Aligning transport investments with the Paris Agreement

Insights from the EIB's transport portfolio 2015-2019

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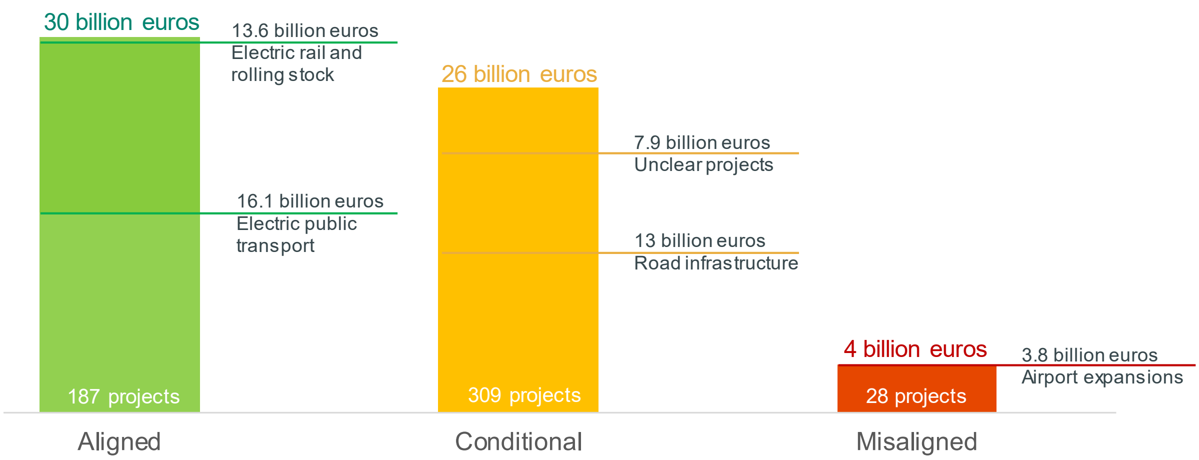
Executive Summary

In the past few years, transport made up about 27% of European emissions. In 2017, transport emissions were 28% above 1990 levels and until recently were on a rapid growth trajectory as a share of the EU's overall emissions as other sectors, notably electricity generation, move towards decarbonisation (EEA, 2019b, 2020). The COVID-19 pandemic in 2020 had a large impact on global and European emissions patterns, including in the transport sector, but despite the drop, emissions are overall expected to return to previous trends depending on the speed of the economic recovery. Achieving the EU's long-term climate goals under the Paris Agreement will still be a monumental challenge and current policies are not sufficient to achieve them. For the transport sector new policies and investment strategies are needed to peak emissions as soon as possible and move towards a steep decline towards decarbonisation.

As a key institution in the EU's COVID-19 response measures, the EIB can and should play a prominent role, especially in its aspiration to be the "EU Climate Bank". Current discussions around a ratcheted 2030 EU NDC target, the implementation of the European Green Deal, and how to support countries facing the economic impact from COVID-19, highlight the importance of a robust and strategic EIB climate roadmap as well as the forthcoming revision of the EIB transport lending policy. The long lifetime of transport infrastructure assets makes current decision making even more important as investments not in line with the temperature goal of the Paris Agreement ("misaligned") are likely to lock countries into a high emissions trajectory for years to come, making the EU's climate goals harder and harder to achieve. In order to inform this discussion, we have conducted an analysis of the EIB's recent transport lending portfolio against the temperature goal of the Paris Agreement and provide recommendations on priority areas for the EIB going forward.

In terms of investment volumes, we find that about half of transport-related investment decisions are clearly "aligned" with the Paris Agreement, mainly electric public transport infrastructure and electric rail and rolling stock. EIB aligned investment however declined steeply between 2015 and 2018. We find that 44% of the EIB's investments since 2015 are "conditional" – not clearly aligned nor misaligned with the Paris Agreement – and require further assessment, mostly with regard to road infrastructure. For these projects, there is generally insufficient publicly available information to carry out a robust assessment. The remaining 6% is "misaligned" with airport expansions accounting for almost 4 billion euros between 2015 and 2019.



Investment volume of the EIB's transport-related portfolio 2015-2019 classified along the positive-negative list.

Based on this portfolio analysis and an evaluation of EU climate targets and current policy framework for the EU transport sector, we make the following key recommendations:

1) Develop a strategic project pipeline for key investment priorities

Multilateral development banks (MDBs) play a key role in mobilising finance for infrastructure in general, and therefore have an important role in helping countries avoid fossil fuel lock-in and stranded assets. However, rejecting projects that are not Paris-aligned is not enough. It is also crucial to work with potential project proponents to encourage sustainable transport planning and to close investment gaps by massively and strategically scaling up mobilisation of finance to decarbonise the transport sector.

- ***Enabling modal shift with transit-oriented development***

Investments avoiding the need for long commutes and enabling a shift of transport mode away from the use of individual passenger vehicles play a central role in an ambitious transport decarbonisation pathway. Dense urban environments should be front-running in the transition as they offer the most viable alternatives to individual vehicles, such as transit-oriented planning, non-motorised, collective or shared and electric transport solutions, which are the most efficient forms of mobility. To promote soft mobility (walking and cycling), and public transport use, it is crucial to build and adapt urban infrastructure in an integrated and safe manner, for example by adapting existing roads to soft transportation.

- ***Investment roadmap to completely decarbonise / electrify European rail***

Decarbonising the transport sector requires expanding, improving and connecting high-speed railway networks. High-speed railway networks are essential for medium- to long-distance national and European travel as more and better high-speed railway systems provide a viable alternative to air and road transport, thus shifting passenger and freight transport onto the tracks. Looking forward, investments in electric railways need massive upscaling.

- ***Building the required infrastructure to support electric mobility***

The transition to a zero-emission transport sector requires a reliable, extensive, zero-emission charging infrastructure for electric vehicles to help overcome charging station and convenience barriers and eliminate range anxiety. In order to make this a reality, large investments to build electric charging points are required for future charging demand.

- ***Efficient, forward-looking freight infrastructure***

Freight transport – from roads, ports, railways, to logistics centres – requires larger-scale infrastructure which takes time to build and has a long lifetime, making such investments prone to carbon lock-in. Therefore, supporting climate-neutral freight transport infrastructure from the beginning is essential, especially given the urgent need to act. Efficient use of multiple modes of transport, and a smooth transfer of cargo from one transport mode to another, can increase load factors and reduce energy demand – important efficiency measures. Optimised use of various modes of transport requires safe and reliable information sharing, containerisation standards, and accessible and easy cross-border transport.

- ***Shipping – foster research, development, and implementation of decarbonisation solutions***

The European Green Deal sets an inland freight transport modal split target of 75% rail and inland waterways (European Commission, 2019b). Shipping, including on inland waterways, is the most efficient mode of freight transport to move by freight ton (Sims *et al.*, 2014), it is however a mode that is currently not yet emission free. Freight on inland waterways must also electrify or switch to zero-emission fuels. Challenges for the electrification of long-distance transport mean that alternative renewable synthetic fuels will play an important role in decarbonisation[1].

It is crucial that port infrastructure investments support the transition to net-zero emission shipping (such as shore power, green port fees and/or similar schemes such as green berth allocation policies, green procurement and carbon pricing schemes). Such investments should include projects providing all European ports with shore power charging equipment and renewable synthetic refuelling infrastructure such as for hydrogen or ammonia. Such finance could be scaled up through EIB collaboration or involvement with a potential EU Maritime Transport Decarbonisation Fund that is currently under discussion in connection with proposals to expand the EU ETS to international shipping.

2) Establish a clear negative list of ineligible transport funding project types

Although such projects are not in the EIB's recent project portfolio, an important step would be to clearly label road, rail, and port infrastructure for the exclusive transport of fossil fuels as "misaligned" projects and therefore bring clarity to what is on the EIB negative list. As such projects actively undermine the Paris Agreement and are not in line with the EIB's role as Europe's "climate bank", they should not be considered for finance. Trains running on diesel fuel regardless of what they transport will very soon lead to lock-in even if they may displace transport of passengers or freight from road vehicles. The EIB should end financing diesel locomotives at the end of 2021. New non-electrified track infrastructure for both freight and passenger rail should ensure a strategy for battery or hydrogen hybrid train rolling stock.

Airport expansion still makes up a significant portion of the EIB's transport lending and should also be placed on a negative list. Greenhouse gas emissions from European aviation have more than doubled since 1990, and are 29% higher in 2017 than in 2000 – with an average growth rate of 3% per year (EEA, 2020). Although prototypes for electric planes exist and a synthetic fuel supply chain is starting to be developed, there is currently no short-term prospect for the decarbonisation of aviation. The first step is therefore to limit its growth, especially in areas already well served with alternative transport infrastructure. Recent EIB backing for new airports and airport expansions in Crete, Helsinki, Frankfurt, and Amsterdam Schiphol are incompatible with the EU's climate targets; accordingly, ending future support for airport expansion is an important part of the EIB's transformation into Europe's "climate bank".

3) Enhance transparency and revise project evaluation processes especially with regard to assumptions on induced emissions

One major challenge in assessing the Paris alignment of conditional projects is the lack of publicly available information and uncertainty of assumptions regarding project proposals. The public information provided from many proposals is often not sufficient to assess a project's climate impact. Here, public disclosure of assumptions regarding factors influencing induced emissions should be a priority. By increasing the focus on Paris alignment already during the project proposal phase, the Paris alignment of projects would not only be easier to assess but would automatically strengthen the alignment of the project pipeline looking forward. Once all the documentation has been gathered, we recommend enhancing the transparency of the project descriptions and portfolio in publicly available documentation, notably with regard to the carbon foot printing exercises, including key assumptions and variables considered. This could, for example, be done in an expanded and renamed Environmental Climate Social Impact Assessment (ECSIA).

[1] Synthetic fuels (power-to-liquids) are not as energy efficient nor as technologically mature or cost effective as electric mobility, thus they should only be considered for transport modes that cannot be electrified.

Table of Contents

1 Introduction

The European Investment Bank (EIB), together with other Multilateral Development Banks (MDBs) and members of the International Development Finance Club (IDFC) have committed to aligning their operations with the Paris Agreement (EIB, 2017). Concretely, the EIB has set a target date to “align all financing activities with the goals of the Paris Agreement from the end of 2020” (EIB, 2019b). A crucial aspect of this is the alignment of all of the EIB’s future transport investments with the global warming limit set in Paris, namely to limit average temperature rise to well below 2°C and pursue efforts to limit it to 1.5°C (the “Paris temperature goal”). Establishing a robust approach to evaluate potential transport investments with regard to their Paris alignment is an even more important task considering the role the EIB is expected to play in economic stimulus measures in response to the COVID-19 outbreak.

Despite the EU’s climate ambitions, including the Commissions’ ambition to become the world’s first climate neutral continent by 2050 (European Commission, 2019c; European Parliament, 2020b), transport made up 27% of European emissions in 2017 - 28% above 1990 levels. Transport also represents a growing rapidly as a share of the EU’s overall emissions as other sectors shrink their carbon footprint (EEA, 2019b, 2020). Achieving the EU’s long-term climate goals will be a considerable challenge and current policies are not sufficient to achieve them (EEA, 2020). The EU’s climate ambition requires the transport sector to peak emissions immediately, followed by a steep decline on the way towards reaching zero emissions around mid-century. To move towards this path, it is important that the EU shifts how it invests in transport infrastructure in order to avoid unnecessary travel, shift to higher capacity modes of transport, and decarbonise existing modes. The long lifetime of transport infrastructure assets leads to a high risk that investment decisions that do not consider long-term climate goals will lock Europe into a high emissions pathway for many years to come.

While the EIB recently updated its energy lending policy and is currently in the process of defining a Climate Roadmap, its transport lending policy dates from 2011 and is also scheduled for revision (European Investment Bank, 2011, 2019). In light of the need to decarbonise the European transport sector and ongoing transport infrastructure related policy processes, we assess the EIB’s transport-related portfolio against the temperature goal of the Paris Agreement and provide input for the forthcoming revision of the EIB transport lending policy.

2 Policy context and post COVID-19 trends

Transport infrastructure investment decision making must be considered in the overall EU climate policy context. The European Commission has set out a vision to be the world's first climate-neutral continent by 2050 at the latest (European Commission, 2019c; European Parliament, 2020b). The European long-term low emission development strategy (LTS) and the European Green Deal lay out a broad guide for how the EU intends to reach this goal. In the interim, the EU’s Nationally Determined Contribution under the Paris Agreement promises at least a 40% reduction of emissions below 1990 levels (Latvia, 2015), and the European Commission has put forward a proposal for the EU to ratchet its 2030 ambition to 55% below 1990 levels (European Commission, 2020). The European Parliament, and in particular the European Parliament’s Environment Committee, is considering to further strengthen the 2030 target to a 60 to 65% reduction (European Parliament, 2020c, 2020a). This will have important consequences for the EU’s two main climate policy instruments: the EU Emissions Trading System (EU ETS) and the Effort Sharing Regulation (ESR). Emissions from intra-European aviation are covered under the EU ETS, and emissions from road and rail are covered under EU Member States’ National Energy and Climate Plans (NECPs) to meet their targets under the ESR.

Although there is no direct relation between the EU’s main climate policy instruments and transport infrastructure investments, Paris aligned transport infrastructure investment will play an important role in facilitating countries’ achievement of their NECPs and can play a complementary role to reduce emissions from inter-European aviation.[2] The EIB is foreseen to play an important role in meeting interim targets and realising this mid-century vision, and has already taken important steps to move in that direction. The European Green Deal doubles the EIB's climate finance target so that by 2025 50% of its operations should be dedicated to climate action and environmental sustainability. It further calls for the EIB investment policy to "provide targeted financing for European Green Deal initiatives as a matter of priority", and the European Parliament stipulates that all relevant EU funds including the EIB transport lending must be "tailored to developing appropriate infrastructure for zero-emissions mobility" (European Commission, 2019c; European Parliament, 2020b). Importantly, the EIB has an important potential role to play in climate proofing the Trans European Transport Network (TEN-T) which heavily influence EU Member States' ability to reach their national climate targets.

At the same time, considering the EIB's role in financing transport infrastructure in Europe, the existing policy context can (also) not afford to ignore the impact of the COVID-19 pandemic that reached Europe in 2020. The contact and mobility restrictions put in place to contain the spread of the virus has had a large immediate impact on society in general, the economy, and the climate. According to Le Quéré et al (2020), global CO_2 emissions per day decreased by 17% by early April 2020 compared to 2019 levels, with just under half of those reductions coming from a reduction in surface transport. Europe experienced an 84-91% reduction in daily flights compared to the same days in 2019 (EUROCONTROL, 2020). Airbus chief executive, Guillaume Faury, was recently quoted as not expecting airlines to recover to normal traffic levels for up to three to five years (Jolly, 2020). The Port of Rotterdam, one of the Europe's largest ports, expects a drop in cargo throughput of 10-20% for 2020 (Mackor, 2020).

Even as economies start to open again after the immediate health crisis and forced confinement, many travel pattern changes are likely to change for the longer term. In the urban context, as long as social distancing is still necessary, there will likely be a shift from the use of public transport towards private cars, but also towards bicycle use and walking (DLR, 2020). With reduced traffic and to reduce strain on public transport systems where social distancing is more challenging, many cities have installed pop-up bike lanes (OECD/ITF, 2020). Some cities have already decided to make these pop-up bike lanes permanent (Cokelaere, Posaner and Hernández-Morales, 2020) and the large growth in electric bicycles sales make longer journeys without a car possible (OECD/ITF, 2020; Ricker and Hawkins, 2020).

Various employers may discover that working remotely works better than they had expected and allow employees to permanently work from home and reducing commuting and business travel – various research groups already expect a shift in global commercial real estate markets with less demand for office space in central business districts (Gujral *et al.*, 2020; Haag, 2020; Murphy, 2020; The Economist, 2020). Companies that had moved to capture the efficiencies of a global supply chain may reprioritize resilience and near / on / re-shore again (Gujral *et al.*, 2020; Karney, 2020).

In terms of transport planning and investment, the role of the EIB can be pivotal not only in implementing the European Green Deal generally, but also making sure to make the best out of the consequences of the COVID-19 pandemic. The EIB should take such shifts into account in its transport lending decision making.

[2] European transport infrastructure will also have an important impact on international aviation emissions regardless if this is covered under the EU's NDC.

3 Alignment analysis

In this section, we summarise the assessment methodology based on Germanwatch & NewClimate (2018), then use it to provide an analysis of the alignment of the EIB's transport portfolio with the goals of the Paris Agreement. This is followed by a project-specific analysis for three selected projects that could not automatically be categorised and therefore required further assessment.

3.1 Methodology[3]

The Paris Agreement calls for the limitation of global average temperatures to well below 2°C and pursuing efforts to limit it to 1.5°C. For the EIB to be the EU's "Climate Bank" it is important that the EIB takes an ambitious 1.5°C interpretation of this temperature target and invest in transport infrastructure to help decarbonise the sector by 2050 at the latest. In order to reach 1.5°C, the IPCC finds that model pathways of CO_2 emissions decrease "45% from 2010 levels by 2030, reaching net zero around 2050" which "require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings)" (IPCC, 2018).

Once built, transport infrastructure in and of itself generally does not have significant emissions: roads, railway tracks, and airports do not directly combust fossil fuels. They do however "induce" emissions: building roads enables road transport which produces greenhouse gas (GHG) emissions with internal combustion engines; non-electrified train tracks are only useful in that they allow diesel locomotives to pull trains; airports exist to facilitate highly emitting air travel. The extent to which the transport sector, including its infrastructure, emits is determined by three principle factors: activity levels, energy intensity, and the emissions intensity of the energy (fuel) used for propulsion. Activity levels refer to how many people and how much cargo is transported and how far – measured in person or metric tonne kilometres. Energy intensity refers to how much energy the activity uses – here the modal split of the transport activity is often the largest determining factor as different modes (foot, bicycle, road vehicles, rail, ship or airplane) have vastly different energy intensities per person / tonne kilometre. Emissions intensity refers to the emissions factor of the energy used: how many metric tonnes of GHG are emitted per unit of energy to power that mode.

Important measures to reduce transport emissions can therefore be categorised as falling into three categories: **"avoid", "shift", and "improve" (ASI) measures**. **Avoid** measures avoid the need for transport where possible. **Shift** measures facilitate or encourage a modal shift towards modes that are more efficient at moving passengers or freight. **Improve** measures improve the fuel and emissions intensity of a certain mode of transport (but do not refer to modal shift towards a more efficient mode). The Science Based Targets initiative, derived from the mobility model of the International Energy Agency suggest that both 2°C scenarios and below 2°C scenarios require not only large improvements in fuel efficiency and electrification of every mode of transport, but also a significant modal shift away from light duty passenger and freight vehicles (Science Based Targets, 2018).

In order to assess a transport infrastructure project's alignment with the goals of the Paris Agreement, we therefore consider the extent to which the transport infrastructure project contributes to the avoiding, shifting, and improving transport and is compatible with decarbonisation of the sector by 2050 at the latest.

Transport infrastructure investments that can automatically be considered **"Paris aligned"** and could be added to a positive list must therefore meet one of two conditions: 1) help avoid the need for travel, facilitate modal shift to lower emitting transport modes; and 2) facilitate decarbonisation of the energy

[3] The methodology for this assessment is based on the working paper "Aligning investments with the Paris Agreement Temperature Goal" (Germanwatch & NewClimate Institute, 2018).

used for propulsion, for example through electrification or a fuel switch from fossil fuels to hydrogen, ammonia, or other synthetic fuels.[4]

Transport infrastructure investments that can automatically be considered **"misaligned"** and therefore could be put on a negative list and rejected are those that are specifically dedicated to the transport of fossil fuels or to investments that undermine the ASI principle and a pathway to full decarbonisation by inducing increased transport-related emissions.

There is a large number of transport infrastructure projects that we consider **"conditionally aligned"** and require further specific assessment based on the specific local and national context to determine their alignment. For such projects, the climate impact is heavily dependent not only on features of the project itself, but also other socio-economic and policy frameworks of where the project is located. Depending on the project, we propose a number of approaches based on the kind of infrastructure a given project entails to assess alignment. We base the analysis on the infrastructure's risk of becoming a stranded asset, its likelihood to lock in the use of fossil fuels, or the extent to which the overall context of the project is in line with best practice with regard to the ASI and decarbonisation criteria. These approaches are further explored in the next section and applied in three case studies in Section 3.2.1.

Table 1: Paris Alignment table providing a positive-negative list used for the analysis (adapted from Germanwatch & NewClimate Institute, 2018)

PARIS ALIGNED	CONDITIONAL	MISALIGNED
Compatible with and contributes to decarbonisation of the sector assuming decarbonised electricity	Limited compatibility with a decarbonisation of the sector – investments in fossil fuel based transport that contributes to modal shift away from higher emitting modes	Not compatible, increases emissions and dependency on fossil fuels, contributes to fossil fuel lock-in
• Non-motorised transport (sidewalks and dedicated bike-lanes, bike sharing infrastructure) • Integration of transport and urban development planning • Electric rail and rolling stock (passenger and freight) • Electric public transport • Inland waterways • Electric vehicles and charging infrastructure • Shore power charging infrastructure • Transport and travel demand management measures	• Road infrastructure including tunnels and bridges • Diesel rail and rolling stock • Non-electrified public transport • Port expansion for transport of non-fossil fuel freight • Ships and ferries • Airport rehabilitation and similar	• New road, rail, waterways and port infrastructure for coal and petroleum transport • New airports and airport expansion

3.1.1 Methodology for roads

Induced transport activity on roads and therefore emissions depends on a number of factors affecting demand for transport in general and the energy and emissions factors of that demand activity. These factors include many factors that are not directly related to best practice in transport policy such as the population of potential users, employment rates, age, lifestyles, associated preferences, as well as real estate prices. Others are more closely related to both the features of the road itself, as well as the general context of transport policy in the city, region, or country in which the road is located. In assessing the Paris alignment of a potential road project, it is therefore important to consider the extent to which

[4] With the exception of electrification, transport infrastructure does not generally have a large influence over the "improve" aspect of the ASI principle: a road has limited influence over the efficiency of a car engine, nor does a train track have a large influence over the efficiency of the locomotive driven on them.

the road itself, as well as the circumstances of the area where the road would be built are in line with best practice along the ASI principle.

Avoid and shift characteristics and policies include various aspects including the availability of high-speed internet and the ability of workers to work remotely from home, which has become especially relevant in the COVID-19 pandemic. They also include urban planning approaches to promote density and the mix of residential, commercial, and industrial zones within a jurisdiction, as well as the availability of infrastructure for alternative modes of transport such as for pedestrians, cyclists, or public transportation. A wide variety of studies have found that better urban design has the potential to reduce GHG emissions by about one third (Haas *et al.*, 2010; Nahlik and Chester, 2014; Sims *et al.*, 2014). The rapid market uptake of electric bicycles expands the potential for longer distance travel in both the urban and rural contexts (Stubbe, 2020).

Demand-oriented policies can affect citizens' modal choice given various mobility options, and whether a prospective vehicle buyer opts for a more or less efficient internal combustion or electric vehicle, which influences emission levels. There is a wide variety of such policies to choose from, among others parking pricing policies, public transit pricing, congestion charges, vignette systems, road tolls, fuel economy labelling and standards, fuel taxes, vehicle registration fees, electric charging infrastructure, car sharing options. To the extent that these characteristics and policies are relevant to the particular road project in question also depends on the specific kind of road be it a small, local road that is directly connected to residences, offices, shops, and factories and many intersections; larger arterial roads that have fewer direct connections to origins and destinations for transport; or highways that are designed to maximise traffic flow, but are not directly used to access transport departure or destination points. A non-exhaustive overview of various policies and road characteristics that could be taken into consideration in measuring Paris alignment can be found in Figure 1.

Policy		Urban roads				Rural roads			
		High-way	Artery	Collec-tor	Local	High-way	Artery	Collec-tor	Local
Avoid	Transit oriented development	X	X	X	X	X	X	X	X
	High speed internet and teleworking promtion	X	X	X	X	X	X	X	X
Shift	Sidewalks and bikepaths		X	X	X		X	X	X
	Bicycle parking		X	X	X				
	Company car taxation - Bonus Malus Sys	X	X	X	X	X	X	X	X
	Vehicle taxes and fees	X	X	X	X	X	X	X	X
	Toll roads	X	X			X			
	Parking pricing	X	X	X	X		X		
	Carpooling promotion	X	X	X	X	X			
	HOV/HOT	X	X	X		X			
	BRT lane/space for a tram	X	X	X		X	X	X	
	Subsidized public transport	X	X	X	X	X	X	X	X
	Vignette system	X	X			X	X		
	Congestion charges	X	X	X		X			
Improve	Vehicle retirement programs	X	X	X	X	X	X	X	X
	Fuel efficiency standards in line with GFEI benchmark	X	X	X	X	X	X	X	X
	Speed limits of at least 90 km/hr	X	X	X	X	X	X	X	X
	Promotion of electric vehicles	X	X	X	X	X	X	X	X
	Fossil fuel vehicle ban	X	X	X	X	X	X	X	X
	Electric charging infrastructure	X	X	X	X	X	X	X	X

Figure 1: Tool to evaluate ASI best practice for various road types adapted from Germanwatch and NewClimate (2018)

3.1.2 Methodology for rail

Rail is a lower emitting mode of transport than internal combustion vehicles on a road – or air travel – and reduces emissions to the extent that it can contribute to modal shift away from higher emitting modes. Rail transport will however also require ultimate decarbonisation to meet the Paris Agreement temperature goal. Here, a decision tree based on three general main questions can facilitate decision-making processes for the funding of rail transport, either tracks or rolling stock.

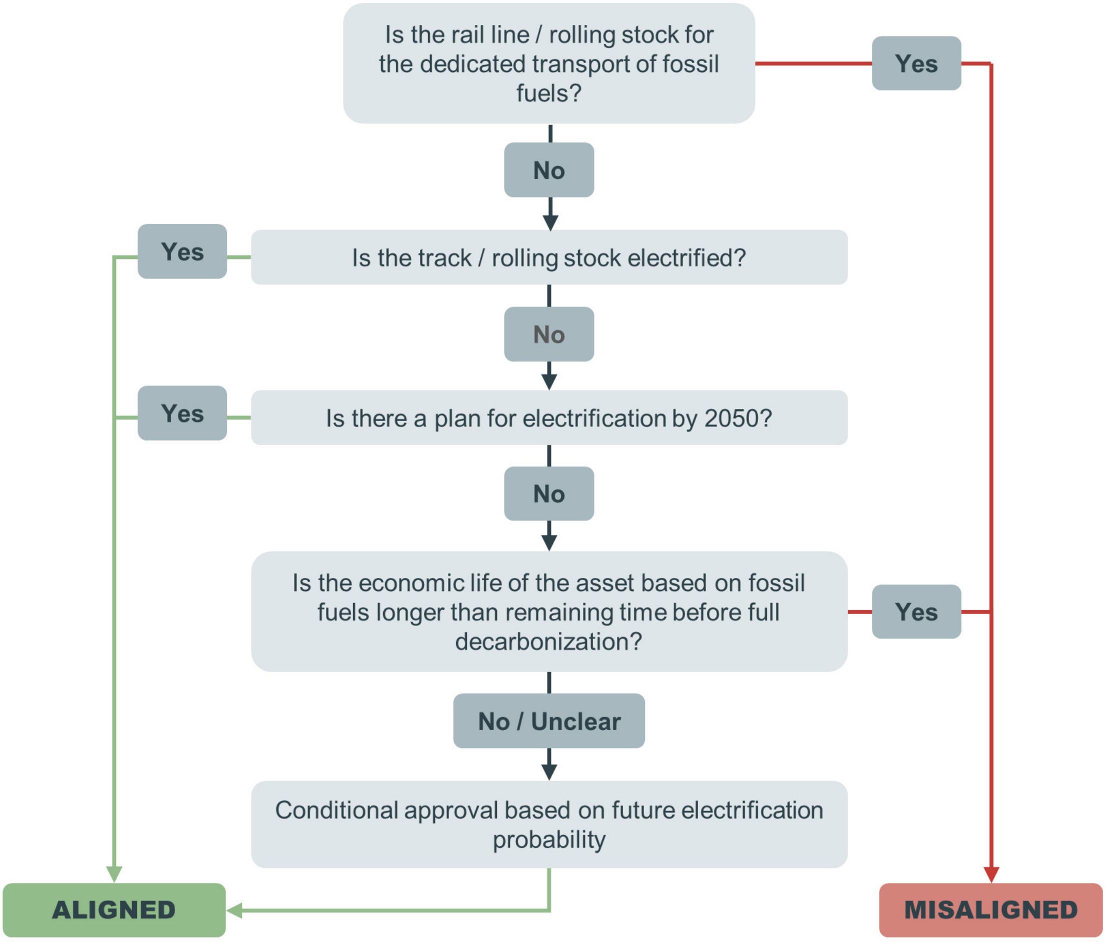


Figure 2: Decision tree for rail infrastructure[5]

The first question is whether the rail infrastructure is for the dedicated extraction or transportation of fossil fuel resources, particularly coal. If so, it cannot be considered Paris-aligned. If not, the next question in the decision tree is whether the infrastructure is electrified (we assume constant progression towards decarbonisation of electricity). If the asset is electric, it can be considered to be Paris-aligned. If not, it is pertinent to ask if there is a plan for electrification by 2050. If there is, it is Paris-aligned. If not, it is crucial to consider whether the lifetime of the asset is longer than the remaining time before the sector's decarbonisation target year. Given the general life span of a diesel locomotive of around 30 years, this would mean as of 2020. In other words diesel trains in Europe cannot be considered Paris aligned investments. For potential investments outside of Europe, diesel locomotives and non-electrified track infrastructure must also be rapidly phased out. In both cases, the electrification of rail infrastructure should be considered and made an investment priority.

[5] For more information on Paris alignment decision trees, see the 2018 Working Paper Aligning Investments with the Paris Agreement Temperature Goal: https://newclimate.org/wp-content/uploads/2018/09/MDB_WorkingPaper_2018-09.pdf

3.1.3 Methodology for ports

Shipping (especially ocean tanker and bulk carriers) is one of the lowest emission modes of freight transport per metric ton kilometre (Sims *et al.*, 2014); however, it will also require decarbonisation to reach the Paris Agreement goals. Shipping emitted approximately one billion metric tons of GHG on average from 2007 to 2012, 3% of global GHG emissions, and is currently expected to increase (Smith *et al.*, 2014; Olmer *et al.*, 2017). These increases, driven by growing trade activity, will necessitate global port expansion and can be equally influenced by incentives for efficiency set by ports (OECD/ITF, 2018b).

MDBs play an important role in port construction and expansion (Oommen, no date; Sustainable Infrastructure Foundation, 2017). These investment decisions can have a great deal of influence over shipping emissions, and have an important role to play in the implementation of climate measures in the sector (OECD/ITF, 2018b). Therefore, the policies in place around port building and expansion will have an important effect on overall shipping emissions, as well as the GHG emissions of the MDBs' lending portfolios. A first consideration should be whether the new port investment is dedicated to the export or import of fossil fuels, particularly coal, petroleum or an LNG terminal. New port infrastructure for the import or export of coal is not Paris-aligned. Given that fossil fuels, including petroleum, petroleum products and coal and coke make up a large proportion of the tonnage of commodities shipped around the world (Panama Canal Authority, 2017; Port of Long Beach, 2018; Rotterdam, 2018), with the increasing decarbonisation of economic systems, ports may be at significant risk of stranded assets in excess capacity (Samadi *et al.*, 2016). In some ports this is already noticeable: trans-shipments of coal through the port of Amsterdam fell by 7.5% in 2016, a phenomenon that the port expects to lead to a 29% decrease by 2022. The port of Amsterdam has set a target to be coal free by 2030 (Darby, 2017). Depending on increased port capacity needs for other non-fossil fuel goods, any port capacity dedicated for the import or export of fossil fuels is therefore at risk of becoming a stranded asset.

Table 2: Port characteristics to support shift and improve adapted from (Germanwatch & NewClimate Institute, 2018)

Passenger	
Shift	Accessibility by public transport and soft mobility
	Bicycle parking infrastructure
Improve	Electrical charging infrastructure for electric vehicles
Freight	
Shift	Maximised short sea shipping to feeder ports
	Maximised inland waterway connectivity
	Maximised rail connectivity to hinterland
	Rail for freight within the port area
Improve	Differentiated port fees based on GHG intensity
	Incentives for reducing speed in approach
	Emissions intensity considered in berthing allocation
	Comprehensive availability of shore power and alternative fuels such as hydrogen / ammonia
	Electric charging infrastructure for trucks
	Electric freight rail track connections to hinterland
	Maximised container utilisation / logistics operation

The Paris alignment of port expansion for the transport of other goods can be assessed in comparison to a best practice port, similar to the road sector approach. The characteristics of such a best practice port include provisions around the extent to which the operation of the port itself is electrified, offers onshore power, has policies for green allocation for berths, considers the emissions of the ships in port fee structures, has speed reduction zones around the port, and the extent to which it fosters further transport via inland waterways or rail as opposed to fossil fuel-based road freight. When not primarily built for the transport of fossil fuels, inland waterways and canals can be considered to be Paris-aligned because they: 1) enable a very carbon efficient mode of freight transport and connectivity; 2) enable significant modal shift away from ICE road freight transport; and 3) they are more readily electrified / decarbonised than intercontinental shipping (Peters, 2018).

3.2 Portfolio assessment

We assessed 516 transport-related investment decisions the EIB made between January 1st, 2015 and December 31st, 2019. The EIB's transport sector investment portfolio amounts to almost 60 billion euros, representing almost one fifth (17.5%) of the EIB's total investment portfolio in that period.

In terms of investment volume, we find that between 2015 and 2019, 50% of transport infrastructure projects were aligned with the Paris Agreement according to our approach, equalling 30 billion euros in value (179 projects). 44% were conditional and need further assessment, amounting to almost 26 billion euros (309 projects). The remaining 6% of the portfolio was misaligned and worth close to 4 billion euros (28 projects) (see Figure 1).

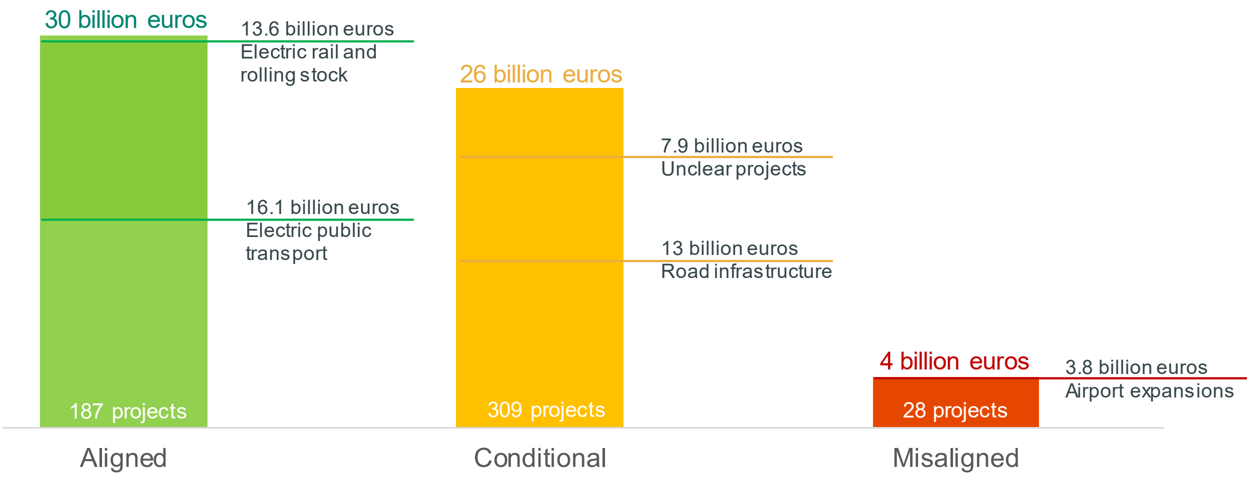


Figure 3: Investment volume of portfolio 2015-2019 classified along the positive-negative list.

"Aligned" projects slightly increased in numbers since 2015 (see Figure 2), however absolute investment volumes have continually decreased from just over 8 billion euros in 2015 to close to 6 billion euros in 2019. In relative terms, aligned projects represented over 60% of all investments in 2015 and close to 40% in 2018, only gaining ground again in 2019 at 50% (see Figure 2). The majority of "aligned" investments were in "electric rail and rolling stock" and "electric public transport" (such as metros and trams) (see Figure 3). Investments in electric rail and rolling stock decreased by 75% from 4.2 billion euros in 2015 to close to 1 billion euros in 2018, increasing again in 2019 to 2.5 billion euros. Similarly, investments in electric public transport have decreased by 30% between 2015 and 2018 from close to 4 billion euros, increasing again in 2019 to reach almost 3 billion euros.

"Conditional" projects require further assessment to determine if they are aligned or misaligned. Conditional projects make up the majority of transport-related EIB projects (309 of 516 projects or almost 60%), yet in terms of investment volumes, "conditional" projects represent slightly more than 40% of the portfolio (see Figure 2). For many EIB transport infrastructure project loans, publicly available project information often does not provide sufficient information to enable such an assessment down to the exact Euro. For example, some projects involve different components: a railway project loan may finance both electric and diesel-fuelled rolling stock. In such a case, the first project component would be "aligned" and the latter "conditional" (see Table 1), however, to the extent that the project information does not provide a breakdown of funds to the different categories, we have labelled the entire project as "conditional". Similarly, an urban infrastructure project that includes both soft mobility infrastructure (cycling lanes) and road infrastructure (an urban by-pass road), is categorised as conditional. As such, a complete evaluation of all conditional projects is not feasible with the project information provided on the EIB's website.

Between 2015 and 2019, the EIB invested almost 13 billion euros in "conditional" road infrastructure. In a recent assessment, the European Court of Auditors found that there is no clear trend towards more sustainable modes of transport in EU cities, no reduction in private car usage, and only limited take-up of the European Commission's guidance in terms of preparing 'Sustainable Urban Mobility Plans' (European Court of Auditors, 2020). Non-motorised urban infrastructure measures are typically part of larger urban infrastructure projects including public transport or road expansion and could not be clearly separated in this assessment. Projects that cannot be classified are marked "unclear". Although largest in terms of the number of projects (139 in total), "unclear" projects represent the third largest project category in investment volumes with approximately 8 billion euros) (see Figure 3).

"Misaligned" projects in the bank's portfolio generally consist of airport expansions (see Figure 4 and Figure 5), accounting for around 6% of total investment volumes – close to 4 billion euros between 2015 and 2019 (see Figure 2). More projects may be misaligned with further assessment of conditional projects, for instance certain road construction projects or port expansions.

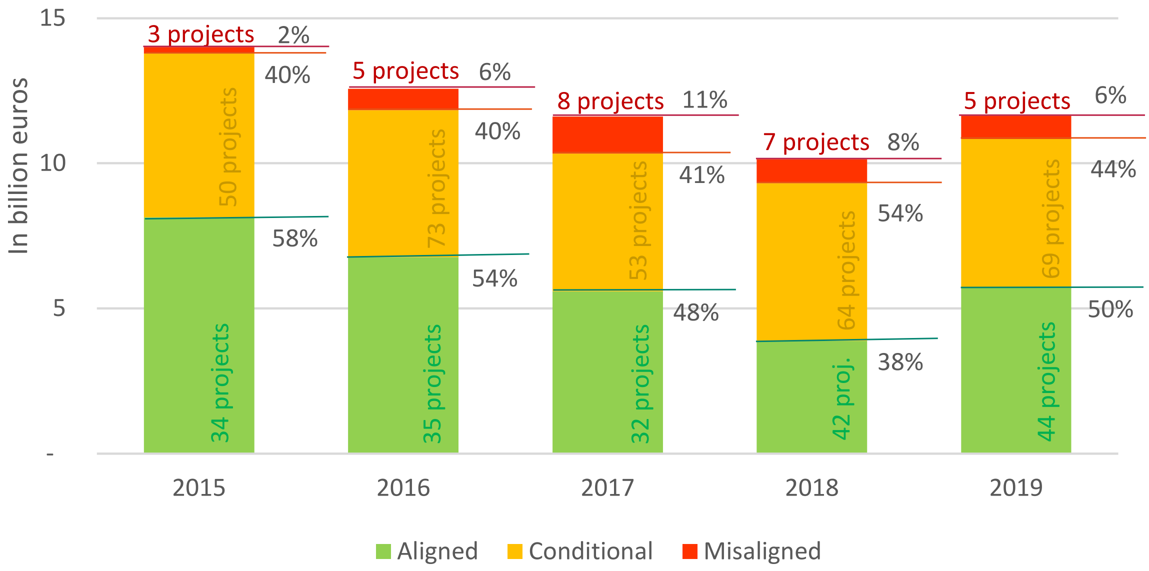
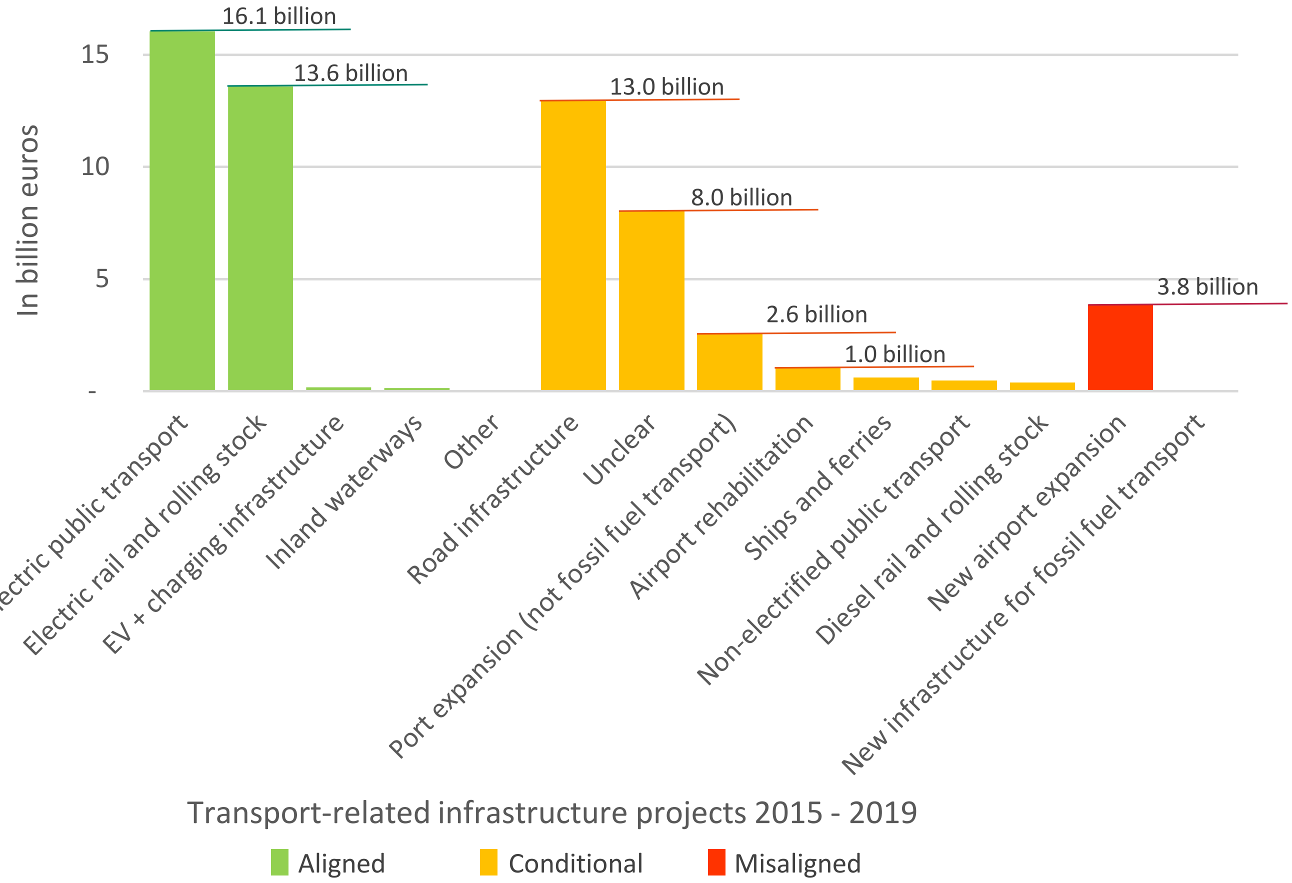


Figure **4:** Portfolio alignment based on the positive negative list for transport projects 2015-2019.

Overall, in the period between 2015 and 2019, investment flows in conditional and misaligned projects remained steady, with a slight decrease for conditional and increase for misaligned projects. Aligned investment volumes steadily decreased through 2018 but increased again in 2019, which was the driving factor behind the overall investment in transport-related projects. Indeed, transport-related projects continually decreased over the last years from 14 billion euros in 2015 down to 10 billion euros in 2018, only rising again in 2019, to almost 12 billion euros (see Figure 2).

Figure 4: Results of the positive negative list for EIB transport projects 2015-2019 in billion euros and by project category



3.2.1 Case studies of conditional projects

Over the assessed time period, the majority of investments could not be automatically categorised as aligned or misaligned and require further analysis (almost 60% in terms of project numbers) to determine whether conditional projects are aligned or misaligned, or if further assessment is needed. We assess one project for each of the three largest "conditional" project categories, namely "diesel rail and rolling stock infrastructure project", "road infrastructure including tunnels and bridges", and "port expansion for non-fossil fuel freight". We assess the selected projects based on their respective decision trees (see 2018 Working Paper).

3.2.1.1 Case study: Road infrastructure project

Project name	Country	Region	Signature date	Amount in EUR
Oosterweel connection[6]	Belgium	Europe	12/04/2019	10,000,000
Description				
The Oosterweel link (part of the TEN motorway Amsterdam-Paris) will close the northern part of the ring road around Antwerp.				

The "Oosterweel connection" project is intended to close the northern part of the ring road around Antwerp and the project documentation foresees that it will improve road traffic conditions on a section of a core road network, the TEN motorway Amsterdam-Paris linking the E17 (Ghent) and the E34/N49 (Bruges) on the left bank with the E19/A12 motorways towards the Netherlands and E34/E313 towards Liège, Germany and Luxembourg. The project is one of the major projects of the Master Plan made by the Flemish Government aimed at "reducing traffic congestion" in the Antwerp Region. As a road project, this loan is neither on the automatically positive "aligned" list, nor in the automatically negative "misaligned" list, and therefore requires further specific assessment (see Table 1).

We assess whether the project (considering potential induced emissions) is aligned with best practice criteria following the Avoid-Shift-Improve (ASI) principle embedded in a pathway to full decarbonisation (drawing for example from Germanwatch & NewClimate Institute, 2018 and Table 2). The project closes the Antwerp ring road, which falls under the urban highway roads category. Due to the number of viable alternatives to road transport in an urban context, most best practice criteria apply and would need to feed into a qualitative assessment (see Table 2). Notably, the project datasheet refers to the "provision of safe and comfortable connections for pedestrians and cyclists".

While there is a lack of information in the project sheet to fully assess the project against the best practice table, some criteria are met. For instance, the Flemish Region applies an environmental correction on the annual circulation tax depending on CO_2 emissions, fuel type and emission standards and the corporate tax (and tax-relief) related to company cars is also linked to CO_2 emissions (ACEA, 2018). Belgium also has a vignette system for freight transport (e-vignette). Furthermore, the city of Antwerp shows alignment with best practice criteria as it prioritises and subsidises public transport, prices parking in the city, has put in place a low-emission zone and limits speed throughout the metropolitan region.

[6] Project summary sheet: https://www.eib.org/en/projects/pipelines/all/20160779

Table 3: Oosterweel and Antwerp SUMP Comparison with best practice matrix

Type of Impact	Best Practice Measure	Oosterweel Connection / Antwerp SUMP and context in Flanders in line with best practice
Avoid	High speed internet and teleworking promotion	(Yes)
Avoid	Transit oriented development	Yes
Shift	Sidewalks and physically separated bike paths	Yes
Shift	Superblocks	No
Shift	Bicycle parking	Yes
Shift	Bike sharing schemes	Yes (Stad Antwerpen, 2020)
Shift	(Company) car taxation – bonus malus system	Yes (ACEA, 2018)
Shift	Tolls on the road	Unclear, freight access to the Kennedytunnel would also be a relevant consideration
Shift	Parking pricing / management	Yes
Shift	Carpooling promotion	No
Shift	HOV	No
Shift	Train / metro / tram / BRT alternatives for that route	Yes (De Lijn, 2020)
Shift	BRT lane / space for a tram	No
Shift	Subsidised public transport	Yes
Shift	Vignette system	Yes
Shift	Congestion charges	No
Improve	No, low, or ultra-low emission zone	No
Improve	Fuel efficiency standards in line with GFEI benchmarks	Yes (GFEI, 2018)
Improve	Speed limits	Yes (POLIS, 2017)
Improve	Promotion of electric vehicles	Yes (Velten *et al.*, 2019)
Improve	Fossil fuel vehicle ban	No
Avoid, Shift, and Improve	Existence of an SUMP	Yes (Antwerp, 2016)

The Oosterweel link's Environmental and Social Data Sheet expects the project to lead to (gross) emissions of 251,100 tonnes of CO_2 equivalent per year; and reduce emissions by 22,200 tonnes of CO_2 equivalent per year (EIB, 2018c). Underlying assumptions for this calculation are not given, but inevitably rely on a number of highly dynamic factors, not all of which are related to the exact design of the road. It is unclear whether certain important factors have been taken into consideration, including the fuel efficiency and electrification rate of the Benelux vehicle fleet, wider spatial planning in Flanders, freight access to the Kennedytunnel, toll levels on the Liefkenshoektunnel as well as toll levels on the Oosterweel link itself. The project is however included in Antwerp's 2020 Master Plan and sustainable urban mobility plan (SUMP) (Antwerp, 2016); a discussion of these plans' impacts on the induced emissions from the Oosterweel link is missing. Researching such information should not necessarily be the responsibility of the EIB loan officer, but rather of the project proponent. Future road project proposals could be asked to include information on modal share and how the project would avoid or minimise an increase of modal share of private vehicle use.

In sum, the project is in line with a number of characteristics of best practice but is missing important information, including an assessment of the city's SUMP and underlying assumptions for alternatives which would be necessary to conduct a robust Paris alignment evaluation.

Key recommendations:

- *Increase scrutiny of road project's integration into SUMPs, and SUMP's implementation of the ASI principle compared to best practice.*
- *Include detailed section on the GHG foot printing exercise for road projects as well as underlying assumptions and their relation to an assessment of the SUMP in the Environmental Climate Social Impact Assessment.*

3.2.1.2 Case study: Rail and rolling stock infrastructure project

Project name	Country	Region	Signature date	Amount in euros
Netz Elbe-Spree rolling stock[7]	Germany	European Union	30/10/2019	150,845,086
Description				
Under the tender there are four lots to provide rail services on 18 railway lines; 17 regional railway lines and the BER airport rail express (FEX) to the new airport.				

The Netz Elbe-Spree rolling stock project will finance the acquisition of rolling stock for around 160 trains that will run on 18 rail lines in the region of Berlin and the surrounding states of Mecklenburg-Vorpommern, Brandenburg and Sachsen-Anhalt.

The project description indicates that the trains are "likely to reduce the use of private vehicles or at least contribute to maintaining modal share of rail, thus contributing to more sustainable transport outcomes by reducing related negative transport externalities" (EIB, 2018b). This finding may have made the project eligible for financing through the EU's Cleaner Transport Facility.

However, up to ten trains are needed for non-electrified parts of the network. The electric rolling stock is clearly aligned according to our methodology. The non-electrified parts of the network can be run by "electric drive-trains that draw energy from a hydrogen fuel cell or a battery", which would be aligned (as emission neutral), or by diesel multiple units, which would be conditional. There is no information available on the split of investment volumes between electric and non-electric trains and uncertainty whether the ten non-electric trains will be hydrogen- or diesel-fuelled. Thus the total investment volumes are conditionally aligned and require further assessment following the railway infrastructure decision tree (see Figure 4).

The main question determining alignment is therefore to assess future electrification or a fuel shift away from diesel. The project sheet does not mention any future plans to electrify the non-electrified parts of the network or a concrete transition to hydrogen powered trains, although the project does mention the "potential" deployment of hydrogen-fuelled trains. Currently, 60% of Germany's railways are electrified and according to the current government's coalition agreement, 70% of railways are to be electrified by 2025 (CDU, CSU and SPD, 2018). The country context does not foresee the full electrification of the railway infrastructure.

In a next step, we consider the economic life of the asset that is expected to run on fossil fuels, in this case the up to ten diesel-powered trains. Locomotives generally have a useful life of approximately 25-30 years, with a major locomotive rebuild after about 10 years (US International Trade Commission, 2011). Assuming project implementation starting in 2020, a 30-year train lifetime and considering the required full decarbonisation of Germany's economy by 2050 at the latest (and ideally earlier), as per

[7] Project summary sheet: https://www.eib.org/en/projects/loans/all/20180074

European and German climate targets, the diesel-powered rolling stock fits just within the timeframe towards full decarbonisation. Project delays in acquisition, however, will quickly become a barrier to a decarbonised rail network. Although a large part of this project is likely aligned, continued financing for diesel locomotives beyond the very short-term risks locking-in fossil fuel use and could lead to a stranded asset. For the project to be fully Paris-aligned, all rolling stock on the Netz Elbe-Spree should be electrified or it should guarantee the (future) use of zero-emission rolling stock by either electrifying the non-electrified part of the network or ensuring a fuel switch to zero emission fuel, such as hydrogen.

Key recommendations:

- *Increase transparency by providing budget breakdown for electrified and diesel project components in project documents including Environmental Climate Social Impact Assessment.*
- *End financing of diesel rolling stock by 2021 to avoid stranded assets and carbon lock-in.*
- *Engage with project proponents to scale up financing options and availability for rail electrification or battery / hydrogen-based alternatives for tracks with lower traffic demand.*

3.2.1.3 Case study: Port infrastructure

Project name	Country	Region	Signature date	Amount in EUR
Piraeus port expansion[8]	Greece	European Union	08/11/2019	100,000,000
Description				
The main project components include the expansion of the car terminal, the improvement of infrastructure of the ship repair zone, the development of a new port logistics centre, the construction of a new cruise passenger handling facility and the acquisition of new container terminal equipment. It also includes the renovation and upgrade of miscellaneous other port and electromechanical (E/M) equipment and installations to achieve the required service levels for the port operations.				

The Piraeus port expansion project consists of expanding the passenger and freight terminals including a car terminal. This project falls under “Port expansion for transport of non-fossil fuel freight” in the conditional category (see Table 1).

For an assessment of the Paris alignment of a port project, we recommend a comparison with best practices. In the case of the Piraeus port expansion project however, an assessment of the project is not possible because of a lack of publicly available data both in the general project description, as well as in the Environmental and Social Data Sheet[9].

Notably a number of aspects are still pending including a decision from the Environment Ministry on the port master plan, decisions on the car terminal expansion and underground connection, and the decision and updated environmental terms for the Environmental Impact Assessment. The Environmental and Social Data Sheet further omits any carbon foot printing exercise but includes a footnote that the project does not exceed the threshold requirements of “above 100,000 tons CO_2 equivalent per year absolute (gross) or 20,000 tons CO_2 equivalent per year relative (net) – both increases and savings” for when a foot printing exercise would be required. There is no further explanation of the assertion on what basis it is made; however, the larger scope of the port expansion is very unlikely to be less than 100,000 tons

[8] Project summary sheet: https://www.eib.org/en/projects/pipelines/all/20170773
[9] Environmental and social data sheet: https://www.eib.org/attachments/registers/94528907.pdf

of CO_2 equivalent per year absolute if the induced emissions of all increased ship traffic enabled by the port expansion (including all emissions to and from other ports) are taken into consideration. The EIB however only includes GHG emissions from manoeuvring and hoteling in its Scope 3 emissions (EIB, 2018a), a very limited interpretation of induced Scope 3 emissions. The recent EU regulation for MRV of shipping emissions may help improve assumptions used to come up with estimates. Even with better MRV data for ships, assumptions required to calculate Scope 3 emissions would rely on a number of assumptions and external variables; thus a best practice checklist for measures that a port can take to reduce Scope 3 emissions would likely provide the best indication of the Paris alignment of the port expansion project.

Key recommendations:

- *Increase scrutiny of new port and port expansion project implementation of the ASI principle compared to a best practice list in order to gauge Paris alignment.*
- *Include detailed section on the GHG foot printing exercise for port projects as well as underlying assumptions in the Environmental Climate Social Impact Assessment.*
- *Expand consideration of Scope 3 absolute emissions assumptions from only manoeuvring and hoteling to the whole induced emissions of increased traffic at the port.*

4 Conclusions and recommendations

We find that the EIB's transport-related portfolio fulfils the Bank's climate finance target of 50%, but is not yet fully "tailored to developing appropriate infrastructure for zero-emissions mobility", as suggested by the EU Green Deal and EU Parliament.

Based on project descriptions, we have not found any EIB financed transport infrastructure projects solely dedicated to the transport of coal or petroleum. This does not mean that the EIB's transport lending portfolio is effectively compatible with the Paris Agreement – notably, expanded LNG infrastructure is consistent with the EIB's energy lending policy while investments in airport infrastructure have increased, particularly in 2017, leading to higher travel capacities, and thus to higher emissions.

We find that there is a lack of information provided in the project descriptions and project Environmental and Social Data Sheets to allow for an assessment of many projects' Paris alignment. Almost 8 billion euros of the EIB's portfolio is "conditional" and would require further assessment in the project's particular context either because projects include different infrastructure types with unclear scope such as both motorised and non-motorised infrastructure, or the lending has been approved before project details have been clarified.

We propose three sets of recommendations: 1) develop a strategic project pipeline for key investment priorities; 2) establish a clear negative list of ineligible transport funding project types; and 3) enhance information gathering, transparency and revise the project evaluation processes especially for conditional projects. Each is further detailed below.

4.1 Develop a strategic project pipeline for key investment priorities

Multilateral development banks (MDBs) play a key role in mobilising finance for infrastructure in general and therefore have an important role in helping countries avoid fossil fuel lock-in and stranded assets. However, rejecting projects that are not Paris aligned is not enough. It is also crucial to **massively and strategically scale up mobilisation of finance to support the type of infrastructure required to decarbonise all sectors of a country, and thus close existing investment gaps**. Such an ambitious infrastructure undertaking could represent an important component of the EIB's efforts to stimulate the European economy and "build back better".

From a whole-economy perspective, massive shifts away from fossil fuels towards electricity, green hydrogen, ammonia, and other synthetic fuels in transport demand sectors are required. Hydrogen strategies and projects are an important feature in the economic stimulus efforts of a number of EU member states as well as the European Commission (BMWi, 2020; Milne, 2020; Simon, 2020). Consumption patterns will have a massive impact on how costly the transition will be, and the more the demand side is optimised, the more feasible it is to reach the overall goal (Germanwatch & NewClimate Institute, 2018).

For the EU and elsewhere, it is crucial to build the required infrastructure to fully decarbonise the transport sector. It is the sector with the fastest growing emissions, due to globally continuing growth in passenger and freight activity, which could "outweigh all mitigation measures unless transport emissions can be strongly decoupled from GDP growth" (Sims *et al.*, 2014). In Europe, the transport sector has not seen the same gradual decline in emissions as other sectors and instead continues to grow (EEA, 2019a, 2020).

In this context, we propose five investment priority areas the EIB should actively seek to build a project pipeline following the avoid-shift-improve principle: **avoid transport needs** (changing behaviours, improving logistics, modifying urban planning); **shift to higher capacity modes of transport** (as in replacing private car infrastructure with public transport and making public transport more attractive); and aim to **improve the mode of transport** (such as the uptake of electric vehicles, energy efficiency measures or the support of shared mobility infrastructure). Progress towards these investment priorities should be regularly revisited, based on scientific, technological and societal advances.

Enabling modal shift with transport-oriented development in urban contexts.

Investments avoiding the need for transport, leading to higher efficiencies in transport (such as passengers/vehicles), or shifting transport away from the use of individual passenger actively support the Paris Agreement and play a central role in an ambitious transport decarbonisation pathway. Dense urban environments should be front-running in the transition as they offer the most viable alternatives to individual vehicles such as transit-oriented planning, soft, collective or shared and electric transport solutions, which are the most efficient forms of mobility. To accommodate walking, cycling, public transport and new soft mobility services, feasible and cost-effective for commuters, it is crucial to build and adapt urban infrastructure in an integrated and safe manner, for example by adapting existing roads to soft transportation.

Investment roadmap to completely decarbonise / electrify European rail

Decarbonising the transport sector requires expanding, improving and connecting high-speed rail networks. High-speed rail networks are essential for medium- to long-distance national and European travel as more and better high-speed railway systems provide a viable alternative to air and road transport, thus shifting passenger and freight transport onto the tracks. EIB financing for electric rail declined by 75% from 2015 to 2018, although investments increased slightly in 2019. Looking forward, investments in electric railways need massive upscaling.

The Trans-European core network (TEN-T) defines a number of rail infrastructure priorities for a comprehensive network by 2050. While many of the TEN-T road projects should be revisited with regard to their Paris alignment and potential road-induced emissions, it is important to complete and scale up TEN-T rail network. Beyond the TEN-T, national electrification plans should be developed and financed, similar to the European Cohesion Fund programme supporting the electrification of the Latvian railway network (Mykola Zasiadko, 2019).

Building the required infrastructure to support electric mobility

The transition to a zero-emission transport sector requires a reliable, comprehensive, zero-emission charging infrastructure for electric vehicles to help overcome charging station and convenience barriers and eliminate range anxiety. In order to make this a reality, large investments to build electric charging points are required for future charging demand, which is expected to grow 15 times above current levels over the next 10 years, costing close to 2 billion euros per year until 2025, according to Transport & Environment (2020).

Individual passenger transport is resource and space consuming and should not be prioritised over soft and rail transport. Thus, charging infrastructure should be focused around charging solutions for a growing fleet of shared cars, electric taxis and ride hailing services – mobility as a service. Delivery electric trucks and vans also need access to a comprehensive charging infrastructure, that cannot as easily be implemented at homes and workplaces; consequently such infrastructure requires larger investments, including grid upgrades, which the EU and national funds play a key role in helping with. It is important for the EIB to scale up and replicate projects such as Enel X Mobility (which plans to install 14 000 charging stations in Italy by 2022), Allego or GreenWay (EIB, 2019a).

Efficient, forward-looking freight infrastructure

Freight transport requires larger-scale infrastructure which takes time to build and has a long lifetime, making such investments prone to carbon lock-in. Therefore, supporting climate-neutral freight transport infrastructure from the beginning is essential, especially given the urgency for climate action. According to past and current trends, freight transport is expected to grow annually by 1.5 % (in tonne km) until 2030 and by 0.8 % thereafter (European Commission, 2016); it is therefore important to act as fast as possible. To avoid carbon lock-in, such projects should be designed in line with the ASI principle, and compatible with an overall sectoral decarbonisation by 2050 at the latest.

Efficient and inter-modal transport increase load factors and reduce energy demand, which is needed to reach net-zero emissions. In addition to electrification, this requires safe and reliable information sharing, containerisation standards (including smaller sub-containers and boxes) to allow an easy shift from maritime transport to rail and road transport, accessible and easy cross border transport and synchro modal transport in logistics chains and freight logistics consolidation centres at metropolitan areas' borders (ACARE et al. 2017; IEA, 2017; Transport & Environment, 2017).

Shipping – foster the research, development, and implementation of decarbonisation solutions

The European Green Deal sets an inland freight transport modal split target of 75% rail and inland waterways. (European Commission, 2019b). Shipping including inland waterways is the most efficient mode of freight transport to move by freight ton (Sims *et al.*, 2014); it is however a mode that is currently not yet emission free. Freight on inland waterways must also eventually be electrified or switch to zero-emission fuels. The full electrification of inland waterway transport requires a switch to electric vessels, electric charging infrastructures and equipment for power supply (Inland Navigation Europe, 2018; CCNR, 2019; De Schepper, 2019; European Commission, 2019a).

Current electric mobility does not permit long-distance transport, as batteries become too heavy relative to the distance that can be travelled. Thus, for maritime (and aviation) transport, with no to limited possibility to refuel, alternative solutions may be needed, such as renewable synthetic fuels[10].

Port infrastructure needs to enable these shifts. It is crucial that port infrastructure investments support this transition by supporting the greening of port infrastructure (such as shore power, green port fees and/or similar schemes such as green berth allocation policies, green procurement and carbon pricing schemes). Investments supporting the transition to net-zero emission shipping should include projects providing ports with renewable synthetic refuelling infrastructure such as hydrogen or ammonia.

[10] Synthetic hydrocarbons (power-to-liquids) are not as energy efficient nor commercial at scale as electric mobility, thus they should only be considered for transport modes that cannot be electrified.

4.2 Establish a clear negative list of ineligible transport funding project types

Although such projects are not in the EIB's recent project portfolio, an important step would be to clearly label road, rail, and port infrastructure for the exclusive transport of fossil fuels as "misaligned" projects and so bring clarity to what the EIB negative list entails. As such projects actively undermine the Paris Agreement and are not in line with the EIB's role as Europe's "climate bank", they should not be considered for finance.

Airport expansion however still makes up a significant portion of the EIB's transport lending and should also be placed on a negative list. GHG emissions from European aviation have more than doubled since 1990, and are 29% higher in 2017 than in 2000 – with an average growth rate of 3% per year (EEA, 2020). Although there are prototypes for electric planes and a synthetic fuel supply chain is starting to be developed, there is currently no short-term prospect for the decarbonisation of aviation. The first step is therefore to limit its growth, especially in areas already well served with alternative transport infrastructure. Recent EIB backing for new airports and airport expansions in Crete, Helsinki, Frankfurt, and Amsterdam Schiphol are incompatible with the EU's climate targets; thus ending future support for airport expansion is an important part of the EIB's transformation into Europe's climate bank

4.3 Enhance transparency and revise project evaluation processes especially for conditional projects

One major challenge in assessing the Paris alignment of conditional projects is the lack of information provided in the project descriptions and project Environmental and Social Data Sheets. In many cases, it should be a priority to revise the project application process for project proponents to make sure that such information is considered and provided. By increasing the focus on Paris alignment already during the project proposal phase, the alignment of projects is not only easier to assess but would automatically strengthen alignment of the project pipeline looking forward. Primarily, a breakdown of spending per project component is needed. For a larger rail project, this would mean separating electric from diesel rolling stock. For road infrastructure, this would entail separating new road infrastructure (with or without provisions for soft modes of transport) from the redesign and refurbishment of existing road infrastructure to incorporate soft mobility[11], or public transport (such as the construction of a cycling lane on or by a road).

Once all the documentation has been gathered, we recommend enhancing the transparency of the project descriptions and portfolio in publicly available documentation, notably with regard to the carbon foot printing exercises including key assumptions and variables considered. This could for example be done in a standardised, expanded and specifically renamed Environmental Climate Social Impact Assessment (ECSIA), with key criteria to define assumptions of induced Scope 3 emissions.

[11] Soft mobility is generally walking and cycling, also known as non-motorised transport, however, soft mobility may also include e-bikes and e-scooters.

Annex

We define transport related project types and the role they play in decarbonising the transport sector based on the NewClimate, Germanwatch 2018 Working Paper. Based on our assessment of EIB's transport-related project portfolio, we add the project types "non-electrified public transport", "ships and ferries", "airport rehabilitations and similar works" to the positive-negative categorisation. As in the working paper, in each case we assume progressively decarbonised electricity generation.

	Project type	Project description and alignment narrative
Aligned	Non-motorised transport infrastructure	In order to peak energy use and emissions, a large-scale shift must occur to more efficient modes of transport, including non-motorised modes such as walking and cycling where applicable. To that end, soft mobility[12] infrastructure is needed such as sidewalks, dedicated bike-lanes or bike/e-scooter sharing infrastructure (Sims *et al.*, 2014). Furthermore, dense urban areas with developed sidewalks and bicycle paths can reduce modal share of ICE road vehicles and reduce congestion on public transport. Bike sharing schemes have recently taken off around the world.
	Transport and travel demand management measures	Better transport management can reduce the overall transport demand of motor vehicles in urban areas. Avoid and reduce policies and measures are important to reach more stringent decarbonisation goals and are more viable in urban areas (Newman and Kenworthy, 2011). Most emission mitigation scenarios foresee an important role for demand management especially given the extent of potential to co-benefits (Gota, Huizenga and Peet, 2016). Examples include road use prioritisation, rail use prioritisation, variable road tolls, congestion charges, parking management, reduced parking and demand pricing, information campaigns, ticket prices.
	Integration of transport and urban development planning	Although highly context-specific, urban design has significant mitigation potential to reduce transport related emissions (Haas *et al.*, 2010; Nahlik and Chester, 2014; Sims *et al.*, 2014). More compact urban development, in which neighbourhoods provide a full range of services accessible on foot, can reduce the need for motor vehicle transport (Handy et al. 2002; Ewing 2011; Cervero and Murakami 2010). Further, Transit Oriented Development (TOD) refers to mixed, dense urban development centred around, or located near a public transport hubs. A holistic approach to transport system and urban planning, such as sustainable urban mobility plans (SUMPs) can reduce car dependence and use, reduce air pollution, and improve liveability. One way to encourage such a shift is by promoting urban densification or infill development through urban growth boundaries around cities. Freight urban consolidation centres supported by (zero-emission) freight transport strategies are needed to supply urban areas with products while reducing the number of freight vehicles in the city (for example as part of a city's SUMP). Such freight logistics centres at

[12] Soft mobility originally referred to forms of non-motorised transport such as walking and cycling, but increasingly includes e-bikes.

		borders of urban areas increase resource efficiency, incentivise modal shift and reduce transport and thus congestion in densely populated areas (Transport & Environment, 2017).
	Electric rail and rolling stock	With the progressive decarbonisation of electricity, rail electrification is an important way to reduce transport emissions, especially with regard to rail's potential as an alternative to diesel or petrol fuelled road and air transport (Science Based Targets, 2018; SLoCaT, 2018).
	Electric public transport	Public transport vehicles have much higher occupancy rates than LDVs and thus more passengers can be pooled in one vehicle. Investments in light rail, busses and trams is necessary to offer high quality networks and a proper alternative to passenger cars while reducing emission and congestions issues (Agora Verkehrswende, 2017; SLoCaT, 2018).
	Shore power charging infrastructure	Shipping (especially ocean tanker and bulk carriers) is one of the lowest emission modes of freight transport per metric ton kilometre (Sims et al. 2014); it will however also require decarbonisation to reach the Paris Agreement goals. The OECD/ITF found that it is technologically feasible to almost entirely decarbonise the transport sector by 2035 (OECD/ITF, 2018a). Ports can have a great deal of influence over shipping emissions and have an important role to play in the implementation of climate measures in the sector (OECD/ITF, 2018a). Shore power or "cold ironing" is the provision of shoreside electrical power to a ship at berth and represents important step to facilitate the electrification of shipping where feasible, for example for short sea shipping, ferries, and for inland waterways. Any port expansion or should encompass the construction of shore power facilities as this is a low hanging fruit in decarbonising the shipping sector (OECD/ITF, 2018a).
	Inland waterways infrastructure	Shipping, including inland waterways is the most efficient transport mode by freight ton (Sims *et al.*, 2014). Consequently, investments in inland waterways are generally Paris-aligned. It is however a mode that is currently not yet emission free. Freight on inland waterways must also eventually be electrified or switch to zero-emission fuels.
	Electric vehicles and charging infrastructure	Internal combustion engines fuelled by gasoline or diesel are the primary emission sources in the transport sector. Electric vehicles (EV) have risen as an alternative for two- and three- wheelers, public transport vehicles, light duty vehicles (LDVs) and heavy-duty vehicles (HDVs). As it stands, EVs have seen the more successful uptake and it is important to support this uptake through electric vehicle charging infrastructure, such as in urban areas, parking spaces or along artery roads (SLoCaT, 2018). E-bikes and similar electrified "last mile" solutions are also included, as this type of infrastructure is more in line with walking and cycling infrastructure than electric vehicle infrastructure and they may also expand the potential distance of trips made by bicycle, extending the distance over which the potential for modal shift from road to bicycle or public transport and last mile solutions (Fyhri and Fearnley, 2015).

Conditional	Non-electrified public transport	Public transport vehicles have much higher occupancy rates than LDVs and thus more passengers can be pooled in one vehicle. Investment in commuter rail and busses is important in order to an alternative to passenger cars, reduce emission and congestion (Agora Verkehrswende, 2017; SLoCaT, 2018). Depending on the project and country context, non-electrified public transport may be aligned or not. In general, even if not fully electrified, public transport can be assumed to be aligned in the short term, to the extent that it allows a shift from individual internal combustion vehicles towards shared mobility, but it will also quickly need to be electrified. Public transport will however also require ultimate decarbonisation to meet the Paris Agreement goals. Electric busses for public transport are however a mature technology rapidly being deployed in developed and developing countries, which means that even if they may shift transport away from private internal combustion travel, diesel busses represent an unnecessary fossil fuel lock in.
	Diesel rail and rolling stock	Rail is a lower emitting mode of transport than vehicles using internal combustion engines on a road - or air travel - and reduces emissions to the extent that it contributes to modal shift away from higher emitting modes (IEA, 2019b). Depending on the project and country context, non-electrified rail may be aligned or not in the short term. Shifting to rail transport has the potential to lead to higher passenger occupancy rates (passenger), load factors (freight) and vehicle utilization rates (both). In general, rail freight produces much lower emissions and energy consumption per tonne-km than road freight. High-speed railways networks are essential for medium- to long-distance national and European travel as they are a viable alternative to road and/or air travel. Rail transport will however also require ultimate decarbonisation to meet the Paris Agreement goals, either in the form of full electrification or through a switch to zero-emission fuels, such as synthetic hydrogen produced by renewable energy sources.
	Ships and ferries	For the maritime sector, synthetic fuels generated from renewable energy will need to play an important role, as direct electrification is limited and biofuels are often in competition with food production. Ships and ferries should be as efficient as possible, and it should be possible to switch to zero-emission fuels when available. Shippers should assess the carbon footprint of their supply chain and target transport options with zero-carbon ships (OECD/ITF, 2018a).
	Port expansion for transport of non-fossil fuel freight	Port infrastructure does not necessarily directly lead to emissions, but due to induced emissions from ships and ferries, such infrastructure projects are conditional. Ports should incentivise inter-modal, efficient and low-emission transport. Exemplary measures are shore power infrastructure, electric charging systems and bunkering facilities for alternative fuels (OECD/ITF, 2018a). Depending on the port characteristics and its context, a port expansion may be aligned or not.

Conditional	Road infrastructure	Road infrastructure (including tunnels and bridges) may have relatively low direct emissions related to the construction phase, but "induce" emissions from internal combustion engines, which is typically the largest source of emissions in such an investment, made possible by the road (Williams-Derry, 2007; Germanwatch & NewClimate Institute, 2018). In 2016, overland freight transport was responsible for over 70% of total freight CO_2 emissions (Climate Action Tracker, 2018). The extent to which an infrastructure project facilitates such emissions depends on the project characteristics and the country context. Depending on the assessment, road infrastructure project may be aligned if the given project leads to emission reduction and is compatible with the full decarbonisation of the transport sector, or it may be misaligned if the project facilitates induced emission form road transport. Currently, there is a trend of constant and continued growth in passenger kilometres and related emissions (Transport & Environment, 2015, 2019; European Environment Agency, 2019; IEA, 2019a). In order to peak energy use and emissions before 2025, a maximum number of passenger kilometres must be avoided and a large-scale shift must occur to more efficient modes of transport. The remaining transport activities should be fully electrified.
	Airport rehabilitation and similar works	Measures to improve security and greening of infrastructure (such as electrification of on-site vehicles, support for synthetic fuels) can be considered Paris-aligned under certain circumstances (such as no capacity expansion). For the aviation sector, synthetic fuels generated by low carbon sources will need to play an important role (Transport & Environment, 2018), as electrification is limited and biofuels have major limitations (such as emissions from land use, deforestation) (Eklof, 2011; Anex and Lifset, 2014; Lazarevic and Martin, 2016). Synthetic fuels, such as hydrogen, can technically be formed through electrolysis where electricity is used to separate water into hydrogen and oxygen. Such process is still inefficient (particularly compared to electric vehicles), requires a lot of electricity generation, most often from fossil fuel electricity, while such fuels are not available at scale (Transport & Environment, 2018; U.S. Department of Energy, 2018). Investments in greening airport on-site fleet can be acceptable and investments in alternative fuels and related infrastructure (such as on-site supply of synthetic fuels) are encouraged.
Misaligned	New airport expansion	Emissions from aviation are drastically increasing, have a high greenhouse gas effect, and no viable zero-carbon alternative exists yet. It is thus most likely that air travel related infrastructure projects lead to emission-intensive travels. Consequently, such measures are misaligned (Germanwatch & NewClimate Institute, 2018). In the longer term, alternative fuels may play a larger role in climate efforts for international shipping and aviation. The authors acknowledge that alternatives to air travel are limited. This highlights the need for further investigation of fuel alternatives.

	New road, rail, waterway and port infrastructure for fossil fuel	Reliance on fossil fuels needs to drastically decrease, thus any infrastructure projects building fossil fuel capacities poses a critical threat to the full decarbonisation of the transport sector and the Paris Agreement. Such investments foster fossil fuel lock-in and are at high risk of becoming stranded assets.

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