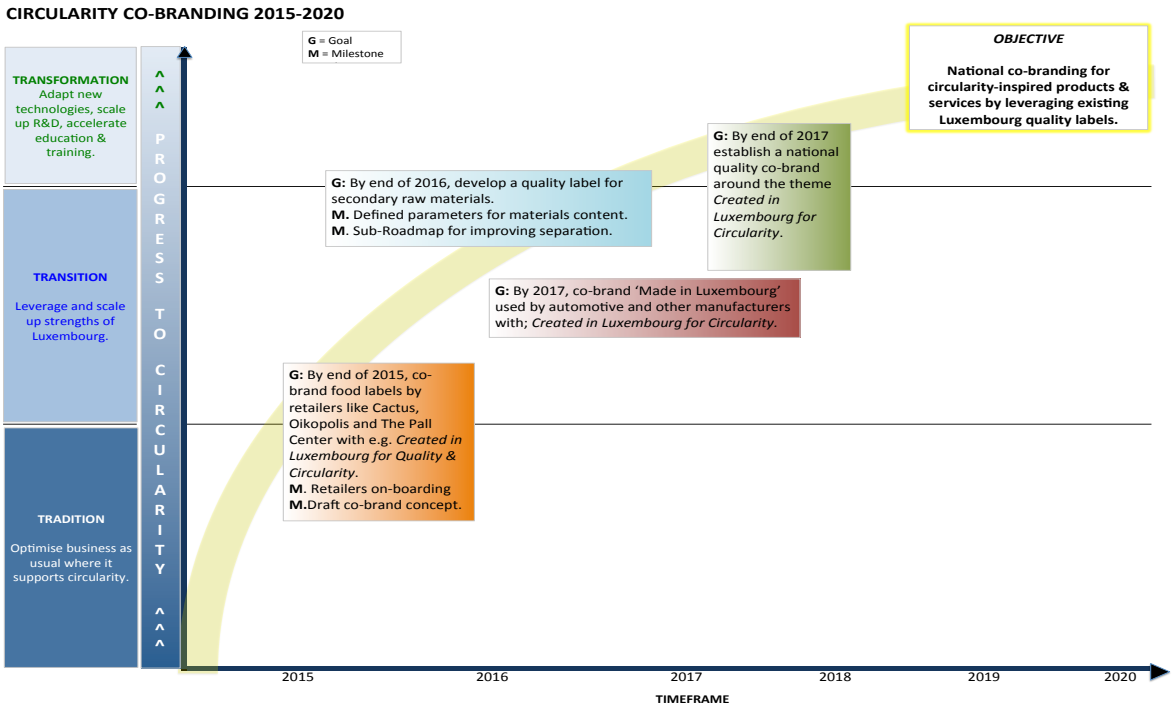


Figure Figure L.4: Marketing & Messaging Roadmap

Objective. Quality Assurance & Measurement Frontrunner

Table L.3: Quality Assurance & Measurement

Category	Objective. *Luxembourg is recognised as an authority for quality assurance and measurement of present and potential value of circular materials.*
Goals & Milestones	**Goal.** *New Balance Sheet for Circularity*. By 2017 develop a *New Balance Sheet for Circularity* to accelerate cost savings based on quality assurance standards for investing in secondary raw materials. *Primary Responsible; Ministry of Finance, Ecoinnvation Cluster & accounting firms with investment & banking firms, Secolux, SDK, Statec, external valorisation experts implementing in the marketplace.* **Milestone**. As part of Luxembourg's contribution to the EU Presidency announce Luxembourg will pilot tools for valorising secondary raw materials. See Quality assurance label for secondary raw materials under Co-brand Objective. *Primary Responsible; EU Presidency office with Ministry for the Economy.* **Milestone.** By mid-2015 co-pilot a Municipal Solid Waste valorisation tool for municipalities. The mechanism integrates quality assurance with valorisation. See Upcycling chapter; *Systematic real-time valorizing and tracking. Primary Responsible; Ministry of the Economy*. *Ambition level.* Supports traditional governments and industries to track and valorise secondary raw materials and accelerate technology improvements. **Goal**. *Up-cycle LCA*. By 2016 develop or adapt a new set of scoping and measurement tools for the Greater Region to make LCA practical for measuring positive impacts of circular processes as well as continuous re-use of secondary raw materials. *Primary Responsible; CRP Henri Tudor with Tarkett, ArcelorMittal, Guardian Industries, LCA experts from the Greater Region, potentially accounting firms.* **Milestone.** By mid-2015 convene an LCA up-cycling workshop of stakeholders.

Category	Objective. *Luxembourg is recognised as an authority for quality assurance and measurement of present and potential value of circular materials.*
	Ambition level. Transition to upgraded way of evaluating environmental impacts. *Quick win potential. See* establish an LCA task force for circularity. **Goal**. By 2016 optimise circularity data gathered by Statec. **Milestones.** • Working group on data requirements for circularity using the questions from the present study as a starting point. *Primary Responsible. Ministry of Finance and the Ecoinnovation Cluster to explore implementation.* • Develop indicators for measuring new job creation resulting from circularity, so employment and job preservation resulting from the initiatives described here will be measurable. *Responsible.Statec and Ministry of Labour.* • By end of 2015 develop a methodology for calculating current value of materials assets in Luxembourg's energy, transportation and water infrastructure. *Primary Responsible MDDI.* **Goal**. By 2016 establish a set of circular procurement guidelines for government and the private sector (each has its own advantages and restrictions) focusing on materials quality and positive impacts. *Primary Responsible; Ministry of the Economy, CRP Henri Tudor or University of Luxembourg.* **Milestone**. By mid-2015 evaluate practices like e.g.; Green Deal procurement in The Netherlands, positive criteria provided by the present study for legislation to aid R&D, procurement criteria used by organizations implementing cradle to cradle, including e.g. C2C Expolab, municipality of Ronneby and City of Venlo.
Leading Stakeholders and Sectors Involved	**Governments.** Municipal governments in Luxembourg and the Greater Region. Economics & environment ministries. **Companies**. Secolux, 51+ waste management companies in Luxembourg. Primary material manufacturers in Luxembourg who want to improve recovery rates of their products like aluminium, steel, speciality glass. The finance community has

Category	Objective. *Luxembourg is recognised as an authority for quality assurance and measurement of present and potential value of circular materials.*
	expressed a readiness to investigate systems for valorising secondary raw materials for investment guidance.
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness, Jobs, Environment** **Municipalities and companies across Europe** often lack systems to track or valorise secondary raw materials, including e.g. recycling or re-use targets set by national governments or the EU. The tools would make compliance easier and be value-added employment mechanisms for Luxembourg, by selling those methods. **For manufacturing.** Companies like Tarkett, Guardian Industries and ArcelorMittal have quality standards for recycled materials and are working to improve those. A tracking and valorisation scheme might be expanded to tracking materials from those manufacturers to optimise materials recovery & banking. **Environment.** By improving valorisation and tracking the efficiency and effectiveness of secondary raw materials systems is improved, leading to environmental savings in emissions, energy, and raw materials extraction impacts.
Justification/ Background information	**EU Presidency** offers special potential for Luxembourg to be perceived as seizing the initiative. By announcing its intentions Luxembourg will be able to grasp the initiative. **Municipalities** across Europe face a dilemma; they are often not able to track in real time or valorise materials streams like glass, paper, metals, and packaging.

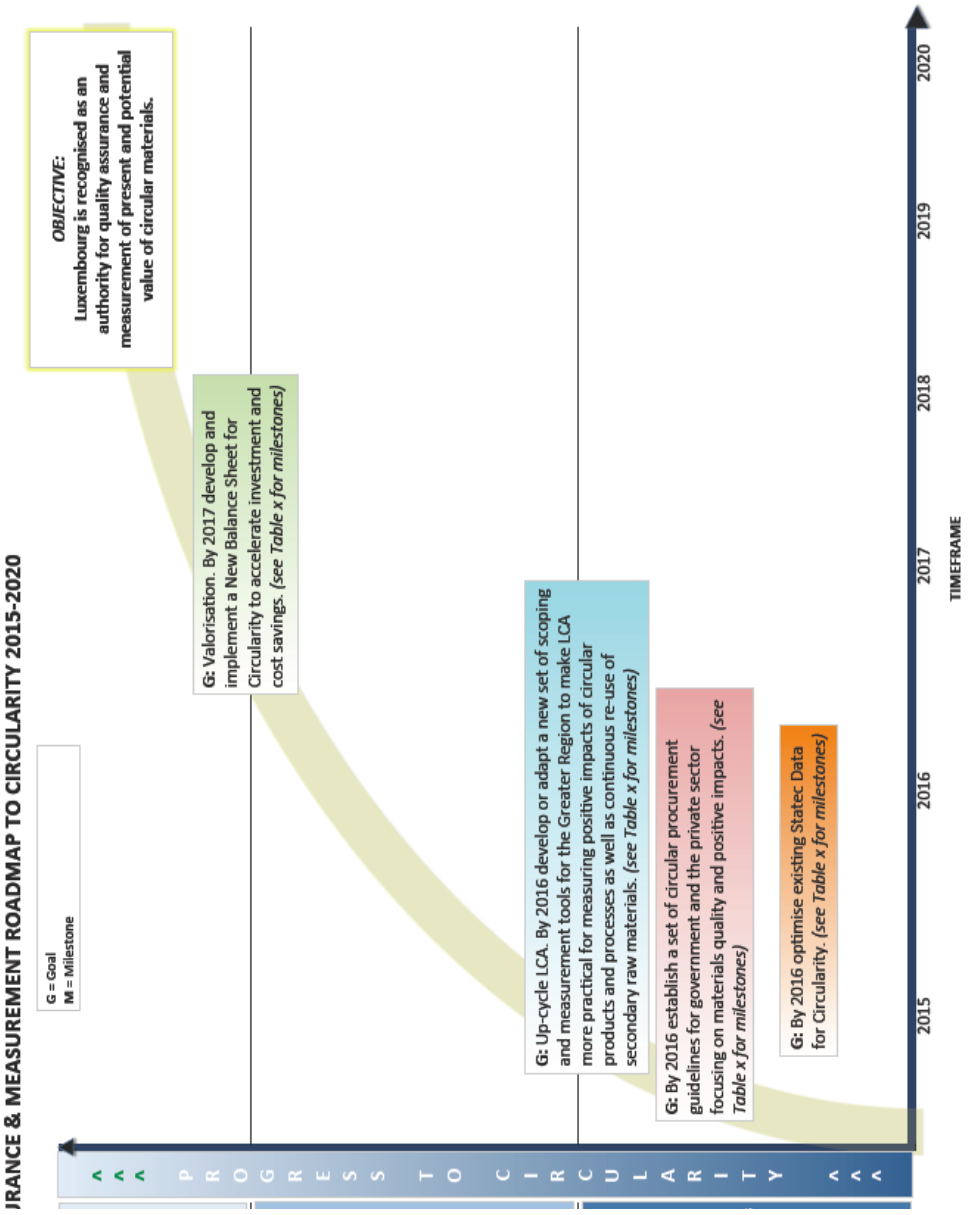


Figure L.5: Quality Assurance & Measurement Roadmap

Objective. Circular Materials IP & R & D Hub

Table L.4: R&D

Category	Objective. *Luxembourg with the Greater Region and supported by the investment industry will be an R&D & IP frontrunner for introducing circular chemicals, composites, nanomaterials and biomaterials to existing and new industries.*
Goals & Milestones	**Goals for biobased materials including additives, coatings & CO2 re-use** **Goal** By 2016 in co-operation with the automotive and shipping cluster, start a project on biological decomposition of carbon fibre and other composites. Decomposition of composites into their component materials is one of the big challenges as composites start to dominate manufacturing of automotive bodies and ship hulls. **Goal** By late 2015, to explore biomaterials potentials selected innovation clusters examine the draft composites roadmap and identify focus areas for circularity. • **Milestone.** By late 2015, establish a programme on circularity-inspired additives, coatings and other functional ingredients for materials. There are <100 base materials in products today and >5,000 commonly used additives, yet no circularity studies on additives. An opportunity. • **Milestone:** Set a minimum of 3 circular biomaterials pilot projects by beginning of 2016. Luxembourg and the Greater Region has the potential to be a testing ground for circular biobased materials because it has most parts of the use stream; sourcing, use, re-use, cascading and nutrient recovery. Involve biomaterials experts located in Luxembourg and the Greater Region, also at companies like DuPont. • **Goal for Healthcare.** *Evaluate hospitals pilot potential*. An example of how biomaterials are integrated with healthcare and product innovation is the Pharmafilter systems described in Sectorial Snapshots under healthcare. CRP Henri Tudor participated in tracking its development. • **Goal.** By 2017 in co-operation with the EU establish a national standard for secondary raw materials. *Related Objective.* Luxembourg is recognised as an authority for quality assurance and measurement of present and potential value of circular materials. *Quick win;* A new quality label for secondary raw materials starting with separation

Category	Objective. *Luxembourg with the Greater Region and supported by the investment industry will be an R&D & IP frontrunner for introducing circular chemicals, composites, nanomaterials and biomaterials to existing and new industries.*
Leading Stakeholders and Sectors Involved	**See R&D under Biomaterials for more information.** **New institute LIST, CRPs, Luxinnovation, Materials Cluster, Automotive cluster. DuPont ?**
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs**. The potential for scaling up biomaterials and additives is described under R&D and is large. **Environment.** Biomaterials have the potential for large positive environmental impacts but only if they and their additives are designed according to circularity cycles.
Justification/ Background information	See R&D under Biomaterials for more information.

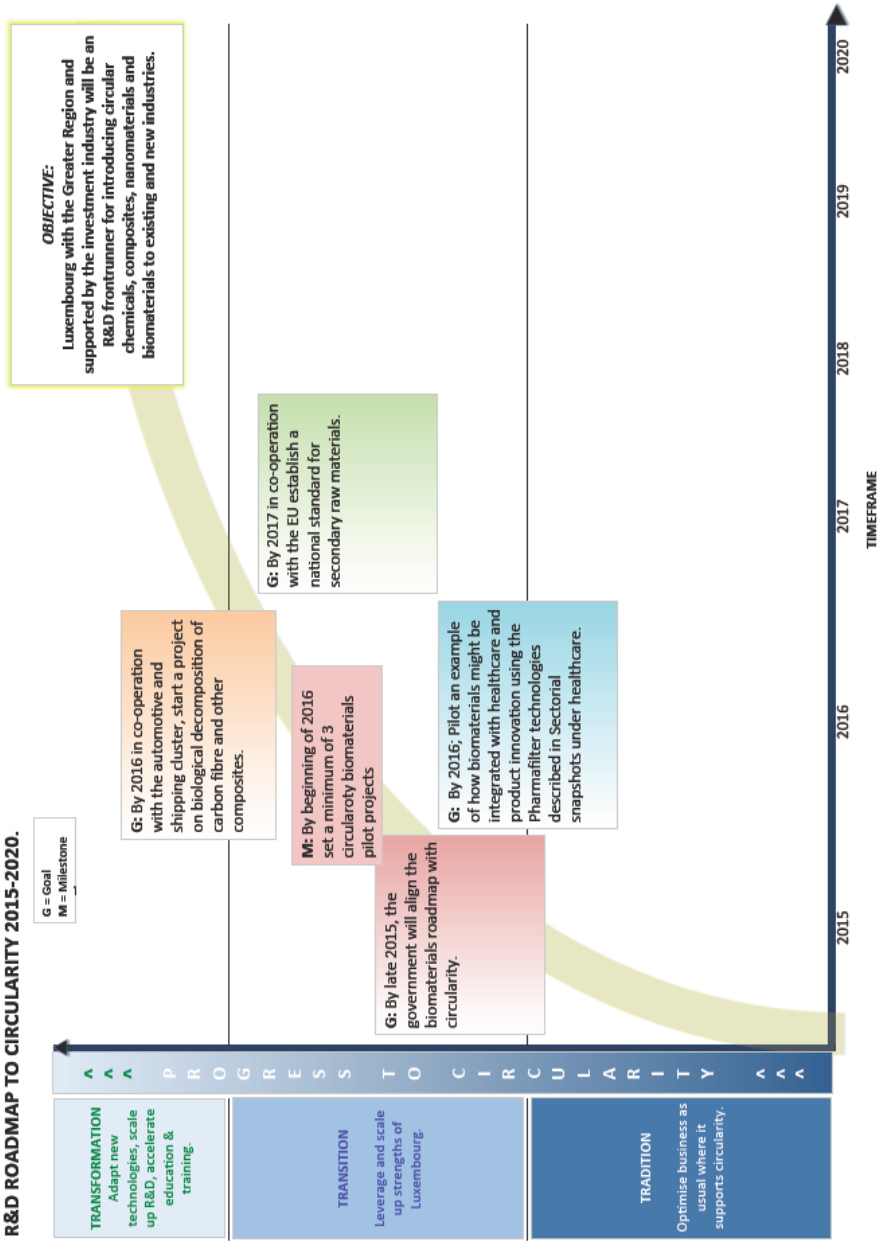


Figure L.6: R&D Roadmap

Objective. Incentives & Regulation Knowledge Leadership

Table L.5: Regulation

Category	Objective. *Luxembourg will work with the EU to improve regulatory and administrative incentives and eliminate barriers for safely and equitably implementing circularity, with a focus on supporting R&D incentives and removing licensing barriers.*
Goals & Milestones	**Goal**. The government will implement positive circularity criteria in R&D support legislation. Resp. MDDI?
Leading Stakeholders and Sectors Involved	R&D institutes & companies.
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs** Positive criteria will give Luxembourg companies a jump on the competition and align more closely with new EU Positive Lists.
Justification/ Background information	Due to the large legislative and regulatory framework surrounding circularity as described for example in the EU Scoping study, it makes sense for Luxembourg to focus. The focus with the greatest potential returns is R&D incentives due to the potential for transformative breakthroughs.

Figure L.7: Regulation Roadmap

Objective. National Plan for Construction Materials Management

Table L.6: Construction & Building Management

Category	Objective. *National materials management plan for circularity in construction & building management.*
Goals & Milestones	**Goal**. By end of 2016 generate 35% savings on construction waste in new construction and renovation projects. Primary Responsible. Skills Cluster, SDK, Chambres des Metiers, LuxBuild2020, builders, LuxReal, CRPs, University Luxembourg. **Milestone.** Complete 1 pilot project by the end of 2015. For example, SDK has done waste separation pilots on construction sites, and it is good to build on their experience. However, the big win is modular construction techniques, and for those it is possible to integrate best practices. As well, the quality of construction materials themselves dictates the re-usability of construction resides. For this, see Annex B describing products designed for circularity and available in Luxembourg and the Greater Region. *Ambition level.* Tradition and transformation. **Goal**. By end of 2015 develop a national plan for reusing excavation waste, starting with a study of best practices internationally. *Primary Responsible. IFSB?* *Quick win potential?* See 'Reducing excavation and construction waste by re-using it' in the Quick Wins part of this section. **Goal**. By the end of 2015 develop a best available materials programme for the building insulation programmes directed at energy efficiency standards. *Primary Responsible. Ministry of the Economy Energy department & MDDI with DuPont, IFSB and others.*
Leading Stakeholders and	Construction sector, facilities management, MDDI, Ministry of the Economy

Category	Objective. *National materials management plan for circularity in construction & building management.*
Sectors Involved	CRPs, LuxReal, LuxBuild2020, IFSB, Secolux, Leading contractors, SDK, KPMG,
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs.** New jobs will be generated through activities which generate value-added uses for excavation waste. **Cost savings.** Excavation waste is an expensive headache and landslides are costing millions of Euros in construction delay, road closures, and loss of productive land. Re-using excavation waste in the right way will solve those costs. **Environment.** Excavation waste is usually not an environmental threat on its own although there is hazardous waste from brownfield sites. In those cases phytoremediation is a cost-effective way of rehabilitating those soils. However, environmental regulation might be a barrier to re-using excavation waste for example for terraforming, and might behaving unintended consequences of rendering land unusable as a 'landfill', or preventing large-scale landscaping of areas with excavation waste.
Justification/ Background information	Construction is the biggest employer and the biggest consumer of materials in Luxembourg. Up to 25% of the materials used for buildings becomes waste during construction, and up to 100% of buildings become demolition waste. Despite this, the majority of sustainable construction projects today focus on operating energy efficiency. There is a potential to generate materials, energy & cost savings from improved selection and separation of materials during construction.

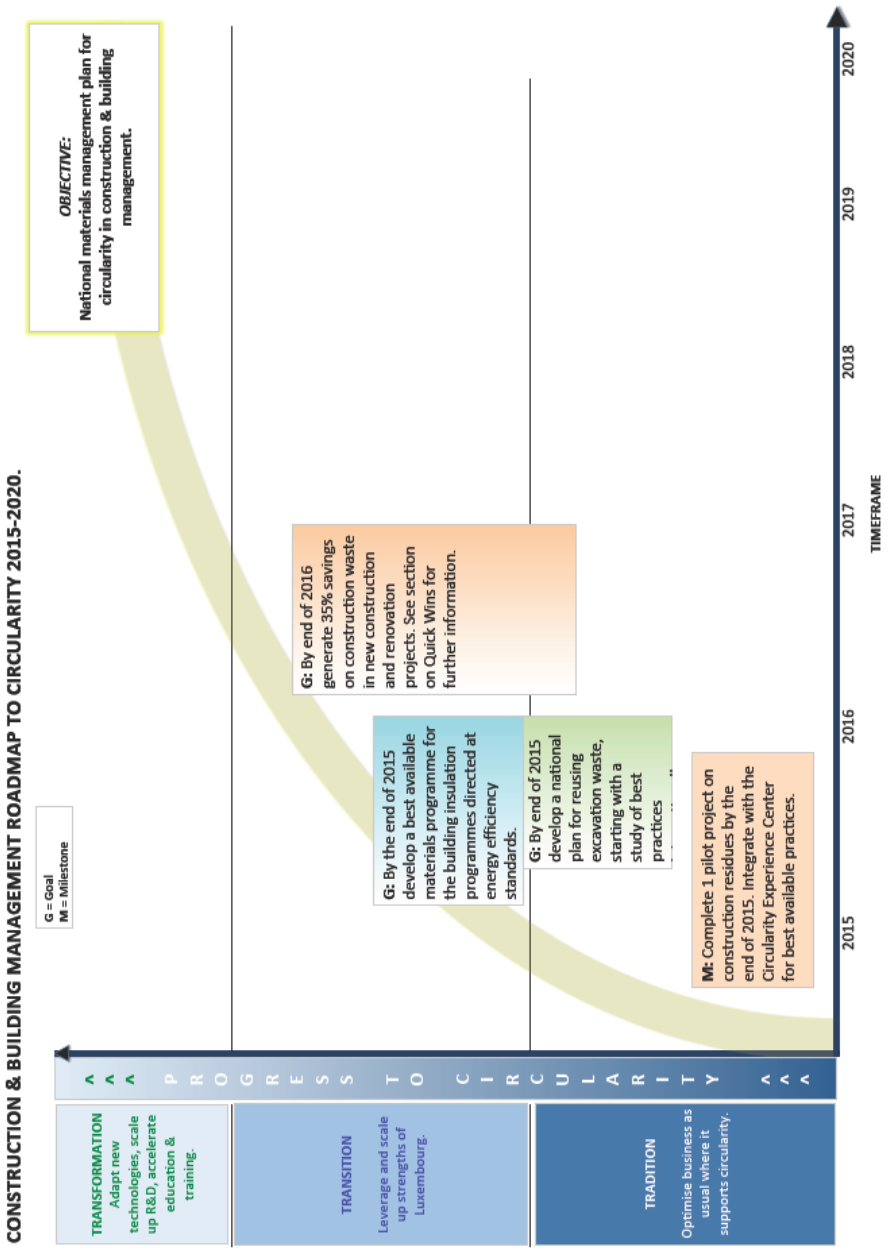


Figure L.8: Construction & Building Management Roadmap

Objective. Luxembourg is the Leading Circularity Finance Hub.

Table L.7: Finance

Category	Objective. *Luxembourg will be the leading financial center for circularity investment & banking.*
Goals & Milestones	**Goal**. Till mid 2015 inventory circularity mechanisms already being used by the alternative investments sector. **Milestone**. February 2015 financial industry forum on the circular economy. *Primary Responsible. Ecoinnovation Cluster, KPMG.* **Milestone.** Develop forum programme relevant to previous participants as well as new participants. *Primary Responsible. Ecoinnovation Cluster, KPMG.* **Milestone**. The High Committee for industry recommends closer links between the R&D community and industry in Luxembourg. It makes sense to add the financial sector to the group, because links between investors and R&D in Luxembourg require improvement. **Goal**. *Walking the Talk*. Investigate the feasibility of organising a customer & supplier community around high quality paper recycling, including destruction of confidential paper; *Ecoinnovation Cluster, KPMG. Qualifies as a quick-win potential* **Goal**. Ministry of the Economy task force to do a 'deep dive' into the feasibility and implications of the following mechanisms; *From a government point of view the establishment of reliable framework conditions and potentially incentive structures to redirect investment flows into more circular economy activities typically comprise;* • shifting tax from renewable resources (like labor) to non-renewable resources like material throughput (e.g. via landfill tax, energy tax)

Category	Objective. *Luxembourg will be the leading financial center for circularity investment & banking.*
	• re-distributing tax income to finance the establishment of critical skills (e.g. slightly increasing corporate tax an then re-distributing the proceeds into CE-based training for certain sectors) • providing government guarantees to attract private sector or foreign direct investments to support large scale investments (e.g. for setting-up of FabLab, concrete 3D printing hub for construction industry in Luxembourg) **Goal**. *Potential actions on circular procurement;* • Provide information to procurement authorities on best circular procurement practices already in the marketplace, as described in Chapter 2 of this study, and by holding workshops focused on circular procurement. • Especially pre-conceptions about anti-competition rules are possible to solve in existing regulatory frameworks. Public and private stakeholders are to be included because procurement departments in large companies have similar challenges as governments.
Leading Stakeholders and Sectors Involved	Procurement departments of governments, public corporations and private companies.
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs** Large scale-up potential. **Environment.** Investment is the start of environmental impacts.
Justification/ Background information	Procurement is seen as big leverage for circularity due to billions of Europe in purchasing annually but in reality there are many barriers perceived and real. Those are important to solve.

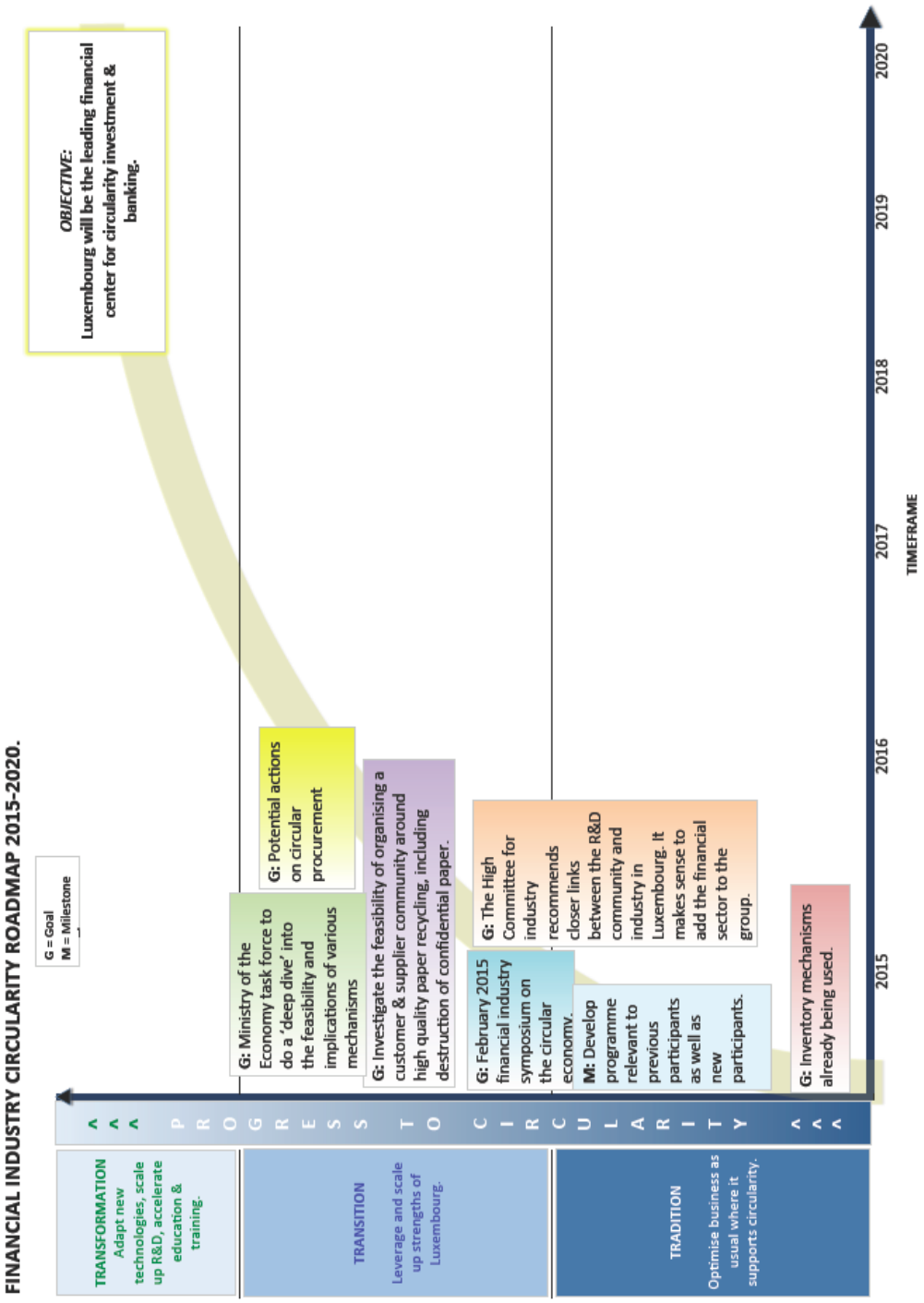


Figure L.9: Finance Roadmap

Objective. Reverse Logistics Hub.

Table L.8: Logistics

Category	Objective. *Luxembourg will be a European reverse logistics hub, leveraging its existing assets to provide new services*
Goals & Milestones	**Goal**. By end of 2015 pilot reverse logistics for fast-moving consumer goods (FMCG) through the Post Office. *Primary Responsible; La Poste, Ecoinnovation Cluster.* **Milestone.** In 9 months launch the pilot by using the return trips of empty post office vehicles as leverage. *Primary Responsible; La Poste, Ecoinnovation Cluster.* *Ambition level.* Supports traditional business to improve the efficiency of its existing assets and services. *Quick win potential?* See Quick win #6. 'Reverse logistics with La Poste'. **Goal.** By the end of 2015, possibly as part of La Poste pilot, implement a customer/supplier closed loop for high quality office and graphic paper to generate up to 10% savings for customers in Luxembourg. Quick win #6. *Primary Responsible; La Poste, Ecoinnovation Cluster.* **Milestone.** Minimum 3 pilot projects announced by mid 2015. **Goal.** Investigate feasibility of a logistics hub repair facility. Primary Responsible; Logistics cluster, Automotive cluster, Ministry of Finance. **Goal.** *Reverse logistics community*. In 2015, inventory what is actually happening with reverse logistics already in Luxembourg by organising a workshop of reverse logistics managers from e.g. Amazon, Kuehne & Nagel and others to examine potential collaboration and who is doing what. Describe which terminologies and NACE codes used for statistics might be utilized to identify reverse logistics movements and opportunities. **Goal.** By mid-2015 inventory subsidy and materials resources for reverse logistics; • According to the Ministry for the Economy, substantial support funding is available for new logistics initiatives. Those are important leveraging

Category	Objective. *Luxembourg will be a European reverse logistics hub, leveraging its existing assets to provide new services*
	tools for adapting the present infrastructure for reverse logistics. A first step is to identify resources available for reverse logistics planning. • At least 70% of materials used in products manufactured in Luxembourg seem to be exported to a retrievable radius around Luxembourg, which suggests it is feasible to bring those materials back for reprocessing. Conduct an investigation into the recoverability of those materials.
Leading Stakeholders and Sectors Involved	**Logistics**. Logistics Cluster. La Poste. Automotive cluster. **Participating customers.** Automotive components dealers. Everybody serviced by La Poste. **Potential recipients of returned materials;** Every company, which uses or processes secondary raw materials.
Potential Gains in Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts	**Competitiveness & Jobs** **For logistics**. Trucks are empty for up to half their trips. Potential to add new jobs for personnel to take back products by using existing vehicle routes. **Environment.** Right now trucks waste large amounts of fuel coming back empty to the terminal. By coming back with goods, efficiency would be improved instead of adding environmental impacts with a parallel collection infrastructure.
Justification/ Background information	**Diverse service providers** internationally including Amazon are piloting postal-type takeback systems for years. In the accelerating competition for circular logistics, businesses like La Poste will win by using their spare capacity for reverse logistics, or lose business to competitors. **La Poste** might be able to expand its business further into the Greater Region.

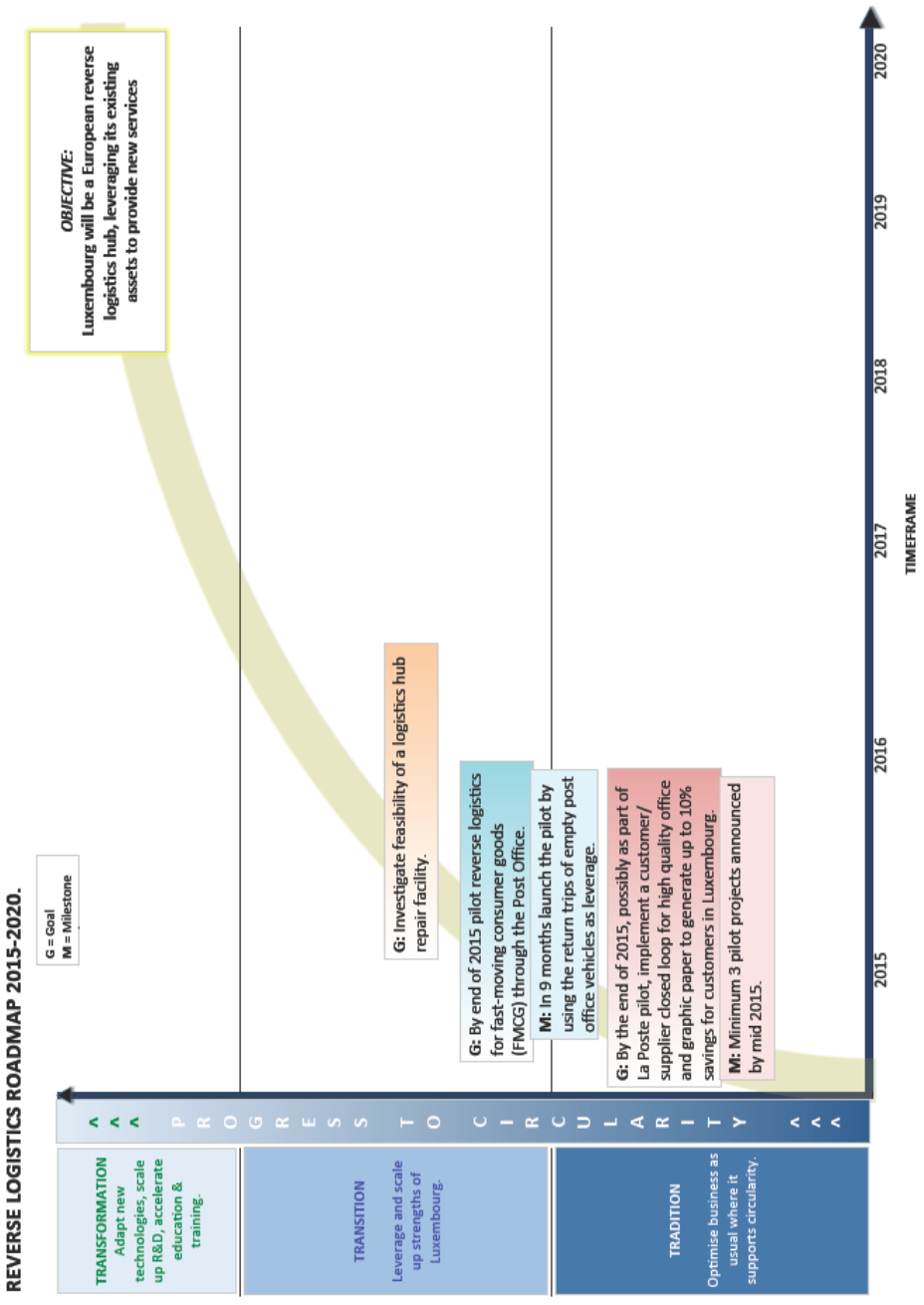


Figure L.10: Logistics Roadmap

Objective. Materials Security for Manufacturing

Table L.9: Secondary Raw Materials

Category	Objective. *Luxembourg with the Greater Region will be a European frontrunner for recovering & using secondary raw materials for primary manufacturing to support its existing industries.*
Goals & Milestones	**The following Goals describe a coordinating function to link Objectives for supplier communities, secondary raw materials label and construction materials management. Organised by the CE working group described previously.** **Goal**. By mid-2015 establish a *Greater Region Secondary Raw Materials Sourcing Group* with manufacturers and suppliers who use secondary raw materials. *Primary Responsible; CE working group, with manufacturers, scrap & cullet dealers.* **Goal.** By end of 2015 prioritise secondary raw materials & especially processes to be upgraded for industry competitiveness and security of supply. **Goal.** By mid 2016 establish at least 3 secondary raw materials customer/supplier communities with roadmaps. *Primary Responsible; CE working group, with participating companies, scrap & cullet dealers and support from CRPs, University of Luxembourg and Greater Region Universities.*
Leading Stakeholders and Sectors Involved	Luxembourg based manufacturers using secondary raw materials. Greater Region scrap and cullet dealers. Greater region companies generating large volume
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs.** Described extensively throughout the study. **Environment.** Described extensively throughout the study.
Justification/ Background information	Luxembourg's primary industries rely on high quality secondary raw materials to survive and are in competition against other materials purchasers.

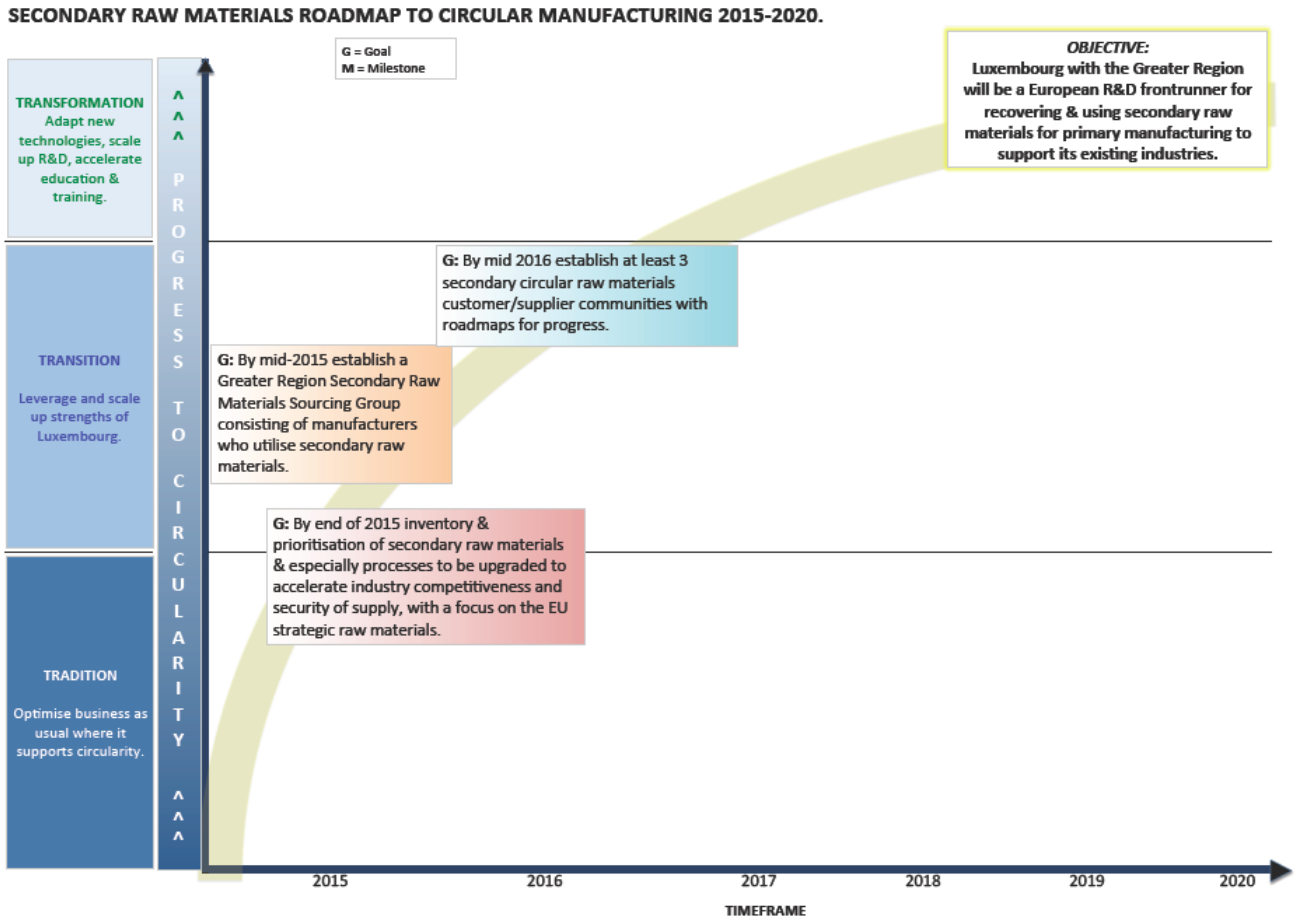

SECONDARY RAW MATERIALS ROADMAP TO CIRCULAR MANUFACTURING 2015-2020.
G = Goal
M = Milestone
OBJECTIVE:
Luxembourg with the Greater Region will be a European R&D frontrunner for recovering & using secondary raw materials for primary manufacturing to support its existing industries.
TRANSFORMATION
Adapt new technologies, scale up R&D, accelerate education & training.
TRANSITION
Leverage and scale up strengths of Luxembourg.
TRADITION
Optimise business as usual where it supports circularity.
PROGRESS TO CIRCULARITY
G: By mid 2016 establish at least 3 secondary circular raw materials customer/supplier communities with roadmaps for progress.
G: By mid-2015 establish a Greater Region Secondary Raw Materials Sourcing Group consisting of manufacturers who utilise secondary raw materials.
G: By end of 2015 inventory & prioritisation of secondary raw materials & especially processes to be upgraded to accelerate industry competitiveness and security of supply, with a focus on the EU strategic raw materials.
2015
2016
2017
2018
2019
2020
TIMEFRAME

Figure L.11: Material Security Roadmap

Objective. Advanced Circularity Technologies Frontrunner

Table L.10: Advanced Technologies

Category	Objective. *Luxembourg will be the technology frontrunner in ICT, robotics and additive manufacturing for near-shoring circularity.*
Goals & Milestones	**Goal**. By end 2015 quantify potential for using advanced manufacturing technologies for near-shoring (a.k.a. on-shoring, re-shoring), to accelerate job creation using circular systems, as well as evaluating the risk to Luxembourg 2nd & 3rd tier suppliers of being made redundant due to near-shoring by 1st tier assemblers. *Primary Responsible; Ecoinnovation cluster, automotive?* **Goal**. By 2017 pilot a human/robotic disassembly facility using R&D going on today. *Primary Responsible; Which innovation cluster? CRPs, University of Luxembourg,* **Milestone.** By 2016 demonstrate human/robotic disassembly of a commonly used product. *Primary Responsible; CRPs, University of Luxembourg,* **Goal**. By end of 2015 pilot 3d feedstock defined for circularity. **Milestone.** In collaboration with the project on defining standards for secondary raw materials, set positive circularity criteria for 2 – 3 pilot 3D feedstocks. *Primary Responsible; Ecoinnovation cluster, 3D manufacturers and users, Mouvement luxembourgeois pour la Qualité et l'Excellence* *Ambition level.* Transformation of the economy to 3D and robotic-powered circularity.
Leading Stakeholders and Sectors Involved	CRPs. 3D machine manufacturers. 3D feedstock manufacturers. Innovation clusters. Materials Cluster. Automotive cluster. Ecoinnovation cluster

Category	Objective. *Luxembourg will be the technology frontrunner in ICT, robotics and additive manufacturing for near-shoring circularity.*
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs.** Robotics and 3D offer great potential for high level job creation as well as skilled trades job creation given their explosive growth. Countries like China and South Korea are leading the path to competitive robotics and manufacturing to cut costs. Luxembourg manufacturers are competing with those regions**.** Disassembly might be a new marketplace where Luxembourg manufacturers might gain first mover advantage. **Environment.** 3D manufacturing is growing at 70% per year but most of the feedstock is not designed for circularity. By redesigning those materials many negative environmental impacts might be avoided.
Justification/ Background information	*Background;* The High Committee for Industry identified high technology competence as a priority especially for automotive. Robotics and 3D are central to competitiveness for those industries today and in the future.

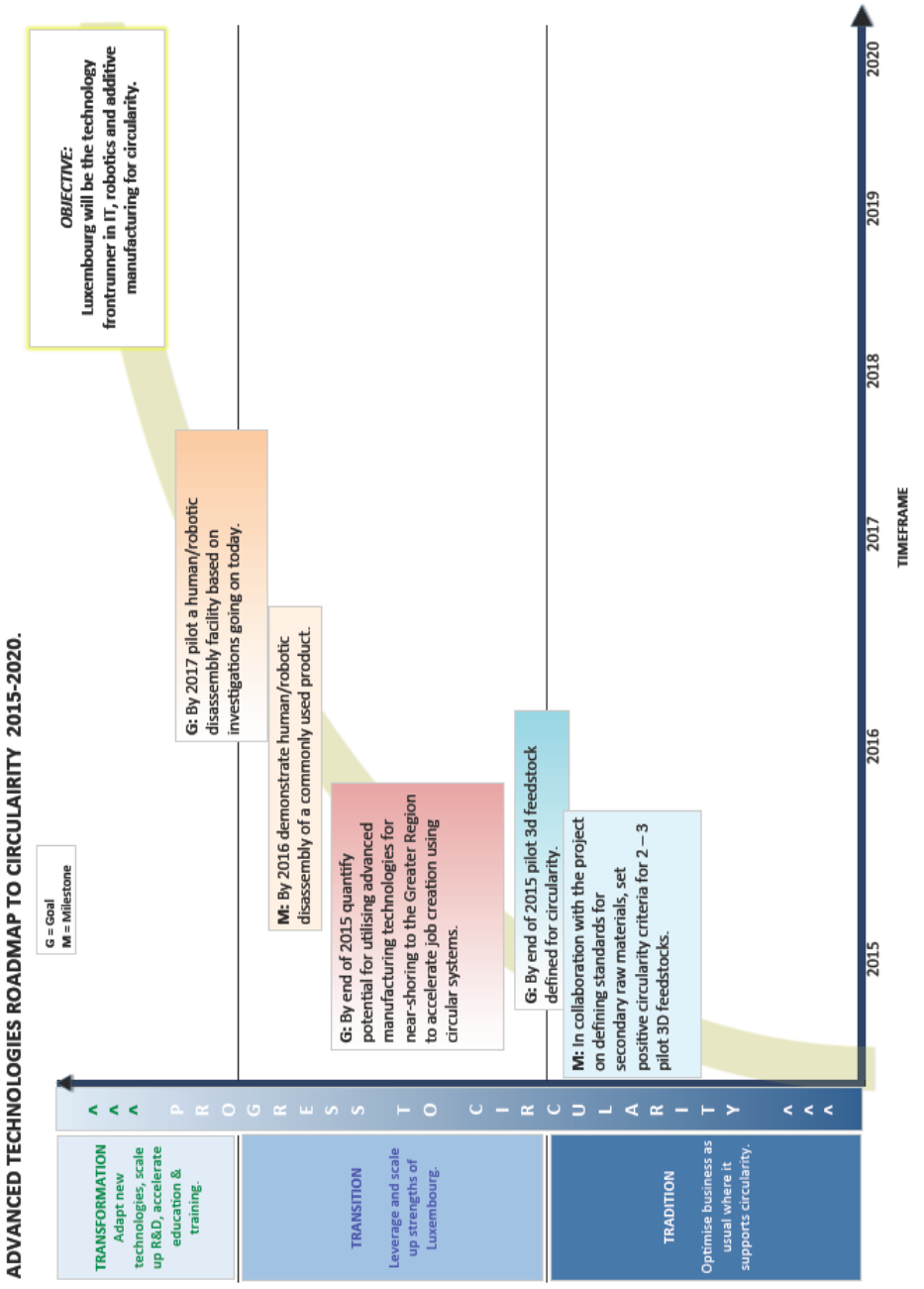


Figure L.12: Advanced Technologies Roadmap

Objective. Economical Water Upcycling.

Table L.11: Water

Category	Objective. *Luxembourg is a circularity leader in economically sensible water upcycling.*
Goals & Milestones	**Goal**. By 2020, recovery 35% of phosphate from municipal wastewater and reuse for fertiliser. *Primary Responsible; Ecoinnovation Cluster, Ministry of Agriculture, water agencies, MDDI, companies offering phosphate recovery technologies*. **Milestone.** By 2017, 3 pilot projects running. *Ambition level.* Transition to circularity using proven technologies. *Quick win potential?* License one of the proven technologies working already. **Goal**. By 2017 deliver drinkable water to the Luxembourg wastewater network from at least one hospital's effluent while improving hospital sanitation with disposable biobased implements. *Primary Responsible; BioHealth cluster, Ecoinnovation Cluster, Ministry of Health, MDDI.* **Milestone.** One agreement finalised during 2015. Join the European Phosphate Platform. *Ambition level.* Transition and transformation to circularity using new but proven systems developed through innovation research in the Benelux. *Quick win potential?* License one of the proven technologies working already.
Leading Stakeholders and Sectors Involved	Municipal wastewater authorities & hospitals in Luxembourg. Agricultural producers who use phosphate. Ministry of Environment and Ministry of Health to monitor.

Category	Objective. *Luxembourg is a circularity leader in economically sensible water upcycling.*
Potential Gains in **Competitiveness, Savings, Job Creation & Preservation, Environmental Impacts**	**Competitiveness & Jobs.** **Goal 1.** Begin to free the Greater Region from dependence on imported phosphate fertiliser. Develop a new technical competence in phosphate recovery and reuse. Reduce the costs of wastewater processing. **Goal 2.** Cut costs for hospitals to clean their wastewater. Cut costs of central wastewater systems to remove pharmaceuticals from wastewater by doing it at the source. Develop a new competence in managing effluent from healthcare facilities and in managing infection risks in hospitals, which are the fastest growing cost in healthcare. **Environment.** Reduce phosphate pollution. Eliminate pharmaceutical pollution from hospitals, which is one of the leading persistent forms of drinking water pollution.
Justification/ Background information	*Background;* Luxembourg is under heavy pressure from the EU to improve its water quality. Infection is the fastest growing cost in hospitals.

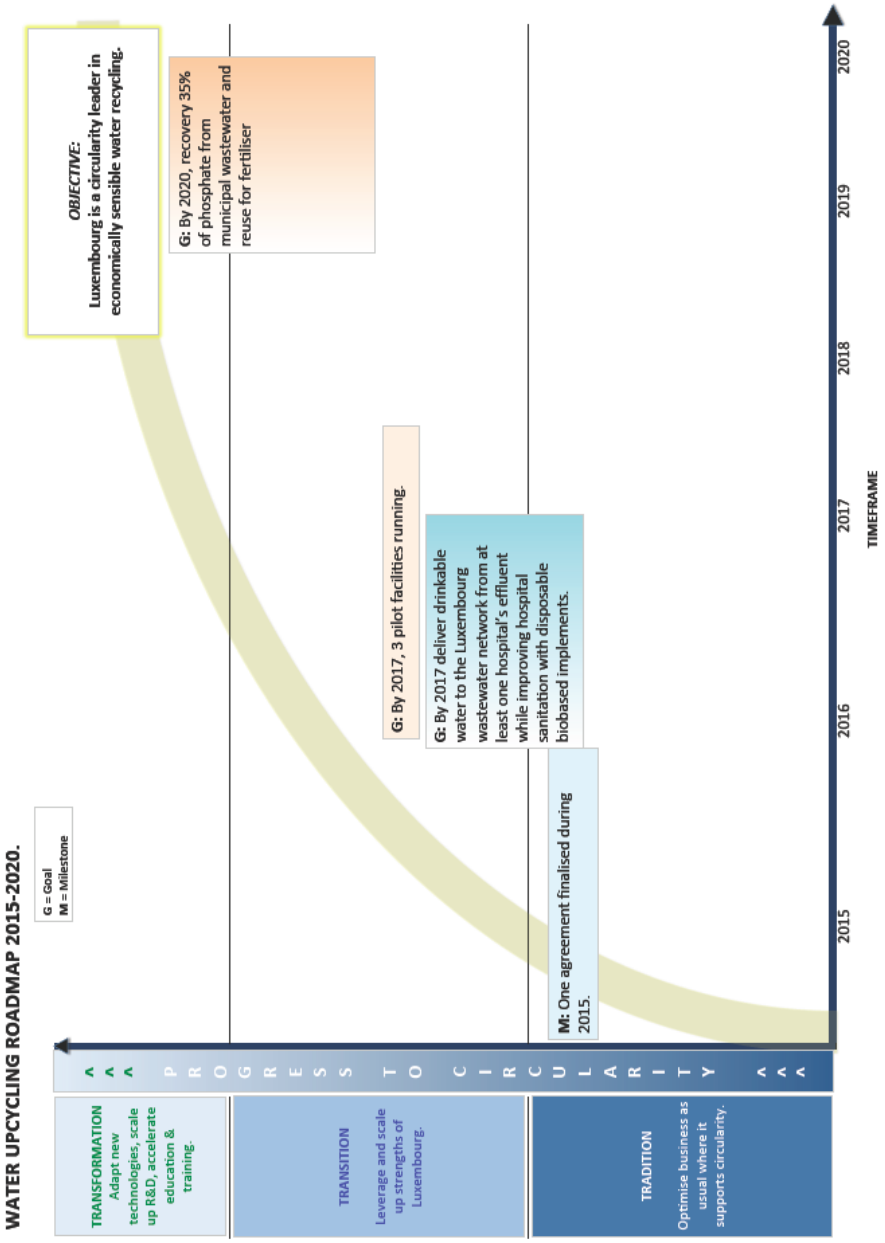


Figure L.13: Water Roadmap

Annex M. Methodology For Arriving At Objectives, Goals & Circularity Roadmap

The Roadmap framework was developed to account for the terms of reference summarized as follows;

> *Describe the pros and cons of why and how Luxembourg uses and might use materials in the circular economy to raise employment, competitiveness and savings, and improve environmental impacts.*

Steps taken for information gathering & assessment

Investigative Steps Examples

- Participation in Greater Region Business Days & Innovation Cluster Forum
- 50+ Interviews with stakeholders done in Luxembourg & by phone
- 25+ parallel activities; information collected and reviewed (See Table I)
- 150+ Studies & reports surveyed including 2014 EC scoping study, All-Party study
- National Sectorial, Employment, & Industrial reports from 2014 reviewed.
- Located distributors of 100+ products certified-for-circularity cycles and available in The Greater Region.
- 15 takeback or valorisation services connected to those products identified.
- Positive principles for legislation developed as example for circularity.
- Delivered interim study.
- Guidance & Feedback from Steering Commitee incl. ranking mechanism.
- Co-planned & participated in finance industry workshop.
- Checked draft Study, Highlights & Synopsis with Ministry for the Economy

Steps to setting potential Objectives and Goals

Stakeholder perception still plays as much a role in determining priorities as the facts themselves. Because of this, it is suggested the Ministry of the Economy canvass Stakeholders on their views about the practicality of each objective and each Roadmap.

There are many goal-setting methods and for example EPEA uses diverse methods to set goals with stakeholders. Goal-setting with stakeholders is a next step after the study.

The following Table M.1 shows which considerations for selecting Objectives and Goals were taken into account in consultation with the study Steering Committee.

Table M.1: Considerations for selecting circularity Objectives, Goals & Milestones

Category	Considerations
Relevance to parallel reports & activities in Luxembourg	• Information for selecting potential goals & objectives was drawn from other studies described in Annex C of the present study, as well as first-hand interviews with a range of stakeholders described in Annex J. • Recommendations from other works including the EU scoping study on Circular Economy and the Haut Comite pour L'industrie were considered. • The existence of a pilot or other initiative, for example the Biomaterials Roadmap. • The existence and level of activity of the related Innovation cluster..
Financial	• As a whole the objectives are diversified to reflect Luxembourg's diversified economy, so investments and benefits are shared across sectors. • Built on existing infrastructure or activities to be cost-effective. • Low cost or savings-oriented to start.
Materials based on the materials focus of the Ministry of the Economy	• The potential to significantly affect large materials flows. or • The potential to have inspirational symbolic impacts to advance Luxembourg's reputation.
Stakeholders	• Presence of a willing partner based on interviews and other investigations. • Based on interviews, perceived capacity of the partner to undertake the work. • Wherever possible, based on existing stakeholder activity.
Study Steering Committee Guidance for potential quick wins	• As a pilot, a scoring mechanism was used with the study Steering Committee to get an impression of priorities for potential quick wins. See figures M.2 +M.3 for more information on the quick wins ranking.

Methodology for identifying & selecting potential quick wins

At the request of the study steering committee, the study spent considerable time identifying potential quick wins for circularity in Luxembourg. Arriving at a definition of a quick win is more complicated than it might seem.

The Challenge

Selecting potential quick wins for circularity is normally a challenge due to the many variables and stakeholders. It is yet more challenging here because the study is asked to address materials value capture, improving competitiveness & costs, increasing jobs and reducing environmental impacts in the context of Luxembourg having limited control over materials cycles.

The Process

Involving stakeholders from the start and throughout the process is a priority. Science and statistics often become irrelevant if the results are not accepted through the eyes of stakeholders. Potential quick wins will only be finalized and prioritized after the Ministry gathers the opinions of further stakeholders about feasibility. Those opinions will be gathered in events scheduled to occur between December 2014 and February 2015.

In that context, to identify potential quick wins the study followed this process;

1. Canvassed more than 45 interviewees about their opinions on the potential.
2. Integrated those observations with statistical data.
3. Considered priorities identified in other CE studies described earlier.
4. Identified potential candidates.
5. Developed a ranking mechanism and asked study Steering Committee members to score.

The practical purposes of the ranking mechanism are to;

- Use a systematic way of involving diverse stakeholders so they see results of their input.
- Provide the Ministry with a vehicle to canvass stakeholders after the study is completed.
- Provide the study with guidance on which quick wins to explore more extensively.

For this, the study asked the Steering Committee to be a sounding board to test the ranking method according to criteria developed from; study terms of reference, clarification of terms by the Steering Committee, and interviews with experts in various sectors.

Note: Hundreds of books are written on the art of integrating hard data with opinion surveys, as well as how to get optimal results from survey rankings. Due to time constraints on the study with a late start and summer holidays, the process was

compressed. Similar approaches of integrating data with opinions were used by e.g. the EC *scoping study,* but over a more extended period of time with a greater budget.

A total of 14 criteria were included under the umbrella categories of Feasibility (7) and Impacts (7) (see Figure M.1 for a snapshot; the full table was provided earlier to the Ministry of the Economy and is available on request).

		Impacts							Feasibility						
	CIRCULAR ACTIVITY ➔➔➔	Supports classic Industry in Luxembourg	Potential for Job creation in 3-4 years	Supports New Start-up Companies or Activities	Potential for Supporting the Financial Sector	Improves Co-operation with Greater Region	Short term potential for broad public education about circularity	It is my personal preference	Potential is Clear for at least one other Ministry to support	Luxembourg based company is ready to participate	Economy Ministry sees how to play a supporting role	Low cost to produce a defined result in 18 months.	Innovation Cluster Exists	Most of the circularity chain is in Luxembourg	Acceptable for the traditional approaches of Luxembourg
Criteria importance 1-3 low = 1	PREFERENCE CRITERIA ⇩⇩⇩	For each box enter your preference 1 - 5 Low = 1 High = 5													
2	Example for following rows.	2	2	1	4	5	2	2	1	1	3	4	1	5	3
	Leverage the automotive cluster for a circular community, reusable packaging aspilot.														
	Biobased and CO2 based cleaners and lubricants to protect workers health.														
	Luxembourg as a Pilot for Renewing Agricultural Soils														
	Learning from & Optimising Steel Renting & Reverse logistics with ArcelorMittal														

Figure M.1: Ranking of Preference Criteria against Circular Activity Criteria divided into Impact and Feasibility (Source: Study output)

Results

Figure M.2 and M.3 describe the ranking results. Figure M.2 is the ranking with emphasis on subjectivity expressed as 'criteria importance'. Figure M.3 is the ranking without subjective emphasis. It is clear that while most upper-half priorities remain the same regardless if the subjective emphasis is included, some significant priorities differ when the subjectivity of participants is de-emphasized. For example a "grown in Luxembourg quality label' rises from #10 to #2, and financial matchmaking rises from the bottom half to the upper half when the subjective emphasis is removed. Those results suggest that depending on the background of participants in the ranking, the Ministry will find some priorities vary significantly.

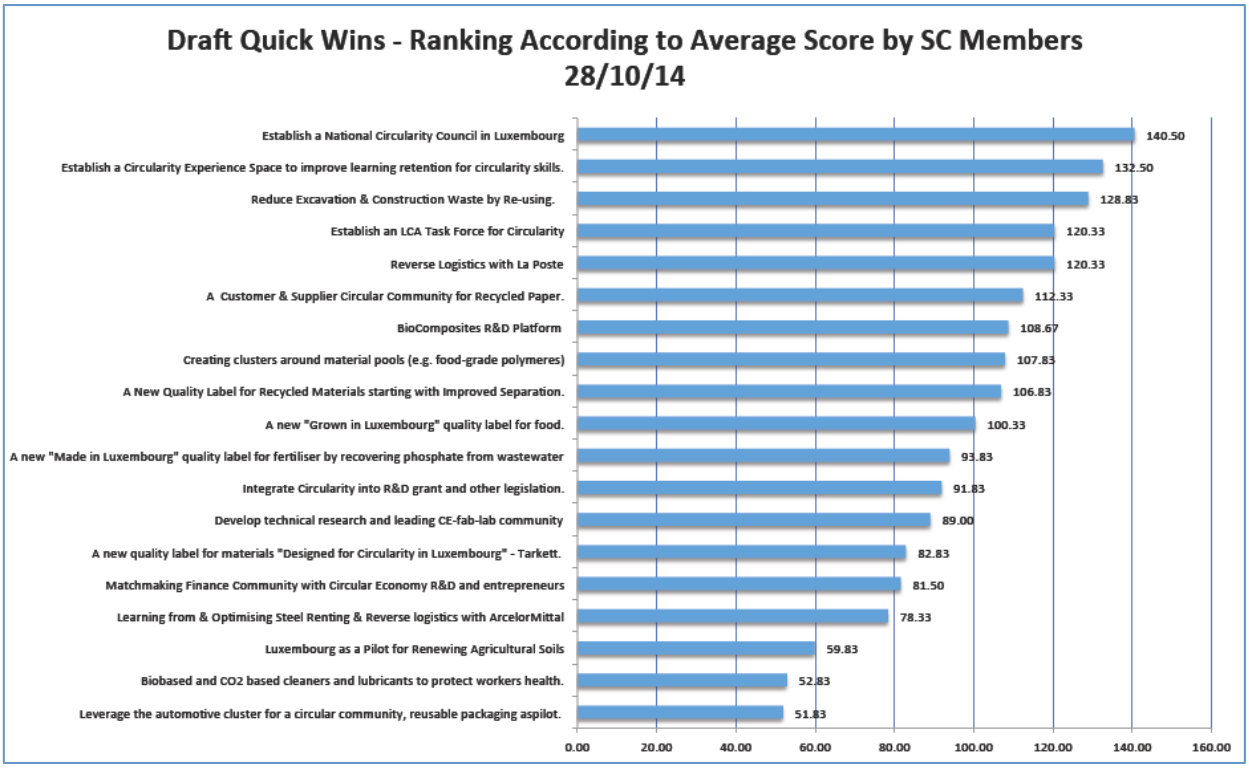


Figure M.2: Ranking with emphasis on subjectivity expressed as 'criteria importance' (Source: Study output)

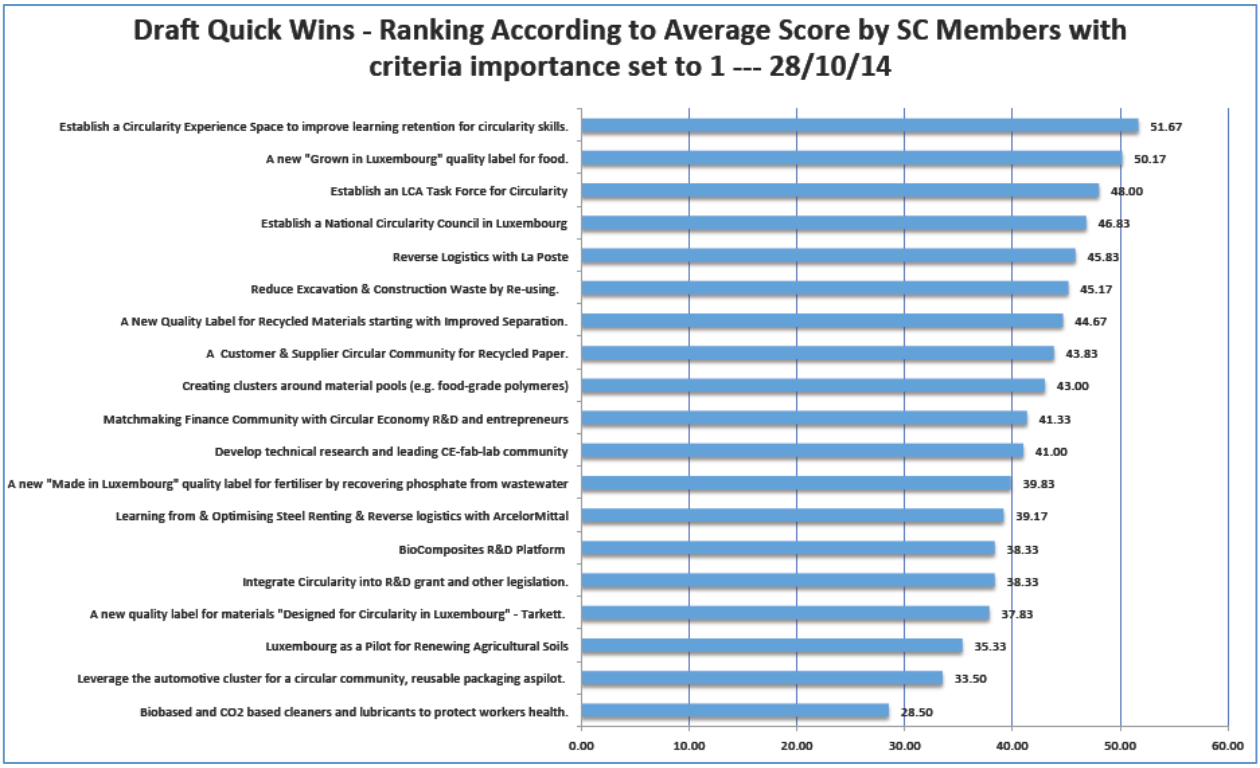


Figure M.3: Ranking without subjective emphasis. (Source: Study output)

How the Study Used Results

The results were used to focus on describing the top 7 potential quick wins. Originally 4 priorities were selected on the recommendation of the steering committee. However the top 4 expands to about 7 when the variance resulting from the ranking is considered, so in Chapter 14.5, 7 potential quick wins are described more completely.

Annex N. Bibliography

The following is a representative sampling of publications used for the study.

Administration de l'Environnement (2012). Zusammenfassung der Jahresberichte 2012 der luxemburgischen Kompostierungsanlagen.

ALD Automotive (2014) ALD Automotive, a leading player in vehicle leasing and global fleet management. http://www.aldautomotive.lu/en-us/about-ald-automotive-group.aspx.

ALD Automotive (2014), How does it work? The principle behind Full Service Leasing is very simple. http://www.aldautomotive.lu/en-us/small-and-medium-companies/full-operational-leasing/how-does-it-work.aspx.

Alfi (2013), Luxembourg: The Global Fund Centre.

Angloinfo (2014), Recycling in Luxembourg. http://luxembourg.angloinfo.com/information/housing/setting-up-home/recycling/.

Ashby, M. P. J., K. J. Bowers, H. Borrion and T. Fujiyama (2014). The when and where of an emerging crime type: The example of metal theft from the railway network of Great Britain. Security Journal, doi: 10.1057/sj.2014.43.

Badger, E. (2012). Why Is a Patent Troll in Luxembourg Suing U.S. Public Transit Agencies?. http://www.citylab.com/tech/2012/04/why-patent-troll-luxemburg-suing-us-public-transit-agencies/1819/.

Barker, A. and V. Houlder (2014). Brussels targets Amazon's Luxembourg tax deal. http://www.ft.com/cms/s/0/b0330530-4d5e-11e4-8f75-00144feab7de.html.

Beentjes, T. (2014). Towards Cradle to Cradle waste management – A case Study of Ecopark Windhof. Internship Report, supervised by CRP Henri Tudor, University Wageningen.

Betriber & Emwelt (2014). Substitution of Hazardous Chemicals - Regulation-driven Innovation.

Braungart, M. and J Engelfried (1992). An" intelligent product system" to replace waste management, Fresenius Environmental Bulletin.

Braungart, M., W. McDonough and A. Bollinger (2007). Cradle-to-cradle design: creating healthy emissions – a strategy for eco-effective product and system design. Journal of Cleaner Production **15**(13-14): 1337-1348.

Buzzi Unicem (2012), Extrait pour luxembourg 2012.

Chambre de Commerce Luxembourg, Industrie, 2012.

Chandrajith, R. and C. B. Dissanayake (2009). Phosphate mineral fertilizers, trace metals and human health. Journal of the National Science Foundation of Sri Lanka 37(3): 153-165

Chaton, C. (2014). Luxemburg setzt auf Circular Economy. http://www.tudor.lu/en/press/luxemburg-setzt-auf-circular-economy.

Chaux de Contern (2014). Workshop Les bétons recyclés.

Chien-Kang, Liu (1955). On the productivity of two experimental fishponds managed with traditional method of Chinese pisciculture, Acta Hydrobiologica Sinica, http://ssswxb.ihb.ac.cn/EN/Y1955/V0/I1/24#

Chinadaily.com.cn (2014). Bank of China to list yuan bond on Luxembourg Stock Exchange. http://www.chinadaily.com.cn/business/2014-05/13/content_17503557.htm.

Cluster for logistics Luxembourg (2014). Freeport for high valuables. http://www.clusterforlogistics.lu/why-luxembourg/projects/project-detail/logistics-parks/freeport.

Cogesud (2014). Presentation des societes.

Copeland, C. (2008). Luxembourg: World Headquarters for the Steel Industry. Benelux: Integration and Individuality.

Deloitte (2014). Healthcare in Luxembourg. http://www2.deloitte.com/lu/en/pages/life-sciences-and-healthcare/articles/healthcare-in-luxembourg.html.

ECO-Conseil S.à r.l. (2011). DATEN zur Abfallwirtschaft im Großherzogtum Luxemburg: Hausmüll und hausmüllähnliche Abfälle.

Editus.lu, Müll- und abfallaufbereitung - 54 Resultate, 2014. http://www.editus.lu/de/suche?q=m%C3%BCll-+und+abfallaufbereitung.

Ernst & Young (2010), Accompagner la définition et la mise en oeuvre de votre stratégie « éco-technologies ».

European Commission (2013). Eurostat publishes first resource efficiency scoreboard. http://ec.europa.eu/environment/ecoap/about-eco-innovation/policies-matters/eu/17122013-eurostat-publishes-first-resource-efficiency-scoreboard_en.htm.

European Investment Bank (2008). The EIB Group's New Building: Internal climate and environment.

Gentil, E. C. (2013). Municipal waste management in Luxembourg. European Environment Agency.

Gordon RB, M. Bertram and TE Graedel (2006) Metal stocks and sustainability. Proc Natl Acad Sci USA 103:1209–1214.

Haut Comité pour L'industrie Groupe de Travail Developpement industriel (2014). Plan d'action pour donner de nouvelles perspectives a l'industrie luxembourgeoise

Hydro, Luxembourg, 2014. http://www.hydro.com/en/About-Hydro/Hydro-worldwide/Luxembourg/.

ILEA., Members, 2014. http://www.ilea.lu/html/members.html.

JLL (2014). Office market report Luxembourg.

Johansson, N., J. Krook, M. Eklund and B. Berglund (2013). An integrated review of concepts and initiatives for mining the technosphere: towards a new taxonomy. Journal of Cleaner Production 55(0): 35-44.

Karnitschnig, M. and R. v. Daalen (2014). Business-Friendly Bureaucrat Helped Build Tax Haven in Luxembourg. http://online.wsj.com/articles/luxembourg-tax-deals-under-pressure-1413930593.

Koerner, M. (2014). Circular Economy – more than just another green initiative. http://blog.kpmg.lu/circular-economy-more-than-just-another-green-initiative/.

KPMG (2012). Luxembourg Banks Insights 2012.

KPMG (2013), KPMG's Automotive Breakfast.

KPMG (2014). Luxembourg SICAR - A vehicle for venture capital investments.

Kreisel, J., L. Wirtz and M. Schiltz (2014). Materials science in Luxembourg. Nature Materials 13(3): 219-222.

Le Gouvernement Du Grand-Douché De Luxembourg (2011). Luxembourg 2020: Programme national de réforme du Grand-Duché de Luxembourg dans le cadre de la stratégie Europe 2020.

Le Gouvernement Du Grand-Douché De Luxembourg (2014). National plan for smart, sustainable and inclusive growth: Luxembourg 2020.

Li, J. (2014). Report on Global Environmental Competitiveness of Luxembourg.

LinkedIn, Georges Thielen, 2014. http://lu.linkedin.com/pub/georges-thielen/26/a39/742.

Lorenz, H., P. Fischer, B. Schumacher and P. Adler (2013). Current EU-27 technical potential of organic waste streams for biogas and energy production. Waste Management **33**(11): 2434-2448.

Luxembourg BioHealth Cluster (2013). Venture Lounge Luxembourg supports biotech investments. http://biohealthcluster.lu/News/News-Archives/Venture-Lounge-Luxembourg-supports-biotech-investments.

Luxembourg BioHealth Cluster (2014). Luxembourg BioHealth Cluster. http://www.biohealthcluster.lu/.

Luxembourg EcoInnovation Cluster (2014). Circular Economy. http://www.ecoinnovationcluster.lu/Services/Circular-Economy.

Luxembourg for business (2014), Key players. http://www.logistics.lu/key-players.

Luxembourg for business (2014). News & Benchmarks. http://www.luxembourgforbusiness.lu/en/news-benchmarks.

Luxembourg for business (2014). Why Luxembourg?. http://www.logistics.lu/.

Luxembourg Materials Cluster (2014). Luxembourg Materials Cluster. http://www.materialscluster.lu/.

Luxembourg Materials Cluster (2014). Turning Innovation into Business.

Luxembourg Portal for Innovation and Research (2014). Delphi Automotive Systems Luxembourg SA - Powertrain Systems. http://www.innovation.public.lu/en/collaborations/trouver-partenaires/entreprises/d/delphi-automotive-systems-luxembourg-sa-1/index.html.

Luxembourg Portal for Innovation and Research (2014). Luxembourg ranks 5th in the Innovation Union Scoreboard. http://www.innovation.public.lu/en/actualites/2014/03/rdi-scoreboard/index.html.

Luxembourg.lu, Automotive components, 2012. http://www.luxembourg.public.lu/en/invest-luxembourg/key-economic-sectors/automotive-components/index.html?highlight=automotive%22components.

Luxembourg.lu (2012), Banking and Insurance. http://www.luxembourg.public.lu/en/invest-luxembourg/key-economic-sectors/banking-and-insurance/index.html.

Luxembourg.lu (2012). Green Technology. http://www.luxembourg.public.lu/en/invest-luxembourg/key-economic-sectors/green-technology/index.html.

Luxembourg.lu (2014). Research and Innovation. http://www.luxembourg.public.lu/en/invest-luxembourg/research-development/index.html.

Luxembourg.lu. (2012). Logistics. http://www.luxembourg.public.lu/en/invest-luxembourg/key-economic-sectors/logistics/index.html.

Luxemburger Wort (2013). Car sharing for Luxembourg City in 2014. http://www.wort.lu/en/luxembourg/car-sharing-for-luxembourg-city-in-2014-52ac195be4b0c12a73867041.

Luxemburger Wort (2014). 15 cars to share in Luxembourg City. http://www.wort.lu/en/luxembourg/launch-in-2015-15-cars-to-share-in-luxembourg-city-53c4de8bb9b3988708045d66.

Luxemburger Wort (2014). Luxembourg allows transportation of shipping containers on its roads. http://www.wort.lu/en/business/coup-for-luxembourg-logistics-luxembourg-allows-transportation-of-shipping-containers-on-its-roads-542a573cb9b398870806e961.

Luxemburger Wort (2014). No 3D printing cluster for Luxembourg. http://www.wort.lu/en/business/calls-for-value-chain-approach-no-3d-printing-cluster-for-luxembourg-5423de4fb9b398870806b441.

Luxinnovation (2014). The future City of Sciences. http://en.luxinnovation.lu/Innovating-in-Luxembourg/The-future-City-of-Sciences.

Luxinnovation (2014). Manufacturing of the future. http://www.business-meets-research.lu/Home/About-Business-meets-Research.

Nuss, C., Sahamie, R. and Stindt, D. (2014), The Reverse Supply Chain Planning Matrix: A Classification Scheme for Planning Problems in Reverse Logistics. International Journal of Management Reviews. doi: 10.1111/ijmr.12046

OECD/IEA (2014). Energy Policies of IEA Countries - Luxembourg.

Ott, M., G. Winter and F. J. Hoffmann (2014). C2C BIZZ – Guide to Cradle to Cradle® (C2C) Inspired Business Sites. http://www.c2cbizz.com/tools/.html.

Regnier, M. (2014). TRADECOWALL SCRL Luxembourg 7 octobre 2014.

Rogers Dale S., Tibben-Lembke Ronald S. Going Backwards: Reverse Logistics Trends and Practices University of Nevada, Reno Center for Logistics Management 1998, Reverse Logistics Executive Council

Rossi, M., S. Charon, G. Wing and J. Ewell (2006). Design for the Next Generation: Incorporating Cradle-to-Cradle Design into Herman Miller Products. Journal of Industrial Ecology **10**(4): 193-210.

Rottenberg, J. (2014). The circular economy in Luxembourg. http://jonathan-rottenberg.monipag.com/the-circular-economy-in-luxembourg/.

Sabatier, R. and S. Nolte (2014). Luxembourg implements law on European cooperative societies. http://www.internationallawoffice.com/newsletters/Detail.aspx?g=1441d148-98d0-42c3-9fbd-1d6663da80e5.

Shen, L., J. Haufe and M. K. Patel (2009). Product overview and market projection of emerging bio-based plastics. Group Science, Technology and Society (STS), Copernicus Institute for Sustainable Development and Innovation, Utrecht University.

Smith, Y., Wolf Richter (2013). Luxembourg Is Not The Next Cyprus, Not Yet, But…. http://www.nakedcapitalism.com/2013/04/wolf-richter-luxembourg-is-not-the-next-cyprus-not-yet-but.html.

The World Bank (2014). Domestic LPI, Performance: Luxembourg 2014. http://lpi.worldbank.org/domestic/performance/2014/C/LUX.

The World Bank (2014). Domestic LPI, Environment and Institutions: Luxembourg 2014. http://lpi.worldbank.org/domestic/environment_institutions/2014/C/LUX.

Thewes, A., et al. (2014). Field study on the energy consumption of school buildings in Luxembourg. Energy and Buildings.

Thill, P. (2013). EEO Review: Promoting green jobs throughout the crisis. European Employment Observatory.

UBS (2014). UBS in Luxembourg. http://www.ubs.com/lu/en.html.

Uni.lu (2014). Finding Sustainable Solutions. http://wwwen.uni.lu/research/focus_areas/finding_sustainable_solutions.

Uni.lu (2014). Focus Areas. http://wwwen.uni.lu/research/focus_areas.

Uni.lu (2014). LCSB - Luxembourg Centre for Systems Biomedicine. http://wwwen.uni.lu/lcsb.

Uni.lu (2014). Research Unit in Engineering Science (RUES). http://wwwen.uni.lu/recherche/fstc/research_unit_in_engineering_science_rues.

Vázquez-Rowe, I., et al. (2013). Application of three independent consequential LCA approaches to the agricultural sector in Luxembourg. The International Journal of Life Cycle Assessment.

Wang, H., Z. Xu, A. Kohandehghan, Z. Li, K. Cui, X. Tan, T. J. Stephenson, C. K. King'ondu, C. M. B. Holt, B. C. Olsen, J. K. Tak, D. Harfield, A. O. Anyia and D. Mitlin (2013). Interconnected Carbon Nanosheets Derived from Hemp for Ultrafast Supercapacitors with High Energy. ACS Nano **7**(6): 5131-5141.

Weydert, J., et al. (2013). AIFM Directive implementation: another reason to choose Luxembourg. ILO.

Wikipedia (2014). Environment of Luxembourg. http://en.wikipedia.org/wiki/Environment_of_Luxembourg.

World Economic Forum. (2014). Meta-Council on the Circular Economy 2014-2016, from http://www.weforum.org/content/meta-council-circular-economy-2014-2016-0.

Ye, T. and Y. Zhenhua (2014). Reverse logistics network: A literature review. Journal of Chemical and Pharmaceutical Research 6(7): 1916-1921.

Annex O. Description of EPEA

EPEA IN BRIEF

The Environmental Protection Encouragement Agency (EPEA) Internationale Umweltforschung GmbH is a multi-functional inter-disciplinary institute for assessing, re-designing and optimising products like textiles, clothing, personal care products, floor coverings, construction materials, office furniture, cleaning products, toys, baby products, printing materials and packaging as well as business parks, schools, and factories. At a conceptual and policy level EPEA co-develops national and regional strategies for improving the positive footprint of governments and companies.

Collaborative competencies include; chemical assessments, optimisations, quickscans and concepts in hands-on settings to enhance value chain partnerships in the private and public sectors. EPEA's focus is integrating interdisciplinary science with industrial innovation and communication. Other services include design input for buildings and area developments in partnership with international architecture, engineering and design firms to support customers in achieving business and institutional goals. Experts at EPEA also enhance the marketing and communications strengths of partners. To support its methods EPEA has one of the leading databases for assessing the *positive impacts potential* of substances. The model has improved billions of euro, dollars and yuan worth of assets and sales.

The institute is the founding authority for the award-winning Cradle to Cradle Design Protocol® which is recognized by associations like the World Economic Forum as a basis for the Circular Economy. Since the early 1990s and until today, EPEA's projects developed with partners won diverse international awards for economics and science and its founder Prof. Dr. Michael Braungart is recognized by leading publications like *The Guardian* as being among the leading sustainability thinkers globally. The government of Germany and Deutsche Bank awarded EPEA the honor of being one of the "365 Landmarks in the Land of Ideas".

Founded by Dr. Braungart in 1987, EPEA works with partners worldwide. EPEA's headquarters is in Hamburg Germany, with satellites in most European countries as well as the U.S., Brazil, China, and Taiwan. Its customers and partners include companies, national and municipal governments, NGOs, consulting firms, and foundations.

For more information visit www.epea.com

EPEA Internationale Umweltforschung GmbH
Trostbrücke 4, 20457 Hamburg (Germany)
Tel.: +49-40-4313 49-0
Fax: +49-40-4313 49-49
E-mail: epea@epea.com