

Screening template for Construction and Demolition Waste management in The Netherlands V2 – September 2015



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Screening factsheet

1 Summary

Construction and Demolition Waste (CDW) management national performance

Official CDW generation data	2006	2007	2008	2009	2010	2011	2012
Hazardous CDW (Mt)	3.13	1.44	1.58	1.57	1.47	1.33	1.48
Non-hazardous CDW (Mt)	21.33	22.71	23.72	23.60	23.06	23.07	24.22
Total (Mt)	24.46	24.15	25.30	25.18	24.53	24.41	25.71

In both the data of generation and the treatment of CDW, no distinction is made between inert and non-inert CDW. The inert waste data is included in non-hazardous waste data, apart from soils and dredging data. There is however no available information on the part of inert waste among non-hazardous waste data.

In 2012, 25.71 million tonnes of construction and demolition waste (CDW) were officially reported as generated in Netherlands. It represents a 4.8% increase compared to 2010. In comparison with the Eurostat data, this figure excludes dredging spoils and the vast majority of soil. The Dutch waste figures exclude soils and dredging spoils in the official waste generation data, mainly because the amounts of these waste types fluctuate significantly based on annual policy on governmental projects. In comparison with the Eurostat data, 6,254 Ktonnes of soil waste is excluded and 241 Ktonnes remains. The remaining part of soils exists out of stony waste types that are indicated on the waste types 170503 and 170504. The amount of dredging soil that was excluded is 49,150 Ktonnes. Lastly, the amount of non-hazardous CDW was 24.22 Mtonnes which is 94.2% of the total CDW generation.

CDW treatment (2012)	Recycling	Energy recovery	Other recovery (includes backfilling)	Incineration	Landfill	Disposal and unknwn	Other removal	Total
Hazardous waste (Kt)	1,187	16.70	0.72	4.72	262	7.61	0.001	1,479
Non-hazardous waste (Kt)	23,062	927	2.54	11.70	215	8.26	0	24,226
Grand Total (Kt)	24,249	944	3.27	16.42	477	15.87	0.001	25,705

- In 2012, according to these statistics, over 93% of the CDW is recovered (recycling, energy recovery and other recovery), of which 95% is recycled. These figures include backfilling and exclude soil (241Ktonnes in 2012) and also hazardous waste.
- The amount of landfilled CDW is dropping: it was 1,169 Ktonnes in 2006 and in 2012 only 477 Ktonnes was left. This corresponds to 2% of all the CDW.
- Energy recovery increases a bit, this is caused by the stimulation of energy production from renewable resources such as biomass.

The source of the data in these tables of both the waste generation and treatment of CDW is the data provided by the Rijkswaterstaat, which is part of the Ministry of Infrastructure and Environment. This data was directly obtained from the waste helpdesk of Rijkswaterstaat.

CDW management practices

In the Netherlands the legal framework regarding waste management and CDW management in particular, is extensively set up. The most important decisions and legislations are:

- It is compulsory that a National Waste Plan is established
- For the majority of the waste, a landfill ban exists. The tax for landfilling is €13 per tonne.
- Import and export of wastes are highly restricted.
- Currently, also an incineration tax is introduced, in order to decrease the amounts of burned waste.

In the Netherlands, waste management and more specific CDW management are mature. Both an advanced waste management plan and waste prevention plan exist. As mentioned before, over 98% of the CDW is recovered and landfilling CDW is almost non-existent.

Many governmental entities, building designers, clients, contractors and recyclers are involved in sustainable CDW management. Several best practices are:

- Led by the government and in collaboration of various industry organisations and sector associations, so called Greendeals are brought to live. Among others, Greendeal cirkel city, Greendeal circular buildings, Greendeal sustainable ground, roads and water construction and Greendeal sustainable concrete exist.
- Many industry initiatives exist in which buildings or entire districts are built with the use of CDW.
- Different R&D programs on recycling mono streams from CDW exist.
- Finding and implementing circular economy solutions is on the rise in for different waste types, among which concrete.
- More and more CDW prevention initiatives start to arise.

Main obstacles to sustainable CDW management

- Market conditions
 - The supply of secondary materials is not yet big enough.
 - There are no clear quality gradations for the recycled materials.
 - The market still mainly focuses on standalone unit prices, such as the price of a container, instead of the total cost with regards to the process of waste recycling.
 - The market still has much trouble with innovative new ideas, such as a business model in which a building remains in possession of the builder (producer) instead of the user.
 - A solid business case for recycling materials has to exist in order to really grow to full potential.
- Bureaucracy
 - The government is not one party (RWS, municipalities, provinces), so communication can be tough. Moreover, in many municipalities there is currently a struggle because of shortage of people and hours, and knowledge.
 - Local authorities and municipalities don't have much knowledge. The knowledge should be better provided by the national government.
 - The load for the project-level to provide feedback on how was performed with regard to sustainability.
- Lack of maturity of initiatives
 - There is much knowledge developed, but the actual commitment to each other how to handle CDW takes commitments from the clients and contractors.
 - Projects are currently all still very much in its infancy.
- Culture
 - According to interviewed stakeholders, the traditional nature of the construction sector holds back the full potential of recycling CDW. People do not think about making the waste recycling processes better.

Main drivers to sustainable CDW management

CDW management (and waste management in general) in The Netherlands has a powerful legal and regulatory framework. Both an advanced waste management plan and waste prevention plan exist. Landfill and incineration taxes are a major enabler of CDW recycling. The following drivers summarize the main current drivers and suggestions of the interviewed stakeholders to grow CDW management to its full potential:

- **Market conditions**
 - Builders are positive about buying secondary materials because the quality is good compared to the price.
 - If the quality of the materials would be assured by a quality label, then builders are willing to use the materials.
 - Cost reduction is an important driver for good CDW management. E.g.: Constructors focus on the separation of waste at the source, in order to minimize logistics. Separation gets cheaper than not separating.
 - Clients more and more ask for buildings with renewable labels.

- **Legislation**
 - The introduction of tax on landfilling and burning waste is a major enabler of more recycled CDW.
 - Prohibition of waste burning would be a major driver for waste recycling in general.

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

In this section the definitions of waste used in The Netherlands are detailed.

2.1 Definition of waste

In The Netherlands waste is officially defined as:

“All substances, preparations or objects, which the owner is disposing, planning to dispose, or obliged to dispose”

This definition is given by the Article 1.1 of the Environment Law “Wet Milieubeheer” (WM)¹ and complies with the definition of the Waste Framework Directive 2008/98/EC (WFD).

2.2 Definition of construction and demolition waste (CDW)

The CDW definition used in The Netherlands is as follows:

“Waste which is generated in construction, renovation and demolition of buildings and other edifices, including road- and water constructions”

This definition is given by the National Waste Plan 2 “Landelijk Afval Plan 2” (LAP2)² and includes the following types of waste:

- Asbestos and waste which contains asbestos
- Dredging
- Aerated concrete
- Roof waste
- Mixed CDW and mixed fractions
- Separately collected glass
- Gypsum
- Fiber optic cables
- Wood
- Other mono streams
- Paper- or plastic insulated cables and remnants
- Materials containing stone
- Grit
- Tar-containing asphalt
- Contaminated soil
- Packaging of paint, adhesive, sealant and resin
- Sieve sand

An own national list of waste classifications is used in The Netherlands. The waste classification is linked to the European List of Waste, but it is not based on it. The existing correspondence between the national list and the LoW can be found in the appendix 5 of:

[http://www.lap2.nl/sn_documents/downloads/01%20Beleidskader/BijlagenLAP2\(ttw2\)_bijlage1-tot-en-met-5.pdf](http://www.lap2.nl/sn_documents/downloads/01%20Beleidskader/BijlagenLAP2(ttw2)_bijlage1-tot-en-met-5.pdf)

Moreover, it is made visible in the Annex if this document.

CDW covers mixed construction and demolition waste offered by companies in the construction sector, but also in composition comparable industrial and household waste, such as waste released unseparated during construction, demolition or remodelling of private households. Furthermore, mixed waste that remains after sorting and other processing of construction and demolition waste also falls under CDW.

¹ Rijkswaterstaat Leefomgeving (2015), Environmental Management Act Waste

² Ministry of Infrastructure and Environment (2014), National Waste Plan appendix 1-5

2.3 End of Waste (EoW) status³

The Netherlands uses the EU defined EoW criteria. Any waste that fulfils the criteria for the 'end of waste' has no longer the status waste. That is the case if the waste has undergone a recovery operation and complies with specific criteria. These criteria are not in the Waste Framework Directive (WFD), but must be adopted by the European Commission. The WFD does set out the conditions that must be used by the European Commission in drafting these specific criteria.

Moreover, for waste for which no European end-of-waste criteria is developed European Member States themselves may introduce schemes with end-of-waste criteria. For the following waste a Dutch regulation applies: Recycling Aggregates from stony waste: Regulation No IENM / BSK-2015/18222 of February 5, 2015.

2.4 Definitions of waste treatment operations⁴

In the Law Environmental Management and the National Waste Plan (LAP) the same terms and definitions are used as in the Waste Framework Directive (2008/98 / EC). The LAP defines these operations as follows:

Recycling

Recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original purpose or for any other purpose, including the reprocessing of organic waste and excluding energy recovery and the reprocessing into materials that are to be used as a fuel or as a filling material.

Reuse

Any act by which products or components that are not waste, again are used for the same purpose for which they were intended.

Recovery

Any operation the principal result that waste serve a useful purpose by replacing materials that would otherwise be used for a specific function, or by which the waste is prepared for a function. The included actions that are part of this are listed in Annex II to the Waste Framework Directive (2008/98 / EC).

Backfilling

Form of 'other useful application' (i.e. recovery) where suitable waste is used for the in the context of recovery of mineral extraction excavated areas (surface mining) or the filling mines, and where the waste means to replace not waste materials. This may also involve waste of manufacturing mortars, which are then used as padding of compartments, inter alia, the application in mines to prevent subsidence.

Official Dutch statistics include backfilling, it is included in the definition of CDW.⁵ In The Netherlands, backfilling is considered to be recovery.

³ Rijkswaterstaat Leefomgeving (2015), Environmental Management Act Waste

⁴ Ministry of Infrastructure and Environment (2014), National Waste Plan appendix 1-5

⁵ Ministry of Infrastructure and Environment (2014), National Waste Plan appendix 6

3 Legal Framework – Waste Management Plans and Strategies

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

3.1 Legislation concerning CDW in The Netherlands

First pieces of legislation on waste⁶

- In 1972, the Dutch government gave the Urgency Notes Environment. (TK 1971-1972, 11 906, Nrs. 1-2, p. 39-41.) This paper can be considered as the first governmental document in which a reasonably complete picture of the Dutch environmental policy was outlined. Regarding waste the note signalled an increase in waste volumes and lagging treatment facilities. The solution was mainly attributable to increase the capacity of landfills and incinerators.
- In the years after the waste was mainly characterized by small size and relatively low level of environmental protection (NMP4 (2001), p. 14). To that extent, in nearly all operational landfill sites soil protection facilities were lacking and flue gas cleaning of waste incineration plants was insufficient. The latter led to the dioxin affair at the end of the 1980s. This situation was the cause to ambitious actions aimed at prevention, reuse, reduction of adverse environmental impacts and national planning, which mainly formed the basis for the current waste policy (VROM (2001a)).
- Examples of milestones from that period (1988-1991) that still resound are the note prevention and recycling (notitie preventieve en hergebruik), the introduction of producer responsibility, the Waste Institution (Afval Overleg Orgaan; AOO) and the Packaging Covenant (Convenant Verpakkingen). This policy has led in later years that the percentage of waste landfilled has dropped considerably and that, despite a sharp increase in the volume of waste, the problem is now largely controlled (NMP4 (2001), p. 14).

Waste Framework Directive transposition⁷

Since 1 January 1994, the Dutch legislation on waste can be found primarily in chapter 10 of the Environmental Management Act (Wet Milieubeheer; Wm). This chapter consists mainly of a framework legislation. This means that a large number of issues are not in the law itself, but are regulated in Orders in Council, provincial environmental regulations or municipal waste regulations. Examples of relevant Orders in Council in this context are the Decree on Landfills and Waste Bans (Stb. 1997, 665) and the Waste Collection Decree (Stb. 2004, 127).

In article 10.4 of the Environmental Management Act, the order of preference for waste management is included.

- The generation of waste is prevented or restricted (prevention);
- in the production of substances, preparations or other products that make use of substances and materials after use of the product, no or minimal adverse effects to the environment should be caused (design for prevention and design for recovery);
- substances, preparations or other products are reused after use (recovery by product reuse);
- substances and materials of which a product exists are recycled after use of the product (recovery by material reuse);
- waste is a main use as fuel or for other means of energy generation (recovery as fuel);
- waste is disposed by burning them on land (incineration as a disposal method);
- waste is landfilled.

This order of preference is leading the Dutch waste management in practice. The approach taken by the Netherlands in this regard is in line with the new Waste Framework Directive 2008/98.

Furthermore, In order to implement Directive 2008/98, the Minister of the Environment submitted a proposal in May 2010 to amend the Environmental Protection Act (Wm), the Law on environmental taxes and the Law on economic offenses. The so-called Implementation Act EG-regulation directive waste was then implemented on December 12 2010. The Directive was implemented primarily in Article 1.1 and in section 10

⁶ Kenniscentrum InfoMil (2015), Manual EU environmental policy and Netherlands

⁷ Kenniscentrum InfoMil (2015), Manual EU environmental policy and Netherlands

of the Environmental Protection Act. In addition, a number of general measures of directors were adjusted (Stb. 2011, 104). The main changes to the Dutch regulations: some new provisions on the scope of the regulations, various modifications of the terminology, the legal establishment of the waste hierarchy, adjusting a mixing ban for hazardous waste and enabling further regulations on separate collection. Furthermore, it is intended to integrate future waste prevention programs in the LAP (National Waste Plan).

National Legislation on CDW

As mentioned above, chapter 10 of the Environmental Protection Act (Wm) is about waste. This section in the Environmental Protection Act contains the main legislation on waste in The Netherlands, including CDW. It contains the following important parts that have to do with CDW:⁸

- **Duty of care for waste:** Everyone should ensure that there are no adverse effects on the environment or come by actions involving waste (Article 10.1).
- **Landfill Prohibition:** There is a ban on the disposal (by landfilling it outside establishments), bring into the soil or burn of waste (Article 10.2). Some exceptions exist which are described in the Decision Exemptions Ban on Dumping Outside Establishments (Besluit vrijstellingen stortverbod buiten inrichtingen).
- **National Waste Management Plan:** A national waste management plan (LAP) must be established (Articles 10.3 to 10.14).
- **Industrial wastes:** There are rules for delivery, receipt, transportation and collection of industrial waste (Articles 10.36 to 10.55).
- **International shipments of waste:** For international shipments of waste, the rules of the EEG Waste Shipment Regulation apply (Articles 10:56 to 10.60).
- **Municipal Waste Regulation:** The minister has powers to make rules in the Municipal Waste Regulation (Articles 10.61 and 10.62).
- **Exemptions:** The minister, municipalities and provinces have opportunities to grant exemptions from certain prohibitions or regulations of the Environmental Protection Act (Articles 10.63 and 10.64).

Furthermore, based on the Environmental Protection Act (Wm), some decrees are made:

- **The Decree on landfills and waste bans (Bssa):** Waste is usually recovered or incinerated and may usually not be dumped. For a number of waste materials a landfill ban exists, laid down in the Decree on landfills and bans waste (BSSA).⁹
- **The Decree on notification of industrial and hazardous waste:** In the Notification of industrial and hazardous wastes the rules about disposal, transporting and receiving waste are pointed out. The decision applies from 1 January 2005.¹⁰
- **Arrangement collectors, transporters, dealers and brokers of waste:** In accordance with the Environmental Management Act, waste is issued only by companies that have a license to take over this waste or companies authorized to collect waste. It is also laid down in the Environmental Management Act that only the owner of the waste is allowed to dispose of the waste. So it is not allowed (for example, as a contractor, consultant or carrier) to act as a disposer of waste of others. Transporters, collectors, dealers and brokers of waste must be registered.

Furthermore, two important documents exist:

- **The National Waste Plan (Landelijk Afval Plan; LAP):** this is the policy framework derived from the Environmental Protection Act regarding waste. The LAP is explicitly intended to include implementation of the Waste Framework Directive. The first LAP was introduced in 2003, LAP2 is the current document which was introduced in 2009 and is valid till 2015. It is described more in detail below.
- **From Waste to Resource (Van Afval Naar Grondstof, VANG):** this document addresses the waste prevention plan. It is introduced on January 1, 2014. It is described more in detail below.

Landfilling¹¹

⁸ Kenniscentrum InfoMil (2015), Manual EU environmental policy and Netherlands

⁹ Rijkswaterstaat Leefomgeving (2015), Landfilling

¹⁰ Landelijk Meldpunt Afval (2015), Laws and Regulations

¹¹ Rijkswaterstaat Leefomgeving (2015), Landfilling

Landfilling is the least desirable way in the Netherlands to remove our waste. For wastes that are reusable or combustible applies a landfill ban. A typical market price including tax is € 186.34 per tonne.¹²

3.2 Waste management plans (WMP) and Strategies

National Waste Plan: LAP¹³

LAP-2 (from here on also referred to as LAP) describes the Dutch waste policy. The main goal is getting as much quality reused waste as possible (instead of landfilling and incineration). For each waste type it is shown what can be done. The LAP is explicitly intended to include implementation of the Waste Framework Directive. The provinces and municipalities should use the LAP as an evaluation framework in exercising their powers under the Environmental Protection Act (Wm). These are for example all licensing under the Environmental Management Act where waste aspects are discussed. This means not only the licenses for waste management facilities but also permits for businesses where waste is released.

After LAP-1 that was introduced in 2003, LAP-2 was adopted on 11 November 2009. The plan, subtitled "Towards a material chain policy", was implemented on 24 December 2009. It is valid from 2009 to 2015 with a proposed view towards 2021.

The in LAP-2 enshrined waste policy is aimed at limiting the production of waste, reducing the environmental impact of the activity 'waste management' and limiting the environmental impact on product chains. The chain approach has taken an important place in LAP-2 based on the consideration that to achieve the most effective steps towards sustainable and efficient material usage the perspective of the entire chain should be considered. It is about achieving a change in thinking / design / production.

Concretely LAP-2 includes the following quantitative and qualitative objectives:

- Encouraging waste prevention, such that the total waste production in 2015 may not be greater than 68 Mtonnes and in 2021 not more than 73 Mtonnes.
- Increasing the recovery of the total waste from 83% in 2006 to 85% in 2015.
- Increasing the recovery of all household waste from 51% in 2006 to 60% in 2015.
- Increasing the recovery of total HDO (trade, services and government) waste from 46% in 2006 to 60% in 2015.
- At least maintain the already in 2006 achieved rate of 95% recovery of CDW, despite the expected increase in the production of this waste stream in the coming years (24 megatonnes in 2006 to 32 megatonnes by 2021).
- At least maintain the already in 2006 achieved rate of 90% recovery of industrial waste, despite the expected increase in the production of this waste stream by 16 megatonnes in 2006 to 18 megatonnes by 2021.
- Reduction (indicative objective) of 20% environmental impact in 2015 for each of the seven priority streams.
- Optimal utilization of the energy-content of waste that cannot be reused.
- Better utilization of the waste heat from waste incineration.
- Realisation of a levelled European playing field for waste management.
- Promoting of market forces and shaping special responsibility of the government for landfilling.
- Using the Cradle-to-Cradle (C2C) concept as a source of inspiration in the seven priority streams.

Section in national WMP on CDW:¹⁴

The LAP-2 includes sector plans for each sector. These indicate what the minimum grade of treatment / processing of a certain waste material or category of waste is and intend to prevent waste substances from being treated / processed in a low quality. Among them, a sector plan for CDW is available. The section below describes the most important decisions described in the sector plan.

¹² Driessen Group (2015), Landfill tariffs

¹³ Kenniscentrum InfoMil (2015), Manual EU environmental policy and Netherlands

¹⁴ Ministry of Infrastructure and Environment (2014), National Waste Plan appendix 6

Delineation:

- Construction and demolition waste is released during the construction, renovation and demolition of buildings and other construction works including in civil engineering.
- This sector plan covers mixed construction and demolition offered by companies in the construction sector, but also similar composed industrial and household waste, such as waste that is unseparated released during construction, demolition or remodeling of private households.

Minimum standard for processing:

- The minimum standard for the processing of CDW is sorting or otherwise processing. The object of the treatment in this respect is to get as much mono streams as possible to be separated which are suitable for recycling, with the restriction that the resulting residue must at least be able to be burned. The sorting process is arranged - if present in the mixture to sort - at least to separate as mono stream:
 - All the components as mentioned in art. 4.1 of the Building Regulations 2012
 - Stone-like material,
 - Wood,
 - Plastic,
 - Metal,
 - Sieve sand, and
 - Hazardous waste marked other than those specified in Chapter 17 of the Waste List under the Regulations for European Waste Catalogue.
- The minimum standard for sorting residue for which recycling is not possible or where the recycling route is so expensive that the cost of delivery by the producer / disposer is more than € 175, per ton, is incineration as a disposal method.

Cross-border transport of waste: (Temporary) removal

- Shipments from the Netherlands to landfill are not allowed on the grounds of national self-care.
- Shipments from the Netherlands in other types of (temporary) removal than landfill are in principle not allowed because recycling is possible. However, this prohibition does not apply to sorting residue under the condition that it appears from the notification that components such as wood, paper, metals, glass and plastic are not suitable for recycling. In this case, transmission for incineration is basically permitted.
- Shipments to the Netherlands for landfill are in principle prohibited under national laws and / or on the basis of national self-sufficiency.
- Shipments to the Netherlands for incineration as a disposal method are in principle not allowed.
- Shipments to the Netherlands for other types of (temporary) removal than incineration and landfilling are in principle not allowed.

Cross-border transport of waste: (Temporary) recovery

- Shipments from the Netherlands for recycling and for interim recovery followed by recycling is permitted in principle, unless eventually much of the transferred waste material is landfilled that the degree of recovery does not justify the transmission or when the degree of recycling is less than is common in processing of waste in the Netherlands.
- Shipments from the Netherlands for other types of (temporary) recovery than recycling or interim recovery followed by recycling is not allowed in principle because recycling is possible.
- Shipments to the Netherlands for (temporary) recovery is permitted in principle if the processing is in accordance with Dutch standard minimum.

Section on Waste Prevention Plan: VANG¹⁵

- The program *Waste To Raw material* (VANG) is the effort by the government to encourage the transition towards a circular economy. The common goal is to bring more sustainable products on the market, consume consciously and recycle more and better.

¹⁵ Rijkswaterstaat Leefomgeving (2015), Waste

- The VANG program has eight operational objectives. These objectives include sustainability at the front of the chain, improving waste separation and collection, directing existing waste policy to a circular economy and addressing specific chains and waste streams.
- With the VANG program, this transition to a circular economy is accelerated.
- VANG is does not describe a part specifically focused on CDW.

3.3 Legal framework for sustainable management of CDW

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

Description	Level of occurrence (Yes/No) Key Scope/Exemptions	Year established and policy reference	Further detail, information source, related web-site
<i>National/regional obligation for selective demolition?</i>	NO		
<i>National/regional sorting obligation (on-site or in sorting facility)?</i>	NO		
<i>National/regional separate collection obligation for different materials (iron and steel, plastic, glass, etc.)?</i>	NO		
<i>Obligation for separate collection and management of hazardous waste from C&D operations? Please specify</i>	NO		
<i>Related Green public procurement requirements</i>	NO		
<i>Waste prevention</i>	NO End of Waste Criteria: some waste should not get the status of waste. It would be better to label some waste as new raw material instead of waste	NA	Source: Interview Ministry of Infrastructure and Environment
<i>Waste prevention</i>	NO There should also be gradations in concrete aggregates in order to assess and assure the quality.	NA	Source: Interview CRH

3.4 Targets

Two targets concerning CDW exist:

- At least maintain the percentage already achieved in 2006 in Netherlands of 95% recovery of CDW, despite the expected large increase in the production of this waste stream in the next few years (from 23 Mtonnes in 2006 to 31 Mtonnes by 2021).¹⁶

¹⁶ Ministry of Infrastructure and Environment (2014), National Waste Plan

- In 2012, according to European standards, over 93% of the CDW is recovered (recycling, energy recovery and other recovery), of which 95% is recycled. These figures include backfilling and exclude soil (241Ktonnes in 2012) and also hazardous waste.
- The Dutch statement that 98% is currently recovered, is explained by the fact that hazardous waste and the stony waste that is classified as soil waste (waste types 170503 170504, corresponding to 241 Ktonnes in 2012) are included in this calculation.
- 70% recovery of CDW is thus already met in The Netherlands.
- The ambition to halve the 10 Mtonnes (2014) that is either burned or landfilled by 2020. This takes into account all waste, not only CDW.¹⁷
- According to the done research and interviews, there is no available information on targets concerning the recycling of specific materials for CDW.

¹⁷ Jan-Henk Welink (2014), Exit Incineration installations

4 Non legislative instruments

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

Key waste management and sustainable building non legislative instruments

Description	Level of occurrence (Yes/No) Key Scope/Exemptions	Year established and policy reference	Further detail, information source, related web-site
<i>Economic Instrument</i> <i>Tax on landfilling and burning</i>	YES The objective of this tax is to make landfilling and burning waste a less interesting option	January 2015	http://www.recycling.nl/afvalstoffenbelasting.html
Guidebook Adaptief vermogen (Adaptive capacity)	Focus on making buildings more easy adapt to their future use	2013	National
Tool BREEAM Assessment Tool	This tool is used to understand what is possible to do in construction and demolition in order to be sustainable. Eventually it leads to obtaining the BREEAM certificate	Unknown	National
<i>Sustainability standards that cover CDW</i> BREEAM	YES Dutch Green Building Council (DGBC) give the BREEAM certificates in The Netherlands	DGBC: 2008 BREEAM: 1990	https://www.dgbc.nl/
<i>Sustainability standards that cover CDW</i> Greendeal Cirkel Stad (circle city)	YES Circle City focuses on CDW separation and reuse as much as possible and trying to close the chain of CDW	2014	Interview Ministry of Infrastructure and Environment http://www.usi.nl/projecten/grondstoffen/greendealcirkelstad/

Description	Level of occurrence (Yes/No) Key Scope/Exemptions	Year established and policy reference	Further detail, information source, related web-site
<p><i>Sustainability standards that cover CDW</i></p> <p>Greendeal Circulaire Gebouwen (circular buildings)</p>	<p>YES</p> <p>Circular buildings is about the development of a 'passport' for buildings, which contains what substances are in the materials of the building. Moreover, it focuses on getting buildings circular</p>	2014	<p>Interview Ministry of Infrastructure and Environment</p> <p>http://www.cfp.nl/green-buildings-2014-alle-gebouwen-circulair-2030/</p>
<p><i>Sustainability standards that cover CDW</i></p> <p>Greendeal Duurzaam GWW (ground, road and water construction)</p>	<p>YES</p> <p>Focus on getting the whole chain of GWW construction sustainable</p>	2013	<p>http://duurzaamgww.nl/index.php/visie-achter-de-aanpak/</p>
<p><i>Extended producer responsibility scheme in operation</i></p> <p>Greendeal Duurzaam Beton (sustainable concrete)</p>	<p>YES</p> <p>See below</p>	2011	<p>Interview Ministry of Infrastructure and Environment</p> <p>http://www.mvonderland.nl/publicatie/green-deal-verduurzaming-betonketen</p>
<p><i>Extended producer responsibility scheme in operation</i></p> <p>Greendeal duurzaam bosbeheer (sustainable forest management)</p>	<p>YES</p> <p>See below</p>	2013	<p>http://bewustmethout.nl/</p> <p>Interview Bouwend Nederland</p>

Extended producer responsibility (EPR) table for each voluntary or mandatory scheme operating in The Netherlands

Material/ product type	Mandatory or Voluntary	Year established	National or regional (specify if regional)	Public sector and Industry lead organisation	Levels of performance e.g. tonnes recycled	Further information/ web-site
Concrete Greendeal Duurzaam Beton (sustainable concrete)	Voluntary Durable Concrete is a chain initiative in which everyone in the concrete chain is involved. It focuses on trying to get the quality of reusable concrete as high as possible. It is up to the market to challenge the concrete chain to deliver sustainable concrete, by buying this concrete.	2011	National	Different ministries and Industry lead organisations	Unknown	http://www.mvonderland.nl/publicatie/green-deal-verduurzaming-betonketen http://www.mvonderland.nl/system/files/media/concreteet_web.pdf
Wood Greendeal duurzaam bosbeheer (sustainable forest management)	Voluntary Focus on sustainable wood offering	2013	National	Industry lead organisations and public sector	Unknown	http://bewustmethout.nl/

Key CDW management requirements and standards

Description	Occurrence (Yes/No) Mandatory (Yes/No) Scope & exemptions	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 Demolition licence, Model Bouwverordening (MBV) (Model Build Regulation)	YES YES It is mandatory to have a demolition licence for every demolition in which more than 10M ³ waste is released	2012	National	This regulation is brought by the association of Dutch Municipalities. A licence has to be requested at the municipality	Unknown	http://www.sloopaannemers.nl/index.php?subject=58

Description	Occurrence (Yes/No) Mandatory (Yes/No) Scope & exemptions	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
Requirements for construction and demolition Besluit Bodemkwaliteit (Decree Soil Quality)	YES YES Among other things, this decree sets quality requirements for the usage of stony building materials in the ground	2008	National	Public sector lead organisation	Unknown	http://www.rwsleefomgeving.nl/onderwerpen/bodem-ondergrond/bbk/
Requirements for construction and demolition Bouwbesluit (building decree)	YES YES The Building Decree is a collection of building regulations to which all construction and demolition in the Netherlands must comply.	2012	National	Decree of August 29, 2011, concerning the construction, use and demolition of buildings (Building Decree 2012), Stb. 2011, 416	Unknown	http://vrom.bouwbesluit.com/ http://vrom.bouwbesluit.com/Inhoud/docs/wet/bb2012/opschrift
Standards for recycling waste Ladder van Lansink (Waste recycle hierarchy standard)	YES NO Describes the waste recycling hierarchy of The Netherlands	1979	National	The standard is introduced by the politician Mr. Lansink in 1979.	Unknown	http://www.recycling.nl/ladder-van-lansink.html
Standards for recycled CDW	NO NO There should be a gradation system to assess the quality of recycled concrete	NA	NA	NA	NA	Interviews

Description	Occurrence (Yes/No) Mandatory (Yes/No) Scope & exemptions	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
Selective demolition/ plan for large demolition sites/demolition standard Kaderrichtlijn Afvalstoffen (Framework Waste)	YES YES Based on the Waste Framework companies must be registered in order to carry, collecting or trade waste.	2004	National	Companies should be enlisted on the so called VIHB-list, in order to carry, collect or trade waste. This list is managed by the Foundation for National and International Road Transport Union (NIWO)	In 2010 there were a total of 11 709 companies registered on the list VIHB	http://www.infomil.nl/onderwerpen/integrale/handboek-eu/afval/kaderrichtlijn/omzetting-nationale/
Other CDW planning requirements EMVI Most Economically Advantageous Tender	YES YES The government assesses tenders partially based on their sustainable impact	2014	National	Public Sector lead organisation	NA	http://www.rijkswaterstaat.nl/zakelijk/zakendoen_met_rws/inkoopbeleid/aanbevelingen/emvi/ http://www.rijkswaterstaat.nl/images/Handleiding%20EMVI%202014%20EV%20140310_tcm174-362414.pdf

Key CDW management guidance and tools

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
App Container Service App	For private and professional order of waste containers for CDW.	2011	National	Industry lead organisation	Unkown 86% of the collected waste is recycled	http://www.smink-groep.nl/web/smink-tammer-activiteiten-werk-amersfoort-leusden-nijkerk-bunschoten-soest-soesterberg/containers-afvalbak-kliko-40-1000-bouw-en-sloop-vuil-afval-smink-tammer-nijkerk/smink-bouw-en-sloopafval-bsa-containersmink-tammer-amersfoort-leusden-nijkerk-bunschoten-soest-soesterberg/bouw-en-sloop-afval-container-smink-amersfoort-soesterberg-tammer-leusden-bunschoten-nijkerk/Container-Service-App.-voor-Iphone.htm

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
Guidelines Bodembeleid: Brekerzand (Soil Policy: Crusher sand)	Describes how crusher sand should be used as foundation in road construction	Unknown	National	Public sector lead organisation	Unknown	http://www.bodemrichtlijn.nl/Bibliotheek/bouwstoffen-en-afvalstoffen/recycling-brekerzand/bouwstoffase-recycling-bre107974

The above lists may not cover all CDW management initiatives.

5 CDW management performance – CDW data

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

Summary - CDW generation and recovery official statistics

Year	2006	2007	2008	2009	2010	2011	2012	2013
Generated (Kt)	24,457	24,147	25,303	25,176	24,528	24,410	25,706	NA
Recycling (Kt)	21,627	22,772	23,864	23,608	23,052	23,034	24,249	NA
Energy (Kt)	362	435	607	805	923	964	944	NA
Recovery (Kt)	1,174	28	13	1	12	2	3	NA
Incineration (Kt)	115	35	27	43	64	25	16	NA
Landfill (Kt)	1,169	820	745	659	455	367	477	NA
Disposal and unknown (Kt)	11	57	47	59	22	18	16	NA
Other removal (Kt)	0.029	0.003	0.003	0.002	0.002	0.002	0.002	NA

The source of the data in the table below and the data provided in the accompanying excel file of both the waste generation and treatment of CDW is the data of Rijkswaterstaat, which is part of the Ministry of Infrastructure and Environment. This data was directly obtained from the waste helpdesk of Rijkswaterstaat.

Method and precision

- The CDW generation and treatment data are collected on a yearly basis. All waste data is collected in an annual survey directed by the Ministry of Infrastructure and Environment. This survey is addressed to individual operators. It reflects the situation 31 December of the specific year.¹⁸
- The questions are composed based on experiences from previous years. The results obtained have all been checked for completeness and consistency. For this, historical data as well as data from Landelijke Meldpunt Afval (LMA; National Waste Notification Bureau) is used.
- In all surveys Eural codes are used in order to have better interconnection with other monitoring activities. They were however not provided along with these data.
- There is no difference between the data collection of even and uneven years.¹⁹
- This data is widely used and referred to by any sector organisations, industry organisations and other governmental entities, as found in internet research and validated by interviewed stakeholders. As already mentioned, these data are gathered and provided by the government itself.
- These figures include hazardous CDW but exclude dredging spoils and soil (see comparison with Eurostat data). In the Annex, a full overview of all included waste types is described.
- Moreover, it has to be noted that the CDW treated quantities correspond only to the CDW produced within the country. They exclude imported and exported CDW.

¹⁸ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2013), Dutch waste in figures, data 2006-2010

¹⁹ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2014), waste treatment, data 2013

5.1 CDW generation data

The source of the data in the table below and the data provided in the accompanying excel file of both the waste generation and treatment of CDW is the data of Rijkswaterstaat, which is part of the Ministry of Infrastructure and Environment. This data was directly obtained from the waste helpdesk of Rijkswaterstaat.

Official CDW generation data	2006	2007	2008	2009	2010	2011	2012
Hazardous CDW (Mt)	3.13	1.44	1.58	1.57	1.47	1.33	1.48
Non-hazardous CDW (Mt)	21.33	22.71	23.72	23.60	23.06	23.07	24.22
Total (Mt)	24.46	24.15	25.30	25.18	24.53	24.41	25.71

What is covered in the data: waste in this target group building includes all the waste generated during the construction, demolition or renovation of homes, commercial buildings and civil engineering works. The CDW generation data is broken down per waste type. No corresponding Eural codes were provided along with the data.

Asbestos

- The annual asbestos waste was 237,257 tonne in 2012.

Method and precision

- The CDW generation and treatment data are collected on a yearly basis. All waste data is collected in an annual survey directed by the Ministry of Infrastructure and Environment. This survey is addressed to individual operators. It reflects the situation 31 December of the specific year.²⁰
- The questions are composed based on experiences from previous years. The results obtained have all been checked for completeness and consistency. For this, historical data as well as data from het Landelijke Meldpunt Afval (LMA; National Waste Notification Bureau) is used. In all surveys Eural codes are used in order to have better interconnection with other monitoring activities.
- There is no difference between the data collection of even and uneven years.²¹
- This data is widely used and referred to by any sector organisations, industry organisations and other governmental entities, as found in internet research and validated by interviewed stakeholders. As already mentioned, these data are gathered and provided by the government itself.

Comparison with EU data

The table below shows the Dutch CDW waste generation figures of 2012 retrieved from the Eurostat database²² (the figures are presented in Mtonnes). These figures correspond with the NACE_R2 type Construction. As can be seen, the figures do not match the figures provided by the Dutch Ministry. The main difference is that the Dutch figures do not include dredging spoils and only indicates a small part of the soils waste type (241 Ktonnes, in comparison to 6,494 Ktonnes). The Dutch waste figures exclude soils and dredging spoils in the official waste generation data, mainly because the amounts of these waste types fluctuate significantly based on annual policy on governmental projects. In comparison with the Eurostat data, 6,254 Ktonnes of soil waste is excluded and 241 Ktonnes remains. The remaining part of soils exists out of stony waste types that are indicated on the waste types 170503 170504. The amount of dredging soil that was excluded is 49,150 Ktonnes. Lastly, the amount of non-hazardous CDW was 24.22 Mtonnes which is 94.2% of the total CDW generation.

For a full overview of the comparison of the data, see the Annex.

²⁰ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2013), Dutch waste in figures, data 2006-2010

²¹ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2014), waste treatment, data 2013

²² Eurostat (2015), Generation of Waste

The figures below are shown in tonnes.

CDW waste type	2012
Glass wastes	48,543
Plastic wastes	34,091
Wood wastes	1,321,587
Waste containing PCB	76
Mixed and undifferentiated materials	11,870
Soils	6,494,428
Metal wastes, ferrous	701,882
Metal wastes, non-ferrous	163,898
Metal wastes, mixed ferrous and non-ferrous	74,758
Mineral waste from construction and demolition	21,855,155
Dredging spoils	49,150,419
Other mineral wastes (W122+W123+W125)	380,619
Total	80,237,326

Comparison with industry data

No real comparison with industry data can be made, since no industry data is available. Though, interviewed stakeholders indicated that the vast majority (>80%) of CDW is concrete and stony waste. In the provided dataset, the vast majority of all generated CDW is classified as 'construction and demolition waste'. Due to the fact that the datasheet does not have a specific classification for concrete or stony waste, it can be assumed that the 'construction and demolition waste' type includes the concrete and stony waste. Thus, to that extent, the stakeholders' thoughts on the composition of the waste is in line with the data.

Hazardous CDW

- Regarding asbestos:
 - In 2012, 237,257 tonnes of asbestos wastes were generated.
 - For asbestos, a specific Asbestos Management Plan exists. This plan describes how to handle asbestos. It points out how to treat asbestos containing waste and how to treat asbestos containing buildings and materials that are not (yet) waste.
 - In 2012, 500,000 tonnes of hazardous CDW were imported into The Netherlands. This gives an implication about the fact that the treatment facilities in The Netherlands are properly developed, since importing waste, and hazardous waste in particular, is prohibited if the waste would be landfilled.
 - Incidents amongst asbestos are taken very seriously. For instance, in 2012 asbestos was found in 3 apartment buildings in Utrecht, after which the whole area was evacuated.²³

- To the knowledge of this research, there are no indications of other specific problematic wastes.

²³ NRC (2012), Report on Asbestos incident Utrecht

5.2 CDW treatment data

The source of the data in the table below and the data provided in the accompanying excel file of both the waste generation and treatment of CDW is the data of Rijkswaterstaat, which is part of the Ministry of Infrastructure and Environment. This data was directly obtained from the waste helpdesk of Rijkswaterstaat.

CDW treatment (2012)	Recycling	Energy recovery	Other recovery	Incineration	Landfill	Disposal and unknwn	Other removal
Hazardous waste (Kt)	1,187	16.70	0.72	4.72	262	7.61	0.001
Non-hazardous waste (Kt)	23,062	927	2.54	11.70	215	8.26	
Grand Total (Kt)	24,249	944	3.27	16.42	477	15.87	0.001

- In 2012, according to these statistics, over 98% of the CDW is recovered (recycling, energy recovery and other recovery) of which 94% is recycled. Moreover, this has been over 90% since 2006.
- The amount of landfilled CDW is dropping: in was 11.69 Ktonnes in 2006, in 2012 only 477 Ktonnes was left. This corresponds to 2% of all the CDW.
- Energy recovery increases a bit, this is caused by the stimulation of energy production from renewable resources such as biomass.

Method and precision

- The same method is used as for the generation data, see previous section.

5.3 CDW exports/imports data

The data is provided by the helpdesk of Rijkswaterstaat, which is part of the Ministry of Infrastructure and environment.²⁴

Export

- In 2012, 710,405 tonnes of CDW were imported into The Netherlands.
- Around 70% of this was hazardous CDW.
- Moreover, 45% of the total was ground and stones that contain hazardous substances.
- Since 2006, the export of CDW has dropped drastically, in 2006 the CDW export was 705,952 tonnes.

Import

- In 2012, 232,113 tonnes of CDW were exported out of The Netherlands.
- Around 85% of this was non-hazardous CDW.
- Since 2006, the import of CDW has drastically risen by more than 300%, in 2006 the CDW import was 215,812 tonne.
- 70% of the CDW that was imported in 2012 was recycled.

5.4 CDW treatment facilities data

The general waste sector organisation, the CDW recycling sector organisation and the Rijkswaterstaat of the Ministry of Infrastructure and Environment all indicate that there is no aggregate data on the CDW treatment facilities in The Netherlands. These data are hence not gathered on a yearly basis. Some things that are available are:

- The basic three types of treatment facilities are: recycling facilities, incinerations and landfills.
- Recycling:
 - The CDW recycling sector organisation counts 65 members. These members are mainly recycle (breaking and sorting) companies that focus on CDW. Some of these companies also perform some other activities.

²⁴ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu (2015), 15_05_13 Production and treatment waste, sector construction

- As for debris breaking installations: there are a lot of these installations, almost every municipality has one.
- In 2012, around 400,000 to 1 million tonnes of the total of 20 million tonnes of recycled aggregates was used in recycled concrete.²⁵
- Landfills:
 - On 31 December 2013 there were 22 landfills in operation in The Netherlands²⁶. Their total rest capacity (not used) was 38 Mtonnes, their used capacity was 14.5 Mtonnes. In 2013, 0.3 Mtonnes CDW waste was landfilled.²⁷
 - The realization of new landfilling locations is currently not happening, since there is enough capacity on hand.²⁸

5.5 Future projections of CDW generation and treatment

- An expected increase in the generation of CDW is expected in the coming years. It was 24 Mtonnes in 2006 and expected to be 32 Mtonnes by 2021.²⁹

5.6 Methodology for CDW statistics

- The CDW generation data are collected on a yearly basis. All waste data is collected in an annual survey directed by the Ministry of Infrastructure and Environment. This survey is addressed to individual operators. It reflects the situation 31 December of the specific year.³⁰
- The questions are composed based on experiences from previous years. The results obtained have all been checked for completeness and consistency. For this, historical data as well as data from het Landelijke Meldpunt Afval (LMA; National Waste Notification Bureau) is used. In all surveys Eural codes are used in order to have better interconnection with other monitoring activities.
- There is no difference between the data collection of even and uneven years.³¹

²⁵ Petra Starink (2012), concrete aggregates on the rise

²⁶ Compendium voor leefomgeving (2015), Landfills, numbers and capacity 1991-2013

²⁷ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2013), Dutch waste in figures, data 2006-2010

²⁸ Ministry of Infrastructure and Environment (2014), National Waste Plan

²⁹ Ministry of Infrastructure and Environment (2014), National Waste Plan

³⁰ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2013), Dutch waste in figures, data 2006-2010

³¹ Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2014), waste treatment, data 2013

6 C&D waste management in practice

In this section the CDW management “on ground” in The Netherlands is explored. Specific CDW obligations, initiatives, voluntary agreements and any other management practice are mentioned if available currently in The Netherlands.

6.1 CDW management initiatives

The initiatives listed below were identified through stakeholders interviews and internet search.

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
ADR (Advance Dry Recovery)	The development of advanced innovative technologies for turning demolition concrete into clean aggregates and cement, started by the Delft University of Technology and 13 partners and is European-funded.	2011	National	Public sector and industry lead organisations ; Delft University of Technology	80% of the mixed waste can be recycled	http://www.scientias.nl/de-rest-van-het-restafval/
C2CA (Concrete To Concrete Aggregates)	The concept of the C2CA project is to take advantage of the ADR technology and add a number of key innovative technologies to make the recycled concrete products suitable as input for the cement and mortar industries.	2011	National	Industry lead and public organisation	Unknown	http://www.mvonderland.nl/system/files/media/concreet_web.pdf http://www.c2ca.eu/

Neptunus	Offers a demountable building concept. In this innovative proposition, houses are built for 10-20 years and take them completely apart afterwards. It works in a lease construction.	1937 (the company)	National	Industry lead organisation	Unknown	http://www.neptunus.eu/demontabel-bouwen
Sita	Waste processor Sita collects EPS from the construction industry. It is broken down into smaller pieces and mixed together with new Styrofoam, which makes it 100% recyclable without any loss of quality.	2010	National	Industry lead organisation	Unknown	http://www.waste-management-world.com/articles/print/volume-11/issue-1/features/dutch-successes.html
Bouwbewust CRH (Conscious building)	Bouwbewust offering of a return stream for CDW to constructors.	2014	National	Industry lead organisation	Unknown	http://www.crh-bouwmaterialen.nl/bouwbewust http://www.bouwtotaal-online.nl/artikel/actueel/79/-crh-bouwmaterialen-laet-klanten-plussen-met-bouwbewust--1372/1372/
C4C	Trying to move the market to absorb waste reversal into the contract.	Unknown	National	Industry lead organisation	100% high quality recycling of all submitted clean concrete rubble At least 75% replacement of gravel in new bricks and tiles	http://www.struykverwoinfra.nl/bedrijf-recycling-(C4C).html

Slim Breken (Smart Chrusher)	A new breaking technology to better separate concrete granulates into its three components (proposition by Koos Schenk)	2011	National	Industry lead organisation	Cement and cement hydrate that are not polluted and directly reusable. The cement cycle is 100% CO2 neutral	http://www.scc-oss.nl/
Buiksloterham, Amsterdam	A new neighborhood built with the use of CDW	2015	Local, Amsterdam	Public sector and Industry	Unknown	http://www.amsterdam.nl/wonen-leefomgeving/bouwprojecten/gebiedsontwikkeling/buiksloterham/buiksloterham-0/proeftuin-nieuwe/ http://www.parool.nl/parool/nl/4036/AMSTERDAM-NOORD/article/detail/3883031/2015/03/04/Buiksloterham-wordt-pionier-voor-recycling.dhtml
Greendeals	Different Greendeals, see non legislative instruments	NA	NA	NA	NA	NA
Werkspoorkwartier, Utrecht	A new neighbourhood built with the use of CDW	2012	Local, Utrecht	Public sector and Industry	Unknown	http://www.utrecht.nl/images/DSO/Economischezaken/economische_bedrijf/pdf/Ontwikkelingsvisie_Werkspoorkwartier_maart%202012.pdf

Circular demolition old hospitals Amersfoort	The circularly demolition of two old hospitals in Amersfoort	2014	Local, Amersfoort	Public Sector	Unknown	http://www.sloopgids.nl/algemeen-nieuws/amersfoort-sloop-ziekenhuizen-als-duurzame-praktijkcase/
Townhall of Arnhem	A circular economy project in which is aimed at preventing waste in the design phase	?	?	?	?	?
Project Adaptief Vermogen (project adaptive ability)	A report on how buildings can be made more flexible, allowing them to easily adapt to serve other future functions	2014	National	Public sector and industry	Unknown	http://www.adaptiefvermogen.nl/
Oranje BV. Sustainable demolition	Offer sustainable demolition, in which waste is reused in the construction chain	Unknown	National	Industry lead organisation	Less new raw materials used. Reaches CO2 reduction of 40%	http://www.oranje-bv.nl/activiteiten/duurzaam-amoveren

Strukton, cleaning and recycling of the foundation of rail tracks	When the track is replaced, a new foundation is needed at which much rubble is released, this rubble is processed and creates a large flow of pure materials for asphalt and concrete.	2013	National	Industry lead organisation	Less waste and less CO2 emission	http://www.spoorpro.nl/spoorbouw/2013/03/12/strukton-neemt-hergebruik-spoorballast-in-eigen-beheer/
Nihot	Nihot produces waste sorting machines that can separate waste particles with an extremely high degree of accuracy of between 95% and 98%.	Unknown	National	Industry lead organisation	Unknown	http://www.waste-management-world.com/articles/print/volume-11/issue-1/features/dutch-successes.html
Usage of recycled concrete	About the resistance against the usage of recycled concrete	Unknown	National	Industry lead organisation	Unknown	Unknown
Burning waste	About waste burning in The Netherlands	Unknown	National	Industry lead organisation	Unknown	Unknown

Within these initiatives, the following could be selected as interesting case studies:

- **ADR Technology:** the development of advanced innovative technologies for turning demolition concrete into clean aggregates and cement, started by the Delft University of Technology and 13 partners and is European-funded.
- **Neptunus:** offers a demountable building concept. In this innovative proposition, houses are built for 10-20 years and take them completely apart afterwards. It works in a lease construction.
- **Slim Breken (Smart Chrusher):** a new breaking technology to better separate concrete granulates into its three components (proposition by Koos Schenk).

6.2 Stakeholders' engagement

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

Description of initiative	Scope, year established, actors involved	Advantages/ Enabling factors	Disadvantages/ Obstacles	Further information/ web-site
Burning waste	About waste burning in The Netherlands	It is good that the government wants to halve waste burning in The Netherlands by 2020. Eventually it should be prohibited.		Source: interview BRBS
Greendeals	About the impact of Greendeals		Some greendeals are not SMART drafted, which means that sometimes real results lack. If you want to change, prohibitions and commandments brought by legislation are essential.	Source: interview BRBS
Using recycled concrete	About the resistance against the usage of recycled concrete		The Dutch government still has difficulties using recycled concrete, since there is currently not enough trust in quality of the recycled concrete. Quality assurance could thus also be a powerful (non legislative) instrument	Source: interview Afvalbank

6.3 Waste legislation enforcement

Waste hierarchy³²

The Netherlands uses the waste hierarchy that is prescribed by the WFD though incineration is added to the hierarchy:

- Prevention
- Re-use
- Recycling
- Recovery
- Energy recovery
- Incineration
- Landfilling

³² Recycling.nl (2015), Lansink's Ladder - The Waste Hierarchy

Responsibilities and sanctions

- Mainly the municipalities do the enforcement. There are plenty of examples where problems occurred, but generally the enforcement going fairly well in Netherlands.³³
- In many municipalities there is currently however a struggle because of shortage of people and hours.
- Moreover, the Environment and Transport Inspection has been commissioned by the ministry effective control over the management and processing of waste. The Inspectorate keeps track whether the recycling targets are met and whether producers take responsibility. The inspection examines how the waste collection goes and what ultimately happens to waste.³⁴
- Additionally, there are assessment guidelines and NEN-norms (Netherlands Norms). This is basically a market regulation (enforcement by the business itself), since it uses certification of the quality of waste streams.

Main courts' decisions

- Various court cases regarding waste can be found.
- Only 1 court case regarding CDW can be found: for the period from April 22, 2010 to September 1, 2010 it is likely the appellant has regularly removed construction and demolition waste without instructions from the company to the district and without payments to the city district. The punishment was unconditional resignation to the specific official.³⁵

Trans boundary movements of hazardous waste

- In the Netherlands, the Minister of Infrastructure and the Environment has the competent authority for the import and export of waste. The minister has this authority delegated to the Inspector General of the Inspection Environment and Transport, which in turn has given mandate to the Inspection Environment and Transport inspectors.³⁶
- Export of hazardous material to Africa is prohibited by European law. The Netherland complies.³⁷

6.4 Drivers / barriers to increase CDW recycling

The following Drivers and Barriers to increase CDW recycling were indicated by interviewed stakeholders.

Factor / characteristic / element in CDW recycling chain	Drivers	Barriers
<i>Market conditions</i>	<ul style="list-style-type: none"> -Builders are positive about buying secondary materials because the quality is good compared to the price. -If the quality of the materials would be assured by a quality label, then builders are willing to use the materials - Cost reduction is an important driver for good CDW management. E.g.: Constructors focus on the separation of waste at the source, in order to minimize logistics. Separation is cheaper than not separating - Client more and more ask for buildings with renewable labels 	<ul style="list-style-type: none"> -The supply of secondary materials is not yet big enough -There are no clear quality gradations for the recycled materials - The market still mainly focuses on standalone unit prices, such as the price of a container, instead of the total cost with regards to the process of waste recycling - The market still has much trouble with such innovative new ideas, such as a business model in which a building remains in possession of the builder (producer) instead of the user. - A solid business case for recycling materials has to exist in order to really grow to full potential

³³ Interview with Geert Cuperus, BRBS, 28-4-2015

³⁴ Inspectie Leefomgeving en Transport (2015), waste <http://www.ilent.nl/onderwerpen/leefomgeving/afval/>

³⁵ Rechtspraak.nl (2013), Unconditional punishment for improper pickup of bulky waste

³⁶ Inspectie Leefomgeving en Transport (2015), waste powers

³⁷ Theo Klein (1998), Export of chemical waste promotes illegal dumping

Factor / characteristic / element in CDW recycling chain	Drivers	Barriers
Legislation	<ul style="list-style-type: none"> -The introduction of tax on landfilling and burning waste is an enabler of more recycled CDW. -Most of the landfilling is banned, but if more options would be are banned, the market will recycle even more waste. -Prohibition of waste burning is a major driver for waste recycling 	<ul style="list-style-type: none"> -The law and regulations are often linear (not circular). E.g.: the use of display glass in concrete is allowed, only the concrete is not recyclable anymore, because the glass is heavily polluted. The final recyclability is not taken into account. - Burning of waste is still allowed, this should become prohibited, since it goes against recycling, and pulls waste.
Initiatives	<ul style="list-style-type: none"> - The BREEAM certificate works well as a driver to make buyers and constructors of buildings want to spend more money in order to make a building more sustainable 	<ul style="list-style-type: none"> -There is much knowledge developed, but the actual commitment to each other how to handle CDW takes commitments from the clients and contractors. -Projects are currently all still very much in its infancy.
Prevention of waste	<ul style="list-style-type: none"> - Adaptive building is a major driver for prevention of waste. 	<ul style="list-style-type: none"> -If materials are recycled, it still costs CO2. It is better to reuse building components -About preventing CDW: a lot can be controlled already in the contracts and tenders, in order to prevent waste / setting requirements for what materials and which design methods may be used.
Bureaucracy		<ul style="list-style-type: none"> -The government is not one party (RWS, municipalities, provinces). In many municipalities there is currently a struggle because of shortage of people and hours, and knowledge. -Local authorities and municipalities don't have much knowledge. The knowledge should she be better provided by the national government -The load for the project-level to provide feedback on how was performed with regard to sustainability
Culture		<ul style="list-style-type: none"> -According to interviewed stakeholders, the traditional nature of the construction sector holds back the full potential of recycling CDW. People do not think about making the waste recycling processes better.

7 CDW sector characterisation

In this section some specific characteristics of the CDW management sector in The Netherlands are explored. Issues covered in this section concern the CDW sector characteristics including market conditions, enabling factors, import and exports of CDW and the characteristics of recycled CDW products.

7.1 Sector characteristics

Building and Public Works sectors waste related characteristics

- CDW collected on building and public works is similar, though it is indicated that at public works more concrete waste is gathered.
- CDW from individual building works is normally less well separated. CDW from the larger sites is normally already to a certain extent separated at the source.
- No information was found on the difference in building works and public works sectors with regards to the quantity of CDW, but it can be assumed that the public works sector is bigger.

CDW collection and transport schemes

The main two types of sorting/transit/recovery facilities are:

- Public waste collection sites that accept small quantities of CDW from individuals. It depends per municipality whether this services are free or paid. Mainly it depends on the quantities and the nature of the waste.
- Private waste collection sites that are mainly used by construction companies rather than individuals. CDW might be taken there but they might also be collected directly on site by the collection site's trucks.
- As an indication, the cost of the rental of a 9M2 CDW container (including transport and treatment of the waste) is €329.³⁸

The majority of CDW is collected by private waste collectors.

CDW treatment schemes

More than 95% of the CDW is recycled, and it mainly contains concrete aggregates.

- The waste therefor mainly gets sorted in sorting facilities. The majority of the companies focus on breaking and sorting.
- Incineration occurs but on a rather low level, since not much CDW waste is fit for incineration.
- The landfilling of CDW is rarely done (see data in section 5).
- In CDW there is normally few hazardous waste.
- In case of for instance tar containing waste: it depends on the permit of the specific treatment company whether they can treat this waste.

Different actors in the sector are represented by several sectorial organisations, the main ones being:

- Association waste companies (VA)
- Branch organisation breaking and sorting (BRBS)
- Building The Netherlands (Bouwend Nederland)
- Demolition contractors (Sloop aannemers)
- Cement and concrete
- Branch organisation for dealers, producers and importers of construction materials (Hibin)
- Association of retailers in the do-it-yourself industry (VWDHZ)
- Organization for construction inspection Agencies (BBI)
- Association for developers and builders (NVB)

As an indication of the number of companies in the CDW sector, BRBS counts 65 members. These members are mainly recycle (breaking and sorting) companies that focus on CDW. Some of these companies also perform some other activities.

The roles of the CDW management actors are mainly governed by market forces.

Conditions for setting up CDW services

- Every CDW collection, storage, logistics, treatment and/or recycling companies needs permits provided by the government
- Moreover, market forces are strong, a business case for the facility is always needed.
- The government does support sustainable solutions, such as the realization of mono streams, by the introduction of different instrument, such as the greendeals.
- Also, the government itself is a major sponsor of the sustainable value chain, by demanding this in their public procurement tenders. The government is by far the largest customer of construction projects.
- NIMBY effects and exportation are restricted by the strict export policy (see section 3.2 for details)
- No arguable reasons for significant obstacles for development of recycling plants exist.

CDW recycling capacity vs. waste generation

³⁸ Van Gansewinkel (2015), product overview

- The vast majority of the Dutch waste treatment facilities do not solely focus on one specific waste stream such as CDW, they normally treat all kinds of waste, including CDW. This makes it hard to isolate Dutch CDW treatment capacity. Hence, According to the done research and interviews, there are no available data on the CDW recycling capacities.

Future developments and innovative potential in CDW sector

- The government has full focus on the stimulation and implementation of circular economy concepts throughout the whole waste management sector. Again, among other initiatives, the various Greendeals set up by the government (in collaboration with the industry) are the best example of this.
Also the new VANG policy document (i.e. From Waste to Raw Material, the national waste prevention plan) is part of this.
- Moreover, the change of the construction business model in which the ownership of buildings, or even ownership of materials stays at the producer is getting more popular. This also contributes to the circular economy mindset. A good example of a company that focuses on this concept is Turn Too (www.turntoo.com).

CDW employment figures & number of companies

- According to the done research and interviews, there are no available data on both the data of employment and the number of companies in the Dutch CDW sector.

7.2 Exports / imports of CDW

Export

- In 2012, 710,405 tonnes of CDW were imported into The Netherlands
- Around 70% of this was hazardous CDW
- Moreover, 45% of the total was ground and stones that contain hazardous substances.
- Since 2006, the export of CDW has dropped drastically, in 2006 the CDW export was 705,952 tonnes.

Import

- In 2012, 232,113 tonnes of CDW were exported out of The Netherlands
- Around 85% of this was non-hazardous CDW
- Since 2006, the import of CDW has drastically risen by more than 300%, in 2006 the CDW import was 215,812 tonne.
- 70% of the CDW that was imported in 2012 was recycled

It is not entirely clear whether exports are compensating lack of recycling/treatment facilities. What is indicated is that, as a result of the structural growth in recycling, the volume that remains for final processing declines. Therefore the recycling overcapacity is also expected to increase. Players in the (final) processing try to fill this gap with waste import³⁹. This statement implies that exports are not overcompensating the lack of recycling/treatment facilities.

7.3 CDW landfilling and CDW as landfill cover

- In the Netherlands waste only landfilled if there is no other way of processing is available. It is waste that cannot be recovered or burnt in an incinerator. This landfilling occurs scattered around twenty landfills across the Netherlands.⁴⁰
- CDW may be used in useful work, such as buildings, roads and bridges. Is the work not 'useful', then this act is getting rid of the waste. It is not the intention to invent applications in order to get rid of CDW.
- CDW is widely used as material for road construction.⁴¹
- In 2013, 152kton of CDW was landfilled in The Netherlands.⁴²

³⁹ Rabobank (nd.), the waste sector

⁴⁰ Rijkswaterstaat Leefomgeving (2015), waste figures

⁴¹ Rijkswaterstaat Leefomgeving (2015), Soil quality decree

⁴² Rijkswaterstaat, Ministerie van Infrastructuur en Milieu, (2014), waste treatment, data 2013

- According to the done research and interviews, there are no available data on whether CDW is used as landfill cover in The Netherlands.

7.4 Market conditions / costs and benefits

Tax

- The landfill tax was abolished on January 1, 2012 as part of simplifying the tax system.⁴³ At the end 2014, a new Tax Plan 2015 was introduced which assumed a tax of € 13 per tonne for landfill and incineration of waste in the Netherlands starting from 2015.
- Currently, unmixed foreign waste is exempted from taxation. Neither tax is levied on the export of waste.
- If it appears that a due to these new taxes waste will be widely exported, it will be considered to no longer charge a rate for landfill and incineration of waste.⁴⁴

Scarcity & tensions

- According to the done research and interviews, there is no available information on issues relating to resource scarcity in terms of construction products/material.
- As a hard directive, LAP-2 indicates that there should be at least 6 years of landfill capacity available. This criteria is largely met.

CDW Recovery/recycling and storage costs

Those costs vary widely depending on the type of waste and the facilities. Therefore it is hard to estimate those costs and there are numerous sources. An estimation is given below:

- Recovery/recycling⁴⁵
 - Homogeneous incombustible waste: till €30 per tonne.
 - Contaminated soil and debris flows including hazardous waste assessed soil and rubble: till €30 per tonne.
 - Hazardous industrial waste: till €30 per tonne.
 - Separately presented asbestos of selective demolition and dismantling and asbestos-contaminated waste in bags (excluding land and debris flows and asbestos offered by individuals): till €55 per tonne.
- Storage & logistics⁴⁶
 - As an indication, the cost of the rental of a 9M2 CDW container (including transport and treatment of the waste) is €329.

7.5 Recycled materials from CDW

The main CDW product is recycled aggregates, which is mainly used for road building. Since February 2015, recycled aggregates have an EoW status. The criteria of the EoW status for aggregates are determined in the following source:

<https://brbs.webdog.nl/files/Regeling%20einde-afval%20recyclinggranulaat.pdf>

These criteria describe details about:

- Requirements of the stony waste to be recycled into aggregates
- Production control
- Product quality
- Declaration of Conformity
- Quality assurance

The requirements of the stony waste contains:

- Quality
 - No hazardous waste

⁴³ Ministry of Infrastructure and Environment (2014), National Waste Plan

⁴⁴ ICOVA (2015), Levy on landfill and incineration of waste in 2015

⁴⁵ Afvalzorg.nl (2014), rates

⁴⁶ Van Gansewinkel (2015), product overview

- No asbestos, tar, residential waste, gypsum, ground, carbon black and timber
- Registration
 - Date of receipt, quantity, name and address of the supplier, and whether the offered stony waste is accepted or rejected
- A check on the presence of tar and polycyclic aromatic hydrocarbons
- A visual observation for asbestos

Other recycled materials:

- Styrofoam⁴⁷
 - Waste processor Sita collects EPS from the construction industry. It is broken down into smaller pieces and mixed together with new Styrofoam, which makes it 100% recyclable without any loss of quality.

Regarding public procurement, as of now there are two important barriers to an increased use of recycled materials from CDW:

- The quality of the recycled product has to be assured by regulations. Possible buyers/users of the products need this assurance in order to be confident to use the products.
- If the quality is assured, possible customer need to gain trust in the market. Also continuous demand is to this regard important.

Some R&D programs

- **ADR (Advance Dry Recovery):** The development of advanced innovative technologies for turning demolition concrete into clean aggregates and cement, started by the Delft University of Technology and 13 partners and is European-funded.
- **Slim Breken (Smart Crusher):** A new breaking technology to better separate concrete granulates into its three components (proposition by Koos Schenk) Co schenk concrete consultancy.

Role of construction materials producers and operators' insurers

- Construction materials producers are benevolent to sell recycled materials, because they recognize the large future market. Moreover, CDW is often cheaper than new materials.
- Talking with interviewed stakeholders and doing internet research, no specific reluctance from insurance companies with regards to the use of CDW as construction materials is mentioned or found.

EPDs for construction products

- Some products have certificates for their recycling quality, such as concrete. Though, interviewed stakeholder point out that the development of EPDs is still in its infancy. Even with the concrete certificate, it is pointed out that quality gradations in order to rank the concrete on its quality would be needed in order to inform buyers and end customers about the quality.
- In general, there are currently not much EPDs for construction products, this is seen as a barrier for recycling materials and for circular economy. EPDs offer a possibility to show sustainability performance of recycled materials versus virgin materials.

Access to recycled construction materials

- In the Netherlands, there is very little development regarding Green Public Procurement. In the Dutch GPP, the use of recycled materials is not included. This is one of the key opportunities.
- Eventually, also for the government, price is conclusive.⁴⁸
- Moreover, interviewed stakeholders indicate that they materials users are benevolent to buy recycled CDW, but the supply of it is still not stable and not enough.

7.6 Construction sector make up

⁴⁷ Waste Management World (2015), Dutch successes

⁴⁸ Joop Bouma (2015), Government choses savings instead of sustainable

The table below describes the turnover of the construction sector from 2005 till 2012.⁴⁹

Turnover construction sector	2005	2006	2007	2008	2009	2010	2011	2012
<i>in Millions of Euros, excl. tax</i>								
Houses								
· New construction	12,699	13,664	14,334	14,262	12,465	10,246	11,107	9,696
· Major maintenance	6,583	6,912	7,479	7,606	6,842	6,035	6,421	5,882
· Small maintenance	5,233	5,207	5,348	5,444	5,520	5,476	5,492	5,239
Buildings								
· New construction	7,652	7,782	9,043	9,848	9,178	7,324	7,551	7,121
· Major maintenance	4,165	4,227	4,709	5,067	4,672	4,242	4,573	4,326
· Small maintenance	3,607	3,740	3,919	4,041	4,094	4,180	4,121	3,890
Civil engineering and road construction								
· New construction and major maintenance	7,920	8,340	8,340	8,949	8,868	8,460	9,145	8,541
· Small maintenance	5,700	5,894	6,118	6,210	6,403	6,166	5,993	5,735
· External subcontracting	2,572	2,659	2,835	2,929	2,686	2,377	2,413	2,160
· Total production	56,131	58,425	62,125	64,446	60,728	54,506	56,816	52,590

The table below shows the number of construction companies in The Netherlands, per different type of construction company.⁵⁰

Number of construction companies	2010	2011	2012	2013	2014
Project development	3,765	3,820	3,940	3,860	3,780
General civil construction	47,950	48,725	51,370	51,600	52,435
Construction of road, railways and tunnels	5,055	5,220	5,405	5,290	5,315
Pipe and cable laying	955	985	1,075	1,245	1,380
Other civil engineering construction	180	220	225	245	260
Demolition and earthworks	4,200	4,340	4,575	4,740	4,875
Construction plumbers	16,120	16,410	17,040	17,180	17,515
Afwerkingsbedrijven (bouw)	41,925	41,500	41,945	41,185	40,965
Other specialised construction	14,060	13,930	14,290	14,095	14,050
Total	134,210	135,150	139,860	139,445	140,575

General data on the construction sector

- Average salaries in construction were €63,000 in 2013 and €61,000 in 2012⁵¹
- The profit margin before tax in 2013 was 1.1%, it was 1.4% in 2012⁵²

⁴⁹ Bouwend Nederland (2015), facts and figures

⁵⁰ Bouwend Nederland (2015), facts and figures

⁵¹ Bouwend Nederland (2015), facts and figures

- The Netherlands has approximately 140,000 companies in the construction industry. The majority of these (135,000) are among small businesses (up to 10 employees). Until the mid-enterprise (10 to 100 employees) more than 5,000 companies and 320 companies are large companies (over 100 employees).⁵³
- In 2013 there are expected to be approximately 40,000 new homes completed. This is a decrease of 17% compared to 2012. The new construction dropped even further in 2014 to around 35,000 homes.⁵⁴
- The number of permits issued was 13,608 million in Q4 2014. In Q4 2013 this was 8,219 million.⁵⁵

Construction products and materials market data

In The Netherlands, around 14-15 million M³ concrete is produced annually (the year is not mentioned). An overview of the division in producers and applications of the concrete market is visible in the table below.⁵⁶

Product Supplier	Total Liters (x1000 liter)	liters/ sector (x1000 liter)	sector
Mortar concrete	550	205 175 60 65 45	Housing Utility Construction Agricultural Construction Raw Water and Road Construction Other
Concrete products	350	130 150 40 40	Elements for residential and commercial construction Pavers, tiles and bricks Piles Sewers and Other Applications
Dealers in building material	50	50	For building contractors and do-it-yourselfers
Contractors	25	25	For civil engineering contractors, including concrete roads, bus lanes road foundations
Dry mortar industry	25	25	Masonry and flooring species

Trends and forecasts

- The housing market is currently stabilizing. Currently, there is a tipping point that more houses are sold than offered.⁵⁷
- Renovation construction is still bigger than construction of new buildings. Though, in 2015 an increase in new building construction of 8% is expected.
- A big boost to construction building is given by the sustainability trends, since customers want their building(s) to be more sustainable.
- Still, 30% of the office buildings is empty
- The roads construction production has dropped with 3% in 2013, this was mainly caused by government cuts. In 2013, also in 2014 a small drop was forecasted, while in 2015 a growth of 1-2% was forecasted.⁵⁸

⁵² Bouwend Nederland (2015), facts and figures

⁵³ Rabobank (nd.), the waste sector

⁵⁴ Rabobank (nd.), the waste sector

⁵⁵ Rabobank (nd.), the waste sector

⁵⁶ Cement en beton (2015), concrete market <http://www.cementenbeton.nl/marktinformatie/betonmarkt>

⁵⁷ RTLZ (2015), More houses sold than offered

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All contacted stakeholders did participate. No other stakeholders were consulted.

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Annex

Annex1 - The table below shows an indicative list with Eural codes coupled to Dutch waste categories.

TABEL 3; INDICATIEVE lijst met Euralcodes per categorie		
categorie	ga/nga [14]	Euralcodes (indicatief)
1	ga	160104*
2	nga	160106
3	nga	160116
4	nga	170405
5A	ga	160504*
5B	nga	160505
6	ga	170410*
7	nga	170411
8	nga	020103; 020107; 200201
9	nga	200108
10	nga	200303
11	nga	200306
12	nga	020204; 020305; 020403; 020502; 020603; 020705
13	nga	190901; 190902; 190903; 190905; 190906; 190999
14	nga	030105; 030301; 150103; 170201; 191207; 200138
15	ga	170204*; 191206*; 200137*
16	nga	020104; 070213; 120105; 150102; 160119; 170203; 200139
17	nga	020110; 100210; 120101; 120102; 120103; 120104; 120113; 150104; 160117; 160118; 170401; 170402; 170403; 170404; 170405; 170406; 170407; 190102; 191001; 191002; 191202; 191203; 200140
18	nga	150101; 200101
19	nga	090107; 090108
20	nga	150109; 200110; 200111
21	nga	020307
22	nga	070213; 170203
23	nga	020199
24	ga	080111*; 080121*; 150110*; 150111*; 200127*
25	nga	200102
26	nga	170202; 191205; 200102
27	nga	020102; 020201; 020202; 020203; 020299
28	ga	180103*; 180106*; 180108*; 180202*; 180205*; 180207*; 200131*
29A	ga	170107; 170302
29B	nga	170301*; 170303*
30	ga	191211*
31	nga	191209
32	ga	170301*; 170303*
33	nga	170302
34A	ga	170301*; 170303*
34B	nga	170302
35A	ga	170301*; 170303*; 170903*
35B	nga	170302; 170904
36A	ga	170303*
36B	nga	170302
37A	ga	170801*
37B	nga	170802
38	ga	170106*; 170507*
39	nga	101314; 170101; 170102; 170103; 170107; 170508; 191209
40A	ga	170204*; 170603*; 170901*; 170902*; 170903*; 191211*
40B	nga	170604; 170904; 191212
41	nga	
42	ga	160107*; 150202*
43	ga	090101*; 090102*; 090103*; 090104*; 200117*
44	ga	090101*; 090102*; 090103*; 090105*; 200117*
45	ga	090101*; 090102*; 090103*; 090104*; 090105*; 200117*

TABEL 3; INDICATIEVE lijst met Euralcodes per categorie		
categorie	ga/nga [14]	Euralcodes (indicatief)
46	ga	060311*; 060313*; 110301*
47	ga	120107*; 120110*; 130110*; 130111*; 130112*; 130113*; 130205*; 130206*; 130207*; 130208*; 130307*; 130308*; 130309*; 130310*
48	ga	120106*; 120110*; 130109*; 130111*; 130113*; 130204*; 130206*; 130208*; 130306*; 130308*
49	ga	070104*; 070204*; 070304*; 070404*; 070504*; 070604*; 070704*; 140603*; 160114*; 200113*
50	ga	050102*; 050103*; 120118*; 130501*; 130502*; 130503*; 130506*; 130507*; 130508*; 130801*; 160708*; 190810*
51	ga	050105*; 120119*; 130701*; 130702*; 130703*; 190207*; 200126*
52	ga	010505*
53	ga	120106*; 120107*; 120108*; 120109*; 120118*; 120119*
54A	ga	190111*
54B	nga	190112
55	ga	060403*
56	ga	190107*; 190113*; 190115*
57	nga	190114; 190116
58	ga	100104*; 100113*; 100114*; 100116*; 100118*
59	nga	100101; 100102; 100103; 100105; 100107; 100115; 100117; 100119; 100124
60	ga	110105*
61A	ga	110106*; 110107*; 110111*
61B	nga	110112
62A	ga	070101*; 070201*; 070301*; 070401*; 070501*; 070601*; 070701*; 080115*; 080119*; 080414*; 080416*; 090113*; 100122*; 110111*; 110115*; 120301*; 160709*; 161001*; 161003*; 190106*; 191103*; 191307*
62B	nga	080116; 080120; 080202; 080203; 080307; 080308; 080413; 080415; 100123; 110112; 161002; 161004; 190404; 191308
63	ga	080115*; 080119*; 100122*; 110106*; 110111*; 110113*; 110115*; 161001*; 161003*; 190106*
64	ga	080116; 080120; 080202; 080203; 100123; 110112; 110114; 110198; 161002; 161004
65	ga	010304*; 060102*; 060103*; 060104*; 060105*; 060106*; 060201*; 060203*; 060204*; 060205*; 060313*; 060403*; 060405*; 060704*; 110105*; 110106*; 110107*; 110111*; 110113*; 160805*; 200114*; 200115*
66	ga	190205*
67A	ga	160211*; 160213*; 160215*; 200123*; 200135*
67B	nga	160214; 160216; 200136
68A	ga	120116*
68B	nga	120117
69	ga	160601*; 200133*
70A	ga	090111*; 160602*; 160603*; 200133*
70B	nga	160604; 160605; 200134
71	ga	200121*
72	ga	160108*; 160603*; 200121*
73	ga	050701*; 060404*; 060703*; 101401*; 170901*; 180110*
74	ga	060701*; 160111*; 160212*; 170601*; 170605*
75	ga	170106*; 170503*; 170505*; 170601*; 170605*
76	ga	191003*; 191005*
77	ga	130101*; 130301*
78	ga	160209*; 160210*
79	ga	170409*
80	ga	170503*
81	nga	170504
82	ga	060101*; 100109*

TABEL 3; INDICATIEVE lijst met Euralcodes per categorie		
categorie	ga/nga [14]	Euralcodes (indicatief)
83A	ga	050107*; 050601*; 191102*; 060602*
83B	nga	050116; 050702; 060603
84A	ga	
84B	nga	
85A	ga	
85B	nga	
86		
87		
88		

noot bij tabel 3

[14] ga betreft gevaarlijk afval, nga betreft niet-gevaarlijk afval

Annex2 - This table describes the waste types included in Dutch CDW generation data. This particular example refers to the data of 2012.

Please note that the category "Construction and demolition wastes below" corresponds to Eurocodes 101208, 101299, 101314, 101399, 1710, 170204, 1703, 170603, 170604, 1708, 1709 (without 170902)

Row Labels	Sum of (tonnes)
Acid, alkaline or saline wastes	35
Animal and mixed food waste	1894
Asbestos wastes	237257
Cesspit contents	18601
Chemical deposits and residues	9732
Combustion wastes	22680
Construction and demolition wastes	21711519
Discarded electrical and electronic equipment	258
Discarded machines and equipment components	4185
Glass wastes	48543
Household and similar wastes	30049
Industrial effluent sludges	4934
Metal wastes, ferrous	701882
Metal wastes, mixed ferrous and non-ferrous	74725
Metal wastes, non-ferrous	163898
Mixed and undifferentiated materials	10770
Mixed chemical wastes	183
Off-specification chemical wastes	1373
Paper and cardboard wastes	5667
Plastic wastes	34091
Rubber wastes	3
Sludges and liqued wastes from waste treatment	1230
Soils	240503
Sorting residues	200918
Spent chemical catalysts	8
Spent solvents	159
Textile wastes	295

Unused explosives	48
Used oils	1612
Various mineral wastes	70554
Vegetal wastes	425539
Waste containing PCB	1
Waste from waste treatment	360137
Waste of naturally occurring minerals	3981
Waste water treatment sludges	30
Wood wastes	1318371
Grand Total	25705669

Annex 3 - The table below shows a full overview of the comparison of the CDW generation data of 2012 provided by the Dutch ministry and the Eurostat data.

Please note that the category "Construction and demolition wastes below" corresponds to Eurocodes 101208, 101299, 101314, 101399, 1710, 170204, 1703, 170603, 170604, 1708, 1709 (without 170902)

	Dutch provided data	Eurostat data
Acid, alkaline or saline wastes	35	NA
Animal and mixed food waste	1.894	NA
Asbestos wastes	237.257	NA
Cesspit contents	18.601	NA
Chemical deposits and residues	9.732	NA
Combustion wastes	22.680	NA
Construction and demolition wastes	21.711.519	21.855.155
Discarded electrical and electronic equipment	258	NA
Discarded machines and equipment components	4.185	NA
Glass wastes	48.543	48.543
Household and similar wastes	30.049	NA
Industrial effluent sludges	4.934	NA
Metal wastes, ferrous	701.882	701.882
Metal wastes, mixed ferrous and non-ferrous	74.725	74.758
Metal wastes, non-ferrous	163.898	163.898
Mixed and undifferentiated materials	10.770	11.870
Mixed chemical wastes	183	NA

Off-specification chemical wastes	1.373	NA
Paper and cardboard wastes	5.667	NA
Plastic wastes	34.091	34.091
Rubber wastes	3	NA
Sludges and liqued wastes from waste treatment	1.230	NA
Soils	240.503	6.494.428
Sorting residues	200.918	NA
Spent chemical catalysts	8	NA
Spent solvents	159	NA
Textile wastes	295	NA
Unused explosives	48	NA
Used oils	1.612	NA
Various mineral wastes	70.554	NA
Vegetal wastes	425.539	NA
Waste containing PCB	1	76
Waste from waste treatment	360.137	NA
Waste of naturally occurring minerals	3.981	NA
Waste water treatment sludges	30	NA
Wood wastes	1.318.371	1.321.587
dredging spoils	NA	49.150.419
Other mineral wastes (W122+W123+W125)	NA	380.619
Grand Total	25.705.669	80.237.326

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