Improving the Landscape for Sustainable Infrastructure Financing

OECD

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Foreword

This report was developed in the context of OECD's contributions to the G20 Indonesian Presidency in 2022, to inform the G20 Infrastructure Working Group's work on sustainable and subnational infrastructure.

This OECD report examines elements that can advance considerations for the environment and data for sustainable infrastructure investment, and discusses what policy actions governments can take to ensure that investors are better able to make investment decisions related to infrastructure assets. The first chapter provides a high-level summary of the G20-OECD Policy Toolkit on Mobilising Funding and Financing for Inclusive and Quality Infrastructure Investment in Regions and Cities that was endorsed by G20 Finance Ministers and Central Bank Governors in October 2022. The second chapter discusses the data needs for infrastructure investment more generally, the ESG approaches being currently proposed, and how this could impact wider ESG data availability. The third chapter brings together studies on legal and regulatory barriers on quality infrastructure investment (QII), to bring a better understanding to what these barriers are. The fourth chapter uses the lens of infrastructure governance to consider how ministries of finance can help align other infrastructure actors promote a pipeline of quality infrastructure projects, ensure that project objectives and reporting correspond with investor expectations, and reduce barriers to sustainable infrastructure investment.

This report is the outcome of cross-directorate efforts of the OECD, with inputs from the OECD Directorate for Financial and Enterprise Affairs, Public Governance Directorate and Centre for Entrepreneurship, SMEs, Regions and Cities. It has benefited from contributions by national government delegates, particularly members of the G20 Infrastructure Working Group, and delegates to the OECD's Task Force on Long-term Investment Financing (Committee on Financial Markets), Public Governance Committee and Regional Development Policy Committee. The views expressed here do not necessarily correspond to those of the national authorities concerned.

The editorial team for this publication was led by Mamiko Yokoi-Arai. Chapter 1 was prepared by Courtenay Wheeler, Yingyin Wu, Isabelle Chatry and Dorothée Allain-Dupré. Chapter 2 by Mamiko Yokoi-Arai with assistance from Amelie Schmidt-Ott, Chapter 3 by Edwin Lau, Ana Maria Ruiz Rivadeneira, Tenzin Dekyi and Ludovica Mager; and Chapter 4 by Mamiko Yokoi-Arai and Maria Teresa Roca de Togores. Editorial and communication support was provided by Pamela Duffin and Liv Gudmundson.

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Infrastructure assets are exposed to long-term and complex risks creating challenges to investors in assessing and managing risks over time. While some institutional investors with a long-term horizon may consider such assets attractive for asset-liability management purposes, this has not translated to actual investment in practice, creating a wide investment gap for infrastructure assets. As investors increase demand for sustainable investment opportunities that combine acceptable returns with the achievement of environmental, social and governance benefits, there is a need to create an environment in which investors are better able to make decisions on the basis of relevant information and data, and for governments to strengthen the mechanisms to prioritise and prepare bankable infrastructure projects that meet the highest quality standards.

Long-term strategies of countries, such as nationally determined contributions (NDCs), the National Adaptation Plans (NAP) and the National Biodiversity Strategies and Action Plans (NBSAPs), are pivotal in mitigating climate change impacts and to improve environmental sustainability. As a consequence of long-term strategies, a number of sustainable finance and infrastructure initiatives have been developed in recent years reflecting the increasing interest and need for financing to take into account ESG factors more carefully and closely.

The G20 Principles for Quality Infrastructure Investment (QII) lay out a clear vision for the need to maximise the positive impact of infrastructure to achieve sustainable growth and development. This recognises both the immediate economic impact of scaling up infrastructure investment, as well as its importance in setting the direction for a sustainable green transition.

However, beyond ensuring that infrastructure investment supports the economic recovery from the crisis in a timely way, governments must also channel resources towards projects that minimise environmental and climate impact, are resilient to future shocks, and contribute to sustainable long-term growth. Using infrastructure to reach climate objectives will require far reaching transitions within and across different sectors (i.e. energy and transport). Disregarding infrastructure's strategic role and long-term impact is likely to lead to investments that run the risk of early obsolescence or locking-in of unsustainable technologies and practices.

Examples across G20 countries suggest that infrastructure investments will do most of the heavy lifting in terms of social and economic recovery in forthcoming years. Under the current economic context, governments therefore face the double challenge of attracting private investment and ensuring that these resources are channelled towards environmentally sustainable and climate resilient infrastructure assets. Scaling-up sustainable infrastructure financing will depend to a large extent on the availability of governments to set a long-term strategic vision that is well aligned with environmental and climate objectives, and has the capacity to materialise this vision in project pipelines that provide prospective investors with a clear sense of the national and subnational government's needs and commitment towards the achievement of climate and environmental objectives.

It is clear that the lack of consistent reporting of infrastructure investments and projects is a fundamental weakness in the ecosystem of sustainable infrastructure financing and planning. Reporting requirements

are complex given the intersection with corporate regimes and corporate governance, but scoping out the current reporting of infrastructure financing and reporting would be a useful first step in understanding where necessary policy action may be. What amounts to sustainable and quality infrastructure, and ESG factors that may be applicable is very much in the nascent stages of development. More discussion of what governments intend for sustainable and quality infrastructure, and how this can be applied in terms of concessions and multilateral development bank financing could provide additional clarity to investors.

Institutional frameworks to finance and develop infrastructure projects remains a key consideration, and strengthened government mechanisms can contribute to ensuring that fiscal planning and project selection is based on the strategies of countries, and that sustainability and ESG factors are taken into account.

In G20 countries, 60% of public investment is undertaken by subnational governments. This means that supporting investment by subnational governments is essential for the development of regions and cities. Supporting inclusive and quality infrastructure investment by subnational governments requires creating an enabling environment with appropriate fiscal and regulatory frameworks, developing sufficient institutional capacity, putting-in-place mechanisms for co-ordination and cooperation, and developing financial markets. It also requires mobilising diverse funding sources (e.g., grants, taxes, user charges, land value capture, etc.), financing instruments (e.g., bonds, loans, etc.) and investment approaches (e.g., public private partnerships, etc.) appropriate for the local context.

1 Mobilising funding and financing for inclusive and quality infrastructure investment in regions and cities

Courtenay Wheeler, Yingyin Wu, Isabelle Chatry and Dorothée Allain-Dupré

This chapter provides a high-level summary of the policy opportunities and tools that can help to mobilise funding and financing for infrastructure investment in regions and cities. It details the key elements of the enabling environment for subnational investment and describes potential funding sources, financing instruments and investment approaches. The chapter was prepared as a summary to the G20-OECD Policy Toolkit on Mobilising Funding and Financing for Inclusive and Quality Infrastructure Investment in Regions and Cities.

1.1. Introduction

To support the theme of the G20 in 2022 to "recover together, recover stronger", the Indonesian G20 Presidency drew attention to the importance of inclusive infrastructure investment in regions and cities.[1] On 17-18 February 2021, in their second meeting under the Indonesian G20 Presidency, Finance Ministers and Central Bank Governors agreed to "develop policies to mobilise inclusive infrastructure investment to enhance social inclusion and address subnational disparities in regions and cities" (G20, 2022[1]). To support this objective, the Organisation for Economic Cooperation and Development (OECD), in cooperation with the Asian Development bank (ADB), were requested to support the G20's Infrastructure Working Group (IWG) in developing a *policy toolkit to mobilise financing mechanisms to enhance infrastructure investment in regions and cities* (Policy Toolkit) (G20, 2022[1]).

A draft of the Policy Toolkit was presented to IWG members in June 2022 and benefited from comments from G20 member countries. To inform the development of the Policy Toolkit, the OECD prepared an accompanying report on inclusive infrastructure investment for the IWG titled *Addressing territorial disparities in future infrastructure needs in the wake of the COVID-19 crisis* (OECD, 2022[2]). This Policy Toolkit reinforces work under the Italian G20 Presidency in 2021, which included the G20 High-Level Conference on Local Infrastructure Investment (Italian Ministry of Finance, 2021[3]) and a report on innovative funding and financing in regions and cities (OECD, 2021[4]).

This Policy Toolkit aims to highlight 'policy opportunities' that can help to mobilise funding and financing for inclusive and quality infrastructure investment by subnational (state, regional, local) governments across developing, emerging and developed countries. A focus is placed on subnational governments, as these governments often have an important role to provide basic public infrastructure essential for inclusion, resilience and sustainability in regions and cities. They can also have a key role to support economic development (UNCDF, 2022[5]). A focus is also placed on quality infrastructure investment to align the Policy Toolkit with the *G20 Quality Infrastructure Investment Principles* (Japan Ministry of Finance, 2019[6]), as improving both the quantity and quality of infrastructure investment also supports inclusivity, resilience and sustainability.

This Policy Toolkit covers four 'pillars' relevant to mobilising funding and financing for inclusive and quality infrastructure investment by subnational governments: the enabling environment, funding instruments, financing instruments and investment approaches. All these pillars are interlinked. Access to finance for infrastructure investments, for example, is improved by creating an enabling environment that supports sustainable subnational government borrowing and by mobilising funding (i.e., revenue sources such as user charges).

This Policy Toolkit is voluntary and non-binding. Rather than recommending specific policy tools, it provides a 'toolkit' of policy opportunities that may serve as a starting point for national or subnational governments seeking to support infrastructure investment in regions and cities. Whether, when, where and how to use tools should be considered on a case-by-case basis, in line with the local context.

1.2. Infrastructure needs in regions and cities

Many regions and cities have a significant need for infrastructure investment to sustain growth and improve well-being. In 2017, the OECD estimated that approximately USD 95 trillion in public and private investments would be needed in energy, transport, water and telecommunications at a global level to sustain growth between 2016 and 2030 (OECD, 2017[7]). Similarly, the Global Infrastructure Hub and Oxford Economics estimated that USD 94 trillion of investment will be needed between 2016 and 2040 across 50 countries (Oxford Economics, 2017[8]). In developing Asia alone, there is a need to invest USD 26 trillion in infrastructure to maintain the region's growth momentum and respond to climate change between 2016 and 2030 (ADB, 2017[9]). Much of this investment is needed at a regional and local level.

Infrastructure investment needs vary substantially across different regions and cities, both within and across countries. Among other areas, different investment needs can arise due to existing subnational infrastructure disparities and the asymmetric impacts of megatrends and shocks, such as urbanisation, climate change, digitalisation, demographic change and the COVID-19 crisis (OECD, 2022[10]). The COVID-19 crisis, for example, revealed many pre-existing territorial inequalities in access to health, social and digital infrastructure that highlight the need for more inclusive and resilient infrastructure (OECD, 2021[11]).

In the coming years, many urban areas will require substantial investment in both existing and new infrastructure. The global population living in cities with at least 50 000 inhabitants is projected to reach 5 billion (55% of the global population) by 2050, up from 3.5 billion in 2015 (OECD/European Commission, 2020[12]). In Developing Asia alone, an additional 1 billion people are anticipated to live in cities in the next 30 years (UN DESA, 2018[13]). Sustainable, resilient and inclusive infrastructure will be required to support continued urbanisation that fulfils cities' potential as engines of growth and job creation (ADB, 2021[14]). In addition to investing in new infrastructure, existing infrastructure in urban areas needs to be better maintained and transformed to become more sustainable and resilient in the face of new megatrends and shocks (Italian G20 Presidency, 2021[15]; OECD, 2021[16]).

Rural areas will also need substantial investment to build resilience, increase sustainability and improve well-being. While digitalisation provides significant opportunities to support economic development, many rural areas face a "double divide" arising from reduced access to both physical and digital infrastructure (OECD, 2022[2]). In G20 countries, for example, internet download speeds over fixed networks in rural areas are 31% lower than the national average, while cities are 21% higher (OECD, 2021[17]). The "double divide" can hamper access to online alternatives to physical infrastructure that are even more useful in rural areas, such as emerging public services in education (e.g., online distance learning activities) and healthcare (e.g., telemedicine) (OECD, 2022[2]). Closing the double divide might also help to make rural areas more attractive and reduce pressures on urban areas from rapid population growth.

Responding to the different and interdependent needs of regions and cities requires all levels of government to support long-term and place-based infrastructure planning and investment. Effective multi-level governance is essential to support quality infrastructure investment that is undertaken at the right scale and is in line with local priorities.

1.3. Infrastructure investment by subnational governments

The responsibility for public infrastructure investment is shared across levels of government. Central or federal governments often have key infrastructure responsibilities, including for nationally significant and critical infrastructure such as highways, long-distance railways, electricity networks and universities. They may also be responsible for guiding, supporting, facilitating, coordinating, funding and/or financing infrastructure investments by subnational governments. Subnational governments are often responsible for essential basic infrastructure such as local and regional transportation networks, education and health care facilities, environment, and social housing. Subnational governments also often have important responsibilities for guiding infrastructure investment, including through land use policy, building permits, and environment regulations.

In many countries, subnational governments are particularly important public infrastructure investors and have many climate-related expenditure responsibilities. They are responsible for almost 60% of public investment in G20 countries, representing 1.9% of GDP (OECD/UCLG, 2019[18]; OECD, 2021[4]). In OECD countries, they are responsible for 63% of *climate and environment significant* public expenditure and 69% of *climate and environment significant* public investment (OECD, 2022[19]). This means that they are well-placed to harness sustainable financing as they will need to deliver many green projects to help address climate change (e.g., building upgrades, sustainable public transport, renewable energy, etc.).

1.4. Policy tools to mobilise funding and financing

Given the important role of subnational governments, mobilising funding and financing at a subnational level can help to provide more inclusive, resilient and sustainable infrastructure in regions and cities. This Policy Toolkit covers four 'Pillars' that are critical to mobilise funding and financing for subnational governments: the enabling environment, funding instruments, financing instruments and investment approaches. For each Pillar, this Policy Toolkit highlights 'Policy Opportunities' with specific 'Example Policy Tools'. These are informed by case studies included in the full-length policy toolkit prepared by the OECD with input from ADB.

Each of the Pillars are critical to help mobilise funding and financing for quality infrastructure investment in regions and cities. The enabling environment determines the instruments and approaches that can be mobilised by subnational governments, as well as how and when they are used (OECD, 2014[20]). Financing is essential to help cover the high up-front costs of infrastructure investment and spread the payment for those costs across future beneficiaries. Funding is also essential to help pay up-front investment costs and to pay for infrastructure operations, maintenance and repay financing. Different investment approaches are needed to harness funding and financing for specific projects.

PILLAR 1: Establish an enabling environment to facilitate the mobilisation of funding and financing for inclusive and quality infrastructure investment by subnational governments

Creating an enabling environment for infrastructure investment by subnational governments is a critical element of mobilising funding and financing in regions and cities. The enabling environment is created by various frameworks, regulations, processes, systems, organisations, networks and other structures that enable and shape how subnational governments invest in infrastructure. A supportive enabling environment can increase the ability of subnational governments to use different funding sources and financing instruments, and investment approaches. While there is no 'right' enabling environment that applies across all countries, as the enabling environment will depend on national and local contexts, there are a number of common cross-cutting policy opportunities as described below.

Policy Opportunity 1: Develop fiscal and regulatory frameworks that support subnational governments to harness funding and financing for quality infrastructure investment in their areas of responsibility, while also managing subsequent risks and considerations (e.g., indebtedness, investment quality etc.).

- Example policy tools: Inter-governmental fiscal frameworks; budget balance rules; debt rules; internal and external audits; fiscal risk assessment; monitoring and early warning systems; independent fiscal institutions.

Policy Opportunity 2: Increase access to financial markets for subnational governments, including by exploring opportunities for expanding the use of specialised public or private financial intermediaries or trust funds, and developing local capital markets for subnational government debt, which can help to improve the affordability and accessibility of finance for these governments.

- Example policy tools: Credit assessments; subnational pooled financing mechanisms; trust funds; national infrastructure banks.

Policy Opportunity 3: Build institutional capacity within subnational governments, in order to improve the ability to mobilise funding and financing instruments and ensure that mobilised resources are used effectively.

- Example policy tools: Capacity building programmes; technical assistance facilities; project preparation and monitoring platforms; PPP units.

Policy Opportunity 4: Support effective co-ordination, cooperation and engagement across and among levels of government, and with local communities, which can support the pooling of resources and help to ensure that infrastructure is delivered at the right scale and in the right place and is in line with local priorities.

- Example policy tools: City and regional deals/contracts; regional and local development strategies; inter-governmental investment co-ordination platforms; inter-municipal cooperation arrangements; stakeholder engagement.

PILLAR 2: Consider opportunities to mobilise new sources of funding for subnational governments to undertake inclusive and quality infrastructure investment

Mobilising funding is essential to pay for infrastructure investment, operations and maintenance. For many subnational governments, mobilising funding is a key barrier for supporting additional infrastructure investment. Funding for subnational infrastructure investment mainly come from grants and subsidies provided by upper-level governments, own-source revenue (e.g., some taxes, user charges, property income, etc.) or user charges paid to a private operator of public infrastructure (e.g., when a concession agreement is in place). Common policy opportunities can exist across each funding source as described below.

Policy Opportunity 5: Mobilise grant and subsidy programmes for infrastructure investment by subnational governments and support the effectiveness of these programmes to deliver quality infrastructure in line with national, regional and local priorities.

- Example policy tools: Competitive grant programmes; matching grants; conditions on grants; regional development funds; philanthropy; viability gap funding.

Policy Opportunity 6: Explore scope for subnational governments to mobilise targeted taxes to support quality infrastructure investment, particularly where there is a visible link between the levy and the investment to highlight the benefit of the tax.

- Example policy tools: Tax increment financing; property taxes; carbon taxes; tourism taxes; mobility and transport taxes.

Policy Opportunity 7: Explore opportunities for harnessing user charges and fees to support infrastructure investment projects, while also considering the impact on accessibility across different socio-economic groups.

- Example policy tools: Utility charges; congestion charges; parking fees.

Policy Opportunity 8: Improve the management of infrastructure assets by subnational governments, which may help to increase funding availability and ensure existing infrastructure is harnessed effectively.

- Example policy tools: Property or land leasing; asset recycling.

Policy Opportunity 9: Strategically harness and capture the value of land, which can increase the funding available for quality infrastructure investment by subnational governments.

- Example policy tools: Developer obligations, infrastructure levies; charges for development rights; land readjustment; strategic land management; transferable development rights.

PILLAR 3: Mobilise accessible, affordable and sustainable finance for inclusive and quality infrastructure investment by subnational governments

Mobilising finance is essential to help subnational governments spread the high up-front costs of infrastructure investments over time. Without harnessing finance, subnational governments might not be able to pay for investment or they could place significant pressure on their annual budget. The use of finance can also spread the burden for the payment for infrastructure across its future beneficiaries (e.g., users, taxpayers). Opportunities for subnational governments to mobilise finance mainly relate to debt (loans, bonds) rather than equity; however, equity that supports subnational government investment is mobilised as part of public private partnerships (PPPs), in some partially owned state-owned enterprises (SOEs) or in private sector infrastructure operators. These opportunities are described below.

Policy Opportunity 10: Explore options for the use of concessional loans for subnational governments to target specific infrastructure investment gaps (e.g., supporting local governments to infrastructure for housing developments) and consider supporting the use of green loans to highlight the sustainability of investments.

- Example policy tools: Concessional loans; green loans.

Policy Opportunity 11: Consider the scope for expanding the use of bonds by subnational governments to improve access to affordable finance (either directly or through financial intermediaries), and facilitate the use of green, climate, sustainable and social bonds to increase investment transparency.

- Example policy tools: General-obligation bonds (municipal bonds); revenue and project bonds; thematic bonds (e.g., green bonds; social bonds; climate bonds; sustainability bonds, etc.).

Policy Opportunity 12: Explore opportunities for harnessing equity in support of subnational government infrastructure.

- Example policy tools: Impact investing; equity in PPPs; blended finance.

Policy Opportunity 13: Explore the scope for targeted and effective use of guarantees to help mobilise private finance for quality infrastructure investment projects undertaken by subnational governments.

- Example policy tools: Financial guarantees; performance guarantees.

PILLAR 4: Harness different investment approaches that mobilise funding and financing for quality infrastructure investment in regions and cities

The investment approach refers to how funding and financing are leveraged to deliver an infrastructure investment project. The choice of investment approach for an infrastructure investment can be separate to the choice of funding and financing instruments. For example, infrastructure that is procured by the public sector ('traditional' public procurement) may be financed through a loan or funded through grants, taxes or user charges. Similarly, an investment approaches include traditional public procurement to support private-sector participation in public infrastructure, delivery through subnational state-owned enterprises or delivery through subnational public-private partnerships (PPP). Policy opportunities are described below.

Policy Opportunity 14: Support private-sector participation in public infrastructure investment, operations and maintenance through 'traditional' and more innovative forms of public procurement

- Example policy tools: Green public procurement; socially responsible public procurement.

Policy Opportunity 15: Where a subnational state-owned enterprise is used to support infrastructure investment (e.g. local public companies), ensure effective and proper use for delivering inclusive and quality infrastructure investment.

- Example policy tools: Development authorities; transport authorities; local utility companies; infrastructure delivery authorities.

Policy Opportunity 16: Support the effective and proper use of public-private partnerships by subnational governments where they are determined to be appropriate for a specific investment project

- Example policy tools: User-pays PPP; Government-pays PPP.

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Note

[1] This chapter is a summary of the *G20-OECD Policy toolkit on mobilising funding and financing for inclusive and quality infrastructure investment in regions and cities*. It was produced for the Indonesian G20 Presidency as part of the Program of Work and Budget of the OECD's Regional Development Policy Committee. The Policy Toolkit leverages the Recommendation of the OECD Council on Public Investment across Levels of Government, the OECD-UCLG World Observatory on Subnational Government Finance and Investment, and other recent work from the OECD on subnational infrastructure investment, in particular the report Unlocking Infrastructure Investment.

2 Addressing the fragmented ESG data landscape of the infrastructure sector

Mamiko Yokoi-Arai

This chapter discusses the data landscape around ESG considerations in the infrastructure sector. It starts with looking at the definition of infrastructure, as this is a crucial component and basis for data collection. It further maps and analyses the approach that various, widely recognised sustainable initiatives in the financial and infrastructure context take in measuring ESG concepts. This chapter also takes a deeper look at the data that is accessible through publicly available datasets.

2.1. Introduction

Infrastructure contributes to 79% of GHG emissions globally (UNOPS, 2021[1]). The bulk of the USD 100 billion needed for climate financing is expected to go towards infrastructure projects, and nearly half of this will come from the private sector (Climate Policy Initiative, 2021[2]). In addition, COVID-19 has made the need to support developing countries even stronger, as evidenced by G20 member initiatives such as the United States' Build Back Better World (B3W) Partnership and the EU's Global Gateway.

The COP26 demonstrated that financial intermediaries are committed to investing to achieve the Paris Agreement, as can be witnessed by the Glasgow Financial Alliance for Net Zero, which gathered financial institutions with a total of USD 130 trillion assets under management to achieve net zero. While there are uncertainties as to how this will lead to actual investments, larger financial institutions understand that they are expected to have a large role in achieving the Paris Agreement, which includes contributions to climate financing.

In order to unlock the potential private investment into infrastructure, governments need to provide frameworks in which various risks can be addressed, and develop an enabling environment that includes the various aspects promulgated by the G20 Principles for Quality Infrastructure Investment (QII). There has been a shift in the discussion related to sustainable infrastructure in recent years, with the increased need for environmental, social and governance (ESG) considerations to be applied to infrastructure projects. There is a need to establish certainty with mechanisms to ensure that public and private infrastructure financing contribute to the Paris Agreement and sustainable development goals (SDGs) in a way that responds to ESG considerations.

Infrastructure assets are exposed to long-term and complex risks that challenge investors in assessing and managing risks over time. While some institutional investors with a long-term horizon may consider such assets attractive for asset-liability management purposes, this has not translated to actual investment in practice, creating a wide investment gap for infrastructure assets. There is thus a need to create an environment in which investors have access to relevant information and data in order to make better investment decisions related to infrastructure assets.

There have been numerous sustainable finance and sustainable infrastructure initiatives to date, which has added to the confusion about which standard should be applied and how. This has affected ESG standards and ESG data for infrastructure assets, with limited data that is ESG assessed to date. Standards related to sustainable infrastructure kick started from the 2018 Principles for QII, and while G20 and other stakeholders have made efforts to advance the sustainable infrastructure agenda over the years, the complexity and long-term nature of infrastructure projects have made it difficult for data to be collected and ESG analysis to be developed.

The lack of data has been raised as an issue at various international discussions. In particular, it was reflected in Policy Message VII of the *Outcome Document of 2021 G20 Infrastructure Investors Dialogue Financing Sustainable Infrastructure for the Recovery* (October 2021) as a way to "[p]romote further **consistency in data collection** through improved methodologies and common terminologies, in particular in the ESG and new technologies area…" which proposes action to address this data gap.

This report brings together the various approaches taken towards sustainable finance and sustainable infrastructure by various initiatives in order to find areas of convergence and to identify what standards would bring the greatest common denominator for sustainable infrastructure.

The objective of this report is to identify how ESG data can be better made available to investors and governments making decisions on infrastructure investments. This requires an understanding of what data is already available for the infrastructure sector and what constitutes ESG data for infrastructure. Having more data available is meant to address the information asymmetry in infrastructure financing, lead to

greater certainty and clarity for investors when they consider investments into sustainable infrastructure, and hopefully lead to a greater contribution by investors into sustainable infrastructure.

Section 2.2 examines the definition of infrastructure which is the basis for any data collection related to infrastructure assets. Currently, an internationally agreed definition of infrastructure does not exist, and without this, discussion of data gaps cannot be sufficiently advanced.

Section 2.3 is based on a mapping exercise of the various sustainable finance and sustainable infrastructure initiatives that have taken place globally. The mapping allows a clearer identification of areas of convergence of the various initiatives, and what is meant by sustainable infrastructure given the various efforts that have been made so far.

Section 2.4 provides an overview of the existing databases that collect data on infrastructure assets. It examines publicly available infrastructure and then ESG infrastructure data, how these databases assess ESG, and the extent to which it corresponds to the convergence of standards.

The final section discusses challenges and opportunities to address the data gaps identified and how governments, investors and other stakeholders can address them.

2.2. Defining infrastructure for data collection purposes

While infrastructure has been subject to policy debate for decades, there is no internationally recognised definition for infrastructure that could be applied for the purpose of data collection. Without a common understanding on what constitutes infrastructure and related classifications, infrastructure related data will continue to lack consistency and comparability across various data sources.

Neither the United Nations Fundamental Principles of Official Statistics nor the Central Product Classification provide a definition for data collection purposes of what is commonly referred to as infrastructure. The United Nations Fundamental Principles of Official Statistics and Central Product Classification refer to the concept (such as institutional infrastructure or IT infrastructure in both cases),but does not provide a clear indication of what elements should be included.

In the OECD publication *Implementation Handbook for Quality Infrastructure Investment*, "[i]nfrastructure provides the backbone of modern well-functioning economies by providing connectivity through enabling the flow of goods, people and information, and by supplying the necessary inputs in the form of energy and water that constitute the foundation for most commercial and industrial activity. Infrastructure is also critical for delivering many services, such as electricity, water and sanitation, digital telecommunications, public transport, health care and education, and flood protection that are essential for health and quality of life, and for providing protection against natural elements" (OECD, 2021[3]). While describing the objectives and areas of infrastructure, this definition is descriptive without specifying the sectors that should be covered by infrastructure.

Most definitions portray infrastructure as a basis of providing basic functions in support of the economy and society. In some cases, a narrower definition may be employed that only encompasses economic infrastructure. Other definitions use the broad definition of infrastructure, meaning that they include social infrastructure or so-called "soft infrastructure", which covers structures that support the provision of services in the areas of education, health, public order and safety, culture and recreation (OECD, 2021[4]).

The Global Industry Classification Standard (GICS) was developed by MSCI and S&P Dow Jones to classify sectors and is widely accepted among rating agencies and data providers as an industry framework for portfolio management and asset allocation. It is a four-tiered, hierarchical industry classification system that consists of 11 sectors, 24 industry groups, 69 industries and 158 sub-industries (S&P Global, 2022[5]). While energy, health care, information technology, communication services and utilities are covered, there is no specific category to target the infrastructure sector. Classifications that include digital infrastructure

often include internet connectivity and broadband access, however only few include assets that enable the storage and exchange of data through a centralised communication system (OECD, 2021[4]).

The OECD's Working Party on National Accounts developed an infrastructure definition to facilitate the data collection and comparison of statistics based on the System of National Accounts. This OECD Working Party is mandated to improve the quality of national accounts data. It is responsible for the improvement of internationally comparable methodologies and standards based on the System of National Accounts (OECD, 2021[4]).

The OECD's Working Party on National Accounts has identified four countries that collect infrastructure data through their national accounts: Canada, the Netherlands, the United Kingdom, and the United States. Three of them focus on infrastructural investments and capital stocks. The Dutch study on the other hand is focusing on the value added generated by economic activities related to infrastructure.

Based on their discussions, the OECD's Working Party on National Accounts proposes the following basic definition for infrastructure: [S]et of fundamental facilities and systems that support the provision of goods and services essential to enable, sustain, or enhance societal living conditions and protect the surrounding environment from erosion and other disasters that reduce the usefulness for economic purposes.

Following this, the OECD further categorises the respective infrastructure sectors that could be covered and is listed in Table 2.1. While renewable energy is not separately classified, categories are present for wind, solar and hydroelectric power generation which are the main renewable energy sectors.

The Infrastructure Company Classification Standard (TICCS) created by EDHECinfra to capture the characteristics of infrastructure investment considers infrastructure assets' financial and corporate structure and expected risk profiles (see Table 2.1). It provides four classifications of infrastructure assets, which are the business risk classification, industrial classification, geo-economic classification and the corporate-governance classification. Under the TICCS classification, a number of economic criteria have to be present for an asset to be considered infrastructure, for instance large size and long repayment period, and inflexible total cost structure (EDHECinfra, 2018[6]).

The TICCS industrial classification applies a broad definition of infrastructure, including social infrastructure. It categorises infrastructure assets in three detailed levels: industrial superclass, industrial class and industrial sub-class. While the classification has a separate category for renewable power and energy and water resources, it does not include flood protection and water management related infrastructure.

Table 2.1. Infrastructure definition comparison OECD and TICCS

OECD	TICCS
Set of fundamental facilities and systems that support the provision of goods and services essential to enable, sustain, or enhance societal living conditions and protect the surrounding environment from erosion and other disasters that reduce the usefulness for economic purposes.	Classification of industry sectors
Economic Infrastructure	
Transport related infrastructure Land transport infrastructure (highways, other road structures and networks including cycle paths and pedestrian areas; tunnels; bridges; and railway lines including railway stations) Water transport infrastructure (canals and waterways; marinas and harbours; seaports; and other water infrastructure) Air transport infrastructure (airports and other passenger terminals; and runways) Space transportation infrastructure (launching sites)	Transport Rail Companies Heavy Rail Lines Road Companies Motorways Motorway Network Dual carriage way roads Stand-Alone tunnels Stand-Alone Bridges Urban Commuter Companies

OECD	TICCS
	Urban Light Rail Overground Mass Transit Underground Mass Transit Bus Transportation Port Companies Tool Port Bulk goods Port Container Port Other Port Airport Companies Airport Car Park Companies Car park
Utilities related infrastructure Mineral exploration and evaluation Oil refineries Storage facilities and distribution networks (e.g. petrol stations) for fossil fuels Natural gas distribution systems and transmission support structures Heat distribution networks Electric power plants and facilities Nuclear production plants, nuclear reactor steam supply systems Steam production plants Hydraulic production plants Marine power plants Wind power plants Solar panels Power and distribution transformers, turbines, turbine generators, etc. Power distribution and transmission networks Other energy-related storage facilities Water-related systems (water filtration plants, water treatment equipment, water distribution systems, etc.) Sewage systems (sewage treatment plants, other sewage infrastructure) Waste disposal facilities	Network Utilities Electricity Distribution Companies Electricity Distribution Network Electricity Transmission Companies Electricity Transmission Network District Cooling/Heating Companies District Heating/Cooling Network Water and Sewerage Companies Water and Sewerage Network Gas Distribution Companies Gas Distribution Network Power Generation, excluding Renewables Independent Power Producers Nuclear Power Generation Gas-Fired Power Generation Coal Fired Power Generation Combined Heat and Power Generation Other Fossil-Fuel-Fired Power Generation Independent Water and Power Producers Power and Water Production Renewable Power Wind Power Generation On-Shore Wind Power Generation Off-Shore Wind Power Generation Solar Power Generation Photovoltaic Power Generation Thermal Solar Power Hydroelectric Power Generation Hydroelectric Dam Power Generation Hydroelectric Run-of-Driver Power Pumped Hydroelectric storage Other Renewable Power Generation Biomass Power Generation Geothermal Power Generation Wave Power Generation Other Renewable Technologies Battery storage Off-Shore Transmission Energy and Water Resources Pipeline Companies Gas pipeline Oil Pipeline Water Pipeline Wastewater Pipeline Energy Resource Processing Companies

OECD	TICCS
	Liquefied Natural Gas Crude Oil Refinery Energy Resource Storage Companies Gas Storage Liquid Storage Other Storage Environmental services Solid Waste Treatment Non-Hazardous Waste Treatment Hazardous Waste Treatment Waste-to-Power Generation Water Treatment Portable Water Treatment Industrial Water Treatment Sea Water Desalination Water Supply Dams Wastewater Treatment Residential Wastewater Treatment and Reuse Industrial Wastewater Treatment and Reuse
Flood protection and water management related infrastructure Dykes, dams and sea walls Water regulation systems Relevant improvements to land, including land acquisitions (e.g. investments in flooding areas, forest management systems to avoid erosion and absorb water excess, etc.) Other flood control systems	Environmental Management Flood Control Coastal and Riverine Locks Energy Efficiency
IT and communications related infrastructure Communications buildings, including cell-towers and data centres Network base stations Broadband access and internet connectivity systems Software to run IT and communications related networks Permits for the use of radio spectra Cables and lines – coaxial, copper, aluminum, etc., optical fibre Satellite networks (in-orbit and ground-based infrastructure) Other communication construction	Data infrastructure Data transmission Telecom Towers Long Distance Cables Communication Satellites Data Centres Data storage Data Centres
Social infrastructure	
Education related infrastructure Schools, colleges, and universities Student residences Libraries Other education related facilities	Education Services Schools Universities Student Accommodation Health and Social Care Services Hospitals Clinics Residential and Assisted Living Government Services Police Stations and Facilities Court of Justice Prisons Street Lighting Social Accommodation Government Buildings and Office Accommodation Defense Services Strategic Transport and Refueling Training Facilities Barracks and Accommodation Recreational Facilities Stadiums and Sport Centres Public Parts and Gardens
Health related infrastructure Hospitals and clinics Nursing homes, homes for the aged Other health facilities	
Public order and safety related infrastructure Police Stations Fire stations Courts Prisons Other public safety related facilities	
Culture related infrastructure Museums Historical sites Religious centres and memorial sites	
Recreation related infrastructure Indoor and outdoor recreational facilities Facilities with spectator capacity	

OECD	TICCS
Public parks Natural reserves: land acquisitions and investments to make the natural reserves accessible	Conversion and Exhibition Centres Arts, Libraries and Museums Amusement Parks

Source: OECD (2021[4]), Defining Infrastructure. https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=SDD/CSSP/WPNA(2021)1/REV1&docLanguage=En
EDHECinfra (2018[6]), The Infrastructure Company Classification Standard. https://edhec.infrastructure.institute/paper/towards-a-scientific-approach-to-esg-for-infrastructure-investors/

While there is considerable overlap between the OECD definition and TICCS, for data collection purposes, and in particular for national account data, the OECD definition would create sufficient granularity and it is proposed that this definition be applied for data purposes.

Also, considering that Global Industry Classification Standard (GICS) has similar industry classifications, having an agreed definition of the infrastructure sectors may permit industry-based financial information to be aggregated to a certain extent.

2.2.1. Summary

For data collection to be better carried out in the infrastructure sector, there needs to be sound basis across the various databases and initiatives. Without infrastructure being clearly defined, uncertainties could arise when considering ESG factors, as some sub-sectors may not be included depending on the definition (such as whether soft/social infrastructure should be included). Thus, it is important to have a common understanding on what constitutes infrastructure to be able to then apply ESG considerations.

Going even further, a definition on infrastructure could permit the collection of infrastructure investment and capital stock to be executed at the national account level, which would support wider private sector efforts and create a basis for comparison across countries. Given the efforts of some countries, data collection of national account-based infrastructure statistics already has a basis upon which to expand to more countries.

2.3. Convergence of sustainable finance and infrastructure initiatives

Long-term strategies of countries, such as nationally determined contributions (NDCs),[1] the National Adaptation Plans (NAP)[2] and National Biodiversity Strategies and Action Plans (NBSAPs)[3] are pivotal in mitigating climate change impacts and to improve environmental sustainability. In order to achieve these plans and to obtain the desired socio-economic outcomes, it is important that corporates and investors have guidance, measurement tools and requirements available to assess their environmental and social approach.

A number of sustainable finance and infrastructure initiatives have been developed in recent years reflecting the increasing interest and need for financing to consider ESG factors more carefully and closely. The G20 agreed on the G20 Principles on Quality Infrastructure Investment (QII) in 2018 (G20, 2018[7]), which creates a good basis for such initiatives to draw on and creates a need to consider ways in which to assess financing for sustainable investment purposes.

To have a better understanding of how QII Principles could be implemented for data purposes, 21 sustainable finance and infrastructure initiatives, which are widely recognised and applied in financial and infrastructure context, were mapped in terms of the conditions by which they made requirements.

The following 21 initiatives were mapped in this exercise:

- Investment Principles and Eligibility Criteria (ACGF, 2020[8])

- Aligned Set of Sustainability Indicators for Infrastructure (IDB, 2020[9])
- CEEQUAL (BRE, 2022[10])
- Equator Principles (Equator Principles, 2020[11])
- Climate Bond Standards (Climate Bonds Initiative, 2020[12])
- Climate Policy Initiative (CPI) Global Landscape of Climate Finance (CLCF, 2019[13])
- EU Green Taxonomy (EU Commission, 2020[14])
- GIB (SuRe) (GIB, 2022[15])
- Green Bond Principles (ICMA, 2018[16])
- Green Loan Principles (LSTA, 2018[17])
- GRESB (GRESB, 2022[18])
- Harmonised MDB Frameworks on Climate Finance Tracking (IDB, 2019[19])
- IDB Sustainable Infrastructure Framework (IDB, 2018[20])
- IFC Definitions and Metrics for Climate-Related Activities (IFC, 2017[21])
- IFC Environment & Social Performance Standards (IFC, 2017[21])
- Infrastructure Sustainability Council of Australia (ISCA) (Infrastructure Sustainability Council, 2022[22])
- ISI (Envision) (Institute for Sustainable Infrastructure, 2022[23])
- Social Bond Principles (relevant infrastructure categories) (ICMA, 2021[24])
- Sustainability Linked Loan Principles (LSTA, 2022[25])
- UN Social and Environmental Standards (UNDP, 2021[26])
- UNDP SDG Impact Standards for SDG Bonds (UNDP, 2022[27])

A number of initiatives have been developed by multilateral developments banks (MDBs), such as the Investment Principles and Eligibility Criteria (ASEAN Infrastructure Fund), Aligned Set of Sustainability Indicators for Infrastructure (ASSI), Harmonised MDB Frameworks on Climate Finance Tracking, IDB Sustainable Infrastructure Framework, IFC Definitions and Metrics for Climate-Related Activities and IFC Environment & Social Performance Standards. UN related initiatives are UN Social and Environmental Standards and UNDP SDG Impact Standards for SDG Bonds.

The EU Green Taxonomy will be applied in EU member states, so it will have the strongest impact in terms of implementation.

There are a number of private sector initiatives, such as BRE (CEEQUAL), Equator Principles, Climate Bond Standards, Climate Policy Initiative, SuRe, Green Loan Principles, GRESB, Infrastructure Sustainability Council of Australia, ISI, Social Bond Principles, and Sustainability Linked Loan Principles. Most are coalition of private sector stakeholders or non-profit initiatives.

The most common methods of assessment used by each initiative have been classified in Table 2.2.

Table 2.2. Main areas of assessment of sustainable finance and infrastructure initiatives

	Environmental	Social	Governance
ADB: Investment Principles and Eligibility Criteria (ASEAN Infrastructure Fund)	Greenhouse emissions reduction Pollution control Biodiversity and ecosystem conservation	N/A	N/A

	Environmental	Social	Governance
Aligned Set of Sustainability Indicators for Infrastructure (ASSI)	Greenhouse emissions reduction Pollution control Biodiversity and ecosystem conservation Waste reduction	Stakeholder engagement Human & labour rights compliance Gender	Anti-corruption Corporate governance and sustainability disclosure
BRE (CEEQUAL)	Greenhouse emissions reduction Pollution control	N/A	N/A
Equator Principles	Greenhouse emissions reduction Pollution control Biodiversity and ecosystem conservation Waste reduction Energy consumption/ efficiency	Stakeholder engagement Human & labour rights compliance Gender	N/A
CBI – Climate Bond Standards	Greenhouse emissions reduction Energy efficiency	N/A	N/A
Climate Policy Initiative (CPI) Global Landscape of Climate Finance	Greenhouse emissions reduction	N/A	N/A
EU Green Taxonomy	Greenhouse emissions reduction Energy and water efficiency	N/A	N/A
GIB (SuRe)	Pollution control Biodiversity and ecosystem conservation Energy and water efficiency	Stakeholder engagement Human & labour rights compliance	Anti-corruption Corporate governance and sustainability disclosure
Green Bond Principles	Greenhouse emissions reduction Pollution control Biodiversity and ecosystem conservation Energy and water efficiency Waste reduction	N/A	N/A
Green Loan Principles	N/A	N/A	N/A
GRESB	Greenhouse emissions reduction Pollution control Waste reduction	Stakeholder engagement Human & labour rights compliance Gender	Anti-corruption Corporate governance and sustainability disclosure
Harmonised MDB Frameworks on Climate Finance Tracking	Energy and water efficiency	N/A	N/A
IDB: Sustainable Infrastructure Framework	Greenhouse emissions reduction Pollution control	Stakeholder engagement Gender	Anti-corruption Corporate governance and sustainability disclosure
IFC Definitions and Metrics for Climate-Related Activities	N/A	N/A	N/A
IFC Environment & Social Performance Standards	Greenhouse emissions reduction Energy and water efficiency	Stakeholder engagement Workforce sustainability	N/A
Infrastructure Sustainability Council of Australia (ISCA)	N/A	N/A	N/A
ISI (Envision)	Greenhouse emissions reduction	N/A	N/A
Social Bond Principles (Relevant Infra Categories)	N/A	N/A	N/A
Sustainability Linked Loan Principles	N/A	N/A	N/A
UN Social and Environmental Standards	Pollution control Biodiversity and ecosystem conservation	Stakeholder engagement Gender	N/A
UNDP SDG Impact Standards for SDG Bonds	N/A	N/A	N/A

Source: ACGF (2020[8]), https://www.adb.org/sites/default/files/institutional-document/601241/acgf-investment-principles-eligibility-criteria.pdf. ADB (2020[9]) http://www.iadb.org. BRE (2022[10]), https://bregroup.com/products/ceequal/the-ceequal-technical-manuals/. Equator Principles (2020[11]), www.equator-principles.com. Climate Bonds Initiative (2020[12]), https://www.climatebonds.net/files/files/CBI_Taxonomy_Tables_January_20.pdf. CLCF (2019[13]), https://climatefundsupdate.org/. EU Commission (2020[14]), https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf. GIB (2022[15]), https://sure-standard.org/about/. ICMA (2018[16]), https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/Green-Bonds-Principles-June-2018-270520.pdf LSTA, (2018[17]), https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf. GRESB (2022[18]), https://documents.gresb.com/generated_files/infrastructure/2022/asset/reference_guide/complete.html IDB (2019[19]), http://dx.doi.org/10.18235/0002528. IDB (2018[20]), http://dx.doi.org/10.18235/0001043. IFC (2017[21]), http://www.worldbank.org/content/dam/Worldbank/document/Climate/common-principles-for-climate-mitigation-finance-tracking.pdf. IFC (2017[21]), http://www.worldbank.org/content/dam/Worldbank/document/Climate/common-principles-for-climate-mitigation-finance-tracking.pdf. Infrastructure Sustainability Council (2022[22]), https://www.iscouncil.org/is-ratings/. Institute for Sustainable Infrastructure (2022[23]), https://sustainableinfrastructure.org/envision/overview-of-envision/. ICMA (ICMA, 2021[24]), https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Social-Bond-Principles-June-2021-140621.pdf. LSTA (2022[25]), https://www.icmagroup.org/. UNEP, (2021[26]), https://www.undp.org/publications/undp-social-and-environmental-standards; UNEP (2022[27]) https://sdgimpact.undp.org/sdg-bonds.html

Due to the strong focus on **environmental** factors in recent years and some of the initiatives, such as the CBI – Climate Bond Standards, Climate Policy Initiative (CPI), EU Green Taxonomy, Green Bond Principles, Green Loan Principles, IFC Definitions and Metrics for Climate-Related Activities, are solely focused on climate change, environmental factors are strongly represented and require a number of granular conditions.

Governance factors are covered the least, with only four initiatives requiring them. **Social** factors are covered by 1/3 of the initiatives. Assessment areas related to both social and governance factors are fairly consistent across the various initiatives. Social factors include stakeholder engagement, human and labour rights compliance, and gender. Governance factors include anti-corruption, and corporate governance and sustainability disclosure across the board.

As for the **environmental** factors, most initiatives have an assessment approach. Greenhouse gas (GHG) emissions reduction and pollution control are the main way in which environmental factors are assessed by nearly half of the initiatives. Otherwise, biodiversity and ecosystem conservation, waste reduction, and energy and water efficiency are applied for environmental factors.

Turning to these assessment methods more closely, Table 2.3 addresses each one specifically in order to better understand their respective approached in practice. This is complemented by the work that the International Finance Corporation (IFC) is developing in the G20 Compendium of Quality Infrastructure Indicators (QII Indicators).

2.3.1. Environmental factors

There are five main **environmental** factors that are applied across the initiatives. These encompass GHG emissions reductions, pollution control, biodiversity and ecosystem conservation, energy efficiency, and waste reduction. They are primarily focussed on climate mitigation measures, and not on climate resilience or adaptation.

GHG emissions reductions inquire on whether reduction against business-as-usual baseline was achieved (Y/N) and on the annual reduction of CO2 emissions by tonnes. **Annual CO2 emissions reduced by tonnes** corresponds with the QII Indicators.

Pollution control is made up of air, water and soil pollution related items but most assessment methods come from the ASSI.

Water pollution assessment methods are freshwater withdrawal (kL/year – annual volume of fresh water used by an infrastructure project), watershed management (Y/N – existence of watershed

assessment/management programme), or number of water pollution exceedances (Y/N – non-compliance with wastewater quality standards).

Air quality is assessed by fine particulate matter emission[4] (yes/no response or mean PM2.5 and PM10 emission). This is reflected in the QII Indicators but uses a different measurement of local air pollutants reduced in tonnes per year.

For **biodiversity and ecosystem conservation**, assessments focus on whether endangered species are impacted, and the number impacted, previously disturbed land (percentage of land used that had previously been non-disturbed or maintained as non-disturbed), and biodiversity and ecosystem management.

Table 2.3. Most common assessment measurements and relevant QII Indicator(s)

	Most common measurement among assessed frameworks	QII indicators measurement
Environmental		
Greenhouse emissions reduction	Reduction against business-as-usual baseline Y/N tCO2e/year Direct emissions less than 100g CO2/kWh (lifecycle emissions, applicable to electricity and heating/cooling generation)	GHG Emissions reduction/avoided tCO2/year
Pollution control	Air, water, and soil pollution Y/N Air quality, fine particulate matter emission: PM2.5 and PM10	Local air pollutants reduced, tons per year
Biodiversity and ecosystem conservation	Endangered species Y/N Number of Species impacted Percentage of land impacted/ disturbed/degraded	–
Energy efficiency	Energy efficiency in buildings, CO2e/p-km Use of renewable energy or energy savings, MWh/GWh	Energy consumption, kWh, or MJ/year
Waste reduction	Waste management and recycling Y/N Reduction of waste: metric tons or percentage of total over lifetime of project Waste prevented/minimised/reused/recycled	–
Social		
Stakeholder engagement	Stakeholder engagement plan Number of displaced people, including minorities and indigenous people	Stakeholder engagement, Y/N, number of beneficiaries Design minimises land acquisition and involuntary resettlement, Y/N
Community development	Management of public health and safety risks, Y/N	Community development contributions, currency Infrastructure improvement in local community, Y/N Rural infrastructure assets established or improved, Km for roads, GWh for electricity, and m3 for water
Human & labour rights compliance	Labour standards Y/N Fair wages, percentage of employees out of total number of employees	Fatal/non-fatal occupational accidents, #
Gender	Gender equality, inclusiveness, and empowerment plan Y/N	Female direct jobs supported by the project, #
Governance		
Anti-corruption	Anti-corruption protocols & procedures, Y/N	Governance body members that have received training on anti-corruption, number of members and percentage of members Anti-corruption protocols & procedures, Y/N
Corporate governance and sustainability disclosure	Corporate governance structures Y/N	Fiscal sustainability Y/N Information disclosure Y/N Transparency and accountability measures in procurement

	Most common measurement among assessed frameworks	QII indicators measurement
		and financial management supported in implementation Y/N

Note: Y/N stands for a question that can be answered with yes or no.
Source: Based on OECD Secretariat analysis.

Energy efficiency measures come primarily from the EU Green Taxonomy and the Green Bond Principles. For energy efficiency, the EU Green Taxonomy requires at least 30% reduction in emissions compared to the baseline performance of the building before the renovation and sets direct emissions below 50g CO2e/p-km. Otherwise, total energy consumed per output scaling factor, or energy efficiency are measured in kwh per cubic metre billed/unbilled authorised water supply (water treatment). They require at least a 20% average decreased in energy consumption of system. The Green Bond Principles recommend measuring energy efficiency by the use of renewable energy or energy savings. Here, the method that is recommended is MWh/GWh for annual energy savings, as well as for annual renewable energy produced. QII Indicator considers energy consumption by kWh or MWh per year.

Waste reduction is covered primarily by the Green Bond Principle, which draws on measurements from various public requirements. This includes reduction of waste (metric tonnes or percentage of total over lifetime of project), waste prevented/minimised/reused/recycled (benchmarked to EU Waste Policy), energy recovered from waste (benchmarked to SWM-GHG calculator,[5] United States Environmental Protection Agency's Waste Reduction Model[6]), waste collected and treated or disposed (benchmarked to EU Landfill Directive), and improved access to municipal waste collection (number of people/percentage of population).

2.3.2. Social factors

Social factors converge on four factors: stakeholder engagement, community development, human and labour rights, and gender.

Stakeholder engagement can be broken down into overall plan for engagement, people and lands affected, and public health and safety. The assessment gathers responses about whether a stakeholder engagement plan exists (yes/no) and whether a free, prior, and informed consent to projects (FPIC) (yes/no through establishment of FPIC).

In terms of people and lands, the following are covered: the need for resettlement (over lifetime of project, the number of people physically displaced by project), heritage assessment (yes/no on existence of protection procedures), consultation/participation of affected parties in design/review/implementation of a project, impacts on vulnerable groups/communities/indigenous peoples/cultural systems, and protection of cultural property/heritage.

The QII Indicators adopt similar areas with the existence of a stakeholder engagement plan and whether the design minimises land acquisition and involuntary resettlement.

Community development focuses on public health and safety in terms of areas examined. The factors examined are having a public health and safety management plan (yes/no on implementation of plan), protection of community health/safety, and health and safety of community, contractors, customers, and supply chain.

In terms of the community development, QII Indicator covered contributions to community development in terms of monetary value, whether the infrastructure would improve local community, and the total number of rural infrastructure assets established or improved by the project.

Human and labour rights compliance covers adherence to human and labour rights policies (yes/no in terms of alignment to International Labour Organization Conventions), human rights commitment and human rights complaints and violations.

Focusing more on labour rights, the assessments include occupational health and safety (OH&S) management systems (yes/no on existence/implementation of system), frequency rates of fatal and non-fatal occupational injuries (number of cases per hours worked), fair wages (percentage of employees paid fair wage), local jobs created (number during construction and operation), non-discrimination, cumulative impacts of existing projects, fire prevention and life safety and workforce sustainability.

The QII Indicators includes the number of fatal and non-fatal occupational accidents.

In terms of **gender**, the assessments look at inclusiveness, and empowerment (yes/no on existence/implementation of gender action plan) and social sustainability plan for maximum benefit inclusion for disadvantaged groups (women, the poor, among others).

The QII Indicator includes the number of female director jobs supported by the project.

2.3.3. Governance factors

Governance factors covers anti-corruption, and corporate governance and sustainability disclosure.

For **anti-corruption**, assessments included whether there is an anti-corruption procedures (yes/no on existence of procedure), anti-bribery and corruption management systems, and financial transparency on taxes and donations.

The QII Indicators highlights the number and percentage of governance body members that have received training on anti-corruption, and the existence of anti-corruption protocols and procedures.

On **corporate governance and sustainability disclosure**, the assessments covered sustainability in project award (yes/no in terms of sustainability being included in tender of project), specific board composition, cybersecurity, legal compliance and oversight, environmental and social management systems, and stakeholder identification and engagement planning.

The QII Indicator takes a slightly different approach on governance from the aforementioned, with yes/no on whether fiscal sustainability assessment is available, yes/no on information disclosure of the purpose, scope, costs and implementation of infrastructure projects is open and accessible to the public, and finally, yes/no on measures to adopt or enforce principles of transparency and accountability in procurement and financial management are implemented in the context of the project, which are considerations specific to the infrastructure governance.

2.3.4. Summary

An examination of the 21 initiatives makes clear that there is convergence in sustainable finance and infrastructure initiatives. This is particularly the case in relation to ‘E’ factors, as some of the initiatives are focussed on climate change. However, the initiatives are focussed on climate mitigation and not climate adaptation and resilience which requires greater consideration given the impact that climate change is having on infrastructure assets, in particular in relation to disasters.

Many initiatives only list the areas of considerations, and do not elaborate on how this could be specifically assessed. This means that while the various initiatives cover similar areas, initiatives that provide a more risk-based approach and enabling a more granular understanding are limited in number.

This is also reflected when the assessment of an area is based on a yes/no response which leads to a binary or tick box approach of assessment. While this is helpful in terms of ensuring that the issue is

considered, and in some instances having a broader binary response could be preferable to a limited detailed assessment, it may not encourage projects to improve their performance on ESG over time. To bring greater contextualisation, the areas of convergence are listed below avoiding, where possible, binary response assessments.

Environmental factors are converging on some areas, such as:

- GHG emissions reduction in terms of tCO2e/year
- Air pollution: fine particulate matter emission PM2.5 and PM10 emission or reduced air pollutant tonnes per year
- Direct emissions less than 100g CO2/kWh (lifecycle emissions, applicable to electricity and heating/cooling generation)
- Number of species impacted, and percentage of land impacted/disturbed by project
- Renewable energy used MWh/year
- Reduced waste in metric tonnes.

GHG emissions, air pollution, and energy efficiency assessment methods are also aligned with the QII Indicators.

For **social factors**, there are a number of areas of divergence in terms of the approaches that are taken, although some areas of convergence can be observed. Areas of convergence for social factors include:

- Existence of stakeholder engagement plan
- Number of displaced people, including minorities and indigenous people
- Existence of heritage assessment and protection procedures
- Existence and implementation of protection of community health/safety plan
- Adherence to International Labour Organization Conventions and existence and implementation of occupational health and safety (OH&S) management systems
- Frequency rates of fatal and non-fatal occupational injuries (number of cases per hours worked)
- Fair wages (percentage of employees paid fair wage)
- Local jobs created (number during construction and operation)
- Existence of gender equality, inclusiveness and empowerment plan.

For **governance** factors, there is convergence on:

- Existence of anti-corruption protocols and procedures
- Existence of corporate governance structures.

The Blue Dot Network seeks to establish a voluntary, inclusive, private-sector focused, government-supported project-level certification scheme to operationalise the G20 Principles for Quality Infrastructure Investment. The G20 Principles incorporate traditional ESG considerations as well as dimensions such as good public governance, resilience, economic efficiency over life cycle cost, debt sustainability and sustainable development, which are important to ensure that investments meet their objectives in a manner that benefits all of society. The Blue Dot Network does not create a new standard, but seeks to streamline and create interoperability between existing international standards in such a way as to increase both the efficiency and robustness of project development, and thus facilitate greater private investment in quality infrastructure.

FAST-Infra is a sustainable infrastructure initiative that seeks to put forward a globally applicable labelling system, the Sustainable Infrastructure Label (SI Label). Requirements that need to be fulfilled to obtain a label build on existing frameworks, taxonomies and standards, such as SDGs and G20 Principles of Quality Infrastructure Investment and IFC performance standards. Its labelling system encompasses four

dimensions, covering adaptation and resiliency in addition to environmental, social and governance dimensions (Climate Policy Initiative, 2021[28]). FAST-Infra criteria are close to these areas of convergence for ESG assessment, so it could be a useful tool for projects to be assessed upon, and data collection to be based on. Project management programmes, such as SOURCE, could also assist countries consider such standards in a more routine manner.

To encourage greater adoption of ESG standards by infrastructure projects, mechanisms that incentivise implementation should be considered closely. The UN Principles for Responsible Investment presents a compelling example of a public-private initiative that has had an impact, with 4 800 signatories and many institutional investors and asset managers being asked whether they are a signatory when conducting business.

2.4. Datasets of infrastructure and ESG assessed assets

The infrastructure sector has a number of data vendors that have developed data on infrastructure over the years. Collection of data on infrastructure assets is challenging, given the complex and long-term nature of investments, and as a result of corporate reporting standards in each country. Construction could experience unexpected delays, political risks could emerge and revenue streams could be unpredictable for some projects. Projects based in emerging and developing countries (EMDEs) will have the additional burden of lacking access to some of the basic reporting and implementation of standards which could assist this process.

Another difficulty arises once the project advances from the preparation and construction phase into the operation phase. At this stage, it becomes difficult to trace and collect data on the same infrastructure project as it often falls into the hands of another entity.

With this caveat in mind, this section provides an overview of what data is currently publicly available. It should be noted that most data vendors charge a fee for access, while some are based on membership. In this respect, there is not a data source that is free of charge, given the high cost involved in collecting data on infrastructure funds and projects.

The objective of this section is to understand what data is available on infrastructure assets, but in particular for those that are ESG assessed. For more sustainable infrastructure projects to be pursued, investors would require data that can assess financial performance of projects, especially against sustainability goals.

The ESG assessment approaches will be considered against the various initiatives as discussed in Section 2.3.

2.4.1. Fee-based databases

Preqin

Preqin is a private data provider that offers financial information with a focus on the alternative asset market. It offers a specific database on infrastructure assets and investments, as well as their ESG performance. Infrastructure data is available by investor, asset manager, funds, and deals and exits. It provides information about investors' infrastructure fund portfolio with regard to fund name and type (e.g. core, core plus, fund of funds and debt), as well as fund performance. Further, the dataset captures information on investment allocation by listed, unlisted and direct infrastructure, and information on location and markets in which infrastructure investments are made, as well as project stages (greenfield, brownfield etc.).

Detailed infrastructure information by investor is limited to the current year and granular historical data is not available. The database does offer historical data by investors' overall infrastructure investment (from 2013), however, this only encompasses the amount invested into infrastructure and is not broken down by allocation (listed, unlisted and direct), project stages and regions. Further, historical data of infrastructure funds is available, but only encompasses fund performance data.

Information on investors that are active in the infrastructure sector is limited for emerging and developing economies. Of an overall of 5 497 observations for investors that operate in this sector, there are only 149 results for Latin America and the Caribbean and 100 results for Africa. There are 978 observations for Asia, whereas results for investors in North America and Europe count 2 209 and 1 536 respectively. This reflects a more limited data availability for emerging and developing economies, which also holds true for Preqin's data on funds and asset managers, as well as for infrastructure deals and exits.

ESG approach of infrastructure data of Preqin

ESG factors captured in the database are based on the level of ESG transparency with regard to the level an investor, fund manager or fund discloses its ESG information publicly. The level of ESG transparency is reflected with an overall ESG key performance indicator (KPI) from 0-10%, which is based on individual KPIs for 37 ESG criteria that are presented in the dataset.[7]

In total, the database offers ESG transparency information of around 2 008 investors and 730 fund managers active in the infrastructure sector. In terms of regions, data coverage ranges from Europe, Asia, Australasia, Middle East, Latin America and Africa. When filtering on investors that are assessed on ESG transparency and that are operating in the infrastructure sector around 780 observations are available for North America, 660 for Europe, 340 for Asia, 100 for Australasia, 50 for the Middle East, 30 observations for Latin America and the Caribbean, and 30 observations for Africa.

The ESG transparency information is based on publicly disclosed and self-reported data, and is not based on a third party ESG assessment. Nevertheless, Preqin's ESG dataset is the broadest database with data on both infrastructure, as well as ESG performance that is publicly available. Risk evaluation and impact assessments of funds is only available for private equity, private debt and venture capital and does not include infrastructure.

Preqin's ESG transparency methodology builds on 37 indicators derived from various ESG frameworks, such as investors' affiliations with the UN Principles for Responsible Investment (UNPRI), Sustainability Accounting Standards Board (SASB), and the Task Force for Climate Related Financial Disclosure (TCFD) and the ESG Assessment Framework of the Institutional Limited Partners Association (ILPA).[8] Indicators also use ESG ratings by MSCI, Sustainalytics, ISS, and other public market ratings providers. ESG information is derived from publicly available sources and matched to the indicators in a "Yes" or "No" format (Preqin, 2021[29]). Based on the indicators Preqin developed a transparency KPI, which gives a percentage that reflects the level to which ESG information is publicly disclosed.

Table 2.4. Preqin's Transparency Indicators

Indicator	Framework		Framework
General ESG		**Social**	
Any mention of ESG consideration in investing	SASB	A modern slavery or human rights policy	Rating providers
An investment policy that includes ESG issues	UNPRI	Female representation on the board of directors	Rating providers
The number of companies in the portfolio with whom engagements were conducted on ESG policies or issues	Rating providers	A formal diversity policy or initiative	ILPA
ESG educational programs designed and run for	Rating	**Governance**	

Indicator	Framework		Framework
General ESG		**Social**	
portfolio companies	providers		
A policy specifying how ESG factors are used before investing in a company	UNPRI	The ownership structure of the GP	Rating providers
A policy specifying how ESG factors are used after investing in a company or in company exits	UNPRI	Registered investment advisor or a registered broker dealer status	ILPA
Dedicated ESG investment staff	UNPRI	General partner firm-level governing, leadership, or executive bodies, including the board of directors	Rating providers
Reporting or monitoring portfolio companies using ESG KPIs	Rating providers	A code of conduct policy for employees	ILPA
Total AUM disclosed as subject to ESG criteria or policies	UNPRI	An insider trading policy	Rating providers
Total assets under management in ESG funds	UNPRI	An anti-money laundering and/or "know your client" (AML KYC) policy	Rating providers
Fund offerings sold as "ESG" or "ESG-themed" funds	UNPRI	A whistle-blower or anonymous incident reporting process	Rating providers
Total assets under management in impact or SDG related companies	UNPRI	Any mention of ESG consideration in operations	SASB
Fund offerings sold as "Impact" or "SDG" funds	UNPRI	Adherence to any ISO standards	Rating providers
Investments in companies explicitly developing products in line with the UN Sustainable Development Goals	Rating providers	General partner firm-level privacy policy	Rating providers
Environment		A policy detailing engagement processes with portfolio companies	Rating providers
General partner firm-level carbon or GHG emissions	Rating providers	An engagement process or considerations specifically focused on ESG issues with portfolio companies	Rating providers
Discloses a public sustainability report	Rating providers	A code of conduct policy for portfolio companies	ILPA
Statements, policies, or initiatives related to climate change	TCFD	ESG due diligence reporting lines	UNPRI
Evidence of environmental impact studies conducted on portfolio companies or properties	ILPA	A list of investors by type (i.e. "family office")	UNPRI
Tracking of GHG emissions at portfolio companies	Rating providers		

Note: UN PRI is the Principles for Responsible Investment (UNPRI or PRI) is a United Nations-supported international network of investors working together to implement its six aspirational principles. Its goal is to understand the implications of sustainability for investors and support signatories to facilitate incorporating these issues into their investment decision-making and ownership practices. In implementing these principles, signatories contribute to the development of a more sustainable global financial system. The Principles offer a framework of possible actions for incorporating environmental, social and corporate governance issues into investment practices across asset classes. As of March 2022, more than 4 800 signatories from over 80 countries representing approximately USD 100 trillion have signed up to the Principles.
Source (Preqin, 2021[29])ESG Transparency & Risk Methodology. Retrieved from Preqin-ESG-Transparency-and-Risk-Methodology.pdf

2.4.2. Refinitiv

Refinitiv's (formerly Thomson Reuters) infrastructure database provides project information from pre-construction to the construction and analysis stage. The project-level data encompasses information of approximately 55 000 infrastructure projects from around 100 countries over 45 years. Of these 38 000 projects are categorised as renewable projects and labelled as 'sustainable infrastructure projects', covering biomass, geothermal, hydroelectric, solar, and waste and wind (Refinitiv, 2021[30]). Hence, in terms of ESG considerations, the dataset offers a category for renewable energy infrastructure projects, however it does not provide ESG information.

While the database offers detailed project level data, including project cost, sector and even information on if the project is considered part of the belt and road initiative, it does not capture information on investors that invested in the project nor on the amount invested.

Of all projects that were financed in 2021, 299 were based in Europe, 212 in North America, 198 in Asia-Pacific excluding Central Asia, 158 in Latin America and 44 in Africa, Middle East or Central Asia. While this number is higher for projects that are announced in the year 2021 the proportion is the same, and the number of projects in Africa, the Middle or Central Asia is significantly lower than the rest of the regions.

In the listed company database, Refinitiv uses its own Business Classifications (TRBC), which is a sector and industry classification. Each sector category is broken down into sub-categories. Like GICS, the classification does not include a specific infrastructure sector category, however it does encompass typical infrastructure sectors, such as energy, transportation and utilities as main headings, each broken down into various sub-categories (Refinitiv, 2022[31]).

ESG approach of infrastructure data of Refinitiv

Refinitiv's listed company database offers ESG specific information based on a scoring methodology that additionally to the 'E', 'S' and 'G' aspects considers the level of controversy that a company received in these areas. However, this data is not offered in combination with the dataset that covers project level infrastructure data. As the sector can be selected, ESG information of listed companies operating in infrastructure sub-sectors can be retrieved, but this information is not available on the investor level.

2.4.3. EDHECinfra

EDHECinfra provides a database that contains information on the performance, valuation, risks and costs of unlisted infrastructure assets, measured against various indices. Performance information of unlisted infrastructure equity and debt is made into market indices (infra300 index, infra100 index), as well as the infraGreen index, which is specific to the renewable energy sector. The latter looks at equity and debt investments in solar and wind projects. The database also offers data on asset and risk valuation of unlisted infrastructure equity and debt (EDHECinfra, 2022[32]). The infra300 index is based on the TICCS classification and reflects market exposure of the different TICCS segments of unlisted infrastructure assets (EDHECinfra, 2021[33]; 2018[6]).[9]

ESG approach of infrastructure data of EDHECinfra

While providing indices and performance data related to unlisted infrastructure assets, EDHECinfra does not provide information specific to ESG performance, but plans to put forward a climate and social risk and impact metric for infrastructure investors in the future to facilitate ESG reporting and data collection in the area (EDHECinfra, 2022[34]).

2.4.4. IJ Global

IJ Global has an infrastructure project and transaction database covering both project finance and corporate balance sheet financing transactions. The database provides details on transactions, including pricing details. It covers project finance for infrastructure sectors including oil and gas, renewables, power, transport and social and defence. In terms of regions, it covers Europe, North America, Asia Pacific, Latin America and the Middle East, but not Africa. The database does not have information on ESG aspects beyond transactions in the renewable energy sector (IJGlobal, 2022[35]).

2.4.5. Moody's

Moody's provides data on project and infrastructure finance including information on the performance of rated infrastructure project debts. Information on default and recovery experience in such debts can be used to analyse the risk profiles of the project finance debt. The dataset covers around 8 583 project transactions from the year 1983 to 2018. In terms of sub-sectors, until the year 2018 it counted around 1 006 social projects with 19 defaults, 1 114 transportation projects with 97 defaults, 305 water and waste projects with 18 defaults, 68 other infrastructure projects with five defaults, 395 media and telecom projects with 46 defaults, 278 oil and gas distribution and refining projects with 17 defaults, and 3 881 power generation and transmission projects with 240 defaults. Further, 5 909 projects were based in high income countries with 335 defaults, and 1 138 projects in middle- and low-income countries with 107 defaults (Kelhoffer, 2020[36]).

While Moody's has a database that captures a wide range of historical infrastructure project transaction data, it does not provide information on ESG considerations. In addition, the regional coverage is largely tilted towards developed economies in relation to developing and emerging economies.

2.4.6. Other databases with ESG coverage

There are various databases that cover ESG specific information, amongst others Bloomberg and S&P Global. Since the focus of this report is infrastructure specific datasets, databases that only cover ESG information are not extensively examined.

For example, S&P Global's Trucost Environmental database captures quantitative information on the environmental performance of around 15 000 listed companies. The data covers environmental issues, such as carbon emissions, water dependency and waste disposal and natural resource efficiency (S&P Global, 2020[37]). The Trucost physical risk database has information on companies' and assets' physical risk exposure to climate change (such as wildfires, sea level rise), providing a physical risk score, which can give an idea of the total value of assets considering these risks. However, the dataset does not provide infrastructure specific information and the infrastructure sub-sectors are limited to utilities, energy, communication services and health care. Further, it does not provide information on the investment level into these assets (S&P Global, 2022[38]).

Bloomberg's ESG dataset includes ESG metrics and disclosure scores for approximately 11 800 companies worldwide. ESG areas covered are air quality, climate change, water and energy management, waste, health and safety, audit risk and oversight, shareholder rights, compensation, diversity and board independence (Bloomberg, 2022[39]). However, the dataset does not provide infrastructure specific information.

2.4.7. Membership-based databases

GRESB

GRESB is a platform that provides assessment and scoring for ESG performance of listed infrastructure companies and funds, but does not disclose this collected data publicly. GRESB's assessments are based on multiple reporting frameworks, and the scoring methodologies are publicly accessible. Members can receive these assessments on an annual basis, but only have access to other members' data in an anonymised, relative or aggregated manner. The benchmark report that is provided after assessments details where the practitioner stands in the GRESB universe, thus in comparison to other members (GRESB, 2022[40]). For non-members, GRESB makes publicly available aggregated information in the form of figures and tables. This information also covers the names and respective sectors of the infrastructure funds and assets that had the highest score in any given year (GRESB, 2021[41]).

2.4.8. Summary: data gaps related to infrastructure assets and ESG approaches

Infrastructure asset datasets

Data related to infrastructure assets is limited to several fee-based data vendors, Preqin, Refinitiv, EDHECinfra, Moody's and IJGlobal. Preqin offers infrastructure data at the investor, fund and deals level, whereas Refinitiv, Moody's and IJGlobal capture data at the project transaction level. EDHECinfra provides information on performance indices, as well as unlisted infrastructure assets data.

This shows that there are a number of databases that collect infrastructure asset and project level data. Yet, one aspect that is prevalent in all databases is that available data is skewed towards advanced financial market data, and limited for EMDEs markets. With regard to Preqin, significantly less observations on infrastructure investments and deals are available when selecting the regions Africa and Latin America and the Caribbean in relation to North America and Europe. IJGlobal's project level transaction data does not cover the region Africa at all. Refinitiv's coverage in 2021 with regard to Latin America was relatively large, but this was significantly less for African and other EMDE markets.

ESG approaches

Databases that have an ESG approach for the infrastructure sector is Preqin only, with EDHECinfra planning one.

Data providers do have ESG approaches but assess different aspects of ESG and not necessarily a risk assessment against ESG factors. Preqin uses ESG transparency, whereby the infrastructure funds self-declare which of the 37 indicators it adheres to or not (a yes/no binary approach). Preqin's ESG transparency provides useful insights into the types of activities the fund may be engaging in that is relevant to ESG considerations. However, it is a yes/no binary approach, heavily reliant on implementation of UN PRI, and does not provide a detailed insight into the funds approach to ESG factors.

GRESB provides aggregated level information on infrastructure funds' and companies' ESG performance in the infrastructure sector and only members are able to receive a more detailed analysis in this respect, but even members are not able to attain full access to GRESB's database.

It is clear that while these ESG approaches are useful in having some information on ESG factors of infrastructure funds and projects, if one considers the sustainable finance and sustainable infrastructure initiatives discussed in Section 2.3, these databases would not be able to respond to providing a quantitative understanding of adherence to initiatives.

One of the main issues related to the development of an ESG assessed database is the weakness of corporate reporting regimes, as well as the disclosure requirements. Infrastructure projects are often private companies or special purpose vehicles (SPVs), with financial reporting not having to be publicly disclosed. Reporting could be paper-based, making data collection of such corporate information extremely resource heavy. While the recommendations of the Task Force on Climate-related Financial Disclosure (TFCD) (TCFD, 2017[42]) would be a useful non-financial disclosure regime, it is limited to environmental factors, and as of October 2021, only eight jurisdictions have TCFD-aligned official reporting requirements (TCFD, 2021[43]), for example.

Limited data is available on infrastructure assets' risk exposures in general but especially not through quantitative risk reporting. Most ESG frameworks' measurement approaches use process and output indicators, such as GHG emission, instead of measuring ESG impacts or ESG risks. Without a framework explicitly considering the direct and indirect risks that the ESG characteristics of infrastructure investments create, the relationship between ESG investments and the market value of these investments remains unclear. Consequently, investors might be less motivated to incorporate ESG considerations in their

investments. EDHECinfra's TICCS classification does provide an opportunity to classify infrastructure assets according to its risks and could facilitate data collection in this regard (EDHECinfra, 2021[44]).

Moreover, data on ESG considerations in infrastructure is skewed towards developed markets with limited coverage of emerging and developing markets. When considering the regional coverage of infrastructure-related ESG approaches, Preqin's ESG Transparency coverage provides some insight into the challenges of this. In Preqin's ESG Transparency data 780 observations are for North America, 660 for Europe, 340 for Asia, 100 for Australasia, 50 for the Middle East, 30 observations for Latin America and the Caribbean, and 30 observations for Africa. It is unclear whether this is the outcome of lack of projects, lack of coverage, or lack of available information. However, it does point to the paradox of where infrastructure investment is most needed, ESG-related data is least available, creating greater information asymmetry for investors.

2.5. Conclusion: better data for infrastructure and ESG assessed

For infrastructure data and ESG assessed infrastructure data to be publicly available, and at a scale that could allow investors to take them more readily into account, there are a number of considerations that could be made by policy makers, investors, project developers, and other stakeholders. The availability of data that would provide greater clarity and certainty for investors to make investment decision would contribute to addressing the information asymmetry and establish a better foundation for the private investment pipeline to be developed.

In addition, home biases that investors may have can only be addressed through a better understanding of foreign markets, and in particular for EMDEs, so having databases that have a time series that would permit assessment of financial performance and against sustainability goals would be important to finance more sustainable infrastructure projects.

2.5.1. Basic infrastructure data

Definition of infrastructure for data collection purposes: Currently, there is no internationally recognised definition of infrastructure for data collection purposes. The OECD's Working Party on National Accounts has developed an infrastructure definition to facilitate the data collection and comparison of statistics based on the System of National Accounts, which could be a starting point for data collection.

Data collection at national account level: supporting data collection of infrastructure investment and capital stock could create a useful baseline to better understand the level of investments that are being made in the domestic context.

Improved reporting regimes and digitalisation: the lack of data in EMDEs and SMEs is related to the weaker corporate reporting regime in these markets. In addition, the lack of digitalisation of reporting also creates a barrier to collecting data from companies that are developing or operating infrastructure assets.

Complexity of infrastructure projects: infrastructure projects will change hands as they transition from the development/construction stage to operation phase. This creates challenges in terms of tracing the project and collecting continuous data of a project.

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Key recommendations for basic infrastructure data

- An internationally agreed definition should form the basis of data collection for infrastructure, and this could be based on the OECD definition developed for national account system.
- Collecting infrastructure investment and capital stock at the national account level would support the creation of a nationally comparable database of infrastructure investment, and such government action would form a basis to consider private investment data.
- Countries could consider mechanisms to strengthen financial and non-financial reporting on infrastructure projects, including alignment with TCFD and Sustainability Accounting Standards Board (SASB) Standards.
- Digitalisation of infrastructure reporting, such as SOURCE, could also strengthen data availability of EMDEs and SMEs, and seeking avenues to do so could be instrumental for data collection purposes.
- Establishing a framework which can trace and collect data over the life cycle of a project could provide valuable information on understanding the financial performance as well as sustainability impact of an infrastructure project

2.5.2. Defining sustainable infrastructure

Recognising sustainable infrastructure: while there has been extensive discussions on sustainable infrastructure, there is not yet a clear understanding of what this might constitute. While there is much emphasis on climate mitigation, climate resilience and adaptation should also become a greater part of the discussion. In addition, greater discussion should take part on social and governance aspects, to encompass the entire ESG spectrum.

Converging on sustainable infrastructure initiatives: there have been a number of sustainable finance and infrastructure initiative from both the public and private sector over the years, which has allowed us to better understand the areas of convergence of these initiatives. While environmental factors have been better defined, and assessment measures can be identified, this is less the case for social and governance factors. Greater work needs to be carried out to ensure that assessment approaches are developed for S and G factors.

Developing a greater understanding of ESG assessment approaches: A shortcoming of some of the initiatives is the binary assessment method for a number of conditions that are being assessed. While having a binary approach is more useful than not having a condition being required, and could result in broader engagement, it does not provide an understanding as to which level the infrastructure project is adhering to any condition. Thus, as greater discussion takes place, it is hoped that more granular and possibly quantitative approaches can be developed for each condition.

Key recommendations for defining sustainable infrastructure

- Having a more detailed discussion on what constitutes sustainable infrastructure and reaching a common understanding on what aspects require close consideration is important to create certainty for investors.
- In addition to climate mitigation, climate adaptation and resilience should also become a greater focus of sustainable infrastructure going forward.
- As there is a greater convergence on E factors, more discussion on S and G factors would assist to better contextualise what constitutes S and G too.
- Approaches to ESG could be better served by having a more granular approach, going beyond a simple binary approach. For this, greater discussion needs to take place to develop approaches that are meaningful and can be quantified.
- Initiatives such as UN PRI present promising examples of how public-private initiatives can be used incentivise businesses to adopt sustainable approaches. A model that can scale up sustainable infrastructure with businesses and investors should be considered if sustainable infrastructure is to be a key policy goal of governments.
- In this vein, the QII Indicators that are being developed by IFC provide an important approach to how some of these considerations could be operationalised and shared for a better understanding of sustainable infrastructure.

2.5.3. ESG data for infrastructure

Lack of comprehensive ESG data for infrastructure: one of the key findings of this report is that ESG-assessed data is not in fact publicly available. Some data vendors have ESG-adjacent data, but do not have available data that is assessing ESG comprehensively.

Cost of producing ESG data: given the nature of infrastructure projects, infrastructure data in itself is costly to produce, and ESG data would be even more resource heavy. Currently, the ESG-adjacent data that is available is thus self-reported on a voluntary basis by infrastructure companies and not assessed by the data vendors. This places a significant barrier on having true ESG data available for infrastructure assets.

Reflection of lack of understanding on sustainable infrastructure: many of the issues related to ESG data reflects back on the fact that there is not a common understanding of sustainable infrastructure, and the market for such data has not yet developed. This could evolve as governments start having clearer requirements related to the development and operation of their infrastructure projects.

Limited disclosure from unlisted infrastructure assets*:* many infrastructure entities are unlisted or private entities, which are subject to limited disclosure requirements. This further hampers applying ESG conditions.

Greater implementation of sustainable infrastructure labels and development of indicators: there are a number of initiatives that could facilitate greater application of assessed ESG conditions and advancement of understanding of how these labels could support infrastructure projects and investor decisions. Initiatives such as FAST-Infra, Blue Dot Network, and collection of QII Indicators could contribute and create a data repository for sustainable infrastructure going forward.

Key recommendations for ESG data for infrastructure

- While ESG-adjacent data exists ESG-assessed data is not publicly available, and thus it is currently not possible to assess the performance of sustainable infrastructure.
- Currently, TFCD-aligned report is limited to eight jurisdictions. While this in itself may not address the reporting of infrastructure projects and is limited to climate related reporting, extending such coverage could incentivise more companies to adopt such reporting.
- Developing a market for ESG data could depend on requirements being made from governments or business expectations leading to voluntarily through incentives. UN PRI could provide a good template on how this could be developed.
- Collecting QII Indicators would create an important benchmark for sustainable infrastructure and linking this with financial performance could be useful. In addition, the launch of sustainable infrastructure initiatives, such as FAST-Infra and Blue Dot Network could also create an impetus for developing a market of ESG data.

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Notes

[1] NDCs are a climate action plans to cut emissions and adapt to climate impacts in accordance with the Paris Agreement. Each Party to the Paris Agreement is required to establish an NDC and update it every five years (United Nations, 2022[47]).

[2] NAPs are strategies that consider medium- and long-term adaptation needs informed by the latest climate science (UNEP, 2022[46]).

[3] NBSAPs are intended to define the current status of biodiversity, the threats leading to its degradation and the strategies and priority actions to ensure its conservation and sustainable use, in accordance with the Convention on Biological Diversity (United Nations, 2022[47]).

[4] PM 2.5 refers to a category of particulate pollutant that is 2.5 microns or smaller in size. The average cross-section of a human hair is 50 microns. PM stands for "particulate matter." PM 10 particles (particles less than 10 microns in size) can irritate your nose and eyes, but fewer of these particles penetrate deep into your lungs, so they do not cause the same health problems that smaller micron particles can, although they do increase rates of respiratory disease.

[5] This is a tool for calculating greenhouse gases (GHG) in solid waste management (SWM) developed by Institut für Energie- und Umweltforschung Heidelberg GmbH. https://www.ifeu.de/fileadmin/uploads/Manual-SWM-GHG-Calculator_2010.pdf

[6] EPA Waste Reduction Model (WARM) provides high-level estimates of potential greenhouse gas (GHG) emissions reductions, energy savings, and economic impacts from several different waste management practices. https://www.epa.gov/warm#:~:text=EPA%20created%20the%20Waste%20Reduction,several%20different%20waste%20management%20practices.

[7] For instance, the asset manager BlackRock has a transparency score of 97%, which encompasses transparency scores of the 37 ESG criteria, including for instance a score on "an investment policy that includes ESG issues".

[8] In contrast to other ESG framework, the ILPA's ESG Assessment Framework is designed for limited partners (LP) specifically. It was developed originally for the private equity asset class, but can also be applied to other asset classes (ILPA, 2022[45]).

[9] An important element of TICCs is to provide a better understanding of characteristics and risk perception of each infrastructure asset. For example, business risk is allocated according to the perceived risk of the industry. In this context, transportation infrastructure is riskier than utilities and infrastructure corporates are riskier than special purpose vehicles (SPVs).

3 Infrastructure governance for environmentally sustainable and climate-resilient infrastructure

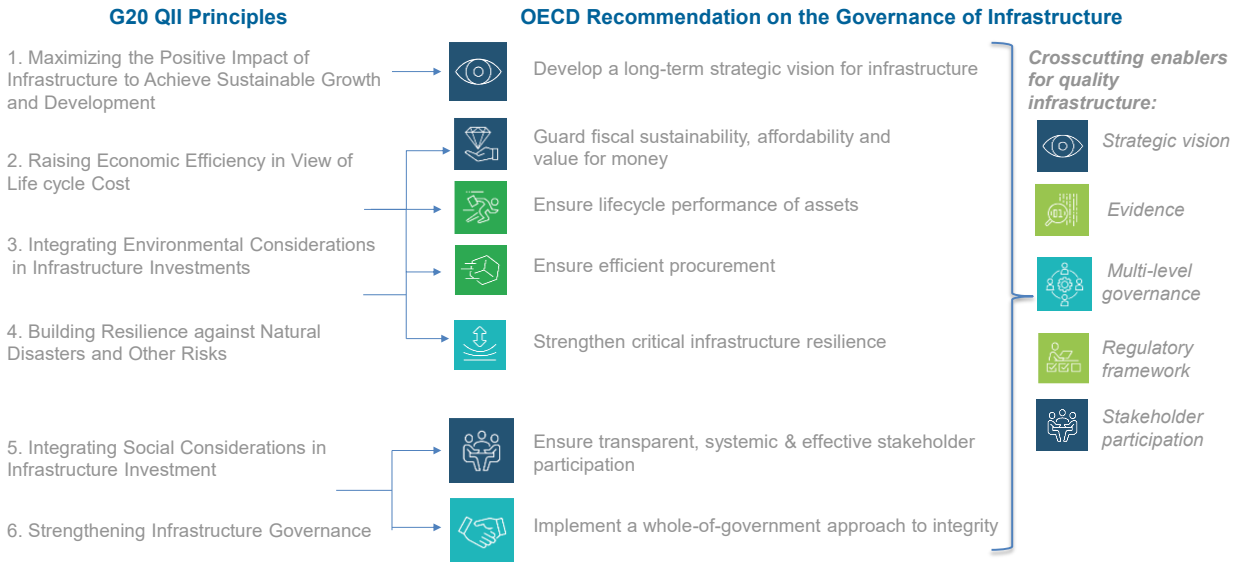
Edwin Lau, Ana Maria Ruiz Rivadeneira and Ludovica Mager

This chapter identifies the main challenges for enabling investment in environmentally sustainable and climate-resilient infrastructure, and defines three priority areas where governments can create the conditions to attract and scale up sustainable infrastructure investment, drawing on principles of infrastructure governance. These priorities are: aligning the strategic long-term infrastructure vision with environmental policy objectives, strengthening project selection and appraisal, and building public sector capacity. This chapter also provides examples of good practices in infrastructure governance based on OECD and G20 country experiences in each one of these priority areas. The examples in the chapter are supported by data from the 2020 OECD Survey on the Governance of Infrastructure.

Implementing the G20 QII Principles will require a fundamental realignment of government planning and delivery processes. Under this context, the following challenges have been identified as critical for enabling investment in environmentally sustainable and climate-resilient infrastructure:

- *Inadequacy of traditional frameworks and tools:* traditional planning and decision-making frameworks and instruments for infrastructure investment are ill-adapted for accommodating multiple objectives, particularly when these extend beyond the direct benefits for users to encompass broader outcomes relating to the environment, such as climate change mitigation, cleaner air, and biodiversity preservation. This is partly due to the fact that understanding the economic impacts of climate change is an evolving field of research and it also depends on key assumptions (Auffhammer, 2018[1]).
- *Fiscal and budgetary constraints for increased investment in environmentally sustainable and climate-resilient infrastructure:* the global macroeconomic environment has experienced significant changes since the COVID-19 pandemic and the war in Ukraine, including a normalisation of higher interest rates and non-transitory inflation. This new reality imposes greater importance on making the right public infrastructure decisions that offer the highest value for money.
- *Heightened uncertainty and rapidly changing environments:* uncertainties arising from factors such as rapidly evolving technologies, the impacts of climate change and behavioural changes in society create a challenge for planning infrastructure assets with lifetimes that span decades. Insufficient flexibility, responsiveness and poorly targeted procurement strategies can lead to dated or carbon-intensive technologies encroaching into long-term infrastructure contracts and agreements.
- Short-sighted investments: governments have a strong incentive to prioritise infrastructure investments with high visibility and display tangible results to certain constituencies (OECD, 2020[2]). Especially amidst an economic and social crisis, the risk of selecting projects that deliver the most benefits in the short-term but that do not adequately address long-term sustainability targets is higher than ever.
- *Multi-level governance:* an infrastructure project does not exist in a vacuum, but it is rather part of a network of multiple infrastructure assets that are interlinked and cross different jurisdictions. In this regard, governing infrastructure is generally challenging as it requires to co-ordinate and co-operate across different administrations, and it all becomes even harder when addressing climate change, considering that its impacts and risks are perceived differently across spaces. Multi-level governance remains a major challenge in ensuring that new skills and capabilities exist in infrastructure planning, preparation and delivery as well as in the deployment and scaling up of new technologies and innovation that the green transition demands. The challenge is especially pronounced in ensuring compliance with new regulatory requirements, and collection and use of quality data on the environmental and climate impacts of infrastructure.Infrastructure governance provides an approach to implement all of the G20 QII Principles, but actions to promote sustainable investment in particular, benefit from an understanding of how Governments can help align other infrastructure actors in order to promote a pipeline of quality infrastructure projects, ensure that project objectives and reporting correspond with investor expectations, and reduce barriers to sustainable infrastructure investment.

Figure 3.1. Infrastructure Governance to support the implementation of G20 Principles for Quality Infrastructure Investment



Infrastructure governance can be understood as the policies, frameworks, norms, processes and tools used by public bodies to plan, make decisions, implement and monitor the entire life cycle of public infrastructure. Governance has a key role to play in delivering well-articulated and whole-of-government infrastructure responses and ensuring infrastructure projects are well-targeted. While there has been an increasing focus on infrastructure governance in recent years, the crisis has sharpened the need to accelerate reform efforts in this area.

The OECD Recommendation on the Governance of Infrastructure and the OECD Recommendation on Principles for Public Governance of Public-Private Partnerships provide guidance on key governance strategies to facilitate and promote investment in green and climate-resilient infrastructure. Based on a recollection of good practices from G20 countries, the OECD has identified three priority areas where governments can support the scaling up of sustainable infrastructure investment, drawing on principles of infrastructure governance;

1. Steering the green agenda: aligning the strategic long-term infrastructure vision with environmental policy objectives
2. Strengthening project selection and appraisal for the delivery of a sustainable infrastructure pipeline
3. Capacity building for sustainable infrastructure investment.

Box 3.1. Guiding sustainable infrastructure investment to ensure effective delivery

The United States has taken several actions to ensure that the 1.2 trillion USD passed in the Infrastructure Investment and Jobs Act is effectively implemented and meets sustainability objectives:

1. **Steering mechanisms**: An Executive Order sets six implementation priorities, including for infrastructure that is climate resilient and which helps combat the climate crisis. An Infrastructure Implementation Task Force established by Executive Order and led by a newly-appointed White House Infrastructure Implementation Co-ordinator, provides guidance from the Centre of Government (National Economic Council Director as co-chair, the Office of Management and Budget (OMB), the Domestic Policy Council, and the Climate Policy Office in the White House), alongside the heads of six federal agencies.
2. **Strengthening project alignment**: Given that the vast majority of infrastructure investment is implemented at the State level, infrastructure co-ordinators have been appointed in 53 states and territories to work with the Task Force. The White House has produced a Bipartisan Infrastructure Law Guidebook and a Rural Playbook, factsheets and videos to help local communities understand how they can benefit from funding under the law.
3. **Capacity building:** The reinforced implementation effort has resulted in Implementation guidance produced by the OMB for ministries and agencies. The federal government is hiring for over 8 000 essential and mission-driven roles to implement the law including engineers and scientists to combat climate change.

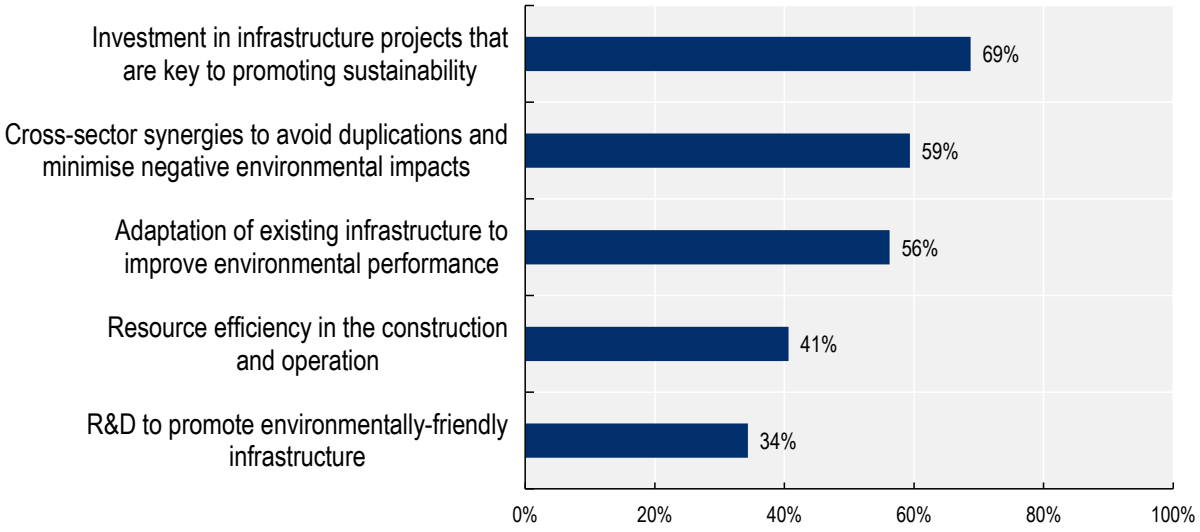
3.1. Steering the green agenda: aligning the strategic long-term infrastructure vision with environmental policy objectives

Quality infrastructure investment requires a clear vision for the future and a credible roadmap to achieve it. The G20 Principles stress the need to define a long-term vision for infrastructure which can help governments establish an adequate institutional framework, implement clear governance arrangements, define needs and targets, co-ordinate across stakeholders and develop reliable action plans. Furthermore, transparency and predictability of government intentions is a precondition to enable long-term investment decisions, especially from private investors.

Long-term infrastructure strategies that are aligned with climate change adaptation and mitigation objectives, with complementary medium-term action plans play an important role in steering investments decisions, from both public and private actors (Aguilar Jaberi, A., et al., 2020[3]). OECD countries have now become more aware of the need for coherence between long-term infrastructure plans and broader sustainable development objectives, in light of commitments made under the Sustainable Development Goals of the Agenda 2030. In this regard, most of the surveyed OECD countries back in 2021 (i.e. 24 out of 32, or 75%) have aligned their long-term infrastructure plan with environmental and climate action policies (OECD, 2021[4]).

Different strategies and tools have been used to promote alignment of strategic long-term infrastructure visions with environmental policy objectives. To illustrate, 69% of the surveyed countries invest in key projects enabling the implementation of broader sustainability initiatives (e.g. circular economy systems, sustainable mobility, net-zero carbon emissions, climate change mitigation and adaptation), 59% focus on identifying cross-sector synergies to reduce negative environmental impacts, and 56% on adapting existing infrastructure to improve environmental performance. Fewer have adopted resource efficiency targets in the construction and operation of infrastructure (41%) or research and development to promote environmentally friendly infrastructure (34%) (OECD, 2021[4]) (Figure 3.2).

Figure 3.2. Goals and targets in the national infrastructure plan to promote environmentally sustainable infrastructure in OECD countries, 2020



Note: Results are shown for 32 OECD countries.
Source: 2020 OECD Survey on the Governance of Infrastructure.

Based on G20 country practices, the following elements can be highlighted in order to improve infrastructure long-term planning, ensuring that the long-term vision is aligned with climate and environmental objectives, and can be used as an instrument to steer the green agenda.

- **Demonstrate clear and credible commitment to long-term climate goals, international biodiversity targets, and other environmental objectives.** In that regard, Indonesia is integrating climate change considerations into the planning processes in order to enable the transition towards a green economy. To develop the Low-Carbon Development Policy under its 2020-24 National Medium-Term Development Plan, **Indonesia** employed a systems-based analysis framework to consider the inter-linkages between different economic sectors and development goals, including the reduction of greenhouse gas emissions and conservation of biodiversity.
- **Ensure that infrastructure long-term planning takes into account environmental and climate considerations, and the link with other government priorities such as inclusion and territorial development. Canada's** 'Investing in Canada Plan' includes a specific funding stream dedicated to investments that support a transition to a clean growth economy in provinces and territories. The plan was recently updated to include a COVID-19 resilience component to fund shovel-ready, short-term projects that aim to retrofit, repair and upgrade existing infrastructure, as well as disaster mitigation and adaptation projects. Another example is South Korea's New Deal to combat the economic setbacks caused by COVID-19, with a distinctive territorial approach. The main objective of the plan is to transform the country into a fast-mover, low-carbon economy and inclusive society.
- **Use the vision to underline a clear investment strategy that sends a message to financial markets of strong government leadership and will for low-carbon infrastructure.** Government leadership in infrastructure investment is vital to shape the direction of a country's green transformation and to crowd in private investment of sustainable infrastructure. To support the implementation of the Singapore Green Plan 2030, **Singapore's** net-zero ambitions and the Green Finance Action Plan, the country has introduced the Significant Infrastructure Government Loan

Act (SINGA), designed to support major, long-term infrastructure projects following stringent project appraisal by tapping into the debt market to use public investment to clearly and significantly set the direction of sustainable infrastructure. Under SINGA, Singapore plans also to issue green bonds as a key part of its sustainability agenda and to help finance further development of sustainable infrastructure, mobilising private capital, and catalysing climate actions.

- **Accommodate future uncertainties resulting from climate change and technological innovation,** by providing the appropriate degree of flexibility to enable adjustments over time and reflect changing circumstances or new information (OECD, 2021[5]). In this regard, a number of alternative decision-making approaches have been developed, using scenario planning as their basis, such as real option analysis, robust decision making and adaptive planning. **The Netherlands,** for example, has adopted adaptive planning water-management as the basis for its long-term planning for its water resources, building on an iterative decision-making process and the use of Nature-based Solutions (NbS) (Zevenbergena, Rijkeb and van Herkb, 2015[6]; OECD, 2018[7]).
- **Estimate the potential effect of the long-term strategic vision on the environment.** For the development of the National Development Plan (NDP) 2021-30, **Ireland** has undertaken climate and environmental assessment of the NDP measures, along with an assessment of the alignment of the plan as a whole with the ideals of a green recovery plan. Seven climate and environmental outcomes were specified on which each NDP measure is likely to have an impact: climate mitigation, climate adaptation, water quality, air quality, waste and circular economy, nature and biodiversity, and just transition. This assessment could be used to inform priority setting and capital budget planning under the Public Spending Code.
- **Ensure cross-sector synergies and introduce a systemic approach to improve resilience in the long term.** The COVID-19 crisis provided an opportunity to focus investment on long-term objectives such as pursuing a low-carbon transition, promoting resilience, and reducing regional disparities. In **Italy,** Milan launched the 2020 Adaptation Strategy to promote a systemic transformation of the city's infrastructure leveraging synergies across sectors. The strategy aims to rethink the timing, timetables and the rhythm of the city, and to reclaim public spaces for well-being, leisure, and sports. The strategy also aims at stimulating the recovery of the construction sector by launching widespread maintenance and redevelopment projects on existing real estate assets, both public and private, alongside energy-saving initiatives, environmental redevelopment and improved home comfort.
- **Develop financial instruments to promote the financing of sustainable infrastructure in the medium and long term. France** has been one of the pioneer and leading countries on sovereign ESG financing. On 24 January 2017, Agence France Trésor (AFT) launched the first French sovereign green bond for an issuance amount of EUR 7bn. In addition, on 16 March 2021, AFT launched a second Green OAT through syndication: the OAT 0.50% 25 June 2044, for an amount of EUR 7bn matching the level reached during the inaugural issue of the first green OAT. France's Green OATs funds central government budget expenditure and expenditure under the "Invest for the Future" programme to fight climate change, adapt to climate change, protect biodiversity and fight pollution. The funds raised are handled like funds from a conventional OAT and managed in compliance with the general budget rule. However, they are matched to an equivalent amount of Green Eligible Expenditures and the aggregate of such expenditure in a given year sets the limit for Green OATs issuance.
- **Develop transparent pathways to create greater investment predictability and strengthen the demand for sustainable investment. Brazil's** Infrastructure Observatory aims to disseminate relevant information on investments and sustainability in infrastructure to improve its planning and regulation. The platform presents scenarios and projections of investment and socio-economic indicators, and lists the projects being planned and executed with participation of the

Federal Government as well as private investments. The projects are evaluated from the perspective of sustainability along four dimensions: economic-financial, environmental, social and institutional.

3.2. Strengthening project selection and appraisal for the delivery of a sustainable infrastructure pipeline

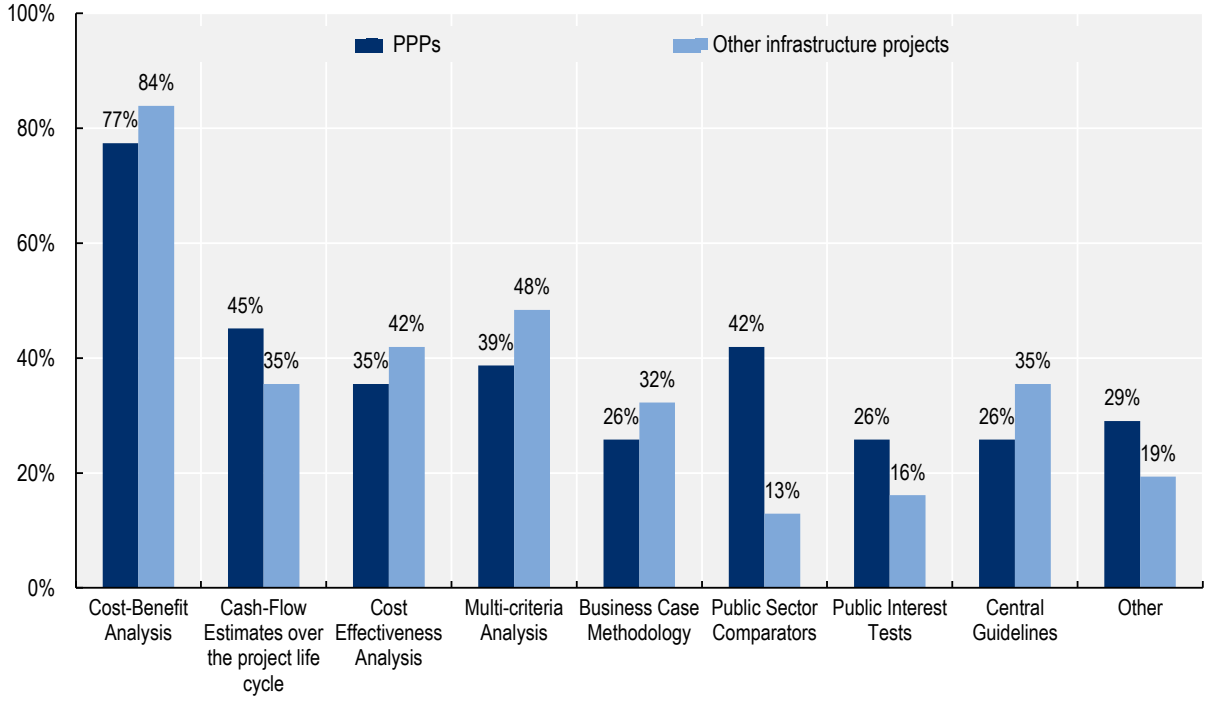
Infrastructure is a long-lived capital-intensive investment. Decisions made today about the nature, location, and design of infrastructure will have long-lasting effects that influence the extent to which investments deliver anticipated benefits over time and align with broader policy objectives (OECD, 2021[8]). Governments have a primary role in defining which investment options are best able to contribute to the achievement of identified policy goals. Political dynamics can undermine sound decision making on infrastructure when processes for identifying priority projects and choosing delivery modes are not sufficiently formalised (OECD, 2017[9]). If the incentives are skewed towards displaying tangible results to a certain constituency, some other infrastructure needs might end up being neglected, resulting in inefficient investments that fail to respond adequately to the needs of the population. Political short-sightedness can indeed hamper sustainable infrastructure investments, whose benefits are often intangible and tend to accrue just in the longer-time horizon. Conversely, it can also lead to window-dressing of climate change actions and policies.

In the context of a wider focus on well-being and sustainable development, infrastructure investment is increasingly required to address multiple economic, social, and environmental objectives. This creates challenges for decision-makers, who are required to weigh and balance different (and sometimes competing goals) in selecting and prioritising projects (OECD, 2021[8]). While there is a natural inclination to promote 'shovel-ready' solutions, this must be balanced by the need for environmentally sustainable and climate-resilient infrastructure.

As pointed out in the OECD Recommendation on the Governance of Infrastructure, governments benefit from decision-making processes that are based on a sound understanding of the expected returns of infrastructure projects and pay due consideration to economic efficiency as well as social, environmental, and climate costs and benefits throughout the whole of the asset's life cycle. Short lists of projects should be developed using assessment methods that analyse both monetary and non-monetary costs and benefits and consider the projects' contribution to environmental and resilience policy goals.

Traditional tools and mechanisms to appraise and prioritise infrastructure projects are often ill-equipped to consider environmental and climate aspects, and this is also due to the inherent difficulty to estimate the environmental costs and benefits of an infrastructure asset and translate them in monetary values. However, valuation of environmental costs and benefits may not always be sufficient to impact the overall costs and benefits of an asset and so setting higher values for environmental and climate impact may be required. Most OECD countries use CBA [(77%, 24 out of 31 countries (for PPPs); 84%, 26 out of 31 countries (for other infrastructure projects)] (Figure 3.3) to inform infrastructure appraisal and decision-making as it is simple in its logic, and it generates clear quantitative values (i.e. Net Present Values, Benefit/Cost ratios) that can be used to compare and rank projects. Nonetheless, it leaves aside a wide range of factors that are not easy-to-monetise, but that are relevant for the purpose of fostering sustainable infrastructure investments (OECD, 2021[5]). Methodologies such as multi-criteria analysis which can accommodate more long-term goals – such as environmental sustainability – are less widely used [39% (for PPPs); 48% (for other infrastructure projects)] (Figure 3.3).

Figure 3.3. Methodologies used to assess infrastructure projects in OECD countries, 2020



Note: Results are shown for 31 OECD countries.
Source: 2020 OECD Survey on the Governance of Infrastructure.

The following good practices based on OECD and G20 country experiences can serve as tools to ensure the project appraisal and prioritisation process fosters sustainable infrastructure:

- **Better integrate environmental considerations in project planning, appraisal and prioritisation.** The OECD is currently supporting the Department of Public Expenditure and Reform (DPER) in **Ireland** to strengthen the integration of environmental and climate considerations in the appraisal of infrastructure project investments, within the framework of the Public Spending Code (PSC). This also includes improve the quantification of the emission impact of infrastructure projects in the CBA.
- **Include sustainability as part of a rigorous project assessment process to inform the capital budgeting process. Australia** has developed a transparent method of project selection to inform Australian Federal budget processes and incentivise sub-national governments and other project proponents to undertake robust appraisals that can include sustainability goals. Infrastructure Australia (IA) undertakes independent assessments of infrastructure projects and initiatives on behalf of the Federal Government against criteria that, in part, includes environmental value. Infrastructure Australia publicly releases these evaluations in the form of Infrastructure Priority Lists. For a project or initiative to be assessed, it must be supported by an appraisal deemed adequate by IA (Infrastructure Australia, 2022). While in Australia, this method could be developed further to include sustainability goals, it provides a structured way for countries to ensure projects and initiatives are robustly appraised against sustainable objectives.
- **Ensure decisions on infrastructure investments are informed by robust evidence-based analysis.** This helps overcome political short-sightedness, enhances the opportunity to opt for sustainable infrastructure investments. In this regard, **Norway's** Ministry of Finance foresees an additional scrutiny for large transport projects via a two-stage quality assurance process, which

includes inputs from independent reviewers and evaluates environmental and social impacts (OECD, 2017[10]).

- **Accurately account for the financial cost of carbon and environmental externalities in the financial evaluation of infrastructure projects. Germany's** Federal Ministry of Finance identifies climate action as a priority (Federal Ministry of Finance, 2022). As part of this, Germany launched its national emissions trading system (nEHS) in 2021 for the heating and transport sectors. The fixed price for a tonne of CO_2, which started at EUR 25 in 2021, will gradually increase to EUR 55 by 2025. All revenues will be recycled into new sustainable investment projects and initiatives.
- **Supplement CBA with other methodological tools to analyse both monetary and non-monetary costs, such as multi-criteria analysis.** The **United Kingdom** has adopted general guidelines for the incorporation of multi-criteria analysis (MCA) in decision-making processes (Department for Communities and Local Government, 2009[11]). The guidelines describe various techniques to perform MCA, encompassing a wide range of quite distinct approaches. MCA can bring a degree of structure, analysis and openness that lie beyond the practical reach of CBA, as it often involves combinations of some criteria which are valued in monetary terms, and criteria for which monetary valuations do not exist. MCA is then a good instrument to integrate and evaluate the environmental (i.e. water and air pollution, impacts on biodiversity and landscape, etc.) and climate impacts (i.e. GHG emissions) of projects, as it considers both elements for which monetary values can be estimated even just indirectly (i.e. through hedonic pricing techniques and stated preferences), as well as elements for which monetary values are not applicable.
- **Integrate sustainability considerations in the evaluation of projects.** In 2021, the Ministry for Sustainable Infrastructure and Mobility (MIMS) in **Italy** introduced sustainability considerations in the planning and evaluation of infrastructural projects, placing great focus on the environmental sustainability, along with the economic, social and governance dimensions. Among the novelties, the ministry designed new guidelines for the *ex-ante* valuation of projects, together with the related operational guidelines specific to the different sectors that fall under its competence, including railway, public transport and road sectors. It also introduced a new scoring system to define an order of priority for projects that builds on multiple criteria, encompassing also the environmental dimensions, as well as new guidelines for the Technical and Economic Feasibility Project that include a study on the environmental impact of project and a sustainability report.
- **Value ecologically sustainable project design.** In **Australia**, the Southbank Education and Training Precinct Project aimed to provide the highest level of ecologically sustainable design. It was awarded the 2009 Southbank Business Sustainability Award for environmental design, water conservation, waste management and energy management. The project was among the six major case studies selected by the Council of Australian Governments' Infrastructure Working Group in 2010 to highlight those facets of major infrastructure projects that demonstrate best practice (Department of Infrastructure and Transport, Australian Government, 2010[12]).
- **Adopt a life-cycle perspective to estimate environmental benefits and costs of an infrastructure asset –** from construction to operation and maintenance to decommissioning. Infrastructure are capital-intensive assets with a lifetime that spans across several years. This entails that environmental considerations should not be limited to construction, but rather extend to the operation, maintenance and decommissioning phase. With the support of the EU, the OECD is currently supporting **Hungary** in promoting green public procurement, with a special focus on life cycle costing (LCC). A comprehensive LCC analysis takes into consideration the costs of mitigating/reducing (external) environmental impacts when awarding a public contract. Hungary, for example, has used LCC during the public procurement process for the construction of a sewage treatment plant for better compliance with environmental regulations.

- **Promote stakeholder participation that can channel infrastructure needs in a sustainable, inclusive and effective way.** This will feed up legitimacy, trust, and shared ownership on infrastructure investment projects that support environmental objectives, while ensuring other important aspects and sustainability dimensions are not disregarded. In **France**, stakeholder engagement is mandatory for any transport infrastructure project with a budget from EUR 300 million or a length of more than 40 km. The Tours-Bordeaux project involved 150 public meetings to provide information on the project from its very earliest stages and 2 000 stakeholder consultations. Five hundred visits to four construction sites were organised, principally for local residents, with nearly 20 000 people attending over a period of three years. Stakeholder consultations resulted in agreements on environmental protection, avoiding sensitive sites, and creating natural environments close to the line in compensation for comparable sites disturbed or destroyed.
- **Align existing evaluation tools and processes with green objectives to streamline implementation.** The **United States** has released a new Permitting Action Plan to strengthen and accelerate federal permitting and environmental reviews by fully leveraging existing permitting authorities to implement new provisions of the Infrastructure Investment and Jobs Act. The Action Plan outlines the Administration's strategy for ensuring that federal environmental reviews and permitting processes are effective, efficient, and transparent, guided by the best available science to promote positive environmental and community outcomes, and shaped by early and meaningful public engagement.

3.3. Capacity building for sustainable infrastructure investment

Sustainable and resilient infrastructure investment is increasingly required to address multiple economic, social and environmental objectives beyond a narrow definition of user needs. This creates challenges for decision-makers, who are required to weigh and balance different (and sometimes competing goals) in selecting and prioritising projects. Existing decision-making frameworks are not always well-adapted to accommodating a more diverse set of objectives. If the political incentives are skewed towards displaying tangible results to a certain constituency environmentally sustainable and climate resilient infrastructure can be neglected. This will result in inefficient investments that fail to respond adequately to the needs of the population.

Closing the infrastructure financing gap and attracting private sector investment will depend on the capacity of governments to ensure a pipeline of quality, environmentally sustainable projects that respond to investor needs. Building capacity to create and use evidence-based tools and metrics will better inform infrastructure planning and prioritisation, providing countries with a clearer understanding of the environmental impacts of investments. Supporting innovative financing instruments, such as green and sustainable bonds, with adequate resources allocated will further support the successful rollout of quality, environmentally sustainable project pipelines.

- **Identify key challenges and reasons for failure and provide support to develop a mitigation strategy**. For example, the Commercial Law Development Program (CLDP), a division of the **United States** Department of Commerce advises policy makers and government officials in developing and post-conflict countries to develop transparent legal and procedural frameworks to oversee complex infrastructure projects. Identifying the common reasons for project failure, the CLDP provides technical assistance in mitigating these risks through due diligence considerations, political considerations, and inter-stakeholder communications.
- **Increasing awareness and providing capacity building on green infrastructure.** The OECD in collaboration with the European Union, is supporting **Italy** to integrate a green infrastructure approach into the planning of transport infrastructure. An important component of the project

includes providing training and capacity building to increase awareness, and strengthen the capacities of public servants on green infrastructure, by improving definitions, cost benefit methodologies, and processes to include the consideration of green infrastructure options, alongside traditional grey infrastructure proposals.

- **Improving capability to translate climate objectives into functional specifications for PPP and project tenders. Indonesia** uses PPP as an innovative financing scheme to integrate considerations of environmental aspects, climate change issues and green financing early on in the project life cycle. Examples of green considerations integrated into PPP projects include, but are not limited to, implementing a project design that promotes efficient use of energy, implementing reuse of treated wastewater, rainwater harvesting, and rainwater aquifer recharge system, and the use of materials which minimise operation and maintenance costs. Indonesia is also implementing an ESG framework into PPP and non-PPP projects as part of its commitment to addressing climate change, as well as capturing financing opportunities.
- **Leverage public development finance institutions to play a catalytic role and strengthen public sector's capacity**. This type of institutions can be particularly helpful to develop the infrastructure finance market and strengthen the pre-investment phase in emerging and developing economies. For example, the National Development Financial Corporation (FDN) in **Colombia**, a financial corporation specializing in the financing and structuring of infrastructure projects, offers innovative products and services to attract resources that facilitate the private sector's participation in the development of infrastructure projects in Colombia. The FDN plays a catalytic role in overcoming gaps in the market and mobilises financial resources to develop national infrastructure, while appropriately managing risks. The FDN is also committed to ensuring that infrastructure investment actively contributes to the achievement of national and international commitments on environmental protection, climate resilience and low greenhouse gas emissions. Similarly, the Brazilian Development Bank (BNDES), the main financing agent for development in **Brazil**, plays a fundamental role in stimulating the expansion of industry and infrastructure in the country. In its efforts to build markets, promote a green economy, and engage in green innovation financing, the BNDES has made direct equity investments in Sunew, a company aiming at the large-scale manufacturing and commercialisation of Organic Photovoltaic (OPV) films to generate solar energy.
- **Improve visibility and technical assistance to projects and make smart use of financial resources**. To achieve climate objectives and solve the infrastructure financing gaps, the **European Union** has accelerated the development of strategically important infrastructure projects by providing institutional access, public guarantees and funds. In 2014, the European Commission launched the Investment Plan for Europe (IPE) to remove obstacles to investments, provide visibility and technical assistance to projects and make smart use of financial resources across Europe. The Plan has three pillars: first, the European Fund for Strategic Investments (EFSI); second, the European Investment Advisory Hub and the European Investment Project Portal; third, targeted efforts to remove national and EU-level regulatory barriers to investments (OECD, 2018[7]).

In the wake of COVID-19, G20 countries understand more than ever the need to leverage infrastructure investment to fully realizing their potential to deliver on key policy priorities, including catalysing the low-carbon transition, incorporating circular economy solutions, safeguarding biodiversity, building resilience to climate change, and underpinning countries' sustainable development.

Governments can improve the environment for sustainable infrastructure investment by improving the alignment of public and private expectations regarding sustainability objectives, pathways and measures. This begins with high-level dialogue at the political level, e.g. through the OECD-G20 Investors' Dialogue, but the work of alignment does not stop here. Implementing the G20 QII Principles, requires governments to cascade their environmental and climate commitments and plans through their infrastructure planning

and capital budgeting across sectors, to operationalise high level objectives into project prioritisation and appraisal criteria, and to ensure that key capacities are in place across the public sector to make the right decisions in line with government objectives in order to ensure a pipeline of bankable quality infrastructure projects.

In support of this complex challenge, the OECD is preparing a Toolbox for the Implementation of the Recommendation on the Governance of Infrastructure that will draw on the examples laid out in this paper and its annexes and further develop the infrastructure governance pillars that can support country ambitions. Furthermore, it is developing Infrastructure Governance Indicators that operationalise the Recommendation in terms of functional practice. Extending these indicators beyond OECD countries and collecting addition good practice examples to include other G20 members and beyond would provide an additional step in filling the data gap on key practices to implement the G20 principles.

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4 Legal and regulatory barriers to quality infrastructure investment

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This chapter brings together studies on legal and regulatory barriers on QII, to bring a better understanding to what these barriers are. It examines the main areas that have been raised as barriers and collates where further examination could be necessary.

4.1. Introduction

One of the common areas that investors claim affect their investment decisions into infrastructure has been legal and regulatory barriers. However, legal and regulatory barriers can be different depending on the investor, type of infrastructure, and country in which the infrastructure is based. Thus, if governments are to address this to attract more private investment, a better understanding of what may constitute legal and regulatory barriers is necessary.

In an attempt to bring a more granular understanding to these barriers, the OECD is developing a report that would try to specify the nature of these barriers based on a table of classification that the Secretariat has developed (Annex 4.A). The table was shared with D20-Long-term Investors Club members which constitutes national development banks, a network of institutional investors, and G20 Infrastructure Working Group (IWG) members for responses on specific laws and regulations that could create barriers.

This preliminary note is based on responses that were provided by EIB, Italy's CDP, the Lithuanian Ministry of Finance, the Inter-American Development Bank (IDB), the Japanese Bank for International Co-operation (JBIC), and Korea's ExIm Bank.[1] Given the limited number of responses, this note only includes observations of Europe, North America, Latin America, and Asia. To ensure that the report can reflect a fuller view of what may be causing investors' hesitancy, participants to the Task Force are encouraged to provide inputs and reports that could support this report. It is hoped that with more information, the report can be developed to reflect all continents and the variety of aspects.

With a fuller collection of information, the next phase of this project could examine ways the barriers identified in specific areas can be reformed, by analysing other markets where they do not constitute a barrier. This would permit the Task Force to develop an understanding of legal, regulatory and procedural frameworks that could support greater private sector financing.

4.2. Table of classification of quality infrastructure investment

The table of classification (see Annex 4.A) has been developed using the OECD Compendium of Policy Good Practices for Quality Infrastructure Investment (2020), OECD Implementation Handbook for Quality Infrastructure Investment (2021) and OECD FDI regulatory restrictiveness index, as well as input from within the OECD Secretariat. The table looks at the investment side (the recipient side of investment) and at the financing side (including regulatory aspects that shape the supply of capital for infrastructure). For completeness' sake, aspects of financial risks have also been included although going beyond legal and regulatory barriers.

This preliminary note looks at an initial sample of seven responses and reports to understand the overarching barriers that investors and financial institutions face globally.

The heterogeneous responses received at this early stage call for a regional approach in this preliminary analysis. Based on those responses and on additional reports referred by respondents, this note provides an overview of the perceived most pressing challenges that are preventing infrastructure investment and development including, but not limited to, legal and regulatory barriers.

Section 4.3 draws on several reports provided by the European Investment Bank (EIB) regarding the state of affairs of infrastructure investment and regional and rural development in the European Union to collect information on regulatory barriers encountered both by the financing side (European firms) and by the investment side (municipalities). Section 0 looks at North America in relation to the United States' firms responding to the EIB Investment Survey. Section 4.5 examines developments in Latin America and Caribbean. Section 4.6 focuses on the limitations to Public-Private Partnerships (PPPs) in a group of Asian countries, reported by the Asian Development Bank in the 2019 PPP Monitor report.

4.3. Europe

This section focuses on the legal and regulatory barriers for infrastructure investment present in the European Union (EU). The bulk of the information comes from the EIB Investment Survey 2021, the EIB Municipalities Survey 2020 titled "The State of Local Infrastructure Investment in Europe", and from direct responses to the OECD barrier classification questionnaire from European investors, among other sources.

Additional responses from German participants illustrate the capital and solvency regulatory barriers present in Germany and the EU at large under the Solvency Capital Requirements (SCR) Solvency I (pension funds and small insurers) and Solvency II (regulated insurers) directives.

It is important to point out that each source provides responses from a different perspective. EIB Investment Survey collected data from European firms of all sizes across four main economic sectors: manufacturing, construction, services, and infrastructure (Delanote and Rizzoli, 2021[1]). The report on the State of Local Infrastructure Investment, on the other hand, gathered data from municipalities receiving financing across the EU (McGoldrick and Debs, 2021[2]).

4.3.1. Infrastructure investment: Focus and gaps

Among the respondents to EIB investment survey, 82% believed that they had invested the right amount between 2018 and 2021; out of all those firms, 78% came from the infrastructure sector (Delanote and Rizzoli, 2021[1]). However, this data does not reflect the potential investment gap that might exist between public and private investment, and this becomes more evident in the EIB survey for municipalities.

Municipalities report that the implementation of austerity policies in many EU member countries has prevented public investment in climate transition and infrastructure projects, and therefore have exacerbated regional differences and widened the investment gaps among them (McGoldrick and Revoltella, 2021[3]). Indeed, many gaps identified are related to climate change, digitalisation, and urban transport, which are the areas with the most pressing need for investment in the EU (McGoldrick and Debs, 2021[2]).

An additional problem stems from the fact that gaps are not homogenous, as smaller and poorer regions tend to identify more and wider investment gaps (McGoldrick and Debs, 2021[2]). In these areas – which usually have a GDP/capita below 75% of EU average (Delanote et al., 2021[4]) – gaps are more severe and common when related to basic infrastructure, such as transport, social infrastructure, and water and waste utilities (McGoldrick and Revoltella, 2021[3]). Similarly, about 75% of less developed municipalities report investment gaps in climate change mitigation (Delanote, Kolev and Rizzoli, 2021[5]).

Ongoing cohesion policies across EU addressed specifically at less developed and rural areas are crucial to ensure progress in the recovery after the COVID-19 crisis (Ferreira, 2021[6]). Economists at the EIB also emphasise the important role that public development banks and institutions can play in overcoming these barriers through regulatory reform that will enable investment and by providing municipalities with innovative resources to improve their resilience.

Regarding SCR's effect on German supply of capital for infrastructure, Solvency I directive sets concrete stress level requirements for pension funds and small insurers. In addition, it also regulates quantitative investment regulation with quotas on investment vehicle allocation, while it does not consider infrastructure as an investment category.

4.3.2. Main challenges and constraints

In 2021, EU firms were considerably more optimistic about the economic outlook than in 2020, especially in terms of economic climate and business prospects. Despite this positive shift in the past year, firms remained pessimistic about the political and regulatory climate (Delanote and Rizzoli, 2021, p. 18[1]).

The main barriers to investment that EIB Investment Survey respondents identified for investment are:

- Availability of skilled staff (79%)
- Uncertainty about the future (73%)
- Business regulations (~ 65%)
- Energy costs (~ 65%)

These constraints are the same as those identified by firms in the infrastructure sector as most pressing for infrastructure investment and development.

In addition, access to finance also comes up frequently as a barrier for investment in the EU. The information from the municipalities can shed some light in this regard. As mentioned before, stricter austerity policies and a decrease in public funding resulting from the global financial crisis and the pandemic limited considerably the ability to develop infrastructure in the EU. The following are the most important barriers, which complement those reported by EU firms:

- Length of regulatory process (85%)
- Regulatory uncertainty (83%)
- Lack of funding (76%)
- Lack of technical capacity (72%)

Although lack of funding does not rank at the top of the list of barriers identified by surveyed municipalities, almost 55% of them reported lack of funding as the most pressing barrier they encounter regarding financing infrastructure projects.

Additionally, 88% of larger municipalities generally reported that agreement among stakeholders represented an important barrier as well (McGoldrick and Debs, 2021, p. 17[2]).

There appears to be a correlation between the barriers identified on the firms' side and those from the municipalities' side, particularly in what pertains to the role and state of infrastructure and the existing obstacles to investment:

- The less developed or more economically lagging a region is, the less attractive it becomes to investors, who might be risk averse in relation to infrastructure projects.
- The more financially constrained a company is, the less investment in R&D and intangibles, and the less financing for projects.
- 72% of municipalities find a lack in technical capacity in their constituencies and 79% of firms find a barrier in accessing skilled staff for their corporate and infrastructure investment projects in the region.
- Some 65% of firms find constraints in business regulations. This might be affecting the municipalities' ability to access private funding and their capacity to establish PPPs. It could also be affecting the length of the regulatory process, which 85% of municipalities find burdensome.
- The general sentiment of uncertainty about the future (73% for firms) and pessimistic view on the political and regulatory situation might affect stakeholders' ability to come to business and financial agreements regarding infrastructure projects.

4.3.3. PRELIMINARY AREAS OF BARRIERS

Based on the table in Annex 4.A, the following barriers correspond to the current investment landscape in the European Union.[2] The areas below do not represent an assessment of barriers, but areas that have been generally identified as requiring more attention.

Table 4.1. Legal, regulatory and procedural barriers in the European Union

INVESTMENT SIDE (regulatory factors that shape the attractiveness of infrastructure for investors)	
Essential security interests (can be derived by either national security or economic protectionism concerns)	
Investment screening** (construction sector)	
Financial related	
Appropriate risk mitigation tools not available**	
Credit rating scores low or unavailable**	
Risk factors	
Regulatory risks	
	Schedule too long
	Compliance with ongoing regulation–Too onerous and costly to perform**
	Uncertainty of regulation
	Complexity/lack of coherence of regulatory standards across jurisdictions/sectors
Inadequate ESG framework for investors	
	Insufficient/non-standardised environmental considerations
	Insufficient/non-standardised social considerations
Poor resilience considerations	
	Climate change-physical risk*
	Climate change-transition risk**
	Social risks*
Insufficient data available for risk analysis**	
	Financial data related reporting
	Non-Financial reporting
Political risks*	
PPP and project finance frameworks	
Lack of supportive framework for PPPs and concessions lacking (private) **	
Lack of supportive frameworks for project finance (Western Balkans investments) **	
Lack of lender step-in rights (private) **	
Procurement regulations	
Lack of stability and predictability of regulatory regime (public) **	
Lack of supportive framework for effective tendering and contract management (public) **	
Lack of supportive framework for integrating ESG and macro aspects in procurement process (public) **	
FINANCING SIDE (including regulatory aspects that shape the supply of capital for infrastructure)	
Capital regulation/Solvency regulation *	
Quantitative investment regulation	
Restrictions on direct or ownership of unlisted companies	
Sectoral regulation *	
Prudential regulation	
Quantitative restrictions for pension fund investments	
Capital market regulation	
Limited availability of debt capital market instruments **	
Restrictions on private placement of infrastructure debt **	
Risk considerations	
Insufficient applicable ESG considerations	
	Regulatory requirements for environmental considerations
	Regulatory requirements for social considerations
	Regulatory requirements for governance considerations

Notes: *: Delanote and Rizzoli (2021[1]), *EIB Investment Survey 2021 European Union Overview*, European Investment Bank, https://www.eib.org/attachments/publications/eibis_2021_european_union_en.pdf (accessed on 15 April 2022).
**: Information shared by the Cassa Depositi e Prestiti (CDP) in Italy.

4.4. North America

Through the EIB work on its Investment Surveys, which address firms in Europe and the United States, it has been possible to understand the investment barriers faced by US firms similar to European firms. The information in this section comes from the specific EIB Investment Survey 2021 Country overview: US. Unlike for Europe (see Section 4.3), the analysis about the US barriers to investment is limited, lacking information from the receiving end of investment, and without direct input from the US.

4.4.1. Infrastructure Investment: Focus and Gaps

Although the level of investment was lower in the United States than in the EU in 2020, the rebound after COVID-19 was also stronger in the US, exceeding pre-COVID-19 investment levels by Q3 of 2021 (Delanote, Kolev and Rizzoli, 2021, p. 2[5]).

Similar to the EU, the largest investments from US firms was on replacement of building and equipment (43%); in this category and just like in Europe, infrastructure firms held the largest share (44%) (Delanote, Kolev and Rizzoli, 2021, p. 3[5]). A more specific categorisation within the Survey indicates that US firms focused on tangible assets, with 43% investing in machinery and equipment, and 21% on land, building and infrastructure (Delanote, Kolev and Rizzoli, 2021, p. 3[5]).

A majority of US firms reported that they do not see any gaps in their investing, with 77% believing that they invested the right amount in 2021 (Delanote, Kolev and Rizzoli, 2021, p. 6[5]). Again, due to a lack of information from investment recipients, it is difficult to comprehend whether other barriers to infrastructure investment might exist in the United States.

4.4.2. Main challenges and constraints

As mentioned in Section 4.3, US firms' sentiment about the economy and investment possibilities improved compared to 2020 and even exceeded European levels. This might be due to a better perception regarding access to finance in the United States. Indeed, around 50% of EU firms considered availability of finance as a constraint, while this percentage amounted to 35% in the US, where it was considered a much smaller obstacle than in Europe (Delanote, Kolev and Rizzoli, 2021, p. 11[5]).

Conversely, like in Europe, the one measure that US firms remain pessimistic about is the political and regulatory climate, which rated not only in the negative but also lower than in Europe and lower than the previous year (Delanote, Kolev and Rizzoli, 2021, p. 10[5]). This remains an area of concern in the short-term for US firms, as they perceive that the political environment will not improve in the next year.

As of 2021, US firms reported the following measures as most pressing long-term barriers:

- Availability of skilled staff (92%)
- Uncertainty about the future (77%)
- Business regulations (~ 71%)
- Labour market regulations (70%)

The EIB Surveys consider nine different measures as barriers to investment. In 2021, US participants selected more measures compared to previous years (Delanote, Kolev and Rizzoli, 2021, p. 11[5]). This slight behavioural shift can be an indicator of the increased complexity of barriers to investment in developed economies. One single measure might not appear as a major obstacle anymore. Rather, many

measures rating as relatively neutral obstacles might aggregate, in fact, to a bundle holding greater relevance to the firm or the stakeholder future investment plans.

4.4.3. Preliminary areas of barriers

Based on the full barrier classification table in Annex 4.A, the following barriers correspond to the current investment landscape in the North America.[3] The areas below do not represent an assessment of barriers, but areas that have been generally identified as requiring more attention.

Table 4.2. Legal, regulatory and procedural barriers in North America

INVESTMENT SIDE (regulatory factors that shape the attractiveness of infrastructure for investors)	
Risk factors	
Regulatory risks	
	Compliance with ongoing regulation–Too onerous and costly to perform
Poor resilience considerations	
	Climate change-transition risk
	Social risks
Political risks	
FINANCING SIDE (including regulatory aspects that shape the supply of capital for infrastructure)	

4.5. Latin America and Caribbean

In 2019, the Inter-American Development Bank (IDB) published a report looking at PPPs legislation in in Latin America and the Caribbean aiming at studying existing legal frameworks, identifying best practices, and establishing guidelines on PPPs[4] applicable to the region. The study also relied on the participation of a team from the Global Infrastructure Hub and on the contribution of prominent lawyers from the countries included in the report (Lembo et al., 2019, p. 3[7]).

As a country-by-country analysis trying to identify regional similarities and current regulatory landscapes, the report focuses on the enabling capacity of legislation and on transferable best practices, but does not explicitly address the barriers inherent to the existing regulation. Drawing on the Barrier Classification Table (Annex 4.A) and on the specific analysis contained in the IDB report this note tries to bridge the barrier gap by creating a parallel between the rest of the note and the specifics in the Latin-American case.

The report covered 17 countries in the region: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, and Uruguay. Most PPPs and infrastructure projects are located in Brazil, Mexico and Colombia, and 83% of projects in the region are developed in the transport sector. (Lembo et al., 2019, pp. 13-15[7])

These countries' aggregate GDPs represent 76% of the regional GDP. Yet, while the there is a global need of USD 94 trillion in investment (Lembo et al., 2019, p. 5[7]) and the infrastructure financing gap is estimated to reach USD 15 trillion by 2040 (Global Infrastructure Hub, 2021, p. 10[8]), Latin-American countries' investment on infrastructure development represents 3.5% of annual GDP, which is below the recommended level for the region to close the gap.

The study shows that 15 countries operate under civil law, whereas two – Jamaica and Trinidad and Tobago – do so under common law. This difference in legal models affects the nature of the PPP laws and regulations in place. In general, countries under civil law present more specific statutes and regulations, while countries under common law rely on case law to set legal precedents (Lembo et al., 2019, p. 10[7]).

Nevertheless, different historical and political contexts of democratic consolidation in the region also affect the development of these laws, which vary significantly between countries and present a heterogeneous regional landscape for PPPs regulatory frameworks. The study identifies three groups according to the existing regulations (Lembo et al., 2019, p. 20[7]):

- Countries with only a concession Law
- Countries with both a concession and a PPP Law
- Countries with only specific PPP Law

The IDB report analytical framework establishes 14 principles that are considered necessary to design and establish sound regulatory frameworks that enable PPPs and infrastructure investment.

Table 4.3. Fundamental principles for PPP legal and institutional framework

	Principle		Principle
1	Legal and institutional framework	8	Dealing with charge
2	Applicable sectors and activities	9	Financing, funding, and guarantee
3	PPP monitoring and regulation	10	Extraordinary event
4	Modelling PPP projects	11	Public authority's prerogative
5	Procuring a PPP project	12	Risk allocation
6	Income structure	13	PPP termination
7	Dispute settlement	14	Transparency and accountability

Source: Lembo et al. (2019, p. 7[7]), Fundamental Principles in PPP Laws: A Review of Latin America and the Caribbean.

4.5.1. Main challenges and constraints

As introduced previously, this note aims at identifying the legal and regulatory barriers inferred through the IDB's comparative study of Latin-American PPPs laws. From the 14 principles outlined in the report, this note will focus on the ones that, at first glance, seem to present regulatory challenges.

4.5.2. Legal and institutional framework

In all the countries covered by the study, the IDB was able to identify a common understanding of PPPs as mechanisms used to enable the implementation of infrastructure projects to provide a public service thanks to private financing (Lembo et al., 2019, pp. 20-21[7]). However, country definitions depart from that common understanding and vary widely depending on each country's specific legislation. This can be related to differences in each country's process to engage private stakeholders (Lembo et al., 2019, p. 18[7]), which in turn can make comparability and transferability of best practices more challenging.

Most countries have a PPP law (Lembo et al., 2019, p. 19[7]). However, an existing law does not guarantee a consolidated legal framework, nor is it a strict pre-requisites for private investment in infrastructure projects. Thus, having PPP laws does not necessarily mean that PPPs are being implemented, which can reflect inconsistent or lacking legal mechanisms, unstable democratic regimes, and/or a combination of failures in other principles identified by the report.

Institutional frameworks are another mechanism that provide guarantees to private investors to take part in PPP projects. Twelve out of the 17 countries included in the report have a PPP unit in their public administration system and most of them also have a PPP regulatory agency (Lembo et al., 2019, p. 15[7]). When a country does not present a PPP unit, it is not uncommon to find a similar body that oversees infrastructure projects. Such guiding institutions are usually linked to larger governing bodies like the Ministry of Public Works or the Ministry of Finance, and are crucial to prevent project inconsistencies, design and operational inefficiencies, and risks of poor performance or failure. (Lembo et al., 2019, p. 21[7])

4.5.3. Applicable sectors and activities

Most PPPs projects (83%) are implemented in the transport sector (Lembo et al., 2019, p. 15[7]). Like in other areas of the world, this stems from a long-standing tradition of private investment historically devoted to the development of economic infrastructure in the transport sector (roads, railways, seaports, airports, etc.) (Lembo et al., 2019, p. 27[7]) due to its long-term reliability, potential to foster economic development, demographic connectivity, and geographic cohesion.

On the other hand, promotion of PPPs in other sectors in the countries included in the survey is harder to come by. This can be directly related to the transport sector tradition, but also to the regulatory limitations present in some countries regarding PPP implementation in other sectors. Specifically, Costa Rica, El Salvador, Guatemala and Uruguay prohibit PPPs from being developed in certain sectors (Lembo et al., 2019, p. 27[7]).

The IDB report presents a general trend showing that Latin-American and Caribbean Governments are open to PPP implementation and private investment in economic infrastructure, but not in social infrastructure, which in most cases is expected to be provided by the Public Authority (Lembo et al., 2019, p. 27[7]). This self-imposed restriction might be limiting the infrastructural innovation and growth opportunities in the region. As the infrastructure financing landscape shifts to a more sustainable and innovative model, Section 4.9 shows that investment in social infrastructure could be an interesting and worthwhile long-term investment alternative (Asian Development Bank, 2019, p. xxiv[9]).

4.5.4. PPP monitoring and regulation

Regarding PPP project monitoring, the study shows that differences among countries are related to a lack of legal standardisation. Nevertheless, the study also found some common practices across the region (Lembo et al., 2019, pp. 31-32[7]):

- Hiring of independent verifier/auditor to analyse that the project complies with industry standards
- Establishing a supervision management team to advise and monitor the project's execution
- Reporting from the procuring authority

Despite these common practices, two main monitoring issues stand out in the report (Lembo et al., 2019, p. 33[7]):

- Lack of standardisation of PPP agreement regulation in the region
- Most countries PPP monitoring legislation rarely addressed sector-specific regulations.

4.5.5. Modelling PPP projects

Modelling and procuring infrastructure development through PPP projects is often a better mechanism than traditional procurement because it delivers higher "value for money" to the public entities and better quality infrastructure to the users. (Lembo et al., 2019, p. 36[7]).

Most countries included in the IDB report follow quite similar modelling methodologies, in which they include key steps: Project pipeline, risk allocation, feasibility studies, etc. (Lembo et al., 2019, pp. 36-39[7]). However, the study does not specify to what extent these methodologies might be relatively homogenous across the region. Only feasibility studies – which are fundamental in the structuring and tender phases (Lembo et al., 2019, p. 41[7]) – seems to be present in regulations in all the countries included in the study.

Technical and institutional capacity are important resources for public authorities when tackling a PPP project pipeline, as they contribute to ensuring the suitability of the project and to maximising its profitability, from project preparation to post-delivery operation and maintenance.

Many Latin American and Caribbean countries – especially those where political, institutional, and regulatory regimes can remain relatively unstable – face a lack of technical and institutional capacity that can entail flawed assumptions and predictions, inefficient planning and co-ordination, and even project failure (Lembo et al., 2019, p. 37[7]).

In these countries, private investment can contribute to compensating the gaps created by institutional and regulatory instability. The IDB study found that most countries have regulations regarding private participation in the modelling process (Lembo et al., 2019, p. 41[7]), especially regarding unsolicited proposals coming from private investors who identify an infrastructure need.

4.5.6. Procuring a PPP project

Procuring infrastructure projects is a complex process which requires the contracting authority to have technical capabilities for evaluation, planning and co-ordination, and to respect transparency rules that give equal opportunity to bidders (Lembo et al., 2019, pp. 50-51[7]).

The IDB analysis concludes that most laws and regulations related to procurement are specific to each country and cannot be related to common practices adopted at the regional level (Lembo et al., 2019, p. 50[7]). The differences in legislation across the region present certain inconsistencies regarding the presentation and evaluation of proposals: some countries require single envelope proposals, others follow two-envelope procedures; some countries contemplate two-phase procedures with a pre-qualification phase and others do not (Lembo et al., 2019, pp. 51-52[7]). While less constraining at the country level, these inconsistences might create access barriers for international bidders and interested in investing in the region.

All countries included in the study follow a competitive bidding selection process and only a small percentage allow for direct awards (Lembo et al., 2019, p. 51[7]). Although the IDB report has a specific procurement section, the topic is addressed throughout the project definition and preparation phases regarding authority responsibility, procurement mechanisms, and procuring authority reports and monitoring.

Most of the countries considered in the study have sector-related legislation that restricts foreign investment in PPP projects. Even if those legislations are not strictly applicable to infrastructure PPP projects or to project bidders, they may create limitation in a bidding and procurement process (Lembo et al., 2019, p. 49[7]).

4.5.7. Income structure

Like with PPP procurement, income structure in each country depends largely on the country's legal particularities (Lembo et al., 2019, p. 56[7]). Two model prevail in the region. The difference between them stems from each country's particular history with private investment and lays essentially in that the first is based on compensation and the second one is based on tariffs (Lembo et al., 2019, p. 57[7]):

- Payment is considered as a periodic payments by the contracting authority to the private entity with or without tariff charge.
- Projects may be self-sustained or co-financed.

Though PPP laws do not usually focus on payment methods, the complexities involved in establishing reliable and transparent payment mechanisms between the administrations and the private partners call for increased attention from stakeholders to ensure that agreements clearly articulate the mechanisms, rights and responsibilities related to the project's revenue and income structure (Lembo et al., 2019, p. 59[7])

4.5.8. Dispute settlement

Alternative dispute mechanisms are available in most of the countries (Lembo et al., 2019, p. 16[7]). These are non-judiciary conflict resolution procedures that can address both the time sensitivity of public service provision and the complexity of technical issues, and that are increasingly necessary in large PPP projects (Lembo et al., 2019, p. 60[7]).

Though these methods exist in most countries, they vary and are either limited by law depending on the country, or – in some cases – not explicitly addressed in the law but rather outlined in the PPP agreement. The most commonly used methods for conflict resolution are conciliation, mediation, and arbitration mechanisms, which exist in most of the countries included in the study (Lembo et al., 2019, p. 61[7]).

In some cases, however, it is encouraged to solve disputes between the parties involved, in good faith, and through informal conflict resolution methods before resorting to formal arbitration. This is the case of countries like Mexico, Chile, or El Salvador, where technical boards might address technical or economic issues (Lembo et al., 2019, p. 63[7]). Similarly, dispute resolution boards are another mechanism that can contribute to mediation about conflicts regarding contracts and agreements between the parties (Lembo et al., 2019, p. 64[7]).

Though these informal mechanisms are faster, ideally formal legislation is the solution to the potential challenges that the parties could face during the negotiation process, and can contribute to providing more stability for foreign investors (Lembo et al., 2019, p. 63[7])

4.5.9. Financing, funding and guarantees

According to PPP legislation in all the countries included in the study, the private party is responsible for financing the project, and they may use appropriate instruments used commonly in international financial markets (Lembo et al., 2019, p. 76[7]).

The main challenge is the lack of capital market maturity, since it eliminates the project finance option from the public side, though some of the guarantees provided by most of the countries analysed include allowing the private investor to provide project finance (Lembo et al., 2019, p. 78[7]). Some of these guarantees are also provided through insurance mechanisms in the form of single-purpose funds to guarantee obligations towards the PPP (Lembo et al., 2019, pp. 80-81[7]).

The lack of capital market maturity is a strong barrier for private investment, and governments in Latin-American and the Caribbean are bound to offset that constraint by providing incentives to private partners developing PPPs. Incentives might include loans, grants, capital contributions, and assistance by publicly-owned development banks and financial institutions (Lembo et al., 2019, pp. 78-79[7]).

4.5.10. Risk allocation

The report considers the relevance of risk allocation at country and regional levels, its allocation on both the public and the private side of the investment, and splits it into risk categories relevant to PPP projects (Lembo et al., 2019, p. 95[7]). However, it gives no consideration or very little consideration to the legal barriers that could promote these risks in the countries included in the study. It is also important to note that the risks included in the study are closely related to the life cycle of a PPP rather than to the private investment directly.

4.5.11. Transparency and accountability

All countries except Trinidad and Tobago have regulation regarding transparency and accountability in general, even if specific PPP regulations might not address these topics directly (Lembo et al., 2019, p. 109[7]). Despite having basic legal frameworks in these regards, however, most of the countries covered

in the report have recently presented corruption-related scandals linked to infrastructure projects, so transparency and accountability remain areas of concern and constraints to foreign investment in infrastructure.

4.5.12. Preliminary areas of barriers

Table 4.4. Preliminary areas of legal, regulatory and procedural barriers in Latin America and Caribbeans
Based on the full barrier classification table in Annex 4.A, the following barriers correspond to the current investment landscape in the Latin America and Caribbean. The areas below do not represent an assessment of barriers, but areas that have been generally identified as requiring more attention

Denotes areas that are not legal, regulatory or procedural concerns	
INVESTMENT SIDE (regulatory factors that shape the attractiveness of infrastructure for investors)	
Essential security interests (can be derived by either national security or economic protectionism concerns)	
Assessment criteria, procedural rules and responsibilities (referred to here as 1st generation mechanisms), comprehensive rule-sets (referred to here as 2nd generation, mechanisms) and a risk-roster that sets out which transactions are potentially injurious to essential security interests and thus subject to review or restrictions	
SOEs, link to foreign government screening or security interests	
Corruption risk high	
Financial related	
Appropriate risk mitigation tools not available	
Credit rating score low or unavailable	
Corporate reporting regime weak– Disclosure regime insufficient or not transparent	
Insurance coverage availability or premium being too high	
	Political risk insurance
	Property insurance
	Other insurance
Risk factors	
Regulatory risks	
	Uncertainty of regulation
	Complexity/lack of coherence of regulatory standards across jurisdictions/sectors
Inadequate ESG framework for investors	
	Insufficient/non-standardised environmental considerations
	Insufficient/non-standardised social considerations
	Insufficient/non-standardised governance considerations
Insufficient data available for risk analysis	
	Financial data related reporting
	Non-Financial reporting
Political risks	
Sectoral regulation	
Sector regulation does not provide the right mix incentives (i.e. risk sharing, efficiency, investment)	
Lack of stability and predictability of regulatory regime	
PPP and project finance frameworks	
Lack of a supportive framework for project finance (e.g. ability to pledge receivables as collateral to loans)	
Procurement regulations	
Lack of stability and predictability of regulatory regime	
An effective complaints system is missing (e.g. transparency, agility, independence)	
Lack of a supportive framework for integrating social, environmental and macroeconomic aspects into the entire procurement process (e.g. from needs assessment to contract execution)	
Dispute resolution mechanisms	
FINANCING (including regulatory aspects that shape the supply of capital for infrastructure)	
Reporting requirement related	
	Difficult to report on required climate risk related (if any requirements exist)
	Difficult to report on required SDG related (if any requirements exist)
	Difficult/challenging to report on ESG-related (if any requirements exist)
	Complexity/multitude of standards, which may make compliance cumbersome
Sectoral regulation	
Capital market regulation	

Denotes areas that are not legal, regulatory or procedural concerns	
Limited availability of capital market instruments for unlisted equity	
Limited availability of debt capital market instruments	
Risk considerations	
Insufficient applicable ESG considerations	
	Regulatory requirements for environmental considerations
	Regulatory requirements for social considerations
	Regulatory requirements for governance considerations
Any others	

4.6. Asia

Finding comprehensive and current data from Asia as a region is more challenging. This section is based on input from Korea's ExIm Bank, the JBIC, and an Asian Development Bank (ADB) report focusing on Public-Private Partnerships (PPPs) in 12 ADB developing member countries (DMCs).

The different responses provide specific information about regulatory barriers in the following 14 countries in the region: Bangladesh, China, Georgia, India, Indonesia, Kazakhstan, Malaysia, Pakistan, Papua New Guinea (PNG), Philippines, Sri Lanka, Thailand, Turkey, and Viet Nam.

Overall, the report evaluates PPPs in Asia to be at the "developing level with two exceptions: In the Philippines, PPPs already operate in a developed framework, whereas in PNG they are still at the emerging level (Asian Development Bank, 2019, p. 14[9]).

Though the ADB report only covers two decades until 2017, it is the most complete source reviewed and can provide an understanding of the infrastructure and PPP landscape in the region before the pandemic. The PPP Monitor report is more granular, split both at country and sector level, then among four different areas of analysis. Most investment barriers and system deficiencies are common in the countries marked in red.

The few responses received lead to the conclusion that overall regional regulatory barriers for the development of quality infrastructure are present in the investing side of the process, rather than the financing side. Out all the inputs received, only one regulation – the Foreign Private Investment Protection and Promotion Act 1980 of Bangladesh – presented challenges on the financing side.

4.6.1. Main challenges and constraints

Barriers in the 11 Asian countries surveyed by the ADB are divided into two segments: the regulatory and institutional frameworks that allow or prevent PPPs from settling and thriving; and PPP market and financial systems maturity to enable the execution of these projects.

4.6.2. Institutional and regulatory frameworks

Five out of the 12 DMCs surveyed in the PPP Monitor reported progress in their regulatory frameworks in 2017. Specifically, Georgia and Pakistan passed PPP laws aimed at improving the regulatory environment to facilitate these initiatives. However, several common barriers are still relevant for most countries reflected in the report:

- Delays in land acquisition processes
- Undeveloped lender security rights
- Undeveloped treatment of termination and compensation events
- Limited government support measures (public funding) packages
- Insufficient guidance and regulation for SOEs participation

- Foreign ownership restrictions
- Lack of standardised PPP contract provisions
- Lack of PPP selection, prioritisation and pipeline development methodologies
- Unbalanced risk allocation

In some countries, regulatory frameworks to allow PPP implementation such as Indonesia's Law No. 64/2020/QH4,[5] and to provide sector-related incentives like Viet Nam's Law No. 48 of 2017 regarding the energy sector[6] or Turkey's renewable energy feed-in tariff[7] are still lacking or too restrictive to enable quality infrastructure investment in the region.

Other respondents also identified specific regulations posing barriers related to security interest and ownership (Malaysia's Large Scale Solar Photovoltaic Bidding[8] and Indonesia's Presidential Regulation No. 4 of 2016 for Indonesian SOEs[9]), currency convertibility, and land use and acquisition (Bangladesh's Foreign Private Investment Protection and Promotion Act 1980).

Institutional capacity for implementation only appears to be fully developed in Bangladesh and the Philippines. One of the many problems referred by most were the constraints to institutional capacity resulting from high public official turnover. Nevertheless, most countries in the group have a PPP-monitoring government agency and have published pipeline of potential PPP projects. In general, responses show that ADB member countries are committed to working on regulatory framework improvements through the revision of existing regulations and introduction in new supporting ones to enable PPP implementation (Asian Development Bank, 2019, p. xxii[9]).

4.7. PPP market and financial systems maturity

The most stable of these aspects are the financial facilities in place to implement PPP projects. Almost all MDCs mentioned in the report have sound financial systems where hedging products and currency convertibility are available for PPP projects (Asian Development Bank, 2019, p. xxiv[9]). On the other hand, the PPP market itself is not as mature as the financial market.

Most PPP projects finalised in 2017 were located in the most developed economies, namely China, India, and Bangladesh. This volume accounted for 76 of the 110 projects under way in 2017, or 69% of projects (Asian Development Bank, 2019, p. xxiii[9]). In parallel, 59% of those PPP projects were executed in the energy sector, the most mature in the region and the one where PPPs implementation rules are most standardised: agreements on power purchase and risk profile are easier to reach, and governments allocate more guarantees (Asian Development Bank, 2019, p. xxiii[9]).

However, other sectors where PPPs implementation was successful are less developed and face more challenges and constraints that governments are still reluctant to address. In the transport and road sector, for example, some barriers include traffic and revenue risk/demand uncertainty and land acquisition constraints.

4.8. ESG compliance requirements

Looking ahead, an increased interest in social infrastructure can become an alternative avenue to unlock PPPs implementation regulation in these countries. Social infrastructure has not always been considered as being an infrastructure asset, but there has been increasing recognition that social infrastructure, which includes education, health, public order, and culture and recreational infrastructure, are also important infrastructure assets. The social benefit of these infrastructures could contribute to sustainable infrastructure and thus be of interest to investors. These infrastructure projects have proven to be as

successful for private investors as traditional infrastructure projects, yet they are subject to fewer of the regulatory constraints cited above and have a lower risk profile (Asian Development Bank, 2019, p. xxiv[9]).

4.8.1. Preliminary areas of barriers

Based on the table in Annex 4.A, the following barriers correspond to the current investment landscape in the Asia.[10] The areas below do not represent an assessment of barriers, but areas that have been generally identified as requiring more attention.

Table 4.5. Legal, regulatory and procedural barriers in Asia

Denotes areas that are not legal, regulatory or procedural concerns
INVESTMENT SIDE (regulatory factors that shape the attractiveness of infrastructure for investors)
Essential security interests (can be derived by either national security or economic protectionism concerns)
Attention to acquisition- and ownership-related policies
Majority foreign ownership control
Assessment criteria (undeveloped security rights and treatment of termination)
SOEs, link to foreign government screening or security interest
Financial related
Currency inconvertibility
Risk factors
Uncertainty of regulation
Complexity/lack of coherence of regulatory standards across jurisdictions/sectors
Applicable ESG considerations in regulation
Insufficient data for risk analysis
Land use and planning regulations
Difficulty of acquiring land (foreign ownership restrictions)
Sectoral regulation
Sector regulation does not provide the right mix incentives (i.e. risk sharing, efficiency, investment)
PPP and project finance frameworks
Lack of supportive framework for PPPs and concessions lacking
Lack of lender step-in rights
Procurement regulations
Lack of stability and predictability of regulatory regime
Lack of supportive framework for effective tendering and contract management
FINANCING SIDE (including regulatory aspects that shape the supply of capital for infrastructure)
Currency/capital controls (e.g. Repatriation of profits)
Restrictions on direct or ownership of unlisted companies

4.9. Considerations and next steps

As demonstrated by this preliminary note, further developing this note could bring important insights into areas that could be addressed to support private financing into infrastructure projects. The note already identifies a number of areas that could be improved, as well as providing ideas as to how these areas could be reformed.

The findings make clear that there are identifiable areas which are barriers to investment, but which may not necessarily be legal and regulatory in nature. The table of classification of barriers (Annex 4.A) provides

a starting point for clarifying which barriers could be hampering investments, and what actions could be taken to address them.

At first glance, the following barriers represent the most commonly mentioned areas of concern for investors and development agencies across the pool of responses received:

- Lack of sufficiently supportive regulatory frameworks, related to both PPP implementation and sectoral regulation
- Insufficient or unavailable risk analysis and mitigation tools, especially those related to regulatory regimes and political uncertainty, as well as to lack of capital market maturity.
- In developed economies in EU, and Germany specifically, capital and solvency regulations are areas of concern due to the restrictions and quotas set by the EU Solvency Capital Requirements (SCR) under the Solvency I and II directives.
- Lack of clear and homogenous ESG regulatory and reporting frameworks and ESG-related risk analysis and mitigation tools for investors.

However, to strengthen the observations and to develop the report to cover more regions, greater input is necessary. Delegates are thus invited to inform the Secretariat of reports or areas that could be added to ensure that the report can be more fully developed.

Once the report has been fully developed, the Secretariat expects that a second phase of the project could examine best practices and seeking ways in which the barriers could be addressed in the context of quality infrastructure investment.

Annex 4.A. Table of classification of legal, regulatory and procedural barriers to quality infrastructure investments

Annex Table 4.A.1. Classification of legal, regulatory and procedural barriers to quality infrastructure investments

Denotes areas that are not legal, regulatory or procedural concerns	
INVESTMENT SIDE (regulatory factors that shape the attractiveness of infrastructure for investors)	
Essential security interests (can be derived by either national security or economic protectionism concerns)	
Attention to acquisition- and ownership-related policies	
	Majority foreign ownership control
	Impeding full foreign ownership
Investment screening	
	Health sector or infrastructure
	Technology sector or infrastructure
	Real estate, border areas (sensitive areas)
	Critical infrastructure
	Biotechnologies
	Energy sector
	Transport
	Education
	Telecoms
	Waste treatment
	Water treatment
Assessment criteria, procedural rules and responsibilities (referred to here as 1st generation mechanisms), comprehensive rule-sets (referred to here as 2nd generation, mechanisms) and a risk-roster that sets out which transactions are potentially injurious to essential security interests and thus subject to review or restrictions	
SOEs, link to foreign government screening or security interests	
Corruption risk high	
Geopolitical risk high	
Trade agreement related	
Non-membership of certain trade agreement have lower ownership threshold	
Financial related	
Appropriate risk mitigation tools not available	
IRR not sufficiently high	
Debt-Service Coverage Ratio (DSCR) (cash flow) estimates poor or low	
Tax rate	
Limited hedging instruments available	
Currency inconvertibility	
Credit rating score low or unavailable	
Corporate reporting regime weak– Disclosure regime insufficient or not transparent	
Contract enforcement weak– enforcement or court system weak	
Insolvency regime weak	
Insurance coverage availability or premium being too high	
	Political risk insurance
	Property insurance

Denotes areas that are not legal, regulatory or procedural concerns	
	Other insurance
Risk factors	
Regulatory risks	
	Approval process too costly
	Approval standard too high
	Approval standard too lax
	Schedule too long
	Compliance with ongoing regulation–Too onerous and costly to perform
	Uncertainty of regulation
	Complexity/lack of coherence of regulatory standards across jurisdictions/sectors
Applicable ESG considerations in regulation	
	Regulatory requirements for environmental considerations
	Regulatory requirements for social considerations
	Regulatory requirements for governance considerations
Inadequate ESG framework for investors	
	Insufficient/non-standardised environmental considerations
	Insufficient/non-standardised social considerations
	Insufficient/non-standardised governance considerations
Insufficient SDG consideration for investors	
	Insufficient EMDE coverage
Poor resilience considerations	
	Climate change-physical risk
	Climate change-transition risk
	Cyber risk
	Social risks
Insufficient data available for risk analysis	
	Financial data related reporting
	Non-Financial reporting
Risk considered to be too high	
Political risks	
Land use and planning regulations	
Lack of clarity over land ownership	
Difficulty of acquiring land rights	
Incoherent planning regulations and procedures	
Sectoral regulation	
Sector regulation does not provide the right mix incentives (i.e. risk sharing, efficiency, investment)	
Lack of stability and predictability of regulatory regime	
Sector regulation does not provide the right mix incentives (i.e. risk sharing, efficiency, investment)	
PPP and project finance frameworks	
Lack of a supportive framework for PPPs and concessions lacking	
Lack of a supportive framework for project finance (e.g. ability to pledge receivables as collateral to loans)	
Lack of lender step-in rights	
Procurement regulations	
Lack of stability and predictability of regulatory regime	
Lack of a supportive framework for effective tendering and contract management (e.g. open and competitive procedures, access of international bidders)	
An effective complaints system is missing (e.g. transparency, agility, independence)	
Lack of a supportive framework for integrating social, environmental and macroeconomic aspects into the entire procurement process (e.g. from needs assessment to contract execution)	
Dispute resolution mechanisms	
International arbitration not allowed for foreign investors	
FINANCING (including regulatory aspects that shape the supply of capital for infrastructure)	
Capital regulation/Solvency regulation	

Denotes areas that are not legal, regulatory or procedural concerns	
Quantitative investment regulation	
Restrictions on direct or ownership of unlisted companies	
Reporting requirement related	
	Difficult to report on required climate risk related (if any requirements exist)
	Difficult to report on required SDG related (if any requirements exist)
	Difficult/challenging to report on ESG-related (if any requirements exist)
	Complexity/multitude of standards, which may make compliance cumbersome
Sectoral regulation	
Currency/capital controls (e.g. Repatriation of profits)	
Prudential regulation	
Quantitative restrictions for pension fund investments	
Liquidity ratios for banks challenging	
High capital charges	
Capital market regulation	
Limited availability of capital market instruments for unlisted equity	
Limited availability of debt capital market instruments	
Restrictions on private placement of infrastructure debt	
Risk considerations	
Insufficient applicable ESG considerations	
	Regulatory requirements for environmental considerations
	Regulatory requirements for social considerations
	Regulatory requirements for governance considerations
Any others	

Annex 4.B. Latin America and Caribbean

Annex Table 4.B.1. PPPs enabling laws, 17 countries

Data collected in 2018

Country	Law	Country	Law
Brazil	Law 11 079/2004 Law 8 987/1995 Law 8 666/93 Decree 8 428/2015 Law 12 527/2011	Mexico	Constitution PPP Law + Rules Applicable Rules for PPPs Fed. Budget + Tax Code Law of National Assets
Colombia	Law 1 508/2002 Law 80/1993 Law 1 150/2007 Decree 1 082 of 2015 Law 1882/2018	Nicaragua	Law 935/2016 Decree 05/2017
Costa Rica	Law 7 762/98 Decree 27 098-MOPT Decree 31 836-MOPT Executive decree 39 965	Panama	Law 22/2006 Law 5/1988
Ecuador	Lew orgánica (PPP Law) Decree 810 Decree 582 Decree 1 040 Ley orgánica – Ley 1 Executive decree 1 700 Resolution n. CIAPP-R-009-Abril-2017	Paraguay	Law 5 102 (PPP Law) Decree 1 350 Law 1 618 Law 2051/03
El Salvador	Decree 379/2013	Peru	Decree 1 362 (PPP Law) Supreme Decree 240-2018-EF
Guatemala	Decree 16/2010 Acuerdo Gubernativo 360/2011	Trinidad and Tobago	Act N. 1/2015 PPP Policy Draft
Honduras	Decree 143/2010 Acuerdo Ejecutivo 02073/2010 Decree 58/2010 Decree 24-2012 Decree 73-2010 Decree 51-2011	Uruguay	Law 18 786 Decree 17/2012 Decree 280/2012 Decree 251/2015
Jamaica	Institutional Framework for Implementation of PPPs		

Note: Only Mexico and Peru have more recently updated their PPP legislation, in 2019.

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Notes

[1] Other responses received were not used at this juncture, given the limited scope of this preliminary note. The OECD hopes to receive more inputs to inform the situation in their respective regions.

[2] Lines marked with one asterisk (*) in the table correspond to specific information found in the EIB Investment Surveys; Lines marked with two asterisks (**) correspond to information reported by Cassa Depositi e Prestiti (CDP) in Italy.

[3] Lines marked with one asterisk (*) in the table correspond to specific information found in the EIB Investment Surveys; Lines marked with two asterisks (**) correspond to information reported by Cassa Depositi e Prestiti (CDP) in Italy.

[4] In the context of the IDB report, PPPs are defined as “long-term infrastructure projects that bundle the implementation and the operation phases of the project, alongside investment made by the private party with financing structures” (Lembo et al., 2019, p. 14[7]).

[5] Coverage of a supportive PPP framework is too narrow to cover most of gas-fired project bankability, coverage of the existing PPP framework should be widened.

[6] MEMR No. 48 2017 restricts share transfer prior to the Commercial Operation Date (COD).

[7] The FIT levels applied to renewable energy projects in Turkey would reflect the level of subsidies available for domestic equipment. Therefore, the FIT levels would not be appropriate foreign investors.

[8] a) Locally incorporated companies that are 100% owned by Malaysians or b) companies that are listed on the local stock exchange and that at least 75% of share are held by Malaysians are able to participate in the bidding.

[9] The Regulation requires that PLN (Indonesia SOE) subsidiary holds at least 51% share of IPP.

[10] Lines marked with one asterisk (*) in the table correspond to specific information found in the EIB Investment Surveys; Lines marked with two asterisks (**) correspond to information reported by Cassa Depositi e Prestiti (CDP) in Italy.

Improving the Landscape for Sustainable Infrastructure Financing

This report examines how to promote sustainable infrastructure investment. It discusses data needs for infrastructure investment and the current environment, social and governance (ESG) approaches before offering policy recommendations to help ensure that investors are better equipped to make investment decisions related to infrastructure assets. The report explores legal and regulatory barriers to quality infrastructure investment, and considers how governments can help infrastructure actors promote quality infrastructure projects, ensure project objectives and reporting correspond with investor expectations, and how to mobilise funding and financing for inclusive and quality infrastructure investment in both regions and cities.

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