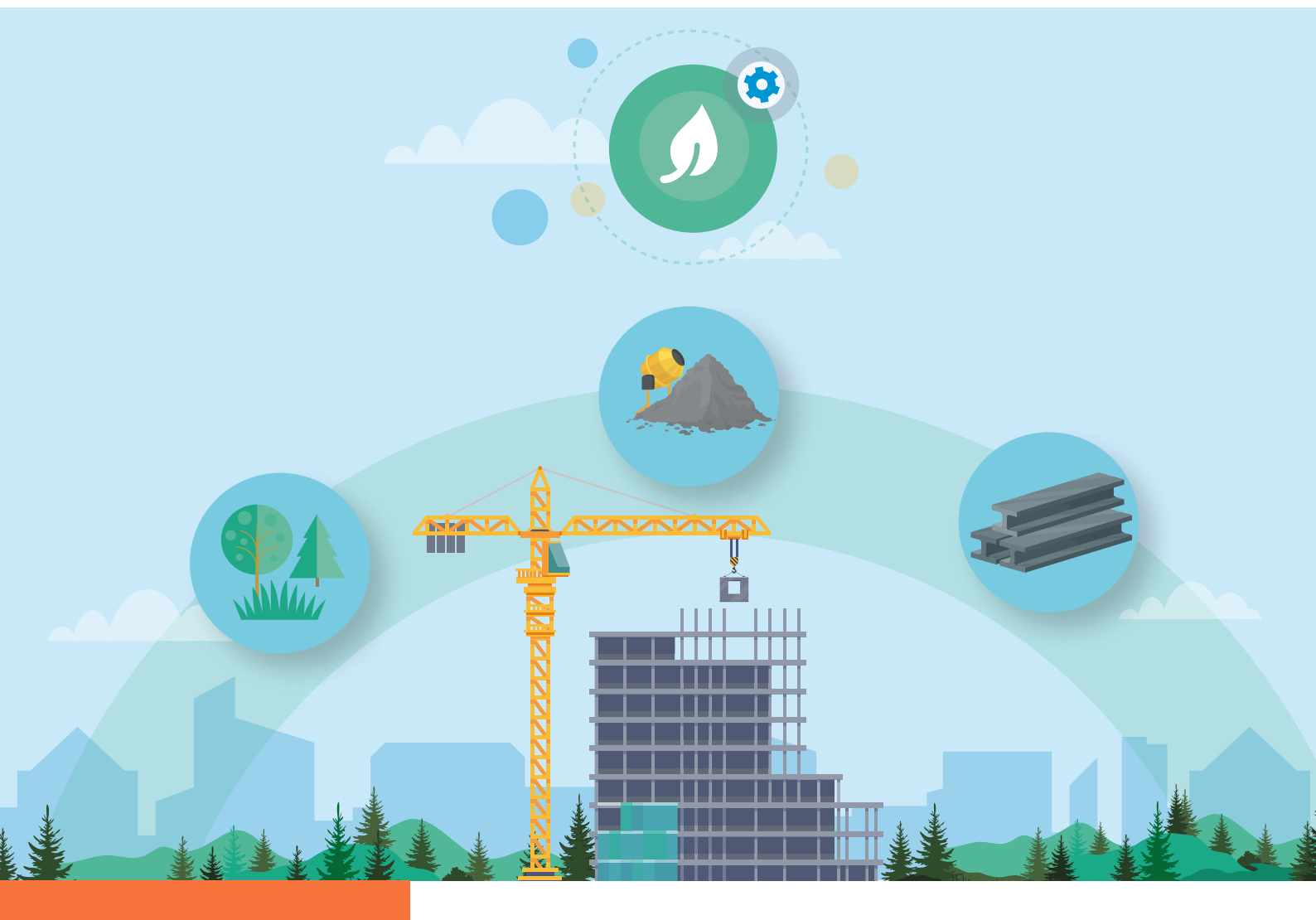


Why does the EU Taxonomy miss the mark on construction?



February 2024



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ECOS - Environmental Coalition on Standards is an international NGO with a network of members and experts advocating for environmentally friendly technical standards, policies and laws. We ensure the environmental voice is heard when they are developed and drive change by providing expertise to policymakers and industry players, leading to the implementation of strong environmental principles.

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Executive summary

Adopted in 2020, the EU Taxonomy Regulation defines environmentally sustainable activities and aims to guide companies and investors to make better informed decisions that will reduce the environmental impacts of their businesses and investments.

The taxonomy framework is implemented via delegated acts adopted by the European Commission. In 2021, the “Climate Delegated Act”¹ introduced key performance indicators (KPIs) that define how the buildings and construction sector, as well as sectors producing relevant materials, can make a ‘substantial contribution’ to mitigate climate change. **The taxonomy misses the mark, however.** These KPIs do not incentivise low-impact construction materials and therefore fail to cover a significant proportion of greenhouse gas emissions in the construction sector.

Building on policy developments initiated in 2023 within construction sector emissions regulation, there is now a unique opportunity for the **taxonomy to accelerate construction sector action on whole life carbon (WLC) emissions.**

On the one hand, we have the Energy Performance of Buildings Directive (EPBD)² and the Construction Products Regulation (CPR)³, which have been under revision in 2023 and nearing final approval. In the coming years, the revised EPBD will progressively phase in whole life carbon targets and limits for new buildings, eventually requiring all buildings in the future to be climate neutral over their entire lifecycle. In parallel, at the level of individual construction products, the CPR will introduce new requirements for reporting lifecycle impacts of products across a series of indicators. This is a key development for improving the transparency of products’ environmental impacts.

In comparison to these developments, the current climate taxonomy criteria are lagging. The taxonomy should support **early adoption of climate impacts calculation and disclosure** of buildings and their construction materials. This would not only improve the climate performance of the built environment but also ensure market readiness for mandatory measures under the EPBD and CPR. **WLC limits should be introduced in the taxonomy as early as possible**, and in any case at the latest when EU WLC benchmarks exist.

On the other hand, a new Taxonomy Delegated Act was adopted in June 2023⁴ with KPIs for the construction sector that are more ambitious than the climate mitigation criteria. For consistency and to **mitigate the risk that market actors deliberately choose the least ambitious criteria**, the Taxonomy Regulation climate mitigation criteria **should be revised as early as possible.**

The European Commission should also **revise the taxonomy climate change mitigation criteria related to the production of construction materials**, specifically for forestry (timber), cement and concrete, and steel. Revised criteria would help to increase the supply and availability of low-carbon materials and thus enable the achievement of WLC targets the moment they come into force.

As the policy mechanism aiming to drive market action, the proposals contained in this paper are not only feasible, but they can also facilitate decarbonisation measures in the construction sector. **We call upon expert stakeholders and policymakers to initiate a discussion and further research on Taxonomy revision.**

4 Why does the EU Taxonomy miss the mark on construction?

Summary of recommendations

The European Commission should **amend the climate mitigation criteria**, based on recommendations from the Platform on Sustainable Finance⁵ to:

1



Revise the scope of the criterion on whole life carbon (WLC) emission disclosures to cover all new buildings and major renovations.

2



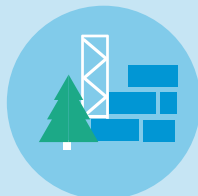
Add a new criterion to disclose the performance of construction products across their 'essential characteristics' related to lifecycle assessment, as defined in the revised Construction Products Regulation.

3



Include a review clause for the inclusion of WLC limits for new buildings based on the framework of requirements created by the revised Energy Performance of Buildings Directive.

4



Upgrade the material production-related criteria to increase the level of ambition, particularly for forestry, cement and concrete, and steel.

The taxonomy covers a wide range of activities in the construction sector

The EU taxonomy: What is it, how does it work, who does it apply to?

The EU taxonomy is a list of 'environmentally sustainable' activities that large companies and financial institutions must report on to attract sustainable finance investments. The 2020 Taxonomy Regulation⁶ defines 'environmentally sustainable' economic activities as a combination of **three cumulative criteria**:

1. The economic activity makes a 'substantial contribution' to one of six environmental objectives:

- Climate change mitigation
- Climate change adaptation
- Circular economy
- Pollution
- Effect on water
- Biodiversity

2. The economic activity does not cause significant harm to any of the five other environmental objectives.

3. Minimum social safeguards are met.

The Taxonomy Regulation requires market participants to disclose their respective performance relating to each economic activity's key performance indicators (also called 'technical screening criteria') The establishment of these indicators is delegated to the European Commission.

In 2021, the European Commission adopted a first set of technical screening criteria for activities considered to make a sustainable contribution to climate change mitigation and climate adaptation – the so-called 'climate delegated act' (Climate DA).⁷

Of the 88 activities listed in the Climate DA, seven relate to the construction sector, such as the construction of new buildings, the renovation of existing ones and their demolition, the acquisition and ownership of new or existing buildings, and the installation of energy saving equipment in buildings. On top of these, several economic activities relate to the production of materials which are key for buildings, such as concrete, steel, or timber.

The reporting requirements of the Taxonomy Regulation are incrementally entering into force:

- **Since 1 January 2022**, all companies currently subject to the Non-Financial Reporting Directive (listed and EU companies with more than 500 employees) must report their taxonomy eligibility. An economic activity is eligible if it has a set of corresponding criteria in the Taxonomy. The reported percentages refer to the proportion of a companies' revenues, capital expenditure, and operational expenditure related to activities in scope of the climate taxonomy.

- **Since 1 January 2023**, the same non-financial undertakings must also report their taxonomy alignment, and that the share of turnover, capital expenditure, and operational expenditure comply with the criteria of the taxonomy. All financial participants proposing funds on the EU market who promote the environmental characteristics of their assets must disclose how much these funds align with the taxonomy criteria.
- **Since January 2024**, financial undertakings must disclose the taxonomy alignment of their underlying investments.
- **From 2025**, the progressive alignment between the Taxonomy reporting requirements and the Corporate Sustainability Reporting will progressively require all listed companies, and those with more than 250 employees AND more than €40m in turnover OR more than €20m on their balance sheets, must report their taxonomy eligibility and alignment. It is estimated that this obligation will therefore apply to approximately 50,000 entities in future, compared to 11,700 at the end of 2023.

Construction in the scope of the taxonomy

As for the construction sector, the Taxonomy disclosure requirements typically apply to:

- Listed or large corporations generating turnover, Capital Expenditure (CapEx), and Operational Expenditure (OpEx) through construction, renovation, acquisition, rental, or use of buildings.ⁱ
- Financial institutions with real estate related assets.
- Financial institutions financing the construction, renovation, or acquisition of buildings.ⁱⁱ
- Non-financial institutions, financing specific real estate projects through Green Bonds issuance.

The EY Taxonomy Barometer 2023⁸ analysed taxonomy data from the fiscal year 2022 and found that **60% of all revenue generated by the construction and real estate sector is from economic activities with existing taxonomy criteria**. This means that the construction and real estate sector has the highest average **taxonomy eligible** turnover of companies, compared to 25% of revenue in all other sectors combined. This share is projected to reach 91% in 2024, when the environment delegated act⁴ enters into force and the inclusion of hotel industry.

Does the construction sector align with the taxonomy criteria? In practice, 15% of all revenue from the construction and real estate sector is considered aligned with the taxonomy, compared to 8% for all sectors combined.

The taxonomy covers an important share of economic activities related to the construction and real estate sector and addresses a wide set of market actors: from banks issuing mortgages to actors. Because of this wide coverage, the taxonomy can be truly influential for **the buildings sector, yet the current criteria do not effectively address the problems of construction sector emissions**.

ⁱ This would include airport buildings and terminals, including potential revenue, e.g. rents from duty-free and other shops. See <https://ec.europa.eu/sustainable-finance-taxonomy/faq>

ⁱⁱ The Platform on Sustainable Finance highlighted that 'reporting on Taxonomy-aligned mortgages will allow credit institutions and regulators to measure the progress of decarbonisation of the sector and may lead Member States to provide additional incentives, if need be, to accelerate the emission reduction of the sector'. See https://finance.ec.europa.eu/system/files/2022-10/221011-sustainable-finance-platform-finance-report-usability_en_1.pdf

Building sector emissions in the taxonomy



What are the different types of building sector emissions?

New buildings consume a significant portion of the remaining carbon budget to keep global warming well below 2°C. A large share of greenhouse gas emissions from a new building stem from the extraction, production, transport, and assembly of raw materials, so-called

'embodied' carbon emissions (Figure 1). Yet the taxonomy mostly focuses on emissions from the use of energy in buildings, also known as 'operational' carbon emissions (Figure 1), and misses the mark on embodied emissions.

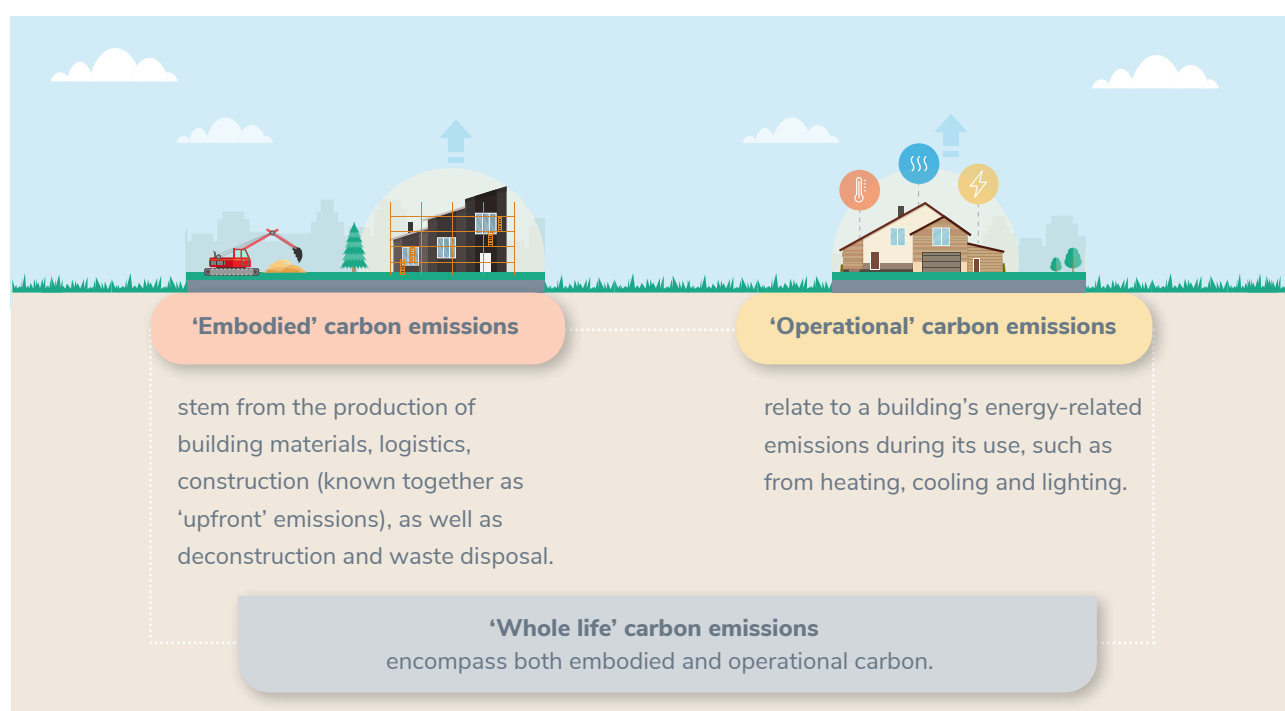


Figure 1 The different types of emissions from buildings which the taxonomy covers.

Adapted from: World Green Building Council & Ramboll. (2019). Bringing Embodied Carbon Upfront.

Focus on operational carbon emissions

Most activities in the climate taxonomy rely on greenhouse gas emissions as an indicator to determine whether a substantial contribution is made to climate change mitigation. **The construction sector, however, relies on a proxy: the 'primary energy demand' (PED).** The PED is expressed in kWh/m² per year, which represents the annual energy needed to heat a building per square meter of useful floor area. Therefore, **the PED focuses on the use of the building**, also called its 'operational phase'.

The taxonomy defines several thresholds for **the PED to make a building sustainable**, depending on whether the building is old or new, related to its year of construction (before or after 31 December 2020).

By only focusing on a building's use phase, the PED disregards important climate impacts of building life cycles.

This was identified as the criteria were being drafted. In 2019, the Technical Expert Group (TEG), an advisory body to the European Commission on the Taxonomy wrote⁹: "The TEG acknowledges that sector emissions are not only caused throughout a building's operational phase but that significant emissions are generated during the extraction, manufacture, and transport of building materials, as well as during the construction process and through the end-of-life demolition process. Due to current whole life cycle GHG emissions data constraints, the TEG chose to focus on the operational phase. However, the TEG strongly recommends the establishment of additional GHG emissions thresholds once more robust data becomes available."

The criteria laid down in the climate DA therefore only indirectly covers operational emissions in buildings, old or new, regarding their construction, acquisition, or ownership.

Whole life carbon emissions: A mere disclosure requirement

The sole exception made to this rule applies to the construction of new and/or acquisition of buildings, built since 1 January 2021, which are larger than 5,000 m², for which the total life cycle emissions need to be disclosed to investors and clients on demand.¹⁰

In other words, for new, very large buildings, there is **only a requirement to quantify whole life cycle carbon emissions (without performance requirements)** - the results do not even have to be made public. No such requirements exist for smaller new buildings or existing buildings (including major renovationsⁱⁱⁱ).

In its final report published in early 2020, the TEG admitted that 'embodied carbon emissions are increasing and receiving growing attention' and that the future expert

group's priorities should "introduce a requirement on including embodied carbon [...] with the aim of introducing thresholds for embodied carbon by 2025". The TEG also recognised that the availability of methods and tools for embodied in building carbon assessment based on life cycle assessment (LCA) are becoming more widespread.¹¹

Unfortunately, the first Platform on Sustainable Finance (2020-2022) was not mandated to make recommendations to amend the climate delegated act, and therefore did not include embodied emissions in the climate taxonomy. Given the amount of time required for amending climate delegated acts, **platform recommendations should be put forward for adoption as soon as possible, so that they apply in 2025 as initially recommended by the TEG.**

ⁱⁱⁱ According to the draft text for the Energy Performance of Buildings Directive: 'major renovation' means the renovation of a building where either (a) the total cost of the renovation relating to the building envelope or technical building systems is higher than 25% of the building value, (excluding the land value). (b) more than 25 % of the surface of the building envelope undergoes renovation.

Omitting several life cycle stages has environmental consequences

From an environmental perspective, embodied emissions account on average for 10-25% of a building's life cycle emissions,¹² noting that these estimates are based on the most energy inefficient building stock currently existing.

If we only consider taxonomy-eligible new buildings, this relative contribution of embodied carbon to a building's total emissions is likely to be higher since the taxonomy only targets the most energy-efficient. The World Green Building Council estimates that 50% of a modern building's emissions, over its lifetime, are due to embodied emissions.¹³

The fact that early and late life cycle stages are not considered is against the spirit of the Taxonomy Regulation itself.

- From a legal perspective, Article 19 of the Taxonomy Regulation requires technical screening criteria to “take into account the life cycle, including evidence from existing life-cycle assessments, by considering both the environmental impact of the economic activity itself and the environmental impact of the products and services provided by that economic activity, in particular by considering the production, use and end of life of those products and services”.⁶
- It is at odds with recent political announcement and developments that highlight the importance and need to better account for whole life carbon in buildings. These developments include the agreement on an EU Whole Life Carbon framework with emission targets as of 2030 under the Energy Performance of Buildings Directive¹⁴ and at the global level the UN Climate Champions under the ‘2030 Breakthrough’ action¹⁵ call for all new projects completed from 2030 to be net zero in operational emissions, with a 40% reduction in embodied emissions.



A pathway for taking whole life carbon emissions into account in the climate taxonomy

Three proposed measures

Seriously addressing the embodied carbon emissions of buildings in the taxonomy must be a priority. In this section we propose a coherent pathway for the roll-out of criteria with **three key measures**:

- 1 Public disclosure of whole life carbon (WLC) emissions for new buildings and major renovations;**
- 2 Public disclosure of environmental product declarations (EPD) for all products placed on the EU market;**
- 3 Limits on whole life carbon emissions of new buildings.**

While the first measure simply broadens the scope of the existing taxonomy criterion for WLC reporting, it addresses an important need for transparency which will contribute to readiness of the market in providing this information. The second measure explains how to limit the entire climate footprint of new buildings.

For each proposed measure, we provide a preliminary assessment along four criteria: environmental ambition, usability, cost, and policy coherence.

Criteria for the preliminary assessment of the proposed measures



Environmental ambition

the degree to which the requirements set for activities can contribute to climate change mitigation or prevent significant harm.



Usability

how easily financial institutions, businesses, and investors can interpret and implement the taxonomy criteria.



Cost

the financial and economic implications for investors, financial institutions, and businesses to adapt their practices and operations to align with the proposed criteria.



Policy coherence

how the proposed criteria align with other EU environmental policies and regulations, especially within the construction sector and the EU Emission Trading System.

Public disclosure of whole life carbon (WLC) emissions and of environmental product declarations (EPD)

This option builds on the existing provisions of the climate DA and on the forthcoming revision of the Energy Performance of Buildings Directive (EPBD) and Construction Products Regulation (CPR), which will themselves mandate calculation and disclosure of lifecycle-GWP at the building and product levels respectively.

Accounting for whole life carbon of all new buildings and major renovations

To be taxonomy eligible, the greenhouse gas emissions of large new buildings (larger than 5,000m²) must be assessed over the entire life cycle of the building and can be disclosed to investors and clients upon request. It is difficult to assess the exact proportion of new buildings which would be covered by this rule, but it is likely to **cover only the largest construction projects**. While relevant for large capital-intensive projects, the coverage will be limited by not covering activities such as housebuilding or other smaller scale development, limiting the climate change mitigation potential. While there is little data publicly available about the proportion of buildings smaller than 5,000m², one study which sampled buildings around the world (with most cases in Europe) indicates that these **smaller buildings could represent over two-thirds of all buildings**.¹⁶ Some national legislation, such as in Denmark, currently has a 1,000m² threshold that will soon be removed to extend WLC disclosure requirements to all new buildings while already introducing limits to larger buildings this year. Depending on the final EPBD revision, this stepwise approach is expected to be followed across the EU in the coming decade. The taxonomy can accelerate this process by **incentivising quick market uptake of WLC requirements ahead of legal requirements as part of national building codes**.

A first possibility to better account for whole life carbon of buildings is therefore to extend this requirement to all new buildings, even those smaller than 5,000m². This would be in line with article 7 of the EPBD recast:

- The adoption, by the end of 2025, of a common EU framework for the national calculation methodology of lifecycle carbon emissions.
- Mandatory requirements for the measurement, reporting, and energy performance certificate (EPC) communication of WLC for all new buildings as of 2027.
- For all new buildings, nationally determined limits on total lifecycle emissions and targets reducing towards climate neutrality every five years from 2030 onwards.

Given that the EPBD applies to all new buildings in Europe, it makes sense for the taxonomy criteria to match this requirement.

Key recommendation

The Climate DA should be amended, without further delay, to include an obligation to quantify WLC, applying to **all new buildings and those undergoing major renovations**.

Since the activity on acquisition and ownership of buildings mirrors the criteria applying to new buildings (for those whose permit was issued since 2021), this requirement should also apply to the latter activity. Requirements should not apply retroactively to buildings constructed before their entry into force, this updated set of criteria could apply for buildings whose permits are granted from the date of the adoption of the new criteria. This would help gather data ahead of setting national WLC thresholds and targets.

In June 2023, a new Taxonomy Delegated Act listing economic activities making a substantial contribution to the transition to a circular economy was adopted.⁴ The construction and renovation of new buildings are covered in this delegated act. The following requirement will apply to both activities, 'life-cycle Global Warming Potential (GWP) of the building resulting from the construction has been calculated for each stage in the life cycle and is disclosed to investors and clients on demand'. This requirement therefore applies to all buildings regardless of size.

Surprisingly, on the issue of whole life carbon, the criteria on circular economy go beyond the climate taxonomy. For the sake of consistency and to avoid market actors deliberately choosing the least ambitious criteria, **the climate taxonomy should be amended to mirror these requirements.**

Regarding the methodological aspects of the life cycle GWP of the building, the taxonomy annexes (both on climate and circular economy) refer to the EU-agreed methodology under the 'Level(s) framework'.¹⁷ 'Level(s)' is a European Commission initiative to promote sustainable buildings across the European Union that provides a common language and process for assessing and reporting the environmental performance of buildings throughout their lifecycle. It provides useful guidance for conducting life cycle assessments of new buildings and renovations.

Aligning the taxonomy with the roll out of EPD disclosure requirements from the Construction Products Regulation

Another opportunity to increase transparency of construction sector embodied emissions is to align the taxonomy with the roll out of EPD disclosure requirements in the Construction Products Regulation. The revised CPR will require construction product manufacturers to disclose the performance of products across the 'essential characteristics' related to lifecycle assessment:¹⁸

- climate change effects
- ozone depletion
- acidification potential
- eutrophication aquatic freshwater
- eutrophication aquatic marine
- eutrophication terrestrial
- photochemical ozone
- abiotic depletion – minerals, metals
- abiotic depletion – fossil fuels
- water use
- particulate matter
- ionizing radiation, human health
- eco-toxicity, freshwater
- human toxicity, cancer
- human toxicity, non-cancer
- land use related impacts.

A lifecycle assessment must therefore be conducted in accordance with EN 15804+A2,¹⁹ (the reference standard for EPDs), and information will need to be disclosed when placing products on the market. **The taxonomy should support this new measure.**

Key recommendation

The taxonomy criteria should be amended to **include EPD information disclosure for all products placed on the EU market**, with a criterion to enter into force as soon as possible.

This measure bears strong synergies with the reporting of WLC information because EPDs are the necessary tools for conducting whole-building LCA for WLC assessments. The sharing of EPD data is already widespread in Europe, it is therefore high time for the taxonomy to further support this practice.

The system for reporting both building-level WLC and product-level EPD results must be determined for the purpose of taxonomy reporting, however tools exist already, which provide a possible way forward. These include the Level(s) framework and some Member States' existing approaches. Conducting a WLC assessment using Level(s) requires:

1. Depending on the level of detail necessary or chosen, make an estimation of the materials to be used or compile a full inventory of products and materials used, e.g. bill of materials.
2. For each material recorded in this list, the quantities of the material used and the embodied GHG emissions per kg of material are also reported which originate from an EPD.
3. In either a simplified or comprehensive LCA assessment, the carbon footprint of all resources used in the construction, use, and end-of-life are compiled to give the full lifecycle-GWP or WLC of a building.

Building on the October 2022 Sustainable Finance Platform recommendations on Data and Usability,²⁰ the following recommendations would help to make this option widely usable by real estate actors:

- **Investors, lenders, and certifying** bodies should be granted direct access to the EPC, NZEB, and Level(s) databases to assist them the reporting of taxonomy aligned assets. An EU-wide framework of unique identifiers, e.g. based on geographical coordinates, would allow lenders to conduct automated checks to identify when EPCs or updated EPCs are available.
- For a transitional period, **banks and mortgage lenders** could be allowed to use data coming from existing green building certification systems as proxies (where these are deemed to cover embodied carbon-related impacts).

Assessment of the measure



Environmental ambition

LOW

If information on WLC is provided, the requirement is met – regardless of the actual building emissions. The recast of the EPBD proposes to make this measure mandatory for all new buildings from 2027. To make sure that retail banks and lending institutions can report on their taxonomy aligned mortgages (and increase the usability of the taxonomy), this information should be easily accessible. The level of ambition could be further raised by making the disclosure of WLC performance public.



Usability

HIGH

Methodological tools already exist with standards such as EN15978 and EN15804 as well as the Level(s) framework. The EPBD revision foresees further harmonisation by the end of 2025 with the adoption of an EU WLC framework for national reporting. Access to WLC data by actors other than project developers should be encouraged (see above).



Cost

LIMITED

The cost of compliance is only the costs of the assessment. WLC assessment is likely to become standard practice in a few years' time, with limited costs compared to the cost of a new building or major renovations.



Policy coherence

HIGH

The circular economy annex adopted by the European Commission in June 2023 requires WLC disclosure for all new buildings and major renovations. For the sake of consistency and to avoid market actors deliberately choosing the least demanding criteria, the climate taxonomy should be amended to mirror these requirements without further delay.

Set whole-building whole life carbon emissions limits

The need to shift towards truly net zero buildings has widely been recognised, and several European countries have implemented regulatory measures to cover embodied/WLC emissions in their national building policies. These include Denmark, Finland, France, the Netherlands, and

Sweden.²¹ Other European countries have implemented similar measures for certain buildings only (such as public buildings) or as part of subsidy schemes. The idea is also gaining more traction outside of Europe, including Australia²² New Zealand,²³ and the state of California²⁴.

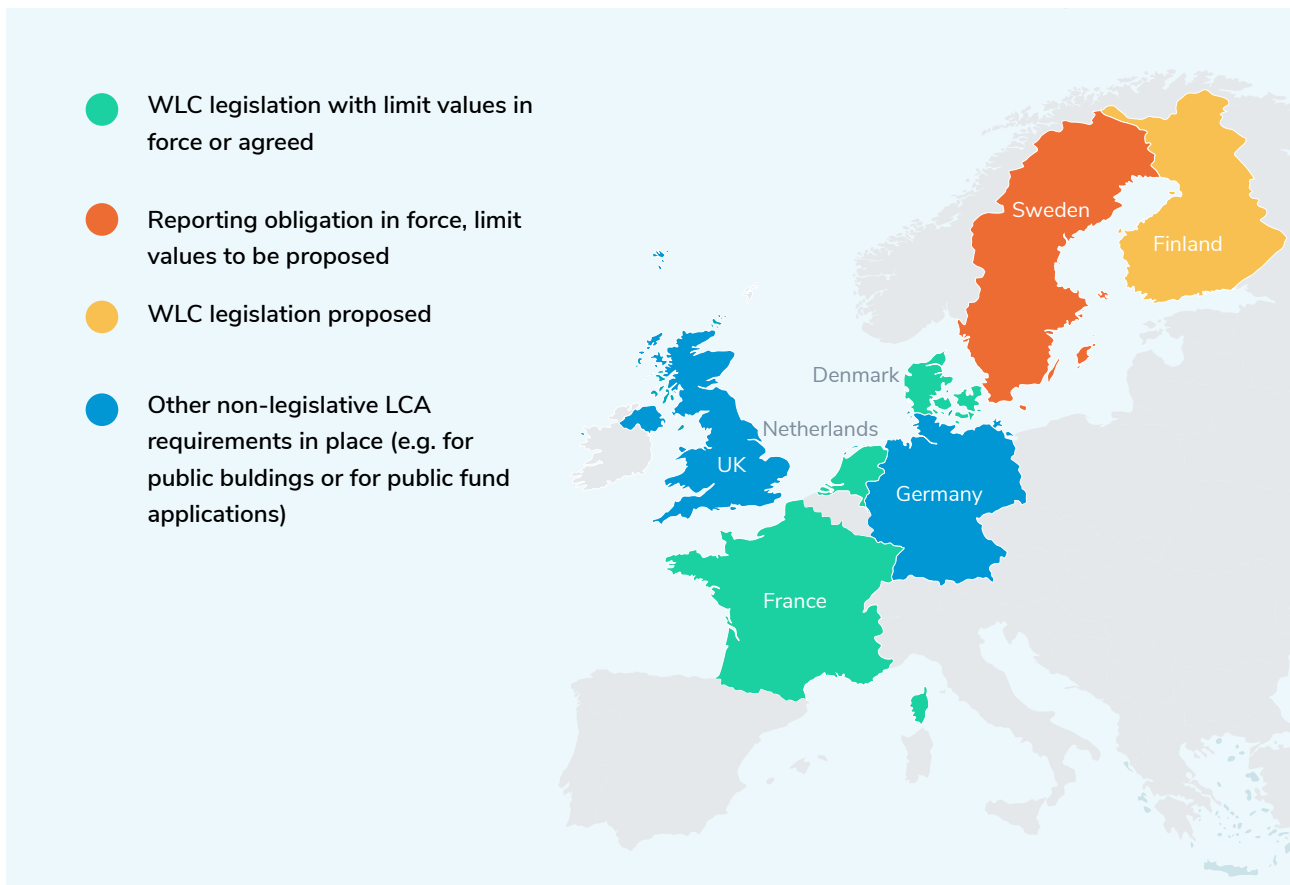


Figure 2 EU countries with WLC legislation or LCA-based requirements.

Adapted from: Ramboll. (2022). Whole life carbon models for the EU27 to bring down embodied carbon emissions from new buildings Review of existing national legislative measures. <https://c.ramboll.com/reducing-whole-life-carbon>

In addition to these national measures, voluntary sustainability schemes that apply to buildings are increasingly integrating embodied/WLC aspects into their standards. In the context of the taxonomy, the TEG identified the need in 2019 to set performance requirements related to embodied carbon in buildings-related activities as a priority.

The development of performance requirements covering embodied carbon/WLC comes with several choices:

Bottom up and top-down benchmark approaches

In their report 'Towards embodied carbon benchmarks for buildings in Europe #4 Bridging the performance gap: A Performance framework', the authors distinguish between two benchmarking approaches:

- **bottom-up benchmarks**, which relate to 'the values of the existing level of embodied carbon based on an empirical dataset.'
- **top-down benchmarks**, which relate to 'values determined by external factors, such as the global carbon budget'.

However, **existing regulatory benchmarks in embodied carbon/WLC are all based on bottom-up approaches**, relying on actual buildings samples.²⁵

- The benchmarks currently used in the taxonomy on the building sector (covering operational emissions only) are based on bottom-up benchmarks, e.g. requirements on new buildings rely on the Net Zero Emission Buildings specifications which are national or regional based.
- To date, one of the few initiatives integrating the top-down approach is the SBTi proposed framework on embodied carbon.²⁶

According to Ramboll's research, "The comparison of the baseline on embodied carbon in new buildings in five EU Member States (i.e. bottom up) and the calculation of a carbon budget and pathway (i.e. top-down) reveal a gap between the reality of the building sector and the necessity of climate science".²⁷ In the short term, given that the bottom-up approach is the most widely used, the integration of performance requirements based on existing empirical datasets in the taxonomy might be more easily accepted by market actors. However, from an environmental perspective, **the taxonomy criteria need to ensure a progressive convergence between the two approaches.**



Figure 3 Development of a global decarbonisation pathway for building typologies per square metre.

Based on: SBTi. (2023). A 1.5°C Pathway for the Global Buildings Sector's, Embodied Emissions.

Relative and absolute performance requirements

Should the carbon benchmark be set in relative or absolute terms? Establishing a relative threshold in the form of a percentage improvement on an embodied or WLC benchmark appears to be the most appropriate solution, at

least in the short term. The benchmark would be context-specific, based on empirical data (in current practice, based on national datasets), and would correspond to different levels from one country to the next. The use of a percentage improvement rather than an absolute figure will **ensure a progressive convergence of the various benchmarks over time** – towards net zero whole life cycle emission buildings.

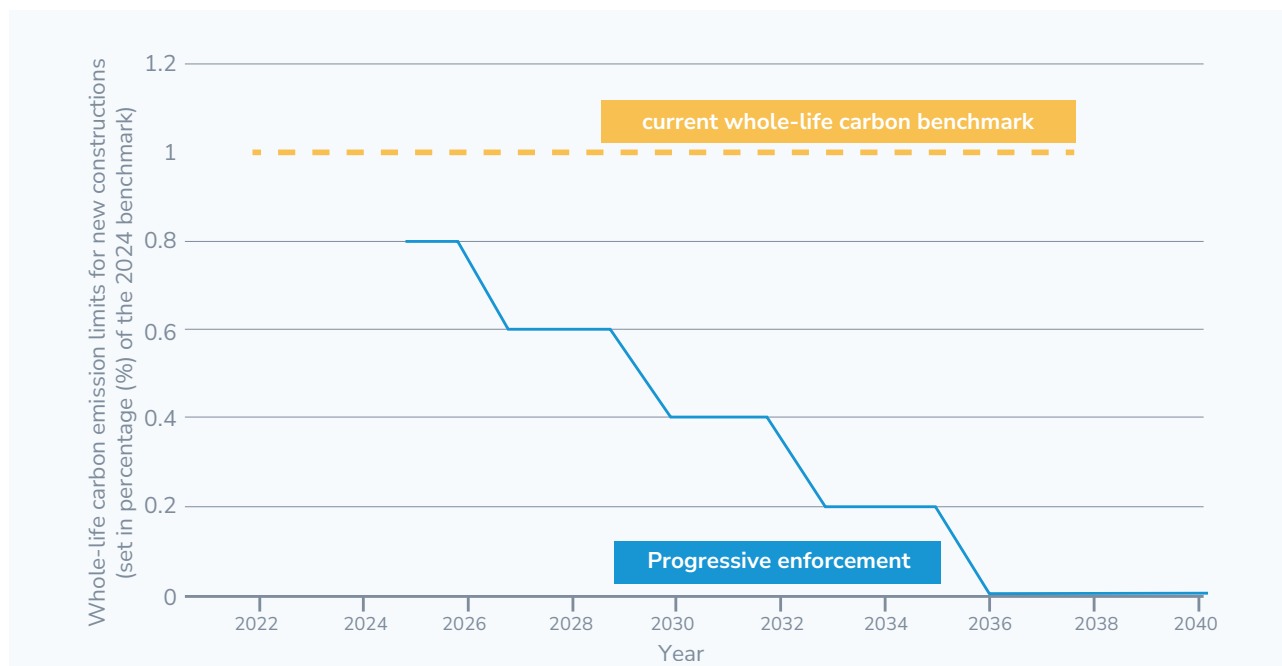


Figure 4 Example of what progressive enforcement of whole life carbon limits for new buildings.

Adapted from: Buildings Performance Institute Europe. (2022) Roadmap to climate-proof buildings and construction – How to embed whole-life carbon in the EPBD.

National and EU-level WLC limits

National-level benchmarks and limits represent a good approach as they are, in principle, suited to the national context. However, until data reaches critical mass to allow for country-specific benchmarks, limits could be set (at least temporarily) at the EU-level based on available and cross-country data assessment. Research is already ongoing to model the EU building stock's WLC impacts and may enable EU limits on WLC before 2030. EU WLC benchmarks could be a basis for the early introduction of **WLC limits as part of the taxonomy's climate mitigation criteria**. At a later stage, following the publication of national roadmaps in 2027, an early introduction of nationally determined limits in the taxonomy would represent a complementary and coherent policy mix.

Key recommendation

The taxonomy criteria should be amended to include a review clause introducing whole life carbon limits set at the EU level for all new buildings, differentiating between building typologies. The limits should be relative, based on a percentage improvement from a baseline with a progressive tightening of the limit to achieve long-term carbon neutrality targets. WLC limits should eventually be set at the national level once national benchmarks become available.

Should carbon storage in buildings be accounted for under the taxonomy?

Carbon storage is a potential benefit of using bio-based materials where buildings are durable and circular, providing that the storage is long-lasting. However, storage duration cannot be estimated accurately and therefore should not be incentivised in a policy context.²⁹ In the absence of robust carbon storage monitoring, which supports long-term storage of biogenic carbon, we recommend keeping any quantification of storage out of the scope of taxonomy criteria and focus on whole life carbon impacts. This must ensure that bio-based materials contribute to buildings' energy efficiency performance, originate from secondary sources and from ecological land management, and that building lifetimes are prolonged. The new criteria under the environment delegated act⁴ already contribute to bio-based and circular material uptake.

Similarly, no credits should be given to natural carbonation of concrete, (the process by which concrete absorbs CO₂ from the atmosphere), because there are no credible methods to determine how much CO₂ the concrete will absorb due to the variety of factors influencing the process. Most importantly, there is significantly less carbon dioxide absorbed than emitted in the production of cement and concrete (about 40 times less, as estimated by ARUP)³⁰. The deliberate oxidation of concrete by injection of CO₂ during the manufacturing process, i.e. concrete curing, can potentially contribute to a lower embodied carbon performance of concrete. The carbon sequestration from this process can be counted as contributing to reducing the emissions from the overall manufacturing process, however **it should not be considered a carbon removal as it does not involve a net negative emission.**

Accelerated carbonation during concrete recycling (or more often, downcycling) processes can also be counted as contributing to reducing the emissions from recycling process.³¹ Recycling should already receive incentive in the circularity criteria of the environment delegated act⁴, it may therefore does not require further incentive as part of the taxonomy.

Assessment of the measure



Environmental ambition

HIGH

WLC emission limits would ensure that all emissions related to buildings and their materials are covered under one criterion, thereby driving emission reductions across all climate change mitigation indicators. The level of ambition of the limits under the taxonomy should be set based on the best performing buildings, learning from building benchmarks developed in ongoing research by the European Commission, and national research institutes.



Usability

HIGH

The elaboration of the EU WLC framework and the implementation of the first measure proposed in this paper will provide the basis for this measure to be usable.



Cost

LIMITED

Once the cost of the WLC assessment is paid, the remaining costs relate to meeting the WLC emission limits which will be necessary for the construction sector to make its fair contribution to climate targets.



Policy coherence

HIGH

The recast of the EPBD will require Member States to introduce WLC limits as of 2030. With some Member States already introducing such limits today, it is a strong signal that the taxonomy should follow suit. Until national-level limits are introduced, a (temporary) EU-level limit may be feasible.

Upgrade the technical screening criteria for materials used typically in construction

Rationale for addressing buildings' 'upfront' carbon emissions



This measure complements the previous two by addressing buildings' so-called 'upfront' emissions (see Figure 1, page 8), by seeking to strengthen the criteria related to the production of typical construction materials with a focus on high-impact materials.

The choice of construction materials, along with the design of buildings, plays a major role in the embodied carbon footprint of buildings. But until whole-building WLC limits are set (which may take several years), the taxonomy would only provide disclosure criteria on WLC and at the product level via EPD reporting (see section III). We therefore propose that the **taxonomy criteria for production of high-impact construction materials** should be revised to **drive the supply of lower-carbon products**.

The taxonomy already sets criteria for the production of some of the most used and most impactful building materials, namely by targeting the manufacture of cement, iron and steel, aluminium, plastics in primary form, and timber (under forestry in the taxonomy). According to the UNEP and Yale Center for Ecosystems + Architecture,³²

concrete and steel are the two most widely used materials in the construction of new buildings and typically account for 40-50% of the embodied carbon in highly energy efficient commercial buildings. Globally, concrete and steel together combine 14% of global carbon emissions, with brick, aluminium, and glass ranking next on the list.

The current criteria on cement, steel, and forestry have been criticised for their **discrepancy from the TEG and Platform's recommendations and should therefore be upgraded**.³³ In the next section we provide key recommendations for setting the right level of climate ambition for these activities.

For some materials currently covered, such as cement, iron, and steel, the criteria include limits on production-related emissions based on the Emission Trading System (EU ETS) benchmark values.³⁴ Our analysis shows that **these benchmarks are not adequate for identifying truly low-carbon cement, concrete, iron, and steel**. At the very least, the taxonomy should be updated to refer to the latest values coming into force as of 2026, as benchmark values are updated every five years.

Specific recommendations for forestry and wood, cement and concrete, and steel

We recommend revising the criteria related to the use of forest biomass to prioritise support for ecological forestry and implement the cascading use principle - by excluding the use of forest biomass in energy-related activities. We also recommend revising the criteria for the manufacturing of cement and (to a lesser extent), the manufacturing of iron and steel to incentivise the most effective low-carbon processes and exclude false solutions from these activities.



Forestry and wood-related criteria

Different uses of forest biomass are in direct competition, increasing pressures on forest ecosystems. As a 2021 report from Material Economics underlines,³⁵ EU Member States' climate plans altogether forecast 40-100% more demand for forest and agricultural products for energy and materials than will be sustainably available due, in large part, to a planned increase in bioenergy demand. At present, global wood consumption is already overshooting by up to 67% the lowest risk boundary of what global forests can sustainably provide, and overconsumption is likely to continue growing.³⁶ A sustainable use of timber for construction must therefore be operated alongside a reduction in the use of wood for other applications and for which alternatives exist offering higher environmental value-added, such as reusable options for packaging and combustion-free renewable energy production.

As of the latest data from the European Commission Joint Research Centre (2023), in 2017 nearly 60% of all wood used in the EU was used for bioenergy. By contrast, only 15% was used for longer-lived applications like sawn wood typically used for construction; 12% was used for wood-based panels; and 11% for paper. At the same time, only 26.5% of all wood uses came from circular uses (either pre-consumer sources i.e. wood scraps and co-products, and a very small share from post-consumer sources).³⁷

Implementing the cascading use principle requires a change in consumption patterns. The taxonomy fails to deliver this on two grounds:

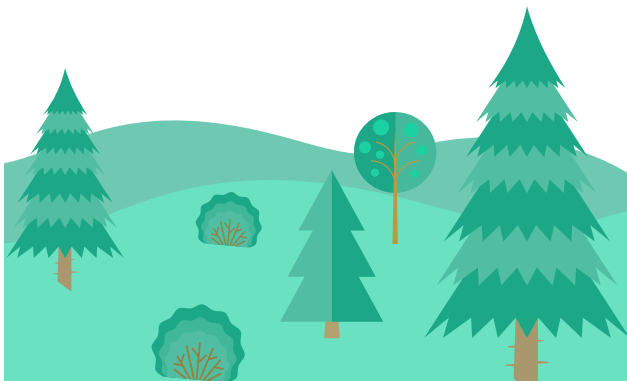
- Forest management activities do not require the forester to screen the economic sector in which their customers (the wood supply chain) operate.
- The taxonomy qualifies wood-based bioenergy as an environmentally sustainable activity, while this activity diverts valuable raw materials from higher value applications.

Since the 2023 revision of the Renewable Energy Directive³⁸ however, the political message from this revision is clear: **the use of primary forest biomass for bioenergy must be phased out to preserve biodiversity, the climate, and the environment.** According to Article 3(3) of the revised Directive, financial support will be banned for energy produced from saw logs, veneer logs, industrial grade roundwood, and stumps and roots. Furthermore, Member States will have to ensure that bioenergy support schemes ensure the implementation of the cascading use principle. Finally, the revised Directive also **prevents Member States from providing new support to produce electricity from forest biomass in electricity-only powerplants**, with some exceptions.

Key recommendation

The taxonomy criteria should therefore be amended:

- Exclude primary forest biomass burning from the scope of the following activities: electricity generation from bioenergy, cogeneration of heat/cool and power from bioenergy, and production of heat/cool from bioenergy.
- New criterion within the 'forest management' activity for forest managers and harvested wood products. Marketers must verify that their production does not contribute to biomass burning and wood uses in other low-value applications, such as packaging, in line with the cascading use principle.



In 2021, the European Commission Joint Research Centre assessed the state of EU forests as 'degrading', despite a growing area of forest.³⁹ Forest degradation entails a loss of tree cover, biodiversity, and soil health, which together leads to a loss of forests' ecosystem functions, including the carbon sink, floods risk prevention, providing habitats for species, and space for human recreation. This is due to forest harvests as well as to the effects of climate-related hazards such as droughts, fires, and pests. With improved management, EU forests can become more resilient by harnessing ecosystem dynamics and through harvesting which enhances (rather than diminishes) biodiversity and ecosystem functions. Management must therefore aim at regenerating forests and enhance resilience.

The taxonomy provides criteria regarding forest management by referring to several possible sources for principles and definitions for sustainable forest management.^{iv} While the criteria mention biodiversity and climate change, they do not aim at a significant improvement of the state of EU forests. Instead there is a **loophole that seeks to maintain the current state of forests and their carbon sinks**, i.e. enabling business-as-usual forest management, with little assurance of progress made on forest ecosystem restoration. Furthermore, although the criteria require the conduct of a climate benefit assessment for all forest holdings over 13 hectares, this effectively does not apply to at least two thirds of all EU forest holdings which are smaller than three hectares.⁴⁰ These criteria cannot be considered sufficient to contribute to the LULUCF carbon sink target or EU forest restoration objectives from the EU Forest Strategy for 2030 and the Nature Restoration Law.

Key recommendation

Improve the criteria for related activities, namely forestry, afforestation, rehabilitation and restoration of forests, and forest management, which must include:

- Clear exclusion of business-as-usual practices which cause significant harm and weaken forests against climate change, such as planting tree monocultures.
- Clear exclusion of business-as-usual practices which do not provide environmental value-added to the land or forest, including clear cutting which leads to soil carbon emissions and biodiversity loss.
- Explicit support for ecological forestry such as continuous cover forestry which protects, enhances, or restores forests' resilience and biodiversity for multiple functions, including carbon sequestration.

Another significant shortcoming of the forestry criteria is the **absence of protection for remaining EU primary and old-growth forests** (making up only 2-4% of total EU forests),⁴¹ despite this being a key measure of EU biodiversity policies.

Key recommendation

Improve the criteria for forestry and forest management to include:

- Strict protection of primary and old-growth forests from logging.

^{iv} According to the taxonomy (Commission Delegated Regulation (EU) 2021/2139), sustainable forest management should follow either: (a) a national definition of sustainable forest management, (b) Forest Europe's definition of sustainable forest

The taxonomy criteria also pose problems for conservation objectives. While the criteria aim to prevent the degradation of land with high carbon stocks, they do not prevent afforestation of areas such as peatland, where the loss of biodiversity and greenhouse gas emissions are an important risk. Nor do the criteria explicitly prevent drainage for land preparation. By contrast, the recent Guidelines on Biodiversity-Friendly Afforestation, Reforestation and Tree Planting formally oppose afforestation of wetlands in general.⁴²



Key recommendation

Improve the criteria for afforestation and rehabilitation and restoration of forests to include:

- Afforestation and rehabilitation and restoration of forests providing substantial contribution should be limited to those which transform degraded land and forests into new or restored forests.
- Do no significant harm criteria should exclude afforestation and restoration of forests involving wetlands and land drainage.



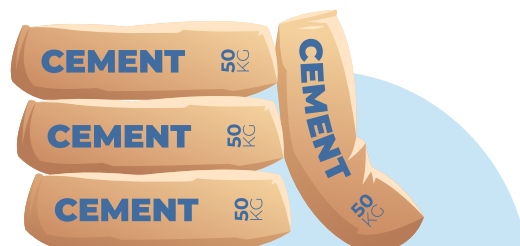
Cement and concrete manufacturing criteria

The current taxonomy criteria allow the labelling of Portland clinker production as green. To decarbonise the cement industry, however, the most cost-effective solution is to significantly lower the clinker-to-cement ratio, e.g. with supplementary cementitious materials⁴³) and/or substitute Portland clinker with low-carbon alternatives.⁴⁴

In other words, we must **reduce traditional Portland clinker production to decarbonise the cement and concrete industry**, rather than manufacture lower-carbon cement that still uses carbon-intensive clinker. The current taxonomy sends the wrong signal to investors and the industry by supporting clinker production, the most carbon intensive cement component. The taxonomy should push industry to further reduce emissions in the manufacturing process of any type of low-carbon cement.

The current clinker-to-cement ratio is estimated at 78%⁴⁵, Research shows that Europe is particularly well placed to achieve much higher levels of clinker substitution.⁴⁶ This is also the view expressed by front-runner organisations and industry.⁴⁷

Furthermore, the scope of the taxonomy is too reductive as cement is only one component of concrete, yet it can be substituted with lower-carbon alternatives including various waste materials.⁴⁸ We therefore recommend to broaden the scope of the taxonomy to also cover concrete.

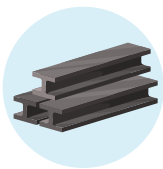


Key recommendation

The criteria should be amended:

- Deletion of criterion 3.7(a).
- Cement GHG emissions from the production of clinker or alternative binders must be compliant with Europe's 2030 and 2050 climate objectives (and forthcoming 2040 target). By 2030, GHG emissions must be lower than 352.35 kg of CO₂ per tonne of cement.⁴⁹
- Concrete must have a binder content lower than 250 kg per cubic metre.⁵⁰

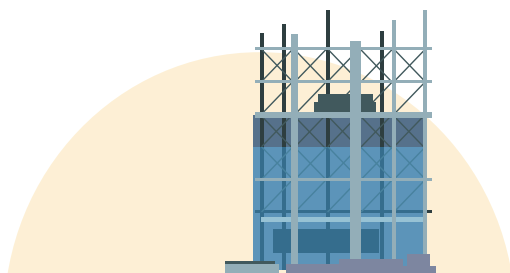
These revisions are based on research from ETH Zurich⁵⁰ which suggests that these targets are ambitious but feasible.



Iron and steel manufacturing criteria

The criteria related to the manufacturing of iron and steel manufacturing are also problematic because they excessively rely on EU ETS benchmarks. The current benchmarks related to steel are set and applied to conventional production processes⁵¹, e.g. sintering/coking blast furnace based steel production, rather than aggregating performance, e.g. direct reduction and electric arc furnace, which would better distribute incentives. This includes rewarding the best-performing steel installations. This results in tailored benchmarks that do not incentivise carbon performance improvements through new low-carbon production routes.

ETS benchmarks must therefore evolve into real carbon performance requirements across equivalent production processes, with a focus on output. This would make the ETS more future-proof as a carbon-market and driver of innovation as a result.



Key recommendation

To solve this problem within the taxonomy, we recommend focusing the criteria on truly low-carbon production routes:

- Delete criterion 3.9(a) pertaining to the use of EU ETS benchmark values, at least until the benchmarks are adjusted to include more recent low-carbon processes.
- Maintain criterion 3.9(b) on steel production in Electric Arc Furnaces.
- Add a criterion supporting the production of steel using renewable hydrogen in a Direct Reduced Iron process, thus reflecting new technological developments.

Assessment of the measure



Environmental ambition

MEDIUM/HIGH

The proposed set of revised criteria introduces higher requirements on the production of materials typically used in construction. In comparison to whole building WLC accounting and limits however, this solution's ambition is rated as medium as it only covers emissions related to material production but not to transport, demolition, etc. It also does not ensure that low-carbon materials will be encouraged at building-level, at least until WLC limits are introduced.



Usability

MEDIUM/HIGH

The criteria proposed vary among novel types of criteria (such as for forestry) and the more typical types of criteria proposed for cement, concrete, and steel. We recommend that additional research be conducted for the development of the criteria's usability.



Cost

MEDIUM/HIGH

The cost of aligning production practices with the criteria proposed here can be high depending on the baseline of companies. This cost can, however, be recovered via premiums on the price of the materials due to their higher sustainability value and should be achievable thanks to the increased attention paid to strategies to limit WLC emissions. This includes policies such as green public procurement, which enable the creation of lead markets for low-carbon products.



Policy coherence

MEDIUM/HIGH

The proposed criteria align well with the EU's ambitions related to these sectors. In the case of steel and cement, our analysis suggests that the EU ETS benchmarks are not ambitious enough, compared to achievable emission reduction potential, we therefore recommend moving away from these benchmarks and adopting different criteria instead.

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Endnotes

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