

Final Report

Measuring Sustainability in Infrastructure Investment

A Case Study Assessment of Selected Standards and Tools

October 2020



GUGGENHEIM

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MOTT
MACDONALD

KPMG



About World Wildlife Fund

For nearly 60 years, WWF has been protecting the future of nature. The world's leading conservation organization, WWF works in 100 countries and is supported by more than one million members in the United States and close to five million globally. WWF's unique way of working combines global reach with a foundation in science, involves action at every level from local to global, and ensures the delivery of innovative solutions that meet the needs of both people and nature.

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Foreword by Scott Miner and Carter Roberts



Scott Miner



Carter Roberts

The estimates are staggeringly high for the level of investment in infrastructure that will be necessary to achieve the United Nations (UN) Sustainable Development Goals (SDGs), facilitate the growth of developing countries, and upgrade the existing stock of aging capital assets around the world. Not only is the need great but the need to do it right is even greater. If new and upgraded infrastructure stock is poorly planned or executed, the damage to the world's ecosystems and social development could outweigh the desired benefits.

The good news is that two important advancements are converging in the area of sustainable infrastructure finance. First, sustainable infrastructure is growing as an asset class among institutional investors and asset managers, particularly as they increasingly focus their capital allocations through the lens of environmental, social and governance (ESG) criteria. The past few years have witnessed an awakening in the finance sector around the roles and responsibilities of asset owners and managers in prioritizing investments to secure a healthy and stable planet and global economy. This has been most pronounced with respect to addressing the climate crisis and the "E" in ESG.

Now this trend must be placed in the context of responding to the COVID-19 crisis. While individual countries and the international community have struggled to meet their immediate health system needs, attention has now firmly turned to the "S" in ESG—to health security, to job preservation and creation, and to restarting global and local economies in a just and equitable manner. With low interest rates and huge commitments of public-private partnerships for funding economic stimulus, spending on infrastructure is likely to expand significantly. This creates an even more urgent case for developing clear and widely accepted sustainable infrastructure standards so these investments can support the transition toward climate-positive, safe and equitable economies and societies.

The second promising development in sustainable infrastructure finance is that we are moving closer to seeing the adoption of a set of consistent methodologies and metrics for sustainability measurement that will be necessary to attract significant institutional capital. We still have work to do, but this project, "Measuring Sustainability in Infrastructure Investment" is an important part of that process.

In this report, researchers from KPMG and Mott MacDonald applied a selection of ESG and sustainability standards to two different operating infrastructure assets: the Yatí-Bodega Road Interconnection in Bolivar, Colombia and the Carlsbad Desalination Plant in Carlsbad, California. The objective of the report is to assess the effectiveness and the practicalities of implementing these standards for investors. The research is the latest product of an ongoing collaboration between our two organizations on sustainable infrastructure investing, including a 2018 study we commissioned by Stanford University Global Projects Center (SGPC), "State of the Practice: Sustainability Standards for Infrastructure Investors." Three standards identified in the SGPC study were assessed in this project: The International Finance Corporation (IFC) Performance Standards (PS) and Equator Principles (EP) (considered as one standard for the purpose of this research), Envision and the UN SDGs. In addition, the research assessed impact measurement and valuation (IMV) as an infrastructure investment

decision-making tool. IMV measures the economic, environmental and social impacts of infrastructure assets using the single metric of monetary value.

The key insights, conclusions and recommendations in this paper move us closer to adopting commonly used standards and measurements that must be in place before sustainable infrastructure investing becomes an institutional asset class. We want to commend the team at KPMG, led by Mark McKenzie and Frits Klaver, and the team at Mott MacDonald, led by Niniane Tozzi, for their work on this important endeavor.



Scott Minerd
*Chairman of Investments and
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Carter Roberts
President
World Wildlife Fund

Acknowledgements

Sustainable infrastructure projects must play a foundational role in achieving the Sustainable Development Goals. Even with ramped up government spending in response to the COVID-19 crisis, private investment will still be needed to meet growing infrastructure demands. Fortunately, there is sufficient private capital available to help fund these projects, either through partnering with governments or as standalone investments. Moreover, the holders of this capital are increasingly seeking investments that can earn sufficient returns while also contributing solutions to climate, environmental and social challenges. One important key to unlocking this capital is for a set of sustainability standards and measurement tools to be commonly adopted by investors, developers, and regulators.



James Pass

This study was commissioned with the intention of furthering progress toward such internationally recognized norms and standards to enable greater allocation of private capital by a diversified set of institutional investors to sustainability objectives. We believe the authors have moved us closer to this goal and unlocking that vital private capital.



David McCauley

Guggenheim Investments and World Wildlife Fund thank KPMG and Mott MacDonald for having led this project. In particular, we would like to recognize the contributions of Frits Klaver and Mark McKenzie of KPMG as well as Niniane Tozzi of Mott MacDonald, who served as the lead authors, with key contributions from team members Nikki van Dam and Vera Moll of KPMG, and Marielle Rowan and Kristy McConnel of Mott MacDonald. They were supported by Richard Threlfall, Global Head of Infrastructure at KPMG. We also appreciate the support of many others who contributed their expertise and perspectives, and without whose advice this product would not have come to fruition. At Guggenheim, this includes Michael Perkinson, Chief of Staff to the Global Chief Investment Officer, who has overseen these and related efforts, as well as the helpful inputs of Ning Liu and Jeremy Diamond. Kate Newman, who leads WWF's work on sustainable infrastructure, was involved with the study from the start with inputs and support from her colleagues Evan Freund, Helena Wright, Joanne Lee, and Collin Lawson. Finally, we should acknowledge the facilitating efforts of colleagues at Handshake, especially Robert Ludke, and the support of Alex Davis and Julia Cox.

Quantifying criteria to help determine and certify the sustainability contributions of an infrastructure project is no small task. In the face of the need for stimulus investments across the globe to support the COVID-19 recovery, we can expect a surge in demand for infrastructure spending. We hope this study will help remind all involved that both public and private capital can and should be directed toward those investments which will simultaneously address COVID-19 recovery needs and support progress toward sustainability goals. While we have not yet reached convergence around a specific set of tools and standards, the report shows that there are already plenty of good options available.

A handwritten signature in black ink, appearing to read 'James Pass'.

James Pass

Global Head, Project Finance
Guggenheim Investments

A handwritten signature in black ink, appearing to read 'David McCauley'.

David McCauley

Senior VP, Global Partnerships Multilateral Affairs
World Wildlife Fund

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Introduction

Background to This Study

This analysis was commissioned by Guggenheim Investments (Guggenheim) and the World Wildlife Fund US (WWF) as part of an ongoing collaboration between the two organizations to better understand parameters of and promote investment in sustainable infrastructure. Through this collaboration, Guggenheim and WWF aim to support the United Nations (UN) Sustainable Development Goals (SDGs) by enabling future infrastructure to be sustainable and resilient and by protecting the natural assets that benefit society and economies.

In order to deliver the SDGs and support the expanding human population, \$90 trillion¹ in infrastructure investment worldwide is required between 2015 and 2030. This represents a doubling of the annual global infrastructure investment in 2015. This level of investment is necessary to replace ageing infrastructure in developed economies and to facilitate the growth of developing countries and emerging markets. Furthermore, this needs to happen in the context of a changing climate and COVID-19. If this new infrastructure stock is planned, sited and designed poorly, the result will be damage to ecosystems, compromised economic and social development goals, and weakened resilience of supply chains.



Investors need effective, reliable and credible standards and assessment tools to help them understand the ESG performance of the infrastructure projects in which they invest.

It is therefore imperative that investors are enabled to direct capital to sustainable and resilient infrastructure projects that will deliver optimal outcomes both for people and for the ecosystems on which our societies depend. Investors need effective, reliable and credible standards and assessment tools to help them understand the environmental, social and governance (ESG) performance of the infrastructure projects in which they invest, and to improve the impacts and outcomes of their investment decision-making. Furthermore, it is important for investors to know not only how their investments impact society, but also what impact environmental and social phenomena such as climate change might have on the performance and value of assets and what that means in terms of risks and returns.

However, many investors lack established tools and processes to assess the ESG performance of infrastructure project assets and factor these into their project screening and selection processes. A diverse array of ESG assessment frameworks, standards and tools is available with yet more being developed and introduced every year but few, if any, have been developed specifically for investor needs. This has led some investors to develop their own ESG assessment tools. There is therefore a clear and urgent need for greater consistency and convergence in terms of how infrastructure investors factor ESG into their investment decisions.

In order to address this challenge, the Stanford Global Projects Center (SGPC) - an interdisciplinary research center at Stanford University, USA - conducted, on behalf of Guggenheim and WWF, a 2018 review of the tools available to infrastructure investors and other participants in the infrastructure value

¹ The Sustainable Infrastructure Imperative: financing for better growth and development, <http://newclimateeconomy.report//2016>

chain that could help to measure the sustainability and resilience of their infrastructure projects and assets². The core of the study was a comparative assessment of 12 standards and tools based on a five-dimensional framework of each standard’s comprehensiveness, objectivity, clarity, transaction costs and traction (see Figure 1). The review was supplemented with interviews with institutional investors, asset managers, service providers, environmental advocates, engineering and construction firms and public sector sponsors in the infrastructure sector to assess the current state of practice and identify challenges.

Figure 1. Infrastructure standards and tools reviewed by Guggenheim, WWF and SGPC in 2018

Project Screening Systems	Accounting Tools
CEEQUAL	CDC Sustainability Protocol
Envision	Greenhouse Gas (GHG) Protocol for Lifecycle Assessment
GRESB	Sustainability Accounting Standards Board (SASB) - Infrastructure
International Finance Corporation (IFC) Performance Standards	Task Force on Climate Related Financial Disclosures
Infrastructure Sustainability Council of Australia (ISCA)	United Nations (UN) Principles of Responsible Investment
SuRe	UN Sustainable Development Goal Indicators

Source: Guggenheim, WWF and SGPC, Executive Summary p.5 (2019)

The research by SGPC predicted that the diversification of ESG standards used to assess infrastructure projects would likely continue in the near term, with a possible coalescence in the future. This ran counter to a desire expressed by some in the investor community to have a more common set of ESG assessment standards to bring greater consistency when evaluating the sustainability of infrastructure projects.

Since publication of the SGPC study, there has been some movement toward the establishment of internationally accepted norms. The entities associated with several leading commercial project-level sustainability standards are discussing a possible agreement on a core set of common minimum requirements, and there are parallel efforts to develop a labeling or certification approach for infrastructure investments to show they are consistent with the G20 Quality Infrastructure Principles.

In order to build on the earlier work by SGPC, Guggenheim and WWF engaged KPMG and Mott MacDonald, jointly known as the ‘researchers’, to apply a selection of ESG and sustainability standards

² Guggenheim, WWF and SGPC, State of the Practice Sustainability Standards for Infrastructure Investors, 2019

and tools to real-life case studies of operating infrastructure assets and present the results in a public report. The objectives of the research were to:

- To understand the process and outcomes of applying the selected standards and tools; and
- To assess how effective each standard or tool could be in providing infrastructure investors with decision-useful ESG and sustainability information.

Standards and Tools Tested

Four of the 12 standards and tools reviewed by SGPC, Guggenheim and WWF in 2018 (see Figure 1) were selected to be assessed in this research³. They were: the International Finance Corporation (IFC) Performance Standards (PS) and Equator Principles (EP) (considered for this research as a single standard or tool, see below), Envision and the UN SDGs. In addition, the research assessed the use of impact measurement and valuation (IMV) as an infrastructure investment decision-making tool. These standards and tools were selected for the range of insights they might provide to investors and also for their geographical applicability. Further, the research set out to test the effectiveness of both established assessment standards and tools (i.e. IFC PS, EP and Envision) and to test the potential of less established ones (i.e. UN SDGs and IMV).



The IFC Performance Standards are generally acknowledged as the most widely used international framework of ESHS requirements, providing financial institutions, private companies and governments around the world with a comprehensive set of ESHS policies, standards and guidance to use in the implementation of projects in all sectors.

IFC Performance Standards and Equator Principles

The IFC PS/EP were selected for testing in this research because they are widely used by financial institutions around the world as a project financing assessment standard and tool. For the purposes of this research, the IFC PS and EP have been considered as one standard or tool because there are intrinsic linkages between the two. The EP were developed based on the IFC PS and the IFC PS are listed in the third Equator Principle as the standards to be followed for investment projects in non-designated countries⁴. The categorization of environmental and social impact magnitude used in the EP is also the same as that of the IFC PS.

IFC Performance Standards

The IFC is the private sector finance arm of the World Bank Group and is recognized as an international leader in environmental and social sustainability policy. When reviewing projects for potential funding, the IFC applies a comprehensive set of social and environmental performance standards. The current versions of these standards came into effect in January 2012 and have been adopted by many other lenders. The IFC PS are generally acknowledged as the most widely used international framework of environmental, social and health and safety (ESHS) safeguards, providing financial institutions, private companies and governments around the world with a comprehensive set of ESHS policies, standards and guidance to use in the design and implementation of projects across all sectors.

³ Note: the inclusion of standards and tools in this research are not an endorsement by the Authors and Sponsors of this report.

⁴ The EPs identify countries as designated and non-designated based on the robustness of national legislation. Designated countries are those deemed to have robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment. See <https://equator-principles.com/designated-countries/> for more details.

Figure 2. Summary of IFC Performance Standards



Source: www.ifc.org/performancestandards

The Equator Principles

The EP are 10 key principles adopted by many financial institutions to ensure that the projects they finance and advise upon are developed in a manner that is socially responsible and reflects sound environmental management practices. Financing institutions that are signatories to the EP apply the principles to assess projects with an investment value greater than US\$10m. The EP require projects to be categorized according to the potential magnitude of their environmental and social impacts and this categorization can subsequently trigger conditions to be placed on the project developers in order to ensure certain environmental and social outcomes.

Figure 3. Summary of the 10 Equator Principles

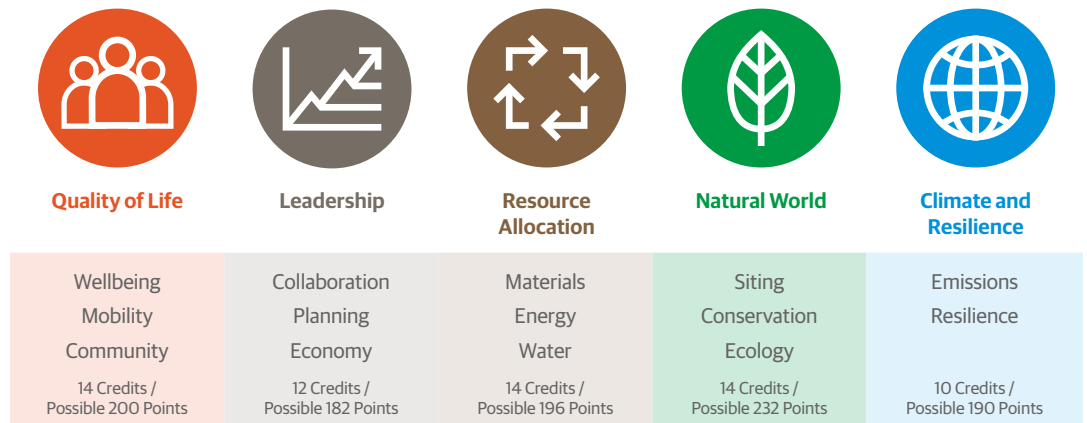


Source: Based on information from <https://equator-principles.com/>

Envision

Envision is a rating system developed by the US-based Institute of Sustainable Infrastructure (ISI) to inform the design of infrastructure projects and evaluate their sustainability and resilience. The framework provides a system of criteria and performance objectives to help decision makers and project teams identify sustainable approaches during planning, design and construction that will continue throughout the asset's operations and maintenance and end-of-life phases. Many of Envision's resources are freely available and can be applied informally. Infrastructure projects that choose to pursue formal Envision Verification with ISI are eligible to receive one of four awards (ranging from Verified to Platinum) depending on their performance. A minimum of 20% of the available points must be earned to achieve the lowest award threshold. Envision was selected for assessment in this research because it is widely used by infrastructure project developers and designers, particularly in the North American infrastructure market.

Figure 4: Envision sustainability criteria



Source: Based on information from sustainableinfrastructure.org

“

The SDGs were developed as a set of goals and commitments for national governments and not as an infrastructure project assessment standard or tool. Nevertheless, they were selected for testing in this research because they are increasingly used as a platform to raise capital for projects that contribute to achieving the goals, and as a framework to guide sustainable investment strategies.

United Nations Sustainable Development Goals (SDGs)

The UN SDGs are an internationally recognized framework for delivering sustainable development for all countries by 2030. Ratified by 193 countries in 2015, the 17 goals include ending poverty, improving health and education and spurring economic growth and are further defined through 169 underlying targets. It should be noted that the SDGs were developed as a set of goals and commitments for national governments and not as an infrastructure project assessment standard or tool. Nevertheless, they were selected for testing in this research because they are increasingly used as a platform to raise capital for projects that contribute to achieving the goals and as a framework to guide sustainable investment strategies. The authors therefore considered that the SDGs might provide a useful framework from which to plan, deliver and operate infrastructure assets and that their potential should be tested.

Figure 5: The UN Sustainable Development Goals



Source: www.sdgactioncampaign.org/

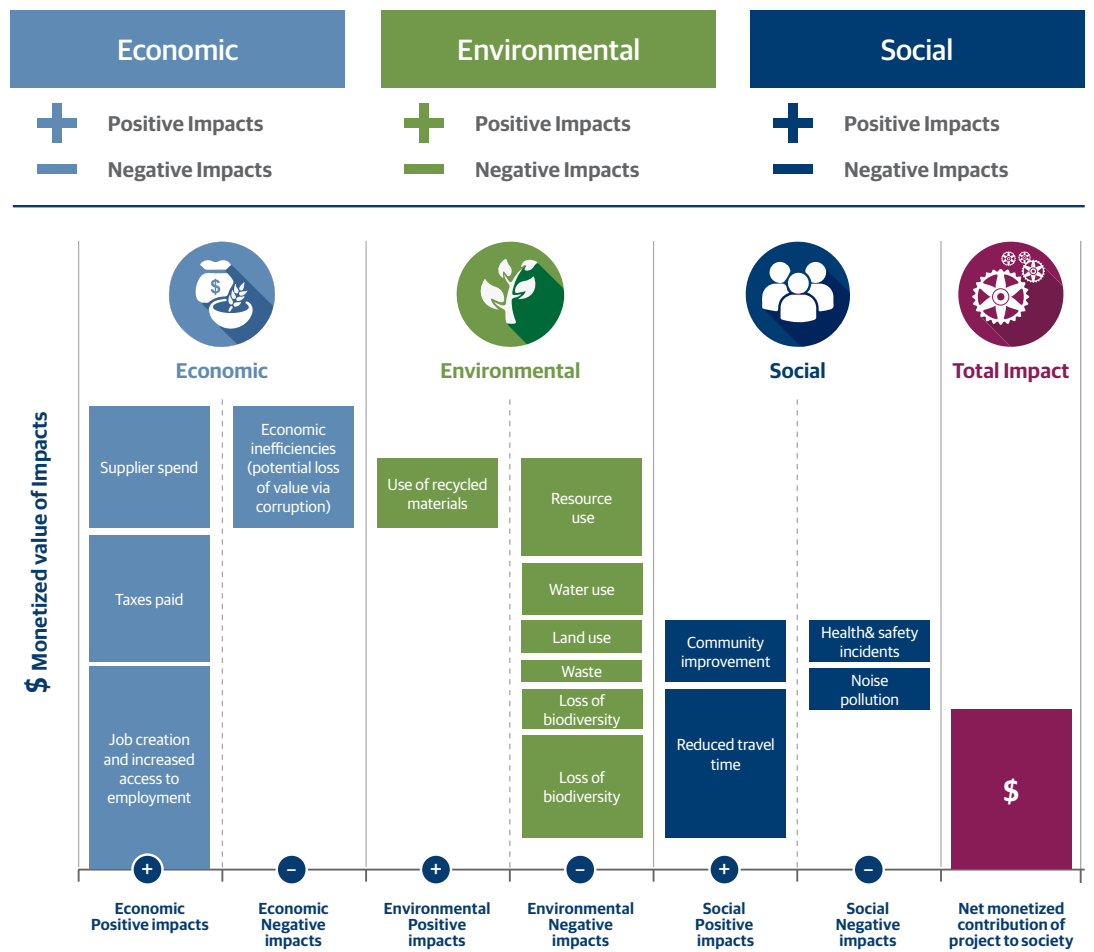
Impact Measurement & Valuation

IMV is the expression of economic, environmental and social impacts using the single metric of monetary value. The approach has its roots in cost benefit analysis widely used in the public sector to value the impacts of policy options. The corporate sector has shown increasing interest in IMV since 2010 when the sportswear brand PUMA was the first major company to publish an Environmental Profit & Loss statement. That statement put a monetary value on the company’s environmental impacts including carbon emissions, waste generation and water use.

Since then, many major corporations have applied IMV techniques to inform their internal investment decisions. This application of IMV enables organizations to assess projects not only on the basis of their financial return-on-investment, but also on the basis of the economic, environmental and social contributions they make to society. There are parallels with the investment community where many investors struggle to make sense of the myriad complex metrics that some sustainability assessment methodologies generate.

IMV was selected for assessment in this research because it may provide investors with a way to understand and quantify both the positive and negative impacts of infrastructure investment options on society.

Figure 6. IMV selected categories and illustrative output of application to an infrastructure project



Source: KPMG

Infrastructure Projects on Which the Standards and Tools Were Tested

The research set out to assess the effectiveness of the selected standards and tools by applying them to two operating infrastructure assets. The following criteria were applied to select the two assets:

- One should be in a developed economy and one in a developing or emerging economy;
- The asset types should be different in order to test the effectiveness of the standards and tools across different asset types;
- The asset owners should agree to the assessment and confirm their co-operation;
- The necessary data should be available from the asset to enable assessment; and
- Guggenheim Investments could not be a past or present investor in the asset.

Based on these criteria, the following projects were selected.

Project 1: Yatí - Bodega Road interconnection, Bolívar, Colombia

The \$72 million Yatí - Bodega road interconnection is a 12km toll road crossing the Magdalena River in the Province of Bolívar, Colombia. It connects two existing major roads and the municipalities of Magangué and Mompos⁵. The interconnection includes Colombia's longest bridge, the Rocandor, at 2.3km, as well as an additional 1km bridge, the Santa Lucia.

5 <https://www.youtube.com/watch?v=zZEXsJik06k>

Figure 7. Aerial view of the Yatí - Bodega road interconnection. The project runs from west to east starting from the town of Santa Fe going to Santa Lucía Bridge, Isla Grande, Roncador Bridge, La Bodega.



Source: Image courtesy of Fondo Adaptación (Colombia)

Prior to the Yatí-Bodega interconnection, the journey to these rural towns, isolated in the Mojana region, could be made only by ferry across the Magdalena River with a maximum capacity of 150 vehicles per day. A one-way trip took an hour and with only three trips a day, travelers often had to wait a day or more to be able to cross. The new interconnection allows up to 6,000 vehicles a day and shortens travel time to 25 minutes. By connecting two main roads and the municipalities in the region, the Yatí - Bodega road interconnection has potential to improve the quality of life and accessibility for thousands of people in Colombia. The project was carried out by the Adaptation Fund⁶, a Colombian governmental body that channels investment to construction, reconstruction and recovery projects with a strong connection to climate adaptiveness.

⁶ Fondo Adaptación is an entity attached to the Ministry of Finance and Public Credit of the Colombian Government that was initially created to address the construction, reconstruction, recovery and economic and social reactivation of the areas affected by the events derived from the La Niña phenomenon of 2010 and 2011. In 2015 the Fund was empowered to execute risk management and climate adaptation projects with a multisectoral and regional focus related to La Niña: <http://sitio.fondoadaptacion.gov.co/>; <https://www.caf.com/en/currently/news/2019/10/colombia-makes-strides-on-climate-change-mitigation/>

Project 2: Carlsbad Desalination Plant, California, United States

The Carlsbad Desalination Plant is a \$1 billion project to increase the fresh water supply in San Diego County, California and has a capacity of 189,000 cubic meters per day (50 million gallons per day or MGD). The county has limited local water resources, with relatively small aquifers and no major rivers and in recent decades has imported more than 80% of its water from Northern California and the Colorado River.

Figure 8. Aerial view of the Carlsbad Desalination Plant



Source: Image courtesy of Poseidon Water LLC

Figure 9. Reverse Osmosis Building



Source: Image courtesy of Poseidon Water LLC

The Carlsbad Desalination Plant was developed by Poseidon Water under a 30-year Water Purchase Agreement with the San Diego County Water Authority and is an important part of the Authority's long-term strategy to improve the reliability of the region's water supply. It helps to minimize the San Diego region's vulnerability to drought by reducing the demand for fresh water from rivers and aquifers⁷.

When it opened in December 2015, the plant was the largest seawater desalination plant in the Western hemisphere, including both the desalination plant and a 10-mile (16-kilometer) pipeline. It was the first major desalination plant in California to be carbon neutral in its operations and its management also ensures continued stewardship of the 300-acre (121-hectare) Agua Hedionda Lagoon.

⁷ <https://www.poseidonwater.com/carlsbad-desal-plant.html> & <https://www.poseidonwater.com/>

Research Methodology

Application of the standards and tools to the case study assets

The selected sustainability assessment standards and tools were retroactively applied to the two infrastructure assets using the best available operating data provided by the asset owners. The outputs of the assessments were then reviewed through the lens of investor ESG needs. None of the standards and tools assessed in this report had previously been applied by the asset owners or developers.

Most of the selected standards and tools were tested on one but not both of the case study assets due to reasons explained in Table 1 below.

Table 1: Overview of standards and tools applied per infrastructure project

	IFC Performance Standards (incl. Equator Principles)	Envision	UN SDGs	IMV
Yatí-Bodega Road interconnection, Colombia	Yes	No	No	Yes
Carlsbad Desalination Plant, USA	No	Yes	Yes	Yes
Reason for (not) applying the standard or tool	IFC PS are primarily applied to projects in non-designated countries. The USA is a designated country.	Envision is primarily used in North America	Data was unavailable for Yatí-Bodega Road interconnection	Tool applied to both assets



Historically, infrastructure investment has been dominated by public sector investors but in recent years private sector investors have become more active both through debt and direct equity investment to supplement public capital.

Assessment of effectiveness for investor needs

The infrastructure investment universe is a broad one. Historically, infrastructure investment has been dominated by public sector investors but in recent years private sector investors have become more active both through debt and direct equity investment to supplement public capital.

The assessment of the selected standards and tools was therefore conducted primarily with the private sector direct equity investor in mind. As noted in previous research by WWF and Cadmus Group⁸, direct equity investors – such as pension funds and the asset managers acting on their behalf, sovereign wealth funds, insurers, infrastructure fund managers and private equity firms – typically assume greater influence over project development and operational management than debt investors or investors in infrastructure equity funds (i.e. indirect investment). As such, they have the potential for greater influence over the extent to which sustainability considerations are integrated, not only in the initial investment decision, but also the ongoing management of the asset.

⁸ Valuing Sustainability in Infrastructure Investment, WWF and Cadmus Group, 2019

The review methodology was devised to focus on the needs of such investors, namely:

- The need to understand the ESG risk and opportunity profile of potential investments;
- The need to integrate a comprehensive set of ESG performance indicators into investment decisions;
- The need to understand the asset's societal impact and/or contribution to sustainable development;
- The need to integrate ESG performance data into financial analysis;
- The need to use ESG assessment standards and tools that are appropriate and effective for the particular investment strategy being used; and
- The need to position the investor's ESG assessment approach as credible and robust in order to build or protect their own professional and/or brand profile and reputation in the ESG investment market.

With these investor needs in mind, the researchers asked the following questions when reviewing the outputs of the assessments:

1. Did the standard or tool generate investor-relevant ESG risk insights?

- Reputational risk: Did the standard or tool generate insights that could help investors understand the risk of damage to the reputation of the asset, its operators or investors, e.g. through negative environmental and social impacts of the asset's construction and operation (e.g. loss of biodiversity, pollution, child labor) or accidents related to construction or operation?
- Regulatory/legal risk: Did the standard or tool generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards?
- Operational risk: Did the standard or tool generate insights that could help investors understand the operational ESG risks of the asset, e.g. technology or process risks (e.g. resource efficiency) or staff-related risks (e.g. wage levels)?
- Market risk: Did the standard or tool generate insights that could help investors understand risks related to the market outside of the control of the organization, e.g. supply shortages for inputs or changing demand due to changes in consumer or societal preferences (e.g. significant shifts toward public transport over private transport or the use of green rather than fossil-based energy)?
- Physical/Climate risk: Did the standard or tool generate insights that could help investors understand the risk of damage to the asset and threats to its financial performance and value from physical or climate impacts such as rising sea levels, reduced water availability, landslides due to denuded forests, earthquake damage, flood damage if wetlands are filled, etc.?
- Social risk: Did the standard or tool generate insights that could help investors understand the risk of disruption to the asset's construction or operation from social factors such as community opposition and protests, non-governmental organization (NGO) actions, climate-driven migration, etc.?

2. Did the standard or tool generate investor-relevant ESG opportunity insights?

- Did the standard or tool generate insights that could help investors understand the potential ESG opportunities of the project? (e.g. an opportunity such as protection of forests might create a more resilient landscape for the asset and hence lower costs, a regulatory opportunity may arise when preferential tax schemes or government subsidies create incentives for investors to adopt new technologies, or to implement energy efficiency measures.)

3. Did the standard or tool enable assessment of a comprehensive set of ESG indicators?

- Did the tool enable assessment of the minimum 12 ESG indicators identified in the WWF Guidance note on integrating ESG-factors into financial models for infrastructure investments⁹?
 - Degradation & Pollution: air, water, greenhouse gases (GHGs), biodiversity and habitat, physical climate impacts;
 - Resource efficiency: energy, water, waste, materials and supply chain;
 - Labor: health & safety;
 - Community & stakeholders: stakeholder engagement; and
 - Governance: corruption, fraud and cyber security.
- Did the tool enable assessment of a broader set of ESG indicators, for example those identified in the long list of the WWF Guidance note (see Figure 10)?

⁹ Guidance Note, Integrating ESG factors into financial models for infrastructure investment, WWF and B Capital Partners, 2019, available at http://awsassets.panda.org/downloads/wwf_guidance_note_infra_pdf

Figure 10. Long list of ESG factors identified by WWF and B Capital Partners¹⁰

Environment		Social		Governance	
Degradation / Pollution	Air (climate) - GHG emissions	Labour	Child labour	Board Issues	Independence of board chair
	Air (health) - other pollution		Discrimination / Inclusion		Board composition
	Water		Gender and diversity (inclusion)		Committee structure / independence (e.g. audit, risk, compensation)
	Ground / Contamination		Freedom of association		Executive compensation
	Noise and Light		Health and safety (employees, customers suppliers)		Voting system (one share / one vote)
	Biodiversity		Labour standards and working conditions		Fiduciary duty
Resource efficiency sourcing / use / treatment	(Raw) materials incl. supply chain	Stakeholder	Employee engagement	Operational Issues	Bribery and corruption
	Energy		Societal preferences		Fraud / cyber security
	Water		Community benefit (e.g. access, inclusion, development, social enterprise partnering)		Lobbying activities
	Waste		Other stakeholder relations		Political contributions
	Physical - impact on asset, e.g. flood		Physical - impact on asset, e.g. riots		Whistle-blower protection

Source: WWF and B Capital Partners (2019)

¹⁰ Guidance Note, Integrating ESG factors into financial models for infrastructure investment, WWF and B Capital Partners, 2019, available at http://awsassets.panda.org/downloads/wwf_guidance_note_infra_pdf

4. Did the standard or tool generate insights on the asset's societal (environmental and social) impact and/or contribution to sustainable development?

- Did the standard or tool generate insights that could help the investor understand the positive or negative impacts the asset has on society and/or its contribution to sustainable development? Examples of these impacts include environmental impacts such as biodiversity loss, air pollution (incl. GHG emissions), water use and pollution, creation of waste and social impacts such as health and safety incidents and child labor.

5. Did the standard or tool generate insights with potential for integration into financial analysis?

- Did the standard or tool generate ESG insights that could be quantified and incorporated into financial analyses such as internal rate of return (IRR) or net present value (NPV) using discounted cash flow models?




6. Which investment strategies was the standard or tool applicable for?

- Did the standard or tool generate insights that could support a variety of project screening/ investment strategies? (N.B. The researchers assessed the effectiveness of each standard or tool for the following investment strategies. While these terms are all widely used in the investment community, the researchers recognized that there is some overlap between these investment strategy categories, for example impact investing can be considered a specific type of sustainability-themed investing):
 - Negative/exclusionary screening: excluding assets that do not comply with specific, pre-set ESG criteria;
 - Norms-based screening: assessing asset performance against global norms such as climate protection, human rights, working conditions and anti-corruption;
 - Positive/best-in-class screening: identifying projects that are considered high performers or best-in-class on specific ESG metrics;
 - Impact investing: investing into specific projects in order to generate a measurable, beneficial social or environmental impact alongside a financial return; and
 - Sustainability-themed investing: selecting projects that help to address specific economic, social or environmental challenges such as the economic empowerment of under-privileged communities or reductions in carbon emissions.

7. Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?

Scoring Methodology

The researchers attempted to answer each question based on analysis of the outcomes when applying the selected standards and tools. The outcomes are found in the next chapter of this report, under each section named 'effectiveness for investors'. In order to compare the insights, each question was scored based on the following:

Score	Description
	High effectiveness The standard or tool generated insights that could be of significant relevance to investor needs.
	Moderate effectiveness The standard or tool generated insights that could be of some relevance to investor needs. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.
	Low effectiveness The standard or tool did not generate insights relevant to investor needs.

Limitations to the research

- The depth of insights a tool or standard provides depends to some extent on the type of asset it is applied to. Given that this research applied the tools and standards to only two infrastructure assets in two locations, the results are limited to those. Different insights may be generated if the standards or tools were applied to other asset types and in other locations.
- The assessments of the assets were conducted retroactively using the best available historic data, which was not always optimal for the purpose of the assessment. As a result, outcomes in some cases are more an estimation than a reflection of definitive performance. Furthermore, some of the standards and tools assessed were designed to be applied in real time but for the purpose of this research had to be applied retroactively. As a result, in some cases the assessments required the researchers to use professional judgement and creativity in order to generate useful outcomes.
- Assessing the outputs of the assessments through the lens of investor needs required some subjective judgement.

Results

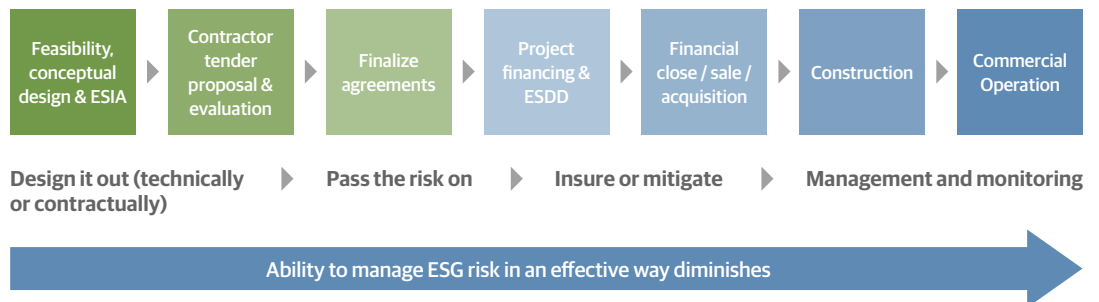
This chapter provides the detailed results of applying the standards and tools to the selected infrastructure projects by describing the methodology, how it was applied, the results, benefits and challenges and the effectiveness for investors.

1. IFC Performance Standards and Equator Principles

How to apply the standard or tool

The IFC PS/EP are used throughout the project lifecycle by lenders and project sponsors for the management of environmental and social (E&S) impacts and risks. The IFC PS/EP inform the project investment decisions, provide legal liability protection, support corporate reputations, contribute to a social license to operate and assist financial and schedule management through effective impact and risk management. Figure 11 shows the E&S management lifecycle for a typical project in a linear fashion.

Figure 11. A typical project cycle from the perspective of lenders and investors



Source: Mott MacDonald

The following step by step process is generally used for applying the IFC PS/EP to developing and implementing an infrastructure project (see Figure 12):

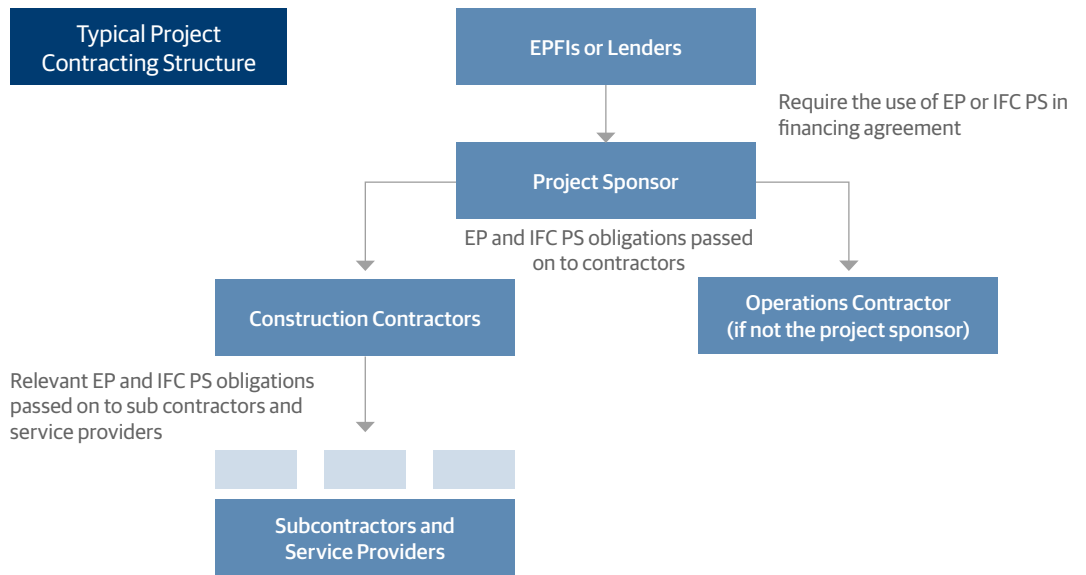
1. The project is categorized based on its potential E&S impacts and risks.
2. An environmental and social impact assessment (ESIA) is produced at the feasibility stage when there are sufficient project design details to identify the general project location, its elements and objectives. The team responsible for the ESIA can use IFC PS1 to inform the ESIA process and PS2-PS8 to inform specific E&S topics and issues that require consideration in the ESIA.
3. The ESIA documentation is handed to a project team responsible for implementation.
4. Typically, financing is sought prior to construction¹¹ and the Equator Principles Financial Institution

¹¹ Sometimes financing is sought after construction has started or even during operation. In that case, while the ESIA may still be analyzed for compliance, there will be greater interest in understanding how the environmental and social management system is being implemented and what gaps are apparent with regards to the EP/IFC requirements during the current project phase.

(EPFI) lenders organize a due diligence process to confirm project compliance with Principles 1-7 of the EP. An Equator Principle Action Plan, which is also sometimes called an environmental and social action plan (ESAP), is produced to identify additional measures to address gaps with the EP and IFC PS requirements. Principle 8 (covenants) is addressed in the financing agreement.

5. With financing in place, contractors and service providers are hired. Contract clauses are expected to reference compliance with the IFC PS/EP, especially adherence to the ESAP and to the management plans for mitigating adverse impacts and risks. Such clauses are used in the EPFI's financial agreement with the borrower/project sponsor who is then expected to pass on the contractual obligations related to E&S performance to its contractors and service providers.
6. The project sponsor and any lenders' Independent Environmental and Social Consultant (IESC) will monitor project E&S performance against PS1-8. The IESC provides an external independent opinion based on review of internal monitoring and E&S performance quality.
7. There are annual reporting requirements for both the project sponsor and the EPFI in Principle 10, and for projects in PS1. Principle 10 requires reporting of GHG emission levels and non-sensitive project-specific biodiversity data.

Figure 12. Step-by-step process for applying the IFC PS/EP



Source: Mott MacDonald

The EP and IFC PS use the same definitions to categorize projects based on the magnitude of potential environmental and social risks and impacts, including those related to human rights, climate change and biodiversity. Table 2 provides definitions of each category and how these can affect project resources.

Table 2. E&S categories and implications for use

Category	Definition	Implications
A	<p>Projects with potential significant adverse E&S risks and/or impacts that are diverse, irreversible or unprecedented.</p> <p>For example, if a project affects a new fish species for which there is little known information, or if it is a project new to a country (such as waste to energy), or impacts various indigenous peoples groups where ownership of the territory hosting the project is unclear, or is in or very close to a nationally or internationally designated biodiversity site.</p>	<p>Compared to category B projects, category A projects require:</p> <ul style="list-style-type: none"> More primary E&S data, detailed analysis, management and monitoring. Wider or specialized engagement. For example, if indigenous peoples are impacted there are specific circumstances of adverse impacts that require free, prior and informed consent Staff with more specialized experience and knowledge to adequately and robustly address the greater sensitivities
B	<p>Projects with potential limited adverse E&S risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.</p> <p>For example, these are projects where mitigation measures for the impacts are well-known, such as expending a highway from two to four lanes, supporting a run-of-river hydropower project, establishing a solar farm in an existing industrial park, running a water pipeline in an existing road reserve.</p>	<p>All of the above have cost implications which need to be anticipated in the project budget.</p> <p>Project sponsors may have concerns about identifying a project as category A, but most EPFI lenders have risk appetites for financing such initiatives, as long as they do not include activities on the IFC exclusion list. EPFIs want a relevant categorization to ensure appropriate resources are applied to address the E&S issues.</p>
C	<p>Projects with minimal or no adverse environmental and social risks and/or impacts.</p>	<p>For some category B and potentially category C projects, the EP recognize that a limited or focused ESIA may be appropriate, applying management standards to the impacts and risks identified. Several of the principles are only relevant to category A and B projects.</p>

Applying the standard or tool to the selected project(s)

Neither the EP nor the IFC PS were applied by lenders or the project sponsor to the Yatí-Bodega project. Colombia, where the project is located, is a non-designated country. Therefore, EPFIs would need to apply the IFC PS if their involvement was requested today.

The standards were likely not used because they were less widely applied and well-known in 2011 when the impact assessment was contracted, and because the *interventoria* was contracted to undertake monitoring. In Colombia, the *interventoria* is hired on behalf of the government to undertake an auditing role for public sector contracts. This role is not commonly applied in other countries. As well, between when the project was assessed and 2020, EPFIs working in Colombia are now using IESCs for monitoring in addition to the *interventoria*'s role. The latter is similar to an owner's engineer role compared to the former which is related to the lender's engineer role.

The impact assessment process, through the ESIA, helps project sponsors identify where to focus E&S attention and resources. Because projects have resource limitations, impacts that are identified as

negative and significant tend to receive the most staff attention, budget and monitoring. All the topics¹² covered in the IFC PS are expected to be assessed and addressed through an ESIA. In comparison with national environmental impact assessment (EIA) legislation, implementation of IFC PS requirements can be more costly.

Table 3 summarizes some of the differences between an EIA undertaken to national standards compared with an IFC PS/EP compliant ESIA. The emphasis on the impact assessment is important because many financial agreements with lenders are signed prior to construction. This means that there is an opportunity for lenders to influence how projects intend to deal with E&S risks and impacts through the ESIA process of management planning, prior to civil works commencing and in particular through the application of the mitigation hierarchy (see Figure 13).

Figure 13. Mitigation hierarchy



Source: Mott MacDonald

This hierarchy is essential for managing impacts and risks on the human context and biophysical environment: avoid and reduce impacts through design; minimize impacts at the source or receptor; repair, restore or reinstate to address temporary construction effects; and compensate for loss or damage.

Table 3. High level comparison of the case study project and an ESIA completed using the IFC PS/EP

Type of information	Yati -Bodega EIA	An EP and IFC PS oriented ESIA	Analysis of similarities and differences
Summary	Includes an executive summary – mainly a description of the baseline and short mention of impacts.	Requires a non-technical summary (NTS) to ensure that community members and other stakeholders not familiar with ESIA and the project/technical terminology understand the project activities, the impacts, the significance of the impacts and the main mitigation, enhancement and monitoring measures.	An NTS is generally more understandable to a community member than an executive summary. The IFC PS aims for a full range of stakeholders to understand the project and to comment on it.

¹² Sometimes a specific PS or requirement is 'scoped out' because of non-relevancy, however the ESIA (usually in the scoping report) is expected to evidence why.

Type of information	Yatí -Bodega EIA	An EP and IFC PS oriented ESIA	Analysis of similarities and differences
Introductory chapters	Includes an introduction and project description. Considers the “no project” scenario, but not in a standalone chapter ¹³ .	Typically includes chapters for introduction, project description, legal and policy framework and project justification with analysis of alternatives. The analysis of alternatives chapter requires review of the “no project” scenario, plus alternative projects with the same outcomes and alternative technologies.	Legal and policy framework chapters are evolving to also include institutional arrangements, so readers understand who has what responsibilities. The analysis of alternatives is more thorough using the IFC PS/EP compared to most national EIAs.
Stakeholder engagement	Includes characterization of the area of influence, demand use of natural resources and E&S impact evaluation.	Typically includes a standalone stakeholder engagement chapter, not only identifying how consultations and information disclosure were organized but also presenting stakeholders’ opinions about the study, key issues and ESIA results. The engagement chapter explains how consultation results contributed to and are reflected in, the final ESIA. Evidence of the stakeholder engagement activities are presented in an appendix.	The IFC PS recognize that community opposition can derail a project. Documentation helps understand efforts made, consultation results and evolution in stakeholders’ opinions about the project. Often a gap between a national EIA and an IFC PS1 compliant ESIA is the level and breadth of engagement.
Assessment chapters	Includes characterization of the area of influence, demand use of natural resources and E&S impact evaluation.	Two approaches are used: a) horizontally with all the E&S baseline (e.g. biodiversity, social, water, noise, etc.) in one chapter and other chapters for the E&S assessment and E&S mitigation (as per the Yatí-Bodega EIA), and b) vertical by E&S aspect, for instance a biodiversity chapter with baseline, impact and mitigation all together, and other chapters covering other E&S aspects using the same structure.	Some government authorities prefer the horizontal approach. Lenders typically prefer the vertical approach to have all the relevant information related to a specific E&S topic in one place. National EIAs that need upgrading because of gaps to meet the IFC PS often are heavy on the baseline with less attention to the significance of impacts and how to mitigate them. For example, there might be a long list of species observed on site, but no reflection on whether the area represents critical habitat and where biodiversity offsetting is needed.

¹³ Colombia has a regulatory process for the development of a detailed analysis of alternatives (DAA) if the regulatory agency determines the project case needs it. In order to do so, the developer has to submit an application in which the project is described, and the environmental authorities then determine in official communication to the developer whether the DAA is needed.

Type of information	Yatí -Bodega EIA	An EP and IFC PS oriented ESIA	Analysis of similarities and differences
Assessment methodologies	<p>A table identifies the component, element, impact and a description of the impact. For example, in the Yatí-Bodega EIA, under the biotic component, ecosystems is the element, and the impacts are identified as: affecting sensitive environmental areas, changes in vegetation coverage, habitat alteration, loss of animal species, displacement of terrestrial animal populations, loss of fauna species and increase of natural resource demand.</p> <p>A calculation is provided for each impact using numbers for criteria related to 10 aspects¹⁴.</p> <p>This EIA costs out the value of the impacts.</p>	<p>A main assessment methodology to determine significance involves characterizing the impact as negative or positive and concurrently using a matrix that combines magnitude and receptor sensitivity criteria.</p> <p>Most assessment approaches, be they qualitative like the former approach or quantitative like the one used in the Yatí-Bodega EIA, aim at identifying 'significant' impacts.</p> <p>An IFC PS compliant ESIA requires inclusion of budgets in management plans but leaves the financial appraisal to economists and financial specialists as part of a financial or technical due diligence.</p>	<p>Assessment methodologies need to allow understanding of significance for individual impacts (i.e. the risk of bird collision with loss of habitat in PS6) as well as how significance can be compared across various impacts dealing with different receptors. For example, the methodology should be able to show how the loss of endangered species (PS6) deemed significant is similarly important as the relocation of many households because of physical displacement (PS5). Using assessment methodologies that provide individual aspect knowledge while still being comparable with other E&S factors is essential.</p>
Management and monitoring measures	<p>The Yatí-Bodega EIA identifies 10 E&S management programs¹⁵: three programs covering 15 aspects related to the abiotic environment; five programs covering 11 aspects related to the biotic environment; and two programs with 10 aspects related to socio-economic context. For the 10 programs there are a total of 15 supporting supervision and monitoring programs.</p>	<p>ESIAs are expected to have management plans or procedures to address known impacts (such as habitat alteration and resettlement) as well as unforeseen impacts and effects (such as emergency preparedness and cultural heritage chance finds).</p>	<p>The IFC PS require a systems approach. An environmental and social management system (ESMS) is expected to include the following elements: policy, identification of risks and impacts, management programs, organizational capacity and competency, emergency preparedness and response, stakeholder engagement and monitoring and review.</p> <p>IFC PS/EP monitoring requirements, including methodologies, are typically more stringent than national requirements.</p>

Source: Mott MacDonald, based on the Yatí-Bodega EIA and experience of undertaking gap analysis between national impact assessments with the IFC PS/EP requirements

¹⁴ The project uses a calculation taking into account character (positive or negative), magnitude/intensity, spatial area, duration, persistence, reversibility, synergy manifestation, accumulation, effect (direct or indirect), frequency, and recoverability.

¹⁵ These plans include a description of objectives, goals, activities involved, type of mitigation measures to implement, impacts, areas where the mitigation measures are applied, benefitted population, description of the actions, participation mechanisms, staff needed, responsibility for implementation and follow up, budget, and key performance indicators (including frequency of monitoring, records, and indicators of compliance). The content is similar to what would be included for plans meeting GIIP.

The results

If the IFC PS/EP had been used, the Yatí-Bodega project would likely have been deemed a category A project because of its scale, which included the 2.3-km long Roncador Bridge. This categorization is based on the analysis of the aforementioned project information to carry out a high-level, subjective assessment of the Yatí-Bodega project employing the IFC PS/EP. This bridge was identified as being the longest in Colombia (making it unprecedented) and the fifth longest in Latin America. The potential impact on river habitat would also be an important consideration in categorization.

If the Yatí-Bodega EIA had been undertaken today using the IFC PS/EP standard, there would need to have been a scoping document, a review of human rights (with better coverage of labor management), a human resource policy, a stakeholder engagement plan, a resettlement action plan, a security management plan, a critical habitat assessment and an invasive species management plan, to name a few of the differences. These plans would include implementation and monitoring requirements and therefore affect E&S performance. The standard's more rigorous requirements in some areas, compared to the generally comprehensive Colombian legislations, could have resulted in additional benefits for stakeholders and the environment, although there would have been additional costs. More attention to mitigation for temporary relocation, economic displacement, livelihood restoration, attention to those displaced who do not have formal title, influx management, security planning, annual reporting, stakeholder database management and engagement log registering, gender, labor rights, human rights, ecosystem services and GHG measuring would have been required by applying the IFC PS.

Another difference between the national EIA and an IFC PS/EP compliant ESIA is that the Colombian environmental permit is based on management plans and procedures identified at the time of the impact assessment. For the Yatí-Bodega EIA, mitigation programs were developed and monitored, but it is not clear whether they were regularly reviewed and updated. In comparison, good international industry practice through the IFC PS/EP requires annual ESMS reviews and updating of management plans. The lack of updating can result in missing opportunities to address linkages among plans and continual improvement from lessons learned and project practicalities.

The Yatí -Bodega EIA identified various biodiversity features and related impacts but did not cover critical habitat in the same way as that required by PS6 with reference to natural, modified and critical habitat. The EIA did undertake a review of legally protected areas as required by PS6. The inventory of flora species references their use by local communities but does not reflect them as alien or non-native as would be required by PS6. Ecosystems as an element and impacts to "productive" activities like fishing are identified, although the terminology of ecosystem services and provisioning services is not used. The project EIA did not address all the climate change impacts and assessment considerations in the same way that an IFC-compliant ESIA could have. There is little online information about the project for the public to know its GHG emissions contribution.

From a physical climate risk perspective, the project is highly susceptible to climate variability and extreme weather events, in part due to the influence of the El Niño–Southern Oscillation (ENSO) in Colombia. Climate change threatens to heighten these risks with projected changes in temperature and precipitation. The result is variable precipitation patterns, and more extreme ENSO conditions, and thus more 'outlier' climate events. The uncertainty associated with future climate is compounded by

the fact that climate change is occurring on top of existing inter-annual variability in the climate caused by ENSO. The full range of uncertainty does not appear to have been captured adequately in the project EIA. Considering the project's long infrastructural lifespan of ~100 years, this can be seen as a gap and therefore a residual risk.

The case study and experience with the standard highlight the following key takeaways:

- Good international industry practice (GIIP) ESG performance requires a project lifecycle approach. A poor-quality ESIA is likely to result in poorer performance in terms of managing E&S impacts and risks. However, just because there is a good ESIA and management plans in place, these factors alone do not guarantee good implementation (or sufficient organizational capacity required for implementation). The standard supports lenders, borrowers/project sponsors, project contractors and service providers and E&S practitioners with clarity on processes and requirements that can be more comprehensive than those required in many countries' national legislation and regulations.
- The standard encourages a holistic approach to E&S impacts and risks management. The connection among the abiotic, biotic and human elements is recognized, with ecosystem services being a key example. Cross-cutting issues, including cumulative impacts, seem to receive more attention with the standard.

Key benefits and challenges

The assessment highlighted the following key benefits and challenges of using IFC PS/EP as a project screening tool for infrastructure investors.

Key benefits

- The IFC PS/EP have wide application and are a dominant E&S framework affecting project financing.
- They or their guidance are regularly updated to reflect changes and improvements in both lending and in project development practice.
- The IFC PS/EP identify the aspects and requirements that are generally considered "material" and when not met may be considered deal breakers for investors.
- The IFC PS/EP include both environmental and social aspects, leading to a more holistic approach of interactions between people and the natural environment. There is a reputational dividend associated with responsible projects that safeguard and benefit all parties in their execution, namely lenders, sponsors, the natural environment, employees and society.
- The dedicated PS6 for biodiversity is used as an international beacon for addressing biodiversity related issues, even on projects where EPFIs are not involved.
- The IFC PS/EP are leading to more uniform and robust E&S practice across a full range of infrastructure development activities. Because the IFC PS/EP are widely accepted and used, investors are able to compare a broader selection of similar projects and to understand the E&S implications in their decision-making.

Key challenges

- The IFC PS, which provide more implementation details than the EP, are focused on the start of the project lifecycle, namely preparation/development and construction, tailing off over operations and with less attention on decommissioning. This is in part because lenders have more concerns and more financial risk at the beginning of their financial agreement, which tails off as projects progress and repay loans.
- Even though the EP have been in existence since 2003 and their influence is widespread among investors and lenders, there continue to be many borrowers/project sponsors and their contractors or service providers, particularly national ones in non-designated countries, whose staff have none or little experience with them. As IFC PS/EP use expands and widens, investors and asset owners are placing more emphasis on providing training, guidance and awareness of how the requirements affect and support implementation.
- For project sponsors with international reach, there is often a need for corporate or additional support to ensure the on-site E&S teams' understanding of how to achieve compliance with the IFC PS/EP.
- In comparison to those who consider the standard similar to nationally-legislated activities, some sponsors can be intimidated by the unanticipated cost of 'extra' compliance, even though upfront investment in this can benefit projects in terms of reducing potential future costs related to treating non-compliances, or reputational risks/costs, or maintenance/replacement costs due to less resilient infrastructure choices.
- The IFC PS/EP (outside of IFC) are voluntary for lenders.
- There are cases where EPFIs may not comply with their own voluntary standards. There is also high variation in terms of how the IFC PS are applied by the 100+ EPFIs.





Effectiveness for investors






The results of the application of the IFC PS/EP were reviewed using the assessment framework set out in the report section 'Research methodology' and are provided in Table 4.

Table 4. Effectiveness of the IFC PS/EP for investors


		Result	Explanation
Did the tool generate investor-relevant ESG risk insights?			
<i>Reputational risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the reputation of the asset, its operators or investors, e.g. through negative environmental and social impacts of the asset’s construction and operation (e.g. pollution, child labor) or accidents related to construction or operation?	+	There is a reputational dividend to investors associated with the identification, assessment, management and monitoring of impacts and risks through application of the IFC PS/EP. For example, with projects that have resettlement, Indigenous Peoples or labor-related impacts that draw more attention from NGOs and stakeholders. EPFIs themselves are increasingly being held to account by project stakeholders. The application of the IFC PS/EP can help enhance the relationship between the project and stakeholders, which can influence a project’s reputation and assists addressing material issues.
<i>Regulatory/Legal risk</i>	Did the standard or tool generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards?	+	As illustrated in the Yatí-Bodega analysis in this chapter, additional risks could have been identified if the IFC PS/EP would have been applied since they require the project sponsor to apply a broader set of international conventions and other good international industry practices beyond national permitting requirements.
<i>Operational risk</i>	Did the standard or tool generate insights that could help investors understand the operational ESG risks of the asset, e.g. technology or process risks (e.g. resource efficiency) or staff-related risks (e.g. wage levels)?	+	The IFC PS/EP capture an array of ESG risks. The IFC PS are useful in understanding and managing E&S risks of assets. If applied at Yatí-Bodega, investors could have identified labor management as a potential risk using IFC PS2.
<i>Market risk</i>	Did the standard or tool generate insights that could help investors understand risks related to the market outside of the control of the organization, e.g. supply shortages for inputs or changing demand due to changes in consumer or societal preferences (e.g. public versus private transport or green versus fossil-based electricity)?	+	IFC PS1 requires the identification of environmental and social risks and impacts, including those outside the control of the organization, such as supply chains and climate change. The EP revised for use in October 2020 have placed more emphasis on assessing climate change risk, including identification of climate transition risks arising from the process of adjusting to a lower-carbon economy. These include: policy and legal risks, such as policy constraints on emissions, imposition of carbon tax and other applicable policies and shifts in demand and supply due to technology and market changes.




		Result	Explanation
<i>Physical/Climate risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the asset and threats to its financial performance and value from physical climate impacts such as rising sea levels, reduced water availability, etc.?	~	<p>The EP revised for use in October 2020 have placed more emphasis on climate change (Principles 1, 2 and 10). Climate change is also a cross cutting topic addressed across multiple IFC PS (PS1 and 3). The new EP provides an appendix about analysis of alternatives requiring the evaluation of technically and financially feasible and cost-effective options available to reduce project related GHG emissions during the design.</p> <p>Construction and operation of the Project. See also the row above about climate transition risk assessment. The bolstered climate focus in the EPs is new so the understanding for how it will be applied to financial performance is limited.</p>
<i>Social risk</i>	Did the standard or tool generate insights that could help investors understand the risk of disruption to the asset's construction or operation from social factors such as community opposition and protest, NGO action, climate-driven migration, etc.?	+	<p>Assessment and management of social risks is a key component of the EP (Principles 1-6, 10) and IFC PS (PS1, 2, 4, 5, 7 and 8), covering a range of factors such as stakeholder consultation and community relations, labor rights, community health and safety, land acquisition and resettlement, Indigenous Peoples and cultural heritage. The emphasis of IFC PS/EP is prevention. It remains for investors to decide on how to deal with unforeseen outcomes.</p>
Did the tool generate investor-relevant ESG opportunity insights?			
<i>Opportunity insights</i>	Did the standard or tool generate insights that could help investors understand the potential ESG opportunities of the project? (e.g. an opportunity such as community engagement, a sustainability certification or good health and safety standards, may generate better staff retention and hence, lower costs; a regulatory opportunity may arise when preferential tax schemes or government subsidies create incentives for investors to adopt new technologies, or to implement energy efficiency measures.)	~	<p>The IFC PS/EP capture an array of ESG compliance issues and opportunities. The due diligence process identifies gaps and opportunities to supplement the existing management measures, which are included in the ESAP and become part of the financial agreement. Costs implications of these mitigations measures, management plans and ESAP items are identified and make up the agreed financial common terms of agreements.</p>

		Result	Explanation
Did the tool enable assessment of a comprehensive set of ESG indicators?			
<i>Basic ESG indicators</i>	<p>Did the tool enable assessment of the minimum 12 ESG indicators identified in the WWF Guidance note on integrating ESG-factors into financial models for infrastructure investments?</p> <ul style="list-style-type: none"> ▪ Degradation & Pollution: air, water, GHGs, biodiversity and habitat, physical climate impacts; ▪ Resource efficiency: energy, water, waste, materials and supply chain; ▪ Labor: health & safety; ▪ Community & stakeholders: stakeholder engagement; and ▪ Governance: corruption, fraud and cyber security. 		The IFC PS/EP address ESG indicators 1-11 identified in the WWF Guidance note, but do not directly identify measures to assess cyber security (indicator 12).
<i>Broader ESG indicators</i>	<p>Did the tool enable assessment of a broader set of ESG indicators, e.g. those identified in the long list of the WWF Guidance note?</p>		The IFC PS/EP address some of the broader ESG factors in the WWF Guidance note, but do not directly identify measures to assess some of the Board and Operational issues under governance. The IFC PS/EP are more E&S than governance oriented.
Did the tool generate insights on the asset's societal impact and/or contribution to sustainable development?			
<i>Societal impact</i>	<p>Did the standard or tool generate insights that could help the investor understand the positive or negative impacts the asset has on society and/or its contribution to sustainable development?</p>		Assessment of positive and negative E&S impacts, including those that affect society, pillars for PS1 and EP2, and is embedded in other IFC PS. The IFC PS/EP are designed to guide projects and investors to consider sustainability in processes for managing and improving project performance.
Did the tool generate insights with potential for integration into financial analysis?			
<i>Financial integration</i>	<p>Did the standard or tool generate ESG insights that could be quantified and incorporated into financial analyses such as IRR or NPV using discounted cash flow models?</p>		Application of the EP/IFC does not attribute a cost value to impacts. Management plans do frequently indicate cost (either qualitatively or currency) for mitigation measures but this is not sufficient for a financial viability analysis.

		Result	Explanation
<p>Which investment strategies was the tool applicable for? Did the standard or tool generate insights that could support the following project screening/investment strategies?</p>			
<i>Negative/exclusionary screening</i>	Excluding assets that do not comply with specific, pre-set ESG criteria.		The IFC and many development banks with standards similar to those of the IFC PS have their own exclusion lists ¹⁶ that are considered in conjunction with the EP/IFC. Categorization requires confirming the project component activities are not on the exclusion list. The IFC PS/EP identify the aspects and requirements of a project that are generally considered “material” and when not met may be considered deal breakers for investors.
<i>Norms-based screening</i>	Assessing asset performance against global norms such as climate protection, human rights, working conditions and anti-corruption.		The IFC PS/EP reflect key management and monitoring considerations to be adopted by projects and their investors for climate protection, human rights, working conditions and anti-corruption. The IFC PS/EP include a number of international conventions and norms, for example those of the Intergovernmental Panel on Climate Change, United Nations, International Labor Organization and the Convention on Biological Diversity.
<i>Impact investing</i>	Investing into specific projects in order to generate a measurable, beneficial social or environmental impact alongside a financial return.		The IFC PS/EP inform investment decisions that could lead to selecting lower risk projects with fewer environmental and social impacts, or minimizing the impacts and maximizing the benefits. The standards however, do not encapsulate financial measurements rather the financial return analysis is undertaken through other processes.
<i>Positive/best-in-class screening</i>	Identifying projects that are considered high performers or best-in-class on specific ESG metrics.		Outcomes from applying the IFC PS/EP could be used to identify best in class projects.
<i>Sustainability-themed investing</i>	Selecting projects that help to address specific economic, social or environmental challenges such as the economic empowerment of under-privileged communities or reductions in carbon emissions.		Outcomes from applying the IFC PS/EP to projects could be used for this type of screening; for example, requirements under IFC PS1, 2, 4, 5 and 7 (related to disadvantaged or vulnerable groups, inclusion, gender) and IFC PS3 (related to reduction in project-related GHG emissions).

¹⁶ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/company-resources/ifcexclusionlist

	Result	Explanation
Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?		
<i>Reputation</i>	Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market? 	Contributing to achievement of the IFC PS/EP can yield a positive reputational outcome for projects and their investors. The influence of these standards continues to increase and has strengthened E&S practice and performance across projects where they are used.

Legend	
Score	Description
	High effectiveness The standard or tool generated insights that could be of significant relevance to investor needs.
	Moderate effectiveness The standard or tool generated insights that could be of some relevance to investor needs. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.
	Low effectiveness The standard or tool did not generate insights relevant to investor needs.






2. Envision

How to apply the standard or tool

Envision was developed with the specific intent of providing a systematic framework for assessing the sustainability of all infrastructure types across the project lifecycle. While it was developed, and has predominantly been applied, in North America, it is intended to be versatile and is increasingly seeing uptake in other regions of the world. The framework is subdivided into five categories with a total of 64 sustainability indicators called 'credits'. It is understood that some of these credits are not applicable to every project and those that are not relevant can be marked as not applicable and excluded from the total point count.

Credits are assessed against five levels of achievement: Improved, Enhanced, Superior, Conserving and Restorative, where Improved is slightly better than most North American regulatory requirements and Restorative means restoration of social, economic and environmental assets in a community. Sustainability ratings for infrastructure projects are established through a performance assessment that awards points for each credit based on level of achievement. The five categories, number of credits associated with these categories and available scoring points are summarized as follows:

Figure 14. Envision credits and assessment of biodiversity, ecosystem services and climate change

		Biodiversity	Ecosystem Services	Climate Change
	Quality of Life (14 Credits / Possible 200 Points)	2 related credits	3 related credits	3 related credits
	Leadership (12 Credits / Possible 182 Points)	-	2 related credits	1 related credit
	Resource Allocation (14 Credits / Possible 196 Points)	-	7 related credits	7 related credits
	Natural World (14 Credits / Possible 232 Points)	13 related credits	13 related credits	-
	Climate and Resilience (10 Credits / Possible 190 Points)	1 related credit	-	9 related credits

Source: Figure developed by KPMG (logos used are courtesy of sustainableinfrastructure.org)

As shown, many of Envision's credits measure factors related to biodiversity, ecosystem services and climate change impacts. Each credit has associated assessment criteria that determine the level of achievement and points earned per credit. Awards can be earned through a formal verification process at four levels depending on the percentage of applicable points earned: Verified (20-29%), Silver (30-39%), Gold (40-49%) and Platinum (50% or more).



Envision verification hinges on the depth and quality of documentation showing a project's sustainability achievements.

Using Envision to identify, assess and monitor project impacts

Envision was designed to be used throughout the project lifecycle, beginning at the planning stages and through design and construction. However, it is recommended that the framework be applied as early as possible (i.e. beginning in the planning stage) to receive maximum value. Envision verification hinges on the depth and quality of documentation showing a project's sustainability achievements. Early stage project planning benefits this data collection process, which if done retrospectively, can be increasingly onerous and impact a project's ability to claim Envision credits. Incorporating sustainability principles of efficiency, resourcefulness and multi-benefit use from the early planning stages can result in significant cost savings while improving sustainability outcomes.

Much of the philosophy behind Envision was developed to be open-source and available to professionals and project teams seeking to better understand sustainable infrastructure. As such, there is no one set methodology for applying the framework, but a typical approach, where Envision is applied early in project planning would likely reflect the following process:

- Engaging an Envision Sustainability Professional (**ENV SP**) to facilitate the application of Envision, ideally from project planning through to detailed design and construction.

- Completing the **Pre-assessment Checklist** against a proposed project to understand areas where the project is adequately addressing sustainability, and identifying any gaps.
- Identifying how project disciplines can apply sustainability, performance measurement and collaborative efforts to the project team in early stages of design, referencing the **Online Scoresheet** to complete a detailed assessment to better understand project performance and areas for improvement.
- Iteratively reviewing the **Online Scoresheet** with relevant disciplines and gathering documentation to support the desired level of achievement for each applicable credit.
- Registering the project with the Institute for Sustainable Infrastructure to begin the **Envision Verification** process.
- Completing **Envision Verification** and receiving an **Envision Award** at either 95% design completion or post construction.

The Envision Framework is a flexible process and it is ultimately up to the project team to determine how, and to what extent, the Envision framework will be applied. It has applicability across the entire project lifecycle, allowing project teams to identify, assess and monitor project impacts from project conception through to end-of-life across a broad spectrum of sustainability indicators.

Identifying Envision's impacts

Envision was developed in North America, and while regulations vary between jurisdictions, the infrastructure sector is broadly required to adhere to legal standards to limit environmental impacts¹⁷. In the United States, for example, the construction sector, which includes the construction of buildings and engineering projects such as highways or utility systems, must abide by a wide variety of legislation as outlined by the US Environmental Protection Agency and state and local regulations in relation to:

- General federal requirements;
- Toxic and hazardous materials;
- Project and site waste;
- Storm water management;
- Clean Water; and
- Air quality¹⁸.

Envision was developed with these regulations in mind. As mentioned above, the lowest Level of Achievement, or performance that earns points within the framework, is "Improved". This implies performance that is slightly better than (or improved above) most North American regulatory requirements. However, as regulations are not uniform across all jurisdictions, it is reasonable to assume that jurisdictions that have adopted more stringent sustainability practices would be more

¹⁷ While Envision is not exclusive to any one geography, most project awards have been granted to North American projects. See ISI's Project Awards Directory for reference <https://sustainableinfrastructure.org/project-awards/>.

¹⁸ United States Environmental Protection Agency 2020. Regulatory Information by Sector: Construction Sector (NAICS 23). Retrieved from: <https://www.epa.gov/regulatory-information-sector/construction-sector-naics-23>

aligned/better positioned to pursue Envision. If identified best practices are adopted by the jurisdiction then it is more likely that the documentation needed to achieve an award level would be within reach¹⁹. Depending on the local project context, local laws and regulations may result in projects earning points within the framework. For example, in Mott MacDonald's experience of applying Envision in the Canadian context, abiding by existing laws and regulations, as well as local policies and standards often results in aligning with a Verified or Silver award level, depending on the asset type. Where local sustainability policy is more advanced, projects are well-enabled to achieve within the Envision framework.

Another important factor to achievement within Envision is documentation. Performance must be clearly documented to demonstrate project achievement against the specific requirements outlined for each credit. It is possible to have a project with many sustainability and resilience attributes but if the project is not well-documented in line with Envision's stringent requirements, it will not perform well in verification. A similar project that is documented well, may well succeed in verification accordingly. While some projects have applied Envision retroactively and successfully earned Awards, the process can be more challenging and time-consuming than pursuing an Envision award earlier on in the planning and design phases²⁰.

Assessing Envision's impacts

Envision was developed to address a full spectrum of sustainability indicators, considering environmental, social and economic impacts of a project across its lifecycle. Envision applies a mitigation hierarchy to any potential project impact as follows:

- Avoidance: Measures taken to avoid creating impacts from the outset;
- Minimization: Measures taken to reduce the duration, intensity or extent of impacts that cannot be avoided;
- Abatement: Measures taken to rehabilitate degraded ecosystems; and
- Offsetting: Measures taken to compensate for any residual adverse impacts.

The highest positive impact in Envision is Restorative, where projects go beyond mitigation measures and restore the social, economic and environmental assets of the community. Further, impacts are measured across three dimensions: Sustainability achievement (incremental improvements in project sustainability), Project life cycle (complementary credits apply across the full project lifecycle and encourage teams to think about impacts beyond the project's end of useful life), and Stakeholder engagement (where an inclusive, representative group of stakeholders are engaged throughout the project).

Applying the standard or tool to the selected project

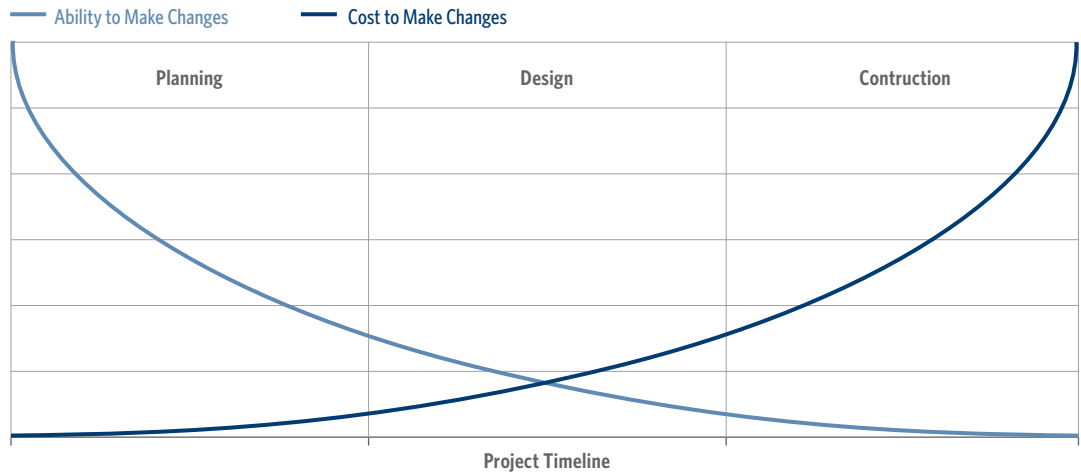
To complete the Envision assessment on the Carlsbad Desalination Plant (the Plant), an offline copy of the Online Scoresheet was created to track performance across credits. The Envision Guidance Manual was used to review project information against credit requirements. While detailed documentation

¹⁹ Electronic Communication with the Institute for Sustainable Infrastructure. 2020

²⁰ Electronic Communication with the Institute for Sustainable Infrastructure. June 2020

was not gathered in line with the formal requirements of Envision, notes were compiled about what relevant documentation would be included to justify the given level of achievement. As previously stated, there is no set methodology for applying Envision. As such, it is important to note that this retroactive application of Envision to the Plant was subjective and employed a relatively small pool of project documents and data based on availability.

Figure 15. Ability to influence sustainability and resilience on an infrastructure project through the project lifecycle



Source: Envision Guidance Manual

For the purposes of this exercise, credits pertaining to the construction phase of the project were excluded. This highlights a key challenge of a retrospective Envision assessment: it is far more difficult and time-consuming to collect detailed information and documentation about early project stages once a project is operational. Excluding credits related to the construction phase does not impact the ability to assess the suitability, benefits and challenges of applying Envision (the purpose of this exercise), but still allows for a fair and transparent assessment of the Plant.

While ISI does not collect and publish information about what stage of a project teams typically begin to apply the framework at, it was designed to have applicability as early as the planning stages of a project, and as highlighted in Figure 15, the planning stage is when project teams have the greatest ability to influence project sustainability. Further, by understanding and aligning with Envision’s stringent documentation requirements early on, the project team can ensure that adequate documentation is being prepared throughout the project, preventing documentation gaps²¹.

²¹ In a webinar presented by ISI in February 2020 titled “Applying Envision Retroactively - PANYNJ’s experience with the Bayonne Bridge Navigational Clearance Project” the presenters indicated the challenges they faced in compiling documentation after project completion, and indicated that they believed higher overall performance in the Envision framework would have been possible for the project with proactive documentation earlier in the project lifecycle (<https://sustainableinfrastructure.org/isi-launches-live-webinar-series/>)

It is important to note that, given Envision's applicability across all infrastructure types, there is some subjectivity in the interpretation of credits (i.e. documentation for any given credit will not be the same every time). It is up to the project team, in collaboration with an Envision Sustainability Professional and the ISI, to gather sufficient documentation to demonstrate performance. There is more than one way to succeed within the framework, but documentation is critical, again highlighting the increasing challenge of demonstrating a project's achievement over time. As noted in the Envision Guidance Manual, during a progressing project lifecycle, the ability to make changes declines, while the cost to make changes increases. While this retrospective assessment provides insight into the Plant's sustainability achievements, it also highlights the challenges of applying Envision late in a project's lifecycle.

The retroactive Envision assessment on the Plant was completed based primarily on desktop research and on data provided from Poseidon. Key resources included:

- Carlsbad Desalination Plant Environmental Impact Report – first issued in 2005 with Addendums in 2009 and 2012²²;
- Poseidon Resources Marine Life Mitigation Plan – issued in 2008²³;
- The Carlsbad Desalination Plant Website²⁴; and
- A request for information from Poseidon, the plant operator, received in April 2020.

In order to facilitate a more robust analysis, recent scientific studies and media articles were used to supplement the project assessment, particularly with respect to the operations phase.

The results

The detailed Envision assessment on the Plant is provided in Table 5. The Plant's achievement of Envision is described per the framework's five categories. Overall, the project earned approximately 25% of the applicable points, equating to a Verified award. Given that this is a retroactive assessment with some documentation gaps and that project design was undertaken more than 10 years ago, this is a positive outcome. Further, retroactive assessments are generally more difficult to employ than contemporary assessments because of the detailed documentation requirements. It is far easier for projects to comply with the requirements if compilation of key project records begins at the project development stage. This Verified classification demonstrates a sustainability achievement that exceeds the industry baseline and suggests that Envision is capturing many of the project's intentional sustainability pursuits.

Key achievements of the Plant captured by the Envision assessment include its commitment to eliminating the Plant's carbon footprint, the use of the state-of-the-art pressure exchanger devices to reduce energy consumption of the reverse osmosis process by nearly 46 percent, a robust community outreach program and increasing water security for the region by providing a drought-proof source of potable water.

²² Carlsbad Desalination Plant. Environmental Impact Report (2005). Retrieved from: <https://www.carlsbaddesal.com/eir.html>

²³ Poseidon Resources Marine Life Mitigation Plan (2008), Carlsbad Desalination Plant. Retrieved from: https://www.carlsbaddesal.com/uploads/1/0/0/4/100463770/marinelifemitigationplan_070308.pdf

²⁴ Carlsbad Desalination Plant (2020), Carlsbad Desalination Plant. Retrieved from: <https://www.carlsbaddesal.com>

It is worth noting that as part of the Plant's regional efforts, Poseidon continues to advance sustainability in two key ways that are not fully captured by the assessment. First is its support of the Otay River Estuary Restoration Project (ORERP), a partnership between the U.S. Fish and Wildlife Service (USFWS) and Poseidon to create, restore and enhance coastal wetlands to benefit native fish, wildlife and plant species and to provide habitats for migratory seabirds and shorebirds and salt marsh-dependent species within the South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge (San Diego Bay NWR). The ORERP proposes to restore approximately 125 acres of coastal wetlands and associated uplands at two locations on the San Diego Bay National Wildlife Refuge (San Diego County, California). While the habitat restoration is taking place offsite, it represents a significant contribution to regional sustainability. Second, the project is currently developing a Climate Change Action Plan, to be completed by July 2022. While this does not support achievement in this retroactive Envision assessment, it is important to recognize the continued efforts to improve the project's sustainability, and that such efforts may not always be captured within an Envision assessment.

Table 5. Detailed assessment of Envision

Category	Outcome
Quality of Life	The Plant has demonstrated alignment with local plans and policies, namely the San Diego County Water Authority (SDCWA) diversification strategy and meets a clear community need of providing a more stable, secure local supply of safe drinking water ^{25,26} . The project included a robust community outreach program which commenced early in the project’s lifecycle and meets or exceeds all local public health and safety requirements ²⁷ . Efforts to identify and mitigate potential impacts to the local community and environment are clearly documented ²⁸ .
Leadership	Performance in the Leadership category is primarily driven by early, recorded commitments to sustainability within the project team. While the project outcomes suggest a strong commitment to sustainability, the documentation requirements for this credit require specific, early written commitments that were not available for this assessment. The Plant’s achievement in this category was driven by the strong community outreach program ²⁹ , its critical contribution to a more stable, drought tolerant water supply ³⁰ and a significant contribution to the local economy in the form of jobs during construction and permanent positions, including career advancement training ^{31,32} .
Resource Allocation	Performance in the Resource Allocation category is driven by two key project components. First is the Plant’s pressure exchanger technology which reduces energy consumption of the reverse osmosis process by 46%. ³³ Second is the fact that the Plant plays a key role in the SDCWA’s diversification strategy and helps to reduce dependence on drought prone local aquifers, providing a benefit to the local water shed. The Plant’s performance in this category was challenged by the limited ability to reduce operational waste. Most of the waste produced by the project is brine and water treatment sludge that are not reused, making Envision’s requirements difficult to achieve.
Natural World	Performance in this category is driven by project siting, where most of the project is sited on previously developed land, except for some portions of the piping infrastructure ³⁴ . The Environmental Impact Report provides clear mitigation strategies for impacts to terrestrial habitats, and maintains floodplain function ^{35,36} . It is worth noting that the significant wetland restoration project being supported by the Plant is not captured within the Envision framework as the restoration work is located 50 miles from the Plant.
Climate and Resilience	The Plant’s Climate and Resilience performance is driven by its greenhouse gas emissions mitigation strategy – it will soon be California’s first major infrastructure project to voluntarily eliminate its carbon footprint ³⁷ . Additionally, as a core part of the SDCWA diversification strategy, the plant helps to increase resilience by improving system diversity ³⁸ . Development of a Climate Change Action Plan, to be completed by July 2022, is currently underway. This plan supports the intent of several other credits in this category, however, given it is not complete, it does not contribute points within the scope of this assessment ³⁹ .

25 San Diego County Water Authority 2020. Seawater Desalination: The Claude “Bud” Lewis Desalination Plant and Related Facilities. Retrieved from: <https://www.sdcwa.org/sites/default/files/desal-carlsbad-fs-single.pdf>

26 Southwest Strategies 2020. The Carlsbad Desalination Project: Cities of Carlsbad, Vista and San Marcos. Retrieved from: <http://swspr.com/casestudies/case-study-title-4/>

27 Poseidon Water 2020. Response to request for information. Email transmission.

28 Carlsbad Desalination Plant 2005. Carlsbad Desalination Plant Environmental Impact Report. Retrieved from: <https://www.carlsbaddesal.com/eir.html>

29 Southwest Strategies 2020. The Carlsbad Desalination Project: Cities of Carlsbad, Vista and San Marcos. Retrieved from: <http://swspr.com/casestudies/case-study-title-4/>

30 Wendy Ridderbusch 2020. Cal Matters: Why desalination can help quench California’s water needs. Retrieved from: <https://calmatters.org/commentary/desal/>

31 Poseidon Water 2020. Response to request for information. Email transmission

32 Poseidon Water 2020. Response to request for information. Email transmission

33 Carlsbad Desalination Plant 2020. Carlsbad Desalination Plant FAQs. Retrieved from: <https://www.carlsbaddesal.com/process-faqs.html>

34 Ibid.

35 Carlsbad Desalination Plant 2005. Carlsbad Desalination Plant Environmental Impact Report. Retrieved from: <https://www.carlsbaddesal.com/eir.html>

36 Ibid.

37 Carlsbad Desalination Plant 2020. Carlsbad Desalination Plant Environmental. Retrieved from: <https://www.carlsbaddesal.com/environmental.html>

38 San Diego County Water Authority 2020. Seawater Desalination: The Claude “Bud” Lewis Desalination Plant and Related Facilities. Retrieved from: <https://www.sdcwa.org/sites/default/files/desal-carlsbad-fs-single.pdf>

39 Ibid.

Key benefits and challenges

The assessment highlighted the following key benefits and challenges of using Envision as a project screening tool for infrastructure investors.

Key benefits

- A primary strength of Envision is its applicability to all infrastructure types and at all stages of a project.
- Projects across a wide spectrum of regulatory contexts have succeeded within the framework, although projects located in jurisdictions with strong sustainability policies are especially well set up for success with Envision.
- By providing a single coherent framework for considering sustainability for infrastructure projects, Envision can help to facilitate discussions around sustainability with a wide variety of project stakeholders.
- Applying Envision may also enable reflection on project processes. Project owners and developers that consistently use the Envision framework will have strong records and consistent metrics by which to measure a project's sustainability.







Key challenges

- Envision is a highly effective framework for assessing sustainability, however a project that does not carefully document how it is meeting the requirements may not be recognized fully for its achievements.
- As of September 2020, Envision remains a framework that is most commonly used in North America, with few project examples in other continents.







Effectiveness for investors




The results of the Envision assessment were reviewed using the framework set out in the report section 'Research methodology' and are provided in Table 6.

Table 6. Effectiveness of envision for investors

		Result	Explanation
Did the tool generate investor-relevant ESG risk insights?			
<i>Reputational risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the reputation of the asset, its operators or investors, e.g. through negative environmental and social impacts of the asset's construction and operation (e.g. pollution, child labor) or accidents related to construction or operation?		Envision includes credits that relate to community quality of life, construction health and safety and labor equity and therefore provides qualitative insights for investors related to reputational risk. Scoring in these areas would highlight the project's strengths or weaknesses in addressing these risks.
<i>Regulatory/ Legal risk</i>	Did the standard or tool generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards?		Envision does not generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards.
<i>Operational risk</i>	Did the standard or tool generate insights that could help investors understand the operational ESG risks of the asset, e.g. technology or process risks (e.g. resource efficiency) or staff-related risks (e.g. wage levels)?		Envision considers the project through its entire lifecycle to understand operational requirements through end-of-life for the asset. In the Carlsbad assessment, Envision generated insights that could help with understanding operational environmental and social risk, but limited conclusions could be drawn on governance.
<i>Market risk</i>	Did the standard or tool generate insights that could help investors understand risks related to the market outside of the control of the organization, e.g. supply shortages for inputs or changing affect demand due to changes in consumer or societal preferences (e.g. public versus private transport or green versus fossil-based electricity)?		Envision does not provide insights that could help investors understand risks related to the market environment.
<i>Physical/ Climate risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the asset and threats to its financial performance and value from physical climate impacts such as rising sea levels, reduced water availability, etc.?		Approximately 20% of Envision's available points are in the Climate and Resilience category, directly assessing climate impacts and risks to the project. Financial performance, however, is not considered in climate impacts.
<i>Social risk</i>	Did the standard or tool generate insights that could help investors understand the risk of disruption to the asset's construction or operation from social factors such as community opposition and protest, NGO action, climate-driven migration, etc.?		Envision places an emphasis on community engagement to ensure that the project aligns with community needs throughout the project lifecycle. Results can be used to identify risks and opportunities related to social impacts. However, depending on when in the project lifecycle Envision is applied, the insights generated may be of variable use to investors. Also, given that the assessment is a snapshot in time, there is no guarantee of future risk being captured.

		Result	Explanation
Did the tool generate investor-relevant ESG opportunity insights?			
<i>Opportunity insights</i>	Did the standard or tool generate insights that could help investors understand the potential ESG opportunities of the project? (e.g. an opportunity such as community engagement, a sustainability certification or good health and safety standards, may generate better staff retention and hence, lower costs; a regulatory opportunity may arise when preferential tax schemes or government subsidies create incentives for investors to adopt new technologies, or to implement energy efficiency measures.)	~	Envision directly provides a formal verification that outlines a project's successes with respect to sustainability. Further, the process of pursuing an Envision award identifies ESG opportunities (and challenges) that can be shaped by project developers throughout the project lifecycle. However, these opportunities are not translated into how they impact the financial performance of a project.
Did the tool enable assessment of a comprehensive set of ESG indicators?			
<i>Basic ESG indicators</i>	Did the tool enable assessment of the minimum 12 ESG indicators identified in the WWF Guidance note on integrating ESG-factors into financial models for infrastructure investments? <ul style="list-style-type: none"> ▪ Degradation & Pollution: air, water, GHGs, biodiversity and habitat, physical climate impacts; ▪ Resource efficiency: energy, water, waste, materials and supply chain; ▪ Labor: health & safety; ▪ Community & stakeholders: stakeholder engagement; and ▪ Governance: corruption, fraud and cyber security. 	~	Envision addresses most of these ESG indicators but does not provide significant insights into governance factors.
<i>Broader ESG indicators</i>	Did the tool enable assessment of a broader set of ESG indicators, e.g. those identified in the long list of the WWF Guidance note?	+	Envision addresses a broad range of ESG indicators captured under the framework's five categories: Quality of Life, Leadership, Resource Allocation, Natural World and Climate and Resilience.
Did the tool generate insights on the asset's societal impact and/or contribution to sustainable development?			
<i>Societal impact</i>	Did the standard or tool generate insights that could help the investor understand the positive or negative impacts the asset has on society and/or its contribution to sustainable development?	+	Envision considers a wide spectrum of social sustainability indicators and emphasizes the need for projects to align with community desires and values.
Did the tool generate insights with potential for integration into financial analysis?			
<i>Financial integration</i>	Did the standard or tool generate ESG insights that could be quantified and incorporated into financial analyses such as IRR or NPV using discounted cash flow models?	-	Envision does not generate insights that could be quantified into financial analysis.

		Result	Explanation
<p>Which investment strategies was the tool applicable for? Did the standard or tool generate insights that could support the following project screening/investment strategies?</p>			
<i>Negative/exclusionary screening</i>	Excluding assets that do not comply with specific, pre-set ESG criteria.		Envision does not exclude assets that do not comply with specific, pre-set ESG criteria.
<i>Norms-based screening</i>	Assessing asset performance against global norms such as climate protection, human rights, working conditions and anti-corruption.		Envision was developed to align with the UN SDGs and includes credits that consider social justice, economic effectiveness, stakeholder engagement, reducing carbon emissions and training and job creation.
<i>Impact investing</i>	Investing into specific projects in order to generate a measurable, beneficial social or environmental impact alongside a financial return.		While Envision measures a wide array of social and environmental impacts, it does not measure financial returns.
<i>Positive/best-in-class screening</i>	Identifying projects that are considered high performers or best-in-class on specific ESG metrics.		Due to the type of outcomes from applying Envision (through awards), projects can be screened for best-in-class.
<i>Sustainability-themed investing</i>	Selecting projects that help to address specific economic, social or environmental challenges such as the economic empowerment of under-privileged communities or reductions in carbon emissions.		While not designed to specifically address investment strategies, Envision provides a flexible system of criteria and performance objectives to aid project decision makers in identifying sustainable approaches during planning, design and construction that will continue throughout the project's operations and maintenance and end-of-life phases.
<p>Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?</p>			
<i>Reputation</i>	Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?		Contributing to achievement of Applying Envision can yield a positive reputational outcome for projects and their investors.

Legend	
Score	Description
	<p>High effectiveness The standard or tool generated insights that could be of significant relevance to investor needs.</p>
	<p>Moderate effectiveness The standard or tool generated insights that could be of some relevance to the investor need. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.</p>
	<p>Low effectiveness The standard or tool did not generate insights relevant to investor needs.</p>

3. United Nations Sustainable Development Goals

How to apply the standard or tool

Progress toward the goals is monitored by the UN Department of Economic and Social Affairs Division for SDGs. There is no set methodology in place to support the application of the SDGs to assess sustainability at the scale of a single infrastructure project – this was not the original intent of the SDGs. There is however an established and growing recognition of the crucial role that infrastructure plays in achieving the SDGs⁴⁰.

In the absence of an existing framework, the subsequent section outlines a methodology for assessing the Plant against the SDGs.

Applying the standard or tool to the selected project(s)

To use the SDGs as a tool to assess the Plant, it was first necessary to develop a tailored methodology. Notably, this represents a single approach to completing a project assessment and alternative methodologies may be considered depending on an assessment team's goals or preferences.

The process included the following key steps:

- **Review the goals:** Conducted a high-level review of the SDGs to determine which goals were relevant to the project. Project specific data was not factored at this stage.
- **Select targets and indicators:** Within selected goals, reviewed individual targets and indicators that could feasibly be impacted by the project. Again, project specific data was not considered at this stage.
- **Refine targets and indicators:** For selected indicators, project specific data was researched and identified. At this stage, some indicators and targets were eliminated due to lack of project information. In other instances, indicators were translated to reflect the project context. Indicator 5.5.1 is one such example: the indicator states proportion of seats held by women in national parliaments and local governments. The researchers used management information posted on the Plant's website to determine gender representation for its senior leadership team.

Figure 16: Methodology to apply the SDGs



Source: Mott MacDonald

⁴⁰ The Economist Intelligence Unit. The critical role of infrastructure for the Sustainable Development goals 2019. Retrieved from: <https://unops.economist.com/wp-content/uploads/2019/01/ThecriticalroleofinfrastructurefortheSustainableDevelopmentGoals.pdf>

- **Assess Carlsbad Desalination Plant:** Using the selected indicators (see Table 7) and identified project information, the assessment was carried out to answer 4 key questions:
 - Is biodiversity addressed?
 - Is climate change addressed?
 - Are ecosystem services addressed?
 - Based on the indicator, does the project have positive, negative or no impacts?

Table 7: SDGs relevant to biodiversity, ecosystem services and climate change

Biodiversity	Ecosystem services	Climate Change
2 - Zero Hunger	1 - No Poverty	1 - No Poverty
6 - Clean Water and Sanitation	2 - Zero Hunger	2 - Zero Hunger
14 - Life Below Water	3 - Good Health and Wellbeing	6 - Clean Water and Sanitation
15 - Life on Land	6 - Clean Water and Sanitation	7 - Affordable and Clean Energy
	11 - Sustainable Cities and Communities	9 - Industry, Innovation and Infrastructure
	12 - Responsible Consumption and Production	11 - Sustainable Cities and Communities
	13 - Climate Action	12 - Responsible Consumption and Production
	14 - Life Below Water	13 - Climate Action
	15 - Life on Land	15 - Life on Land

Source: Mott MacDonald

While attempts were made to use as much quantitative data as possible, the resulting assessment relied heavily on qualitative information.

Following the process of selecting goals that were applicable to the Plant, a review of relevant project information was completed to assess whether the project had a positive, neutral or negative impact. In total, impact ratings were developed for 10 relevant SDGs. While the Plant had mostly positive impacts based on the goals assessed, it is difficult to draw granular conclusions due to the subjective nature of the assessment.

The results

Ten of the SDGs were found to apply to the project and 22 indicators associated with those 10 goals were assessed to determine performance of the Plant. It is important to note that the SDGs that a particular project contributes to are primarily defined by the asset type. Therefore, the number of applicable SDGs should not be construed as an indicator of a project's sustainability.

While biodiversity, ecosystem services and climate change are not the sole focus of the SDGs, they are considered across a variety of goals that were relevant to the Plant. Out of the 17 SDGs, 12 were found to have the potential to impact either biodiversity, ecosystem services or climate change as further discussed in this section. Of the 12 SDGs that were identified, 7 were relevant to the Plant and

were included in this assessment. Therefore while many of the SDGs relate to biodiversity, ecosystem services and climate change, this does not necessarily mean that they are effective for assessing these topics for a specific project.

The SDG assessment on the Plant was completed based primarily on desktop research and on data provided from Poseidon Water. For a list of key resources please refer to the previous Envision section.

Table 8. Detailed assessment

Goal	Outcome
1. End all poverty in all its forms everywhere	The Plant provides 10% of the fresh water used by 3.1 million people in San Diego County, providing a stable, drought tolerant supply. ^{41,42} It is the only local water source and the only source not dependent on snowpack or rainfall. ⁴³ This project information reflected a positive impact for SDG 1.
5. Gender equality	Impacts were designated as positive because Poseidon's management team demonstrates gender balance, supporting the achievement of SDG 5. ⁴⁴
6. Clean water and sanitation	The Plant's ability to increase water security for the region resulted in positive project impacts. Further, one study suggested that due to the increasing cost of water, the agriculture industry is finding innovative ways to improve water efficiency. ⁴⁵ Each of these factors supports the achievement of SDG 6. However, water from the Plant is more costly than water from other sources, presenting a challenge to affordable and equitable access. ⁴⁶ The water quality aspects of this Goal required consideration of the Plant's brine discharge, which was useful in highlighting how this risk is monitored by local authorities and mitigated by the Plant.
8. Decent work and economic growth	In fact, the Plant had a strong positive impact on local jobs, contributing 2,400 skilled jobs during the construction period and approximately 40 permanent positions. ⁴⁷
9. Industry, innovation and infrastructure	The Plant's energy efficiency programs offsets 100% of indirect GHG emissions (from purchasing electricity) through energy recovery systems and recycled CO ₂ in its treatment process, as well as reforestation and carbon offset purchases. ⁴⁸ This highlights a positive project impact. However, the higher cost of water produced by the Plant resulted in a less favorable project impact for one target in SDG 9 ⁴⁹ .
11. Sustainable cities and communities	The impact for this goal was deemed positive as the Plant is the first local, drought tolerant water supply in San Diego county - its importance is noted in the San Diego County Climate Change, Vulnerability, Resilience and Adaptation Plan. ⁵⁰

41 Jim Robbins (2019). As water scarcity increases, desalination plants are on the rise. YaleEnvironment360. Retrieved from: <https://e360.yale.edu/features/as-water-scarcity-increases-desalination-plants-are-on-the-rise>

42 Ibid.

43 Wendy Ridderbusch (2020). Why desalination can help quench California's water needs. Cal Matters. Retrieved from: <https://calmatters.org/commentary/desal/>

44 Carlsbad Desalination Plant (2020). Carlsbad Desalination Plant: Who we are. Retrieved from: <https://www.carlsbaddesal.com/who-we-are.html>

45 Petersen, K. L., Nadine Heck, Borja G. Reguero, Donald Potts, Armen Hovagimian, Adina Paytan (2019). Biological and Physical Effects of Brine Discharge from the Carlsbad Desalination Plant and Implications for Future Desalination Plant Constructions. Water. Retrieved from: <https://www.mdpi.com/2073-4441/11/2/208>

46 San Diego County Water Authority (2019). Report on Claude "Bud" Lewis Carlsbad Desalination Plant Operations for Fiscal Year 2019 (Presentation). Retrieved from: https://www.sdcwa.org/sites/default/files/2016-12/Board/2019_Agendas/2019_09_26FormalBoardPacketSEC_0.pdf#page=41

47 Poseidon Water (2020). Request for Information. Email Transmission.

48 Carlsbad Desalination Plant (2020). Carlsbad Desalination Plant: Environmental. Retrieved from: <https://www.carlsbaddesal.com/environmental.html>

49 San Diego County Water Authority (2019). Report on Claude "Bud" Lewis Carlsbad Desalination Plant Operations for Fiscal Year 2019 (Presentation). Retrieved from: https://www.sdcwa.org/sites/default/files/2016-12/Board/2019_Agendas/2019_09_26FormalBoardPacketSEC_0.pdf#page=41

50 San Diego County Water Authority (2020). Seawater Desalination: The Claude "Bud" Lewis Desalination Plant and Related Facilities. Retrieved from: <https://www.sdcwa.org/sites/default/files/desal-carlsbad-fs-single.pdf>

Goal	Outcome
12. Responsible Consumption and production	It is assumed that the project abided by the County of San Diego's "Environmentally Preferable Procurement" Policy, thus contributing to the achievement of SDG 12 and reflecting a positive impact. ⁵¹
13. Climate action	The Plant reflects a positive impact on the achievement of SDG 13 in two key ways. First, the plant is the first local, drought tolerant water supply in San Diego county – its importance is noted in the San Diego County Climate Change, Vulnerability, Resilience and Adaptation Plan. ⁵² Second, the plant offsets 100% of indirect GHG emissions (from purchasing electricity) through energy recovery systems and recycled CO ₂ in its treatment process, as well as reforestation and carbon offset purchases. ⁵³
14. Life below water	Poseidon is committed to ongoing preservation and protection activities in the Agua Hedionda Lagoon and has partnered with the US Fish and Wildlife Service on the Otay River Estuary Restoration Project. While brine discharged from the Plant has occasionally resulted in offshore salinity levels in excess of permitted levels, research suggests that there have been no direct local impacts on sea life. Based on this goal, the Plant resulted in a range of positive and negative impacts.
15. Life on land	Poseidon is committed to ongoing preservation and protection activities in the Agua Hedionda Lagoon and has partnered with the US Fish and Wildlife Service on the Otay River Estuary Restoration Project, with positive implications for biodiversity, supporting the achievement of SDG 15. ^{54,55}

Had the SDGs been applied to the project's planning and design phases there would have been more opportunities to influence positive outcomes aligned with the SDGs. Furthermore, more SDG specific metrics could have been identified and tracked at early project stages, which proves to be a much easier exercise than collating information once the project is operational.

Further, the type of available project information is a key enabling factor in the ability to assess a project. The SDG indicators are highly specific and do not always represent typically documented project information. Although maintaining as much consistency as possible with the UN defined targets and indicators is valuable from a uniformity perspective, the indicators do not always represent typically documented information. As a result, there are instances where indicators must be tailored or created to meet the target and goal objectives. For example, SDG 2 – Zero hunger has an indicator that measures the proportion of agricultural area under productive and sustainable agriculture. While the Plant provides a more sustainable source of water in an area with a large agriculture industry, it is exceedingly challenging to measure the specific impact of the Plant on this indicator and therefore it was excluded from the assessment.

51 County of San Diego (ND). County of San Diego, California, Board of Supervisors Policy: Environmentally Preferable Procurement. Retrieved from: <https://www.sandiegocounty.gov/cob/docs/policy/B-67.pdf>

52 San Diego County Water Authority (2020). Seawater Desalination: The Claude "Bud" Lewis Desalination Plant and Related Facilities. Retrieved from: <https://www.sdcwa.org/sites/default/files/desal-carlsbad-fs-single.pdf>

53 Carlsbad Desalination Plant (2020). Carlsbad Desalination Plant: Environmental. Retrieved from: <https://www.carlsbaddesal.com/environmental.html>

54 Carlsbad Desalination Plant (2020). Carlsbad Desalination Plant: Environmental. Retrieved from: <https://www.carlsbaddesal.com/environmental.html>

55 San Diego County Water Authority (2019). Report on Claude "Bud" Lewis Carlsbad Desalination Plant Operations for Fiscal Year 2019 (Presentation). Retrieved from: https://www.sdcwa.org/sites/default/files/2016-12/Board/2019_Agendas/2019_09_26FormalBoardPacketSEC_0.pdf#page=41

Key benefits and challenges

The research and assessment highlighted the following key benefits and challenges of using the SDGs as a project screening tool for infrastructure investors.

Key benefits

- The SDGs provide a leading and widely accepted framework for measuring progress toward sustainability, and while no set methodology exists for applying the SDGs to infrastructure assets, investors and developers are increasingly exploring how to incorporate them into their decision-making processes.
- The goals acknowledge and integrate with other global sustainability commitments.
- The global nature of the goals allows national plans to be developed and compared to one another, which in turn creates opportunities for alignment on sustainability across multi-national infrastructure initiatives.
- A key benefit of the SDGs is the broad-spectrum view of sustainability they provide, capturing a wide breadth of infrastructure development's potential impacts.
- When applied or factored in upstream planning efforts, the SDGs may help decision makers to consider a full suite of potential impacts a project may have, including unintended consequences.


Key challenges

- The SDGs were developed to track global progress toward sustainable development at a high level. They were not developed specifically to measure impacts of infrastructure at a project level. As a result, targets and indicators may have to be tailored to meet a project-specific context.
- While there is industry interest in applying the SDGs to infrastructure, there is no single consistent methodology to do so.
- Timing of an SDG assessment during a project lifecycle correlates with the detail and quality of the assessment outputs.
- Some SDGs indicators are not applicable to infrastructure of any type.






Effectiveness for investors




The results of the application of the SDGs were reviewed using the assessment framework set out in the report section 'Research methodology' and are provided in Table 9.

Table 9. Effectiveness of the SDGs for investors

		Result	Explanation
Did the tool generate investor-relevant ESG risk insights?			
<i>Reputational risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the reputation of the asset, its operators or investors, e.g. through negative environmental and social impacts of the asset's construction and operation (e.g. pollution, child labor) or accidents related to construction or operation?		By highlighting the projects' contribution to a selection of SDGs, the outcomes drew attention to potential areas of reputational risk. The SDGs' wide acceptance as a global sustainability norm make conclusions from their application to projects relevant to reputational risk.
<i>Regulatory/legal risk</i>	Did the standard or tool generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards?		The SDGs do not draw conclusions related to future regulation.
<i>Operational risk</i>	Did the standard or tool generate insights that could help investors understand the operational ESG risks of the asset, e.g. technology or process risks (e.g. resource efficiency) or staff-related risks (e.g. wage levels)?		The SDGs capture a wide array of ESG risks. However, translating the goals, including their targets and indicators, to an asset specific context can be challenging. The SDGs are useful in understanding (at a qualitative level) operational ESG risks of assets when targets and indicators can be translated to a project context, such as job creation and employment equality and inclusion.
<i>Market risk</i>	Did the standard or tool generate insights that could help investors understand risks related to the market outside of the control of the organization, e.g. supply shortages for inputs or changing affect demand due to changes in consumer or societal preferences (e.g. public versus private transport or green versus fossil-based electricity)?		The SDGs do not clearly generate market risk insights.
<i>Physical/Climate risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the asset and threats to its financial performance and value from physical climate impacts such as rising sea levels, reduced water availability, etc.?		Various targets and indicators under SDGs 1, 2, 6, 7, 9, 11, 12, 13 and 15 capture impacts related to climate change. These impacts span both adaptation and mitigation; however, they do not directly translate into financial performance or asset valuation.
<i>Social risk</i>	Did the standard or tool generate insights that could help investors understand the risk of disruption to the asset's construction or operation from social factors such as community opposition and protest, NGO action, climate-driven migration, etc.?		While less financial in nature, several SDGs provide insights on social impact such as migration and community wellbeing.

		Result	Explanation
Did the tool generate investor-relevant ESG opportunity insights?			
<i>Opportunity insights</i>	Did the standard or tool generate insights that could help investors understand the potential ESG opportunities of the project? (e.g. an opportunity such as community engagement, a sustainability certification or good health and safety standards, may generate better staff retention and hence, lower costs; a regulatory opportunity may arise when preferential tax schemes or government subsidies create incentives for investors to adopt new technologies, or to implement energy efficiency measures.)	~	The SDGs are broad in nature and therefore capture a wide array of ESG risks and opportunities. Only after translating targets and indicators to a project context, and when opportunities to capture such data are identified early on in development, does the ability for a project to contribute to the SDGs greatly improve.
Did the tool enable assessment of a comprehensive set of ESG indicators?			
<i>Basic ESG indicators</i>	Did the tool enable assessment of the minimum 12 ESG indicators identified in the WWF Guidance note on integrating ESG-factors into financial models for infrastructure investments? <ul style="list-style-type: none"> ▪ Degradation & Pollution: air, water, GHGs, biodiversity and habitat, physical climate impacts; ▪ Resource efficiency: energy, water, waste, materials and supply chain; ▪ Labor: health & safety; ▪ Community & stakeholders: stakeholder engagement; and ▪ Governance: corruption, fraud and cyber security 	~	The SDGs address ESG indicators 1-11, but do not identify measures to assess cyber security.
<i>Broader ESG indicators</i>	Did the tool enable assessment of a broader set of ESG indicators, e.g. those identified in the long list of the WWF Guidance note?	+	The 17 SDGs cover a wide range of broader ESG indicators identified in the WWF Guidance note.
Did the tool generate insights on the asset's societal impact and/or contribution to sustainable development?			
<i>Societal impact</i>	Did the standard or tool generate insights that could help the investor understand the positive or negative impacts the asset has on society and/or its contribution to sustainable development?	~	Societal impacts are an important part of the SDGs that are captured by several goals and targets. In the Plant project example, the Plant's contribution to regional water security resulted in a positive societal impact. However, these results were more qualitative than quantitative.
Did the tool generate insights with potential for integration into financial analysis?			
<i>Financial integration</i>	Did the standard or tool generate ESG insights that could be quantified and incorporated into financial analyses such as IRR or NPV using discounted cash flow models?	-	Outcomes from applying the SDGs are not well suited to financial integration.

		Result	Explanation
<p>Which investment strategies was the tool applicable for? Did the standard or tool generate insights that could support the following project screening/investment strategies?</p>			
<i>Negative/exclusionary screening</i>	Excluding assets that do not comply with specific, pre-set ESG criteria.		The tool or standard did not generate investor relevant insights.
<i>Norms-based screening</i>	Assessing asset performance against global norms such as climate protection, human rights, working conditions and anti-corruption.		The SDGs reflect key benchmarks for global aspirations in climate protection, human rights, working conditions and anti-corruption.
<i>Impact investing</i>	Investing into specific projects in order to generate a measurable, beneficial social or environmental impact alongside a financial return.		While the SDGs include a wide array of social and environmental impacts, they were qualitative in the assessment
<i>Positive/best-in-class screening</i>	Identifying projects that are considered high performers or best-in-class on specific ESG metrics.		Outcomes from applying the SDGs to projects could be used for this type of screening, however this would require a tailored methodology.
<i>Sustainability-themed investing</i>	Selecting projects that help to address specific economic, social or environmental challenges such as the economic empowerment of under-privileged communities or reductions in carbon emissions.		The insights generated by applying the SDGs to a project can be used to assess whether the asset helps to address a wide variety of sustainability-themed challenges.
<p>Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?</p>			
<i>Reputation</i>	Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?		Contributing to achievement of the SDGs could yield a positive reputational outcome for projects and its investors.

Legend	
Score	Description
	<p>High effectiveness The standard or tool generated insights that could be of significant relevance to investor needs.</p>
	<p>Moderate effectiveness The standard or tool generated insights that could be of some relevance to the investor need. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.</p>
	<p>Low effectiveness The standard or tool did not generate insights relevant to investor needs.</p>

4. Impact Measurement & Valuation

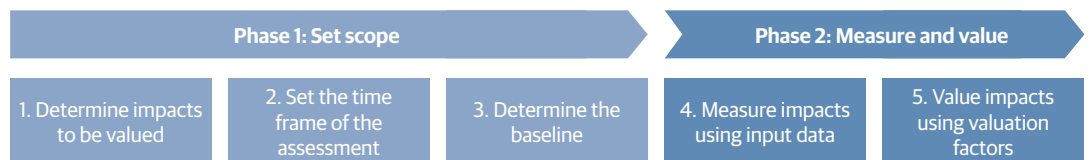
How to apply the standard or tool

A typical IMV assessment begins with setting the scope of the valuation. This includes selecting the economic, environmental and social impacts to be valued, deciding the time period over which the impacts will be valued and establishing a baseline against which the impacts can be measured (for example, comparing the impacts of a wind farm with those of a natural gas power plant).

In the second phase, relevant input data is collected such as tons of carbon emitted over the assessment period, cubic meters of water used or the amount spent on wages and benefits for construction workers. Financial valuation factors are then applied to provide a monetized value for each impact. This can be a positive or negative value depending on whether the impact is a benefit or a cost to society. For example, the Social Cost of Carbon (SCC) is a commonly used valuation factor to apply a financial value to the societal cost of carbon emissions. It estimates, in dollars, the cost of the economic, environmental and social damage caused by the climate change resulting from the emission of a single additional ton of GHGs into the earth's atmosphere.

Once financial values have been calculated for all the impacts in scope, a discount rate is applied to reflect a present value.

Figure 17. Typical process for application of IMV



Source: KPMG

Applying the standard or tool to the selected project(s)

1. Impacts to be valued: A long list of economic, environmental and social impacts that might be valued for each asset was drawn up through desktop research and a review of available data. A materiality review was then conducted to identify the impacts likely to have relevant value for the purposes of this illustrative assessment. Eight impacts were selected to be valued for each asset. Seven of these were common to both assets, enabling comparison of value and scale between them. The selected impacts are shown in Table 10 below.

2. Timeframe of the assessment: IMV was applied to the construction and operational phases of each asset's lifecycle in order to assess the potential of IMV as a project screening and selection tool for investors. An operational period of 30 years was assumed for both projects to enable comparison of the projects over the same timeframe.

3. Baseline of the assessment: The impact valuations for both assets used a baseline of the existing pre-asset scenario - i.e. the impacts if the asset had not been built.

4 & 5. *Measurement and valuation*: Project impacts were measured according to input data provided by the project owners and valued by applying appropriate valuation factors drawn from a variety of sources including government agencies, academic institutions and other organizations. Table 10 shows the valuation factors used with their sources in footnotes. The assessment discounted all impacts using a social discount rate of 3.5%, which is typically used by governments for discounting societal impacts. Future costs were inflated based on an expected yearly inflation rate of 3%.

Table 10. Overview of impacts assessed and valuation factors used

Impact type	Impact	Carlsbad Desalination Plant	Yatí-Bodega road interconnection	Valuation factor
Economic	GDP benefits (construction only)	✓	✓	\$ contributed to national economies through spending on local suppliers
Economic	National and local taxes	✓	✓	\$ tax contribution made to national and local governments
Economic	Jobs created	✓	✓	\$ spent on wages
Social	Health and safety incidents	✓	✓	For both assets, a value was calculated for worker health and safety incidents based on an established severity level ⁵⁶ . For Yatí-Bodega, an additional value was calculated to account for the reduction in road accidents resulting from the project ⁵⁷
Social	Time saved for road users (Yatí-Bodega only)	Not applicable	✓	Value of time (\$) in Colombia ⁵⁸
Environmental	Avoided water use (Carlsbad Desalination only)	✓	Not applicable	Societal costs (\$) of water ⁵⁹
Environmental	GHGs embedded in construction materials and emitted during construction and operations	✓	✓	Social cost (\$) of carbon ⁶⁰
Environmental	Waste (operations only)	✓	✓	Social cost (\$) of waste ⁶¹
Environmental	Impact on biodiversity/ marine life	✓	✓	Benefits (\$) of ecosystem services ⁶²

56 Safe Work Australia (2015). The cost of work-related injury and illness for Australian employers, workers and the community: 2012-2013. Costs were converted based on GDP/PPP to the United States and Colombia.

57 Road safety annual report 2019 - Colombia, International transport forum/OECD

58 El valor social del tiempo en Colombia, Documento 499, Dirección de Estudios Económicos, 01 de agosto de 2019

59 TruCost (2013). Natural Capital at Risk: The Top 100 externalities of business

60 Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, August 2016

61 Rabl, J. V. Spadaro and A. Zoughaib (2008) Environmental Impacts and Costs of Solid Waste: A Comparison of Landfill and Incineration.

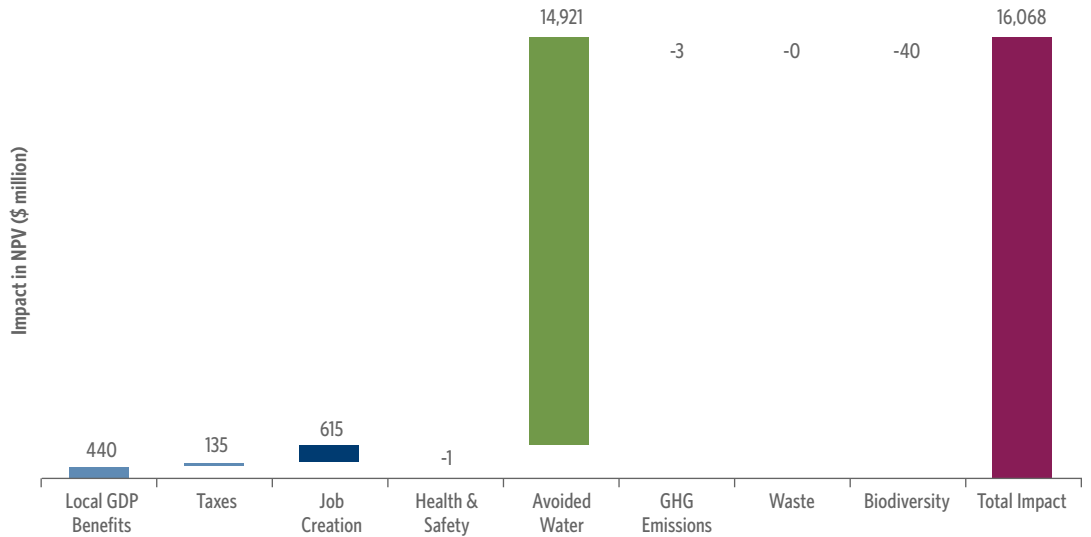
62 The economics of ecosystems & biodiversity. Climate issues update. September 2009

The results

For the purpose of this assessment, results of the IMV were visualized using the waterfall chart format which is commonly used and understood in investment and corporate finance.

Carlsbad Desalination Plant, USA

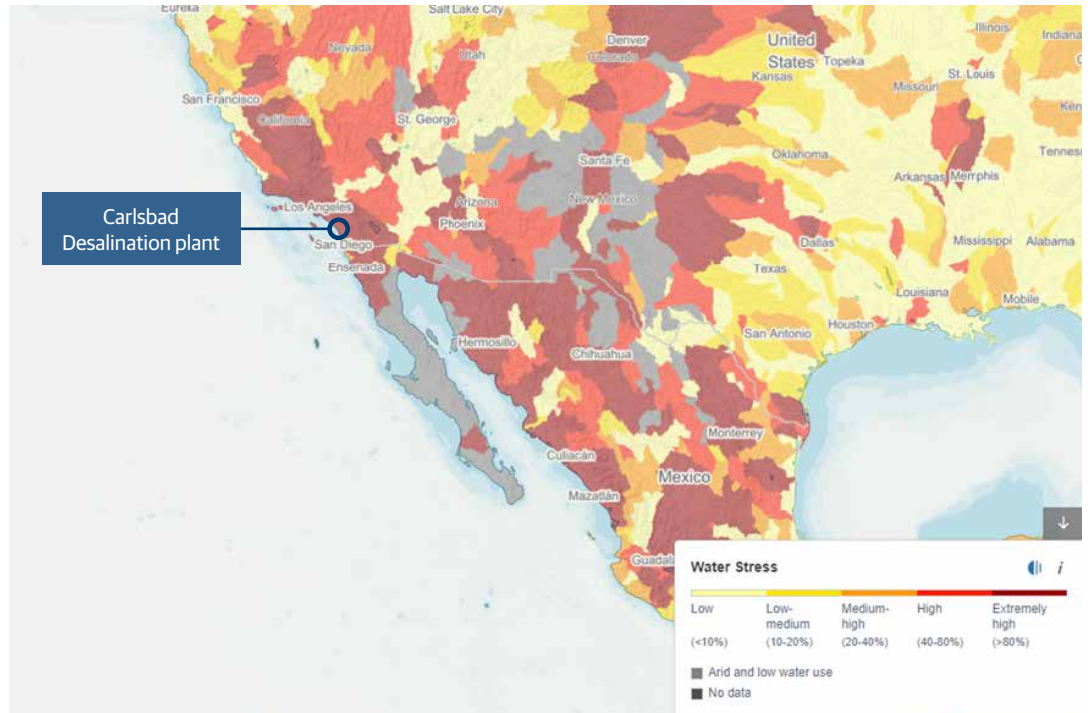
Figure 18. IMV results of the Carlsbad Desalination Plant



Source: KPMG analysis based on publicly available information and information received from the Carlsbad Desalination Plant

As visualized in Figure 18, the IMV results suggest that the Carlsbad Desalination Plant creates a monetized positive NPV to society in excess of US\$16 billion over the 30-year operational term. Over 90% of this value is contributed by the avoidance of water extraction from natural resources such as rivers and aquifers. The high financial value applied to the positive impact of avoided water extraction reflects high water scarcity in the area served by the plant (see Figure 19). The impact was calculated by taking the yearly water production volume and valuing this using a social cost of water price from TruCost, based on the water scarcity level provided by the Aqueduct Risk Atlas. These annual costs were then inflated and discounted for the 30-year period.

Figure 19. Baseline water stress level in southern California



Source: Aqueduct Risk Atlas

This assessment may be useful for investors by clearly illustrating the significant positive societal impact the project has by addressing an urgent local water scarcity problem. In comparison, the scale of the plant’s other economic, social and environmental impacts – both positive and negative – is minimal.

Investors might also consider that investing in this project may reduce the risk of other investments in the same area that depend on the availability of fresh water, for instance in agriculture, energy or concrete.

It is notable that the monetized impact of GHG emissions is low. This is because emissions from the plant’s operations are net zero since the plant purchases renewable energy and offsets other emissions⁶³. The analysis does include the negative impact of GHG emissions embedded in materials used to construct the plant, such as concrete and steel, which have been estimated at a negative monetized NPV of US\$3 million.

The most significant negative impact of the project is its impact on biodiversity, which was calculated at a negative NPV of US\$40 million. This was based on environmental impact data for discharge into the nearby lagoon⁶⁴ and valued using TEEB: The Economics of Ecosystems and Biodiversity⁶⁵ data

63 <https://www.carlsbaddesal.com/uploads/1/0/0/4/100463770/energy-minimization-and-ghg-reduction-plan-052308.pdf>

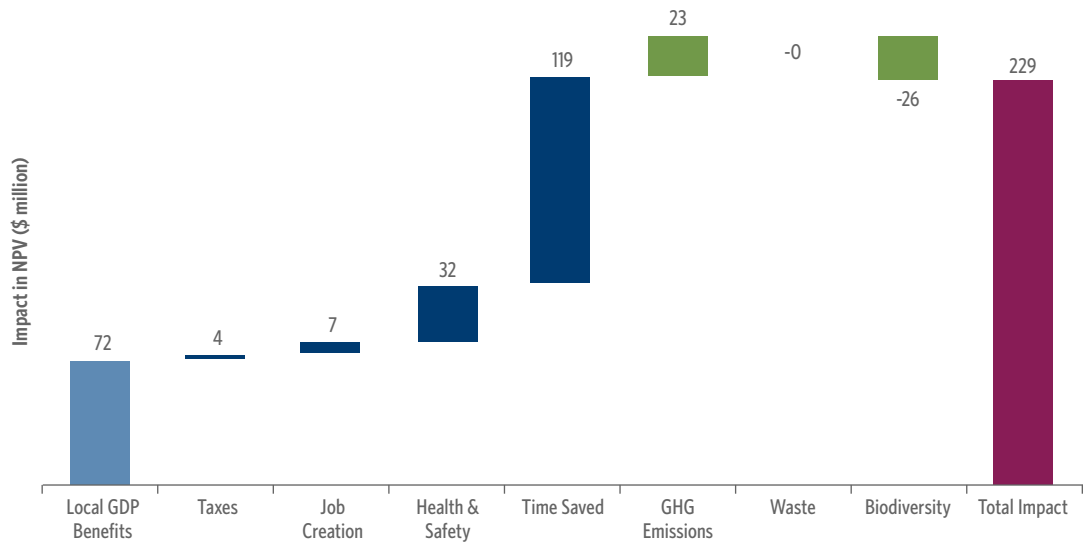
64 <https://www.carlsbaddesal.com/uploads/1/0/0/4/100463770/graham.pdf>, https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/docs/appendices/Appendix_VV.pdf

65 The economics of ecosystems & biodiversity. Climate issues update. September 2009

for coastal areas. The analysis does not include the positive impact of a wetland restoration plan⁶⁶ implemented to compensate for biodiversity loss from construction as it can be argued that habitat loss in one location cannot be offset by habitat restoration in a different location.

Yatí-Bodega Road Connection, Colombia

Figure 20. IMV results of the Yatí-Bodega Road Connection



Source: KPMG analysis based on public available information and information received from the Adaptation Fund (Colombia)

As visualized in Figure 20, IMV suggests that the road connection creates a monetized positive NPV to society of US\$229 million over a 30-year operational timeframe. Around half of this positive societal contribution is accounted for by the time saved by users of the connection. The assessment found that the new road would save around four million hours of travel time per year; a local valuation factor of \$1.05 per person hour was used to quantify this time saving in monetary terms with the figure being inflated for the full 30-year timeframe and then discounted to an NPV.⁶⁷

After the time saved, the most significant positive impact of the project was the generation of GDP through supplier spend (NPV US\$72 million). Economic benefits account for over one third of the project's total value to society when income taxes and worker wages are considered.

A further important positive impact of the project is the reduction of car accidents due to reduced travel time and improved quality of road surface. This reduction in accidents was valued at NPV US \$32 million.

⁶⁶ Actions from Poseidon's wetland restoration plan (https://www.carlsbaddesal.com/uploads/1/0/0/4/100463770/marinelifemitigationplan_070308.pdf) were not included in this analysis. If these were included, the negative impacts linked to biodiversity and ecosystems will be less significant than currently visualized

⁶⁷ El valor social del tiempo en Colombia, Documento 499, Dirección de Estudios Económicos, 01 de agosto de 2019

The assessment identified two significant environmental impacts. The first was a positive impact in the form of reduced GHG emissions due to the reduced travel time and distance. This impact was given a positive NPV of US\$23 million over the 30-year operation of the asset based on GHG emission factors, the expected number of vehicles per year and average fuel consumption per vehicle type. The assessment identified an overall reduction in fuel consumption leading to a reduction of almost 6.5 kilotons of CO₂ emissions per year.

The second significant environmental impact identified was a negative one in the form of the loss of over 48 hectares of forest habitat due to construction of the interconnection. The negative NPV valuation of US\$26 million used valuation factors from a study by TEEB: The Economics of Ecosystems and Biodiversity⁶⁸.

It should be noted that this impact valuation was performed for illustrative purposes only to assess the potential usefulness of the approach as a project selection tool for infrastructure investors. It therefore included only a selection of impacts and some had to be omitted from the analysis due to challenges including a lack of easily accessible data. Further positive impacts that might be included in a more comprehensive impact valuation of the project could include:

- Growth of the local economy, wealth and wellbeing in the community as a result of increased mobility, commercial activity and employment opportunities, including:
 - Improved access to educational, medical and commercial facilities for the local population; and
 - Reduced costs to local farmers of transporting produce to market and reduced food waste.
- Improved community resilience and access in case of flooding and other climate impacts.

Key benefits and challenges

The assessment highlighted the following key benefits and challenges of using IMV as a project screening tool for infrastructure investors.

Key benefits

- IMV is a flexible assessment method that can be applied to a wide range of infrastructure asset classes in any geography.
- It can provide investors with a holistic overview of a project's economic, environmental and social impacts that can be expressed in a single visualization, providing clear and easy to understand information. The results can be used by investors to allocate capital to projects on the basis of value created for society.
- By using a single monetary metric, IMV can provide investors with a sense of the scale of different impacts. Comparison of scale between impacts is difficult when using multiple metrics.

⁶⁸ The economics of ecosystems & biodiversity. Climate issues update. September 2009

- By categorizing the impact as economic, social or environmental and indicating which impacts are positive or negative, IMV can provide investors with insights into the fit between the project and their investment strategies or beliefs.
- IMV can enhance investors' discussions with asset developers and operators about sustainability performance and how the asset's impacts on society could be improved.
- IMV can be used by investors to screen a complete portfolio based on the same metric and optimize this portfolio based on the value the assets create.

Key challenges

- As with the other standards and tools assessed in this research, quality ESG data is not always easily accessible from infrastructure assets.
- Some societal impacts can be challenging to monetize. For example, in the case of the Yati-Bodega connection, this includes the increase in societal wellbeing in local communities due to the project.
- Valuation factors are largely not yet standardized (although initiatives are underway to address this⁶⁹). It is therefore important to select valuation factors carefully to ensure credibility and an acceptable level of detail and quality in the assessment.
- Selection of the appropriate impacts for valuation of each project requires specialist sustainability/ ESG subject matter knowledge that investors may not have in-house; impact valuations may therefore have to be outsourced.
- Putting a financial value on aspects like human health or nature can raise moral and ethical dilemmas and may be seen as controversial to some stakeholders, even though the approach has long been used by governments and certain industry sectors such as insurance companies.
- When using a common financial metric, the value of some impacts may appear low relative to others. This can mask their real importance. For example, a project's negative impacts on a local community may appear minimal in monetary terms when compared with its positive impacts, but could still result in reputational damage to the project and its investors or trigger community action that could affect the project's construction or operations.





Effectiveness for investors

The results of the IMV assessment were reviewed using the assessment framework set out in the report section 'Research methodology' and are provided in Table 11.



⁶⁹ <https://www.value-balancing.com/> & <https://impactmanagementproject.com/>




Table 11. Effectiveness of IMV for investors

		Result	Explanation
Did the tool generate investor-relevant ESG risk insights?			
<i>Reputational risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the reputation of the asset its operators or investors, e.g. through negative environmental and social impacts of the asset's construction and operation (e.g. pollution, child labor) or accidents related to construction or operation?	~	By highlighting the projects' negative economic, social and environmental impacts and providing a sense of their relative scale, IMV drew attention to potential areas of reputational risk for investors in a qualitative way.
<i>Regulatory/legal risk</i>	Did the standard or tool generate insights that could help investors understand the risk of non-compliance with existing and/or future ESG laws, regulations and standards?	~	IMV did not directly provide data on the risk of regulatory non-compliance. However, by highlighting significant negative impacts that future regulation may seek to mitigate, it did provide information that could help to identify potential future regulatory risks. As with reputational risk, these risks were identified qualitatively but not quantified.
<i>Operational risk</i>	Did the standard or tool generate insights that could help investors understand the operational ESG risks of the asset, e.g. technology or process risks (e.g. resource efficiency) or staff-related risks (e.g. wage levels)?	-	The tool or standard did not generate investor relevant insights.
<i>Market risk</i>	Did the standard or tool generate insights that could help investors understand risks related to the market outside of the control of the organization, e.g. supply shortages for inputs or changing demand due to changes in consumer or societal preferences (e.g. public versus private transport or green versus fossil-based electricity)?	-	The tool or standard did not generate investor relevant insights.
<i>Physical/Climate risk</i>	Did the standard or tool generate insights that could help investors understand the risk of damage to the asset and threats to its financial performance and value from physical climate impacts such as rising sea levels, reduced water availability, etc.?	~	The tool provided some qualitative insights into how one of the assets (the Yatí-Bodega interconnection) helped to mitigate effects of climate change on the local community.
<i>Social risk</i>	Did the standard or tool generate insights that could help investors understand the risk of disruption to the asset's construction or operation from social factors such as community opposition and protest, NGO action, climate-driven migration, etc.?	-	The tool or standard did not generate detailed investor relevant insights.

		Result	Explanation
Did the tool generate investor-relevant ESG opportunity insights?			
<i>Opportunity data</i>	Did the standard or tool generate insights that could help investors understand the potential ESG opportunities of the project? (E.g. an opportunity such as community engagement, a sustainability certification or good health and safety standards, may generate better staff retention and hence, lower costs; a regulatory opportunity may arise when preferential tax schemes or government subsidies create incentives for investors to adopt new technologies, or to implement energy efficiency measures.)		The tool or standard did not generate investor relevant insights.
Did the tool enable assessment of a comprehensive set of ESG indicators?			
<i>Basic ESG indicators</i>	Did the tool enable assessment of the minimum 12 ESG indicators identified in the WWF Guidance note on integrating ESG-factors into financial models for infrastructure investments? Degradation & Pollution: air, water, GHGs, biodiversity and habitat, physical climate impacts; Resource efficiency: energy, water, waste, materials and supply chain; Labor: health & safety; Community & stakeholders: stakeholder engagement; and Governance: corruption, fraud and cyber security		The application of IMV does allow for the potential valuation of these 12 ESG indicators. However, not all 12 were valued in the assessment of the two case study projects since not all of them were material to the analysis and not all of the required data was available for the projects.
<i>Broader ESG indicators</i>	Did the tool enable assessment of a broader set of ESG indicators, e.g. those identified in the long list of the WWF Guidance note?		IMV enables the assessment of a broad range of ESG indicators. For example, in the assessments carried out for this report, travel time saved was valued for the review of the Yatí-Bodega interconnection.
Did the tool generate insights on the asset's societal impact and/or contribution to sustainable development?			
<i>Societal impact</i>	Did the standard or tool generate insights that could help the investor understand the positive or negative impacts the asset has on society and/or its contribution to sustainable development?		The assessment showed this to be a significant benefit of using IMV as a project screening tool. IMV provided a holistic view of the projects' positive and negative societal impacts across the economic, social and environmental spheres. The results could be linked with the SDGs to provide investors with a view on the how the projects contribute to sustainable development.

		Result	Explanation
Did the tool generate insights with potential for integration into financial analysis?			
<i>Financial integration</i>	Did the standard or tool generate ESG insights that could be quantified and incorporated into financial analyses such as IRR or net present value NPV using discounted cash flow models?	~	While the results of IMV are expressed as net present values, they indicate societal (external) costs and benefits. The data is therefore not consistent with integration into investors' financial models, however it can be useful for investors as a starting point toward integration.
Which investment strategies was the tool applicable for? Did the standard or tool generate insights that could support the following project screening/investment strategies?			
<i>Negative/exclusionary screening</i>	Excluding assets that do not comply with specific, pre-set ESG criteria.	~	Although IMV can be used to screen a project on certain pre-set ESG criteria, such as 'low carbon emissions', other methodologies are more suited to this objective.
<i>Norms-based screening</i>	Assessing asset performance against global norms such as climate protection, human rights, working conditions and anti-corruption.	~	Insights generated through IMV can be used to assess an asset's performance against global norms to some extent, although this is an indirect result of applying the tool.
<i>Impact investing</i>	Investing into specific projects in order to generate a measurable, beneficial social or environmental impact alongside a financial return.	+	The assessment suggests that IMV has significant potential to support impact investors. By providing a quantitative, comparable and holistic view of an investment's economic, social and environmental impacts, IMV can help investors compare and select investments based on their societal impact.
<i>Positive/best-in-class screening</i>	Identifying projects that are considered high performers or best-in-class on specific ESG metrics.	+	IMV could be applied to enhance the positive impacts of an investment portfolio on society and reduce negative impacts. It could be used to identify best-in-class investments by comparing them based on the value they create or reduce for society.

		Result	Explanation
<i>Sustainability-themed investing</i>	Selecting projects that help to address specific economic, social or environmental challenges such as the economic empowerment of under-privileged communities or reductions in carbon emissions.		The insights generated can be used to assess whether the asset helps to address specific challenges. For example, the IMV analysis for the Carlsbad Desalination Plant clearly illustrated the value the plant created by addressing water scarcity in California.
Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?			
<i>Reputation</i>	Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?		IMV assessments could help investors demonstrate that they have selected projects based on value for society with an aim of maximizing positive impacts of their investment decisions and minimizing negative impacts. Undertaking this type of assessment could help investors enhance their reputation in the sustainable investment market.

Legend	
Score	Description
	High effectiveness The standard or tool generated insights that could be of significant relevance to investor needs.
	Moderate effectiveness The standard or tool generated insights that could be of some relevance to the investor need. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.
	Low effectiveness The standard or tool did not generate insights relevant to investor needs.

Conclusions and Recommendations

The research has highlighted the availability of a wide range of sustainability standards and tools that can provide insights and alternative lenses by which to assess infrastructure assets. However, the applicability of the tools to investors varied, and to a large extent their value for informing investment decisions is dependent on the specific needs of the individual investor in terms of purpose, ambition and investment belief or strategy. For example, the IFC PS/EP provide a primarily compliance-driven lens which can help investors understand whether projects are compliant with local regulations or specified norms. Other standards and tools can provide more detailed and nuanced insights to further inform investor consideration and decisions. For example, in this research the application of IMV showed that even though a project was compliant with regulations, it still had a significant negative impact on biodiversity. Conversely, a project that is found to deliver significant positive impacts when IMV analysis is applied may still fail to comply with certain IFC PS/EP requirements .

The key finding of this research therefore is that no single standard or tool was found to satisfy all of the sustainability assessment needs of infrastructure investors . As such, investors are likely to find that a combination of different standards and tools are necessary to provide the breadth of perspective and full range of insights they seek. A hybrid approach could create efficiencies in the process and provide focus on the risks and impacts of importance to individual investors. Each of the tested standards has its own specific strengths and weaknesses as summarized below. There were certain rather crucial aspects in which none of the four standards and tools tested were found to be particularly strong - for example, the financial quantification of physical risk from climate change.

IFC Performance Standards and Equator Principles

The IFC PS and EP are, at their core, a risk management tool that can provide investors with a thorough understanding of the environmental and social risks related to projects they are considering for investment (see Table 12 below). Applying the IFC PS and EP to the case study infrastructure assets included in this research highlighted a further key benefit to investors, namely that IFC PS/EP compliant environmental and social impact assessments may 1) be more comprehensive than those required by local regulations and 2) be more effective than local regulations in ensuring an acceptable level of environmental and social performance over the operational life of the asset.

The IFC PS/ EP hold a critical advantage as an ESG assessment tool for infrastructure investors in that having been launched more than 15 years prior to this research, they are relatively mature when compared with many of the other ESG standards and tools on the market. They have been supported by respected organizations including the IFC and World Bank and are now widely known and used internationally by hundreds of lenders and investors in infrastructure project financing. They have achieved a critical mass of recognition and credibility that may be helpful to investors seeking to use established assessment methods with the potential to protect or even enhance their reputation in the ESG investment market. On the other hand, fully understanding and interpreting the IFC PS/EP requires some technical expertise and professional environmental and social subject matter knowledge that some investors may not have in-house.

Since non-compliance with the IFC PS/EP is increasingly being viewed as a deal-breaker for many project financiers, it could be argued that any infrastructure investor active in the ESG market should require compliance with the IFC PS/EP as a basic requirement for any project to be considered for investment.

Despite the relative maturity of the IFC PS/EP as a project assessment framework, challenges remain. Many infrastructure project developers lack experience with them (especially in developing countries), on-the-ground understanding of the need for compliance can be low and there can be variations in how well they are applied. Wider adoption of IFC PS/EP objectives and requirements by infrastructure investors worldwide as a pre-requisite for investment, and more active investor support to help project sponsors, developers and operators implement the IFC PS/EP effectively, could go a long way to addressing these challenges and making the IFC PS/EP even more effective. However, some more ambitious investors may wish to go beyond the compliance-focused and do-no-harm orientation.

Envision

Envision assesses a robust set of sustainability indicators, and the minimum threshold for a project to earn a formal award is indicative of sustainability performance above the industry standard. If comparing projects that have received an Envision award, the framework could help investors to assess and compare the overall sustainability performance of different infrastructure projects or alternative designs as part of the project screening process. Perhaps its greatest potential is to support exclusionary or best-in-class investment strategies, allowing investors to identify projects that meet a target award threshold, while excluding those that do not (see Table 12 below). Envision offers advantages for investors in that it is a consistent assessment framework that generates simple, easily understood project ratings that can be factored into the project screening process without the need for deep technical environmental or social knowledge in-house. It can also be applied to any infrastructure class.

Applying Envision to the case study projects included as part of this research illustrated how the framework can be used to form a holistic view of the asset's sustainability performance and to capture key sustainability achievements for investor consideration. However, it also revealed gaps and showed that Envision does not necessarily fully capture all aspects of a project's sustainability performance. The project boundary and available documentation of sustainability achievements will influence achievement within the framework.

While Envision was created to be geography agnostic, the framework has been most widely applied to North American infrastructure assets. Efforts are currently underway to spread its influence globally and drive wider implementation.

UN Sustainable Development Goals

The UN SDGs and their underlying targets were intended as goals for national governments to develop their countries sustainably, not to provide investor-relevant data for infrastructure project

screening. No single, universally accepted methodology exists to apply the SDGs in an investment context. Nevertheless, this research has shown that, with some flexibility and creativity, it is possible to develop an infrastructure assessment methodology based on the SDG framework. It also showed that the insights generated by such a methodology could give an indication of a project's contribution to sustainable development and could support a range of investment strategies (see Table 12 below). This is important given the high profile and acceptance of the SDGs as the leading global sustainable development framework and the increasing inclination of investors to channel capital to projects that support the goals.

However, it should be noted that the insights generated by this research were largely subjective and qualitative whereas the other tools and standards were more successful in providing objective and quantitative insights of various kinds. The potential of the SDGs as a sustainability assessment framework for infrastructure may therefore be strongest when used as a thematic overlay for other standards or tools, or as a compass to guide investors to assets with the potential to make significant contributions to the SDGs.

Impact Measurement and Valuation (IMV)




This research showed that IMV can provide investors with a holistic, quantified view of the ESG impacts of potential infrastructure investments that can be directly compared with each other because of the use of a single monetary metric. As such, the research suggests that IMV may have potential to support impact investing strategies (see Table 12 below). IMV has the advantage of being based on a credible, long-established impact assessment approach commonly used by the public sector (i.e. cost benefit analysis) and is being further developed by dedicated organizations (such as the Value Balancing Alliance⁷⁰) to drive convergence and consistency across sectors in terms of how impacts are valued in monetary terms. This trend may serve to further enhance the attractiveness of IMV as an impact investing tool as the impact investing industry matures and grows toward a trillion dollar market (currently \$715 billion according to the Global Impact Investing Network⁷¹).

⁷⁰ <https://www.value-balancing.com/>

⁷¹ <https://thegiin.org/research/publication/impinv-survey-2020>

Table 12. Summary of the effectiveness of the outcomes for investors of the four tools and standards

Insights assessed	Type of insights	IFC PS/EP	Envision	SDGs	Impact measurement & valuation
Did the tool generate ESG risk insights?	Reputational risk	+	+	+	~
	Regulatory/legal risk	+	-	-	~
	Operational risk	+	~	~	-
	Market risk	+	-	-	-
	Physical/Climate risk	~	~	~	~
	Social risk	+	~	~	-
Did the tool generate ESG opportunity insights?	Opportunity insights	~	~	~	-
Did the tool enable assessment of a comprehensive set of ESG indicators?	Basic ESG indicators	~	~	~	~
	Broader ESG indicators	~	+	+	+
Did the tool generate insights on the asset's societal impact and/or contribution to sustainable development?	Societal impact	+	+	~	+
Did the tool generate insights with potential for integration into financial analysis?	Financial integration	-	-	-	~
Which investment strategies was the tool applicable for? Did the standard or tool generate insights that could support the following project screening/investment strategies?	Negative/exclusionary screening	+	-	-	~
	Norms-based screening	~	~	+	~
	Impact investing	~	~	~	+
	Positive/best-in-class screening	+	+	~	+
	Sustainability-themed investing	~	+	~	+
Did the standard or tool generate credible and robust insights that might enable the investor to protect or enhance their own reputation in the sustainable investment market?	Reputation enhancement	+	+	+	+

Legend	
	High effectiveness The standard or tool generated insights that could be of significant relevance to the investor need
	Moderate effectiveness The standard or tool generated insights that could be of some relevance to the investor need. However, its effectiveness was limited by factors such as lack of quantitative insights, indirect rather than direct relevance or limited application to a broad range of ESG indicators.
	Low effectiveness The standard or tool did not generate insights relevant to the investor need

Key Insights

Investors need to be clear about their own requirements in choosing sustainability assessment standards and tools

Each of the standards tested in this research provided a useful lens on the sustainability performance of infrastructure assets and each has its own strengths and weaknesses. A key recommendation from this research is that investors, in order to identify the right standards and tools for their needs, need utmost clarity over their requirements – for example, they need to carefully consider their ambition levels and investment approaches. The framework of investor needs developed for this research may provide a useful starting point for investors to review and articulate their needs (see the “Research methodology” section of this report).

Current standards and tools have gaps in relation to “black swan” events

None of the standards and tools tested in this research explicitly take emerging risks such as COVID-19 into account even though these can have significant impacts on infrastructure investments. Investors should therefore be aware that there may be gaps in current versions of these and other standards and tools in terms of assessing the adaptability and resilience of asset in unexpected circumstances. Equally, the investor community should not exclude the fact that tools and standards evolve, and that future versions could very well include further risk considerations to encompass scenarios such as pandemics.

Early application of ESG assessment standards and tools in project screening and design is important to optimal sustainability outcomes

Many of the assessments in this report pointed to the importance of early adoption and application of ESG standards and tools in the investment and even project development cycle for facilitating more sustainable project outcomes. Embedding sustainability at the project onset helps to identify and track necessary data throughout project development and operation and identifies more opportunities to avoid, mitigate and restore negative project impacts. The retroactive application of standards and tools in this research highlighted several shortcomings that could likely have been overcome had the

standards or tools been adopted in the design phases of the projects. Further, early adoption is in-line with investor considerations, which most often come into play in the initial stages of project planning.

Recommendations

While many ESG standards and tools are already available for infrastructure investors and more are being developed and introduced every year, few have been developed specifically for investor needs. The sustainability tools and standards tested for this research only partially fulfilled the identified investor needs; none did so comprehensively. Furthermore, deriving these outcomes can be costly, time-consuming (especially when analysis is performed at a portfolio level) and key insights are often generated indirectly rather than directly.

In order to develop a more efficient sustainability assessment process for infrastructure investors, it may be beneficial to refine existing tools, develop a new standard or tool specifically tailored toward the needs of investors, or to combine existing standards and tools so that they better fulfill investors' needs.

Establish a task force to develop a standard sustainability assessment approach for infrastructure investors

The establishment of a task force to develop a standard approach for investors to assess the sustainability of infrastructure projects could be an option to close the current gap. A successful example of such an effort applied to establishing clear guidelines for disclosing risks companies face from climate change and how they are addressing them to inform investors and other stakeholders is the Task Force on Climate-related Financial Disclosures (TCFD)⁷², which was launched in 2015 to develop a consistent approach to corporate disclosure of climate-related financial risk. In the same way, a task force on sustainability disclosure for infrastructure projects could help to bring together investors with infrastructure project sponsors, developers and operators (data preparers) to agree on the ideal form of disclosures to fulfil the needs of investors (data users) while being pragmatic and workable for data providers. Over five years, the TCFD has succeeded in developing recommendations for disclosure that have won widespread support internationally, are increasingly being implemented and have been adopted by some governments as mandatory reporting requirements for businesses.

Establish a collaborative platform to build on and converge existing standards and tools

An alternative initiative could be to establish a collaborative platform that aims to build on existing standards and tools and moves toward convergence. In some ways, the landscape of infrastructure sustainability assessment standards and tools mirrors the landscape of corporate sustainability reporting frameworks. Both are crowded spaces with many and various options open to reporters, which creates challenges for investors who need to interpret reported sustainability data and factor it into their analysis and investment decisions. In the corporate world, the Corporate Reporting Dialogue

⁷² <https://www.fsb-tcfid.org/>

(CRD) was established in 2014 to bring together several leading corporate sustainability reporting frameworks to promote greater coherence, consistency and comparability among them⁷³. Although the CRD has not (yet) achieved full consistency between the reporting frameworks, it has proven to be successful in making the differences and similarities of the indicators included in the participating reporting frameworks more transparent, specifically on climate change disclosure through its Better Alignment Project⁷⁴.

A similar initiative could help the infrastructure community and investors reach a more coherent approach toward assessing the sustainability of infrastructure projects in a way that fulfils investors' needs. Further work could also be done by the developers of the standards and tools to bridge the current gap and improve the applicability of outcomes for infrastructure investment.

The goal is clear in terms of enabling investors to assess the sustainability of infrastructure projects more effectively in a way that suits their needs and integrates with their investment approaches and models. There are different routes toward achieving that goal, but it is critical that investors – in collaboration with partner organizations such as WWF – continue to take the lead and drive progress. Investors need to work with each other and experts to establish common science-based sustainability expectations for infrastructure projects and to develop and agree upon minimum standards for what constitutes sustainable infrastructure investment – moving toward internationally recognized norms.

Further research could explore how to reach agreement on such norms as well as what regulatory and market incentives could be developed to encourage their application. Further work is also needed to assess how standards and tools can better capture arising risks such as environmental degradation, risks related to increased robotization and the use of artificial intelligence and the risk of future pandemics.

The COVID-19 crisis, which emerged during the research for this report, highlighted the urgency of this work – given the likely acceleration of infrastructure investment to boost economic recovery – and underscored the need for further investigation into how standards and tools can better assess the adaptability and resilience of infrastructure assets in times of disaster or crisis. This report acknowledges that COVID-19 is changing the ways in which we understand, measure and track social risk. It is therefore important for investors to collaborate with all those involved in the development of a project and to be open to new approaches for engaging with stakeholders to better understand social risk. Further research is recommended to explore whether current and future standards and tools keep pace with rapid and continuous developments in sustainability and ESG.

⁷³ <https://corporatereportingdialogue.com/>

⁷⁴ <https://corporatereportingdialogue.com/better-alignment-project/>

Appendix 1: Glossary

COVID-19 refers to the ongoing coronavirus pandemic and health crisis

CRD Corporate Reporting Dialogue

EIA environmental impact assessment

ENSO El Niño–Southern Oscillation

Envision Verification refers to the formal verification process, administered by the Institute for Sustainable Infrastructure, that must be completed in order for a project to earn an Envision award.

ENV SP Envision Sustainability Professional

EP Equator Principles

EPFI The financial organizations who voluntarily apply the EP are called Equator Principles financial institutions (EPFIs)

ESAP environmental and social action plan

ESG refers to the three central factors for measuring the sustainability impact of an investment in a company or business: environment, social, governance. ESG frameworks have been adopted following the formation of the United Nations' Principles for Responsible Investment, the leading global network of investors to demonstrate their commitment to responsible investment and the incorporation of sustainability topics into the investment process.

ESHS environmental, social and health and safety

ESIA environmental and social impact assessment

GHGs greenhouse gases

GIIP Good international industry practice

IESC Independent Environmental and Social Consultant

IFC PS/EP For the purpose of this report we are considering the International Finance Corporation Performance Standards and Equator Principles (IFC PS/EP) as one standard because of the intrinsic interlinkages between the two.

IMV Impact Measurement and Valuation

IRR internal rate of return

ISI Institute for Sustainable Infrastructure

MGD million gallons per day

NGO non-governmental organization

NPV net present value. In this report, the IMV tool assessed the impact of selected assets on society by expressing these in financial terms as social costs or benefits over the 30 year lifecycle of the asset. In order to provide a present value at the time of the assessment, these costs and benefits to society over a 30 year period are discounted and therefore expressed as NPV. Note that this NPV is different to the NPV used by investors in the financial valuation of projects and so the IMV data cannot be directly integrated into financial valuations.

NTS non-technical summary

ORERP Otay River Estuary Restoration Project

PS Performance Standards

San Diego Bay NWR San Diego Bay National Wildlife Refuge

SCC Social Cost of Carbon

SDCWA San Diego County Water Authority

UN United Nations

SDGs refers to UN SDGs

Sustainability is a broad concept including anything related to wellbeing of people and environment. The most common ways that sustainability standards have been incorporated into the investment decision-making process of institutional investors has been through the adoption of Environmental Social Governance (ESG) programs that structure sustainability information and provide a framework to identify sustainability risks and opportunities.

In this report we use sustainability when we refer to the broader concept of wellbeing of people and planet. We use ESG when we talk about the three topic structure that is often used in the investment community to disclose and apply sustainability information.

SGPC Stanford University Global Projects Center

Standards & Tools refers to instruments that assess the sustainability performance of assets, projects or organizations. In this report we refer to these standards and tools and sustainability standards, as their scope is broader than ESG and the investment community.

TEEB The Economics of Ecosystems and Biodiversity

The Goals refers to the SDGs

US United States

USFWS US Fish and Wildlife Service

WWF World Wildlife Fund

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