

CIRCULAR ECONOMY TAXONOMY STUDY

Assessing the market-readiness of the proposed Circular Economy EU Taxonomy criteria for buildings

RFBB, Denmark

DGBC, The Netherlands

DGNB, Germany

ÖGNI, Austria

SGNI, Switzerland

GBCe, Spain

Published in February 2023



Publication details

ABSTRACT

In this study, a study consortium of seven organisations were joined by 29 market participants from Austria, Belgium, Denmark, France, Germany, Ireland, Spain, Switzerland, The Netherlands and Turkey. The proposed Circular Economy Taxonomy criteria for building activities were applied to 38 real building case studies. The study gives valuable insights into challenges, which were faced by the financial and real estate organisations and provides recommendations and practical solutions for applying the criteria.

WRITTEN BY

German Sustainable Building Council (DGNB)

www.dgnb.de

Seema Issar, Vincent Ostermeyer, Dr. Anna Braune,
Dr. Christine Lemaitre

Green Building Council España (GBCe)

www.gbce.es

Julia Manzano, Alfons Ventura, Bruno Sauer

Green Building Council Denmark (RFBB)

www.rfbb.dk

Amal El-Kaswani, Mette Qvist

Austrian Green Building Council (ÖGNI)

www.ogni.at

Sabine Huger, Markus Auinger, Peter Engert

Climate Positive Europe Alliance (CPEA)

www.cpea.eu

Ursula Hartenberger

Swiss Sustainable Building Council (SGNI)

www.sgni.ch

Heinz Bernegger

Dutch Green Building Council (DGBC)

www.dgbc.nl

Ruben Zonnevrijlle

PROJECT MANAGEMENT

Seema Issar | s.issar@dgnb.de

PLEASE CITE AS

DGNB, GBCe, RFBB, ÖGNI, D-GBC, SGNI, CPEA (2023):
Circular Economy Taxonomy Study – Assessing the
market-readiness of the proposed Circular Economy
EU Taxonomy Criteria for buildings

ACKNOWLEDGEMENTS

This study would not have been possible without the
commitment of the 29 market participants and the
Advisory Board. We would like to thank everyone for
their effort, expertise and contributions.

SUPPORTING GREEN BUILDING COUNCILS

Croatia Green Building Council (CGBC)

www.gbccroatia.org

Bulgarian Green Building Council (BGBC)

www.bgbc.bg

MEMBERS OF THE ADVISORY BOARD

- **Carl Bäckstrand**, Architect Council of Europe
- **Patrick Bergmann**, madaster
- **Eduardo Brunet**, Greenward Partners
- **Peter Hebin Bruun**, atp ejendomme
- **Juan Cortés**, Jones Lang Lasalle Arquitectura
- **Daniel Cuervo**, Asprima
- **Patrick Eberhard**, madaster
- **Julie Emmrich**, World Green Building Council
- **Arlaen Hernandez**, Asprima
- **Prof. Dr. Winfried Heusler**, Schüco
- **Sascha Kullig**, vdp
- **Silke Küstner**, WWF
- **Luis Martin**, Gesvalt SA
- **Diego Vilaró**, Gesvalt SA
- **Dr. Carolina Montano-Owen**, World Green Building Council
- **Prof. Dr. Tobias Popovic**, Hochschule für Technik Stuttgart
- **Dr. Stephen Richardson**, World Green Building Council
- **Dr. Peter Andreas Sattrup**, Danske Arkitektvirksomheder
- **Ruth Schagemann**, Architect Council of Europe
- **Mikkel Hallundbaek Schlesinger**, CEBRA Architecture
- **Cristina Sendra**, Eco Intelligent Growth
- **Dr. Frederik Voigt**, ZIA

Content

| | |
|---|----|
| Executive Summary | 7 |
| 1. Introduction | 8 |
| 1.1 Study Rationale | 9 |
| 1.2 Objectives | 9 |
| 1.3 Methodology | 10 |
| 1.3.1 Introduction to the Taxonomy criteria | |
| 1.3.2 Evaluating Taxonomy conformity | |
| 1.3.3 Evaluating the data reliability | |
| 2. Market | 14 |
| 2.1 Snapshots from the Market Participants | 14 |
| 2.1.1 Participant profiles and motivation for participation | |
| 2.1.2 Snapshot: Circular Economy among market participants | |
| 2.1.3 Snapshot: Implementation of the EU Taxonomy | |
| 2.2 Case Studies | 18 |
| 3. Results | 20 |
| 3.1 Evaluating the market-readiness for the Circular Economy Taxonomy | 20 |
| 3.2 Comparison to DNSH Circular Economy Requirements | 27 |
| 3.3 Rating Data Reliability | 27 |
| 4. Recommendation | 28 |
| 4.1 Recommendations for the Taxonomy | 28 |
| 4.2 Recommendations for application | 28 |
| 4.2.1 Building Material Passports | 29 |
| 5. Outlook | 31 |
| 6. Annex | 32 |
| Annex I: Circular Economy Taxonomy Questionnaire | 32 |
| Annex II: Circular Economy Taxonomy Study: Sample company-specific report | 36 |

Executive Summary

Background

Increasing global resource use and associated environmental impact are necessitating a radical shift towards whole lifecycle approaches and developing and implementing circular economy practices. This is particularly true for the construction and real estate sector given its high levels of both resource intensity and waste generation. Recognising the importance of setting economic activities on a circular economy trajectory, in March 2022, the European Commission's Platform on Sustainable Finance, as part of its continued work on developing a classification system for six environmental objectives that are at the heart of the so-called EU Taxonomy for Sustainable Finance published a set of technical screening criteria for making a substantial contribution to a transition towards circular economy. These screening criteria covered two construction and real estate sector activities: 1. Construction of New Buildings, 2. Building Renovation.

Testing the market-readiness for the Taxonomy circular economy criteria

Building on the methodologies adopted by a previous study focused on examining the market-readiness for the Taxonomy technical screening criteria developed in relation to climate change mitigation, this study, undertaken by a group of European Green Building Councils [evaluates the market-readiness of the Taxonomy circular economy screening criteria for the following sectoral activities:](#)

1. Construction of New Buildings and
2. Building Renovation

on the basis of 38 buildings across Europe.

Out of these, 35 buildings were assessed against the new construction and 3 buildings against the renovation criteria. Amongst these projects some were already

under development and others were still at the design stage. The study was undertaken in collaboration with 29 market participants including banks, investors, project developers, construction companies, asset managers, corporate real estate and consultants and was supported by an expert Advisory Group.

Key study results

Many organisations participating in the study see [circular economy as a strategic objective](#) and whereas there were some countries where projects scored high in relation to specific criteria and taking into account certain differences in focus by individual stakeholder clusters within the Tparticipant group, the overarching result of the study was that neither the 35 new construction projects nor the 3 renovation projects could be classified as aligned with the EU Taxonomy criteria for circular economy.

There are a number of reasons for this: at organisational level the results are mainly due to [a lack of relevant circular economy focused data, internal knowledge gaps](#) and [the absence of clear implementation action plans and performance indicators](#). However, as the study underlines, there is also a set of structural reasons that hinder active engagement with and implementation of circular economy principles in construction and real estate and ultimately achieving associated Taxonomy alignment. These include [a lack of appropriately aligned frameworks, definitions, digital tools and clear references](#) as to how alignment should be documented.

Introduction

The construction sector is crucial for a successful transition towards a circular economy. One third of the global resources is consumed by the built environment and in Europe alone it is responsible for generating 35 % of total waste. The FIEC Statistical Report¹ shows that around 80 % of the investments in construction goes into buildings. Considering the high levels of investment, the high emissions and resource consumption of this economic activity, jointly addressing both the financial and the construction sector combinedly, the EU Taxonomy has a huge lever to increase the transition to a circular economy. Its importance is backed by the 2021 Circularity Gap Report² which further reports that the built environment in Europe is just 8.6 % circular.

Circularity within the building sectors spans from looking at recycling or recovery rate of generated waste, the use of best construction techniques that support circularity, restricting the use of hazardous materials as well as incorporating calculations of the Global Warming Potential. In new constructed buildings circularity additionally is translated in documenting the materials in so called building material passports for potential future use or reuse of the building components and materials. Further increasing and accelerating circularity at building level would additionally trigger considerations around sufficiency, circularity at building material and component level and development and use of dedicated tools to facilitate access to information when it is required.

In March 2022, the Platform on Sustainable Finance proposed technical screening criteria³, extending the existing EU Taxonomy and further detailing the overall objective of the EU "Sustainable Finance Action Plan" to enable directing finance towards sustainable growth and for associated transformation of high impact industries. For the building sector related economic activities [the proposal had defined technical screening criteria for new construction and renovation for the fourth environmental Taxonomy objective: transition to Circular Economy.](#)

[A successfully defined circular taxonomy has the potential to support and incentivise EU resource efficiency objectives.](#)

In April 2022, the study consortium consisting of Green Building Council Espana, Croatia Green Building Council, German Sustainable Building Council Green Building Council Denmark, Austrian Green Building Council, Climate Positive Europe Alliance, Swiss Sustainable Building Council, Bulgarian Green Building Council and the Dutch Green Building Council initiated the study for "Assessing the market-readiness of the proposed Circular Economy EU Taxonomy Criteria for buildings".

The study consortium was joined by 29 market participants, who provided case studies, applied the proposed criteria to projects and contributed with their expertise, market know-how and time. Together the [market participants from Austria, Belgium, Denmark, France, Germany, Ireland, Spain, Switzerland, The Netherlands and Turkey applied the criteria to a total of 38 buildings](#), which not only enabled an assessment of the market-readiness but also the formulation of invaluable recommendations for the European Commission and the Platform on Sustainable Finance.

1.1 Study Rationale

Considering the crucial role of the real estate sector for a successful transition to a resource-efficient circular economy, the inclusion of Circular Economy in the EU Taxonomy can be a valuable trigger to speed up the transition.

Since publication of the criteria for Climate Change Mitigation, in 2021 and 2022 many financial institutions have been focussed on building up know-how on implementing Taxonomy regulations establishing internal processes to avoid allocation of funds to non-resilient projects. [Implementing circular practices however is still perceived as a challenge both among strategic market participants and the real economy.](#)

By applying the proposed Taxonomy criteria to real case studies, the study intends to understand preparedness of various market stakeholders for implementing the proposed criteria. Additionally, the study builds capacities to spread know-how of the requirements and how to implement them.

Further, by testing the Taxonomy, [valuable insights and recommendations could be derived for the Platform on Sustainable Finance and the European Commission](#) to help shape the criteria into a functioning system at the core of a resilient European economy.

1.2 Objectives

Redevco has set ambitious targets in terms of whole life carbon and circularity, as we see these as critical elements in addressing the climate crisis. However, reporting on circularity and circularity-related environmental topics is difficult, as frameworks and benchmarks do not always exist or align.

We hope to acquire a better understanding of how our current policies align with the EU Taxonomy requirements and where these would need updating. Furthermore, good reporting needs assurance on information, which will be derived from various sources. This study should help in firstly identifying what data is still required and secondly what is needed to ensure a common reporting framework can be established.

Guido den Teuling. Sustainability Manager at Redevco B.V.

The study's primary aim is to [guide the transposition of the Taxonomy's technical screening criteria into market practices](#) and processes that in turn will support firmly embedding Circular Economy principles in the construc-

tion and real estate sector in the EU. By testing the Taxonomy criteria on real projects, the study assesses the strength of the proposed criteria in delivering the envisioned impact of the Taxonomy and

¹FIEC Statistical Report 2021 | ²Circularity Gap Report 2021 | ³Platform on Sustainable Finance: Technical Working Group: Part B – Annex: Technical Screening Criteria, 03/22

identifies challenges, costs and benefits of implementing the related processes for market stakeholders. The objective of the first phase of the study was to provide the European Commission and the Platform on Sustainable Finance with market feedback on the criteria, which was based on the findings of the application of the criteria using the case studies.

1.3 Methodology

1.3.1 Introduction to the Taxonomy criteria

As part of the EU “Sustainable Finance Action Plan” the EU Taxonomy aims at establishing a clear and detailed classification system to mobilise finance for sustainable growth for transforming improvements in existing industries. In July 2020, the Taxonomy Regulation came into

The objective of the second phase was aimed at participating organisations, to provide training and insights regarding verification of their respective projects. These insights will enable capacity building within the participating organisations and will help to disseminate knowledge on implementation.

force, establishing the basis for the EU Taxonomy by setting out the conditions that an economic activity has to meet in order to qualify as environmentally sustainable. The EU Taxonomy proposal includes six environmental objectives:

-  Climate change mitigation
-  Climate change adaptation
-  Sustainable use and protection of water and marine resources
-  The transition to a circular economy
-  Prevention and reduction of environmental pollution
-  Protection and recovery of biological diversity and ecosystems

To qualify as being environmentally sustainable in keeping with the Taxonomy, economic activities must make a substantial contribution to at least one of these six objectives. At the same time, they must have no significant detrimental impact on the other five. The term used for this principle is ‘Do No Significant Harm’ (DNSH).

The Climate Delegated Act detailing the technical screening criteria for climate change adaptation and mitigation objectives were published in December 2021.

In March 2022, the Platform on Sustainable Finance proposed technical screening criteria for the “transition to a circular economy” for the economic sectoral activities renovation and new construction. In October 2022, the Platform on Sustainable Finance published a Supplementary Report extending the definitions for the construction and real estate sector with criteria for demolition of buildings and other structures. As these were published post study initiation, they were not part of the study.

1.3.2 Evaluating Taxonomy conformity

Questionnaires for Evaluation

For evaluating the market-readiness of the proposed Taxonomy circular economy screening criteria, the project team developed two questionnaires (see Annex I) for new construction and renovation activities. The questionnaires covered the requirements for substantially contributing to the Transition to Circular Economy derived from the Platform on Sustainable Finance’s report and ‘Do No Significant Harm’ in relation to Circular Economy technical screening criteria from Annex I and II of the Delegated Act. In addition, the questionnaires also covered the requirements for the DNSH criteria for the other environmental objectives and the minimum requirements for

acting in compliance with the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights.

The conformity of the other DNSH criteria was assessed for providing companies their project-specific feedback. These however do not form part of the scope of the study, given that these criteria are already finalised as part of the adopted Climate Change Mitigation and Climate Change Adaptation taxonomies respectively. The questionnaires further included proposals for documentation, additional instructions on references to the Level(s) framework and an additional section on evaluating the reliability of the provided response, which was developed by the GBCs.

Trainings and Interviews

In addition to the questionnaires, market participants were able to join two training sessions. Following the study’s kick-off in June 2022, market participants were offered the opportunity to join an introductory training session, comprising of circular economy strategies, circular economy instruments and business models in the built environment. The second session, was focused on the technical screening criteria for significant contribution to a circular economy economy and referenced Level(s) indicators, in order to spread know-how on application.

Participating companies were interviewed in order to gain deeper insights regarding companies’ status quo in dealing with impact data in relation to sustainability aspects, their interest in green financing, their engagement in following the development of the Taxonomy and their internal targets and strategies reflecting sustainability objectives. The interviews assisted the project team in understanding participants’ motivation for participating in the study and the companies’ organisational structure.

Data Collection & Evaluation

After being trained and interviewed, the data collection was initiated, whereby market participants had six weeks from mid-July until the beginning of September to collect documentation on their case study and fill in the questionnaires provided by the study group. Multiple Q&A sessions were offered during the data collection phase to market participants, to discuss questions and challenges in understanding the technical screening criteria, application to projects and collecting documentation with the core study group and their peers.

The data collection resulted in completed questionnaires and supporting proof documentation, which was submitted to the relevant GBCs. On the basis of this documentation, the project team was able to evaluate the projects for their alignment. These evaluations were based on assumptions depicted in Annex I and based on information available at the point of data collection and evaluation (Summer 2021).

An [initial summary of the current market readiness was compiled in a report⁴](#) and published in October 2022. These were further presented in a [virtual roundtable to members of the European Commission and the Platform of Sustainable Finance](#) in the beginning of October to provide insights for better defining the delegated acts that will extend the existing Taxonomy regulations.

Market participants received a [company-specific report including a descriptive summary of the Taxonomy evaluation](#) of their submitted case study. The reports comprised further insights on data quality and entailed recommendations and comments for each participating company.

Centrepiece of the company-specific report is the graphical depiction of the assessment of alignment of each

submitted project. Presentation of the results mirrors the questionnaires used during the phase of data collection, also providing information on fulfilling the prevailing DNSH requirements. For an example of the company-specific reports, please see Annex II.

Throughout the study, the GBCs were supported by the 23 members of the Advisory Board, who brought in their expertise and experience around the topic.

1.3.3 Evaluating the data reliability

Similar to the GBC's Taxonomy study conducted in 2020, the supporting evidence documentation was evaluated for data reliability. Considering that there are several initiatives on defining a building's sustainability performance also in correspondence to its financial performance, a lot of effort has gone into developing frameworks and tools, e.g. defining sustainability metrics by integrating the risk perspective from an ESG point of view.

With varying frameworks, methods and definitions being applied in the market today, the common objective of enhancing transparency on a project's sustainability performance needs to be focussed. Consequently, providing information on reliability of the evaluation of sustainability performance is an essential building block to assess the correlation between environmental and financial performance and Taxonomy alignment.

Especially when applying the circular economy criteria, while methods within Level(s) were referenced, some proposed requirements have been left undefined or it is optional how the alignment can be documented.

In documenting criteria, where methods were undefined, the study group mostly referenced widely applied methods defined within different sustainable (green) building rating schemes.

The project team therefore recommend to [determine a data quality indicator](#) according to the methodology developed within the previous EU Taxonomy Study in relation to the environmental objective climate change mitigation: Evaluating the market-readiness of the EU taxonomy criteria for buildings (March 2021)⁵. This methodology considers three aspects:

1. Basis for the evaluation: quality of applied method
2. Level of competence of the person evaluating the conformity
3. Independent verification: degree of independence of the person evaluating conformity

With the semi-quantitative method, a data quality indicator is computed and can be interpreted as depicted in table 1.

| Data quality indicator | Classification of reliability |
|------------------------|-------------------------------|
| N/A | Not assessable |
| 0 | No reliability |
| >0-1 | Low |
| >1-2 | Medium |
| >2 | High |

Table 1: Classifying the data quality indicator

The evaluation of a project's Taxonomy alignment in combination with determining the data quality indicator, the trust and reliability of the evaluation can be integrated into valuation, risk analysis and financing decisions across the differing industries of banking, investment and insurance. This ultimately will help in scaling up financial flows towards reliably sustainable properties.

⁴DGNB, GBCe, DK-GBC, ÖGNI, SGNi, CGBC, BGBC, CPEA (2022): Recommendation to the European Commission and the Platform on Sustainable Finance

⁵EU Taxonomy Study (2021)

Market

2.1 Snapshot Market Participants

Participant profiles and motivation for participation

Among the 29 market participants, different sector viewpoints were represented, with project developers being the majority and construction companies, consultants, investors, banks, asset managers and corporate real estate adding their perspective, as depicted in figure 1.



Figure 1: Overview of market participants

Market participants stated that **circularity is perceived as an integral part of sustainability, yet implementation of circularity on building and project level was mostly conceived as a rather vague topic lacking a clear approach**. Thus, when looking at ranking the environmental objectives of the EU Taxonomy, climate change mitigation was rated as a key focus objective with biodiversity coming in second place and, climate adaptation or circularity only being rated as the third most important environmental objective of the EU Taxonomy, as seen in figure 2.

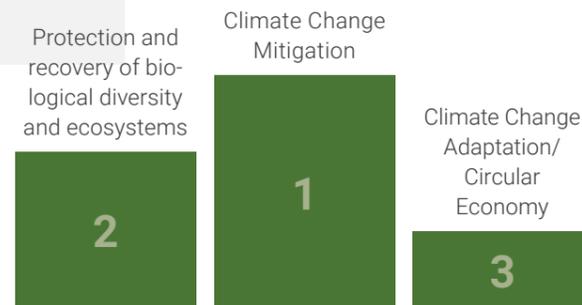


Figure 2: Perceived relevance of the EU Taxonomy defined environmental objectives

Recognising circularity as an integral aspect of sustainability and acknowledging the relevance of circular economy for a sustainable construction sector, market participants wanted to gain a more detailed understanding on (future) regulatory obligations for alignment and to adapt company strategies in terms of regu-

lation and data requirements for reporting obligations. The practical application of the Taxonomy criteria helped to identify and assess the type of data required, its availability and accessibility. Furthermore, market

participants were motivated by being able to showcase their front-runner status and avoiding future risks due to lack of know-how.

However, participation in the study further also helped in communicating the urgency of the topic within the participating companies and spreading awareness among colleagues. Finally, market participants appreciated the ability to connect with other participants to understand the preparedness of peers and compare peer performance.

All market participants were keen to participate in giving feedback to the Platform on Sustainable Finance.

Banks and financial institutions are mostly concerned with the application of EU Taxonomy criteria across different sectors and the non-financial reporting regulations. Therefore, their main objective was **to understand the market readiness** and impact of the circular economy criteria for the clients within the building sector and **to gain practical experience**, to enable future assistance and assessment with clients' implementation as a financial institution.

We believe that circularity in the real estate sector will only succeed if it is measurable and we manage to have common indicators across the EU. Hence our interest in participating in this study. We understand that studies will provide common data and market feedback that in turn will help not only the financial sector to know the degree of circularity of a development but also all the stakeholders involved. These efforts will increase the credibility of the sustainability concept by minimising "green washing". We are aware that it will not be an easy path and will require great effort from the companies, but we are convinced that it is the only possible way.

Juan Manuel Borrás, COO at Culmia Desarrollos Inmobiliarios SLU.

Project Developers are significantly affected by the EU Taxonomy at an operational level, requiring adapting planning and execution of projects. Therefore, the main objective of this market participant cluster was **to gain know-how on the circularity performance of their projects, defining relevant indicators and understanding which data is required to document alignment in future**. Consequently, required **effort and cost could be determined**, influencing future strategic decisions, e.g. whether Taxonomy alignment via the environmental objective Circular Economy would be a viable option in future. In addition, project developers were able to **identify future**

optimisation potentials, ranging from adding on to existing databases to managing sustainability-performance tracking of projects.

The **consultancies**, though mainly participating for their clients projects, aimed at **understanding how existing regulations, standards and methods** were aligned with the Taxonomy's circular economy requirements how documentation would be interpreted for alignment in future while also supporting them **with translating the criteria into national contexts and seeking peer to peer exchange regarding reporting requirements**.

Snapshot: Circular Economy among market participants

Circular economy implementation in the building industry is vital to achieve waste minimisation, decarbonisation and climate change mitigation according to 2030 – 2050 European objectives. The EU Taxonomy and the Level (s) framework are both essential tools to drive the transition towards sustainability and circular economy. To apply the criteria the methodology should be adjusted to the market reality as well as accompanied by an easy application of digital tools. Understanding the process may facilitate technology integration from the initial project stages.

Toni Escudé, Head of Health & Sustainability at 011h SUSTAINABLE CONSTRUCTION S.L.

Many of the market participants stated during the interviews that even though **circular economy was defined as an overall objective** within their company, the setting of clear targets is still in the early phase, as **clear action plans are still missing**. If set, targets were focused on increasing the recycling rates or reducing waste. However, circular economy was mostly defined as third priority after the environmental objectives of climate change mitigation and adaptation. By not having defined clear key performance indicators in reference to circularity, not only implementation of measures is hindered but the monitoring and tracking of progress is equally impossible.

The early adopters among the group of market participants outlined that **the use of digital tools**, digitising planning processes, and collecting data on the buildings' circularity by using available indices, **significantly help in implementing circularity targets**, not only by enabling tracking of the targets, but also by enabling documentation. Additionally, large project developers go as far as building their own in-house material warehouse bank, to facilitate in-house re-use of materials.

However, even early adopters currently mostly focus on the implementation of lighthouse projects, rather than transferring key learnings to existing standard construction methods and slowly moving towards scaling of circular approaches.

The Banks among the market participants stated that circularity was of lower importance in comparison to EU Taxonomy alignment in general. For the investors amongst the group, at present, circular economy hardly affects the company strategy and daily business either, as responsibility of circular implementation and compliance is delegated to project developers.

Project developers explained that pioneering the implementation of circularity at building level is owed mostly to personal beliefs and generational change within their companies.

The necessary willingness to cover the perceived additional costs is lacking. They did concede that they are also driven by the increasing demand for sustainable building by investors, future tenants and building users.

The challenges in transitioning towards a more circular economy among market participants, as shown in table 2:

| Lack of data availability/transparency | Lack of know-how for implementation | Lack of circular materials and products | Regulatory restrictions |
|--|--|---|--|
| <ul style="list-style-type: none"> · Missing information on quality and availability of (secondary) resources · Lacking data for analysing and tracking circular performance · Gaining access information required for closing loops · Lack of digitisation for cross-divisional data management | <ul style="list-style-type: none"> · Determining which indicators/KPIs are relevant · Identifying relevant information for data collection (e.g. among waste management companies) · Discerning key methodologies and tools · Identifying available (secondary) circular materials | <ul style="list-style-type: none"> · Lacking central data platform to access circular products · Limited availability of circular materials and costs in obtaining them · Lack of traceability | <ul style="list-style-type: none"> · Existing design practices do not take account and hinder circular thinking · Nationally and Europe-wide varying standards and requirements for circular materials |

Table 2: Perceived challenges in implementing circularity

Yet, market stakeholders also pointed out a number of **opportunities by implementing circular economy practices**, which have gained in importance due to the high cost and limited availability of building materials. Circularity thus not only **enhances economic viability**, but also has a **core positive impact on environmental performance from a lifecycle perspective**.

For scale-up effects, serial production is perceived as one necessary solution to ensure long-term circularity in buildings. In addition, **the emergence of new business models for accessing materials and components** from renovations and demolitions and utilising materials,

which can be reused after future demolition are key opportunities perceived among the participants.

Snapshot: Implementation of the EU Taxonomy

Since the GBC's EU Taxonomy study was published in March 2021, the relevance and interest in the EU Taxonomy has increased significantly due to the high regulatory pressure perceived by the market participants. The majority of market participants started that **internal processes are being adjusted to allow for better data collection in future, by digitising processes and intensifying**

cooperation between different departments. Therefore, depending on the environmental objective which is being considered, the preparedness and data availability varies greatly.

Due to preparation for reporting requirements from 2023 onwards, banks and investors mostly had defined sustainable finance frameworks and determined their ESG strategy, thereby mainly focusing on the existing two environmental objectives, as defined by the EU-Taxonomy, i.e. climate change mitigation and adaptation.

Consequently, ESG due diligence processes or conducting climate risk analysis for acquisitions have been added to standard operating procedures. Investors are not only adding EU Taxonomy related aspects to strategic decisions, they have also added reporting specifications

and internal benchmarks linked to EU regulations to their investment decision-making processes.

Project developers, who are mainly affected by the EU Taxonomy at an operational level, still perceive a lack of awareness and know-how among market stakeholders.

Among the project developers however, country differences prevail, with project developers in some European countries aiming at ensuring Taxonomy alignment with the majority of future buildings and choosing materials and project sites according to EU Taxonomy criteria, while some Spanish participants openly acknowledged that extensive training initiatives are being focused on in preparation of future implementation. This group of participants, is thus still in the process of establishing clear methodologies and Taxonomy related processes, i.e. life cycle analysis or climate risk analysis.

2.2 Case Studies

In summary, the 29 market participants submitted 38 buildings as case studies. The buildings were located in Austria, Belgium, Denmark, France, Germany, Ireland, Switzerland, Spain, The Netherlands and in Turkey, as seen in figure 3.

From these, 3 buildings were assessed against the technical screening criteria for renovations and 35 buildings were assessed against the criteria for new construction activities.

As seen in figure 4, the majority of the case studies are projects, which have or are in process of obtaining a sustainability or green building certification according to the systems of DGNB, VERDE, BREEAM or LEED.

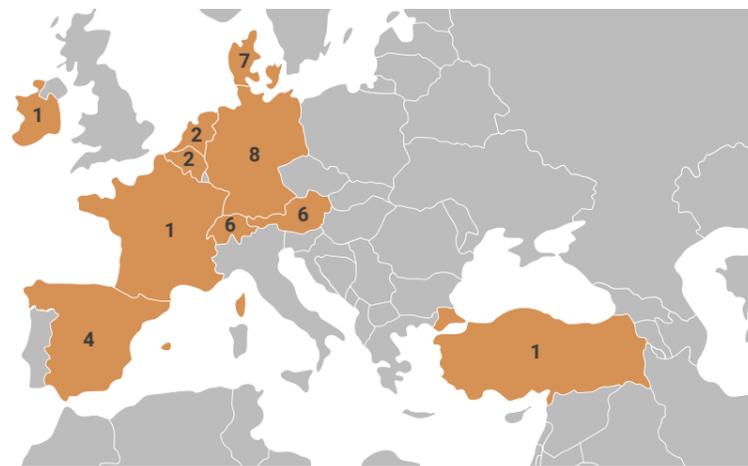


Figure 3: Analysed Case Studies

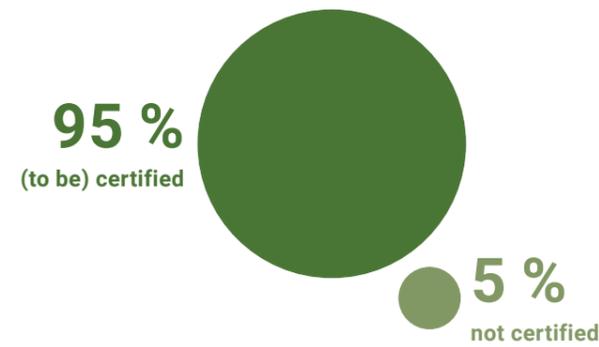


Figure 4: Share of certified projects

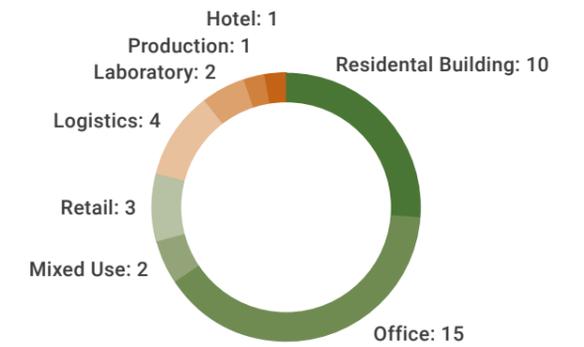


Figure 5: Building types of analysed case studies

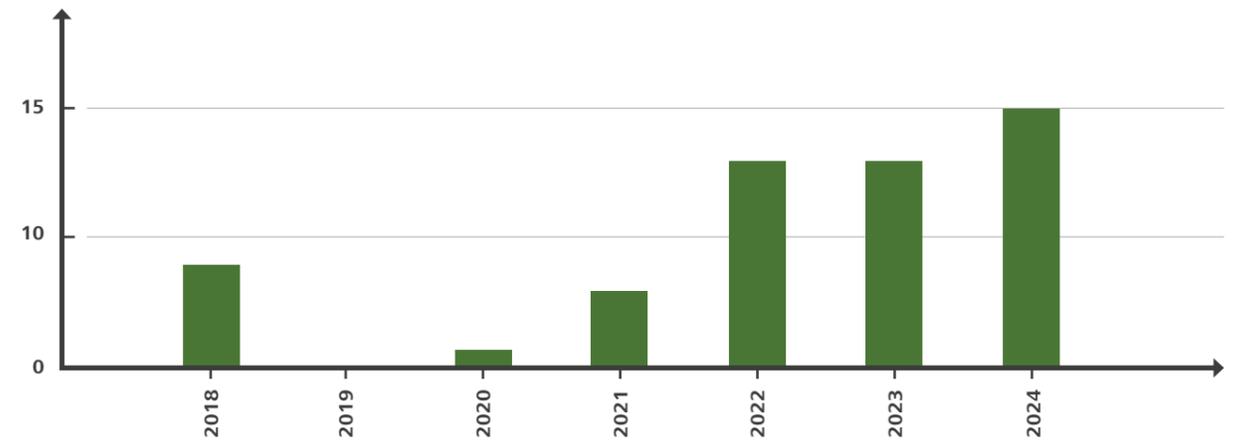


Figure 6: Completion date of analysed new construction projects

The case studies covered different building types, with a clear majority in office buildings and residential buildings, as seen in figure 5.

From the 35 case studies regarding the technical screening criteria for new construction, the vast majority of projects are still in the (early) planning phase with projected completion date in 2024, as seen in figure 6.

Results

3.1 Evaluating the market-readiness for the Circular Economy Taxonomy

According to the screening criteria proposed by the Platform on Sustainable Finance in March 2022, [neither the 35 new construction projects nor the 3 renovation projects can be classed as Taxonomy aligned](#). To enable this classification, assumptions as described in the methodologies and the questionnaires in Annex I, which were based on the information available at time of evaluation (2021) were required. Taxonomy alignment implies that all defined criteria are fulfilled, as depicted in figure 7a, however, in the following analysis the focus is on significantly contributing to Circular Economy in particular, where each requirement is evaluated separately. Market participants stated that [5 % of the submitted projects had set a special focus on enhancing circularity in their projects, however even these were not aligned to the criteria](#). Figure 7b shows the degree of circularity in all new construction projects, with the majority of projects aligning to less than 50 % of the proposed Taxonomy criteria.



Figure 7a: Conformity to the EU Taxonomy



Figure 7b: Degree of circularity of analysed new construction projects as defined in the proposed Circular Economy Taxonomy screening criteria

● 0 %-25 % ● 25 %-50 % ● 50 %-75 % ● 75 %-100 %

Table 3 shows an overview of all requirements defined for Significant Contribution to Circular Economy in comparison to the Do-No-Significant-Harm requirements for Circular Economy.

| Significantly Contribute to Transition to Circular Economy | Do No Significant Harm to Transition to Circular Economy |
|--|--|
| 1. Treatment of all generated waste according to EU Demolition and Construction Waste Protocol | 1. Limit waste generation using best available techniques, selectively demolishing and using sorting systems |
| 2. Prepare at least 90 % of non-hazardous construction and demolition waste for re-use and recycling | 2. Prepare at least 70 % of non-hazardous construction and demolition waste for re-use and recycling |
| 3. Calculate Life Cycle Assessment of entire building and publish results | N/A |
| 4. Support circularity by designing resource efficiently, adaptable and flexible and dismantlable | 3. Support circularity by designing resource efficiently, adaptable and flexible and dismantlable |
| 5. Retain at least 50 % of the original building (only applicable for renovation) | N/A |
| 6. Build asset comprising of 15 % re-used and 15 % recycled components and 20 % a combination of re-used, recycled or responsibly sourced renewable materials | N/A |
| 7. Confirm that components and materials do not contain asbestos nor SVHCs according to REACH | N/A |
| 8. Use electronic tools to provide information on materials and components used, guidance on future maintenance, recovery and reuse pathways, which are made available to the client | N/A |

Table 3: Overview of Circular Economy requirements within the EU Taxonomy

The first requirement of [adhering to the EU Demolition and Construction Waste Protocol](#) was met by around 90 % of the evaluated projects.

For the second requirement, which sets a benchmarking of [recycling at least 90 % of the building and demolition](#)

[waste](#) only around 40 % of the projects met this target, as depicted in figure 8, whereas overall around 70 % achieved to the DNSH benchmark of having to prepare 70 % of the non-hazardous construction and demolition waste for reuse and recycling. Buildings being completed either in 2023 or 2024 were not able to provide proof

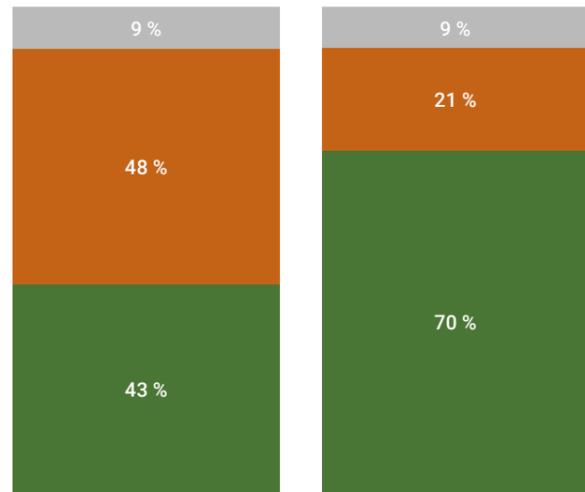


Figure 8: Share of projects aligned, non-aligned and non-assessable to the second requirement of reusing and recycling 90% (significant contribution, left column) or 70% (DNSH, right column) of the construction and demolition waste

documentation, while buildings still in the planning phase set out declarations of intent to fulfil the 90% in order to be Taxonomy-aligned, as the waste balance would only be available in future. Consequently, the data reliability for projects classed as aligned is low. For a higher data reliability, waste balances would need to be assessed.

Considering the low number of projects in certain countries, the comparison was only done where around 4 case studies were available, therefore Benelux was grouped into one. It can be noted, as depicted in figure 9, that around 60% of the projects in Austria and Denmark were aligned, while in Germany data was unavailable and in Switzerland 60% of the projects were not aligned to reusing and recycling the non-hazardous construction and demolition waste.

The third requirement for [conducting a life cycle analysis](#) was fulfilled by around 90% of the projects. This result however, is not market representative, as according to the

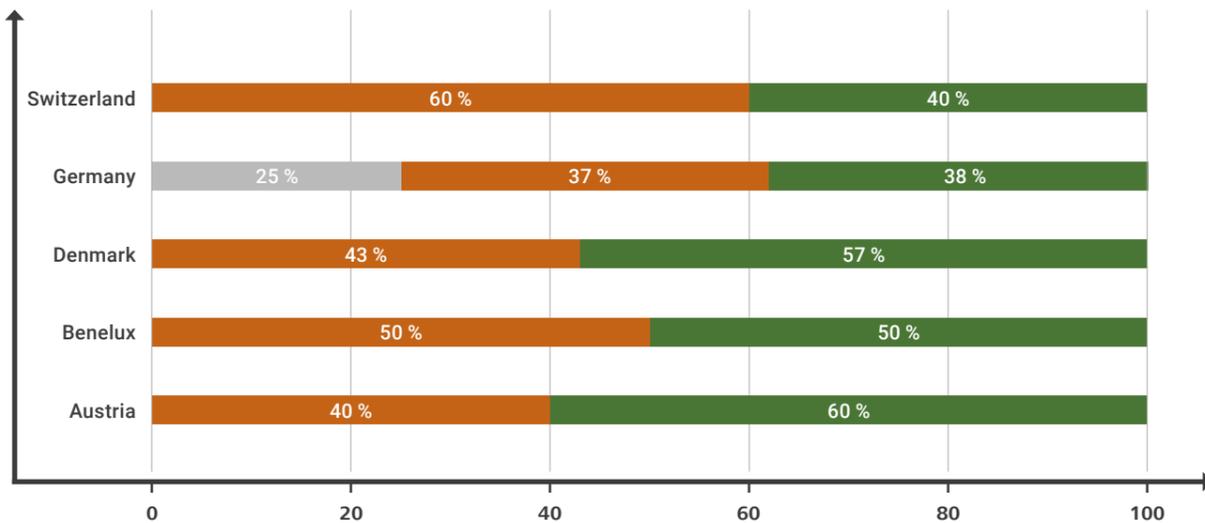


Figure 9: Country comparison: reusing and recycling 90% of construction and demolition waste

● Non-Compliant ● Data unavailable ● Compliant

Investment market Green Buildings 2022⁶, around 26% of the investment volume are being certified, whereas in this study, around 95% of the projects are (being) certified. In all certification schemes used within the study group conducting a life cycle analysis is central part of the certification process. The non-certified projects did not fulfill the requirement of calculating the life cycle analysis.

Especially the requirement of having to [publish the life cycle assessment results](#) in a public register could not be fulfilled by 80% of the projects, as most member states do not provide registers for such publication.

Overall, around 70% of the case studies could classify their building as being aligned to the fourth requirement of [supporting circularity by their building design](#). Circularity is characterised by resource-efficiency, adaptability and flexibility and dismantlability – consequently the case studies were analysed according to the characterisation individually.

Both adaptability and flexibility and dismantlability were documented according to methodologies used in sustainability certifications – around 80% of the projects were able to comply with these methodologies and requirements.

In comparison, around 80% of the projects were classed as aligned and 12% as non-aligned and 8% as non-assessable to the related, third DNSH requirement.

As seen in figure 10 the [majority of projects currently under development could not prove alignment, while projects being completed in the future had declared their intention of designing in resource-efficiency, adaptability and flexibility and dismantlability](#).

For the evaluation, however, projects completed in the future and classified as aligned are rated with lower data reliability in comparison to those already completed with a circular design.

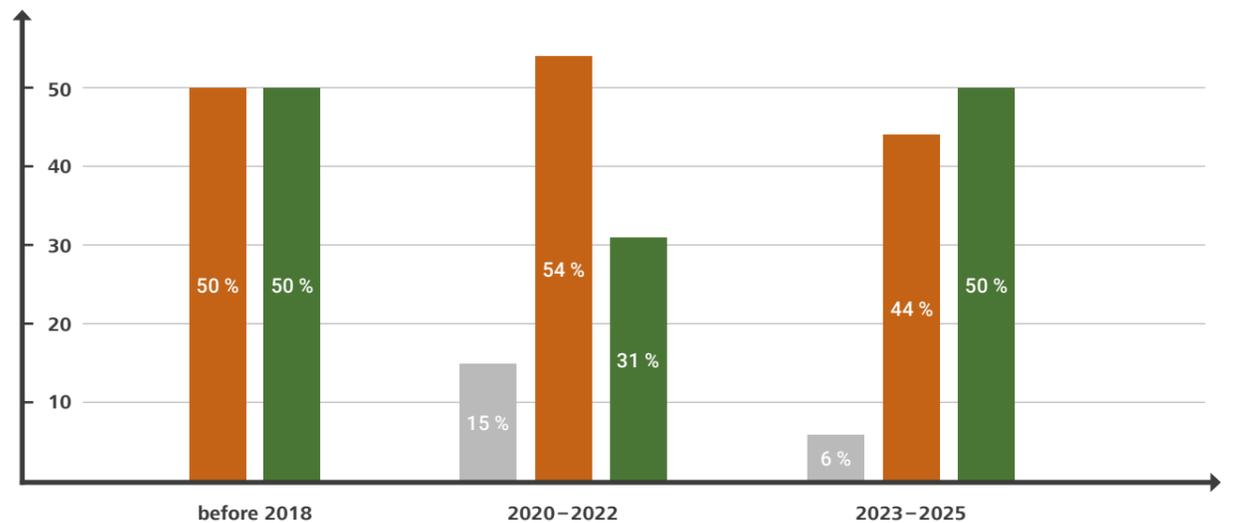


Figure 10: Project stage and alignment to circular design requirement

● Non-Compliant ● Data unavailable ● Compliant

⁶ Investment market Green Buildings, BNP Paribas Real Estate (2022)

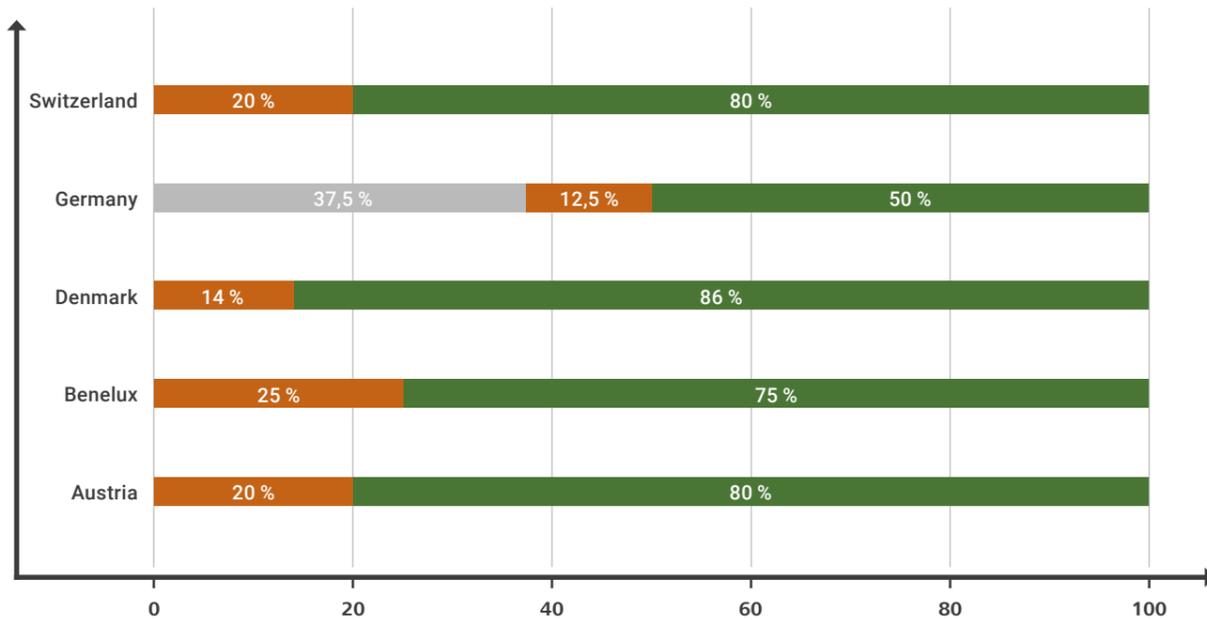


Figure 11: Country differences in documenting alignment to circular design requirements

● Non-Compliant ● Data unavailable ● Compliant

Figure 11 further shows country differences, whereby the majority of projects in Denmark, Austria and Switzerland could prove their projects' circularity design, whereas around 35% of projects in Germany were classed as non-assessable due to missing data.

For renovation at least 50% of the original building must be retained in order to be classed as Taxonomy-aligned. This requirement was assessed with the small data set of 3 projects. As none of the projects had defined the retention as a pre-requirement to be documented, only one project could fulfil the requirement. The topic of renovation is further addressed in Chapter 4.1 Recommendations for the Taxonomy.

In the fifth requirement applicable for renovation at least 50% of the original building must be retained in order to be classed as Taxonomy aligned.

When evaluating the requirements separately and in detail, figure 12 shows that that the quota for responsibly sourced renewable materials and components was fulfilled by around a third of the projects – this being the highest achievement within this particular requirement.

The quotas as defined in the proposed screening criteria could either be calculated by surface or weight and depending which requirement was documented. Varying methods were used to prove alignment, as depicted in

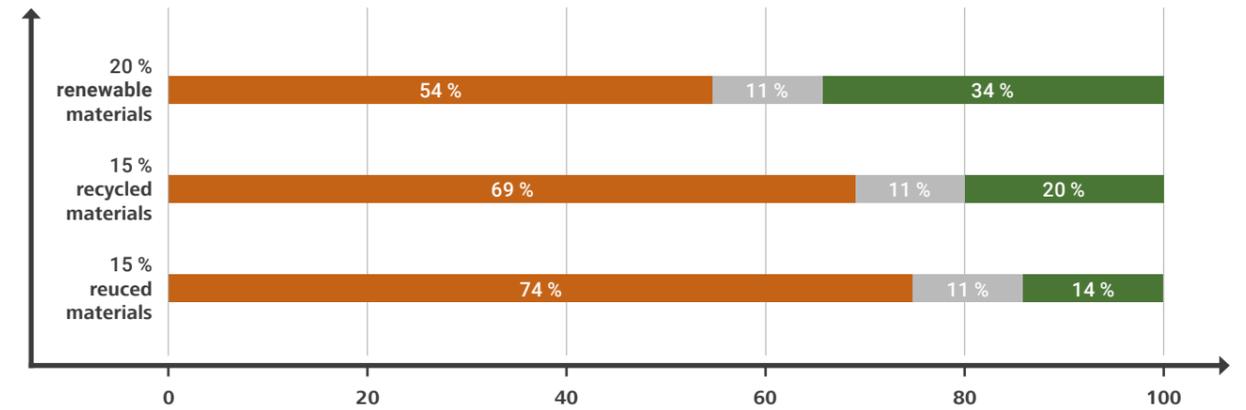


Figure 12: Material requirements within the Circular Economy Taxonomy

● Non-Compliant ● Data unavailable ● Compliant

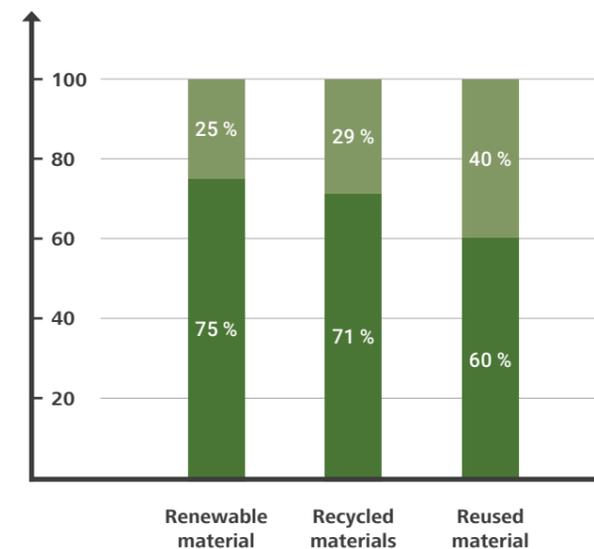


Figure 13: Method of calculation: weight versus surface

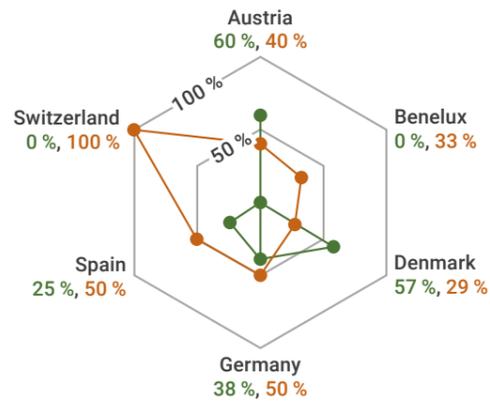
● Compliant by weight ● Compliant by surface

figure 13. As determined in the recommendation report, depending on materials and components, varying methodologies can lead to extra materials being built in to achieve the required quotas.

Projects already completed and under development did not have enough data or were unable to document the high benchmarks defined, in order to be classed as Taxonomy-aligned. Consequently 65% of the projects were non-aligned with the quota and 20% of the projects were classed as non-assessable, as not enough data was available to enable a calculation of the quota.

In the following three radar charts in figure 14 the country differences have been illustrated. As can be seen in all radar charts, the proportion of non-alignment is higher in all countries in all three categories of reusing, recycling and renewable materials and components, except in Austria and Denmark, when looking at responsibly-sourced renewable materials. The remaining proportion of case studies

Responsibly sourced renewable materials

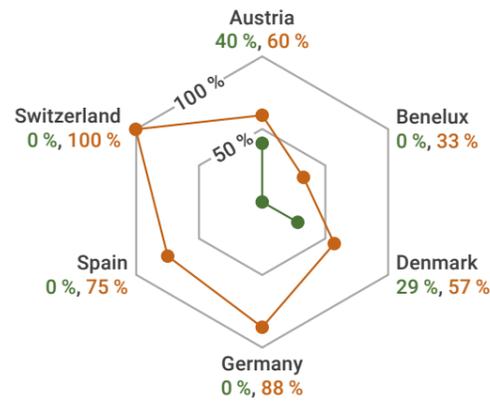


classified as not assessable due to lack of data was left out of the figures for more clarity. Even the projects which had a clear focus of enhancing circularity within their projects, were unable to fulfil the material quota prescriptions.

The seventh requirement for [adhering to REACH and not using components containing asbestos nor SVHCs](#) defined within the technical screening criteria, could be documented and fulfilled by nearly 90 % of the projects.

The final requirement [to use electronic tools to manage and store information of the circularity](#) of the project was fulfilled by around 70 % of the evaluated projects. However, around 60 % of the case studies lacked information on maintenance, recovery and potential reuse pathways, this was information not stored within the electronic tools being used. Information on materials and components was part of the data stored within the electronic tools, which was later also provided to the client. Projects still in the design phase and being completed after 2023 were more likely to be planned using electronic tools in comparison to projects already completed in 2020 or earlier.

Reuse 15 %



Recycle 15 %

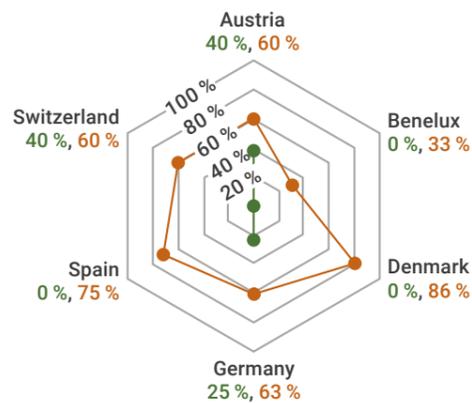


Figure 14: Country comparison for share of aligned and non-aligned projects in terms of reuse, recycle and renewable material benchmark (the radar charts do not depict the remaining proportion of unassessable projects)

● Compliant ● Non-Compliant

3.2 Comparison to DNSH Circular Economy Requirements

A full comparison of the Circular Economy Taxonomy requirements of substantially contributing to the fourth environmental objective is shown in table 3 (page 21). While [none of the case studies assessed could be classed as aligned with substantially contributing to the transition of Circular Economy](#), around 70 % can be classed as

[aligned with the DNSH Circular Economy requirements](#). Similar result can be seen in figure 8 (page 22), where the particular requirement of demolition and construction waste was assessed. In general, no significant variation was found when regarding different building types or asset sizes.

3.3 Rating Data Reliability

Figure 15 depicts how the documentation was rated in terms of its reliability. As shown in table 2, the highest data reliability is expressed with 3, while a low reliability is defined in a data reliability rating of 1. When disregarding the 20 % of requirements, where no documentation was available, [high reliability could be achieved, where the study group had defined clear methodologies for documentation](#) within the questionnaires. Where Taxonomy requirements were not defined clearly, but methods were provided by

the organisations conducting the study, alignment was documented as per methodology provided. Data reliability [also varied depending on the project stage](#): projects still in the design phase had lower data reliability in comparison to projects which were already completed. Submitted documentation was [mostly compiled for \(future\) certification purposes](#), with highest data reliability achieved when calculating the life cycle analysis and for labels used to prove that renewable materials were responsibly sourced.

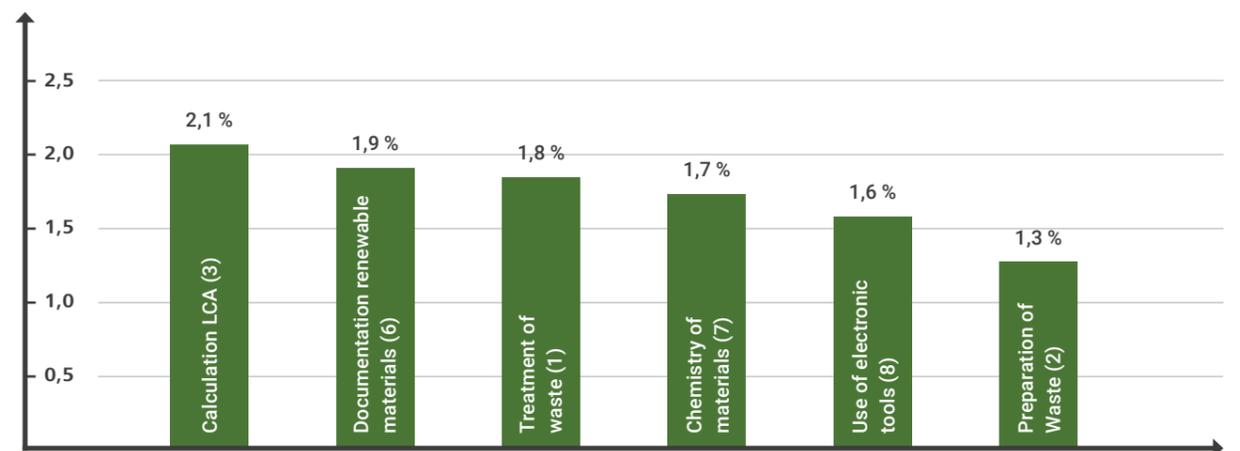


Figure 15: Data reliability and circular economy requirements (numbering according to table 3)

Recommendations

4.1 Recommendations for the Taxonomy

The overall aim of the study was to improve application and determine the usability of the screening criteria. As such, recommendations regarding the finalisation of the criteria for the European Commission and also the Platform on Sustainable Finance were published in an intermediate report. Instead of pushing for more circularity, there is a risk that only the other environmental objectives (i.e. the existing Climate Delegated Act) will be implemented, as the screening criteria for circularity are very ambitious⁷.

In general, to counteract uncertainty in the market, it is necessary to **provide more unambiguous definitions of scope and methodologies, or rather** synchronise with existing and tested methodologies. This further could **prevent the taxonomy becoming too bureaucratic**.

Especially with setting targets for using a certain quota of reused, recycled and responsibly sourced renewable materials, it is necessary to ensure that the necessary circumstances are available to enable implementation. **An extensive circular ecosystem is essential for implementing circularity better.** This would not only entail construction materials and components clearly depicting their recycled content, the toxicology and future circular pathways, but also an improved **infrastructure to access reused materials**, for example in the form of digital procurement warehouses. Regulation would refer to a common set of indicators which would be incorporated on product datasheets of materials and components sold in the EU. Instead of defining highly ambitious rigorous

targets, the requirement should give more leeway to **the decision-maker to decide which quota contributes most to the transition to circular economy within the project.**

Alternatively, instead of defining quotas for reused, recycled and renewable materials and components, the locally rare materials should be defined or rather the quota of locally available materials needs to be determined to ensure that those categorised as rare are used frugally thus determining the clear objective of reusing and recycling rare materials or ensuring their pro-longed use.

Ideally, a Circular Economy Taxonomy would focus on and **further incentivize renovation of existing buildings and ensure targets of the renovation wave are achieved** and create a level-playing field between both the new construction and renovation criteria. Consequently, prior to a new construction project a mandated sufficiency analysis could further enable a greater focus on renovation projects.

4.2 Recommendations for application

The construction and real estate sector has been grappling with difficulties in managing building data and information especially with regard to a whole life cycle approach for capturing data and its subsequent management. Especially for classifying an economic activity in terms of Taxonomy alignment, or rather understand-

ing whether a building is Taxonomy aligned, **data and documentation on the building and construction processes** is essential. Data is often inaccessible as a number of third parties and varying stakeholders are involved in managing and capturing data concerning one particular building.

While having **central data platforms will help in terms of accessibility**, it is also essential that all relevant information is documented and the right methodologies are applied and made available to concerned parties. This requires all **stakeholders along the supply chain to take on the responsibility within their area of influence by documenting and visualising relevant information**: be it the building product manufacturer making transparent and accessible the information on the building components so that architects have access to the information or regulators setting up databases, where data on the life cycle performance is collected and reported instead of

pushing the responsibility of publishing LCA results only towards market stakeholders. By additionally depicting the economic value of used materials and components, implementing circularity would have a further economic incentive.

Project developers or those contributing through their operations towards a more circular economy within the construction and real estate sector can ensure that the groundwork for later implementation is set, by closely following regulatory changes and also by applying the methodologies set out in the Level(s) framework.

4.2.1 Building Material Passports



The accessibility and information exchange on materials is essential to increase circularity in the construction and real estate industry. Therefore, it's necessary to increase transparency of materials used in the building structure as well as the technical building equipment for the entire life cycle of the building. A digital building material passport can provide this transparency as it combines qualitative and quantitative assessments of circularity, pollutants, material composition and environmental analysis. Consequently, a standardised building material passport could be a very relevant optimisation and proof document for certifications and EU Taxonomy checks.



Sebastian Theißen – Managing Partner at LIST Eco

Building Material Passports could prove a very crucial **method of documentation for implementing more circularity** and consequently for the circular economy Taxonomy. Building Material Passports contain all relevant material and technical characteristics of the product and materials used in a building and their quantities. Additionally, they incorporate valuable information for future

maintenance and recovery or reuse pathways. In the proposal for a Building Material Passport published by the DGNB⁸, information on the buildings ability to dismantle was additionally provided, i.e. information on sorting, separating components and chemical compounds. If the **Building Material Passport is made accessible to all relevant building professions** responsible for

⁷At this point, it seems appropriate to add that in the next mandatory review of the Climate Delegated Act, the ambition of the technical screening criteria must be aligned to the objectives set in the Paris Climate Agreement.

⁸DGNB Gebäuderessourcenpass: <https://www.dgnb.de/de/themen/gebaeuderessourcenpass/>

4

Recommendations

the building stock and end users, reuse, recycling or re-processing of specific components is facilitated, thereby avoiding valuable materials and components ending up in landfills at the end of their lifecycle. Ideally, for the implementation of the circular economy Taxonomy, the Building Material Passport would incorporate minimum indicators relevant for alignment.

However, [recycling and reusing requires a corresponding recycling or reuse strategy to be defined in early planning stages](#) which would optimise the entire life cycle of the building in terms of resource efficiency. Adding the dismantling concept in the Building Material Passport, ensures that all relevant information is at one point.

Building Material Passports, as developed in the BAMB project⁹, also integrate information on materials determining the value of the building materials and components for later recovery and reuse. By providing this information even after having built in the materials, the value of the materials products can be maintained even over longer periods, further creating incentives for suppliers to produce sustainable and circular materials, as it facilitates reversed logistics and taking back of products. Developers are supported in making sustainable material choices, thereby building more flexible buildings and existing building managers are enabled to manage the built-in circular materials.

BIM-based Building Material Passports are further tools, which are used to optimise and document new construction projects during planning, as information is available at the respective location where the component is used. This type of digitalisation allows for simplified and quicker calculating of quotas and masses of certain building materials and components, which is an essential part of the currently defined Taxonomy criteria

in comparison to other methods. Furthermore, the digital format of the Building Material Passports could exchange data from building products and the product data sheet (e.g., as the Product Circularity Datasheet PCDS¹⁰ or the standardised Product circularity data sheet as defined in ISO/WD 59040¹¹), which essentially requires open APIs and the specification of which database, software and interface is used. A Building Material Passport linked to its digital twin would help in incorporating all relevant information during the entire life cycle of the building.

⁹BAMB – Buildings As Material Banks (BAMB 2020) | ¹⁰PCDS.lu – Product circularity data sheet | ¹¹ISO - ISO/WD 59040 - Circular Economy – Product Circularity Data Sheet

Outlook

The general outcome is that the proposed circular economy Taxonomy criteria are [highly ambitious and challenging in terms of large-scale application](#) and that at present overall market engagement with the climate change mitigation criteria is higher, raising the question of future levels of reporting against the EU Taxonomy

circular economy criteria. However, despite the perceived challenges, the training opportunities, the peer exchange, testing projects alignment against criteria, identifying existing data gaps will help market participants in [finetuning organizational circular economy strategies for the future](#).

Annex

Annex I: Circular Economy Taxonomy Questionnaire

| Substantial Contribution to Circular Economy | | |
|--|---|--|
| No. | Question | Possible proof documentation |
| 4.1 | a) Is all generated construction waste treated in accordance with the checklist of the EU Demolition and Construction Waste Protocol or related national protocols? | <ul style="list-style-type: none"> Reference to Credits in National Certification Systems <ul style="list-style-type: none"> DGNB ENV1R + TEC1R BREEAM Waste Management on Construction Site EU Demolition and Construction Waste Protocol checklist Level(s) indicator 2.2 Level 3 "Withdrawal report (partes de retirada)" and waste certificates issued by an authorized waste manager |
| | b) Is at least 90 % of the non-hazardous construction and demolition waste generated on the construction site prepared for re-use or recycling? (excluding naturally occurring material referred to in category 17 05 04 in the European List of Waste established by Commission Decision 2000/532/EC479) | |
| 4.2 | Has a life cycle assessment of the entire building been calculated? (According to Level(s) and EN 15978, covering each stage in the life cycle and the results are made publicly available. | <ul style="list-style-type: none"> Reference to LCA Calculations and Results (within legal requirements, certification schemes) Specify if these LCAs meet Level(s) & EN 15978 Reference to publication |
| | b) Have the results of this life cycle assessment been made publicly available? | |
| 4.3 | Do construction designs and techniques support circularity? | <ul style="list-style-type: none"> Provide a concept or a statement of intent |
| | a) Does the construction design demonstrate resource efficiency? | <ul style="list-style-type: none"> Description of measures taken to improve resource efficiency Reference to benchmarks or indicators if available (i.e. Reused Material Content, Recycled Material Content, Regenerative Resource Content, Weight reduction measures, Recyclable content, Material Life Spans, Structural Designs Reducing Resource Intensity) |
| | b) Does the construction design demonstrate adaptability and flexibility? | <ul style="list-style-type: none"> Tools and Benchmarks provided by GBCs: DGNB Criteria ECO 2.1; DGBC Adaptability Tool Level(s) Indicator 2.3 & 2.4, Level(s) 2.4 Calculator V2 Confirmation by Expert with regard to ISO 20887:2020, EN 15643, EN 16309 |

| | | |
|-----|---|--|
| | c) Does the construction design ensure easy dismantlability to facilitate reuse and recycling? | <ul style="list-style-type: none"> Use national methodologies: DGNB: TEC1.6 criterion of the DGNB System; DGBC: Disassembly Potential Measurement Methodology Confirmation by Expert on building dismantlability friendliness in accordance with ISO 20887 and Level(s) Indicator 2.4 Reference to other Tools and Indices i.e. UMI, Detachability Index etc. |
| | Is at least 50 % of the asset comprised from a combination of re-used components, recycled content, or responsibly sourced renewable materials? | see below |
| 4.4 | a) Is at least 15 % of the asset comprised from re-used components? (By weight or surface area) | <ul style="list-style-type: none"> Self-Declaration Expert Declaration Certificates of Origin for Building Products Level(s) Bill of Materials (Indicator 2.1) |
| | b) Is at least 15 % of the asset comprised of recycled content? (By weight or surface area) | <ul style="list-style-type: none"> Recycled Content Certificates i.e. DAP; C2C Reference to DGNB Label Recognition in ENV1.3 Self-Declaration Level(s) Bill of Materials (Indicator 2.1) |
| | c) Are the remaining 20 % comprised from any combination of re-used, recycled, responsibly sourced renewable materials or components? (by weight or surface area) | <ul style="list-style-type: none"> Certificates of origin Recycled Content Certificates (DAP, C2C etc.) for woods: Chain of Custody certification For other renewable materials: Renewable material certification according to international recognized system (ISCC PLUS, RSB Global Advanced Products Certification) |
| | d) Renewable Materials: Do woods, fibers and wood particles verifiably stem from sustainable forest management? | <ul style="list-style-type: none"> Certificates for sustainable forestry (i.e. FSC, PEFC etc.) Chain of Custody Certification Forest Europe Resolution H1 – Compliance Declaration |
| | e) Renewable Materials: Are additional renewable materials certified according to an internationally recognized system? (ISCC PLUS, RSB Global Advanced Products Certification) | <ul style="list-style-type: none"> ISCC PLUS RSB Global Advanced Products Certification Reference to DGNB Label Recognition BREEAM Recognized Responsible Sourcing Certification Schemes |

| | | |
|--------------------------------------|---|--|
| 4.5 | Can you confirm that components and materials used in the construction do not contain asbestos nor substances of very high concern unless authorized or exempted for specific use though REACH? | <ul style="list-style-type: none"> • Self-Declaration • Expert Declaration • DGNB ENV 1.2 Criteria |
| 4.6 | a) Have electronic tools been used to describe characteristics of the building? | <ul style="list-style-type: none"> • Reference to Material Passport or similar Documentation • Reference to Electronic Tools (i.e. BIM Models with material inventory) • Self-Declaration |
| | b) Does the electronic documentation provide information on Materials and Components used? | |
| | c) Does the electronic documentation provide information and guidance on future maintenance? | |
| | d) Does the electronic documentation provide information and guidance on the recovery of materials and components at the end of their lifecycle? | |
| | e) Does the electronic documentation provide information and guidance on potential reuse pathways? | |
| | f) Can the respective information be digitally stored and made available to the client? | |
| Only for renovation projects: | | |
| 4.7 | Is at least 50 % of the original building retained? | <ul style="list-style-type: none"> • Self-Declaration & Reference to Calculation |
| 4.8 | Does the building renovation comply with the applicable requirements for major renovations? | <ul style="list-style-type: none"> • Demand based energy performance certificate |
| | Alternatively: Does the renovation lead to a reduction of primary energy demand (PED) of at least 30 % | |

| DNSH Circular Economy | | |
|-----------------------|--|--|
| DNSH 4 | a) Is at least 70 % (by weight) of the non-hazardous construction and demolition waste generated on the construction site prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials? | <ul style="list-style-type: none"> • Confirmation through building owner on compliance with §14 (2) KrWG • (Summary of) the waste balance according to the GewAbfVf and calculation of quota optional • Tender specification • Waste management concept |
| | b) Did operators limit waste generation in processes related to construction and demolition by considering aspects listed below? <ul style="list-style-type: none"> • using the best available techniques • demolishing selectively to enable removal and safe handling of hazardous substances • facilitating reuse and high-quality recycling by selectively removing materials using sorting systems for construction and demolition waste | <ul style="list-style-type: none"> • Tender specification and Site plans • Contractor's process description • Minutes of reviewing processes • Declaration of architect/construction manager, product manufacturer or operator on removal of building components • Requirements for handling construction materials hazardous to soil and water |
| | c) Does the building design and construction technique support circularity by being designed more resource-efficient, adaptable, flexible and dismantlable? | <ul style="list-style-type: none"> • Documentation according to TEC1.6 of DGNB New Construction System • Documentation according to ECO2.1 of the DGNB New Construction System • Confirmation of architect/structural engineer/product manufacturer on deconstruction friendliness • Declaration on project-specific application of assessment methods for deconstruction friendliness • Declaration on type of assessment method applied |

Annex II: Circular Economy Taxonomy Study Sample company-specific report

| General information | |
|---|--|
| Sample Project A | New construction |
| Location: Sample Street 4, Sample City, Germany | Stage: Project is being developed |
| GFA: 16.000 m2, Type of use: Logistics | Certification scheme: DGNB |
| Taxonomy evaluation | |
| Compliance | Data reliability |
| <ul style="list-style-type: none"> ● Requirement met ● Requirement not met ● Data unavailable | <ul style="list-style-type: none"> ■ ■ ■ Low (Data Quality Index 0-1) ■ ■ ■ ■ Medium (Data Quality Index 1-2) ■ ■ ■ ■ ■ High (Data Quality Index 2-3) |

| Project A | | |
|--|------------|------------------|
| Type: New construction | Compliance | Data reliability |
| Minimum requirements <ul style="list-style-type: none"> • Business and human rights | ● | ■ ■ ■ |
| Substantial contribution to circular economy <ul style="list-style-type: none"> • Re-use, recycling or material recovery of at least 90 % of non-hazardous construction and demolition waste | ● | ■ ■ ■ |
| <ul style="list-style-type: none"> • Calculating life cycle assessment and making results publicly available | ● | ■ ■ ■ |
| <ul style="list-style-type: none"> • Promoting of circular economy through building design and construction technology | ● | ■ ■ ■ |

| | | |
|--|---|-------|
| • At least 50 % of the asset combines re-used components, recycled content or responsibly sourced renewable materials | ● | □ □ □ |
| • Building components and materials do not contain asbestos or substances of very high concern of the REACH regulation | ● | □ □ □ |
| • Fulfilling requirements for the use of electronic tools | ● | □ □ □ |
| "DNSH" Circular economy <ul style="list-style-type: none"> • Re-use/recycling of material recovery of at least 70 % if non-hazardous construction and demolition waste | ● | ■ ■ ■ |
| • Considering waste generation requirements | ● | ■ ■ ■ |
| • Promoting of circular economy through building design and construction technology | ● | ■ ■ ■ |

| Project A | | |
|--|------------|------------------|
| DNSH Requirements | Compliance | Data reliability |
| "DNSH" Climate change mitigation <ul style="list-style-type: none"> • Building use • Fulfilling benchmark for primary energy demand | ● | ■ ■ ■ |
| "DNSH" Climate change adaptation <ul style="list-style-type: none"> • Identifying climate risks and analysis of materiality • Defining measures to reduce climate risks • Not interfering with climate action efforts of others • Climate adaptation measures aligned to regional and national strategies | ● | ■ ■ ■ |

| | | |
|--|---|-------|
| "DNSH" Water | | |
| • Installing water fitting according to requirements of the taxonomy | ● | ■ ■ ■ |
| • Avoiding adverse effects on construction site related to water | ● | ■ ■ ■ |
| • Water use and protection plan for construction site available | ● | ■ ■ ■ |
| "DNSH" Pollution | | |
| • Building components and materials do not contain asbestos or substances of very high concern of the REACH regulation | ● | ■ ■ □ |
| • Compliance to formaldehyde and VOC requirements | ● | ■ □ □ |
| • Examining construction site for soil pollution | ● | ■ ■ ■ |
| • Implementing measures to reduce noise, dust and pollutant emissions | ● | ■ ■ ■ |
| "DNSH" Biodiversity | | |
| • Implementing EIA | ● | ■ ■ ■ |
| • Implementing mitigation and compensation measures for protecting the environment | ● | ■ ■ ■ |
| • Fulfilling requirements for site | ● | ■ ■ □ |
| • Implementing mitigation measures if non-compliance with requirements relating to the property | ● | □ □ □ |

WRITTEN BY

German Sustainable Building Council (DGNB)

www.dgnb.de



Green Building Council España (GBCe)

www.gbce.es



Green Building Council Denmark (RFBB)

www.rfbb.dk



Austrian Green Building Council (ÖGNI)

www.ogni.at



Climate Positive Europe Alliance (CPEA)

www.cpea.eu



Swiss Sustainable Building Council (SGNI)

www.sgni.ch



Dutch Green Building Council (DGBC)

www.dgbc.nl



Published in February 2023