Nordic conference
Copenhagen, 3rd – 4th April 2025

Lowering embodied carbon of road- & rail infrastructure

Conference summary:

Organizers' project background, conclusions and recommendations

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Disclaimer

This document is developed in light of the conference titled 'Lowering Embodied Carbon of Road- and Rail Infrastructure' – a conference held in Copenhagen the 3rd and 4th of April 2025, arranged by Danish Standards (DS) – Denmark's national standardization body and in co-hosting with the Nordic Council of Ministers.

The conference has been a concluding step of an investigatory project led by Danish Standards – a project funded by the European Climate Foundation (ECF):

This investigatory project has had the objective to map the needs for standardization and Nordic policy integration to reduce the embodied carbon of transport infrastructure, establish market-to-scale on the embodied carbon, and amplify market signals of increased demand for low-carbon steel and cement to support the green transition and competitiveness of Nordic steel- and cement industries.

The conference aim has been to test the project findings in perspectives of the conference participants' practical experience, identified best practices, and policy recommendations.

The conference participants included representatives of Nordic cement- and steel industries, ministerial officials of the Transport- and Climate ministries, road- and rail authorities, standardization bodies, NGOs and think-tanks of the Nordic countries.

This document contains the conclusions of the conference organizers formulated in light of the conference discussions, and the content hence has not been formally endorsed by the conference participants.

The development of this document has been supported by civil society partners of the European Climate Foundation also participating in the conference discussions:

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Executive summary

Steel and cement/concrete are vital products in the construction and renewal of transport infrastructure such as roads, railroads, tunnels and bridges. At the same time the manufacturing industries of steel and cement compose a vital part of the real economy while also accounting for a significant share of the green-house gas (GHG) emissions:

In a European average, steel industries account for approximately 5% of the EU GHG emissions while the cement industries account for 4% of EU GHG emissions.

Meanwhile, the competitiveness of both industries is challenged and both industries have entered the EU's list of sectors at high-risk of relocating production outside of Europe.

In the Nordic Region, all 5 Nordic countries' (Denmark, Finland, Iceland, Norway and Sweden) have adopted the European Union's Emissions Trading System (EU ETS) in the endeavor to reduce the countries' GHG emissions.

In perspective of the ETS, the steel- and clinker cement producing industry account for 21% of the Nordic ETS quotas compared to 15% at the EU-level.

From 2026 towards 2034, the free ETS CO2-allowances will be phased-out, and the cement and steel industries in Europe are under significant pressure to decarbonize their production as the two industries' competitiveness is also under pressure on other fronts:

Despite steel- and cement being competitive on the products' carbon footprint (the embodied carbon), and the ideal prerequisites for decarbonizing production in the Nordic Region – due to the availability of clean energy and geographical conditions for carbon storage – the European import of both steel and cement from non-European countries is increasing.

The Single Market is experiencing dumping of cheap steel, namely deriving from Asia, and the production of clinker cement is increasingly moving outside the European borders. In order to safeguard and ensure industrial competitiveness, minimized exposure and capital recovery from the required investments in decarbonization, Nordic steel- and cement industries have called for stronger market signals of demand for low-carbon products, notably from the construction- and public infrastructure sector.

Meanwhile, currently there is little benchmarking on embodied carbon values among the Nordic infrastructure authorities, and little transparency for industries and civil society to track the transport infrastructure sector's work to reduce embodied carbon and their progress in increasingly procuring low-carbon steel and cement.

Despite various coordination forums of Nordic road- and rail authorities, Ramboll has in a 2025 investigation concluded that potential exist to increase Nordic integration i.a. via a more coordinated use of standards to ensure monitorization, benchmarking and reduction of the embodied carbon from materials used in the Nordic countries' road- and rail infrastructure.

It is on the basis of Ramboll's investigations and conclusions that Danish Standards and the Nordic Council of Ministers with the support of the European Climate Foundation organized the conference in Copenhagen on the 3rd and 4th of April 2025.

At this conference the participants have sought to enhance the Ramboll recommendations for policy measures in order to support the Nordic infrastructure bodies' progress in reaching climate-neutrality and reducing embodied carbon which at the same time would sustain the competitiveness of Nordic heavy-industry. These recommendations have been established under three different themes of conference recommendations.

The 3 conference recommendations themes to the Nordic policy level consist of:

1) **Re-thinking economic feasibility studies and environmental impact assessments (EIAs)** to increase transparency and attention to embodied carbon and green premiums already as part of the political project-decision phase

2) **Ensuring Nordic cross-border benchmarking** via harmonization of Nordic approaches to life-cycle analysis methodologies and reporting on steel and cement/concrete products' global warming potential (GWP) to improve comparability of the Nordic countries' progress in reducing embodied carbon of infrastructure projects

3) **Establishing climate-neutrality goals and specific embodied carbon aims for steel- and cement among Nordic infrastructure authorities** to send market signals of amplified demand for low-carbon steel and cement to incentivize and accelerate the industrial decarbonization

Organizers' project background

Reducing embodied carbon of infrastructure – key to ensuring the green transition of industries and fulfilling the Nordic climate goals

The 5 Nordic countries, meaning Denmark, Finland, Iceland, Norway and Sweden, have the world's most ambitious climate goals:

Norway has the most ambitious goals and aims to become climate-neutral by 2030. Finland aims to achieve climate-neutrality by 2035, Iceland by 2040, and lastly Denmark and Sweden by 2045. The 5 Nordic countries' climate ambitions thus also exceed the European Union's goal for climate-neutrality by 2050.

One of the main EU-level policy drivers for reaching climate-neutrality across the European Union is the Emission Trading System (ETS) established in 2005:

The ETS obliges GHG intensive sectors including i.a. electricity and heat generation, oil refineries, cement, steel, chemicals, and commercial aviation to buy CO2-quotas equivalent to their CO2-emissions. Each country has an annual number of free emission quotas to allocate to industries to exempt industries from buying quotas/allowances and thereby prevent increases to the cost of production.

Up until 2024, the ETS has already delivered GHG emission reductions of approximately 50% in the sectors covered by ETS since its establishment in 2005[i]. The ETS is hence on a decent trajectory to fulfill the target of delivering a -62% emission reduction across ETS sectors by 2030.

Among the frontrunning sectors of decarbonization is the power sector with a 12% reduction driven notably by the shifts in the EU energy mix[ii]. Meanwhile, the emissions the three hard-to-abate industries, meaning cement, chemicals/petrochemicals and steel remain stable. Among these, the steel and cement industries are estimated to account for 9% of the European GHG emissions.

The buildings- and the infrastructure sector are responsible for the vast majority of the market offtake of steel and cement. While the building sector emissions are decreasing, the emissions of the transport sector – which accounts for more than one third of the countries' total effort sharing emissions[iii] – have stagnated.

In the transport infrastructure sector, 80-90% of the embodied GHG emissions from the construction or renewal of transport infrastructure such as roads, railroads, tunnels and bridges derive from materials, and notably steel and concrete composed with clinker cement. The remaining 10-20% of embodied carbon derive mainly from on-site emissions, meaning notably machinery and electricity use.

As such, an interdependent relation thus exists between reaching a climate-neutral transport infrastructure sector and strengthening the competitiveness and the green transition of steel- and cement industries:

In order to reach a climate-neutral transport infrastructure sector in the Nordics, increasing the use of low-carbon steel and cement, and hence lowering the embodied carbon, will be imperative. At the same time, the Nordic infrastructure sector is with its combined purchasing-power key to incentivizing and accelerating the decarbonization of steel- and cement industries by ensuring a sufficient demand for low-carbon steel and cement.

Nevertheless, project investigations reveal that this interdependent relation is in a dilemma, because while the industry is anticipating market signals from the infrastructure sector, many national infrastructure authorities are awaiting a mature market supply of low-carbon products.

One of the central conclusions to the project investigations – also supported by participants at the conference – is that Nordic policymakers ought to ensure that the Nordic infrastructure authorities swiftly increase market signals of demand and aims for the offtake low-carbon steel and cement to stimulate the industrial transition well-ahead of the ETS free allowance phase-out in 2034.

More specifically, several conference participants concluded that without such due-diligence of market signals consisting of climate-neutrality goals and embodied carbon aims to signal a market offtake of low-carbon steel and cement, the infrastructure sector will risk increased prices for non-decarbonized products after the phase-out of free ETS allowances.

In perspectives of the ETS, more than 14 million free ETS allowances were in 2023 allocated to Nordic steel and cement. If this same amount of free emission allowances were to have been bought at the 2023 ETS-price of €65 per metric ton, the production costs of Nordic steel- and cement would have increased by approximately €950 million.

Facts on Nordic climate goals and Nordic steel- and cement emissions in perspectives of the EU ETS

	DK	FI	IS	NO	SE	Nordics	EU27 (+ NO + IS)
Year of aim for Climate-neutrality	2045	2035	2040	2030	2045		2050
Country GHG MtCO2eq	41,83	43,45	4,17	56,72	49,12	195,29	3282,68
Verified ETS emissions All activities	9.715.382	16.408.523	2.422.559	22.487.488	19.945.805	70.979.757	1.151.038.363
Verified ETS-emissions Steel + Cement tCO2eq	1.704.342 (17% of verified ETS emissions)	5.072.173 (31% of verified ETS emissions)	0 (0% of verified ETS emissions)	982.880 (4% of verified ETS emissions)	6.921.888 (35% of verified ETS emissions)	14.621.291 (21% of verified ETS emissions)	176.060.754 (15% of verified ETS emissions)
Steel + Cement Free ETS allowances tCO2eq	1.675.181	4.874.021	0	1.033.730	6.485.733	14.068.665	231.549.689

Sources: Emissions Database for Global Atmospheric Research (EDGAR) 2024 report on 2023 numbers[iv]
European Environment Agency (EEA) Registry[v] (2023 – activity codes 24 (pig iron + steel) + 29 (clinker cement)

Development of climate-neutrality goals and aims for embodied carbon of materials

In the Ramboll investigations of 2025[vi], it is concluded that Sweden is the only of the five Nordic countries to have a goal for full climate-neutrality also covering the embodied carbon among national infrastructure authorities.

	Denmark	Finland	Iceland	Norway	Sweden
Embodied carbon targets	Road: no quantified targets defined Rail: 20-30% reduction in total, covers embodied carbon.	No quantified targets defined.	No quantified targets defined.	Each actor has individual goals that are currently being discussed and updated, generally cover embodied carbon.	Climate neutral by 2040 covers embodied carbon.

Source: Ramboll, 2025: Towards low-carbon transport infrastructure in the Nordics

The climate-neutrality goals of the Swedish National Transport Authorities (Trafikverket) have been adopted based on an analytic report developed in 2021 by the consulting firm WSP.[vii]

In this report of 2021, WSP has analyzed various trajectories to significantly reduce GHG of infrastructure by up to 90% by 2040, which, Trafikverket have adopted even more ambitious targets. These targets are based on design-optimization using less material (material efficiency) and then using materials with lower embodied carbon (GWP) values.

Meanwhile, in contrast to supporting the decarbonization of industries – the use of less materials (material effiency) will not contribute to an acceleration of the industrial transformation of cement- and steel industries, and also will not ensure reaching net-zero embodied carbon in the transport infrastructure sector.

Apart from the Trafikverket, also the Danish National Rail Authorities (BaneDanmark) have a climate impact reduction target of 20-30% which also covers embodied carbon. However, in the BaneDanmark's sustainability strategy of 2024, despite claims to be in accordance with the GHG-protocol, the embodied carbon of infrastructure is not assessed, and the scope of organizational CO2 assessment is limited merely to energy emissions and administration.[viii]

In the 2024 strategy, BaneDanmark concluded that one of the reasons for not establishing aims or limits to embodied carbon, is due to lack of funds to cover green premiums which hence support the arguments of ensuring green premium transparency already in the project decision-phase.

In a Swedish context, the WSP report of 2021 supports the BaneDanmark's conclusion that reducing embodied carbon will require additional funds for premiums of buying low-carbon materials (green premiums).

Meanwhile, WSP also concludes that these additional funds will only be initial, as the amplified demand will spark increased supply of decarbonized products, reducing green premiums by more than 73% for a >90% embodied carbon reduction in year 2045.

EU legislation – obliged attention to embodied carbon but streamlining of regulation is needed

To reduce the GHG emissions of the construction sector, and in order to increase the demand for low-carbon materials for buildings, the European Union has in 2024 adopted the Energy Performance of Buildings Directive (EPBD) which will regulate whole-life cycle carbon (WLC) of buildings – meaning GHG emissions from materials, energy use in the construction-phase, energy consumption in the usage phase, and emissions from demolition.

This revised EPBD of 2024 was developed on the basis of regulation of whole-life carbon buildings regulations in 3 of the Nordic Countries (Denmark, Finland and Sweden) – regulations that have sparked the development of competitive, innovative and energy-focused construction product industries in the Nordics.

Despite the EPBD establishing a long-term demand for low-carbon materials to be used in the buildings sector, including steel and cement, the EPBD cannot be expected to generate a similar increase in the demand for low-carbon materials in the infrastructure sector. This is due to significantly higher performance requirements to the steel and cement used in the infrastructure sector, and that the steel- and cement products for infrastructure typically not being produced in the same lines of production, nor necessarily by the same industries.

As of 2025, there is however no EU-level framework regulating the embodied carbon of transport infrastructure. The only pertinent EU-level regulation linked to project-level assessment, disclosure and reduction of the climate impact from the construction of transport infrastructure is the Environmental Impact Assessment (EIA) Directive (2011/92/EU) and the Strategic Environmental Assessment (SEA) Directive (2001/42/EC).

The EIA Directive of 2011 obliges European member states' infrastructure authorities to develop an EIA, and in these EIAs disclose the climate- and environmental impact for major infrastructure projects such as long-distance railways, motorways and airports etc. Hereafter, if the infrastructure authorities conlude a significant impact, the SEA Directive obliges the authorities to strategically limit the climate- and environmental impact.

However in contrast to the EPBD, the EIA Directive does not contain any harmonized standards for how the climate impact from the construction or renewal of infrastructure should be assessed, nor how the assessed climate impact should be disclosed and hence feed into the project-decision phase.

Meanwhile, relevant for organizational-level reporting, in 2022 the European Parliament adopted Corporate Sustainability Reporting Directive (CSRD - 2022/2464), and in 2024 the Corporate Sustainability Due Diligence Directive (CSDDD - 2024/1760) was adopted.

These two new policy files will apply to larger European infrastructure companies which will be obliged to conduct organizational-level climate assessments and reporting in accordance with European Sustainability Reporting Standards (ESRS) which are also aligned with the global tool known as the GHG Protocol. Reporting on scope 3 emissions are included in the scope of the ESRS and the GHG Protocol, and reporting of embodied carbon of materials will hence also be mandatory.

Standards and Nordic integration to lower the embodied carbon of transport infrastructure

The standards for climate / life-cycle assessments (LCAs) are common basis of methodology for assessments of the climate- environmental impact of new construction or renovation projects of constructions of buildings and infrastructure.

In the building sector, the European Union has with its adoption of the revised Energy Performance of Buildings Directive (EPBD) harmonized the use of a life-cycle assessment standard (EN15978) for assessment of the i.a. the climate-impact or global warming potential (GWP) of construction, renovation and even demolition of buildings across the European Union.

Moreover, for specific assessment of the GWP of construction materials, such as steel and cement in buildings, the EPBD has harmonized the use of the Environmental Product Declaration standard (EN15804). This harmonization of European standards has established market-to-scale and competition on the carbon footprint of buildings, building materials and also competition among the members of the building sector's value-chain members to construct buildings with the lowest embodied carbon.

For the infrastructure sector no assessment or disclosure standards have been harmonized, although a similar LCA-standard for infrastructure exists (EN15643).

Meanwhile, in the endeavor to assess the climate impact of infrastructure, the national infrastructure authorities have developed digital tools in the Nordics for the life-cycle assessment of infrastructure: 7 different LCA-tools for 5 different countries.

Despite Nordic LCA coordination groups, notably among the national road authorities, all 7 different LCA-tools vary in their methodologies for defining and counting the GHG emissions.

As concluded in a report by Sweco in 2023[ix], not 2 of the 7 Nordic LCA-tools share a similar LCA-methodology, and Sweco's investigations conclude that these varying methodologies have a major significance:

For example, if the climate impact (CO2 emissions) was to be assessed on the exact same motorway project e.g. example for the Oresunds Motorway using 2 of the 7 different Nordic LCA-tools, the concluded climate impact would differ between 5.000 tCO2e compared to 20.000 tCO2e on the LCA of earthworks depending on which 7 Nordic LCA-tools is used to calculate the climate impact – a climate impact assessment differing by 400%.

In the assessment of the embodied carbon of steel and cement specifically, the concluded climate impact would differ between 10.000 tCO2e or 20.000 tCO2e depending on which Nordic LCA-tools are used to calculate the climate impact – about double the embodied carbon depending on which of the Nordic LCA-tools is used for the climate impact assessment.

The steel industry

Together with cement, steel is a significant force of the european economy, its economic growth and employment. With the annual average production of 140 million tonnes of steel, across more than 500 steel production sites in 22 EU member states, the European steel industry has an annual turnover of approximately €191 billion.[x]

In a European average, the steel industries account for 5% for the EU GHG emissions. However, in the Nordics the steel industries subject to the ETS, can account for up to 26% (Sweden) of the national verified ETS emissions notably linked to the 4 fossil blast-furnace (BF) steelworks in the Nordic Region.

In Europe, it is the European harmonized standard for steel (EN10020) that defines the classification in 3 different grades of steel depending on their chemical composition. These 3 grades are: non-alloy, stainless steel, and other alloy steels.

With the production and access to clean energy in the Nordic region, the Nordic steel industries hold a competitive advantage to supply the European steel market with products with the lowest embodied carbon (GWP) values.

Meanwhile, the Single Market is experiencing dumping of cheaper steel deriving notably from Asian countries, and since 2008, the steel production within the European Union has decreased by 30%, and hence reaching a historical low-point[xi].

The European import of steel from non-European countries has been increasingly significantly reaching import levels of more than 30 million tons of steel annually, and Europe is thus supporting the construction of more than 160 new fossil blast furnace (BF) steelworks that are under construction globally.

According to Eurofer it is notably unpredictability in energy prices, inflation, uncompetitive energy- and carbon pricing that is structurally undermining steel industry within the European borders[xii], and causing notably primary steelmaking to leave the European shores.

Facts on Nordic & European steel in perspectives of EU ETS

	DK	FI	IS	NO	SE	Nordics	EU27 (+ NO + IS)
Steel / iron industry verified ETS emissions	0 (0% of total verified ETS emissions)	4.408.290 (27% of total verified ETS emissions)	0 (0% of total verified ETS emissions)	89.171 (0,4% of total verified ETS emissions)	5.260.757 (26% of total verified ETS emissions)	9.758.218 (14% of total verified ETS emissions)	83,057.679 (0% of total verified ETS emissions)
Steelworks Total Incl. announced	0	5	0	0	6	11	147
Total Capacity ttpa 2025 operating + pre-retire.	0	6.975	0	770	8.927	16.972	181.251
BF/BOF steelworks 2025 operating + pre-retire.	0	2	0	0	2	4	40

Sources: European Environment Agency (EEA) Registry (2023 – activity codes 24 (pig iron + steel))
Global Energy Monitor 2025

The cement industry

The cement industry and its products compose a vital component and key ingredient in making of both concrete and mortar. Cement is typically 95% of the CO2 footprint of concrete, and clinker production account for more than 90% of the emissions from cement production.

The European harmonized standard for cement (EN197-1) defines 27 types of cement products and constituents for the single market. These 27 product types are grouped into five categories of cement (CEM 1-5) depending on the percentage of clinker in the product.

For concrete, the European harmonized concrete standard (EN 206-1), is defining common european strengthclasses. Meanwhile, each of the European countries have national annexes to EN 206-1 with requirements for which strength-classes ought to be used when constructing infrastructure, and typically also requirements for higher shares of clinker in the cement used to make concrete.

Clinker cement is also the most energy-intensive cement product and is therefore also covered by the EU ETS. At the EU-level, clinker cement is up to 8% of the EU ETS quotas, while in the Nordics up to 17% (Denmark) of the national ETS-allowances.

To reduce the carbon footprint of cement production and also mitigate the longer term cost impact of the phase-out of free ETS quotas, the two biggest cement producing industries present in the Nordic Region – Aalborg Portland and Heidelberg Materials – have invested in carbon-capture and storage technology (CCS) and thus of the larger cement industries Nordic countries have some of the frontrunning industries of Europe on decarbonization.

Carbon-capture and storage (CCS) + usage (CCUS) is currently a vital share of the trajectory for the cement sector and accounts for 42% of the industry's CO2 reduction at a 2050 horizon. [xiii]

Despite the Nordic frontrunning position and ideal prerequisites for increasing the Nordic production of clinker cement with lower embodied carbon, European imports from non-European countries are increasing, and have increased by approximately 260% since 2016.

Over the same number of years, the EU cement exports to non-EU countries has decreased by approximately -52%[xiv]. This ought to be seen in a light of an increased demand for cement expected to continue in perspectives of economic growth.

Facts on Nordic & European production of cement clinker

	DK	FI	IS	NO	SE	Nordics	EU27 (+ NO + IS)
Cement clinker verified ETS emissions	1.704.342 (17% of total verified ETS emissions)	663.883 (4% of total verified ETS emissions)	0 (% of total verified ETS emissions)	893.709 (4% of total verified ETS emissions)	1.661.131 (% of total verified ETS emissions)	4.923.065 (8% of total verified ETS emissions)	95.734.048 (8% of total verified ETS emissions)
No. of cement plants	1	3	0	2	2	8	Appx 200
Operating capacity cement Mta	2.95	1.7	0	1.92	3.1	7.57	Appx 178

Sources: European Environment Agency (EEA) Registry (2023 – activity codes 24 (pig iron + steel) + 29 (clinker cement)
Global Energy Monitor 2025
CEMbureau Activity Report on 2023 (published 2024)[xv]

Conference themes & recommendations

1. Re-thinking economic feasibility (cost-benefit) studies & environmental impact assessments

The national approaches to ensuring financial allocations to cover green premiums and hence lowering the embodied carbon of steel- and cement products differ among the five Nordic countries.

Despite all Nordic countries operating with monetary values / carbon-pricing / shadow price per ton of CO2, the conference participants generally agreed that potential embodied carbon reductions – and the attached green premiums to these reductions – ought to be transparent already in the early project-decision phases.

The project investigations have revealed that the public procurement phase – one of the last phases in the authorities' commissioning of an infrastructure project – is too late in the project process to secure sufficient funds for green premiums as part of the ambitions to lower the embodied carbon of low-carbon steel or cement.

The conference participants expressed that the rethinking of notably the environmental impact assessments (EIAs) and economic feasibility studies / cost-benefit analyses of major infrastructure projects would be prudent, notably for projects stretching over several years, and notably for the Nordic countries with traditions of adopting legislation via the parliamentary legislatures when deciding on the realization of major infrastructure projects.

By moving forward the assessments potential embodied carbon reductions from steel- and cement/concrete based upon dialogues and consultation with major supplying industries of steel- and cement, the policymakers would be able to develop forecasts of future embodied carbon values and hence also potential emission reductions of the steel and cement.

Furthermore, by advancing these assessments, authorities and consultancies could dialogue with industries to disclose forecasts of potentials for embodied carbon reductions. With this disclosure the policymakers could be provided with a significantly more informed basis of knowledge before deciding on the final commissioning of a major transport infrastructure project. In this way, the policymakers would furthermore obtain increased financial clarity to also ensure a timely allocation of sufficient budgeted funds to cover green premiums.

In order to diminish, and also prevent this establishment of red-tape, the conference participants suggested that the Nordic governmental authorities establish a process of coordinating the revisions of ministerial guidelines for environmental impact assessments and the economic feasibility studies / cost-benefit analyses.

The conference participants noted that with an increased streamlining of Nordic ministerial guidelines – and hence also increasingly streamlined procurement of EIAs and economic feasibility studies to external consultancies – the public authorities could expect increased competition among consultancies in the Nordic Region, which could also reduce expenses to external consultancies.

With inspiration from existing approaches to life-cycle assessments (LCAs) / assessments of the climate-impact (GWP) of constructions in the buildings sector in the EPBD, the Nordic ministerial authorities could advantageously include references to the LCA-standard for assessment of the climate footprint of infrastructure (EN15643).

Referencing the EN15643 in the ministerial guidelines would increase the Nordic consistency in the developed EIAs and economic feasibility studies / cost-benefit analyses, and also enable the Nordic infrastructure bodies to mirror embodied carbon levels, potential reductions, and green premiums across various project phases at the project-level across country boards.

At the product level, the ministerial guidelines for EIAs and economic feasibility studies / cost-benefit analyses could advantageously also include an obligation for the embodied carbon values (GWP values) and green premiums to be specified in accordance with European standards for categories and strength-classes of steel- and cement/concrete. This would enable perspectivization of the choice of products in perspectives of the CO2 of equivalent market-available products.

Recommendations on conference theme 1:

Re-thinking economic feasibility studies & environmental impact assessments:

1	Initiate a Nordic coordination and revision of the national ministerial guidelines for the development of pre-investigative environmental impact assessments (EIAs) as well as economic feasibility / cost-benefit studies
2	At the project level, the environmental impact assessments' (EIAs) assessment of the embodied carbon (GWP) should be disclosed for infrastructure projects – similar to life-cycle assessments (LCAs) in the buildings sector, but following the standard for assessment of sustainability in infrastructure (EN15643)
3	At the product level, the environmental impact assessments (EIAs) for new infrastructure projects should disclose the forecasted embodied carbon (GWP) per product category and strength-classes in accordance with European standards for steel (EN10020) and concrete (EN206-1)
4	The economic feasibility studies (cost-benefit analyses) should contain forecasts of the additional funds (green premiums) to reduce the embodied carbon (GWP) per product category and strength class in accordance with European standards for steel and cement

2. Ensuring Nordic cross-border benchmarking of infrastructure CO2

As portrayed in the Sweco report, there are 7 different LCA-tools for the 5 Nordic countries, with not two of these 7 systems sharing a similar LCA-methodology for the climate impact assessment of infrastructure projects.

The differing methodologies, causing differing conclusions to climate impacts, are notably due to different scopes (modules of the LCA-standard), and also how the infrastructure authorities define to the different modules of the LCA-standard.

Despite Nordic coordination forums and several Nordic LCA-projects, the 5 Nordic countries' infrastructure authorities have implemented differing methodologies. Meanwhile, both Ramboll and Sweco conclude that these differing approaches are problematic:

LCA-methodologies are often considered a technical matter for authorities. Meanwhile, in order to deliver on the political ambitions for further Nordic integration, political mandates to the infrastructure authorities to ensure Nordic harmonization of LCA-methodologies will be necessary to ensure cross-border benchmarking and mirroring the progress and decarbonization potentials among the different Nordic infrastructure sectors.

Also on the product-level, the conference participants discussed the potential for Nordic harmonization to achieve reliable benchmarking on the embodied carbon of steel and cement/concrete:

Among the Nordic steel producers there is currently no wide support for a common benchmarking tool. Meanwhile, for concrete, 3 of the 5 Nordic Countries (Finland[xvi], Norway[xvii], and Sweden[xviii]) each have sustainability scales for concrete, published by the countries' industry associations for concrete.

The conference concluded that it would be advantageous to have a common Nordic approach to benchmarking on the reductions in GWP in percent of a baseline – equivalent to the tool developed by the Finnish Concrete Association.

Recommendations on conference theme 2:
Ensuring Nordic cross-border benchmarking of infrastructure CO2

1	Nordic policymakers should mandate the national infrastructure authorities to harmonize the scope and definitions of LCA-modules across the Nordic countries to increase comparability of the climate impact
2	Nordic policymakers of countries with no concrete scale (Denmark and Iceland) should initiate dialogue with the countries' concrete associations to adopt one of the 3 existing Nordic approaches to benchmarking the global warming potential (GWP) of concrete
3	Nordic policymakers should ensure that the infrastructure bodies conduct benchmarking on the embodied carbon (GWP) per product category and strength-class in accordance with European standards for steel and cement/concrete

3. Establishing climate-neutrality goals and aims for embodied carbon for Nordic transport infrastructure

The concluding question of the Copenhagen Conference to the policymakers was whether the infrastructure authorities should await market maturity and the availability of low-carbon steel- and cement, or whether the infrastructure sectors should enter dialogues with industries, establish market-signals and thus support the industrial transformation well ahead of the phase-out of free ETS-allowances.

In order to safeguard the competitiveness of Nordic steel- and cement industries, utilizing the prudent Nordic prerequisites for low-carbon production with the use of green Nordic energy and CCS, and expand the low-carbon production capacity, demand-side policies and market signals must be amplified to show prospects of market offtake of low-carbon products.

As part of sending sturdy market-signals and incentivizing the accelerated industrial transition and hence ensure increased market supply of products with low embodied carbon values, the political establishment of climate-neutrality goals for all infrastructure authorities also covering embodied carbon, compose a pivotal first starting-point.

Meanwhile, establishing realistic forecasts for the embodied carbon (GWP) values of products, realistic embodied carbon aims and forecasts of green premiums will require further investigations:

To kick off these investigations, Nordic policymakers could advantageously consider mandating the infrastructure authorities to initiate the development of similar investigations to the report developed by WSP for Trafikverket in 2021 with a point-of-departure in dialogues with Nordic steel- and cement industries to determine the realistic forecasts.

On this basis, the Nordic policymakers would be enabled to ensure allocation of funds for green premiums, and mitigate the infrastructure authorities' risk of paying more for non-decarbonized in light of the ETS free quota phase-out, while also supporting the green transition of Nordic heavy-industry:

Recommendations on conference theme 3: Establishing climate-neutrality goals and aims for embodied carbon for Nordic transport infrastructure

1	All Nordic transport authorities should establish overall climate-neutrality goals also covering embodied emissions
2	The national authorities should initiate dialogue with heavy-industry and establish specific aims for the embodied carbon (GWP values) for steel and cement
3	The national infrastructure authorities should initiate preparations to conduct organization-level reporting on scope 3 emissions, including embodied carbon emissions, as part of the implementation of new EU-legislation (CSDDD and CSRD) and attached reporting standards (ESRS)

References

[i] EU, 2025: News article: EU Emissions Trading System has reduced emissions in the sectors covered by 50% since 2005
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