

# Circular economy in the construction, civil engineering and real estate industry

Status mapping

Direktoratet for forvaltning og økonomistyring (DFØ)

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# Summary

## Background and purpose

The transition from a linear to a circular economy is an important part of the work to meet the overarching climate and environmental targets set out in the Paris Agreement, the UN Sustainable Development Goals and Norway's climate and environmental targets and commitments. The construction and civil engineering industry is one of seven priority areas for circular development in the EU roadmap for a circular economy. Activities in the Norwegian construction industry generate more than two million tonnes of waste annually, illustrating the central role the industry has to play in the transition towards a more circular economy.

As part of the follow-up on the "Action plan to increase the proportion of green public procurements and green innovation", the Norwegian Agency for Public and Financial Management will strengthen its guidance on circular construction and civil engineering and has therefore appointed Deloitte to map the status of the circular economy in CCERE procurements. The knowledge platform that has been created will provide a scientific basis for the further development of the Norwegian Agency for Public and Financial Management's guidance on circular construction and civil engineering.

## Process

The knowledge platform is based on data collected through (1) a document review of relevant documents and reports and (2) two group interviews with special interest organisations, contracting authorities in local and central government, CCERE supplier representatives and consultants on the circular economy from a procurement perspective. The group interviews followed an interview guide created in consultation with the Agency and were conducted as semi-structured, interactive workshops.

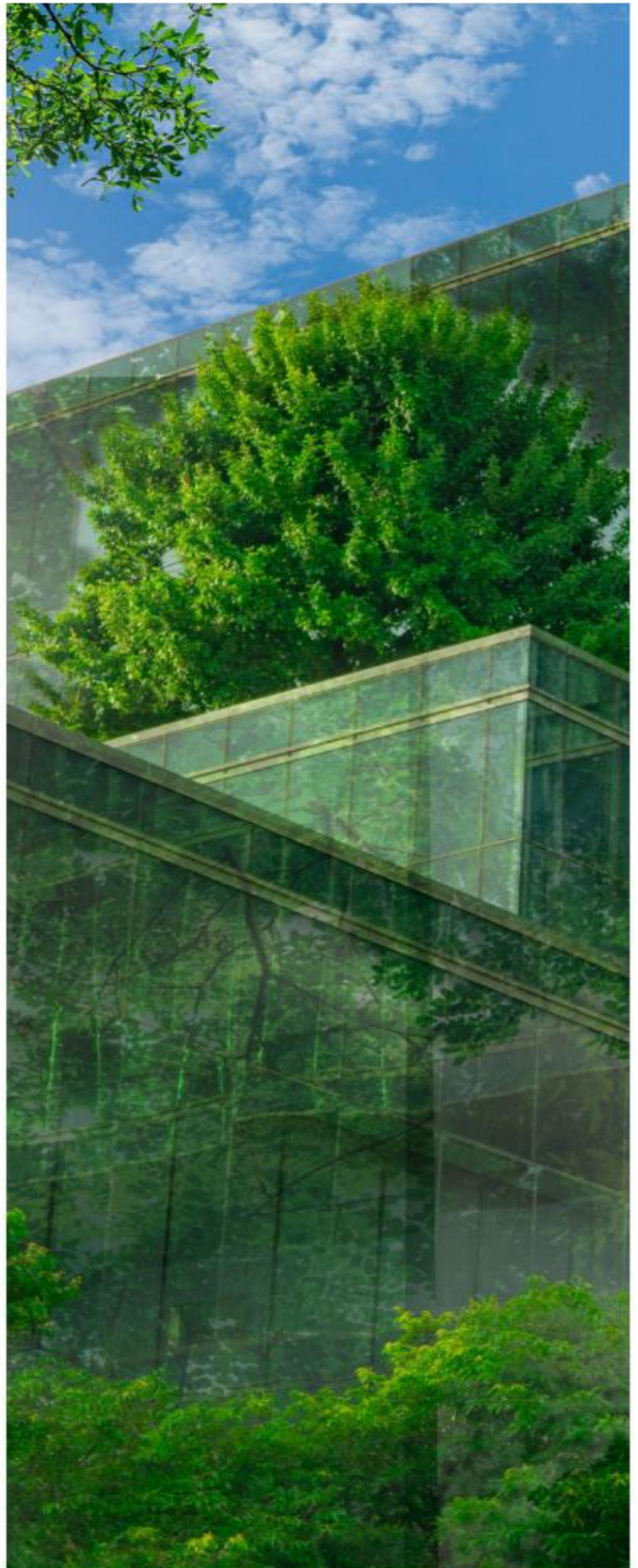
## Results and implications

### Status

There is a clear trend towards a more circular CCERE industry both in Norway and in the neighbouring countries of Sweden and Denmark. Regulatory guidelines, support schemes and initiatives and platforms that have been established clearly show that the circular economy has been moved higher up the agenda. The Netherlands has been highlighted as a model country for the circular economy within the CCERE industry through its role in regulatory design and as an initiator.

### Initiative and platforms

There are also high levels of activity taking place to establish initiatives, instruments and platforms for the circular economy. Platforms for the reuse of materials in the construction, civil engineering and real estate industry (CCERE industry) have experienced a particular boost in recent times, with an increasing number of players offering services for reuse, material recovery and recycling.



**Barriers to the circular economy in the CCERE**

**industry** Industry players unanimously agree that the circular economy is and will remain important to the CCERE industry going forward. Nevertheless, it turns out that it is difficult to achieve a holistic approach to circularity in the industry. This is primarily due to barriers at the time of involvement and the corresponding impact, budget constraints, regulatory provisions that limit the scope of opportunity, challenging logistics and a perceived lack of market to sell reused construction materials, combined with continuously raised expectations and unclear levels of ambition. This is in keeping with the barriers that have been highlighted in the literature, classified as cultural and skills-based challenges, financial challenges, market challenges and structural challenges.

**The role of the Norwegian Agency for Public and Financial Management**

The players in the CCERE industry have found that there are a lot of excellent materials available at Anskaffelser.no. Nevertheless, it transpires that the platform itself places limits on the information that can be found and that the existing guidelines are perceived to be very theoretical and abstract. Furthermore, the Agency is perceived as passive during encounters with the CCERE industry in connection with the circular economy and there have been calls for the Agency to become a more proactive intermediary to challenge needs owners.

**Further recommendations**

The Agency's areas of opportunity are linked to identified barriers and any initiative that could reduce such barriers may be appropriate.

The identified needs are already used as guidance materials to incorporate the circular economy from the design and planning phase, as criteria or checklists that help assess newbuilds versus renovation, for pilot projects with good financial results over time (reduced lifecycle costs) that justify the short-term costs associated with circularity and in assessment overviews of potential circular requirements and overviews of the players available in the market for the sale of reused construction materials. In order to view the barriers in relation to the proposed initiatives to reduce barriers, please see table 1.

It is important for the CCERE industry players that the guidance materials that are drawn up are simple. The industry players have encouraged the Agency to use existing frameworks and well-functioning guidance as a starting point and to extend these for future developments and needs for a circular economy in the CCERE industry. It has been proposed that the guidance be targeted to each ambition level in order to achieve the levels on the maturity scale. However, it transpired from the group interviews that the industry players do not have a clear idea of what sort of guidance they will require for each topic. The industry players' main barrier remains how to think in a circular fashion and *how* to get started with circular procurements in the CCERE industry and there is not necessarily a distinction drawn between reuse, renovation, energy upgrades and efficiency, shared use and the sharing economy, the functionality economy and local ripple effects.

Barrier	Measure
Delayed time of involvement and corresponding impact	Accommodate the involvement of key personnel and the circular economy at an early stage of the decision-making process
Budgetary constraints	Highlight long-term savings through reduced lifecycle costs
Regulatory provisions limiting the scope of opportunity	Presentation of industry-appropriate requirements that go beyond current regulations
Challenging logistics and a perceived lack of market for the sale of reused construction materials	Highlight the options for the sale of reused construction materials
Continuously raised expectations and unclear ambition levels	Highlight model projects and realistic ambition levels

**Table 1 Barriers and associated measures**

### Measures for circularity in the CCERE industry

Countless initiatives, tools, platforms and networks have been established to facilitate circularity in the CCERE industry, nationally and internationally. Despite the fact that circularity in the CCERE industry extends well beyond material reuse, it is clear that the players that offer services for reuse analyses, design tools, mapping, cataloguing and the provision of used construction materials have come furthest in the work to upscale

circular solutions.<sup>109</sup> Untapped potential still exists for the establishment of initiatives and platforms for shared use, energy upgrades and renovation. The tables below present a selection of initiatives/tools and platforms/relevant networks to the circular economy in the CCERE industry. Some of the initiatives and platforms that have been highlighted in the tables below are companies offering these as part of their core activities

### Initiatives/tools for the circular economy in the CCERE industry

Title	Geographic focus	Target group	Description
<a href="#">The Bygg21 signature</a> <sup>110</sup>	Norway	CCERE industry	Signature confirming that your company will support the use of best practices as defined by Bygg21 to help achieve a more sustainable, productive and cost-effective industry.
<a href="#">Level(s)</a> <sup>111112</sup>	EU	Private and public sector building owners	Pan-European methodology to assess and report on the sustainability of buildings from a lifecycle perspective.
<a href="#">Nordic Sustainable Construction</a> <sup>113</sup>	Nordic region	Public sector and European Commission	Aims to establish the Nordic region as a leading region for sustainable and competitive construction and housing with minimal impact on the environment and climate. Engages Nordic legislators, as well as public and private sector players along the entire value chain for construction and civil engineering in Denmark, the Faroe Islands, Finland, Greenland, Iceland, Norway, Sweden and Aland.
<a href="#">Nordic Innovation</a> <sup>114</sup>	Nordic region	CCERE industry	Playbook and support tool to provide companies with a thorough understanding of how to achieve circular benefits
<a href="#">Nordic Declaration on Low Carbon Construction and Circular Principles in the Construction Sector</a> <sup>115</sup>	Nordic region	CCERE industry, education and research	Declaration for Nordic ministers responsible for construction and housing to confirm their commitment to fight climate change and reduce emissions from the developed environment.
<a href="#">The Criteria Wizard</a> <sup>116</sup>	Norway	Local authorities, public sector agencies and others conducting public purchases and procurements	Wording relating to requirements and criteria for environmental and social responsibility and documentation of the requirements that may be imposed in a procurement process. Includes specific requirement specifications for renovation, such as adaptability and reuse of buildings, reduction of energy requirements, etc.

<sup>109</sup> FutureBuilt (s.a.). SHARE & LEARN: Platforms for reuse (open to all)

<sup>110</sup> Bygg21 (s.a.). SIGNATURE FOR AN EFFECTIVE CONSTRUCTION AND REAL ESTATE INDUSTRY

<sup>111</sup> Life Level(s)(s.a.). About the project.

<sup>112</sup> European Commission (s.a.). Level(s)common framework.

<sup>113</sup> Nordic Sustainable Construction (s.a.). ABOUT Nordic Sustainable Construction.

<sup>114</sup> Nordic Innovation (s.a.). Construction - Current state analysis and circular opportunities.

<sup>115</sup> Nordic Co-operation (10/10/2019). Nordic Declaration on Low Carbon Construction and Circular Principles in the Construction Sector

<sup>116</sup> Norwegian Agency for Public and Financial Management (s.a.). The Criteria Wizard - A tool for sustainable procurements

<a href="#">Enova's energy measures for rental properties, care homes, nursing homes and student housing<sup>117118</sup></a>	Norway	Local authorities and rental properties	Support scheme that will stimulate many local authorities to allocate budget funds for energy upgrades. Current projects will be completed before 2025. Will reduce the annual need for purchased energy through reduced energy requirements and renewable energy production.
<a href="#">EU Digital Building Logbook<sup>119</sup></a>	Europe	CCERE industry	Proposal that aims to establish a pan-European approach gathering all relevant data about a building and ensuring that authorised persons can access accurate information about the building.
<a href="#">Materia<sup>120</sup></a>	Norway	CCERE industry	Tool for reuse mapping, including material directories and professional mapping reports. Also provides quality data for marketplaces for reusable materials.
<a href="#">Nordic Swan Ecolabel's Environmental Requirements<sup>121122</sup></a>	Norway	Contracting authorities, building owners	Certification showing that the environment has been taken into account during the entire construction process from raw material to finished structure. The Nordic Swan Ecolabel is also available for renovation projects that are carried out in accordance with strict environmental requirements.
<a href="#">FutureBuilt's criteria for circular buildings V2.0<sup>123</sup></a>	Norway	CCERE industry	Criteria for circularity as environmentally-based decisions on renovations versus demolition, resource utilisation during the demolition and construction phase, reuse of entire building components and reusability and adaptability.
<a href="#">Green Material Guide<sup>124</sup></a>	Norway	Architects, consultants and developers	Early-stage guidance for environmentally sound material choices spanning several key environmental topics. The environmental topics that are considered include global warming, resource base, the circular economy, environmental toxins and indoor climate.

**Table 2 - Initiatives and tools for a circular economy in the CCERE industry**

<sup>117</sup> Enova (s.a.) Support with energy measures for local authority housing

<sup>118</sup> Regjennngen.no (06/10/2022). Strengthens efforts for increased energy efficiency

<sup>119</sup> Publications Office of the European Union (2020). Definition of the digital building logbook.

<sup>120</sup> Materia (s.a.) Our service

<sup>121</sup> Nordic Swan Ecolabel (s.a.). The Nordic Swan Ecolabel's environmental requirements for housing and other buildings

<sup>122</sup> Nordic Swan Ecolabel (s.a.). The Nordic Swan Ecolabel's environmental requirements for the renovation of buildings.

<sup>123</sup> FutureBuilt (s.a.). FutureBuilt's quality criteria.

<sup>124</sup> Grønn Byggallianse (2021). Green Material Guide - Guidance for making environmentally sound material choices Version 3.1.



## Platforms and networks

Title	Geographical focus	Target group	Description
<a href="#">Nordic Circles</a> <sup>125</sup>	Norway	CCERE industry	Develops and supplies environmentally friendly construction materials through recycling projects for offshore metals, such as ships and oil rigs.
<a href="#">Nordic Networks for Circular Construction</a> <sup>126</sup>	Nordic region	CCERE industry	Aims to accelerate circular construction in the Nordic countries through collaboration, peer-to-peer learning and joint calculations.
<a href="#">Nordic Circular Hotspot</a> <sup>127</sup>	Nordic region	Companies, politicians and the authorities	Learning venue for circularity in the Nordic region. Works to promote realisation and implementation in the market by leading and learning from the circular and sustainable transition in the Nordic market.
<a href="#">AV Reuse (Asplan Viak)</a> <sup>128</sup>	Norway	Consultants, contracting authorities and architects	System for reuse mapping and design using used construction materials. The tool provides documentation for tech, BREEM and certifications. AV Reuse can be used to find the materials you need.
<a href="#">Loopfront</a> <sup>129</sup>	Norway	Building owners and contractors	Data-driven opportunity to map material use and waste in the CCERE industry. Makes materials available within your organisation and for external players. Documents savings in NOK and carbon footprint.
<a href="#">Vriml</a> <sup>130</sup>	Norway	CCERE industry	Platform that helps the construction industry reduce greenhouse gas emissions. Digitises physical reuse materials for materials managers and makes them available to architects in BIM.
<a href="#">Madaster</a> <sup>131</sup>	Global	CCERE industry, education and research	Facilitates the circular economy by assigning materials an identity in a digital register. Includes a carbon calculator for the various lifecycle stages of the building. Overview of the value of the raw materials in a reuse market.
<a href="#">Rehub</a> <sup>132</sup>	Norway	CCERE industry	Links supply and demand for reusable construction materials. Provides suggestions for logistics and storage, technical testing, suggestions for the allocation of responsibilities, estimated CO2 reduction. A logistics marketplace is available. A new version with a portfolio module is scheduled for release by the end of 2022.

<sup>125</sup> Nordic Circles(s.a.)

<sup>126</sup> Nordic Networks for Circular Construction (s.a.)

<sup>127</sup> Nordic Circular Hotspot (s.a.). About Nordic Circular Hotspot.

<sup>128</sup> Asplan Viak (s.a.). AV Reuse.

<sup>129</sup> Loopfront (s.a.). A circular collaboration platform that meets your unique needs.

<sup>130</sup> Vriml (s.a.). About us.

<sup>131</sup> Madaster (s.a.). Platform.

<sup>132</sup> Rehub(s.a.).

<a href="#">Resirgel</a> <sup>133</sup>	Norway	CCERE industry	Offers interdisciplinary consultancy services in all disciplines required to realise reuse. Guides the project through the entire reuse process, in close collaboration with the contracting authority, designers and contractors.
<a href="#">Sirken</a> <sup>134</sup>	Norway	CCERE industry	The world's largest self-service reuse container for the construction industry. Provides private individuals with the opportunity to purchase surplus materials from the construction industry. The service has been established on a full scale in Trondheim and work is under way to scale up the initiative in the Oslo region (the existing container is situated in Frysjaiparken).
<a href="#">National knowledge arena</a> <sup>135</sup>	Norway	CCERE industry, local government sector	National and digital knowledge arena for reuse in the construction industry with 18 stakeholders, including Sirkulær Ressurssentral, Pådriv and Resirql. Develops, shares and disseminates knowledge and experience.
<a href="#">Material Mapper</a> <sup>136</sup>	Norway	CCERE industry	Data-driven marketplace and platform for the mapping of surplus materials in construction.
<a href="#">Again X</a> <sup>137</sup>	Norway	CCERE industry	Dashboard that allows for improved risk assessments, planning and monitoring of KPIs relating to sustainability in the real estate sector
<a href="#">SirkTRE</a> <sup>138</sup>	Norway	CCERE industry	Aims to establish a fully circular value chain for wood by facilitating and demonstrating the reuse and material recovery of returned wood in practice.
<a href="#">CoLab</a> <sup>139</sup>	Norway	CCERE industry	Interdisciplinary environment/cluster collaboration with a focus on high-quality, cost-effective and sustainable solutions that can be adopted across the entire value chain in the construction process. Members can test new digital tools without having to absorb the full cost.
<a href="#">Concrete Innovation Cluster</a> <sup>140</sup>	Norway	CCERE industry	National arena for innovation that contributes to a carbon neutral concrete industry by 2030 through knowledge development, collaboration and restructuring.
<a href="#">Global Energiesprong Alliance</a> <sup>141</sup>	Europe	CCERE industry and public sector	Intermediary connecting building owners, construction companies and decision-makers, with the aim of developing energy-efficient buildings with zero emissions.

**Table 3 - Platforms and networks for a circular economy in the CCERE industry**

<sup>133</sup> Resirgel (s.a.). About us.

<sup>134</sup> Sirken (s.a.). About Sirken.

<sup>135</sup> Paadriv(s.a.) National knowledge arena for reuse in the construction industry

<sup>136</sup> Material Mapper (s.a.). About.

<sup>137</sup> AgainX (s.a.). About us.

<sup>138</sup> Sirktre (s.a.).

<sup>139</sup> Construction City (s.a.). CoLab open - cluster collaboration launched for the construction industry.

<sup>140</sup> Betongklyngen (s.a.).

<sup>141</sup> Energie Sprong (s.a.). Global Energiesprong Alliance explained.