European Commission

European Construction Sector Observatory

Policy fact sheet

Austria

Construction Carousel

(BauKarussell)

Thematic objectives 2, 3, 4 and 5

November 2020

In a nutshell

Implementing body	Viennese Consortium[1] led by Pulswerk GmbH[2], Romm / Mischek ZT[3] and RepaNet[4] in collaboration with socio-economic companies such as Caritas SÖB[5] and DRZ Wien[6,7]
Key features & objectives	A circular economy and sustainable development initiative that aims to increase the efficiency and benefits of building dismantling / demolition activities, as well as the reuse of raw materials and components in construction projects through "Social Urban Mining" (Austria's first provider)[8].
Implementation date	2016 - Ongoing[9]
Targeted beneficiaries	Builders, building dismantling planners, demolition firms, building owners / institutions, dismantling and repair socio-economic organisations and networks[10].
Targeted sub-sectors	All sub-sectors and value chains
Budget (EUR)	Not disclosed[11]
Good practice	★★★★☆
Transferability	★★★★★

Construction Carousel (BauKarussell) is a pioneering initiative within the construction sector in Austria for its social and environmental orientation. Launched in 2016, the Construction Carousel has successfully achieved its proof of concept and validated its innovative approach by implementing recovery-orientated dismantling practices in significant construction and demolition projects in Vienna and its surroundings.

Construction Carousel is an industry-led initiative that aims to encourage the planning and implementation of recovery-orientated dismantling practices with a social focus.

Turning the dismantling phase into one of the top priorities for optimal planning smart and efficient construction, demolition and renovation (C&D&R) projects, the Construction Carousel initiative provides builders, planners, institutions, demolition and construction companies the opportunity to:

- Take full advantage of the principles and related benefits of the circular economy and sustainable development (reuse of component, products and materials, brand image, lower costs, etc.);
- Reduce the environmental impact of new C&D&R projects (resource efficiency and conservation, and lower building footprint);
- Extend the socio-economic benefits triggered through the implementation of new C&D&R projects by opening new workplaces for people with difficulties in the labour market.

Thanks to the outstanding working relation displayed by the lead and operational partners with the collaboration network of public and private companies and associations within the Construction Sector in Austria, the Construction Carousel Initiative has been able to carry out more than six large-volume recovery-oriented dismantling services in the less than 4 years.

The initiative is currently expanding its "Social Urban Mining" approach in new construction, demolition and renovation projects across the country. It is also strengthening its network of collaboration partners within and outside Austria to further develop and improve the quality of services offered to the construction sector (e.g. builders, planners, institutions, private stakeholders, demolition and construction companies, etc.).

1.

General description

The Construction Carousel is a sector specific initiative for the Building Demolition Sector (BDS) that takes full advantage of the principles of the circular economy and sustainable development. It supports the adoption and use of innovative dismantling processes and practices[12]. It provides an innovative framework for managing, reusing and reducing construction waste in demolition and renovation projects[13].

The initiative fully complies with Austria's "Recycling Building Materials" regulations (Recycling-Baustoffverordnung RBV[14]) and the standard method for dismantling buildings in demolition projects (Önorm B3151: Rückbau von Bauwerken als Standard-abbruchmethode[15]).

The Construction Carousel (CC) initiative enables the construction sector to better understand and quantify the socio-economic and environmental impact of managing, recovering and reusing construction waste.

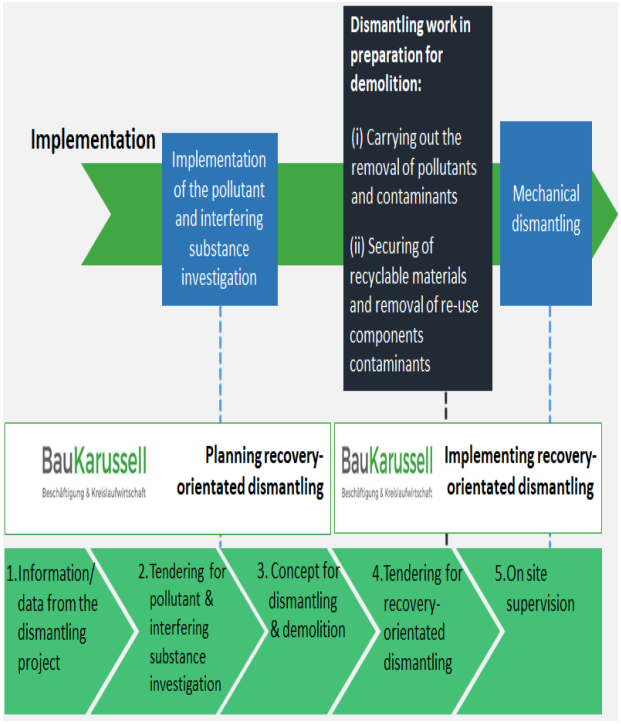
Using a "Social Urban Mining"[16] approach, the initiative provides the construction sector and all interested stakeholders (e.g. institutions, firms, non-profit organisations) with the means to visualise the benefits of using recovery-orientated dismantling practices in construction projects. It also helps to close the gap between the supply of and demand for high quality recovered raw materials, products and components in Austria[17].

Waste avoidance, material recycling and waste disposal are central to many Austrian construction sector initiatives[18]. **The difference with the "Social Urban Mining" approach applied by the CC initiative is that it prioritises reuse** (Vorbereitung zur Wiederverwendung) over the waste hierarchy[19] levels and the EU's requirements for managing, treating, using and commercialising construction and demolition waste (CDW)[20].

As shown in Figure 1, implementation of the "Social Urban Mining" approach involves two principal work streams, a five-step process and three implementation activities. Using this approach, recovery-orientated dismantling services can be successfully delivered in line with regulations, whilst also delivering environmental and social benefits[21].

In contrast to other approaches, the "Social Urban Mining" framework can be adapted and applied according to the specific requirements and conditions of each project. Process steps and implementation activities can also be implemented separately, if needed.

Figure 1: Social urban mining approach



Source: BauKarussell (2020*g*)[22]

The "Social Urban Mining" approach used by the CC initiative helps to integrate the dismantling phase into the overall planning process for new demolition or renovation projects.

The first work stream supports the **planning of recovery-orientated dismantling activities**. It provides professional advice during the planning and concept design phases on the reuse of components and materials within and beyond a proposed project. This work stream covers the first three steps of the five-step process and one implementation activity:

- **Step 1. Project information capture** (Erfassung des Rückbauprojektes)[23] gathers all the information and data pertaining to a demolition or renovation project;
- **Step 2. Invitation to tender for the investigation of pollutants and interfering substances** (Ausschreibung der Schad- und Störstoff-erkundung)[24]. The aim is to identify and select suppliers with the competences to carry out the analysis according to the EN ISO 16000-32:2014 international standard and the B3151:2014 national standard;
- **Implementation activity 1. Conduct the pollutants and interfering substances (P&IS) investigation** (Durchführung der Schad- und Störstofferkundung) to identify the quantity and quality of the materials and components that can be reused after the removal of P&IS;
- **Step 3. Dismantling and value creation concept** (Erstellung des Rückbau- und Wertschöpfungs-konzeptes)[25] to determine how materials and components can be reused within and beyond the project.

The "Social Urban Mining" approach helps to create employment and reduce social disparity in Austria through collaboration with socio-economic firms.

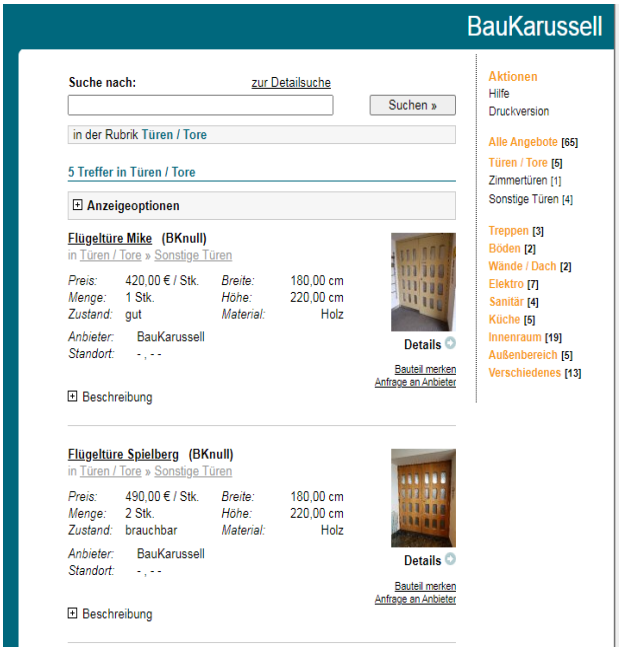
The second work stream supports the **implementation of recovery-orientated dismantling activities**, aided by a strong network of socio-economic companies. The second work stream covers the final two steps of the five-step process and two implementation activities:

- **Step 4. Tendering for recovery-orientated dismantling** (Ausschreibung des verwertungs-orientierten Rückbaus)[26] services from socio-economic firms, based on specific requirements, the dismantling concept and the results of the P&IS investigation;
- **Implementation activity 2. Preparatory dismantling work** *(*Abbruchvorbereitende Rückbauarbeiten*)*. Socio-economic companies are requested to prepare the implementation of the recovery-orientated services. Companies enrol and train disadvantaged workers[27] in the labour market (e.g. the long-term unemployed);
- **Implementation activity 3. Mechanical dismantling** (Maschineller Rückbau). Socio-economic companies are requested to implement the recovery-orientated services such as the removal of pollutants and contaminants, and/or the removal or reuse of materials and components;
- **Step 5. On-site construction supervision** (Rückbaubegleitung)[28] to monitor recovery-orientated dismantling service performance by the selected socio-economic companies, against the contract goals.

Access to and use of recovered components and raw materials in the Austrian Construction Sector is facilitated by the CC catalogue (Bauteilkatalog[29]), as shown in Figure 2. This online catalogue acts as a "one-stop-shop" for the sale or purchase of high-quality reuse components and raw materials which can be or have been recovered using recovery-orientated dismantling practices.

The online Construction Carousel Catalogue makes it easier to match the supply and demand of high-quality reuse components and raw materials for new construction projects.

Figure 2: Construction Carousel Catalogue



Source: BauKarussell (2020g)[30]

The online catalogue also provides detailed information and data on key features and characteristics, such as availability, quality, price, dimensions, location and other relevant information to help users find a good deal according to their project needs and preferences. The availability of products is linked to the implementation timeframe for recovery-orientated dismantling services in either demolition or renovation projects. This can be viewed as a "future transaction system"[31] for recovered construction materials and components using "Social Urban Mining" practices and activities.

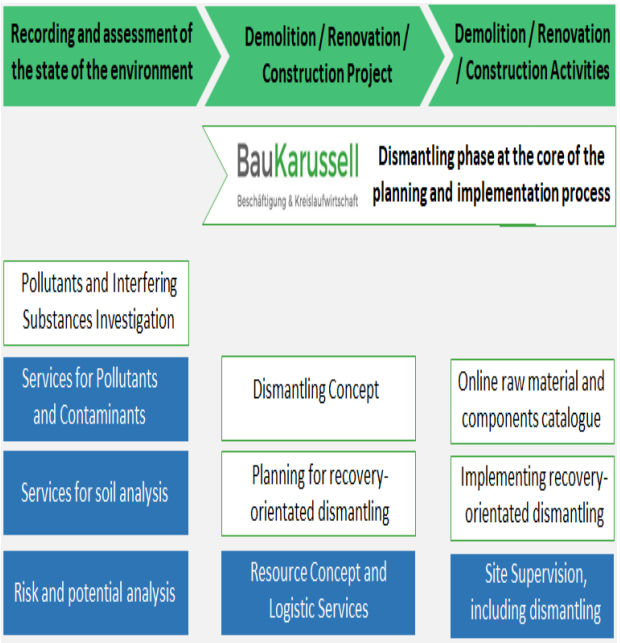
The CC initiative guarantees the quality of reuse components and raw materials included in the online catalogue (Bauteilkatalog).

The quality of all raw materials and components recovered using the innovative "Social Urban Mining" approach and commercialised through the online catalogue is guaranteed by the CC initiative. This quality guarantee adheres to common legal requirements for the commercialisation of reuse components and materials in Austria. The goal is to prove both the quality of the products offered through the catalogue and the viability and value of the approach in large-scale C&D&R projects.

In combination, the CC initiative's social urban mining approach and online catalogue aim to deliver a number of **important benefits to the Austrian construction sector**:

- Close the gap between the supply of and demand for reuse components and raw materials;
- Reduce the environmental impact of new C&D&R projects;
- Simplify the application of circular economy and sustainable development principles and practices throughout the construction cycle, as shown in Figure 3;
- Create new jobs and job opportunities for people with disadvantages in the labour market, extending the socio-economic impact of the CC initiative in the short, medium and long-term.

Figure 3: Social and eco-friendly construction, demolition and renovation projects



Source: BauKarussell (2019b)[32]

2.

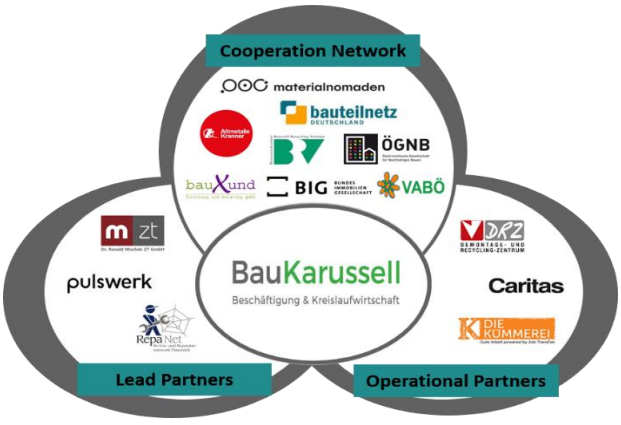
Achieved or expected results

In just four years since its launch, the Construction Carousel (CC) initiative has demonstrated that its pioneering "Social Urban Mining" approach can be successfully applied in different types of construction, demolition and renovation projects[33]. The principle challenge now facing the CC initiative is to scale up its recovery-orientated dismantling services with social added value across the country.

The CC initiative has ratified the socio-economic and environmental benefits of its innovative approach thanks to the cooperation agreements recently signed with key public and private players within the Austrian Construction Sector[34].

As shown in Figure 4, the CC initiative has succeeded in growing its cooperation network at home and abroad. The network currently features eight non-profit, public and private organisations, including the Federal Real Estate Company (Die Bundesimmobiliengesellschaft-BIG)[35] – one of the largest real estate owners in Austria. The operational team is also growing. The latest partner to join is Die Kümmerei, a non-profit organisation that helps disadvantaged workers[36] (e.g. long-term unemployed) in the labour market to have access to on-the-job training to improve their chances of acquiring a new job[37].

Figure 4: Cooperation and operational network



Source: BauKarussell (2020b)[38]

Funding from support programmes has enabled the CC initiative to further develop and put into practice its "Social Urban Mining" approach. The pilot phase (2016-2018), for example, was supported by project funding through the "Less waste, of course" (natürlich weniger Mist)[39] programme run by the Vienna City Council. Additional funding was provided by programmes managed by public institutions and non-profit organisations such as VKS GmbH[40] and the Federal Ministry for Digitalisation and Business Location (Bundesministerium für Digitalisierung und Wirtschaftsstandort) for Waste Avoidance and Waste Management in the Construction Sector.

Two pilot projects were implemented using the CC initiative's "Social Urban Mining" approach.

The first was the dismantling and deconstruction of the Coca-Cola Factory (2017), as part of the "Biotope City"[41] construction project led by the City of Vienna. As shown in Figure 5, the recovery-orientated dismantling activities contributed to the reuse of around 5,000 roof panels for thermal insulation and 3,000 m^2 of green roofs[42].

Figure 5: Recovery-orientated dismantling

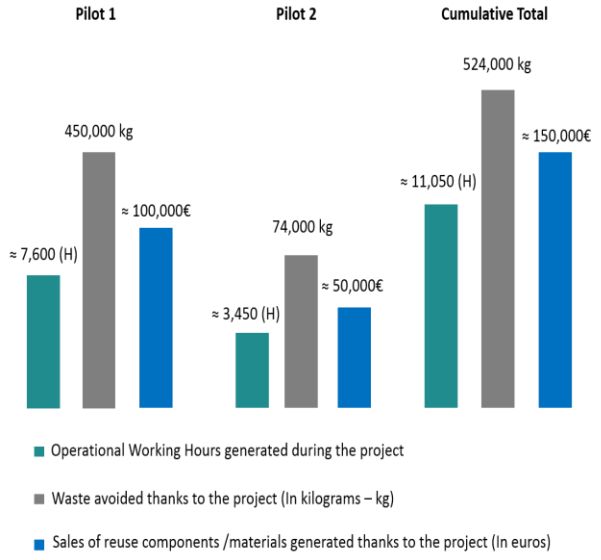
Source: BauKarussell (2018b)[43]

Use of the "Social Urban Mining" approach in the first pilot project achieved very significant results. Over 450,000 tons of waste were avoided, 74,000 tons of recycled material were sorted, and 171,000 tons of contaminants were removed[44]. Improved planning of dismantling activities in the project also

helped the initiative to generate sales of recovered raw materials and components worth approximately EUR 100,000. In addition, the initiative generated nearly 7,600 hours of work for its operational partners[45]. The second pilot was the dismantling of the Glass Palace, a 38-year-old building in which the main Data Centre of the City of Vienna was located. This project generated more than 3,450 working hours for the CC initiative's operational partners. The recovery-orientated dismantling practices used in the project helped to achieve a waste reduction of 74,000 kg and around EUR 50,000 in sales generated through the online catalogue[46].

The pilot phase has demonstrated the socio-economic and environmental value of the CC initiative, as shown in Figure 6. Construction waste was reduced by 524,000 kg. More than EUR 150,000 in sales were generated through its online catalogue of reuse components and raw materials. Temporary employment was created for more than 4,000 people disadvantaged in the labour market[47], and over 11,000 hours of work was generated for CC operational partners.

Figure 6: Pilot phase – cumulative results



Source: Wirtschaft & Umwelt – Zeitschrift (2018b)[48]

The CC initiative continues to demonstrate the capacity of its "Social Urban Mining" approach to transform and improve the implementation of large-scale demolition and construction projects.

In 2019, due to the successes achieved in its pilot phase, the CC approach was applied to one of the most significant recovery-orientated dismantling projects in Austria – the dismantling of the Medical University (MedUni) Mariannengasse Campus in Vienna[49]. This was part of a cooperation project between the Construction Carousel Initiative, the MedUni Vienna and the Federal Real Estate Company (BIG). Between October 2019 and July 2020, the CC initiative enabled the project to[50]:

- Promote nearly 5,000 socio-economic working hours providing long-term unemployed people with 20 temporary jobs for a 10-month period;
- Save and recover nearly 60,400 kg of reusable components, raw materials and valuable (historical) objects (e.g. hundred-year-old paternoster cabins for the Elevator Museum)[51];
- Separate and prepare 81,170 kg of waste for recycling or removal.

The CC initiative has earned multiple awards for its pioneering approach that integrates circular economy and sustainable development principles. It also has been recognised for its social impact.

In 2018[52], the City of Vienna awarded the Construction Carousel initiative with the "OekoBusiness Wien"[53] award for innovative projects and ideas that clearly demonstrate their feasibility to save energy, waste and resources. In the same year, the initiative earned the Phoenix Award in the Waste Management Category from the Austrian Water and Waste Management Association (Österreichischer Wasser- und Abfallwirtschaftsverband - ÖWAV)[54].

In 2020, EIT RawMaterials[55] awarded the CC initiative with third place in the Raw Materials and Circular Societies Prize Competition for its social, economic and environmental impact[56]. The initiative has also been selected by the Austrian radio station Ö1, as part of its Future Repair (Reparatur der Zukunft)[57] programme, to receive mentoring to further develop and extend its innovative "Social Urban Mining" approach throughout the Austrian construction sector. In addition, the initiative has won the "OekoBusiness Wien" for a second time (2020[58]).

Overall, the Construction Carousel is a successful initiative that is continuing to gain traction in the Austrian construction sector. It is transforming how construction material and components are dismantled and reused. It is providing

opportunities to achieve significant reductions in construction waste and the environmental impact of large-scale C&D&R projects, as well as new jobs for the long-term unemployed.

Looking forward, the CC initiative expects to increase the use of its "Social Urban Mining" approach in the domestic construction sector and beyond[59]. The long-term goal is to establish the approach as a standard method for planning and implementing construction, demolition and renovation projects.

In the near future, the CC initiative plans to establish itself as a legal entity, with its lead members as shareholders. This will enable it to fully address the needs and requirements of the market. Finally, the CC initiative aims to invite academic partners to join its cooperation network. This will enable the initiative to provide certified training to temporary employees, which should increase their chances of finding long-term employment in the construction sector[60].

3.

Perspectives and lessons learned

The Construction Carousel (CC) "Social Urban Mining" approach increases cost-neutral resource efficiency and reduces the footprint of new Construction, Demolition and Renovation projects.

The "Social Urban Mining" approach introduced in 2016 by the CC initiative provides the construction sector with a feasible and cost-efficient opportunity to implement smart recovery-orientated dismantling services and practices. This view is shared by a number of construction sector stakeholders (Romm ZT[61], BauXund[62], the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (Bundesministerium Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie)[63], the Federal Real Estate Company (BIG)[64], and the Environmental Department of the State of Upper Austria and Linz AG[65]).

In market terms, according to Repanet and Romm ZT[66], recovery-orientated dismantling practices such as the CC "social urban mining" approach have the potential to provide 10-30% of the raw materials and components required by new construction projects. In contrast, dismantling activities using standard approaches and non-circular economy principles and methodologies can only contribute to about 1% of the total raw materials, products and components needed by the construction sector.

The Construction Carousel is a pioneering initiative that is helping the construction sector to better define construction and demolition (C&D) waste, with the support of recovery-orientated dismantling services and practices.

According to the Austrian Institute for Building and Ecology (Österreichisches Institut für Bauen und Ökologie – IBO)[67], the CC initiative is one of the most positive examples of smart and effective methods in Austria for the management, treatment and use of C&D waste. Prior to the successful introduction of recovery-orientated dismantling services and practices within the Austrian construction sector, all recycled building materials from C&D&R projects were defined as waste until they were handed over to the corresponding authorities in charge of their treatment.

According to the Austrian Building Material Recycling Association (Österreichischer Baustoff-Recycling Verbandes - BRV)[68], poorly planned dismantling services and poorly managed C&D&R waste over many years resulted in significant losses of raw materials and components which could have been dismantled, recovered and reused in new construction projects.

The CC initiative has demonstrated that innovative concepts and business models based on circular economy and sustainable development principles can also be socially orientated[69].

According to Pulswerk GmbH[70], the Austrian Ecology Institute[71], Romm ZT[72], Raiffeisen-Landesbank Tirol AG[73], Energie AG[74], Schindel und Holz[75] and Repanet[76], one of the major successes of the Construction Carousel initiative has been the integration of socio-economic companies and organisations with the capacity to carry out all of the planned manual dismantling activities on-site.

According to Linz AG, the Federal Real Estate Company (BIG), the dismantling and recycling Centre of Vienna (DRZ)[77] and Repanet, the Construction Carousel initiative does much more than just incentivises resource efficiency in new construction projects. It also provides an innovative path for training and re-introducing long-term unemployed people to the labour market. It is therefore a win-win-win solution for the construction sector, the economy and society.

The CC initiative supports the commercialisation of high-quality reuse materials and components, and it improves and adds value to C&D&R projects.

The Federal Ministry for Sustainability and Tourism (Bundesministerium für Nachhaltigkeit und Tourismus)[78], and the Austrian Association for Waste Avoidance (Verband Abfallberatung Österreich – VABÖ)[79] highlight two key successes of the CC initiative. The online catalogue provides easy access to quality-tested reuse materials and components that match the specific needs and requirements of new construction projects. The CC method also enables public and private companies to better implement large-scale C&D&R projects by applying recovery-orientated dismantling practices with high socio-economic added value.

4.

Conclusion and recommendations

The Construction Carousel is a pioneering initiative which has successfully completed its pilot phase and has achieved significant results. At present, it is in the process of extending its "Social Urban Mining" approach to new construction, demolition and renovation projects across Austria.

In just four years, the initiative has not only shown how key circular economy and sustainable development principles can be applied in the construction sector, it has also demonstrated how new C&D&R projects can achieve important efficiency and resource savings and social impact.

To date, the Construction Carousel has:

- **Supported the delivery of more than six successful recovery-orientated dismantling services in Austria;**
- **Generated more than 17,000 working hours for its operational partners;**
- **Avoided more than 650,000 kg of construction and demolition (C&D) waste;**
- **Generated more than EUR 150,000 in sales of reuse raw materials and components through its online catalogue[80];**
- **Created more than 4,000 temporary jobs for long-term unemployed people.**

Looking forward, three recommendations are suggested to help accelerate the use and adoption of the "Social Urban Mining" approach in C&D&R projects and further increase its impact:

- Establish a legal entity that will represent the initiative. This will provide greater clarity for clients and help to position the service in the market;
- Establish new collaborations with the academic sector to strengthen the initiative's service offer and add value (certification) to the training offered to temporary employees selected to carry out recovery-orientated dismantling services onsite;
- Consider using common indicators for projects (e.g. sales generated, waste avoided, recycled components) to help quantify the initiative's overall outcomes and impacts.

Overall, the Construction Carousel Initiative is rated a "4-star good practice measure" on a scale of 1 (low) to 5 (high).

This score is based on the positive results the initiative has achieved since 2016. It has successfully piloted a pioneering approach that integrates circular economy and sustainable development principles with social benefits. It has also demonstrated that recovery-orientated dismantling services and practices can help projects to achieve cost-neutral resource efficiency.

To achieve a 5-star good practice score, the initiative would need to be scaled up to achieve greater reach throughout the Austrian construction sector. Establishing a legal entity, for instance, would help the initiative to attract larger numbers of building planners, companies and institutions interested in applying recovery-orientated dismantling services in their new C&D&R projects.

The Construction Carousel Initiative is rated a "5-star transferable measure" on a scale of 1 (low) to 5 (high).

The Construction Carousel provides an effective, smart and cost-efficient method for improving recovery-orientated dismantling service and activity planning and implementation. It has been validated in pilot projects and is highly transferable. It also provides a "good practice" example of how circular, sustainable and socially orientated approaches can be successfully implemented in the construction sector to deliver tangible results and benefits.

Endnotes

1 BauKarussell (2020a), Netzwerk und Partner, p.100:
https://www.ioeb.at/fileadmin/ioeb/Dokumente/ECOVATION/Rueckbau_Recycling.pdf
BauKarussell (2020b), Netzwerk und Partner:
https://www.baukarussell.at/ueber-baukarussell/netzwerk-partner/

2 Pulswerk GmbH (2020a) is the consulting company of the Austrian Ecology Institute (Österreichischen Ökologie-Instituts). Its main objective is to advise companies and public authorities on the planning and implementation of sustainable solutions:
http://www.pulswerk.at/profil.htm

3 Romm/Mischek ZT (2020a) building / planner partnership between Dr. Thomas Romm ZT and Dr. Ronald Mischek ZT GmbH:
http://typo3.p197264.webspaceconfig.de/en/home | http://www.mischek-zt.at/

4 Re-Use- und Reparaturnetzwerk Österreich - RepaNet (2020a) is a voluntary association founded in 2004 for the Promotion of Resource Conservation and Employment in the Environmental Sector in Austria. The association represents the interests of socially oriented re-use companies as well as repair networks. It is important to remark that this association acts as the national umbrella organisation of the European network RREUSE (Recycling and Reuse of European Social Enterprises):
https://www.repanet.at/ueberuns/

5 Caritas SÖB (2020a) is a non-profit organisation that helps those people in need or disadvantage in Vienna and the Eastern part of Lower Austria:
https://www.caritas-wien.at/special-content/ueber-uns/

6 Demontage und Recycling-Zentrum - DRZ Wien (2020a) is the recycling, reuse and upcycling company for old electrical devices established by the Education Center in Vienna, also known in German as “Wiener Volkshochschulen”:
https://www.drz-wien.at/
Caritas SÖB, as well as DRZ Wien are two socio-economic companies which operate on behalf of and with funds from AMS Wien, the (Public Employment Service in Austria. BauKarussell (2020c), Wer steht hinter BauKarussell?
https://www.baukarussell.at/ueber-baukarussell/

7 During the initial phase (2016-2017), SÖB WUK Bio.Planzen collaborated in the implementation of the CC project. SÖB WUK Bio.Planzen supports long-term unemployed people to get new skills and competences to be part again in the job market:
https://www.wuk.at/angebot/bildung-und-beratung/biopflanzen/.
The Construction Carousel is a public-private partnership, in which are included socio-economic firms and organisations.

8 Meissner. Markus – Project Coordinator – BauKarussell (2019a), Verwertungsorientierter Rückbau:
https://www.youtube.com/watch?v=TbdSNc-4D5M

9 Hochreiter Werner. Mag – Wirtschaft & Umwelt – Zeitschrift für Umweltpolitk und Nachhaltigkeit (2018a), Projekt BauKarussell – vorbildliches ‘Re-Use‘ am Bau:
https://www.ak-umwelt.at/betrieb/?issue=2018-02

10 BauKarussell (2020d), Mission:
https://www.baukarussell.at/ueber-baukarussell/mission-statement/

11 Meissner. Markus - BauKarussell (2020f), Interview conducted.
Throughout its implementation, the initiative has received funding from public, private and non-profit organisations. The development of the methodology supported by funding from public programmes and private stakeholders. The planning and implementation of recovery-orientated dismantling services has been covered through the contract agreements signed with the clients requesting help in their Construction and Demolition Projects.
Umweltruf (2019a), BauKarussell: Neuer Webauftritt für Re-Use am Bau:
http://www.umweltruf.de/2019_Programm/news/news3.php3?nummer=4507

12 BauKarussell (2020e), know-how: präambel und rechtshintergrund:
https://www.baukarussell.at/know-how/
BauKarussell (2018a), Social urban mining:
http://docplayer.org/77473252-Baukarussell-social-urban-mining-forschungsberichte-zur-abfallwirtschaft-di-markus-meissner-donnerstag-abf-boku-wien.html

13 European Commission (2019a), Überprüfung der Umsetzung der Umweltpolitik 2019 - Länderbericht – Österreich:
https://ec.europa.eu/environment/eir/pdf/report_at_de.pdf

[14] Law introduced in 2015 by the Federal Minister for Agriculture, Forestry, Environment and Water Management (Bundesministers für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft). (RIS 2020a), Bundesrecht konsolidiert: Gesamte Rechtsvorschrift für Recycling-Baustoffverordnung:
https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20009212
WKO (2020a), Recycling-Baustoffverordnung:
https://www.wko.at/branchen/information-consulting/entsorgungs-ressourcenmanagement/recycling-baustoffverordnung.html

[15] The standard was defined in 2014 by the Austrian Standards Institute (Österreichisches Normungsinstitut). The dismantling method proposed as standard is a sequence of conditioned actions which are divided in three groups: (i) actions before the invitation; (ii) actions after tendering, before mechanical dismantling; and (iii) mechanical dismantling. Austrian Standards Institute (2014a), Rückbau von Bauwerken als Standardabbruchmethode:
https://www.ris.bka.gv.at/Dokumente/Bundesnormen/NOR40187245/II_290_2016_OeNORM_B_3151.pdf

[16] Urban Mining is an innovative concept that represents the re-use of existing secondary materials which have been accumulated in cities and settlements through time. Wiedemann. Annette – Acatech DE (2020a), Acatech HORIZONTE: Urban Mining:
https://www.acatech.de/projekt/acatech-horizonte-urban-mining/
Urban Mining is considered a new concept which its main goal is to handle in a that targets the smart way handling of raw materials. Urban Mining starts with the analysis on how raw material can be recovered. Flamme. Sabine – Urban Mining e.V (2020a), Urban), Urban mining:
https://urbanmining.at/about
The Social Urban Mining approach developed by the Construction Carousel initiative is considered social given that operational work in dismantling projects is carried out by socio-economic companies that employ and train people who are disadvantaged in the labour market. Thus, apart from ensuring the re-use of raw materials from building structures, the approach has a quantifiable social impact. RepaNet (2019a), BauKarussell im Stakeholder-Dialog:
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