Long-term
Infrastructure
Investors
Association

Environmental, Social and Governance Handbook for Long Term Investors in Infrastructure

Preface

The purpose of this handbook is to provide a descriptive summary of practices, standards and tools that infrastructure investors apply today to realize better performance on environmental, social and governance dimensions (ESG), and to sustain that performance over a long term.

ESG has grown considerably in its importance to the investor community – in the context of global calls for reducing carbon footprint, combatting poverty, promoting healthy and safe labour, tightening corporate governance. Most of those calls are particularly relevant to investments in infrastructure assets, because infrastructure includes all those installations and services – transport, energy, utilities, telecommunication, social facilities, etc – that nearly everyone in the world uses and depends on, every day.

For *long term* investors in infrastructure, there are even more reasons to be serious about ESG. Probability of a downside ESG event that can trigger financial liabilities – from environmental pollution to a governance malpractice – grows with a longer hold, hence implementation of ESG prevention and mitigation measures becomes much more important for sustaining financial performance of the investment.

Yet, notwithstanding the broad agreement on the importance of ESG, still relatively few investors understand what it takes in practice to invest in infrastructure responsibly.

Over twenty organizations – institutional investors, asset managers, development banks, advisers and not-for-profits – have been involved in compiling and reviewing the handbook. References to individual ESG practices of the contributing organizations have been identified as such in the text, where appropriate. We are particularly grateful for substantial contributions that came from Global Infrastructure Basel Foundation, Meridiam Infrastructure and SWEN Capital Partners, as well as from the PRI (Principles of Responsible Investment).

We sincerely hope that this handbook will help readers take their ESG practices in infrastructure investing to the next level. At Long Term Infrastructure Investors Association, we will continue working with our members and the industry on raising the awareness as well as implementation standard of responsible investment in infrastructure.

ESG as a key success factor for infrastructure investment

The purpose of this ESG handbook is to provide stakeholders with an easy-to-use guideline that shall help incorporate an ESG approach in infrastructure investments. Such an approach may offer superior business models as well as long term performance advantages. However, to benefit from the ESG advantages, an appropriate incorporation of ESG factors into investment analysis and decision making is fundamental.

DEFINITIONS

Infrastructure, the organisational backbone of the economy

Although the definition encompasses various dimensions of infrastructure, this handbook will mainly deal with material infrastructure, "the sum of all physical assets, equipment and facilities" (Jochimsen 1966). Such material infrastructure includes water, sanitation, energy, housing, transport and information and communication technologies according to definition of the World DataBank of the World Bank Group.

Infrastructure plays a fundamental function in the development of societies. Since it connects capital and workers more efficiently, it increases Total Factor of Production (TFP), and therefore enhances economic growth while reducing the levels of inequality. Standard & Poor's (2015) evaluated that an increase in infrastructure spending of 1 per cent of real GDP can have a multiplier effect of between 1.0 and 2.5 per cent for G20 countries over a three-year period. In addition to a potential boost of jobs and GDP, long term benefits from infrastructure can include improved efficiency and higher tax revenues.

In a conventional sense, infrastructure displays 8 specific characteristics (adapted from Weber and Alfen 2010).
In first instance, infrastructure represents a **key public service**. Infrastructure assets enhance the development of a nation as they deliver fundamental public services such as the provision of clean water or electricity, enable the mobility of persons and goods and offer efficient communication.

Infrastructure is also characterised by a **low elasticity of demand.** This means that the use of infrastructure is often independent from business cycles for it plays fundamental roles in the economy: indeed, the rail and road networks are used even during downturns. Hence demand for infrastructure services is expected to remain relatively constant.
A further dimension of infrastructure is its **quasi-monopoly situation** with high barriers to market entry: given that the upfront cost of new infrastructure can be tremendous -sometimes amounting to some US$ billions- and that there are important returns to scale -once the network exists, connecting one more household for instance is relatively cheap-, competition appears limited or even inexistent.

As a direct consequence, infrastructure may witness specific **regulation.** In fact, in case of little or no competition, regulatory authorities do step in and correct the market by, for example, fixing prices while compensating the infrastructure holder through a set of guarantees.

Long service life is also a particularity of infrastructure. Some roads existing today in Europe were traced by the Romans some 2,000 years ago, illustrating the notion of infrastructure as the long term backbone of the economy. This example is certainly not representative, but infrastructure assets often have service lives of as much as a century. Of importance for investors is then to amortise their investment within the associated life span.

Infrastructure is also expected to provide **inflation protection**: revenues are likely to be combined with inflation adjustment mechanisms, be it through regulated income clauses, guaranteed yields or any other contractual guarantees. When revenues are generated by user charges,

prices follow the Consumer Price Index (CPI) or GDP growth.

Regular, stable, yet late cash flows are also a feature of infrastructure. Given the characteristics mentioned above, after an initial construction phase, infrastructure assets produce regular and stable cash flows. Thus, they generally represent safe investment opportunity for risk-averse institutional investors.

Greenfield vs. brownfield infrastructure

Greenfield projects are known as development or primary projects. They often start from "nothing", i.e. they generally correspond to assets constructed for the first time in a specific location, the construction of a new highway for instance. Uncertainty may stem from cost and demand sides. On the cost side, these projects must pass the construction phase in particular. On the revenue side, and depending on the project framework, uncertainty may stem from the demand for the infrastructure and the associated price.

Brownfield projects are understood as operational or secondary projects. In contrast to greenfield projects, they are already operational or rely on existing infrastructure. For example, they may operate the reconstruction, renovation or expansion of an asset. As such, the risks associated with the early phases of greenfield projects are outdated; the remaining risks are operational, regulatory and market risks. Compare for instance the construction of a new Concentrated Solar Power plant with the addition of one more unit within the plant.

Therefore, the distinction between brownfield and greenfield infrastructure lies in their different level of risk and ultimately, their maturity (Weber and Alfen 2010). The first will thus tend to attract risk averse investors while the latter is more appropriate for investors that will participate in shaping the project in the start-up phase so as to ensure its value grows and possibly generates higher returns.

Definition of Environmental, Social and Corporate Governance criteria

ESG stands for environmental, social and corporate governance. ESG criteria represent the three dimensions that directly and indirectly affect the financial performance of investments.

There is a growing recognition that an effective analysis of ESG risk and opportunities is a fundamental part of assessing a project's value. Investors also increasingly take into account the ESG issues impacting their own reputation in a society where sustainable development is becoming a major concern. Such concerns include - among other things:

- Environmental concerns such as climate change, hazardous waste, nuclear energy, biodiversity.
- Social concerns including diversity, human rights, consumer and worker protection, sin stocks, ageing population, animal welfare.
- Corporate governance concerns ranging from management structure, employee relations to executive compensation.

ESG requires investors to take a wider view, which provides insights into the long term prospects of projects. Therefore, an ESG approach may provide investors with a benchmark to judge the overall quality and spectrum of the project's opportunities and risks.

Primary sets of ESG criteria and elements are also related to international agreements such as the Rio Declaration on Environment and Development produced at the 1992 United Nations Conference on Environment and Development (UNCED), the International Labour Organization (ILO), a United Nations agency setting among others an international labour standard or the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

However, the great heterogeneity of views, motives and practices regarding the ESG approach impedes comparison between firms` claimed successes. A coordinated and effective responsible investing could be favourable and simplify investment decisions and would therefore lead to further investments and benefits. A uniform implementation would also be desirable to avoid "greenwashing", the deceptive promotion of an environmentally friendly image.

Nonetheless, there is currently no global commonly agreed ESG scale/standard. As a result, it is difficult to state whether or not a firm invests in a sustainable and responsible manner. A clear universal definition could address this first issue. Another step would be to create an ESG scale firms could refer to. In such case, instead of evaluating whether the investments are green or not, it is the quality of firms` engagement that would be assessed.

If one clear definition does not yet exist, there are however many examples of frameworks and tools providing practical guidance for investors to implement ESG in their investment decisions (see chapter 2. Existing frameworks and tools).

Definition of Sustainable Infrastructure

Sustainable infrastructure provides the same services as conventional infrastructure while bringing additional benefits flowing from the implementation of ESG criteria. Since any infrastructure facility is improved, or made more valuable, when incorporating the concerns of the triple bottom line, i.e. economic, social and environmental concerns, and since the ESG approach covers these triple concerns, adopting an ESG approach brings added value to the environment, civil society and investors.

Referring to a publication from the World Bank Group (2012), introducing ESG into infrastructure project is indispensable for a country to stay competitive: "Infrastructure can be a vector of change in addressing some of the most systemic development challenges of today's world: social stability, rapid urbanization, climate change adaptation and mitigation and natural disasters. Without an infrastructure that supports green and inclusive growth, countries will not only find it harder to meet unmet basic needs, they will struggle to improve competitiveness."

Sustainable infrastructure is therefore not only a key component of a functioning economy; it also forms the basis of good livelihoods for billions of people, and can significantly contribute to achieving sustainability and addressing global climate challenge. Indeed, the UN Open Working Group includes the potential of infrastructure in their proposal for the Sustainable Development Goals (SDGs) by directly mentioning sustainable and resilient infrastructure in two of the seventeen SDGs. This underlines the potential power of infrastructure to drive sustainable development.

Climate and Infrastructure

Climate change affects all regions of the world and impact and consequences of global warming are truly intimidating: melting polar ice sheets are fueling rising sea-levels that will leave no shore unaffected. Other regions are likely to face extreme cold episodes and rainfall more often while others may suffer from extreme heat waves and droughts. In fact, many poor developing countries as well as a wide range of economic sectors that rely strongly on their natural environment (e.g. agriculture, forestry, energy and tourism) are particularly exposed to climate change. Other potential negative effects are the damages incurred to property and infrastructure by natural disasters, losses of productivity due to disruption in daily life and harmed trade related to climate change, mass migration of climate refugees- people who are forced to leave their homes because of hostile environments. Different quantifications regarding the costs of climate change were made by economists however, as Nicholas Stern, a former chief economist with the World Bank

Group, and his co-author Simon Dietz mentioned in their paper "Endogenous growth, convexity of damages and climate risk" (2014), the economic costs of global warming are still underestimated and governments have to tackle the continuously increasing emissions of human-induced greenhouse gases.

There exist several legally binding frameworks such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to address the challenges posed by global climate change. The Kyoto Protocol is an international treaty, which extends the 1992 UNFCCC by which the signatory states commit to reducing greenhouse gas (GHG) emissions. The Kyoto Protocol claims that global warming is indeed occurring and that it is a change mainly induced by human activity. The primary sources of GHG are the burning of fossil fuels for electricity production, transportation, industry and agriculture. To comply with the reduction of GHG emissions, sustainable infrastructure can play a key role by providing infrastructure with higher energy efficiency or even decarbonised renewable energy for instance. However, not all countries are part of those legally binding frameworks.

Cities represent currently the major carbon emitters, with 66 per cent of global energy consumption to their name (C40 at the GIB Summit 2015). They are also most vulnerable to climate change effects, as mentioned by C40 - the cities leadership group of the world's megacities committed to addressing climate change. Furthermore, the estimation of the increase of the global population by 2 billion between 2010 and 2030 will further lead to more emissions and worsen the already tense situation. While it is estimated that most of this increase will occur in the developing world and in urban settlements, further specific infrastructure investments will be required to handle this increase. Barysch et al. (2014) estimate that 75 per cent of the global population will live in cities by 2050. Depending on the infrastructure appetite of cities and how they plan and structure their growth, cities can have a huge impact on paving the way for a sustainable future.

Biodiversity and infrastructure

As described by the World Wide Fund for Nature (WWF), biological diversity – or biodiversity – is the term given to the variety of life on Earth. It includes the variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact. This diversity forms the natural capital that keeps our ecosystems resilient and economies productive. Indeed, only by preserving such diversity will our environments adapt to a changing climate and maintain human life in these particular locations. For example, drought-resistant crops will be of decisive importance to populations living on the border of the Sahara or other expanding deserts. However, the world is currently experiencing a dramatic loss of biodiversity mainly as a result of urbanisation, deforestation and overexploitation of natural stocks. A continuing pressure on ecosystems may lead to they becoming too small, depleted or isolated to further ensure human presence.

Referring to the United Nations (UN) Millennium Ecosystem Assessment (MA), Europe's territory is more fragmented than any other continent`s. This is mainly due to the fact that vast areas have been transformed into urban zones or blended by transport infrastructure. This had decreased the resilience of once biodiversity-rich ecosystems As an attempt to limit the trend, the Convention on Biological Diversity (CBD) has been agreed upon. It is a multilateral treaty with three main goals: 1) conservation of biological diversity (or biodiversity) 2) sustainable use of its components, 3) fair and equitable sharing of benefits arising from genetic resources.

Sustainable infrastructure can play - if biodiversity conservation is adequately implemented - a crucial role in protecting the functionality of urban and rural ecosystems and enhancing the quality of life (e.g. health, tourism, protecting historic and cultural heritage). As such, biodiversity conservation is often associated with the term of green infrastructure. Green infrastructure refers to a network of public and private areas that provide ecological, environmental, social and even economic services. Green infrastructure can include reforestation zones, parks, green bridges, fish migration channels, floodplain restoration or high-value farmland. Such connectivity encourages the mobility of organisms (e.g. plants and animals) and enables therewith ecological processes and flows to unfold undisturbed. Sustainable infrastructure needs to grasp the concept of green infrastructure in order to contribute to the conservation of biodiversity.

Climate Change and Carbon-Related Considerations

Climate change and carbon-related issues are particularly important to factor in when considering infrastructure investment, both in terms of risk and opportunity. Climate change and carbon are increasingly discussed in the investor community with various approaches to this subject, all sharing one common premise though: "what can be measured can be managed".

To simplify there are two main stances:

- some investors taking the more financially focused view that carbon should be monitored only because it entails additional risks and therefore needs to be included as any other risk factor;
- some investors taking the more socially responsible view that it is incumbent upon them to support decarbonisation and transition efforts.

There is therefore significant literature on the topic and an abundance of reports and handbooks which seek to help investors to deploy a carbon approach. However, there is limited material available specifically on infrastructure. This is all the more unfortunate when considering that infrastructure is of course a key sector for climate change / carbon analysis with outcomes which tend to be more readily measurable.

Indeed, infrastructure can have significant positive or negative impact in terms of carbon emissions. Conversely, infrastructure can itself be particularly exposed to the impacts of climate change.

Infrastructure, and particularly the "project finance" type of infrastructure where investors finance a clearly identified and ring-fenced object, allows for a more direct and meaningful measurement of impact than when considering that of a "black box" corporate investment.

This section aims at providing some resources and help, by presenting a holistic approach that is being used to monitor infrastructure investment. What follows should not be read as an approach that should be compulsorily mandated across the industry but as an example of how a responsible long term investor can approach carbon issues in a prudent manner. It is strongly recommended, however, that all long term investors take up at least some of these ideas and practices if they have not done so already.

Carbon-related risks

From a risk perspective, it is essential to engage on carbon-related issues and not leave this as a blind spot of how risk is approached. It is key to include an analysis of climate and energy risks as well as opportunities during the investment phases of projects. As an integrated part of the investment process, a qualitative assessment of the energy, carbon, and climate-related risks which have potentially negative financial, operational, commercial, or reputational impacts on the project should be undertaken on the basis of a systematic analysis framework.

For instance, one of the first risks to consider is the likely effects on a portfolio's performance engendered by increased fuel prices and/or stricter regulation relating to carbon pricing. A second concern would be the significant reputational risk that is associated with carbon-heavy projects and which would deter responsible and ethical investors from otherwise valuable projects. This can ultimately leave certain types of projects "stranded". On the other hand, carbon policy changes preparing for a lower carbon economy could also provide upside for low-carbon sectors (Mercer, 2015).

From a risk perspective, preparing for climate change and extreme weather events to which projects may be exposed is also crucial. In addition to the deterioration that can be caused to such assets, factors such as the continuing

usability of the infrastructure, increases to operational or maintenance costs or increase of insurance premia are factors that need to be considered.

Before making the decision to invest in a project, a detailed carbon, energy and climate change risk analysis should therefore be carried out, after which a project can be classified as low, medium or high risk to determine the subsequent level of monitoring of it that will be appropriate. This risk analysis should take into account matters such as how a project's energy supply will be managed throughout its life, how that project is exposed to energy pricing volatility, and how a project will react to climate change and extreme weather events. A rail project, for instance, in low-lying fields near to an area prone to flooding will obviously have to take into account the threat over the next decades of rising sea levels. A road in the Gulf of Mexico will have to forecast likely effects on the road of climate change-related increases in the frequency and severity of heavy storms that will damage the project's infrastructure.

On the carbon front, the analysis should examine a given project's plan to transition to a low-carbon economy. This will not just affect road projects, which might be expected to be the most 'carbon-exposed' projects in the layman's imagination, but every project. The analysis of the transition to a low-carbon economy should try to forecast the impact of increased costs driven by weightier requirements in the context of tightening carbon regulation, and also the impact of policy changes induced by potential collapse in carbon markets and changes in carbon taxes. It should also forecast the impact of greenhouse gas emissions from a given project. By doing these analyses and synthesizing them into one coherent one, it is possible that an investor can make a helpful risk assessment of a project that will go some way towards whether to invest in it and if a 'Go' decision is subsequently made how these risks can be managed and mitigated over a project's lifetime.

These risks should be identified throughout the investment and asset management process and analysed at the earliest screening phase.

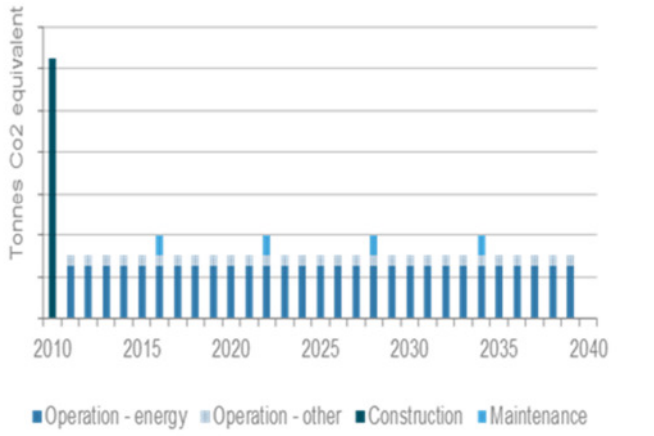
Carbon footprint

In addition to the approach mentioned above a number of investor initiatives refer to carbon footprinting of portfolios. Given the importance of infrastructure projects (especially when considering the full scope of impacts and including indirect emissions) and the ability to estimate with some accuracy future carbon footprints as the objects are well defined, this dimension should be included when considering infrastructure investment.

The carbon footprint of infrastructure projects will of course vary; in such a diverse asset class the footprint of projects like a road in America, a greenfield stadium in Europe and a greenfield hospital in an emerging market economy are of course going to be different and will have different emissions predicted throughout their life cycles. A hospital, for instance, will produce a lot of carbon emissions during construction, and then comparatively little as it settles into routine operations. A toll road for cars, however, will see a constantly high level of emissions throughout its lifecycle, due to the fact that its very *raison d'etre* is the carriage of carbon-emitting vehicles.

Carbon perimeter: direct and indirect emissions

Carbon footprint of the project over its lifetime

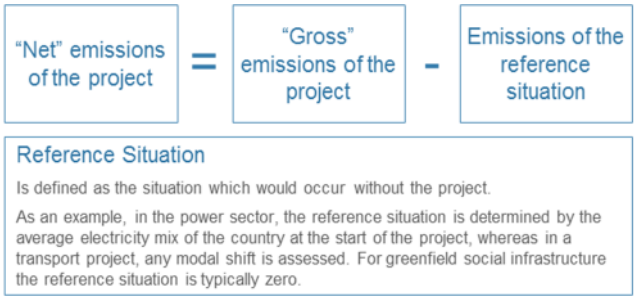


There are, however, ways and means whereby an investor can work with stakeholders in a project – procuring authority, contractors, local community groups to name only a few – to plan how to approach carbon matters in a systematic and easy-to-understand way, such as some well-developed and sophisticated carbon calculation tools.

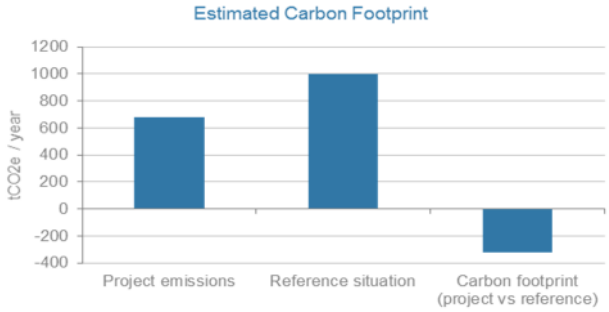
We advise implementing a system which can calculate the projected carbon footprint of any given infrastructure project, taking inputs of various technical data of a project such as the direct or indirect emissions that are expected to occur over a period of years.

Scope 1 emissions of greenhouse gases (GHG) are the most obvious; GHG emissions which are directly related to a project's activity, such as combusted fuel used on a tunnel boring machine for instance. Scope 2 emissions are more indirect; GHG emissions from the generation of purchased electricity that is needed for a project's activity (generators for contracted builders' accommodation for example). Scope 3 emissions are yet more indirect, and are emissions that result from the production of materials purchased from other parties and used in the project's activity such as the steel used to make a rail track or such as employee business travel or waste disposal. The prudent approach would be to take into account all three of these levels, which also is most appropriate from a risk analysis point of view. To illustrate, one investor in a social infrastructure project has found that despite the construction phase's carbon footprint being relatively low, the forecasted footprint for the operational phase was very high. This was because the facility was built 20km away from a train station, meaning that the vast majority of its users travelled to it by car; an indirect emission that added greatly to the footprint. This kind of emission can of course be mitigated by the introduction of car sharing incentive systems and suchlike.

Once the relevant data has been compiled for a project, the next step is that it must then be compared to a reference situation, which is defined as the situation that would occur without the project. 'Net' emissions of the project are then assessed to be the 'gross' emissions of the project minus the emissions that would take place in the reference situation. Obviously a greenfield social infrastructure project will not have a reference situation, but for brownfield road projects this is a useful and simple aid to help determine if a project is likely to have a positive or negative net impact on carbon emissions.



Taking example of a greenfield rail project this time, actions that could be taken in the light of a carbon footprint forecast would include: optimizing earth movements to reduce external supplies; optimizing and streamlining concrete and supply transport distances; implementing eco-driving for passenger transport and freight; increasing the scalability of maintenance vehicles and thus lowering gross energy consumption to name but a few.



At the strategic level, too, certain lessons can be learned from deploying such approach. Firstly, carbon footprint assessment must be done as early as possible in the development of a project – and certainly before the construction phased – in order that an appropriate carbon action plan can be initiated. Next, for transport projects the validity of the analysis during the operation phase depends on the availability of solid and extensive traffic studies which are not always available or 100% accurate. However, the tool can still provide vital information on the construction phase and at least a guide to the operational phase.

By adopting and utilizing the approaches above – a carbon risk analysis and a carbon footprint impact assessment – a responsible investor can determine whether or not to invest in a project and, should the decision be made to do so, how best to deal with the challenge of dealing with the issues presented. It is recommended that any long term investor incorporates this into their investment strategy on a systematic basis and that all members of the investment team receive appropriate training in order that they are aware of carbon issues and so manage their portfolio investment decisions accordingly. In turn, once an asset has been acquired, the asset management team must be required to report at regular intervals on the carbon-related matters of a given project to investors. Not only is this a prudent strategy that will reward those who take it on in terms of excellent reputational risk management and mitigation, but also one that will improve the lives of communities globally, and will fit in very well with increasing demand for environmentally responsible infrastructure.

It is equally important that other key stakeholders of the infrastructure investment process – including the granting authorities – can benefit from regular training opportunities on the carbon issues.