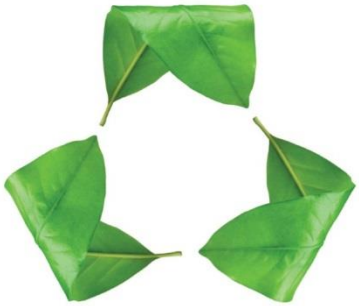
Construction and Demolition Waste management in

Portugal

V2 – September 2015



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1. Summary

In Portugal, the Decree-Law 73/2011 of 12 June (Decreto-Lei 73/2011, de 12 de junho) amends and republishes the national waste management legal framework (Decree-Law 178/2006 of 5 September; Decreto-Lei 178/2006, de 5 de setembro) and implements the Waste Framework Directive (WFD), including the target of 70% for construction and demolition waste (CDW) recovery set in article 11 for 2020.

Concerning CDW, Portugal published a specific legal framework for the management requirements for this waste stream in 2008. The Decree-Law 46/2008 of 12 March (Decreto-Lei 46/2008, de 12 de março) supports a series of legislative and regulatory measures in order to bridge knowledge gaps and to promote the application of the waste hierarchy. One of the main aims of this decree-law is to promote CDW recycling, in line with the recycling targets established in the WFD. It also aims to create legal conditions for the proper management of CDW with a focus on the prevention of hazardous waste, and on the obligation of sorting at source of waste generation.

More specifically, this decree-law created the conditions for the following initiatives: i) the implementation of the waste management hierarchy in construction and demolition works that focuses on reuse on site, followed by sorting at the construction site works; ii) a sorting obligation previous to landfill disposal; iii) a definition of a specific transportation guide; iv) a permit exemption for certain CDW management operations; v) the obligation to comply with national or Community standards related with recycling; and vi) the creation of innovative mechanisms in planning (the Plan for the Prevention and Management in public works and data recording in private works).

The Decree-Law 46/2008 established the necessity to elaborate a specific national plan to the CDW management, with the specific goal of understanding and implementing the Community and national targets for CDW. The Portuguese Environment Agency (*APA - Agência Portuguesa do Ambiente*) is preparing a seminar to enhance the achievement of the WFD target, where all of the stakeholders or its representatives associations will be invited.

The CDW generation and treatment data are recorded every year in the Integrated Map for Waste Registration (MIRR) of the Integrated Registration System developed by Portuguese Environment Agency (SIRAPA). Regarding this platform, data to quantify the CDW generation and treatment can be obtained from two sources: Statistics Portugal (*INE – Instituto Nacional de Estatística*) and Portuguese Environment Agency. The Statistics Portugal presents data between 2008 and 2012, following the Waste Statistics Regulation, although with some adaptations. The Portuguese Environment Agency reported to the European Commission (EC) the CDW generation data for the year 2009 according to a specific methodology. The calculation does not completely follow EC methodology, since it was only based on the codes 17 of the European List of Waste (LoW). However, the calculation allows to evaluate Portuguese effort to achieve the target of 70% established in the WFD for 2020.

The CDW management data are presented in the following table. Methodological differences justify the discrepancies found in the reported values from the two sources. There are no projections available concerning the CDW generation, treatment, operations planning or management infrastructures.

CDW (all NACE rev.2)	Source of data	Year					
		2008	2009	2010	2011	2012	2013
Generated (tonnes)	INE	2 096 475 (3.53%)*	2 146 524 (4.23%)*	2 195 128 (2.52%)*	2 522 541 (2.60%)*	1 224 861 (2.33%)*	1 746 652 (1.59%)*
	APA (APA, 2014b)	-	1 647 795 (6.81%)*	-	-	-	-
Treated (tonnes)	INE	1 411 280 (5.08%)*	1 221 147 (7.26%)*	925 687 (5.91%)*	1 620 559 (3.82%)*	657 744 (4.28%)*	1 038 039 (2.50%)*
	APA (APA, 2014b)	-	1 276 060 (5.63%)*	-	-	-	-

CDW (all NACE rev.2)	Source of data	Year					
		2008	2009	2010	2011	2012	2013
Recycled CDW (tonnes) **	INE	250 657	299 312	362 721	851 608	429 746	845 930
Backfilled CDW (tonnes)	INE	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Landfilled CDW (tonnes) ***	INE	1 160 102	918 843	556 310	762 068	227 288	190 158
Energy recovery of any (tonnes)	INE	522	2 993	6 656	6 883	711	1 951

* Percentage of hazardous CDW in relation to the total generated or treated
** Considering "other recovery except backfilling partim (R2-R11)" + "backfilling partim (R5)"
*** Considering "all disposal (all D codes)"
n.d. Not determined

The following actors are involved in the CDW management in Portugal: national waste authority (Portuguese Environment Agency), regional waste authorities (five Commissions for Coordination and Regional Development), construction companies (Small and Medium Enterprises (SMEs) are the main actors in the construction sector as compared to Large Enterprises (LEs)), private waste management companies, municipalities and municipal solid waste (MSW) management systems. There are sectorial organisations at a national level that represent those actors. To date, available data do not exist for specific initiatives undertaken by these entities that have had significant effects in order to achieve the WFD target.

The inspection authorities are responsible for monitoring and enforcing waste regulation requirements, namely the compliance with CDW legal framework. These authorities are: General Inspection of Agriculture, Sea, Environment and Spatial Planning (*IGAMAOT - Inspeção-Geral da Agricultura, do Mar, do Ambiente e do Ordenamento do Território*); five regional waste authorities; municipalities; and police authorities.

Stakeholder consultation facilitated the identification of the main drivers and barriers to improve CDW recycling in Portugal.

The **leading drivers** identified were:

- existence of a specific legal framework and technical guides;
- existence of facilities for sorting and recycling (although the heterogeneity of geographical distribution);
- obligation to report data.

The **main barriers** identified were:

- the current situation of the Portuguese economy which has been marked with a significant slowdown in the last years, leading to severe consequences in the construction sector and CDW generation and recovery;
- non-compliance with legal framework;
- lack of enforcement (by inspection/auditing authorities);
- limited permission to use recycled CDW;
- high management cost associated to proper CDW management;
- low landfill tax and non-existent disposal fee tax under the environmental rehabilitation of quarries;
- inexistent legal and technical specifications for selective demolition;
- inexistent End of Waste (EoW) criteria for inert CDW;
- non-competitive pricing of recycled materials (and inexistence of specific tax for natural aggregate extraction);
- lack of coordination and synergy between stakeholders;
- lack of data cross checking and verification of CDW generation for small and medium construction companies;
- lack of environmental awareness.

2. Definitions concerning construction and demolition waste (CDW) and management

In this section the definitions of waste used in Portugal are presented.

2.1. Definition of waste

In Portugal, the definition of waste is following the definition of the WFD 2008/98/EC of the European Parliament and of the Council of 19 November[1]: *"waste' means any substance or object which the holder discards or intends or is required to discard"*.

The definition is presented in the Decree-Law 73/2011 of 17 June (Decreto-Lei 73/2011, de 17 de junho)[2] (article 3, point e.), which amends the national waste management legal framework (Decree-Law 178/2006 of 5 September) and implements the WFD in Portugal.

2.2. Definition of construction and demolition waste (CDW)

The definition of CDW is given in Portugal by the Decree-Law 73/2011 of 17 June: *'waste resulting from construction, reconstruction, extension, alteration, maintenance and demolition and collapse of buildings.*[3]*'*

Regarding the definitions, there is not a distinction between construction and demolition waste.

The classification for CDW in Portugal follows the European LoW (Commission Decision 2000/532/EC of 3 May)[4], published at national level by Ordinance 209/2004 of 3 March[5] (Portaria 209/2004, de 3 de março; amended by Decree-Law 73/2011 of 17 June). In Portugal, there are no codes excluded from the classification of CDW (code 17) given by the European LoW.

According to the document *Frequently Asked Questions* (version from October 2011)[6] from the Portuguese Environment Agency, CDW are any waste resulting from construction, reconstruction, extension, alteration, maintenance and demolition and collapse of buildings, including the specific waste streams contained therein. Municipal or similar waste, and waste mixtures of construction works with other waste from distinct origin are not included in this definition.

The Decree-Law 73/2011 of 17 June sets in article 2 that uncontaminated soil and other naturally occurring material excavated in the course of construction activities (where it is certain that the material will be used for construction purposes in its natural state on the site from which it was excavated) are excluded from the application context of the national waste management legal framework.

Furthermore, the Decree-Law 46/2008 of 12 March (Decreto-Lei 46/2008, de 12 de março)[7] (CDW legal framework; see subchapter 3.1) establishes in article 6 (reuse of soils and rocks) that uncontaminated soils and rocks must be reused at the construction site or at other construction works, as well as in environmental and landscape rehabilitation of quarries, as landfill cover or other location licenced by municipal authorities.

Regarding the definition, and according to the Decree-Law 46/2008 of 12 March (article 14), the producers and CDW management companies shall comply with the legal framework applied to specific waste streams contained in CDW, in particular those relating to packaging waste, waste electrical and electronic equipment (WEEE), waste oils, used tires and waste containing polychlorinated biphenyls (PCB).

2.3. End of Waste (EoW) status

The Decree-Law 73/2011 of 17 June has set requirements for substances or objects resulting from a production process, which can be considered as by-products and not waste. The Decree-Law also establishes conditions for end of waste (EoW) criteria. The by-product and EoW criteria, are explained

[1] EPC (2008): http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF
[2] MAOT (2011): https://dre.pt/application/file/670129
[3] Translation by the authors. Only the original text in Portuguese applies as a legal binding definition.
[4] Commission (2000): http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32000D0532&from=EN
[5] MEADRPSCOTA (2004): https://dre.pt/application/file/551687
[6] APA (2011): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/FAQSRCD102011.pdf
[7] MAOTDR (2008): https://dre.pt/application/file/246961

respectively in articles 44 a) and 44 b). Both concepts introduce a distinction between waste and non-waste, but they have different legal context.

Regarding article 44 a), a by-product or a non-waste material is a substance or object resulting from a production process, whose principal purpose is not its production when the following conditions met:

- the material's or substance's future application is determined;
- the substance or object can be used directly without further processing, aside from that which takes place via normal industrial practice;
- the production of the substance or object is an integral part of a production process;
- the substance or object fulfils the relevant health and environmental requirements in regards to its intended use, meaning that they do not lead to overall adverse impacts from an environmental or human perspective.

The classification of a by-product must be made by stakeholders, through sectorial associations or individually, at the Portuguese Environment Agency, by submitting a specific application form. The application is evaluated within 90 days with a submission fee of € 5 000.

The by-product classification does not apply to waste that is excluded from the scope of national waste management legal framework (Decree-Law 73/2011 of 12 June), nor to the consumption of waste generated in production activities (e.g. empty packages).

Prior to the submission of the application form, it is essential to evaluate if the substance or object has the potential to be classified as a by-product. This assessment should be made taking into account the flow chart presented in the Annex.

To date, none of the existing classifications of by-products in Portugal is applicable to CDW[8].

Taking into account article 44 b), EoW criteria can apply to certain waste that has undergone a recovery operation, including recycling, and complies with specific requirements developed in accordance with the following conditions:

- the substance or object is commonly used for specific purposes;
- a market or demand exists for such a substance or object;
- the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products;
- the use of the substance or object will not lead to overall adverse environmental or human health impacts;
- the criteria may include limit values for pollutants and take into account any adverse environmental effects of the substance or object.

In the absence of common EU criteria, the National Waste Authority may, after consulting the directly interested economic operators or their representative structures, set specific requirements that must be fulfilled in order a certain object or substance to be considered a by-product or qualify for EoW status. In the present case, Portuguese Environment Agency should:

- prepare an Ordinance specifying the requirements for waste declassification;
- communicate the decision to the European Commission through the Portuguese Institute for Quality, in accordance with Decree-Law 58/2000 of 18 April (Decreto-Lei 58/2000, de 18 de abril), which provides the rules to administrative procedures in these cases.

Once it is declassified, the waste legal framework is no longer applicable to that specific object or substance, but the legislation concerning products or substances applies, namely the Regulation (EC) 1272/2008 (classification, packaging and labelling) and the Regulation (EC) 1907/2006 (REACH - EU regulation concerning the Registration, Evaluation, Authorisation and restriction of Chemicals).

Currently, no specific EoW criteria for CDW exist in Portugal[9].

2.4. Definitions of waste treatment operations

The definitions for reuse, recycling and recovery used in Portugal are the following, according to Decree-Law 73/2011 of 17 June (article 3, points nn, bb and qq, respectively):

[8] APA (2015). *E-mail* contacts.
[9] APA (2015). *E-mail* contacts.

- **Reuse:** any operation by which products or components that are not waste are used again for the same purpose they were conceived;
- **Recycling:** any recovery operation, including the reprocessing of organic material, through which the constituents of the waste materials are reprocessed into products, materials or substances whether for the original purpose or other purposes, but it does not include energy recovery and the reprocessing into materials that should be used as fuels or for backfilling operations;
- **Recovery:** any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II sets out a non-exhaustive list of recovery operations.

The definitions are following Annex II of WFD. The definitions have been published in Portugal for the first time in Annex III of Ordinance 209/2004 of 3 March, and were published again with some alterations taking into account the WFD specifications in Annex II of Decree-Law 73/2011 of 17 June.

The guidelines by Eurostat on reporting data of waste treatment operations are being followed, although Statistics Portugal does not report backfilling as separately because there is no specific recovery code to classify this operation.

Concerning the legal framework, Portugal does not have a definition for backfilling operations. However, an official document from the Portuguese Environment Agency to Regional Waste Authorities (Circular 02/2014/DRES-DFEMR)[10] of August of 2014, outlines the use of waste from CDW for backfilling operations. This document complies with the guidelines of the Commission Decision 2011/753/EU.

This latter document indicates that in the instance when CDW are used to recover excavated areas or for landscape engineering works (in the cases where wastes replace the materials that are not wastes) it constitutes a recovery operation called backfilling (e.g. the use of CDW to fill the voids resulting from mining). The document also matches backfilling with the R10 recovery operation code (land treatment resulting in benefit to agriculture or ecological improvement), and must be reported in accordance to that operation code.

3. Legal Framework – Waste Management Plans and Strategies

In this section the legal framework governing CDW management in Portugal is presented.

3.1. Legislation concerning CDW in Portugal

Concerning CDW management, in 2008 Portugal published the Decree-Law 46/2008 of 12 March (Decreto-Lei 46/2008, de 12 de março)[11] that establishes the legal framework for waste management resulting from construction works or demolition of buildings or collapses, including prevention and reuse and the operations of collection, transport, storage, treatment, recovery and disposal.

The main goal of the decree-law is to create legal conditions for the proper management of CDW which focus on the prevention of hazardous waste generation, sorting at source, recycling and other forms of recovery, in light of reducing the use of natural resources and minimising landfilling. The changes introduced through the publication of Decree-Law 46/2008 are the following:

- Responsibility for CDW management (article 3):
  - the responsibility to manage CDW belongs to the producer (or holder if the producer is not identifiable). Private construction works may have a construction permit exemption as long as the CDW is managed by the entities responsible for the municipal waste management. The producers/holders are entitled to transfer their responsibility to waste management companies or to entities responsible for the management of other waste streams;
- Reuse of uncontaminated soils and rocks (article 6):
  - uncontaminated soils and rocks must be reused at the construction site or another site. If not possible, they can be reused in other construction works, for environmental and landscape rehabilitation of quarries, as landfill cover or other sites licensed by the municipality;
- Incorporation of recycled CDW at construction works (article 7):

[10] APA (2014a): http://www.apambiente.pt/_zdata/Politicas/Residuos/Circulares/Circular_2_2014.pdf
[11] MAOTDR (2008): https://dre.pt/application/file/246961

- the incorporation of CDW at construction works must comply with national or EU standards, orin their absence with technical requirements defined by National Laboratory for Civil Engineering (LNEC - Laboratório Nacional de Engenharia Civil);

- Sorting and CDW shredding (article 8):
  - CDW which cannot be reused has to be sorted at the construction site in order to be recovered or recycled. If sorting at the construction site is not possible, the producer has to deliver it to a licensed waste operator;
- CDW landfilling (article 9):
  - only possible after sorting and it is subject to taxation (article 21).
- Planning (articles 10 and 11):
  - creation of innovative mechanisms in planning, establishing requirements for the creation and implementation of a Prevention and Management Plan for CDW in public works (article 10) and for registering data at private works (article 11 and Annex II);
- CDW Transport (article 12):
  - the definition of a specific transport guide for CDW (Ordinance 417/2008 of 11 June);
- Permit exemption for certain CDW management operations (article 13):
  - i) CDW storage operations in the construction site during construction works; ii) sorting operations and CDW shredding conducted at the construction site; iii) recycling operations involving the reintroduction of CDW in the production process; iv) conducting tests for prospective evaluation of CDW and for the possibility of incorporating CDW in the production process; v) use of CDW at construction work site; and vi) the use of soils and rocks containing no hazardous substances, resulting from construction activities, in the environmental and landscape recovery of mines and quarries and for the cover of landfills;
- Waste streams (article 14):
  - the producers and management operators of CDW shall comply with the legal framework applied to specific waste streams contained in CDW;
- Information duty (article 15):
  - To collect information concerning CDW generated and managed, CDW producers, private waste managers and waste management systems need to report data through the Integrated Registration System of the Portuguese Environment Agency electronic platform, called SIRAPA. However, if any private CDW producer has less than 10 employees it does not have an obligation to report waste (Decree-Law 73/2011 of 17 June, article 48, paragraph 1, point a.).

Other specific or related regulations which affect CDW management in Portugal are:

- Ordinance 40/2014 of 17 February (Portaria 40/2014, de 17 de junho)[12]:
  - establishes the rules for the correct removal of materials containing asbestos, and for packaging, transport and management of the respective CDW generated, regarding the protection of the environment and human health. This Ordinance also aims at clarifying aspects related to the inventory of materials containing asbestos and their characterisation, in the project phase (*Ministérios da Saúde, da Solidariedade, Emprego e Segurança Social do Ambiente, Ordenamento do Território e Energia, 2014*);
- Decree-Law 73/2011 of 17 June (Decreto-Lei 73/2011, de 17 de junho)[13]:
  - transposes the Waste Framework Directive 2008/98/EC, and introducesthe target of **incorporating at least 5% of recycled materials or materials containing recycled components**, regarding the total amount of raw materials used in public construction works (*Ministério do Ambiente e do Ordenamento do Território, 2011*);
- Decree-Law 26/2010 of 30 March (Decreto-Lei 26/2010, de 30 de março)[14]:
  - obliges the CDW holder from private construction works (with mandatory permit) to keep record on CDW generated (*Presidência do Conselho de Ministros, 2010*);
- Decree-Law 183/2009 of 10 August (Decreto-Lei 183/2009, de 10 de agosto)[15]:
  - establishes the criteria to accept codes 17 01 01, 17 01 02, 17 01 03, 17 01 07, 17 02 02 and 17 05 04 of European LoW in landfills for inert wastes without testing (*Ministério do Ambiente, do Ordenamento do Território e do Desenvolvimento Regional, 2009*);
- Decree-Law 18/2008 of 29 January (Decreto-Lei 18/2008, de 29 de janeiro)[16]:

[12] MSSESSAOTE (2014): https://dre.pt/application/file/572271
[13] MAOT (2011): https://dre.pt/application/file/670129
[14] PCM (2010): https://dre.pt/application/file/612544
[15] MAOTDR (2009): Decree-Law 183/2009 of 10 October, https://dre.pt/application/file/493323
[16] MOPTC (2008): https://dre.pt/application/file/248099

- establishes the elaboration and implementation of a CDW prevention and management plan for all public construction works (*Ministério das Obras Públicas, Transportes e Comunicações, 2008*);

- Ordinance 417/2008 of 11 June (Portaria 417/2008, de 11 de junho)[17]:
  - defines the documentation which certifies CDW transport and reception at private waste management facilities (*Ministério do Ambiente, do Ordenamento do Território e do Desenvolvimento Regional, 2008*);
- Ordinance 209/2004 of 3 March (Portaria 209/2004, de 3 de março):
  - transposes Decision 2000/532/EC and its amendments concerning the European LoW (*Ministérios da Economia, da Agricultura, Desenvolvimento Rural e Pescas, da Saúde e das Cidades, Ordenamento do Território e Ambiente, 2004*)[18];
- Ordinance 335/97 of 2 September (Portaria 335/97, de 2 de setembro)[19]:
  - regulates the transportation of waste (*Ministérios da Administração Interna, do Equipamento, do Planeamento e da Administração do Território, da Saúde e do Ambiente, 1997*).

The Decree-Law 46/2008 indicates that CDW landfilling can only be performed once sorted. If inert CDW is destined to landfill, a charge of 2 € per tonne is applied (this tax was established in 2008). This tax is adjusted every year. For example, the value increased by € 0.50 every year between 2008 and 2011 (Decree-Law 73/2011 of 17 June, article 58, paragraph 2, point b.) and article 76, paragraph 6). Since 2012, the value has been adjusted every year based on market prices (Decree-Law 73/2011 of 17 June, article 60, paragraph 1 and article 76, paragraph 6). **The value was in last years: € 2.00 (2008)[20], € 2.50 (2009)[21], € 3.00 (2010)[22], € 3.50 (2011)[23], € 4.15 (2012)[24], € 4.27 (2013)[25] and € 4.28 (2014)[26].**

Regarding the landfill costs, in the "Study on the Sustainable Management of CDW in North Interior Region - 1st Stage" (FCT-UNL, 2013)[27], are presented the landfilling costs for CDW in 2013 in the North Interior Region of Portugal. In that year, as indication, the **values varied between € 29.88/tonne and € 57.60/tonne.**

3.2. Waste management plans (WMP) and Strategies

The national Waste Management Plan for 2014-2020 (Resolution of the Council of Ministers 11-C/2015 of 16 March; *Resolução do Conselho de Ministros 11-C/2015, de 16 de março*)[28] includes also the national Waste Prevention Strategy. In this plan, a general description of CDW and the target set on article 11 of the WFD are included. However, there are no new specific measures regarding CDW prevention or CDW management.

Apart from the WMP, there are no other strategic documents/plans in place in Portugal with reference to CDW. However, article 4 of Decree-Law 46/2008 of 12 March, regarding the legal framework for CDW management, established that *'the quantitative and qualitative goals to be achieved in accordance with the goals set by national or EU law applicable to CDW, as well as the priorities, targets and actions for its management will be set out in a specific plan for CDW management, approved in accordance with article 15 of Decree-Law 178/2006 of 5 September (republished by Decree-Law 73/2011 of 17 June)'*. This plan is being prepared by the Portuguese Environment Agency with specific objective to analyse and implement the EU and national targets for CDW[29].

[17] MAOTDR (2008): https://dre.pt/application/file/449509
[18] MEADRPSCOTA (2004): https://dre.pt/application/file/551687
[19] MAIEPATSA (1997): https://dre.pt/application/file/396810
[20] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[21] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[22] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[23] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[24] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[25] APA (2013): http://www.apambiente.pt/_zdata/DESTAQUES/2013/FiscalidadeVerde/3-TGR%20-%2030-04-2013-V4.pdf
[26] APA (2015a): http://www.apambiente.pt/_zdata/Divulgacao/TaxasServicos/Tabela_Precos_APA_Delib4-CD-2015.pdf
[27] FCT-UNL (2013): http://www.ccdr-n.pt/servicos/ambiente/159/estudo-da-ccdr-n-propoe-reciclagem-dos-residuos-de-construcao-e-demolicao
[28] PCM (2015): https://dre.pt/application/file/66763017
[29] APA (2015). *E-mail* contacts.

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.

Description	Level of occurrence (Yes/No) Key Scope/Exemptions	Year established and policy reference	Further detail, information source, related web-site
National/regional obligation for selective demolition?	No	-	-
National/regional sorting obligation (on-site or in sorting facility)?	Yes CDW management legal framework.	2008 (Decree-Law 46/2008 of 12 March)	Article 8, paragraphs 1 and 2: CDW which cannot be reused has to be sorted at the construction site in order to be recovered or recycled; if sorting at the construction site is not possible, the producer has to deliver it to a licensed waste operator (sorting facility).
National/regional separate collection obligation for different materials (iron and steel, plastic, glass, etc.)?	No	-	-
Obligation for separate collection and management of hazardous waste from C&D operations? Please specify	Yes	2014 Ordinance 40/2014 of 17 February	Establishes rules for the correct removal of materials containing asbestos, and for packaging, transport and management of the respective CDW generated.
Related Green public procurement requirements	Yes	2015 National Waste Management Plan 2008 National strategy for green public procurement for the period 2008 to 2010 – Resolution of the Council of Ministers 65/2007 of 7 May (*Resolução do Conselho de Ministros 65/2007, de 7 de maio*)[30]	-

3.4. Targets

In Portugal, Decree-Law 73/2011 of June, 17, namely article 7 (principle of the waste hierarchy), paragraph 6, transposes from the WFD the 70% target of preparing for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other materials, of non-hazardous CDW excluding naturally occurring material defined in category 17 05 04 of European LoW.

[30] PCM (2007): https://dre.pt/application/file/520877

In order to achieve the mentioned target, article 7 - paragraph 8 defines within the context of public construction works that when technically feasible, it is mandatory to use at least 5% of recycled materials or materials containing recycled components of the total amount of raw materials used. Aside from that statement, there are no other targets in Portugal regarding CDW management.

It should be noted that the Portuguese Environment Agency reported 2009's CDW management data to the EC according to a specific methodology described in subchapter 5.6. This methodology is adapted from Annex III of Commission Decision of 18 November 2011 (notified under document C(2011) 8165). In contrast to the specifications of the Commission Decision, Portugal does not include the codes 19 from the European LoW.

Portugal follows article 11 specifications to exclude naturally occurring material defined in category 17 05 04 in the European LoW.

According to the Portuguese Environment Agency, backfilling operations are incorporated in the reported data sent to EC.

4. Non legislative instruments

In this section, any other instruments that may specify how the country is addressing the question of CDW management are highlighted, especially as a preliminary overview for task 3, as these instruments might be creating conditions for a sustainable management of CDW.

Instruments

Description	Level of occurrence (Yes/No) Key Scope/Exemptions	Year established and policy reference	Further detail, information source, related web-site
Sustainability standards that cover CDW (e.g. BREEAM)	Yes LiderA Sustainability Assessment System PTPC Portuguese Technological Platform to Construction SBTOOLPT Adaptation of the assessment tool for sustainable construction *SBTool International*	LiderA: 2005 PTPC: 2011 SBTOOLPT: n.a.	LiderA weblink[31] PTPC weblink[32] SBTOOLPT weblink [33]
Extended producer responsibility scheme in operation? *If yes complete EPR table below*	*No.*	-	-

n.a. – not available

[31] LiderA (2005): http://www.lidera.info/
[32] PTPC (2011): http://www.ptpc.pt/
[33] SBTOOLPT: http://www.sbtool-pt.eu/

Identification of other specific initiatives

Description	Occurrence (Yes/No) Mandatory (Yes/No) Scope & exemption	Year established	National or regional (specify if regional)	Details of Public sector and Industry enforcement/ involvement/ collaboration	Levels of performance e.g. tonnes recycled,% coverage	Further information/ web-site
Requirement for pre-demolition audits	No.	-	-	-	-	-
Standards for recycled CDW	Yes, mandatory. (4 technical guides by LNEC)[34, 35, 36, 37]	2009	National	n.a.	n.a.	n.a.
Selective demolition/ plan for large demolition sites/demolition standard	No.	-	-	-	-	-
Other CDW planning requirements	Yes, mandatory.	2014 Criteria for the inventory of materials containing asbestos and their characterisation, in the project phase (Ordinance 40/2014 of 17 February)[38] 2008 Plan for the Prevention and Management of CDW for public works (Decree-Law 46/2008 of 12 March: article 10)[39] 2008 waste data recording for private works (Decree-Law 46/2008 of 12 March: article 11, point f) and Annex II)[40]	National	n.a.	n.a.	n.a.

n.a. – not applicable

[34] LNEC (2009a): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4712009.pdf
[35] LNEC (2009b): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4722009.pdf
[36] LNEC (2009c): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4732009.pdf
[37] LNEC (2009d): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4742009.pdf
[38] MSSESSAOTE (2014): https://dre.pt/application/file/572271
[39] MAOTDR (2008): https://dre.pt/application/file/246961
[40] MAOTDR (2008): https://dre.pt/application/file/246961

Identification of technical guidelines/standards/ codes of practice for use of CDW in construction application

Description of guidance/ tool	Scope	Year established/ produced	National or regional (specify if regional)	Public sector and/or Industry lead organisation	Levels of use (high/ medium/low) or specify	Further information/ web-site
Code of practice RERU (Outstanding Regime for Urban Rehabilitation)	Consists in a set of rules, releasing the works of urban rehabilitation from certain technical standards for the construction (because these standards are oriented to new construction).	2014 Decree-Law 53/2014 of 8 April (*Decreto-Lei 53/2014, de 8 de abril*)	National	-	n.a.	It is an exceptional code of practice, as it is the response to Portugal's economic and social situation. It is temporary because runs until April 9 of 2021. Weblink[41,42]
Best Practices Guide for Municipalities Sustainable Development	Supports municipalities on implementation of eco-conscious measures, promoting in Public Administration more efficient and responsible actions in terms of energy and environment.	2013	National	-	n.a.	Project: Study Implementation of Eco-conscious Public Administration) Weblink[43]
Proposal of Mandatory Incorporation of at Least 5% of Reused and Recycled Materials in Public Works[44]	Incorporation of at least 5% of reused or recycled materials in public construction works.	2009	National	Public sector	Low	Can be applicable for other construction works without the public sector.
Construction and Demolition Waste (guidebook)	Portuguese legal framework for CDW and best practices.	2010	National	Public and private sectors	n.a.	Weblink[45]

n.a. – not applicable

[41] RERU (2014): http://www.portaldahabitacao.pt/opencms/export/sites/portal/pt/portal/reabilitacao/RERU/RERU_0_Indice.pdf
[42] RERU (2014): http://www.portaldahabitacao.pt/opencms/export/sites/portal/pt/portal/reabilitacao/RERU/RERU_J_Amianto.pdf
[43] AEP (2013): http://www.poatfse.qren.pt/upload/docs/Newsletters/Autarquias_FinalV4.pdf (pages 56 to 63)
[44] Quercus (2009)
[45] Guidebook for CDW: http://www.dashofer.pt/shop/product_list/residuos_de_construcao_e_demolicao

Other CDW initiatives

Description of initiative	Scope	Year established	National, regional, local (specify which local area/region)	Public sector and/or Industry lead organisation	Levels of performance e.g. tonnes recycled	Further information/ web-site
SWS - Shared Waste Solutions	Platform which aims at building a network of knowledge, experience and cooperation that enhances the creation of value from the available waste and by-products.	2013	National	Public and private sectors	n.a.	Time horizon : 2013 to 2014 Funding : COMPETE / QREN Project : FCOMP-05-0128-FEDER-032969 Weblink [46]
Douro Limpo - Awareness and environmental education campaigns in the Alto Douro Vinhateiro (North of Portugal region).	Dialog improvement between stakeholders with direct or indirect interests in the resolution of environmental problems of the Douro region. CDW was one of the streams focused on awareness campaigns regarding illegal disposal.	2006	Regional	Public sector	n.a.	Time horizon : 2006-2007 Funding : ON Douro Weblink[47]
APPRICOD - Assessing the Potential of Plastic Recycling in the Construction and Demolition Activities (LIPOR)	Learn from the experience of the pilot-projects carried out at local and regional level to understand the technical, environmental and economic aspects of plastic CDW management	2003	Regional and local	Public and private sectors	n.a.	Time horizon : 2003 to 2006 Funding : LIFE Project : ENV/B/000019 Weblink[48],[49]

[46] SWS (shared waste solutions): http://www.sws.uc.pt
[47] Douro Limpo (2006): http://www.dourolimpo.utad.pt/intro.html
[48] APPRICOD (2003): http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2321&docType=pdf
[49] APPRICOD (2003): http://www.acrplus.org/index.php/en/project-themes/previous-projects/2-content/277-appricod

Description of initiative	Scope	Year established	National, regional, local (specify which local area/region)	Public sector and/or Industry lead organisation	Levels of performance e.g. tonnes recycled	Further information/ web-site
WAMBUCO - European waste manual for building construction	Provide an easy usable method to estimate waste generation from building construction activities, be it a new building or renovation.	2002	European	Construction sector and University	n.a.	Time horizon : 2002 to 2004 Funding: FP5-EESD Project reference: EVK4-CT-2002-30006 Weblink[50,51]

n.a. – not applicable

The above list may not cover all CDW management initiatives.

Regarding hazardous CDW, the Decree-Law 46/2008 of 12 March (legal framework for CDW management) establishes in the article 5, point a) that the development of projects and their implementation in construction works should focus on the adoption of methodologies and practices that minimise the generation and the hazardousness of CDW, by reusing materials and by using materials not likely to generate CDW containing hazardous substances. Beyond that, articles 10 (public works) and 11 (private works) establish that CDW must remain in the construction site or other facility prior to treatment for the least amount of time, as well as that the storage of hazardous waste cannot exceed three months.

Moreover, the Ordinance 40/2014 of 17 February establishes rules for the correct removal of materials containing asbestos, and for packaging, transport and management of the respective CDW generated.

In the case of exports and imports of hazardous CDW, the quantities are very low, less than 1.4% of total CDW generation, as can been seen in subchapter 5.3. Since the data was gathered through the trans-boundary movements of waste database, it is considered reliable.

[50] WAMBUCO (2002): http://cordis.europa.eu/project/rcn/64808_en.html
[51] WAMBUCO (2002): https://repositorium.sdum.uminho.pt/bitstream/1822/4518/1/Sa%C3%ADd_ELIVOL1_2005.pdf, accessed on March and April 2015

5. CDW management performance – CDW data

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

The table below shows the generated and treated CDW registered between 2008 and 2013. For 2009 there are two sources of data: Statistics Portugal and Portuguese Environment Agency, as described in subchapter 5.1.

CDW (all NACE rev.2)	Source of data	Year					
		2008	2009	2010	2011	2012	2013
Generated (tonnes)	INE	2 096 475 (3.53%)*	2 146 524 (4.23%)*	2 195 128 (2.52%)*	2 522 541 (2.60%)*	1 224 861 (2.33%)*	1 746 652 (1.59%)*
	APA (APA, 2014b)	-	1 647 795 (6.81%)*	-	-	-	-
Treated (tonnes)	INE	1 411 280 (5.08%)*	1 221 147 (7.26%)*	925 687 (5.91%)*	1 620 559 (3.82%)*	657 744 (4.28%)*	1 038 039 (2.50%)*
	APA (APA, 2014b)	-	1 276 060 (5.63%)*	-	-	-	-
Recycled CDW (tonnes) **	INE	250 657	299 312	362 721	851 608	429 746	845 930
Backfilled CDW (tonnes)	INE	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Landfilled CDW (tonnes) ***	INE	1 160 102	918 843	556 310	762 068	227 288	190 158
Energy recovery of any (tonnes)	INE	522	2 993	6 656	6 883	711	1 951

* Percentage of hazardous CDW in relation to the total generated or treated
** Considering "other recovery except backfilling partim (R2-R11)" + "backfilling partim (R5)"
*** Considering "all disposal (all D codes)"
n.d. Not determined
*INE - Statists Portugal (*Estatuto Nacional de Estatística*); APA – Environment Portuguese Agency (*Agência Portuguesa do Ambiente*)*

5.1. CDW generation data

In Portugal, CDW generation data are recorded every year in the Integrated Map for Waste Registration (MIRR) of the Integrated Registration System developed by the Portuguese Environment Agency (SIRAPA), namely in on-line forms available to waste producers.

Data can be disaggregated by economic sector, taking into account the National Classification about Economic Activities, Rev. 3 (fully integrated at 4 digit level with the NACE Rev. 2.). However, it is not possible to separate data by type of activity (e.g. new construction, demolition).

Households are not included in the data, because municipal waste systems operators have no means and capacity to do such evaluation and distinction of the proportion of waste resulting from households and businesses (industry, commerce and services).

The annually reported CDW data in SIRAPA can be obtained from two sources: Statistics Portugal (INE – Instituto Nacional de Estatística) and the Portuguese Environment Agency (APA – Agência Portuguesa do Ambiente). According to the Waste Statistics Regulation, data presented between 2008 and 2012, has some methodology differences. In other words and as previously indicated, the Portuguese Environment Agency reported 2009 waste generation data according to a specific methodology described in subchapter 5.6.

Methodological differences justify the discrepancies found in the reported values from the two sources presented in the excel files[52]. The excel files present a breakdown of data available according to LoW and regarding all sectors of economic activities.

According to Statistics Portugal (INE, 2012), the amounts of CDW generated and CDW treated do not match because in a significant number of businesses identified as final treatment or end of cycle of waste management some of the R and D codes are not covered by the Waste Statistics Regulation (namely D8, D9, D11, D12, D13, D14, D15; R12 and R13).

Apart from data reported by Statistics Portugal to Eurostat and by the Portuguese Environment Agency to the EC, there are no other data sources concerning CDW generation in Portugal.

5.2. CDW treatment data

Similarly to CDW generation data, CDW treatment data are recorded every year in the platform MIRR of SIRAPA, namely in the on-line forms available for the waste management companies.

Data can be disaggregated by economic sector, taking into account the National Classification about Economic Activities, Rev. 3 (fully integrated at 4 digit level with the NACE Rev. 2.). However, it is not possible to disaggregate the data by type of activity (e.g. new construction, demolition).

Taking into account the data recorded every year in SIRAPA, data to quantify CDW treatment can be obtained from two sources: Statistics Portugal and the Portuguese Environment Agency. Statistics Portugal presents data between 2008 and 2012, according to Waste Statistics Regulation, with some adaptations, as described in subchapter 5.6. The Portuguese Environment Agency reports CWD treatment data to the EC for the year 2009 according to a specific methodology described in the subchapter 5.6. Methodological differences justify the discrepancies found in the reported values from the two sources.

According to Statistics Portugal (INE, 2012), the amounts of CDW generated and treated do not match. This occurs because in a significant number of businesses identified as final treatment (or end of cycle of waste management) some of the R and D codes are not covered by the Waste Statistics Regulation (namely D8, D9, D11, D12, D13, D14, D15; R12 and R13).

Apart from the data reported by Statistics Portugal to Eurostat and by the Portuguese Environment Agency to the EC, there are no other data sources for the CDW treatment in Portugal.

CDW treated on-site are not reported in the data for recycling. There is no estimated volume for CDW treated per year on-site in Portugal. This fact can interfere with the quality of the data reported, although this interference cannot be quantified.

In Portugal there is extensive use of D13 to D15[53] and R12 to R13[54] codes, essentially by waste producers, which is not statistically accounted on waste treatment data since those operations are not covered by the Waste Statistics Regulation.

There is no information available concerning CDW pre-treatment (mechanical, biological, physic-chemical treatments). There is also no consistent information about facilities capacity, so it is not possible to compare these data with the treatment values.

5.3. CDW exports/imports data

The European legal framework of trans-boundary movements of waste is the Regulation (EC) 1013/2006 from the European Parliament and the Council of the European Union of 14 June. The national Decree-Law 45/2008 of 11 March (Decreto-Lei 45/2008, de 11 de março), ensures the implementation and the compliance with the Regulation.

[52] Excel file name:"Portugal_2015_CDW_Statistics_INE" (Statistics Portugal data) and "Portugal_2015_CDW_Statistics_APA" (Portuguese Environment Agency data).

[53] D13 - Blending or mixing prior to submission to any of the operations numbered D1 to D12; D14 - Repackaging prior to submission to any of the operations numbered D1 to D13; D15 – Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where the waste is produced).

[54] R12 - Exchange of waste for submission to any of the operations numbered R1 to R11; R13 - Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced).

The Portuguese Environmental Agency also acts as the national authority for trans-boundary movements of waste, and is the responsible party to analyse all procedures related to trans-boundary waste movements.

Since 2009, the Portuguese Environment Agency has the authority to present objections to hazardous waste shipments destined for disposal in order to implement the principle of self-sufficiency at national level, in the case that such hazardous wastes can be adequately disposed at CIRVER (Centros Integrados de Recuperação, Valorização e Eliminação) – hazardous waste management infrastructures.

The Ordinance 242/2008 of 18 March establishes a tax to be charged by the Portuguese Environment Agency regarding administrative procedures for trans-boundary movements of waste.

Since 2013, the notifications for "green" listed waste are submitted electronically, according to the Decree-Law 23/2013 of 15 February (Decreto-Lei 23/2013, de 15 de fevereiro), in the Portuguese Environment Agency platform: SILiAmb.

The Portuguese Environment Agency provided data on trans-boundary movements of CDW for exports (2013-2014) and imports (2012-2013).[55] The first two tables below illustrate export data (the first table organized by LoW code and the second table by country). The consecutive tables outline import data (the third table organized by LoW code and the fourth table by country). In the case of exports and imports alike, hazardous CDW represent a small percentage of the total, always less than 1.4% of the annual amount of CDW generated.

CDW exports (tonnes)					
LoW code		2013		2014	
17 01 02	Bricks	0.39	0.39	4.94	20.44
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	-		15.50	
17 02 01	Wood	-	5.00	0.35	183.67
17 02 03	Plastic	5.00		183.32	
17 04 01	Copper, bronze, brass	1 957.51	3 535.02	3 433.87	5 602.92
17 04 02	Aluminium	551.63		1 139.09	
17 04 03	Lead	23.69		2.44	
17 04 04	Zinc	180.28		167.70	
17 04 05	Iron and steel	243.92		307.46	
17 04 06	Tin	-		9.20	
17 04 07	Mixed metals	131.69		-	
17 04 11	Cables other than those mentioned in 17 04 10	446.30		543.16	
17 09 02*	CDW containing PCB	0.67	0.67	-	-
Total			**3 541.08**		**5 807.03**

* Hazardous
Source: APA (2015). *E-mail* contacts.

CDW exports (tonnes)		
Country	2013	2014
Belgium	26.70	-
Brazil	162.00	-
China	999.98	2 673.10
Korea (Republic of)	20.80	
France	75.31	-

[55] APA (2015). *E-mail* contacts.

CDW exports (tonnes)		
Country	**2013**	**2014**
Germany	22.90	-
Greece	-	68.54
Hong Kong	-	141.62
India	779.46	464.42
Italy	23.60	49.38
Netherlands	24.88	-
Spain	1 332.25	2 364.05
Switzerland	41.16	25.12
Thailand	52.84	-
Total	**3 541.08**	**5 807.03**

Source: APA (2015). *E-mail* contacts.

Regarding 2013-2014 export data, the most representative four-digit chapter of the LoW is 17 04 (metals, including their alloys). The most relevant countries of destination are Spain and China.

CDW imports (tonnes)					
LoW code		**2012**		**2013**	
17 01 01	Concrete	909.70	2 563.92	-	144.50
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	1 654.22		144.50	
17 02 01	Wood	43.18	54.82	103.44	111.27
17 02 02	Glass	4.56		0.60	
17 02 03	Plastic	7.08		7.23	
17 03 02	Bituminous mixtures other than those mentioned in 17 03 01	5.88	5.88	-	-
17 04 01	Copper, bronze, brass	360.60	4 072.70	717.13	4 296.43
17 04 02	Aluminium	201.12		88.36	
17 04 03	Lead	176.40		46.81	
17 04 04	Zinc	263.37		105.20	
17 04 05	Iron and steel	1 886.58		2 888.09	
17 04 07	Mixed metals	965.88		359.98	
17 04 11	Cables other than those mentioned in 17 04 10	218.75		90.86	
17 05 03*	Soil and stones containing dangerous substances	47.50	539.44	-	-
17 05 04	Soil and stones other than those mentioned in 17 05 03	491.94		-	
17 06 01*	Insulation materials containing asbestos	9.74	18.86	-	72.40
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03	9.12		5.32	
17 06 05*	Construction materials containing asbestos	-		67.08	
17 08 02	Gypsum-based construction materials other than those mentioned in 17 08 01	-	-	6.96	6.96
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	218.09	218.09	267.66	267.66

CDW imports (tonnes)		
LoW code	2012	2013
Total	**7 473.71**	**4 899.22**

* Hazardous
Source: APA (2015). *E-mail* contacts.

CDW imports (tonnes)		
Country	2012	2013
France	86.78	65.26
Germany	32.65	6.22
Great Britain	52.40	2.00
Greece	-	67.08
Italy	101.58	38.41
Norway	29.07	-
Spain	7 142.62	4 720.25
United States of America	28.61	-
Total	**7 473.71**	**4 899.22**

Source: APA (2015). *E-mail* contacts.

Regarding import data for 2012 and 2013, the most representative four-digit chapter of the LoW is the 17 04 (metals, including their alloys), followed by 17 01 (concrete, bricks, tiles and ceramics) but in this case only in 2012. Spain is the most relevant country of origin in both years.

5.4. CDW treatment facilities data

According to the national Waste Management Plan (Resolution of the Council of Ministers 11-C/2015 of 16 March), Portugal has landfills for inert CDW disposal distributed as described in the following table. These inert CDW landfills are compliant with EU legislation.

Territorial unit	Inert disposal landfills		Capacity[56]	
	Sector	N.º		
Portugal mainland	Public	3	Licensed capacity (tonnes): Expected operating capacity (tonnes): Anticipated useful life (years):	103 156 100 437 37
			Licensed capacity (tonnes): Expected operating capacity (tonnes): Anticipated useful life (years):	420 000 399 869 13
			Licensed capacity (tonnes): Expected operating capacity (tonnes): Anticipated useful life (years):	160 000 133 132 13
	Private	7 (quarries)	*n.a.*	
Autonomous Region of Azores	Private	4	*n.a.*	
Autonomous Region of Madeira	Private	2	*n.a.*	

n.a. – not available
Source: APA (2015). *E-mail* contacts

Data regarding the inert CDW landfills were only available for Portugal's mainland. Lack of information can also be observed: i) concerning the capacity of the landfills and if it will increase or decrease, despite the fact

[56] APA (2015). *E-mail* contacts.

of the slowdown of the construction sector for the last years has decreased the amount of CDW generated; ii) the amount of CDW planned to be used for covering/rehabilitation of existing landfills; and iii) data on mobile and fix treatment units available.

Regarding the facilities for CDW treatment, while quarries can use CDW for landscape rehabilitation purposes and furthermore be considered as a backfilling operation, it has not been reported as such. There are also sorting facilities. No consistent information for the CDW treatment capacity is available, and therefore it is not possible to evaluate the relation between CDW generation and treatment. A study for the CDW stream conducted by the Portuguese Environment Agency (APA, 2014b) indicates the number of licensed operators by treatment code (R or D) for 2009. Regarding the operation R5 (recycling/reclamation of other inorganic materials) and considering only the mainland of Portugal, the distribution is the following:

LoW 4-digit code		Number of facilities
17 01	Concrete, bricks, tiles and ceramics	17
17 02	Wood, glass and plastic	7
17 03	Bituminous mixtures, coal ta rand tarred products	8
17 04	Metals (including their alloys)	6
17 05	Soils (including excavated soil from contaminated sites), stones and dredging spoil	13
17 06	Insulation materials	4
17 08	Gypsum-based construction material	6
17 09	Other construction and demolition wastes	17

Source: APA (2014b).

5.5. Future projections of CDW generation and treatment

There are no projections available about future CDW generation, treatment, planning of management operations or planned waste management infrastructures[57].

5.6. Methodology for CDW statistics

There are two sources of CDW management data in Portugal, namely Statistics Portugal (from 2008 to 2012) and the Portuguese Environment Agency (only for 2009).

Statistics Portugal reports to Eurostat data regarding CDW management according to the respective guidelines, with few adaptations.

Regarding waste generation, the data was collected according to national legislation through the national waste registration platform, the MIRR.

Waste producers and waste management operators are obliged to report data through the MIRR platform, being identified according the following criteria:

- all businesses and individuals running local units (establishments) with 10 or more employees which generate non municipal waste;
- all businesses and individuals responsible local units which generate hazardous waste;
- all businesses and individuals performing waste management as their economic activity;
- all businesses and individuals performing waste collection and transportation as their economic activity;
- all businesses responsible for municipal waste management systems;
- all businesses responsible for separate systems for the management of specific waste streams;
- all businesses and individuals which participate on waste markets whether as traders or brokers;
- all businesses which produce and/or place on markets specific products that require registration according the legislation on specific waste streams like packaging, used tires, mineral lubricants, end of life vehicles, batteries and accumulators, electrical and electronic equipment, etc.

[57] APA (2015). *E-mail* contacts.

Although data reported by waste producers is provided by local units, data matching on waste is made at the business level. It is currently not possible to have a single code to identify the local units, as it is challenging to match data at local units' level. Therefore the sample size and selection is made at the business level (enterprise), as well as the matching of quantities of waste generated by local units and the businesses sample selected from the statistical office registers database (statistical units register). The specification of the scope of the data and the respective statistical units for sampling/stratification and estimations is done at business level (enterprises).

Concerning waste treatment, data on quantities treated are based on the information reported by the waste producers and waste operators according to the specific web forms. The data reported by producers and waste operators include a registration code declaring the waste management operation (R or D codes). The amounts of waste generated and managed or treated do not match because a significant number of businesses identified as final treatment or end of cycle of waste management some of the R and D codes are not covered (namely: D8; D9; D11; D12; D13; D14; D15; R12 and R13).

In collaboration with the Portuguese Environment Agency, Statistics Portugal made recent changes in Waste Statistics for the 2012 reference year, taking into account the following aspects[58]:

- taking into account the experiences from previous years, reported outliers, which correspond to higher than the maximum or lower than the minimum values compared to previous years of reported waste quantities, are excluded or re-examined;
- data from waste operators were superimposed with data reported by waste producers in order to increase the coverage of reporting(including data from businesses which not report and fill in the webform for waste producers) and also to improve the data quality for some replies. Validation of data was performed by comparing the different forms of reporting (both from waste producers and waste management operators) in order to eliminate duplications and to avoid double counting which results from the integration of data.

Data from 2008 to 2011 has been amended taking into account these methodological changes. There are no planned changes in methodology for CDW statistics in Portugal.

Furthermore, the **Portuguese Environment Agency** reports data to the EC according to the requirements of the WFD. At the moment, the reported data only runs up to year 2009. The calculation regarding the WFD target does not follow fully the methodology of the EC (as laid down in Commission Decision 2011/753/EU), since it was only based on the codes 17 of the European LoW. However, the calculation of the WFD target allows to evaluate the effort that has to be done for Portugal to achieve 70% target by 2020 (APA, 2014b).

The calculation was based on data reported in the MIRR of SIRAPA for the year 2009, particularly with data found in the forms filled in by waste producers and waste management companies. In addition, information recorded in the Urban Waste Registration Map (MRRU) was considered, particularly regarding the level of backfilling operations.

The evaluation was conducted based on the grouping of codes 17 of European LoW in 13 different categories, depending on their nature, to allow the estimation of recovery rates by material (APA, 2014b):

- concrete, bricks and tiles (LoW 17 01 01; 17 01 2 and 17 01 03);
- wood, glass and plastic (LoW 17 02 01; 17 02 02; 17 02 03 and 17 02 04*);
- bituminous and tar mixtures (LoW 17 03 01*; 17 03 02 and 17 03 03*);
- metals and cables not containing dangerous substances (LoW 17 04 01; 17 04 02; 17 04 03; 17 04 04; 17 04 05; 17 04 06; 17 04 07 and 17 04 11);
- metal waste and contaminated cables (LoW 17 04 09 and 17 04 10*);
- soil and stones (LoW 17 05 03* and 17 05 04);
- dredging spoil (LoW 17 05 05* and 17 05 06);
- track ballasts (LoW 17 05 07* and 17 05 08);
- hazardous insulating materials and asbestos (LoW 17 06 01*, 17 06 03* and 17 06 05*);
- non-hazardous insulation materials (LoW 17 06 04);
- gypsum-based construction materials (LoW 17 08 01* and 17 08 02);
- other hazardous CDW (LoW 17 09 01*; 17 09 02* and 17 09 03 *);
- mixtures of CDW (LoW 17 01 06*; 17 01 07 and 17 09 04).

After a preliminary analysis of the data, the Portuguese Environment Agency has considered to make some corrections. The reasons outlined to undergo modifications are due to improper waste code allocation and

[58] INE (2012)

lack of licensing in the period under review or for the quantities which have been reported in different units (APA, 2014b).

6. C&D waste management in practice

In this section the “on the ground” CDW management in Portugal is presented. Current and specific CDW obligations, initiatives, voluntary agreements and any other management practice are outlined.

6.1. CDW management initiatives

The table below shows CDW management initiatives.

Description of initiative	Scope	Year established	National, regional, local (specify which local area/region)	Public sector and/or Industry lead organisation	Levels of performance e.g. tonnes recycled	Further information/ web-site
RCD Valor	Investigates the replacement of the natural soil as backfill materials in structures reinforced with geosynthetics (walls and embankments), regarding economic and environmental sustainability in the construction sector.	2013	-	University	No performance indicators are available.	Time horizon: 2013 to 2015-11-30 (expected) Project: PTDC/ECM-GEO/0622/2012| FCOMP-01-0124-FEDER-028842 Funding: *FCT - Fundação para a Ciência e Tecnologia* Weblinks[59,60]
Multi Valor RCD – Optimization of the Process of Recovery of CDW Trough Mechanical, Physical, Chemical and Environmental Characterization	Extend the range of marketed products and improve their quality. Optimization model of the production process. Comply with legal requirements in terms of recovery. Demonstrate for the companies the potential of CDW.	2013	Regional	Recycling industry and University	No performance indicators are available.	Time horizon: 2013 to 2015-06-30 (expected) Funding: QREN ID&T Weblink[61]
My CDW (*Os Meus RCD*)	Platform to any citizen report illegal dumping of CDW.	-	National	ENGO	No performance indicators are available.	Responsability : *GEOTA – Grupo de Estudos Ordenamento do Território e Ambiente* Weblink[62]
CCDR-Norte	Evaluate a case study at the North Interior region of Portugal (48 municipalities) to find a regional solution to CDW management until 2020.	2013	Regional	Public sector	No performance indicators are available.	Time horizon: 2012 to 2013 Funding: QREN and ON.2 Responsability: CCDR Norte Weblink[63]
SUPREMA - Sustainable application of construction and demolition recycled materials in road infrastructures	The promotion of the sustainable use of CDW in pavement base and sub-base layers and in capping layers, by improving the knowledge concerning the mechanical and environmental characteristics of these materials, their performance as unbound aggregates and the determination of parameters to be used in pavement design.	2010	National	Public sector	The results of the project were the basis for the LNEC technical specification regarding the use of materials for sub-base and base layers resulting from asphalt mixtures now under development.	Time horizon: 2010 to 2013 Project: PTDC/ECM/100931/2008 Responsability : LNEC - Laboratory for Civil Engineering, in cooperation with IST - University of Lisbon Funding: *FCT - Fundação para a Ciência e Tecnologia*
ZeroWIN	Development of industrial networks involving producers of materials, holders or promoters, architects, waste managers and other stakeholders. The purpose was to discover symbiosis potential between these actors aiming at reduced waste generation, energy and water consumption.	2009	European	Public and private sector	No performance indicators are available.	Time horizon : 2009 to 2014 Funding : FP7/2007-2013 Weblinks[64, 65, 66]
CONVERTER	Adequate CDW management in Alentejo region. Stakeholders awareness about life cycle of the products/waste. Promotion of conditions to the integrated management system of CDW answer to the economic and social development of the region. Some actions were related to: prevention of CDW generation, awareness and environmental education campaigns, recovery of environmental liabilities and the creation of the mark of “Constructor Environment Friend”.	-	-	-	No performance indicators are available.	Time horizon : (there is no information about the continuity of this project) Responsability : Resialentejo (MSW management system) Weblink[67]

[59] RCD Valor (2013): http://sigarra.up.pt/feup/pt/projectos_geral.mostra_projecto?P_ID=65772
[60] RCD Valor (2013): http://repositorio-aberto.up.pt/bitstream/10216/75471/2/100492.pdf
[61] Multi Valor RCD (2013): http://www.multitriagem.com/?page_id=229
[62] My CDW (2015) - form: http://www.omeueco-sistema.pt/scid/reesDir/defaultFormViewAll.asp?systemCategoryID=44
[63] FCT-UNL (2013): http://www.ccdr-n.pt/servicos/ambiente/159/estudo-da-ccdr-n-propoe-reciclagem-dos-residuos-de-construcao-e-demolicao
[64] ZeroWIN (2009): http://www.zerowin.eu/
[65] ZeroWIN (2009): http://www.4980.timewarp.at/sat/ZeroWIN/pdf_secure/Presentations%20CI14/CareInnovation-IW-2014.pdf
[66] ZeroWIN (2009): http://www.4980.timewarp.at/sat/ZeroWIN/pdfs/practical%20demonstrator/Practical%20Demonstrator%205%20P%20Construction.pdf
[67] Converter (s.d.): http://www.ccdr-a.gov.pt/residuos/Projecto%20Converter_Resialentejo.pdf

Description of initiative	Scope	Year established	National, regional, local (specify which local area/region)	Public sector and/or Industry lead organisation	Levels of performance e.g. tonnes recycled	Further information/ web-site
RETRIA – LIPOR	The RETRIA project was developed by Lipor (MSW management system of Great Oporto Area), and after the Decree-Law 46/2008. It aimed to implement a system of non-hazardous CDW collection and transportation, sorting and recovery. Other objective was to introduce in the market recycled aggregates, low-cost and high quality, produced in RETRIA infrastructures. The RETRIA installed capacity was 300,000 tonnes/year.	2003	Regional	Public and private sectors	Infrastructures installed capacity was 300,000 tonnes/year.	Time horizon : (there is no information about the continuity of this project) Weblink[68,69]
REAGIR - Recycling and Reuse of CDW as a Part of Integrated Waste Management	To promote a service for collection and recycling of CDW in order to reverse the tendency of illegal dumping. A pilot recycling facility, based on crushing, was established as a demonstration model for promoting recovery and reuse of CDW products in public works. On 2006 (before the implementation of CDW legal framework in Portugal: Decree-Law 46/2008 of 12 March), the Municipal Waste Management Regulation was changed, incorporating the project guidelines.	2003	Local	Public and private sector	Between 2006 and 2012, CDW generation decreased. Infrastructures installed capacity has never been reached, considering 30,000 tonnes/year.	Time horizon : 2003 to 2007 Funding : LIFE Responsability : Montemor-o-Novo Municipality Weblink[70]

[68] Retria (2003): http://www.retria.pt/
[69] Retria (2003): http://www.lipor.pt/upload/Lipor/ficheiros/Apresenta%C3%A7%C3%A3o_RETRIA_Pedro%20Mimoso_Visaconsultores.pdf
[70] REAGIR (2003): http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2345&docType=pdf

6.2. Stakeholders' engagement

The table below aims to gather information on the existing initiatives, together with a preliminary assessment of the enabling factors/obstacles, advantages/drawbacks and other relevant comments.

Description of initiative	Scope, year established, actors involved	Advantages/ Enabling factors	Disadvantages/ Obstacles	Further information/ web-site
CCDR-Norte	Scope: evaluate a case study at the North Interior region of Portugal (48 municipalities) to find a regional solution to CDW management until 2020. Year established: 2013 Actors: CCDR Norte	Identification of legal and operational barriers to CWD management, namely: - Missing a correlation between the stakeholders and procedures; - CDW with recovery potential classified with disposal operations; - Municipalities have outdated regulations regarding CDW management; - Reporting still needs adjustments (*e.g.* small producers and generation place).	The study was conducted through an economic slowdown of the construction sector, with a consequent decrease of CDW generation. Because there is no data of CDW generation concerning private works exempt of construction permit, a projection regarding CDW generation was made to the North Interior region of Portugal, although based in other national case studies.	Web-site[71]
REAGIR - Recycling and Reuse of CDW as a Part of Integrated Waste Management	Scope: recycling of CDW in order to divert it from illegal dumping. A pilot recycling facility, based on crushing, was established as a model for promoting recovery and reuse of CDW products in public works. Year established: 2003 Actors: Public and private sector	The project engaged 61% of CDW producers in a recycling scheme. Introduced better local controls and promotion of separation at source. Improved the ability to recycle and reuse, reducing the amount of waste dumped and benefiting the local environment.	The quantities of CDW decreased due to a slowdown of the economy and consequently of the construction sector. The installed capacity of the pilot recycling facility has never been reached.	Web-site[72]

[71] FCT-UNL (2013): http://www.ccdr-n.pt/servicos/ambiente/159/estudo-da-ccdr-n-propoe-reciclagem-dos-residuos-de-construcao-e-demolicao

[72] REAGIR (2003): http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2345&docType=pdf

6.3. Waste legislation enforcement

In Portugal, the inspection authorities are responsible for monitoring and enforcing waste regulation requirements, namely the compliance with CDW legal framework established in Decree-Law 46/2008 of 12 March. These authorities are:

- IGAMAOT - General Inspection of Agriculture, Sea, Environment and Spatial Planning (*Inspeção-Geral da Agricultura, do Mar, do Ambiente e do Ordenamento do Território*);
- 5 CCDR (Regional Waste Authorities) – Commissions for Coordination and Regional Development (*Comissões de Coordenação e Desenvolvimento Regional*): CCDR Norte, CCDR Centro, CCDR Lisboa e Vale do Tejo, CCDR Alentejo and CCDR Algarve;
- 308 municipalities;
- Police authorities that instruct the processes that will be executed by IGAMAOT.

In Portugal, CDW management needs to comply with the waste hierarchy. The Decree-Law 73/2011 of 17 June (waste legal framework) sets in article 7 (principle of waste hierarchy), paragraph 1, that the legislation and the policy in waste must respect the following priorities in management of waste, namely: a) prevention and reduction, b) preparation for reuse, c) recycling, d) other forms of recovery, and disposal. The Decree-Law 46/2008 of 12 March (CDW legal framework) establishes the specific requirements so those principles can be put in practice, as described in subchapter 3.1. In practice, the treatment of many CDW is classified with a disposal code (D).

The target of 70% recovery of CDW set in article 11 of WFD has been transposed in Portugal by Decree-Law 73/2011 of 12 June by article 7, paragraph 6, point b). According to data presented to the EC by the Portuguese Environment Agency, regarding CDW for 2009 in Portugal, the compliance with the target stands at 34% (APA, 2014b) (see subchapters 5.6).

The Decree-Law 73/2011 of 17 June sets in article 4 (principle of sufficiency and proximity), paragraph 1, that the treatment operations must take place in appropriate waste infrastructures, with use of appropriate technologies and methods, to ensure a high level of protection of the environment and public health, preferably in the country of origin of the waste and obeying the proximity criteria. According to available data and contacts with stakeholders, Portugal currently has enough capacity to manage the total amount of CDW generated. Moreover, Portugal has recorded few trans-boundary movements of CDW. However, in the last years the state of the economy has slow down significantly the construction sector, with a consequent reduction in the CDW generated.

There are no consistent data available for the illegal dumping of CDW. Nevertheless, in a study for the CDW stream conducted by the Portuguese Environment Agency (APA, 2014b), the municipalities that answered the survey (about 1/3) indicated the following justifications for that occurrence:

- lack of proximity of licensed entities for the treatment of CDW;
- high costs associated with the management (e.g. collection, transportation, delivery to the management operators and municipal rates);
- lack of inspection;
- lack of municipal regulations, in particular for CDW from construction works exempt from licensing;
- lack of information / ignorance of the laws;
- lack of environmental awareness.

Also, some municipalities indicated the number of illegal dumping incidents, as well the amount (in tonnes per year) of CDW collected through clean-up actions from 2006 to 2009. The results show an increase of the number of identified occurrences and of CDW collected through those actions although it might be associated with an increase of clean-up initiatives promoted by municipalities in the last years.

Consistent data regarding the capacity of the inspection authorities to enforce compliance, namely staff, skills, measures, etc. do not exist.

According to the Decree-Law 73/2011 of 17 June, article 70, inspection authorities, except police authorities, are responsible to instruct the processes of infringement. When the entity has no jurisdiction to instruct the process, the competent regional waste authority regarding the place of the infringement investigates and decides the infringement.

Regarding IGAMAOT[73], data on CDW court cases and infringement procedures are available only for 2010 and 2011. Data for later years is not disaggregated for CDW stream. In 2010, 43 inspections were carried out which resulted in 54 infringement procedures. Four of these cases were considered serious, related to the abandonment of CDW, and two of them are pending in court. In that year, and in collaboration with police authorities, 514 infringement procedures were also registered. In 2011, 63 inspections were carried out, resulting in 30 infringement procedures. From those, 24 cases are awaiting for decision.

Portuguese Environment Agency is responsible for procedures of exports and imports of hazardous waste, as seen in subchapter 5.3.

6.4. Drivers / barriers to increase CDW recycling

Drivers and barriers to increasing CDW recycling were identified essentially through communication with relevant stakeholders and are presented in the table below. The stakeholders contacted and that gave their contribute to the present task are: the Portuguese Environment Agency[74], three Commissions for Coordination and Regional Development (*Norte*[75]*, Centro*[76] *and Algarve*[77]), the Portuguese Association of Waste Management Operators and Recyclers (APOGER)[78], the Industrial Association of Construction and Public Works (AICCOPN)[79], the National Association of Portuguese Municipalities (ANMP)[80] and two environmental non-governmental organizations (*Quercus*[81] *and GEOTA – Grupo de Estudos de Ordenamento do Território e Ambiente*[82])

Additionally, a background document addressed to stakeholders, produced by the Portuguese Environment Agency, entitled "How to achieve the target of 70% of recovery of CDW in 2020?"[83] was used. This document sets the bottom line for the discussion on a workshop that will be held in the near future to understand how Portugal can achieve the target from the WFD transposed for Portugal.

Factor / characteristic / element in CDW recycling chain	Drivers	Barriers
Legislation and inspection procedures	• Existence of a specific legal framework for the management of CDW since 2008; • Transposition of the target defined in the WFD for recovery of CDW (article 11); • The Portuguese target to incorporate at least 5% of recycled materials , regarding the total amount of raw materials used in public construction works; • The existence of inspection authorities, with responsibility well defined in the legal framework.	• Non-compliance with the decree-law; • Lack of clarification of some legal definitions and concepts; • Many bureaucratic aspects related to CDW management; • The Prevention and Management Plan of CDW for public works (Decree-Law 46/2008 of 12 March, article 10) is not satisfactorily applied; • Registration of CDW in private works is not being verified (Decree-Law 46/2008 of 12 March, article 11 and Annex II); • Lack of a legal figure with responsibility in the environmental management of the construction site, including CDW management; • Lack of power of inspection authorities; • Few inspection activities to operators in illegal conditions; • Very time-consuming administrative infringement procedures and, in most cases, without immediate consequence.

[73] APA (2015). *E-mail* contacts.
[74] APA (2015). *E-mail* contacts.
[75] CCDR-Norte (2015). *E-mail* contacts.
[76] CCDR-Centro (2015). *E-mail* contacts.
[77] CCDR-Algarve (2015). *E-mail* contacts.
[78] APOGER (2015). *E-mail* contacts.
[79] AICCOPN (2015). *E-mail* contacts.
[80] ANMP (2015). *E-mail* contacts.
[81] Quercus (2015). *E-mail* contacts.
[82] GEOTA (2015). *E-mail* contacts.
[83] APA (2015a)

Factor / characteristic / element in CDW recycling chain	Drivers	Barriers
Standards	• Technical guides for the use of recycled CDW defined by LNEC; • Development of three more specific technical guidelines for the construction sector.	• The existing rules are very restrictive, with very limited permission to the use of recycled CDW; • Long periods for the assessment of the use of recycled materials.
Recycling process	• Existence of infrastructures for sorting and recycling of CDW; • Current low recycling performance for inert CDW.	• Unfavorable economic situation of the country, with very significant slowdown in the construction sector for the last years; • The rate charged by waste management operators to accept CDW, together with the cost of transportation, are factors causing sometimes the illegal dumping of CDW; • The costs and procedures associated with changes in the licensing processes are an obstacle for the improvement of recycling facilities and their adaptation to new markets and businesses; • Low tax of inert CDW landfilling; • Non-existence of a tax for the disposal of CDW under the environmental rehabilitation of quarries; • Non-existence of legal and technical specifications for selective demolition; • Absence of an effective policy for the use of recycled materials; • Significant amounts of CDW mixtures received by the sorting facilities, with influence on the recycled materials quality; • Non-existence of EoW criteria for inert CDW; • Lack of promotion for the CDW market; • Heterogeneity of geographical distribution for recycling solutions: in the low demographic density regions there is no market and economically feasible solutions; • Lack of environmental awareness for the technical issues related to the management of CDW.
Materials availability	• High potential for recycling of CDW, although the quantities of CDW generation are lower than before due to the economic situation of the country.	• Not competitive prices of the recycled materials in contrast to the low prices of natural raw materials, • Non-existence of a specific tax for the extraction of natural aggregates.
Key stakeholders involvement	• Existence of a national waste authority and five regional waste authorities; • Existence of representative associations for the various actors involved in the management process for CDW; • The responsibility for the CDW management is well defined in the legal framework for the different actors involved.	• Lack of coordination and synergies between stakeholders; • Lack of pro-active initiatives from stakeholders; • Lack of a management entity responsible for the CDW; • Lack of incentives for research and innovation for the development of technical solutions.
Data reporting	• The obligation to report data regarding CDW management.	• No data validation; • Lack of control of waste generation for small and medium construction companies, because they are not obliged to register, which can lead to lack of inspection and illegal dumping.

7. CDW sector characterisation

7.1. Sector characteristics

The following actors are involved in the management of CDW in Portugal: national waste authority (Portuguese Environment Agency), regional waste authorities (five Commissions for Coordination and Regional Development), construction companies, private waste management companies, municipalities and MSW management systems.

National and regional authorities are responsible for licensing and monitoring of CDW policies and management activities.

The **construction companies** existing in Portugal are organised in classes of qualification (see table in the chapter 7.6). It is possible to conclude that, regarding the maximum values of permissible works, the small and medium sized enterprises are the most relevant in the Portuguese construction sector.

In 2013 FCT-UNL[84] produced a report regarding the CDW management in 48 municipalities from the North Interior Region of Portugal. The construction companies were contacted by surveys and telephone, with the main goal of identifying the means by which companies implement the planning and management practices of CDW. The study concluded that large construction companies which responded to the survey (considering classes of qualification from 5 to 9 – see table in subchapter 7.6) affirmed that they comply with legal requirements through the following practices and documents: i) Environmental Management Plan to the construction work; ii) Plan for the Prevention and Management of CDW (in the case of public works); iii) consideration of construction methods oriented to selective demolition; iv) imposition of contractual provisions in contracts for subcontractors; v) construction site planning, taking into account the logistics directed to the management of CDW; and vi) consideration of the best available technologies that enable to extend the life cycle through the reuse of materials.

Concerning the construction phase, those companies said that they implemented some kind of action in respect to the management of CDW, namely: i) sorting and minimising the generation and the hazardousness of CDW; ii) reusing uncontaminated soils and rocks; iii) reusing materials on site; iv) recycling on site; and v) transportation to licensed waste management companies, including landfills.

Additional procedures to those required by law were also confirmed the companies: i) recording environmental monitoring and measurement data (including transportation); ii) operational control procedures (work instructions); iii) a work waste generation map; iv) a general waste management plan; v) a recording map regarding CDW management companies and permits; and vi) training and awareness of workers.

For the small and medium sized enterprises (considering classes of qualification from 1 to 4), the study concludes that they have a lack of awareness to legal procedures. They have also some difficulties to implement CDW practices at construction works. Nevertheless, these companies normally work in subcontracting arrangements where the consortium is responsible to ensure the documentation regarding CDW management.

Concerning **private waste management companies**, these actors are responsible for the treatment of CDW, and in some cases for the collection and transportation, if agreed with the waste producers. The Decree-Law 46/2008 of 12 March (CDW legal framework) sets on article 3, paragraph 1 that the responsibility of the CDW management is from the producer/holder of the waste. In all cases, CDW ceases to be the responsibility of the producer by transferring CDW to a licensed waste management company. Moreover, the records of transportation of CDW are registered in specific tracking documents between the producer and the licensed waste management company (regarding the legal procedures presented in Ordinance 417/2008 of 11 June).

The **municipalities and MSW management systems** are responsible for managing CDW resulting from private construction works with permit exemption. In these cases, CDW must be managed by the entities responsible for the management of MSW (Decree-Law 46/2008 of 12 March, article 2).

In Portugal there are sectorial organisations at the national level that represent the following actors, however, not all companies/entities are represented in each one of them:

[84] FCT-UNL (2013): http://www.ccdr-n.pt/servicos/ambiente/159/estudo-da-ccdr-n-propoe-reciclagem-dos-residuos-de-construcao-e-demolicao

Producers:

- InCI - Institute of Construction and Real Estate (*Instituto da Construção e do Imobiliário*);
- AICE - Industrial Association of Building Construction (*Associação dos Industriais da Construção de Edifícios*);
- AICCOPN - Industrial Association of Construction and Public Works (*Associação dos Industriais da Construção e Obras Públicas*);
- AECOPS - Business Association of Construction, Public Works and Services (*Associação de Empresas da Construção, Obras Públicas e Serviços*).

Waste management companies:

- AEPSA - Association of Portuguese Companies for the Environment Sector (*Associação das Empresas Portuguesas para o Sector do Ambiente*);
- APOGER - Portuguese Association of Waste Management Companies and Recyclers (*Associação Portuguesa dos Operadores de Gestão de Resíduos e Recicladores*).

Recyclers:

- APOGER - Portuguese Association of Waste Management Operators and Recyclers (*Associação Portuguesa dos Operadores de Gestão de Resíduos e Recicladores*).

Municipalities:

- ANMP - National Association of Portuguese Municipalities (*Associação Nacional de Municípios Portugueses*).

So far, there are no data available for specific initiatives undertaken by these organisations that have had significant impacts on achieving the WFD target.

At the moment existing facilities in Portugal have the necessary capacity to recycle the CDW generated. However, according to some stakeholders opinion, some regions in Portugal, especially in the interior of the country, may have a lack of facilities for some CDW treatment. There is no forecast for waste generation, not being possible to evaluate if the network facilities will work in the future.

The Portuguese Environment Agency is preparing a workshop to discuss with relevant stakeholders about the WFD target to 2020. The prospective future developments and innovation potential in the CDW management sector is expected to be discussed.

7.2. Exports / imports of CDW

Taking into account the slowdown of the Portuguese economy and in consequence of the construction sector, it can currently be considered that the existing facilities have the necessary capacity to recycle the CDW generated. However, according to stakeholders opinion, some regions in Portugal, especially in the interior of the country, may have a lack of facilities, which may justify the export of CDW mainly to Spain, the neighbourhood country.

In some cases, Portugal exports CDW to countries further away (see subchapter 5.3), but due to the low quantities registered these are considered single cases not directly linked to the lack of available capacity for CDW treatment.

7.3. CDW as landfill cover

A number of Portuguese landfills for MSW disposal are allowed to make use of a percentage of inert waste from the total amount of MSW received by year. CDW is used for daily cover or to improve access to the site, under the general following conditions:

- Inert waste should not contain waste fractions such as iron, wood and plastics with recovery potential;
- Inert waste must present characteristics compatible with road construction;
- The annual quantity of inert waste to be used shall not exceed 10% of the quantity of municipal waste deposited in that year.

Regarding the national plan for waste management (Resolution of the Council of Ministers 11-C/2015 of 16 March), in Portugal there are 32 landfills for MSW disposal.

The Portuguese Environment Agency provided data for 2012 and 2013 regarding the landfill cover of 19 MSW landfills. The data was extracted from the Urban Waste Registration Map (MRRU), regarding the

reported data from MSW management systems to the recovery operation R10 (land treatment resulting in benefit to agriculture or ecological improvement). The following table presents the amount of CDW (tonnes) used for daily cover or to improve access to MSW landfills for 2012 and 2013, distributed by code of LoW.

LoW code		2012	2013
17 01 01	Concrete	18.20	116.74
17 01 02	Bricks	7.96	0.60
17 01 03	Tiles and ceramics	154.42	87.12
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	37 628.20	34 747.45
17 02 02	Glass	1.48	3.74
17 02 03	Plastic	43.99	96.42
17 03 02	Bituminous mixtures other than those mentioned in 17 03 01	0.00	78.24
17 05 04	Soil and stones other than those mentioned in 17 05 03	10 868.19	21 356.32
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03	6.74	106.46
17 08 02	Gypsum-based construction materials other than those mentioned in 17 08 01	23.84	1.12
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	2 848.40	3 177.97
Total		**51 601.42**	**59 772.18**

Source: APA (2015). *E-mail* contacts.

7.4. Market conditions / costs and benefits

In Portugal, direct financial incentives to recycle CDW do not exist. However, a landfill tax for inert CDW exists, established in the Decree-Law 46/2008 of 12 March (CDW legal framework; see subchapter 3.1), with the main purpose of divert these wastes from landfill disposal. Currently this tax is € 4.28 per tonne. Case studies are not available on this subject.

In Portugal, aggregates and other natural raw materials scarcity is not a problem. At present, there are two major obstacles regarding CDW recycling identified by the stakeholders. Firstly, Portugal's economy still faces difficulties and the construction sector has not recovered yet. Secondly, the prices of the recycled materials are higher than natural raw materials.

Currently EoW criteria for aggregates and/or other materials do not exist.

In Portugal the role of construction materials producers and construction operators' insurers (in the process of marketing and use of recycled CDW as construction materials) is not clear.

Regarding the recycling contents and recyclability, the environmental product declarations (EPDs) and the Green Public Procurement (GPP) criteria for construction products only consider general principles, they are not specific for CDW.

7.5. Recycled materials from CDW

As mentioned above, one of the main barriers for the incorporation of recycled materials at construction works is the higher price of recycled materials in comparison to natural raw materials.

In Portugal, the Decree-Law 46/2008 of 12 March, which establishes the legal framework for CDW management, outlines that the incorporation of CDW at construction works must comply with national or EU standards or in their absence with technical guidelines defined by the National Laboratory for Civil Engineering (article 7). This entity has established four technical requirements to date, namely:

- E 471/2009 - Guide for the use of recycled coarse aggregates in concrete85: establishes the minimum requirements that the coarse recycled aggregates covered by EN 12620 must comply with in order to be used in concrete;
- E 472/2009 - Guide for the production of recycled hot mix asphalt86: classifies reclaimed asphalt materials covered by EN 13108-8 and provides guidelines for their use in hot mix recycled asphalt;
- E 473/2009 - Guide for the use of recycled aggregates in unbound pavement layers87: establishes the requirements that recycled aggregates covered by EN 13242+A1 and EN 13285 must comply with in order to be used in unbound sub-base and base pavement layers;
- E 474/2009 - Guide for the use of construction and demolition recycled materials in embankments and capping layers88: establishes the minimum requirements that construction and demolition waste must comply with in order to be used in embankment and capping layer of transport infrastructures.

In the meantime, the National Laboratory for Civil Engineering, together with the Portuguese Environment Agency, are developing the following technical standards which are set to be applied to the CDW in construction works:

- Materials for rural, agricultural or forestry roads;
- Materials for filling ditches (backfilling);
- Materials for sub-base and base layers resulting from asphalt mixtures.

7.6. Construction sector make up

In the next table, data from Portugal is available (data from the Statistics Portugal, 2015)[89], for the values of new construction, refurbishment and demolition. Data regarding the new construction and refurbishment are aggregated by residential or others. For the demolition work, there is only data on the number of demolitions carried out, not being differentiated by building type.

In 2013, there was a total of 23 640 construction works, which is a 12.45% decrease compared to 2012. This corresponds to 16 364 new construction (13.77% decrease), 6 715 refurbishment (3.44% decrease) and 561 demolition works (47.62% decrease).

	Value of new construction, refurbishment and demolition for Portugal							
Reference period of data	Total	New construction	Residential	Others	Refurbishment	Residential	Others	Demolition
2013	23 640	16 364	12 082	4 282	6 715	4 355	2 360	561
2012	27 002	18 977	14 713	4 264	6 954	4 660	2 294	1 071
2011	27 217	19 288	15 241	4 041	6 569	4 483	2 084	1 360
2010	30 449	21 946	17 445	4 490	6 844	4 676	2 164	1 659
2009	36 009	26 466	21 363	5 089	7 587	5 295	2 290	1 956
2008	42 956	32 493	26 645	5 837	8 310	5 880	2 430	2 153
2007	46 407	35 307	29 096	6 198	9 006	6 595	2 409	2 094
2006	47 625	36 367	30 339	6 009	9 112	6 759	2 352	2 146
2005	51 717	40 668	34 214	6 428	9 289	7 013	2 275	1 760
2004	49 974	39 252	32 832	6 389	9 112	6 867	2 237	1 610
2003	59 674	48 395	40 879	7 491	10 147	7 738	2 398	1 132

Source: adapted from INE (2015)

In the next table, the total surface area of the completed works (new construction and refurbishment), for the period 2003 - 2013 is presented. There is no data regarding the surface area of the demolition works.

[85] LNEC (2009a): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4712009.pdf
[86] LNEC (2009b): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4722009.pdf
[87] LNEC (2009c): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4732009.pdf
[88] LNEC (2009d): http://www.apambiente.pt/_zdata/Politicas/Residuos/FluxosEspecificosResiduos/RCD/E4742009.pdf
[89] INE (2015): http://www.ine.pt/

In 2013, the total surface area of the completed works was 9.91 million m^2, which is a 12.60% decrease compared to 2012. This corresponds to a value of 7.94 million m^2 for new construction (15.15% decrease) and 1.97 million m^2 for refurbishment (0.56% decrease).

Reference period of data	Total (m^2)	Total surface area (m^2) of the completed works: construction, refurbishment and demolition for Portugal		
		New construction	Refurbishment	Demolition
2013	9 914 990	7 940 324	1 974 666	n.a.
2012	11 343 833	9 358 106	1 985 727	n.a.
2011	10 928 611	9 066 612	1 861 999	n.a.
2010	12 941 153	11 150 092	1 791 061	n.a.
2009	16 226 101	14 122 191	2 103 910	n.a.
2008	19 226 479	17 015 882	2 210 597	n.a.
2007	20 290 355	18 366 179	1 924 176	n.a.
2006	19 850 831	17 830 424	2 020 407	n.a.
2005	21 125 690	19 268 112	1 857 578	n.a.
2004	21 026 058	19 323 591	1 702 467	n.a.
2003	26 061 274	24 430 682	1 630 592	n.a.

n.a. – not available
Source: adapted from INE (2015)

The next table shows the number of licenses of new construction, refurbishment and demolition. Data regarding the new construction and refurbishment are aggregated by residential or other construction. For the demolition works, there is only data on the number of demolitions carried out, not being detailed by type of building.

In 2013, there was a total of 16 253 licenses for construction works, which is a 22.73% decrease compared to 2012. This corresponds to 9 460 licenses for new construction (23.18% decrease), 5 604 licenses for refurbishment (20.42% decrease) and 1 189 licenses for demolition works (29.06% decrease).

Reference period of data	Total	Number of licenses of new construction, refurbishment and demolition for Portugal						
		New construction			Refurbishment			Demolition
			Residential	Others		Residential	Others	
2013	16 253	9 460	5 607	3 853	5 604	3 414	2 190	1 189
2012	21 033	12 315	8 316	3 996	7 042	4 542	2 496	1 676
2011	25 341	16 247	11 932	4 312	7 448	4 970	2 474	1 646
2010	28 089	19 488	14 955	4 533	6 981	4 796	2 184	1 620
2009	30 993	20 911	16 151	4 759	7 910	5 517	2 392	2 172
2008	39 222	28 368	22 639	5 728	8 471	6 044	2 427	2 383
2007	45 944	34 401	28 449	5 951	9 020	6 619	2 401	2 523
2006	49 437	36 992	31 034	5 958	9 585	7 202	2 383	2 860
2005	50 965	39 037	32 811	6 226	9 754	7 359	2 395	2 174
2004	52 703	40 271	33 466	6 805	9 989	7 547	2 441	2 443
2003	56 528	43 724	36 652	7 072	10 695	8 236	2 459	2 109

Source: adapted from INE (2015)

Data regarding licensed dwellings in new constructions for family housing by dwelling typology, by annual variation (2003 - 2013), is presented in the next table. In 2013, there was a total of 7 286 licensed dwellings in new construction for family housing, which is a 35.24% decrease compared to 2012. This corresponds to 712 licenses for the dwelling typology “T0 or T1” (37.71% decrease), 1 494 licenses for the dwelling typology

"T2" (44-38% decrease), 3 592 licenses for the dwelling typology "T3" (29.57% decrease) and 1 488 licenses for the dwelling typology "T4" (35.92% decrease).

Reference period of data	Total	Licensed dwellings in new constructions for family housing by Dwelling typology for Portugal			
		T0 or T1	T2	T3	T4 or more
2013	7 286	712	1 494	3 592	1 488
2012	11 251	1 143	2 686	5 100	2 322
2011	17 335	1 423	3 631	7 986	4 295
2010	25 002	2 037	5 533	11 873	5 559
2009	27 298	2 432	6 072	13 064	5 730
2008	45 981	4 438	11 681	21 406	8 456
2007	65 828	6 783	18 117	29 488	11 440
2006	71 921	7 995	19 638	32 255	12 033
2005	73 922	7 378	20 088	33 684	12 772
2004	77 115	7 747	21 359	35 093	12 916
2003	81 546	7 580	22 012	37 442	14 512

Source: adapted from INE (2015)

Regarding the number of companies working in the construction sector, data can be obtained from two different sources – the Institute of Construction and Real Estate (InCI) and Statistics Portugal. The InCI, regulator of the sector of construction and real estate, has as competence the allocation of titles for the exercise of regulated activities, including building permit, registration certificate, real estate license and registration of property developer. From the InCI (2015)[90] is possible to know the number of companies, in the construction sector, with building permit, by municipal district and maximum class qualifications.

The maximum class qualifications, contained in the permits of construction companies, refer to the maximum values of work set by Ordinance 1371/2008, of December 2, that each of them allows. The next table presents the correspondence between the classes of qualifications and maximum values, and also the number of companies in Portugal for the construction sector for each class of qualification. As can be seen, the highest number of permits corresponds to the first class of qualification (60.48% of the total companies).

Maximum values of the permitted works, by type of qualifications

Classes of qualifications	Maximum values of permissible works (€)	Number of companies with business permit in construction (Portugal)
1	Until 170 000	10 350
2	Until 350 000	2 657
3	Until 700 000	1 652
4	Until 1 400 000	1 135
5	Until 2 800 000	862
6	Until 5 500 000	224
7	Until 11 000 000	119
8	Until 17 000 000	39
9	Above 17 000 000	76
Total		**17 114**

Source: adapted from InCI (2015)

[90] InCI (2015): http://www.inci.pt/Portugues/Construcao/consultaemp/Paginas/Alvara.aspx

In the Statistics Portugal (2015)[91] data regarding the number of companies in the construction sector can be found, and also the employment size class and the employed staff in companies. This data is presented by annual variation and economic activity (CAE Rev.3 - Portuguese Classification of Economic Activities, Revision 3). The division for the construction sector (CAE Rev.3, sector F) is organized by:

- property development (development of building projects) and building construction
  - Property development (development of building projects);
  - Construction of buildings (residential and non-residential).
- civil engineering
  - Construction of roads, bridges, tunnels, airport runways and railways;
  - Construction of water transport networks, sewage, energy distribution, telecommunications and other networks;
  - Construction of other civil engineering.
- specialized construction activities
  - demolition and preparation of construction sites:
    - demolition;
    - preparation of construction sites;
    - drilling and boring.
  - installation: electrical, plumbing, air conditioning and other facilities;
  - finishing activities in buildings;
  - other specialised construction activities.

The number of companies by annual variation (2004 – 2012) and economic activity (CAE Rev.3) is presented in the next table. In 2012, there were a total of 88 797 companies in the construction sector, with a 10.47% decrease compared to 2011. This corresponds to 43 883 companies for "Property promotion and building construction" (10.48% decrease), 3 186 companies for "Civil Engineering" (7.59% decrease) and 41 728 companies for "Specialized construction activities" (10.67% decrease). Regarding number of companies in 2012, construction sector corresponds to 8.35% of the total number of companies existing in Portugal for all sectors.

	Number of companies by economic activity (Division - CAE Rev. 3)				
Reference period of data	Total	Construction	Property promotion; building construction	Civil Engineering	Specialized construction activities
2012	1 062 782	88 797	43 883	3 186	41 728
2011	1 112 000	99 179	49 019	3 448	46 712
2010	1 144 150	106 710	53 145	3 641	49 924
2009	1 198 781	117 825	58 807	3 919	55 099
2008	1 235 093	126 156	63 614	4 090	58 452
2007	1 206 116	125 570	64 403	4 228	56 939
2006	1 143 648	123 103	63 625	4 172	55 306
2005	1 121 529	127 149	66 060	4 372	56 717
2004	1 084 928	128 832	67 230	4 553	57 049

Source: adapted from INE (2015)

The next table shows the number of companies in the construction sector according to employment size class and the number of employed staff in 2012. There were 88 797 companies in the construction sector, 49% in "property development (development of building projects) and building construction", 4% in "civil engineering" and 47% in "specialized construction activities". The 3 regions with the greatest number of construction companies were North region, followed by the centre and then Lisbon. Concerning the employment size class, the largest number of companies corresponds to the category of "less than 10 persons" (94%). For the number of employees in the construction sector, in 2012, there was a total of 344

[91] INE (2015): http://www.ine.pt/

185, of which 46% in “property development (development of building projects) and building construction”, 19% in “civil engineering” and 35% in “specialized construction activities”.

		Total	Construction	Property promotion; building construction	Civil Engineering	Specialized construction activities
Number of companies by economic activity	Total	1 062 782	88 797 (8.36%)	43 883 (49.42%)	3 186 (3.59%)	41,728 (46.99%)
	Less than 10 persons	-	83 216 (93.71%)	40 928 (49.18%)	2 433 (2.92%)	39,855 (47.89%)
	10 - 49 persons	-	5 018 (5.65%)	2 716 (54.13%)	586 (11.68%)	1,716 (34.20%)
	50 - 249 persons	-	510 (0.57%)	228 (44.71%)	140 (27.45%)	142 (27.84%)
	250 and more persons	-	53 (0.06%)	11 (20.75%)	27 (50.94%)	15 (28.30%)
Employed staff in companies by economic activity		-	344 185	159 205 (46.26%)	63 484 (18.44%)	121 496 (35.30%)

Source: adapted from INE (2015)

The last table shows the employed staff in companies by annual variation (2004 – 2012) and economic activity (CAE Rev.3) for Portugal. In 2012, there were a total of 344 185 employed staff in companies in the construction sector, which is a 15.21% decrease compared to 2011. This corresponds to 159 205 employed staff for “Property promotion and building construction” (17.62% decrease), 63 484 employed staff for “Civil Engineering” (10.29% decrease) and 121 496 employed staff for “Specialized construction activities” (14.38% decrease).

	Employed staff in Companies by Economic Activity (Division - CAE Rev. 3)			
Reference period of data	Construction	Property promotion; building construction	Civil Engineering	Specialized construction activities
2012	344 185	159 205	63 484	121 496
2011	405 928	193 253	70 772	141 903
2010	448 709	215 931	82 906	149 872
2009	489 826	242 167	87 058	160 601
2008	527 330	271 500	85 686	170 144
2007	519 600	278 142	76 442	165 016
2006	497 171	266 241	72 998	157 932
2005	484 020	258 724	71 548	153 748
2004	480 531	256 062	71 984	152 485

Source: adapted from INE (2015)

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Other consulted stakeholders

The following stakeholders have been contacted but did not participate:

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- AEPSA - Association of Portuguese Companies for the Environment Sector (Associação das Empresas Portuguesas para o Sector do Ambiente).
- AICE - Industrial Association of Building Construction (Associação dos Industriais da Construção de Edifícios).
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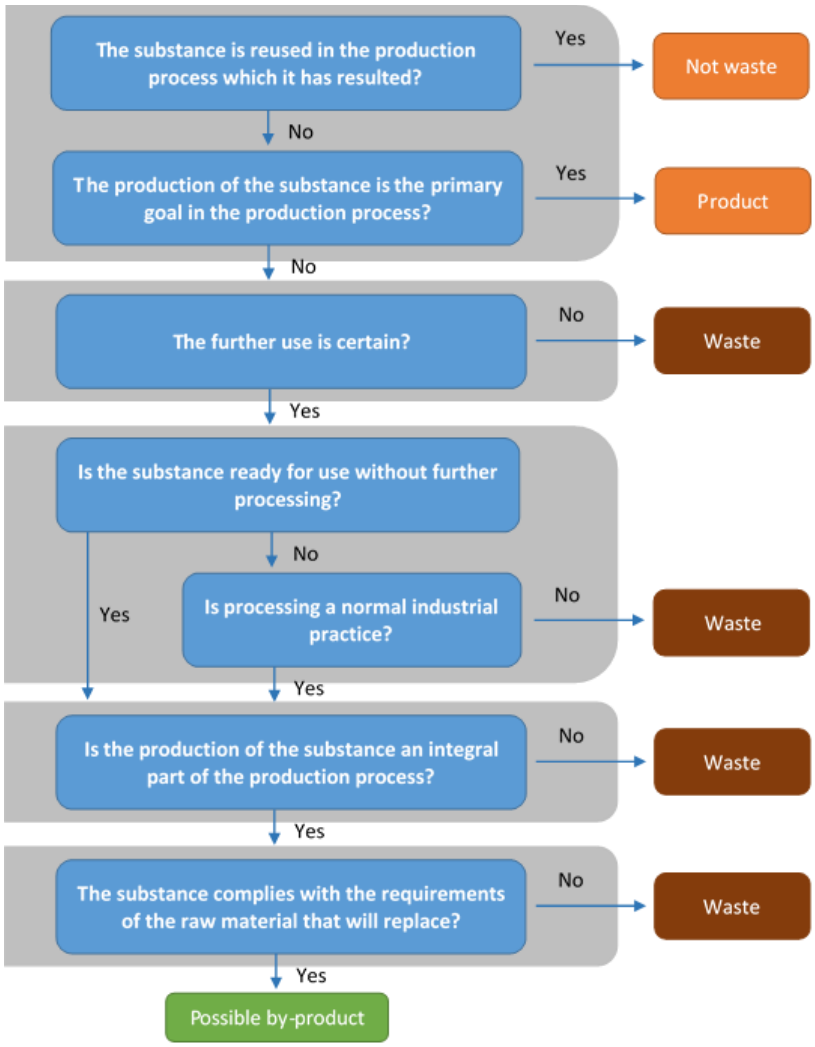
Annex



Source: adapted from APA (2015c)