Development and implementation of initiatives fostering investment and innovation in construction and demolition waste recycling infrastructure

Executive Summary | 16 November 2017

Prepared for:

European Commission

DG for Internal Market, Industry, Entrepreneurship and SMEs

Industrial Transformation and Advanced Value Chains

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Cover photo: Kretz, D. 2017.

This photo depicts the Europa Building in Brussels, Belgium. The Europa Building exemplifies sustainable design, especially through the use of recycled materials in its construction. 28 Member States make up the EU at present and thus restored wooden window frames from 28 countries that have been retrieved from renovation or demolition sites are found in its façade. The building was designed by Samyn and Partners (Belgium), Studio Valle Progettazioni (Italy) and Buro Happold (United Kingdom).

Executive Summary

This study has two major objectives: (i) **to identify, list and analyse existing business models in the field of CDW recycling within a selection of EU countries and select non-EU countries**, and (ii) **building on these analyses to develop and elaborate a set of five business cases that are exemplary in their nature for the planning and design of new CDW recycling facilities, especially in countries where recycling rates are currently below the Waste Framework Directive target of 70%.**

The study includes consultations with stakeholders in an iterative and inclusive interactive process to ensure the viability of the results. This is through the inclusion of stakeholder inputs from the onset and constitutes a validation workshop (planned for November 16th 2017) on the resulting elaborated business cases.

Through the five business cases resulting from this study, the outcome of this study will be a direct contribution to the improvement of the CDW recycling facility development, especially in countries that are lagging behind on their Waste Framework Directive targets. The study aims bridging the so-called 'valley of death' between entrepreneurs and financial institutions. It is instrumental in facilitating the use of funding from the European Fund for Strategic Investments (EFSI) as well as of other EU funding instruments for the encouragement of individual CDW recycling projects inspired on the business cases proposed and as such ultimately invigorates the drive towards the 70% CDW recycling target.

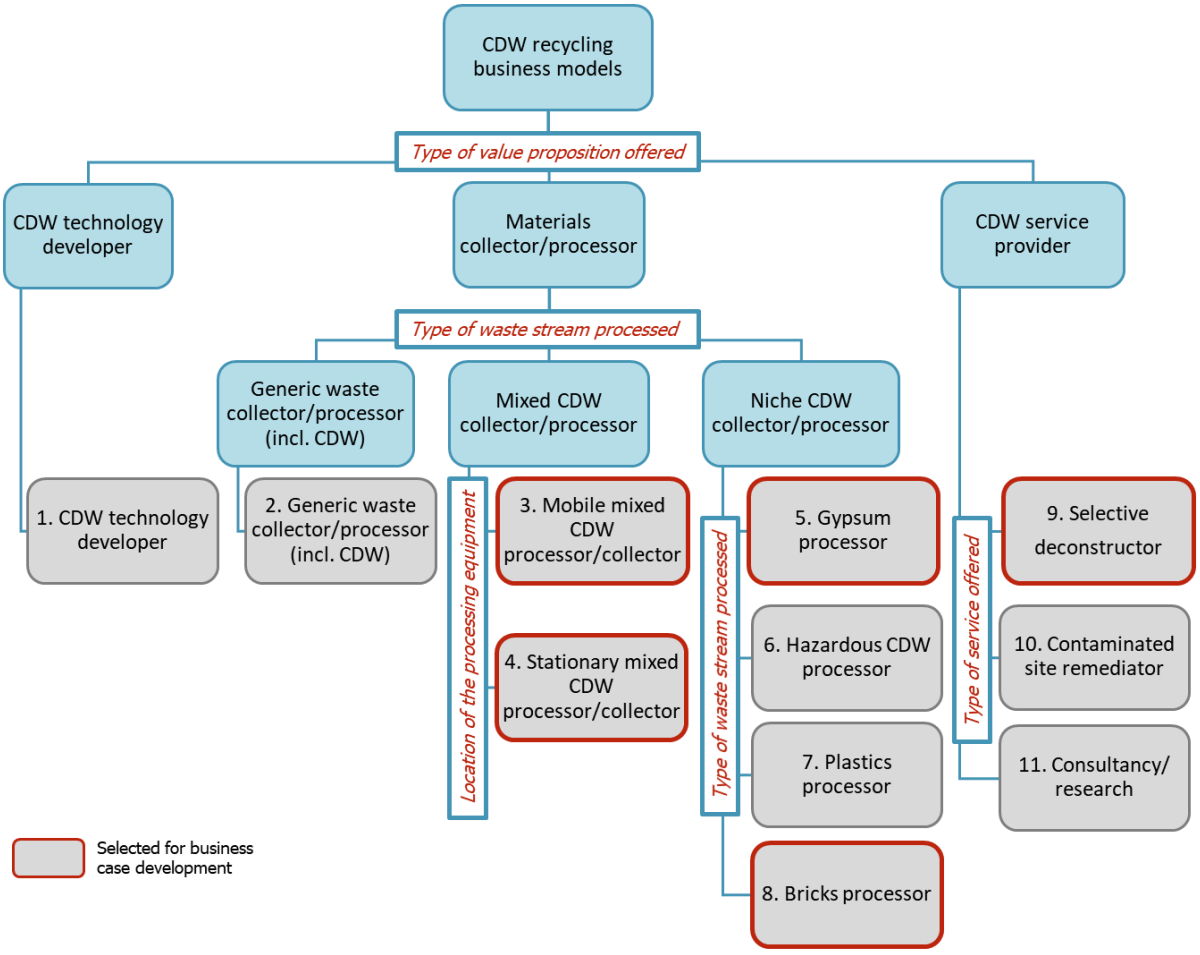
Based on volume, Construction and Demolition Waste (CDW) is the largest waste stream in the EU – it represents about one third of all waste produced. Proper management of CDW and recycled materials – including the correct handling of hazardous waste – can have major benefits in terms of sustainability and the quality of life. But it can also provide major benefits for the EU construction and recycling industry, as it boosts demand for CD recycled materials.

The key legislation in the context of CDW recycling is the Waste Framework Directive, which sets the basic concepts and definitions related to waste management, as well as prescribes Member States to achieve the target of 70% of CDW being recycled by 2020. Furthermore, the recent and ambitious Circular Economy Package , which includes revised legislative proposals on waste to stimulate Europe's transition towards a circular economy to boost global competitiveness, foster sustainable economic growth and generate new jobs, is part of the legislative context relevant for the topic of this study.

Through targeted country selection, and information gathering based on interviews, expert knowledge and literature, a set of business models were able to be distilled in a typology. The typology is depicted in Figure 1, whereby business models could be differentiated using distinguishing features. In order to narrow down to a selection of five business cases for further development, a multi-criteria analysis was completed, whereby questions on the profitability, sustainability, stability of the demand and supply and legal compliance were scored and the resulting top five normalised ranked business models were selected for further development.

An understanding of the business context that enables and hinders the development of CDW infrastructure was similarly distilled relating to market / economic parameters, the regulatory / legislative situation, the technology development and application as well as the social conditions. In Europe we find distinctive differences between advanced CDW recycling countries and lagging CDW recycling countries which both help and hamper further CDW recycling activities, respectively.

Figure 1: Overview of the proposed business model typology for CDW recycling.



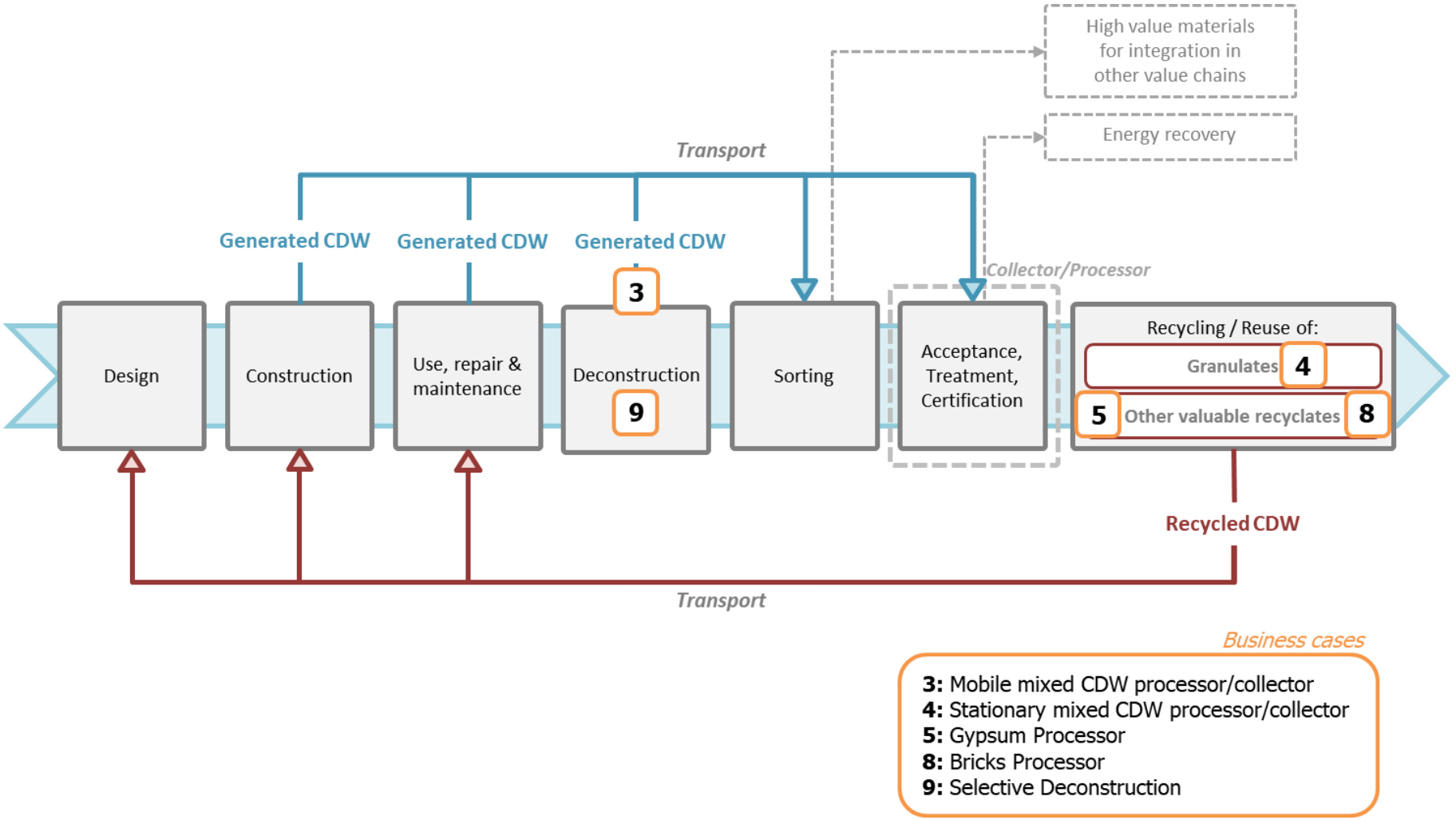
Source: IDEA Consult

Business cases were developed based on the five selected business models, with the aim of being readily used by potential financers and entrepreneurs as an instrument to improve the CDW recycling infrastructure in the EU. The placement of the five business cases along the CDW recycling value chain is depicted in Figure 2 and they include:

- Gypsum processor
- Brick processor
- Stationary Mixed CDW Processor
- Mobile Mixed CDW Processor
- Selective Deconstruction

In a first step, a selection of representative financial stakeholders were consulted to understand their requirements and to allow the stakeholders to give insight into how they could be supported with the generic business cases. In the second step, a specific business model was selected for the development of a pilot business case, which was presented to the Commission, entrepreneurial and financial stakeholders for further validation. Four further business cases were elaborated using key information used obtained from a senior profile (CEO, owner, operational director) in a company that is experienced in running such a business. A repeat validation of the generic calculation model was done by an entrepreneur experienced in running this type of business. The final validation of all business cases is foreseen to take place during the Validation Workshop Stakeholders Meeting on November 16th 2017.

Figure 2: Placement of five selected business cases in the CDW value chain



Source: IDEA Consult

In order to reach the 70% construction and demolition waste recycling target, addition investment in infrastructure are clearly needed. Based on the information gathered in this study, we estimate how much CDW recycling is still needed to reach that 70% target at EU level. According to our estimates, 73 million tonnes of CDW remain to be recycled to reach the 70% target including backfilling, or 82.5 million tonnes excluding backfilling. This target can be best achieved by concentrating investments on volumes of CDW through mobile and stationary mixed CDW recycling treatment facilities. Three scenarios of development with (i) mobile CDW facility only investments, (ii) stationary mixed CDW facility investments and (iii) both mobile and stationary mixed investments can be applied in order to assess the possible range of cost to reach the target. This results in an estimated cost of CDW recycling infrastructure (based on a target of recycling 73 million tonnes of CDW) of:

- Scenario 1: mobile mixed CDW recycling facilities only: **742,695,652 €**
- Scenario 2: stationary mixed CDW recycling facilities only: **1,095,000,000 €**
- Scenario 3: both mobile and stationary mixed CDW recycling facilities: **918,847,826 €**.