BUILDING OUR GREEN FUTURE

STANDARDS TO SUPPORT DECARBONISING ENERGY-INTENSIVE INDUSTRIES

ECOS

EXECUTIVE SUMMARY

Two of the world's main polluters are hidden in plain sight. Cement and steel, so commonly used in the construction sector, represent approximately 13% of our CO_2 emissions combined - a perfect example of the impact that energy-intensive industries have on our planet's deterioration[1, 2]. They are both typically produced using highly polluting methods, and we are nowhere near reducing the resulting emissions, even though more sustainable options exist.

The EU now has an opportunity to introduce rules which will favour less harmful production methods, not only for steel and cement but for energy-intensive industries in general, which include chemicals, plastics and aluminium production, among others.

The European Green Deal is a key priority for this European Commission. The New Industrial Strategy and the Circular Economy Action Plan (CEAP), the planned reviews of both the Industrial Emissions Directive (IED), and Construction Products Regulation (CPR), as well as the next phase of the EU Emissions Trading System (ETS), are all expected to drive change and decarbonisation to help reach net-zero emissions by 2050. Combined, these initiatives have the potential to drastically reduce emissions, go beyond incremental decarbonisation, and deliver real industrial transformation.

This paper analyses the relationship between key regulatory requirements of these policies and their supporting standards, and how they can contribute to achieving the EU's net-zero 2050 GHG emissions goal[3]. Key conclusions of this paper centre on the regulatory changes needed to achieve the objectives of the European Green Deal using environmental requirements and sustainability-orientated standards.

REGULATORY CHANGES NEEDED

Establish ambitious mandatory environmental performance requirements for high-impact intermediary and end-products, based on harmonised carbon and environmental footprint criteria.

Support low-carbon industrial products by developing single performance requirements based on the full range of viable technologies and production routes for a given product or industry. This would stimulate competition between low-carbon and highly pollutant production routes.

Introduce harmonised requirements for circular and resource efficient construction products in regulatory requirements and standards for major sectors using energy-intensive materials, such as the construction sector.

Standards in support of decarbonisation should not set regulatory requirements Instead, standards should support criteria defined within regulation by offering technical methods to enable measuring performance (including environmental performance) against regulatory requirements for decarbonisation in an accurate and comprehensive manner.

1 https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Energy_Efficiency_and_CO2_Reduction_in_the_Iron_and_Steel_Industry.pdf

2 https://reader.chathamhouse.org/making-concrete-change-innovation-low-carbon-cement-and-concrete#

3 European Commission 2050 long-term strategy: https://ec.europa.eu/clima/policies/strategies/2050_en

Material snapshot: **Cement and Steel**

Cement and steel are very useful materials. They are essential ingredients of our roads, bridges, tunnels, cars, and ships. However, their production is highly polluting, releasing large amounts of GHGs into the atmosphere.

CEMENT

Uses

Cement is largely used to produce concrete (76%) and is widely used in construction (50%) and public infrastructure (30%), such as street paving, bridges and tunnels.

Production

Cement is produced from a mixture of primary and often secondary raw materials. To produce it, these materials are combined at high temperatures most often in coal-fired kilns until the mixture reaches the consistency of a fine cementitious material. 99% of cement consumed today is Portland cement, which is highly polluting due to the large amount of energy and heat needed for producing clinker, its main ingredient. Many less energy-intensive alternatives exist to drive down clinker content but adoption of these is low.

Emissions

Cement is the second most consumed material on the planet, produced at a rate of 4 billion tonnes each year.

approximately

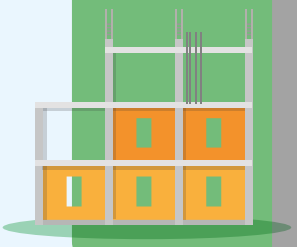
8%

of global CO_2 emissions

STEEL

Uses

The primary demand sectors for steel are construction and public, energy and transport infrastructure (42% combined), transport (31%), and industrial applications (16%).



Production

Most steel is produced using iron ore and limestone, heated at over 1500 °C in a blast furnace to produce iron (hot metal), which is then fed into a basic oxygen furnace to produce steel. Electric arc furnaces are also widely used to recycle scrap steel which can greatly reduce emissions. However, limits exist to the use of recycled content in new products, and production volumes using such an approach remain low. A major shift in use and production routes is needed across the entire industry for decarbonisation.

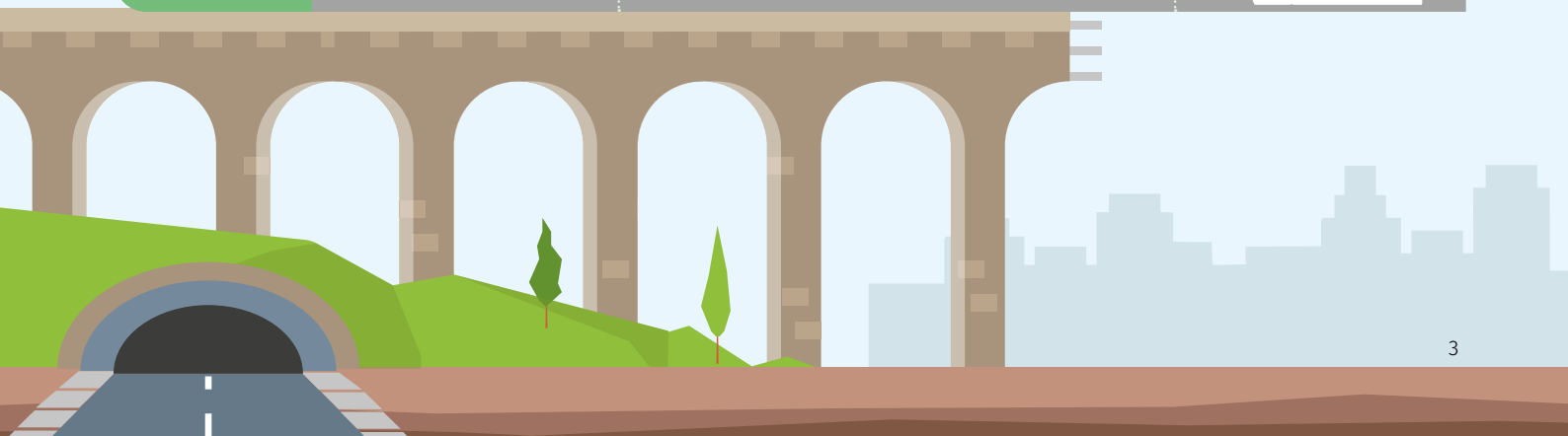
Emissions

More than 1,800 million tonnes of steel are produced worldwide every year.

approximately

5%

of global CO_2 emissions



DECARBONISATION UNDER THE EMISSIONS TRADING SYSTEM (ETS)

Unify sectoral carbon performance requirements

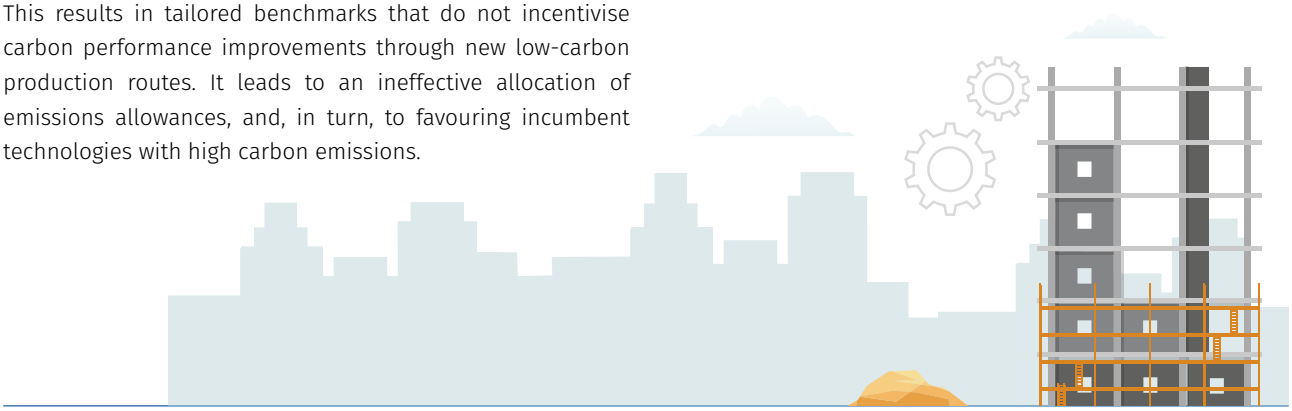
The ETS is a cornerstone of the EU's climate policy and as such should have great impact on reducing the emissions of many industries and products. However, **the direct impact of the ETS system on emissions is questionable:** the systems's targets lack ambition, and the policy is in part nullified by the free allocation of allowances that reduce the cost of pollution to industrial market actors[4]. In fact, emission reductions achieved since the system's introduction have largely been driven by technological advancements and changes in consumption that are not attributable to the economic impacts of the ETS[5] itself.

Primarily, emissions requirements under the current imperfect system are undermined by free allocation criteria through the inappropriate use of benchmarks to set CO_2 performance thresholds on because they cover a restricted range of products and associated processes. For example, the current benchmarks for steel are set and applied to conventional production processes and routes (e.g. sintering or coking for blast furnace based steel production), rather than as an aggregation of performance across different routes (e.g. Direct Reduction and Electric Arc Furnace) which would better distribute incentives, including by rewarding the best-performing steel installations.

This results in tailored benchmarks that do not incentivise carbon performance improvements through new low-carbon production routes. It leads to an ineffective allocation of emissions allowances, and, in turn, to favouring incumbent technologies with high carbon emissions.

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.

More stringent benchmarks must be supported by an improved measurement and monitoring system. There is a need for specific methodologies and standards for measuring emissions. Moreover, these methodologies must enable the monitoring of the actual emissions performance against the established benchmarks. Although a calculation approach is specified within the ETS and quality control measures exist[6], current provisions under the ETS[7] do not fully prevent divergent practices in these processes. To ensure all emissions are measured following a consistent methodology, clear horizontal and sector-specific instructions for implementation are required, making effective use of existing standards where possible (e.g. sector-specific emissions measurement standards). This will reduce potential divergence, improving consistency across installations and EU Member States assessments.



4 Free allowances are said to be a measure to avoid carbon leakage outside of the EU, but alternative measures are required for the ETS to be an effective carbon market.

5 Laing, T., Sato, M., Grubb, M. and Comberti, C., 2017. Assessing the effectiveness of the EU Emissions Trading System.

6 Within the Monitoring and Reporting Regulation, standards are designated for quality assurance of automated measurement systems (EN 14181), and Air quality — Measurement of stationary source emissions (EN 15259).

7 ETS Consolidated Text (2018): Annex IV PART A — Monitoring and reporting of emissions from stationary installations - Measurement: Measurement of emissions shall use standardised or accepted methods and shall be corroborated by a supporting calculation of emissions.

Recommendations to make steel and cement more sustainable under the ETS

Under the current ETS, the European Commission and the EU Member States should establish sectoral benchmarks through a performance-based approach by setting unified carbon performance requirements.

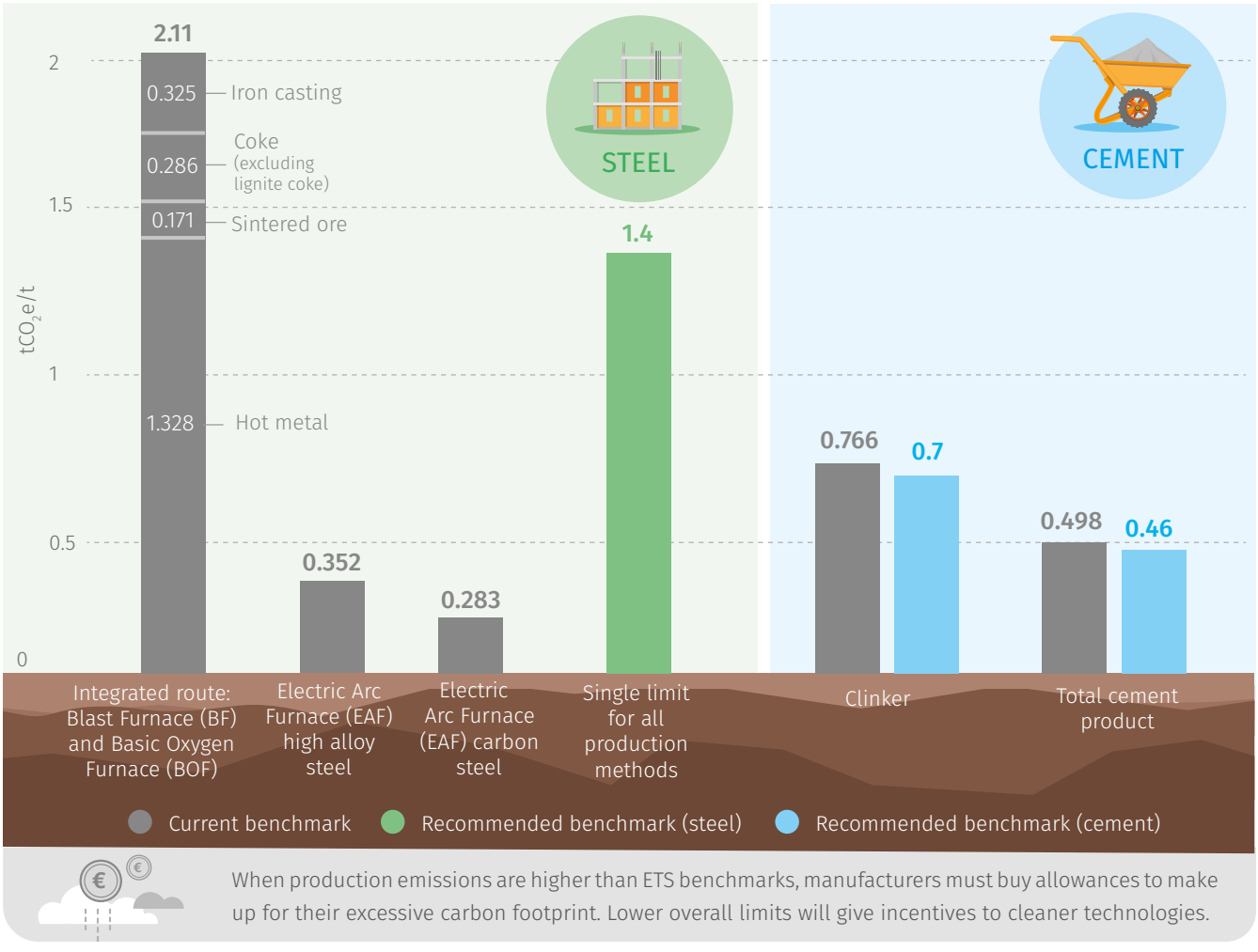
FOR STEEL

- For coal-based blast furnace steel production, immediately remove derogation of an annual 0.2% for mandated benchmark reductions;
- As part of the foreseen updates of steel related benchmark values under Phase 4 of the ETS, lower the current total benchmarks for the Blast Furnace (BF) and Basic Oxygen Furnace (BOF) methods to a maximum total of 1.7 tCO_2/t steel;
- By 2030, establish a unified steel product benchmark to include lower-carbon production method to ultimately lower the applicable benchmark to represent at least the overall average performance of current steel production at 1.4 tCO_2/t steel.

FOR CEMENT

- Immediately lower the clinker benchmark value to 0.7 tCO2e/t;
- For cement, lower the total cement product benchmark to 0.46 tCO_2e/t. Adjust benchmark values thereafter by including lower-carbon production methods and products under a single cement product benchmark value;

Building upon current provisions, designate a single GHG accounting methodology for the measurement and monitoring of actual emissions from stationary source emissions for each sector based on up to date data. It should target the reduction of primary emissions, and not overestimate the potential emission reduction of emission mitigation techniques or wrongly aggregate emissions and claimed sequestrations.



When production emissions are higher than ETS benchmarks, manufacturers must buy allowances to make up for their excessive carbon footprint. Lower overall limits will give incentives to cleaner technologies.

The recommended benchmark figures for steel and cement respectively, are based on viable CO_2 performance levels of existing technologies, production volumes, and distribution across production processes in Europe. Data sources include among others the world steel association STEEL STATISTICAL YEARBOOK 2019, and Eco-efficient cements: potential, economically viable solutions for a low-CO_2, cement-based materials industry (UNEP, 2016).

DECARBONISATION UNDER THE INDUSTRIAL EMISSIONS DIRECTIVE (IED)

driving sustainability requirements for high-impact resources

The Industrial Emissions Directive seeks to support high levels of environmental protection relating to the deployment of industrial activities in the EU. The IED "focuses on prevention of pollution rather than control", by establishing technical criteria for installation categories within Best Available Techniques (BAT) reference documents (BREFs), against which compliance with Emission Limit-Values (ELVs) and other permit conditions is verified.

However, emissions continue at unacceptable levels, and the IED needs improvement in the way that requirements are considered and established with progress towards zero-pollution commitments under the European Green Deal in mind.

Firstly, to provide clear guidance to all stakeholders, a clear IED roadmap should be developed, outlining the route to eliminating key emissions including heavy metals and Volatile Organic Compounds by 2050. Increasing the coherence of the IED with other industrial and environmental policies such as the chemicals strategy will also be essential.

For example, **the IED should clearly include CO_2 as a pollutant**, which is not the case currently. This could be implemented through the introduction of EU climate policy and ETS-aligned emission limits, and development of required BAT content correspondingly. This approach to increasing policy coherence at the interface of industrial and environmental policies could also help to align the requirements of REACH and the Ambient Air Quality Directive, while integrating circularity as foreseen in the CEAP.

In terms of technical criteria, the current BAT process[8], which collates technological norms and progress, largely relies upon longstanding industry practices, not suitable for net-zero decarbonisation. The criteria for determining BAT for inclusion remains largely descriptive, with criteria such as: the use of low-waste technology; the use of less hazardous substances; and the need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it, among others[9].

There is a need to **push performance requirements beyond largely static Emission Limit Values** to support technological progress. The IED should set a performance baseline for BAT criteria and all new and existing BAT candidates should be assessed according to performance against all comparable processes, facilities or methods of operation. Existing Best Available Techniques (namely production processes) could therefore be excluded if they do not demonstrate sufficient progression against these criteria across BREF revision cycles.

Measurement and monitoring standards in many cases already help validate the performance and therefore the inclusion, adoption and implementation of an approach or technology within the bounds of BREF regulation under the IED. However, by nature their development can lag behind cutting-edge technological innovations which may be candidates for inclusion within the relevant BREF. Timely development of accurate standardised methods to validate performance against increasingly stringent requirements will therefore be essential to certify European industry's progress towards the 2050 goals. This will require support (i.e. policy and resources) for standards writers when standards to evaluate techniques with substantial emissions reduction potential are to be developed.

8 Often referred to as the Sevilla Process.

9 See Annex III of the Industrial Emissions Directive 2010/75/EU here.

Recommendations for decarbonisation under the Industrial Emissions Directive (IED)

- Develop a roadmap for establishing requirements and developing standards in line with the goals of achieving zero pollution and zero emissions by 2050, while consistent with the aim of integrating circular economy practices;
- Develop ELV and related Best Available Technique content to support the inclusion of CO_2 emissions within the IED, aligned and in support of the EU ETS;
- Develop a performance-based approach to criteria for determining Best Available Techniques, by setting minimum performance requirements against current emissions levels;
- Establish increasingly stringent ELVs based on a more environmentally progressive range of viable techniques and technologies;
- Ensure the development of required standardised methods for measurement and monitoring of emissions to support zero pollution and zero emissions by 2050;
- Ensure that standards gaps are anticipated (e.g. lack of standardised measurement or validation method) to avoid preventing progress in introducing new requirements to reduce emissions;
- Increase policy coherence and align requirements and standards under the IED with other related policies such as the Circular Economy Action Plan, the ETS, REACH, and the Ambient Air Quality Directive to increasing impact across the board.

STANDARDS FOR DECARBONISATION UNDER CONSTRUCTION POLICY

remove barriers and enable cleaner steel and cement products

Beyond industrial policy, sustainable product policy is needed to support market creation and demand for cleaner products made from high-impact resources. Construction, as the largest demand sector for steel and cement, is a priority case where product policy, alongside other policy tools,[10] needs to drive sustainability for decarbonisation. In the current framework, standards are essential to this but are predominantly not sustainability ready.

Under the existing Construction Products Regulation, performance against sustainability parameters is scarcely required or declared, giving priority to requirements for mechanical resistance and stability such as tensile yield strength. All future construction product standards must take a pro-active approach and require the **mandatory declaration of performance against sustainability criteria** based on indicators accepted within the CPR today.[11]

Methodologies in support of such criteria must also be further harmonised to ensure direct comparability between products, for instance based on environmental performance (such as CO_2 emissions) and intended use or functionality. For example, both steel and cement are used separately and in combination for structural construction products, but current material or product-specific calculations make comparability in accurate terms a challenge. This acts as a barrier to sustainability at the design phase as it makes it difficult for architects and developers to compare products.

While performance requirements should be harmonised, material-specific issues must also be addressed for both steel and cement product standards due to the particular factors impacting the lifecycle of these materials respectively (e.g. the degradation of steel and cement occurs differently during the use-phase, and opportunities for reuse or recycling are also different depending on the material). The combination of horizontal and material measures will help maximise circularity and resource efficiency.

The circularity and resource efficiency of steel must be fostered for decarbonisation using CPR requirements and standards. For that, standards must be further developed to assess and validate safety, performance and sustainability of secondary components based on physical and chemical properties throughout the lifecycle. These standards will enable, for example, the evaluation of scrap material as feedstock for new steel products by analysing the condition of the material and presence of contaminants, for example in post-consumer scrap which remains underused today.

Additionally, horizontal product standards,[12] such as for steel grades or delivery conditions, need to be adapted to establish appropriate values to foster the use of more circular steel products, and therefore differentiate between conventional and emerging low-carbon steel products. This will unlock the value and increase the attractiveness of these more sustainable products. It will also be necessary to adapt functional performance requirements to avoid excessive use of steel.

To decarbonise cement, and concrete as the end-product, it is important to remove the current barriers in harmonised as well as non-harmonised standards. Today, these norms correlate the list of “ingredients” in each cement type with performance characteristics and binder behaviour. While this approach is meant to ultimately ensure the quality of the concrete end-product, it leaves little space for an easy uptake of low carbon alternatives and clinker substitution. The fact that newer cements and alternative binders are not part of the existing standards should be tackled as a priority to ensure a wider uptake of such cements. This, in turn, will also have a ripple-down effect for contractors and architects and help drive demand for such alternatives.

10 The CPR is not the only policy tool available to address this issue but can play a major role in decarbonising the construction sector by impacting industrial production processes up the value chain.

11 Under a range of Basic Requirements for Construction Works (BWR) within the CPR, a list of candidate criteria exists that can be included within standards IF demanded for by Member States, without such demands, standards rely upon industry to drive requirements for the disclosure of sustainability related information.

12 Delivery conditions concerning high-impact resources relate to the required process control and inspection to ensure that the delivery complies with the requirements of the order, alongside required inspection documentation verifying this. This is an important point of exchange of information in value chains for high-impact resources, potentially in future to verify that declared sustainable performance is correctly provided and compliant with client requirements.

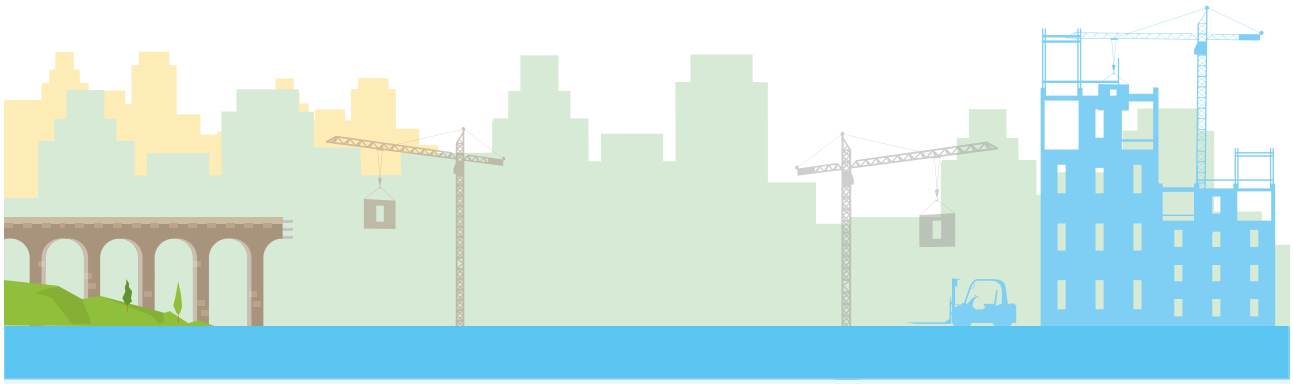
Recommendations for steel construction product standards

- Modify standards to enable greater secondary steel use. To this end, develop standards to assess the physical properties and chemical composition of reusable components and of different forms of secondary products and scrap material to help better inform their reuse and recycling;
- Revise standards to characterise and classify grades of steel with appropriate limit values to foster secondary steel uptake, supported by horizontal standards relating to inspection and delivery;
- Develop steel construction product standards with appropriate functional and environmental requirements that support a resource efficient use of higher quality materials for all major construction applications.

Recommendations for cement construction product standards

- Existing harmonised standards should not block the uptake of alternative and low-carbon binders but proactively include them as available cements for the EU market;
- New standards should be developed to outline performance tests for demonstrating binder behaviour instead of providing prescriptive product formulations;
- Develop environmental performance requirements for cementitious products under the CPR itself and prompt the drafting of corresponding assessment methodologies needed in harmonised standards.

CONCLUSION



In the coming months, the European Commission will shape how sustainable energy-intensive industries will be for decades to come – based on the upcoming review of the Industrial Emissions Directive (IED), the Construction Products Regulation (CPR), as well as implementation of the next phase of the Emissions Trading System (ETS).

To make sure outdated and polluting industrial processes are really phased out, policies need to truly start supporting low-carbon options. Currently, environmental performance requirements placed on the existing techniques and technologies are not defined to favour sustainability. This means that dirtier practices are given more space to pollute, while more modern and sustainable production methods are not incentivised - a double standard that needs to end.

The European Commission must ensure that all industrial activities are governed by appropriate rules, giving cleaner technologies a chance to compete on equal terms. Common requirements should be fixed not only for emission levels, but also for circularity and resource efficiency.

Finally, the way the role of standards is defined for these regulatory changes can have a decisive impact on how effective the rules are in real life. To help greener industrial and sectoral practices thrive, standards should not focus on defining requirements that consolidate the status quo. They should instead establish the required methodologies and framework to assess performance against ambitious environmental criteria.

The green line to standards

Where to find us?

ECOS
Mundo-B, rue d'Edimbourg 26
1050 Brussels, Belgium

Tel: +32 (0)2 894 46 68
info@ecostandard.org
www.ecostandard.org

@ECOS_Standard
ECOS-EU

September 2020

ECOS is co-funded by the European Commission and the European Free Trade Association