Land Transport Criteria

Version 2

Development of Eligibility Criteria under the Climate Bonds Standard & Certification Scheme

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Climate Bond Certified

Document revision number	Date	Summary of changes
2.1 Clarified threshold years	Aug 2022	Clarification of years new thresholds are applicable. I.e., passenger transport thresholds become zero from 2026 onwards. Clarification that Hydrogen vehicles are eligible as opposed to Biofuel vehicles.
2. Formal update to criteria	Oct 2020	Lowering passenger transport emissions thresholds, lower acceptable percentage of rail freight being fossil fuels (now 25%), clearer exclusions of biofuel and fossil fuel vehicles, clarify fossil fuel transport exclusions, inclusion of zero emissions supporting vehicles in other sectors, clearer requirements for emissions reductions for new interurban rail, addition of coaches into scope, and changes to layout to align with other sector criteria.
1. First publication of original Criteria	Feb 2016	

Climate Bonds INITIATIVE

Definitions

Climate Bonds Initiative (CBI): An investor-focused not-for-profit organisation, promoting large-scale investments that will deliver a global low carbon and climate resilient economy. The Initiative seeks to develop mechanisms to better align the interests of investors, industry and government so as to catalyse investments at a speed and scale sufficient to avoid dangerous climate change.

Climate Bond: A climate bond is a bond used to finance – or re-finance - projects needed to address climate change. They range from wind farms and solar and hydropower plants, to rail transport and building sea walls in cities threatened by rising sea levels. Only a small portion of these bonds have been labelled as green or climate bonds by their issuers.

Certified Climate Bond: A Climate Bond that is certified by the Climate Bonds Standard Board as meeting the requirements of the Climate Bonds Standard, as attested through independent verification.

Climate Bonds Standard (CBS): A screening tool for investors and governments that allows them to identify green bonds where they can be confident that the funds are being used to deliver climate change solutions. This may be through climate mitigation impact and/ or climate adaptation or resilience. The CBS is made up of two parts: the parent standard (Climate Bonds Standard v2.1) and a suite of sector specific eligibility Criteria. The parent standard covers the certification process and pre- and post-issuance requirements for all certified bonds, regardless of the nature of the capital projects. The Sector Criteria detail specific requirements for assets identified as falling under that specific sector. The latest version of the CBS is published on the Climate Bonds Initiative website

Climate Bonds Standard Board (CBSB): A board of independent members that collectively represents $34 trillion of assets under management. The CBSB is responsible for approving i) Revisions to the Climate Bonds Standard, including the adoption of additional sector Criteria, ii) Approved verifiers, and iii) Applications for Certification of a bond under the Climate Bonds Standard. The CBSB is constituted, appointed and supported in line with the governance arrangements and processes as published on the Climate Bonds Initiative website.

Climate Bond Certification: allows the issuer to use the Climate Bond Certification Mark in relation to that bond. Climate Bond Certification is provided once the independent Climate Bonds Standard Board is satisfied the bond conforms with the Climate Bonds Standard.

Green Bond: A Green Bond is where proceeds are allocated to environmental projects. The term generally refers to bonds that have been marketed as “Green”. In theory, Green Bonds proceeds could be used for a wide variety of environmental projects, but in practice they have mostly been the same as Climate Bonds, with proceeds going to climate change projects.

Transport assets and projects: Assets and projects relating to the production of private and / or public vehicles, and / or the development of associated infrastructure, logistics and ICT.

Technical Working Group (TWG): A group of key experts from academia, international agencies, industry and NGOs convened by the Climate Bonds Initiative. The TWG develops the Sector Criteria - detailed technical criteria for the eligibility of projects and assets as well as guidance on the tracking of eligibility status during the term of the bond. Their draft recommendations are refined through engagement with finance industry experts in convened Industry Working Groups and through public consultation. Final approval of Sector Criteria is given by the CBSB.

Industry Working Group (IWG): A group of key organisations that are potential issuers, verifiers and investors convened by the Climate Bonds Initiative. The IWG provides feedback on the draft sector Criteria developed by the TWG before they are released for public consultation.

The Climate Bonds Initiative gratefully acknowledges the Technical Working Group members who supported the development of these Criteria. Members are listed in Appendix 1.

Table of Contents

1 Introduction

1.1 Overview

This Background Document serves as a reference document to the Criteria Document for the Land Transport Criteria (hereafter referred to as simply the Transport Criteria). The purpose of the Background Document is to provide an overview of the key considerations and issues that were raised during development of the Transport Criteria[1].

The Criteria are generally developed through a consultative process with Technical Working Groups (TWGs) and Industry Working Groups (IWGs), and through public consultation. The TWGs comprise academic and research institutions, civil society organizations, multilateral banks and specialist consultancies whereas IWGs are represented by industry experts including potential bond issuers and investors. A period of public consultation offers the opportunity to any member of the public to comment on the Criteria. This document aims to capture these various dialogues and inputs and substantiate the reasoning behind the Transport Criteria. It should be noted that, prior to this process being the standard procedure and in the case of the Transport Criteria, only a TWG was convened, followed by a period of public consultation.

This Background Document begins with an introduction to the challenges in financing a low carbon and climate resilient world and the role that bonds can play in meeting this challenge, particularly through the standardisation of green definitions. This is followed by Section 2, which introduces the transport sector and the implications of climate change on the sector in terms of both emissions and climate risks. Section 3 explains the principles and boundaries of Transport Criteria development. Section 4 synthesizes the discussions arising from the TWGs and public consultation and presents the resulting Criteria.

Supplementary information available in addition to this document include:

1. Transport Criteria Brochure: a 2-page summary of the Transport Criteria.
2. Transport Criteria Document: the complete Criteria requirements.
3. Climate Bonds Standard V3: the umbrella document laying out the common requirements that all Certified Climate Bonds need to meet, in addition to the sector-specific Criteria (V2.1 is the most recent update version).
4. Climate Bonds Standard & Certification Scheme Brochure: an overview of the purpose, context and requirements of the Climate Bonds Standard & Certification Scheme.

For more information on the Climate Bonds Initiative and the Climate Bonds Standard & Certification Scheme, see https://www.climatebonds.net/standard. For the documents listed above, see https://www.climatebonds.net/standard/transport

1.2 Funding needs of a low-carbon and climate resilient economy

The current trajectory of climate change, expected to lead to global warming of 3.1-3.7°C by 2100[2], poses an enormous threat to the future of the world's nations and economies. The effects of climate change and the risks associated with a greater than 2ºC rise in global temperatures by the end of the

[1] Please note that the document does not include water-based transport or aviation.
[2] According to Climate Tracker, under current policies we could expect 3.1-3.7ºC: http://climateactiontracker.org/global.html

century are significant: rising sea levels, increased frequency and severity of hurricanes, droughts, wildfires and typhoons, and changes in agricultural patterns and yields. Avoiding such catastrophic climate change requires a dramatic reduction in global greenhouse gas emissions.

To ensure sustainable development and halt climate change, all future infrastructure, both built and nature-based, needs to be low-carbon and resilient to climate change, without compromising the kind of economic growth needed to improve the livelihoods and wellbeing of the world's most vulnerable citizens. Global infrastructure investment is expected to amount to USD 90 trillion over the next 15 years, which is more than the entire current infrastructure stock.[3]

Ensuring that the infrastructure built is low-carbon raises the annual investment needs by 3–4%.[4] Climate adaptation needs add another significant amount of investment, which is estimated at USD 280–500 billion per annum by 2050 for a 2ºC scenario.[5]

According to the Task Force on Climate-related Financial Disclosures (TCFD), there are two broad channels through which climate change can present risks to business activities and assets[6]:

1. Physical risk: the risk of impacts from climate- and weather-related events, such as floods and storms that damage property or disrupt supply chains and trade;
2. Transition risk: the financial risks that could result from the process of adjustment towards a lower-carbon economy. These include sudden shifts in demand; legal risk due to parties who have suffered loss or damage seeking compensation; and changes in policy favouring lower carbon technologies.

These could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent, and widespread inadequate information on these risks could even threaten the stability of the financial system. Risks to financial stability will be minimised if the transition to a low carbon and climate resilient economy begins early and follows a predictable path, thereby helping the market anticipate a smooth transition to a 2ºC warming world.

1.3 Green bonds are critical to mobilising the capital required

Traditional sources of capital for infrastructure investment, such as governments and commercial banks lending, are insufficient to meet capital requirement needs to 2030. Institutional investors, particularly pension and sovereign wealth funds, are increasingly looked to as viable actors to fill these financing gaps.

Capital markets enable issuers to tap into large pools of private capital from institutional investors. Bonds are appropriate investment vehicles for these investors as they are low-risk investments with long-term maturities, making them a good fit with institutional investors' liabilities (e.g. pensions to be paid out in several decades).

Bond financing works well for low-carbon and climate-resilient infrastructure, particularly for refinancing projects and assets post-implementation, as capital markets also facilitate risk

[3] New Climate Economy (2016). Better Growth, Better Climate.
[4] New Climate Economy (2016). The Sustainable Infrastructure Imperative: Financing for Better Growth and Development.
[5] UNEP (2016). The Adaptation Finance Gap Report.
[6] TFCD's 'Recommendations of the Task Force on Climate-related Financial Disclosures': https://www.fsb-tcfd.org/publications/final-recommendations-report/

management. Across investors and financial markets, different entities face different types and severities of risks related to climate change, depending on many factors including degree of long-term exposure, likelihood of negative climate impacts, and ability to mitigate impacts or shift positions.

Bonds offer relatively stable and predictable returns, and long-term maturities. This makes them a good fit with institutional investors' investment needs. Labelled green bonds are bonds with proceeds used for green projects, mostly climate change mitigation or adaptation projects, and labelled accordingly. The rapid growth of the labelled green bond market has shown in practice that the bond markets provide a promising channel to finance climate investments.[7]

The green bond market can reward bond issuers and investors for sustainable investments that accelerate progress toward a low carbon and climate resilient economy. Commonly used as long-term debt instruments, green bonds are issued by governments, companies, municipalities, commercial and development banks to finance or re-finance assets or activities with environmental benefits. Green bonds are in high demand and can help issuers attract new types of investors.

Green bonds are regular bonds with one distinguishing feature: proceeds are earmarked for projects with environmental benefits, primarily climate change mitigation and adaptation. A green label is a discovery mechanism for investors. It enables the identification of climate-aligned investments with limited resources for due diligence. By doings so, a green bond label reduces friction in the markets and facilitates growth in climate aligned-investments.

However, currently green bonds account for less than 0.2% of the global bond market, with approximately USD 380 billion[8] of green bonds outstanding, compared to the global bond market of USD 100 trillion. The potential for scaling up is tremendous. The market now needs to grow much bigger, and quickly.

1.4 Introduction to Climate Bonds Initiative and the Climate Bonds Standard

The Climate Bonds Initiative is an investor-focused not-for-profit organisation whose goal is to promote large-scale investments through green bonds and other debt instruments to accelerate a global transition to a low-carbon and climate-resilient economy.

Activating the mainstream debt capital markets to finance and refinance climate-aligned projects and assets is critical to achieving international climate goals, and robust labelling of green bonds is a key requirement for that mainstream participation. Confidence in the climate objectives and the use of funds intended to address climate change is fundamental to the credibility of the role that green bonds play in a low carbon and climate resilient economy. Trust in the green label and transparency to the underlying assets are essential for this market to reach scale but investor capacity to assess green credentials is limited, especially in the fast-paced bond market. Therefore, the Climate Bonds Initiative created Climate Bonds Standard & Certification Scheme, which aims to provide the green bond market with the trust and assurance that it needs to achieve scale.

The Climate Bonds Standard & Certification Scheme is an easy-to-use tool for investors and issuers to assist them in prioritising investments that truly contribute to addressing climate change, both from a resilience and a mitigation point of view. It is made up of the overarching Climate Bonds Standard detailing management and reporting processes, and a set of Sector Criteria detailing the requirements assets must meet to be eligible for certification. The Sector Criteria covers a range of sectors including solar energy, wind energy, marine renewable energy, geothermal power, low carbon buildings, forestry, and water. The Certification Scheme requires issuers to obtain independent verification, pre- and post-issuance, to ensure the bond meets the requirements of the Climate Bonds Standard.

[7] See Climate Bonds Initiative's 'State of the Market' Report for more information: https://www.climatebonds.net/resources/reports/bonds-and-climate-change-state-market-2017
[8] Source: Climate Bonds Initiative (June 2018)

1.5 Process for Sector Criteria Development

The Climate Bonds Standard has been developed based on public consultation, road testing, review by the assurance roundtable and expert support from experienced green bond market actors. The Standard is revisited and amended on an annual basis in response to the growing green bond market. Sector specific Criteria, or definitions of green, are developed by TWGs, made up of scientists, engineers and technical specialists. Draft Criteria are presented to IWGs before being released for public comment. Finally, Criteria are presented to the Climate Bonds Standard Board for approval (see diagram below).

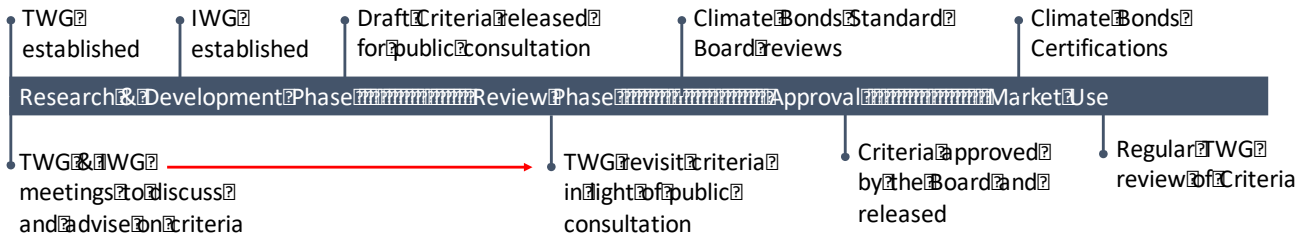


Figure 1: process for developing Climate Bonds Standard Sector Criteria

To date, Sector Criteria for wind, solar, geothermal, marine renewables, forestry, water, buildings, bioenergy, waste management, protected agriculture and shipping are available for certification. Sector Criteria for hydropower and agriculture are under development. Working groups for energy transmission & distribution and desalination will be launched soon.

1.6 Revisions to these Criteria

As part of the Climate Bonds Initiative's goal to accelerate a global transition to a low-carbon, resilient economy, the Transport Criteria seek to maximize viable bond issuances with verifiable environmental outcomes. This guidance should be recognised as the first set of sector-specific guidance for the transport sector. All groups and individuals involved recognise the breadth and complexity of this sector and emphasise that this guidance should be a foundation on which to encourage increased transparency and consistency in application of scientific best practices and data in the context of bond issuances. Note that Climate Bonds Initiative expects that the Transport Criteria may be refined over time. However, any approvals given will not be removed or changed retroactively. These eligibility criteria should be recognised as a starting point.

These Criteria have now been reviewed once after their initial launch, with the TWG taking stock of issuances that arise in the early stages and any developments in improved methodologies and data that can increase the climate integrity of future bond issuances. This is therefore the second iteration of the Transport Criteria (V2). After this first review, the Criteria will be reviewed again on a needs basis as technology and the market evolves. As a result, the Criteria are likely to be refined over time, as more information becomes available.

2 Sector Overview

2.1 What are Transport assets?

Investments in the transport sector are 'real asset' investments (i.e. they are physical assets that have a value due to their substance and properties). Transport related assets are featured in institutional investor allocations. These types of investments occur globally and are essential components of most economies, particularly in developed economies, where transport related sectors are key contributors to national economies, state budgets and employment. Appropriate and responsible investments in the transport sector can help developed and emerging economies transition to more sustainable growth pathways, especially where these investments help to increase adaptive capacity and resilience to climate change. Generally, investor interest in these sectors is likely to increase due to fundamental drivers such as the need to facilitate trade and meet demands for social mobility in line with economic development and population growth, while equally meeting the Paris goals and Sustainable Development Goals (SDGs).

In terms of assets/projects likely to be suitable for bond issuance, the following areas are most likely to be relevant, but not limited to:

- Vehicle technologies
    a. To significantly increase emissions efficiency (including fuel efficiency, fuel type and other vehicle improvements);
    b. New technologies and hybridisation. The growth in e-mobility, the introduction of a wider number of hybrid vehicles and autonomous/semi-autonomous vehicles over the past five years has been significant.
- Transport infrastructure
    a. All modes of collective/mass transport and its infrastructure, especially urban rail and Bus Rapid Transport (BRT);
    b. New developments in public transport such as ropeways and cable cars;
    c. Alternative (low carbon) energy refuelling distribution infrastructure;
    d. National transport infrastructure to reduce transport emissions and fulfil national climate change commitments.
- System improvements and technologies that encourage overall efficiency (high load, occupancy and flow);
    a. Technologies that allow new behaviour (such as qualifying vehicle car pool clubs, bike sharing)
    b. Better integration of all types of transport.

The assets and projects that we expect to see as use of proceeds in green bonds seeking Certification through the Transport Criteria fall into the following areas:

- Passenger rail transport (interurban)
- Freight rail transport
- Public transport
- Infrastructure for low carbon transport
- Passenger cars and commercial vehicles
- Freight transport by road
- Associated components for low carbon private vehicles
- Interurban scheduled road transport
- Supply chain facilities, such as manufacturing facilities or depots

The scope of the assets covered by the Transport Criteria is fully discussed in section 3.2.

2.2 Transport and climate change

Transport is the second largest contributor to global GHG emissions after electricity generation, responsible for 23% of all energy-related CO2 emissions globally and 14% of total GHG emissions[9]. Road transportation for passengers and freight remains the primary source of emissions in the sector, responsible for 73% of CO2 emissions from all transport[10].

According to the 2017 edition of IEA's Energy Technology Perspectives, emissions from transport increased by 2.5% annually between 2010 and 2015 and continue to grow. Emissions from transport need to peak and begin to decrease rapidly if the sector is to become 2 degree compatible. In the absence of effective mitigation policies, transport emissions could increase at a faster rate than emissions from the other energy end-use sectors and reach around 12 Gt CO2eq/yr by 2050[11]. Mitigation measures in the transport sector can take the following major forms:

- Reduced GHG emissions;
- Increased GHG emission efficiency (i.e. fewer GHGs emitted per unit of production), and;
- Displacement of more carbon-intensive modes of transport (e.g. internal combustion engine vehicles).

Transport infrastructure is a key driver of transport behaviour and choice. Transport investments can therefore lock in a high carbon transport future if the assets and activities invested in are not aligned with a low carbon future. Scaling up and shifting investment towards low carbon transport infrastructure will subsequently lock in a low carbon transport future.

As well as the aspect of transport infrastructure lock in, the extent of low carbon technology development across transport modes varies considerably. Certain modes, such as electrified rail transport, are already associated with relatively low carbon emissions (particularly if powered from a grid with a high percentage of renewable sources). This contrasts with modes such as road freight transport via Heavy Goods Vehicles for which achieving low carbon emissions is much more challenging. There is added complexity in financing transport infrastructure investments because transport investments are highly tied to national policies and commitments, as well as geographical suitability for a given mode of transport. It is important to thus recognise where benefits can be fully reached when incentivising investment in low carbon transport. Transport assets, activities and infrastructure also have strong implications for adaptation and resilience efforts and importance for environmental integrity (e.g., biodiversity, soil carbon and watershed functioning).

Ridership is also critical in determining per p-km public transport emissions; all else being equal, busy routes have lower emissions per p-km than fairly empty ones.

[9] Sims R. et al. (2014) Transport. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change
[10] REFERENCE
[11] Sims R. et al. (2014) Transport. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Table 1: Comparison of different estimates of emissions from transport modes.

Transport type	Source of estimate	Emissions scope	Estimate range
Rail estimates			
All rail, metro, tram	IPCC (2014)[12]	Scope 1 + 2	39-109[1] gCO_2/p-km
Light rail	IEA (2012)[13]	unspecified	4-22 gCO_2/p-km
Metro	IEA (2012)	unspecified	3-21 gCO_2/p-km
Intercity rail	IEA (2014)[14]	Scope 1	6 gCO_2/p-km
High-speed rail	IEA (2014)	Scope 1	0 gCO_2/p-km
Rail freight	IEA (2014)	Scope 1	8 gCO_2/t-km
Road comparisons			
All road passenger	IEA (2014), IPCC (2014)	Scope 1	80-221 gCO_2/p-km
HGV road freight	IEA (2014), IPCC (2014)	Scope 1	70-768 gCO_2/t-km

Notes: [1] The upper limit for this figure presumably incorporates Scope 2 emissions from countries with relatively fossil-fuel intensive grids.

Table 2. Sources of variation among transport investments.

	Sources of variation
Complexity	• Essential components such as training, infrastructure (e.g., storage, maintenance), information systems (e.g., traffic coordination), inputs (e.g. refrigerants in freight logistics), and technologies • Experience, capability, and suitability in different regions • Potential impacts on social issues (in particular social mobility) and biodiversity • Reliance on public support or policy changes
Financial viability and cost-effectiveness	• Execution costs, including design and impact monitoring • Ease and costs of monitoring activities, outcomes, and revenue and benefit flows
Evidence base	• Available scientific information about the anticipated GHG reduction for different transport infrastructure activities

While the mitigation potentials of different modes of transport are well understood, accurately determining whether transport assets and activities are compatible with a 2 degree or lower warming scenario is partially influenced by the availability of data for setting targets and thresholds. Since the first iteration of the Climate Bonds Transport Criteria, for example, EU legislation has been passed in 2017 that ensures more accurate emissions values for light vehicles within the EU (the Worldwide Harmonised Light Vehicle Test Procedure). Moreover, in June 2018, the EU Council adopted monitoring and reporting rules of CO2 emissions as well as fuel consumption of new heavy-duty vehicles. While this ensures that investments aimed at low carbon transport can be more dependable, this standard does not stretch to other regions of the globe. This is reflected in many countries' Nationally Determined Contributions (NDCs), where transport-related emissions are not strongly monitored. Equally, even in a scenario where all countries successfully implemented their NDCs,

[12] Sims et al. (2014) ibid.
[13] IEA Energy Technology Perspectives 2012
[14] IEA Energy Technology Perspectives 2014

multiple studies suggest this would not result in averting climate change below 2 degrees[15]. Nonetheless, trends in transport technologies and efficiencies may not differ too greatly in their development and financing.

2.3 Climate targets and transition trajectory

Climate mitigation in the land transport sector is strongly linked to switching to zero-emission fuel sources (such as electrified transport), improving vehicle fuel use efficiency and modal shift. In the UK, for example, the Committee on Climate Change (CCC) projected that a scenario of improving efficiency of conventional vehicles, a shift to ultra-low emissions vehicles (e.g. plug-in hybrid electric vehicles) and some moderation of demand growth could result in a 34% decrease in domestic transport emissions by 2030, compared to 1990 levels[16].

Bloomberg NEF estimated that electrifying the transport sector in European countries such as the UK and Germany could lead to a 55% emissions reduction between 2020 and 2050[17]. In the USA, meanwhile, transport electrification may account for 25% of the emissions reductions that would come from halving US energy use with energy efficiency measures[18].

Improvements to vehicle fuel efficiency as a key element to transport decarbonisation can be framed as a 'low-hanging fruit' option that is attractive to both industry and policy-makers as it also means lower fuel costs. The Global Fuel Economy Initiative (GFEI) calculated that a 50% improvement in average vehicle fuel economy by 2050 is a realistic and cost-effective target. Moreover, this target could account for roughly a third of the CO_2 reductions needed for motorised passenger transport to align with a 2 degrees emission trajectory[19].

Modal shift (such as a shift to passenger and freight transport by rail) alone has the potential to reduce EU transport GHG emissions over land by about 20% from 1990 levels by 2050, for example, if global best practice is adopted across rail[20]. A more recent model, again for an EU context, suggests that increasing rail freight modal share from 18% to 23% in the EU could reduce land freight emissions by 4% by 2050 compared to a business-as-usual scenario but from a 2000 baseline[21]. See Table 1 for an overview of different transport mode emissions.

As of 2019, only one in five of the National Climate Plans (NDCs) submitted by countries as part of the Paris agreement contain quantified mitigation targets for transport[22]. Outside of this unencouraging progress in an international context, clearer binding targets can be found in some national contexts but are nonetheless too few and far between. The UK government aim to end domestic transport emissions by 2050[23], Canada has adopted sales targets for zero-emissions passenger vehicles of 10% by 2025, 30% by 2030 and 100% by 2040[24]. China's national government has been actively reducing the fuel intensity of road transport, with a new fuel standard implemented for light duty trucks in 2018,

[15] Harmsen et al. (2019). Taking some heat off the NDCs? The limited potential of additional short-lived climate forcers' mitigation. Available from: https://link.springer.com/article/10.1007/s10584-019-02436-3
[16] https://www.theccc.org.uk/wp-content/uploads/2013/12/1785b-CCC_TechRep_Singles_Chap5_1.pdf
[17] https://data.bloomberglp.com/professional/sites/24/BNEF-Sector-Coupling-Report-Feb-2020.pdf
[18] https://www.aceee.org/research-report/u1907
[19] GFEI (2015) Fuel Economy State of the World 2016: Time for Global Action. Global Fuel Economy Initiative, London http://www.globalfueleconomy.org/media/203446/gfeistate-of-the-world-report-2016.pdf
[20] Nelldal, B.L. and Andersson, E., 2012. Mode shift as a measure to reduce greenhouse gas emissions. Procedia-Social and Behavioral Sciences, 48, pp.3187-3197.
[21] https://www.transportenvironment.org/newsroom/blog/freight-modal-shift-rail-can-contribute-decarbonising-land-freight
[22] https://www.wri.org/blog/2019/10/everything-you-need-know-about-fastest-growing-source-global-emissions-transport
[23] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878642/decarbonising-transport-setting-the-challenge.pdf
[24] https://climateactiontracker.org/countries/canada/

and planned standards coming into effect for passenger vehicles in 2020 and heavy-duty vehicles in 2021[25]. It also has in place a freight transport modal shift policy in effect since 2016[26].

According to the IEA[27], global transport emissions increased by less than 0.5% in 2019 (compared with 1.9% annually since 2000) owing to efficiency improvements, electrification and greater use of biofuels. However, to follow a sustainable development trajectory, emissions in transport need to peak as soon as possible. Energy intensity must drop by 3.2% on average annually from 2020 to 2030 – more than double the annual average rate of decrease since 2000 – to put transport efficiency on track with its sustainable development scenario. For the transport sector to meet projected mobility and freight demand while reversing CO2 emissions growth, energy efficiency measures – including modal shift and reducing overall motorised vehicle activity – will thus need to be deployed to greater and maximum effect.

2.4 Investment need

According to the Climate Policy Initiative, USD 3 trillion per year of investment will be required between 2015 and 2035 to increase the ability of new and existing transport systems to be compatible with a 2 degree (2DS) warming scenario (in addition to existing transport investments of roughly USD 1-2 trillion per year)[28]. The IEA meanwhile estimates a far higher figure of USD 751 trillion in investment required between 2017 and 2060 to meet a 2DS or a 'below 2 degrees' (B2DS) warming scenario[29]. Per year this comes to roughly USD 17.5 trillion. This is considerably lower than the estimated investment need for the transport sector in a business-as-usual (BAU) scenario (USD 860 trillion between 2017 and 2060)[30]. WRI also provides estimates of required investment in transport infrastructure of USD 2 trillion per year until 2050 in order to meet a 2DS warming scenario.

Global annual transport investments are estimated to lie between USD 1.4 and 2.1 trillion[31]. Taken alongside the amount of outstanding climate-aligned transport bonds as of 2019 of USD 509 billion[32] (though these figures may likely have both increased since) and a further USD 80 billion-worth of Climate Bonds certified transport bonds, current investment flows are insufficient to meet low carbon transport infrastructure needs. Table 3 describes some of the potential bond types that could be used to finance sustainable transport measures.

In 2010, public sector investment represented 42% of global transport investment[33]. As such, transport investment is closely tied to government policy for domestic transport, as well as multilateral initiatives such as the European TEN-T (Trans-European Transport Network). In China, for example, electric vehicle (EV) owners receive tax exemptions from the government while in some European countries there are existing subsidies for electric bikes[34]. With the other 58% of investment coming from the private sector, government policy can facilitate the channelling of private finance into sustainable transport projects. Public-private partnerships (PPPs) are one way of linking private finance to large-scale public infrastructure projects. An example of this includes a US$6.8 billion high-speed railway (HSR) project in China[35], reflective of the Chinese government's push for a shift to both passenger rail and rail freight.

[25] https://climateactiontracker.org/countries/china/
[26] Chen, S., Wu, J. and Zong, Y., 2020. The Impact of the Freight Transport Modal Shift Policy on China's Carbon Emissions Reduction. Sustainability, 12(2), p.583.
[27] https://www.iea.org/reports/tracking-transport-2020
[28] CPI 2014: https://climatepolicyinitiative.org/wp-content/uploads/2014/10/Moving-to-a-Low-Carbon-Economy-The-Financial-Impact-of-the-Low-Carbon-Transition.pdf
[29] The IEA analysis includes shipping and aviation investments, but this comprises a small part of the investment need.
[30] IEA ETP 2017: https://webstore.iea.org/download/direct/1058
[31] https://wriorg.s3.amazonaws.com/s3fs-public/The_Trillion_Dollar_Question_II_Tracking_Investment_Needs_in_Transport_0.pdf
[32] CBI State of the Market 2019: https://www.climatebonds.net/files/reports/cbi_sotm_2019_vol1_04d.pdf
[33] Lefevre et al. 2014. World Resources Institute. Available at: https://www.wri.org/sites/default/files/trillion_dollar_question_working_paper.pdf
[34] SLoCaT, 2018: http://slocat.net/tcc-gsr
[35] Saha, D. et al. 2018. World Bank Group: http://documents1.worldbank.org/curated/en/658451524561003915/pdf/125640-AR-PPI-2017-AnnualReport-PUBLIC.pdf

Table 3: overview of example bond-types, issuers and revenue streams of low carbon transport bonds that could be eligible for certification

Bond-types	Issuers	Revenue Streams	Purposes	Potential Examples
Public Sector Bonds	Sovereign	Treasury revenues	Support national infrastructure projects to reduce emissions from transport	Sovereign green bonds, sukuk bonds
	Public Agencies Municipal authorities	Treasury revenues	Roll-out of public mass transit systems as part of sustainable cities policies	US muni bonds
Financial Institution Bonds	Development Banks and Commercial Banks	Treasury revenues Consumer auto loans	Rail system upgrades, new rail infrastructure Manufacturing EVs, Hybrids	World Bank green bonds
Portfolio Bonds	Asset-Backed Securities (ABS)	Auto loan cash flows	New loans for low carbon vehicles (e.g EVs and Hybrids)	E.g. Toyota
Corporate Bonds	Automobile manufacturer,	Treasury revenues	EV, Hybrid automobile manufacturing facility	E.g. Tesla
	EV supply chain technology providers	Treasury revenues Lease Finance contracts	EV battery production	E.g. Johnson Controls

Notes: Some bonds may be a combination of two approaches e.g. asset-backed securities backed by government agencies or local authorities; or covered bonds with FI and portfolio bond characteristics. 'Treasury' denotes balance sheet finance of issuer

2.5 Bonds in the sector

Research conducted by Climate Bonds Initiative has identified up to USD 509 billion[36] in outstanding bonds clearly aligned with the transport sector, representing 59% of the total universe of climate-themed bonds.[37] Table 4 provides recent examples of bonds in the transport sector.

Table 4. Examples of recent bonds in the transport sector.

Issuer	Year	Description	Credentials
Rumo	July 2020	USD 500mn, 8-year bond to finance the purchase of new locomotives and rolling stock for rail freight. Bond proceeds will also be allocated to upgrading the related infrastructure to support these trains and the associated railway lines[38]	Climate Bonds Certification
New York Metropolitan Transport Authority	May 2020	USD 1.725bn (29-year bond) allocated for capital investments in MTA's electrified rail assets and supporting infrastructure[39]	Climate Bonds Certification

[36] CBI State of the Market 2019: https://www.climatebonds.net/files/reports/cbi_sotm_2019_vol1_04d.pdf
[37] See http://www.climatebonds.net/files/post/files/cb-hsbc-15july2014-a3-final.pdf
[38] https://www.climatebonds.net/Certification/Rumo
[39] https://www.climatebonds.net/certification/new-york-mta

Issuer	Year	Description	Credentials
Société du Grand Paris	May 2020	EUR 1.5bn (USD 1.626bn), 30-year bond to finance the construction of new lines and line extensions: almost 200 km of new metro lines to supplement the 400 km of existing lines in the Ile-de-France region[40]	Climate Bonds Certification
Ermewa Group	Dec 2019	EUR 528mn (USD 581mn) bond (tenor up to 10 years) to finance Ermewa's portfolio of over 20,000 railcars which do not carry any fossil fuels or petrochemical products. The eligible rolling stock carry cereals, industrial goods and other products[41]	Climate Bonds Certification
Akiem Group	Sept 2019	EUR 360mn (USD 398mn) bond (tenor up to 15 years) to refinance the issuer's fleet of 298 fully electrified train locomotives[42]	Climate Bonds Certification
Porsche AG	Aug 2019	EUR 1bn (USD 1.12bn) bond (tenor up to 7 years) to finance development and production of its Taycan model, which is Porsche AG's first fully electric car[43]	Climate Bonds Certification
Auckland City Council	July 2019	NZD 150mn (USD 99.2mn), 6- year bond to finance the acquisition of new trains and electrified rail equipment[44]	Climate Bonds Certification
Russian Railways	May 2019	EUR 500mn (USD 585mn), 8-year bond to finance rolling stock which operate on many commuter and intercity routes. It is currently the most common high speed train model operating in Russia[45]	Climate Bonds Certification
ALD Automotive	Oct 2018	USD 580mn, 4-year bond used to finance and refinance the acquisition and operations of vehicles which comply with the Low Carbon Transport criteria, particularly electric vehicles[46]	Climate Bonds Certification
City of Cape Town	2017	ZAR 1bn (USD 76mn), 10-year bond to invest in projects that are consistent with the City's sustainability goals and which help the city to adapt to and mitigate climate change, including replacement of the city's BRT buses with electric buses[47]	Climate Bonds Certification

[40] https://www.climatebonds.net/certification/societe-du-grand-paris
[41] https://www.climatebonds.net/Certification/Ermewa
[42] https://www.climatebonds.net/certification/akiem
[43] https://www.climatebonds.net/certification/porsche
[44] https://www.climatebonds.net/certification/auckland-council
[45] https://www.climatebonds.net/certification/Russia_Railways
[46] https://www.climatebonds.net/certification/ald-automotive
[47] https://www.climatebonds.net/certification/city-of-cape-town

3 Principles and Boundaries of the Sector Criteria

3.1 Guiding principles

The Climate Bond Standard needs to ensure that the transport assets and projects included in Certified Climate Bonds are low carbon and climate resilient, in line with best available scientific knowledge and compatible with the goals of the Paris Agreement. At the same time, the Transport Criteria need to be pragmatic and readily usable by stakeholders in the market, to maximise engagement and use. High transaction costs run the risk of reducing uptake of the Standard. Keeping the costs of assessment down while maintaining robust implementation of the criteria is important. Table 5 sets out the principles guiding the development of the Transport Criteria to meet and balance these two goals.

Table 5: Key principles for the design of the Transport Criteria.

Principle	Requirement for the Criteria
Level of ambition	Compatible with meeting the objective of keeping global temperature rise well below 2ºC above pre-industrial levels set by the Paris Agreement, and with a rapid transition to a low carbon and climate resilient economy.
Robust system	Scientifically robust to maintain the credibility of the Climate Bond Standard.
“Do not reinvent the wheel”	Harness existing robust, credible tools, methodologies, standards and data to assess the low carbon and climate resilient credentials of any technology, endorsed by multiple stakeholders where possible.
Level playing field	No discrimination against certain groups of operators or geographies.
Multi-stakeholder support	Supported and developed by key stakeholders; those within the relevant industry, the financial community and broader civil society.
Continuous improvement	Subject to an evolving development process with the aim of driving continuous improvement and credibility in the green bond market.
Practically applicable	The criteria should be practically applicable taking into account the differing structures of the current low carbon transport industry and the debt capital market.
Lifecycle Emissions	Where possible, entire asset lifespans are at least considered, and ideally taken into account to ensure that they contribute to emissions reductions.

Development of the Transport Criteria is intended to broaden knowledge and capacity among potential bond issuers about the credentials transport assets and activities must have if they are to be considered low carbon and climate resilient.

In addition to the overarching principles discussed in the table above, the following additional considerations were central to developing the Criteria and facilitating the scoping process.

3.1.1 Eligibility based on quantitative emissions reductions

Defining bond eligibility under the Transport Criteria seeks to be, where possible, based on quantitative emissions reductions to provide better certainty that certified bonds will lead to their expected climate impact. With notable exceptions, this means compliance will be based on clear, quantitative benchmarks or thresholds that result in a decision of “eligible” or “not eligible”. No intermediate status is possible.

Nonetheless, this approach needs to:

- Be flexible for bond issuers regardless of whether they are financing new or refinancing existing projects and assets
- Be measurable during all phases of implementation
- Keep transaction costs of proving compliance low, within reason

3.1.2 Technology agnostic

In general, the Climate Bonds Standard avoids picking 'winners and losers’ in terms of technologies – a task beyond its mandate and capacity. For example, despite the incompatibility of fossil fuels with a low carbon economy, this is reflected in the quantitative thresholds rather than outright exclusions. It is assumed that the threshold is stringent enough to exclude most fossil fuel transport assets and activities. However, electronic vehicles (EVs) are singled out as eligible assets as they are a clear part of the low carbon transport sector. The purpose of this is to give a clear signal to the market and ease for issuers financing such projects, rather than giving preferential treatment over other solutions.

3.1.3 Carbon offsets

The Transport Criteria do not accept carbon offsets as eligible mitigation assets or activities. Aside from certain controversies associated with carbon offsetting, carbon offsetting also takes the responsibility away from the issuer to improve their practices in terms of emissions mitigation. As it is the transport sector itself that must decarbonise, excluding offsets keeps the onus on the sector to take considerable steps towards reducing its emissions. This is consistent with other Climate Bonds Standard sector criteria.

Further details of eligible and ineligible assets under the Transport Criteria can be found in Table 6.

3.2 Assets in Scope

Table 6 presents use of proceeds that might be included in a Certified Climate Bond, subject to meeting the Criteria described in section 4.4. The first column in Table 6, ‘Eligible activity types’, gives an exhaustive list of all the activity types that are within scope of the Transport Criteria. The second column, ‘Example use of proceeds’, is an illustrative list of the type of projects that may be included in a Certified Climate Bond. It is not possible to include an exhaustive list of all potential use of proceeds due to the breadth of possibilities, but all use of proceeds must fall within one of the specified eligible activity types.

The assets in Table 6 are eligible for inclusion in a Certified Climate Bond if they meet the relevant mitigation requirements (see section 4.4 for details).

Bonds financing multiple projects may also have to prove compliance with other Sector Criteria to be eligible for Climate Bonds Certification. For example, if a bond includes both transport projects and solar projects it would be necessary for the issuer to prove compliance with both the Transport Criteria and the Solar Criteria.

The scope of eligible assets and activities is presented in Table 6 and has been organized using a traffic light system for ease of use as follows:

- Green circle: almost certain to be compatible with a low carbon or climate-resilient economy in all circumstances and automatically assumed to be eligible for certification

- Red triangle: almost certain to be incompatible with a low carbon or climate-resilient economy and automatically assumed to be ineligible

- Amber square: ambiguous and needing further assessment to determine its eligibility

The first column in Table 6, 'Eligible activity types', gives an exhaustive list of all the activity types that are within scope of the Transport Criteria. The second column, 'Example use of proceeds', is an illustrative list of the type of projects that may be included in a Certified Climate Bond. It is not possible to include an exhaustive list of all potential use of proceeds due to the breadth of possibilities, but all use of proceeds must fall within one of the specified eligible activity types.

Table 6: scope of eligible projects and assets for Climate Bonds Certification under the Transport Criteria.

Asset category	Example use of proceeds	Mitigation	See Criteria section(s)
Passenger cars and commercial vehicles – private and light commercial vehicles which transport private passengers along with key components for such vehicles (See section 4.5.1 for an overview of the criteria for this asset category)	Manufacture and upgrade, purchase, and/or operation of zero direct emissions passenger or light commercial vehicles, for example: ○ Electric vehicle manufacturing ○ Banks leasing electric vehicles ○ Taxi firms operating electric vehicle fleets	●	○ 4.4.1
	Manufacture and upgrade and/or purchase, of key components to be used in eligible vehicles, for example: ○ Manufacturing of high-density lithium-ion batteries ○ Leasing of high-density lithium-ion batteries	●	○ 4.4.1
	Manufacture and upgrade, purchase, and/or operation of other passenger and light commercial vehicles, for example: ○ Hybrid vehicle manufacturing ○ Banks leasing hybrid vehicles ○ Taxi firms operating hybrid vehicle fleets	■	○ 4.4.2 ○ 4.4.4
	Manufacture and upgrade, purchase, and/or operation of fossil fuel or biofuel passenger and light commercial vehicles (for example Internal Combustion Engine)	▲	No criteria as ineligible
Public passenger transport by road – buses (urban) and coaches (interurban) transporting public passengers along with key components for such vehicles (See section 4.5.2 for an overview of the criteria for this asset category)	Manufacture and upgrade, purchase and/or operation of zero direct emissions buses or coaches, for example: ○ Electric bus manufacturing ○ Entities leasing electric buses ○ Private coach companies operating electric coach fleets	●	○ 4.4.1
	Manufacture and upgrade and/or purchase, of key components to be used in eligible vehicles, for example: ○ Manufacturing of high-density lithium-ion batteries ○ Leasing of high-density lithium-ion batteries	●	○ 4.4.1
	Manufacture and upgrade, purchase, and/or operation of other buses and coaches, for example: ○ Public bus manufacturing ○ Banks leasing hybrid vehicles ○ Private coach companies operating hybrid vehicle fleets	■	○ 4.4.2 ○ 4.4.4

Asset category	Example use of proceeds	Mitigation	See Criteria section(s)
	Manufacture and upgrade, purchase, and/or operation of biofuel buses and coaches	▲	No criteria as ineligible
Freight transport by road – heavy-duty vehicles used for the purpose of moving goods along with key components of such vehicles (See section 4.5.3 for an overview of the criteria for this asset category)	Manufacture and upgrade, purchase, and/or operation of zero direct emissions heavy duty vehicles, for example: ○ Electric truck manufacturing ○ Banks leasing electric trucks ○ Logistics companies operating electric truck fleets	■	○ 4.4.1 ○ 4.4.3
	Manufacture and upgrade, purchase, and/or operation of all other heavy duty vehicles, for example: ○ Hybrid or biofuel truck manufacturing ○ Banks leasing non-electrified trucks ○ Logistics companies operating hybrid or biofuel truck fleets	▲	No criteria as ineligible
	Manufacture and upgrade and/or purchase, of key components to be used in eligible vehicles, for example: ○ Manufacturing of high-density lithium-ion batteries ○ Leasing of high-density lithium-ion batteries	●	○ 4.4.1
Passenger rail transport rolling stock – rolling stock for the purpose of transporting public passengers (See section 4.5.4 for an overview of the criteria for this asset category)	Manufacture and upgrade, purchase, and/or operation of zero direct emissions urban rail transit rolling stock, for example: ○ Manufacturing of electrified metro rolling stock ○ Leasing of tramway carriages ○ Entities operating electrified metro rolling stock	●	○ 4.4.1
	Manufacture and upgrade, purchase, and/or operation of zero direct emissions rolling stock, for example: ○ Manufacturing of electrified passenger rail rolling stock ○ Leasing of passenger rail carriages ○ Train companies operating electrified passenger rail rolling stock	■	○ 4.4.1 ○ 4.4.5 (if new interurban rail)
	Manufacture and upgrade, purchase, and/or operation of other rolling stock, for example: ○ Manufacturing of diesel passenger rail rolling stock ○ Leasing of passenger rail diesel carriages ○ Train companies operating diesel passenger rail rolling stock	■	○ 4.4.2 ○ 4.4.4 ○ 4.4.5 (if new interurban rail)
Freight rail transport rolling stock – rolling stock for the purpose of transporting goods (See section 4.5.5 for an overview of the criteria for this asset category)	Manufacture and upgrade, purchase, and/or operation of zero direct emissions rolling stock, for example: ○ Manufacturing of electrified freight rail rolling stock ○ Leasing of freight rail carriages ○ Train companies operating electrified freight rail rolling stock	■	○ 4.4.1 ○ 4.4.3
	Manufacture and upgrade, purchase, and/or operation of other freight rail rolling stock, for example: ○ Manufacturing of diesel passenger rail rolling stock ○ Leasing of diesel passenger rail carriages ○ Train companies operating passenger rail rolling stock	■	○ 4.4.2 ○ 4.4.3 ○ 4.4.4 ○ 4.4.5 (if new interurban rail)
Rail transport networks – rail networks and lines and supporting infrastructure for the purpose of transporting	Construction and development, purchase, and/or operation of zero direct emissions urban rail transit lines, for example: ○ Construction of metro or tramway lines ○ Leasing of metro or subway lines ○ Network operators operating an urban rail transit network	●	○ 4.4.1

Asset category	Example use of proceeds	Mitigation	See Criteria section(s)
passengers, goods, or a mixture of both (See section 4.5.5 for an overview of the criteria for this asset category)	Construction and development, purchase, and/or operation of exclusively zero direct emissions railway lines, for example: ○ Construction of electrified interurban railway lines ○ Leasing of railway contracts ○ Network operators operating a regional electrified railway network	■	○ 4.4.1 ○ 4.4.3 (if freight transported on the line) ○ 4.4.5 (if new interurban rail)
	Construction and development, purchase, and/or operation of railway lines not used exclusively by zero direct emissions rolling stock, for example: ○ Construction of interurban railway lines ○ Leasing of railway contracts ○ Network operators operating a regional railway network	■	○ 4.4.2 ○ 4.4.3 ○ 4.4.4 (if freight transported on the line) ○ 4.4.5 (if new interurban rail)
Miscellaneous vehicles for other sectors – mobile vehicles that serve purposes other than transporting passengers or freight along with key components for such vehicles (See section 4.5.6 for an overview of the criteria for this asset category)	Manufacture, operation and leasing of zero direct emissions waste collection vehicles	●	○ 4.4.1
	Manufacture of zero direct emissions miscellaneous vehicles used in other sectors, for example: ○ Mobile stairways or buggies ○ Off-road excavators or concrete trucks used in construction	●	○ 4.4.1
	Manufacture of key components to be used in eligible vehicles, for example: ○ Manufacturing of high-density lithium-ion batteries ○ Leasing of high-density lithium-ion batteries	●	○ 4.4.1
Infrastructure for low carbon transport – other supporting infrastructure and logistics that link directly to one or more mode of transport, or physical asset or activity. These activity types might concern system operations, or facilities that improve the performance of such supporting systems. Construction and running of facilities may still be included in these activities. (See section 4.5.7 for an overview of the criteria for this asset category)	Construction of dedicated infrastructure for other types of emissions-free travel such as public walking and cycle lanes	●	○ 4.4.1
	Dedicated charging and alternative fuel infrastructure (when separable from fossil fuel filling stations and garages)	●	○ 4.4.1
	Construction and development, purchase, and/or operation of dedicated infrastructure for eligible rolling stock, railway lines and networks, for example: ○ Train and bus stations ○ Inspection depots for freight rail rolling stock ○ Traction maintenance depots / Motive power depots for rolling stock ○ Backup electricity generators ○ Signalling infrastructure including buildings	●	Automatically eligible if 100% dedicated to eigible lines and vehicles (see section 4.4.7)
	The implementation and integration of Information and Communication Technology (ICT) systems that improve asset utilisation, flow and modal shift, regardless of transport mode (for example public transport information, car-sharing schemes, smart cards, road charging systems, etc.)	■	Eligible on a case-by-case basis (see section 4.4.7)
	Construction of facilities for intermodal freight and development of smart freight logistics	■	Eligible on a case-by-case basis (see section 4.4.7)

Asset category	Example use of proceeds	Mitigation	See Criteria section(s)
	Development and integration of transport and urban development planning systems – for example, improvements to terminals to improve journey times	■	Eligible on a case-by-case basis (see section 4.4.7)
	Construction of new roads, road bridges, road upgrades, parking facilities, fossil fuel filling stations, etc.	▲	No criteria as ineligible
Research and Development	Relevant research and development, training and program implementation costs and expenditures, where there is a definable future asset, product and/or process that can be linked to climate benefits under the Transport Criteria.	●	See Climate Bonds Standard V3

3.3 Assets out of Scope

The red items in Table 6 are excluded either because they are incompatible with a low carbon or climate-resilient economy or because determining their eligibility is outside the mandate of the Transport Criteria. The justifications for exclusions are presented in the following sections. Other exclusions not in table 6 are also included below.

3.3.1 Fossil fuel vehicles and supporting infrastructure

Internal Combustion Engine (ICE) and Compressed Natural Gas (CNG) vehicles are automatically excluded from these criteria for simplicity. Discussions centred around whether this was necessary considering the threshold requirements present for passenger cars and commercial vehicles (see section 4.4.1). While it is expected that the threshold will exclude most if not all such vehicles from certification (and certainly all by 2025), it was decided that automatic exclusion would a) make the criteria easier to use for issuers and; b) send a clear market signal that ICE and CNG vehicles are not part of a low carbon future for transport, with far more suitable alternatives already present for green bond investments (electric vehicles being the prime example).

Supporting infrastructure such as new roads and fossil fuel filling stations are also out of scope in these criteria and therefore ineligible.

3.3.2 Dedicated fossil fuel rail transport

Even in a case where the transport asset or activity has emissions lower than the thresholds specified in section 4.3.2, if the asset or activity is at least partially dedicated to transport fossil fuels (for example coal or oil), then it is automatically ineligible for certification under these criteria. This is because it locks-in further use of fossil fuels in the global economy and ultimately supports an economic activity which has been comprehensively shown to be incompatible with the Paris agreement. For these criteria ‘partially dedicated’ can be understood as more than 25% of the assets being used to transport fossil fuels.

3.3.3 Other emissions out of scope

The Transport Criteria have been developed with an intentional focus on the operational emissions of the transport industry – direct emissions from vehicles in operation. That is not because non-operational emissions (for example upstream emissions from energy production, or embodied emissions associated with manufacture and disposal) are not considered important. However, for

practical reasons it is not deemed feasible for an issuer to manage the upstream or embedded emissions of an asset at point of bond issuance.

As a result, the Transport Criteria are based on inclusion in scope of assets that are either vehicles, or the infrastructure that directly supplies vehicles with energy/fuel. For reasons of pragmatism, the criteria do not cover:

- Upstream infrastructure associated with the energy used by vehicles in operation, for example those associated with the production or transport of energy/fuel outside filling stations.

- Infrastructure associated with the construction and disposal of vehicles.

These criteria can thus not be used to certify assets associated with the upstream production of fossil-based energy/fuel or the disposal of vehicles.

We also recognise that refrigeration gases on freight trucks pose a significant challenge to both our ozone layer and global warming, and there are opportunities for the transport sector to reduce these impacts. However, these assets and emissions were not included within scope of the Transport Criteria because their use crosses between different industries across the transportation and logistics sector.

3.4 Alignment with other Sector Criteria

It is essential that clear guidance on which Sector Criteria assets and projects are eligible for Climate Bonds Certification is given. This saves confusion and means that it is clear to the verifier, issuer and investor, which requirements a given asset or project is expected to meet. Table 7 identifies possible overlaps and explains which Sector Criteria should be referred to in which cases. The following sections give further explanation.

Table 7: clarification of under which Sector Criteria assets or activities are eligible for Climate Bonds Certification.

Assets or Activity	Applicable Sector Criteria
Bus Rapid Transit	Bus Rapid Transit are specific systems seen in many countries whereby buses have dedicated roadways and priority over other road traffic. Issuers seeking to certify such systems in developing countries (as defined by the OECD) should use the BRT Criteria. Bus Rapid Transit systems in developed countries (OECD defined) should use the Transport Criteria.
Vehicles for use in forestry projects	Vehicles used within a forest concession up to the forest gate are applicable for Certification under the Forestry Criteria, rather than the Transport Criteria. Vehicles used beyond a forest concession and past the forest gate must comply with the Transport Criteria.

Forest Roads	Roads constructed through forest concessions can be Climate Bonds certified under the Forestry Criteria so long as they meet all the necessary requirements (see Section 3.7 of the Forestry Criteria). Note: regular, non-forest roads are not currently eligible for certification under the Transport Criteria.
Infrastructure - Buildings	Buildings constructed that are not used solely for the purposes of supporting transport assets and activities (for example an office building partially operating an ICT support system for a public transport network), must also meet the requirements of the Low Carbon Buildings Criteria. Any buildings to be constructed for the purposes of acting as dedicated supporting infrastructure for transport activities and projects (for example a freight train depot), need only meet the Transport Criteria. This means that the assets or activities it supports must meet the criteria.
Renewable energy production for powering electrified transport	Any use of proceeds marked for financing projects and assets pertaining to renewable energy production to generate electricity for transport assets listed in these Criteria will be dealt with its appropriate Criteria (for example, electricity generated through solar power must meet the Solar Energy Criteria).
Shipping	Assets relating to water transport, be it passenger or freight, such as vessels or port infrastructure, will be applicable for certification under the Shipping Criteria.

3.4.1 Forestry (vehicles and roads)

Vehicles which are used in forestry projects and within a forest concession up to the forest gate are applicable under the Forestry Criteria, rather than the Transport Criteria. This is justified as follows in the Forestry Criteria Background document[48] :

'Supporting vehicles working on the forestry concession are an essential part of the management of all forestry operations. In addition, the carbon sequestration benefits of the forests should outweigh the emissions from vehicles. Requiring that these supporting vehicles comply with the Transport Criteria, would likely cause an issuer to decide not to get Climate Bonds Certification rather than remove vehicles from their use of proceeds. Instead, as these vehicles are necessary supporting infrastructure, particularly to good management of forests, they are included as eligible supporting infrastructure if they are used predominantly within the forest concession. Vehicles, such as trucks, that are used predominantly beyond the forest gate would still have to meet the Transport Criteria.'

The Climate Bonds Standard normally excludes roads from eligible use-of-proceeds as already specified in these criteria (see Table 6). Forest roads, on the other hand, are an essential infrastructure for a forest operation. The Forestry TWG stressed the importance of their inclusion as without forest roads, machinery may cause more damage to a forest in reaching a plantation (damaging the sequestration capacity of the forest) and moreover take longer, thereby increasing its emissions overall.

3.4.2 Infrastructure – Buildings

If a building is being constructed or retrofitted in order for dedicated use to transport assets or activities which in turn meet the Transport Criteria, the building meets the criteria by extension. This is because the building is an essential piece of infrastructure for that asset or activity and requiring an issuer to also meet the Buildings Criteria is outside the mandate of the Transport TWG.

[48] https://www.climatebonds.net/files/files/CBI_Background%20Doc_Forests_November%202018%282%29.pdf

However, any building that is not dedicated to eligible transport assets or activities should meet the Buildings Criteria[49].

3.4.3 Renewable energy production for powering electrified transport

As discussed in section 3.3.4 (Other emissions out of scope), the Transport Criteria do not cover the production of energy used to power vehicles, even if eligible. In the case of electrified transport, which is automatically eligible, any renewable power used to produce the electricity must meet the respective criteria depending on the type of renewable energy. For example, offshore wind falls under the Marine Renewables Criteria[50] while solar power falls under the Solar Criteria[51].

3.4.4 Shipping

Issuers seeking to certify assets or activities relating to passenger or freight water transport (i.e. shipping) must meet the Shipping Criteria[52] rather than the Transport Criteria as this falls outside of the scope of these criteria.

[49] https://www.climatebonds.net/standard/buildings
[50] https://www.climatebonds.net/standard/marine
[51] https://www.climatebonds.net/standard/solar
[52] https://www.climatebonds.net/shipping

4 Discussion and Eligibility Criteria

4.1 Overarching issues and considerations

The purpose of the Transport Criteria, like all Sector Criteria developed for the Climate Bonds Standard & Certification Scheme, is to certify assets and projects that are aligned with a low carbon economy and are climate resilient. Requirements for demonstration of alignment with these objectives will vary depending on the type of transport assets and activities that are being financed. However, there are also overarching principles and considerations that might apply to all areas of transport within scope. These are discussed in detail in this section.

4.1.1 The overarching principles of the Transport Criteria

The Transport Criteria require compliance with the following:

- The investment results in transport solutions that directly contribute to reducing atmospheric greenhouse gas concentrations (GHGs) consistent with avoiding dangerous climate change, and have at least a neutral impact on mitigation (i.e., no net GHG increase)
- Lock-in of carbon-intensive investments must be avoided. The right types of investments are required now to facilitate deeper cuts in the future. This means rewarding not only incremental reductions in carbon emissions but taking a long-term strategic view.

The requirements for each type of transport assets (e.g. interurban passenger rail or road freight) are designed to reflect these overarching principles.

4.1.2 Ambitious mitigation of GHG emissions and decoupling transport emissions from economic growth

There are particularly strong links between economic growth and demand for transport. As people get wealthier, they demand greater quantities of goods, which need to be transported, and are more likely to travel further for both work and leisure. According to the IPCC, transport emissions are expected to increase faster than emissions from any other energy-using sector without "aggressive and sustained" mitigation measures[53]. As it noted in the Transport Chapter of its Fifth Assessment Report:

"*Reducing global transport greenhouse gas (GHG) emissions will be challenging since the continuing growth in passenger and freight activity could outweigh all mitigation measures unless transport emissions can be strongly decoupled from GDP growth*."

While there is some evidence that this decoupling might have started in some developed countries, it is not expected in the developing world "for the foreseeable future". Whether the transport sector yields emissions savings depends on whether gains in carbon efficiency are offset by gains in distance travelled. In order to counter this, investment in mitigation options will be required well beyond low carbon vehicles, including:

[53] Sims et al. (2014) ibid.

- Modal shift: new and retrofit public transport infrastructure, from intercity rail to local buses; infrastructure to encourage walking and cycling; intermodal freight facilities; investment in terminals to improve journey times and appeal of public transport.

- Journey avoidance: smart freight logistics; car-sharing; improved ICT to avoid commuting.

- Fuelling infrastructure and supply for new vehicle technologies: electric vehicle charging infrastructure, hydrogen fuel stations, hydrogen storage.

This is in addition to investments that could, in theory, support assets or activities that have:

- Positive transformational effects on a supply chain: for example, other companies adopt the practices of companies financed by certified bonds and thereby gain experience with mitigation strategies, leading to new expectations for transport or logistics practices.

- Positive transformational effects on a region: for example, successful GHG reduction strategies are mimicked across the larger region, leading to 'scaled up' mitigation.

- Positive transformational effects on sectoral business practices: for example, bond-financed initiatives can test novel transport activities at scale and pave the way for broader application.

4.1.3 Dynamic systems increase the difficulty of estimating absolute emissions savings

Transport systems are dynamic systems subject to well-known feedback effects such as induced demand, fuel efficiency rebound effects and interactions with land use planning. These increase the difficulty of forecasting demand and measuring net emission reductions. The most thorough and accurate low carbon criterion for transport infrastructure projects and products would estimate lifetime emissions savings in absolute tonnage terms, taking such second-order effects and modal shift into account.[54]

In the absence of pre-existing project appraisals, such calculations are unfeasibly complex and onerous for the purposes of the Standard, and much of the data is in any case unavailable. By default, we therefore favour a methodology based on per passenger-kilometre (p-km) and per tonne kilometre (t-km) thresholds to keep eligibility assessments simple and tractable.

However, we propose that for interurban rail projects (e.g. high-speed rail and dedicated freight rail) an independent project appraisal should be carried out showing that these investments will reduce total transport related carbon emissions in the affected corridor by at least 25% (see sections 3.3, and 3.4 of the Transport Criteria document for where this requirement is pertinent). This Criterion has been particularly prompted by concerns around interurban and highspeed rail projects, namely that emissions savings due to modal shift away from road and aviation can be at least partially offset by induced demand and increased terminus traffic. [55]

The chosen reduction requirement was originally between 10% and 25%, decided on by the TWG in V1 of the Transport Criteria. V2 of the Criteria now requires more simply a minimum 25% emissions reduction to avoid ambiguity, and because an upper limit on emissions reduction is unnecessary. This requirement is only for new projects and not for existing interurban passenger rail projects being refinanced.

[54] Eckelman, M.J. "Life cycle assessment in support of sustainable transportation". Environmental Research Letters, 8(2), p.021004 (2013).
[55] Lee, Douglass B., Lisa A. Klein, and Gregorio Camus. "Induced traffic and induced demand." Transportation Research Record: Journal of the Transportation Research Board 1659.1 (1999): 68-75; Hymel, Kent M., Kenneth A. Small, and Kurt Van Dender. "Induced demand and rebound effects in road transport." Transportation Research Part B: Methodological 44.10 (2010): 1220-1241.

4.1.4 Decarbonisation of the transport sector requires more than incremental change

A fundamental principle of the Climate Bonds Standard is to avoid lock-in of carbon-intensive investments. The right types of investments are required now to facilitate deeper cuts in the future. This means rewarding not only incremental reductions in carbon emissions, but taking a long-term strategic view.

It is vitally important to tackle vehicle emissions, which make up the bulk of transport emissions. Unlike power generation or industry, these emissions originate from millions of individual point sources (private vehicles) controlled by individual decision-makers. Emissions cannot feasibly be monitored or capped, and forcing technological options is often politically unacceptable. This limits policy drivers mostly to price pressure, and emissions standards for manufacturers. Within this framework, the freedom of individuals to choose lower or higher carbon transport is a political reality but also a barrier to decarbonisation. In addition, the impact of new carbon efficient vehicles has an in-built time lag, given that only a proportion of vehicles will be replaced in any given year. In the EU, fleet turnover was about 6% per year[56] in 2014, meaning that it would take at least 17 years to replace the whole fleet.

The penetration of low carbon vehicles faces further economic and technical barriers in the form of network externalities related to fuelling infrastructure, limited range and cost of components such as batteries. Overcoming these barriers requires innovations and economies of scale that can only be driven by more certain and widespread uptake. Ambitious performance standards communicating the need for transformational, rather than incremental, changes are necessary to achieve this.

4.1.5 Potential for radical decarbonisation is dependent on broader climate policy

Long-term opportunities for radical decarbonisation of land transport are presented by greater use of electrification and hydrogen. In 2014 electricity represented only 1% of the total energy demand of transport worldwide[57], but electrification of transport is widely recognized as an area of high potential in both freight and passenger sectors[58]. Hydrogen currently makes up about 4% of global final energy and non-energy use, but around 95% of this is generated from natural gas and coal[59].

In both cases their short-term mitigation potential is highly dependent on the supply choices, technologies and policies in the country of use. Well-to-wheel emissions using hydrogen generated by renewables-powered electrolysis are considerably lower than for internal combustion engine (ICE) vehicles, while those using hydrogen from steam methane reforming are comparable[60]. Similarly, well-to-wheel emissions for electric vehicles in countries with high grid emissions can be higher than for ICE vehicles. Incorporating this issue into criteria for private vehicles would be complicated by having to account for grid emissions in not one country, but the many ultimate destinations of vehicle manufacturers' exports.

Clearly in both cases, policy decisions need to be made to opt for the lower carbon production path, and we anticipate this being the case over the medium-to-long term for both technologies. Particularly with respect to hydrogen, given that climate policy will be the primary driver in making it economically viable, it is justified to assume there will be a policy imperative for the lower carbon production method to become predominant. Our position is, given their high potential as sustainable transport fuels in a

[56] Calculated from Eurostat data and the International Council on Clean Transportation European Vehicle Market Statistics Pocketbook.
[57] Sims et al. (2014) ibid.
[58] See discussion in IEA Energy Technology Perspectives 2014.
[59] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Sep/IRENA_Hydrogen_2019.pdf
[60] See University of California (2014), "Well-to-Wheels Greenhouse Gas Emissions of Advanced and Conventional Vehicle Drive Trains and Fuel Production Strategies".

context of broader long-term mitigation policy, there is a clear case for supporting electrified and hydrogen-powered transport. It is important not to disincentivise investment in long-lived assets related to promising technologies due to what could be transient limitations. For both these reasons, and in order to maintain simplicity, projects and products related to electrified and hydrogen-powered transport will be automatically considered eligible for certification. This is based on an underlying assumption that, while acknowledging the possibility, circumstances in which certified investments in these technologies do not result in net carbon savings will be insignificant (both in terms of extent and time horizon). This assumption will be kept under review as the Standard matures. Upon updating the Criteria to V2, this rationale continues to be pertinent with an even greater evidence base supporting large-scale implementation of electrification and hydrogen.

4.1.6 Low carbon infrastructure which maintains high fossil fuel consumption patterns

As Table 1 in section 2.2 shows, high capacity rail can be one of the lowest carbon modes of land travel, and it is therefore likely that most rail projects will be certified by the Standard.

However, a dilemma is raised by cases of dedicated freight corridors built primarily to transport fossil fuels, as is currently the case in India[61], Indonesia and parts of the USA. In such cases it is difficult to justify certifying transport projects that will make heavy fossil fuel use both more economical and likely to be locked-in for the long term.

Alternatively, it could be argued that transporting coal by rail is preferable to transporting it by truck; for example, South Africa's largest coal consumer, the utility company Eskom, is currently investing in rail lines to replace 5,100 daily truckloads transporting coal to power stations[62].

To maintain the credibility of Climate Bonds, it has been strongly recommended by the TWG that in the initial stages of certification, and to reduce the risk of misinterpretation, any investments for infrastructure maintaining fossil fuel use patterns be excluded. This exclusion clause is based on the aforementioned principles of avoiding lock-in and promoting technologies that will contribute to long-term objectives. However, this raises the question of how to determine whether a dedicated freight corridor is likely to be dominated by fossil fuel-intensive industries without adding excessive complexity to the certification process (see section 3.3.3).

Similar arguments could be made regarding attempts to build 'green garages'[63] – that if the garage is going to exist, it is preferable for it to have charging infrastructure, energy efficient lighting, etc. than not. We regard establishing the relevant facts in such cases as too onerous and would automatically exclude all infrastructure that encourages high car use from certification.

4.1.7 Metrics and load factors

The underlying mitigation principle of the Transport Criteria is emissions reduction. In the absence of life cycle estimations which encompass the full set of emissions associated with a single transport corridor or vehicle, emissions intensities are the appropriate metric to understand emissions per kilometre travelled (in grams of CO_2). This gives a metric of gCO_2 / km, which is then expressed further either per passenger (for passenger transport) or per tonne (for freight transport) - gCO_2 / pkm or gCO_2 / tkm.

[61] See http://www.railway-technology.com/projects/dedicatedrailfreight/
[62] See http://www.esi-africa.com/eskom-to-spend-r9-79-billion-to-move-coal-transport-from-road-to-rail/
[63] See http://www.greenparkingcouncil.org/certified-green-garages/certification/

Ridership and payload are critical in determining per p-km public transport and per t-km freight emissions; all else being equal, busy routes have lower emissions per p-km and per t-km than fairly empty ones. Criteria for transport therefore needs to incorporate appropriate project-specific load factors. This can be based on historic data, or subsequently reviewed on the basis of new data, which should be available from the relevant public authority and verifiable in relation to ticket revenues.

Note that, for passenger cars and commercial vehicles, the load factor should always be one passenger as this is based on the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) and other similar emissions testing procedures. In essence this means a metric of gCO_2 / km is also accepted.

4.1.8 Rationale for universal threshold metric

There are two main options on which to base p-km or t-km criteria for accreditation:

- Emissions saving metric: assessing whether the new project or product reduces emissions compared to the counterfactual (Δ gCO2/p or t-km); or
- Performance metric: assessing whether the new project or product results in emissions lower than a given threshold (gCO2/p or t-km). This could either be:

  a. *Universal* for all modes of transport; or

  b. Mode-specific

For the reasons outlined in Section 4.1.4, incremental emissions reductions in existing technologies are not adequate by themselves. Ambitious performance standards create greater downward pressure and likelihood that (i) low carbon technologies will mature; and (ii) overall (and not just relative) emissions reductions will happen. By adopting a universal threshold approach, it should be possible to qualify all projects that we judge to be an important part of the sustainable transport mix needed for a low-carbon economy (rail, public mass transit, low carbon vehicles for passenger and freight etc.).

As mentioned above, it is likely that the vast majority of rail projects will be certified. We note that bonds are a traditional financial mechanism for the rail industry, and therefore issuers are unlikely to go through an arduous accounting process at this early stage of the market just to label "green" or "climate-friendly". It is important not to set the administrative hurdles too high that may disincentivise project development that supports a long-term shift away from private motorised travel.

Finally, performance against a universal threshold is simpler and easier to track over time; setting a different metric for each mode based on best in class performance would be difficult to monitor as it would require resources to keep updating it.

4.1.9 Reliability of private vehicle emissions data

In terms of road vehicle emissions, a threshold approach also aligns with regulatory standards in the EU and California, in theory allowing us to use test cycle information provided by vehicle manufacturers in complying with these regulations.

It is recognised that emissions data provided by vehicle manufacturers has proven to be unreliable in the past, as evident in the emissions scandals of 2015 and onwards. Though there is always scope to improve international regulatory standards by the US EPA and the EU Commission, there have already been significant developments in the EU as discussed in section 1.1.11. The WLTP represents a

sizeable improvement in the measurement of and standards for vehicle emissions which can provide investors with greater assurance of the accuracy of a vehicle's emissions, "gCO2 per p-km or t-km".

It is generally important that investors have confidence in the data being used for certification. For this reason, this first version of the criteria deals with widespread concern over any potential for inaccuracy in reporting of private vehicle emissions by adopting a cautious approach of placing vehicles within broad technology categories which are either known to have direct tailpipe emissions of less than the emissions threshold in all cases (e.g., battery and fuel cell vehicles) and those which are not (e.g. conventional internal combustion engine, liquefied petroleum gas and natural gas vehicles).

4.1.10 Scope of emissions

Possible emissions that could be considered by the criteria are as follows:

- Scope 1: direct tailpipe CO2 emissions from fossil fuel combustion
- Scope 2: indirect emissions from electricity consumption
- Scope 3: emissions resulting from extraction, manufacture, transportation or disposal of fuels and transport products

We propose only to consider Scope 1 emissions, direct emissions from the vehicle, when comparing products' and projects' performance against the threshold. The reasons for this are as follows:

1. The dominance of road vehicle emissions. The certification process is subject to both resource and information constraints, so it is practical to focus our efforts on the areas where both the problem and potential for mitigation are greatest. 97% of all emissions from powering land transport result from fossil fuel combustion in road vehicles, with indirect emissions from electricity consumption contributing less than 3%[64].

2. The need to send strong signals to vehicle purchasers. Considering well-to-wheel emissions could mean that a more polluting vehicle manufactured in a country subject to emissions constraints for manufacturers is treated as equivalent to a lower carbon vehicle manufactured in a non-regulated country. This weakens signals to consumers who, as noted above, are key decision-makers in reducing emissions from the transport sector. Furthermore, the evidence comparing gCO2/km emissions of different vehicle technologies seems to suggest that criteria based on well-to-wheel emissions would have the same results as criteria based on direct emissions, except in very few edge cases[65]. For these reasons, it is judged that considering embedded emissions will result in onerous information requirements with little practical benefit.

3. The need to promote technologies and infrastructure that have the potential to radically shift emissions trajectories and avoid fossil fuel lock-in. As noted above, electrified modes have the potential to dramatically lower transport emissions if deployed in conjunction with a decarbonising electricity supply. In addition, electric vehicles face cost and infrastructure barriers that need widespread uptake to be overcome. Most importantly, private electric and hybrid vehicles will be sold internationally for use in countries with vastly different grid emissions; we do not know what their indirect emissions will be.

[64] See Figure 8.1 in Sims et al. (2014) ibid.
[65] For example, a battery electric vehicle could have higher well-to-wheel emissions than an efficient diesel vehicle in a country with high grid emissions, as discussed. However, generally well-to-tank emissions of ICE vehicles are high enough for this not to be concern. See Kromer and Heywood (2007), "Electric Powertrains: Opportunities and Challenges in the U.S. Light-Duty Vehicle Fleet", Sloan Automotive Laboratory, Massachusetts Institute of Technology; and Knobloch et al. (2020): Net emission reductions from electric cars and heat pumps in 59 world regions over time

An exception in terms of scope is made in cases where a project appraisal predicts a net gain in carbon emissions from a transport project regardless of scope (see 4.1.3).

As highlighted, the standard has been subject to a process of review that considered whether Scope 2 emissions should be included, assessing whether jurisdictions are progressing sufficiently towards lower carbon electricity generation for their inclusion or exclusion to be justified. Section 4.1 generally outlines that many of these issues highlighted above are still pertinent enough that incorporation of these scopes of emissions continues to be difficult.

4.1.11 Exclusion of biofuel vehicles in the Transport Criteria

Biofuels and vehicles designated as using biofuels continue to be ineligible under V2 of the Transport Criteria as they were in V1. Several considerations form the rationale for excluding this type of fuel. Originally, the TWG acknowledged the complex issues surrounding biofuel production, deciding that exclusion was the best way of avoiding potential problems further down the line that might arise in certifying bonds that will finance biofuel vehicles in transport. In V2 we further clarify these issues.

Regarding the carbon credentials of biofuel use in transport, complexity does not restrict itself simply to issues with indirect land use change (ILUC), deforestation and water demand, which are outlined in a 2014 IPCC report[66]. These issues also all link to potential problems with the supply of biofuels. The higher the demand for biofuels (which may be artificially increased through policy and/or financial support), the more these issues described by the IPCC are amplified. Therefore, it was decided that biofuels will be excluded for the following further reasons:

- The transport sector already has better viable alternatives (even for road freight) with fewer environmental impacts than biofuels, for example electrification. The gap in carbon credentials between biofuels and these alternatives will likely only grow over time (for example, improvements to battery storage).

- While Climate Bonds is supportive of the evidence base for biofuels playing an important role in a low carbon economy, it is aware that certain sectors have fewer alternative fuel options than others. Taking into consideration the previous point, excluding biofuels from the Transport Criteria signals to the market that biofuels have a greater potential for decarbonising sectors such as aviation, where green alternative fuels are far less viable. There is consequently less likelihood of different sectors competing for a limited supply of biofuels and driving more of the issues previously outlined.

- One of the principles set by CBI when updating sector criteria is that of no backsliding. Allowing biofuels into the criteria would represent relaxing standards to a wider scope of potential fuels, which would go against this principle.

Ultimately, a pivotal reason for excluding biofuels from the Transport Criteria was impracticality. Any inclusion of biofuels in the criteria would have followed suite from the EU Taxonomy on Sustainable Finance, whereby only vehicles using 100% approved biofuels in road freight or interurban scheduled road transport (i.e. coach transport) would be eligible. However, it was deemed that verification of this requirement would be difficult (and potentially impossible) to carry out and onerous on the bond issuer, as any vehicle that can run on biofuel (specifically biodiesel) can also run on traditional fossil fuel diesel. Moreover, there are few if any examples of geographic regions or localities where biofuel infrastructure supports of 100% biofuel use in HDVs or coaches.

[66] IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

As such, Climate Bonds does not set requirements for biofuels that, ultimately, are extremely difficult to either meet or verify. However, what can be controlled is the production of biofuel itself, which is captured in the Climate Bonds Bioenergy Criteria.

Note: in many countries, standard petrol grades have a small percentage of biofuel in them. For example, current petrol grades in the UK contain up to 5% bioethanol, known as E5. It is proposed to increase this to up to 10% (E10)[67]. It would be unfair to exclude vehicles using such blends of biofuels when it is out of their control. This is why only vehicles which are explicitly designated as biofuel vehicles are excluded. In such a case, vehicles need only meet the rest of the criteria relevant to them and will not be automatically excluded otherwise.

4.1.12 Inclusion of Hydrogen in the Transport Criteria

Some of the supporting rationale for including hydrogen as an eligible fuel in the Transport Criteria is already detailed in section 1.1.5. This section goes further in highlighting the discussions that took place around its inclusion and elaborating on the arguments given in 1.1.5.

The manufacture of hydrogen is currently a carbon intensive process, but developments in technology such as blue hydrogen (hydrogen produced via steam methane reforming) and in particular green hydrogen (produced via electrolysis powered by renewable energy) mean the carbon footprint could be significantly lowered in the future. The EU Taxonomy on Sustainable Finance now includes emissions thresholds for hydrogen manufacturing, while the Technical Expert Group (TEG) Transport sub-group for the taxonomy recognised that hydrogen will be a crucial element in decarbonising the transport sector.

There are arguments to suggest that, in many cases within the transport sector, electricity should still be the energy source of choice over hydrogen. This is partly due to hydrogen's high operating costs owing to inefficiency and energy losses in its production[68]. Despite this, bearing in consideration expected renewables proliferation in the future and improvements to grid systems and energy infrastructure, hydrogen will still be a crucial part of green transport solutions in the short- to long-term. These criteria aim therefore to signal to the market that both electricity and hydrogen are low carbon solutions needed to decarbonise transport. It is up to policy makers and practitioners to know which option is most appropriate in each situation.

Despite the inclusion of hydrogen as automatically eligible in these criteria, it is well noted that hydrogen has differing levels of potential in different sectors based on sector needs to decarbonise and access to alternative clean fuel options within these sectors. Transport, for example, has access to electrification solutions across many modes, as well as flexibility in terms of modal shift. Manufacturing and heavy industries, on the other hand, currently have fewer viable low carbon alternatives. For example, steel production is a process for which electrification from renewables is not expected in the short- to medium-term, while some applications for hydrogen are being explored at scale[69]. Climate Bonds would therefore like to note that any coordination of a limited supply of green hydrogen should take note of these different sector needs, weighing up the appropriate options for each.

It is noted also that some elements of a future hydrogen economy and infrastructure are already in place, to an extent (for example gas pipe infrastructure and terminals). However, natural gas pipes are notably different to those that would transfer hydrogen. There may therefore be key differences and trade-offs in short-term investments and long-term carbon and financial savings between hydrogen and electrification, depending on the specific case in point.

[67] https://www.rac.co.uk/drive/advice/emissions/what-is-e10-fuel-and-how-could-it-affect-you/
[68] http://www.csrf.ac.uk/2020/02/blog-long-haul-lorries-powered-by-hydrogen-or-electricity/
[69] http://www.hybritdevelopment.com/steel-making-today-and-tomorrow

Lastly, hydrogen production is experiencing an increase in policy support and visibility as a component of a low carbon economy. For example, the Scottish government has set out plans to become a future hydrogen hub, while the German government has adopted a National Hydrogen Strategy to increase production[70].

4.1.13 Decarbonising road freight

Road freight represents a particularly challenging area of transport to decarbonise compared to other areas of transport. Trucks are the fastest growing source of global oil demand, accounting for 40% of the oil demand growth by 2050 and 15% of the increase in global CO2 emissions[71]. At the same time, there are fewer opportunities for clean fuels in road freight as might be seen in private passenger vehicles, for example. As discussed in section 1.1.7, biofuels may be a short-term option in some cases, but are ultimately unsuitable as a long-term solution.

Modal shift will be a key part of decarbonising freight as a whole. The carbon footprint of transporting goods via rail is amongst the lowest across all modes of transport, and considerably lower than by HDV. The thresholds set in the Transport Criteria are based off the Global Fuel Economy Initiative (GFEI) projections and aim to reflect preference towards rail freight transport as there is no differentiation in thresholds between different modes and the thresholds correspond to low emissions road freight vehicles. In this way high performing road freight vehicles will always be able to meet certification, but there is also a clear signal to the market that rail freight should be the obvious choice for decarbonising freight in general. See section 4.3.3 for further explanation of freight thresholds.

Even in a scenario where there is a significant shift to rail transport of goods, HDVs and trucks will inevitably be needed, especially in the case of ‘last-mile’ journeys (the transport of goods from a transportation hub to the final destination). Innovations and developments in electrification and hydrogen technologies for trucks will therefore be crucial, and policy and financial initiatives must reflect this while also supporting continued research and development into these technologies. Vehicle and logistics efficiency are both equally key aspects to prioritise, especially in the short-term.

4.1.14 Fleet averages for emissions and meeting the thresholds

Between publication of V1 of the Transport Criteria and the update to V2, there were queries raised regarding whether the universal thresholds could be met using a fleetwide average. In essence this could mean some vehicles or activities being financed would not meet the threshold, but overall the fleet would meet the threshold as an average. For all cases of issuance seeking certification under these criteria, such calculations of emissions are not eligible. For example, if a vehicle manufacturer is seeking certification, each vehicle to be financed must meet the appropriate threshold.

However, it was acknowledged that situations could arise whereby a fleet operator may be financing operation of a fleet which meets the threshold overall, but has difficulty knowing what the emissions intensity of each vehicle is. A good example might be of public transport bus fleet which might be made up of a mixture of electric and fossil fuel vehicles, while having variable ridership from vehicle to vehicle. This makes fuel consumption per passenger-km and thus the emissions intensity of each vehicle in the fleet difficult to calculate and report on.

While bond issuances financing such activities are rare, to accommodate such an instance, these criteria allow operators of a fleet of vehicles which transport public passengers (including taxi fleets) to use a fleet average where ridership or emissions intensity data for each vehicle is not known. Best practice, however, would be for every vehicle being financed to meet the threshold. This exemption

[70] Both examples were announced in 2020
[71] ITF (2018) “Towards Road Freight Decarbonisation Trends Measures and Policies”, ITF Policy Papers, OECD Publishing, Paris.

will only be available up to 2025, after which point (2026 onwards) all vehicles will have to be zero emissions (see section 4.3.2). Note that fleets certified prior to 2026 under this rule will not have certification removed after 2026 if no longer meeting the threshold.

4.1.15 Bus Rapid Transit

Table 7 outlines how Bus Rapid Transit (BRT) systems are eligible not under the Transport Criteria, but instead are addressed separately in the Climate Bonds Standard BRT Criteria.

However, for extra clarification, the BRT Criteria are only intended for BRT projects and initiatives to take place in developing countries (as determined by the OECD). For BRT systems to be implemented or financed in developed countries (again as determined by the OECD), these systems must meet the appropriate requirements of the Transport Criteria.

4.1.16 Interurban scheduled road transport

Interurban scheduled road transport was not explicitly included in scope in V1 of the Transport Criteria. With V2 seeking to better align with other best practice green taxonomies, most notably the EU taxonomy on sustainable finance, it became clear that the Transport Criteria V1 did not suitably allow for such assets and activities.

These assets and activities essentially include interurban coach and bus travel for public passengers. As such, these asset and activity types mirror public transport assets and activities in their requirements. This is because, while the future of most sustainable medium- and long-haul passenger travel may lie in rail (and depending on technological developments, aviation), this is still today preferable to individual car journeys in ICE vehicles.

However, currently there are considerable challenges associated with electrifying this category of vehicle for interurban routes, something the EU taxonomy acknowledges. The EU taxonomy hence allows for a narrow range of biofuel vehicles in this category to be eligible in order to provide some leeway for such vehicles if also low emissions. However, the Transport Criteria continue to exclude biofuel vehicles generally in the criteria for the same reasons as put forward for road freight, for example (see the rationale in section 4.1.11).

Moreover, it is expected that zero- or low-emissions vehicles of this category will be increasingly common in the near-future. As such, while it is acknowledged that bond issuances of such assets or activities may be limited in the short-term, Climate Bonds expects to see these requirements as realistic in this timeframe.

4.1.17 Dedicated fossil fuel rail transport – accuracy of percentages

The EU taxonomy acknowledges uncertainties in setting a maximum percentage of dedicated fossil fuel freight transport in order to be eligible, noting difficulties in knowing, particularly ex-ante, how locomotives will be used over the lifetime of the investment. As such, the taxonomy instead opts to classify ‘dedicated’ as assets 100% used to transport fossil fuels. This allows much easier verification of whether assets are completely dedicated to such uses.

While these criteria accept this rationale, experience with previous issuances of freight rail meeting this requirement for certification give sufficient confidence that issuer evidence of a 25% threshold being met can be trusted by verifiers. Moreover, aligning with the EU taxonomy in this regard would represent a backslide in standards, which goes against the principles of Climate Bonds criteria

development. For example, a 25% limit would increase to 100%, meaning Climate Bonds certification could result in a bond financing freight rail for which 99% of its cargo transported is fossil fuels.

4.1.18 Information and Communication Technology (ICT) assets

The Transport Criteria stipulate that ICT assets and activities in transport are eligible on a case-by-case basis (see section 4.4.7). Climate Bonds explored whether more specific assets or activities could be outlined which are eligible or ineligible. However, TWG input stressed that the true impact of ICT on emissions is difficult to evaluate as it ultimately supports an application or transport mode that may reduce emissions, rather than reducing emissions itself.

Nonetheless, to provide further guidance for issuers who include ICT applications for transport in their use of proceeds, when evaluating such assets on a case-by-case basis, Climate Bonds will be looking for strong evidence that the ICT will result in a considerable reduction in emissions. For example, an ICT system which improves traffic flows in a city. Clear benefits to mitigation will be accepted. However, where benefits may be less clear, or the ICT is not integral or necessary to the transport system, Climate Bonds may ask for the issuer to provide evidence that at least a 25% reduction in emissions on a system level is achieved by the ICT. However, Climate Bonds reserves the right to make exclusions in certain cases even if this figure is met.

ICT that is integral and necessary infrastructure to transport that would be eligible under these criteria (for example ICT for a metro system) will also be eligible.

4.2 Definitions and key terms

Heavy Goods Vehicles vs. Heavy Duty Vehicles

Concerning freight transported by road, generally there are two terms that are seen commonly to cover the vehicles responsible (for example, trucks or lorries): Heavy Goods Vehicles (HGVs) and Heavy Duty Vehicles (HDVs). HGV is commonly used in the UK while in EU policy language HDV is commonly the term of use. Large Goods Vehicle (LGV) may also be seen as a term in the EU for the same classification of vehicles. In any case, all these terms classify the same type of vehicle and, to align with EU policy language (for example the Taxonomy on Sustainable Finance), HDV is the term leveraged in the Transport Criteria.

An HDV is defined according to EU Directive 2001/116/EC as follows:

Vehicles used for the carriage of goods and with a gross combination mass (GCM) of over 3,500 kilograms (3.5 tonnes) or 7,716 lb*

*Gross Combination Mass can be defined as:

The maximum allowable combined mass of a road vehicle, the passengers and cargo in the tow vehicle, plus the mass of the trailer and cargo in the trailer

Transport Corridors

Relevant to section 4.4.3 in this document.

Simplified from the World Bank definition[72], a transport (or transportation) corridor is classed as:

One or more routes that connect economic centres (for example urban areas) within and across countries

Light Commercial Vehicles

A commercial carrier vehicle with a gross vehicle weight of no more than 3.5 metric tons (tonnes). A van is a well-known example in European countries.

Acronyms

- BRT – Bus Rapid Transit
- EV – Electric Vehicles
- ICE – Internal Combustion Engine
- CNG – Condensed Natural Gas

4.3 Overarching issues and considerations (Version 2 update)

The following discussion outlines the issues and considerations that arose in the Transport Criteria update which may previously have not been pertinent in V1 of the criteria.

4.3.1 Principles of updating Climate Bonds sector criteria

Any updates carried out to Climate Bonds criteria must follow the following principles:

- 'No backsliding'. In updating thresholds and requirements for showing compliance with criteria, there must not be a relaxing of standards. In other words, they must at the very least maintain the same level of ambition. Scope of eligibility may widen in the event that certain assets or activities have developed or been proven to hold significant mitigation or adaptation value.

- Climate Bonds criteria represents best practice mitigation (and adaptation and resilience) measures in a given sector in the context of a path to decarbonisation and a 1.5-degree warming scenario. In other words, it should not be less strict than other prominent green standards and taxonomies (within reason).

- Continued scientific robustness. Criteria updates must continue to be made using the most recent and sound scientific evidence, with final approval from the TWG.

- Any key technical or content changes must be recorded and published for transparency.

4.3.2 Updating the emissions thresholds in the Transport Criteria

With the EU Taxonomy being published to include thresholds for land transport assets and activities, Climate Bonds evaluated similarities and gaps between it and the Transport Criteria. This would provide an important perspective on where gaps in scope might exist within the Transport Criteria or where technical mitigation requirements are weaker than those in the Taxonomy.

[72] Further details of the World Bank definition can be found here: http://documents1.worldbank.org/curated/pt/441171468315291413/pdf/384590Internat1e0corridors01PUBLIC1.pdf

With the Taxonomy planned to be enshrined as binding European legislation for sustainable finance activities, it is important that Climate Bonds criteria are well aligned with this Taxonomy, except in cases where Taxonomy standards might be lower (see the previous section). Therefore, in cases where Taxonomy emissions thresholds for transport are *stricter* (and thus *lower*), the Transport Criteria thresholds have been updated to align with this.

In V1 of the Transport Criteria, both freight and passenger transport, respectively, had to meet specific emissions thresholds based on projections and targets set by the Global Fuel Economy Initiative (GFEI). The GFEI promotes and supports government action to improve the energy efficiency and reduce the fuel consumption of the road vehicle fleet[73]. At the time of publication of V1, these GFEI targets were heavily based on and developed using the IEA 2 Degrees Scenario (2DS). Targets were robustly set using modelling and calculations carried out by technical experts. These represented realistic yet ambitious emissions thresholds for transport practitioners to meet when seeking certification. Reference emissions levels were taken from 2005, with gradually decreasing thresholds towards 2050.

The Taxonomy, however, has taken an approach which sets a threshold of 50g CO_2 / km or p-km for passenger transport or private LDVs until 2026, at which point the threshold becomes zero. This is reflective of an ambitious need for new vehicle stock to be zero-emissions in the medium- to long-term, with the entire fleet eventually being zero-carbon. With these thresholds being lower than those previously in the Transport Criteria (see figures 2 and 3), the Transport Criteria have subsequently been updated to align with these thresholds. An exception for the time being is freight transport, which is discussed in the next section (4.3.3).

Global applicability is a crucial feature for any Climate Bonds criteria. As such it was important to ensure the updated thresholds meet this requirement, as the EU Taxonomy centres around sustainable finance and economic activities within the European Union. As such there was a possibility that these thresholds would be unrealistic to meet in certain countries. For example, it could be envisioned that in more developing countries the targets for passenger rail or private cars are difficult to meet as a lack of transmission and distribution infrastructure (electrical grid) means that electric transport is an unsuitable investment in the short- to medium-term.

However, Climate Bonds engaged with technical experts involved in the process of developing the Taxonomy, who held the view that the thresholds are nonetheless realistic and, more importantly, necessary on a global scale. Combined with global sustainable development goals as a whole, it is important to signal to the market that ambitious greening of transport is entirely feasible if done in parallel with other sectors such as electrical grids and renewable energy production.

Below is illustrated the disparity between the thresholds of the Transport Criteria (V1) and the EU Taxonomy:

Figure 3. Passenger Transport Thresholds (e.g. cars and light-duty vehicles).

[73] See https://www.globalfueleconomy.org/media/708302/gfei-working-paper-20.pdf for the latest working paper of the GFEI

Direct emissions	2000	2010	2015	2020	2030	2050
IEA 2DS Passenger Activity (gCO2 per t-km)	107	94	87	75	56	33
EU Taxonomy Passenger Threshold (gCO2 per t-km)				50	0	0

Figure 4. Freight Transport Thresholds (e.g. freight transport by road).

Direct emissions	2000	2010	2015	2020	2030	2050
IEA 2DS Freight Activity (gCO2 per t-km)	35	30	27	25	21	18
EU Taxonomy Freight Threshold (gCO2 per t-km)				TBC	TBC	TBC

4.3.3 Freight thresholds in the Transport Criteria

As is seen in Figure 4, in the current absence of freight thresholds in the EU taxonomy, freight thresholds in the Transport Criteria are kept as is in the previous version (V1). This means they reflect projections for fuel emissions reductions developed by the GFEI and IEA.

The EU taxonomy will eventually adopt thresholds for freight based on a benchmark that is 50% lower than average reference CO_2 emissions of HDVs as defined for the Heavy Duty CO2 Regulation. Once this is published, Climate Bonds will review this threshold to determine whether this will be suitable to adopt in the Transport Criteria, using the same principles as for the passenger threshold(s).

4.3.4 Dedicated rail transport of fossil fuels

Version 1 of the transport criteria stipulated that railway lines or rolling stock carrying freight of which more than 50% was fossil fuels were not eligible. This was always intended as a starting point that would decrease over time in line with the necessary decrease in fossil fuels as part of the energy demand mix. Coal makes up the biggest bulk (in tonnage) by far of any fossil fuel transported by rail, though this varies from country to country. Noting this, coal makes up around one third of freight tonnage transported by rail in both the USA and Russia, and only 7% in the UK. In broad terms, this may indicate that the 50% threshold was always a conservative target, although notable exceptions exist in countries such as China (in which nearly 60% of freight tonnage transport by rail is coal).

This requirement for rail freight is now lowered to 25% to reflect the need for reducing fossil fuel's role in the economy and to send a signal to the market that transporting fossil fuels can lock-in their future use. This threshold will continue to be reviewed and tightened in future versions of these criteria, in line with better scientific and market knowledge. A gradual decrease to this threshold over time will give leeway to issuers financing freight rail that carries other commodities in addition to fossil fuels and therefore can aid modal shift and emissions decreases.

Note that for fossil fuels transported by road, this is not eligible in any circumstance.

4.3.5 Inclusion of zero direct emissions vehicles from other sectors

There are some assets that might support sectors such as aviation or construction which while themselves are not strictly green today, will continue to be key features of future economies, even low-carbon ones. Equally, such vehicles may not fall intuitively into the other categories in these criteria

yet for certain issuers may form a significant part of their activities. Therefore, with transition imperatives in mind and thus accepting all aspects of these sectors will need to decarbonise in line with the Paris agreement, the manufacture of mobile vehicle assets used in these industries are included as eligible under these criteria, providing those vehicles are zero direct emissions.

For retail, this may include buggies which transport consumers round a retail park. For construction, it may include off-road diggers. If an issuer wishes to finance the manufacture of zero emissions vehicles that supports a sector such as those already mentioned, then Climate Bonds sees no reason to exclude such vehicles.

Only the manufacture of such vehicles, rather than their operation or purchase, is eligible. Reasons for this are twofold. Firstly, issuers such as banks may not have access to such granularity of detail in the projects that they are financing. For example, a bank issuing a bond to finance a new railway line will not be able to disclose whether construction equipment used in the project are zero emissions. Secondly, based on experience with certifications, a significant number of certified issuers would be unable to meet this requirement of included assets being zero direct emissions. Climate Bonds will review this eligibility when zero direct emissions vehicles are more common in the market, and information on such vehicle use is more commonly disclosed to issuers.

One exception to this is waste collection vehicles. The operation and leasing of such vehicles (if zero direct emissions) is also eligible under these criteria.

4.3.6 Incorporating scope 2 and scope 3 emissions into the Transport Criteria

There is consensus that the best way of evaluating an asset or activity's complete emissions footprint is through Life Cycle Approach (LCA) or Life Cycle Engineering (LCE). For a transport asset, this fully shows associated emissions all the way from construction or manufacturing up to decommissioning (cradle-to-grave). As a systems-oriented assessment framework it helps understand the complexity, interdependencies, and impacts of infrastructure systems.

While such frameworks are becoming more routine in assessing transportation systems performance, they are not universally practiced. The EU taxonomy does not set emissions requirements on an LCA basis for transport as it does for some economic activities such as manufacturing of plastic or the production of electricity from Solar Photovoltaic (PV). It does, however, stress the need for a common Union methodology (and subsequent legislation) for the assessment and the consistent data reporting of the full life-cycle CO2 emissions of heavy-duty vehicles that are placed on the Union market.

Climate Bonds stresses the need for such initiative to be shown for all types of transport. However, as it stands LCA approaches are considerably more onerous and complex than what is currently required in the Transport Criteria (that of emissions intensity thresholds). As such, it is recognised that setting LCA requirements in the Transport Criteria would require considerable technical input and understanding of industry practice, further than what has already been leveraged in drafting these criteria. See section 4.1.10 for full rationale of this approach.

It is proposed that a priority for the next update of the Transport Criteria should focus fully on implementing such approaches into its mitigation requirements. An example of why this would be valuable is the case of electric battery vehicles. While accepted as the obvious transport solution for passenger cars, LDVs and perhaps even HDVs, there are considerable questions asked of the mineral requirements associated with such battery technologies. Future manufacturing and use of products will thus have a wide range of emissions associated with mineral extraction, for which full life cycle analysis understanding will be needed. Further discussion of this issue is provided in the next section.

4.3.7 Mining and minerals

Criteria do not currently exist for the mining of minerals and materials used in the low carbon transport sector. However, it is acknowledged that they are a crucial part of vehicle manufacturing and the use of batteries in electric vehicles, amongst various other uses. With projected increases in sales and use of such vehicles and thus increased demand of necessary minerals, there will be a need in future to review criteria in the context of sustainable resource extraction for such uses.

The previous section discussed this in light of lifecycle emissions, pertinent because it is estimated that primary mineral and metal production accounted for approximately 10% of the total global energy-related greenhouse gas emissions in 2018[74]. However, along with other non-climate environmental issues (such as biodiversity loss), there are also considerable social issues associated with mineral extraction, often taking place in developing countries where the risks of modern slavery and lack of employee safety are widespread and difficult to prevent[75]. For this reason, while LCA approaches will help encompass associated emissions in mining, further criteria on these other complex issues will need developing in the long-term. There already exists the OECD Due Diligence Guidance for Responsible Mineral Supply Chains, for example, but it is unclear whether more specific standards exist for use in the bond market.

4.3.8 Disclosure of transport compliance data

In bond markets, issuers are generally not required to be explicit in their use of proceeds. The Climate Bonds Standard is a pioneering effort to promote transparency on intended use of proceeds and independent review of proceeds management, thereby holding issuers accountable for activities and outcomes. Disclosure on use of proceeds is an important factor for all sectors that green bonds are issued in. For that reason, the requirements around disclosure are stipulated in the Climate Bonds Standard and not the Sector Criteria[76].

However, the TWG supported additional disclosure requirements for issuers to meet the Transport Criteria, in providing compliance data used to meet the requirements relevant to them. This could be their emissions data or independent project appraisal, for example. This is intended to drive best practice in the transport sector, something that is crucial for providing investors and policy makers with better information for green decision making. With disclosure of climate-related financial information and data increasingly observed, transport is a key sector that must align with such initiative.

4.4 Mitigation Requirements

Mitigation requirements for the Transport Criteria have been set depending on transport type. The following sections give the requirements separately for passenger cars and commercial vehicles, public passenger transport by road, freight transport by road, passenger rail rolling stock, freight rail rolling stock, railway networks and lines, and infrastructure for low carbon transport.

If a bond contains public transport projects and infrastructure for low carbon transport projects, for example, the public transport projects must comply with the public transport requirements and the infrastructure for low carbon transport projects must comply with the infrastructure for low carbon transport requirements. This holds for any bond with any mixture of project or asset types.

4.4.1 Automatic eligibility

[74] https://sustainabilitycommunity.springernature.com/posts/59131-the-climate-footprint-of-mining
[75] Mancini & Sala (2018)
[76] The requirements of the Climate Bonds Standard can be found here: https://www.climatebonds.net/standards/standard_download

All zero direct emissions transport along with key components and dedicated supporting infrastructure are automatically eligible and therefore certifiable under the Transport Criteria.

Note: for some asset categories that are zero direct emissions, additional criteria will need to be met. Consult Table 6 for further details.

4.4.2 Universal emissions thresholds

Figure 2 presents the EU taxonomy emissions targets for p-km in 2020 through to 2025[77], after which (2026 onwards) they drop to zero, and IEA 2DS emissions targets for t-km in 2020 through to 2050[78]. Supporting methodological notes are provided for additional aid in using the thresholds.

Table 4. Universal emissions thresholds for passenger and freight activity

	Year of Issuance			
Direct Emissions	2020	2026	2030	2050
Passenger Activity Threshold (g CO_2eq per p-km)	50	0	0	0

	Year of Issuance		
Direct Emissions	2020	2030	2050
Freight Activity Threshold (g CO_2eq per t-km)	25	21	18

Methodological note 1: Using the thresholds

The threshold to be used by the issuer for certification is the starting year of the bond (year of issuance). As an example of how the thresholds should be used, a bond for rail freight issued in 2020 should meet the threshold for 2020 for the lifetime of the bond, in this case 25g CO_2 per t-km.

Methodological note 2: Fleet Averages

For bonds financing vehicle fleet operation or manufacturing, fleetwide averages cannot be used to show compliance with the thresholds. Each vehicle must meet the threshold. The only exception is for vehicle fleets that transport public passengers – for example public bus fleets or taxi companies. More information can be found in the corresponding background paper, section 4.1.14.

Methodological note 3: Using load factors to calculate emissions intensity

[77] For passenger transport, the thresholds align with the EU taxonomy on sustainable finance, based off reference data that gives a benchmark for low emitting vehicles across all modes of transport. In 2020, this is set at 50g CO_2 per p-km until 2025, after which (2026 onwards) only zero emissions vehicles (0g CO_2 per p-km) will be eligible.

[78] Mobility Model (MoMo) data, ibid, provides global stock-wide average of emissions where, to qualify in 2020, assets need to perform better than the Global Fuel Economy Initiative (GFEI) target accounted for in the IEA 2 Degree Scenario (2DS) emission targets (50% better fuel economy for new vehicle registrations by 2030, compared to 2005).

For relevant fossil fuel or hybrid vehicles or rolling stock needing to meet the thresholds, the project, product or supporting infrastructure passes if:

$$\frac{\text{vehicle emissions per km when fully loaded}}{\text{load factor} \times \text{full capacity}} < \text{passenger (per p-km) or freight (per t-km) threshold}$$

Example:
A municipality in the USA borrows money to replace a large proportion of its public bus fleet. Each new bus has 50 seats and emits 437 gCO2/km when fully loaded. Buses are 30% full on average across all routes and times. A bond issued to pay for the buses is eligible under the Criteria if:

$$\frac{437}{0.3 \times 50} = 29.1 \text{ gCO2/p-km} < \text{universal passenger (per p-km) threshold}$$

(likely to be the case)

Example:
A private locomotives company in China borrows money to replace a large proportion of its freight rolling stock. Each new train can transport up to 3000 tonnes of cargo and emits 30,000 gCO2/km when fully loaded. Trains are 60% full on average across all routes and times. A bond issued to pay for the trains is eligible under the Criteria if:

$$\frac{30000}{0.6 \times 3000} = 16.6 \text{ gCO2/t-km} < \text{universal freight (per t-km) threshold}$$

(likely to be the case)

Methodological note 4: load factors of passenger cars and commercial vehicles

For passenger cars and commercial vehicles, the load factor should always be taken as one passenger per vehicle in line with the Worldwide Harmonised Light Vehicle Test Procedure (WLTP), or other similar emissions testing procedures. The threshold metric for cars and commercial vehicles can therefore be taken in practice also as gCO2/km.

As such there is no need to calculate average ridership, for example.

Additional notes

Thresholds currently do not differ between geographical regions and there are separate thresholds for passenger transport and freight transport.

For freight transport, a threshold has not yet been set in the EU taxonomy. This will be 50% lower than average reference CO_2 emissions of HDVs as defined for the Heavy Duty CO2 Regulation, for which data will be available in the future. It should be noted that, in a situation where a subsequent threshold for freight in the EU taxonomy is lower and thus more stringent than what is currently stipulated in the Transport Criteria, such a threshold would be adopted in these criteria in future versions to reflect the highest green standards. Vice versa, these new thresholds would not be adopted into these criteria once known to avoid backsliding on standards.

4.4.3 Exclusion of dedicated fossil fuel transport

Railway lines and rolling stock

Infrastructure and rolling stock for railway lines that are built with the over-riding objective of transporting fossil fuels do not qualify under the Criteria. That is if:

a) The primary purpose of the line is clearly described as fossil fuel freight by authoritative government sources; or, in the absence of this:

b) More than 25% of the freight in t-km transported by the line is comprised of fossil fuels*; or alternatively:

c) More than 25% of the rolling stock is dedicated to the transport of fossil fuels

*This can be demonstrated by issuers a number of ways:

- For operators of railway lines and rolling stock, receipts may provide data that establish the tonnage of fossil fuels transported as a percentage of total freight transported on the line.
- Lessors of rolling stock financing operations may demonstrate using their own internal data that the percentage of their clients that are engaged in fossil fuel activities or transport is below 25%.
- For banks issuing a bond in order to lease rolling stock, data may be provided which demonstrates that the proportion of rolling stock dedicated to fossil fuel transport is below 25%.

Road vehicles

For road freight vehicle and component manufacturers, purchasers and operators (see Table 6), any proportion of a vehicle's or fleet's cargo being made up of fossil fuels makes that vehicle or fleet ineligible and thus not certifiable.

4.4.4 Exclusion of biofuel vehicles

Road vehicles or rolling stock designated as using biofuels, even partially, do not qualify under these Criteria, even if meeting the relevant threshold for passenger or freight transport. The same exclusion rule holds for railway lines or networks that are being financed on which biofuel rolling stock will run.

Note: vehicles or rolling stock using petrol blends containing small percentages of biofuels as seen in some countries are still eligible so long as they meet the rest of the criteria relevant to them.

4.4.5 Independent project appraisals for new interurban rail transport

For new interurban rail projects (including high-speed rail and dedicated freight lines):

A project only qualifies if an independent project appraisal demonstrates that the investment will reduce total transport related greenhouse gas emissions (per p-km or per t-km) in the affected transport corridor by at least 25%.

Guidance on project appraisals

In the development of a new interurban rail project, it may already be subject to carbon accounting or appraisal procedures that could provide additional information. The project developer may thus have already chosen prior to pre-issuance an external party to develop the methodology or which owns a software tool that can provide the analysis. This may be a transportation planning software or similar.

In general, there are no specific requirements on the type of appraisal that is needed. A study commissioned by the project developer to determine the level of emissions reductions would be accepted as an appropriate appraisal. The two key factors that will be used to evaluate whether the study is suitably robust are:

a) the developer has used reputable sources for references and emissions factors (for example government agencies, UNFCCC[79], IEA, EEA) and;
b) that the Verifier has checked and approved the study.

Assuming then that the study projects a minimum 25% emissions reduction in the transport corridor, the bond will suitably meet this criterion.

A range of greenhouse gas emissions methodologies and calculators exist for railway lines including, but not limited to: IFEU 2011, RFF-SNCF-ADEME 2011, NTNU 2011, UIC 2011, and AEA-CE Delft-TNO 2012.[80] However, it is accepted the issuer will likely have identified its own appraisal methodology to meet this requirement. As such, the Climate Bonds Initiative do not specifically require or make distinctions between any type of appraisal or methodology and these are intended simply as examples for context.

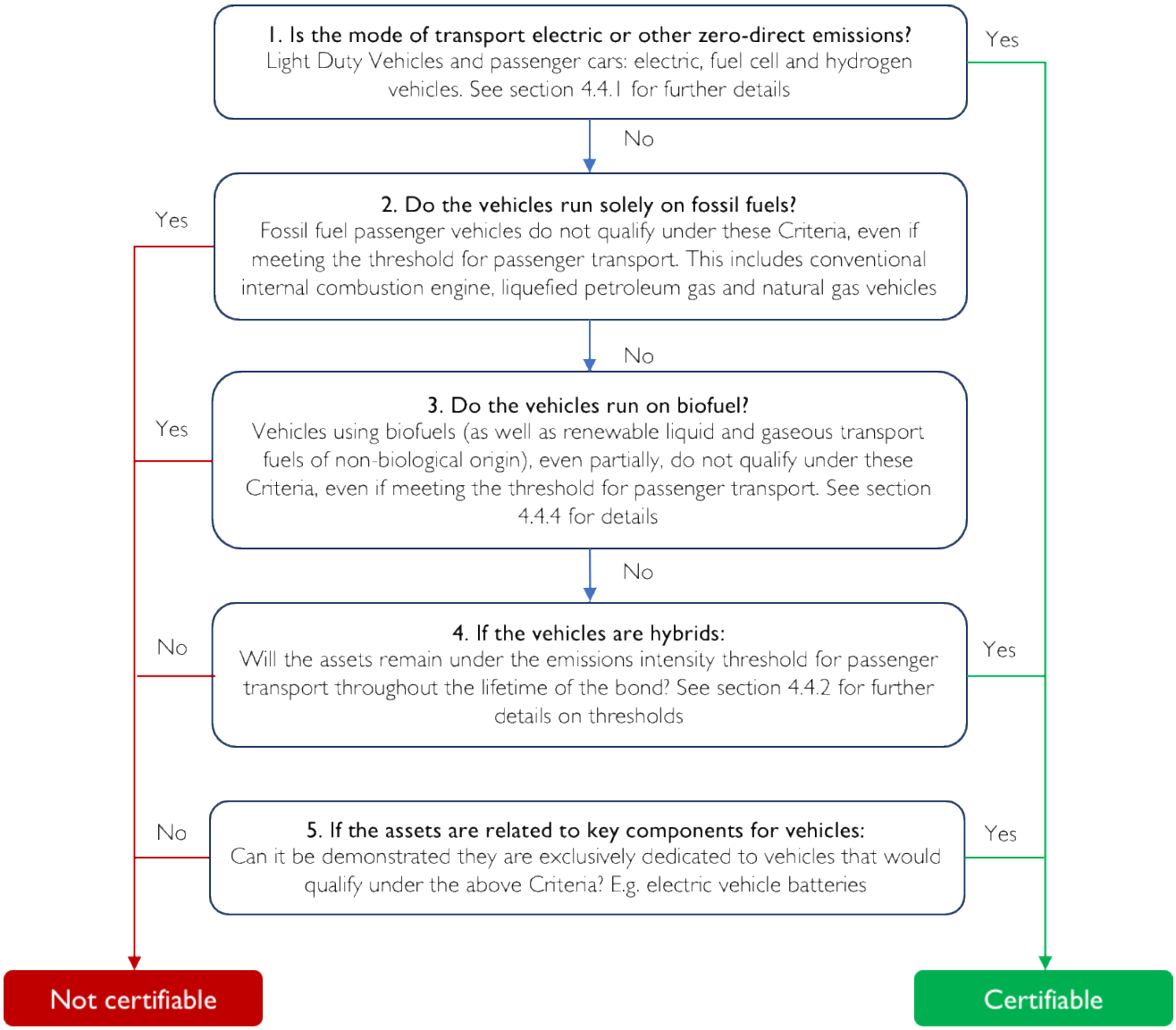
Note that for bonds refinancing existing interurban rail projects, the issuer need not meeting this requirement.

[79] The UNFCCC Clean Development Mechanism (CDM) illustrates one such example of a GHG methodology for modal shift from road to rail or sea in freight transport: https://cdm.unfccc.int/methodologies/DB/4DOIK2WYP8P3AGAVJKT0CHY1NXJ4QP
[80] These example methodologies were taken from the following study, but is not necessarily an exhaustive list:: https://uic.org/IMG/pdf/carbon_footprint_of_railway_infrastructure.pdf

4.5 Decision trees for asset categories

4.5.1 Passenger cars and commercial vehicles

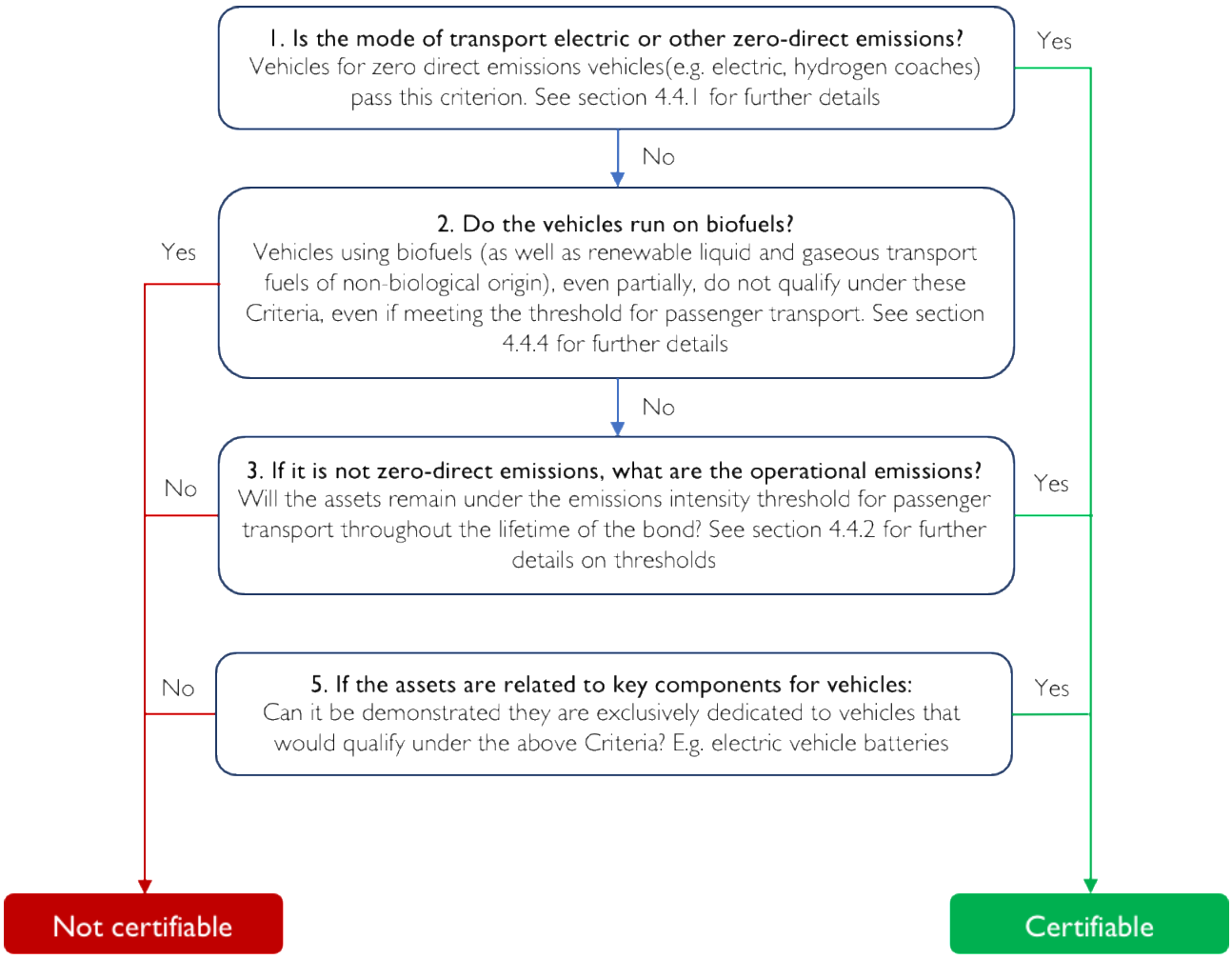
Resulting Criteria



Note: for passenger cars and commercial vehicles, the load factor used in meeting the thresholds (if relevant) should always be one passenger. As such, the metric can be gCO2/km in practice.

4.5.2 Public passenger transport by road

Resulting criteria

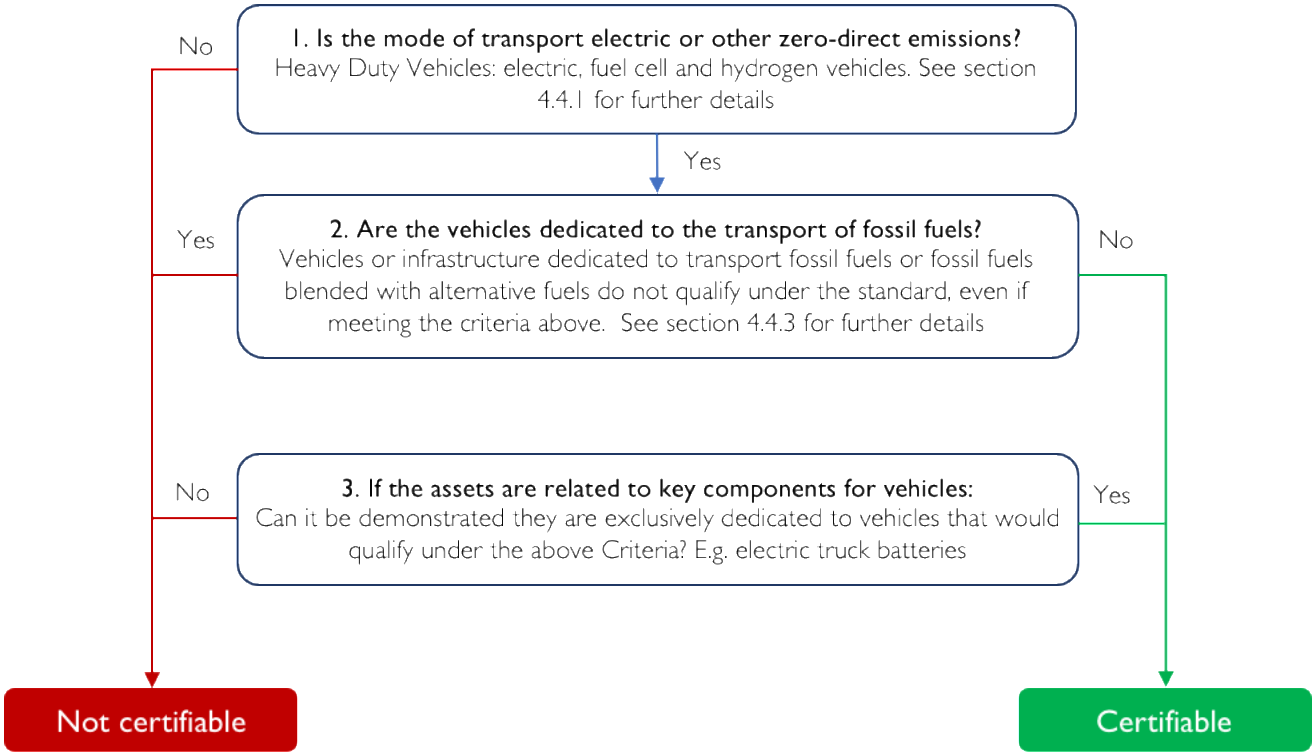


Note: for Bus Rapid Transit systems in developing countries (as defined by the OECD), the BRT Criteria[81] under the Climate Bonds Standard should be used. For such systems in developed countries (OECD defined), the Transport Criteria should continue to be used.

[81] https://www.climatebonds.net/files/files/standards/Land%20transport/final_brt_criteria_and_guidelines.pdf

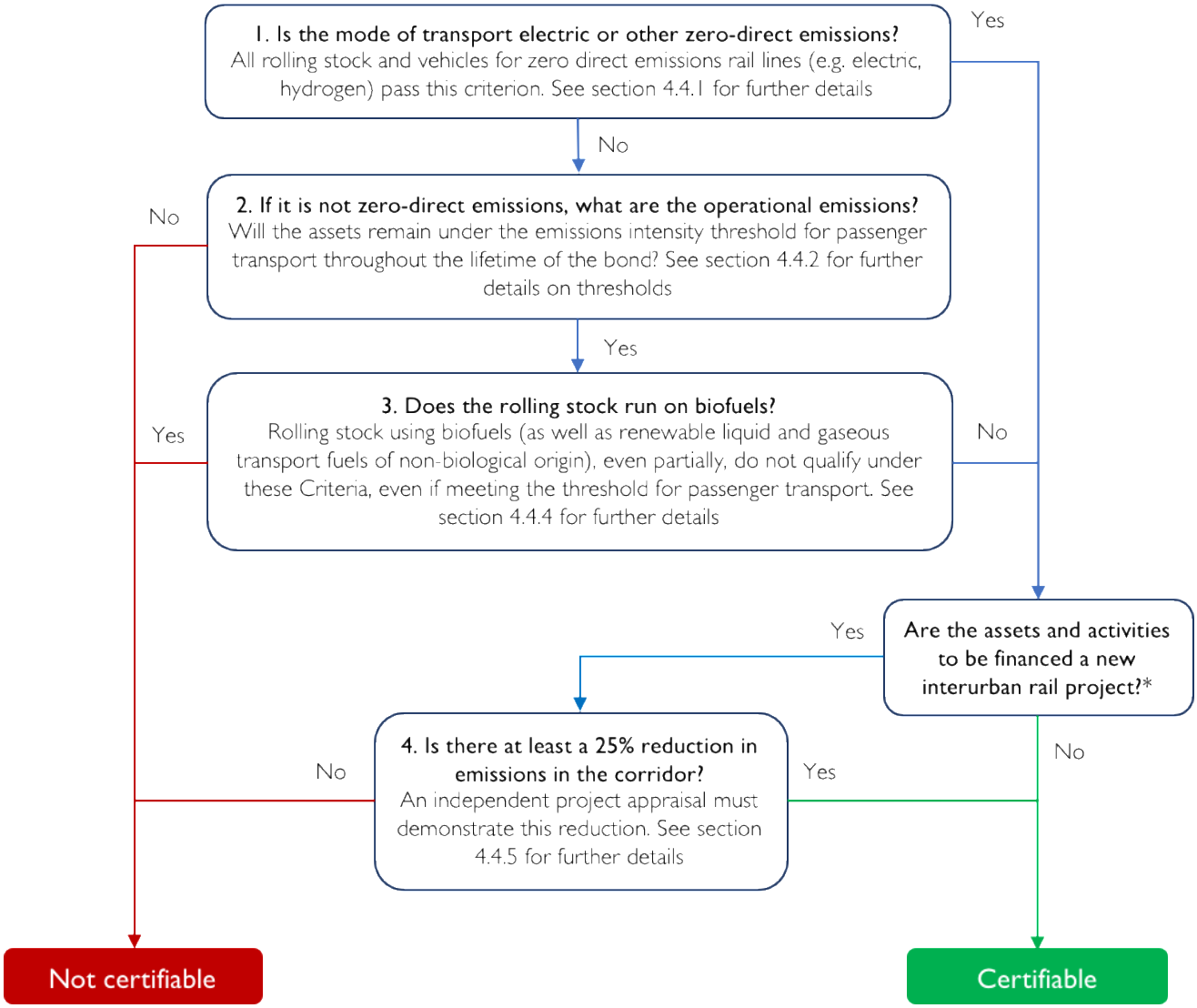
4.5.3 Freight transport by road

Resulting Criteria



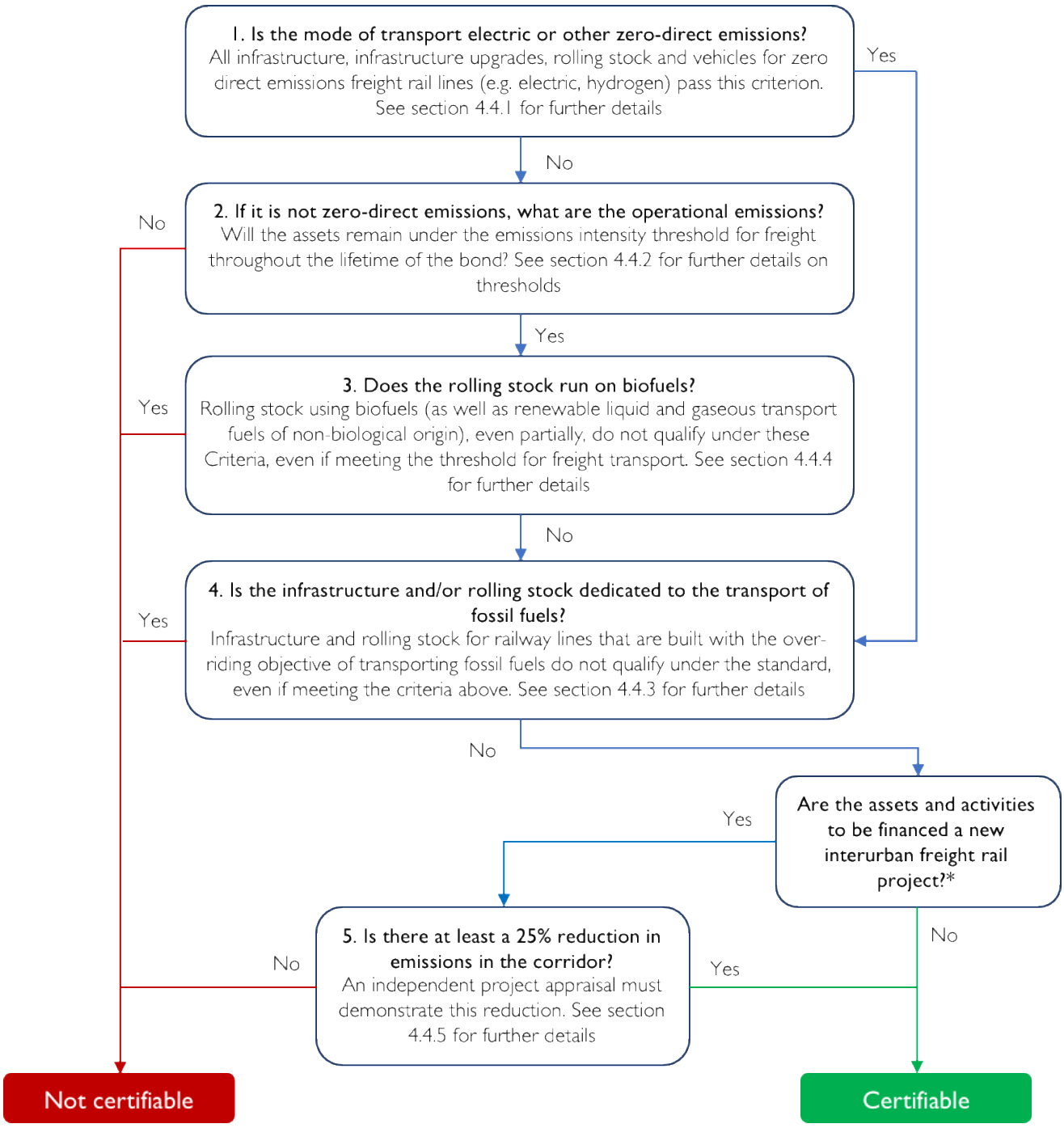
4.5.4 Passenger rail rolling stock

Resulting Criteria



4.5.5 Railway networks and freight rail rolling stock

Resulting criteria



4.5.6 Miscellaneous vehicles for other sectors

Resulting criteria

The manufacture of miscellaneous vehicles used in other sectors that are zero direct emissions, e.g. off-road diggers, are automatically eligible and therefore certifiable

Waste collection vehicles

In addition to their manufacture, the operation and leasing of waste collection vehicles that are zero direct emissions is also eligible under these criteria

4.5.7 Infrastructure for low carbon transport

Resulting criteria

The following other infrastructure types are automatically eligible and therefore certifiable:

- Dedicated charging and alternative fuel infrastructure (when separable from fossil fuel filling stations and garages)
- Retrofits for public transport infrastructure
- Public walking and cycling infrastructure; cycling schemes
- Construction and development, purchase, and/or operation of dedicated infrastructure for eligible rolling stock, railway lines and networks, for example: train and bus stations, inspection depots for freight rail rolling stock, traction maintenance depots / motive power depots for rolling stock, backup electricity generators, signalling infrastructure including buildings

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The following infrastructure types are eligible on a case-by-case basis** and may include the following:

- ICT that improves asset utilization, flow and modal shift, regardless of transport mode (public transport information, car-sharing schemes, smart cards, road charging systems, etc.).
- Intermodal freight facilities
- Investment in terminals to improve journey times
- Smart freight logistics

The following other infrastructure encourage maintained or increased ICE vehicle use patterns and are ineligible and therefore not certifiable:

- New roads, road bridges, road upgrades etc.
- Parking facilities

*These are intended merely as examples. The principle is that many types of vehicles exist which may not fall easily or intuitively into the other categories in these criteria yet form a significant part of an issuer's transport assets and activities. This requirement is intended to allow for such instances. Other examples may exist which, providing they are zero direct emissions, are eligible under these requirements.
**The infrastructure types listed in box 2 are evaluated for certification on a case-by-case basis by the Climate Bonds Initiative. A 25% emissions reduction benchmark is intended as last resort if it is uncertain how effective or necessary the infrastructure assets are to decarbonisation. If Climate Bonds is not satisfied with the general information provided by the issuer to the verifier then it will request demonstration of such a reduction, or vice versa.

- Fossil fuel filling stations

4.6 Reporting requirements

Reporting on the use of proceeds for a Certified Climate Bond is required at three stages:

1. Pre-issuance – before issuing the bond the issuer must engage with the verifier to confirm use of proceeds are aligned with the requirements of the Climate Bonds Standard
2. Post-issuance – after issuing the bond the verifier confirms that use of proceeds, once allocated, remain aligned with the requirements of the Climate Bonds Standard and Transport Criteria
3. Annual reporting – the issuer must prepare a simple report each year for the term of the bond to confirm that use of proceeds are aligned with the requirements of the Climate Bonds Standard and the Transport Criteria

The above are the overarching reporting requirements as laid out in the Climate Bonds Standard[84]. This is to both prove compliance and to promote stronger disclosure of use of proceeds from issuers.

All requirements for certification must be maintained in compliance for the duration of the bond.

Additional disclosure requirements – version 2

Version 2 of the Transport Criteria now stipulates additional disclosure requirements for issuers to provide at the pre-issuance reporting stage. All data or information, numerical or otherwise, used to prove compliance with the criteria must be provided in the independent verifiers report.

For example, emissions data in accordance with the universal thresholds or freight data to prove less than 25% fossil fuel transport dedication for freight rail.

[84] Further information about the Climate Bonds Standard can be found here: https://www.climatebonds.net/standards/standard_download

Appendix 1: TWG members

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- Benoit Lefevre, World Resources Institute
- Arie Bleijenberg, Koios Strategy / The Netherlands Organisation for Applied Scientific Research (TNO)
- Prof. Dr. Danang Parikesit, Indonesian Transport Society / Universitas Gadjah Mada
- Carol Lee Rawn, Ceres
- John Dulac, Organisation for Economic Co-operation and Development (OECD), previously International Energy Agency (IEA)
- Pierpaolo Cazzola, International Transport Forum (ITF) / OECD, previously International Energy Agency (IEA)

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