SUPPORTING THE INFRASTRUCTURE DATA INITIATIVE –
Summary of the Workshop on Infrastructure as an Asset Class and Data Collection for Long-term Investment – 2nd November 2017, Paris

November 2017

On 2 November 2017, the OECD hosted a Workshop on Infrastructure as an Asset Class and Data Collection for Long-term Investment, supporting the **G20/OECD Task Force on Institutional Investors and Long-term Financing** (the "G20/OECD Task Force"). The Workshop was attended by over 70 participants and brought together members of the Task Force (i.e. representatives of the G20, OECD, Asian Pacific Economic Cooperation (APEC), and International Organisations (IOs) such as the Financial Stability Board (FSB), the World Bank Group (WBG), the Global Infrastructure Hub (GIH) and the European Investment Bank (EIB)) with selected private sector stakeholders from the OECD Network of Long-term Investment, academics and other industry experts.

This note provides a summary of the Workshop and the rationale for better information and meaningful performance benchmarks in infrastructure investment and introduces the EIB, GIH, LTIIA and OECD Joint Infrastructure Data Initiative (See Infrastructure Data Initiative – Project Proposal).

This note is complementary to a separate OECD report, titled "Breaking Silos: Actions to Develop Infrastructure as an Asset Class", which presents more in depth the G20 work on Data Gaps for Long-term Investment (LTI) as well as main policy questions at stake for mobilising private sector financing and a concrete research and policy agenda on data gaps and analytical work

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WORKSHOP ON INFRASTRUCTURE AS AN ASSET CLASS AND DATA COLLECTION FOR LONG-TERM INVESTMENT

Objectives of the workshop, key messages and next steps

On 2 November 2017, the OECD hosted a Workshop on Infrastructure as an Asset Class and Data Collection for Long-term Investment, supporting the **G20/OECD Task Force on Institutional Investors and Long-term Financing** (the "G20/OECD Task Force"). The Workshop was attended by over 70 participants and brought together members of the Task Force (i.e. representatives of the G20, OECD, Asian Pacific Economic Cooperation (APEC), and International Organisations (IOs) such as the Financial Stability Board (FSB), the World Bank Group (WBG), the Global Infrastructure Hub (GIH) and the European Investment Bank (EIB)) with selected private sector stakeholders from the OECD Network of Long-term Investment[1], academics and other industry experts.

The workshop recognised Argentina's prioritisation of promoting infrastructure as an asset class during its G20 presidency in 2018 and aimed to identify concrete policy actions to support the process. The discussions built on recent related events and initiatives, including the LTIIA Fourth Annual Meeting and Joint Forum with the OECD on the Development of infrastructure as an Asset Class, organized on 18 October, the 4th OECD Green Investment Financing Forum, held on the 24 and 25 October at the OECD in Paris, as well as the preceding Task Force Workshop on Data Collection for Long-term Investment on 10 May 2017.

This note provides a summary of the Workshop of the 2nd of November including also the rationale for better information and meaningful performance benchmarks in infrastructure investment and introduces the EIB, GIH, LTIIA and OECD Joint Infrastructure Data Initiative (See Infrastructure Data Initiative – Project Proposal)

This note is complementary to a separate OECD report, titled "*Breaking Silos: Actions to Develop Infrastructure as an Asset Class*", which presents more in depth the G20 work on Data Gaps for Long-term Investment (LTI) as well as main policy questions at stake for mobilising private sector financing and a concrete research and policy agenda on data gaps and analytical work. The importance of the use of micro data for the analysis of infrastructure investments, the nature of the data available, methodological aspects and recent initiatives on data collection are also included in the second section.

The Workshop consisted of the following four sessions:

Session I: Long-term Financing Priorities in 2018 for G20, G7, APEC and FSB

Session II: Developing Infrastructure as an Asset Class: Policy Options

Session III: Developing Financial Performance Benchmarks for Infrastructure

Session IV: ESG Performance Benchmarks for Infrastructure

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[1] This Network is part of the OECD Long-term Investment project, including industry participants (investors, banks, corporates) academics and NGOs [see www.oecd.org/finance/lti]

Key messages:

- Argentina's prioritisation of infrastructure during its G20 presidency presents a unique opportunity to significantly advance the policy agenda on establishing infrastructure as an asset class and attract more private infrastructure investment.

- Throughout its Presidency, Argentina will be committed to establishing a clear road-map on how to develop infrastructure as an asset class. Further focus areas in this regard will include financial diversification of infrastructure investment, contractual standardization and increased transparency in the infrastructure market.

- The Financial Stability Board (FSB) announced a new project aimed at evaluating the effects of the G20 regulatory reforms on financial intermediation, including on the financing of infrastructure investment. The project will be carried out as part of the FSB's framework for post-implementation evaluation of the effects of G20 financial regulatory reforms.

- The new Canada Infrastructure Bank will invest a total of CAD 35 billion over the coming years and will collaborate with provincial, territorial, municipal, indigenous, private sector and institutional investment partners.

- The bundling of small-scale infrastructure projects and pooling of smaller investors is essential to channelling more private finance into (smaller-scale) infrastructure.

- More empirical evidence is essential to i) support institutional investors in allocating capital towards sustainable and quality infrastructure investments, ii) better understand the effects of infrastructure investment on institutional investors' overall portfolio efficiency, iii) better manage long-term risks and iv) gain a better understanding of the effects of technology and innovation on the financial performance of infrastructure assets.

- Data confidentiality issues are a major obstacle to the collection of infrastructure data and the establishment of meaningful performance benchmarks.

- The development of a universally accepted template to standardize infrastructure debt documentation and disclosure is integral to streamline the infrastructure investment market and increase its accessibility for institutional investors.

- Not only infrastructure project and market risks, but also infrastructure supplier risks can significantly affect project costs and must be better quantified and incorporated into investment models.

- A lack of information to efficiently price risks on the supplier side is amplified by the behavioral issue of uncertainty aversion. Together, these result in overestimated risk contingencies, excessive risk discounting, higher costs, and reduced economic competitiveness of an infrastructure project.

- It was argued that the quality and reliability of data provided by asset owners and operators can be problematic, along with the inaccessibility of data especially at project and revenue level.

- Clear allocation of project delivery obligations and liabilities is essential to avoid project cost overruns and to avoid excessive accumulation of public debt, which can threaten a country's economic stability.

- Research insights shed light on inefficiencies in infrastructure planning and delivery as well as in the construction industry, which was characterised to have particularly low-levels of innovation and slow uptake of new technology.

- In order to increase the success rate of PPP projects in the long-run, there must be a better understanding of how to price the involved equity stakes and the return on equity correctly to better align strategic interests.

- Moody's project finance data shows that marginal default rates among unrated project finance bank loans trend towards levels consistent with single-A rated loans as they season. Projects face substantive incremental risks during construction and ramp-up phases; ultimate recovery rates are averaging at around 80%, despite the adverse impact of demand risk in the infrastructure industry sector.

- Defining and covering different infrastructure sectors, as well as underlying contractual frameworks, was argued to be essential to establishing meaningful financial performance benchmarks and to adequately cover the entire infrastructure market.

- Linkages between ESG performance and financial performance are not very well understood by investors and especially transition and climate risks are not sufficiently reflected in their investment decisions, nor are they properly priced in the valuation of assets.

- Pricing-in ESG externalities is essential to increase the commercial competitiveness of sustainable infrastructure projects; better integrate ESG into capital regulatory frameworks can help boost investments in sustainable infrastructure projects.

- Meaningful financial and ESG performance benchmarks have to be diverse enough to cover the wide variety of different infrastructure projects and countries.

- ESG performance benchmarks are needed to support the alignment of investment strategies with global climate goals.

- A "governance approach" to set ESG definitions and standards is required to urge investors to consider ESG issues, implement policies and increase transparency as well as more financial, and not fiscal, incentives are needed to channel investments in sustainable and climate resilient infrastructure.

SESSION I: LONG TERM FINANCING PRIORITIES IN 2018 FOR G20, G7, AND APEC

Objective of the session:

Session I aimed at discussing the future priorities for G20, G7 and APEC in 2018 to support the global agenda on long-term investment, discussing in particular the G20 priorities for the 2018 Argentinian Presidency on "Infrastructure as an Asset Class" and the infrastructure data gap. Further presentations included the Financial Stability Board (FSB) and the Canadian Infrastructure Bank.

Main takeaways:

−   The **OECD Secretariat,** through the **OECD Project on Institutional Investors and Long-term Investment (LTI)**, has for some time identified that a lack of data on infrastructure projects and their investment characteristics presents a barrier to private investors. Without critical pieces of information, such as historical performance and robust risk-return analysis that could be facilitated with infrastructure benchmarks, many investors face obstacles in completing the due diligence process on infrastructure investments.

Recent OECD research takes a holistic approach to long-term investment analysis by addressing private sector participants across the value chain (corporations, banks, institutional investors), and by developing better analytical tools for long-term infrastructure investment. In this context, the LTI's work focuses on the diversification of finance for sustainable infrastructure[2], the mobilisation of institutional investors for infrastructure investment, promoting infrastructure as an asset class and financing connectivity, low carbon infrastructure and clean tech innovation. Against this backdrop, the availability and quality of data and information on long-term investment and the promotion of infrastructure as an asset class are recognised as major priorities for the Argentinian G20 presidency in 2018. The OECD Secretariat identified the following three areas as key for the G20 agenda: i) mapping the financing of infrastructure (including investor and risk mapping), ii) infrastructure as an asset class and the role of institutional investors (including the development of ESG and financial performance benchmarks) and iii) mobilizing private sector financing in developing countries (including the mapping and development of innovative risk sharing instruments and financial products).

−   **Argentina** announced the establishment of the **G20 Infrastructure Working Group** and briefly outlined the reasons for prioritizing private capital financing of infrastructure for its 2018 G20 presidency. In particular, increasing private sector involvement will be promoted through the development of infrastructure as an asset class. Current conditions in global capital markets, such as a 'global savings glut', low interest rates, increasing fiscal stress in the public sector, were presented as the main arguments to prioritize this work stream.

Throughout its Presidency, Argentina will be committed to establishing a clear road-map on how to develop infrastructure as an asset class. Further focus areas in this regard will include financial diversification of infrastructure investment, contractual standardization and increased transparency in the infrastructure market. The latter point in particular was argued to be essential to attracting and collaborating with institutional investors. Argentina also highlighted the importance of involving the private sector in this process from beginning to end.

−   The **Financial Stability Board (FSB)** informed about its priorities with regards to financing for infrastructure investment under its **2018 work plan** and assured its support towards the Argentine G20 presidency. In this context, the FSB announced a new project aimed at evaluating the effects of the G20 regulatory reforms on financial intermediation, including on the financing

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[2] See the G20/OECD Guidance Note on the Diversification of Financial Instruments for Infrastructure and SMEs. The guidance note is a set of recommendations for G20 governments aiming at diversifying financial instruments ;it was endorsed by the G20 leaders in September 2016. See supporting document with additional details.

of infrastructure investment. The project will be carried out as part of the FSB's framework for post-implementation evaluation of the effects of G20 financial regulatory reforms. The first part is intended to be completed in advance of the 2018 Argentine G20 Summit and will examine trends and analyse the effects of reforms on the financing of infrastructure investment. The second part will be completed in advance of the Japanese G20 Summit. It will examine intermediation trends and the effects of reforms across different financing sources, including bank financing and market-based financing, and across types of borrowers and countries. This project will be the second of its kind under the FSB framework and follows a first evaluation of the incentives to centrally clear over-the-counter derivatives, which started in July 2017 and will conclude by late 2018.

– As part of the Canadian government's 'Investing in Canada Plan', the **Canada Infrastructure Bank** was established as a new institution to invest in revenue-generating infrastructure projects of public interest, with a strong focus on attracting investment from private sector and institutional investors. The Bank presented its mandate to engage primarily in large, transformative infrastructure projects such as regional transit plans, transportation and electricity grids and to provide both direct investment as well as non-investment support services. The latter will include the provision of expertise on infrastructure investment to private investors and governments as well as the collection and sharing of infrastructure investment data.

The Bank will invest a total of CAD 35 billion over the coming years and will collaborate with provincial, territorial, municipal, indigenous, private sector and institutional investment partners. It aims to increase the pipeline of bankable infrastructure projects and to bring more efficiency to infrastructure investments by involving private investors through various types of PPPs and by building user fee-based investment models. The Bank further promised a maximum of transparency and invited foreign investors to collaborate as well as investors to submit project suggestions on issues of public interest. This is aimed in particular at diversifying approaches to close the widening infrastructure gap. Answering to questions, it was clarified that the Bank will not restrict investments to specific ticket sizes and will also not apply a pre-set definition of 'infrastructure', as both aspects are expected to be determined by the market and through experience in what type of projects investors will be interested. The bundling of smaller-scale projects was also said to be envisioned at a later point in the future.

SESSION II: DEVELOPING INFRASTRUCTURE AS AN ASSET CLASS: POLICY OPTIONS AND THE INFRASTRUCTURE DATA INITIATIVE

Objective of the session:

The second session of the Workshop focused on recent trends in institutional infrastructure investment and on the main obstacles to promoting infrastructure investment as an asset class. The discussion built on relevant OECD work, a proposed research agenda and policy actions outlined in the OECD note *Breaking Silos: Actions to Develop Infrastructure as an Asset Class and Address the Information Gap*. The session hosted panellists with a wide range of backgrounds, including institutional investment, academia and project law practice, as well as experts from the International Transport Forum and the OECD Secretariat. At the end of the session, the EIB, GIH, LTIIA, LTIC and OECD presented the 'Infrastructure Data Initiative' and outlined its ambitions and objectives.

Main takeaways:

−   The **OECD Secretariat** presented the outcomes of its most recent **Annual Survey of Large Pension Funds and Public Pension Reserve Funds** (forthcoming)[3]. The survey found that, although infrastructure investment currently represents only 1.1% of total assets under management by large pension funds and public pension reserve funds included in the survey, there is strong evidence of growing interest in infrastructure investments. It further concludes that many funds have a strong home-market bias and that if foreign investments are undertaken, most funds limit their engagements to OECD countries. Very little investment is allocated to projects in emerging markets.

    In light of these results and considering the growing level of assets managed by institutional investors, the Secretariat further argued that there is a need for more empirical evidence that describes the characteristics of infrastructure investments, including impacts to portfolio efficiency. Improving the quality and availability of information for investors will help them determine whether infrastructure investment can play a stronger role in their long-term asset allocation. Furthermore, the establishment of clear infrastructure investment benchmarks and the availability of comparable project data will also increase the accuracy of due diligence processes and support investors in their investment decisions.

    Ultimately, the OECD Secretariat argued that clear information is also essential to support pension funds and other institutional investors in allocating capital towards sustainable and quality infrastructure investments, to better manage long-term risks and to better understand the effects of technology and innovation on long-term asset performance.

−   **Swiss Re** confirmed from an investor's point of view that interest in infrastructure among institutional investors is growing and pointed out that the sector is prepared to increase its engagement if stronger policy support is provided. It was further argued, however, that the policy debate on establishing infrastructure as an asset class has not progressed significantly since the Australian G20 presidency in 2014, which also prioritised infrastructure investment. In addition, almost half of the disputes brought before the ICSID are related to infrastructure projects, which is why Swiss Re called for the development of a universally accepted template to standardize debt documentation and disclosure to streamline the infrastructure market and increase its accessibility for institutional investors.

    Considering the above, Swiss Re thus formulated three concrete policy wishes: i) strengthen private capital market intermediation, ii) unlock and incentivise the large asset base of long-term institutional investors and iii) support the development of a tradable infrastructure asset class and strengthen investor rights. To this end, Swiss Re argued that MDBs need to work better with the

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[3] OECD (2015, 2016, forthcoming) "Annual Survey of Large Pension Funds and Public Pension Reserve Funds. Report on Pension Funds' Long-Term Investments".

private sector on standardising the financial market documentation. For example, the existing European Financial Services Roundtable template could be taken as a starting point. Furthermore, MDBs should require strong lending practices in order to access lending facilities,. See for example, the World Bank's PPP contract terms best practices.

As a last point, Swiss Re strongly argued for more investment in sustainable infrastructure and better integration of ESG aspects into investment decisions as well as into the capital regulatory framework. Eventually, this also has to be supported by clearer definitions for 'sustainable investment', stronger policy commitment and the establishment of ESG reporting standards and data collection.

– The **Terrawatt Initiative (TWI)** presented **the Global Solar Energy Standardisation Initiative** - that is currently being jointly implemented by both TWI and the International Renewable Energy Agency (IRENA). The initiative aims to design and draft a comprehensive set of open source contracts and guidelines to reduce development time and costs of transactions that weigh heavily on the competitiveness of renewable projects, starting first with an initial focus on solar energy. The key objective is to simplify and streamline the existing practices by redesigning and rethinking how to deliver a more balanced approach to risk allocation that could contribute to reduced industry costs and an increased deployment of solar around the globe.

The Initiative brings together a group of public and private sector experts within the industry (covering financing, development, supplier, insurance and legal expertise etc.). The aim is to standardise solar energy project and finance documentation, helping to further boost investments in solar power development by creating a standardised global investment framework. The working group members and participants together define and agree on the core terms for the standard documentation needed, setting also global quality benchmarks and standards for the sustainability of the industry.

However, the core objective of the Initiative is not to automatically repeat what has been adopted in the past. All participants to the discussions are invited to challenge the concepts that prevail to date in the industry. In particular, TWI argued that addressing the weakness and complexity of present practices will allow for e cost-oriented and easy-to-implement sets of documentation, ensuring a balanced and fair risk-allocation through the value chain of solar projects for further promotion of sustainable solar developments and sustainable forms of investment to offer.

– The **International Transport Forum (ITF)** presented the work-in-progress of its **Working Group on Private Investment in Infrastructure**, which strongly argues for better risk pricing for both investors as well as suppliers. In this context, the current debate on establishing infrastructure as an asset class and the infrastructure data gap is only focusing on enabling investors to price risks more efficiently. However, it does not address the fact that infrastructure suppliers also face risks which must be quantified. While it is true in this regard that infrastructure benchmarking can lead to lower cost of financing and greater transparency for investors, research from the ITF suggests that targeted efforts to either de-risk the supplier side or provide it with more information could also significantly reduce overall project costs. As a consequence, the inability of suppliers to address and price their risks adequately results in higher principles that have to be repaid, which in turn inflates the amount of investment that is needed to realise a specific project.

The technical issue of not having enough information to efficiently price risks on the supplier side is amplified by the behavioural issue of uncertainty aversion. Together, these result in overestimated risk contingencies, excessive risk discounting, higher costs, and in reduced economic competitiveness of an infrastructure project. Improved data availability and a better understanding of the underlying challenges are therefore essential to address these inefficiencies, but it must be mentioned that different stakeholders need different types of data. While an investor can indeed fall back on historical cash flow data to help decide on his/her general portfolio strategy, infrastructure suppliers cannot. They have to deal with risk and uncertainty on a project-by-project base, i.e. they have to assess the physical risks at hand for each separate project they are delivering. The ITF therefore called for a holistic view of the cost of risk transfer in a project that considers not only the investors but also suppliers. In view of the significant

uncertainty in long-term contracts the ITF also called for a more mindful consideration of what market circumstances a regulated and asset based model might be preferred to a competition for the contract (PPP). The ITF hopes to provide basic answers to these questions, when the Working Group concludes its work in the early second quarter 2018.

– A researcher from the **University of Oxford** presented an **academic view** on the subject of infrastructure as an asset class and related data issues. It was argued that data for estimated versus actual outturn cost (CAPEX and OPEX), time, and benefits are typically unavailable or inadequate.

In addition, it was argued that current capital market conditions support an increased engagement of private investment in infrastructure. However, the large estimates of investment shortfalls generated by various consulting firms do not typically take into account rapid changes in technology which would dramatically lower the cost of building future infrastructure. For example, mobile telephony networks are considerably cheaper than fixed-line networks. Similarly, innovative decentralized energy grids or modularized transport solutions will be steeply cheaper than extrapolated as-is estimates. Considering the rapid development of new technologies and aging infrastructure stocks particularly in developed economies, new investment in infrastructure decommissioning, asset recycling and upgrading is needed.

Further research insights also shed light on inefficiencies in infrastructure planning and delivery as well as in the construction industry, which was argued to be characterized by particularly low-levels of innovation and slow uptake of new technologies. In fact, the majority of infrastructure projects are experiencing issues of cost-overrun, with no evidence for significant differences between publicly and privately managed projects. This, as it was argued, further raises the question of who in the end is bearing the costs of overruns and whether cost overruns from publicly initiated projects can accumulate to excessive amounts of public debt, which in the end may threaten the economic stability of a country.

To address this issue, full transparency from both the public as well as the private side is required as well as policies aimed at improving project delivery processes and increasing efficiencies in the construction industry. Ultimately, using reference class forecasting methodologies was proposed as a viable approach to increase accuracy in estimating costs and usage levels of infrastructure, which is essential to reducing the threat of economic failure.

SESSION III: DEVELOPING FINANCIAL PERFORMANCE BENCHMARKS FOR INFRASTRUCTURE

Background:

Session III aimed at addressing the issues of infrastructure investment in the context of strategic asset allocation as well as in the regulatory context and asked the following questions: How is infrastructure currently benchmarked? What are existing benchmarking initiatives and how can future projects contribute to overcoming the benchmarking challenge? Is the lack of historical data on infrastructure performance hindering regulatory efforts to establish the asset class? [See Annex 2, 3 and 4]

Main takeaways:

− Research insights into **the cost of equity in PPP transactions** in the healthcare sector were presented by **Bocconi University**.[4] It was argued that for PPP-based infrastructure projects to be economically successful, partnerships must be built around clear strategic goals that also follow a clear public policy perspective. PPPs should not be merely used as a tool to inject private capital into the infrastructure market, but long-term objectives of both public and private stakeholders have to be matched to build sustainable financing partnerships and to efficiently allocate risks, losses and returns among the partners.

In this context, it was thus argued that in order to increase the success rate of PPP projects in the long-run, there also has to be a better understanding of how to price equity investments and and the associated return on equity correctly to better align strategic interests. In fact, the CAPM model was in this regard described as not accurate enough to be applied to PPP projects in the healthcare and other infrastructure sectors.

The presented research called for private operators to be partners of public healthcare authorities in order to reach more efficiency and to better balance overall social and financial returns.

− **Moody's** presented its most recent research and **insights on the credit performance of two infrastructure-relevant data sets**, covering i) a set of unrated project finance bank loans of around $2.0 trillion and ii) $2.8 trillion of Moody's rated infrastructure debt securities.

The Moody's study "Default and Recovery Rates for Project Finance Bank Loans, 1983-2015", March 2017, reports on the former data set and shows that marginal default rates among unrated project finance bank loans trend towards levels consistent with single-A rated loans as they season. Projects are facing substantive incremental risks during construction and ramp-up phases and that ultimate recovery rates are averaging at around 80%, despite the adverse impact of demand risk in the infrastructure industry sector.

With regards to rated infrastructure debt securities, Moody's study "Infrastructure Default and Recovery Rates, 1983-2016", July 2017, finds that credit loss rates for A-rated and Baa-rated infrastructure debts are lower over the medium/long term compared to like-rated non-financial corporates and also that infrastructure ratings remain more stable than those of non-financial corporates.

− The **EDHEC Infrastructure Institute presented the EDHECInfra private infrastructure benchmarks**, which cover 14 European countries. EDHECinfra has developed a database of infrastructure investment data which includes cash flow and balance sheet items, attributes, and events. Data has been collected in collaboration with the infrastructure investment industry from banks, asset owners and managers as well as open sources. Currently, the benchmark is representative of 52% of private infrastructure investment in the European market by total asset

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[4] Hellowell M., Vecchi V. (2017), Estimating the cost of the capital for PPP contracts in emerging markets, World Bank

value, and 20% of the market by number. Future work by EDHECinfra will produce global private infrastructure equity and debt indices in 2018, creating a new platform for investors to access index data, advanced analytics, store infrastructure investment data, build portfolios dynamically, and perform valuation analysis.

– **Deutsche Asset Management** also echoed the need for financial infrastructure benchmarks, explaining that benchmarks are essential for adequate asset pricing, portfolio allocation decisions as well as for portfolio evaluation.

It was generally argued that the growing investor interest in private infrastructure debt can be attributed to the long-term duration of infrastructure projects, and to the availability of broad opportunities across rating categories, sectors, corporate and project finance vehicles, as well as accessibility to senior and mezzanine tranches. These characteristics are useful for portfolio optimisation and yield illiquidity premia for investors who pursue buy and hold objectives.

Deutsche Asset Management further presented the iBoxx Infrastructure Debt Indices. The indices measure the performance of listed corporate infrastructure bonds with daily pricing updates and are divided into four main indices across currencies and regions (USD, GBP, EUR and USD Liquid High Yield) and 75 sub-indices across various sectors, maturities and credit ratings. The indices are diversified and capture many of the different assets that are currently coming to the market in different sectors. Defining and covering different infrastructure sectors, as well as underlying contractual frameworks, was argued to be essential to establishing meaningful financial performance benchmarks and to adequately cover the entire infrastructure market. The iBoxx Infrastructure Project was announced to be potentially expanded also into project bonds in the future.

SESSION IV: ESG PERFORMANCE BENCHMARKS FOR INFRASTRUCTURE

Background:

In light of the above, the aim of the fourth and last session of the Workshop was to discuss the relevance of sustainability performance assessments in infrastructure investment. Discussions focused on the data and metrics needed to help investors deliver sustainability outcomes that are aligned with broader policy orientations, as for instance reflected in the SDGs, as well as with their own fiduciary duties. Ultimately, the session also aimed to further explore the interface between financial performance and sustainability performance. [See Annex 5: ESG Performance of Infrastructure Assets and Transition Risk - Data Requirements]

Main takeaways:

− The **International Institute for Sustainable Development (IISD)** presented its new **Sustainable Asset Valuation (SAVi) Tool**, which is designed to inform governments and investors about the value and financial performance of sustainable infrastructure investments. The tool can be used to quantify an asset's ESG performance as well as ESG externalities, their impact on risks along the project life cycle as well as to evaluate the effect of ESG impacts on capital expenditure, project cash flows, internal rates of return and debt and loan service ratios. It compares in its approach two scenarios against each other: i) asset performance as planned under the base case and ii) asset simulated with enhanced ESG performance. The specific ESG performance indicators and externalities can be selected by clients on a project basis.

SAVi currently covers energy, roads, buildings, irrigation and waste water projects and has over 200 externalities built in from which clients can chose. With this, SAVi can for instance incorporate social costs of carbon, environmental emission costs and carbon taxes. In a presented example, renewable energy projects can be commercially much more competitive when these externalities are considered in investment decisions.

− A critical view on current efforts towards the **alignment of investment strategies with climate targets under the Paris Agreement** was provided by the **2 Degrees Investing Initiative**. It was in particular stressed that more financial rather than purely fiscal incentives are required to support investors in aligning their investment objectives with international climate goals.

With respect to existing ESG methodologies and benchmarking approaches, arguments were made that for instance technology benchmarks are often not exclusive enough and are too generic, with infrastructure assets being attributable to more than one technology category or not being covered by any category at all. Emissions benchmarks, on the other hand, can often result in distortional results, depending on what base value is used to calculate the benchmark (e.g. GHG emissions in relation to revenues or GHG emissions over enterprise value). Also existing methodologies for scorecard and least cost benchmarks are highly diverse and deliver very heterogeneous results, while often not representing realistic conditions.

In light of the above, it was therefore argued that meaningful benchmarks have to be linked to climate scenarios to effectively incorporate climate and transition risks. The analysis of these underlying climate scenarios is thus essential in this context as well as to better understand how these scenarios affect environmental, social and governance dimensions differently.

− The **Imperial College Business School presented its new Centre for Climate Finance and Investment**, which focuses its research on emerging market financing, and provided insight on the topic of ESG benchmarking. It was pointed out that exact empirical evidence is needed to quantify ESG dimensions in infrastructure investment and to ultimately make investors aware of ESG impacts on financial performance and of their capability to enhance as well as destroy asset value. In addition, for ESG benchmarks to be incorporated in financial theory, quantitative rather

than qualitative measures are required as well as a clearer cut between environmental, social and governance considerations.

To be effective, ESG benchmarks will thus need to be designed to increase transparency in less known markets and to help price environmental, social and regulatory risk factors (such as for example establishing a climate Beta / climate sensitivity index). Ultimately, it was also argued that the positive link between good ESG performance and good financial performance becomes particularly apparent in emerging markets, where ESG dimensions can be of even higher importance and complexity. Meaningful benchmarks can therefore inform investors about potential risks and help increase investment in these markets.

- **Georg Inderst**, an independent consultant, provided comments on **ESG performance benchmarking in infrastructure.** He argued that much of the ESG analysis and integration has in the past been concentrated on listed equities and only recently reached alternative investment classes. The connection between ESG and infrastructure investment, however, has to be better understood at different levels, such as at asset, sector, investment and portfolio level. In fact, ESG investing has significantly progressed in recent years and more discussions evolved around the interlinkage between ESG and financial performance, including risk-adjusted returns and credit spreads. Different approaches to ESG scorings/ratings have been developed in the markets, with a new focus emerging particularly on ESG performance and "impact".

Predominantly in the context of climate change, investors are making advances in measuring carbon emissions of their portfolios. These measures have immediate global impact and are more straight-forward to implement compared to others, such as in the area of climate adaptation or social inequality, where measures are more complex. Investors, the financial industry, ESG experts, academia and the public sector thus have to seek to increase their common understanding of how to design effective ESG metrics for infrastructure, which should be an open and dynamic process[5].

In light of rapid market developments, ESG performance "standards" should not be set prematurely and should not be regulated. Set standards might be too narrow, over-restricting the investment universe, or too loose and not having an effect at all. Instead a "governance approach" to setting ESG definitions and standards is recommended, urging investors to consider ESG issues, implement policies and be transparent. Regulators and international organizations can thus support the market with clear laws and regulation (e.g. climate policies, fiduciary and disclosure requirements), and by establishing investable green/social project pipelines. International organisations such as the OECD on the other hand should guide this process and monitor and disseminate best practice examples.

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[5] Inderst, G., Kaminker, Ch. and Stewart, F. (2012). Defining and Measuring Green Investments. OECD Working Papers on Finance, Insurance and Private Pensions, No.24.

SUPPORTING THE INFRASTRUCTURE DATA INITIATIVE

Background to the Infrastructure Data Initiative[6]

Institutional investors, such as pension funds, insurers, and sovereign wealth funds, have been looking for new sources of long-term, inflation protected returns. Asset allocation trends show gradual globalisation of portfolios, with increased interest in emerging markets and diversification into new asset classes. Increasing numbers of institutional investors are recognising the potential for infrastructure investment to provide diversification to existing investment portfolios, and to provide an alternative to traditional fixed income investments in liability-driven investment portfolios. Despite these encouraging trends, total amounts of institutional investment in infrastructure remain relatively limited, considering the large pool of available capital from long-term investors[7]. Within this context, the solution to 'unlock' the pool of private capital held by institutional investors is to achieve global recognition of infrastructure as an investment asset class[8] through better measurement of how infrastructure investments perform, facilitating the completion of investor asset allocation analysis and due diligence on infrastructure investment.

A growing number of investors are also concerned with the potential impact of climate change on their long-term financial performance, seeking to integrate ESG considerations into their investment processes. In this regard, investors are becoming more interested in understanding the impact that infrastructure investments can have on societal issues such as poverty reduction and inclusive growth and development, and minimising climate change risks. However, the full integration of sustainability considerations in the infrastructure investment process is hindered by definition and standardisation issues[9]. Developing a standardised common framework for upfront and ongoing reporting of transaction information and performance of projects will be a primary outcome of this initiative.

Besides investors, operators as well as governments and regulators have a genuine interest in the investment characteristics of the assets that they manage, privatise, or regulate. Since resource-constrained governments are unlikely to provide sufficient finance for the massive infrastructure requirements, they need to institute conducive policies of regulatory independence and effective risk mitigation mechanisms while ensuring optimal and sound sustainable infrastructures generating efficient economic impact. This is even more relevant to mobilise private sector financing and institutional investor capital in both developed and developing countries where additional efforts will be needed to mitigate and efficiently allocate risks that investors face, along with effective measures and instruments to crowd in private capital. Evaluating the exact magnitude and significance of the impact of a particular type of infrastructure on economic outcomes is also correlated with the financial performance beyond being of interest for multilateral development agencies, DFIs and donors targeting investment in infrastructure projects in developed and developing countries.

In particular, micro-level data provides useful information for ex post analysis, such as for the evaluation of spending resources on infrastructure and economic impact. In addition, information on the financial terms of projects can provide more evidence for public authorities about the relationship between project-specific risks and the cost of capital in completed transactions. This information

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[6] Based on the joint presentation held at the Workshop by EIB, GIH, LTIIA and OECD See for more information and reference the complete Project Proposal on Infrastructure Data Initiative]

[7] The OECD, in their annual Large pension fund survey, found that, although infrastructure investment currently represents only 1.1% of total assets under management, there is evidence of growing interest in infrastructure investments.

[8] Such recognition is important, because it can allow a broader range of investors the opportunity to invest, can reduce transaction costs for investment, and can facilitate financial innovation. Indeed, a recent joint survey by GI Hub and EDHEC shows that 70% of institutional investors believe that creating an infrastructure asset class is important to the future growth of the infrastructure investment market.

[9] OECD's report on "Investment Governance and The Integration of ESG Factors" (2017)

would help authorities better evaluate financing terms in past and future procurements, reduce their reliance on unverified third-party sources and can help to identify potential refinancing opportunities.

Only limited empirical analysis explains the risk-adjusted performance and portfolio diversification benefits of listed infrastructure in a portfolio, with even fewer studies on unlisted infrastructure performance, showing highly fragmented results. Observing the performance of infrastructure investments and constructing benchmarks based on historical returns can create valuable inputs into the asset allocation process, and permits the evaluation of long-term objectives and success metrics. Infrastructure investments may also be useful components of an inflation hedging benchmark and liability-hedging benchmarks (complementing fixed income, equities, and inflation sensitive assets). In addition, for regulators, benchmarks provide inputs to perform stress tests and Value-at-Risk (VaR) analyses and provide information to facilitate the calibration of existing metrics.

The collection of ESG data is necessary to ensure that infrastructure financing is aligned with broader policy outcomes. Using project-level data and building on other relevant data sources (i.e. PAED data, or the Equator Principles for project finance lending), this can provide a basis for analysing impacts on various social outcomes and for performing environmental risk assessments (ERA). In addition, the extent to which a company or asset has procedures in place to monitor relevant metrics of its environmental performance (e.g. water management) and benchmark its performance will also impact its ability to assess its risks through a robust ERA and manage those risks. When environmental data is crossed with financial and economic impact data, the collection of environmental metrics could go beyond the sole purpose of assessing the environmental performance and assess the global performance of an infrastructure asset. This is the case for the assessment of transition risks associated with the expected policy and market response to climate change.

In light of the above, the Global Infrastructure Hub (GIH), the European Investment Bank (EIB), the Long-Term Infrastructure Investors Association (LTIIA), the Long-term Investors Club (LTIC) and the OECD launched the 'Infrastructure Data Initiative' at the G20/OECD Task Force Workshop on 2 November 2017. The initiative aims to improve the availability and quality of data and information on infrastructure investment, particularly at granular project and cash flow level, with the objective to identify the critical data that is needed to develop infrastructure investment standards and benchmarks*[See for more information and reference the *Project Proposal on Infrastructure Data Initiative]*

In particular, the initiative aims to contribute to a more profound understanding of the investment characteristics of the emerging infrastructure asset class, contributing to the emerging body of literature on infrastructure finance. The initiative therefore targets three priority areas:

- *Financial performance benchmarks:* Including new benchmarks on appropriate investment return metrics for both infrastructure equity and debt instruments, including also risk measured over project life-cycle

- *Economic and impact analysis:* Evaluation of projects to assess the societal and economic impact generated by infrastructure projects

- *ESG[10] performance*: Sustainability and inclusive growth impacts, environmental and climate related risks[11]

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[10] Environmental, Social and Governance

[11] As highlighted by the OECD's report on Investment Governance and The Integration of ESG Factors, evidence suggests that ESG factors may have a material financial impact and therefore should be relevant to institutional investors as they build their portfolios. However, the lack of standardisation and ESG data on infrastructure assets limits the ability to explore the link between the ESG performance and the financial performance.

Policy implications and added value

While achieving substantial investment in infrastructure by long-term investors is thus difficult to imagine without the creation of adequate measures of expected performance and risk, market mechanisms have so far failed to create the information necessary for the supply and demand of long-term investment to meet.

Scarcity and confidentiality of performance data is a problem for these investments, but by combining anonymous estimates from the various sources and having this initiative act as an independent and objective intermediary, it is possible to develop a much better understanding of the economic and financial risk-return properties of infrastructure as an asset class. Collecting comparable data from different countries is particularly important for infrastructure. Because of its long-term horizon it is difficult for a single country to collect sufficient data within a short period of time for a comprehensive assessment. The existing data gap can be closed much faster through an international platform.

Hence, there is a clear role to play for policy makers and academia to address a collective action problem and support the standardization of data collection and the creation of adequate investment benchmarks for the purposes of long-term investing in infrastructure.

The Infrastructure Data Initiative thus aims to bridge gaps between existing initiatives, to pull together data from a wide variety of datasets, such as from governments and DFI's as well as from commercial databases, and to build a publicly available infrastructure database with the aim to:

1. *Match between suitable investments and investor preferences:*

    Facilitating performance evaluation, guiding asset allocation decisions and creating a new channel for infrastructure financing.

2. *Support regulators in determining fair, regulated prices:*

    More accurate risk measures can lower capital charges, inform risk management decisions and improve investment screening capabilities.

3. *Shed light on sustainability criteria in infrastructure investment:*

    Transparent parameters allow for an adequate monitoring of ESG performance, which in turn allows to better factor ESG into investment decisions and risk management processes.

4. *Help government improve public infrastructure procurement:*

    Better understanding of the risks and expected financial performance of long-term public-private contracts enables more efficient risk sharing mechanisms and optimising value-for-money ratios particularly in developing countries.

ANNEXES

ANNEX 1 – Workshop Agenda

Workshop on Infrastructure as an Asset Class and Data Collection for Long-term Investment

Thursday 2nd of November 14:30 – 18:00
Room CC 13 - OECD Conference Centre, Paris, France

14:30 – 14:35	**Introduction** • **Damien Dunn**, Chair G20/OECD Task Force on Institutional Investors and Long-term Financing and Australian Treasury • **André Laboul** Special Advisor to the OECD G20 Sherpa and Senior Counsellor, OECD Directorate for Financial and Enterprise Affairs
14:35 – 15:00	**SESSION I: Long Term Financing Priorities in 2018 for G20, G7 APEC and FSB** • **Raffaele Della Croce**, Lead Manager Long Term Investment Project, OECD Directorate for Financial and Enterprise Affairs • **Mathias Mondino** - Director Ministry of Finance, Argentina • **Tara Rice** – Member of the Secretariat - Financial Stability Board (FSB) • **Glenn Campbell**, Assistant Deputy Minister Canada Infrastructure Bank, Infrastructure Canada
15:00 – 16:00	**SESSION II: Developing Infrastructure as an Asset Class: Policy Options** • **Joel Paula**, Economist, Long Term Investment Project, OECD Directorate for Financial and Enterprise Affairs • **Jerome Jean Haegeli** Managing Director Swiss Re • **Leïla Hubeaut** Partner Energy & Infrastructure Herbert Smith Freehills Paris LLP • **Dejan Makovsek,** Economist Internationa Transport Forum • **Atif Ansar,** Professor Oxford University **Infrastructure data Initiative by EIB, GIH, LTIIA, LTIC and OECD** • **Guido Bichisao** Director European Investment Bank • **Brer Adams** Senior Director Global Infrastructure Hub • **Eugene Zhuchenko** Executive Director Long Term Infrastructure Investors Association
16:00 - 16:15	**Coffee Break**
16:15 – 17:05	**SESSION III: Developing Financial Performance Benchmarks for Infrastructure** • **Veronica Vecchi**- Professor - Bocconi University • **Sarah Tame** Chief Communication Officer –EDHEC • **Gianluca Minella** Vice President Alternatives Deutsche Bank Asset Management • **Andrew Davison** Senior Vice President Moody's
17:05 – 17:50	**SESSION IV: ESG Performance Benchmarks for Infrastructure** • **Jakob Thoma**, Director, 2 degree Initiative • **Charles Donovan,** Director, Imperial College, Centre for Climate Finance and Investment • **Georg Inderst**, Inderst Advisory • **Oshani Perera,** Director International Institute for Sustainable Development (IISD)
17:50 - 18.00	**Conclusions, Next Steps**
18:00-19:30	**Cocktail**

ANNEX 2 – Financial Performance Benchmarks / EDHEC Work

Creating financial performance benchmarks from a representative sample of privately-owned data is a significant undertaking with limited existing access to databases. EDHEC Risk Institute, part of the EDHEC business school, has created a dedicated research team focusing on infrastructure markets. In 2015, that dedicated research team commenced development of equity and debt benchmarks. The majority of this information has been obtained from 'ground up' analysis of disclosed financial statements and derived from understanding of the local investment environment (for example with respect to regulatory and financing conditions). The EDHEC initiative is sponsored by the Long Term Infrastructure Investor Association and Natixis, a global asset manager as well as the LTIC.

Data description

In EDHEC "Data Collection for Infrastructure Investment Benchmarking Objectives, Reality Check and Reporting Guidelines" published in 2016, are proposed guidelines for collecting and reporting infrastructure investment data for the purpose of building investment benchmarks of private infrastructure debt or equity**.**

For each identified firm, two types of observable data points are of interest: 1. Cash flows (and cash flow ratios, which may or may not be derived from balance sheet items) 2. Events (or milestones) in the development of the firms and, possibly, the evolution of its risk profile. Next, cash flow and event data need to be categorised according to economically meaningful attributes.

Figure 1 - Data types and attributes of private infrastructure investments
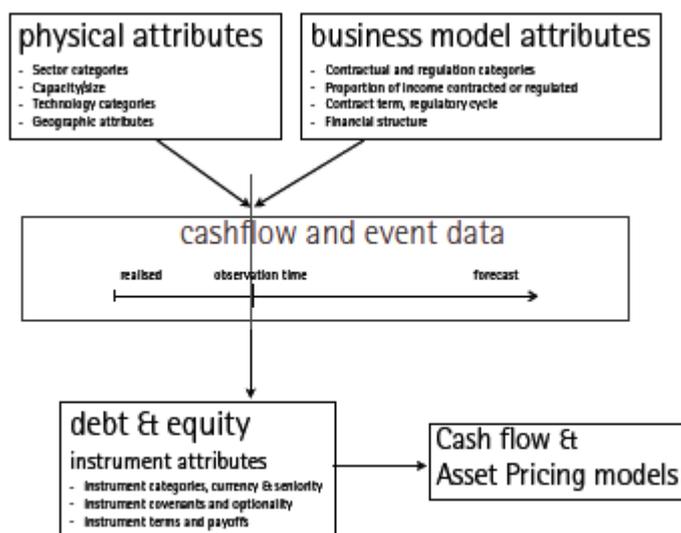
These fall into three categories (*Figure 1* above provides an illustration):

1. **Physical attributes of the firm**: *what* and *where* the firm is as an infrastructure investment.

2. **Business model attributes of the firm**: sources of *revenues* and *costs* of the firm and whether or not the risk inherent in these exposures is insured via contracts with third parties.

3. **Attributes of available financial instruments**: type of payout structure, control rights and terms applicable to the claimants to the firm's liabilities and equity.

Table 1 - Data types and attributes of private infrastructure investments

Category	Data	
Firm identifiers	Registered name Common name Registration number	Incorporation date Investment start date
Physical attributes	Sector (ISO list) Shapefile (GIS) Capacity (units) Technology (set list)	Greenfield (flag) Investment size Asset life (years)
Business model attributes	Business model family : contracted, merchant, regulated Contract counter-party (public/private) Contract life Contracted capacity / output (volume, price) Contracted inputs (volume/price) Indexation (income, costs)	Regulatory model (price cap, RoR, Capex) Periodicity of regulation (date of last reset, frequency) Forex mismatch (currency of liabilities) Institutional backstops (IFI, ECA, PRI flags) Financial structure (senior leverage, tail)
Events	Project milestones (Investment start and completion, greenfield construction start and completion, partial operation start, full operation start, full operations, brownfield construction start and completion, partial operation start, full operations, brownfield construction start and completion)	Credit events (lockup, soft default, hard default, administration, liquidation) Regulatory event (review, renegotiation, termination, arbitration, renewal) Technical event (construction delays, system failure, accident)

Cash flows	Cash flows from/to equity investors (inc. shareholders loans and fees)	Cash flow ratios (DSCR, LLCR)
	Cash flows from/to creditors (inc. fees)	Cash flow availabile for debt service (Free cash flow)
Instruments	Type (fixed, variable income)	Convertibility and optionality
	Face value	Maturity
	Seniority	Repayment profile
	Covenants (DSCR default triggers, lockup thresholds, cash sweeps)	Payoff (interest, coupon, etc.)

ANNEX 3 – Economic Performance – Impact Evaluation at Project Level

Comparative international analysis of benefit performance is a pressing area requiring further research. Recent focus of analysis in Oxford has been on the impact evaluation at project level of specific infrastructure projects. Based on a large dataset a recent paper looks at infrastructure investment in China[12].

The approach has been to collect data on the performance of a large sample of investments to understand whether each of the projects generated economic value, i.e. a benefit-to-cost ratio equal to or greater than one (BCR $\geq$ 1.0).

Data was collected on the actual, ex post outcomes related to the benefits, cost, and time of a sample of 95 road and rail infrastructure projects in China built from 1984 to 2008 across 19 (out of 22) provinces, four (out of four) municipalities, and four (out of five) autonomous regions. This is the largest dataset of its kind on China's infrastructure that exists. The portfolio is worth USD 52 billion (2010 RMB equivalent) or roughly USD 65 billion in 2015 prices. All transport projects for which valid and reliable cost and schedule data could be found were included in the sample. Of the 95 projects, 74 are road and 21 rail projects.

To overcome the challenge of finding reliable data on the outcome of forecasts on important decisions in China, the empirical strategy relied on documentary evidence contained in the loan documents—ex ante planning and ex post evaluation, or 'retrospective reports' (Miller et al., 1997)—of International Financial Institutions (IFIs). The data collection approach also gave the opportunity to develop more detailed case histories to richly illustrate statistical results and identify causal mechanisms.

Table 2 - Variables and characteristics of major project

Basic project features	– Project sector and sub-sector – New project or upgrade
Physical scope and size *(Example of transport infrastructure)*	– Length of road or rail – No. of lanes and or tracks – Percent of road or rail underground, elevated, and at grade, respectively, totalling 100 per cent
Construction Cost	– Estimated project cost – Actual project cost – Cumulative inflation contingency
Time	– Year of final decision to build – Estimated implementation schedule – Year of start of full commercial operation – Actual implementation schedule
Benefit *(Example of transport infrastructure)*	– Estimated traffic – Actual traffic

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[12] Ansar A., Flyvbjerg B., Budzier and Lunn D. "Does infrastructure investment lead to economic growth or economic fragility? Evidence from China " Oxford Review of Economic Policy, Volume 32, Number 3, 2016, pp. 360–390

Procurement and financing	– Estimated project foreign exchange costs as a proportion of estimated total project costs (percentage) – Competitiveness of procurement process, amount under international competitive bidding as a proportion of estimated total project costs – Main contractor country – IFI financed project – IFI financing—proportion of estimated project cost Project received central government subsidy
Economic and political context variables	– Administrative level (central, provincial, prefecture, county, township) – Name of subnational region in which project nested – Index of political status the subnational region – GDP – Per capita income of the project's country in year of project approval – Average actual cost growth rate in the project's country over the implementation period—the GDP deflator – Manufacturers Unit Value index of actual average cost growth rate for imported project components between year of loan approval and year of project completion – Three-year moving average of the inflation rate in the project's country – Actual average exchange rate depreciation or appreciation between year of formal-decision-to-build and year of full commercial operation

ANNEX 4 – Efficiency in Financing Costs of Private Sector

Analytical work developed in recent years at Bocconi and Edinburgh Universities has been looking at efficiency in financing of infrastructure and costs of private sector involvement.

The return on capital is a major contributor to the cost of design, build, finance and operate (DBFO) contracts, under which public infrastructure is financed and delivered by private companies. The presence of significant excess returns is identified in each case. If the rate of return projected by an investor significantly exceeds a benchmark cost of capital, excess returns may be identified.

One academic paper analysed the cost-efficiency of Private Finance Initiatives (PFIs) in the UK health sector facilities.[13] Initially, it was proposed an analytical framework grounded in corporate finance literature for estimating the WACC of private sector equity investors. This was used as a benchmark against which to evaluate the expected rates of return on investments in SPV equity. The framework is used to measure and evaluate returns on 77 PFI projects (out of the total population of 123) commissioned by NHS organisations in England and Scotland between 1997 and 2010. The results confirm the existence of returns that are in each case significantly in excess of the sponsors' WACC. The average difference between investor WACCs and expected rates of return is 9.5%, indicating a high degree of rent extraction by investors. The results call for a substantial revision of the methodologies applied by the public sector in terms of the procurement of PFI contracts and the appraisal of private sector bids.

Basic project data have been extracted from the HM Treasury database. Equity IRRs were provided to the authors in a request made under the UK's Freedom of Information Act, alongside information contained within the full business cases of PFI schemes in England and Scotland that have signed since this date. In order to derive the WACC of the project sponsors of the sample, data was collected relating to the cost of equity (Ke) and the cost of the debt (Kd) of each company. The HM Treasury database contains for each project the data described in the table below.

Table 3 - HM Treasury database

| Collected Data	Capital investment value, Contract length	The name of the SPV and A list of project sponsors (SPV shareholders)

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[13] Gatti, S. (2013), Hellowell, M. and Veronica Vecchi (2013) Does the private sector receive an excessive return from investments in health care infrastructure projects? Evidence from the UK, Health Policy, 110-2, pp. 243-270

ANNEX 5 – ESG Performance of Infrastructure Assets and Transition Risk - Data Requirements

The assessment of the Environmental, Social, and Governance (ESG) performance of infrastructure assets is an imperative from both a policy and an investment perspective. Infrastructure spending is fundamentally justified by the economic benefits it brings in terms of job creation and long-term growth. Holistic approaches such as the one advocated by the Sustainable Development Goals call for an infrastructure investment that has sustainability at its core. However, the full integration of sustainability considerations in the infrastructure investment process is hindered by definition and standardisation issues. Similarly, the evaluation of infrastructure sustainability performance proves to be difficult without a clear definition of agreed upon performance indicators. As highlighted by the OECD's report on "*Investment Governance and The Integration of ESG Factors*" (2017), evidence suggests that ESG factors may have a material financial impact and therefore should be relevant to institutional investors as they build their portfolios. However, the lack of standardisation and ESG data on infrastructure assets limits the ability to explore the link between the ESG performance and the financial performance.

Figure 2 - the core aspects and associated data included in GRESB ESG Assessment of Infrastructure Assets
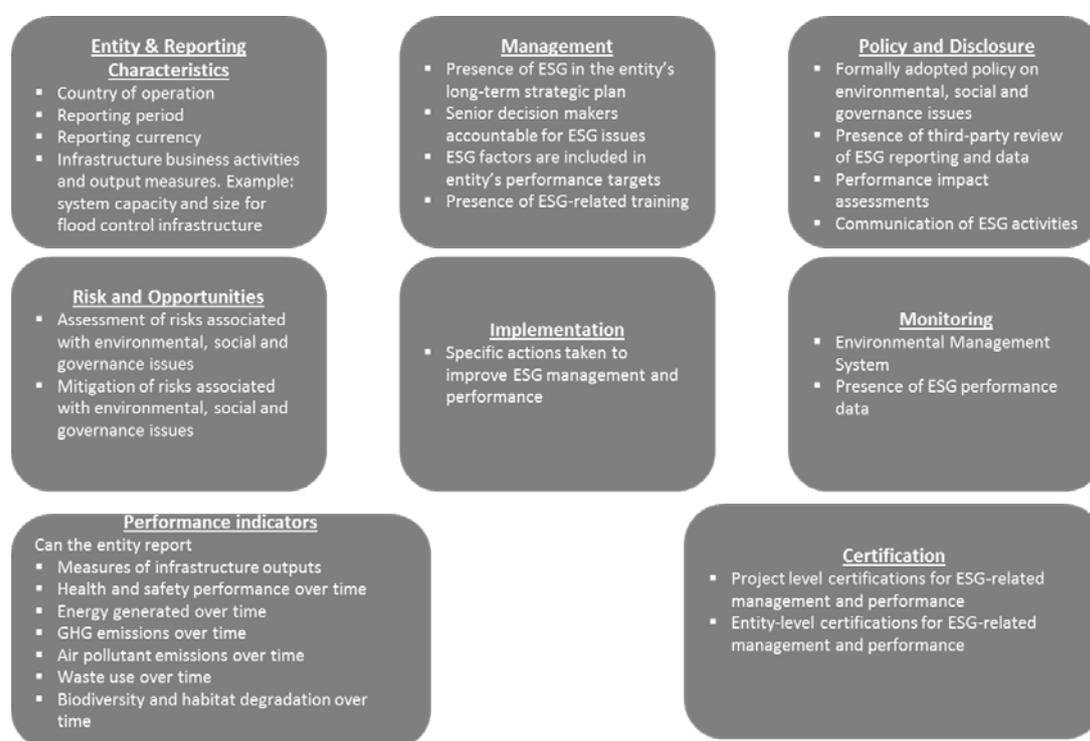
Source: Adapted from "2016 GRESB Infrastructure Reference Guide"[14], 2016.

The collection of ESG data on infrastructure assets is necessary in order to (i) better assess the ESG benefits of infrastructure project and the extent to which they meet the broader policy objectives, (ii) better explore the link between the ESG and the financial performance of an asset with the potential to mobilise further financing for sustainable infrastructure, (iii) better evaluate the impact of specific environmental factors such climate change on infrastructure asset valuation and financial stability.

Many international standards, such the Global Infrastructure Basel's SuRe, have been developed in order to integrate sustainability and resilience aspects into infrastructure development and upgrade. In addition to the project-focused tools such as SuRe, initiatives such as GRESB address infrastructure sustainability

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[14] http://gresb-public.s3.amazonaws.com/2016/content/2016-GRESB-Infra-Reference-Guide.pdf

issues at the asset and the fund levels. In practice, GRESB provides a tool coupled with a scoring methodology that assesses ESG performance of assets in line with international standards such as PRI standards.

The figure above describes the elements and data factored in GRESB's ESG assessment of infrastructure assets. The fact that the GRESB initiative is mainly backed by pension funds highlights the rising importance institutional investors are giving to ESG performance.

When environmental data is crossed with financial data, the collection of environmental metrics could go beyond the sole purpose of assessing the environmental performance and directly include the financial performance of an infrastructure asset. This is the case for the assessment of transitions risks**.**

Transition risk, also refer to as carbon risk, is the financial risk rising from the scale and speed of the changes required by the transition to a low carbon economy (TCFD, 2016). The uncertainty over the nature and timing of low-carbon transition-related policy intervention, the developments in low-carbon technologies, as well as the energy markets conditions, can all impact the valuation of financial assets. If the pricing of these factors is sudden and abrupt, it might constitute a threat to financial stability.

Exposure to transition risk can be influenced by conditions related to companies and assets carbon intensity, physical assets lifespan and companies' profitability. According to the 2 Degree Initiative (2014) exposed assets can be grouped in categories with common influencing factors. First, "fossil assets" referring to sectors with high Green House Gas (GHG) direct emissions (Scope 1 emissions) and indirect emissions linked to use of their products (Scope 3 emissions). But also, fossil fuel dependant infrastructure assets that depend on accessibility lo low-cost fuels or are involved in the transport of such fuels. Example of such infrastructure assets are airports, fossil-fuel pipelines, and electric transmission connected to fossil fuel generation facilities, rail lines that primarily transport fossil fuels, suburban rail estate development or roads.

Table 4 - Climate risk exposure screening data

Objective	Collecting exposure information at the asset level	Understanding the operator's ability to manage carbon risk
Required data set	- The type of the asset - The fuel mix profile - The asset expected lifetime - Cost of production - The GHG profile of the asset as defined by GHG protocols	- Corporate strategy, policies and management capacity - Capital Structure - Specific operational management approach - Risk management strategy, including carbon risk management - Carbon risk management related capital expenditure plans

Source: adapted from WRI & UNEP FI, 2015.

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