



European Construction Sector Observatory

Policy fact sheet

Germany

Circular Construction Initiative
(Kreislaufwirtschaft BAU)

Thematic objectives 2, 3 & 4

December 2020



In a nutshell

Implementing body	Independent network of seven leading German sector-specific associations ¹
Key features & objectives	Biennial monitoring report commissioned by the Federal Ministry for Environmental Protection (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU) and the Federal Ministry of the Interior, Building and Home Affairs (Bundesministerium des Innern, für Bau und Heimat – BMI). The reports assess the current status and progress achieved by the German Construction Sector as it transitions to a Circular Economy ² .
Implementation date	1995 – ongoing ³
Targeted beneficiaries	Construction, Demolition and Building Material Sector
Targeted sub-sectors	All sub-sectors.
Budget (EUR)	Not Published ⁴
Good practice	★★★★☆
Transferability	★★★★★

Over the last two decades, the Circular Construction (CC) initiative (Kreislaufwirtschaft BAU) has been tasked with providing reliable and easy to use information and data on circular construction progress and results. Its main focus is on the reuse of usable Building Material Waste (BMW) and Mineral Construction Waste (MCW).

Commissioned by the Federal Government, an independent network of industry associations collaborates to produce circular construction

assessment reports to inform government policy-making and guide the Construction, Demolition and Building Material (CDB) Sector in its transition to a circular economy.

The Circular Construction (CC) initiative began as a voluntary commitment to the Federal Government to reduce the amount of usable BMW/MCW waste sent to landfill.

In the first implementation phase (1995-2005), the sector committed to halve the amount of usable BMW/MCW waste sent to landfill. Within two years, this voluntary commitment achieved what it was set to accomplish, following the promotion and adoption of various circular measures and activities.

When the voluntary commitment came to an end in 2005, the scope of the Circular Construction initiative was reduced to focus on monitoring activities.

The CC initiative publishes a monitoring report every two years. The reports are informed by information and data gathered by the Federal Office for Statistics, Destatis, as well as the framework developed to categorise BMW/MCW waste. Each report presents the main findings and results achieved by the sector on waste reuse.

To date, the CC initiative has produced 11 monitoring reports for the Federal Government. According to the data presented in the most recent monitoring report, 94.95% of BMW/MCW waste (excluding soil and stone) was reused in 2016.

A new report is expected to be published in the spring of 2021. It will analyse the results achieved by the German CDB Sector up to 2018.

The reports translate technical data into actionable information to support policy dialogue and learning.

All reports are available on the Circular Construction (Kreislaufwirtschaft BAU) website.

1.

General description

The Circular Construction (CC) initiative is an independent construction sector monitoring tool that assesses the results achieved by the German Construction Sector in terms of Construction and Demolition Waste (CDW) disposal and re-use⁵.

The main source of data for the reports is Destatis, the Federal Statistics Office. The main inputs are data on the circular use of CDW, as well as the classification of hazardous and non-hazardous waste included in the Waste Catalogue Ordinance (WCO) – Abfallverzeichnis-Verordnung, AVV⁶.

Using those data sources, the CC initiative conducts periodic assessments of the current status of the sector and the progress of its transition to a circular economy that ensures greater conservation of natural resources and better use of available (primary and secondary) minerals and materials⁷.

The CC initiative re-classifies specific types of Mineral Construction Waste (MCW) into five distinctive categories to show the materials identified in practice as waste for disposal and reuse by the Construction Sector.

There are a wide range of technical definitions and designations for different kinds of mineral, material, construction and demolition waste included in the WCO. There are also specific codes⁸ determined for both the identification and statistical analysis of each type of waste generated by the Construction, Demolition and Building Material Sector. However, many of those segregated parameters established in law have never been easy to apply in practice⁹.

To address this issue, the Circular Construction (CC) initiative proposes a **framework**, as shown in Table 1, to make it easier for government and the construction sector to **analyse and calculate MCW**

according to the type of waste identified and generated in the practice.

Table 1: Assessment framework – monitoring categories

Rubble	
17 01 01	Concrete.
17 01 02	Bricks.
17 01 03	Tiles, bricks and ceramics.
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06.
Road rubble	
17 03 02	Bitumen (asphalt) mixtures other than those mentioned in 17 03 01.
Soil and stones	
17 05 04	Soil and stones other than those mentioned in 17 05 03.
17 05 06	Dredged material other than those mentioned in 17 05 05.
17 05 08	Track ballast other than those mentioned in 17 05 07.
Gypsum-based construction waste	
17 08 02	Gypsum-based construction waste other than specified in 17 08 01.
Construction waste	
17 02 01	Wood.
17 02 02	Glass.
17 02 03	Plastic.
17 04	Metals (including alloys) other than those contaminated by dangerous substances (17 04 09) and other than cables containing oil, coal tar or other dangerous substances (17 04 10).
17 06 04	Insulation material other than those described in 17 06 01 and 17 06 03.
17 09 04	Mixed construction and demolition waste with the exception of those mentioned in 17 09 01, 17 09 02 and 17 09 03.

Source: Kreislaufwirtschaft Bau (2019a)¹⁰

The CC initiative has provided a Monitoring Report to the Federal Government every two years since 1996. All reports are published on the CC website.

As part of its commitment to assess the achievements made by the Construction, Demolition and Building Material (CDB) Sector in relation to the reduction of Mineral Construction Waste (MDW), the Circular Construction Monitoring Report assesses the five distinctive categories defined in the monitoring framework. The report also includes recommendations on how policies/regulations and practices can help to generate better outcomes within the sector¹¹.

The CC initiative began as a voluntary commitment to the Federal Government to reduce the amount of usable construction waste sent to landfill by promoting the adoption of better recycling and recovery practices.

The CC initiative is composed of nine foundational partners, as shown in figure 1. They are leading representatives of the German construction, demolition and building material sector and value chain. Together, they made a voluntary commitment to achieve a 50% reduction in the total amount of usable construction waste sent to landfill. The commitment was for a period of 10 years (1996-2005). The reduction was agreed in relation to waste volumes produced between 1996 and 2005, compared to the amount produced in 1995¹².

Figure 1: Foundation partners



Source: Kreislaufwirtschaft Bau¹³

To achieve that commitment, the CC initiative used a diverse range of measures to develop better recovery and recycling practices¹⁴:

- **Advice and Information** (*Beratung und Information*) on best practices for construction and dismantling, waste avoidance, waste separation and waste recycling;
- **R&D promotion** (*Förderung von Forschung und Entwicklung von Maßnahmen*) to support the development of innovative products and services;
- **Development and delivery of training** (*Entwicklung und Angebot von Ausbildungs- und Fortbildungsmaßnahmen*) on industry-specific topics, policies and measures;
- **Cooperation and coordination with central associations** (*Abstimmung und Zusammenarbeit mit den entsorgungspflichtigen Körperschaften und kommunalen Spitzenverbänden*) to reduce waste disposal;
- **Monitoring** (*Sammel- und Verwertungsstelle für Daten; Sammel- und Verteilungsstelle für Informationen*) including data collection, analysis and distribution.

Originally designed to help policymakers to design and implement circular policies and regulations (1995-2005), the remit of the CC initiative was adapted to focus solely on monitoring activities.

Following the expiration of the voluntary commitment in 2005, some of the foundational partners decided not to continue with the initiative¹⁵. New partners were subsequently brought on board to develop biennial monitoring reports on construction sector waste disposal and reuse.

For over 20 years, the CC initiative has consistently provided the Federal Government and the CDB sector with access to reliable and easy to use information and data on MCW disposal, recycling and reuse in the construction sector.

2.

Achieved or expected results

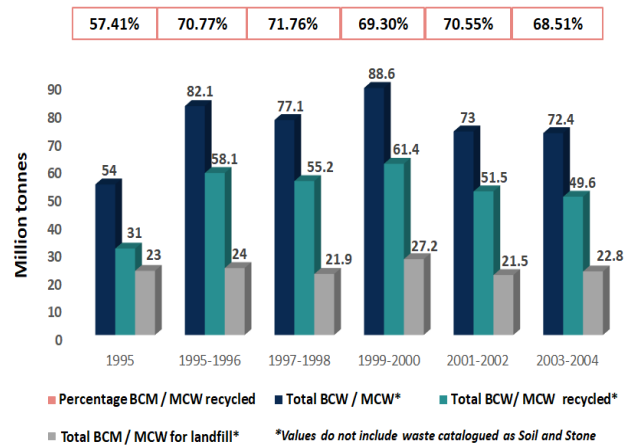
Within its first two years of implementation (1995-1996), the **Circular Construction (CC) initiative** succeeded in fulfilling its voluntary commitment to the Federal Government (*Bundesregierung*) and the Ministry for Environmental Protection "*Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU*" to reduce the amount of usable Building Material and Mineral Construction Waste (BMW/ MDW) sent to landfill by the German Construction, Demolition and Building Material (CDB) Sector¹⁶.

Circular construction measures implemented between 1995 and 2005 helped the CDB Sector increase the recycling rate of usable BMW/MCW waste to nearly 70%. They also achieved a 13% reduction in the total amount of usable BMW/MCW waste sent to landfill, compared to the amount reported in 1995.

Key measures¹⁷ promoted by the CC initiative during that period included **selective dismantling** (*selektiven Rückbau*) and **better onsite recycling practices** (*Erfassung und Getrennthaltung auf der Baustelle*). Those measures helped improve the overall recycling rates of usable BMW/ MCW waste, such as building debris, street break-up debris, and mixed building rubbish (*Baureststoffen - Bauschutt, Straßenaufbruch und Baumischabfällen*). They also contribute to reducing the overall amount of usable minerals and materials sent to landfill by the CBD sector.

Figure 2 shows the results achieved between 1995 and 2004. Between 1995 and 1998, for example, the CC initiative achieved its highest increase in the recycling rate. It rose from 57.41% to 71.76%, an improvement of 78.06%. The total average recycling rate for usable BMW/ MCW waste during the first phase of the CC initiative was approximately 70.14%.

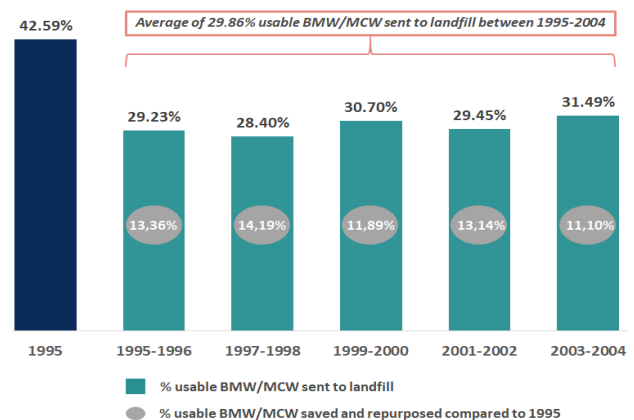
Figure 2: BMW/MCW results achieved during the first implementation phase (1995-2004)



Source: *Kreislaufwirtschaft Bau (2001/03/05/07a)*¹⁸

The amount of usable BMW/MCW waste sent to landfill was also reduced during the first implementation phase of the CC initiative. As shown in Figure 3, the largest reduction was achieved between 1996 and 1998, with 28.40% of the total usable BMW/ MCW waste sent to landfill in that period. Compared to 1995, the landfill disposal rate registered during the first ten years of the CC initiative was 12.74% lower on average.

Figure 3: Total usable BMW/MCW eliminated



Source: *Kreislaufwirtschaft Bau (2001/03/05/07a)*¹⁹

The positive achievements during the first implementation phase allowed the German CDB sector to be catalogued as a “2010 Class” member, with countries such as the Netherlands, Denmark, Belgium and Switzerland.

The improvements made to the total landfill disposal and recycling thresholds for usable BMW/MCW waste enabled the German CDB sector to achieve its 2010 targets ahead of time. The targets related to goals and recommendations set for 2010 by the European Commission.

The work of the CC initiative enabled the CDB sector to achieve a recycling ratio for usable BMW/MCW waste of over 70%. Reaching this threshold gave Germany entry to select group of countries nominate the “2010 Class”²⁰.

Due to the changes applied on the scope of the CCI initiative after the end of the commitment signed, further improvements to recycling and disposal rates of usable BMW/MCW waste achieved by the CDB sector, as shown in Figures 4 and 5, cannot be attributed to the initiative.

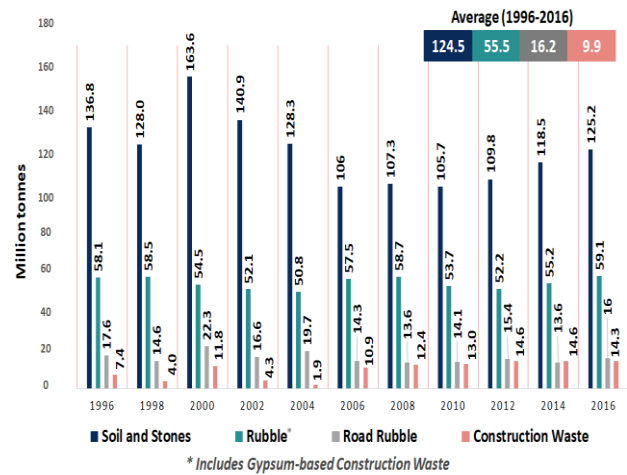
With the end of the voluntary commitment between the Federal Government and the foundational partners in 2005, important changes to the scope of the CC initiative were applied. All of the activities and services designed to help the CDB sector move towards a circular transition (e.g.: advisory services; training; and/or data collection) were reduced, and focus was placed solely on monitoring.

The changes to the initiative’s scope and activities were influenced by the perception that the circular transition principles (pillars) had been successfully implemented in the German CDB sector²¹. Other issues also had an influence, with the changes within the CC partnership, and the introduction, modification and derogation of sectoral laws and regulations. Examples included LAGA M20 (*Mitteilungen der Länderarbeits-gemeinschaft Abfall*)²², the Federal Soil Protection and Contaminated Sites Ordinance (*Bundes-Bodenschutz- und Altlastenverordnung*)²³ and the Shell Ordinance (*Mantelverordnung*)²⁴.

To date, the CC initiative has produced and published a total of 11 Monitoring Reports. Commissioned by the Federal Government, the biennial reports assess the usable BMW/MCW waste disposal and recycling/reuse rates achieved by the CDB sector.

As the nature of CC initiative services changed, there was a similar change in the format of its outputs. As a result, the monitoring reports are not comparable with the analytical work conducted up to 2005. The biennial monitoring reports are fairly short documents that present key facts and figures sourced primarily from the Federal Office for Statistics, Destatis²⁵. Figure 4 provides an example of the data presented in the most recent report. It shows, for instance, a 340% increase in construction waste volumes between 2004 and 2014, with a modest 2% fall between 2014 and 2016.

Figure 4: Statistical data registered until 2016



Source: Kreislaufwirtschaft Bau (2019b)²⁶

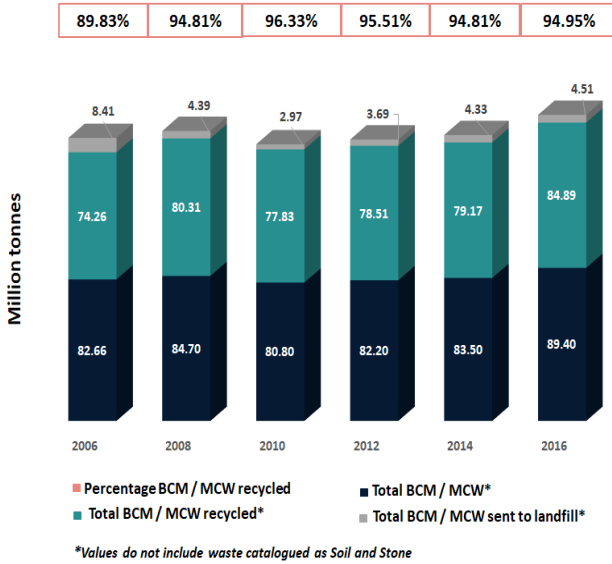
As shown in Figure 5, the largest amount of BMW/MCW waste was registered in 2016, reaching a total value of 89.4 million tonnes, excluding waste catalogued by the CC initiative as “Soil and Waste”.

The data published in the CC monitoring reports shows that between 2006-2016, the largest reduction in the share of BMW/MCW waste sent to landfill by the German CDB sector was achieved between 2008 and 2010. Approximately 3.67% of the total volume of usable BMW/MCW waste was sent to landfill in that period.

Compared to 1995, the landfill disposal rate registered by the sector between 2006 and 2016 was 4.87 times lower on average. In 2016, approximately 95% of the total amount of usable BMW/MCW waste produced by the German CDB sector was recycled²⁷.

In the spring of 2021, the **Circular Construction (CC) Initiative** is scheduled to publish its twelfth Monitoring Report. It will assess the usable BMW/MCW disposal and recycling/reuse rates achieved by the CDB sector up to 2018²⁹.

Figure 5: Share of BMW/MCW waste recycled and sent to landfill, 2006-2016



Source: Kreislaufwirtschaft Bau (2011b/13a/15a/17a/19b)²⁸

3.

Perspectives and lessons learned

The Circular Construction (CC) initiative has demonstrated the value of circular construction.

The CC initiative has demonstrated that circular principles and practices, and favourable laws and regulations³⁰, can deliver sizeable benefits. Over the last 25 years, they have helped the Construction, Demolition and Building Material (CDB) Sector to significantly reduce the landfill disposal of usable Building Material and Mineral Construction Waste.

CC Monitoring Reports provide access to practical and easy to use data to inform public and private sector decision-making.

The CC Monitoring Reports have enabled public and private sector stakeholders to gain valuable insight into the circular practices being applied in the CDB sector and the progress being made as the sector transitions to a circular economy. This knowledge enables government and businesses to contribute further improvements to enhance the conservation of natural resources and increase the recycling and reuse of BMW/ MDW waste.

The recycling and reuse practices, methods and standards adopted by the CDB sector can inform the development of better policies and regulations³¹.

Circular best practices developed and successfully applied in the CDB sector provide a learning opportunity for current and future policymaking, according to leading industry stakeholders.

New sector-related policies and regulations, such as the Shell Ordinance³² (*Mantelverordnung*), should seek to maintain and extend the benefits achieved through framework initiatives such as the CC initiative. They have demonstrated over many years that they can help to:

- Reduce the landfill disposal of usable BMW/MDW waste;
- Promote circular economy principles;
- Strengthen the acceptance and use of secondary raw materials in new construction and renovation projects.

Independent initiatives, such as the CC initiative, are useful tools through which to promote and monitor circular principles and practices.

According to the Ministry for Environmental Protection and the Federal Ministry of the Interior, Building and Home Affairs (*Bundesministerium des Innern, für Bau und Heimat – BMI*)³³, change is best promoted and monitored by initiatives and organisations that are sector-independent. Similarly, change is best delivered on the basis of voluntary commitments from stakeholders. The CC initiative is a good example of the effectiveness of an independent and voluntary approach to reducing usable BMW/MDW waste and increasing recycling rates. The approach adopted has enabled the CDB sector to meet national and European recycling targets.

4.

Conclusion and recommendations

Thanks to the commitment, determination and performance of its partners, the Circular Construction (CC) initiative has successfully demonstrated how leading independent associations from the Construction, Demolition and Building Material (CDB) Sector can effectively work together to: (i) reduce the total volume of Building Material and Mineral Construction Waste (BMW/MCW) sent to landfill; and (ii) increase the total amount of BMW/MCW waste recycled and reused.

The CCI initiative has successfully demonstrated its added-value to the Federal Government and the CDB sector by providing them with the access to comprehensive Monitoring Reports. CC reports assess the progress and results achieved as the CDB sector transitions to a circular economy.

To date, 11 Monitoring Reports have been produced and published. Over the last 25 years, the CDB sector has significantly reduced the landfill disposal rate of BMW/MCW waste from 43% in 1995 to approximately 5% in 2016.

Looking forward, three recommendations are suggested that could help increasing the overall impact of the initiative, as well as the use of the data displayed in the Monitoring Reports, especially for the definition and implementation of newer laws and regulations:

- Data and analysis on the effectiveness of best practices applied in the CDB sector to reduce the landfill disposal of usable BMW/MCW waste would be advantageous. It would help to better understand which circular practices deliver the most positive impact and which are most easily transferable;
- Consider extending the monitoring reports to include recommendations to improve circular policies, initiatives and activities. They would help both the Federal Government and the CDB

Sector accelerate the adoption of circular and sustainable principles and methods;

- As the CC initiative is led by the main associations within the German CDB sector, a new portfolio of specialised services (e.g.: advisory services, coaching) could be developed to help stakeholders across the sector to identify, assess and adopt cost-efficient circular and sustainable practices and measures to increase the recycling and reuse of usable BMW/ MCW waste.

Overall, the Circular Construction (CC) initiative is rated a “4-star good practice measure” on a scale of 1 (low) to 5 (high).

This score is based on the solid results and contributions this sector-independent initiative has achieved over a period of 25 years, and especially throughout its first phase (1995-2005). The CC initiative has helped the German CDB sector to significantly reduce the amount of BMW/MCW waste sent to landfill, allowing the country to be achieve the “Class 2010” label for achieving a reuse ratio of over 70% in the early 2000s. More recently, 11 monitoring reports have furnished the Federal Government and the German CDB with valuable and easy to use data on waste disposal and recycling rates.

The Circular Construction (CC) initiative is rated a “5-star transferable measure” on a scale of 1 (low) to 5 (high).

In principle, the CC initiative concept and approach is very transferable. The key is to engage with the target sector and its stakeholders, compose an independent assessment and monitoring team of industry representatives, and establish a clear scope and mandate for the assessment and monitoring activities.

Endnotes

- 1 The initiative is led since more than 20 years by the German Building Materials Association “*Bundesverband Baustoffe - BBS*”. The partners which are currently supporting the implementation of this initiative are: the Federal Association for Waste, Water and Raw Materials Management Association “*Bundesverband der Deutschen Entsorgung Wasser - und Rohstoff - wirtschaft e.V – BDE*”; the Federal Quality Association for Recycled Building Materials “*Bundesgütegemeinschaft Recycling-Baustoffe e.V. – BGRB*”; the Federal Association for Recycling Building Materials “*Bundesvereinigung Recycling Baustoffe e.V – BRB*”; the German Demolition Association “*Deutscher Abbruchverband e.V – DA*”; the main Association of the German Construction Sector “*Hauptverband der Deutschen Bauindustrie e.V. – HDB*”; and the Central Association of the German Building Industry *Zentralverband des Deutschen Baugewerbes e.V. – ZDB*”.
Kreislaufwirtschaft Bau (2020a), Kreislaufwirtschaft BAU – Die Initiative:
<http://www.kreislaufwirtschaft-bau.de/#information>
- 2 Kreislaufwirtschaft Bau (2019a), Summary:
<http://www.kreislaufwirtschaft-bau.de/Arge/Summary.pdf>
- 3 Kreislaufwirtschaft Bau (2000a), Monitoring – Bericht: Bauabfälle, p.14:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-01.pdf>
Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
- 4 The partners of the Circular Construction Initiative (CCI) provide all the resources needed for the development /publication of each monitoring report.
Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
- 5 Mineral Construction Waste (MCW) is considered the largest material flow amongst the Construction & Demolition Waste (CDW) generated by the German Construction Sector.
Kreislaufwirtschaft Bau (2019b), Mineralische Bauabfälle Monitoring 2016:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-11.pdf>
Kreislaufwirtschaft Bau (2000a), Monitoring – Bericht: Bauabfälle 1:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-01.pdf>
- 6 The Waste Catalogue Ordinance (WCO) entered in force in 2001 as the national representation of the European List of Waste which entered in force in 2000. Apart from regulating the designation and classification of waste according to its hazardousness, the WCO defines the criteria for the assessment of hazardous properties in Germany. The WCO is divided in 842 types of waste, from which 408 are considered hazardous and 434 non-hazardous. The WCO provides an identification code for each type of waste to help stakeholders with the correct identification and classification.
Bundesamts für Justiz (2001a), Verordnung über das Europäische Abfallverzeichnis (Abfallverzeichnis-Verordnung - AVV):
<https://www.gesetze-im-internet.de/avv/AVV.pdf>
European Commission (2020a), Waste Framework Directive - Waste classification and the European List of Waste:
<https://ec.europa.eu/environment/waste/framework/list.htm>
Bayerisches Staatsministerium für Umwelt und Verbraucherschutz (2020a), Abfalleinstufung, Abfallbezeichnung und Abfallschlüssel nach Abfallverzeichnis-Verordnung:
<https://www.umweltpakt.bayern.de/abfall/fachwissen/186/abfalleinstufung-abfallbezeichnung-abfallschlüssel-nach-abfallverzeichnis-verordnung>
- 7 Kreislaufwirtschaft Bau (2017a), Mineralische Bauabfälle Monitoring 2014, pp.4-5:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-10.pdf>
Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
- 8 Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU (2017a), Verordnung über das Europäische Abfallverzeichnis:
<https://www.bmu.de/gesetz/verordnung-ueber-das-europaeische-abfallverzeichnis/>
- 9 Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
- 10 Kreislaufwirtschaft Bau (2019b), Mineralische Bauabfälle Monitoring 2016, p.5:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-11.pdf>
- 11 Kreislaufwirtschaft Bau (2020a), Kreislaufwirtschaft BAU – Die Initiative:
<http://www.kreislaufwirtschaft-bau.de/#information>
- 12 Kreislaufwirtschaft Bau (2000a), Monitoring – Bericht: Bauabfälle 1, p.3:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-01.pdf>

- Voluntary Commitment as expressed in German: *zur Reduzierung der Ablagerung von verwertbaren Bauabfällen bezogen auf das Bauvolumen gegenüber dem Stand von 1995 bis zum Jahre 2005 auf die Hälfte.*
- Kreislaufwirtschaft Bau (2001a), Monitoring – Bericht: Bauabfälle 2, pp.17-18:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-02.pdf>
- Kreislaufwirtschaft Bau (2003a), Monitoring – Bericht: Bauabfälle 3, pp.6-7:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-03.pdf>
- 13 Kreislaufwirtschaft BAU – Die Initiative:
<http://www.kreislaufwirtschaft-bau.de/#information>
- 14 Kreislaufwirtschaft Bau (2000a), Monitoring – Bericht: Bauabfälle 1, pp.4-5:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-01.pdf>
- 15 Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
 EU WID Magazin (2011a) ARGE Kreislaufwirtschaftsträger Bau kritisiert Mantelverordnung und löst sich auf:
<https://www.euwid-recycling.de/news/wirtschaft/einzelansicht/Artikel/arge-kreislaufwirtschaftstraeger-bau.html>
- 16 Kreislaufwirtschaft Bau (2001a), Monitoring – Bericht: Bauabfälle 2, p.5:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-02.pdf>
- 17 Kreislaufwirtschaft Bau (2001a), Monitoring – Bericht: Bauabfälle 2:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-02.pdf>
 Kreislaufwirtschaft Bau (2003a), Monitoring – Bericht: Bauabfälle 3:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-03.pdf>
- 18 Kreislaufwirtschaft Bau (2001a), Monitoring – Bericht: Bauabfälle 2, pp. 12-18:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-02.pdf>
 Kreislaufwirtschaft Bau (2003a), Monitoring – Bericht: Bauabfälle 3, pp.8-9:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-03.pdf>
 Kreislaufwirtschaft Bau (2005a), Monitoring – Bericht: Bauabfälle 4, pp.5-7:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-04.pdf>
 Kreislaufwirtschaft Bau (2007a), Monitoring – Bericht: Bauabfälle 5, pp.12-13:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-05.pdf>
- 19 Ibid
- 20 Kreislaufwirtschaft Bau (2001a), Monitoring – Bericht: Bauabfälle 2, p.9:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-02.pdf>
 Kreislaufwirtschaft Bau (2003a), Monitoring – Bericht: Bauabfälle 3, p.13:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-03.pdf>
 Kreislaufwirtschaft Bau (2007a), Monitoring – Bericht: Bauabfälle 5, pp.30-37:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-05.pdf>
- 21 Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
 Kreislaufwirtschaft Bau (2011a), Monitoring – Bericht: Bauabfälle 6:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-06.pdf>
 Kreislaufwirtschaft Bau (2011b), Monitoring – Bericht: Bauabfälle 7:
<http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-07.pdf>
- 22 Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU (2003a), Mitteilung der Länderarbeitsgemeinschaft Abfall (LAGA) 20:
https://www.laga-online.de/documents/m20_tr_mineral-abfaelle_allgteil-i_2_1517834500.pdf
- 23 Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU (2020a), Verordnung zur Einführung einer Ersatzbaustoffverordnung, zur Neufassung der Bundes-Bodenschutz- und Altlastenverordnung und zur Änderung der Deponieverordnung und der Gewerbeabfallverordnung:
<https://www.bmu.de/gesetz/verordnung-zur-einfuehrung-einer-ersatzbaustoffverordnung-zur-neufassung-der-bundes-bodenschutz-und/>
- 24 Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU (2020b), Mantelverordnung:
<https://www.bmu.de/faqs/mantelverordnung/>
- 25 Kreislaufwirtschaft Bau (2020a), Kreislaufwirtschaft BAU – Die Initiative:
<http://www.kreislaufwirtschaft-bau.de/#information>
 Berthold Schäfer – Managing Director - Bundesverband Baustoffe (BBS) (2020a), Interview conducted.
- 26 Kreislaufwirtschaft Bau (2019b), Mineralische Bauabfälle Monitoring 2016, p.13:

- <http://www.kreislaufwirtschaft-bau.de/Arge/Bericht-11.pdf>
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