



# STATE OF THE ART REPORT ON POLICIES AND STANDARDS

November 2016

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Co-funded by the Horizon 2020 Framework  
Programme of the European Union

# Executive summary

## Major highlights

From the different policy instruments that are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment, the binding legislations mainly focus on energy performance and construction & demolition waste management.

This results from the transposition by Member States of the requirements of the revised Waste Framework Directive (2008/98/EC) and the revised Energy Performance of Buildings Directive (2010/31/EU) into their legislation. The requirement level is depending of the Member State and the (sub-)national context. While the Scottish government has e.g. developed a Zero Waste Plan, the Flemish government has set up a Regulation on recycled aggregates, and Sweden has developed The Swedish Waste Plan 2012-2017 and The Swedish Waste Prevention Program 2014-2017, in Portugal the waste management is not defined and implemented yet like in other countries in EU.

Even within sustainable building and circular economy policy instruments Energy remains an essential focus point. The Flagship Initiative 4: “Resource Efficient Europe” of the 10-year strategy Europe 2020 proposed by the European Commission e.g. supports the shift towards a low carbon economy, increase the use of renewable energy sources, modernize the EU’s transport sector and promote energy efficiency.

Most policy instruments supporting sustainable building design and construction, comprising building materials (environmental) assessment, and circular economy in the built environment are voluntary instruments developed at national or sub-national level. Private certification schemes demonstrated to have a positive impact on sustainable building design.

The building sector is characterized by a complex and multi-disciplinary value chain, which is reflected by the wide range of policies impacting it. It is important to assess the impact of (future) policies on the different links of the value chain. The Construction Products Regulations (CPR) e.g. offers a common language and harmonised rules that could allow for reprocessed, recycled and reused materials to be widely exchanged by providing confidence in their performance and quality. However, obliging the CE marking for all reclaimed construction products could, depending on the type of construction product, have a contradictory effect and even distort existing second hand construction products networks, as a result of the complexity of the process and the resulting cost. It is therefore crucial to investigate the potential support and barriers for the different links of the value chain.

## Identified Barriers

The fragmentation of the policies over the different policy levels and the current complexity of the legislative frameworks may lead to a lack of integration of the different policies and could in some cases even lead to contradictions.

It could be argued that a key barrier comes through energy efficiency policies across Europe. The prioritisation of energy efficiency and high energy performance of buildings may unintentionally result in building design and materials which do not lend themselves to

deconstruction and reuse. It is not the high performance, which could hamper the adoption of dynamic and circular building design, but the choice of construction techniques and materials to achieve to required performance.

Furthermore the definitions provided by the EU Waste Framework, seems to lack clarity. As a result high recovery rates could correspond to down-cycling of stony fraction used for road foundation (and other low grade applications) which is far from the definition of 'recovery' as understood within the BAMB project.

An additional barrier can be seen in the fact that until recently many of the existing policies and instruments have been developed from a linear viewpoint, which does not take into consideration the potential reality of a circular built environment. For example, current urban regulations and building permits are based on a linear and static vision of buildings which may impede changes and transformations supported by reversible design and materials recovery. Similarly, some current financial incentives require complete ownership of buildings, which may be contradictory to new business plans and ownership models within a circular built environment.

The lack of knowledge and awareness of companies and technicians has also been identified as an important issue with regards to the implementation effective resource and waste management, as well as the implementation of Materials Passports and reversible design.

## Identified opportunities

Although the lack of clear definitions is seen as a potential barrier, the EU Waste Directive also offers an opportunity to support the transition towards a circular building economy. The Directive introduces the "polluter pays principle" leading to Landfill Taxes in several countries. The increasing cost of landfill provides an economic driver for alternative solutions which avoid end-of-life waste, such as reversible building design. Further clarification of the current definitions could, in addition also, help to increase the quality level of the recovered, re-used and recycled materials.

Existing hard laws on energy performance, waste management and construction product regulations offer the opportunity to address certain aspects supporting the implementation of dynamic and circular buildings. Extending these policy instruments by integrating Materials Passports and Reversible building design protocols would enable the development of an integrated approach meeting climate change, energy, environmental and economic issues.

This integrated approach is essential if we want to avoid that today's energy efficiency actions hampers tomorrow recovery of valuable materials. Energy Refurbishment of 3% required by the Energy Efficiency Directive (2012/27/EU) offer the incredible opportunity to do things better and to respond to a variety of challenges in a sustainable and effective manner.

More recently a new stage of policy development is underway. The Circular Economy Package (EU), Circular Economy Strategy (Scotland), Regional Program for Circular Economy (Brussels Capital Region), etc. have been adopted. All of these policy instruments recognise that the built environment is a key sector to introduce circularity.

This provides a significant opportunity to reframe sustainable building policies and instruments to allow for a circular approach. Existing voluntary programs, plans, strategies and tools are being investigated within the BAMB project and suggestions will be given to

enable their adaptation to support the transition towards a circular and dynamic built environment.

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# Integrated state of the art report Policies and standards

## Introduction

Policies and regulations in member states and across the EU will influence our ability to transition to a circular economy – positively and negatively. Work is underway in the BAMB project to understand where the opportunities and barriers lie in a complex and, sometimes contradictory, regulatory landscape.

This state-of-the-art report aims to give an overview of the current policy instruments that are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment. The analysis of the current policy instruments has been done on a European level and on a member state level for 4 different countries being: Belgium, Portugal, Sweden and UK.

This state-of-the-art report will serve as a basis for a further in depth analysis of the barriers and opportunities and the drafting of suggestions for the adaptation of existing instruments or the drafting of new policies.

## Policy at EU level

Buildings and the building industry are affected by a wide range of European initiatives, policies and legislation as a consequence of their societal role and impact (social, economic & environmental), the broad range of topics and materials they cover, and the variety of stakeholders characterising the building industry value chain. The construction sector is impacted by a wide spectrum of policies and standards, from overarching EU policies (Europe 2020) to specific building related policies covering different topics such as building products, energy consumption, waste, etc. Besides global overarching policies, it is observed that the policies that might impact the BAMB project are initiated from an economic and sectorial point of view (DG GROW), from an environmental point of view (DG ENV; DG Climat) or both (DG ENER).

## Sectoral Policies

The Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) is the European Commission service responsible for completing the internal market; helping turn the EU into a smart, sustainable, and inclusive economy; fostering entrepreneurship and growth; generating policy on industrial and intellectual property rights; and delivery the EI's space policy. From a building sector point of view<sup>1</sup>, the objective of DG GROW is to help the construction sector meet economic challenges by:

- quantifying the impacts of EU legislation on the sector
- ensuring the full implementation of the Construction Products Regulation (CPR)

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<sup>1</sup> [https://ec.europa.eu/growth/sectors/construction\\_en](https://ec.europa.eu/growth/sectors/construction_en)

- consolidating the internal market for construction products by developing a common technical language for the performance of construction products
- following up on the Strategy for the sustainable competitiveness of the construction sector and its enterprises (2012) that improves training, tendering and financing in the construction sector
- following up on the Communication on Resource efficiency opportunities in the building sector (2014) that aims to improve design, construction, demolition and recycling of construction products, as well as simplify data in the use of resources to reduce waste.

When cross referencing the objective of promoting circular economy with construction & demolition, the following is stated<sup>2</sup>:

Waste originating from construction and demolition represents one of the highest volumes of waste in Europe. One ton of construction and demolition waste is produced per person per year – i.e. 500 million tonnes in the whole EU every year. Valuable materials are not always identified and recovered. Improving waste management in this sector is crucial for the circular economy.

The following actions are to be undertaken by DG GROW in co-operation with other relevant Directorates-General:

- Take a series of actions to ensure improved recovery of valuable resources and adequate waste management in the construction and demolition sector, as well as facilitate assessing the environmental performance of buildings.
- Develop pre-demolition guidelines to boost high-value recycling in the sector as well as voluntary recycling protocols aimed to improve quality of and build confidence in recycled construction materials.

## Environmental policy

### Overarching

The Directorate-General for Environment is the European Commission service responsible for EU policy on the environment. It aims to protect, preserve and improve the environment for present and future generations, proposing and implementing policies that ensure a high level of environmental protection and preserve the quality of life of EU citizens. It also makes sure that Member States apply EU environmental law correctly.

The work of DG ENV is guided by multiannual Environment Action Programmes. The 7th Environment Action Programme (EAP), ' entered into force in January 2014 and will be guiding European environment policy until 2020. In order to give more long-term direction it looks beyond 2020 and sets out a vision of where it wants the Union to be by 2050<sup>3</sup>:

"In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where

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<sup>2</sup> [https://ec.europa.eu/growth/industry/sustainability/circular-economy\\_en](https://ec.europa.eu/growth/industry/sustainability/circular-economy_en)

<sup>3</sup> <http://ec.europa.eu/environment/action-programme/>



natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society."

It identifies three key objectives:

- to protect, conserve and enhance the Union's **natural capital**
- to turn the Union into a **resource-efficient**, green, and competitive low-carbon **economy**
- to **safeguard** the Union's citizens from **environment-related pressures** and risks to health and wellbeing

### Climate policy

The Directorate-General for Climate Action (DG CLIMA) is responsible for leading the European Commission's effort to fight climate change within Europe as well as at the international level. DG CLIMA has set a series of targets for reducing greenhouse gas emissions progressively up to 2050.

Key climate and energy targets are set in the<sup>4</sup>:

- 2020 climate and energy package
- 2030 climate and energy framework

These targets are defined to put the EU on the way to achieve the transformation towards a low- carbon economy as detailed in the 2050 low-carbon roadmap.

The EU tracks its progress on cutting emissions through regular monitoring and reporting. Before proposing new policies, the Commission carefully assesses their potential impacts.

The 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020<sup>5</sup>.

The package sets three key targets:

- 20% cut in **greenhouse gas** emissions (from 1990 levels)
- 20% of EU energy from **renewables**
- 20% improvement in **energy efficiency**

The targets were set by EU leaders in 2007 and enacted in legislation in 2009 and 2012. They are also headline targets of the Europe 2020 strategy for smart, sustainable and inclusive growth.

The EU is taking action in several areas to meet the targets.

The 2030 climate and energy framework sets three key targets for the year 2030<sup>6</sup>:

- At least 40% cuts in **greenhouse gas emissions** (from 1990 levels)
- At least 27% share for **renewable energy**

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<sup>4</sup> [http://ec.europa.eu/clima/policies/strategies/index\\_en.htm](http://ec.europa.eu/clima/policies/strategies/index_en.htm)

<sup>5</sup> [http://ec.europa.eu/clima/policies/strategies/2020/index\\_en.htm](http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm)

<sup>6</sup> [http://ec.europa.eu/clima/policies/strategies/2030/index\\_en.htm](http://ec.europa.eu/clima/policies/strategies/2030/index_en.htm)

- At least 27% improvement in **energy efficiency**

The framework was adopted by EU leaders in October 2014. It builds on the 2020 climate and energy package.

It is also in line with the longer term perspective set out in the Roadmap for moving to a competitive low carbon economy in 2050, the Energy Roadmap 2050 and the Transport White Paper.

The 2050 **low-carbon economy** roadmap suggests that<sup>7</sup>:

By 2050, the EU should cut emissions to **80%** below 1990 levels

- Milestones to achieve this are **40%** emissions cuts **by 2030** and **60% by 2040**
- **All sectors** need to contribute
- The low-carbon transition is **feasible & affordable**.

### Energy policy<sup>8</sup>

The Directorate-General for Energy (DG ENER) is the policy-specific department of the European Commission responsible for developing and implementing a European energy policy. In order to meet the above-mentioned energy targets, 3 energy strategies have been developed:

- 2020 Energy Strategy
- 2030 Energy Strategy
- 2050 Energy Strategy

In order to meet the targets of the 2020 Climate and Energy Package, the 2020 Energy Strategy sets out five priorities, amongst which 3<sup>9</sup> are related to buildings and the building industry:

- Making Europe more energy efficient by accelerating investment into efficient buildings, products, and transport. This includes measures such as energy labelling schemes, renovation of public buildings, and Eco-design requirements for energy intensive products.
- Protecting consumer rights and achieving high safety standards in the energy sector. This includes allowing consumers to easily switch energy suppliers, monitor energy usage, and speedily resolve complaints
- Implementing the Strategic Energy Technology Plan – the EU's strategy to accelerate the development and deployment of low carbon technologies such as solar power, smart grids, and carbon capture and storage.

As stated above, the EU has set itself the goal of reducing greenhouse gas emissions by 80 when compared to 1990 levels by 2050. The 2011 **Energy Roadmap 2050** explores the transition of the energy system in ways that would be compatible with this greenhouse gas

<sup>7</sup> [http://ec.europa.eu/clima/policies/strategies/2050/index\\_en.htm](http://ec.europa.eu/clima/policies/strategies/2050/index_en.htm)

<sup>8</sup> <https://ec.europa.eu/energy/en/topics/energy-strategy/2020-energy-strategy>

<sup>9</sup> <https://ec.europa.eu/energy/en/topics/energy-strategy/2020-energy-strategy>

reductions target while also increasing competitiveness and security of supply. The Roadmap sets out four main routes to achieve this goal: energy efficiency, renewable energy, nuclear energy, and carbon capture and storage.

Because investments are made for a period of 20 to 60 years, policies that promote a stable business climate which encourages low-carbon investments must begin to be made today.

The main points of the Energy Roadmap, which may directly affect buildings and the building industry include:

- Decarbonising the energy system is technically and economically feasible. In the long-run, all scenarios that achieve the emissions reduction target are cheaper than the continuation of current policies.
- Early infrastructure investments cost less and much of the infrastructure in the EU built 30 to 40 years ago needs to be replaced anyway. Immediately replacing it with low-carbon alternatives can avoid more costly changes in the future. According to the International Energy Agency, investments in the power sector made after 2020 would cost 4.3 times as much as those made before 2020.

## Overarching policy - Europe 2020

Europe 2020 is the European Union's ten-year jobs and growth strategy. It was launched in 2010 to create the conditions for smart, sustainable and inclusive growth.

Five headline targets have been agreed upon for the EU to achieve by the end of 2020. These cover employment, research and development, climate/energy, education, social inclusion and poverty reduction.

The Europe 2020 agenda puts forward three mutually reinforcing priorities addressed by 7 flagship initiatives<sup>10</sup>:

### **Smart growth**

- Digital agenda for Europe
- Innovation Union
- Youth on the move

### **Sustainable growth**

- Resource efficient Europe
- An industrial policy for the globalisation era

### **Inclusive growth**

- An agenda for new skills and jobs
- European platform against poverty

## Further Policy and Legislation Developments Specific to the Building Sector

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<sup>10</sup> [http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/flagship-initiatives/index\\_en.htm](http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/flagship-initiatives/index_en.htm)

## Development of binding legislation with a direct impact on the building sector

A comprehensive range of policies is identified addressing energy efficiency in buildings as well as construction and demolition waste management.

Energy supply concerns, increasing energy prices, as well as climate change issues have triggered the development of energy efficiency and energy performance policies. The 2020 climate and energy package targets set in 2007 have been enacted in legislation in 2009<sup>11</sup>. Due to the large impact of buildings related to the energy consumption of buildings during occupancy, further policy development has been focussing on the energy performance of buildings, the use of renewable energy and energy efficiency. As a result, a series of binding legislation with specific references to the building sector has been enacted.

In particular, the recast **Energy Performance of Buildings Directive** (2010/31/EU) is a key EU legislation in this area, requiring all new buildings to be nearly zero energy by 2020 and new public buildings to be nearly zero energy by 2018. In addition, it requires: minimum energy performance requirements to be set by member states for new buildings, for the major renovation of buildings and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls, etc.); for EU countries to draw up lists of national financial measures to improve the energy efficiency of buildings; and publication of energy certificates for buildings advertised for sale or rental<sup>12</sup>.

The directive focuses specifically on energy performance in buildings, but does not consider broader issues, such as the materials used to improve performance and the ease or difficulty of disassembly and recovery.

The **Energy Efficiency Directive** (2012/27/EU), requires the establishment of a long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private (article 4), the annual renovation of 3 % of public buildings owned and occupied by National central governments (Article 5), public procurement focussing on high energy performance of buildings (Article 6) and the reduction of embodied energy (Article 7).

The **Renewable Energy Directive** (2009/28/EC) was developed to establish an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs from renewables by 2020. This will be achieved through the attainment of individual national targets, which range from 10% to 49%. Under the directive, each country has a national renewable energy action plan identifying how it will reach its target<sup>13</sup>.

In contrast with what the brief name of the **ECO-design directive** (2009/125/EC) may suggest, it goes beyond broader environmental design recommendations and establishes a framework for the energy performance requirements of products and services. It deals with the energy efficiency of e.g. heating (water and space) apparatus and components, and other

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<sup>11</sup> [http://ec.europa.eu/clima/policies/strategies/2020/index\\_en.htm](http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm)

<sup>12</sup> <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>

<sup>13</sup> <https://ec.europa.eu/energy/en/topics/renewable-energy/renewable-energy-directive>

appliances such as lighting. The Eco-design Directive also sets minimum requirements on products and applies energy labels to energy using and energy related products.<sup>14</sup>

The CE marking on (construction) products offers the guarantee that the manufacturers take the responsibility for the declared performances as established within the **Construction Products Regulation** (305/2011). The Regulation (305/2011) defines the rules for the affixing the CE Mark based on harmonised technical specifications. It provides a common technical language and uniform assessment methods to assess the performance of construction products.<sup>15</sup> The materials must meet fundamental requirements including mechanical resistance and stability, safety in case of fire, hygiene, health and environment, safety and accessibility in use, protection against noise, energy economy and heat retention, sustainable use of natural resources.<sup>16</sup>

From July 1, 2013, the declaration of performance must be attached to a product bearing the CE marking.<sup>17</sup> While primarily concerned with functional quality, one of the basic requirements for construction works is the sustainable use of natural resources.<sup>18</sup>

The **Directive on the landfill of waste** (99/31/EC) is one of the first EU waste policies to deal with construction and demolition waste. The directive states that where waste needs to be landfilled, it must be sent to landfills which comply with the requirements of Directive 1999/31/EC. The objective of the Directive being to prevent or reduce, as far as possible, negative effects on the environment by introducing stringent technical requirements for waste and landfills.<sup>19</sup>

The **Waste Framework Directive** (2008/98/EC) sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. This overarching legislation on waste management in the EU explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles.

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<sup>14</sup> Resource efficiency in the building sector, DG Environment, 23 May 2014

<sup>15</sup> [https://ec.europa.eu/growth/sectors/construction/product-regulation\\_nl](https://ec.europa.eu/growth/sectors/construction/product-regulation_nl)

<sup>16</sup> [http://www.anec.eu/attachments/0509Presentation%20M\\_%20Fuchs.pdf](http://www.anec.eu/attachments/0509Presentation%20M_%20Fuchs.pdf)  
[http://ec.europa.eu/growth/sectors/construction/product-regulation/index\\_en.htm](http://ec.europa.eu/growth/sectors/construction/product-regulation/index_en.htm)

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[http://economie.fgov.be/en/entreprises/particular\\_domains/Quality\\_in\\_the\\_construction\\_industry/construction\\_products/Marquage\\_CE/#.V-jVkdU5PQo](http://economie.fgov.be/en/entreprises/particular_domains/Quality_in_the_construction_industry/construction_products/Marquage_CE/#.V-jVkdU5PQo)

<sup>18</sup> Resource efficiency in the building sector, DG Environment, 23 May 2014

<sup>19</sup> [http://ec.europa.eu/environment/waste/landfill\\_index.htm](http://ec.europa.eu/environment/waste/landfill_index.htm)



The Directive introduces the "polluter pays principle" and the "extended producer responsibility". It includes a recycling and recovery target to be achieved by 2020 - 70% of construction and demolition waste must be prepared for re-use, recycling and other recovery. The Directive requires that Member States adopt waste management plans and waste prevention programmes.<sup>20</sup>

### European standard for aggregates

A set of European standards for aggregates was introduced in 2004<sup>21</sup>. The standards were withdrawn in 2013 to allow some changes to be made. They have been reviewed and are being published in 2016. The standards, such as EN 12620 Aggregates for concrete and EN 13139 Mortar, cover physical and chemical properties of aggregate across a range of uses. EN 12620 also provides standards for the physical and chemical properties of recycled aggregates from construction and demolition waste<sup>22</sup>. EN933 provides a set of separate standards addressing the geometrical properties of aggregates.

### Further development of additional policies and standards with a direct impact on the sector

Unlike, energy and waste, the promotion of sustainable buildings and resource efficiency and productivity have not benefited from such prolonged policy action. Most policies identified at EU level are still in the stage of non-binding 'soft law' (Policy, Framework, Plan, Program, Communication, etc.) as opposed to binding Regulations, Directives or Decisions.

The European Commission's **Lead Market Initiative** (COM(2007)860) identified sustainable construction as one of six Lead Markets and in its Annex 1 describes an Action Plan for Sustainable Construction. This emphasizes the importance of LCA approach to sustainable buildings, and calls for environmental performance to be included in building regulations, (particularly with regard to energy efficiency), but also in improving the opportunities for GPP in construction and for multiple action on standardisation, labelling and certification<sup>23</sup>.

<sup>20</sup> <http://ec.europa.eu/environment/waste/framework/>

<sup>21</sup> [http://www.mineralproducts.org/prod\\_agg01.htm](http://www.mineralproducts.org/prod_agg01.htm)

<sup>22</sup>

[https://standards.cen.eu/dyn/www/f?p=CENWEB:110:0:::FSP\\_ORG\\_ID,FSP\\_PROJECT:6136,58865&cs=1D5A8C21978C6514C513005784A81EA95](https://standards.cen.eu/dyn/www/f?p=CENWEB:110:0:::FSP_ORG_ID,FSP_PROJECT:6136,58865&cs=1D5A8C21978C6514C513005784A81EA95)

<sup>23</sup> Resource efficiency in the building sector, DG Environment, 23 May 2014

The European standard **EN 15804 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products** provides core Product Category Rules (PCRs) for Type III environmental product declarations (EPD) for any construction product or service. Areas covered by this standard include which stages of a product's lifecycle are considered in the EPD, rules for calculating Life Cycle Inventory and Life Cycle Impact. The standard can be applied to an EPD for the product stage, or can be extended to cover cradle to grave. Consideration is given to environmental benefits beyond the system boundary related to reuse, recycling and recovery.

The European Commission has held a public consultation on a Common EU framework of core indicators for the environmental performance of EU buildings. The aim is to develop a set of indicators which will assess the environmental performance of a building throughout its lifecycle. Objectives are divided into two themes: Life Cycle environmental performance, including Resource efficient material life cycles, and Quality, performance and value<sup>24</sup>.

The **European Eco-label (Regulation (EC) No 66/2010)** includes criteria for some product categories that are relevant to the sustainability of buildings; particularly in decoration and finishing, but also flooring. Nearly half of all registered products under this scheme fall into the categories "hard floor covering" and "indoor paints and varnishes"<sup>25</sup>.

In 2005, the EU published its strategy on the **Sustainable use of Natural Resources (COM(2005)670)**. This emphasised the importance of sustainable production and consumption to the prosperity of Europe and included considerations of the application to Life Cycle thinking to policy.<sup>26</sup>

In 2015, the EU unveiled a Circular Economy Package, of which **Closing the loop - an EU action plan for the Circular Economy** forms a key part. The plan establishes a concrete and ambitious programme of action and measures covering the whole cycle, from production and consumption to waste management and the market for secondary raw materials. It also introduces a timescale for actions, including development of pre-demolition assessment guidelines for the construction sector in 2017, a voluntary industry-wide recycling protocol for construction and demolition waste in 2016 and core indicators for the assessment of the lifecycle environmental performance of a building, and incentives for their use from 2017 onwards.<sup>27</sup>

In addition, revised legislative proposals on waste introduced as part of the plan will include *'concrete measures to promote re-use and stimulate industrial symbiosis - turning one industry's by-product into another industry's raw material'*<sup>28</sup>.

Building on the Europe 2020 strategy and the challenges Europe faces following the global economic crisis, the **Circular Economy package: Roadmap to a Resource Efficient Europe** (COM(2011) 571) outlines how we can transform Europe's economy into a sustainable one by 2050. It proposes ways to increase resource productivity and decouple

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<sup>24</sup> [http://susproc.jrc.ec.europa.eu/Efficient\\_Buildings/docs/REB\\_Indicator\\_findings\\_proposals.pdf](http://susproc.jrc.ec.europa.eu/Efficient_Buildings/docs/REB_Indicator_findings_proposals.pdf)

<sup>25</sup> Resource efficiency in the building sector, DG Environment, 23 May 2014

<sup>26</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005DC0670&from=EN>

<sup>27</sup> [http://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC\\_2&format=PDF](http://eur-lex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0012.02/DOC_2&format=PDF)

<sup>28</sup> [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)

economic growth from resource use and its environmental impact. It illustrates how policies interrelate and build on each other. Key resources are analysed from a life-cycle and value-chain perspective. Housing is identified as one of the sectors responsible for most environmental impacts. 3 action lines are proposed:

- 1) Transforming the Economy
- 2) Natural Capital and Ecosystem Services
- 3) Tackling key sectors amongst which Buildings.

The Resource Efficiency Roadmap sets out a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020.<sup>29,30</sup>

**A resource-efficient Europe** – Flagship initiative of the Europe 2020 Strategy – was one of seven flagships put forward by the European Commission in the EU 2020 Strategy. The roadmap builds on and complements other policy initiatives under this flagship, such as the revision of the CAP and CFP, Biodiversity Action Plan, White Book on Transport and the Roadmap on Energy. The roadmap sets out a coherent framework of policies and actions in a variety of policy areas, required for the shift towards a resource efficient economy.

The main objectives of **Resource Efficiency - Opportunities in the Building Sector** are to promote a more efficient use of resources consumed by new and renovated commercial, residential and public buildings and therefore to reduce their overall environmental impacts throughout the full life cycle. Resource use is determined in a large part by design decisions and choices of construction materials. To help bring resource efficiency gains, designers, manufacturers, contractors, authorities and users need usable and reliable information to inform their decision-making. This initiative addresses the information deficit by proposing a set of clearly defined and measurable indicators for the assessment of the environmental performance of buildings.

Commodity markets have displayed increased volatility and unprecedented movements of prices in recent years and producers and consumers have called for policy responses to mitigate the negative effects. The **Strategy on Tackling the Challenges in Commodity Markets and on Raw Materials** (2011) presents an overview of what has been achieved in areas including energy, metals and minerals and agriculture and food, and the steps that are planned. It is part of the Europe 2020 Strategy to ensure smart, sustainable and inclusive growth and is closely linked to the flagship initiative for a resource efficient Europe.

**Raw materials initiative (COM(2008)699) Meeting our critical needs for growth and jobs in Europe**, published in 2008, highlights the essential nature of raw materials for the sustainable functioning of modern society, including in sectors such as construction.

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<sup>29</sup> [http://ec.europa.eu/environment/resource\\_efficiency/about/roadmap/index\\_en.htm](http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm)

<sup>30</sup> FINAL COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: Roadmap to a Resource Efficient Europe (2011)



## Barriers and opportunities of existing EU level policies

Policy and legislation at a European level offers a number of opportunities for reversible building design and materials passports, through measures ranging from resource efficiency and scarcity, waste and energy performance.

The construction industry is addressed both directly through strategies such as Strategy for the sustainable competitiveness of the construction sector and its enterprises and through general policies and legislation such as the **Circular Economy Package**.

The greatest opportunities for renewable building design and for materials passports arise from the European level policies and legislation covering the circular economy. The EU **Circular Economy Package** highlights construction and demolition waste as a priority area. As such, it forms part of the EU's plan to develop guidelines and new legislation for use on demolition sites in order to increase recycling rates of waste, with a number of specific targets and goals for buildings. This has relevance to work in both reversible building design and materials passports, due to their direct alignment to the principles of the circular economy.

Policies and legislation around resource efficiency also offer a number of opportunities within this field. There are both specific and general policy initiatives supporting resource efficiency. The former, including **Resource efficiency: Opportunities in the building sector**, identify the need to reduce resource use in buildings through reduction in energy costs and reduction in life cycle costs, which reversible building design and materials passports are well-placed to encourage.

Policy and regulation around waste provide both opportunities and barriers for reversible building design and materials passports. The **Waste Framework Directive**, for example, creates legal definitions for reuse; materials which comply with the criteria can officially be labelled as products. This could be an opportunity for materials passports, if it could be incorporated.

The same directive, however, also creates a potential barrier, as currently end-of-waste criteria only exist for a few materials and applications. These would need to be expanded to other materials in order to remove the barrier to reversible building design.

EU Climate change policy and legislation also provide both opportunities and barriers. Opportunities are around the promotion of the circular economy and the potential for reversible building design and material passports to support the reduction in greenhouse gas emissions. However, the need for climate proofing changing weather may lead to the use of materials which increase the difficulty of deconstruction and separation of materials.

Similarly, EU policy and legislation around energy efficiency and the energy performance of buildings could lead to the use of materials in a way which makes recovery and reuse difficult.

## National Levels and Sub-national levels

### Belgium

The Belgian political landscape is characterised by 3 different levels of policy of legislation that might affect buildings and Building As Materials Banks related topics: federal level, regional Level (Flemish Region, Brussels Capital Region and Walloon Region) and municipality level.

In Belgium, the powers of Federal State cover everything connected with the public interest of all Belgians – public finances, the army, the judicial system, social security, foreign affairs, as well as significant aspects relevant to public health and home affairs<sup>31</sup>.

At a federal level, policies and legislation concerning buildings, environment and related economic aspects are mainly dealt with by 2 Federal Public Administrations - FPA Economy, and FPA Health and Environment. Federal level policies and legislation focus mostly on construction products.

Some legislation concerns the implementation of EU policies and regulations such as :

- the **Arrêté royal concernant l'indication, par voie d'étiquetage et d'informations uniformes relatives aux produits, de la consommation en énergie et en autres ressources des produits liés à l'énergie** (13 AOÛT 2011). This decree transposes into law Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products and repealing Directive 92 /75 / EEC. This decree focusses on the energy consumption of products in use and corresponding labeling.
- The development of a **Product National Contact Point** as stated in the EU Regulation 305/2011 which lays down that each Member State designates a Product Contact Point for Construction.

The National Product Contact Point for Construction is to give the following information:

- the national provisions (technical rules as laid down in Regulation 764/2008) aiming at fulfilling the fundamental requirements which apply to **construction works for the intended use** of each construction product (essential characteristics);
  - the coordinates of the competent authorities in charge of the supervision of the implementation of the national provisions;
  - the means of appeal generally available within the national territory in the event of disagreements between the competent authorities and an economic operator.
- The **Arrêté royal fixant les exigences minimales pour les affichages environnementaux sur les produits de construction et pour l'enregistrement des déclarations environnementales de produits dans la base de données**

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<sup>31</sup> [http://www.belgium.be/en/about\\_belgium/government](http://www.belgium.be/en/about_belgium/government)

**fédérale** (22 MAI 2014) is obliging material producers to develop an EPD according to the Belgian Federal requirements for products for which they publish environmental impact information on the product or its packaging. Producers are obliged to register their EPD in a Federal Database. The Royal Decree refers to the *EN 15804 Sustainability of construction works* yet includes an article that ensures that from 2017 on also module A4, C and D become mandatory, as well as the whole set of environmental indicators of the EC PEF method for reasons of having a robust set of indicators. Regarding the background database used for LCA, the Decree is open, but the federal database will request transparent information about which database has been used. The EPD data is automatically introduced in the National EPD data base.<sup>32</sup>

- **National Environmental Product Declarations Database:** Manufacturers who wish to affix an environmental statement on their product(s) should first have an EPD carried out according to the requirements stated in above mentioned Decree of Mai 2014 and should have it registered in this database. Manufacturers who market products without environmental statement can also use the database to declare their LCA. The database is accessible for the public, which means that architects, public authorities or consumers can also consult (part of) the data entered in the database.
- The bill '**Projet de loi relatif aux marchés publics**' aims to essentially (partially) transpose the new guidelines in European public procurement, in particular Directive 2014/24/ EU of the European Parliament and Council of 26 February 2014 on public procurement and repealing Directive 2004 /18 / EC and Directive 2014/25 / EU the European Parliament and of the Council of 26 February 2014 procurement by entities operating in the sectors of water, energy, transport and postal services, repealing Directive 2004/17 / EC.

Other policies, mechanisms and regulations set goals and standards specific to Belgium.

For example, the law '**Loi relative aux marchés publics et à certains marchés de travaux, de fournitures et de services**' (15 JUIN 2006) specifies the National requirements regarding public procurement for works, supply and services.

Furthermore, the Control Mechanism – **Bureau for Standardisation (NBN)** is responsible for developing and selling standards in Belgium. In addition, NBN also organises training on the use of management standards. Together with its sector operators, NBN acts as the Belgian knowledge centre for all activities related to standardisation. NBN plays a societal role by helping companies, consumers, public authorities and other stakeholders to strive for greater quality within a competitive international context.

The federal government is also in charge of publishing several **Technical Specifications (STS)**. The STS make a specific contribution to the realization of construction works according to the rules of art and good craftsmanship. These reference documents, of normative and / or indicative nature, are primarily intended for clients, namely the prescribers and designers. The STS describe requirements that can be asked for of products and

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<sup>32</sup> Alexander Passerl<sup>1</sup> & Sébastien Lasvaux<sup>2,3</sup> & Karen Allacker<sup>4,5</sup> & Dieter De Lathauwer<sup>6</sup> & Carolin Spirinckx<sup>7</sup> & Bastian Wittstock<sup>8,9</sup> & Daniel Kellenberger<sup>10</sup> & Florian Gschösser<sup>11</sup> & Johannes Wall<sup>1</sup> & Holger Wallbaum<sup>1</sup>, Environmental product declarations entering the building sector: critical reflections based on 5 to 10 years experience in different European countries, International Journal Life Cycle Assess 2015

requirements regarding the implementation. It comprises prescriptions regarding the materials used; technical requirements such as stability and fire safety requirements; energy performance and comfort; acoustic properties; etc.

The Flemish Region, the Brussels-Capital Region and the Walloon Region have powers relating to the economy, employment, agriculture, water policy, housing, public works, energy, transport, the environment, town and country planning, nature conservation, credit, foreign trade, supervision of the provinces, communes and intercommunal utility companies<sup>33</sup>.

Consequently, at a regional level, policies and legislation address the requirements with regards to *climate change and energy, urban planning, building* (design, construction, use & end-of-life) as well as *construction and demolition waste management*.

Depending on the region, the responsibilities for the definitions of requirements in the abovementioned areas can be centralised under one administration or can be spread over different administrations. In the Brussels Capital Region, all environmental aspects related to buildings are centralised and treated by one administration called Brussels Environment. Consequently, the environmental performance of buildings is integrated within broader regional plans.

The Regional Plan for Air-Climate-Energy aims to achieve a reduction of Greenhouse gas production of 30% compared to 1990 by 2025 and the improvement of the air quality in order to meet the EC standards regarding air quality. The building sector is responsible for a large share of the energy consumption and greenhouse gas production in the Brussels Capital Region. Therefore the plan embraces a framework for sustainable buildings with a high energy and environmental performance taking into account the reduction of non-renewable resources resulting from construction, refurbishment of use of buildings, reduced emission CO<sub>2</sub>, the environmental impact of materials used in buildings, etc.

## Energy Performance

The Recast Energy Performance of Buildings Directive (2010/31) has been transposed in the 3 regions. Although the 3 regions have agreed to use a common methodology, calculation tool and materials database (EPBD) for the calculation of the energy performance of buildings, the required performance and strategies to achieve the objectives differ from one region to the other.

The development of instruments to promote energy performance can be seen as the first stage of policy development within the contemporary built environment. After raising awareness and testing how far the market was able to go through experiments, advanced and high energy performance levels have become mandatory and remain the main legal mandatory aspect to take into account in building construction and refurbishment.

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<sup>33</sup> [http://www.belgium.be/en/about\\_belgium/government](http://www.belgium.be/en/about_belgium/government)

In the Brussels Capital Region, all new constructions and heavy refurbishment projects need to meet the requirements close to passive house standards. First, this regulation was implemented for public buildings (since 2010), afterwards the regulation became mandatory for all building permits for new housing and office buildings.

## Waste Management

As a result of the EU policies and Waste Framework Directive (2008) the Belgian regions are characterised by well-established Waste policies. However, the specific context of the country has fostered the further development of waste policies.

The high population density of Belgium and the issues of land availability have forced the regions to develop a consolidated framework of policies regarding waste management and waste prevention. The issue of land availability of greatest importance to the Brussels Capital Region. As a result of the density of the city, the Brussels Capital Region relies on the neighbouring regions for the treatment of its construction waste and recycling in which the end-of-life treatment plants for construction waste and recycling are located.

These specificities have led to the development of construction and demolition waste prevention policies.

In the Brussels Capital Region, the re-use of construction materials / waste is promoted through the **Strategy for Re-use of construction and demolition materials** (2008-2025) and the **Plan for the prevention and management of waste** (May 2010) which sets a framework to promote reuse of construction material and actions to achieve it. Different tools have been developed to raise awareness and foster the re-use and recycling of construction materials and demolition waste.

In the Flemish Region the focus has first been put on improving the quality of demolition waste in order to improve its re-cycling and thus reduce landfilling. ***The Sloopinventaris (demolition inventory), article 4.3.3 Vlarema*** is the obligation to make up a demolition inventory for buildings with a volume over 1000 m<sup>3</sup> and with a (partially) other function than residential. The demolition waste inventory includes the description of the demolition site with an attached list of all the waste that will be released. The description is to also include the place in the building where the waste stream occurs and the proposed way the waste fraction will be selectively collected, stored and disposed of. This has further led to the **Regulation on recycled aggregates** which is for the certification of recycled granulates.

In a second stage, Flanders' framework has been enlarged from sound construction waste and materials management as set in the **Flemish Materials Decree** (date) towards a more integrated approach. By doing so, the first steps are also set towards circularity. **The policy program 'Materiaal bewust bouwen in kringlopen' (Building in a material conscious way)**, running from 2014 until 2020, puts the vision of circular thinking within the built environment in practice, by providing a framework for cooperation between authorities and

different actors in the construction sector, in order to stimulate the sustainable management of materials. The policy framework concentrates efforts into five main themes:

- closing cycles of the stony fraction,
- closing cycles of the non-stony fraction
- selective demolition and deconstruction
- (embodied) environmental performance of buildings
- Design for Change

## Sustainable buildings

Besides the energy performance of buildings, the Brussels Capital Region has also given importance to sustainable building design, embracing the reduction of negative environmental impacts of buildings while fostering biodiversity, comfort and quality of living. Different policy instruments have been developed to raise awareness, to train, and to finance sustainable building initiatives. Some initiatives remain restricted to the Brussels Capital Region, such as the **Call for Exemplary Buildings** and the **Guide for Sustainable Buildings**. However, the latter has supported the development of a sustainability assessment scheme, **REF-B**, consolidated and agreed on by the 3 regions.

## Environmental Impact of Materials

The objectives of the Flemish Materials Decree to develop sound management of construction waste and materials has led to the development of a Flemish/Belgian **LCA methodology - MMG** aiming to assess the Environmental Impact of Materials in Building(s) (Component)s). The focus on the environmental performance of buildings within the Brussels Capital Region has quickly led to the support of, and cooperation in this initiative which is now further co-developed by the 3 regions in cooperation with the Federal Public Administration. A first Design Tool will be launched in 2017. It is important to emphasise that the developed methodology aligns with the methodology used for the EPD framework and database developed at a national (Federal) level.

## Circular Economy

Life-cycle thinking and circular thinking has been introduced in different policy tools for a couple of years. The life-cycle thinking and re-use of materials, closing the materials loop, has been embraced in different tools developed in the Brussels Capital Region and the Flanders Region, such as the :

- The **Guide for Sustainable Buildings** developing a file on life-cycle thinking within the chapter ‘Materials’
- The **Opalis** website focusing on the professional sector active in selling salvaged building materials around Brussels (covering almost all of Belgium). The website provides an online directory of dealers of salvaged buildings material (both buying and selling materials), advice on how to reuse salvaged materials, and ready to use design briefs for specific materials.
- The **Practical Guide for the re-use of building materials** explaining how to set a reuse strategy in an architectural renovation project. It divides the project into a step-by-step process and gives advice on the procedure for pre-studies, project

planning, project design and its execution. It is mainly orientated towards on-site reuse.

- **23 design guidelines: explanation and downloads** presenting Design for Change guidelines as an outcome of the applied research project "**Design for Change: Development of a policy and transitional framework**". In this project, a framework was developed to assess the "Design for Change" characteristics of building elements, buildings and districts, in a qualitative and quantitative way. The development of the qualitative part led to the visual description of 23 Design for Change guidelines. These are explained in online sheets which allow designers, developers and policymakers to get acquainted with existing solutions and at the same time provide them with an understanding of the importance of the Design for Change approach. Each principle also includes key questions in order to assess a design alternative.

These tools are developed to support a transition towards a circular economy which is developed amongst others within the **Programme Régional en Economie Circulaire (PREC)** (8 mai 2014) for the Brussels Capital Region and the **Policy program 'Materiaal bewust bouwen in kringlopen' (Building in a material conscious way)** for the Flemish Region.

The Regional Programme for Circular Economy (PREC) has 3 overall objectives:

- Turn environmental objectives into economic opportunities.
- Anchor the economy in Brussels to produce locally when possible, reduce transport distances, optimize land use and create added value for Brussels.
- Support job creation

In order to reach these objectives 111 measures have been defined within 5 sectors: Construction, resources and waste, logistics, retailers and food.

## Barriers and opportunities

The political and geographical context of Belgium and its regions has contributed to a status quo that presents both opportunities and barriers for BAMB as the result of European policies and legislation that have been transposed to the federal and regional levels, federal legislation and initiatives, regional legislation and initiatives, and an urban environment.

As a result of EU directives, energy performance of buildings began as the focus for policy instruments in the construction sector. An opportunity for BAMB could be the extension of initiatives and policy tools supporting high energy efficiency, embracing resource productivity. Linking the requirements regarding energy performance to other requirements such as environmental impact of materials in buildings, resource effectiveness of buildings and circular building design, could enable a more integrated vision on building design, resource use on a macro level (energy and non-energy related) and interior and exterior pollution (air, water, soil and waste).

A potential barrier presents itself regarding **the federalization of standards** and regulations in these areas and the division of scope and responsibilities between national and regional levels of government. While there are regional requirements for energy performance, standards for construction materials are established by various federal level instruments which may result in contradictions. Building professionals as architects and engineering firms

experience these differences as contra-productive and lead to regionalization of building activities.

However, the administrations of the 3 regions and the federal public administrations in charge of the different aspects related to building materials are aware of this difficulty and are working closely together. The development of a Belgian LCA methodology as well as work on the Belgian requirements for EPD and the PCR categories have been and are developed in close cooperation.

In some cases the energy performance requirements may hamper or be contrary to resource efficient actions and/or circular building design. It is therefore important to take these potential contradictions into account within the further policy developments. This stresses the importance of the development of an integrated approach embracing energy performance, environmental impact, resource effectiveness and circular building design.

The design and construction of sustainable buildings as well as sustainable refurbishment is supported through voluntary policy instruments developed to raise awareness, to train, and to finance sustainable building initiatives. Most of these voluntary instruments embrace the sustainable use of materials and waste treatment, the reduction of construction and demolition waste, and the effective and versatile use of buildings. The existence of tools integrating a broader perspective on sustainable building design and the awareness raised offer the opportunity to further develop an integrated approach embracing mandatory (energy performance) instruments.

The reduction of building and construction waste and the re-use of building materials is now one of the main focus points. Different mandatory instruments have been developed over the years within the framework of the EU Waste Framework Directive (2008/98/EC) and as a consequence of the high population density characterising Belgium.

The regions have, amongst other things, been developing a demolition inventory, a strategy for re-use of building materials fostering the dismantling of buildings and the reuse of valuable materials, a plan for the prevention and management of waste and Regulation on recycled aggregates.

The Brussels Capital Region is however facing some specific challenges. As a result of the density of the city, space is a rare commodity. End-of-life treatment plants for construction waste and recycling occurs in Flanders or Wallonia. The stockpiling of valuable construction materials is challenging and little processing industry can be found within the borders of the region. Therefore the region relies on the neighbouring regions.

An additional barrier can be seen in the fact that until recently many of the existing policies and instruments have been developed from a linear viewpoint, which does not take into consideration the potential reality of a circular built environment. For example, current urban regulations and building permits are based on a linear and static vision of buildings which may impede changes and transformations supported by reversible design and materials recovery. Similarly, some current financial incentives require complete ownership of buildings, which may be contradictory to new business plans and ownership models within a circular built environment.



Nevertheless, more recently a new stage of policy development is underway. A circular economy plan has been recently adopted by the Brussels Capital Region, one of the pillars being the building sector. The policy program 'Materiaal bewust bouwen in kringlopen' (Building in a material conscious way) also introduces circular thinking approaches within the Flemish Region. This provides a significant opportunity to reframe sustainable building policies and instruments to allow for a circular approach. While the wealth of data provided through the existing voluntary programs, plans, strategies and tools that have been developed will feed into BAMB tools and support the implementation of resource productivity and circular and dynamic buildings; the BAMB tools will also serve as an interesting input to the further strengthening of these and enabling their adaptation and better implementation within a circular built environment.

However, it is worth noting one final barrier that is relevant for the majority of policies and standards developed during the various stages of policy development in the sector – many programs, plans, strategies and tools remain voluntary. It has to be investigated which mandatory policy instruments have to be developed and how in order to have a significant impact on resource productivity and an integrated policy on sustainable and circular building.

# Portugal

## Portugal Governance overview

The Portuguese policies and regulations are organised in two levels, national policies, normally resulted from EU directives or policies, i.e. national plans and programs and regulations and laws with different frameworks.

The principal policies and regulations in Portugal that might have influence on the implementation of BAMB are related with the environmental protection, waste, urban areas and planning, energy efficiency and certification and climate changes. Along with this instruments, exist some financial instruments, green procurement and commitment as well as green taxes, that could reinforce the implementation of BAMB.

Portuguese Government through its central and local bodies is the principal administrator and enforcer of environmental law. Local bodies, such as the municipalities, play a key role, but at a central level, the most important agent is the Ministry of Environment. This entity, is assisted by regional bodies, 5 Regional Development Coordination Commissions and 2 Environmental Secretaries, Madeira and Azores. Despite the municipalities are the public authority closer to the communities and also to some companies and clusters, they are not able to be effective and knowledgeable to apply and verify compliance with policies, regulations and standards.

The Portuguese Environment Agency (APA) is the national public body whose mission is to develop and monitor the management of environment and sustainable development policies. It works in close cooperation with other public, private and non-governmental organizations, to ensure a high level of protection and enhancement of environmental systems.

The Agency for Energy (ADENE) is a non-profit organization whose mission is to promote and carry out activities of public interest in the field of energy and in particular energy efficiency and efficient use of water. Actually, they are responsible for managing the Energy Certification of Buildings in Portugal.

The General Direction for Energy and Geology (DGEG) is an entity of the Portuguese Public Administration whose mission is to contribute to the design, promotion and evaluation of policies on energy and geological resources in a perspective of sustainable development and security guarantee supply.

Also important to refer at a central level is the Agriculture, Sea, Environment and Spatial Planning Inspection Authority, with administrative autonomy.

## Barriers and opportunities

Portugal has been moving slowly after the economic crisis, but the government, companies, stakeholders are carefully rethinking how to restart, and rebuild. This is the opportunity to do well. It is clear that construction industry and the public authorities needs a new approach and despite all the background, the sector is starting to look with attention to find ways to do better and cheaper. The lack of knowledge and awareness of the companies and technicians is a huge barrier that need to be transposed.

The policies recently defined as well as the financial instruments approved need to be implemented along the country, but is also a very important note, that Portugal has overlapping plans for the same areas, which leads to inefficiently and lack of coordination between stakeholders, slowing the decision-making processes.

An old and bureaucratic system is also a barrier to simplify and improve ways of doing and to attract the industry to change. Any change, is still an effort that means costs and waste for the companies.

However, there is areas related with waste management, design and planning, new products, end of waste criteria, public procurement, green taxes, etc. that are not yet defined and implemented like in other countries in EU, and this is the main opportunity to reinforce and raise awareness along the industry about materials passports reversible building design.

## Sweden

### Summary Sweden

Policies and regulation concerning reversible building design and building materials information in Sweden are mostly on national or EU level.

Sweden has an extensive environmental code, *Miljöbalken 1998:808 – MB*, as well as a strong Environmental policy. Sweden aims to solve the big environmental issues within this generation, to leave a society to next generation without the burden of these big issues and without contributing to rising environmental and health issues abroad. A circular approach is assumed necessary to fulfil the overarching Swedish environmental goals (Regeringsbeslut M2012/1171/Ma). The complex nature of policies, legislation and standards for this focus area in Sweden limits the ability to guarantee an exclusive list within the scope of BAMB, and for the list compiled see ??.

**Sweden's Environmental policy, *Preciseringar av miljö kvalitetsmålen och etappmål i miljömålssystemet M2012/1171/Ma*** complementary to the UN Sustainability Goals, has 16 Environmental Quality Objectives and 24 goals. Seven of these goals are of special interest for BAMB:

- **Increased resource efficiency in the construction sector (Ökad resurshushållning i byggsektorn)**
- **Non-toxic and resource-efficient material cycles (Giftfria och resurseffektiva kretslopp)**
- **Reducing children's exposure to hazardous chemicals (Minska barns exponering för farliga kemikalier)**
- **Knowledge of chemicals, material health and environmental properties (Kunskap om ämnens hälso- och miljöegenskaper)**
- **Information on hazardous substances in products (Information om farliga ämnen i varor)**
- **Development and application of EU rules on chemicals (Utveckling och tillämpning av EU:s kemikaliereregler)**
- **More effective supervision of chemicals in the EU (Effektivare kemikalietillsyn inom EU)**
- **Green Haus Gas Emissions until 2020 (Utsläpp av växthusgaser till år 2020)**

The development of the policies and legislations in this area is pushed from EU level, governmentbranches, municipalities and lobby groups. The industry and private actors have complemented policy and legislation with private initiatives where there has been a perceived lack of governmental regulation or incentives.

### Energy performance

Due to the **Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings the Swedish building regulation, BBR, contain requirements for energy use in new buildings as well as specifications for**

**calculation in the different climate zones in Sweden. This regulation does not encompass embedded energy. For more see EU-level.**

## Waste

The Swedish Waste Plan 2012-2017, as well as The Swedish waste prevention programme 2014-2017 implementing the European Parliament and Council directive 2008/98/EG include Construction and demolition waste as a prioritised area for prevention of waste, with a clear circular approach.

The aim of the program and Plan is to guide and inspire national, regional and local government bodies as well as other Swedish players so that environmental goals can be reached and prevent waste and encourage product design containing no hazardous substances. The Swedish waste regulation, Avfallsförordningen 2011:927, builds on EU:s waste hierarchy and definitions for waste categories. This regulation also specifies what regulations apply for waste to no-longer be defined as waste. Sweden has a tax on landfill since 1999, *Lag (1999:673) om skatt på avfall*, and very little waste from the building sector goes to landfill.

Naturvårdsverket, the Swedish Environmental Protection Agency has issued a Guide to facilitate the recycling of waste in construction in a safe manner with regard to environmental and health issues. *Återvinning av avfall i anläggningsarbeten. Handbok 2010:1*. This guide is voluntary.

Municipalities in Sweden have no or little control over the upstream issues, i.e. minimizing the generation of waste, minimization of waste, the content of hazardous substances and recycling even though they bear the bulk of the responsibility for waste treatment.

Avfall Sverige (Waste Sweden) is a voluntary Swedish organization for municipalities working with waste management and recycling. The organisation conducts development activities in the whole area of waste. This is done through a joint development initiative funded by the Waste Sweden's municipal members. The initiative has a broad focus on concrete development projects. Waste Sweden has a vision: "There's no waste." The vision includes two specific targets for 2020: "The relationship between waste and growth has been broken," and "There is a strong and clear movement up the waste hierarchy". Waste Sweden's vision, "There is no waste," presupposes, however, that the industry is involved in these issues. The municipalities also have a unique opportunity to demonstrate the impact of consumer society through its handling and description of the waste. This can be used to influence policy and practice in a positive direction. Waste Sweden mainly use information to influence generation/prevention of waste.

The building industry has issued their own voluntary guidelines, *Resource and waste guidelines during construction and demolition*, The Swedish Construction Federation (Sveriges Byggindustrier) and Kretsloppsrådet

*“These guidelines aim to improve resource management within the construction and demolition industries. The guidelines are a tool for fulfilling the requirements in the Swedish Environmental Code's general rules of consideration and the waste hierarchy and for meeting general expectations from society regarding the industry's material and waste management standards. In some cases, therefore, the guidelines exceed the more concrete requirements in the legislation.”* (Sveriges byggindustrier & Kretsloppsrådet, 2015)

## Sustainable building

Sweden's Planning and Building Act, *Plan och Bygglag 2010 :900 – PBL* contains provisions on the planning of land and water and on Construction. The provisions aim to promote a society with equal and good social living conditions and a good and sustainable living environment for people in today's society and for future generations, while taking into account the individual human freedom. (PBL 2010:900) Chapter 8 states basic requirements for buildings and §4a states that a municipality is not entitled to enforce local regulation for construction and buildings. Chapter 9 and 10 regulate building and demolition permits and requirements (inventory etc.) for demolition. There are some sustainability requirements in PBL regarding the immediate local setting, but they are not applicable for national or global sustainability issues.

Sweden's Planning and Building Regulation, *Plan och bygg förordningen 2011 :338 - PBF*, contains provisions on content and definitions, plans and area regulations, requirements for construction, permits and notification etc. This regulation specifies requirements for buildings and has no direct reference to circular building aspects.

The National Board of Housing, Building and Planning's Building rules, *Boverkets byggregler, BFS 2011:6,- BBR*, contain regulations and general recommendations on accessibility, housing design, room height, the operating space, fire protection, hygiene, health and environment, noise, safety in use and energy conservation. Chapter 6:11 and 6:911 regulate Building products and materials impact on Health and environment, 2:2 Financially valid use-time of building parts and access, repair, maintenance etc.

Standards, *SS, Standards from the Swedish Standards Institute, SIS* are an important part of the building regulation. The standards are supposed to be applied as a way to ensure quality in buildings. SIS offers standards for most construction/ building processes and construction (when no European Standards exist). There are no standards for reversible building design or materials passports in Sweden.

The work safety and health regulation for building and construction work have requirements for demolition, *AFS 1999:3 BYGGNADS- OCH ANLÄGGNINGSSARBETE - Arbetskyddsstyrelsens föreskrifter om byggnads- och anläggningsarbete samt allmänna råd om tillämpningen av föreskrifterna (Ändringar införda t.o.m. 25 mars 2014 )*

“From a work perspective, it is especially important to know the building construction in order to know how it can be demolished safely. An inventory and investigation is required to show that stability and carrying capacity is sufficient at all stages of the demolition. Often drawings and various tests needs to be performed beforehand to be able to make a confident assessment of such stability, and to map hazardous materials in the building.” ([Arbetsmiljöverket 2015-06-30](#))

Generally, the building acts and regulations in Sweden rely on the environmental act for requirements regarding sustainability. Less detailed attention has been given to circular aspects in requirements of buildings for example the design, and specifications on how to design buildings to aid re-use and recycling of building materials/products or prevent buildings from becoming obsolete by flexibility. The building regulations (PBL, PBF and

BBR) do not take global or national sustainability issues into consideration (Boverket, 2016), and there is a lack of integration between the Environmental Act (MB 1998:808), building regulation (PBL, PBF, BBR etc.), the Waste Plan (Naturvårdsverket 2012), the Waste Prevention Program (Naturvårdsverket 2015 a), the Environmental Goals (Regeringsbeslut M2012/1171/Ma), Waste Regulations etc. concerning circular aspects of the building sector. There are however several initiatives from Swedish authorities underway, for example:

The Swedish National Board of Housing, Building and Planning suggest in a preparatory study, **Environment and Climate adjusted building regulation, Rapport 2016:14 Boverket Miljö och klimatanpassade byggregler, Förstudie**, further development of EU and UN initiatives for sustainable building, information and guidance for use of LCA nationally in Sweden, and further investigations into instruments to further documentation and information about building materials/products and reversible building design.

The mandatory regulations are in Sweden supplemented with voluntary private certification schemas.

## Environmental impact of materials/materials information

Building materials are regulated through **Byggproduktförordningen, Construction Products Regulation, CPR, 305/2011 (See EU-level)**. Responsible authority is the National Board of Housing, Building and Planning (PBF).

Building materials and products with known content and free of hazardous materials aids re-use of building materials. The Swedish building authorities as well as the building sector have put much focus on documentation and assessment of building materials and products as a pre-requisite for re-use and recycling. Several voluntary tools are used in Sweden for documentation and assessment of building and construction materials and products.

- BASTA (Guidence to Sustainable Construction Materials),
- Byggvarubedömningen (Building Material Assessment),
- Sunda Hus,
- The Nordic Ecolable (Swan),
- Miljöstatus,
- EPD
- Produktkollen

There are several propositions and initiatives on the table at this moment from various authorities regarding environmental impact of building materials.

- Proposition concerning National System for documentation of building material/products in new buildings, the Swedish National Board of Housing, Building and Planning, *Rapport 2015:46 Regeringsuppdrag Boverket, Dokumentationssystem för byggprodukter vid nybyggnation*
- Investigation into use of LCA for building products with regards to environmental /climate impact, the Swedish National Board of Housing, Building and Planning, *Rapport 2015:35 Regeringsuppdrag Boverket, Byggnaders klimatpåverkan utifrån ett livscykelerspektiv*

- There is a proposition for stricter regulation concerning toxic chemicals in building products, *Rapport 8/15 Kemikalieinspektionen, Rapport från ett regeringsuppdrag, Hälsoskadliga kemiska ämnen i byggprodukter – förslag till nationella regler* issued by the Swedish Chemicals Agency.

The Nordic Green Building Councils have developed a guide to define and choose sustainable building materials, with some regard to re-use, reversible building design, secondary use of materials, *Nordic Guide to Sustainable Materials*.

## Circular economy

In Swedish policy and regulation the areas of waste prevention and circular economy are often interconnected.

*A preparatory study on Circular Economy in Sweden, Cirkulär Ekonomiutredning* by Ola Alterå, is planned to be reported back to the government end of February, 2017. The overall objective is to achieve a more resource efficient and circular economy, which limits the impact on the environment. The instruments should be designed to stimulate producers, consumers and businesses in the intermediate level to invest in used products, as well as the repair and upgrading of products. The investigation will primarily focus on products for the consumer market, which is particularly interesting from a resource and environmental perspective with regard to environmental goals.

Lobby groups (ex.Cradle Net) have been working to get a broader focus to the investigation then was initially the aim.

## Local Level

Local and regional governments in Sweden have little or no room to affect rules and incentives for construction and building. The Municipality has a responsibility to supervise building and demolition within the municipality and warrant permits based on national regulations. Municipalities are required to have local waste plans based on EU:s waste hierarchy, and national waste and waste prevention plans, but have limited influence over the creation of waste.

Many municipalities see it as a limitation that they are not able to issue additional regulations regarding sustainable building within their region. One exception is if the municipality owns land, then they can act as developers and are permitted to set additional rules for building on their land, which many municipalities in Sweden do. With other words, they are limited to set examples to drive the sector forward.

Municipalities can influence the development through their own investments and actions. Based on Green Public Procurement within the municipality and Local policies and plans for sustainable building etc. the Municipality can push the market towards circular buildings.

## Opportunities and barriers

The overarching Swedish policies and legislation concerning environmental aspects, the build environment, waste and products, identified, all ask for a circular approach. Re-use and recycling of building products and materials in loops with safe and non-toxic materials and products are asked for, and highlighted in these levels of policy and legislation. On more



detailed practical levels the requirements and regulation does not require reversible design, materials able to reuse etc. The standards used in the Swedish building sector are not developed around circular approaches. The aim is clear, but the path to get there is still fussy. There are policies and private initiatives, certifications, material assessment databases etc. giving more hand fast alternatives for action. But they are mostly weak regarding circular aspects.

There is much activity going on in the field in Sweden, often ignited by developments on EU and UN levels. The aim in these developments are similar to the aim of BAMB, but there is a risk that if standards and legislation precede BAMB, the solutions BAMB develops could be hampered by the legislation, even if the aim is similar. The same concern can be raised with regard to the private initiatives.

The Swedish legislation and policies relevant for BAMB support the idea of materials passports and reversible building design, but are often vague. The relevant rules, policies and standards are dispersed in different legislations and policies without a clear map of relevant policies, legislations and standards. The private voluntary initiatives to fill identified gaps to give the sector the forward momentum it seeks makes the area even more complex. This makes the field difficult to navigate. The goals and objectives for the construction and demolition sector in the waste plan and waste prevention programme are in harmony with BAMB objectives, and the BAMB solutions are a good match to support the implementation of the objectives in the plan and programme. These documents are soft policies, guiding but not regulatory. The Swedish Building regulations acts, PBL, PBF and BBR, have weak connections to environmental policies and the waste plan and prevention program concerning circular building aspects. Circular material flows and re-usability is not part of the technical requirements for buildings. It might be a barrier for BAMB results that the more specific requirements and building regulations do not require reversible building design or reusable building components. On the same note, *SS Standards from the Swedish Standards Institute, SIS*, have an important role for the building and construction in Sweden. The reliance on standards in the construction sector in Sweden could be a way to enforce reversible building design and materials passports, if new standards are to be developed and adopted, but could also be a barrier in the absence of applicable standards. The voluntary tools and systems for assessing building materials and buildings from a sustainability point of view could be either a barrier or an opportunity depending on how they will embrace BAMB solutions. In Sweden it is often stressed that the voluntary systems are a better incentive for further development in the sector than regulation, since regulation often does not demand drastic enough changes and often are perceived to put the bar too low and with that stifling engagement and induce a false sense of that enough is done because the regulations are followed.

The energy requirements are often lifted as a barrier to reversible design and sustainable material choices since it does not take embedded energy into account. Therefore it needs to be clearly shown that reversible building design can be energy efficient enough.

## United Kingdom

### UK Governance overview

The UK policy and regulatory landscape is complex through having devolved administrations. Some policies and legislation cover the whole UK, whereas others are specific to one or more of England, Scotland, Wales or Northern Ireland.

Central government has 25 ministerial departments and 21 non-ministerial departments. The latter are headed by senior civil servants and typically have a regulatory or inspection function. Some government departments, such as the Ministry of Defence, cover the whole of the UK, whereas others, such as the Department for Environment, Food and Rural Affairs (Defra), do not. There has been a very recent restructuring of some departments, following the EU referendum vote and the subsequent change of Prime Minister.

The UK has over 300 agencies and public bodies working with the Government to advise and to deliver policies<sup>34</sup>.

England is the largest country in the UK, with 84% of the UK's population and generating 85% of total GDP. It also has nearly 50% of the land area and the highest population density. Scotland is the second largest country in terms of GDP, population and land area and has the lowest population density. Wales is the third largest, followed by Northern Ireland. In terms of construction activities, England has around 85% of all construction companies and 85% of construction employees.

Scotland has developed its own waste legislation since the 1990s. Wales and Northern Ireland largely apply the waste legislation developed by the UK government, although this is beginning to change. All four countries have their own waste management plans and environmental enforcement agencies, as well as government departments responsible for waste management. Currently, the devolved administrations in Scotland and Wales are also funding and developing policy and/ or legislation related to Construction and Demolition Waste (CDW).

#### *England*

Unlike Scotland, Wales and Northern Ireland, there is no separate national assembly for England. Policy and legislation for England is therefore developed and implemented by the UK Government.

Following the referendum on membership of the European Union, a new Department for Business, Energy & Industrial Strategy has been formed. This department is now responsible for policy and legislation on climate change, as well as innovation and science<sup>35</sup>. This department is therefore of particular relevance to BAMB, along with the Department for Environment, Food and Rural Affairs (Defra) (see next paragraph), the Department for

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<sup>34</sup> <https://www.gov.uk/government/how-government-works>

<sup>35</sup> <https://www.gov.uk/government/ministers/secretary-of-state-for-business-energy-and-industrial-strategy>

Communities and Local Government, and possibly the new Department for Exiting the European Union.

Defra is responsible for waste legislation in England and for data reporting. It also leads the UK relationship with the European Commission on waste matters, working closely with the other countries' governments<sup>36</sup>. Defra has undergone significant change in the last few years and no longer has a policy lead for CDW. It has also substantially reduced its funding to the charity Waste and Resources Action Programme (WRAP), who are no longer able to provide support to the construction industry. The Site Waste Management Plan Regulations 2008 specific to CDW were in place in England from April 2008 to December 2013, but have since been rescinded.

The enforcement body for waste in England is the Environment Agency.

### *Scotland*

The devolved Government for Scotland has a range of responsibilities, which include: health, education, justice, rural affairs, housing and the environment. Some powers are reserved to the UK Government, including immigration, the constitution, foreign policy and defence.

Scottish Government directorates are responsible for progressing the five core strategic objectives; Wealthier and Fairer Scotland, Healthier Scotland, Safer and Stronger Scotland, Smarter Scotland and Greener Scotland. The directorates most relevant to BAMB include Environment & Forestry, Energy & Climate Change, Scottish Procurement & Commercial, and Local Government and Communities.

Scotland has developed its own waste legislation, for which the Scottish Government has responsibility. Scotland also has its own policies and waste management plan, resulting in differing priorities and activities from England and Wales. The Scottish Government funds Zero Waste Scotland (ZWS), which undertakes activities related to CDW, including guidance on waste management and provision of a whole life costing tool<sup>37</sup>. Scotland has recently issued its Circular Economy Strategy and has identified construction and the built environment as a priority area<sup>38</sup>.

The enforcement body in Scotland is the Scottish Environmental Protection Agency (SEPA); SEPA is also responsible for waste statistics. SEPA is currently undertaking a consultation to clarify how and when waste regulations apply to the reuse of products.

### *Wales*

The Welsh Government is responsible for areas including health, education, language and culture and public services. The Welsh Government Civil Service is divided into 4 groups: the Office of the First Minister and Cabinet Office, the Health and Social Services Group, the Economy, Skills and Natural Resources Group, and the Education and Public Services Group. The most relevant (in terms of BAMB) is the Economy, Skills and Natural Resources Group.

In 2013, Natural Resources Wales took over the work of Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales. This is the largest Welsh

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<sup>36</sup> <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about>

<sup>37</sup> <http://www.resourceefficientscotland.com/ConstructionBuiltEnvironment>

<sup>38</sup> <http://www.gov.scot/Resource/0049/00494471.pdf>

Government sponsored body - employing 1,900 staff across Wales with a budget of £180 million<sup>39</sup>.

Much of the waste legislation applied in Wales has been developed by the UK central government and is therefore the same as that applied in England. However, the waste management plan for Wales sets more ambitious targets. The Welsh Government-funded Constructing Excellence in Wales provides support to business on CDW via the Waste Prevention Programme<sup>40</sup> and focus on reducing CDW (particularly wood, plastic, insulation and gypsum products, hazardous waste and metals in a separate Construction and demolition sector plan<sup>41</sup>.

The enforcement body for waste in Wales is Natural Resources Wales.

### *Northern Ireland*

The Northern Ireland Executive has eight departments. These include the Department of Agriculture, Environment & Rural Affairs, the Department for Communities, the Department for the Economy, and the Department for Infrastructure.

The Department of Agriculture, Environment & Rural Affairs has responsibility for waste policy, but all waste legislation relating to the construction sector in Northern Ireland is owned by Defra. There is no specific programme or support for CDW, with the focus largely on preventing and dealing with illegal waste dumping.

The Northern Ireland Environment Agency undertakes enforcement activities.

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<sup>39</sup> <https://naturalresources.wales/about-us/what-we-do/?lang=en>

<sup>40</sup> <http://www.cewales.org.uk/>

<sup>41</sup> [http://gov.wales/topics/environmentcountryside/epq/waste\\_recycling/publication/canddsectorplan/?lang=en](http://gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/canddsectorplan/?lang=en)

# Potential impact of Brexit

There is no concrete information relating to what might happen as a result of the UK vote to leave the European Union. At the moment, three outcomes are thought possible:

1. UK does not leave the EU – no Brexit. This would mean UK would remain in line with EU policy and regulation
2. A deal similar to Norway is struck, or other deal that guarantees access to EU single market – soft Brexit. This would mean UK is likely to remain in line with EU policy and regulation
3. A deal which does not allow UK full access to single market – hard Brexit. The consequence of this in terms of relevant policy and regulation is very unclear. It could be that there would be little change for several years, with a policy by policy adaptation depending on the need to comply with wider trade agreements, or to reduce regulatory burdens to mitigate economic impacts of hard Brexit. This could also result in Scotland having another referendum for independence.

The preferred/probable outcome is unlikely to be known for 6 months or more. Once Article 50 is triggered (currently anticipated to be by the end of March 2017), a two year period of negotiation between the UK Government and the EU is expected to follow.

Much of the time and resources of the UK government will be focussed on Brexit related matters, which could impact on the scope to introduce new policies or adapt existing ones that are not directly related to Brexit.

In the event of the UK leaving the EU, an unintended, positive consequence could be an increase in enthusiasm for the circular economy in the built environment as a means of improving the UK economy in reaction to the falling value of the pound and the increasing costs of imports. This could also lead to investment in local businesses and resources.

However, it should be noted that the UK would not be involved in any negotiations on the next round of European circular economy measures and would not be mandated to implement any future legislation or policies.

## Policy and legislation

The UK has over 30 instruments at both UK-wide and country-wide level, which are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment. Some of these are driven by European legislation, whilst others are led by UK or national governments.

UK policy relating to buildings as material banks falls into three main areas: waste, climate change and energy, and planning and building.

### Waste

The **Environmental Protection Act (1990)**<sup>42</sup> provides the waste management framework for the UK, establishing integrated pollution control and tightening the rules on waste disposal. This was followed by the **Environment Act (1995)**<sup>43</sup> which established the Environment Agency and the Scottish Environment Protection Agency, the key enforcement bodies for the UK.

In 1996, the **Landfill Tax**<sup>44</sup> was introduced by the Conservative government, the first tax in the United Kingdom with an explicit environmental purpose. The tax removed landfill as a cheap option for the disposal of waste in the UK, acting as an incentive to alternate forms of disposal, including reuse and recycling. The Landfill Tax is collected from landfill site operators and is charged at one of two rates, the lower rate applying to materials including bricks and concrete. Although originally set up to cover the UK, the Landfill Tax is now administered separately in Scotland.

All parts of the UK have transposed the requirements of the revised Waste Framework Directive (2008/98/EC) into their legislation. This has been done through **The Waste (England and Wales) Regulations (2011)**<sup>45</sup>, **The Waste (Scotland) Regulations (2012)** and **The Waste (Northern Ireland) Regulations (2011)**.

The Scottish government has developed a **Zero Waste Plan**<sup>46</sup>, which has been in place since 2010. Its aim is to deliver a zero waste Scotland over the next ten years. The plan is underpinned by the requirements of European legislation. It imposes further restrictions on some types of waste to landfill.

The **Waste (Wales) Measure (2010)**<sup>47</sup> also enables the Welsh government separately to ban or restrict some types of waste to landfill. Regulations are in place across the UK for the management of hazardous waste (known as Special Waste in Scotland).

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<sup>42</sup> <http://www.legislation.gov.uk/ukpga/1990/43/contents>

<sup>43</sup> <http://www.legislation.gov.uk/ukpga/1995/25/contents>

<sup>44</sup> <https://www.gov.uk/government/publications/excise-notice-lft1-a-general-guide-to-landfill-tax/excise-notice-lft1-a-general-guide-to-landfill-tax#lower-rate-qualifying-material>

<sup>45</sup> <http://www.legislation.gov.uk/uksi/2011/988/contents/made>

<sup>46</sup> <http://www.gov.scot/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

<sup>47</sup> [http://gov.wales/topics/environmentcountryside/epq/waste\\_recycling/legislation/measure2010/?lang=en](http://gov.wales/topics/environmentcountryside/epq/waste_recycling/legislation/measure2010/?lang=en)

Scotland is the only part of the UK with a separate circular economy strategy. **Making Things Last: A Circular Economy Strategy for Scotland**<sup>48</sup> was published in 2016 and sets out the Scottish government's priorities for moving towards a circular economy and their ambition for waste prevention. This strategy takes the targets and ambitions in the Zero Waste Plan and in Safeguarding Scotland's Resources and places them in the context of action for a more circular economy. The strategy has been developed, and will be delivered, in partnership with Zero Waste Scotland and SEPA. The strategy, together with the Manufacturing Action Plan, will be supported by over £70m of investment, including £30m of European Structural Funds.

## Climate Change and Energy

The **Climate Change Act (2008)**<sup>49</sup> established a framework to develop an economically credible emissions reduction path. It also strengthened the UK's leadership internationally by highlighting the role it would take in contributing to urgent collective action to tackle climate change under the Kyoto Protocol. The Act includes: a **2050 target** which commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels; **Carbon Budgets** which require the government to set legally binding 'carbon budgets' (a carbon budget is a cap on the amount of greenhouse gases emitted in the UK over a five-year period); the establishment of a **Committee on Climate Change** to advise the government on emissions targets, and report to Parliament on progress made in reducing greenhouse gas emissions; a **National Adaptation Plan** requiring the government to assess the UK's risks from climate change, prepare a strategy to address them, and encourage critical organisations to do the same.

In Scotland, the Scottish Government's target to reduce the country's emissions of greenhouse gases by 80% by 2050 are contained in the **Climate Change (Scotland) Act (2009)**<sup>50</sup>

Further related acts have followed. The **Climate Change and Sustainable Energy Act (2006)**<sup>51</sup> provides legislation to underpin a long term energy supply for the country, including measures to promote microgeneration, community energy and renewable heat. The **Planning and Energy Act (2008)**<sup>52</sup>, which applies in England and Wales, allows local councils to set targets in their areas for on-site renewable energy, on-site low carbon electricity and energy efficiency standards, in addition to national requirements. It also requires developers to source at least 10% of any new building's energy from renewable sources, implementing nationwide the 'Merton Rule' (a planning policy initially developed by the London Borough of Merton).

**The Energy Efficiency (Eligible Buildings) Regulations (2013)**<sup>53</sup> transpose Article 5 of the Directive 2012/27/EU of the European Parliament and of the Council 25 October 2012 on energy efficiency to UK law. The **National Renewable Energy Action Plan**<sup>54</sup> for the United Kingdom Article 4 of the Renewable Energy Directive 2009/28/EC provides detailed

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<sup>48</sup> <http://www.gov.scot/Resource/0049/00494471.pdf>

<sup>49</sup> <http://www.legislation.gov.uk/ukpga/2008/27/contents>

<sup>50</sup> <http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/climatechangeact>

<sup>51</sup> <http://www.legislation.gov.uk/ukpga/2006/19/contents>

<sup>52</sup> <http://www.legislation.gov.uk/ukpga/2008/21/contents>

<sup>53</sup> <http://www.legislation.gov.uk/uksi/2013/3220/contents/made>

<sup>54</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47871/25-nat-ren-energy-action-plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47871/25-nat-ren-energy-action-plan.pdf)

information on a set of measures that would enable the UK to meet its 2020 target on renewable energy.

Scotland has a number of separate plans and strategies. The **Energy Efficiency Action Plan (Scotland)**<sup>55</sup> sets out the Scottish Government's ambitions in energy efficiency. Key actions include improving the energy efficiency of all housing stock to meet the demands of the future and developing a public sector that leads the way through exemplary energy performance and provides a low carbon Scotland.

**A low Carbon Economic Strategy for Scotland: Scotland – A low Carbon Society**<sup>56</sup> details the Scottish government's commitment to supporting the transition to a low carbon Scottish economy. The built environment is one of the focus areas, along with resource efficiency, although considerations around resource use at end of an asset life are not addressed.

### **Planning and building regulations**

One of the most significant planning laws in England and Wales is the **Town and Country Planning Act (1990)**. It sets out how development is regulated and specifies local planning authorities – County Councils and District Councils (except in London and other Metropolitan areas)<sup>57</sup>. The Act also introduces Section 106, which allows planning authorities to impose obligations on developers to mitigate any negative impacts of development<sup>58</sup>.

The **National Planning Policy Framework**<sup>59</sup>, introduced in 2012, and which applies in England, addresses planning from the perspective of sustainable development and emphasises the importance of people and communities to the planning process. It presents 12 core principles for planning, alongside a 13-point delivery framework aimed at local planning authorities, which encompasses economic, social and environmental aspects of sustainable development. The principles and framework are designed to inform the development of Local Plans and to establish a presumption in favour of sustainable development throughout the process.

The **National Planning Policy for Waste (2014)**<sup>60</sup> establishes a requirement to consider waste management alongside other concerns such as housing and transport as part of the planning process.

In England and Wales, the **Building Act (1984)**<sup>61</sup> gives the Secretary of State the power to make regulations regarding health, safety and welfare of people in and around buildings. Those regulations, the **Building Regulations (2010)**<sup>62</sup>, set out the minimum standards for design, construction and alteration to buildings. They also define when building work is

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<sup>55</sup> <http://www.gov.scot/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan>

<sup>56</sup> <http://www.gov.scot/Resource/Doc/331364/0107855.pdf>

<sup>57</sup> <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7459>

<sup>58</sup> [http://www.pas.gov.uk/3-community-infrastructure-levy-cil/-/journal\\_content/56/332612/4090701/ARTICLE](http://www.pas.gov.uk/3-community-infrastructure-levy-cil/-/journal_content/56/332612/4090701/ARTICLE)

<sup>59</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf)

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/364759/141015\\_National\\_Planning\\_Policy\\_for\\_Waste.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364759/141015_National_Planning_Policy_for_Waste.pdf)

<sup>61</sup> <http://www.legislation.gov.uk/ukpga/1984/55/contents>

<sup>62</sup> <http://www.legislation.gov.uk/uksi/2010/2214/contents/made>



‘controlled’, how an application should be made and which technical requirements apply to the controlled work.

Similar provisions are contained within the separate **Building (Scotland) Act (2003)**<sup>63</sup>, the **Building (Scotland) Regulations (2004)**<sup>64</sup> and the **Building Regulations (Northern Ireland) (2012)**<sup>65</sup>.

The **Sustainable and Secure Buildings Act (2004)**<sup>66</sup> introduced new powers and requirements with respect to a range of building related issues. Not all sections of the Act have been enacted and some of them would require new regulations to give them effect, but the range of subjects covered include: sustainability, crown buildings, security, historic buildings, removal of exemptions, report on the building stock, local authority registers of information and enforcement measures. The Act requires a biennial report from the government on the progress towards sustainable building stock in England.

**The Construction Products Regulations (2013)**<sup>67</sup>, which applies across the UK, is the legislation which adopts the harmonised rules for the marketing of construction products in the EU. The regulation provides a common technical language to assess the performance of construction products. It ensures that reliable information is available to professionals, public authorities, and consumers, so they can compare the performance of products from different manufacturers in different countries.

### **Summary of opportunities for and barriers to materials passports and reversible building design within the United Kingdom.**

There is a great deal of uncertainty surrounding future policy developments, following the UK referendum on membership of the European Union. For the time being, all legislation driven by European law remains on the statute books. However, it is to be expected that some changes will be made following Brexit and the extent of these will likely depend upon the type of agreement reached between the UK and the EU.

The current complexity of the legislative framework in the UK provides a challenge. The four countries, England, Scotland, Wales and Northern Ireland, share some legislation. However, the devolved governments of Scotland, Wales and Northern Ireland also develop some of their own laws. The opportunities and barriers do therefore vary across the UK.

Scotland currently provides the greatest opportunities for materials passports and reversible building design. Its Circular Economy Strategy, for which construction and the built environment is a priority area, and its Zero Waste Plan provide a legislative rationale for materials passports and reversible building design.

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<sup>63</sup> <http://www.legislation.gov.uk/asp/2003/8/contents>

<sup>64</sup> <http://www.legislation.gov.uk/ssi/2004/406/contents/made>

<sup>65</sup> <http://www.legislation.gov.uk/nisr/2012/192/contents/made>

<sup>66</sup>

<http://webarchive.nationalarchives.gov.uk/20151113141044/http://www.planningportal.gov.uk/buildingregulations/buildingpolicyandlegislation/currentlegislation/secure>

<sup>67</sup> <http://www.legislation.gov.uk/uksi/2013/1387/contents/made>

The Construction Products Regulations, driven by European legislation and in effect across the whole UK, also offer a strong opportunity for materials passports and reversible business design. The common language and harmonised rules of the regulations could allow for reprocessed, recycled and reused materials to be widely exchanged by providing confidence in their performance and quality.

A further key opportunity comes from the Landfill Tax, in effect in England, Wales and Northern Ireland (and separately administered in Scotland). The increasing cost of landfill provides an economic driver for alternative solutions which avoid end-of-life waste, such as reversible building design.

The various Building Acts and Buildings Regulations in place across the UK could also provide opportunities for materials passports and reversible building design, should governments choose to drive changes in policy through amendments to legislation.

The Town and Country Planning Act of 1990 also offers great scope to implement all aspects of circular economy at a local authority/municipality level. In particular, Section 106, which allows planning authorities to impose obligations on developers to mitigate any negative impacts of development. There is anecdotal evidence that a few municipalities are already considering their ability to influence here, especially in London.

The main barriers to materials passports and reversible building design currently in the UK stem from a combination of uncertainties over the impact of Brexit on future policy and the complexity of the legislative framework across the country.

It could be argued that the other key barrier comes through energy efficiency policies across the UK. The prioritisation of energy efficiency may unintentionally result in building design and materials which do not lend themselves to deconstruction and reuse.



# ANNEXES TO THE STATE OF THE ART REPORT ON POLICIES AND STANDARDS

November 2016

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Co-funded by the Horizon 2020 Framework Programme of the European Union

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# European Union: Policy and Regulation

## State of the Art report

# EU Level

## Introduction

The purpose of this report is to summarise the current State of the Art relating to EU policies and regulations that could either support, or hinder, circular economy in the built environment.

The circular economy is defined by the Ellen MacArthur Foundation (EMF) as an “industrial system that is restorative or regenerative by design”, taking the linear industrial model that dominated the 20th and early 21st century and replacing it with a circular one in which waste is designed out and products are designed to be optimised for a cycle of disassembly and reuse.

According to EMF, The circular economy exists through three main principles:

- To preserve and enhance natural capital
- Optimisation of resource yields
- Foster system effectiveness by revealing and designing negative externalities

These three main principles are then translated into the six actions of the RESOLVE framework, each representing a circular business opportunity.

- REGENERATE
  - Shift to renewable energy and materials
  - Reclaim, retain, and restore health of ecosystems
  - Return recovered biological resources to the biosphere
- SHARE – Maximise product utilisation
  - Share assets (e.g. cars, rooms, appliances)
  - Reuse/second-hand
  - Prolong life through maintenance, design for durability, upgradability, etc
- OPTIMISE – Optimise system performance
  - Increase performance/efficiency of product
  - Remove waste in production and supply chain
  - Leverage big data, automation, remote sensing and steering
- LOOP – Keep components and materials in closed loops and prioritise inner loops
  - Remanufacture products or components

- Recycle materials
- Digest anaerobically
- Extract biochemical from organic waste
  
- VIRTUALISE – Deliver utility virtually
  - Dematerialise directly (e.g. books, CDs, DVDs, travel)
  - Dematerialise indirectly (e.g. online shopping)
  
- EXCHANGE – Select resource input wisely
  - Replace old with advanced non-renewable materials
  - Apply new technologies (e.g. 3D printing)
  - Choose new product/service (e.g. multimodal transport)

Whilst EU policy and regulation are structured differently to the principles outlined above, there are some areas where the existing framework could be acting as an opportunity or barrier to adopting the specific business opportunities included in the RESOLVE framework.

## Summary of EU Policies and Standards that could be relevant

### High level review:

According to the Europa website<sup>68</sup>, the objective of the European Commission is to help the construction sector meet economic challenges by:

- quantifying the impacts of EU legislation on the sector
- ensuring the full implementation of the Construction Products Regulation (CPR)
- consolidating the internal market for construction products by developing a common technical language for the performance of construction products
- following up on the Strategy for the sustainable competitiveness of the construction sector and its enterprises (2012) that improves training, tendering and financing in the construction sector
- following up on the Communication on Resource efficiency opportunities in the building sector (2014) that aims to improve design, construction, demolition and recycling of construction products, as well as simplify data in the use of resources to reduce waste.

When cross referencing the objective of promoting circular economy with construction & demolition, the following is stated<sup>69</sup>:

Waste originating from construction and demolition represents one of the highest volumes of waste in Europe. One ton of construction and demolition waste is produced per person per year – i.e. 500 million tonnes in the whole EU every year. Valuable materials are not always

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<sup>68</sup> [https://ec.europa.eu/growth/sectors/construction\\_en](https://ec.europa.eu/growth/sectors/construction_en)

<sup>69</sup> [https://ec.europa.eu/growth/industry/sustainability/circular-economy\\_en](https://ec.europa.eu/growth/industry/sustainability/circular-economy_en)

identified and recovered. Improving waste management in this sector is crucial for the circular economy.

The Commission will:

- Take a series of actions to ensure improved recovery of valuable resources and adequate waste management in the construction and demolition sector, as well as facilitate assessing the environmental performance of buildings
- Develop pre-demolition guidelines to boost high-value recycling in the sector as well as voluntary recycling protocols aimed to improve quality of and build confidence in recycled construction materials.
- Propose in the revised legislative proposal on waste to require better sorting of construction and demolition waste

### **Specific instrument review:**

A wider review of EU level instruments, research and procurement was undertaken, and the following policies and standards are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment. These are evaluated in more detail in the next section.

Note that EU regulations are binding on individuals in all member states. Directives, however, set member states an objective and a date for achieving it, but do not determine how the target will be met <sup>70</sup>.

### **Public Instruments**

- Circular Economy package: Closing the loop - an EU action plan for the Circular Economy
- Circular Economy package: Roadmap to a resource efficient Europe + Annexes
- A resource-efficient Europe – Flagship initiative of the Europe 2020 Strategy
- The Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe
- New Strategy on Tackling the Challenges in Commodity Markets and on Raw Materials
- The 7<sup>th</sup> Environmental Action Plan: Living well, within the limits of our planet
- EU Strategy on Adaption to climate Change (2013)
- The 2020 Climate and Energy Package (2009)
- Strategy for the sustainable competitiveness of the construction sector and its enterprises
- EU Forest Strategy (2013)
- The urban dimension of EU policies – key features of an EU urban agenda
- Regulation: Waste Shipment Regulation (EC) No 1013/2006
- Regulation: Construction Products Regulation (CPR 305/2011)
- Regulation: Timber Regulation (EC) 995/2010

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<sup>70</sup> <https://www.innertemplelibrary.org.uk/research-and-training/faq/faq-researching-eu-law/>



- Regulation: Classification, labelling and packaging of substances and mixtures (EC) 1272/2008
- Directive: Waste Framework Directive (2008/98/EC)
- Directive: Waste Shipment Regulation (EC) No 1013/2006
- Directive: Directive on the landfill of waste (99/31/EC)
- Directive: WEEE (Directive 2002/96/EC)
- Directive: Packaging and Packaging Waste (Directive 2004/12/EC)
- Directive: Eco-design (Directive 2009/125/EC)
- Directive: Industrial Emissions Directive (2010/75/EU)
- Directive: Energy performance of buildings (Directive 2010/31/EU)
- Directive: Energy Efficiency (Directive 2012/27/EU)
- Directive: Renewable Energy Directive (2009/28/EC)
- Standard: EN 15804 Sustainability of construction works. Environmental Product Declarations.
- Standard: EN 15643 Sustainability of construction works. Sustainability assessment of buildings.

### **Procurement related**

- Procurement: Green Public Procurement
- Labelling: BREEAM
- Labelling: NaturePlus
- Labelling: EU Ecolabel
- Voluntary scheme: Recovinyl Plus

### **Research & business growth**

- Horizon 2020
- Life programme
- EU commissioned work (JRC/directly commissioned)
- The European Innovation Partnership (EIP) on Raw Materials
- The Eco-innovation Action Plan

# Opportunities and barriers

The opportunities and barriers have focussed on Reversible Building Design and Materials Passports.

## Public Instruments

*Circular Economy package: Closing the loop - an EU action plan for the Circular Economy*

**Summary:** the ambitious Circular Economy Package of which the action plan is part of, includes a number of revised legislative proposals on waste to stimulate Europe's transition towards a circular economy. The action plan establishes a concrete and ambitious programme of action, measures covering the whole cycle: from production and consumption to waste management and the market for secondary raw materials.

*Opportunities for Reversible Building Design and Materials passports: Construction and demolition waste is a priority area, forms part of the EU's plan to develop guidelines and new legislation for use on demolition sites in order to increase recycling rates of waste. Proposed actions to "close the loop" and revised legislative proposals are part of the push to develop circularity in the EU, these include actions such as simplified and improved definitions, harmonisation of recycling calculation rates and concrete measures to promote re-use. Which all provide opportunities for increased reversible building design and materials passports.*

*Circular Economy package: Roadmap to a resource efficient Europe + Annexes*

**Summary:** The Roadmap to a Resource Efficient Europe (COM (2011) 571) outlines how to transform Europe's economy into a sustainable one by 2050. Within it are proposals on how to increase resource productivity and decouple economic growth from resource use and its environmental impact. It illustrates how policies interrelate and build on each other. The roadmap provides a framework in which future actions can be designed and implemented coherently. It sets out a vision for the structural and technological change needed up to 2050, with milestones to be reached by 2020. These milestones illustrate what will be needed to put Europe on a path to resource efficient and sustainable growth.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: A step towards a coherent action framework, policy and legislation created by the European Commission to transform the economy will be guided by this roadmap. Sets a number of key targets and goals for buildings such as CDW recycling rates of 70% and optimised material use. These are goals of which materials passports and reversible building design are designed to tackle, identifies the need to support for innovate solutions of which the BAMB project is.*

### *A resource-efficient Europe – Flagship initiative of the Europe 2020 Strategy*

**Summary:** One of seven flagships put forward by the European Commission in the EU2020 Strategy. The roadmap builds on and compliments other policy initiatives under this flagship, such as the revision of the CAP & CFP, Biodiversity Action Plan, White book on Transport and the Roadmap on Energy, The roadmap will set out a coherent framework of policies and actions in a variety of policy areas, required for the shift towards a resource efficient economy.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *In line with the circular economy package it proposes a framework of policies to support the shift to a low carbon, resource efficient economy. Materials passports and reversible building design play a key role in this shift, and benefit from Europe’s flagship 2020 strategy.*

### *Resource Efficiency - Opportunities in the Building Sector*

**Summary:** The main objectives of this initiative are to promote a more efficient use of resources consumed by new and renovated commercial, residential and public buildings to reduce their overall environmental impacts throughout the full life cycle. Resource use is determined in a large part by design decisions and choices over construction materials. To help bringing resource efficiency gains, designers, manufacturers, contractors, authorities and users need useable and reliable information to inform their decision-making. This initiative addresses this information deficit by proposing a set of clearly defined and measurable indicators, for the assessment of the environmental performance of buildings.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Identifies a number of policy areas to be addressed and the need to reduce resource use in buildings through reduction in energy costs and reduction of life-cycle costs, which materials passports and reversible building design can encourage.*
- Barriers to Materials Passports & Reversible Building Design: *Different national public and private approaches are increasing complexity of the working environment for stakeholders, this mixed with a lack of supporting data and recognition of different approaches is hampering progress made in resource efficiency. This in turn is creating a barrier to the adoption of materials passports and reversible building design.*

### *The Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe*

**Summary:** Raw materials are essential for the sustainable functioning of modern societies. Access to and affordability of mineral raw materials are crucial for the sound functioning of the EU’s economy. Sectors such as construction, chemicals, automotive, aerospace,

machinery and equipment sectors which provide a total value added of € 1,342 billion and employment for some 30 million people all depending on access to raw materials. Securing reliable and undistorted access to raw materials is increasingly becoming an important factor for the EU's competitiveness. The critical dependence of the EU on certain raw materials underlines that a shift towards a more resource efficient economy and sustainable development is becoming even more pressing. This communication focuses on non-energy minerals, the underlying analysis and the proposed measures, in particular with regards to trade distortions of third countries, apply to a high degree to other non-energy raw materials (such as wood), which are faced with similar supply constraints and threats to competitiveness as a result of market distortions.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Identifies the need for increased resource efficiency and improved conditions for recycling through the following measures; development of best practices in collection and treatment of waste, improved availability of statistics on waste and materials flows, reviewing EU waste and Eco-design legislation, support for research and innovation and the promotion of economic incentives for re-use and recycling. The initiative promotes circular thinking which help reversible building design and the development of materials passports.*

#### ***New Strategy on Tackling the Challenges in Commodity Markets and on Raw Materials***

**Summary:** Commodity markets have displayed increased volatility and unprecedented movements of prices in recent years. Prices in all major commodity markets, including energy, metals and minerals, agriculture and food, increased sharply in 2007 to reach a peak in 2008, declined strongly in the second half of 2008 and have been on an increasing trend again since the summer of 2009. These developments have led to increased calls for policy responses to mitigate the negative effects of such movements on both producers and consumers, the communication presents an overview of what has been achieved in each of these areas and of the steps which are planned to take the work forward. It is part of the Europe 2020 strategy to ensure smart, sustainable and inclusive growth and is closely linked to the flagship initiative for a resource efficient Europe.

- *Opportunities for Reversible Building Design: Commodities and financial markets are becoming increasingly intertwined, policy is proposed to deal with the potential risks associated with this. Increased resource efficiency and the promotion of recycling is also listed as a key initiative in addressing potentially volatile markets. Which provides an opportunity for reversible buildings and generally increased circularity.*

#### ***The 7<sup>th</sup> Environmental Action Plan: Living well, within the limits of our planet***

**Summary:** This action plan will be guiding European environmental policy until 2020. In order to give long-term direction it sets out a vision beyond that, of where it wants the union to be in 2050. It identifies three key objectives; to protect conserve and enhance the union's natural capital, to turn the union into a resource-efficient, green, and competitive low-carbon economy, to safeguard the union's citizens from environment-related pressures and risks to health and wellbeing.

- *Opportunities for Reversible Building Design: Reinforces the 2020 objectives of creating a 'low carbon and resource-efficient economy', priority objective 2 places focus on resource efficiency, environmental performance of goods along whole life cycle. It highlights the role of the commission's roadmap and the opportunities for the circular economy in a Resource Efficient Europe as a framework for this.*

#### *EU Strategy on Adaption to climate Change (2013)*

**Summary:** Sets out both a framework and mechanisms for taking the EU's preparedness for current and future climate impacts to a new level. Consists of three objectives; promoting action by member states, promoting better informed decision-making and promoting adaption in key vulnerable sectors. As well as eight actions; Encourage all member states to adopt comprehensive adaptation strategies, providing LIFE (Financial Instrument for the Environment) funding to support capacity building and step up adaptation action in Europe (2014-2020), Introducing adaptation in the covenant of mayors framework (2013/2014), bridging the knowledge gap, Further developing climate-ADAPT as the 'one-stop shop' for adaptation information in Europe, facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion policy and the Common Fisheries Policy (CFP), Ensuring more resilient infrastructure and promoting insurance and other financial products for resilient investment and business decisions.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Essentially promotes a range of Actions which are to feed into Horizon 2020 research programme, the circular economy package and the 2022 climate and energy package. These promote circularity as a solution to a variety of issues that are likely to become more prevalent in the future.*
- *Barriers to Reversible Building Design: Highlights the need for climate proofing of buildings and infrastructure against threats such as "extreme precipitation, extreme summer heat events, exposure to heavy snow fall, flooding risk etc. This may lead to the use of materials that increase the difficulty in deconstruction and separation of materials at the end of use phase.*

#### *The 2020 Climate and Energy Package (2009)*

**Summary:** the 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the 2020. Three key targets have been set: a 20% cut in greenhouse gas

emissions (from 1990 levels), 20% of EU energy from renewables and a 20% improvement in energy efficiency. The targets set by EU leaders in 2007 and enacted in legislation 2009. They are also headline targets of the Europe 2020 strategy for smart, sustainable and inclusive growth.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Sets key targets in binding legislation that are also headline targets in the Europe 2020 strategy, focus on reducing greenhouse gas emissions could encourage reversible building design and material reuse as a measure of doing so.*
- Barriers to Reversible Building Design: *increased focus on air tightness to increase energy efficiency can lead to difficulty in separating materials and so conflicts with the idea of a circular economy.*

### ***Strategy for the sustainable competitiveness of the construction sector and its enterprises***

**Summary:** The communication identifies the main challenges that the sector faces today and up to 2020 in terms of investment, human capital, environmental requirements, regulation and access to markets, and proposes initiatives to support the sector for this purpose. In the short term, the emphasis is put on the need to support growth and employment in the construction sector in response to the crisis. In the long term, the challenges the industry faces will require a concerted and coordinated approach at European level to improve the functioning of the value chain, particularly through voluntary partnerships between private and public sectors and an appropriate regulatory framework, where necessary.

- Opportunities for Materials Passports: *Opportunity for materials passports to build on development and need for regulatory frameworks and resource efficiency by incorporating them into the materials passports.*
- Opportunities for Reversible Building Design: *Specifies that a more competitive construction industry would create buildings and infrastructure easily adaptable to changing social and economic needs, this is an opportunity for reversible building design as this is one of the key areas of which it could help encourage.*

### ***EU Forest Strategy (2013)***

**Summary:** The strategy deals with the new challenges forests and forest sector face at the present. It stresses the importance of forests for rural development, as well as for the environment, for forest-based industries, bioenergy, and in the fight against climate change. In this it underlines the need to follow a holistic approach, bringing together different internal and external forest-policy issues, covering the multiple benefits of forests, and addressing the whole forest value-chain (i.e. the way forest resources are used to generate goods and

services). The strategy also emphasises that forest-linked EU policies should be taken into account for national forest policies. Furthermore, it calls for a forest information system to be set up, for Europe-wide harmonised information on forests to be collected and for integrating diverse information systems and data platforms.

- Opportunities for Materials Passports: *Provides an opportunity for bio-material material passports to incorporate information on its sustainability attaining to where it's been sourced and its potential to implement the cascade principal.*
- Opportunities for Reversible Building Design: *Identifies Re-use and recycling of wood as two key policy areas in order to create resource efficiency in the forest sector (see cascade use of wood principle). This provides an opportunity of reversible building design, especially if it incorporates more sustainably sourced bio-materials that follow this principal.*

### ***The urban dimension of EU policies – key features of an EU urban agenda***

**Summary:** Europe faces challenges related to the economy, the climate and the environment, most of these have an urban dimension. Cities roles in economic, social and cultural development and their potential for a more resource efficient habitat, have long been recognised. The policy response at a European and national level has been slow and piecemeal. This communications purpose is to widen debate to all relevant stakeholders. Building on the results of the CITIES forum it proposes a set of questions for consultation aimed at further clarifying the need for an EU urban agenda, what objectives should be and how it could function. The communication sets out the current urban situation in the EU; where Europe stands today in terms of urban policy and; the calls for an EU urban agenda; the global dimension of urban development; and the potential ways forward with questions for consultation.

- Opportunities for Reversible Building Design: *Reversible building design could play a key part in forming part of the EU urban agenda and meeting a number of challenges such as CO2 reduction, demographic change and resource efficiency.*

### ***Regulation: Waste Shipment Regulation (EC) No 1013/2006***

**Summary:** Addresses the problem of uncontrolled transport of waste, regulation (EC) no 1013/2006 of 14 June 2006 on shipments of waste lays down procedures for the transboundary shipments (i.e. transport) of waste. The regulation implements into EU the provisions of the “Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal” as well as the related OECD decision. It includes a ban on the export of hazardous waste to non-OECD countries and well as a ban on the exports of waste for disposal.

- **Barriers to Materials Passports & Barriers to Reversible Building Design:** *Some limits are placed on movement of certain types of waste, could potentially hinder the movement and trade of recovered/reused/recycled waste for further use.*

**Regulation:** *Construction Products Regulation (CPR 305/2011)*

**Summary:** The CPR lays down harmonised rules for marketing of construction products in the EU. The regulation provides a common technical language to assess the performance of construction products. It ensures that reliable information is available to professionals, public authorities, and consumers, so they can compare the performance of products from different manufacturers in different countries.

- **Opportunities for Reversible Building Design:** *Could also allow reprocessed, recycled, reused materials to be widely exchanged across national boundaries within the European Union. If the potential issues are solved this could have far reaching benefits for the circular economy, as the market can be accessed across Europe for the reuse of building materials.*
- **Barriers to Materials Passports:** *New technical specifications would have to be developed for any reused/recycled construction products, guarantees of product performance would have to be issued as well as legal responsibility for the product. This will likely cause problems unless amendments are made to the legislation to account for reuse and recycling.*

**Regulation:** *Timber Regulation (EC) 995/2010*

**Summary:** Lays down the obligations of operators who place timber and timber products on the market – also known as the (Illegal) Timber Regulation counters the trade products on the market – also known as the (Illegal) Timber Regulation counters the trade in illegally harvested timber and timber products through three key obligations; it prohibits the placing on the EU market for the first time of illegally harvested timber and products derived from such timber; it requires EU traders who place timber products on the EU market for the first time to exercise ‘due diligence’; once on the market, the timber and timber products may be sold on and /or transformed before they reach the final consumer. To facilitate the traceability of timber products economic operators in this part of the supply chain (referred to as traders in the regulation) have an obligation to; keep records of their supplier and customers.

- **Opportunities for Reversible Building Design:** *Creates obligations on operators and traders to remove risk of illegal timber in the supply chain. This is intended to help reduce illegal forestry which is having a negative impact on important rainforests around the globe, which helps the circular goal of enhancing and preserving natural capital within the EU.*



- *Barriers to Reversible Building Design: Does not include recycled wood materials, and so does not provide guarantees on the source of the original timber.*

**Regulation:** *Classification, labelling and packaging of substances and mixtures (EC) 1272/2008*

**Summary:** EU legislation on classification, labelling and packaging aims to ensure a high level of protection of human health and the environment and the functioning of the internal market. It does so by laying down EU-wide criteria that must be applied to determine whether a substance or mixture which is manufactured or imported into the European market has properties which could damage human health or the environment. In cases where the substance or mixture meets these so-called “classification criteria”, i.e. if it has certain hazardous properties, the substance or mixture must be classified accordingly, e.g. for acute toxicity or for flammability. Suppliers must then communicate the identified hazards of these substances or mixtures to their customers, including to consumers. The most common tool for hazard communication is the labelling on the packaged substance or mixture, but also the Safety Data Sheet which is provided to other companies in the supply chain.

- *Opportunities for Materials Passports: Requires all chemicals to be classified according to their hazardous properties, which could be included on the materials passports.*
- *Opportunities for Reversible Building Design: Allows easy identification of the hazardous materials used in the built asset if any, which will make it safer to deconstruct.*

**Directive:** *Waste Framework Directive (2008/98/EC)*

**Summary:** Sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soils, plants or animals, without causing a nuisance through noise or odour, a without adversely affecting the countryside or places of special interest. Waste legislation and policy of the EU member states shall apply as a priority order the following waste management hierarchy.

- *Opportunities for Materials Passports: Creates legal definitions for reuse with materials having to comply with them, once they have met these criteria they can officially be labelled as products (secondary materials). Could provide an opportunity to materials passports if this can be incorporated.*
- *Opportunities for Reversible Building Design: Article 6 (1) and (2) detail the end-of-waste criteria, for when a waste ceases to be a waste and becomes a*

*secondary raw material. The criteria are set for specific materials to help level the playing field and remove administrative burden and could allow greater recovery of materials from a built asset during deconstruction.*

- *Barriers to Materials Passports & Reversible Building Design: Currently end-of-waste criteria only exist for a few materials and applications, such as aggregates from inert waste. These will have to be expanded to remove the barrier to both reversible building in regards to the reprocessing of other materials, as well as providing further structure/standardisation for materials passports.*

**Directive:** *Directive on the landfill of waste (99/31/EC)*

**Summary:** According to the waste management hierarchy, landfilling is the least preferable option and should be limited to the necessary minimum. Where waste needs to be landfilled, it must be sent to landfills which comply with the requirements of Directive 1999/31/EC on the landfill of waste. The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment, in particular on surface water, groundwater, soil, air, and on human health from the landfilling of waste by introducing stringent technical requirements for waste and landfills.

The Landfill Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for deposit of waste onto or into land. Landfills are divided into three classes; landfills for hazardous waste; landfills for non-hazardous waste; landfills for inert waste

- *Opportunities for Reversible Building Design: Three types of landfills classified; hazardous waste, non-hazardous waste and inert waste. Permission to build new landfills is rarely given, with waste being encouraged towards other recycling/reuse and incineration.*

**Directive:** *WEEE (Directive 2002/96/EC)*

**Summary:** Waste of electrical and electronic equipment (WEEE) such as computers, TV-sets, fridges and cell phones is one of the fastest growing waste streams in the EU, with some 9 million tonnes generated in 2005, and expected to grow to more than 12 million tonnes by 2020. WEEE is a complex mixture of materials and components that because of their hazardous content, and if not properly managed, can cause major environmental and health problems. Enter the force in February 2003. The Directive provided for the creation collection schemes where consumers return their WEEE free of charge. These schemes aim to increase the recycling of WEEE and/or re-use.

- *Opportunities for Reversible Building Design: Would apply to building infrastructure such as HVAC systems, encourages the safe collection and reprocessing of WEEE waste that could be associated with built assets.*

**Directive:** *Eco-design (Directive 2009/125/EC)*

**Summary:** The Eco-design of Energy Related Products Directive 2009/124/EC is a framework directive which primarily focuses on energy in use. It does this by setting minimum requirements for certain energy consuming products. To be considered for inclusion within the directive a product must; have a volume of sales that exceeds 200,000 units per year throughout the internal European market – this is an accumulative total and not one calculated on an individual producer basis, have a significant environmental impact within the internal market, present significant potential for improvement in environmental impact without incurring excessive costs. The objective is to reduce greenhouse gas emissions and other adverse environmental impacts throughout the life-cycle of a product with emphasis placed on the design and development stages of a product with a view to improving its energy efficiency.

- *Opportunities for Materials Passports: Sets mandatory ecological requirements covering 40 product groups, these would likely need to be included in the materials passports where the directive covers appropriate products groups.*
- *Opportunities for Reversible Building Design: Mandatory ecological requirements for energy-using and energy related products, includes windows, lightbulbs and insulation. In practice this is an opportunity for reversible building design as it also encourages recyclability among other waste issues.*

**Directive:** *Industrial Emissions Directive (2010/75/EU)*

**Summary:** Directive 2010/75/EU is the main EU instrument regulating pollutant emissions from industrial installations. The IED was adopted on 24 November 2010, it is based on a commission proposal recasting 7 previously existing directives (including in particular the IPPC Directive) following an extensive review of the policy. The IED entered into force on 6 January 2011 and had to be transposed by member states by 7 January 2013. The IED aims to achieve a high level of protection of human health and the environment taken as a whole by reducing industrial emissions across the EU, in particular through better application of ‘Best Available Techniques’.

- *Opportunities for Reversible Building Design: Encourages the use of best available techniques this can include recycling of waste depending on what the process is. This is potentially beneficial as it potentially can deconstruction and reversible building design so to best maintain the value of the constituent materials.*

**Directive:** *Energy performance of buildings (Directive 2010/31/EU)*

**Summary:** Under the Energy Performance of Buildings Directive; energy performance certificates are to be included in all advertisements for the sale or rental of buildings, EU countries must establish inspection schemes for heating and air condition systems or put in

place measures with equivalent effect, all new buildings must be nearly zero energy buildings by 31 December 2020 (public buildings by 31 December 2018), EU countries must set minimum energy performance requirements for new buildings, for the major renovation of buildings and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls, etc.) and EU countries have to draw up lists of national financial measures to improve energy efficiency of buildings.

- *Barriers to Materials Passports & Barriers to Reversible Building Design: Increased focus on energy performance in buildings can lead to the use and amalgamation of materials, in a way that makes it difficult to disassemble and recover them.*

**Directive:** *Energy Efficiency (Directive 2012/27/EU)*

**Summary:** EU countries make energy efficient renovations to at least 3% of buildings owned and occupied by central government, EU governments should only purchase buildings which are highly energy efficient, EU countries must draw-up long-term national building renovation strategies which be included in their National Energy Efficiency Plans

- *Barriers to Materials Passports & Barriers to Reversible Building Design: Increased focus on energy performance in buildings can lead to the use and amalgamation of materials, in a way that makes it difficult to disassemble and recover them.*

**Directive:** *Renewable Energy Directive (2009/28/EC)*

**Summary:** The Renewable Energy Directive establishes an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets. All EU countries must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.

*Barriers to Reversible Building Design: Increased focus on renewables could see building designs requiring renewables to be taken into account during the design of a built asset, depending on the type of renewable use removal could range from 'simple' to 'difficult' during deconstruction.*

**Standard:** *EN 15804 Sustainability of construction works. Environmental Product Declarations.*

**Summary:** EN 15804 provides core product category rules (PCR) for Type III environmental product declarations (EPD) for any construction product and construction service. The core PCR; describe which stages of a products life cycle are considered in the EPD and which processes are to be included in the life cycle stages this includes the rules for calculating the

Life Cycle Inventory and the Life Cycle Impact; The assessment underlying the EPD which includes the specification of the data quality to be applied; defines the indicators to be declared and the way in which they are collated and reported; defines rules for the development of scenarios, includes the rules for reporting predetermined the environmental and health information that is not covered by LCA for a product construction process and construction service where necessary; defines the conditions under which construction products can be compared based on the information provided by EPD.

- Opportunities for Materials Passports: *Environmental data along the life cycle of the product should be incorporated within material passports. Based on this (quantitative) B2B data, stakeholders along the value chain of the product will be able to take environmentally sound decisions*
- Opportunities for Reversible Building Design: *Environmental data along the life cycle of the product within a building or building system should be incorporated within the reversible design tools. Based on this (quantitative) B2B data, stakeholders along the value chain of the product will be able to take environmentally sound decisions*
- Barriers to Materials Passports & Barriers to Reversible Building Design: *Calculating the net environmental benefits in terms of recycling, reuse and energy use is not mandatory and not very transparent (if included in the analysis).*

**Standard:** *EN 15643-2011 Sustainability of construction works. Sustainability assessment of buildings.*

**Summary:** A European Standard that provides the specific principles and requirements for the assessment of environmental performance of buildings taking into account technical characteristics and functionality of a building. Assessment of environmental performance is one aspect of sustainability assessment of buildings under the general framework of EN 15643-1. The framework applies to all types of buildings and it is relevant for the assessment of the environmental performance of new buildings over their entire life cycle, and of existing buildings over their remaining service life and end of life stage.

- Opportunities for Reversible Building Design: *Can help to calculate sustainability of a built asset and could allow easier assessment of a building for deconstruction.*
- Barriers to Reversible Building Design: *The use of EN15643 is not mandatory and relies on access to information from Environmental Product Declarations.*

## Procurement related

### **Green Public Procurement**

**Summary:** Europe’s public authorities are major consumers. By using their purchasing power to choose environmentally friendly goods, services and works, they can make an important contribution to sustainable consumption and production – what we call Green Public Procurement (GPP) or green purchasing. GPP is a voluntary instrument, it has a key role to play in the EU’s efforts to become a more resource-efficient economy. It can stimulate a critical mass of demand for more sustainable goods and services which otherwise would be difficult to get on the market. GPP is therefore a strong stimulus. It requires the inclusion of clear and verifiable environmental criteria for products and services in the public procurement process.

- *Opportunities for Reversible Building Design: Green Public procurement can encourage the use of materials passports and reversible building design as it stipulates the requirement for “authorities to procure goods, services and works with a reduced environmental impact throughout their lifecycle when compared to goods, services and works with the same primary function that would otherwise be procured.” Material passports and reversible building design fall into this category.*
- *Opportunities for Materials Passports: Materials passports could allow more environmentally and socially friendly products to be more easily identified during the tendering process.*
- *Barriers to Reversible Building Design: Potential lack of legal (and technical) expertise in applying the necessary environmental criteria when purchasing products will dissuade purchasing of socially and environmentally friendly products during the tendering process of projects, this will have to be addressed to encourage the uptake of materials and products beneficial to reversible building design.*

### **Labelling: BREEAM**

**Summary:** The Building Research Establishment Environmental Assessment Method, a sustainable assessment method for master planning projects, infrastructure and buildings. IT addresses a number of lifecycle stages such as New Construction, Refurbishment and In-Use. Globally there are more than 530,300 BREEAM certified developments, and almost 2,251,200 buildings registered for assessment since it was first launched in 1990.

- *Opportunities for Reversible Building Design: Sections about waste reduction and materials are of particular focus within the BREEAM Scheme itself, the use of reversible building design could potentially incur extra credits. If reversible buildings were recognised by the BREEAM scheme it would be a benefit. There is great scope to update future BREEAM standards with credits targeting Circular Economy, these would need to be able to be evidenced against standard, good and best practice.*

### **Labelling: NaturePlus**

**Summary:** Supports and promotes the sustainable use of resources and the protection of the climate in the manufacture of building products. The label promotes the use of building products that have been strictly tested to ensure that they do not cause any negative impacts on health. Products awarded this label have reached high standards related to; climate protection, Healthy accommodation and sustainability. It is an orientation aid to consumers and building professionals and is fully in line with the EU Construction Products Regulation.

- Opportunities for Materials Passports: *The addition of Natureplus quality label criteria will be an opportunity for material passports would likely be useful information to be included within them.*

### **Labelling: EU Ecolabel**

**Summary:** The label has been created to help identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw material through to production, use and disposal. Recognised throughout Europe the EU Ecolabel is a voluntary label promoting environmental excellence which can be trusted.

- Opportunities for Materials Passports: *Would provide an opportunity for materials passports especially if the EU Ecolabel is recognised internally within them.*
- Opportunities for Reversible Building Design: *Products with EU Ecolabels are recognised as having a reduced environmental impact throughout their life cycle, this includes disposal. Materials identified as having the EU Ecolabel could be easier to reprocess and sort during the deconstruction of a building.*

### **Voluntary scheme: Recovinyl Plus**

**Summary:** VinylPlus a renewed ten-year voluntary commitment of the European PVC industry, establishing a long-term framework for the sustainable development of the industry by tackling a number of critical challenges, in the EU-28, Norway and Switzerland. Specific 'closing the loop' targets include; recycling 800,000 tonnes/year of PVC by 2020, developing and exploiting innovative technology to recycle 100,000 tonnes/year of difficult to recycle PVC material (within the overall 800,000 tonnes/year recycling target) by 2020, addressing the issue of legacy additives and delivering a status report within each annual VinylPlus Progress Report.

- Opportunities for Materials Passports: *Enables easier PVC reprocessing through certification of PVC recyclate, by giving certain guarantees as to the quality of the PVC to be recycled. Would be useful to integrate into the materials passports in some form.*

- Opportunities for Reversible Building Design: *Encourages PVC used in buildings to be reprocessed after the building has been deconstructed, and makes it easier to do so as it guarantees a certain level of quality of the PVC being processed if it has the Recovinyl plus label.*

## Research & business growth

There are many opportunities to support circular economy through the application and further development of research and development across the EU. A possible barrier is the parallel development of similar projects, which could act as a disincentive for relevant stakeholders to become engaged.

One of the best ways to overcome barriers and maximise opportunities is through awareness raising and mutual understanding of what is actually being done in parallel projects which seem to have similarities. This is being done reasonably effectively in the first batch of Horizon 2020 projects that target better resource use in construction and demolition. A more challenging objective would be to assimilate the relevant learning to date across the spectrum of EU R&D, demonstration, consultancy and guidance projects. A few key areas are summarised below:

### *Horizon 2020*

**Summary:** Horizon 2020 is the biggest EU research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. It is a financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. By coupling research and innovation, Horizon 2020 is helping to achieve this with its emphasis on excellent science, industrial leadership and tackling societal challenges.

- BAMB Buildings and Material Banks – <http://www.bamb2020.eu/>
- HISER - Holistic Innovative Solutions for an Efficient Recycling and Recovery of Valuable Raw Materials from Complex Construction and Demolition Waste (HISER) - <http://www.hiserproject.eu/>
- FISSAC - Fostering Industrial Symbiosis for a Sustainable Resource Intensive Industry across the extended Construction Value Chain - <http://fissacproject.eu/en/>

### *Life programme*

LIFE is the EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU. Since 1992, LIFE has co-financed some 4306 projects. For the 2014-2020 funding period, LIFE will contribute approximately €3.4 billion to the protection of the environment and climate.



See:

<http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.getProjects&themeID=64&projectList> for construction and demolition waste related projects

<http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.getProjects&themeID=14&projectList> for eco-design projects

<http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.getProjects&themeID=17&projectList> for Green procurement projects

### *Joint Research Council/ directly commissioned work*

The EC commissions work via the Joint Research Council or through directly tendered projects. Some the most relevant are summarised here:

#### JRC

The Joint Research Centre (JRC) is the European Commission's science and knowledge which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy. The area dedicated to Green and Circular Economy<sup>71</sup> and some possibly relevant outputs includes:

- *REAPro (Resource Efficiency Assessment of Products) method to assess the material efficiency of products according to several parameters, including reusability/recyclability/recoverability, recycled content, use of key resources (including critical raw materials), and durability (including reparability and upgradability).*
- *Raw Materials Information System - provides a structured repository of information on raw materials*
- *Supporting Environmentally Sound Decisions for Construction and Demolition (C&D) Waste Management*

#### DG Environment

The Directorate-General for Environment is the European Commission department responsible for EU policy on the environment. It aims to protect, preserve and improve the environment for present and future generations, proposing and implementing policies that ensure a high level of environmental protection and preserve the quality of life of EU citizens. It also makes sure that Member States apply EU environmental law correctly.

There are many studies, which are accessible the DG Environment website<sup>72</sup>. A few recent ones that could be relevant to BAMB include:

- *A framework for Member States to support business in improving its resource efficiency (2015)*
- *Taking the EU Resource Efficiency Agenda Forward - A policymaker and business perspective (2015)*
- *Sectoral Resource Maps (2013)*
- *Mapping resource prices: the past and the future (2012)*

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<sup>71</sup> <https://ec.europa.eu/jrc/en/research-topic/green-and-resource-efficient-europe>

<sup>72</sup> <http://ec.europa.eu/environment/pubs/studies.htm>

- *Management of CDW in the EU - requirements resulting from the Waste Framework Directive and assessment of the situation in the medium term (2011)*
- *Resource Efficient Use of Mixed CDW Wastes – (BRE working on this) ongoing project<sup>73</sup>*
- *Public consultation on "Common EU framework of core indicators for the environmental performance of EU buildings" – (VITO working on this) comments open until 7<sup>th</sup> October 2016<sup>74</sup>.*

### DG Growth

The Directorate-General (DG) for Internal Market, Industry, Entrepreneurship and SMEs is the European Commission service responsible for several relevant areas, including:

- completing the Internal Market for goods and services;
- helping turn the EU into a smart, sustainable, and inclusive economy by implementing the industrial and sectorial policies of the flagship Europe 2020 initiative;
- fostering entrepreneurship and growth by reducing the administrative burden on small businesses; facilitating access to funding for small and medium-sized enterprises (SMEs); and supporting access to global markets for EU companies (encapsulated in the Small Business Act).

Their website signposts support tools to help manufacturers identify key legislation, regulations and standards in the construction sector, including the key online tools and studies on construction published in the EU<sup>75</sup>. Some potentially relevant (to BAMB) include:

- *The NANDO database identifies Notified Bodies (NB) and Technical Assessment Bodies (TAB) responsible for construction products. These bodies are assessing products and/or the manufacturing processes for relevant harmonised European standards (HEN)*
- *The Dangerous substances database CP-DS offers information on construction product regulations related to dangerous substances.*
- *The EU-LCI database provides a set of common values at EU level for the Lowest Concentration of Interest (LCI) in indoor air*
- *CE marking of construction products guide<sup>76</sup>*
- *Life cycle costing (LCC) as a contribution to sustainable construction - a common methodology<sup>77</sup>*
- *Screening of national building regulations<sup>78</sup>*
- *Sustainable Competitiveness of the construction Sector<sup>79</sup>*

Also relevant - *The European Innovation Partnership (EIP) on Raw Materials (next section)*

*The European Innovation Partnership (EIP) on Raw Materials:*

<sup>73</sup> [http://ec.europa.eu/environment/waste/studies/mixed\\_waste.htm](http://ec.europa.eu/environment/waste/studies/mixed_waste.htm)

<sup>74</sup> [http://susproc.jrc.ec.europa.eu/Efficient\\_Buildings/documents.html](http://susproc.jrc.ec.europa.eu/Efficient_Buildings/documents.html)

<sup>75</sup> [http://ec.europa.eu/growth/sectors/construction/support-tools-studies\\_en](http://ec.europa.eu/growth/sectors/construction/support-tools-studies_en)

<sup>76</sup> <http://ec.europa.eu/DocsRoom/documents/12308?locale=en>

<sup>77</sup> <http://ec.europa.eu/DocsRoom/documents/5054/attachments/1/translations/>

<sup>78</sup> <http://ec.europa.eu/DocsRoom/documents/5082/attachments/1/translations/>

<sup>79</sup> <http://ec.europa.eu/DocsRoom/documents/4838/attachments/1/translations/>

The European Innovation Partnership on Raw Materials is a stakeholder platform that brings together representatives from industry, public services, academia and NGOs. Its mission is to provide high-level guidance to the European Commission, Member States and private actors on innovative approaches to the challenges related to raw materials.

(<https://ec.europa.eu/growth/tools-databases/eip-raw-materials/en>). The EIP on Raw Materials' aim is to help raise industry's contribution to the EU GDP to around 20% by 2020. It will also play an important role in meeting the objectives of the European Commission flagship initiatives 'Innovation Union' and 'Resource Efficient Europe'. It will do this by ensuring the sustainable supply of raw materials to the European economy whilst increasing benefits for society as a whole.

*Eco-innovation Action Plan*<sup>80</sup>:

The EcoAP is an important element of the European policy framework for sustainable consumption and production. It reinforces initiatives such as, the Eco-Management and Audit Scheme (EMAS), the EU Ecolabel, the Environmental Technology Verification (ETV) scheme as well as the Product Environmental Footprint pilot. Since its adoption, the EcoAP has been targeting innovative SMEs. It recognises innovative front-runner businesses with the European Business Awards for the Environment (EBAE), it opens up funding opportunities under COSME, Horizon 2020, and the LIFE programme and builds on the Enterprise Europe Network (EEN) for business matchmaking. Recently, EcoAP efforts have been strengthened by the Green Action Plan for SMEs.

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<sup>80</sup> <http://ec.europa.eu/environment/ecoap/about-action-plan/objectives-methodology/>

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# Belgium: Policy and Regulation State of the Art report



# Belgium

## National Level

### Identified Policies and Standards

#### Judicial Instruments

*Arrêté royal concernant l'indication, par voie d'étiquetage et d'informations uniformes relatives aux produits, de la consommation en énergie et en autres ressources des produits liés à l'énergie (13 AOÛT 2011)*

- Summary :  
This decree transposes into law Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products and repealing Directive 92 /75 / EEC  
  
This decree focusses on the energy consumption of products in use and the corresponding labeling.
- Keywords : General Policy/Circular Economy/label
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté royal fixant les exigences minimales pour les affichages environnementaux sur les produits de construction et pour l'enregistrement des déclarations environnementales de produits dans la base de données fédérale (22 MAI 2014)*

- Summary :  
This Decree is obliging material producers to develop an EPD according to the Belgian Federal requirements for products for which they publish environmental impact information on the packaging.  
The EPD data is automatically introduced in the EPD data base.
- Opportunities for Materials Passports : *The EPD data could be used to build on for the development of materials passports*
- Opportunities for Reversible Building Design : *EPD can be developed for materials but could also be developed for systems. Reversible design criteria enabling repair, re-use, re-cycling could be introduced in the EPD data base*
- Keywords : Products
- Degree of obligation: Mandatory
- [Link](#)

*NBN EN 15804- Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*

- Summary :

The EN 15804 provides core product category rules for all construction products and services. It provides a structure to ensure that all Environmental Product Declarations (EPDs) are derived, verified and presented in a harmonized way. It is organized in modules covering different life cycle stages. Some modules are mandatory, others are optional.

- Opportunities for Materials Passports :  
*Environmental data along the life cycle of the product should be incorporated within material passports. Based on this (quantitative) B2B data, stakeholders along the value chain of the product will be able to take environmentally sound decisions.*
- Opportunities for Reversible Building Design :  
*Environmental data along the life cycle of the product within a building or building system should be incorporated within the reversible design tools. Based on this (quantitative) B2B data, stakeholders along the value chain of the product will be able to take environmentally sound decisions.*
- Barriers for Materials Passports & Reversible Building Design:  
*Module D, calculating the net environmental benefits related to future reuse, recycling and energy recovery is not mandatory.*
- Keywords : Products
- Degree of obligation: Mandatory
- [Link](#)

## STS

- Summary :  
The STS make a specific contribution to the realization of construction works according to the rules of art and good craftsmanship. These reference documents, of normative and / or indicative nature, are primarily intended for clients, namely the prescribers and designers.

The STS describe requirements that can be asked for of products and requirements regarding the implementation.

It comprises prescriptions regarding the materials used; technical requirements such as stability and fire safety requirements; energy performance and comfort; acoustic properties; etc.

The different types of technical specifications are listed below:

*STS 23.1: Constructions en ossature bois*

*STS 52.1: Menuiseries extérieures en bois*

*STS 53.2 Portes industrielles, commerciales et résidentielles*

*STS 04.1 Bois et panneaux à base de bois : bois de structure*

*STS 04.2 Bois et panneaux à base de bois : bois de menuiserie*

*STS 04.3 Bois et panneaux à base de bois : traitements du bois*

*STS 04.4 Bois et panneaux à base de bois : panneaux dérivés du bois*

*STS 06.8 Bois et panneaux à base de bois : matériaux d'assemblage pour charpente*

*STS 08.82 Matériaux d'isolation thermique*

*STS 22 Maçonnerie pour constructions basses*

*STS 23 Structures en bois*

*STS 23:ad.1 Structures en bois : addendum et commentaires*

*STS 31 Charpenterie*

*STS 36 Menuiseries métalliques : fenêtres, façades légères et huisseries*

*STS 45.1 Parachèvement de sol intérieur : généralités, mortiers-collés, mosaïque de simili-porcelaine et de verre*

*STS 45.2 Parachèvement de sol intérieur : généralités, bois et liège*

*STS 45.3 Parachèvement de sol intérieur : généralités, pierre naturelle*

*STS 45.6 Parachèvement de sol intérieur : généralités, revêtement de sol en céramique*

*STS 52.3 Menuiserie extérieure en PVC*

*STS 56 Vitrages extérieurs collés*

*STS 71-1: «Post-isolation des murs creux par remplissage in situ de la coulisse ayant une largeur nominale d'au moins 50 mm»*

*STS 23:ad.2 Structures en bois : constructions en rondins*

*STS 34.2 Couverture des bâtiments : couvertures métalliques*

*STS 44 Chapes de nivellement et sols industriels*

- Opportunities for Materials Passports :  
*The technical information that is contained in the STS could be used to be integrated in the Materials Passports.*
- Extend the STS with aspects related to the treatment of the material in order to improve recycling and guarantee resource productivity.*
- Opportunities for Reversible Building Design :  
*Extend the STS with prescriptions regarding reversible design aspects and minimum re-use and transformation capacity could be required.*
- Keywords : Products
- Degree of obligation: Voluntary
- Link

#### *Control Mechanism – Bureau for Standardisation (NBN)*

- Summary :  
The Bureau for Standardisation (NBN) is responsible for developing and selling standards in Belgium. In addition, NBN also organises training on the use of management standards.

Together with its sector operators, NBN acts as the Belgian knowledge centre for all activities related to standardisation.

NBN plays a societal role by helping companies, consumers, public authorities and other stakeholders to strive for greater quality within an international competitive context.

Keywords : Product ; building

- Degree of obligation: Voluntary
- [Link](#)

#### *Control Mechanism – National Technical Approvals (ATG)*

- Summary :  
The national technical approvals (ATG) are voluntary assessments, covering both regulated and other characteristics, demonstrating the fitness for the intended use.

As a rule, national technical approvals require certification according to ISO system 5, performed by certification bodies assigned by the UBAtc (Belgium's only authority offering technical approval of construction materials, products, systems and installers).

- Opportunities for Materials Passports :  
*The technical information that is contained in the STS could be used to be integrated in the Materials Passports.*  
*The performance properties could take into account 'resource productivity' performance properties*
- Opportunities for Reversible Building Design :  
*The performance properties could take into account the reuse potential and transformation capacity as part of the estimated longevity of use and durability of the products*  
*Some technical aspects related to the connections and how to apply the product could be elaborated with reversible design criteria*
- Barriers for Materials Passports & Reversible Building Design :  
*The information provided is probably not matching the format needed for the Materials Passports or reversible design assessment tools*  
*The technical approvals are voluntary. The information is thus not available for every product*
- Keywords : Product
- Degree of obligation: Voluntary
- [Link](#)

#### Public Investments

##### *Projet de loi relatif aux marchés publics*

- Summary :  
This bill aims essentially the (partial) transposition of the new guidelines in European public procurement, in particular Directive 2014/24/ EU of the European

Parliament and Council of 26 February 2014 on public procurement and repealing Directive 2004 /18 / EC and Directive 2014/25 / EU the European Parliament and of the Council of 26 February 2014 procurement by entities operating in the sectors of water , of energy, transport and postal services and repealing Directive 2004/17 / EC.

- Keywords : General policy/circular economy
- Degree of obligation:
- Link

*Loi relative aux marchés publics et à certains marchés de travaux, de fournitures et de services (15 JUIN 2006)*

- Summary :  
Bill regarding public procurement for works, supply and services.
- Keywords : General policy/ circular economy
- Degree of obligation: Mandatory
- [Link](#)

Information

*Environmental Product Declarations Database*

- Summary :  
  
Manufacturers who wish to affix an environmental statement on their product(s) should first have a life cycle analysis (LCA) carried out and should have it registered in this database. Manufacturers who market products without environmental statement can also use the database to declare their LCA.  
  
The database is accessible for the public, which means that architects, public authorities or consumers can also consult (part of) the data entered in the database.
- Opportunities for Materials Passports :  
*The EPD data could be used to build on for the development of materials passports*
- Opportunities for Reversible Building Design :  
*EPD can be developed for materials but could also be developed for systems. Reversible design criteria enabling repair, re-use, re-cycling could be introduced in the EPD data base*
- Barriers for Materials Passports & reversible design:  
*By now, when a EPD is developed, only the cradle to gate part is mandatory*
- Keywords : Products
- Degree of obligation:
- Link

## Referentiel B

- Summary :

Label for sustainable buildings developed by the Brussels Capital Region together with the Flemish and Walloon region.  
The tool comprises 9 sections, including focusing on the sustainable use of construction materials in buildings.  
The 9 sections:

  - 1) Management
  - 2) Mobility
  - 3) Development of nature
  - 4) Physical Environment
  - 5) Human, social and cultural environment
  - 6) Material
  - 7) Energy
  - 8) Water
  - 9) Comfort & health
- Opportunities for Materials Passports & Reversible Building Design :

The section 6) Materials is focusing on the sustainable use of construction materials *in buildings*. *Besides the environmental impact of building materials in building elements and buildings design for deconstruction & disassembly aspects and re-use are introduced. These concepts can be elaborated based on the reversible design and materials passports concepts and the tools developed through the BAMB project.*  
*The section 1) Management can be elaborated based on the findings and tools developed in WP5 – A1.*  
*The tools developed within the BAMB project could be used to assess the level of resource effectiveness of projects within a Referentiel B labelling process.*  
*The different regions aim to use the Ref-B to support Green Public Procurement in de construction sector.*
- Keywords : general ; building
- Degree of obligation: voluntary
- [Link](#)

## Research

### BBRI – Pratiques de prévention et de gestion des déchets

- Summary :

The CSTC (Centre Scientifique et Technique de Construction) is a research center on building construction. It has published some fact sheets on preventing construction site wastes. Some of them are linked to the reuse aspects. The overall objective of these factsheets is to invite the constructor to make contact with the BBRI, in order to help for minimizing waste on their construction projects.
- Keywords : reuse, recycle
- Degree of obligation: voluntary
- [Link](#)

*Quickscan job potential Circular Economy (HIVA / KUL)*

- Summary :
- Keywords :
- Degree of obligation:
- Link

## Best Practices

### *Belgian Building Research Institute - Recyhouse*

- **Summary :**  
The Belgian Building Research Institute (BBRI) constructed a demonstration-building on the site of its experimental station in Limelette, which required five years of work (1996-2001).  
Recyhouse is a building incorporating a very large amount of new construction materials produced with residues of all sorts. The objective is to demonstrate that it is indeed possible to construct a building almost entirely with the means of recycled materials.  
The main goal of Recyhouse is to inform all those associated with the building process about the possible applications of recycled products.
- **Keywords :** Buildings
- **Degree of obligation:** Voluntary
- **Link**

### *Recovinyl*

- **Summary :**  
Organization born from an initiative of the European PVC industry. Its mission is about simulating and encouraging the use of recycled PVC. In order to achieve this, the association is focusing on ensuring the increase of the PVC recycling amount, certifying the use of recycled PVC and optimizing the resource efficiency of the PVC industry by mediating between recyclers and converters.
- **Keywords :** recycle
- **Degree of obligation:** voluntary
- **Link**

### *EMSO*

- **Summary :**  
Initiative from the producers of plastic canalizations (tubings) to collect and recycle plastic canalizations. Plastic canalization waste holders are asked to dispose those waste free of charge in 10 collection points across Belgium.
- **Keywords :** recycle ; plastics
- **Degree of obligation:** none
- **Link**

### *Clean Site System*

- **Summary :**  
Initiative from the construction material producers (represented by ValIPac) to collect and recycle plastic packaging waste of construction material. Construction and demolition staffs are asked to fill 400L bags with those wastes and to dispose them at participating construction material retailers. Each bags cost 1.65€.
- **Keywords :** recycle ; plastics



- Degree of obligation:
- Link

## Conclusions

- although negative experiences to harmonise policy measures between region on the level of energy performance of buildings, different policy administrations within the regions are working together to elaborate harmonised policy tools and measures for environmental performance of buildings (including impact caused by materials) for the entirety of Belgium. A good example is the development of a web tool for Belgian architects (financed by the three regions) and in parallel the development of a Belgian EPD program, linked to each other.

# Subnational Level

## Belgium - Brussels-Capital Region

### Identified Policies and Standards

#### Judicial Instruments

*Ordonnance relative à l'organisation du marché de l'électricité en Région de Bruxelles-Capitale (19 juillet 2001)*

- Summary :  
Transposes the European directive on electricity markets since energy is a matter in part regionalized in Belgium (URE, distribution, SER)
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Ordonnance portant le Code bruxellois de l'Air, du Climat et de la Maîtrise de l'Energie (COBRACE) : en particulier article 2.4.9 (2 MAI 2013)*

- Summary :  
Main aim of this Law is the improvement of the air quality in order to meet the EC standards regarding air quality.  
The building sector is responsible for a large share of the energy consumption and greenhouse gas production in the Brussels Capital Region. Therefore the decree embraces a framework for sustainable buildings with a high energy and environmental performance taking into account the reduction of non-renewable resources resulting from construction, refurbishment of use of buildings, reduced emission CO<sub>2</sub>, the environmental impact of materials used in buildings, etc.  
Book 1 – Common measures  
Book 2 – Sectorial measures (Buildings, Transport, Exemplary of public authorities, Professional, Penalties)  
Book 3 – Specific measures about air and climate  
  
The law is implemented through implementing decrees.
- Barriers for Materials Passports :  
*Construction materials are a Federal entitlement*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Plan Air Climat Energie Bruxellois (2 JUIN 2016)*

- Summary :

The Regional Air-Climate - Energy has its legal basis in the COBRACE (Code bruxellois de l'Air, du Climat et de la Maîtrise de l'Energie).

Main aim of this Plan is the reduction of Greenhouse gas production of 30% compared to 1990 by 2025 and the improvement of the air quality in order to meet the EC standards regarding air quality.

The building sector is responsible for a large share of the energy consumption and greenhouse gas production in the Brussels Capital Region. Therefore the decree embraces a framework for sustainable buildings with a high energy and environmental performance taking into account the reduction of non-renewable resources resulting from construction, refurbishment of use of buildings, reduced emission CO<sub>2</sub>, the environmental impact of materials used in buildings, etc.

The plan suggests 64 measures and 144 actions in order to be the above objectives.

7 axes are developed:

Axis 1: Buildings

Axis 2: Transport

Axis 3: Economy

Axis 4: Urban planning

Axis 5: Modes of consumption and use of products

Axis 6: Climate change adaptation

Axis 7: Air quality assessment

Axis 8: Participatory mechanisms to achieve the main objectives

Axis 9: Social Dimension

- Opportunities for Materials Passports & Reversible Building Design :

Axis 1: buildings

*The Framework for sustainable building can be extended by not only taking into account the environmental impact of materials used buildings but also their re-use and transformation capacity as well as the dynamic and circular character of buildings.*

*These can have a special focus on the dynamic and circular character of buildings and the reversible design of buildings.*

Axis 2: transport

*Rationalizing the urban transport*

*Reversible design, transformation and re-use capacity of buildings and systems can enable to increase the in situ re-use and reduce the transport of Construction materials and demolition waste.*

Axis 3: Economy

*Measure 33 “developing a real program for circular economy in order to enable a high-performance local economy meeting environmental objectives” is subdivided in 3 Actions:*

*Action 71) Implement a Regional Program for circular economy fostering the development a successful local economy at the service of objectives environmental*

*Action 72) Strengthening information and awareness on the importance of dematerialization and re-use of goods within the development of circular and collaborative economy*

*Action 73) Developing a framework for the re-use and the recovery of waste through the environmental permit*

*This measure and corresponding actions can be further refined and reversible design & materials passports tools can be used to support the implementation*

- Barriers for Materials Passports :  
*Construction materials are a Federal entitlement*
  
- Keywords : General Policy/Circular Economy
- Degree of obligation: Voluntary
- [Link](#)

*Ordonnance portant le Code bruxellois de l'aménagement du Territoire – CoBAT (9 avril 2004)*

*The law of 29 August 1991 on planning and urban planning ( OOPU )Ordonnance organique de la planification et de l'urbanisme (29 août 1991)*

*The law of 4 March 1993 on the conservation of immovable heritage Ordonnance relative à la conservation du patrimoine immobilier (4 mars 1993)*

*The order of 18 July 2002 concerning the right of first refusal Ordonnance relative au droit de preemption (18 juillet 2002)*

*The order of 18 December 2003 on rehabilitation and re- allocation of unused business locations*

*Ordonnance relative à la réhabilitation et à la réaffectation des sites d'activité inexploités (18 décembre 2003)*

- Summary :  
The CoBAT establishes and governs the main mechanisms regarding urban planning in Brussels:
  - Planning (strategic plans, land use plans , expropriation ... )
  - Urban planning regulations ( regional and municipal )
  - The building and subdivision permits/certificates (actions subject to permit submission, instructions regarding submission, competent authorities, etc.)
  - The protection of the real estate heritage (filing, registration on the protection list, inventory and real estate registry , searches ... )

- The undeveloped/unexploited activity sites
- The right of preemption
- The information and urban planning information (PDF)
- Offences and penalties.
- Opportunities for Materials Passports & Reversible Building Design :  
*Urban Planning regulation could make a minimum level of resource productivity performance mandatory, as has been done for the energy performance.*
- Barriers for Reversible Building Design :  
*Current urban regulations and building permit regulations are based on a linear and static vision of buildings which may impede the changes and transformation supported by reversible design*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale du 21 décembre 2007 déterminant des exigences en matière de performance énergétique et de climat intérieur des bâtiments (21 décembre 2007)*

- Summary :  
Decree defining the requirements (and calculation methodology) for energy performance of buildings
- Opportunities for Materials Passports & Reversible Building Design :  
*Linking the requirement regarding energy performance to other requirements such as environmental impact of materials in buildings, resource effectiveness of buildings and circular building design might make it possible to have an integrated vision on building design and resource effectiveness (energy and non-energy related)*
- Barriers for Materials Passports & Reversible Building Design :  
*Construction materials are a Federal entitlement.  
If remaining separate there might be contradictions between the direct impacts of energy efficiency and resource effectiveness and circular building design.*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif aux exigences PEB applicables aux systèmes de chauffage pour le bâtiment lors de leur installation et pendant leur exploitation (3 JUIN 2010)*

- Summary :  
Decree defining the requirements for energy performance of buildings – special focus on the requirements for heating systems

- Opportunities for Materials Passports & Reversible Building Design :  
*Linking the requirement regarding energy performance to other requirements such as environmental impact of materials in buildings, resource effectiveness of buildings and circular building design might make it possible to have an integrated vision on building design and resource effectiveness (energy and non-energy related)*
- Barriers for Materials Passports & Reversible Building Design :  
*Construction materials are a Federal entitlement  
If remaining separate there might be contradictions between the direct impacts of energy efficiency and resource effectiveness and circular building design.*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à l'entretien et au contrôle des systèmes de climatisation et aux exigences PEB qui leur sont applicables lors de leur installation et pendant leur exploitation (15 décembre 2011)*

- Summary :  
Decree defining the requirements for energy performance of buildings – special focus on the requirements for cooling systems.
- Opportunities for Materials Passports & Reversible Building Design :  
*Linking the requirement regarding energy performance to other requirements such as environmental impact of materials in buildings, resource effectiveness of buildings and circular building design might make it possible to have an integrated vision on building design and resource effectiveness (energy and non-energy related)*
- Barriers for Materials Passports & Reversible Building Design :  
*Construction materials are a Federal entitlement  
If remaining separate there might be contradictions between the direct impacts of energy efficiency and resource effectiveness and circular building design.*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à un audit énergétique pour les établissements gros consommateurs d'énergie (15 décembre 2011)*

- Summary :  
Decree regarding the mandatory energy audit of buildings with high energy consumptions. It defines the requirements with regards to the audit itself and the measure to implement within the framework of the submission of an environmental permit.

- Opportunities for Materials Passports & Reversible Building Design :  
*Linking the requirement regarding energy aspects of the audit to materials and re-use potential before refurbishment works for new constructions.*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à la promotion de l'électricité verte (17 DECEMBRE 2015)*

- Summary:  
The law concerns the delivery of certificates for the installation producing green energy, the warrantee of the origin and the green certificates.
- Barriers for Materials Passports & Reversible Building Design :  
*The government of the Brussels Capital Region has been adapting the legislation regarding the promotion of 'Green' electricity in order to integrate new measures enabling the incinerator of Neder-Over-Heembeek to receive green certificates for the production of electricity supported by the incinerator for the incineration of renewable resources origination from household waste. This could lead to a situation in which it is more interesting to incinerate construction materials than to reuse them.*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Ordonnance relative à l'inclusion de clauses environnementales et éthiques dans les marchés publics (8 mai 2014)*

- Summary :  
Law defining the public authorities can integrate environmental clauses and Life Cycle Cost Clauses in Public Procurement. This integration is however not mandatory.
- Opportunities for Materials Passports & Reversible Building Design :  
*By reducing the life cycle cost and/or the environmental impact re-use and transformation of buildings, building systems and products can be promoted through the integration of specific clauses in public procurement*
- Keywords : General Policy/Circular Economy
- Degree of obligation: Mandatory
- [Link](#)

*Programme Régional en Economie Circulaire (PREC) (8 mai 2014)*

- Summary :

The Regional Programme for Circular Economy (PREC) has 3 overall objectives :

- Turn environmental objectives into economic opportunities.
- Anchor the economy in Brussels to produce locally when possible, reduce transport distances, optimize land use and create added value for Brussels.
- Support job creation

In order to reach these objectives 111 measures have been defined within 5 sectors: Construction, resources and waste, logistics, retailers and food.

- Opportunities for Materials Passports & Reversible Building Design :

*Materials passports and reversible building design are offering ways to meet the objectives of the Brussels Capital Region in different sectors such as the construction sector, resource and waste, logistics and waste.*

*On the one hand, the tools developed will help to achieve the objectives of the PREC.*

*On the other hand, the PREC will facilitate the implementation of circular Building Design and resources productivity.*

- Other opportunities:

*The Actions developed within the BAMB project to better support the implementation of the BAMB results will support the Brussels Capital region to meet its objectives with the sectors of logistics and business*

- Keywords : Building - general
- Degree of obligation:
- [Link](#)

#### *Strategy for Re-use of construction and demolition materials*

- Summary :

This informal paper has been prepared by local actors active in reuse of construction and demolition waste materials. Local actors include the construction federation, research actors, training actors active in construction, and NGOs.

The paper aims to be a guide line to orientate regional action towards excellency regarding reuse of these materials.

It is organised in 3 phases :

2008-2015 : Launching (achieved)

2015-2020 : Experimentation and expertise development

2020-2025 : Spreading and consolidation of reuse as a standard in construction sector

- Opportunities for Materials Passports & Reversible Building Design :

*The paper aims for the reuse of construction materials to be standard and common in the refurbishment and construction of buildings in the BCR by 2025.*

*On the one hand the experiments and expertise developed through the different phases of the strategy and the action plan will help the implantation of the BAMB results through the input they can give and the awareness that will be raised.*

*On the other hand the BAMB results and tools will enable the strategy to be better implemented and to reach its objectives.*

*The BAMB tools can be used to consolidate the reuse of materials through the implementation of circular building design.*



- Other opportunities:

*In order to reach its objectives the strategy will cover different aspects amongst which the financial and economic aspects, value chain, networks, over logistical and practical issues as well as the policy instruments focussing e.g. on training and awareness.*

- Keywords : Building; reuse; reclaim; selective deconstruction; material
- Degree of obligation: none
- [Link](#)

*Plan de prévention et de gestion des déchets (Mai 2010)*

- Summary :
  - Sets a framework to promote reuse of construction material and actions to achieve it.
  - Proposes a 90% recycling rate of C&D wastes (could be interpreted as including reused material).
- Keywords : general ; reuse ; selective deconstruction ; sorting
- Degree of obligation: none, orientations only
- [Link](#)

*Circulaire relative à la réutilisation de débris dans les travaux routiers et d'infrastructure (9 MAI 1995)*

- Summary :
  - This ministerial circular allows the use of recycled materials for different uses in road and infrastructure works based on specific technical requirements. Interpretation of the Plan de la Région Bruxelles-Capitale relatif à la prévention et à la gestion des déchets and complimentary to CCT 150
- Opportunities for Materials Passports :
  - Materials passports can support the introduction of high quality recycling and up-cycling in infrastructure works*
- Barriers for Materials Passports :
  - It often results in down cycling of materials and does not promote re-cycling and up-cycling. In order to turn this barrier into an opportunity only materials which cannot be up-cycled anymore should be used for down cycling like road filling.*

Keywords : recycling

- Degree of obligation:
- [Link](#)

*Ordonnance relative aux déchets (14 juin 2012).*

- Summary :
  - Transposition of the waste framework directive (2008/98/CE from November 19th 2008).

Defines wastes, lists waste related obligations, defines a waste management hierarchy (and sets Preparation for Reuse as the second preferred step, after prevention and before recycling).

- Other barriers: *Waste have to be treated as waste, to be able to reuse waste, materials have either to stay materials (never become waste), follow an end of waste procedure (does not exist for construction material yet), or undergo a preparation for reuse process.*
- Keywords : Waste Management; waste hierarchy ; preparation for reuse
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale déterminant les règles de mise en œuvre de l'obligation de tri pour les producteurs ou détenteurs de déchets autres que ménagers (21 JUIN 2012).*

- Summary :  
Requirement to sort non-hazardous and non-inert waste from construction sites subject to environmental permits (PMC, paper/cardboard, green waste, glass and waste subject to recovery requirements (WEEE, batteries) ...
- Opportunities for Materials Passports :  
*Materials passports could help to make the distinction in different types of materials and sorting of these materials in order to facilitate the processing*
- Other opportunities:  
*Management tools and decision making tools can help identify the different materials and products in order to reuse and / or process these.  
The law could be elaborated from waste management to materials and product management*
- Keywords : Waste management ; Waste producer; Sorting
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif au recyclage obligatoire de certains déchets de construction ou de démolition (16 MARS 1995)*

- Summary :  
Defines « Construction and demolition wastes » ; « debris » and « recycling ».  
Makes it mandatory to have all debris sorted and recycled.
- Keywords : Construction and demolition wastes ; debris ; recycling
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale établissant la liste de déchets et de déchets dangereux (25 AVRIL 2002)*

- Summary :  
 Defines criteria and hazardous properties that make waste hazardous.  
 Lists waste (including hazardous waste). Waste starting with the code 17 are construction and demolition waste. Waste codes with a star (\*) are hazardous wastes.  
 Example : 17 01 01 concrete 17 01 06\* mix or separated fraction of concrete, bricks or tiles and ceramics containing hazardous substances.
- Keywords : Hazardous wastes
- Degree of obligation: Mandatory
- [Link](#)

*Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif au registre de déchets (30 JANVIER 1997)*

- Summary :  
 This decree obliges all producers of dangerous waste and all producers of special waste resulting from health care activities to keep an up to date waste register containing the following minimum information:  
 1 code and the name of the waste according to the European Waste Catalogue ;  
 2. the amount of the waste, expressed by weight or by volume;  
 3. the waste removal date;  
 4. the name and address of the collector and the waste of the carrier;  
 5 the name and address of the waste treatment plant;  
 6. the code and the name of the method of treatment of the waste complies with the list in Annex 1.  
 § 2 - The register of the producer of hazardous waste may consist of waste collection bills.
- Opportunities for Materials Passports :  
*Extending this procedure to all kind of construction & demolition waste may foster the identification of the type of waste and the data regarding C&D waste. In addition, it may enable to feed materials passports and will also give the opportunity for materials and products for which a materials passport has been developed to be 'treated' in the optimal way.*
- Keywords : Waste management
- Degree of obligation: Mandatory
- [Link](#)

Financial Instruments

*Prêt vert bruxellois*

- Summary:  
 0% to 2% loan enabling to finance refurbishment works which will improve the energy efficiency of residential buildings. It results from the partnership between Brussels Environment, the financial cooperative Crédal and the Housing Fund.
- Opportunities for Materials Passports & Reversible Building Design :

*The approach could be extended to loans for dynamic and circular refurbishment of buildings.*

- Keywords : General/ Circular economy
- Degree of obligation: voluntary
- [Link](#)

#### *Prêt du Fonds du logement*

- Summary :  
The Fund of the Brussels Region Housing offers soft loans for the purchase of housing. These soft loans aim to give access to housing to a larger part of the population with limited income.  
The beneficiaries of these loans must meet several conditions, since these loans are granted:
    - to household income not exceeding certain amounts
    - to households that do not own at the time of signing the deed
    - for goods fulfilling certain conditionsThe loan amount is capped. The value of the property is also capped.
  - Opportunities for Materials Passports & Reversible Building Design :  
*The conditions that need to be fulfilled could be adapted in such a way that they meet circular and dynamic building requirements. However this is not matching the aim of the loan being the access to housing.*  
*Today the housing unit needs to meet the needs of the household composition. This composition can change which could be supported by dynamic building design*
  - Barriers for Materials Passports & Reversible Building Design :  
*In order to profit from this loan, the borrower must be full owner of his house / housing unit or the holder of a real right of the entire residential property and its accessorie , enabling it to occupy this house / housing unit entirely or less during the period of credit.*
- Keywords : General/ Circular economy
  - Degree of obligation: voluntary
  - [Link](#)

#### *Primes régionale énegie 2016 / Energy Premium for energy efficient building or refurbishment*

- Summary :  
This financial support of the Brussels Capital Region aims to improve the energy performance of the housing stock.  
Only works improving the energy performance of the building (unit) are taken into account. Some sustainable choices regarding the material use to reach this improved energy performance can be rewarded too.  
Building owners asking for the financial support does not have to live in the house / housing unit.

The works need to be done by a professional in order to be eligible for funding;

- Opportunities for Materials Passports & Reversible Building Design :  
*Enlarge the scope of this financial support in order to support works implementing dynamic and circular building design*

- Keywords : Building / Energy performance / construction & refurbishment
- Degree of obligation: voluntary
- [Link](#)

#### *Appel 'be circular – be brussels'*

- Summary :  
Launched on 2016, this call is for any innovating project aiming at developing the applicant core-business towards a circular economy approach, on a local level.  
One subject of the call is about exemplary construction sites. The renovating building projects should integrate a circular economy approach, maximize the existing building upkeep and the reuse of construction materials, anticipate future flexibility of the building and designing each layer of the building in order to improve its lifespan.
- Opportunities for Materials Passports & Reversible Building Design :  
*Good practices with regards to reuse of materials, tests, and designing of an architectural renovation project toward a circular economy approach. On the one hand the BAMB project will be able to rely on the findings of the projects. On the other hand BAMB tools might be tested or used as assessment tools in future calls.*
- Keywords : General/ Circular economy ; products ; buildings
- Degree of obligation: voluntary
- [Link](#)

#### *Appel 'Batiments exemplaires'*

- Summary :  
The call for sustainable building design launched from 2007 till 2013 providing 100EUR/m<sup>2</sup> funding to the projects selected during the yearly call. The construction or refurbishment projects needed to be exemplary in the different domains of sustainability as described in the Guide for sustainable buildings.
- Opportunities for Reversible Building Design :  
*Some good practices with regard to re-use and transformation capacity may be investigated within the different projects*
- Keywords : buildings
- Degree of obligation: voluntary

- [Link](#)

#### *Appel 'be.exemplary'*

- Summary :  
Call for exemplary buildings to be constructed or renovated in Brussels – follow up of Batiment Exemplaire call (2007 – 2013) launched yearly from 2016 on. Each project, taking into account its specific context, will have to meet 4 themes that make up the Brussels urban challenge as a whole:
  - Architecture and urban planning
  - Social Aspects
  - Environmental aspects
  - Circular economy
- Opportunities for Reversible Building Design :  
*Some good practices with regard to re-use and transformation capacity may be investigated within the different projects*  
Other opportunities: *Some good practices with regard to business models and tools to support the circular economy aspects may be investigated within the different projects*  
*Within the future calls some criteria might be refined based on the results of the BAMB project in order to test their feasibility*
- Keywords : General/ Circular economy ; buildings; new construction & refurbishment
- Degree of obligation: voluntary
- [Link](#)

#### *Prime à la rénovation de l'habitat*

- Summary :  
This financial support of the Brussels Capital Region aims to support the realisation of certain refurbishment works.

The works eligible for subsidy include:

- stability of the building: foundations, beams , columns , masonry, etc.
- roof : roofing , roof structure , accessories
- cladding , coatings
- window frames (wooden installation, repair , ...), exterior front doors
- treatment against moisture and dry rot
- gas facilities , electrical , sanitary and heating
- acoustic and thermal insulation
- Sewage
- repair, replacement , placement of a rainwater tank

Building owners asking for the financial support does have to live in the house / housing unit

The works need to be done by a professional in order to be eligible for funding;

- Opportunities for Materials Passports & Reversible Building Design :  
*Enlarge the scope of this financial support in order to support works implementing dynamic and circular building design*
- Other barriers:  
*The requirement of ownership of the building may be an impeding factor*

- Keywords : General/ Circular economy / refurbishment
- Degree of obligation: voluntary
- [Link](#)

## Public Investments

### *Vade-mecum pour le réemploi*

#### **COMMENT EXTRAIRE LES MATÉRIAUX DE CONSTRUCTION RÉUTILISABLES AVANT OU PENDANT LE MARCHÉ PUBLIC DE TRAVAUX**

- Summary:  
Legal and practical guidelines and tools for reclaiming reusable materials from public buildings and how to implement such a strategy in public procurement. The vademecum details 4 different routes (with ready to use technical and legal documents) to organize material reclaim and their sale.
- Opportunities for Materials Passports & Reversible Building Design :  
This guide offers practical solutions and public procurement clauses to better support Public Investments to integrate the reuse of materials and systems.
- Keywords : materials ; reuse ; legal ; public procurement ; ready to use technical and legal documents ; best practises
- Degree of obligation: voluntary
- [Link](#)

## Greenbizz

- Summary :  
*In Brussels, Greenbizz provides companies and start-ups with an area of 8000 m<sup>2</sup> of facilities and services to create and develop their green, sustainable or environment-linked projects. Besides office spaces Greenbizz offers technological support and coaching to create innovative projects.*  
  
*A network of specialists that covers the various aspects of the sustainable economy is created.*
- Keywords : general/ circular economy
- Degree of obligation:
- [Link](#)

## Information

### *Training and seminars*

- **Summary :**  
Trainings and seminars regarding different topics are organised. With regard to sustainable construction trainings and seminars are organized for designers and decision takers on the one hand (Brussels Environment) and for construction workers on the other hand (CDR).
- **Opportunities for Materials Passports & Reversible Building Design :**  
*Trainings and seminars regarding the design of reversible buildings, the use of materials passports and how to implement the (how to construct & refurbish using these concept) are essential to inform and train building professionals from different links of the value chain.*
- **Keywords :** general, building, products
- **Degree of obligation:** voluntary
- [Link](#)

### *Label 'Entreprise écodynamique '*

- **Summary :**  
The label "Ecodynamic company" created May 11, 1999 is an official recognition in the Brussels- Capital Region for Brussels companies which implement an internal environmental management.  
The label is open to all business sectors. It rewards their environmental dynamism and their progress, including, management and prevention of waste , rational energy use, management of transport and sustainable transport choices, ....
- **Opportunities for Materials Passports & Reversible Building Design :**  
*The effective management of the building as a result of the use of materials passports and reversible design could be introduced as an additional criterion*
- **Keywords :** general ; management
- **Degree of obligation:** voluntary
- [Link](#)

### *Guide pratique - Réemploi / réutilisation des matériaux de construction*

- **Summary :**  
This guide explains how to set a reuse strategy in an architectural renovation project. It divides the project step by step and gives some advices on the procedure for the pre-studies, the project planning, the project design and it's execution. It is mainly orientated towards on-site reuse.
- **Opportunities for Reversible Building Design:** the guide raises awareness regarding the reuse of construction materials and systems.



- Keywords : material, reuse, on-site, strategy ; best practises
- Degree of obligation: voluntary
- [Link](#)

### *Guide for Sustainable Buildings*

- Summary :  
The Guide for sustainable Buildings develops in 9 themes the aspects that have to be integrated by designers and decision takers in order to build and refurbish buildings in the most sustainable way.  
  
The tool comprises 9 sections:
  - 1) Management
  - 2) Mobility
  - 3) Development of nature
  - 4) Physical Environment
  - 5) Human, social and cultural environment
  - 6) Material
  - 7) Energy
  - 8) Water
  - 9) Comfort & health
- Opportunities for Materials Passports & Reversible Building Design :
  - *The section 6) Materials is focusing on the sustainable use of construction materials in buildings. Besides the environmental impact of building materials in building elements and buildings design for deconstruction & disassembly aspects and re-use are introduced. These concepts can be elaborated based on the reversible design and materials passports concepts and the tools developed through the BAMB project.*
  - Other opportunities:
    - *The section 1) Management can be elaborated based on the findings and tools developed in WP5 – A4.*
    - *Economic and financial aspects are discussed within every theme / section. A link can be made with regards to the WP5 – A2*
    - *The guide is a web tool, links can be made to the different tool developed within the BAMB project*
    - *The Guide for sustainable Buildings is used as a tool to support the design with regards to obtaining the Label Referentiel-B or with regards to the different calls (Be.Exemplary; Be. Circular; etc. ). The guide is also used as the base for the trainings and seminars sustainable construction organised by Brussels Environment.*
- Keywords : buildings ; materials ;
- Degree of obligation: voluntary
- [Link](#)

## *Opalis*

- Summary :  
website focusing on the professional sector active in selling salvaged building materials around Brussels (covering almost all Belgium). Online directory of dealers of salvaged buildings material (both buying and selling materials), advices to reuse them and ready to use design briefs for specific materials.
- Keywords : reuse ; material ; ready to use design briefs ; dealers ; best practices
- Degree of obligation: voluntary
- [Link](#)

## *CDR Construction – Do it yourself deconstruction guides*

- Summary :  
11 illustrated step by steps do it yourself user-guides on material deconstruction. Covered materials include: radiators, washbasins, doors, bricks, windows, electric plugs and switches, lighting systems, flooring, inbuilt furniture, etc.
- Opportunities for Reversible Building Design :  
*This guide might further be developed with some approaches on how to use and implement (reclaimed) products in order to facilitate their re-use afterwards.*
- Keywords : reuse ; deconstruction guides ; do it yourself
- Degree of obligation: voluntary
- [Link](#)

## *Liste des sociétés agréées et enregistrées dans le secteur déchets*

- Summary :  
List of the different approved stakeholders active in the area of waste in the Brussels Capital region, including collection and transport of C&D wastes and companies approved by the federal authorities to remove and treat asbestos
- Keywords : deconstruction, transport, stockpiling, recycle, waste treatment
- Degree of obligation: voluntary
- [Link](#)

## *Analyse de modèles urbains innovants liés à la gestion des déchets de déconstruction et démolition sélective et aux flux de chantier dans leur contexte et l'identification des actions pertinentes à adapter à la Région Bruxelles-Capitale (2015)*

- Summary:  
Study on deconstruction and selective demolition waste management, published in 2015. This study describes good practices found in urban areas

in the field of the reuse and recycling, and gives some advices to implement them in the Brussels Region.

- Other opportunities: *The analysis investigates the feasibility of some innovative approaches regarding different aspects that are related to circular buildings such as reversed logistics, value and value chain, etc. The analysis is based on some existing best practices for which the barriers and opportunities with regard to their implementation in the Brussels Capital region are investigated.*
- Keywords : reuse, recycle, good practices
- Degree of obligation: voluntary
- [Link](#)

#### *Guide de Gestion des déchets de construction et de demolition*

- Summary :  
Study published in 2009, focusing on the recycling of the construction waste. It presents the Brussels legislation and explain notably, the advantage of the recycling in terms of costs. The re-use approach is barely skim.
- Keywords : waste treatment; best practices
- Degree of obligation: voluntary
- [Link](#)

#### Research

#### *Ecobuild*

- Summary :  
The network that brings together Brussels' sustainable construction and renovation actors  
Organizes visits and trainings within the field of sustainable building
- Keywords : general/ circular economy
- Degree of obligation:
- [Link](#)

#### *Etude sur l'analyse du gisement, des flux et des pratiques de prévention et de gestion des déchets de construction et démolition en RBC*

- Summary :  
study on waste prevention and management focusing on the Brussels Region. This study was published in 2012 and cover the construction activity, the different practices in waste management on (40) construction sites leading to an evaluation of the type and quantity of the overall construction waste production in the Brussels region. The last part of the study is focusing on the ecology, economy and jobs related to the sector.
- Keywords : general/ circular economy ; construction waste flows

- Degree of obligation: informative
- [Link](#)

*Le bâti Bruxellois source de nouveaux matériaux BBSM (the Brussels Building stock as a Source of new Materials)*

- Summary :

In light of the current needs in terms of renovation mostly aimed towards energy performances of building, the present survey intends to offer a new point of view: a perspective based on matter and including the potential of resources the materials used in the building could represent for the Brussels Capital Region. One of the surveys' goals is to partially respond to the lack of data regarding the material flows and material deposit produced by energy retrofit operations. As a matter of fact, the data collection actually represents a substantial stage to achieve a more closed loop system and an efficient resource use. The research will investigate these issues in a bottom-up approach: by studying typical energy retrofit processes in terms of material impacts, also referred to as material balances, which could generate ratio data useable for an integrated resource management at a larger scale.

A work on the existing value chains and recovery streams is also conducted to point out the opportunities of strengthening existing value chains or creating new ones.

An other part of this research is to analyse the impacts of a more circular approach on building design. Moreover, the study identifies technical and normative restrictions of using recycled or reused materials as well as legal constraints concerning reuse operation.

- Keywords : general/ circular economy/energy and sustainable retrofit/building materials/construction & demolition waste/material stocks & flows/waste recovery
- Degree of obligation: voluntary, research funded through a European Fund for Regional Economic Development for Brussels (programming 2014-2020).

## Conclusions

The political and geographical context of the Brussel Capital Region has contributed to a status quo that presents both opportunities and barriers for BAMB as the result of regional initiatives, federal and European regulations that have been transposed to the regional level, and an urban environment.

As a result of EU directives, energy performance of buildings began as the focus for policy instruments in the construction sector of the Brussels region. The development of instruments to promote energy performance can be seen as the first stage of policy development within the contemporary built environment. After raising awareness and testing how far the market was able to go through experiments, advanced and high energy performance levels have become mandatory and remain the main legal mandatory aspect to take into account in building construction and refurbishment. An opportunity for BAMB could be the extension of initiatives and policy tools supporting high energy efficiency, embracing source productivity. Linking the requirements regarding energy performance to other requirements such as environmental impact of materials in buildings, resource effectiveness of buildings and circular building design, could enable a more integrated vision on building design, resource use on a macro level (energy and non-energy related) and interior and exterior pollution (air, water, soil and waste). A potential barrier presents itself regarding **the federalization of standards** and regulation in these areas and division of scope and responsibilities between national and regional levels of government. While there are regional requirements for energy performance, standards for construction materials are established by various federal level instruments which may result in contradictions. Building professionals as architects and engineering firms experience these differences as counterproductive and lead to regionalization of building activities. In some cases the energy performance requirements may hamper or be contrary to resource productive actions and/or circular building design.

In a second stage of policy development, the design and construction of sustainable buildings as well as sustainable refurbishment have been emphasized. Different policy instruments have been developed to raise awareness, to train, and to finance sustainable building initiatives. Most of these voluntary instruments embrace the sustainable use of materials and waste treatment, the reduction of construction and demolition waste, and the effective and versatile use of buildings. The reduction of building and construction waste and the re-use of building materials is now one of the main focus points. The region has, amongst other things, been developing a strategy for re-use of building materials fostering the dismantling of buildings and the reuse of valuable materials. However, the Brussels Capital Region is facing some huge challenges. As a result of the density of the city, space is a rare commodity. End-of-life treatment plants for construction waste and recycling occurs in Flanders or Wallonia. The stockpiling of valuable construction materials is challenging and little processing industry can be found within the borders of the region. Therefore the region relies on the neighboring regions. An additional barrier can be seen in the fact that until recently many of the existing policies and instruments have been developed from a linear viewpoint, which does not take into consideration the potential reality of a circular built environment. For example, current urban regulations and building permits are based on a linear and static vision of buildings which may impede changes and transformations supported by reversible design and materials recovery. Similarly, current financial incentives require complete ownership of buildings, which may be contradictory to new business plans and ownership models within a

circular built environment. Nevertheless, more recently a new stage of policy development is under. A circular economy plan has been recently adopted by the Brussels Capital Region, one of the pillars being the building sector. This provides a significant opportunity to reframe sustainable building policies and instruments to allow for a circular approach. While the wealth of data provided through the existing voluntary programs, plans, strategies and tools that have been developed will feed into BAMB tools and support the implementation of resource productivity and circular and dynamic buildings; the BAMB tools will also serve as an interesting input to the further strengthening of these and enabling their adaptation and better implementation within a circular built environment.

However, it is worth noting one final barrier that is relevant for the majority of policies and standards developed during the various stages of policy development in the sector - many programs, plans, strategies and tools remain voluntary.

# Belgium - Flemish Region

## Identified Policies and Standards

### Judicial Instruments

*Policy program 'Materiaal bewust bouwen in kringlopen' (Building in a material conscious way)*

- Summary : This policy framework replaces the previous one focussing (only) on environmentally sound materials and waste management in the built environment. The current policy framework, running from 2014 until 2020, puts the vision of circular thinking within the built environment in practice, by providing a framework for cooperation between authorities and different actors in the construction sector, in order to stimulate sustainable management of materials. The policy framework concentrates efforts into five main themes:
  - closing cycles of the stony fraction,
  - closing cycles of the non-stony fraction
  - selective demolition and deconstruction
  - (embodied) environmental performance of buildings
  - Design for Change
- Opportunities for Materials Passports : Material Passports are in line with the 5 policy themes within the policy framework. The policy framework can put Material Passports on the political agenda, as well as introduce it to different actors within the construction sector.
- Opportunities for Reversible Building Design :Reversible Building Design is in line with the 5 policy themes within the policy framework, especially "Design for Change". The policy framework can/will put Reversible Building Design on the political agenda, as well as introduce it to different actors within the construction sector.
- Keywords : Building, materials, building products, closing cycles, policy framework
- Degree of obligation: Voluntary
- [Link](#)

*Sloopinventaris (demolition inventory), article 4.3.3 Vlarema*

- Summary : Obligation to make up a demolition inventory for buildings with a volume over 1000 m<sup>3</sup> and with a (partially) other function than residential. The demolition waste inventory includes the description of the demolition site with an attached list of all the waste that will be released. For each waste stream it includes at least the following data: (1) name, (2) the associated EURAL code, (3) the expected quantity (expressed in m<sup>3</sup> or tonnes), (4) the place in the building where the waste stream occurs and its appearance and (5) the proposed way the waste fraction will be selectively collected stored and disposed of.
  - Opportunities for Materials Passports : Material passports can simplify the demolition inventory, especially when BIM is used to identify material streams.

- Opportunities for Reversible Building Design : less, as the inventory is more focused on demolition as on deconstruction. However, the same principles take place.
  - Barriers for Materials Passports : Demolition inventories are mainly oriented to the business-as-usual demolition
  - Barriers for Reversible Building Design : Demolition inventories are mainly oriented to the business-as-usual demolition activities, and not so much to deconstruction and disassembly.
- Keywords : Selective Demolition,
  - Degree of obligation: Mandatory
  - [Link](#)

*Eenheidsreglement gerecycleerde aggregaten (Regulation on recycled aggregates)*

- Summary : Forms the basis for certification of recycled granulates.
  - Opportunities for Materials Passports : Material passports should provide enough information to certification bodies about the quality of recycled granulates
    - Opportunities for Reversible Building Design : none
- Keywords : recycling, materials, waste treatment
  - Degree of obligation: Mandatory
  - [Link](#)

*Vlaams Materialendecreet (Flemish Materials Decree)*

- Summary : Decree on end of waste criteria, which forms the basis for a sustainable management of waste and material cycles.
    - Barriers for Materials Passports : The Materials Decree is still very much oriented to mitigation of C&D waste and not so much on closing cycles.
    - Barriers for Reversible Building Design : The Materials Decree is still very much oriented to mitigation of C&D waste and not so much on closing cycles.
- Keywords : Waste treatment, materials
  - Degree of obligation: Mandatory
  - [Link](#)

*Vlarema*

- Summary : Implementing order of ‘het Materialendecreet’ which contains detailed prescriptions for : transport and trade of waste, reporting on waste and materials, use of raw materials, selective collection of waste and materials at companies, responsibilities for manufacturers.
  - Opportunities for Materials Passports : limited
  - Barriers for Materials Passports :Vlarema is still very much oriented to mitigation of C&D waste and not so much on closing cycles



- Barriers for Reversible Building Design : Vlarema is still very much oriented to mitigation of C&D waste and not so much on closing cycles
- Keywords : Waste treatment, materials
- Degree of obligation: Mandatory
- [Link](#)

## Information

### *Ecolizer*

- Summary : The Ecolizer is a design tool for designers and companies. It enables life cycle impact calculations and provides the designer with information on the most impact generating life cycle phase; For construction products it is less relevant, compared to the MMG assessment (i.e. "Environmental Performance of Materials used in Buildings and Building Elements"), taking into account the specificity of the Belgian built environment.
  - Opportunities for Materials Passports :easy to implement LCA information within material passports. Nevertheless the information provided by Ecolizer, is not applicable to building materials and products.
  - Opportunities for Reversible Building Design : none/limited
  - Barriers for Materials Passports : Ecolizer is used on material level and not is related to building sector– MMG is preferred
  - Barriers for Reversible Building Design Ecolizer is used on material level and not is related to building sector– MMG is preferred
  -
- 
- Keywords : products, LCA, environmental impact
- Degree of obligation: voluntary
- [Link](#)

### *Provinciale steunpunten duurzaam wonen en bouwen*

- Summary : The provincial centers, are independent bodies providing advice and support to building owners and building professionals on sustainable living and building.
  - Opportunities for Materials Passports : dissemination of good practices and valuable lessons through demonstration projects
  - Opportunities for Reversible Building Design : dissemination of good practices and valuable lessons through demonstration projects
- Keywords : buildings, pilot and demonstration projects
- Degree of obligation: voluntary
- [Link](#)

### *23 ontwerprichtlijnen: toelichting en downloads*

- Summary : The Design for Change guidelines are an outcome of the applied research project " Design for Change: Development of a policy and transitional framework" (see above). In this project a framework was developed to assess the "Design for Change" characteristics of building elements, buildings and districts, in a qualitative and quantitative way. The development of the qualitative part led to the visual description of 23 Design for Change guidelines. To assist in the application of these principles, each design principle was discussed and illustrated on a separate sheet. These sheets are available online and allow designers, developers and policymakers to get acquainted with existing solutions and at the same time provide them with an understanding of the importance of the Design for Change approach. Each principle also includes key questions in order to assess a design alternative.
  - Opportunities for Materials Passports : less/none
  - Opportunities for Reversible Building Design : Support of reversible design approach through design guidelines
  - Barriers for Reversible Building Design :possible contradictory advice between BAMB results and design guidelines on the OVAM website.
- Keywords : buildings, building element, districts
- Degree of obligation: voluntary
- [Link](#)

#### *Environmental Impact of materials in Buildings (OVAM, IBGE, WR)*

- Summary : This initiative was undertaken by the Flemish region (OVAM), but afterwards recognized by all Belgian regions. It concerns the development of a transparent framework for unequivocal calculation and communication of Environmental Performance of Materials used in Buildings and Building Elements (MMG). The MMG determination method was developed within a framework of broad consultation. Numerous experts from the construction industry and from Flemish, Brussels, Walloon and federal government authorities were invited at several public consultation meetings to share their opinion and give advice. Various materials manufacturers provided producer- and industry specific data input. This enabled the MMG research team to compare the available generic data to producer-specific data and also provided the cooperating manufacturers and industrial organisations a better insight into the environmental impact of their product(s). Several additional
  - Opportunities for Materials Passports : include information on environmental impacts (LCA) within material passports to support decision-making.
  - Opportunities for Reversible Building Design : include information on environmental impacts within reversible building design to support decision-making.
  - Keywords : buildings, environmental impacts, materials, building products, LCA
  - Degree of obligation: voluntary
  - [Link](#)

#### *Transition network on sustainable living and building*

- Summary : Network aiming to pass the principles of sustainable development through to living and building.

- Opportunities for Materials Passports : dissemination of good practices and valuable lessons through demonstration projects
- Opportunities for Reversible Building Design : dissemination of good practices and valuable lessons through demonstration projects
- 
- Keywords : buildings
- Degree of obligation: voluntary
- [Link](#)

#### *COPRO -*

- Summary : impartial certification organism that controls construction products. The regulation “eenheidsreglement” sets the basis for certification procedures by COPRO and CERTIPRO.
- Keywords : recycling
- Degree of obligation: voluntary
- Link

#### *CERTIPRO*

- Summary : certification organism managed by VITO for the following products: waste water treatment plants and septic tanks, and recycled granulates. The regulation “eenheidsreglement” sets the basis for certification procedures by COPRO and CERTIPRO.
- Keywords : recycling
- Degree of obligation: voluntary
- [Link](#)

#### *Benor*

- Summary :  
*BENOR is an authorized Belgian voluntary brand of conformity that belongs to the NBN (Belgian Bureau of Normalisation). BENOR has committed the certification of diverse products of its sectors to sectorial institutions of certification, such as COPRO. BENOR declares that a product is conform to a norm. If the norm does not exist, or in order to complete the norm, the characteristics of conformity can be enlarged to other technical specifications. These specifications are then validated by the IBN as recognized technical basis for the BENOR brand. For the sector of road construction products, the Technical Prescriptions (PTV) also prevail. The NBN and the PTV norms are regarded as “rules of competence“, they validate the suitability of products they define.*
  - Opportunities for Materials Passports : linking Benor to the material passport of a product will gradually allow the uptake of recycled materials
  - Opportunities for Reversible Building Design : Selective deconstruction instead of demolition will improve quality of reclaimed products (on-site)
- Keywords : quality guarantee of building products

- Degree of obligation: voluntary
- [Link](#)

#### *The Quality mark COPRO*

- *Summary : The quality brand COPRO completely rests on the same principles, procedures and pursuit procedures than the Quality Mark BENOR. On behalf of COPRO, COPRO acts as organism of certification. The controlled products are mainly used for road construction works. The COPRO brand allows to quickly examine demands for which the BENOR control brand is not available. Most of products certificated under the COPRO brand take on the BENOR brand with time.*
  - Opportunities for Materials Passports : linking COPRO to the material passport of a product will gradually allow the uptake of recycled materials
  - Opportunities for Reversible Building Design : Selective deconstruction instead of demolition will improve quality of reclaimed products (on-site)
- 
- Keywords : quality guarantee of building products
- Degree of obligation: voluntary
- [Link](#)

#### *The technical approval ATG*

- *Summary : Voluntary technical approvals (ATGs) give technical advices, including description and technical characterizing of products. An ATG is an appreciation on a determined product of a determined producer for a determined sector. It must help the user to control the conformity of the delivered product with the existing approvals. ATGs are produced for products to which no norm refers already. They mainly concerns systems, innovating products and products that consist of several components. In principle, ATGs are delivered on basis of notices. Such notices are created by experts from the Belgian Union for Technical Approvals in the Construction Sector (UBAtc-Butgb). They represent a basis on which judgments for construction products can be funded. ATGs are compatible with the European version, i.e. the European Technical Assessment (ETA), provided by EOTA ([www.eota.eu](http://www.eota.eu))*
- Opportunities for Materials Passports : ATG give public data on the general composition an performance in normative conditions of the approved building products
- 
- Keywords : quality guarantee of building products
- Degree of obligation: voluntary
- [Link](#)

#### *Tracimat*

- *Summary :*  
*Tracimat is an interesting voluntary initiative that has been developed in order to help with selective demolition and increase traceability of CDW.*

*The association TRACIMAT aims guaranteeing quality and traceability of construction and demolition waste through the design, implementation and monitoring of a traceability system for debris from the place where the debris is released as waste until its processor; a traceability system that is part of the environmental management system for recycled aggregates and the unity regulation which forms an element .*

- Opportunities for Materials Passports : The traceability system developed within Tracimat can be of inspiration for the further development of the materials passports. The use of materials passports will replace initiatives such as tracimat
- Opportunities for Reversible Building Design : For the time being Tracimat focuses on high quality recovery of stony granulates, not on reuse of building components. However, the same level of thinking can be applied.
- Barriers for Reversible Building Design : For the time being Tracimat focuses on high quality recovery of stony granulates, not on reuse of building components. However, the same level of thinking can be applied.
- 
- Keywords : selective demolition, quality guarantee, recycling
- Degree of obligation: voluntary
- Link

## Private Sector

### *Plan C*

- Summary : *Plan C is a hub connecting entrepreneurs and organisations, challenging them and activate them towards circular economy. Plan C is one of the three pillars of the [Flemish materials Programme \(VMP\)](#). The VMP is intended to guide Flanders by 2020 the top 5 European regions in terms of sustainable materials management. One of the key activities within Plan C is to give advice to entrepreneurs on business modelling of product service combinations.*
  - Opportunities for Materials Passports : linking (advice on) business modelling with Material Passports, will give entrepreneurs a better overview on the business opportunities of building products
  - Opportunities for Reversible Building Design : linking (advice on) business modelling with Reversible Building Design, will give entrepreneurs a better overview on the business opportunities of building solutions
- 
- Keywords : general/ circular economy
- Degree of obligation:
- [Link](#)

## Research

### *Design for Change: Development of a policy and transitional framework*

- Summary :

*In 2012 OVAM studied the possible effects of Design for Change. However, the Gandhi Study (Paduart et al. 2013) demonstrated that a number of advantages and disadvantages of adaptable building solutions are context-dependent. Hence, the evaluation criteria that were developed had to be tested further.*

*The goal of this applied research project is to narrow the gap between theory and practice, by examining and developing specific drivers for the implementation of Design for Change in practice. These drivers include a common language, different demonstration projects, a user-friendly assessment method and illustrating consultancy programs for current building projects. Keywords : Building, Design for Change, Adaptable building, Assessment, Policy Support, Transition experiments*

- Opportunities for Materials Passports : the developed assessment framework will support producers and system developers to assess and improve building products and systems
  - Opportunities for Reversible Building Design: the developed assessment framework will support designers and other decision-makers to assess and improve (static as well as dynamic) building solutions
- Degree of obligation: Voluntary, research study
  - [Link](#)

#### *Policy Research Centre studies Sustainable Materials Management*

- Summary : Research consortium aiming to create and gain more in-depth scientific insights in actual and future sustainable materials management (SMM) issues relevant for policy; To give scientific support with an integrated interdisciplinary approach to SMM 'practitioners', Flemish governmental agencies, civil society, industry and others; To create a knowledge platform for interdisciplinary collaboration between SMM stakeholders
  - Barriers for Reversible Building Design : possible contradictive advice between BAMB results and design guidelines on the OVAM website.
- 
- Keywords : general/ circular economy
- Degree of obligation:
- [Link](#)

#### *Quicksan job potential Circular Economy (HIVA / KUL)*

- Summary :  
Building further on the expertise of the HIVA team in the Policy Research Centre Sustainable Materials Management, this research explores different activities and the required skills and competences for the transition to a circular economy in the cases of the building sector, the agro-food sector and electric and electronic equipment in Flanders. Additionally, it analyses new business models that accompany the transition towards sustainable materials management.
- Other opportunities:

Could be an interesting input for the analysis and development of circular business models in the construction sector.

- Keywords : Buildings ; business models
- Degree of obligation: Voluntary
- Link

## Conclusions

- Similar conclusions than made for the Brussels Capital Region:
  - federalisation works contra-productive (cf. energy regulation)
  - densely populated region > waste treatment and circular economy is priority
  - Flanders/Belgium is a highly rated region/country in recycling (read downcycling) of C&D waste
- Flemish policy instruments are much oriented towards waste reduction and mitigation. However, a transition is perceived towards circular economy in the building sector is visible. OVAM, Plan C,... are some of the frontrunners. Material Passports and Reversible building design will facilitate this transition, in accordance with some running initiatives, such as the OVAM policy framework (2014-2020),
- Within OVAM a clear shift is visible from 'end-of-pipe' thinking towards circular thinking. OVAM plays a important role in setting (innovative) initiatives in the Flemish built environment.
- Some other initiatives, such as TraciMat, could easily be translated to stimulate reuse of building components, instead of merely recycling/composting building materials.
- ...



# Portugal: Policy and Regulation State of the Art report

## Introduction

The purpose of this report is to summarise the current State of the Art relating to policy and regulations in Portugal that could either support, or hinder, circular economy in the built environment.

The circular economy is defined by the Ellen MacArthur Foundation (EMF) as an “industrial system that is restorative or regenerative by design”, taking the linear industrial model that dominated the 20th and early 21st century and replacing it with a circular one in which waste is designed out and products are designed to be optimised for a cycle of disassembly and reuse.

According to EMF, The circular economy exists through three main principles:

- To preserve and enhance natural capital
- Optimisation of resource yields
- Foster system effectiveness by revealing and designing negative externalities

These three main principles are then translated into the six actions of the RESOLVE framework, each representing a circular business opportunity.

- REGENERATE
  - Shift to renewable energy and materials
  - Reclaim, retain, and restore health of ecosystems
  - Return recovered biological resources to the biosphere
- SHARE – Maximise product utilisation
  - Share assets (e.g. cars, rooms, appliances)
  - Reuse/second-hand
  - Prolong life through maintenance, design for durability, upgradability, etc
- OPTIMISE – Optimise system performance
  - Increase performance/efficiency of product
  - Remove waste in production and supply chain
  - Leverage big data, automation, remote sensing and steering
- LOOP – Keep components and materials in closed loops and prioritise inner loops
  - Remanufacture products or components
  - Recycle materials
  - Digest anaerobically
  - Extract biochemical from organic waste
- VIRTUALISE – Deliver utility virtually
  - Dematerialise directly (e.g. books, CDs, DVDs, travel)
  - Dematerialise indirectly (e.g. online shopping)
- EXCHANGE – Select resource input wisely

- Replace old with advanced non-renewable materials
- Apply new technologies (e.g. 3D printing)
- Choose new product/service (e.g. multimodal transport)

Whilst Portugal policy and regulation are structured differently to the principles outlined above, there are some areas where the existing framework could be acting as an opportunity or barrier to adopting the specific business opportunities included in the RESOLVE framework.

## Portugal Governance overview

Portuguese Government through its central and local bodies is the principal administrator and enforcer of environmental law. Local bodies, such as the municipalities, play a key role, but at a central level, the most important agent is the Ministry of Environment. This entity, is assisted by regional bodies, 5 Regional Development Coordination Commissions and 2 Environmental Secretaries, Madeira and Azores.

The Portuguese Environment Agency (APA) is a modern public organization, created in 2012 in result of a merging process involving 9 different institutes. APA is the national public body whose mission is to develop and monitor the management of environment and sustainable development policies. It works in close cooperation with other public, private and non-governmental organizations, to ensure a high level of protection and enhancement of environmental systems.

The Agency for Energy (ADENE) is a non-profit organization whose mission is to promote and carry out activities of public interest in the field of energy and in particular energy efficiency and efficient use of water. Actually, they are responsible for managing the Energy Certification of Buildings in Portugal.

The General Direction for Energy and Geology (DGEG) is an entity of the Portuguese Public Administration whose mission is to contribute to the design, promotion and evaluation of policies on energy and geological resources in a perspective of sustainable development and security guarantee supply.

Also important to refer at a central level is the Agriculture, Sea, Environment and Spatial Planning Inspection Authority, with administrative autonomy.

Finally, is significant to note that Portugal has overlapping plans for the same areas, which leads to inefficiently and lack of coordination between stakeholders, slowing the decision-making processes.

### Specific instrument review:

A wider review of Portugal level instruments, research and procurement was undertaken, and the following policies and standards are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment. These are evaluated in more detail in the next section.

### **Public Instruments**

- Environmental Framework (Lei de bases do Ambiente) (2014)
- Waste Management Framework (2011)
- Construction and Demolition Waste Framework (2008)
- Legal Framework for Landfilling of Waste (2009)
- Legal Framework for Urban Regeneration (2009)
- Legal Framework for Urban Planning and Building (1999)
- General Law on Urban Construction (2008)
- Energy certification of buildings (SCE) (2013)
- Energy Performance Regulation for Residential Buildings (REH)
- Energy Performance Regulation for Trade and Service Buildings (RECS)
- Exceptional Regime for Urban Rehabilitation (RERU)
- Construction Waste Tracking Guides (GARCD)
- Energy Efficiency on Public Administration (ECO.AP)
- Public Procurement Code (2008)
- Strategic Framework for Climate Policy (QEPiC) 2015
- National Strategy for Climate Change Adaptation (ENAAC 2020)
- National Programme for Climate Change 2020/2030 (PNAC)
- National Renewable Energy Action Plan (PNAER) (2013)
- National Energy Efficiency Action Plan (PNAEE) (2013)
- Strategic Plan for Municipal Solid Waste - PERSU 2020
- National Plan for Industrial Waste Prevention – PNAPRI
- National Waste Management Plan for 2014-2020
- PO SEUR 2020 – Operational Programme for Sustainability and Efficient Use of Resources (2014)
- Green Taxes Reform Project (2014)
- Green Growth Commitment (2015)

### **Public Investments**

- APA – Portuguese Environment Agency
- ADENE – Portuguese Energy Agency
- DGEG – General Direction for Energy and Geology
- IHRU – Housing and Urban Rehabilitation Institute

## **Opportunities and Barriers for materials passports and reversible building design within Portugal (National level)**

### **Public Instruments**

#### **Regulation:** Environmental Framework (2014)

Environmental framework aims affectivity environmental rights through the promotion of sustainable development, supported by an appropriate management of the environment, particularly ecosystems and natural resources, contributing to the development of a low carbon society and a "green economy", rational and efficient use of natural resources, to ensure the well-being and the gradual improvement of quality of life.

When the first regulation was published in 1987, Portugal was particularly concerned about pollution, planning, nature and with damaging attitudes that it was urgent to ban. Now it is time to climate change, sustainability, the cross-sectorial policies and green tax, however this new framework does not provide the tools for their application.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: It provides the environmental framework for Portugal, which creates opportunities to create legislation for materials passports and reversible building design.*

#### **Regulation:** Waste Management Framework (2011)

Waste Management Framework in 2011, amends and republishes the national waste management legal framework and implements the Waste Framework Directive, including the target of 70% for construction and demolition waste (CDW) recovery for 2020. Defines CDW as "waste resulting from construction, reconstruction, extension, alteration, maintenance and demolition and collapse of buildings". The regulation also establishes conditions for end of waste (EoW) criteria. EoW criteria can apply to certain waste that has undergone a recovery operation, including recycling, and complies with specific requirements developed in accordance with some conditions.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: It provides the waste management framework for Portugal that creates opportunities to create legislation for materials passports and reversible building design. Introduces definitions and concepts about waste, and has opportunities to implement further the End of Waste criteria as well as new concepts of design, such as designing out waste or reversible buildings.*
- *Barriers to for Materials Passports & Opportunities for Reversible Building Design: New technical specifications would have to be developed for any reused/recycled construction products, guarantees of product performance would have to be issued as well as legal responsibility for the product. This is*

*likely to cause problems unless amendments are made to the legislation to account for reuse and recycling.*

**Regulation:** Construction and Demolition Waste Framework (2008)

CDW Framework establishes the legal framework for waste management resulting from construction works or demolition of buildings or collapses, including prevention, reuse and the operations of collection, transport, storage, treatment, recovery and disposal. The main goal of the regulation is to create legal conditions for the proper management of CDW, which focus on the prevention of hazardous waste generation, sorting at source, recycling and other forms of recovery, in light of reducing the use of natural resources and minimising landfilling.

This regulation introduced a few measures to try to increase the rate of recycling and recovery, such as the need of a CDW Prevention and Management Plan for public works, the target to incorporate at least 5% of recycled materials, the total amount of raw materials used in public construction works, and an Information duty to collect data on CDW generated and managed.

- *Opportunities for Materials Passports: Creates legal definitions for reuse with materials having to comply with them; continue to developing technical guidelines for use of recycling materials; once they have met these criteria they can officially be labelled as products (secondary materials). Will provide an opportunity to materials passports if this can be incorporated.*
- *Opportunities for Reversible Building Design: Could also allow reprocessed, recycled, reused materials to be widely exchanged across national boundaries within the European Union. If the potential issues are solved this could have far reaching benefits for the circular economy, as the market can be accessed across Europe for the reuse of building materials.*
- *Barriers to Materials Passports: the process of CDW management needs to be modified in order to avoid bureaucratic aspects, and existing rules are very restrictive, with very limited permission to the use of recycled CDW, with long periods for the assessment of the use of recycled materials. The market is not sufficiently aware to use recycled materials, and there is not a competitive pricing of the recycled materials in contrast to the low prices of natural raw materials. The information and knowledge of designs teams and construction industry is not enough to allow them to choose a recycled material. Awareness and promotion of these materials to the construction industry can be a barrier because it does not exist, but this could also be an opportunity.*
- *Barriers to Reversible Building Design: the regulation defines some measures applied to CDW management, but the lack of a legal figure with responsibility in the environmental management of the construction site, including CDW management, is a barrier to improve and change design, as well as lack of environmental awareness for the technical issues related to the management of CDW by construction industry technicians.*

**University of Minho comment:** *Other possible barrier is the wrong perception of the owners about the structural viability of construction solutions which allow the deconstruction and, subsequent, recovery and reuse of materials. Instead of the requirement to use a certain percentage of recycled materials, incentives should be promoted (e.g. reduce the IMI or IMT tax) according to the reuse rate used.*

**Regulation:** Legal Framework for Urban Planning and Building (1999)

The Urbanisation and Building Regulations (RJUE) implemented since 1951 in Portugal, provide a list of urban operations, which require licensing and advance notice. The RJUE also lists those operations, which are less relevant and have less of an impact in terms of urban planning. This regulation also redefines the set of plans and planning tools at all scales.

- **Opportunities for Materials Passports & Opportunities for Reversible Building Design:** *There is a group of new measures applicable to the framework of the spatial planning to ensure rational, efficient land use by: limiting urban expansion, aggregating all the planning rules in Municipal master plans, eradicating land eligibility for building, simplifying procedures, introducing a new economic and financial framework and encouraging inter-municipal planning solutions. These measures are in general design measures that will create opportunities for a new approach about the buildings and the cities.*
- **Barriers for Materials Passports & Opportunities for Reversible Building Design:** *Portugal has many overlapping plans for the same area that communicate with each other inefficiently and any change is slow and uncoordinated. This has generated inefficiency and inequality, reduced transparency and competitiveness and made people wary of decision-making processes.*

**Regulation:** Legal Framework for Urban Regeneration (2009)

In 2004, regulation was created for areas with historical interest and for critical areas of recovery and urban rehabilitation. This legal framework allowed the local authorities to take control over urban rehabilitation interventions. This business tool possesses the authority and administrative powers to perform actions such as expropriation and licensing, hence promoting urban rehabilitation procedures. More recently, in 2009, urban rehabilitation is promoted by municipalities through the delimitation of Áreas de Reabilitação Urbana (ARU) - areas that justify an integrated intervention under this legislation – that may be delimited as its own or through a detailed urban rehabilitation plan.



- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Some opportunities with proper amendments to the regulations to encourage reversible building design and circularity. The country has considerable skills in the construction sector, but only 10% of work is allocated to urban renewal. Portugal is a tourist destination that has increasing number of visitors, but one-third of houses require redevelopment and town centres still suffer from problems of degradation and depopulation. Urban regeneration as well as renewable of the buildings stock by rehabilitation and recovery will be an opportunity for development sustainability and delivery materials and design new solutions.*
- *Barriers for Materials Passports & Opportunities for Reversible Building Design: The regulations are not designed to enhance reversible building design and so represent a barrier to their implementation without proper amendments to them to could hinder the application of reversible building. In addition, urban regeneration have to have flexible regulation, in order to comply with the standards, but also be able to be competitive on the housing market.*

**Regulation:** Energy certification of buildings (2013)

Since 2013, the energy certification of buildings is mandatory. Improving energy performance of buildings is one of the key factors for energy sustainability. This sector is responsible for the consumption of approximately 40% of final energy in Europe, so it is important that energy efficiency measure needs to be implemented to allow EU to meet their commitment under the Kyoto Protocol. The challenge is ambitious; reduce energy consumption by 50%, which represents an annual reduction of 400 million tonnes of CO<sub>2</sub>.

- *Barriers for Materials Passports & Reversible Building Design: All buildings owned by government must be audited and have an energy certificate and starting improving performance rating as well as renewable rates of energy. The rest of the buildings needs to be certified, and the building stock should gradually be composed of buildings with nearly zero-energy (NZEB). All these plans for increased energy efficiency is likely to have minimal effect on the implementation of reversible building design or materials passports. However, savings measures could potentially hinder reversible building design. For materials passports, there is a low chance of this legislation creating any opportunities.*
- *Barriers for Materials Passports & Reversible Building Design: Does not directly create a barrier however, it does set out obligations to reduce carbon emissions and increase energy efficiency, which as mentioned previously could create barriers for reversible building design.*

## Financial Instruments

### **Tax:** Legal Framework for Landfilling of Waste (2009)

Establishes the legal framework for waste disposal in landfills, the technical characteristics and requirements to be observed in the design, licensing, construction, operation, closure and post-closure of landfills. Along with the construction and demolition framework and the tax code, there exists a landfill tax for inert CDW, with the main purpose of diverting these wastes from landfill disposal. Currently this tax is € 4.28 per tonne. No other direct financial incentives to recycle CDW exists.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: The landfill tax intends to remove landfill as a cheap option for disposal of waste and should act as an incentive to alternate forms of disposal including recycling and reuse of which reversible building design and materials passports can have a positive impact.*
- *Barriers for Materials Passports & Barriers for Reversible Building Design: Currently the rate charged by waste management operators to accept CDW, together with the cost of transportation, are factors causing sometimes illegal dumping of CDW. The verification of the final destinations of waste along with a non-existent incentives to the companies that comply with the legislation, as well as the lower value of landfill tax, and a non-existence of a tax for the disposal of CDW under the environmental rehabilitation of quarries, are existing barriers, to develop a more circular approach as well as a change of how to design buildings.*

### **Community funding:** PO SEUR - Operational Programme for Sustainability and Efficient Use of Resources (2014)

PO SEUR is an EU programme that came into force in December 2014 and aims to contribute to sustainable growth, responding to the challenges of the transition to a low carbon economy based on a more efficient use of resources, and promoting greater resilience to climate risks and disasters established through an Execution Decision from the EC.

Portugal is seeking a sustainable growth trajectory based on a more competitive and resilient model of development with a lower consumption of natural and energy resources and that simultaneously generates new opportunities of employment, wealth and knowledge reinforcement. The programme for 2014-2020 aims for Europe to anticipate and adapt to the great global changes in the field of energy, climate change and more efficient use of resources alongside a dynamic perspective that links competitiveness to sustainability.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: PO SEUR will support initiatives and projects until 2020 that will help to fulfilment with national policies for Energy Efficiently, Renewable Energies, Climate Change, Waste, Water and Environmental Protection. The opportunities for Materials Passports and Reversible Building are on Axis II -*

*Support the transition to a low carbon economy and Axis III - Protect the environment and promote resource use efficiency.*

- *Barriers for Materials Passports & Barriers for Reversible Building Design: the lack of legislation and standards to comply with the new policies and that will allow to the stakeholders and to the industry get along with some of this new approaches and knowledge are the major barriers. In addition, the lack of follow up and monitoring of all projects funded could be a barrier to promote & verify the opportunities and measures that are being developed to improve circularity and improve design.*

### **Procurement: Public Procurement Code (2008)**

Portuguese Public Procurement Regulation derives mostly from the transposition of the EU regulations on public procurement, namely Directive 2004/17/EC, coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors and Directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Portuguese Public Procurement establishes the elaboration and implementation of a CDW prevention and management plan for all public construction works. These plans needs to be presented along with the design projects to any public works. The opportunity to develop and plan construction and demolition waste since the design stage is a key aspect to implement reversible building.*
- *Barriers for Materials Passports & Barriers for Reversible Building Design: the CDW prevention and management plans presented on the design stage of a project sometimes are not considering during construction stage, and there is no entity that audits or verifies their implementation. The plans include a qualitative and quantitative assessment of CDW, but this is normally done without any audit to the buildings, and any measures, just estimated.*

### **Public Investments**

#### **APA: Portuguese Environment Agency**

The Portuguese Environment Agency is a public institute, within the scope of the Portuguese Ministry of Environment. Their mission is to propose, develop and monitor, in an integrated and participative manner, the public policies for the environment and sustainable development, in close cooperation with other sectoral policies and public and private entities. The areas of intervention are Air, Water, Waste, Climate change, Chemicals, Noise, Protection of ozone layer, Genetic Modified Organisms, Sustainable development, Citizen participation, Environmental assessments, Environmental economics and green growth, and Environmental risks. They also are the national Waste Authority.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: The Portuguese Environment Agency is responsible for government policy on adaptation to global warming, sustainable development and waste management among areas that are applicable to materials passports and reversible building design. APA will be highly influential in the application of materials passports and reversible building design in Portugal, if working with the industry and the stakeholders to understand and decide the approach and the timescale. There is an opportunity to collaborate and develop schemes necessary to promote materials passports and reversible building.*
- *Barriers for Materials Passports & Barriers for Reversible Building Design: As they are responsible for waste enforcement, issues may arise with facilities designed for recycling and re-use being permitted for the processes they are undertaking.*

**ADENE:** Portuguese Energy Agency

ADENE is focused in promoting energy efficiency in Buildings, Industry, Transport and Public Sector. The Agency is also able to act in relevant areas for other political sectors when related to the energy policy and in close cooperation with the appropriate public entities. They work for the benefit of different economic sectors to improve energy efficiency, adopt new energy management systems and introduce new technologies and innovation.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: ADENE are the mobilizing agent for sustainable energy at the national level. They developed competencies that guide and gather all the sector's citizens and entities around energy efficiency. They have the committed to helping companies and individuals to improve their energy efficiency, and like APA, there is an opportunity to collaborate and develop schemes necessary to promote materials passports and reversible building.*

**Policy:** National Programme for Climate Change 2020/2030 (PNAC)

The PNAC 2020/2030 aims to ensure a sustainable path of reducing national emissions of greenhouse gases, in order to achieve an emissions reduction target of -18% to -23% in 2020 and -30% to -40% in 2030 compared to 2005, ensuring compliance with national mitigation commitments and putting Portugal in line with European objectives in this field. This plan establishing guidelines for sectoral policies and measures, sets sectoral targets for emission reduction and identifies a set of policy options and sectoral measures to develop in the future among with policy relevant sectors such as transport, energy, agriculture and forest. It is promoting the integration of mitigation goals in sectoral policies and advocates a dynamic approach to planning, giving to the sector a greater responsibility in identifying policies and measures.

- **Opportunities for Materials Passports & Opportunities for Reversible Building Design:** *A wide range of measures to combat climate change, such as the goal of decarbonising the intake and energy output, positioning Portugal as a supplier of energy produced from Renewable Energy Sources for the EU, and reduce the energy dependence of the country, contributing to the diversification of energy sources. This will provide opportunities to have a different approach to design and operation of the buildings.*
- **Barriers for Reversible Building Design:** *Efforts to increase the use of renewables and increase energy efficiency measures in buildings, may lead to the design of buildings that are less easily disassembled, this could act as a barrier to reversible building design.*

**Policy:** National Waste Management Plan (2014-2020)

The national Waste Management Plan for 2014-2020 includes also the national Waste Prevention Strategy. This plan includes a general description of Construction and Demolition waste and defines targets set on the waste framework directive. However, there are no new specific measures regarding prevention or management for Construction and Demolition waste.

- **Opportunities for Materials Passports & Opportunities for Reversible Building Design:** *this plan defines an integrated waste policy in the life cycle of products, a focus on a circular economy and tends to ensure greater efficiency in the use of natural resources. This considers waste as a material or energy resource promoting the closure of the cycle and the diversion of landfill, which is a different approach of what is being implemented now. Targets include helping to secure re-use and recovery, sustainable waste management and driving waste management up the waste hierarchy. Reversible building and materials passports have the potential to have a positive impact on reaching the goals of the national planning policy for waste.*
- **Barriers for Materials Passports & Opportunities for Reversible Building Design:** *the lack of coordination and synergies between stakeholders and entities responsible for the waste management might be a significant barrier, as well as a small chance that the legislation changes in a short time period.*

**Policy:** Green Growth Commitment (2015)

Portugal, after the Economic and Financial Assistance Program conclusion, monitored by the troika, needs to establish and implement a post-troika vision of long-term development that benefits from the launch of a new cycle of structural reforms and of selective and productive investments in strategic areas, such as knowledge, industrial policy and green economy that sustainably promote growth and employment. The Commitment for Green Growth aims to position Portugal as a global role model for green growth, and it therefore sets short- and

medium-term goals that are demanding and ambitious but still achievable with a will to reform with everyone's involvement.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: The Green Growth Commitment brings some new features to Portugal in different areas, as well as incentives and investment. The goals to achieve are in areas such as waste management, productivity of materials and the incorporation of waste in the economy among others. It will have opportunities to encourage circularity and to change design concepts and improve waste management. A green tax reform will be also an opportunity to diversify sources of revenue, foster eco-innovation and eco-efficiency in the use of resources, reduce dependency on energy imports and encourage more sustainable production.*
- *Barriers for Materials Passports & Barriers for Reversible Building Design: due to the unfavourable economic crisis and slowdown of construction sector for the last years, there might not be the capacity to respond and adjust to some changes without proper support and monitoring to restructuring the market, technical skills and availability of resources.*

*University of Minho: The economic crisis may be seen as a possibility to rethink how to design and rebuild economic buildings, using construction techniques and processes which promote reversible buildings and the reuse of components and materials, in order to find better and cheaper solutions.*

# Sweden: Policy and Regulation State of the Art report

# Sweden

National level

Identified Policies and Standards

Judicial Instruments

*Preciseringar av miljö kvalitetsmålen och etappmål i miljömålssystemet M2012/1171/Ma*

- Summary: Sweden's Environmental policy with 16 Environmental Quality Objectives and 24 goals.
  - “The overall aim of Swedish environmental policy is to hand over, by 2020, a society in which the major environmental problems facing the country have been solved. This is summed up in a ‘generational goal’, which describes what is to be protected and what changes need to be made in our society. When this goal is reached:
    - The ecosystems have recovered, or are about to recover, and their ability to generate long-term ecosystem services have been secured.
    - The biodiversity and natural and cultural environment is preserved, promoted and used sustainably.
    - Human health is exposed to minimal negative environmental impact while positive environmental impact on human health is promoted.
    - The material loops are resource efficient and as far as possible free from harmful substances.
    - Natural resources are used efficiently and in a sustainable manner.
    - The share of renewable energy increases and energy is used efficiently with minimal impact on the environment.
    - Patterns of consumption of goods and services are causing as little environmental and health problems as possible.

The generational goal and the 16 environmental quality objectives have been adopted by the Riksdag (the Swedish Parliament), and constitute a promise to future generations of clean air, a healthy living environment, and rich opportunities to enjoy nature. These Swedish objectives, moreover, are to be achieved without increasing the environmental and health problems of other countries.” (Swedish Environmental Protection Agency, 2016).

Three quality objectives are of special interest for BAMB :

- Reduced Climate Impact,
- A Non-Toxic Environment
- A Good Built Environment

Seven goals are of special interest for BAMB:

- **Increased resource efficiency in the construction sector (Ökad resurshushållning i byggsektorn)**



- **Non-toxic and resource-efficient material cycles** (Giftfria och resurseffektiva kretslopp)
- **Reducing children's exposure to hazardous chemicals** (Minska barns exponering för farliga kemikalier)
- **Knowledge of chemicals, material health and environmental properties** (Kunskap om ämnens hälso- och miljöegenskaper)
- **Information on hazardous substances in products** (Information om farliga ämnen i varor)
- **Development and application of EU rules on chemicals** (Utveckling och tillämpning av EU:s kemikalieregler)
- **More effective supervision of chemicals in the EU** (Effektivare kemikalietillsyn inom EU)

- Keywords :
- Degree of obligation: Overarching vision goals, guiding for national, regional and local government bodies.
- Link: <http://www.miljomal.se/sv/> or <http://www.miljomal.se/sv/Environmental-Objectives-Portal/>

*Från avfallshantering till resurshushållning, Sveriges avfallsplan 2012-2017, Rapport 6502, maj 2012*

- Summary: The Swedish Waste Plan 2012-2017, implementing the European Parliament and Council directive 2008/98/EG. Construction and demolition waste is a prioritised area for prevention of waste.
- Keywords :
- Degree of obligation: Overarching vision goals, guiding for national, regional and local government bodies.
- Link: <http://www.naturvardsverket.se/Miljoarbete-i-samhallet/Miljoarbete-i-Sverige/Uppdelat-efter-omrade/Avfall/Avfallsplanen/>

*Tillsammans vinner vi på ett giftfritt och resurseffektivt samhälle, Sveriges program för förebyggande av avfall 2014-2017*

- Summary: The Swedish waste prevention programme 2014-2017. The aim of the program is to guide and inspire Swedish players so that environmental goals can be reached and there will be less waste and product design containing no hazardous substances, no matter how much the economy grows. The program includes objectives, activities and indicators which measure progress to reduce the amount of waste and hazardous substances. It includes a description of the measures already implemented. One of four focus areas is construction and demolition. This programme is required by the Framework Directive on Waste (2008/98 / EC).
- Keywords :
- Degree of obligation: Overarching vision goals, guiding for national, regional and local government bodies.

- Summary: Sweden's Planning and Building Act. This Act contains provisions on the planning of land and water and on Construction. The provisions aim to promote a society with equal and good social living conditions and a good and sustainable living environment for people in today's society and for future generations, while taking into account the individual human freedom. (PBL 2010:900)
  - Chapter 8 states basic requirements for buildings and §4a states that a municipality is not entitled to enforce local regulation for construction and buildings.
  - Chapter 9 and 10 regulate building and demolition permits and requirements (inventory etc.) for demolition.

There are some sustainability requirements in PBL regarding the immediate local setting, but they are not applicable for national or global sustainability issues.

- Keywords :
- Degree of obligation: Mandatory

#### *Plan och bygg förordningen 2011 :338 - PBF*

- Summary: Sweden's Planning and Building Regulation, which contains provisions on content and definitions, plans and area regulations, requirements for construction, permits and notification etc. Supports PBL.
- Keywords :
- Degree of obligation: Mandatory

#### *Boverkets byggregler, BFS 2011:6,- BBR*

- Summary: the National Board of Housing, Building and Planning's Building rules, BBR, contains regulations and general recommendations on accessibility, housing design, room height, the operating space, fire protection, hygiene, health and environment, noise, safety in use and energy conservation. Chapter 6:11 and 6:911 regulate Building products and materials impact on Health and environment, 2:2 Financially valid use-time of building parts and access, repair, maintenance etc.
- Keywords :
- Degree of obligation: mandatory

#### *Miljöbalken 1998:808 - MB*

- Summary : The Swedish Environmental code.
 

“ §1 The provisions of this Code is to promote sustainable development so that present and future generations are assured a healthy environment. This development is based on the insight that nature is worthy of protection and that the right to modify and exploit nature comes with a responsibility to manage nature well. The Environmental Code is meant to be used so that:

  1. **human health and the environment are protected against damage and harm whether caused by pollution or other influence,**
  2. valuable natural and cultural environments are protected and cared for,
  3. biological diversity is protected,
  4. land, water and natural environment are used so that, from the ecological, social, cultural and socio-economic point of view, sustainable management is secured, and

5. **reuse and recycling as well as other sound management of materials, commodities and energy are promoted so that cycles are achieved.**” (The Swedish Environmental code, Miljöbalken 1998:808, Chapter 1, our translation)

”Allmänna hänsynsregler m.m. Alla som bedriver en verksamhet eller vidtar en åtgärd skall hushålla med råvaror och energi samt utnyttja möjligheterna till återanvändning och återvinning. I första hand ska förnybara energikällor användas.” (The Swedish Environmental code, Miljöbalken 1998:808, Chapter 2, §5) Our translation: “Anyone who conducts business or takes action is to conserve raw materials and energy, and utilise the opportunities for reuse and recycling. In the first instance, renewable energy is to be used.”

Chapter 15 regarding waste and the responsibility of the producer

From August 2, 2016, the waste hierarchy is established in the Environmental code (Miljö- och Jordbruksutskottets betänkande 2015/16:MJU22)

- Keywords :
- Degree of obligation: Mandatory

*Avfallsförordningen 2011:927*

- Summary: Sweden’s waste regulation
- Keywords :
- Degree of obligation: Mandatory
- Link: [http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2011927\\_sfs-2011-927](http://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2011927_sfs-2011-927)

*Europaparlamentets och rådets direktiv 2008/98/EG om avfall (Directive 2008/98/EC)*

See EU-level

*Återvinning av avfall i anläggningsarbeten. Handbok 2010:1. Naturvårdsverket.*

- Summary: Government issued Guide to facilitate the recycling of waste in construction in a safe manner with regard to environmental and health issues. ISBN 978-91-620-0164-3.
- Keywords :
- Degree of obligation: voluntary
- <http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/0100/978-91-620-0164-3/>

*Byggproduktförordningen Construction Products Regulation, CPR, 305/2011 (See EU-level)*

- Keywords :
- Degree of obligation: Mandatory

*SS, Standards from the Swedish Standards Institute, SIS*

- Summary: Offers standards for most construction/ building processes and construction (when no European Standards)
- Keywords :
- Degree of obligation: voluntary (when not enforced by legislation)

*AFS 1999:3 BYGGNADS- OCH ANLÄGGNINGSSARBETE - Arbetarskyddsstyrelsens föreskrifter om byggnads- och anläggningsarbete samt allmänna råd om tillämpningen av föreskrifterna (Ändringar införda t.o.m. 25 mars 2014 )*

- Summary: Work safety and health regulation for building and construction work. “From a work perspective, it is especially important to know the building construction in order to know how it can be demolished safely. An inventory and investigation is required to show that stability and carrying capacity is sufficient at all stages of the demolition. Often drawings and various tests needs to be performed beforehand to be able to make a confident assessment of such stability, and to map hazardous materials in the building.” ([Arbetsmiljöverket](#) 2015-06-30)
- Keywords :
- Degree of obligation: Mandatory

Current development:

Several Swedish government bodies are currently investigating and proposing new measures to achieve the national and international environmental goals Sweden has decided to reach connected to the focus area of BAMB.

- *Rapport 2015:46 Regeringsuppdrag Boverket, Dokumentationssystem för byggprodukter vid nybyggnation* (Proposition concerning National System for documentation of building material/products in new buildings, the Swedish National Board of Housing, Building and Planning).
- *Rapport 2015:35 Regeringsuppdrag Boverket, Byggnaders klimatpåverkan utifrån ett livscykelperspektiv* (Investigation into use of LCA for building products with regards to environmental /climate impact, the Swedish National Board of Housing, Building and Planning).
- *Rapport 2016:14 Boverket Miljö och klimatanpassade byggregler, Förstudie*, (Environment and Climate adjusted building regulation, a preparatory study, the Swedish National Board of Housing, Building and Planning). The board suggest further development of EU and UN initiatives for sustainable building, information and guidance for use of LCA nationally in Sweden, and further investigations into instruments to further documentation and information about building materials/products and reversible building design.
- *Rapport 8/15 Kemikalieinspektionen, Rapport från ett regeringsuppdrag, Hälsoskadliga kemiska ämnen i byggprodukter – förslag till nationella regler* (Toxic chemicals in building products- suggestions for national regulation)
- *Cirkulär Ekonomiutredning (A preparatory study on Circular Economy*. A special investigator is charged with the task to analyse what obstacles may exist in the legislation and which instruments are needed to increase the reuse of products. Investigator is Ola Alterå, former State Secretary of the Ministry of Industry from

2006 to 2010. The instruments should be designed to stimulate producers, consumers and businesses in the intermediate level to invest in used products, as well as the repair and upgrading of products. It can also lead to new business models, new companies and new jobs. The overall objective is to achieve a more resource efficient and circular economy, which limits the impact on the environment. The investigation will primarily focus on products for the consumer market, which is particularly interesting from a resource and environmental perspective with regard to environmental goals.) <http://www.regeringen.se/pressmeddelanden/2016/01/regeringen-vill-okatera-anvandningen/>

## Financial Instruments

*Lag (1999:673) om skatt på avfall (Tax on landfill of waste)*

- Summary: Sweden has a tax on waste that goes to landfill since 1999. The tax is currently 500SEK per ton.
- Keywords :
- Degree of obligation: Mandatory
- Link: <http://www.notisum.se/Pub/Doc.aspx?url=/rnp/sls/lag/19990673.htm>

## Public Investments

*Lagen om Offentlig Upphandling 2007:1091- LOU*

- Summary: The Swedish Public Procurement Act (2007:1091 – LOU) which is largely based on EU Directive concerning public procurement. Green Public Procurement – criteria for sustainable procurement for building and construction projects
- Link: <http://www.upphandlingsmyndigheten.se/hallbarhet/stall-hallbarhetskrav/bygg-och-fastighet/>

## Information

### *Websites*

- Summary: Swedish government agencies have several websites to spread information about national environmental goals, building regulation, waste prevention, chemicals in products etc. Some examples are:
  - <http://www.miljomal.se/Miljomalen/>
  - <http://www.boverket.se/pblkunskapsbanken>
  - <http://www.kemi.se/en>
  - <http://www.upphandlingsmyndigheten.se/>

### *Information networks*

- Summary: Avfall Sverige (Waste Sweden) is a voluntary Swedish organization for municipalities working with waste management and recycling. The organisation conducts development activities in the whole area of waste. This is done through a

joint development initiative funded by the Waste Sweden's municipal members. The initiative has a broad focus on concrete development projects.

Waste Sweden has a vision: "There's no waste." The vision includes two specific targets for 2020: "The relationship between waste and growth has been broken," and "There is a strong and clear movement up the waste hierarchy".

Municipalities in Sweden have no or little control over the upstream issues, i.e. minimizing the generation of waste, minimization of waste, the content of hazardous substances and recycling. Waste Sweden's vision, "There is no waste," presupposes, however, that the industry is involved in these issues. The municipalities also have a unique opportunity to demonstrate the impact of consumer society through its handling and description of the waste. This can be used to influence policy and practice in a positive direction. Waste Sweden mainly use information to influence generation/prevention of waste.

- Link: <http://www.avfallsverige.se/avfallshantering/foerebyggande-av-avfall/>

## Private Sector

*Resource and waste guidelines during construction and demolition*, The Swedish Construction Federation (Sveriges Byggindustrier) and Kretsloppsrådet

- Summary: *“These guidelines aim to improve resource management within the construction and demolition industries. The guidelines are a tool for fulfilling the requirements in the Swedish Environmental Code's general rules of consideration and the waste hierarchy and for meeting general expectations from society regarding the industry's material and waste management standards. In some cases, therefore, the guidelines exceed the more concrete requirements in the legislation.”* (Sveriges byggindustrier & Kretsloppsrådet, 2015)
- Degree of obligation: Voluntary
- Keywords :
- Link: [https://publikationer.sverigesbyggindustrier.se/Userfiles/Info/860/160313\\_Guidelines\\_.pdf](https://publikationer.sverigesbyggindustrier.se/Userfiles/Info/860/160313_Guidelines_.pdf)

*Certifications for sustainable buildings are used as voluntary steering systems.*

- Summary: Certifications currently used in Sweden to assess the environmental impact of a building/structure according to Hellman (2014):
  - BREEAM Sweden,
  - BREEAM Intl.,
  - BREEAM communities,
  - LEED,
  - The Nordic Ecolabel and
  - Miljöbyggnad
- Degree of obligation: Voluntary

- Keywords :

#### *Tools to handle material issues in Building projects*

- Summary: Several tools are used in Sweden for documentation and assessment of building and construction materials and products. Hellman (2014) describes following list:
  - BASTA (Guidence to Sustainable Construction Materials),
  - Byggvarubedömningen (Building Material Assessment),
  - Sunda Hus,
  - The Nordic Ecolable (Swan),
  - Miljöstatus,
  - EPD
- Degree of obligation: Voluntary
- Keywords :

#### *Nordic Guide to Sustainable Materials*

- Summary: The Nordic Green Building Councils have developed a guide to define and choose sustainable building materials, with some regard to re-use, reversible building design, secondary use of materials.
- Degree of obligation: Voluntary
- Keywords:
- Link: <https://www.sgbc.se/nyheter/1154-gemensamma-nordiska-kriterier-for-hallbara-byggnadsmaterial>

Research

#### *Mistra Closing the loop*

- Summary: Mistra (**the Swedish foundation for strategic environmental research**) supports research of strategic importance for a good living environment and sustainable development. The call “Closing the loop” intends to develop methods for identifying potential resources better and restoring them to industry. Ways of doing this will include developing measuring and processing techniques that enable industrial waste to be upcycled as raw and other materials without spreading pollutants and support recycling of complex products.
- Link: <http://closingtheloop.se/>

#### *Mistra REES*

- **Summary: Mistra REES – Resource-Efficient and Effective Solutions based on circular economy thinking is a 4-year program run by a consortium of leading Swedish universities, large and small companies and societal actors. The program’s vision is to advance the transition of the Swedish manufacturing industry towards a circular and sustainable economy.**

- Link: <http://mistrarees.se/?l=en>

*Policia, Policies for Life Cycles, an Integrated Assessment*

- Summary: The IVL-led (IVL- Swedish Environmental research institute) project Policia, Policies for Life Cycles, an Integrated Assessment, lasts for three years, and will examine how combinations of policy instruments can be designed to correct for market failures from a "cradle to cradle" perspective along the whole life cycle - from raw material extraction, production, consumption to recycling or re-production.
- Link: <http://www.circularmaterialeconomy.se/styrmedel-for-cirkular-ekonomi/>

Integration in Other Policies

Opportunities for Materials Passports and Reversible Building Design

Judicial Instruments

*Preciseringar av miljö kvalitetsmålen och etappmål i miljömålssystemet M2012/1171/Ma*

- Opportunities: Preliminary, the aim of the environmental policy is in line with BAMB objectives.

*Från avfallshantering till resurshushållning, Sveriges avfallsplan 2012-2017, Rapport 6502, maj 2012*

- Opportunities: Preliminary, the goals and objectives for the construction and demolition sector in the waste plan is in harmony with BAMB objectives, and the BAMB solutions are a good match to support the implementation of the objectives in the plan.

*Tillsammans vinner vi på ett giftfritt och resurseffektivt samhälle, Sveriges program för förebyggande av avfall 2014-2017*

- Opportunities: Preliminary, the goals and objectives for the construction and demolition sector in the waste prevention programme is in harmony with BAMB objectives, and the BAMB solutions are a good match to support the implementation of the objectives in the programme.

*Plan och Bygglag 2010 :900 – PBL*

- Opportunities: Preliminary, basic requirements include health impact on users and local environment, are included as technical requirements and this could be an opportunity for materials passports.

*Boverkets byggregler, BFS 2011:6,- BBR*

- Opportunities: Preliminary, basic requirements include health impact on users and local environment, are included as technical requirements and this could be an opportunity for materials passports.



*Miljöbalken 1998:808 - MB*

- Opportunities: Preliminary, the aim of the environmental policy is in line with BAMB objectives.

*Återvinning av avfall i anläggningsarbeten. Handbok 2010:1. Naturvårdsverket.*

- Opportunities: Preliminary, there is a focus on that material information is important for recycling of waste in construction in a safe manner.

*SS, Standards from the Swedish Standards Institute, SIS*

- Opportunities: Preliminary, standards could be a way to enforce reversible building design

*AFS 1999:3 BYGGNADS- OCH ANLÄGGNINGSSARBETE - Arbetarskyddsstyrelsens föreskrifter om byggnads- och anläggningsarbete samt allmänna råd om tillämpningen av föreskrifterna (Ändringar införda t.o.m. 25 mars 2014 )*

- Opportunities: Preliminary, the regulation could support reversible building design as a mitigation of risks associated with demolition, when materials and constructions are not known or difficult to dismantle.

Financial Instruments

*Lag (1999:673) om skatt på avfall (Tax on landfill of waste)*

- [Opportunities: Preliminary, the tax on waste that goes to landfill is a signal from the government that recycling of waste is warranted, could be positive for BAMB](#)

Public Investments

*Lagen om Offentlig Upphandling 2007:1091- LOU*

- Opportunities: Preliminary, if BAMBs solutions are compatible with and easy to use in a procurement process, all public bodies may easily demand them

Information

## Private Sector

*Resource and waste guidelines during construction and demolition, The Swedish Construction Federation (Sveriges Byggindustrier) and Kretsloppsrådet*

- [Opportunities: Preliminary, the Swedish Building industry are interested and engaged in the topic and could be ready to adopt BAMB outputs.](#)

*Certifications for sustainable buildings are used as voluntary steering systems.*

- **Opportunities:** Preliminary, the certification systems are all concerned with the same issues as BAMB, sharing goals and objectives. If the certification systems see a value in using materials passports and/or reversible building design for points in their systems, the use could spread fast.

*Tools to handle material issues in Building projects*

- **Opportunities:** Preliminary, the experience in the Swedish building sector of using product information- and assessment-systems could have prepared the ground for next step towards circular building.

*Nordic Guide to Sustainable Materials*

- **Opportunities:** Preliminary, the project states that it is difficult to measure sustainability indicators for material resource use. They see some limitations with the measurement they chose for the Nordic Guide to sustainable materials. This opens a window for the combination of reversible design and materials passports as foundation for measuring sustainable resource use.

## Integration in Other Policies

Barriers for Materials Passports and Reversible Building Design

### Judicial Instruments

*Preciseringar av miljö kvalitetsmålen och etappmål i miljömålssystemet M2012/1171/Ma*

- **Barriers:** Preliminary, there is no clear focus on design as a prerequisite for sustainable resource use.

*Från avfallshantering till resurshushållning, Sveriges avfallsplan 2012-2017, Rapport 6502, maj 2012*

- **Barriers:** Preliminary, the plan mentions the importance of reversible building design, but the main focus is on re-use and the demolition process.

*Tillsammans vinner vi på ett giftfritt och resurseffektivt samhälle, Sveriges program för förebyggande av avfall 2014-2017*

- Barriers: Preliminary, the program mentions the importance of reversible building design, but the main focus is on re-use and the demolition process.

*Plan och Bygglag 2010 :900 – PBL*

- Barriers: Preliminary, PBL has no explicit connection to environmental policies, waste plans or circular material flows and re-usability is not part of the technical requirements according to this act.

*Plan och byggförordningen 2011 :338 - PBF*

- Barriers: Preliminary, PBF has no explicit connection to environmental policies, waste plans or circular material flows and re-usability is not part of the technical requirements according to this act.

*Boverkets byggregler, BFS 2011:6,- BBR*

- Barriers: Preliminary, BBR has no explicit connection to environmental policies, waste plans or circular material flows and re-usability is not part of the technical requirements according to this act.

*Miljöbalken 1998:808 - MB*

- Barriers: Preliminary, there is no clear focus on design as a prerequisite for sustainable resource use.

*Återvinning av avfall i anläggningsarbeten. Handbok 2010:1. Naturvårdsverket.*

- Barriers: Preliminary, there is no clear focus on design as a prerequisite for re-use and recycling.

*SS, Standards from the Swedish Standards Institute, SIS*

- Barriers: Preliminary, standards could enforce status quo in the sense that things are done according to standards, with no room for development and new solutions.

*AFS 1999:3 BYGGNADS- OCH ANLÄGGNINGSSARBETE - Arbetarskyddsstyrelsens föreskrifter om byggnads- och anläggningsarbete samt allmänna råd om tillämpningen av föreskrifterna (Ändringar införda t.o.m. 25 mars 2014 )*

- Barrier: Preliminary, the regulation can be used to discourage from selective deconstruction of buildings because of enhanced risks.

## Financial Instruments

*Lag (1999:673) om skatt på avfall (Tax on landfill of waste)*

- Barriers: Preliminary, it is sometimes argues this tax is too low to be a real incentive.

## Public Investments

*Lagen om Offentlig Upphandling 2007:1091- LOU*

- Barriers: Preliminary, if BAMBs solutions are not compatible with and easy to use in a procurement process, public bodies may avoid them

## Information

### *Information networks*

#### Private Sector

*Resource and waste guidelines during construction and demolition, The Swedish Construction Federation (Sveriges Byggindustrier) and Kretsloppsrådet*

- Barriers: Preliminary, the resource and waste guidelines have a prominent waste and recycling focus. There could be a mismatch between the perception of need for reversible design and materials passports.

*Certifications for sustainable buildings are used as voluntary steering systems.*

- Barriers: Preliminary, if the certification systems do not align with materials passports and/or reversible building design, or develop other similar solutions BAMBs materials passports and reversible design tools could be side-lined.

### *Tools to handle material issues in Building projects*

- Barriers: Preliminary, there could be a sense in the Swedish building sector that the product information and assessments are fulfilled with available tools and that there is no need to go further.

### *Nordic Guide to Sustainable Materials*

- Barriers: Preliminary, the project has decided to use amount of secondary resources used as measurement for material resource use, and stress the importance of reversible

design outside of the criteria for sustainable materials. The Green Building Councils are an important player on the sustainable building scene in Sweden.

Integration in Other Policies

Best Practices

## Conclusions

The overarching Swedish policies and legislation identified above all asks for a circular approach. Re-use and re-cycling of building products and materials in loops with safe and non-toxic materials and products are asked for, and highlighted in all levels of policy and legislation. The complex nature of policies, legislation and standards for this focus area in Sweden limits the ability to guarantee an exclusive list within the scope of BAMB. Sweden aims to solve the big environmental issues within this generation, to leave a society to next generation without the burden of these big issues and without contributing to rising environmental and health issues abroad. A circular approach is assumed necessary to fulfil the overarching Swedish environmental goals (Regeringsbeslut M2012/1171/Ma) and BAMB fits well into the aim of these policies and regulations.

Building materials and products with known content and free of hazardous materials aids re-use of building materials. The Swedish building sector as well as steering bodies have put much focus on documentation and assessment of building materials and products as a prerequisite for re-use and recycling (Ex Hellman 2014). Less detailed attention has been given to the design, and specifications on how to design buildings to aid re-use and recycling of building materials/products or prevent buildings from becoming obsolete by flexibility. The building regulations (PBL, PBF and BBR) do not take global or national sustainability issues into consideration (Boverket, 2016), and there is a lack of integration between the Environmental Act (MB 1998:808), building regulation (PBL, PBF, BBR etc.), the Waste Plan (Naturvårdsverket 2012), the Waste Prevention Program (Naturvårdsverket 2015 a), the Environmental Goals (Regeringsbeslut M2012/1171/Ma), Waste Regulations etc.

The National Board of Housing, Building and Planning in Sweden suggest further implementation and development of EU and UN initiatives for sustainable building and construction as a path forward as well as spreading information to support the use of LCA (2016).

The Swedish legislation and policies relevant for BAMB support the idea of materials passports and reversible building design, but are vague. The relevant rules, policies and standards are dispersed in different legislations and policies. There is no clear map of relevant policies, legislations and standards, and several branches were private voluntary initiatives fill identified gaps to give the sector the forward momentum it seeks. This makes the field difficult to navigate.

There is much activity going on in the field in Sweden, often ignited by developments on EU and UN levels. The aim in these developments are similar to the aim of BAMB, but there is a risk that if standards and legislation precede BAMB, the solutions BAMB develops could be hampered by the legislation, even if the aim is similar.

## Sweden

### Local Level

#### Identified Policies and Standards

##### Judicial Instruments

*Plan och Bygglag 2010:900 – PBL*

- Summary: Sweden's Planning and Building act. This Act contains provisions on the planning of land and water and Construction. The provisions aim to promote a society with equal and good social living conditions and a good and sustainable living environment for people in today's society and for future generations, while taking into account the individual human freedom. (PBL 2010:900)
  - Chapter 8 §4a states that a municipality is not entitled to enforce local regulation for construction and buildings.
  - Chapter 9 and 10 regulate building and demolition permits and requirements (inventory etc.) for demolition.
- Keywords :
- Degree of obligation: Mandatory

*Tillsammans vinner vi på ett giftfritt och resurseffektivt samhälle, Sveriges program för förebyggande av avfall 2014-2017 & Från avfallshantering till resurshushållning, Sveriges avfallsplan 2012-2017*

- Summary: The national waste plan and waste prevention program among other steering documents stress that Municipalities in Sweden are responsible for supervising the management of construction and demolition waste and make demands to avoid building products that contain hazardous substances are built into public buildings.
- Keywords:
- Degree of obligation: Mandatory

#### *Municipal waste prevention plans*

- Summary: Municipalities are bound to have waste plan (MB 1998:808, 15 §11), with actions to prevent waste and further re-use and recycling.

Financial Instruments

Public Investments

*Setting an example*

- Summary: Municipalities can influence the development through their own investments and actions. Based on Green Public Procurement within the municipality and Local policies and plans for sustainable building etc. the Municipality can push the market towards circular buildings.

#### **Not applicable for Swedish local level**

Information

Private Sector

Research

Integration in Other Policies

## Opportunities for Materials Passports and Reversible Building Design

Judicial Instruments

Financial Instruments

Public Investments

Information

Private Sector

Research

Integration in Other Policies

## Barriers for Materials Passports and Reversible Building Design

Judicial Instruments

Financial Instruments

Public Investments

Information

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## Best Practices

### *Stockholms stads Kemikalieplan 2014-2019*

- Summary: The city of Stockholm require a log of all building materials and their chemical content for all the buildings the municipality builds or contracts as well as assessments of the materials/products.

### *Sustainability Programme for Urban Planning and Building in Ronneby*

#### *Sustainable development inspired by Cradle to Cradle®*

- Summary: Policy for building and planning in Ronneby, prescribing design for deconstruction, circular material use and documentation of materials/products among other guidelines for the municipalities own buildings.
- Link: <http://www.ronneby.se/sv/bygga-bo-miljo/hallbart-byggande/kvalitetsprogram/>

## Conclusions

Local and regional governments in Sweden have little or no room to affect rules and incentives for construction and building. The Municipality has a responsibility to supervise



building and demolition within the municipality and warrant permits based on national regulations.

Many municipalities see it as a limitation that they are not able to issue additional regulations regarding sustainable building within their region and are limited to set examples to drive the sector forward. One exception is if the municipality owns land, then they can act as developers and are permitted to set additional rules for building on their land, which many municipalities in Sweden do.

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# United Kingdom: Policy and Regulation

## State of the Art report

# Introduction

The purpose of this report is to summarise the current State of the Art relating to policy and regulations in the United Kingdom of Great Britain and Northern Ireland that could either support, or hinder, circular economy in the built environment.

The circular economy is defined by the Ellen MacArthur Foundation (EMF) as an “industrial system that is restorative or regenerative by design”, taking the linear industrial model that dominated the 20th and early 21st century and replacing it with a circular one in which waste is designed out and products are designed to be optimised for a cycle of disassembly and reuse.

According to EMF, The circular economy exists through three main principles:

- To preserve and enhance natural capital
- Optimisation of resource yields
- Foster system effectiveness by revealing and designing negative externalities

These three main principles are then translated into the six actions of the RESOLVE framework, each representing a circular business opportunity.

- **REGENERATE**
  - Shift to renewable energy and materials
  - Reclaim, retain, and restore health of ecosystems
  - Return recovered biological resources to the biosphere
- **SHARE** – Maximise product utilisation
  - Share assets (e.g. cars, rooms, appliances)
  - Reuse/second-hand
  - Prolong life through maintenance, design for durability, upgradability, etc
- **OPTIMISE** – Optimise system performance
  - Increase performance/efficiency of product
  - Remove waste in production and supply chain
  - Leverage big data, automation, remote sensing and steering
- **LOOP** – Keep components and materials in closed loops and prioritise inner loops
  - Remanufacture products or components
  - Recycle materials
  - Digest anaerobically
  - Extract biochemical from organic waste
- **VIRTUALISE** – Deliver utility virtually
  - Dematerialise directly (e.g. books, CDs, DVDs, travel)
  - Dematerialise indirectly (e.g. online shopping)
- **EXCHANGE** – Select resource input wisely
  - Replace old with advanced non-renewable materials
  - Apply new technologies (e.g. 3D printing)

- Choose new product/service (e.g. multimodal transport)

Whilst UK policy and regulation are structured differently to the principles outlined above, there are some areas where the existing framework could be acting as an opportunity or barrier to adopting the specific business opportunities included in the RESOLVE framework.

## UK Governance overview

The UK policy and regulatory landscape is complicated through having devolved administrations. Some policies cover the whole UK, whereas others are specific to one or more of England, Scotland, Wales or Northern Ireland.

England is the largest country in the UK, with 84% of the UK's population and generates 85% of the GDP. It also has nearly 50% of the land area and the highest population density. Scotland is the second largest country in terms of GDP, population and land area and has the lowest population density. Wales is the third largest, followed by Northern Ireland. In terms of construction activities, England has around 85% of all construction companies and 85% of construction employees.

Generally, Scotland has developed its own waste legislation since the 1990s. Wales and Northern Ireland use most of the same waste legislation as England, although this is beginning to change. All four countries have their own waste management plans and environmental enforcement agencies as well as Government departments responsible for waste management. Currently, Scotland and Wales are developing more policy related to Construction and Demolition waste (CDW), supported by financial resources, than England and Northern Ireland.

### *England*

It should be noted that some departments, like the Ministry of Defence, cover the whole UK. Others just cover England. There are 25 ministerial departments and 21 non-ministerial departments. The latter are headed by senior civil servants and typically have a regulatory or inspection function. There are also over 300 agencies and public bodies working with government to advise and deliver policies.

There has been a very recent restructuring of some departments, following the EU referendum vote and a change of Prime Minister. The newly formed Department for Business, Energy & Industrial strategy is potentially relevant to BAMB, along with DEFRA (see next paragraph), Department for Communities and Local Government, and possibly the new Department for exiting the EU.

In terms of waste, the Department for Environment, Food and Rural Affairs (Defra) is responsible for waste legislation in England and data reporting. It also leads the UK relationship with the European Commission on waste matters, working closely with the other countries' Governments. Defra has undergone significant change in the last few years and no longer has a policy lead for CDW. It has also substantially reduced its funding support to the charity Waste Resources Action Programme (WRAP), who no longer work in CDW. The Site Waste Management Plan Regulations 2008 specific to CDW were in place in England from April 2008 to December 2012. The enforcement body for waste in England is the Environment Agency.

### *Scotland*

The devolved government for Scotland has a range of responsibilities, which include: health, education, justice, rural affairs, housing and the environment. Some powers are reserved to the UK government and include: immigration, the constitution, foreign policy and defence.

Scottish Government directorates are responsible for progressing the five core strategic objectives; Wealthier and Fairer Scotland, Healthier Scotland, Safer and Stronger Scotland, Smarter Scotland and Greener Scotland. Most relevant to BAMB appear to be Business Directorate, Environment & Forestry, Energy & Climate Change, Scottish Procurement & Commercial, Local government and Communities.

In terms of waste, Scotland has developed its own legislation, for which the Scottish Government has responsibility. Scotland also has its own polices and waste management plan, resulting in differing priorities and activities from England and Wales. The Scottish Government fund Zero Waste Scotland (ZWS), which undertakes activities related to CDW. Scotland has recently issued its Circular Economy Strategy and has identified CDW as a priority area. The enforcement body in Scotland is the Scottish Environmental Protection Agency (SEPA); SEPA is also responsible for waste statistics.

### *Wales*

Headed by the First Minister of Wales, the Welsh Government is responsible for areas such as health, education, language and culture and public services. The Welsh Government is separate from the British Government, which retains responsibility for UK-wide areas such as tax, defence, foreign policy and benefits. The Welsh Government Civil Service is divided into 4 groups: Office of the First Minister and Cabinet Office; the Health and Social Services Group; the Economy, Skills and Natural Resources Group; and the Education and Public Services Group. The most relevant (in terms of BAMB) is the Economy, Skills and Natural Resources Group.

In 2013, Natural Resources Wales took over the work of Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales. This is the largest Welsh Government Sponsored Body - employing 1,900 staff across Wales with a budget of £180 million.

Much of the waste legislation in Wales is developed with England, and as such is similar. However, the aspirations and policies are diverging through the development of a waste management plan for Wales with targets more ambitious than the other Counties. The Welsh Government fund Constructing Excellence in Wales provides support to business on CDW via the Waste Prevention Programme and there is focus on CDW due to the amount produced, with work being undertaken in this area supported by a financial programme of support to the construction industry. The enforcement body for waste in Wales is Natural Resource Wales.

### *Northern Ireland*

The Northern Ireland Executive has eight departments. These departments include Department of Agriculture, Environment & Rural Affairs, Department for Communities, Department for the Economy, and Department for Infrastructure.

The Department of Agriculture, Environment & Rural Affairs, which is part of the Northern Ireland Executive has responsibility for waste policy. All waste legislation relevant to Northern Ireland is owned by Defra. The Northern Ireland Environment Agency undertakes



enforcement activities. There is no specific programme or support for CDW, with the focus largely on preventing and dealing with illegal waste dumping.

## UK Governance overview

The UK policy and regulatory landscape is complex through having devolved administrations. Some policies and legislation cover the whole UK, whereas others are specific to one or more of England, Scotland, Wales or Northern Ireland.

Central government has 25 ministerial departments and 21 non-ministerial departments. The latter are headed by senior civil servants and typically have a regulatory or inspection function. Some government departments, such as the Ministry of Defence, cover the whole of the UK, whereas others, such as the Department for Environment, Food and Rural Affairs (Defra), do not. There has been a very recent restructuring of some departments, following the EU referendum vote and the subsequent change of Prime Minister.

The UK has over 300 agencies and public bodies working with the Government to advise and to deliver policies<sup>81</sup>.

England is the largest country in the UK, with 84% of the UK's population and generating 85% of total GDP. It also has nearly 50% of the land area and the highest population density. Scotland is the second largest country in terms of GDP, population and land area and has the lowest population density. Wales is the third largest, followed by Northern Ireland. In terms of construction activities, England has around 85% of all construction companies and 85% of construction employees.

Scotland has developed its own waste legislation since the 1990s. Wales and Northern Ireland largely apply the waste legislation developed by the UK government, although this is beginning to change. All four countries have their own waste management plans and environmental enforcement agencies, as well as government departments responsible for waste management. Currently, the devolved administrations in Scotland and Wales are also funding and developing policy and/ or legislation related to Construction and Demolition Waste (CDW).

### *England*

Unlike Scotland, Wales and Northern Ireland, there is no separate national assembly for England. Policy and legislation for England is therefore developed and implemented by the UK Government.

Following the referendum on membership of the European Union, a new Department for Business, Energy & Industrial Strategy has been formed. This department is now responsible for policy and legislation on climate change, as well as innovation and science<sup>82</sup>. This department is therefore of particular relevance to BAMB, along with the Department for Environment, Food and Rural Affairs (Defra) (see next paragraph), the Department for Communities and Local Government, and possibly the new Department for Exiting the European Union.

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<sup>81</sup> <https://www.gov.uk/government/how-government-works>

<sup>82</sup> <https://www.gov.uk/government/ministers/secretary-of-state-for-business-energy-and-industrial-strategy>

Defra is responsible for waste legislation in England and for data reporting. It also leads the UK relationship with the European Commission on waste matters, working closely with the other countries' governments<sup>83</sup>. Defra has undergone significant change in the last few years and no longer has a policy lead for CDW. It has also substantially reduced its funding to the charity Waste and Resources Action Programme (WRAP), who are no longer able to provide significant support to the construction industry. The Site Waste Management Plan Regulations 2008 specific to CDW were in place in England from April 2008 to December 2013, but have since been rescinded.

The enforcement body for waste in England is the Environment Agency.

### *Scotland*

The devolved Government for Scotland has a range of responsibilities, which include: health, education, justice, rural affairs, housing and the environment. Some powers are reserved to the UK Government, including immigration, the constitution, foreign policy and defence.

Scottish Government directorates are responsible for progressing the five core strategic objectives; Wealthier and Fairer Scotland, Healthier Scotland, Safer and Stronger Scotland, Smarter Scotland and Greener Scotland. The directorates most relevant to BAMB include Environment & Forestry, Energy & Climate Change, Scottish Procurement & Commercial, and Local Government and Communities.

Scotland has developed its own waste legislation, for which the Scottish Government has responsibility. Scotland also has its own policies and waste management plan, resulting in differing priorities and activities from England and Wales. The Scottish Government funds Zero Waste Scotland (ZWS), which undertakes activities related to CDW, including guidance on waste management and provision of a whole life costing tool<sup>84</sup>. Scotland has recently issued its Circular Economy Strategy and has identified construction and the built environment as a priority area<sup>85</sup>.

The enforcement body in Scotland is the Scottish Environmental Protection Agency (SEPA); SEPA is also responsible for waste statistics. SEPA is currently undertaking a consultation to clarify how and when waste regulations apply to the reuse of products.

### *Wales*

The Welsh Government is responsible for areas including health, education, language and culture and public services. The Welsh Government Civil Service is divided into 4 groups: the Office of the First Minister and Cabinet Office, the Health and Social Services Group, the Economy, Skills and Natural Resources Group, and the Education and Public Services Group. The most relevant (in terms of BAMB) is the Economy, Skills and Natural Resources Group.

In 2013, Natural Resources Wales took over the work of Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales. This is the largest Welsh

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<sup>83</sup> <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about>

<sup>84</sup> <http://www.resourceefficientscotland.com/ConstructionBuiltEnvironment>

<sup>85</sup> <http://www.gov.scot/Resource/0049/00494471.pdf>

Government sponsored body - employing 1,900 staff across Wales with a budget of £180 million<sup>86</sup>.

Much of the waste legislation applied in Wales has been developed by the UK central government and is therefore the same as that applied in England. However, the waste management plan for Wales sets more ambitious targets. The Welsh Government-funded Constructing Excellence in Wales provides support to business on CDW via the Waste Prevention Programme<sup>87</sup> and focus on reducing CDW (particularly wood, plastic, insulation and gypsum products, hazardous waste and metals) in a separate Construction and demolition sector plan<sup>88</sup>.

The enforcement body for waste in Wales is Natural Resources Wales.

### *Northern Ireland*

The Northern Ireland Executive has eight departments. These include the Department of Agriculture, Environment & Rural Affairs, the Department for Communities, the Department for the Economy, and the Department for Infrastructure.

The Department of Agriculture, Environment & Rural Affairs has responsibility for waste policy, but all waste legislation relating to the construction sector in Northern Ireland is owned by Defra. There is no specific programme or support for CDW, with the focus largely on preventing and dealing with illegal waste dumping.

The Northern Ireland Environment Agency undertakes enforcement activities.

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<sup>86</sup> <https://naturalresources.wales/about-us/what-we-do/?lang=en>

<sup>87</sup> <http://www.cewales.org.uk/>

<sup>88</sup> [http://gov.wales/topics/environmentcountryside/epq/waste\\_recycling/publication/canddsectorplan/?lang=en](http://gov.wales/topics/environmentcountryside/epq/waste_recycling/publication/canddsectorplan/?lang=en)

## Potential impact of Brexit

There is no concrete information relating to what might happen as a result of the UK vote to leave the European Union. At the moment, three outcomes are thought possible:

4. UK does not leave the EU – no Brexit. This would mean UK would remain in line with EU policy and regulation
5. A deal similar to Norway is struck, or other deal that guarantees access to EU single market – soft Brexit. This would mean UK is likely to remain in line with EU policy and regulation
6. A deal which does not allow UK full access to single market – hard Brexit. The consequence of this in terms of relevant policy and regulation is very unclear. It could be that there would be little change for several years, with a policy by policy adaptation depending on the need to comply with wider trade agreements, or to reduce regulatory burdens to mitigate economic impacts of hard Brexit. This could also result in Scotland having another referendum for independence.

The preferred/probable outcome is unlikely to be known for 6 months or more. Once Article 50 is triggered (currently anticipated to be by the end of March 2017), a two year period of negotiation between the UK Government and the EU is expected to follow.

Much of the time and resources of the UK government will be focussed on Brexit related matters, which could impact on the scope to introduce new policies or adapt existing ones that are not directly related to Brexit.

In the event of the UK leaving the EU, an unintended, positive consequence could be an increase in enthusiasm for the circular economy in the built environment as a means of improving the UK economy in reaction to the falling value of the pound and the increasing costs of imports. This could also lead to investment in local businesses and resources.

However, it should be noted that the UK would not be involved in any negotiations on the next round of European circular economy measures and would not be mandated to implement any future legislation or policies.

## Specific instrument review:

A wider review of UK level instruments, research and procurement has been undertaken, and the following policies and standards are considered to have relevance in relation to promoting, or possibly hindering, the adoption of circular economy opportunities in the built environment. These are evaluated in more detail in the next section.

### Public Instruments

- Environmental Protection Act (1990)
- Climate Change Act (2008)
- Environment Act (1995)
- Planning and Energy Act (2008)
- Building Act (1984)
- The Building Regulations (2010)
- Climate Change and Sustainable Energy Act (2006)
- Sustainability and Secure Buildings Act (2004)
- Town and Country Planning Act (1990)
- The Energy Efficiency (Eligible Buildings) Regulations (2013)
- The Construction Products Regulations (2013)
- Landfill Tax (1996)
- Scotland Zero Waste Plan (2010)
- The Waste (England and Wales) Regulations (2011)
- The Waste (Northern Ireland) Regulations (2011)
- The Waste (Scotland) regulations (2012)
- Waste Management plan for England (2013)
- The Environmental Permitting (England and Wales) Regulations (2010)
- The Pollution Prevention & Control (Scotland) Regulations (2012)
- The Pollution Prevention & Control (Northern Ireland) Regulations (2013)
- Building (Scotland) Act (2003)
- The Building (Scotland) Regulations (2004)
- The Building Regulations (Northern Ireland) (2012)
- The Landfill (Scotland) Regulations (2012)
- The Hazardous Waste (England and Wales) Regulations (2005)
- The Hazardous Waste (Northern Ireland) Regulations (2005)
- The Special Waste Regulations (1996) (Scotland)
- Waste (Wales) Measure (2010)
- Climate Change (Scotland) Act (2009)
- Energy Efficiency Action Plan (Scotland) (2010)
- A low Carbon Economic Strategy for Scotland: Scotland – A low Carbon Society
- Making Things Last: A Circular Economy Strategy for Scotland (2016)
- National Planning Policy Framework (2012)
- National Planning Policy for Waste (2014)

- National Renewable Energy Action Plan for the United Kingdom Article 4 of the Renewable Energy Directive 2009/28/EC

## Opportunities and Barriers to materials passports and reversible building design within the United Kingdom (National level)

### Public Instruments

**Act:** Environmental Protection Act (1990)<sup>89</sup>

**Summary:** The act brings in a system of integrated pollution control for the disposal of wastes to land, water and air. It is comprised of three parts; Part I which establishes integrated pollution control and gives Local Authorities new powers to control air pollution from a range of prescribed processes; Part II improves the rules on waste disposal; Part III covers statutory nuisances and clean air.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: It provides the waste management framework for the UK which creates opportunities to build in legislation for materials passports and reversible building design.*
- *Barriers to Materials Passports & Barriers to Reversible Building Design: Very limited in its scope as all it does is provides a framework for waste management.*

**Act:** Climate Change Act (2008)<sup>90</sup>

**Summary:** The Climate Change Act was passed in 2008 and established a framework to develop an economically credible emissions reduction path. It also strengthened the UK's leadership internationally by highlighting the role it would take in contributing to urgent collective action to tackle climate change under the Kyoto Protocol. The act includes: a **2050 target** which commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels; **Carbon Budgets** which require the government to set legally binding 'carbon budgets' (a carbon budget is a cap on the amount of greenhouse gases emitted in the UK over a five-year period); the establishment of a **Committee on Climate Change** to advise the government on emissions targets, and report to Parliament on progress made in reducing greenhouse gas emissions; a **National Adaptation Plan** requiring the government to assess the UK's risks from climate change, prepare a strategy to address them, and encourage critical organisations to do the same.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Small opportunity for materials passports and reversible building, if it could be demonstrated that they help reduce greenhouse gas emissions.*
- *Barriers to Materials Passports & Barriers to Reversible Building Design: Has minimal impact on materials passports or reversible building design; by focusing on reduction of CO2 emissions, may unintentionally encourage the*

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<sup>89</sup> <http://www.legislation.gov.uk/ukpga/1990/43/contents>

<sup>90</sup> <http://www.legislation.gov.uk/ukpga/2008/27/contents>



*use of materials and construction techniques which increase the difficulty of deconstruction and separation of materials at the end of use.*

**Act:** Environment Act (1995)<sup>91</sup>

**Summary:** The Environment Act 1995 updates much of the earlier legislation on the areas that extends to: Part 1 the Environment Agency and the Scottish Environmental Protection Agency, Part 2 Contaminated Land and Abandoned Mines, Part 3 National Parks, Part 4 Air Quality and Part 5 Miscellaneous general and supplemental provisions (e.g. waste, mineral planning permissions, hedgerows, drainage, fisheries etc.). The Act establishes the Environment Agency (operational in England and Wales) and the Scottish Environment Protection Agency.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Low opportunities although the Act incorporated the Environment Agency and the Scottish Environmental Protection Agency as institutions, responsible for enforcement and environmental permitting. Opportunity to collaborate and develop schemes necessary to promote materials passports and reversible building.*

**Act:** Planning and Energy Act (2008)

**Summary:** The Act allows local councils to set targets in their areas for on-site renewable energy, on-site low carbon electricity and energy efficiency standards, in addition to national requirements. It also requires developers to source at least 10% of any new building's energy from renewable sources, implementing nationwide the 'Merton Rule'. The Act covers England & Wales.

- *Barriers to Reversible Building Design: Promotes, rather than enforces, energy efficiency standards. Driver for on-site renewables. Both might unintentionally increase the difficulty of disassembly or reuse at the end of the built asset's life.*

**Act:** Building Act (1984)<sup>92</sup>

**Summary:** The primary enabling legislation under which secondary legislation such as the Building Regulations are made. It empowers the Secretary of State (for England and Wales) to make regulations for the purpose of: securing the health, safety, welfare and convenience of persons in or about buildings and of others who may be affected by buildings or matters connected with buildings; furthering the conservation of fuel and power; preventing waste, undue consumption, misuse or contamination of water. It also empowers and obliges local authorities to enforce the Building Regulations in their areas, including a right of entry into buildings and powers of prosecution and enforcement in relation to non-compliant building work, dangerous structures and demolitions.

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<sup>91</sup> <http://www.legislation.gov.uk/ukpga/1995/25/contents>

<sup>92</sup> <http://www.legislation.gov.uk/ukpga/1984/55/contents>

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: Explicitly defines the ability of government to make regulations with regard to preventing waste, conservation of fuel and power. Opportunities potentially rest with the ability to create new regulations, which could drive materials passports and reversible building design.*

**Regulation:** The Building Regulations (2010)<sup>93</sup>

**Summary:** A statutory instrument that sets out the legal requirements for regulatory control of building work in England and Wales. It defines when building work is ‘controlled’, how an application should be made and which technical requirements apply to the controlled work. It also includes technical requirements and additional legal requirements such as the provision of fire safety information.

- *Opportunities for Reversible Building Design: Few opportunities without proper amendments to the regulations to encourage reversible building design and circularity.*
- *Barriers to Reversible Building Design: The regulations are not designed to enhance reversible building design and so represent a barrier to their implementation.*

**Act:** Climate Change and Sustainable Energy Act (2006)<sup>94</sup>

**Summary:** The principal purpose of this Act is to enhance the United Kingdom’s contribution to combating climate change. This includes securing a diverse and viable long-term energy supply. Some of the main provisions include: Microgeneration, Reporting on greenhouse gas emissions, Carbon emissions reduction obligation and Community energy and renewable heat.

- *Barriers to Reversible Building Design: Does not directly create a barrier however it does set out obligations to reduce carbon emissions and increase energy efficiency which, as mentioned previously, could unintentionally create barriers to reversible building design.*

**Act:** Sustainability and Secure Buildings Act (2004)

**Summary:** Introduces new powers and requirements with respect to a range of building related issues. Not all sections of the Act have been enacted and some of them would require new regulations to give them effect, but the range of subjects covered include: sustainability, crown buildings, security, historic buildings, removal of exemptions, report on the building stock, local authority registers of information and enforcement measures. The Act requires a biennial report from the government on the progress towards sustainable building stock in England.

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<sup>93</sup> <http://www.legislation.gov.uk/uksi/2010/2214/contents/made>

<sup>94</sup> <http://www.legislation.gov.uk/ukpga/2006/19/contents>

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Materials passports and reversible building design could potentially reduce carbon emissions, increase sustainability and make UK building stock more resistant to resource shortages and climate change in the future. However, no specific opportunities are identified.*
- Barriers to Reversible Building Design: *Focus on increased energy efficiency targets as previously mentioned will likely cause the use of materials that are not easily separable and are likely to cause issues in reversible building design.*

**Act:** Town and Country Planning Act (1990)

**Summary:** This act sets out how development is regulated. It specifies local planning authorities – county councils and district councils (except in London and other Metropolitan areas)<sup>95</sup>. The Act also introduces Section 106, which allows planning authorities to impose obligations on developers to mitigate any negative impacts of development<sup>96</sup>.

- Opportunities for Reversible Building Design: *Planning authorities could stipulate the use of reversible building design through instruments such as S106, as a condition of granting planning permission.*
- Barriers to Reversible Building Design: *The local nature of planning policy could potentially hinder the application of new technologies, such as reversible building design, due to ‘NIMBY’ (Not In My Back Yard) concerns.*

**Regulation:** The Energy Efficiency (Eligible Buildings) Regulations (2013)<sup>97</sup>

**Summary:** The regulations transpose Article 5 of the Directive 2012/27/EU of the European Parliament and of the Council 25 October 2012 on energy efficiency; set and energy savings target of 163.6 gigawatt hours to be achieved in eligible buildings owned and occupied by central government by 2020; requires the Secretary of State to report to the European Commission, on an annual basis, the amount of energy savings achieved in each year of the reporting period of 2014 to 2020; place a duty on the component authorities to encourage public bodies to adopt energy efficiency plans; and requires the Secretary of State to review the operation and effect of the Regulations and publish a report by 14 January 2019.

- Barriers to Reversible Building Design: *All buildings owned by central government must meet a total energy savings target of 163.6 gigawatt hours. Through the creation of energy efficiency plans, this is likely to have minimal effect on the implementation of reversible building design or materials passports. However savings measures could potentially hinder reversible building design.*

**Regulation:** The Construction Products Regulations (2013)<sup>98</sup>

<sup>95</sup> <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7459>

<sup>96</sup> [http://www.pas.gov.uk/3-community-infrastructure-levy-cil/-/journal\\_content/56/332612/4090701/ARTICLE](http://www.pas.gov.uk/3-community-infrastructure-levy-cil/-/journal_content/56/332612/4090701/ARTICLE)

<sup>97</sup> <http://www.legislation.gov.uk/uksi/2013/3220/contents/made>

<sup>98</sup> <http://www.legislation.gov.uk/uksi/2013/1387/contents/made>

**Summary:** The Construction Products Regulations (CPR) lay down harmonised rules for the marketing of construction products in the EU. The regulation provides a common technical language to assess the performance of construction products. It ensures that reliable information is available to professionals, public authorities, and consumers, so they can compare the performance of products from different manufacturers in different countries.

- Opportunities for Reversible Building Design: *Could also allow reprocessed, recycled, reused materials to be widely exchanged across national boundaries within the European Union. If certain issues are resolved this could have far reaching benefits for the circular economy, as the market can be accessed across Europe for the reuse of building materials.*
- Opportunities for materials passports  
*Regulation 7 stipulates that building work shall be carried out:*
  - (a) with adequate and proper materials which –*
    - i. Are appropriate for the circumstances in which they are used,*
    - ii. Are adequately mixed or prepared, and*
    - iii. Are applied, used or fixed so as adequately to perform the functions for which they are designed.*

*These rules could be an opportunity for materials passports to help various products more easily meet regulation 7.*
- Barriers to Materials Passports: *New technical specifications could have to be developed to facilitate use of reused/recycled construction products, guarantees of product performance would have to issued as well as legal responsibility for the product.*

**National Renewable Energy Action Plan<sup>99</sup>** for the United Kingdom Article 4 of the Renewable Energy Directive 2009/28/EC

**Summary:** The National Renewable Energy Action Plan provides detailed information on a set of measures that would enable the UK to meet its 2020 target. It also details a plan that goes beyond 2020 to help secure energy supplies for the future. The independent UK Committee on Climate Change to review the renewables target and provide advice on increasing the level of ambition of the targets set within the plan. The UK renewable policy frame is made up of three key components: financial support for renewables; unblocking barriers to delivery; and developing emerging technologies.

- Barriers to Reversible Building Design: *Increasing use of renewable energy will likely need a rethink of building design with different infrastructure needs. Use of on-site renewables could hinder deconstruction and reuse of materials.*

## Financial Instruments

**Tax:** Landfill Tax (1996)

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<sup>99</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47871/25-nat-ren-energy-action-plan.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47871/25-nat-ren-energy-action-plan.pdf)

**Summary:** Introduced on the 1<sup>st</sup> October 1996 by the Conservative Chancellor Kenneth Clarke it was the first tax in the United Kingdom with an explicit environmental purpose. It is collected from landfill site operators and charged at a standard rate per tonne on ‘active waste’ (such as plastic packaging), and at a lower rate on inactive waste (such as builders rubble). The standard rate of tax has been increased steadily increasing since 1999, in 2009 ten years later it was set at £40 per tonne. This is mainly due to the duty escalator put in place by the then Labour Chancellor Gordon Brown, which set in place legislation that the landfill tax will rise by £1 per tonne per year.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: The landfill tax removed landfill as a cheap option for disposal of waste in the UK, acting as an incentive to alternate forms of disposal including recycling and reuse. Reversible building design and materials passports could have a positive impact on reduction of disposal of waste to landfill.*
- *Barriers to Materials Passports & Barriers to Reversible Building Design: Under the current system, only half of all construction waste is reused or recycled; the construction sector produces three times as much waste as all the households in the UK combined. Stricter enforcement or restructuring of the landfill tax may be needed to further encourage circularity, reuse and reversible building design.*

## Opportunities and Barriers to materials passports and reversible building design within the United Kingdom (Sub-national level)

### Public Instruments

Scotland's Zero Waste Plan (2010)<sup>100</sup>

**Summary:** The Zero Waste Plan sets the strategic direction for waste policy in Scotland, with a vision that all waste is viewed as a resource. The plan is underpinned by the requirements of European legislation and an aim to achieve the best overall outcomes for Scotland's environment by making best practical use of the approach in the waste management hierarchy: waste prevention, reuse, recycling and recovery. It is intended to create a stable framework that will provide confidence for the investment necessary to deliver a zero waste Scotland over the next 10 years.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Sets out Scotland's actions in order to transpose the EU waste framework directive into UK law, supports a number of goals such as the 70% recycling target for all waste arising in Scotland. As well as restrictions for certain types of waste to landfill, both of these support and encourage the implementation of reversible building design and materials passports.*

Regulations: The Waste Regulations (Northern Ireland) (2011)<sup>101</sup>

**Summary:** The Waste Regulations (Northern Ireland) (2011) transpose the requirements of the revised Waste Framework Directive (2008/98/EC) in the province. The overall objective of the legislation is to 'protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use.

- Opportunities for Materials Passports and Reversible Building Design: *Transposes the waste framework directive into Northern Ireland legislation, including the application of waste hierarchy which encourages preparing for re-use and recycling, two key components of the circular economy. It therefore provides an opportunity for the implementation of materials passports and reversible building design.*

Regulations: The Waste (Scotland) Regulations (2012)<sup>102</sup>

**Summary:** The Waste (Scotland) Regulations (2012) transpose the requirements of the revised Waste Framework Directive (2008/98/EC) in the province. They make the following provisions; all businesses both public sector and non-for-profit organisations are required to

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<sup>100</sup> <http://www.gov.scot/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

<sup>101</sup> <http://www.legislation.gov.uk/nisr/2011/127/contents/made>

<sup>102</sup> <http://www.legislation.gov.uk/ssi/2012/148/contents/made>

present metal, plastic, glass, paper and card for separated collection; food businesses which produce over 5kg of food waste per week to present that food waste for separated collection from 1 January 2016; local authorities to provide minimum recycling service to householders; waste contractors to provide collection and treatment services which deliver high quality recycling; a ban on any metal, plastic, glass, paper, card and food collected separately for recycling from going to incineration or landfill from 1<sup>st</sup> January 2014; all new incinerators must ensure that metals and dense plastics have been removed from residual municipal waste prior to incinerator; and a ban on biodegradable municipal waste going to landfill from 1 January 2021.

- Opportunities for Materials Passports and Reversible Building Design: *Transposes the waste framework directive into Northern Ireland legislation, including the application of waste hierarchy which encourages preparing for re-use and recycling two key components of the circular economy and so it provides an opportunity for the implementation of materials passports and reversible building design.*

Regulations: Waste Management Plan for England (2013)

**Summary:** The Government conducted a review of Waste Policy in England The Waste Management Plan for England and associated documents, combined with equivalent plans being produced by the devolved administrations in Scotland, Wales and Northern Ireland followed the review. The Plan is a high level document which is non site specific, providing analysis of the current waste management situation in England, and evaluates how it will support implementation of the objectives and provisions of the revised WFD. It meets the requirements of Article 28 of the revised Waste Framework Directive which are broader than the requirements of Article 7 in the preceding WFD.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *The plan is an opportunity for circularity as it is encourages the implementation of the objectives and provisions of the Waste Framework Directive, including the waste hierarchy and the mandatory targets set out within it.*

Regulations: The Environmental Permitting (England and Wales) Regulations (2010)<sup>103</sup>

**Summary:** The environmental permitting regime for England and Wales requires operators to obtain permits for some facilities, to register others as exempt and provides for ongoing supervision by regulators. The aim of the regime is to: protect the environment so that statutory and Government policy environmental targets and outcomes are achieved; deliver permitting and compliance with permits and certain environmental targets effectively and efficiently in a way that provides increased clarity and minimises the administrative burden on

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<sup>103</sup> <http://www.legislation.gov.uk/uksi/2010/675/contents/made>

both the regulator and operators; encourage regulators to promote best practice in the operation of facilities; continue to fully implement European legislation.

- *Barriers to Reversible Building Design: Permits have to be sought for certain types of waste management facilities and this could have a minor impact on the reprocessing, reuse or recycling of construction materials and so reversible building design.*

Regulations: The Pollution Prevention & Control (Scotland) Regulations (PPC 2012)<sup>104</sup>

**Summary:** The regulations implement the requirements of the Industrial Emissions Directive (IED) as well as consolidating the Pollution Prevention and Control (Scotland) Regulations 2000 (PPC 2000). The regulations apply to certain industrial activities. The revisions aim to remove ambiguities and inconsistencies, ensure clearer environmental benefits, promote cost-effectiveness and encourage technological innovation. The PPC regulations apply an integrated environmental approach to the regulation of certain industrial activities. This includes emissions to air, water (including sewer discharges to water) and land, plus a range of other environmental effects, which must be considered. Permits are considered based on the nature of the activity and whether it is defined as a Part A activity or a Part B activity. They take into account Best Available Techniques (BAT), in order to balance costs against benefits as much as possible.

- *Barriers to Reversible Building Design: Scotland's PPC regulations take an integrated environmental approach to the regulation of certain industrial activities. Permits will have to be sort likely under Part A activities. This could potentially have a minor impact on the reprocessing, reuse or recycling of building materials.*

Act: Building (Scotland) Act (2003)<sup>105</sup>

**Summary:** Gives the Scottish Government the power to create building regulations with the purpose of; securing health, safety, welfare and convenience of persons in or about buildings and of others who may be affected by buildings or matters connected with buildings; furthering the conservation of fuel and power; and furthering the achievement of sustainable development.

- *Opportunities for Reversible Building Design: Provisions for the creation of Scottish building regulations, potential opportunity as it allows the creation of regulations that could be beneficial to reversible building design.*

Regulations: The Building (Scotland) Regulations (2004)<sup>106</sup>

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<sup>104</sup> <https://www.sepa.org.uk/regulations/pollution-prevention-and-control/>

<sup>105</sup> <http://www.legislation.gov.uk/asp/2003/8/contents>

<sup>106</sup> <http://www.legislation.gov.uk/ssi/2004/406/contents/made>



**Summary:** The regulations cover buildings that are exempted; conversions to which they apply; descriptions of building and work including the provision of services, fittings and equipment, not requiring a warrant; measurements. Schedule 5 covers building standards applicable to design and construction this includes; structure, fire, environment, safety, noise and energy. It sets minimum standards and requirements for buildings and makes provisions for access to buildings and further conservation of fuel and power.

- Opportunities for Materials Passports and Opportunities for Reversible Building Design: *Cover design, construction, and demolition, provision of services, fittings, equipment and conversion of a building. This may represent an opportunity to work with the Scottish government towards provision for circularity in the construction sector through materials passports and reversible building design.*

Regulations: The Building Regulations (Northern Ireland) (2012)<sup>107</sup>

**Summary:** The Building Regulations set minimum standards and requirements for buildings, make provisions for access to buildings and further the conservation of fuel and power. They set out legal requirements intended to ensure the health, safety, welfare and convenience of people in and around buildings.

- Opportunities for Materials Passports and Opportunities for Reversible Building Design: *The regulations cover design, construction, and demolition, provision of services, fittings, equipment and conversion of a building. This may represent an opportunity to work with the Northern Irish government towards provision for circularity in the construction sector through materials passports and reversible building design.*

Regulation: The Landfill (Scotland) Regulations (2003)<sup>108</sup>

**Summary:** These regulations implement the Landfill Directive and set standards for the design and operation of landfills. Landfill sites must be classified as hazardous, non-hazardous, or inert. The Landfill Directive aims to reduce the amount of waste to landfill by finding ways to recover value from waste and develop more sustainable management practices.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Due to classification of landfill sites, alternative solutions to construction waste disposal may be sought, which could encourage more circularity and provide an opportunity for reversible building design and materials passports.*
- Barriers to Reversible Building Design: *Landfill regulations tend to push materials towards other end of life areas such as incineration rather than*

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<sup>107</sup> <http://www.legislation.gov.uk/nisr/2012/192/contents/made>

<sup>108</sup> <http://www.legislation.gov.uk/ssi/2003/235/contents/made>

*recycling or reuse, this will have to change in order to promote reversible building design.*

Regulation: The Waste (England and Wales) Regulations (2011)<sup>109</sup>

**Summary:** These regulations implement the revised EU waste Framework Directive 2008/98 which sets requirements for the collection, transport, recovery and disposal of waste. They require businesses to confirm that they have applied the waste management hierarchy when transferring waste and include a declaration to this effect on their waste transfer note or consignment note. It introduces a two tier system for waste carrier and broker registration, including the new concept of waste dealer.

- *Opportunities for Materials Passports: Creates legal definitions for reuse, with which materials have to comply; once they have met these criteria they can officially be labelled as products (secondary materials). Could provide an opportunity for materials passports if this can be incorporated.*
- *Opportunities for Reversible Building Design: Article 6 (1) and (2) detail the end-of-waste criteria, for when a waste ceases to be a waste and becomes a secondary raw material. The criteria are set for specific materials to help level the playing field and remove administrative burden and will allow greater recovery of materials from a built asset during deconstruction. Also includes the waste management hierarchy which encourages prevention, preparing for re-use and recycling.*
- *Barriers to Materials Passports & Reversible Building Design: Currently end-of-waste criteria only exist for iron, steel, aluminium scrap, glass cullet and copper scrap. These will have to be expanded to remove the barrier to both reversible building in regards to the reprocessing of other materials, as well as providing further structure/standardisation for materials passports.*

Regulation: The Hazardous Waste (England and Wales) Regulations (2005)<sup>110</sup>

**Summary:** Hazardous waste is any waste with hazardous properties that might be harmful to human health or the environment. The regulations cover the storage, transport and disposal of hazardous waste to ensure it is appropriately managed and any risks are limited.

- *Barriers to Reversible Building Design: If any hazardous waste is produced or handled by a business it has a 'duty of care' and must meet extra requirements depending on whether you are a producer or holder, carrier or consignee. Unlikely to be a major barrier as most construction waste is non-hazardous, however in the case that hazardous materials are being used these regulations*

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<sup>109</sup> <http://www.legislation.gov.uk/uksi/2011/988/contents/made>

<sup>110</sup> <http://www.legislation.gov.uk/uksi/2005/894/contents/made>

*could be the basis for a barrier to reversible building design, as it may be difficult to reprocess, reuse or recycle them.*

Regulation: The Hazardous Waste (Northern Ireland) Regulations (2005)<sup>111</sup>

**Summary:** Hazardous waste is any waste with hazardous properties that might be harmful to human health or the environment. The regulations cover the storage, transport and disposal of hazardous waste to ensure it is appropriately managed and any risks are limited.

- **Barriers to Reversible Building Design:** *If any hazardous waste is produced or handled by a business it has a 'duty of care' and must meet extra requirements depending on whether you are a producer or holder, carrier or consignee. Unlikely to be a major barrier as most construction waste is non-hazardous, however in the case that hazardous materials are being used these regulations could be the basis for a barrier to reversible building design, as it may be difficult to reprocess, reuse or recycle them.*

Regulation: The Special Waste Regulations (1996) (Scotland)<sup>112</sup>

**Summary:** In Scotland, hazardous waste is known as special waste. These regulations set out the procedures to be followed when disposing of, carrying and receiving special waste. They are the principal piece of legislation covering special waste arising in Scotland.

- **Barriers to Reversible Building Design:** *If any hazardous waste is produced or handled by a business it has a 'duty of care' and must meet extra requirements depending on whether you are a producer or holder, carrier or consignee. Unlikely to be a major barrier as most construction waste is non-hazardous, however in the case that hazardous materials are being used these regulations could be the basis for a barrier to reversible building design, as it may be difficult to reprocess, reuse or recycle them.*

Regulation: Waste (Wales) Measure 2010<sup>113</sup>

**Summary:** The measure covers four main areas; it allows Welsh ministers to ensure that retailers pass the carriers bag charges on to specified environmental projects; it sets targets for the percentage of waste that local authorities recycle or compost as well as allowing the imposition of fines on local authorities failing to meet those targets; it enables the Welsh authorities to ban or restrict certain wastes from landfill in Wales; and it allows the Welsh

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<sup>111</sup> <http://www.legislation.gov.uk/nisr/2005/300/contents/made>

<sup>112</sup> <https://www.sepa.org.uk/regulations/waste/special-waste/>

<sup>113</sup> [http://gov.wales/topics/environmentcountryside/epq/waste\\_recycling/legislation/measure2010/?lang=en](http://gov.wales/topics/environmentcountryside/epq/waste_recycling/legislation/measure2010/?lang=en)

authorities to introduce fees and charge schemes for Site Waste Management Plans for the Construction Demolition Sector.

- *Opportunities for Reversible Building Design: Allows the Welsh Government to make provisions with regards to site waste management and disposal of waste created with regards to construction and demolition. An opportunity for reversible building as it can allow the creation of site waste management plans in Wales that would benefit reversible building design.*

Climate Change (Scotland) Act 2009<sup>114</sup>

**Summary:** The Act sets out in statute the Scottish Government's target to reduce Scotland's emissions of greenhouse gases by 80% by 2050. It also establishes an interim target for 2020 of at least 42 % reductions in emissions, and allows ministers, by order, to vary the reduction figure for interim target based on expert advice.

- *Opportunities for Materials Passports & Opportunities for Reversible Building Design: A wide range of measures to combat climate change, reversible building design and materials passports are likely to play a large part in doing this. They can potentially help relieve any issues with increased uncertainty in resource supply caused by climate change and so play a part in a mitigation strategy. But also an opportunity to cause help target waste reduction as set out in part 6 of the act.*
- *Barriers to Reversible Building Design: Efforts to increase energy efficiency measures in buildings through this scheme may lead to the design of buildings that are less easily disassembled; this could act as a barrier to reversible building design.*

Energy Efficiency Action Plan (Scotland)<sup>115</sup>

**Summary:** The plan reaffirms the Scottish Government's ambitions in energy efficiency. It sets out a wide ranging programme of activity on behaviour change, household, business and public sector energy efficiency, infrastructure, skills, and finance. It sets out a framework for energy efficiency and microgeneration that furthers Scotland's climate change social agenda's. Key actions include: improving the energy efficiency of all housing stock to meet the demands of the future; establishing a single energy and resource efficiency service for Scottish businesses; developing a public sector that leads the way through exemplary energy performance and provides a low carbon Scotland; reducing transport energy demand; promoting infrastructure improvements; and ensuring that the work force is properly skilled to take up such opportunities.

- *Barriers to Reversible Building Design: Efforts to increase energy efficiency measures in buildings through this scheme may lead to the design of buildings*

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<sup>114</sup> <http://www.gov.scot/Topics/Environment/climatechange/scotlands-action/climatechangeact>

<sup>115</sup> <http://www.gov.scot/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan>

*that are less easily disassembled. This could act as a barrier to reversible building design.*

#### A low Carbon Economic Strategy for Scotland: Scotland – A low Carbon Society<sup>116</sup>

**Summary:** Details the Scottish government’s commitment to supporting the transition to a low carbon Scottish economy, to help seize business opportunities and a better quality of life. It is an integral part of the Government’s Economic Strategy to secure sustainable economic growth, and is a key component of the broader approach to meeting Scotland’s climate change targets. The built environment is one of the focus areas, along with resource efficiency, although considerations around resource use at end of an asset life are not addressed.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *The strategy seeks a low carbon Scotland with a range of strict targets for decarbonisation. With a wide range of policy drivers behind this the circular economy stands to play a key role in doing this.*
- Barriers to Reversible Building Design: *emphasis on the construction and in-use phases of a building lifecycle, particularly energy efficiency, may lead to the use of materials and design of buildings which are not suitable for deconstruction and reuse.*

#### Making Things Last: A Circular Economy Strategy for Scotland (2016)<sup>117</sup>

**Summary:** The strategy sets out the Scottish government’s priorities for moving towards a circular economy and their ambition for waste prevention. This strategy takes the targets and ambitions in the Zero Waste Plan and in Safeguarding Scotland’s Resources and places them in the context of action for a more circular economy. The strategy has been developed, and will be delivered, in partnership with Zero Waste Scotland and SEPA. The strategy, together with the Manufacturing Action Plan, will be supported by over £70m of investment, including £30m of European Structural Funds.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *This looks to be a great opportunity to align circular economy with local and regional economic growth. Construction and the built environment is one of four priority sectors identified. It is a recent development in Scotland, so an early discussion with the implementing bodies could be advantageous, before associated programmes are completely determined.*

#### Policy: National Planning Policy Framework (2012)<sup>118</sup>

**Summary:** The Framework, which applies in England, addresses planning from the perspective of sustainable development and emphasises the importance of people and

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<sup>116</sup> <http://www.gov.scot/Resource/Doc/331364/0107855.pdf>

<sup>117</sup> <http://www.gov.scot/Resource/0049/00494471.pdf>

<sup>118</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6077/2116950.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf)

communities to the planning process. It presents 12 core principles for planning, alongside a 13-point delivery framework aimed at local planning authorities, which encompasses economic, social and environmental aspects of sustainable development. The principles and framework are designed to inform the development of Local Plans and to establish a presumption in favour of sustainable development throughout the process.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: *Provides an opportunity as it aims to deliver sustainable development and resource efficiency as well as ensuring waste management is considered with other spatial planning concerns. The circular economy is in the position to play a key role in bringing the goals of the national planning policy about, and creates an opportunity for reversible building design and materials passports.*

### **Policy: National Planning Policy for Waste (2014)<sup>119</sup>**

**Summary:** The policy, which applies to England, sets out the Government's ambition to develop a more sustainable and efficient approach to resource use and management. Its ambitions include; delivery of sustainable development and resource efficiency; ensuring that waste management is considered alongside other spatial planning concerns such as housing and transport; providing a framework in which communities and businesses are engaged with and take more responsibility for their own waste; helping to secure re-use, recovery and recycling of waste without endangering human health or the environment; and ensuring the design layout of new residential and commercial developments and other infrastructure compliments sustainable waste management.

- Opportunities for Materials Passports & Opportunities for Reversible Building Design: Targets include helping to secure re-use and recovery, sustainable waste management and driving waste management up the waste hierarchy. Reversible building and materials passports have the potential to have a positive impact on reaching the goals of the national planning policy for waste.

### **Summary of opportunities for and barriers to materials passports and reversible building design within the United Kingdom.**

There is a great deal of uncertainty surrounding future policy developments, following the UK referendum on membership of the European Union. For the time being, all legislation driven by European law remains on the statute books. However, it is to be expected that some

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/364759/141015\\_National\\_Planning\\_Policy\\_for\\_Waste.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364759/141015_National_Planning_Policy_for_Waste.pdf)

changes will be made following Brexit and the extent of these will likely depend upon the type of agreement reached between the UK and the EU.

The current complexity of the legislative framework in the UK provides a challenge. The four countries, England, Scotland, Wales and Northern Ireland, share some legislation. However, the devolved governments of Scotland, Wales and Northern Ireland also develop some of their own laws. The opportunities and barriers do therefore vary across the UK.

Scotland currently provides the greatest opportunities for materials passports and reversible building design. Its Circular Economy Strategy, for which construction and the built environment is a priority area, and its Zero Waste Plan provide a legislative rationale for materials passports and reversible building design.

The Construction Products Regulations, driven by European legislation and in effect across the whole UK, also offer a strong opportunity for materials passports and reversible business design. The common language and harmonised rules of the regulations could allow for reprocessed, recycled and reused materials to be widely exchanged by providing confidence in their performance and quality.

A further key opportunity comes from the Landfill Tax, in effect in England, Wales and Northern Ireland (and separately administered in Scotland). The increasing cost of landfill provides an economic driver for alternative solutions which avoid end-of-life waste, such as reversible building design.

The various Building Acts and Buildings Regulations in place across the UK could also provide opportunities for materials passports and reversible building design, should governments choose to drive changes in policy through amendments to legislation.

The Town and Country Planning Act of 1990 also offers great scope to implement all aspects of circular economy at a local authority/municipality level. In particular, Section 106, which allows planning authorities to impose obligations on developers to mitigate any negative impacts of development. There is anecdotal evidence that a few municipalities are already considering their ability to influence here, especially in London.

The main barriers to materials passports and reversible building design currently in the UK stem from a combination of uncertainties over the impact of Brexit on future policy and the complexity of the legislative framework across the country.

It could be argued that the other key barrier comes through energy efficiency policies across the UK. The prioritisation of energy efficiency may unintentionally result in building design and materials which do not lend themselves to deconstruction and reuse.