Construction and Demolition Waste management in Spain
V2 – 31/08/2015
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1. Summary

Construction and Demolition Waste (CDW) management national performance

<table>
<thead>
<tr>
<th>Waste category</th>
<th>Quantity generated in 2012 (million tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>N/A</td>
</tr>
<tr>
<td>Other inert waste</td>
<td>N/A</td>
</tr>
<tr>
<td>Total inert waste</td>
<td>27 637 698</td>
</tr>
<tr>
<td>Non-inert non-hazardous waste</td>
<td>N/A</td>
</tr>
<tr>
<td>Hazardous waste</td>
<td>66 156</td>
</tr>
<tr>
<td>Total CDW</td>
<td>27 703 854</td>
</tr>
</tbody>
</table>

In 2012, the National Statistics Institute indicated that Spain generated 27 million tonnes of construction and demolition waste (CDW), which coincides with EUROSTAT data. 99% of this total consisted of inert waste, with 1% consisting of hazardous waste. Out of the total generated CDW, 19 million tonnes (68%) was recycled into various outlets, while 4 million tonnes were backfilled and another 4 million tonnes were landfilled.

All Spanish regions, or “Autonomous Communities” have an obligation to report their regional statistics to the National Statistics Institute yearly, based on the European List of Waste codes in an effort to have consistent and transparent figures. According to stakeholders interviewed for this study, although this system is reliant on the collaboration and coordination of all Autonomous Communities, there are certain regions that may omit statistical reporting, which may reduce the validity of statistics. It was not possible to obtain a breakdown per region for 2012 figures to cross check potential margin error.

Regarding soil, this figure is not available within the statistical report drawn out by the National Statistics Institute, although stakeholders interviewed for this study indicated that this waste source (ELOW 17 05 04) is excluded from the declared 19 million tonnes of recycled CDW in 2012.

CDW management practices

The table below shows the destination for treated CDW in 2012. It is not able to mention that 4 363 831 tonnes of CDW were landfilled in that same year, which is almost the same as the amount that was backfilled. A breakdown of inert, non-inert-non-hazardous, and hazardous waste is currently not available. While there are still cases of illegal dumping, according to stakeholders, these unquantified levels have gone down over the years¹.

The FERCD (Spanish Federation of Construction and Demolition Waste) published figures for 2009-2013 that vary from those that are published by the National Statistics Institute/Ministry of Environment. EUROSTAT and the National Statistics Institute/Ministry of Environment will launch discussions on data viability in mid-2015, as the presented official data has outliers and additionally because data from other actors illustrate data discrepancies. Throughout this factsheet, data from FERCD will be presented when relevant, in parallel to officially reported data. However, it should be noted that until the results come in from official statistics discussions it is not feasible to outline conclusions on data discrepancy. A similar explanation can be shared regarding the fact that FERCD data includes “official” and “uncontrolled”/”unmonitored” data. More information is found in section CDW generation data. It should

¹ Interview with stakeholder in EU wide Construction and Demolition Sector. 11/05/2015. Interview with Antonio Cabrera Marianini Subdirección General de Residuos; D.G. Calidad y Evaluación Ambiental y Medio Natural Ministerio de Agricultura, Alimentación y Medio Ambiente. 30/04/2015
therefore be noted that all data presented within this factsheet sources from the National Statistics Institute/Ministry of Environment unless otherwise indicated.

<table>
<thead>
<tr>
<th>CDW destination (2012)</th>
<th>Waste collection, grouping and/or sorting site</th>
<th>Material recovery</th>
<th>Storage facility</th>
<th>Other including provider takeback</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Re-use, recycling, recovering on another site, including by another company</td>
<td>Backfilling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inert waste, non-inert non-hazardous waste</td>
<td>Not available</td>
<td>19 011 024</td>
<td>Not available</td>
<td>Not available</td>
<td>23340023</td>
</tr>
<tr>
<td>Hazardous waste</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

C&D waste management is an important topic on the current national arena, as the revised version of the 2015-2020 State Waste Framework Plan PEMAR is currently undergoing scrutiny by all Autonomous Communities and relevant stakeholders (waste federation and associations). Various versions of this unpublished draft PEMAR have been circulated to these stakeholders by the Ministry of Agriculture, Food, and Environment in light of fostering attainable, yet feasible improvements to the previous 2007-2015 National Plan on Construction and Demolition Waste (II PNRCD). Associations such as: ANEFA, FdA, COMINROC, CEPCO have been amongst the most active by transmitting rounds of comments to the Ministry.

Visibility on all national CDW management practices are not centralised by the Ministry or any centralised body. In fact, national legislation and plans on waste management encourage and lay out a framework for Autonomous Communities develop regional-wide plans and legislation adapted to their region. This specificity therefore makes it difficult to obtain a snapshot of the current and comprehensive initiatives throughout Spain, although the current collaboration level amongst regions is considered favourable. The regions of the Basque Country and Catalonia, are generally considered to be leaders in waste (CDW) management. Regional C&D waste management plans are positive drivers. Dynamic collaboration during legislation or waste management plan revisions is furthermore another notable driver to good CDW management.

Main obstacles to sustainable CDW management

- **Tough recovery from a hard hit economy**
  - The economic crisis greatly hurt Spain’s construction and demolition sector. CDW waste generation levels have risen and fallen with Spain’s economic growth. As seen below in the official data reported by the National Statistics Institute, leading up to the years of the economic crisis, namely the years 2001-2007, a steady rise of about 8.7% waste generation occurred annually, while a drastic drop in waste generation was experienced between 2007-2009 during the cusp of the economic crisis (see The table below outlines the i).
  - As indicated in the PEMAR, this economic crisis has furthermore left treatment centres without sufficient CDW supply to properly function (as many treatment centres are running below treatment capacity), and consequently, a wavering and unpredictable demand for prepared material.

- **Lack of regulations (pre-demolition audits)**
  - Many experts indicated that the lack of regulations on selective demolition and pre-demolition audits is considered to be a great source for CDW management issues. This general lack of

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3 This Plan is comprised within the 2007-2015 PNIR.

monitoring provides minimal incentives for waste and C&D actors to follow legislation and to be accountable of their actions.

- **market conditions for recycled aggregates**
  - Lack of markets for CDW (aggregates) deters development and promotion of the use of viable recycled waste.

- **Lack of awareness of the advantages of recycled aggregates**
  - This low awareness is directly related to the lack of markets for CDW (and vice versa). As waste actors are not well-informed about the advantages of using recycled aggregates in construction and renovation works, it is difficult to create a strong uptake in the market for CDW. Interviewed stakeholders indicated that many actors in the construction and renovation industry do not regard end-of-life CDW as a viable product to be used in construction and renovation works, especially since this waste material has a reputation to be highly contaminated and unprofitable to use.

- **Availability of landfills and low landfill cost**
  - Stakeholders generally believe that the landfill cost is not strict enough, and regardless of this perceived low price (EUR 5-40 depending on region), and the declared availability of 195 regulated landfills, illegal dumping is still not eradicated.

- **Absence of GPP**
  - It is a currently discussed topic on the national scale. The National Federation of Aggregates would be in support of envisioning a framework for obliging a 5-10% requirement for the use of recycled aggregates in construction works. However, this objective is currently difficult to obtain, as the use of recycled aggregates is only at about 1% and because there is not enough support to prioritise this objective.

- **Lack of awareness B2B & B2C**
  - Stakeholders indicated that issues such as illegal dumping and improper management in light renovation works. In light renovation works that may not necessarily be carried out by professionals, there is a risk that the individual in charge may not comply by the proper measures for disposal. In regards to illegal dumping, there is no concrete way to harmoniously sanction all cases of illegal dumping.
  - Since CDW management is generally considered a B2B concern, consumers are generally uneducated on how to act near a project site or how to conduct small renovation works on their households.

The table below demonstrates that there was a steady rise of 8.7% in the years leading up to economic crisis.

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total generated CDW (tonnes)</td>
<td>24 210 592</td>
<td>23 974 824</td>
<td>27 816 601</td>
<td>31 593 383</td>
<td>34 845 319</td>
</tr>
</tbody>
</table>

- **Statistical methodology inconsistencies**
  - The drop between 2010-2011 leading up to another increase in 2012 was deemed questionable within the scope of the study (see The table below outlines the i). After consulting with a stakeholder within the Ministry, it was indicated that in 2010, the National Statistics Institute may have encountered issues with properly reporting waste flows to EUROSTAT via the ELoW methodology, as it was the first time that this methodology was to be used. These levels are seen to have risen again in 2012, which most likely correlates with proper methodological use for reporting. The Ministry and National Statistics Institute have recognised the misinterpretations that may arise from these outlier-type data and have envisioned opening discussion in mid-2015 in light of correcting the official reports for 2010-2011.

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5 Estimation provided by confidential stakeholder.

Furthermore, there are sometimes issues with lack of statistical reporting from Autonomous Communities which can lead to an underrepresentation of statistics.

The table below outlines the impacts on CDW generation and recovery during economic crisis\(^7\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Generated CDW (tonnes)</th>
<th>Recycled CDW (tonnes)</th>
<th>Backfilled CDW (tonnes)</th>
<th>Landfilled CDW (tonnes)</th>
<th>Energy recovery if any (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>42 000 000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>32 000 000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>2009</td>
<td>23 000 000</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>11 763 266</td>
<td>5 073 723</td>
<td>2 673 002</td>
<td>4 016 541</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>9 329 132</td>
<td>3 859 854</td>
<td>273 280</td>
<td>5 195 998</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>27 703 854</td>
<td>19 011 024</td>
<td>4 328 999</td>
<td>4 363 831</td>
<td>0</td>
</tr>
</tbody>
</table>

Main drivers to sustainable CDW management

The following recommendations outline the main suggestions of the interviewed stakeholders in order to address the above mentioned obstacles:

- Leverage record low CDW levels to focus on other initiatives
  - The economic crisis, which drastically lowered the amount of CDW generated from the years of 2007-2009 could have potentially opened a door for the implementation of various initiatives, one being voluntary certification schemes. The LEED certification gained a slim level of recognition during the early years of the economic hit thanks to theoretically less-expensive maintenance fees and increased value on its asset portfolio. However, as the amount of LEED certified buildings has only 252 registered buildings, with an even smaller 97 that have achieved the LEED certification, this initiative has not been considered as a driver in CDW management, although it potentially could be an advantageous tool. A stakeholder indicated that measures should be explored on how to leverage low CDW generation levels as an incentive to focus on other voluntary measures.

- Promote regulations (pre-demolition audits)
  - Although selective demolition exists on certain regional levels, such as in the Basque Country (Decree 112/2012), this is not a national practice, which greatly hinders the possibility to obtain good quality of CDW.
  - A positive driver towards promoting regulations consists of a mandatory financial deposit, required by law prior to demolishing buildings. Upon proving that the demolished building’s CDW was lawfully managed, the deposit is reimbursed. While this system facilitates good management, as financial incentives are set in place, tighter monitoring needs to be set in motion in order to ensure that all actors are following through. At this stage, it is not clear whether this deposit scheme functions.

- Jump start the creation market conditions for recycled aggregates
  - On the national level, substantial levels of natural minerals are cheaper to excavate than to utilise recycled aggregates. Informal discussions are arising regarding taxing natural (raw) aggregates, however in practice certain stakeholders believe that this could further hinder the market for recycled aggregates, as current demolition practices leave demolition waste with relatively high levels of contaminants that are expensive to eliminate. Measures to promote the use of quality schemes should be implemented.
  - Green public procurement is not yet developed, although it could help the recycled aggregate market.

- Increase availability of landfills and address low landfill cost issue

- The introduction of a national entrance tax for landfills should be established nation-wide (Currently this is implemented on a regional level in Catalonia, Madrid and Murcia). Furthermore as outlined within the PEMAR a harmonisation of taxes throughout all regions is foreseen, as certain regions’ lower landfill taxes may unintentionally facilitate an influx of waste exports to those regions.

  - Increase awareness B2B & B2C
    - Although CDW matters generally concern B2B, national, regional and local campaigns on the importance of properly disposing CDW and on conveying aggregates as viable construction material (to change its current perception as a waste material) could be advantageous. Targeted marketing efforts could be aimed at C&D (waste) actors on more technical subjects.
2. Definitions concerning construction and demolition waste (CDW) and management

2.1 Definition of waste

In this section the definitions of waste used in Spain are explored.

Per Chapter 1 Article 3 of the 22/2011 Law on Waste and Contaminated Soil (Ley 22/2011, de 28 de julio, de residuos y suelos contaminados), waste is defined as "whichever substance or object that originates from one of the categories that is drawn out by this Law, in which the owner of the material gives up, or intends to give up ownership of the material". This definition is generally the same as that outlined in the WFD. Definitions of other terms such as "waste manager", "recycle", "landfill", "reuse" are outlined in Article 3 of this national law.

2.2 Definition of construction and demolition waste (CDW)

In Article 3.a) The Royal Decree 105/2008 of Construction and Demolition Waste Production and Management 105/2008 defines CDW as "any type of waste that is generated from construction and demolition works...which consists of activities within the context of construction, demolition, and renovation of any: building, road, port, airport, railroad, canal, dam, sports zone, leisure area, or any other type of engineered structure".

Within the Royal Decree, it further indicates that the activity of construction and demolition can consist of:

The execution of work that modify the form or quality of the terrain or the sub-terrain. Examples of this can consist of excavations, injections, urbanizations, with the exclusion of activities that are laid out in the 2006/21/CE Directive on Waste Management.

The following types of waste, classified by the European List of Waste (ELoW) are transposed from the WFD into the PNIR:

- 17 01: Concrete, bricks, tiles and ceramic material
- 17 02: Wood, glass, plastic
- 17 03: Bituminous mixes, coal, tar, and tar products
- 17 04: Metals (including alloys)
- 17 05: Dirt (including excavation and contaminated zones), rocks and sewage sludge
- 17 06: Isolating materials and construction materials that contain asbestos
- 17 08: Construction materials sourcing from plaster
- 17 09: Other CDW

Particular materials excluded from this definition are:

- Earth and stones uncontaminated from hazardous substances
- Waste generated from C&D works regulated by a specific legislation
- Waste that is already regulated by the 2006/21/CE Directive on management of waste from extractive industries
Within this context, construction and demolition waste is defined as one term and complies with the WFD.

2.3 End of Waste (EoW) status


- Ensure that there is a market or demand for such substances and objects;
- Substances or objects meet technical requirements for specific purposes, that existing legislation and standards are applicable to products;
- Ensure an adequate degree of environmental protection.

At the national level, Spain has not concretely developed an EoW status for any waste flow. Concrete discussions on how to integrate a set End of Waste status for various waste flows for aggregates will start in June 2015. Important national actors, such as the National Federation of Aggregates will play an important role in these discussions.


The specifications within this document:

- Define recycled aggregates from CDW as those that have arisen from the treatment of inorganic material previously used in construction;
- Outline limits that are used to prohibit the use of recycled aggregate (i.e. contamination with pollutants, subject to contaminated soil, etc.);
- Outline the permitted uses allowed for recycled aggregates;
- Outline under what conditions aggregates cease to be waste and obtain the status of products to be used in various applications (fabrication of bricks, concrete, etc.).

2.4 Definitions of waste treatment operations

Waste treatment operations are also found in the The Royal Decree 105/2008 of Construction and Demolition Waste Production and Management 105/2008 and the Law 22/2011 on Waste and Contaminated Soil:

- **Reused**: A product used for the same purpose for which it was originally designed.
- **Recycled**: The transformation of waste throughout a production process to be used again for the original purpose, or for other purposes such as bio-methanisation. Incineration as a form of energy recovery falls out of the definition of recycling.
- **Recovery**: all processes that facilitates the use of resources contained in waste without endangering human well-being and without using methods harmful to the environment.
- **Treatment**: physical, chemical or biological process that changes the characteristics of CDW by reducing its volume or recovery or hazardous qualities, improving its potential disposal operations, including preparation prior to recovery or disposal.

Many other definitions exist, for example on waste producer’s and owner’s responsibility.
Regarding waste recovery, Article 13 in the Royal Decree establishes a set of minimum criterions used to distinguish when inert waste can fall within the definition of recovery via backfilling, or if it should be considered a landfill operation. Such considerations:

- Rely on the Autonomous Communities to declare the operation as one for revalorization before the commencement of waste management.
- Considered only if the operation is executed by a licenced waste management body that is subject to administrative authorization for waste recovery.
- Only materials that meet technical and legal requirements for their intended use shall be permitted. The result of the recovery shall have successfully substituted the use of natural resources.

Therefore any backfill operations that comply with the above criteria are considered as a recovery operation in national statistics.

The National Federation for Aggregates indicated that the use of recycled aggregates could be good potential material to use for backfilling. However, as result of the lack of regulating standards on aggregates and the low awareness on the benefits of its use, only 1% of available aggregate material is used and a future uptake of this material is not foreseen (unless full-forced efforts and measures are set in place to promote its use).

On the Autonomous Community level, Valencia, bears a regional Decree 200/2014 which regulates the use of inert waste within backfilling operations, renovation works, or for final construction works.


In this section the legal framework governing CDW management in Spain is explored.

3.1 Legislation concerning CDW in Spain

Spain possesses two main legislative document and waste plans that specifically refer to C&D waste management:

Overview of National Legislation & Waste Framework Directive transposition:

  - This is the law that transposes the WFD into the national legislation and therefore covers all topics relating to waste management, in all waste sectors.
- The Royal Decree 105/2008 of Construction and Demolition Waste Production and Management: valid as of 14 February 2008 (Real Decreto 105/2008, de 1 de febrero, por el que se regula la producción y gestión de los residuos de construcción y demolición).
  - Specifically covers CDW management. It establishes a jurisdiction on the production and management of CDW. Its objective is to establish, in order of emphasis, the prevention, reutilization, recycling, forms of valorisation and the assurance that all waste is properly treated in order to ensure sustainable development in the construction sector.

There is no concrete landfill diversion policy in place in this country. It is however identified in the PNIR that the majority of waste generated in Spain is indeed sent to landfill and that these levels must be better managed. In the draft version of the 2015-2020 State Waste Framework Plan PEMAR, it furthermore

indicates that backfilling and landfilling are still two of the most practiced CDW removal practices\textsuperscript{21}. The Royal Decree states that unsatisfactory levels of demolition waste have been recycled, a barrier being the low landfill costs thought the nation (EUR 5-40, depending on the region) and furthermore the pending issue of illegal dumping. Although no statistical data is available on this latter issue, common experiences amongst interviewed stakeholders suggest that illegal dumping is less practised than in the past, although it is still considered as an issue.

End of Waste Legislation

\begin{itemize}
  \item Article 5 of the 22/2011 Law on Waste and Contaminated Soil transposes the WFD’s definition of the EoW principle\textsuperscript{22}.
\end{itemize}

Classification and European List of Waste

\begin{itemize}
  \item Article 6 of the 22/2011 Law on Waste and Contaminated Soil transposes the WFD’s obligation to report hazardous and non-hazardous waste with the ELoW categories\textsuperscript{23}.
\end{itemize}

Technical specifications for construction works

\begin{itemize}
  \item The technical specification guidance on graded aggregates used for road and bridge works was developed:
    \begin{itemize}
      \item Article 510 of this technical specification contains guidance on how to implement aggregates used in construction of roads and bridges and it furthermore mentions the use of recycled materials or aggregates and subproducts/subproduct waste in compliance with the National Waste Plan Construction and Demolition 2001-2006, provided that the origin of the materials is declared.
      \item Article 330 "Earthworks" Order FOM / 1388-1302 the PG3
      \item Article 332 "Landfills" ORDER FOM / 1382-1302 of PG3
      \item Article 421 "Landfills for drainage material" Order FOM / 3460/03 PG3
      \item Standard 6.1-IC “Sections Firm” for highways. Order FOM / 3460/03 PG3
      \item The technical specifications within these latter 4 documents refer to the use of recycled aggregates for embankments, landfills and for road construction.
    \end{itemize}
\end{itemize}

Regional level

Several pieces of legislation on the regional level have been developed, based off of the framework outlined in the Law 22/2011, in particular Article 9 outlining Auto sufficiency (of regions), and Article 12 outlining administrative competencies. Examples of such regional legislations (non-extensive) that are transposed from the Law 22/2011 are:

\begin{itemize}
  \item Extremadura: Decree 20/2011 on CDW management\textsuperscript{24}
    \begin{itemize}
      \item This Decree is an extension of the Royal Decree and sets out various regional specifications.
    \end{itemize}
  \item Cantabria: Decree 72/2010 on CDW management\textsuperscript{25}
    \begin{itemize}
      \item This Decree is an extension of the Royal Decree and sets out various regional specifications.
    \end{itemize}
  \item Madrid: Order 2726/2009 for CDW management
    \begin{itemize}
      \item This Decree is an extension of the Royal Decree and sets out various regional specifications.
    \end{itemize}
\end{itemize}

Regions with notable differences or “improvements” to the national Law 22/2011 are (non-extensive list):

\begin{itemize}
  \item Basque Country: Decree 112/2012 for CDW management\textsuperscript{26}.
\end{itemize}

---


• The specifications within this document define recycled aggregates from CDW as those that have arisen from the treatment of inorganic material previously used in construction and furthermore outline further under what conditions aggregates cease to be waste and obtain the status of products to be used in various applications (fabrication of bricks, concrete, etc.).

- Basque Country: Order of 12/01/2015
  • This Order is inspired from the 22/11 Law but furthermore goes a step further in Article 8 by outlining the obligation for selective demolition within the region. Specific levels of separation requirements are outlined per waste flow (170101, 170102, 170103, 1704, 170202, 170203, 200101, and 170802). According to a CDW Service Manager for the Basque Regional Government, the requirement on onsite sorting is generally followed by waste actors, although it remains difficult to measure its actual implementation.

- Catalonia: Decree 89/2010 approving the programme for CDW management (PROGROC)
  • This Decree is an extension of the Royal Decree sets out various regional specifications, namely quantitative objectives on CDW management:
    - Monitored CDW management: objective: ensure 100% -- by 2012, 80% was ensured.
    - Reduction of CDW generation: objective: lower by 10% -- by 2012, 76% was ensured.
    - Recycling of CDW: objective: 50% -- by 2012, 43% was ensured.
    - Recovery of construction packaging waste: objective: increase to 70% -- data unavailable.
    - Selective demolition of hazardous materials: objective: ensure 100% -- by 2012, 85% was ensured.

  • As 43% was ensured for recycling and 80% was ensured for monitored management of CDW, it could be inferred that approximately 20% of recycling consists of illegal operations.

  • It additionally transposes the Royal Decree’s specification on deposits. This Decree 89/2010 indicates that the waste actor must submit a deposit of EUR 11/tonne (with a minimum of 150 euros) for CDW upon the issuing of their licence. The waste actor is reimbursed after proving lawful management of CDW.

- Valencia: Decree of 200/2004 from the Consell de la Generalitat
  • This Decree does not address CDW specifically, however it addresses how inert waste can be used as backfilling within construction works.

- Aragon: Decree 262/2006 regarding CDW management and recovery of debris not from construction and home repair
  • This Decree outlines an obligation for selective demolition, however in Article 12 it indicates that this practice can be waived if the financial costs outweigh the environmental benefits.

3.2 Waste management plans (WMP) and Strategies

The following waste plans are in force on the national level:


28 Interview with Joseba González Artaza, CDW Service Manager for the Basque Regional Government. 26/05/2015.


- The current 2007-2015 *Integrated National Plan for Waste (Plan Nacional Integrado de Residuos (PNIR))*\(^{34}\) is the second version of this initial document, first established in 2001. The objective of this 742 page Plan is to comprehensively outline national plans on all national waste flows, such as for urban waste, hazardous waste, end of life vehicles, sludge generated from purifiers for residual water, etc. Within this plan, a specific national plan is also drawn out for construction and demolition waste, titled the National Plan on Construction and Demolition Waste (II PNRCD).

The 2007-2015 National Plan on Construction and Demolition Waste (II PNRCD)\(^{35}\)
- The current plan on CDW management in Spain, which outlines the status of CDW management in between the years of 2001-2005, provides projections for the years 2006-2012 (in which the quantitative levels of CDW generation were overestimated, due to the economic hit).
- In particular it aims to establish objectives on: prevention, reutilization, recycling, and forms of recovery and elimination of CDW. Furthermore, this document defines methods for applying these objectives and goes over financial methods. Measures were taken to ameliorate this national plan from its first version, published in 2001, as it takes into account regional and local waste plans on CDW. It also incorporates the results from the study on C&D waste generation in Spain, carried out by the Ministry of Environment in 2006. Data within the Plan is taken from Autonomous Communities as well as from other stakeholders in construction and waste management.

The 2015-2020 State Waste Framework Plan (*Plan Estatal Marco de Residuos (PEMAR)*)\(^{36}\)
- currently in its draft phase and has been distributed by the Ministry of Environment to relevant stakeholders within the CDW sector for comments and will replace the PNIR once the draft version is adopted. This Framework, which has a specific section on CDW (Section 13) sets forth more ambitious objectives, based off of the evolution of Spain’s current status in CDW since the PNIR/ II PNRCD. The main objectives of this plan is to set out a:
  - Base framework for all Autonomous Communities to further develop and tailor their own waste plan for their particular regions, in large part by outlining the scope and current status of CDW management in Spain;
  - Drawn out plan for demolition practices;
  - Management of CDW;
  - Outline recycled content of C&D materials
  - Possibilities of recyclability and reuse for materials originating from C&D projects;
  - Durability of C&D materials.

Regional Waste Plans:
- As laid out in the PNIR, or more specifically, the II PNRCD, objectives and guidelines are laid out for all Autonomous Organisations to properly draw up regional waste plans. Currently, all regions have a particular section within their waste plans targeted at CDW.

As Spain’s Autonomous Communities are encouraged to develop regional waste plans (via the II PNRCD), each region has developed several regional plans either targeting different waste flows identified in the PNIR (i.e. ELV vehicles, hazardous waste, etc.). Furthermore, particular regions have developed a waste plan targeting CDW (non-extensive):
- Madrid: Integrated Waste Plan for CDW\(^{36}\).
- The Baleares regional waste plan groups together Construction and Demolition Waste Management with end-of-life tires, which was approved by the Council 8 April 2002.

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\(^{35}\) This Plan is comprised within the 2007-2015 PNIR.


Resource Efficient Use of Mixed Wastes

13
In line with the revision of the II PNIR for the development of the PEMAR, it is possible that additional regional waste plans are also being succumbed to revisions by the jurisdiction of their Autonomous Communities. However, as these plans are updated and drafted in an autonomous manner, they are not necessarily revised at the same time.

Local authorities theoretically do not have a direct influence on CDW management, as within their jurisdiction boundaries, smaller construction, demolition, and renovation works (as defined by article 3 of the Law 10/1998) are considered as urban waste and out of the scope of CDW.

### 3.3 Legal framework for sustainable management of CDW

This section aims at identifying specific legislation that would create good conditions for a sustainable management of CDW as a preliminary overview for task 3.

---

<table>
<thead>
<tr>
<th>Description</th>
<th>Level of occurrence (Yes/No) Key Scope/Exemptions</th>
<th>Year established and policy reference</th>
<th>Further detail, information source, related web-site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National/regional obligation for selective demolition?</strong></td>
<td>No for national, yes for regional. On the national level, this only comprises selective demolition for hazardous from non-hazardous waste. On the regional level (Basque Country), Specific levels of separation requirements are outlined per waste flow (170101, 170102, 170103, 1704, 170202, 170203, 200101, and 170802).</td>
<td>In the Basque Country: Order of 12/01/2015</td>
<td>Although selective demolition for waste flows is not yet implemented on the national level, this is a current topic of discussion on the Ministry level. On the regional level (Basque Country): <a href="http://www.lehendakaritza.ejgv.euskadi.eus/r48-bopv2/es/bopv2/datos/2012/09/1203962a.shtml">http://www.lehendakaritza.ejgv.euskadi.eus/r48-bopv2/es/bopv2/datos/2012/09/1203962a.shtml</a></td>
</tr>
<tr>
<td><strong>National/regional sorting obligation (on-site or in sorting facility)?</strong></td>
<td>Royal Decree 105/2008 (Article 5.5) Yes, it is preferably done on-site by the waste owner, however if the site is not suitable for sorting, it can be taken to a waste sorting site to be carried out by professionals. Small-scale projects are excluded from this obligation.</td>
<td>2008</td>
<td>Royal Decree 105/2008 <a href="http://noticias.juridicas.com/base_datos/Admin/rd105-2008.html#a11">http://noticias.juridicas.com/base_datos/Admin/rd105-2008.html#a11</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outlines the separation fractions per waste flow:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Concrete: 80 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Bricks, ceramics, tiles: 40 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Metal: 2 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Glass: 1 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Plastic: 0.5 T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Paper and cardboard: 0.5 T</td>
</tr>
<tr>
<td><strong>National/regional separate collection obligation for different materials (iron and steel, plastic, glass, etc.)?</strong></td>
<td>Not implemented on the national level, however particular regions have, such as Aragon and Basque Country.</td>
<td>Order of 12/01/2015 for Basque Country establishing collection limits</td>
<td>Order of 12/01/2015 <a href="http://www.lehendakaritza.ejgv.euskadi.eus/r48-bopv2/es/bopv2/datos/2012/09/1203962a.shtml">http://www.lehendakaritza.ejgv.euskadi.eus/r48-bopv2/es/bopv2/datos/2012/09/1203962a.shtml</a></td>
</tr>
<tr>
<td><strong>Obligation for separate collection and management of hazardous waste from C&amp;D operations?</strong></td>
<td>The Royal Decree 105/2008 (Article 4.1.7.b) regulates hazardous waste that may arise from construction and demolition works and furthermore stipulates its separate collection from non-hazardous waste.</td>
<td>2007-2015</td>
<td>Royal Decree 105/2008 <a href="http://noticias.juridicas.com/base_datos/Admin/rd105-2008.html#a11">http://noticias.juridicas.com/base_datos/Admin/rd105-2008.html#a11</a></td>
</tr>
<tr>
<td><strong>Related Green public procurement requirements</strong></td>
<td>No.</td>
<td>N/A</td>
<td>Although GPP is not yet implemented, current discussions on its feasibility are under way on the Ministry and federation level. Concrete actions are not yet envisioned.</td>
</tr>
</tbody>
</table>
3.4 Targets

There are both qualitative and quantitative targets for CDW management that are initially indicated within the PNRCD (2007-2015) and further developed in the 2015-2020 PEMAR:

- Creation of a network focusing on (necessary) infrastructure for CDW management;
- Establishing a standard statistic system;
- Close down unauthorised/non-adapted landfills or quarries;
- Controlled collection and management of 95% of all CDW (starting in 2011);
- Selective collection and management of 95% of waste (starting in 2008).

Some of the most notable qualitative targets in the PEMAR are:

- Reduce the number of CDW set out for landfill or backfill;
- Integrate environmental costs within the cost of virgin materials in order to incentivise and facilitate the use of recycled materials;
- Begin discussions on how to implement selective demolition and establish selective collection;
- Establish a framework for favourable uptake of recycled aggregates for use in construction works.

Some of the most notable quantitative targets in the PEMAR for 2016-2020 are:

- Non-hazardous CDW for the preparation for reuse, recycling and other recovery operations (excluding soil and stones):
  - Objectives: 2016-60% / 2018-65% / 2020-70%
- Elimination of non-hazardous CDW to landfills:
  - Objectives on remaining hazardous waste: 2016-40% / 2018-35% / 2020-30%;
- Soil and stones (17 05 04) used in earthworks and restoration, backfill:
  - Objectives: 2016-75% / 2018-85% / 2020-90%
- Elimination of stones and soil (17 05 04) to landfill in respect to the total volume of naturally excavated materials:
  - Objectives on remaining soil in landfills: 2016-25% / 2018-15% / 2020-10%

Proposals within the PEMAR on how to carry out or meet these targets are:

- Promote selective demolition via the hierarchy principle: target CDW: target CDW producers and CDW holders;
- Revise the Royal Decree 105/2008 in respect to separating CDW per origin and per material (Article 5.5) in order to properly enforce the proper management of these materials;
- Encourage the development of techniques and practices of on-site CDW separation in light of increasing recycled aggregates and its applicability for their (re)use;
- Encourage development of technologies via R&D, specifically focusing on securing high quality CDW;
- Promote the use of quality non-hazardous recycled CDW in public works (i.e. train works, road works) and the manufacture of products (i.e. concrete);
- Introducing disincentives (implementation of entry fee tax, increase of existing landfill tax, sanctions for owner of CDW that does not properly separate generated CDW;
- Facilitate state administration or public administrations to encourage that public works projects take into account any possible design and construction alternatives that create less waste in phase of construction and furthermore promote the correct selective dismantling of end of life buildings;
- Authorities from the state administration develop and determine criteria to be used to assess (construction) tenders in light of considering measures on the prevention and recycling of CDW, and furthermore those that implement recycled aggregates and other recycled products originating from CDW;
- Develop agreements with industries and Autonomous Communities to promote the use of existing quarries as grounds for recovering CDW and restoring the excavated area (in respect to Article 13 of the Royal Decree 105/2008) to follow its restoration plans on lands affected by mining activities;

- Autonomous Communities address the CDW mismanagement for light renovation/construction projects that are usually the most widely seen in underserviced rural areas;
- Promote good practices, sourcing from local authorities, for the generation and management of small/light CDW works, primarily by facilitating better access to treatment centres and to ensure that these treatment centres accept CDW.
4. Non legislative instruments

Non legislative instruments are not very developed in Spain. However, this section addresses the following instrument in light of creating conditions for a sustainable management of CDW.

<table>
<thead>
<tr>
<th>Description</th>
<th>Level of occurrence (Yes/No)</th>
<th>Year established and policy reference</th>
<th>Further detail, information source, related web-site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainability standards that cover CDW (e.g. BREEAM)</td>
<td>Yes. LEED certification, however there are only 97 of them have obtained the certification within the total 252 buildings registered in the program.</td>
<td>Voluntary certification scheme established in 1998.</td>
<td><a href="http://spainqbc.org/">http://spainqbc.org/</a></td>
</tr>
<tr>
<td>Extended producer responsibility scheme in operation?</td>
<td>No. EPR schemes are not yet implemented in Spain. Although the ministry regards EPR schemes as a potential driver for sustainable CDW management, it is not yet feasible to implement, which is illustrated in its absence within the newly revised PEMAR.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Occurrence (Yes/No)</th>
<th>Mandatory (Yes/No)</th>
<th>Scope &amp; exemptions</th>
<th>Year established</th>
<th>National or regional (specify if regional)</th>
<th>Details of Public sector and Industry enforcement/ involvement/collaboration</th>
<th>Levels of performance e.g. tonnes recycled, % coverage</th>
<th>Further information/ website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement for pre-demolition audits</td>
<td>Partial. While there are no requirements for a pre-demolition audit per se, the waste manager must indicate how CDW will be managed.</td>
<td>2008</td>
<td>National</td>
<td>Ministry</td>
<td>The waste producer is subject to an obligation to include a document that outlines how CDW will be managed throughout the project’s duration. A mandatory deposit is furthermore required by law prior to demolishing buildings, which is reimbursed after proving lawful management of CDW. At this stage, it is unclear to actors how regulated and effective this requirement is.</td>
<td><a href="http://www.aridos.i">Royal Decree 105/2008</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards for recycled CDW</td>
<td>No, however this is currently under discussion</td>
<td>National</td>
<td>Federation &amp; Ministry</td>
<td>As the use of recycled aggregates</td>
<td><a href="http://www.aridos.i">http://www.aridos.i</a></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Description</th>
<th>Occurrence (Yes/No)</th>
<th>Mandatory (Yes/No)</th>
<th>Scope &amp; exemptions</th>
<th>Year established</th>
<th>National or regional (specify if regional)</th>
<th>Details of Public sector and Industry enforcement/involvement/collaboration</th>
<th>Levels of performance e.g. tonnes recycled, % coverage</th>
<th>Further information/ website</th>
</tr>
</thead>
<tbody>
<tr>
<td>discussion at the Ministry level: there is a need for standards for recycled aggregates in order to ensure its quality. This is furthermore a heavily considered topic by the National Aggregates Federation.</td>
<td></td>
<td></td>
<td></td>
<td>currently underway</td>
<td></td>
<td>is only between 1-2%, creating standards or norms could be a driver for its use, as aggregates are used in high levels for construction and renovation works: - Concrete: uses 80% aggregates - Asphalt: 95% aggregates - road construction 94%</td>
<td></td>
<td>nfo/</td>
</tr>
<tr>
<td>Selective demolition/ plan for large demolition sites/demolition standard</td>
<td>No, however this is currently under discussion at the Ministry level. 95% selective collection was a target for 2008 in the PNIR, however it was not attained.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Other CDW planning requirements</td>
<td>Waste management plans on regional level.</td>
<td>Various</td>
<td>Regional</td>
<td>Autonomous Communities</td>
<td>N/A</td>
<td>Various</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key CDW management guidance and tools**

<table>
<thead>
<tr>
<th>Description of guidance/ tool</th>
<th>Scope</th>
<th>Year established/ produced</th>
<th>National or regional (specify if regional)</th>
<th>Public sector and/or Industry lead organisation</th>
<th>Levels of use (high/ medium/low) or specify</th>
<th>Further information/ website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of guidance/tool</td>
<td>Scope</td>
<td>Year established/produced</td>
<td>National or regional (specify if regional)</td>
<td>Public sector and/or Industry lead organisation</td>
<td>Levels of use (high/medium/low) or specify</td>
<td>Further information/web-site</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>---------------------------</td>
<td>-------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Best practice interactive portal</td>
<td>Interactive portal aimed at SMEs</td>
<td>Not indicated</td>
<td>National/Internationals</td>
<td>European Regional Environmental Services Platform</td>
<td>Unknown</td>
<td><a href="http://www.euresp-plus.net/es/guia-de-buenas-practicas">http://www.euresp-plus.net/es/guia-de-buenas-practicas</a></td>
</tr>
<tr>
<td>Project: Guide to Recycled aggregates originating from CDW</td>
<td>Project carried out between 2008-2011, considered a main driver for construction, industry and stakeholders involved in strengthening CDW recycling activities in Spain.</td>
<td>2012</td>
<td>National</td>
<td>Spanish Association of Recycling CDW developed the scope of the project, won the scientific grant from the Ministry Environment, Rural and Marine Affairs Spain, under the National Research Plan on Scientific Research, Development and Technological Innovation. Project coordinated by GERD (Spanish Association Managers of Construction and Demolition Waste).</td>
<td>Unknown</td>
<td><a href="http://www.caminospaisvasco.com/Profesion/documentos">http://www.caminospaisvasco.com/Profesion/documentos</a> tecnico/oguia</td>
</tr>
</tbody>
</table>

Other CDW initiatives
<table>
<thead>
<tr>
<th>Description of initiative</th>
<th>Scope</th>
<th>Year established</th>
<th>National, regional, local (specify which local area/region)</th>
<th>Public sector and/or Industry lead organisation</th>
<th>Levels of performance e.g. tonnes recycled</th>
<th>Further information/web-site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental analysis on identifying effective indicators to quantify total waste generation on construction site in each site and for different material categories</td>
<td>Outlines results of study carried out by following 5 real projects</td>
<td>2013</td>
<td>National</td>
<td>Public sector</td>
<td>Conclusion: 90.55 kg CDW/m² for plasterboard, 132.69 kg CDW/m² for brick</td>
<td><a href="http://oa.upm.es/33605/1/INVE_MEM_2013_184199.pdf">http://oa.upm.es/33605/1/INVE_MEM_2013_184199.pdf</a></td>
</tr>
</tbody>
</table>
5. CDW management performance – CDW data

In this section the performance of CDW management in Spain is explored. This section particularly seeks to gather all available data and information about CDW generation and treatment, exports/imports, and treatment facilities in Spain.

5.1 CDW generation data

CDW generation and recovery official statistics (in tonnes) (source: National Statistics Institute)

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generated CDW (tonnes)</td>
<td>42 000 000</td>
<td>32 000 000</td>
<td>23 000 000</td>
<td>11 763 266</td>
<td>9 329 132</td>
<td>27 703 854</td>
</tr>
<tr>
<td>Collected CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Recycled CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5 073 723</td>
<td>3 859 854</td>
<td>19 011 024</td>
</tr>
<tr>
<td>Backfilled CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>2 673 002</td>
<td>273 280</td>
<td>4 328 999</td>
</tr>
<tr>
<td>Landfilled CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4 016 541</td>
<td>5 195 998</td>
<td>4 363 831</td>
</tr>
<tr>
<td>Energy recovery if any (tonnes)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

While the statistics presented in the table above are used officially by the National Statistics Institute and reported in EUROSTAT, the FERC (Spanish Federation of Construction and Demolition Waste) as well as other federations collect and report data, which vary from these official statistics. As seen below in the FERC’s data, wide discrepancies can be seen with the two types of data. Furthermore, these statistics provide estimations on “uncontrolled”/“undeclared” data, whereas these figures are not present in the EUROSTAT reported data and furthermore outlined in the PEMAR. The Ministry of Environment along with EUROSTAT will address all issues with inconsistent official data in mid-2015. Considering only the statistics reported by FERC, it can be seen that data is greatly skewed if the uncontrolled/unreported data is not taken into account. This issue will surely be a topic of discussion with EUROSTAT.

CDW generation and recovery official statistics (in tonnes) (source: FERCD)

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generated CDW (tonnes)</td>
<td>45 750 936</td>
<td>37 816 176</td>
<td>29 429 702</td>
<td>29 458 572</td>
<td>20 185 709</td>
</tr>
<tr>
<td>Collected CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Recycled CDW (tonnes)</td>
<td>14 603 106</td>
<td>12 995 937</td>
<td>9 805 543</td>
<td>6 323 032</td>
<td>7 647 071</td>
</tr>
<tr>
<td>Backfilled CDW (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Landfilled CDW (tonnes)</td>
<td>5 772 859</td>
<td>5 960 088</td>
<td>5 373 051</td>
<td>5 762 275</td>
<td>5 171 110</td>
</tr>
<tr>
<td>Energy recovery if any (tonnes)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Each Autonomous Community has the obligation and authority to manage, collect and reports these statistics annually using the ELoW codes methodology outlined in the WFD and furthermore transposed in the Law 22/2011 and the Royal Decree 105/2008) to the National Statistics Institute. The National Statistics Institute then compiles all data by ELoW categories and reports it to EUROSTAT following their reporting criteria.

As explained in the country summary, while there was a relatively steady increase of about 8.7% in CDW generation during 2001-2005, the table above (National Statistics Institute) illustrates two trends in CDW generation losses, one that is attributed to the economic instability of Spain between the years of 2007-2009, and the second during 2010-2011 which may be due to a methodological reporting difference, as 2010 was the first year that the National Statistics Institute reported data to EUROSTAT. As EUROSTAT data is not input via ELoW categories, the National Statistics Institute may have reported them using a different methodology. As both the Ministry and the National Statistics Institute have already held conversations with EUROSTAT regarding the inconsistent data, formal discussions will begin in mid-2015 on the national level between the Ministry and the National Statistics Institute to investigate and determine how to potentially correct this data. However, it is estimated by a stakeholder within the Ministry that a more realistic trend could be considered as one with a gradual increase from 2009 to 2012 data, (2012 data is perceived to have been reported to EUROSTAT using the proper methodology and is therefore deemed realistic). Taking this comment into account, it is possible that the statistics compiled from the FERCD may follow a more realistic trend than the statistics compiled by the National Statistics Institute.

Regardless, the data from the National Statistics Institute is published on official planning documents such as the PNIR, II PNRCR, and the PEMAR which serve as good public source of transparent information for statistic trends over the years. The official Spanish Government website’s waste catalogue furthermore publishes this official data on their webpage for CDW, although it is not yet updated (data goes up to 2009).

It should be noted that while projections were made in the PNIR for the years between 2006 and 2010, (based on waste generation data in 2005 (showing a 1.62% increase) paired with the growth percentage...
within the construction sector), these projections did not account for the economic hit. These estimations shown in the table below compared with real data in the table at the beginning of this section further illustrates the impact of the economic hit\(^3\).

The following table below outlines CDW Generation Estimation based on 2005 statistics (source National Statistics Institute)

<table>
<thead>
<tr>
<th>Comunidad Autonoma</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andalucia</td>
<td>5,922,852</td>
<td>6,096,400</td>
<td>6,185,062</td>
<td>6,308,101</td>
<td>6,401,873</td>
<td></td>
</tr>
<tr>
<td>Aragón</td>
<td>1,297,023</td>
<td>1,329,028</td>
<td>1,356,325</td>
<td>1,382,146</td>
<td>1,402,733</td>
<td></td>
</tr>
<tr>
<td>Asturias</td>
<td>528,044</td>
<td>540,414</td>
<td>550,690</td>
<td>561,167</td>
<td>569,313</td>
<td></td>
</tr>
<tr>
<td>Baleares</td>
<td>650,974</td>
<td>666,606</td>
<td>679,506</td>
<td>692,650</td>
<td>702,828</td>
<td></td>
</tr>
<tr>
<td>Canarias</td>
<td>1,028,332</td>
<td>1,049,541</td>
<td>1,072,279</td>
<td>1,096,428</td>
<td>1,112,694</td>
<td></td>
</tr>
<tr>
<td>Cantabria</td>
<td>545,387</td>
<td>558,402</td>
<td>569,162</td>
<td>580,113</td>
<td>588,602</td>
<td></td>
</tr>
<tr>
<td>Castilla-La Mancha</td>
<td>3,288,537</td>
<td>3,387,970</td>
<td>3,436,403</td>
<td>3,504,423</td>
<td>3,585,632</td>
<td></td>
</tr>
<tr>
<td>Castilla y León</td>
<td>1,199,352</td>
<td>1,228,069</td>
<td>1,252,496</td>
<td>1,276,900</td>
<td>1,295,727</td>
<td></td>
</tr>
<tr>
<td>Cataluña</td>
<td>6,978,590</td>
<td>7,147,001</td>
<td>7,289,063</td>
<td>7,429,952</td>
<td>7,548,472</td>
<td></td>
</tr>
<tr>
<td>Comunidad Valenciana</td>
<td>4,898,948</td>
<td>5,017,515</td>
<td>5,116,185</td>
<td>5,217,002</td>
<td>5,294,841</td>
<td></td>
</tr>
<tr>
<td>Extremadura</td>
<td>602,027</td>
<td>514,644</td>
<td>626,676</td>
<td>635,951</td>
<td>648,403</td>
<td></td>
</tr>
<tr>
<td>Galicia</td>
<td>2,231,250</td>
<td>2,285,102</td>
<td>2,329,051</td>
<td>2,374,776</td>
<td>2,409,733</td>
<td></td>
</tr>
<tr>
<td>Madrid</td>
<td>3,587,671</td>
<td>3,576,010</td>
<td>3,740,772</td>
<td>3,822,889</td>
<td>3,879,799</td>
<td></td>
</tr>
<tr>
<td>Murcia</td>
<td>1,500,615</td>
<td>1,537,680</td>
<td>1,568,130</td>
<td>1,599,187</td>
<td>1,623,020</td>
<td></td>
</tr>
<tr>
<td>Navarra</td>
<td>309,700</td>
<td>317,265</td>
<td>323,491</td>
<td>328,940</td>
<td>334,727</td>
<td></td>
</tr>
<tr>
<td>País Vasco</td>
<td>1,230,531</td>
<td>1,270,217</td>
<td>1,296,417</td>
<td>1,321,120</td>
<td>1,340,832</td>
<td></td>
</tr>
<tr>
<td>Rioja (La)</td>
<td>436,899</td>
<td>447,681</td>
<td>456,540</td>
<td>465,375</td>
<td>472,511</td>
<td></td>
</tr>
<tr>
<td>Oviedo</td>
<td>11,364</td>
<td>11,648</td>
<td>11,861</td>
<td>12,119</td>
<td>12,501</td>
<td></td>
</tr>
<tr>
<td>Melilla</td>
<td>27,161</td>
<td>27,940</td>
<td>28,397</td>
<td>28,953</td>
<td>29,405</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>36,334,087</td>
<td>37,222,525</td>
<td>37,953,823</td>
<td>38,699,208</td>
<td>39,272,885</td>
<td></td>
</tr>
</tbody>
</table>

The statistics shown below are actual data, collected by the FERCD for the years of 2009-2013. Comparing the estimation table above with the actual figures below, it can be seen that an underestimation was calculated for 2009 (the peak year before the crisis took hold in Spain), and an overestimation was calculated for 2010. In the actual figures outlined in the table below, a near 10 million drop was experienced between these years. While the estimated figures were 2 million shy from the actual figures, it did not take the increase seen in 2009 into account.

CDW Generation 2009-2013 (actual figures) (source: FERCD)\(^4\)


Breakdown of public works vs building works projects

The table below outlines the most recent statistical break-down of building works vs public works, from the FERCD. In particular, the evolution of construction works’ surface area for a variety of sub-sectors of public and building works can be seen. A 38% decrease is illustrated in total surface area subject to construction from 2009 to 2013. 41% of the total surface area subject to construction works between 2009-2014 consisted of residential works.

<table>
<thead>
<tr>
<th>Type of works</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>PERIOD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (new)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demolition (prior to construction)</td>
<td>1.417</td>
<td>1.073</td>
<td>885</td>
<td>672</td>
<td>382</td>
<td>4.430</td>
<td>2.7%</td>
</tr>
<tr>
<td>Residential building renovation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial demolition</td>
<td>2.957</td>
<td>2.239</td>
<td>1.846</td>
<td>1.403</td>
<td>796</td>
<td>9.242</td>
<td>5.7%</td>
</tr>
<tr>
<td>No demolition</td>
<td>4.614</td>
<td>3.493</td>
<td>2.881</td>
<td>2.189</td>
<td>1.242</td>
<td>14.419</td>
<td>8.9%</td>
</tr>
<tr>
<td>Residential renovation (commercial)</td>
<td>1.673</td>
<td>1.267</td>
<td>1.045</td>
<td>794</td>
<td>450</td>
<td>5.228</td>
<td>3.2%</td>
</tr>
<tr>
<td>Residential demolition</td>
<td>1.239</td>
<td>938</td>
<td>774</td>
<td>588</td>
<td>334</td>
<td>3.872</td>
<td>2.4%</td>
</tr>
<tr>
<td>Tertiary (new)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial demolition</td>
<td>755</td>
<td>477</td>
<td>411</td>
<td>370</td>
<td>377</td>
<td>2.390</td>
<td>1.5%</td>
</tr>
<tr>
<td>Tertiary renovation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial demolition</td>
<td>1.576</td>
<td>996</td>
<td>857</td>
<td>772</td>
<td>787</td>
<td>4.987</td>
<td>3.1%</td>
</tr>
<tr>
<td>Without demolition</td>
<td>2.459</td>
<td>1.554</td>
<td>1.337</td>
<td>1.204</td>
<td>1.228</td>
<td>7.781</td>
<td>4.8%</td>
</tr>
<tr>
<td>Tertiary renovation (commercial)</td>
<td>892</td>
<td>563</td>
<td>485</td>
<td>437</td>
<td>445</td>
<td>2.821</td>
<td>1.7%</td>
</tr>
<tr>
<td>Tertiary demolition</td>
<td>660</td>
<td>417</td>
<td>359</td>
<td>323</td>
<td>330</td>
<td>2.090</td>
<td>1.3%</td>
</tr>
<tr>
<td>Domiciliary</td>
<td>3.743</td>
<td>4.808</td>
<td>4.910</td>
<td>4.89</td>
<td>4.183</td>
<td>22.133</td>
<td>13.7%</td>
</tr>
<tr>
<td>Public works (railroads)</td>
<td>2.714</td>
<td>972</td>
<td>759</td>
<td>579</td>
<td>4.83</td>
<td>5.508</td>
<td>3.4%</td>
</tr>
<tr>
<td>Public works (roads and highways)</td>
<td>3.080</td>
<td>2.043</td>
<td>972</td>
<td>523</td>
<td>650</td>
<td>7.269</td>
<td>4.5%</td>
</tr>
<tr>
<td>Public works (airport sector)</td>
<td>23</td>
<td>28</td>
<td>18</td>
<td>5</td>
<td>75</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Public works (port sector)</td>
<td>134</td>
<td>132</td>
<td>73</td>
<td>73</td>
<td>93</td>
<td>505</td>
<td>0.3%</td>
</tr>
<tr>
<td>Public works (defence sector)</td>
<td>148</td>
<td>48</td>
<td>44</td>
<td>17</td>
<td>102</td>
<td>359</td>
<td>0.2%</td>
</tr>
<tr>
<td>Public works (irrigation sector)</td>
<td>182</td>
<td>134</td>
<td>47</td>
<td>13</td>
<td>54</td>
<td>429</td>
<td>0.3%</td>
</tr>
<tr>
<td>Public works (energy sector)</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>25</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Public works (water sector)</td>
<td>942</td>
<td>808</td>
<td>439</td>
<td>208</td>
<td>471</td>
<td>2.867</td>
<td>1.8%</td>
</tr>
<tr>
<td>Public works (sanitation sector)</td>
<td>1.127</td>
<td>911</td>
<td>454</td>
<td>208</td>
<td>471</td>
<td>2.867</td>
<td>1.8%</td>
</tr>
<tr>
<td>Public works (telecommunication sector)</td>
<td>31</td>
<td>20</td>
<td>48</td>
<td>4</td>
<td>4</td>
<td>108</td>
<td>0.1%</td>
</tr>
<tr>
<td>Public works (sports sector)</td>
<td>214</td>
<td>132</td>
<td>24</td>
<td>13</td>
<td>16</td>
<td>399</td>
<td>0.2%</td>
</tr>
<tr>
<td>Public works</td>
<td>279</td>
<td>160</td>
<td>65</td>
<td>24</td>
<td>25</td>
<td>553</td>
<td>0.3%</td>
</tr>
</tbody>
</table>
Resource Efficient Use of Mixed Wastes

Construction Sector data (per thousand m² of construction)\(^{45}\)

Regardless, treatment statistics for both building and public works are reported by the National Statistics Institute to EUROSTAT, using the same methodology as detailed above.

Furthermore a breakdown of waste generation per region is not available past 2005. At that time, almost half of the generated waste originated from Catalonia, Valencia and Andalucía while around a fourth generated from Madrid, Castilla-La Mancha and Galicia. The remaining fourth are divided up amongst the remaining 13 regions\(^{46}\).

Data from industry

The National Federation of Aggregates, collects data via their member companies within the aggregates sector, representing 700 companies (the most representative aggregates federation). Their most recent data for 2013, which is for internal use (and therefore not available in this study) outlines that there are higher levels of landfill, than indicated in the 2012 national statistics. It is however not relevant to compare these internal statistics from official statistics, as the years are not the same and furthermore because the federation does not obtain statistics from all CDW actors, only those of their member companies.

### 5.2 CDW treatment data

The table below outlines treatment data (source EUROSTAT-reported by the National Statistics Institute) (2012)

<table>
<thead>
<tr>
<th>Deposit onto or into land</th>
<th>Land treatment and release into water bodies</th>
<th>Incineration / disposal (D10)</th>
<th>Recovery other than energy recovery - Backfilling</th>
<th>Incineration / energy recovery (R1)</th>
<th>Recovery other than energy recovery - Except backfilling</th>
<th>Total waste treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposit onto or into land</td>
<td>Land treatment and release into water bodies</td>
<td>Incineration / disposal (D10)</td>
<td>Recovery other than energy recovery - Backfilling</td>
<td>Incineration / energy recovery (R1)</td>
<td>Recovery other than energy recovery - Except backfilling</td>
<td>Total waste treatment</td>
</tr>
<tr>
<td>4,154,834</td>
<td>200,028</td>
<td>0</td>
<td>4,328,999</td>
<td>0</td>
<td>18,709,260</td>
<td>27,393,121</td>
</tr>
</tbody>
</table>

In the table above, the amount of total waste treatment (27,393,121 tonnes) is almost equal to the total amount of reported waste generated (27,703,854 tonnes). Out of these 27 million tonnes of treated CDW, 68% is recovered, via forms excluding backfilling, while 14% is backfilled. Before any waste enters Spain’s regulated landfills, an obligatory pre-treatment is necessary\(^ {47}\). Within the PNIR, it was reported that some consist of physic-chemical treatment, although exact levels are not recorded.

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The different types of pre-treatment can be seen below in the table along with their respective ELoW codes, waste description, recovery status, waste treatment recovery option, types of prepared material, and outlet destinations for prepared material.

All hazardous CDW must be separated from non-hazardous waste before disposal, as outlined in the Royal Decree. As indicated by stakeholders, hazardous waste is treated and disposed of on the national level, as untreated or unseparated CDW is not authorised to be exported.

### Treatment and Recovery possibilities for different waste types

<table>
<thead>
<tr>
<th>ELoW codes</th>
<th>Waste description</th>
<th>Recovery possible?</th>
<th>Recovery or landfill via</th>
<th>Materials or waste arising from recovery or landfill</th>
<th>Outlet destinations for prepared materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1701 01</td>
<td>Concrete</td>
<td>Yes</td>
<td>CDW treatment centre</td>
<td>Aggregates, sand, gravel</td>
<td>N/A</td>
</tr>
<tr>
<td>17 01 02</td>
<td>Bricks</td>
<td>Yes</td>
<td>CDW treatment centre</td>
<td>Lightweight aggregates</td>
<td>N/A</td>
</tr>
<tr>
<td>17 01 03</td>
<td>Tiles and ceramic materials</td>
<td>Yes</td>
<td>CDW treatment centre</td>
<td>Lightweight aggregates</td>
<td>N/A</td>
</tr>
<tr>
<td>17 01 06*</td>
<td>Mixes or separated concrete fractions, bricks, tiles, and ceramic materials that contain hazardous material</td>
<td>No</td>
<td>Physic-chemical treatment + landfill</td>
<td>No useable material can arise from this type of waste unless the physicochemical treatment transforms the hazardous material into non-hazardous material.</td>
<td>Landfall</td>
</tr>
<tr>
<td>17 01 07</td>
<td>Mixes of concrete, brick, tiles, and ceramic materials different than those outlined in the 17 01 06 code</td>
<td>Yes</td>
<td>Recovery centre Waste use after treatment</td>
<td>Aggregates and materials for construction works may arise (depending on compliance with technical and environmental requirements, the obtained materials may be considered as waste. In the latter case, this would necessitate treatment</td>
<td>Backfilling operations, landfill cover, concrete for backfilling operations</td>
</tr>
</tbody>
</table>

### 5.3 CDW exports/imports data

As statistics do not exist on CDW exports and imports, it was determined by interviewed stakeholders that little to no CDW is currently imported or exported. It was reported that exporting necessitates pre-treatment, therefore this, combined with transportation costs and a low demand, would not make it a profitable practice. At one point several years back, Spain did try out importing CDW from surrounding countries with the expectation that the imported material could be easily used as recycled material. However, as contamination levels were high, this practice was discontinued. Furthermore, considering Spain’s economic climate and the fact that there is a wavering market for national CDW, importing CDW would only further drive down demand. Hard data and dates on this test are not available.

### 5.4 CDW treatment facilities data

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Spain has an infiltrated network of treatment plants, transfer stations, and authorised landfills country-wide. Data collection per Autonomous Community is reported on the amount of each type of facility. At the time of publication for the PNIR for the 2007-2015 period, reporting levels for the amount of these facilities was low. In the below map (2006), there were 40 reported transition platforms, 60 treatment plants, and 8 landfills. As reporting was not secured for all Autonomous Communities, this data should not be considered as complete. Regardless, as specified within the PEMAR, it is foreseen to harmonised landfill taxes in all regions. This harmonisation could prevent exports of CDW to regions that have lower landfill taxes.

Comparing this data with that taken in 2009 and published on the Spanish Government's website for CDW, the reporting methodology was changed; amounts for treatment plants, transition platforms, and landfills were grouped together and reported as one figure per region, making a total of 120 (a total of 108 was reported in 2006).

In the draft PEMAR, reporting was improved, and furthermore reporting categories were enlarged to include transition platforms, stationary treatment plants, mobile treatment plants, as well as regulated landfills. Figures can be seen below. Although several Autonomous Communities have not declared figures for particular categories, these numbers are still up for modification (as the PEMAR is in its draft phase); final figures will be modified upon the plan’s final publication in the second half of 2015. Regardless, it is not possible to assess the evolution of treatment and landfill sites since the first published report in 2006 because of differences in reporting methodology and furthermore because of incomplete data.
### Treatment and landfill sites per region in 2012 (source: draft PEMAR 2015-2020; regional declarations)

<table>
<thead>
<tr>
<th>Autonomous Community</th>
<th>Transition Platforms (number)</th>
<th>Stationary Treatment Plants (number)</th>
<th>Mobile Treatment Plants (number)</th>
<th>Regulated landfills (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andalucía</td>
<td>92</td>
<td>119</td>
<td>21</td>
<td>71</td>
</tr>
<tr>
<td>Aragón</td>
<td>18</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Asturias</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Baleares</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
</tr>
<tr>
<td>Canarias</td>
<td>0</td>
<td>23</td>
<td>Not declared</td>
<td>7</td>
</tr>
<tr>
<td>Cantabria</td>
<td>12</td>
<td>4</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Castilla-la Mancha</td>
<td>Not declared</td>
<td>28</td>
<td>27</td>
<td>12</td>
</tr>
<tr>
<td>Castilla y León</td>
<td>0</td>
<td>45</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Cataluña</td>
<td>12</td>
<td>50*</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td>Ceuta</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
</tr>
<tr>
<td>Comunidad Valenciana</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
</tr>
<tr>
<td>Extremadura</td>
<td>16</td>
<td>21</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Galicia</td>
<td>3</td>
<td>43</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>La Rioja</td>
<td>Not declared</td>
<td>16</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Madrid</td>
<td>10</td>
<td>14</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Melilla</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
<td>Not declared</td>
</tr>
<tr>
<td>Murcia</td>
<td>2</td>
<td>4</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>Navarra</td>
<td>Not declared</td>
<td>7</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>País Vasco</td>
<td>Not declared</td>
<td>Not declared</td>
<td>11</td>
<td>Not declared</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>168</strong></td>
<td><strong>384</strong></td>
<td><strong>134</strong></td>
<td><strong>195</strong></td>
</tr>
</tbody>
</table>

In any case, the 2015 reporting period outlines that the availability of transition platforms along with stationary and mobile treatment plants outnumbers available regulated landfills, which could potentially be a driver for treatment and recycling. However, according to interviewed stakeholders, the relatively low landfill cost (EUR 5-40 depending on the region) does not act as a valid deterrent. On another spectrum, although this landfill cost is perceived as low, illegal dumping continues to pose issues on the national levels. Levels are not documented, however they are estimated to have decreased over the years.

In regards to (temporary) waste storage, according to article 18 in the Law 22/2011, “waste owners” are obliged to ensure that the waste is subject to proper hygienic conditions and security measures while it is still under their responsibility. The duration for non-hazardous waste temporary storage cannot surpass a two year limit if intended to recovery purposes, or a one year limit if intended for landfill.

Madrid, Catalonia, and Murcia are the only regions that have implemented an entry fee tax, or “gate fee” tax for waste entering landfills, however data on the success of this initiative is not available and it is not foreseeable to apply gate fees to all regional landfills. It should be noted that all reported landfills comply with the requirements outlined in the Royal Decree 1481/2001 which outlines obligations for landfill compliance and are furthermore compliant with EU legislation.

Regarding treatment facility capacity, Spain currently has the infrastructure and furthermore the operational capacity to take on CDW on a national level. On the contrary, since the economic recession in 2008, treatment facilities have taken a collective hit in the amounts of incoming CDW. As documented in the PEMAR, treatment plants are running under treatment capacity which makes it difficult for these facilities to stay open and properly function. Before the economic hit, public works commissioned by cities were a relatively sure and steady source of CDW, however as the demand for construction has diminished,
Regardless of waste supply, Spain does not face issues with treating particular waste sources (concrete, bricks, glass, etc.) although it was generally communicated by interviewed stakeholders that despite record low levels of generated CDW (which in theory could be a facilitator for introducing better management or waste management practices), contamination levels in incoming CDW are a main barrier for further recovery and recyclability of materials. Within this scope, there is a need for two improvements (communicated by interviewed stakeholders):

- Tackle the problem at the source via the introduction of selective demolition. It was generally believed that if more care was taken in the demolition or renovation stage by separating waste flows, the amount of recyclable materials could be greatly increased. Moreover, collection bin design, placement, and management could be improved to lower the amount of contaminants (i.e. clear signs, introduction of closed containers, ease of access, and supervision);
- Creation of norms or standards on recycled CDW, in particular for aggregates is a main topic of discussion on the national level so that treatment facilities have quality targets when treating and preparing materials (to ensure their recyclability).

5.5 Future projections of CDW generation and treatment

Although projections were outlined in the 2007-2015 PNIR, (see table 3) projections have not (yet) been outlined in the current draft version of the PEMAR, although they may be inserted in a later version. As indicated in the section on “CDW generation data” within this study, the projections outlined in the PNIR did not take into account the economic recession which took place consecutive to the document's publication, however they show an interesting perspective on what the potential could have been in Spain with a stable economy. Regarding CDW generation and treatment projection estimations for the 2015-2020 period, interviewed experts indicated that levels would most likely gradually rise, but not in the exponential manner as experienced before the recession. As the PEMAR is still in its draft phase, quantitative projections are not yet public.

5.6 Methodology for CDW statistics

As detailed above within the “CDW generation data” section, the National Statistics Institute is the body in charge of reporting CDW statistics to EUROSTAT. Autonomous Communities collect and report CDW statistics following the ELoW codes, following the methodology defined in the 2011/753/EU Decision, excluding hazardous substances and natural substances defined in category 17 05 04. This data is then collected and compiled by the National Statistics Institute. As shared by a Ministry stakeholder, there is a potential margin of error during the years 2010 and 2011 as the used methodology may not have been correctly applied. This stakeholder indicated that as the reporting methodology to EUROSTAT is not the same as for the ELoW, this may leave the door open for future reporting inconsistencies, even on the EU-wide level.

For the moment, there is no concrete way to determine if or what kinds of methodological reporting issues there were for the years in question. However, formal discussions will take place in mid-2015 to determine the feasibility of identifying reporting issues, and depending on the response, the feasibility of revising the reports.

In any case, 2012 data is perceived to have been reported to EUROSTAT using the proper methodology and is therefore deemed realistic.

6. C&D waste management in practice

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49 Interview with stakeholder in EU wide Construction and Demolition Sector. 11/05/2015.
In this section the CDW management “on ground” in Spain is explored.

6.1 CDW management initiatives

The following table consists of appropriate information on projects or specific initiatives that shows how legal and non-legal framework is applied.

<table>
<thead>
<tr>
<th>Description of initiative</th>
<th>Scope</th>
<th>Year established</th>
<th>National, regional, local (specify which local area/region)</th>
<th>Public sector and/or Industry lead organisation</th>
<th>Levels of performance e.g. tonnes recycled</th>
<th>Further information/ website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working group on technical proposal for an end of waste status for waste flows, in particular for aggregates</td>
<td>Objective to introduce technical measures within present EoW status outlined in the national Law.</td>
<td>2015</td>
<td>Regional (Basque Country)</td>
<td>Public sector</td>
<td>Performanc e levels or results on feasibility study not yet determined.</td>
<td>Interview with Joseba González Artaza, CDW Service Manager for the Basque Regional Government. 26/05/2015.</td>
</tr>
<tr>
<td>Working group: Norms for Recycled aggregates</td>
<td>Discussion on creating norms and standards to drive the use of recycled aggregates and debate of adding tax to natural aggregates</td>
<td>2015</td>
<td>National</td>
<td>National Federation for Aggregates</td>
<td>Performanc e levels or results not yet determined.</td>
<td>Interview with César Frades, National Federation for Aggregates. 29/04/2015.</td>
</tr>
<tr>
<td>Draft version of the 2015-2020 PEMAR: sets an objective to create a framework for favourable uptake of recycled aggregates for use in construction works</td>
<td>This was an improvement made from the previous waste management plan, II PNRCD</td>
<td>Expected publication: 2015</td>
<td>National</td>
<td>Ministry</td>
<td>Not yet implemented</td>
<td>Still in draft phase and not yet published.</td>
</tr>
<tr>
<td>Project: Guide to Recycled aggregates originating from CDW</td>
<td>Project carried out between 2008-2011, considered a main driver for construction, industry and stakeholders involved in strengthening CDW recycling activities in</td>
<td>2012</td>
<td>National</td>
<td>Spanish Association of Recycling CDW developed the scope of the project, won the scientific grant from the Ministry Environment, Rural and Marine Affairs Spain, under the National Research</td>
<td>Various, see report.</td>
<td><a href="http://www.caminospaisvasco.com/Profesion/documentostecnico/guia">http://www.caminospaisvasco.com/Profesion/documentostecnico/guia</a></td>
</tr>
</tbody>
</table>

---

6.2 Stakeholders’ engagement

This subsection was addressed to all contacted parties during the stakeholder consultation of the screening phase in order to incorporate their views, insights and hands-on experience on CDW management initiatives already in place in Spain. The table below aims to gather information on the existing initiatives – identified above – or other initiatives identified by the stakeholders themselves, together with a preliminary assessment of the enabling factors/obstacles, advantages/drawbacks, and other relevant comments.
### Exemplary CDW Management Leaders

The regions of the Basque Country and Catalonia are generally considered to be leaders in waste (CDW) management.

#### Good Examples of Regional C&D Waste Management Plans

- Positive drivers and enablers for other regions to follow.
- Regional plans and degrees are updated on non-harmonised time tables (in relation to other regions).

#### Further Information/Web-site

Interview with Joseba González Artaza, CDW Service Manager for the Basque Regional Government. 26/05/2015.

### Green Building Council

- Non-lucrative private council established in 1998 (but made significant headway in 2008) formed by companies and organisations with the goal of transforming the construction industry towards sustainability within the next generation.

#### Promote the Voluntary Certification Scheme LEED (Recognised Worldwide)

- The certification scheme requires a building site to create a management plan on CDW in order to maximize what can be recovered at a building's end-of-life. More points are given to a building when it hits new targets.

#### Further Information/Web-site

www.spaingbc.org

There is no current national cooperation platform to obtain guidance or exchange ideas between stakeholders within the construction material production, building designers, and CDW recyclers and demolition companies. However, via membership to association and federations (i.e. National Federation for Aggregates), companies obtain access to vital information about evolutions within the sector, including involvement in waste plans and laws (call for comments) and access to conferences and seminars on the national and regional level.

### 6.3 Waste Legislation Enforcement

National authorities are responsible for setting out waste laws and plans, while Autonomous Communities hold out the responsibility to establish their own laws and plans tailored to their region. This latter party furthermore monitors and enforces waste regulations within their region. A key example on how regions enforce the concept and responsibility of a “waste owner” and “waste producer” (Article 17 in the Law 22/2011) is by handing out construction and demolition waste permits/licences. These permits outline responsibilities such as (non-extensive list):

- Separating waste flows (non-hazardous from hazardous) to prepare for removal.
- For hazardous “waste producers”, must carry out an assessment on how to minimise this type of waste (producers of hazardous waste in small quantities are exempt from this requirement);
- If the waste treatment is not carried out by the “waste owner” itself, proper documentation must be ensured for the good management of waste.
- Mandatory financial deposit, required by law prior to demolishing buildings. Upon proving that the demolished building's CDW was lawfully managed, the deposit is reimbursed. While this system facilitates good management, as financial incentives are set in place, tighter monitoring needs to be

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52 Interview Spain Green Building Council 15 April 2015.
set in motion in order to ensure that all actors are following through. At this stage, it is not clear whether this deposit scheme functions.

As commented by a stakeholder from the Basque Country’s regional government, the Basque Country has implemented a regional law on selective demolition (not applicable throughout the nation) meaning that it is the responsibility for waste removal companies or the relevant “waste owner” to carry this out. It was pointed out that because of the complexity of the CDW sector, permits/licences cannot be uniform for every project. For example, a renovation or demolition project on an older building, constructed in the 1940-50’s may have materials that are more complicated to recycle and recover.

On a general sense, when “waste owners” violate permit or licencing rights, local/regional authorities may impose sanctions or fines against the waste owner. Particular court cases or infringement procedures on CDW management were not identified. Waste owners are individuals that is:

- The physical or legal owner of the building permit or for C&D works that do not require planning permission, it will be considered as the legal owner of the property subject to C&D works.
- The person or jurisdiction that carries out treatment operations or that is responsible of waste composition;
- An importer or purchaser.

Backfilling waste only composes about 14% of the reported CDW in 2012, with the majority of CDW going towards recovery. Data on illegal dumping does not exist; stakeholders indicated that while levels of illegal waste disposal has diminished (per general knowledge/observations), it is still a challenging aspect to control and quantify.

It is not clear whether waste legislation is properly being enforced, and whether it is being carried out accordingly in practice.

### 6.4 Drivers / barriers to increase CDW recycling

The main drivers and barriers that affect (directly/indirectly) the recycling efforts and boost/impede CDW recycling rates and overall performance in Spain can be seen below:

<table>
<thead>
<tr>
<th>Factor / characteristic / element in CDW recycling chain</th>
<th>Drivers</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic stability</td>
<td>The economic crisis drastically lowered the amount of CDW generated from the years of 2007-2009 and left a potential opportunity for non-legislation initiatives. LEED certified buildings gained more recognition, as there was potential for real estate investment funds to prefer investments in these certified before others (building’s compliance with the LEED criteria theoretically costs less to manage and maintain). This was positive, however the number of certified buildings remains low. As CDW levels are still low, this moment could be used as a driver.</td>
<td>Although there is less CDW, it is not necessarily being better managed. These lower numbers of CDW can be misinterpreted.</td>
</tr>
<tr>
<td>Collaboration via legislation process</td>
<td>Generally, important C&amp;D waste actors are involved in legislation process (i.e. current revision of waste plan)</td>
<td>Would require improvements in legislation process.</td>
</tr>
</tbody>
</table>

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54 It should be noted that hard data on national or regional recycling rates are not available, as reporting discrepancies hinder its validity.
<table>
<thead>
<tr>
<th>Factor / characteristic / element in CDW recycling chain</th>
<th>Drivers</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill tax &amp; gate fee</td>
<td>As an objective, the PEMAR outlines the creation for an admission taxing systems for CDW when entering a regulated landfill, and furthermore foresees to harmonise these taxes across regions. Examples of successfully implemented gate fee taxes can be seen in Catalonia, Murcia, and Madrid.</td>
<td>It may prove to be difficult to apply this nationwide.</td>
</tr>
<tr>
<td>Landfill and treatment facility infrastructure</td>
<td>While there are 195 regulated landfills, the higher proportion of transition platforms (168), mobile treatment sites (134), and permanent treatment sites (384) could potentially host a favourable climate for recycling.</td>
<td>In practice, the outweighing number of treatment facilities is not properly leveraged, as treatment facilities are generally under treatment capacity.</td>
</tr>
<tr>
<td>Market conditions for aggregates</td>
<td>One of the objectives in the PEMAR is to include environmental costs within the cost for natural aggregates in order to make recycled aggregates more competitively priced. Various working groups have been established to address this topic.</td>
<td>There are currently no incentives to choose recycled aggregates over natural (virgin) aggregates. Spain is rich in natural mineral resources, therefore it is easy and inexpensive to extract natural aggregates. Currently the price of natural aggregates does not include the environmental cost for extraction, therefore it only takes into account the net costs.</td>
</tr>
<tr>
<td>Regional initiatives</td>
<td>As regions have the freedom to further develop their own waste laws or plans, this facilitates better design and uptake, according to regional needs.</td>
<td>These plans and laws are not always visible on the national level, therefore there is a lack of synergy and lessons learned. Furthermore, this freedom to develop laws and plans has led to an imbalance between regional advancement.</td>
</tr>
</tbody>
</table>

### 7. CDW sector characterisation

In this section some specific characteristics of the CDW management sector in Spain are explored.

#### 7.1 Sector characteristics

**Building and public works sector waste-related characteristics**

- Actors involved: land owner/waste owner, waste management company, specific waste flow treatment facility, subcontractors, public authorities, etc. Some of these actors are outlined in the Royal Decree and furthermore in the Law, however the definitions are not comprehensive;
- Stakeholders interviewed for this study generally indicated that building works require much higher levels of organisation and coordination than they do for public works (road, train works);
- Methodology/techniques for carrying out public works (i.e. road works) is relatively standardised and requires a (relatively) lesser required quality for recycled materials than for building works (i.e. lower quality glass that is not suitable for reincorporation for building glass manufacturing can instead be recovered into glass beads. These glass beads can then be mixed in with paint to give its reflective quality and used for lane road lane lines.
- Building CDW material has a wide variety of materials to extract, some more challenging than others because of composition (i.e. buildings 1940-50’s may have higher risk of asbestos use, oil use within materials) or because of installation particularities;
- The estimated profitability of a project may also hold weight (i.e. waste management companies may opt for larger demolition project in comparison to smaller or short term renovation projects because of cost competitiveness for infrastructural use such as bin rentals).
CDW collection and transport schemes

- National CDW collection and transportation schemes do not exist in Spain.
- On the regional level, ample transition platforms, stationary and mobile treatment plants exist in order to facilitate treatment (see section “CDW treatment facilities data” for breakdown per region).
- Private waste collection sites also exist.
- If the waste treatment is not carried out by the “waste owner” itself, proper documentation must be ensured for the good management of waste.

Capacity to boost CDW recycling and recovery via involved actors

- The lack of synergised national efforts to boost CDW remains a major challenge and at its current stage the efforts of different actors is not harmonised enough in order to properly boost recycling and recover rates;
- While efforts in certain regions remain as good practices, these actions are not transposed to other regions;
- Treatment facilities, which are generally under capacity do not have the financial means to invest in campaigns or awareness-raising events in light of sensitising construction works or demolition companies on the importance of ensuring high quality CDW.
- In particular, public authorities, who used to the main source of CDW supply for treatment centres via their publicly commissioned projects no longer have the financial means to do so at the same level. In fact, the budget for public authority-commissioned public works dropped from EUR 38 500 million from before the crisis in 2008 to just over 5 000 million in 2012 accounting for a near 87% decrease in monetary budget.

Available budget for public works commissioned by public authorities (source draft 2015-2020 PEMAR)

Employment in CDW sector

The cause-effect low levels of construction and demolition projects and waste has also led to parallel low levels of employment levels in this sector. From 2 million workers in 2008 before the crisis took hold, to 1,323,371 in 2011, employment has reduced by a striking 60%. The aggregates sector alone accounts for 10 thousand direct and 40 thousand indirect workers (subcontractors and transporters).

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Generally, infrastructure to carry out proper waste management operations is not the main barrier (although infrastructure for landfills and waste platforms is needed). On the contrary, constant supply of CDW is an obstacle, as seen with treatment facilities working at undercapacity.

### 7.2 Exports / imports of CDW

Spain’s imports and exports are not recorded quantitatively. Rather, via stakeholder feedback, it was indicated that CDW was imported in the past with the expectation that the imported material could be easily used as recycled material. However, as this material proved to be of poor quality at the time, this practice was discontinued. Regardless, Spain has the capacity to properly absorb its CDW quantities. Neighbouring countries, such as France would not have the potential to absorb these quantities as it is a large CDW producer itself.

### 7.3 CDW as landfill cover

Although not explicitly stated in the Law or the Royal Decree, or statistically documented nationwide, CDW is indeed used in landfill cover operations. In particular, the Corral Serra landfill, which was opened in 2005 following EU standards, used about 85,041 tonnes of recycled aggregates as landfill cover out of the 303,738 tonnes of received CDW (between the years of 2005-2009).57

Furthermore, developments such as the IT tool, LABWASTE.1258, mathematicians carried out a study to estimate the amount and type of aggregate that is needed for the construction, maintenance (i.e. landfill cover) and closure of a landfill. See image below for the explored uses for recycled aggregates, and in particular the red circle for the mention of landfill cover use.

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Despite these two examples of aggregate use for landfill cover, it is hard to determine how widespread is the use of CDW for covering landfills since there is no extensive data on this practice.

### 7.4 Market conditions / costs and benefits

Besides the low landfill tax (EUR 5-40 depending on the region) and the gate fee taxes in Catalonia, Murcia and Madrid, there are no concrete financial incentives to recycle CDW. Furthermore, these existent taxes are considered to be low and a poor deterrent to landfilling.

Currently there is no data on environmental benefits or costs to construction based on the concept of circular economy or resource efficiency. However, as laid out in the PEMAR, one of the objectives for 2015-2020 is to integrate the environmental costs within the price of natural (virgin) aggregates in order to more appropriately reflect the total cost. This objective, supported by the working groups that are being taken on the national and federation level (i.e. National Federation of Aggregates) could foster potential for advancement. In particular the National Federation of Aggregates will be discussing their point of view on the current discussion taking place on whether natural aggregates should be taxed, in light of deterring its use. As explained by this federation, in practice, companies that use recycled aggregates in construction or renovation works usually have to mix in a certain percentage of natural aggregates with recycled aggregates to ensure its sufficient quality for construction works. This is done since recycled aggregates are generally of poor quality (with contaminants such as rubbish, plastics, wood, gravel, etc.) the pure virgin quality is intended to balance out the recycled material. It is believed that if a tax is to be applied without addressing the need to better the quality of recycled aggregates, market conditions may not change.

As Spain has ample levels of natural minerals that are cheaper to excavate than to use recycled aggregates, C&D actors may be naturally gravitated to use these materials over recycled CDW (aggregates) that may have questionable quality. To jump start a potential market uptake of aggregates, introducing *regulated* quality standards would paramount in ensuring C&D actors that recycled CDW is of equal quality to natural aggregates. In addition, it could be envisioned that when introducing viable quality standards that are respected and enforced on the local, regional and national level, awareness campaigns that perceive aggregates as viable material instead of as waste (as currently viewed by many Spanish actors) could help boost the market uptake.

### 7.5 Recycled materials from CDW

The most frequent types of CDW materials that are recycled are concrete, bricks, ceramic, and tiles.
Regardless, an obstacle to CDW recycled material use for construction works is the perception of recycled CDW as a “waste” and not as a “product”. Evidently, the core issue to developing a viable market for recycled CDW is that it is not yet clear what conditions aggregates or CDW cease to be waste and obtain the status of products to be used in various applications (fabrication of bricks, concrete, etc.). Construction companies are rather reluctant to use recycled CDW because of quality issues. B2B communication campaigns could be useful to inform relevant parties on the benefits and uses of CDW.

Green Public Procurement (GPP) is not yet implemented in Spain, however it is a currently discussed topic on the national scale. Ideally, although not possible for the near future (especially since the use of recycled aggregates is only at about 1%), the National Federation of Aggregates would be in support of envisioning a framework for obliging a 5-10% requirement for the use of recycled aggregates in construction works. For the moment, ideas on this remain abstract.

There is no official national formal training on how to use recycled products in new construction. However, individual efforts have been carried out via the “GEAR PROJECT”, which was coordinated by the Spanish Association of Construction and Demolition Waste, carried out various projects and case studies on Spain’s CDW sector between the years 2008-2011, in particular on aggregates. 24 treatment facilities, 4 universities, and 3 research centres were the main consulted parties for these investigations. Via this project, 40 new recycling plants were established, and in particular, the project facilitated more than 80 construction works with the use of recycled aggregates. This manual or guide on aggregates serves as a good benchmark for future advancements in CDW advancements.

7.6 Construction sector make up

The construction sector in Spain boomed exponentially leading up to the years before the recession, resulting in a drop-off of construction projects, both privately and publicly commissioned. The table below illustrates this drop in renovation, demolition, and construction licences between the years of 2007-2012. As indicated in section “CDW sector characterisation”, public authorities no longer have the financial means to commission projects as they did before the recession. Public authority-commissioned public works dropped from EUR 38 500 million from before the crisis in 2008 to just over 5 000 million in 2012 accounting for a near 87% decrease in monetary budget.

Number of issued licences for construction, renovation, and demolition works in the residential and tertiary sector (2007-2012) Source: National Statistics Institute: Ministry of Public Works

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW CONSTRUCTION WORKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- BUILDING CONSTRUCTION</td>
<td>187.147</td>
<td>93.678</td>
<td>51.744</td>
<td>44.781</td>
<td>38.973</td>
<td>28.956</td>
</tr>
<tr>
<td>Residential</td>
<td>166.322</td>
<td>79.752</td>
<td>39.564</td>
<td>35.110</td>
<td>30.194</td>
<td>21.038</td>
</tr>
<tr>
<td>- CONSTRUCTION ON SURFACE</td>
<td>128.254</td>
<td>66.085</td>
<td>37.433</td>
<td>26.706</td>
<td>22.323</td>
<td>17.953</td>
</tr>
<tr>
<td>In residential works</td>
<td>102.790</td>
<td>48.205</td>
<td>24.419</td>
<td>18.488</td>
<td>15.245</td>
<td>11.585</td>
</tr>
<tr>
<td>In tertiary works</td>
<td>25.464</td>
<td>17.880</td>
<td>13.014</td>
<td>8.218</td>
<td>7.078</td>
<td>6.372</td>
</tr>
<tr>
<td>- HOUSING CONSTRUCTION</td>
<td>634.098</td>
<td>268.435</td>
<td>130.546</td>
<td>91.645</td>
<td>76.005</td>
<td>57.543</td>
</tr>
<tr>
<td>RENOVATION WORKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building renovation</td>
<td>33.359</td>
<td>34.807</td>
<td>33.267</td>
<td>31.910</td>
<td>30.237</td>
<td>29.154</td>
</tr>
<tr>
<td>- DEMOLITION WORKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing demolition</td>
<td>25.244</td>
<td>13.253</td>
<td>6.975</td>
<td>6.985</td>
<td>6.208</td>
<td>5.909</td>
</tr>
</tbody>
</table>

The table below illustrates the total number of residential works carried out throughout the years 2007-2012. As seen when comparing totals, there has been an 88% decrease in residential works in 2012 as compared to 2007.


<table>
<thead>
<tr>
<th>Year</th>
<th>Residential: &quot;attached&quot; housing (i.e. townhouses)</th>
<th>Residential: Singular housing units</th>
<th>Residential: &quot;block&quot; units (i.e. apartments)</th>
<th>Residential: collective housing</th>
<th>Commercial service units</th>
<th>Other (residential)</th>
<th>Residential: TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>50.695</td>
<td>50.456</td>
<td>34.393</td>
<td>115</td>
<td>2.938</td>
<td>7.243</td>
<td>135.659</td>
</tr>
<tr>
<td>2008</td>
<td>21.179</td>
<td>31.852</td>
<td>12.763</td>
<td>98</td>
<td>2.525</td>
<td>5.735</td>
<td>65.892</td>
</tr>
<tr>
<td>2011</td>
<td>3.971</td>
<td>15.943</td>
<td>3.162</td>
<td>40</td>
<td>1.772</td>
<td>3.735</td>
<td>23.116</td>
</tr>
<tr>
<td>2012</td>
<td>2.357</td>
<td>12.158</td>
<td>1.692</td>
<td>35</td>
<td>1.625</td>
<td>2.891</td>
<td>16.242</td>
</tr>
</tbody>
</table>

This decrease in construction, demolition, and renovation works has also lowered the number of employment in the C&D sector. As seen above in the “CDW sector characterisation”, there was a recorded level of 2 million workers in 2008 before the crisis and decreased exponentially by 60% to 1.323.371 in 2011.  

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References

Interview sources

Interview with stakeholder in EU wide Construction and Demolition Sector. 11/05/2015.
Interview with Antonio Cabrera Marianini Subdirección General de Residuos; D.G. Calidad y Evaluación Ambiental y Medio Natural Ministerio de Agricultura, Alimentación y Medio Ambiente. 30/04/2015
Interview with César Frades, National Federation for Aggregates. 29/04/2015.
Interview with Joseba González Artaza, CDW Service Manager for the Basque Regional Government. 26/05/2015.
Interview Spain Green Building Council 15 April 2015.

Other consulted stakeholders

The following stakeholders have been contacted but did not participate:

Martí Madorell i Arboli, Head of the Department Disposición i Control de la Agencia, Agència de Residus de Catalunya: mmadorell@gencat.cat.

Literature sources


Online sources


Resource Efficient Use of Mixed Wastes