

## EXECUTIVE SUMMARY

### • BACKGROUND

EU28 currently generates 461 million tons per year of Construction and Demolition Waste (C&DW), excluding excavated material, and the generation rates are expected to reach 516 Mt in 2020 and around 570 Mt between 2025 and 2030. Communication (COM (2014) 445 final) "on Resource Efficiency Opportunities in the Building Sector" stated the Commission's intention to encourage a more efficient use of the resources consumed by new or refurbished buildings. The Waste Framework Directive 2008/98/EC establishes a target of 70% of Construction and Demolition Waste (CDW) to be recycled by 2020. In December 2015 The European Commission adopted the "Circular Economy Package", which includes revised legislative proposals on waste to encourage Europe's transition towards a circular economy. In this Circular Economy Package, Construction and Demolition Waste is identified as a key aspect. The present study is one of the 3 actions identified in the Circular Economy Package for the construction and demolition sector.

The main objectives achieved during the study are:

1. The assessment of the current regulatory, technical and economic conditions within the Member States,
2. Identification of key-factors which could drive the implementation of pre-demolition/renovation audits and assessment and definition of the conditions – upstream and downstream – for successful implementation of pre-demolition/renovation audits
3. To provide comprehensive and operational information and to draft methodological, technical and best-practice guidelines to be implemented by contractors and project sponsors in order to support national authorities for the actual achievement of the EU 2020 target for CDW recycling

### • KEY FINDINGS

The strategies adopted by European Countries to reduce non-recovered waste are uneven and success rates are unequal. For instance, when considering countries or regions with reported high recycling rates such as the Netherlands, the region of Flanders in Belgium, Denmark or Czech Republic, it seems that the strategies around regulation are diverse; Flanders has a landfill ban for recyclable waste materials, whereas the Czech Republic is planning to introduce it by 2023. Onsite sorting based on the European classification (or similar), and a waste audit depending on size and type of building are compulsory in Flanders and Czech Republic, while in Denmark they are conducted as part of PCBs screening. In The Netherlands, however, these practices are not enforced, and their success may be linked to the scarcity of natural aggregates. On the other end, Italy and Spain can be found as examples of low recycling rates. The regulations and guidelines concerning waste audits were identified in many countries in the Resource Efficient Use of Mixed Wastes study by Deloitte<sup>1</sup>. While Spain is one of the countries (especially some regions as the Basque Country) with strong regulations for

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<sup>1</sup> Resource Efficient Use of Mixed Wastes  
[http://ec.europa.eu/environment/waste/studies/mixed\\_waste.htm](http://ec.europa.eu/environment/waste/studies/mixed_waste.htm)

compulsory waste audits, Italy has very little regulation around CDW. In some cases, as in Spain, these practices are hardly implemented. Several reasons have been found in literature and during interviews, including, but not limited to: lack of control and monitoring or lack of management infrastructures. A revision of legal and regulatory aspects, market issues, technical and methodological aspects, economic dimension and human and cultural aspects has been performed.

This information has been analysed and evaluated identifying the needs for predemolition and/or renovation CDW assessment audits and the best practices in the different countries. As a result of this information the waste audit guideline has been produced, including templates to ease its implementation.

Performing a waste audit present a series of advantages (both economically and environmentally) providing important added value to the whole project. Special emphasis needs to be put on the following aspects about waste audits:

- Waste audits are the first step towards recycling
- Waste audits promote fair competition amongst contractors (when performed before the call for tenders and included in the invitation)
- Waste audits increase awareness and ease traceability processes. It is of major importance to know the materials that will be set free (as especially the hazardous ones as unexpected costs during the works can be avoided)
- Environmental and technical quality of materials can be steered:
  - Environmental aspects that will be improved include:
    - which contaminants are present
    - Contribute to the assurance that they are removed and do not end up in the environment
    - The achievement of higher environmental quality of recyclable waste materials
  - Technical quality aspects that will be improved include the identification of “higher quality” batches of recycled materials (for example concrete)
- Waste audits contribute to a better demolition waste management. Knowing the quantities and nature of materials expected leads to the optimisation of works (how many containers / on-site vs off-site sorting / etc.)

- **WASTE AUDIT GUIDELINE**

A waste audit before demolition or renovation is a specific task within the project planning and is necessary to understand the type and amount of elements and materials that will be deconstructed/demolished and to issue recommendations on their further handling. An assessment of the viable recovery routes for materials can also be given (including reuse and the potential reuse value, recycling on- and off-site and the associated cost savings and energy recovery).

The waste audit should also consider any relevant legislation such as the requirements for environmental permits if waste is to be used on-site or any waste that may be hazardous and

such needs to be managed in accordance with a specialized waste legislation. It should be performed before (in order to secure) the demolition or renovation permit. Its findings support the decisions of the authorities to approve the planned work and should be revised in the light of final results of the construction, demolition or refurbishment process.

The auditing process aims to deliver such documents that the owner can submit a demolition or renovation permit application and open a call for tenders. Furthermore, the outcome of the audit should also provide reliable estimates to contrast them with the results from waste management report. An effective process for carrying out a waste audit should follow the steps depicted in Figure 1.

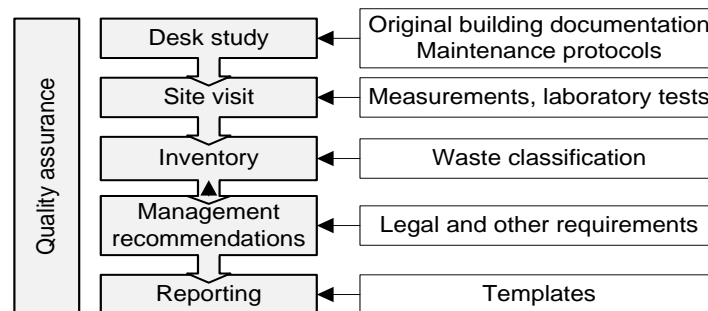


Figure 1 Example of the waste audit process

Inventory and waste management recommendations are typically generated from the desk study and site visit.

#### • NEEDS IDENTIFIED FOR WASTE AUDITS AND IMPLEMENTATION PROPOSAL

The objectives of the EU C&D waste protocol are focused on the increased perceived quality/reliability of C&D waste management process and C&D recycled materials. The needs for waste audits identified in the stock taking task are related with the following aspects:

- (1) Environmental and health protection
- (2) Progress towards C&D waste targets
- (3) Generation of reliable waste statistics
- (4) Increased environmental performance
- (5) Demand for C&D recycled materials
- (6) Increase of cooperation along the waste value chain
- (7) Economic performance

Proposals for guidelines have been based on best practices identified. Three main points have been considered essential for the efficiency of the audits:

- The required skills/knowledge of the auditor and its independence from the contractor (and the owner)
- Comparison of the real outputs from construction and renovation process with those estimated by the audit
- Definition of responsibilities and compensations in case of strong deviations