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SUSTAINABLE INFRASTRUCTURE AND THE MULTILATERAL DEVELOPMENT BANKS

CHANGING THE NARRATIVE

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Executive Summary

Current approaches to infrastructure investment are out-date and ill-suited to an increasingly complex world. Several systemic drivers are fundamentally changing the infrastructure value assessment. First, the growing risks from climate change impacts means that all new infrastructure must be compatible with the Paris Agreement and the Sustainable Development Goals (SDGs). Infrastructure assets have a long lifespan of multiple decades, so the long-term infrastructure built now needs to shift to net zero emission infrastructure. However, far too much of the existing pipeline is made up of high carbon, fossil-based and inefficient projects. This not only increases the risk of stranded assets for investors, it puts public property and livelihoods at risk and threatens the habitability of some parts of the world.

On the opportunity side, new solutions are emerging driven both by technology change and the low-carbon revolution. Digital technologies are also helping to empower citizens to participate actively in energy and other markets. Innovations in demand side management and interconnected transport, heat, digital and energy systems can help deliver climate and sustainability objectives. But these solutions cut across both sectoral and national boundaries – creating a need to think not just of infrastructure projects within sectors, but of infrastructure systems.

Current infrastructure policy and regulation is too fragmented to effectively manage the interlocking risk driven by climate change, or to take advantage of cross-sectoral technological solutions. Incremental policy changes are not enough – fundamental institutional reforms are needed.

Given that most new infrastructure will be built in developing countries, Multilateral Development Banks (MDBs) have a key role to play in addressing the sustainability challenge; both in assisting governments with creating an effective enabling environment for sustainable infrastructure and through providing various innovative financial instruments that increase participation of the private sector.

Recognition of the infrastructure challenge has led to a proliferation of reports, analysis, initiatives and tools focused on sustainable infrastructure. These activities collectively account for important progress, and further efforts are needed to support and build on these tools. However, an assessment of the landscape of activity shows that most interventions are focused at the project level - and in many cases are focused also at the downstream end of the project cycle. Work on standards and safeguards, for example, are important but these alone are unlikely to result in a new approach to overall infrastructure system choices and design. This will require more systematic governance reforms.

MDBs and other international financial institutions (IFIs) can help to strengthen existing activities; and can also promote more fundamental institutional and policy reforms. Interviews conducted with stakeholders and a literature review has identified a range of recommendations for development finance institutions (DFIs) and other IFIs to help ensure infrastructure that is built in the next few years is economically, socially and environmentally sustainable:

- Shift from project-level to national or international-level reforms to support sustainable infrastructure, for example through support for 2050 planning processes;
- Systemically use innovative finance mechanisms to mobilise private finance for sustainable infrastructure and initiate bankable projects; and find mechanisms to pay for institutional changes to deliver sustainable infrastructure;
- Transform existing infrastructure including putting energy efficiency first and recognizing energy efficiency as infrastructure;
- Strengthen and improve existing infrastructure safeguards as well as building institutional capacity to do sustainability assessments;
- Strategically identify gaps in the existing portfolio;
- Better tie the benefits of sustainable infrastructure to other co-benefits and sustainable development goals;
- Build the capacity of staff and clients to keep track of the latest trends and technologies.

Finally, recommendations for government and other international stakeholders working on sustainable infrastructure include:

- Strengthening national-level interventions to support sustainable infrastructure – either substantial strengthening of existing government capacities or cross linking to non-government capacities;
- Strengthening city and local-level planning and institutions for long term infrastructure investment;
- Ensure initiatives for sustainable finance are aligned with the sustainable infrastructure imperative;
- Shift from an incremental to a more structural approach to sustainable infrastructure;
- Sustainable infrastructure needs to be linked to reduced macroeconomic risk;
- Create incentives and send market signals for the paradigm shift within the system and within institutions.

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Introduction

Achieving the Paris Agreement and the UN's Sustainable Development Goals (SDGs) will depend on the development of new infrastructure. As explained in the New Climate Economy report, the world is expected to invest around US$90 trillion in infrastructure over the next 15 years. The investment choices we make even over the next two to three years will start to lock in for decades to come either a climate-smart, inclusive growth pathway, or a high-carbon, inefficient and unsustainable pathway[1].

According to some economic commentators there has been historic under-investment in infrastructure in both emerging [2] and advanced economies alike [3], leading to problems such as epic traffic jams, tainted water supplies, lack of maintenance and inefficiencies[4]. However, we need not only to increase investment in infrastructure but also shift the composition of investment. Unless climate change is curtailed, extreme heat waves could make parts of India and Pakistan uninhabitable by the end of the century[5], and the World Bank has projected that parts of the world could be dealing with tens of millions of internal climate migrants by 2050[6].

This requires an urgent paradigm shift by investors, and concerted actions by industry initiatives and governments alike. The cost of delivering the infrastructure needed is not prohibitive and there are savings to be found in a low carbon economy[7]. But the underlying frameworks and systems that determine those investments are deeply embedded and difficult to influence. Infrastructure regulation, governance and institutions will be key. The UK's National Infrastructure Commission [8] and the Infrastructure Sustainability Council of Australia are notable examples of institutional mechanisms to help deliver sustainability of infrastructure[9].

In addition to national institutions and methodologies to improve the sustainability of infrastructure, there are also multilateral efforts underway, with some of the Multilateral Development Banks (MDBs) leading the way. MDBs can act as mobilisers of private finance for sustainable infrastructure (SI), have convening power and assist client governments with project preparation and technical assistance on infrastructure.

In 2016, the Asian Infrastructure Investment Bank (AIIB) was launched as a new China-led multilateral institution with the stated aim of investing in sustainable infrastructure and being 'lean, clean and green'[10]. In recent years, China's Belt and Road Initiative (BRI) has also been launched - an immensely ambitious development campaign which Beijing

[1] New Climate Economy Report (2016). **The Sustainable Infrastructure Imperative**

[2] **https://www.nic.org.uk/mind-the-infrastructure-gap/**

[3] McKinsey Global Institute (2016). **Bridging Global Infrastructure Gaps**

[4] McKinsey Global Institute (2016). **Bridging Global Infrastructure Gaps**

[5] Eun-Soon et al, 2017. **Deadly heat waves projected in the densely populated agricultural regions of South Asia**

[6] World Bank (2018) **Groundswell : Preparing for Internal Climate Migration**

[7] OECD (2017) **Investing in Climate, Investing in Growth.**

[8] UK's **National Infrastructure Commission (NIC)** has been established as an executive agency of the Treasury to provide impartial, expert advice and make independent recommendations to the government on economic infrastructure

[9] See: **http://www.isca.org.au/who_we_are**

[10] See: **https://www.aiib.org/en/about-aiib/**

says will ultimately lend as much as $8 trillion for infrastructure in 68 countries[11], with $900m of projects already planned or underway[12]. BRI provides a tremendous opportunity to drive strong, sustainable and inclusive growth in partner countries– but if this is not managed using sound environmental and climate criteria, the BRI itself could undermine the global agenda and create profound risks for the future of world development[13]. The BRI could turn out to be the world's largest ever infrastructure project, making the imperative of sustainable infrastructure ever more important.

The infrastructure challenge has led to a proliferation of reports, analysis, initiatives and tools focused on the concept of sustainable infrastructure. This briefing provides an analysis of the landscape of existing sustainable infrastructure initiatives and other activities. We then assess the extent to which this activity, in aggregate, is likely to result in the level of change that is needed to deliver the objectives of the Paris Agreement and the SDGs. We conclude by offering recommendations for how the MDBs and other actors can act as a catalyst for sustainable infrastructure investment.

Why does infrastructure have to be sustainable?

Major changes are underway in emerging economies that will determine whether the Paris Agreement and SDGs are met. Infrastructure assets have a long lifespan with bridges and sewerage systems having a design lifetime of up to 100 years (see below)[14]. Infrastructure often lasts beyond its design lifespan. Subway systems in the US have lasted for 60-100 years[15] with the failure to address current maintenance and replacement needs costing the U.S. economy an estimated $340bn in business revenue over the next six years[16].

[11] See: **https://www.weforum.org/agenda/2017/06/china-new-silk-road-explainer/**

[12] See: **https://www.ebrd.com/what-we-do/belt-and-road/overview.html**

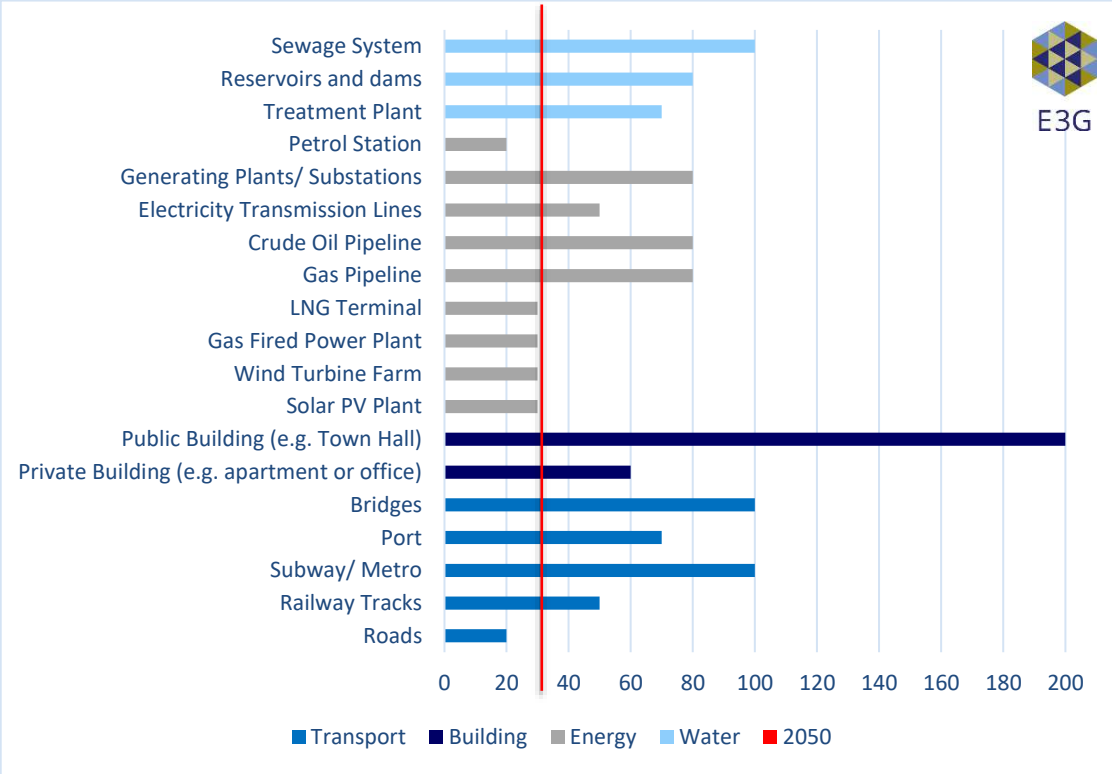
[13] Ahmad, Neuweg and Stern (2018) **China, The World and The Next Decade Better Growth Climate**

[14] According to Rodrique (**2017**), the lifespan of a transport asset is the approximate number of years in which it is expected to perform under normal operating conditions while receiving regular maintenance (average lifespan).

[15] See: **http://www.infrastructurereportcard.org/transit**

[16] **https://ascelibrary.org/doi/abs/10.1061/%28ASCE%29CO.1943-7862.0001014**

Figure 1: Typical lifespan of different types of infrastructure in years



Sources: Gibson (**2017**); Historic England (***2016***); Granovskii et al. (***2006***); PwC (***2014***); DECC (***2014***); Forbes (***2016***); Weinzettel et al. (**2009**); Zieglera et al. (**2018**); Branker et al. (**2011**); Mundada et al. (**2016**); Dias (**2013**); Gkountis et al. (**2015**); Rodrique (***2017***) Kelly (**2007**); Stripple & Uppenberg, (**2010**);

The Paris Climate Agreement necessitates a 'net zero' emission energy and transport system in the second half of this century[17] in order to stabilise global warming at the limit of "well below 2C". For example, all new buildings must be fossil-free and near zero energy by 2020 for a 1.5°C scenario whilst in the transport sector, no fossil fuel-powered car can be sold after 2035[18], necessitating a shift to electric vehicle charging infrastructure. The world's 'carbon budget', the amount of carbon we can safely burn to stay within a global temperature threshold, is fast shrinking[19]. High-carbon infrastructure assets could become 'stranded' as the world decarbonises[20] due to changes associated with the transition to a low-carbon economy. There is also a risk of stranding due to the reduced financial, economic, and social costs of alternatives. Due to the long lifetime of infrastructure as indicated in Figure 1, decisions today will need to be able to compete in the predicted future marketplace for energy generation and in the provision of other services. For example, oil pipeline infrastructure would no longer be needed in a world that runs on smart automated electric vehicles.

[17] Pye et al (2017) **Nature Energy** volume 2, Article number: 17024

[18] See: **https://climateactiontracker.org/publications/the-ten-most-important-short-term-steps-to-limit-warming-to-15c/**

[19] See: **https://www.carbonbrief.org/analysis-four-years-left-one-point-five-carbon-budget**

[20] Pfeiffer et al (2018) **Committed emissions from existing and planned power plants and asset stranding required to meet the Paris Agreement**

The traditional framework and approach to infrastructure investment decision making is predicated on a world where the climate is stable, fossil fuels have no external cost and demand is relatively predictable. This approach will no longer be sufficient. Worsening climate impacts present two major sets of risks to infrastructure owners: (1) physical risks that the asset will be negatively impacted by rising sea level or a severe storm, flood, or other extreme weather event and (2) transition risk related to the shift towards a low-carbon economy. The latter category presents a particular challenge to high carbon assets. In addition to growing climate impacts, there are several other drivers systemically changing the value assessment of infrastructure, including: digitalization and technological innovation, increased public participation and empowerment.

1. **Distributed technology that does not fit traditional business models**: Mobile technology and big data are delivering rapid and disruptive smarter infrastructure, changing how people travel and use energy and challenging assumptions about investment in transport, electricity and gas networks. Dynamic management of traffic flows is improving efficiency of road use. Services like Uber and ZipCar are changing travel and vehicle use patterns. Disruptive technologies are affecting but both the demand side and supply side of infrastructure. Wider use demand management techniques and new technologies in the home and at utility scale will avoid expensive investment in back-up generation and grid capacity. But the digitalization of the economy and active demand side management brings uncertainty and risk.

2. **Greater public scrutiny and participation**: This will occur partly due to activation on the demand side of energy markets. But there will also be an increase in the availability of information on infrastructure use – bike share systems, energy saving technology and apps. This trend is being reinforced by a move towards decentralized decision-making in some countries, which can help local government deliver priority investments[21]. There are clear links to technology. Taking advantage of digital smart technologies and the opportunities of convergence of infrastructure systems requires careful integration at the local level of consumer markets, supply chains, physical systems and planning choices.

3. **Growing climate risk**: Climate change is impacting infrastructure systems. Overall losses from natural disasters in 2017 including hurricanes Harvey, Irma and Maria as well as monsoons in South Asia were $330 billion, second only to 2011 which included the earthquake and tsunami in Japan[22]. Direct climate impacts are increasing the frequency of extreme weather events and driving cascading failures and damages across infrastructure systems in previously unexpected ways[23]. Not only are climate risks increasing but these are impacting on a more systemically interconnected economy, thus the knock-on impacts are greater and recovery can

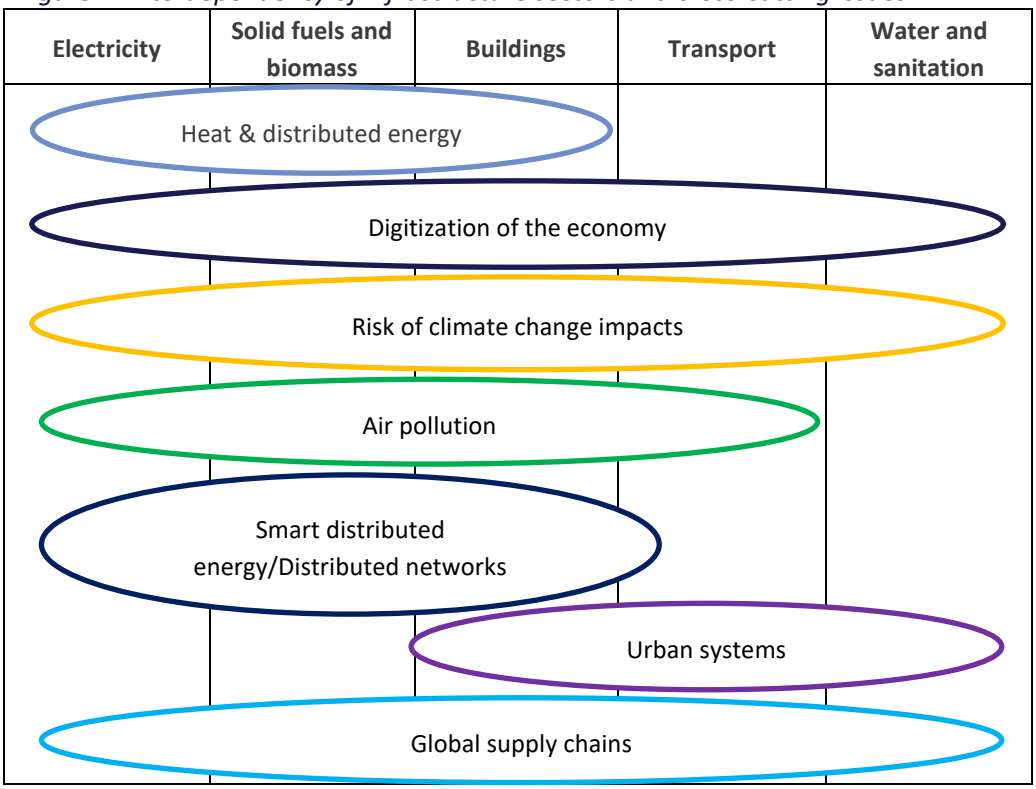
[21] OECD (2018). **In the Public Interest Delivery of Sustainable, Transparent and Inclusive Infrastructure**

[22] See: **https://www.nytimes.com/2018/01/04/climate/losses-natural-disasters-insurance.html**.

[23] For examination of underestimation of Superstorm Sandy costs see **http://www.nat-hazards-earth-syst-sci.net/13/2579/2013/nhess-13-2579-2013.pdf**.

be more challenging. International vulnerabilities to climate impacts through overseas investment, supply chains, global markets and political instability were dramatically illustrated by the Bangkok floods in 2011 but are rarely accounted for in standard assessments[24].

Figure 2: Interdependency of infrastructure sectors and cross-cutting issues



***Source**: E3G*

How do we make infrastructure sustainable?

Given these significant and growing risks, incremental policy changes are not enough – fundamental institutional reforms are needed. However, the global infrastructure debate has been dominated by narratives and actions that fail to recognize this fact. The need for economic and physical resilience is often overshadowed by concerns about the finance gap and underinvestment in infrastructure[25]. There is a critical danger that by attempting to tackle the perceived "infrastructure financing gap" countries rush to build new infrastructure systems which are ill-suited and vulnerable to the future we all face. This poses not only physical risks but also fiscal risks due to effects on public finances[26].

[24] An example of such assessment for the UK can be seen here **http://pwc.blogs.com/files/international-threats-and-opportunities-of-climate-change-to-the-uk.pdf**

[25] For example, see WEF (2014) **Strategic Infrastructure Steps to Operate and Maintain Infrastructure Efficiently and Effectively** and McKinsey Global Institute (2016) **Bridging Global Infrastructure Gaps**.

[26] IMF (2016) **After Paris: Fiscal, Macroeconomic, and Financial Implications of Climate Change**

One approach has been to develop a checklist of safeguards that investment committees have to consider before final decision. Over time these safeguards have become more wide-reaching and robust with multi-stakeholder groups having a role in their development and monitoring their implementation. Yet while standards and labels can help to ensure infrastructure quality they also highlight sustainability as a "downstream" project engineering issue rather than something that should inform overall infrastructure system choices and design. Given that safeguards are usually applied late in the project cycle and are viewed as impositions and regulatory "requirements", they can be viewed as a "tick-box" exercise with limited enforcement. Moreover, while there has been a focus on integration of externalities in economic analysis, for example through carbon pricing, this is not a panacea[27]. In the buildings sector, for example, a carbon price is not sufficient to incentivize zero carbon buildings even though there may be a strong economic case, as there are other barriers in place[28]. Issues such as standards and integration of external costs are critical but individually do not meet the scope of the problem.

To reach the Paris climate goals, a 100% renewable energy grid will require energy systems to be smart, flexible and integrated[29]. The integrated nature of modern energy networks blur the boundaries between different infrastructure 'types'[30]. New solutions which are emerging due to both technology change and the low-carbon revolution cut across both sectoral and national boundaries (see Figure 2 above). Investment in grid flexibility lowers the final costs for the grid and for energy bill payers[31]. Moreover, investment in energy efficiency of the built environment is an infrastructure investment which also reduces the need for further investment through lower power consumption and demand-side response as a source of flexibility[32]. Increasingly interconnected transport, heat, digital and energy systems offer opportunities[33] - but also stretch the limits of the current regulatory framework.

Meanwhile, challenges such as air pollution and climate change impacts also cut across sectoral boundaries. Thus, the infrastructure of the future will likely require a change in regulatory systems. In the EU, E3G analysis has noted that energy infrastructure policies and institutions will need to be re-tooled towards actively managing the uncertainties of the transition[34] and the nature of the system post-transition.

By focusing on green and sustainable finance, sustainable infrastructure assets can be scaled up. For example, the EU Action Plan on Sustainable Finance sets out plans for the EU to reorient capital flows including to mobilise sustainable infrastructure

[27] **https://www.e3g.org/library/how-are-development-banks-performing-on-shadow-carbon-pricing**

[28] See: **https://germanwatch.org/en/2degree-criteria**

[29] See: **https://www.nrel.gov/docs/fy17osti/68349.pdf**

[30] E3G (2017) **Infrastructure for a Changing Energy System. The Next Generation of Policies for the European Union.**

[31] **https://www.e3g.org/library/plugging-the-energy-gap**

[32] E3G (2013) **Infrastructure networks and the 2030 climate and energy framework**

[33] E3G (2017) **Infrastructure for a Changing Energy System. The Next Generation of Policies for the European Union.**

[34] E3G (2017) **Infrastructure for a Changing Energy System. The Next Generation of Policies for the European Union**

investment[35]. Regulators and risk rating agencies can play a role in building a demand for SI. It has been proposed that recognising infrastructure as an asset class[36] with dedicated risk charges, as the European Union is now doing, can support the flow of financing[37]. The need for risk capital and blended finance to encourage investment in projects that are otherwise seen as too risky is frequently cited as a key issue. MDBs have also played an important role in green bonds and in climate finance. Initiatives like Amundi's new USD$2bn 'Cornerstone Green Bond Fund (CGBF)'[38] exemplify the investor role of development banks but also the necessity of different investors to reach the USD$2bn target the fund seeks.

Defining 'Sustainable' and 'Infrastructure'

In the Organisation for Economic Co-operation and Development (OECD) reporting system, "infrastructure" refers to the sectors of water and sanitation, energy generation and support, transport and communications[39]. Natural infrastructure - wetlands, land use, agriculture and forestry management[40] - is also a type of infrastructure which can address water challenges by filtering water and buffering against floods[41]. Energy efficiency must be, though too often is not, recognised as infrastructure as it is a long-lasting capital stock which provides inputs to a wide range of goods and services and frees up capacity elsewhere in the economy[42]. Infrastructure can also be multi-functional and cut across sectors, for example, architects are designing structures which double as a car park and storm water storage solution for flood-prone areas of cities[43].

Sustainable infrastructure can be defined as infrastructure that is socially, economically and environmentally sustainable[44]. There are important linkages between the three types of sustainability, for example, having social safeguards in place and transparency in project data may also be a pre-requisite for ensuring that large-scale projects do not affect local communities and the environment, as well as ensuring that information is available to identify potentially harmful projects.

E3G's definition of sustainable infrastructure is **infrastructure that is socially, economically, institutionally and environmentally sustainable, including natural infrastructure and energy efficiency.** Institutional sustainability requires robust institutional capacity and clearly defined procedures for project planning,

[35] **https://www.e3g.org/news/media-room/commission-launches-plan-to-make-eu-sustainable-finance-world-leader**

[36] An asset class is a "group of securities that exhibits similar characteristics, behaves similarly in the marketplace and is subject to the same laws and regulations". See: **https://www.investopedia.com/terms/a/assetclasses.asp**

[37] McKinsey Global Institute (2016) **Bridging Global Infrastructure Gaps**

[38] **https://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/about+ifc_new/ifc+governance/investor+relations/grnbond-overvw**

[39] OECD (2017) **Investing in Climate, Investing in Growth**

[40] New Climate Economy Report (2016) **The Sustainable Infrastructure Imperative**

[41] **http://www.wri.org/blog/2018/05/forests-and-wetlands-are-water-infrastructure-new-green-bond-helps-finance-their**

[42] E3G (2016) **Energy Efficiency as Infrastructure**

[43] **https://www.archdaily.com/880164/all-in-one-structure-solves-flooding-parking-and-the-lack-of-green-space-in-cities**

[44] Brookings (2016) **Delivering on Sustainable Infrastructure**

procurement, and operation[45]. Sustainable infrastructure fits within and can be informed by the broader context of ratings for sustainable finance (see the EU's taxonomy for sustainable finance), green bonds and the voluntary disclosure of information about climate-related risks. For example, according to Climate Bonds Initiative, transport projects can be defined as low carbon on a per passenger-km (p/km), for passenger transports[46].

MDBs can themselves play a role in such definitions including an active involved in green bond standards. Safeguard or rating systems such as SuRe[47] and Envision[48] have also been used to define sustainable infrastructure. Among these, SuRe standard is a global voluntary standard which integrates key criteria of sustainability and resilience into infrastructure development and upgrade[49], building on existing standards such as the World Bank's International Finance Corporate (IFC) performance standards[50]. It is unclear at this stage whether such standards and ratings drive substantial levels of additional finance to sustainable infrastructure – for example due to branding and providing confidence to clients, or whether they are applied 'ex post' after the project has been approved.

Infrastructure investment decisions involve choices based on perceptions or projections about the future, including shifts in technology, population or socioeconomic change, so from an individual decision perspective, we can define 'sustainability' in terms of the projections that will drive choices[51]. However, predictions are often wrong, and relying on them can prove costly, which is why the World Bank and others have developed new methods to help decision makers make more robust decisions under deep uncertainty[52].

Role of the Multilateral Development Banks (MDBs)

Multilateral Development Banks (MDBs) and other Development Financial Institutions (DFIs) can have an important role both in assisting governments with creating an effective enabling environment for SI, through technical assistance and project preparation and through mobilising of private action. Alongside commitments on climate finance, many of the MDBs have made separate aspiration pledges to scale up their infrastructure investment in coming years[53], making the alignment of this investment with climate goals all the more vital if these goals are to be achieved. However, analysis of current flows of MDBs climate finance (below) shows some areas have received more attention than others.

[45] IADB (2018) **What is sustainable infrastructure**

[46] See: **https://www.climatebonds.net/standard/transport**

[47] **http://www.gib-foundation.org/sure-standard/**

[48] **https://sustainableinfrastructure.org/envision/how-it-works/**

[49] **http://www.gib-foundation.org/sure-standard/**

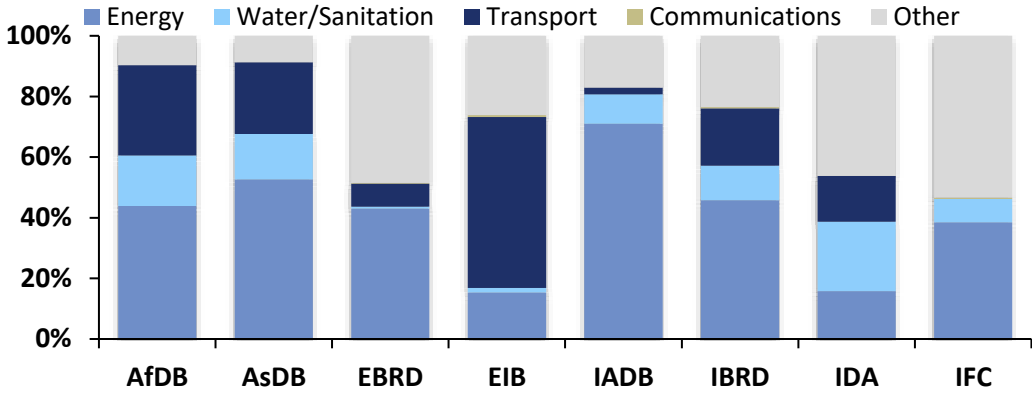
[50] GIB Foundation (2015) **Sure Standard**

[51] Population increases demand for infrastructure; but infrastructure can in turn attract population to a region, resulting in a feedback loop. See: Hall et al (2016) **The Future of National Infrastructure: A System-of-Systems Approach**.

[52] **http://blogs.worldbank.org/ppps/embracing-uncertainty-better-decision-making**

[53] See: **http://g20chn.org/English/Documents/Current/201608/P020160815360318908738.pdf**

Figure 3: Climate finance to different infrastructure sectors (Annual Avg 2015-16)



Source: *E3G analysis of climate-related development finance from OECD-DAC*[54]

Given the MDBs are already investing in infrastructure, their lending and supporting services are well-suited to funding and leveraging investment making this more sustainable[55]. MDBs are, for example, supporting client countries with fossil subsidy reform, and helping countries evaluate options based on rigorous cross-country evidence. MDBs can be critical in helping to establish institutional contexts for delivering and scaling up sustainable infrastructure including with policy-based loans or results-based loans. It is important to note that the historical policies from the World Bank and IMF in 1980's were accused of leading to the opposite dynamic, as they called on countries' to cut budgets and reduced institutional capacity by promoting privatization without adequate regulatory systems in place[56].

The Inter-American Development Bank (IADB) and Mercer have done a review of existing initiatives on sustainable infrastructure,[57] including 'mobilizers' – those working with and convening stakeholders, and 'tool providers' - integrating environmental analysis in the investment process. E3G analysis (see *Annex 1*) shows out of the 'mobiliser' initiatives for sustainable infrastructure identified by Mercer[58], several of these have more than four MDB as members. The Global Infrastructure Facility (GIF) has a wide membership - the African Development Bank is the only one of these MDBs below which is not a member – meaning it could be a useful forum to bring partners together to discuss sustainable infrastructure.

Most of these are relatively new and do not have a large pipeline of projects yet, making it difficult to assess their progress. The World Bank-led Public-Private Infrastructure Advisory Facility has started an initiative aiming at taking stock of the concepts, standards and rating methodologies for sustainable infrastructure; and exploring the case for a common approach among the MDBs. However, it is too early

[54] **http://www.oecd.org/dac/stats/climate-change.htm**

[55] Brookings (2016) **Delivering on Sustainable Infrastructure**

[56] Stiglitz (2002) Globalization and its Discontents.

[57] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure**

[58] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure**

to gauge progress of this initiative. Moreover, whilst Annex 1 shows several MDBs are members of these initiatives, it does not help to identify which of these are the most innovative or successful. The landscape is complex because there are also various other tools, initiatives and projects that MDBs have developed related to sustainable infrastructure- some of which are city-focused[59], regional[60] or sector-specific. Some MDB programmes have aimed to mainstream efficiency into lending, for instance, EBRD's Industrial Energy-Efficiency Audit program to consider the energy-efficiency potential of all its industrial and commercial loan applications[61].

Analysis of the tool providers identified by Mercer[62] (see *Annex 2*) shows the Sustainable Infrastructure Foundation (SIF) has the most MDBs as members[63]. This hosts the relatively new SOURCE platform[64] - a platform freely available national and sub-national governments to help them prepare infrastructure projects; and is now used by more than 40 governments[65]. It has also been found that most existing Project Preparation Facilities (PPFs) are financed, managed and structured by MDBs[66]. However, the majority of Project Preparation Facilities in Africa tend to focus on the later stages of the project cycle, leading to a shortage of bankable projects to be pursued by investors[67].

MDB's may be able to improve or verify their standards by comparison with external standards. For example, IADB has found that theirsafeguard policies address 99% of points under the 'Envision' system and exceeded it on gender and indigenous peoples[68]. Included in this work was an analysis of IFC's Guidelines as IADB requires its clients to follow these guidelines, and it was found that 39 of 60 Envision credits are addressed by the IFC's Guidelines[69]. These standards may also have additional value for the private sector. An estimated $4.5 trillion in investments have already adhered to IFC's standards or principles inspired by them, so improving IFC standards could be one way of driving infrastructure investments towards more sustainable infrastructure[70]. More work is needed to assess the quality of such standards. However, recent analysis by IADB suggests current sustainability rating systems cover only a very small number of sustainability criteria earlier on in the project planning

[59] See for example AsDB's **Cities Development Initiative for Asia**.

[60] See for example IADB and UK's **Sustainable Infrastructure Program** in Latin American and the Caribbean; AsDB and WBG's **Pacific Regional Infrastructure Facility in the Pacific**; or AfDB's **Programme for Infrastructure Development in Africa**.

[61] Brookings (2016) **Delivering on Sustainable Infrastructure**

[62] **https://publications.iadb.org/handle/11319/7943** See the report for further details of the tool providers and what they do.

[63] EIB is not a member but however the European Investment Project Portal is on the Strategic Committee for SIF, which has EIB as a partner

[64] **https://public.sif-source.org**

[65] **https://public.sif-source.org/mdbs-infra-banner-story/pinsent-mason-wbg-blog-online-platform-helps-drive-infrastructure-developing-countries/**

[66] GIB Foundation (2014) **Unleashing Private Capital Investments for Sustainable Infrastructure Greenfield Projects**

[67] USAID (2016) **Assessment of Project Preparation Facilities: Power Africa Transactions and Reforms Program**

[68] IADB (2016) **The Role of IDB's Safeguard Policies in Promoting Sustainable Infrastructure**

[69] IADB (2016) **The Role of IDB's Safeguard Policies in Promoting Sustainable Infrastructure**

[70] **https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/impact-stories/how-ifc-has-changed-finance**

stage[71]. Gaps exist in the availability of guidance or regulation earlier in the project cycle– also known as 'upstream' - to guide the implementation of sustainability aspects during later stages[72].

Leverage points in the project decision chain

Project decision chains can be divided into various segments from upstream to downstream, including conceptualisation, planning, execution and termination[73]. Building on previous research[74] and semi-structured expert interviews, E3G has sought to identify potential leverage points that could shift investment to sustainable infrastructure at the different stages of the project decision chain (see below)[75]. At the upstream end, experts have suggested that energy, urban and transport planning can play a role in determining the sustainability aspects of the infrastructure investment, for example, urban planners may make decisions about the relative benefits of mass transit or road investments.

Carbon pricing may have an impact on the decision to go ahead with an energy investment at the planning stage, but for other sectors such as transport or buildings, the carbon price may not be sufficient to incentivise a greener investment decision as there are other barriers in place[76]. Economic planning is highly dependent on the assumptions selected. For example, one limitation of using cost-benefit analysis for planning is that it may result in a choice of projects biased against the poorest, as these households have less money and therefore benefits for these communities do not show up as much in cost-benefit analysis. Flood protection investment decisions can dramatically change if one counts the benefits for poor people more than for the non-poor[77]. Another limitation with traditional economic analysis is that it does not usually factor in the avoided costs related to the benefits of a climate-resilient design.

Across all sectors, regulations, policies and legislation such as national infrastructure or development plans, building codes or emission performance standards can also determine whether an infrastructure investment is sustainable. Brookings[78] note the importance of removing of fossil fuel subsidies and systematically taking climate risk into account in project appraisal[79]. Risk rating agencies may play a key role in this.

[71] IADB (2018) **IDBG Framework for Planning, Preparing, and Financing Sustainable Infrastructure Projects**

[72] IADB (2018) **IDBG Framework for Planning, Preparing, and Financing Sustainable Infrastructure Projects**

[73] Rolstadås, A., Pinto, J. K., Falster, P., & Venkataraman, R. (2015). **Project decision chain**. Project Management Journal, 46(4), 6–19.

[74] E3G (2018) **Banking on Reform**

[75] The sectoral categories are drawn from **OECD** excluding communications which has been identified as as a **less climate-relevant sector**. Buildings are included as this a major emitting using sector as identified in the **IPCC 5th Assessment report** .

[76] **https://www.e3g.org/library/how-are-development-banks-performing-on-shadow-carbon-pricing**

[77] One solution is to explicitly count the benefits for poor people more than the benefits for non-poor people. See: **https://openknowledge.worldbank.org/handle/10986/25335.**

[78] Brookings (2016) **Delivering on Sustainable Infrastructure**

[79] Brookings (2016) **Delivering on Sustainable Infrastructure**

Figure 5: Conceptual framework of tools and leverage points identified to shift to sustainable infrastructure at different stages of the project decision chain

Sector	Cross-cutting macro-economic policy and regulation	Conceptualization	Planning	Execution	Termination
Energy		• Energy roadmaps; • NDCs/Long term strategies; • Development plans; • Internal targets e.g. climate finance; • Technical assistance (TA) and investment facilities	• Lending criteria / exclusion lists; • Carbon pricing; • Factoring in health costs or avoided losses into economic analysis; • Costs of capital; • Emission performance standards (EPS)	• Procurement • Project Environmental Impact Assessment (EIA); • Consultation and disclosure	• Operation and Maintenance
Transport		• Urban planning; • Transport roadmaps; • Development plans;	• Avoid-shift-improve (ASI) approach; • Climate risk screening; • Carbon pricing has limited impact; • Factoring in health costs into economic analysis • Blue spot analysis/ criticality analysis/asset management systems	• Procurement • Project EIA • Consultation and disclosure	• Operation and Maintenance
Buildings		• Urban planning; • Development plans; • Building codes; • Engineer training;	• Carbon pricing has limited impact; • Mortgage/insurance requirements; • Factoring in health costs into economic analysis; • EDGE tool, Energy Star and LEED;	• Procurement • Project EIA • Consultation and disclosure	• Operation and Maintenance
Water & Sanitation		• Development plans; • Urban planning; • Landscape or watershed management; • IRWM.	• Climate risk screening; other national legislation • Robust decision-making tools e.g. for planning coastal flood protection	• Procurement • Project EIA • Consultation and disclosure	• Operation and Maintenance

***Source**: Multiple*

When a decision or choice is made earlier on in the project cycle (also known as 'upstream') there may be more flexibility to weigh up different options, consider alternative materials or even a different design including the risks the project can be exposed to through its life cycle. By contrast, when an infrastructure decision is made later in the project decision chain there may be a certain level of path dependency or lock-in due to perceived sunk costs, vested interests, or institutional momentum based on existing decisions that have been made or costs that have been incurred[80]. Meanwhile, if a 'green' or sustainability certification is sought further down the project decision chain, this may result in incremental changes to the design or procurement rather than systemic changes to infrastructure sustainability. **This indicates that actors such as MDBs with the goal of supporting sustainable infrastructure investment could consider supporting how upstream policy,**

[80] Low et al (2015) A multivalent conception of path dependence: The case of transport planning in metropolitan Melbourne, Australia. **Environmental Sciences**, 2:4, 391-408, DOI:

legislation, regulations, planning, and organizational capacities contribute to delivering sustainability of infrastructure[81].

The framework above demonstrates that many of the current solutions, tools or platforms by MDBs, including in the realm of safeguards or performance standards, are at the mid- or downstream end of the project decision chain and may only result in incremental changes. Whilst safeguards are important this may not act as a transformational lever towards increases in sustainable infrastructure. Long-term strategies or 2050 planning have been identified by stakeholders as important in terms of upstream planning, due to the long lifespan of infrastructure assets.

Barriers to shifting investments towards sustainable infrastructure that were identified by stakeholders included the lack of integration across government departments that work in silos, the lack of capacity or skills, finance gaps or misaligned incentives, bottom-up or sector-specific barriers and risks, as well as the presence of a plethora of sustainable infrastructure initiatives but a lack of focus within them. There several planning-related and regulatory levers which cut across all sectors including, at the upstream end, macro-economy policy and regulation. Further research would be needed to validate the conceptual framework and identify other leverage points and incentive structures which could help to effectively shift global infrastructure projects to a more sustainable trajectory.

Recommendations

Transformation to a climate-resilient and low carbon economy is likely to require systemic rather than piecemeal changes for investment in infrastructure that is sustainable over its life cycle. Scientists have confirmed that limiting warming to any level requires annual net carbon dioxide emissions to be phased out to virtually zero[82]. This will have to be done by between 2050 and 2070 to meet the 2-degree global temperature goal[83]. Given that many infrastructure assets have long lifespans, the infrastructure being built now must be radically shifted to net zero systems and future-proofed to achieve the global Paris goals in a cost-effective way. Reaching a 100% renewable energy system offers major opportunities to integrate across systems and may require radical changes in regulatory systems[84].

The interviews with stakeholders and the literature review has identified a range of recommendations for the DFIs and other IFIs:

- **Shift from project-level to national or international-level reforms to support sustainable infrastructure**, for example through support for upstream planning processes for 2050 planning, or assistance for improved sub-national or city-level urban planning, as well as during project preparation and design.

[81] IADB (2018) **What is sustainable infrastructure**

[82] Rogelj et al (2015) Zero emission targets as long-term global goals for climate protection. **Environmental Research Letters**, Vol 10, No. 10

[83] **http://www.un.org/climatechange/blog/2014/11/un-report-underscores-need-quick-action-climate-change/index.html**

[84] E3G (2017) **Infrastructure for a Changing Energy System. The Next Generation of Policies for the European Union.**

This could also include improved support for policy and regulatory reforms to unlock barriers to sustainable infrastructure e.g. carbon pricing, fossil fuel subsidy reform, sustainable procurement, and green tax or fiscal incentives. Modelling long-term strategies provides an opportunity to stress-test infrastructure plans and projects with implications well beyond the middle of the century. This is particularly important for new DFIs such as AIIB to consider as they set up their strategies and systems.

- **Systemically use innovative finance mechanisms to mobilise private finance for sustainable infrastructure and initiate bankable projects** e.g. blended finance, guarantees, green bond markets, and technical assistance facilities to build the project pipeline. Guarantees are well suited to sustainable infrastructure because they can be precisely targeted to policy risks and MDBs have a comparative advantage in extending guarantees through their honest-broker role, but the overall volume of guarantees remains modest[85]. Critically, financial systems need to find mechanisms to pay for the upstream institutional changes to deliver sustainable infrastructure – which is challenging when project preparation facilities (PPFs) are focused more on projects rather than portfolios. For example, DFIs could create a substantial fund of concessional finance that is only accessible when a region or country has established they have incorporated sustainability into infrastructure institutions.
- **Transform existing infrastructure including putting energy efficiency first** and recognizing energy efficiency as infrastructure provides inputs to a wide range of goods and services. There are major benefits to treating energy efficiency as infrastructure and integrating into national infrastructure planning – as it means supply side investment needs will fall - reducing the costs to society[86].
- **Strengthen and improve existing infrastructure safeguards as well as building institutional capacity to do sustainability assessments,** instead of creating new standards. MDBs could assess their existing safeguards against global best practices (like IADB has done with Envision[87]) or agree on a collective independent assessment against a sustainable infrastructure rating. Similarly, MDBs could play a role in better promoting infrastructure as an asset class with clear and objective standards for SI (such as the green bonds indices developed by MSCIO/Barclays)[88]. More work is needed to assess the quality of existing standards; and there is a lack on guidance or regulation at the upstream level to guide the implementation of sustainability aspects during later stages.
- **Building institutional capacity for sustainability assessment** by inserting sustainability assessment into line agencies. This could be done along the

[85] Brookings (2016) **Delivering on Sustainable Infrastructure**

[86] E3G (2016) **Energy Efficiency as Infrastructure**

[87] IADB (2016) **The Role of IDB's Safeguard Policies in Promoting Sustainable Infrastructure**

[88] Brookings (2016) **Delivering on Sustainable Infrastructure**

lines of the models in the USA and Australia, supported in house or by independent professional associations e.g., ISI in the USA or ISCA in Australia.

- **Identify gaps in the existing portfolio** and ensure climate-related finance is mainstreamed through each of the key infrastructure sectors – as there are currently some infrastructure sectors in which a lower proportion of finance has been identified as 'climate related'– for example buildings and transport.
- **Better tie the benefits of sustainable infrastructure to other co-benefits and sustainable development goals** – for example on health and water quality. This could include, for example, better integration of air pollution costs into transport infrastructure planning and urban plans. There is some evidence this is a better incentive to shift towards low carbon transport alternatives than carbon pricing.
- **Build the capacity of staff and clients to keep track of the latest trends and technologies** and the impact they will have on future demand models and infrastructure value assessment. For example, while MDBs and DFIs are familiar with projects for solar and wind technologies there has been relatively little focus on taking advantage of smart digital technologies.

Recommendations for government actors and other international stakeholders working on sustainable infrastructure:

- **Strengthening national-level interventions to support sustainable infrastructure – either substantial strengthening of existing government capacities or cross linking to non-government capacities.** There is a need to support or create national institutions for SI. UK's NIC or Australia's ISCA could be used as the benchmark for national plans, including upstream screening and pipeline development.
- **Strengthening city and local-level planning and institutions for long term infrastructure investment.** A more comprehensive approach to urban planning would consider the whole city, including opportunities for innovative smart technologies in transport, heat, digital and energy systems, as well as considering the costs of air pollution and long-term risks in infrastructure planning.
- **Ensure initiatives for sustainable finance are aligned with the sustainable infrastructure imperative.** Sustainable finance taxonomies being developed at present, including in the EU, need to consider the long-term lifespan of infrastructure investments and the need to shift to a net zero economy.
- **Shift from an incremental to structural approach to sustainable infrastructure**. Implications of funding particular assets need to be considered from a long-term perspective where the infrastructure has a long lifespan, or there is a risk of locking in outdated carbon-intensive technology as well as climate risk impacts. This is particularly important for large-scale global initiatives such as the Belt and Road Initiative.

- **Sustainable infrastructure needs to be linked to reduced macroeconomic risk**. This is being driven in part by the findings of the Task Force on Climate Related Financial Disclosure and warnings from credit rating agencies of possible rating downgrades due to failure to address climate risk. Relatedly, greening the financial system can support sustainable investments through adoption of common standards, re-orienting or creating new institutions to support green investments.
- **Create incentives and send market signals for the paradigm shift within systems and within institutions**, as well as sharing best practice incentive models within and between institutions. Overall, more focus is needed on upstream legislation, planning, and organizational capacities[89], including macro-economic policy and regulation, that could drive a shift in global infrastructure to meet global challenges.

[89] IADB (2018) **IDBG Framework for Planning, Preparing, and Financing Sustainable Infrastructure Projects**

About E3G

E3G is an independent climate change think tank operating to accelerate the global transition to a low carbon economy. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. In 2018, E3G was ranked the 5th top environmental policy think tank for the second year running in the Global Go To Think Tank Index 2017.

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Annex 1: 'Mobilizers' for Sustainable Infrastructure & MDB members

'Mobilizers' identified by Mercer[90]	AFDB	ASDB	EIB	EBRD	IADB	WBG	AIIB	NDB
Africa50	Yes							
Aligned Intermediary								
Climate Investor One								
Danish Climate Investment Fund (KIF)								
Global Climate Partnership Fund (GCPF)						Yes		
Global Green Growth Institute (GGGI)						Yes		
Global Infrastructure Facility (GIF)		**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Global Infrastructure Hub (GI Hub)		**Yes**			**Yes**	**Yes**	**Yes**	**Yes**
Green Infrastructure Investment Coalition (GIIC)						Yes		
Matchmaker								
NEPAD-IPPF	Yes							
Public-Private Infrastructure Advisory Facility (PPIAF)		**Yes**		**Yes**	**Yes**	**Lead**		
Sustainable Development Investment Partnership (SDIP)	**Yes**		**Yes**	**Yes**	**Yes**	**Yes**		

***Source**: E3G Analysis. Initiatives in bold have more than 4 MDBs as members.*

Among the 'mobilizers' identified by Mercer[91], E3G analysis (above) shows four have more than four MDBs as members: the Global Infrastructure Facility (GIF), Global Infrastructure Hub (GI Hub), Sustainable Development Investment Partnership (SDIP), and Public-Private Infrastructure Advisory Facility (PPIAF)[92]. GIF was with a focus to "grow the global pipeline of quality, bankable infrastructure projects" and has 38 approved projects on its website as of June 2018[93]. GIF has a wide membership - the African Development Bank is the only one of these MDBs below which is not a member[94]. The GI Hub, a G20 initiative, is focused on knowledge sharing rather than providing direct support to governments (i.e. forecasting infrastructure investment needs to meet the SDGs in 56 countries)[95]. Sustainable Development Investment Partnership is a platform launched in 2015 to "scale the use of blended finance" and has a pipeline of 75 projects[96]. Meanwhile the World Bank-led PPIAF has a focused on public-private partnership and badges itself as the "only global facility dedicated to strengthening the policy, regulatory and institutional underpinnings of private sector investment in infrastructure in emerging markets"[97].

[90] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure.** Refer to the report for further details of these mobilisers.

[91] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure**

[92] **http://ppiaf.org/**

[93] **https://www.globalinfrafacility.org/all-projects-list**

[94] **https://www.globalinfrafacility.org/what-is-the-gif**

[95] **https://outlook.gihub.org/methodology**

[96] **http://sdiponline.org/updated_workstreams/**

[97] **http://ppiaf.org/**

Annex 2: Tool Providers for SI and MDBs members

'Tool providers' identified by Mercer[98]	AFDB	ASDB	IADB	EIB	EBRD	WBG
Bloomberg New Energy Finance (BNEF)						
CEEQUAL / BREEM Infrastructure						
EDHEC Infrastructure Institute Singapore						
Global Infrastructure Basel (GIB) Foundation [responsible for SuRe standard]				Yes (on Council)	Yes (on Council)	
GRESB Infrastructure						
INFRADEV Clearinghouse						
Institute for Sustainable Infrastructure [responsible for Envision rating system™]			Yes			
IRENA Navigator						
Preqin						
Sustainable Infrastructure Foundation — [responsible for 'SOURCE' platform]	**Yes (on Council)**	**Lead**	**Yes (on Council)**		**Yes (on Council)**	**Yes (on Council)**
Sustainable Transport Appraisal Rating (STAR)		Yes				
World Bank Renewable Energy Financial Instrument Tool (REFINe)						Yes

Source: E3G Analysis. Initiative in bold has more than 4 MDBs of these 6 MDBs as members.

Among these 'tool providers' identified by Mercer[99] (above), Global Infrastructure Basel (GIB) is responsible for SuRe standard[100]; the Institute for Sustainable Infrastructure (ISI) is responsible for Envision rating system; while the Sustainable Infrastructure Foundation (SIF) is responsible for the SOURCE platform.

[98] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure**

[99] Mercer and IADB (2016) **Building a Bridge to Sustainable Infrastructure**

[100] **http://www.gib-foundation.org/sure-standard/**