

Assessing the Institutional Capacity of Latin American Countries for Sustainable Infrastructure Planning and Delivery

Climate Change and
Sustainability

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Abstract

This paper reviews country- and sector-level upstream planning and procurement approaches of water, transport, and energy infrastructure projects in Bolivia, Chile, El Salvador, Jamaica, Nicaragua, and Peru. For each country and sector, we review institutional frameworks and the policies and legislation relevant for sustainable infrastructure planning. Our analysis covers the frameworks for countries to plan infrastructure at the upstream level, as well as procurement and contractual frameworks. We focus particularly on how sustainability is integrated in such processes. The ultimate goal of this paper is to identify the main institutional gaps that need to be addressed in Latin American and Caribbean countries so they can improve their planning and preparation of sustainable infrastructure projects.

Comprehensive regulations and policies exist primarily in the energy and transport sectors, as policies and regulations in water are the most outdated. Fiscal and regulatory incentives promote sustainable energy projects, and sustainable fuels are subsidized in transport. Yet, national policies in all three sectors cover periods that are not enough to specify a long-term sustainable infrastructure vision and drive the transformation towards a sustainable infrastructure system. Policies and plans consider periods exceeding ten years only in energy, which in the case of Chile and Peru extend to 30 and 40 years, respectively. Furthermore, only Chile addresses perverse incentives and externalities in the investment system, primarily the social impact of greenhouse gas emissions through a carbon price. Multi-year budget frameworks cover a fiscal period of up to three years, yet this period is rarely enough to match timeframes for infrastructure. Other than Peru, the countries lack specific policies to incentivize institutional investors to invest in infrastructure, thus missing opportunities to increase the role of domestic capital markets and mobilize alternative sources of financing infrastructure.

In all countries, national development plans specify sustainable development goals. Yet, all countries lack a national infrastructure plan with a multi-sector infrastructure pipeline to achieve their national development goals. As such, infrastructure needs are not specified through an integrated, multi-sector approach, missing opportunities for synergies and efficiency gains. Sectoral planning is conducted through a “siloed” approach, with little or no inter-ministerial collaboration. Furthermore, sectoral infrastructure plans specify goals for expanding access to services, but rarely provide specific goals for each sub-sector or the projects planned to achieve these goals. In addition, the alignment of infrastructure plans with international commitments such as the Sustainable Development Goals and nationally determined contributions have not been evaluated. Chile, Jamaica, and Peru assess sustainability risk in investment evaluation. Yet, the range of risks, and the methodologies to assess risks, considered is not clear. Overall, investment evaluations promote projects that have a positive economic value. Only Chile, El Salvador, and Nicaragua require projects to have a positive social value and contribute to social development. Yet, it is not clear if the range of indicators that assess the social value of projects is adequate.

Efforts to ensure liquidity and availability of investments, such as issuing infrastructure project bonds and/or developing infrastructure funds, are only observed in Chile and Peru. Overall, strong sustainability gaps were observed in the procurement process. Although most countries in our group have national climate change strategies, climate impact assessments are not required while developing projects. Furthermore, only Bolivia requires social development plans to help local communities develop sustainably, moving beyond the conventional “do no harm” management approach. All countries lack requirements for project sustainability management systems to set sustainability performance goals, and frameworks or incentives for project sustainability performance data monitoring and tracking.

JEL Codes: Q51, Q54, Q56

Keywords: Sustainable Infrastructure, Sustainability, SDGs, Institutional Frameworks, Procurement

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Abbreviations

BRT	Bus Rapid Transit
EIA	Environmental Impact Assessment
EIU	Economist Intelligence Unit
ETS	Emissions Trading Scheme
GHG	Greenhouse Gas
IDB	Inter-American Development Bank
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
LAC	Latin America and Caribbean
NDC	Nationally Determined Contribution
NDP	National Development Plan
NGO	Nongovernmental Organization
OECD	Organisation for Economic Co-operation and Development
PIMA	Public Investment Management Assessment
PPP	Public-Private Partnership
PV	Photovoltaic
SDGs	Sustainable Development Goals
U.S. DOS	United States Department of State
UN	United Nations

1. Introduction

The Latin American and Caribbean (LAC) region faces an urgent need to increase infrastructure investment to sustain economic growth and improve quality of life. Investments around 5 percent of the region's GDP (\$250 billion) are required in infrastructure annually in order to close the estimated infrastructure gap and satisfy development needs (Serebrisky et al., 2015). Yet, LAC countries currently invest around 3.5 percent of GDP in infrastructure (Serebrisky, et al., 2017). Furthermore, these investments should be directed towards sustainable infrastructure in order to achieve the United Nations' (UN) Sustainable Development Goals (SDGs) and the Nationally Determined Contributions (NDCs) as part of the 2015 Paris Agreement. Sustainable infrastructure investments are also essential in enhancing climate resiliency in the LAC region, which is already one of the world's most vulnerable regions to the impacts of a changing climate. In fact, experts have estimated that the economic costs of climate change in the region might range between 1.5 and 5 percent of the LAC region's GDP by 2050 (UN ECLAC, 2015).

At the same time, several studies report that the quality of infrastructure services and the efficiency of infrastructure investments in the LAC region are lower than they could be based on the income per capita levels in LAC countries (Cerra et al., 2016; Serebrisky et al., 2017). Deficiently planned infrastructure project pipelines are not effective in improving productivity and economic growth, and jeopardize the quality of life of the society. Significant opportunities exist in improving the effectiveness of the infrastructure project planning and delivery process to promote projects that better address long-term development and climate goals.

The institutional capacity of countries to plan, design, and execute prudent infrastructure project pipelines is fundamental in facilitating infrastructure investments that enhance quality of life and climate resilience; its lack thereof will hinder any such projects and delay development. In addition, lack of institutional capacity to plan and implement sustainable infrastructure projects leads to the selection of the wrong projects that are sited in conflictive locations, leading to conflicts that cause substantial delays and cost overruns (Watkins et al., 2017).

In fact, McKinsey (2017) estimates that improving the infrastructure project selection and delivery processes could reduce the global annual infrastructure investment needs, currently estimated at \$3.3 trillion, by \$792 billion. In the LAC region, it is estimated that optimizing infrastructure portfolios, streamlining the infrastructure delivery process, and making the most of existing assets can reduce the annual infrastructure investment needs by 40 percent (Serebrisky et al., 2017). Such improvements would save approximately 1 percent of the region's GDP.

This paper focuses on a selection of six LAC countries. It reviews country- and sector-level approaches to the upstream planning and public works procurement of water, transport, and energy infrastructure projects. Specific attention is given to how environmental and social sustainability, including climate resilience and mitigation, is part of such processes. The ultimate goal of this paper is to identify the main institutional gaps that need to be addressed in LAC countries so they can improve their planning and preparation of sustainable infrastructure projects.

2. Institutional Capacity for Sustainable Infrastructure Planning

2.1 Institutional Capacity in LAC

Although not everyone recognizes the importance of enhancing upstream planning capacity, several countries have taken steps to develop more sustainable infrastructure project pipelines (Cerra et al., 2016). The Public Investment Management Assessment (PIMA) process, developed by the International Monetary Fund (IMF) in 2015, is a tool that assesses the decision-making for public infrastructure investments of countries; it evaluates 15 key institutional indicators for public investment planning, resource allocation, and project implementation. These include (i) fiscal principles, (ii) national and sectoral planning processes, (iii) public-private partnership (PPP) frameworks, (iv) multi-year budgeting, (v) project appraisal and selection, (vi) investment protection, (vii) transparency of budget execution, (viii) project management, and (ix) monitoring of public assets.

The IMF's assessment of public infrastructure investment capacity in LAC through the PIMA tool shows that the implementation of best practices in public infrastructure planning, allocation, and execution is unequal across the region, especially in aspects related to private sector participation (Cerra et al., 2016). Overall, Brazil, Chile, Colombia, Mexico, and Peru show the highest level of PPP infrastructure planning institutional capacity (Economist Intelligence Unit (EIU), 2017). Yet, many Latin American and most Caribbean countries lack well-structured public infrastructure investment approaches, which hinder infrastructure investments and lead to low-quality projects. Overall, despite the improvements that have been observed in the last decade, the efficiency of public infrastructure investments in LAC is lower than the average achieved by advanced economies worldwide (Cerra et al., 2016). Fay et al. (2017) support this conclusion, underscoring the lack of institutional capacity for planning, regulatory uncertainty, and budgeting and implementation issues as prominent factors leading to inefficient infrastructure investment in LAC.

2.2 Best Practices in Government Infrastructure Planning and Delivery

Effective government infrastructure planning and delivery requires an overarching national multi-sector infrastructure strategy to ensure that infrastructure investments are coordinated across sectors, government bodies, and private sector entities (Cerra et al., 2016). For example, France and Japan have established strategic infrastructure master plans by sector, minimizing planning and political risk (OECD, 2017a). Similarly, Australia and the UK, which are cited as good-case examples in terms of infrastructure planning and delivery, are developing long-term strategic infrastructure plans. Until recently, the UK relied on mid-term strategic sectoral plans (OECD, 2017a). Australia created an independent infrastructure planning entity, *Infrastructure Australia*, making the project planning, prioritization, and selection process more transparent and efficient (OECD, 2017a). In addition, establishing overarching national multi-sector infrastructure plans requires coordination between agencies and ministries, promoting inter-agency and inter-ministerial cooperation that is fundamental in overcoming “silo-thinking” at the infrastructure sector and related ministry levels.

Regarding strategic infrastructure planning and delivery aspects, the LAC region as a whole performs relatively poorly, especially in terms of managing infrastructure project appraisal, implementation, and monitoring, and ensuring availability of funding and multi-year budgeting

(Cerra et al., 2016; World Bank 2017a). However, countries in the LAC region increasingly realize the importance of developing long-term national infrastructure plans. In fact, the EIU's 2017 Infrascope report states that 14 out of 33 countries in the LAC region have established long-term strategic national infrastructure plans that exceed a government's term. Yet, there remains a lot of work to be done in terms of implementing long-term infrastructure strategies in these countries, as well as developing such strategies in the remaining countries in the LAC region.

For instance, implementing designated agencies and designated funds for project preparation and investment appraisals would help ensure that appropriate resources and staff are responsible for evaluating investment proposals, yet these are rare in LAC. A notable example is El Salvador's project preparation fund (*Fondo Salvadoreño para Estudios de Preinversión*) that focuses on evaluating projects at the pre-investment phase to ensure that the most prudent projects are approved and proceed to the investment phase.

Efficient project appraisal depends considerably on the use of rigorous economic assessments for project selection and preparation (World Bank, 2017b). Yet, although 17 out of the 33 LAC countries surveyed in the 2017 Infrascope require a cost-benefit analysis during project selection (EIU, 2017), the World Bank (2017a) reports that most countries have not adopted specific methodologies for conducting these assessments, which often results in the selection of the wrong projects. Furthermore, the risk of policy and regulatory change remains a major hurdle for increasing infrastructure investments. LAC countries still face challenges in developing stable legal and regulatory environments that facilitate efficient and transparent infrastructure procurement (World Bank, 2017a).

PPPs are also key in developing sustainable long-term project pipelines. In terms of private participation in infrastructure, the first PPPs in LAC were implemented relatively recently. These were for highway projects in Colombia and Mexico during the early 1990s. However, since then the region has demonstrated significant advances in the PPP sector. Overall, Brazil, Chile, Colombia, Mexico, and Peru have the most advanced PPP markets in LAC, which are also the countries with the longest history of implementing PPPs in infrastructure projects (EIU, 2017).

Cerra et al. (2016) report that the key elements of efficient PPP institutional frameworks include (i) consistent PPP legislation, (ii) incentive-neutral regulation, (iii) requirements for project integration into the budget cycle, (iv) strong oversight framework, (v) efficient allocation on roles and responsibilities across institutions responsible for PPPs, (vi) value for money requirements for projects, and (vii) transparent disclosure. Although LAC as a whole ranks below the global standards on PPP and infrastructure delivery, Brazil, Chile, Colombia, Mexico, and Peru have consistently rank among the best countries internationally during the recent years (Cerra et al., 2016). Peru, in particular, has a very strong regulatory and institutional framework for PPPs. Brazil and Mexico have active subnational government PPP entities, yet Brazil has a weaker regulatory framework. Argentina, El Salvador, Guatemala, Honduras, Jamaica, Paraguay, and Uruguay have recently developed PPP frameworks and entities to implement projects (Cerra et al., 2016; EIU, 2017).

However, LAC national infrastructure plans often do not prioritize PPPs in project planning and selection methods. In fact, only Chile, Colombia, Ecuador, Honduras, Jamaica, and Mexico have established requirements to integrate the prioritization of PPP projects while addressing national

infrastructure needs. Furthermore, a value for money (cost-benefit) analysis is not used consistently in project appraisal and selection, hindering the selection of prudent projects.

2.3 Best Practices in Sustainable Planning

Sustainable infrastructure refers to infrastructure projects that are planned, designed, constructed, and operated in a way that ensures environmental, social, and economic sustainability. Establishing sustainable infrastructure as an asset class, thereby distinguishing sustainable from conventional infrastructure, can also help increase sustainable investments. Officially designating sustainable infrastructure assets would allow the increased use of sustainability criteria in project planning and design, and attract investors focused on sustainable and responsible investing that incorporate environmental, social, and governance considerations in investment appraisal.

The upstream planning stage presents significant opportunities for sustainable infrastructure planning. At this stage, sustainability opportunities can be incorporated most efficiently without requiring significant modifications, also ensuring that the most important sustainability aspects are considered during project design. Serebrisky et al. (2017) also note that focusing on the upstream planning and design project stages can help reduce costs by avoiding changes and modifications once construction has begun. They further report that a major opportunity to reduce infrastructure costs is to avoid selecting and implementing projects that do not address transparently identified infrastructure gaps and provide benefits to the community. The Chilean infrastructure planning system presents a good-practice example in incorporating sustainability during project planning and selection in order to ensure the implementation of prudent infrastructure projects. All infrastructure projects go through the national investment system, but only those that are evaluated through a cost-benefit analysis as socially profitable—thus making a quantifiable net positive impact on the quality of life of local communities—are selected (IDB, forthcoming). As part of this process, carbon emissions are priced during project evaluation, promoting more sustainable or less polluting projects.

A notable sustainable planning consideration in the upstream planning stage is the development of national, regional, and sectoral climate change mitigation and adaptation, and disaster risk management plans. Infrastructure projects can then be planned and implemented in alignment with the principles and goals specified in these plans, thereby clearly contributing to national development and NDC goals. Without national incentives at the upstream level to address climate change and disaster vulnerability aspects during the planning process, projects integrate climate change aspects haphazardly and can be sited in locations vulnerable to climate and disaster risks.

Sustainable infrastructure planning and investment can be bolstered through sector-specific initiatives to promote sustainable projects, such as renewable energy auctions. Recently, Brazil, Chile, and Mexico have successfully implemented renewable energy actions and will also be implementing new ones in the near future. Argentina is planning its first renewable energy auction, *RenovAr-1*, while the Argentine government states that it is expecting at least \$7 billion in renewable energy investments in 2017 alone (Dezem and Gilbert, 2017). In fact, Argentina created a sector-specific fund backed by a World Bank guarantee (*Fondo Fiduciario de Energías Renovables*) to provide project financing assistance and security for payments under power

purchase agreements for the sale of electricity (World Bank, 2016). Furthermore, green bonds can also be used to raise funds for climate-resilient and sustainable infrastructure projects. *Energía Eólica*, a Peruvian windfarm operator, issued the first green bond in LAC totaling \$204 million in 2014 (Goldman Sachs, 2017). However, despite the promising results in Peru, limited progress has been made ever since.

In order to implement sustainable projects most efficiently, perverse incentives and inefficient subsidies that distort service prices and encourage unsustainable projects must be tackled, especially in the energy sector (Cerra et al., 2016). Energy subsidies can be directly removed or minimized, and in combination with the implementation of greenhouse gas (GHG) control mechanisms, promote more sustainable infrastructure projects. Such mechanisms include formal carbon taxes, emission trading schemes, and regulatory programs, as well as incentives to encourage sustainable investments. Chile and Mexico were the first countries in LAC to implement a carbon tax, while Brazil and Colombia are also considering it (World Bank, Ecofys, and Vivid Economics, 2016).

Another notable aspect for implementing sustainable projects are meaningful stakeholder consultations. National and sectoral infrastructure plans that are implemented in a participatory manner are effective in promoting projects that address community goals and needs, and identifying stakeholder concerns to help minimize project-related grievances over the long term. On the other hand, the projects that are planned and implemented without meaningfully consulting stakeholders are much more likely to face conflicts that lead to delays, cost overruns, and cancellations (Watkins et al., 2017; Kvam, 2017).

Overall, research has focused on evaluating the institutional capacity and frameworks of LAC countries to plan infrastructure projects at the upstream level, yet there is no emphasis on how countries and their frameworks incorporate sustainability issues while planning and implementing infrastructure. Furthermore, methodologies that assess institutional capacity for planning do not encompass the entire cycle of an infrastructure asset. Limited consideration is given to procurement and contractual design, while there is almost no reference on how these relate to sustainable infrastructure.

Our research focuses on three fundamental stages of the infrastructure project cycle: (i) the institutional setting stage, (ii) the upstream planning stage, and (iii) the project procurement stage. The institutional stage covers the policies, legislation, and market conditions relevant for sustainable infrastructure project planning at the country level. The upstream planning stage encompasses the planning processes to develop long term, national, regional, and sector infrastructure plans and project pipelines. The project procurement stage covers the national frameworks and processes to develop and implement infrastructure projects, from the planning stage to operations. As such, our research holistically identifies the institutional gaps across the infrastructure project cycle that hinder the development of sustainable infrastructure, helping LAC countries plan infrastructure at the upstream level more efficiently and implement projects that are climate-resilient and incorporate environmental and social sustainability considerations.

3. Methodology of Analysis and Data Sampling

3.1 Approach

Our research methodology defines the main steps of our analysis, framing the key questions driving our work. Relevant literature is reviewed on international best practices and the institutional performance of LAC countries to define the institutional capacity indicators. We proceed to the selection of countries and sub-sectors to analyze in the energy, transportation, and water sectors. For each country and sectors identified, we document institutional frameworks, market conditions, and the policies and legislation that are relevant for sustainable infrastructure planning. We describe the existing frameworks for countries to plan infrastructure at the upstream level, making emphasis on how these frameworks enable the incorporation of sustainability considerations. We continue our analysis with procurement and contractual frameworks, in particular as these relate to sustainable infrastructure. We conclude by calculating the institutional capacity score for each country, per sector and in total.

We draw conclusions using information from the steps above. We compare, contrast, and benchmark against generally recognized good practices, and derive findings and recommendations on the prevailing institutional gaps to be addressed in order for LAC countries to plan and implement sustainable infrastructure projects.

3.2 Research Questions

This research focuses on answering the following questions:

- How can we benchmark the institutional capacity of a country to deliver sustainable infrastructure?
- What are the key components and good practices for the planning of sustainable infrastructure?
- How can procurement and project delivery frameworks enable sustainable projects?
- How do countries in LAC perform on the above?
- What are the prevailing institutional gaps in LAC that need to be addressed?

3.3 Process of Analysis

The process of analysis can be summarized as follows:

- I. Identify six countries to document
- II. Identify the segments to study in the energy, water and transportation sectors
- III. Review relevant literature and related studies on LAC institutional performance and international best practices on upstream planning, procurement, and contracts
- IV. Define framework of analysis, derive set of questions with performance levels
- V. Collect and analyze data
- VI. Compute the Capacity Scores for each country and sector
- VII. Process and analyze findings
- VIII. Draw conclusions and recommendations

3.4 Limitations of Research

It is important to note some of the limitations of this work. First, we document existing country frameworks as they formally exist, and not the actual capabilities of institutions to implement, monitor, or enforce such frameworks. For our work, we conducted a desk review of information available online, but we did not conduct field studies, or workshops and interviews; these could potentially shed more light on how these frameworks are or are not applied, and how they are enforced in case of non-compliance. A potential next phase of this research could address these limitations with workshops or other field studies in countries.

3.5 Selection of Countries

The Infrascope analysis rank (EIU, 2017) was used as the principal criterion for the selection of countries. The country selection focused on identifying two top-ranking, two average-ranking, and two low-ranking countries within the Infrascope 2017 analysis. It is important to note that countries rank differently in the categories of institutional capacity, upstream planning, and project procurement; some rank top in one but not in another.

Overall, Brazil, Chile, Colombia, Mexico, and Peru are considered among the most advanced LAC countries in PPPs, while they have the most infrastructure investments in LAC along with Uruguay (EIU, 2017). These were the candidates for top-ranking countries. Within this group, we selected Chile because of its comprehensive efforts over the last 25 years to drive infrastructure investments and develop a pioneering concessions system. The second selection is Peru, primarily because of its very strong PPP framework.

For the average-ranking candidates, we reviewed the following: Costa Rica (average institutional capacity, average PPP framework); El Salvador (low institutional capacity, average PPP framework); Jamaica (average institutional capacity, strong PPP framework); Paraguay (average institutional capacity, average PPP framework); and Uruguay (strong institutional capacity, lots of investments, weak PPP framework). Within this group, we selected El Salvador and Jamaica because both have average institutional frameworks but have focused considerably in recent years on increasing investments in infrastructure and developing long-term infrastructure plans.

For the low-ranking candidates, we reviewed the following: Argentina (average institutional capacity, very low PPP framework); Bolivia (low institutional capacity, not much info on PPP framework); Dominican Republic (average institutional capacity, low PPP framework); Ecuador (low institutional capacity, very low PPP framework); Guatemala (low institutional capacity, low PPP framework); Nicaragua (low institutional capacity, low PPP framework); and Panama (average institutional capacity, low PPP framework). Within this group, Bolivia and Nicaragua are the selected low-ranking countries because of the gaps in their institutional frameworks for infrastructure project planning and implementation.

3.6 Selection of Sectors

In order to identify the sub-sectors to study within energy, water, and transport, we applied a sustainability lens and looked for the sectors that would provide the necessary lessons for governments to improve their infrastructure planning process.

Cerra et al. (2016) report that vast majority of PPPs are implemented in energy and transportation projects throughout LAC. Furthermore, most of the published research has traditionally focused on these two sectors. However, the literature focuses primarily on general sustainability issues in the energy and transportation sectors, and not specifically on country institutional capacity to conduct sustainable upstream planning.

3.6.1 Energy

Although the energy sector and PPP markets are among the most mature, the energy network, especially in rural areas, is still underdeveloped in our countries group, excluding Chile and Peru. More than 90 percent of Jamaica's energy needs are satisfied through imported fossil fuel sources (Bloomberg New Energy Finance, 2016). In Nicaragua, 20 percent of the total population, but 54 percent of the rural, lacked access to reliable electricity in 2014 (Bloomberg New Energy Finance, 2016). Similarly, in Bolivia, 19 percent of the total population, but 64 percent of the rural, lacked access to an electricity network in 2014 (Plurinational State of Bolivia, 2016). As such, national development plans (NDPs) focus strongly on enhancing access to electricity countrywide through new power plants and transmission line projects.

Overall, fossil fuels dominate the energy matrices in our countries group. In Bolivia, 70 percent of electricity needs are met through thermal power plants, while in Chile and Peru, conventional energy sources account for 72 and 49 percent of electricity generation capacity, respectively (Bloomberg New Energy Finance, 2016). As such, the national development and energy plans in the countries include medium- and long-term goals and strategies to diversify the national energy matrices. These strategies are also driven by the 2015 Paris Agreement and the NDC for GHG emission reductions of countries (Bloomberg New Energy Finance, 2016). Overall, the wind, solar photovoltaic (PV), and hydropower sub-sectors are considered in the sub-sector selection process, since they are the most prominent renewable energy sources in national energy and development plans.

However, given that many LAC countries are rich in hydrocarbon resources, conventional energy sources are expected to continue playing a major role in their energy mix. For instance, among the pre-selected countries, Bolivia and Peru own significant natural gas reserves. Peru is already a liquefied natural gas exporter, while Bolivia is also planning to become a net natural gas exporter (Honoré, 2016). In fact, Bolivia's NDP states that approximately \$12.7 billion (26 percent of the national plan's total budget) will be invested in the hydrocarbons sector until 2019 (Plurinational State of Bolivia, 2016).

Conventional energy is still the most prominent sub-sector for institutional investors (OECD, 2016b), thus, at least one conventional energy sub-sector is considered in the sub-sector selection process. Since investments in coal projects are rapidly decreasing worldwide, natural gas is the conventional energy sub-sector alternative.

In regards to other private investors, beyond institutional players, 88 percent of project participation worldwide during 2016 was observed in renewable energy projects (hydropower, solar PV, and wind). In general, solar and wind are among the most prominent sub-sectors for investors. In 2015, \$25.5 billion were invested in wind projects, \$4.1 billion in solar projects, and

\$2.3 billion in biofuels and biomass and waste projects in LAC (Bloomberg New Energy Finance, 2016).

As such, in the energy sector, the sub-sector candidates for our analysis are wind, solar PV, hydropower, transmission, geothermal, and natural gas. Within this group, we selected wind, solar PV, and hydropower primarily because of the importance of implementing effective long-term plans on these sub-sectors for all countries, in order to progress towards a more sustainable energy system.

3.6.2 Transportation

The transport sector is one of the most mature in terms of PPPs and infrastructure overall. It can provide many lessons for infrastructure planning processes and the institutional capacity of a country to deliver sustainable projects. Cerra et al. (2016) state that the earliest PPP projects in LAC were highways in Colombia and Mexico in the early 1990s, followed by ports and airports. Watkins et al. (2017) found that transportation projects are overall more conflictive than water projects because of land use requirements. Among the most significant transportation challenges in our countries group is the need to enhance mobility and accessibility at the country level while reducing GHG emissions through the development of more sustainable transportation projects. Access to transportation infrastructure, particularly in rural regions, remains inadequate.

Furthermore, the transportation sector is the largest energy consumer and one of the largest fossil fuel consumers in LAC (Balza et al., 2016). At the same time, rapid economic and population growth since the start of the 21st century has led to constantly increasing urbanization and traffic congestion in urban centers (EIU, 2015). In addition, fuel subsidies perpetuate an over-reliance on motorized transport, hindering the development of more sustainable alternatives. Multi-modal public transportation networks in urban centers lack adequate investments in infrastructure to cover a rising demand, jeopardizing the efficiency of the public transportation system and negatively affecting the quality of life of commuters and local communities (EIU, 2015).

Overall, urban mobility challenges are not adequately addressed in national development and infrastructure plans. Most NDPs, as well as transportation infrastructure plans, include ambitious goals for enhancing mobility and improving access to efficient transportation networks. For example, the Bolivian NDP states that 4,806 km of new roads and highways should be completed by 2020, to integrate all its population in the national transportation system with adequate access to transportation services (Plurinational State of Bolivia, 2016). Similarly, the Chilean and Jamaican national development strategies also specify ambitious goals for improving mobility, enhancing accessibility, and integrating isolated and less developed regions. However, in general, NDPs in all pre-selected countries focus predominantly on the highway sub-sector. Yet, the plans lack specific sustainable transportation strategies. For example, there is no designated sustainable public transportation policy, with strategies and goals for developing an efficient bus rapid transit (BRT) network.

In terms of investor participation, roads and highways is the sub-sector with the highest investor participation, followed by ports, airports, and railways (World Bank, 2017c). Investors are particularly attracted by the long-term income streams of highway projects (OECD, 2016a). However, given the focus on minimizing the transportation sector's carbon footprint and reducing congestion through more sustainable, multi-modal transportation means, BRT is another transportation sub-sector focus of our work.

In the transportation sector, the sub-sectors candidates were: highways, airports, BRT, and ports. Within this group, we selected highways, airports, and BRT. Highways and airports were selected because of their significance for enhancing connectivity in national development agendas in the selected countries, while ports were excluded because Bolivia, one of the six countries of our sample, is a landlocked country and does not have any ports. The BRT sub-sector is particularly important for all countries in addressing urban mobility and connectivity challenges, and would provide the necessary lessons for ensuring the sustainable development of public transportation.

3.6.3 Water

From a long-term point of view, and in particular accounting for climate change, the water sector will become more and more important for LAC countries in the future. All countries that were pre-selected for this research face significant water problems, both regarding water supply and sanitation services. For example, almost 100 percent of El Salvador's water sources are polluted, and the country is consistently reporting high water stress levels. El Salvador's Ministry of Environment and Natural Resources reported in 2017 that clean water sources in El Salvador over the last decade declined by 27 percent (Machuca, 2017). Similarly, 10 percent of Jamaica's water resources have been depleted due to pollution, saline intrusion, and watershed degradation (Planning Institute of Jamaica, 2009).

Furthermore, house potable water supply coverage is still low in rural regions in all of these countries. For instance, in Bolivia, during 2014, 58 percent of rural population lacked access to sewage and sanitation services (Plurinational State of Bolivia, 2016). In Bolivia and Jamaica, the poorest segment of the population is also the segment with the least access to piped water. Climate change exacerbates these challenges and is expected to hinder any national plans that aim to expand water access towards a constantly increasing demand for potable water and sanitation services.

For our work, we selected the potable water supply, treatment, and sanitation sub-sectors because of the importance of developing sustainable and effective long-term infrastructure plans in order to expand access to such basic services in all of the selected countries.

4. Institutional Capacity Benchmarking

The institutional framework benchmarking starts with evaluating what policies, legislation, regulations, and organizations are responsible for infrastructure in each country, and whether they cross link with SDG and NDC execution. Initiatives to manage risks of policy change by stabilizing laws and regulations that cover fiscal rules, PPP frameworks, and initiatives to ensure that public and private enterprises are governed under the same regulations are identified. Furthermore, our assessment covers the adoption of multi-year budgeting by the ministry of finance and infrastructure sector officials, to match planning time frames with infrastructure project cycles.

In terms of infrastructure sustainability, efforts to increase private sector participation in the national infrastructure agendas and encourage the incorporation of sustainability risk analysis into investment evaluations are examined. Then, initiatives to address price distortions and perverse subsidies that encourage unsustainable infrastructure, as well as to establish sustainable

infrastructure asset classes are investigated. Furthermore, countries are evaluated on whether they have established national standards or principles for green bonds, energy auctions, and for increasing investments in sustainable infrastructure. In this regard, policies to expand access to institutional (pension and insurance fund) investors, and increase the participation of the private sector in national infrastructure agendas are also evaluated. Table 1 summarizes the institutional framework parameters.

-
1. Up to date, relevant infrastructure legislation.
 2. Up to date, relevant infrastructure policies.
 3. Relevant, de-centralized regulator per infrastructure sector.
 4. Private participation allowed in the infrastructure sector vs. a government monopoly.
 5. Relevant, de-centralized public organizations responsible for infrastructure per sector.
 6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.
 7. National development and infrastructure plans aligned with SDGs and NDCs.
 8. Multi-year budgeting of infrastructure projects by the responsible ministry.
 9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.
 10. Level playing field for public and private enterprises with equal regulations and incentives.
 11. National principles for green bonds.
 12. Local capital markets and policies to expand access to institutional investors.
 13. National frameworks and incentives for corporate governance and social responsibility.
 14. National frameworks and incentives for sustainability and climate risk disclosure.
 15. Sustainable certification scheme for infrastructure providers.
 16. National carbon emissions price or national emissions trading scheme.
 17. Functional, de-centralized environmental assessment authority.
 18. National and sectoral frameworks for disaster risk management.
 19. Formal and functioning frameworks for community consultation.
-

Table 1. Institutional framework parameters.

4.1 Bolivia

4.1.1 General

The Ministry of Public Works, Services, and Housing is the central public entity responsible for the development of infrastructure in Bolivia. The ministry develops and implements national infrastructure plans, programs, and projects. Bolivia has not enacted an overarching law to regulate the public infrastructure sector and has not implemented a national public infrastructure policy to set the long-term needs and goals for public infrastructure. Yet, the ministry's plans and programs are aligned with Bolivia's NDP, setting the long-term vision for the development of the country and the infrastructure sector.

Bolivia allows PPPs in infrastructure when the government decides that private investments are required in the process of its NDP and with a pre-requisite that the government will maintain a majority in the operating company. Privately-held concessions are not allowed in any sector. The

Bolivian government prohibited concessions through the constitutional reform of 2009, and between 2006 and 2014 nationalized entities that had been privatized in the 1990s (United States Department of State (U.S. DOS), 2017f).

In general, the Bolivian government has not enacted an explicit policy or law that prioritizes public over private entities, but public organizations are able to access credit from the Bolivian Central Bank at low interest rates and with other positive terms, currently not available to private entities (U.S. DOS, 2017f).

Public entities are also likely to be treated preferentially in regards to accessing licenses, supplies, materials, and land (U.S. DOS, 2017f). Incentives to invest in sustainable infrastructure projects are not available, and the Bolivian government currently prioritizes and provides incentives in the hydrocarbons sector, where PPPs are allowed only when the State has a majority of project shares. Bolivia has not established initiatives to manage risks of policy change, while agreements to stabilize policy, laws, and regulations are not available for domestic or foreign investors.

Bolivia is currently in the process of implementing a multi-year budget framework that covers three fiscal years; public entities are not required to develop multi-annual budgets (IMF, 2014; 2016). National green bond standards or guidelines have not been developed in Bolivia, while green bonds have never been used for infrastructure. Furthermore, Bolivia has not established a national carbon pricing scheme to value GHG emissions and lacks a national emissions trading scheme (ETS). The country, however, has ratified the Paris Agreement and submitted its NDC targets.

National laws and frameworks have not been established for corporate governance and social responsibility, but the Bolivian government requires public and private entities to implement international corporate governance and social responsibility guidelines (U.S. DOS, 2017f). In addition, the Bolivian Constitution promotes responsibility, social justice, distribution, and redistribution of the products and social assets in order to live well, which is regarded as an indirect mandate for corporate social responsibility. The Investment Law of 2014 mandates that foreign companies investing in Bolivia have to donate equipment and machinery to universities and schools in areas close to their investments, as well as implement research projects that add social value.

4.1.2 Energy

The Ministry of Energy and the Ministry of Hydrocarbons are the public entities responsible for the development of the energy sector in Bolivia. The Ministry of Hydrocarbon and Energy was divided into two distinct ministries in 2017, one of many actions taken by the Bolivian government to focus more on renewable energy, as well as expand capacity to facilitate electricity exports to neighboring countries. Bolivia relies considerably on hydrocarbons and hydropower for energy generation, and, until recently, the participation of other renewable energy sources in the energy matrix was minimal.

For example, the first wind farm commenced operations in 2014, while the first solar PV power plant entered the development stage in 2015 (Bloomberg New Energy Finance, 2016). The Ministry of Hydrocarbons is responsible for the exploitation, export, trade, and storage of hydrocarbons, while the Ministry of Energy is responsible for electricity and renewable energy. Bolivia does not have a national energy policy and the long-term goals and needs of the sector are specified through NDPs and strategies.

The participation of private entities in energy infrastructure projects in Bolivia is limited, as concessions for energy projects are prohibited. Initiatives to stabilize tax and legal frameworks are not available for energy projects, while national incentives to invest in renewables have not been established. It must be noted, however, that Bolivia established renewable energy incentives in 2005, providing tax reliefs applicable only in the Beni and Pando departments, both of which are isolated rural regions with very low electrification levels.

National incentives are only available for hydrocarbon projects, but hydrocarbon resources have been designated as property of the Bolivian State and People and can only be managed by public entities, or through joint ventures where the State maintains the majority of the project shares.

4.1.3 Water

The Ministry of Environment and Water is responsible for the development of the water infrastructure sector in Bolivia. The water sector lacks an up-to-date overarching water law and relies on the Bolivian Water Law for regulation. The Water Law was enacted in 1906, and its principles have been minimally modified ever since. Bolivia has tried to reform the Water Law multiple times, but these have been unsuccessful, and the overarching water management principles remain the same.

The Vice Ministry of Potable Water and Basic Sanitation develops and implements national policies and plans, while the Vice Ministry for Water Resources and Irrigation is responsible for managing national water resources. The Authority for Supervision and Social Control of Drinking Water and Basic Sanitation, under the Ministry of Environment and Water, is the water regulator.

Bolivia has not developed a national water policy, and the long-term needs and goals of the sector are specified in its NDP. It is important to note that in 2009, Bolivia adopted a new Constitution that established water as a human right and emphasizes universal access to water as a long-term priority for the sector. The participation of private entities is not allowed in water infrastructure projects, in both the potable water and sanitation sub-sectors, while legal and tax stability agreements are not available for domestic and foreign investors involved in the development of water infrastructure projects. Furthermore, Bolivia has not established national incentives to facilitate investments in water infrastructure projects, including water projects that implement sustainability practices.

4.1.4 Transportation

The Ministry of Public Works, Services, and Housing is the public entity responsible for the development of the transportation sector in Bolivia. The Vice Ministry of Transport proposes policies and implements the national transportation plans that are specified through its NDP. The General Directorate of Land, River, and Lake Transport is responsible for land and river transport, and the General Directorate of Air Transport is responsible for air transport. Bolivia is a landlocked country and does not have any ports.

National transportation plans and policies are developed in accordance with the principles of the Transport Act No. 165 of 2011, which is the overarching law that regulates the transportation sector. The Regulatory Authority for Telecommunications and Transport (*Autoridad de Regulación y Fiscalización de Telecomunicaciones y Transporte*) is responsible for regulating the

sector. Bolivia has not yet developed a National Transportation Policy, with its long-term needs and sectoral goals included in the NDP.

Private entities are not allowed to develop and operate projects as concessions. National incentives to invest in sustainable transportation infrastructure are not available, nor legal and tax stability agreements for domestic and foreign investors. Nevertheless, public and private entities are governed under the same laws and regulations and there are no specific policies that favor public over private entities involved in the transportation sector.

Table 2 summarizes our assessment of the institutional framework in Bolivia through the 19 institutional framework parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	3,0				
2. Up to date, relevant infrastructure policies.	0,7				
3. Relevant, de-centralized regulator per infrastructure sector.	2,3				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	0,3				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	2,3				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	0,0				
7. National development and infrastructure plans aligned with SDGs and NDCs.	0,0				
8. Multi-year budgeting of infrastructure projects by the responsible ministry.	0,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	0,0				
10. Level playing field for public and private enterprises with equal regulations and incentives.	0,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	0,0				
13. National frameworks and incentives for corporate governance and social responsibility.	1,0				
14. National frameworks and incentives for sustainability and climate risk disclosure.	0,0				

15. Sustainable certification scheme for infrastructure providers.	3,0				
16. National carbon emissions price or national ETS.	0,0				
17. Functional, de-centralized environmental assessment authority.	3,0				
18. National and sectoral frameworks for disaster risk management.	0,0				
19. Formal and functioning frameworks for community consultation.	4,0				

Table 2. Bolivia's institutional framework parameter scores.

4.2 Chile

4.2.1 General

The Ministry of Public Works is the central public entity responsible for managing infrastructure works in Chile, including transportation and water projects. Energy infrastructure projects are the responsibility of the Ministry of Energy. The Ministry of Public Works is territorially decentralized, with Regional Ministerial Secretariats in all 15 Chilean regions. The ministry enacts and implements legislation that regulates public infrastructure projects and construction contracts. Chile does not have a policy that covers the entire infrastructure sector, and each public-sector entity is responsible for developing and implementing its own national policy. However, the ministry's long-term plans are aligned with the central government's vision as specified through the NDPs.

Private participation is allowed in the infrastructure sector, with Chile being one of the first countries in the LAC region to enact a Concessions Law and establish a framework to facilitate PPPs in 1991. In general, public and private entities in the infrastructure sector are governed under the same laws and regulations, and public entities are not treated preferentially. Chile allows domestic and foreign investors to request tax stability in regards to value-added tax and customs duty, although the customs duty stability initiative applies only to machinery and equipment that is not available in Chile. Furthermore, a stable income tax rate can be granted for 10 years when projects require investments that exceed \$50 million and 20 years when developing industrial or extractive projects (U.S. DOS, 2017a). National principles and guidelines for green bonds are not available. A green bond for infrastructure development has not yet been issued by the Chilean government, but there is one issuance from its private sector.¹ Chile established a national carbon emissions tax in 2017,² but still does not have an operational national ETS.

Although Chile publishes a medium-term budget, it focuses mostly on providing projections for fiscal indicators, and it does not explicitly indicate the government's medium-term commitments

¹The green bond market in Chile is in the early stages of development. In fact, in 2017 Inversiones CMPC (a subsidiary of Empresas CMPC) was the first private entity to issue a \$500 million green bond to finance sustainable forestry, biodiversity preservation, sustainable water management, pollution prevention, and control and energy efficiency projects (Climate Bonds Initiative, 2017).

²The national carbon tax prices carbon at \$5 per ton of emissions. In addition, carbon emissions are valued at \$32.5 per ton while evaluating projects in the Chilean national investment system.

(Organisation for Economic Co-operation and Development (OECD), 2017b). Chile has established national incentives to invest in sustainable infrastructure that are applicable to the energy and transportation projects. Incentives for general public works were not found. The domestic capital market is strong, including some of the biggest domestic institutional investors compared to the rest of the LAC region. However, overall, institutional investments in infrastructure in Chile remain particularly low (EIU, 2017). Chile was one of the first countries in LAC to use project bonds for infrastructure projects in the 1990s, to attract indirect institutional investor participation (Tuesta, 2016), while implementing its national concessions program, especially for highways and airports. Yet, institutional investors are prohibited by law to invest directly in equity funds and infrastructure projects. In May 2016, the Chilean government introduced in Congress the Bill No. 10.661–05 that would allow institutional investors to invest directly in private equity funds and infrastructure projects, including concessions, in an effort to expand access to institutional investors in infrastructure projects (Program for the Promotion of Public-Private Associations in Mexican States, 2016). The Bill has not yet been approved, but the Congress expects to approve it by the end of 2017.

4.2.2 Energy

The Ministry of Energy is the public entity responsible for the development of the Chilean energy sector. The ministry develops and implements policies, standards, and plans for energy infrastructure projects. The sector is regulated by the general electric service law, which was last updated in 2014. The National Energy Commission is a decentralized, autonomous public entity responsible for regulation, while the Electricity and Fuels Superintendence develops the sector's technical standards. Notably, in order to promote a more efficient and decentralized management system, Chile created regional energy secretariats in all 15 of its regions. The Chilean government published in 2015 the National Energy Policy 2050, which sets the strategic priorities for the energy sector. The policy specifies that at least 70 percent of the annual energy needs will be satisfied by renewable energy sources by 2050, yet without indicating the percentage that would be covered by each different renewable energy source in the mix, such as wind and solar PV. The Chilean authorities have not yet evaluated the alignment of the national energy policy with Chile's SDG and NDC commitments on emissions reduction.

Private participation is allowed in the energy sector, and generation, transmission, and distribution activities can be carried out by private entities. Domestic and foreign investors can request tax stability agreements for energy projects, granting the same benefits as those previously mentioned in the general infrastructure section. Chile has also implemented national incentives to invest in renewable energy projects. A renewable energy mandate was specified through the law No. 20.257 of 2013 that obliges utilities to have at least 20 percent of their electricity from renewable sources by 2025. Furthermore, since 2004, renewable energy projects with capacity smaller than 9 MW benefit from a 100 percent transmission charge exemption. Renewable energy projects with capacity between 9 and 20 MW benefit from partial transmission charge exemption ranging from 100 percent for 9 MW projects to 0 percent for projects in excess of 20 MW. Notably, Chile developed a designated auction system for renewable energy technologies in September, through which generators commit to supply renewable electricity for specific time periods during the day (Bloomberg New Energy Finance, 2016). However, only two auctions have been observed so far. Specific frameworks for corporate governance and social responsibility, sustainability and climate risk disclosure, and disaster risk management are not available in

energy. Chile has national frameworks or incentives for these aspects, but sector-specific frameworks for energy projects have not yet been developed.

4.2.3 Water

The General Directorate of Waters and the General Directorate for Hydraulic works, both under the Ministry of Public Works, are responsible for managing water resources in Chile. The ministry sets the overarching goals for the sector and the General Directorate of Waters is responsible for implementing the national water policies. The Superintendence of Sanitary Services is a decentralized, autonomous public entity with its own budget responsible for water and sanitation regulation, and developing guidelines and standards. The sector is regulated by the Water Code of 1981. However, although the code was last amended in 2005, it is currently not in par with water legislation in other OECD countries, hindering Chile's efforts to facilitate sustainable, integrated water management (OECD, 2017b). A Water Code reform is pending since 2011, but it has not yet been approved through the Senate (OECD, 2017b). Nevertheless, a National Water Resource Policy was issued in 2015, setting a long-term vision for the sustainable development of the sector. Furthermore, Chile has implemented a 2012–2025 National Water Resource Strategy that sets medium- and long-term priorities per infrastructure sector. The Chilean authorities have not yet evaluated the alignment of the national policies with Chile's SDG and NDC emissions reduction commitments.

Private participation is allowed in the water sector, and private entities can develop and operate infrastructure projects in both the water supply and sanitation sub-sectors. Yet, incentives to facilitate investments in sustainable water infrastructure projects are not available in Chile. Nevertheless, domestic and foreign investors can request legal and tax stability agreements for water infrastructure projects, which grant the benefits described in the general infrastructure section. A gap exists in the availability of water-specific frameworks for corporate governance and social responsibility, sustainability and climate risk disclosure, disaster risk management, and community consultation. Although Chile has established national frameworks or incentives for these aspects, sector-specific frameworks to guide their implementation in water projects have not yet been developed.

4.2.4 Transportation

The Ministry of Public Works and the Ministry of Transport and Telecommunications are the central public entities responsible for the development of the transportation sector in Chile. The Ministry of Public Works specifies the long-term needs and objectives for the sector, and the Ministry of Transport and Telecommunications is responsible for developing and implementing national policies in order to achieve these objectives. Notably, the Ministry of Transport and Telecommunications is responsible for the development of urban transit, including the BRT sub-sector. Chile has specific regulations that cover land, air, and maritime transport. Land transport regulations cover both urban and rural transportation aspects, as well as public transport. The National Transportation Policy of 2013 establishes the long-term objectives for the transportation sector, specifying strategic goals for the land, air, and maritime transport sub-sectors. The Chilean authorities have not yet evaluated if the national transportation policy is aligned with Chile's SDG and NDC commitments for emissions reduction.

Private participation is allowed in the transportation sector, in all its sub-sectors. In fact, the wide majority of PPPs through the concessions system were highways. In terms of incentives to invest in sustainable infrastructure projects, Chile allows the blending of bioethanol and biodiesel in conventional fuels but has not enforced an official mandate. However, it has implemented fiscal incentives for biodiesel and bioethanol in the form of fuel tax exemptions (International Renewable Energy Agency (IRENA), 2017). Domestic and foreign investors can request legal and tax stability agreements for transportation projects, which grant the benefits described in the general infrastructure section.

As with the energy and water sectors, transportation-specific frameworks for corporate governance and social responsibility, sustainability and climate risk disclosure, disaster risk management, and community consultation are not available. Table 3 summarizes our assessment of the institutional framework in Chile through the 19 institutional framework parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	3,7				
2. Up to date, relevant infrastructure policies.	4,0				
3. Relevant, de-centralized regulator per infrastructure sector.	3,0				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	4,0				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	3,3				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	3,3				
7. National development and infrastructure plans aligned with SDGs and NDCs.	0,3				
8. Multi-year budgeting of infrastructure projects by the responsible ministry.	3,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	4,0				
10. Level playing field for public and private enterprises with equal regulations and incentives.	4,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	3,0				

13. National frameworks and incentives for corporate governance and social responsibility.	0,8				
14. National frameworks and incentives for sustainability and climate risk disclosure.	1,0				
15. Sustainable certification scheme for infrastructure providers.	3,0				
16. National carbon emissions price or national ETS.	4,0				
17. Functional, de-centralized environmental assessment authority.	4,0				
18. National and sectoral frameworks for disaster risk management.	1,0				
19. Formal and functioning frameworks for community consultation.	4,0				

Table 3. Chile's institutional framework parameter scores.

4.3 El Salvador

4.3.1 General

The Ministry of Public Works, Transport, and Urban Development (hereafter Ministry of Public Works) is the central government entity responsible for the development of public works, transportation, housing, and urban development in El Salvador. Overarching legislation that covers the entire infrastructure sector is not available, and each sub-sector is regulated by its own distinct legal framework. Similarly, an overarching policy for the development of the infrastructure sector is not available, but Ministry of Public Works' plans are aligned with the NDP, which sets a long-term vision for the sustainable development of public infrastructure.

The participation of private entities is allowed in the development and operation of infrastructure in El Salvador, with the exception of the water sector. In fact, El Salvador, has established comprehensive initiatives to manage risks of policy change in order to make the infrastructure sector more attractive to both domestic and foreign investors. Specifically, the Law of Legal Stability for Investments of 2015 covers the energy, strategic infrastructure, and logistics projects, among others, enabling investors to request tax stability agreements at local and municipal levels, and stability in tax exemptions, customs procedures, the right to transfer funds abroad, and the immigration regime in regards to the investor's residence status (Invest in El Salvador, 2017). In addition, public and private entities are governed under the same laws and regulations, and state-owned entities are not treated preferentially.

National incentives to invest in sustainable infrastructure are available, but just for the energy sector. El Salvador has not implemented efforts to enhance the capacity of local capital markets to finance infrastructure projects. Furthermore, El Salvador allows both direct and indirect institutional investments in infrastructure, as well as institutional participation in infrastructure investment funds. However, policies or initiatives to expand access to institutional investors and facilitate more infrastructure investments have not been implemented, and institutional participation in infrastructure projects remains low (EIU, 2017).

El Salvador has not established national frameworks for corporate governance and social responsibility. However, public and private entities are encouraged to implement international good practice corporate governance frameworks, and the country is a member of international institutions that promote corporate governance and social responsibility, such as the Inter-American Corporate Social Responsibility Network (U.S. DOS, 2017d). In 2006, El Salvador enacted the general regulation and law for civil protection, disaster prevention, and mitigation that prioritizes the consideration of disaster risk management aspects while developing infrastructure projects. Furthermore, disaster risk has been identified as one of the top priorities in the NDP, and the government has committed to develop disaster risk management guidelines and mechanisms. Yet, a national framework for disaster risk management or an official policy has not yet been developed.

4.3.2 Energy

The National Energy Commission is the public entity responsible for developing and overseeing the energy sector in El Salvador. The overarching legislation that regulates the sector is the General Electricity Law of 1996, which was last modified in 2017. In 2010, the National Energy Commission developed the National Energy Policy 2010–2024 that sets the long-term goals for the sustainable development of the energy sector, aiming to reduce oil dependency and expand renewable energy sources in the national energy system.

The energy market in El Salvador is liberalized, and legal and regulatory frameworks promote the participation of private entities in the generation, distribution, and sale of electricity. Furthermore, national incentives have been established to facilitate investments in sustainable energy projects. El Salvador enacted the Renewable Energy Incentives Law in 2007, providing tax exemption for five years for projects with capacity exceeding 10 MW, and for 10 years for projects with capacity less than 5 MW. Furthermore, the law provides total tax exemption on revenues from the sale of certified emissions reductions.³ Domestic and foreign investors can request legal stability agreements while developing energy projects under the provisions of the Law of Legal Stability for Investments of 2015.

4.3.3 Water

The National Aqueduct and Sewer Administration is the public entity responsible for the development of the water sector. El Salvador lacks a coherent legal framework and a decentralized regulator for the water sector, and has had an institutional gap for decades in regards to water resources management. The national General Water Law was enacted in 1906 but, despite several attempts to revise it, it remains without any updates ever since. Currently, the National Aqueduct and Sewer Administration works as an umbrella institution that is responsible for policy-making, regulation, and service provision in the water and sanitation sub-sectors. Nevertheless, a National Water and Sanitation Policy was implemented in 2011, setting the water sector's strategic objectives over the 2011–2015 period.

³ Certified emissions reductions are carbon credit units issued by the Clean Development Mechanism to certify the emissions reductions achieved by the Clean Development Mechanism-sponsored projects.

The participation of private entities is not allowed in the development and operation of water projects. In fact, a principal reason El Salvador has been struggling with revising its General Water Law is the debate on whether private entities should be allowed to develop and operate water projects. Furthermore, incentives to invest in sustainable projects in the water sector are not available, while the Law of Legal Stability for Investments of 2015 is not applicable to water projects. As such, domestic and foreign investors in water cannot request legal stability agreements.

4.3.4 Transportation

The Ministry of Public Works is the public entity responsible for the transportation in El Salvador. The General Land Transport Regulations of 1995 is the overarching law that regulates the sector, which was last updated in 2002 through the executive decree No. 35. An independent transport regulator has not been established, and the Vice Ministry of Transport under the Ministry of Public Works is responsible for regulating urban and rural land, air, and maritime transport. El Salvador developed a National Transportation Policy in 2010, which sets strategic priorities for the modernization of the transportation sector, focusing particularly on the BRT sub-sector.

Private entities are allowed to participate in the development and operation of transportation infrastructure projects, and domestic and foreign investors are able to request legal stability agreements under the provisions of the Law of Legal Stability for Investments of 2015. Incentives to invest in sustainable projects in the transportation sector have not been specified in El Salvador.

Table 4 summarizes our assessment of the institutional framework in El Salvador through the 19 institutional framework parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the ¼ full circle indicates an insufficient value, the ½ full circle indicates an average value, the ¾ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	1,0				
2. Up to date, relevant infrastructure policies.	2,0				
3. Relevant, de-centralized regulator per infrastructure sector.	2,3				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	2,7				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	2,3				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	3,0				
7. National development and infrastructure plans aligned with SDGs and NDCs.	0,0				

8. Multi-year budgeting of infrastructure projects by the responsible ministry.	4,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	4,0				
10. Level playing field for public and private enterprises with equal regulations and incentives.	4,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	0,0				
13. National frameworks and incentives for corporate governance and social responsibility.	0,0				
14. National frameworks and incentives for sustainability and climate risk disclosure.	0,0				
15. Sustainable certification scheme for infrastructure providers.	3,0				
16. National carbon emissions price or national ETS.	0,0				
17. Functional, de-centralized environmental assessment authority.	3,0				
18. National and sectoral frameworks for disaster risk management.	1,0				
19. Formal and functioning frameworks for community consultation.	0,0				

Table 4. El Salvador's institutional framework parameter scores.

4.4 Jamaica

4.4.1 General

Jamaica does not have a central public entity responsible for the development of infrastructure, and respective ministries and public entities are responsible for sectors under their jurisdiction. Furthermore, a national public infrastructure policy is not available, but the national infrastructure policies implemented by each respective public entity are aligned with the Jamaica Vision 2030 NDP, which specifies the government's vision for the energy, water, and transportation sectors up to 2030. The Planning Institute of Jamaica, under the Ministry of Finance and Planning, is responsible for coordinating the development of policies, and national, regional, and sectoral plans and programs for the development of Jamaica.

The participation of private entities is allowed in the development and operation of infrastructure projects. In fact, the Jamaican government has focused considerably on promoting PPPs and has an active privatization program. Yet, Jamaica has not established initiatives to manage risks of policy change by stabilizing policy, laws, and regulations. Furthermore, national incentives to invest in sustainable infrastructure are not available, but income tax reliefs are provided for large-

scale and/or pioneering projects,⁴ which might cover sustainable infrastructure projects. Projects must be assessed through an Economic Impact Assessment, and then approved by the Jamaican Parliament in order to be designated as large scale and/or pioneering.

Jamaica has implemented a medium-term budget framework and requires national and sectoral entities to propose multi-year budgets that cover a fiscal period of three years. Yet, the country has made efforts to enhance the capacity of local capital markets, and domestic investments in infrastructure remain very limited (EIU, 2017). Furthermore, initiatives to expand access to institutional investors were not identified, and institutional investments in infrastructure in Jamaica remain very low (EIU, 2017). A carbon market has not yet been developed in Jamaica, as the country lacks a national carbon emissions pricing mechanism; an ETS is also not available. There is no information on whether Jamaica plans to implement a carbon pricing mechanism or an ETS in the near future. Finally, Jamaica has not established national social responsibility frameworks or incentives and does not exhibit alignment with international corporate governance and social responsibility guidelines (U.S. DOS, 2017c).

4.4.2 Energy

The Ministry of Science, Technology, Energy and Mining is responsible for the development of the energy sector in Jamaica, including the development and implementation of energy policies and legislation. The Energy Division formulates and implements energy infrastructure strategies in accordance with the NDPs and priorities. The energy sector is regulated by the Electricity Development Act, which was last amended in 1971. Jamaica has not created a decentralized, autonomous entity to regulate the energy market, with the Ministry of Energy and Mining acting as the regulator. In 2009, the Ministry of Science, Technology, Energy and Mining published the National Energy Policy 2009–2030 that establishes the Jamaican government's long-term vision for the sustainable development of the energy sector. Jamaica stands out in this aspect as, in addition to the national energy policy, it has developed a Renewable Energy sub-policy for the renewable energy sector as a whole (albeit focusing particularly on wind energy), as well as biofuels and energy-from-waste sub-policies.

Private entities are allowed to develop and operate energy projects, as the energy sector has been liberalized. However, government incentives to invest in sustainable energy projects are not available. Although Jamaica has developed national renewable energy policies, the policies set the long-term objectives for the sector but without specific initiatives to facilitate investments. Yet, renewable energy projects might be available for income tax reliefs in case the Jamaican Parliament designates such projects as large scale and/or pioneering.

4.4.3 Water

The National Water Commission, under the Ministry of Agriculture and Irrigation, is responsible for managing water resources and the development of water infrastructure in Jamaica. The sector is regulated by the Water Resources Act of 1995, which has not been updated ever since. The Water Resources Act established the Water Resources Authority as the regulatory entity for surface and sub-surface water bodies, while water and wastewater utilities are regulated by the Office of the Utilities Regulation. Jamaica published a National Policy and Strategy for Water

⁴ The Ministry of Finance designates projects as large scale and/or part of a pioneer industry.

Resources in 2012, which sets the medium- and long-term vision for the development of the sector. In 2013, the National Plan for Water Resources was published to specify the initiatives in order to achieve the goals set in the national policy.

The participation of private entities is allowed in water infrastructure projects, in both water and sanitation sub-sectors. However, national government incentives to invest in general water infrastructure projects, or water projects that implement sustainability practices such as utilizing greywater and/or revitalizing polluted ecosystems, were not identified. Yet, water projects that are designated as large-scale and/or pioneering by the Ministry of Finance and approved by the Jamaican Parliament can benefit from tax reliefs.

4.4.4 Transportation

The Ministry of Transport and Mining is the central public entity responsible for the development of the transportation sector in Jamaica. The sector is regulated by the Transport Authority Act of 1987, which was last updated in 2005. A decentralized, autonomous regulatory entity has not been established, and MTW acts as the regulator. Jamaica developed a National Transport Policy in 2007, setting a five-year development plan for the transportation sector that includes investment programs for the land, air, and water sub-sectors; however, the policy has not been updated. Instead, Jamaica specifies the long-term needs of the sector through the Vision 2030 NDP.

The participation of private entities is allowed in the development and operation of transportation infrastructure projects. Furthermore, Jamaica has established an E10 ethanol mandate⁵ in order to facilitate more sustainable transportation. Other specific tax and legal incentives are not available for the transportation sector, but domestic and foreign investors can benefit from tax reliefs in case the Jamaican Parliament designates the project as large-scale and/or pioneering.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	1,0				
2. Up to date, relevant infrastructure policies.	1,0				
3. Relevant, de-centralized regulator per infrastructure sector.	3,0				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	3,7				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	3,0				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	3,0				
7. National development and infrastructure plans aligned with SDGs and NDCs.	1,0				
8. Multi-year budgeting of infrastructure projects by the responsible ministry.	4,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	0,0				

⁵ The E10 mandate specifies that 10 percent of gasoline content must come from ethanol.

10. Level playing field for public and private enterprises with equal regulations and incentives.	4,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	0,0				
13. National frameworks and incentives for corporate governance and social responsibility.	0,0				
14. National frameworks and incentives for sustainability and climate risk disclosure.	0,0				
15. Sustainable certification scheme for infrastructure providers.	3,0				
16. National carbon emissions price or national ETS.	0,0				
17. Functional, de-centralized environmental assessment authority.	3,0				
18. National and sectoral frameworks for disaster risk management.	1,0				
19. Formal and functioning frameworks for community consultation.	0,0				

Table 5. Jamaica's institutional framework parameter scores.

Table 5 summarizes our assessment of the institutional framework in Jamaica through the 19 institutional framework parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the ¼ full circle indicates an insufficient value, the ½ full circle indicates an average value, the ¾ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

4.5 Nicaragua

4.5.1 General

The Ministry of Transport and Infrastructure is the public entity responsible for the development of the infrastructure sector in Nicaragua. The ministry has not enacted overarching legislation that covers the entire infrastructure sector. However, in 2013, the Nicaraguan government enacted the Special Law for the Development of Nicaraguan Infrastructure and Transport access to the Canal, Free Trade Zones, and Associated Infrastructure. This law reinforced the role of the Nicaraguan State in providing infrastructure services, and in the same time authorized the Nicaraguan Canal megaproject.⁶ Similarly, although a national infrastructure policy does not exist, the Special Law sets the vision for developing infrastructure projects that are sustainable and

⁶ The Nicaragua Canal is a planned shipping canal project through Nicaragua connecting the Caribbean Sea and the Pacific Ocean.

efficient for the State and the Nicaraguan people, without making any distinctions in regards to specific infrastructure sectors.

Nicaragua enacted the PPP Act in 2016, allowing the participation of private entities in infrastructure. Yet, it retains a government monopoly in sectors strategic for the nation's development, including potable water and sanitation, energy transmission, and ports. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations have not been identified in Nicaragua. Furthermore, even if public and private entities are governed under the same regulations, private entities might face competitive challenges in sectors where the State has a big market share, including electricity generation (U.S. DOS, 2017e).

Nicaragua was one of the first countries in the LAC region to develop a medium-term budget framework through the law No. 550 of 2005. The law explicitly indicates the commitments of each public entity over three fiscal years, which are evaluated and revised annually. A Public Investment Program publication identifies the budget allocated to each infrastructure sector over the next three fiscal years, which again are published and revised annually.

Government incentives to invest in sustainable infrastructure projects are available only for renewable energy projects, which are discussed in the following energy sub-section of this work. Nicaragua has not yet utilized green bonds for infrastructure, neither has developed green bond standards or guidelines. Furthermore, Nicaragua does not have a national carbon market, as a carbon price to value GHG emissions or a national ETS have not yet been established. Finally, Nicaragua does not have national social responsibility frameworks, and developers and companies are not explicitly required to implement international corporate governance and social responsibility guidelines (U.S. DOS, 2017e).

4.5.2 Energy infrastructure

The Ministry of Energy and Mines is the public entity responsible for the development of the energy sector in Nicaragua. The ministry was created in 2007 following the implementation of the first update of the Strategic Plan for the Energy Sector of 2004, which set the diversification of the national energy system as a priority. Previously, the Nicaraguan Energy Commission was the public entity responsible for planning and policy-making in the energy sector. The law No. 272 of 1998 is the overarching law that regulates the sector, establishing the principles for the development of a competitive energy market including the participation of the private sector.

Nicaragua has enacted specific laws for the development of renewable energy, including the Law for the Promotion of Electricity Generation from Renewable Sources No. 532 of 2005, the Exploration and Exploitation of Geothermal Resources law No. 443 of 2002, and the Reform Promotion Act for the Hydroelectric Sub-Sector No. 531 of 2003. The Ministry of Energy and Mines is responsible for developing national energy policies, while the Nicaraguan Energy Institute (*Instituto Nicaragüense de Energía*) is the decentralized public regulatory authority. The Institute approves and controls energy prices, authorizes generation and transmission licenses, concessions and power purchase agreements.

Private entities are allowed to develop and operate projects in energy generation and distribution, but not in transmission,⁷ where the government retains a monopoly. The law No. 532 of 2005 on

⁷ Electricity carried through high-voltage transmission lines is reduced to lower voltages at local substations/transformers, and is then distributed through distribution lines to households and businesses.

the Promotion of Renewable Electricity Generation from Renewable Sources mandates energy distributors to cover a specific percentage of their capacity from renewable energy sources, prioritizing geothermal, hydropower, wind, solar PV, and biomass. The Institute specifies the percentage that must be covered by renewable energy, in accordance with the national energy policy and strategies.

Law 532 established general incentives for renewable energy investments, and specific incentives for hydropower projects. Specifically, investors are granted exemptions from payment of import duties and value-added tax on machinery, equipment, materials, and supplies used for feasibility and construction works for renewable energy projects. Furthermore, renewable energy projects are exempt from municipal taxes for 10 years following the official start of operations. For hydropower projects, investments are exempt from all national and municipal taxes for a period of 10 years after operations commence, and from taxes for the exploitation of natural resources for five years. In addition, hydropower projects are exempt from a stamp tax for 10 years.⁸

4.5.3 Water

The National Commission for Water and Sanitary Sewage is responsible for the development of the water sector and the formulation and implementation of national water policies in Nicaragua. National Water Law No. 620 of 2010 is the overarching law that regulates the water sector. The law establishes the National Water Authority, the public entity responsible for regulating Nicaragua's national water assets, while the Nicaraguan Institute of Aqueducts and Sewers approves and regulates the potable water and sanitation services. Nicaragua does not have a national water policy to specify a long-term vision for the sustainable development of the sector.

Private entities are not allowed to develop and operate infrastructure projects in potable water and sanitation sub-sectors, but PPPs can be implemented for multi-purpose water management and energy projects, such as reservoirs that also generate energy, and irrigation projects. In addition, incentives to invest in water projects, or projects that focus on sustainability in the water sector, are also not available. Finally, tax and legal stability agreements are not available for domestic and foreign investors developing water projects.

4.5.4 Transportation

The Ministry of Transport and Infrastructure is the public entity responsible for the development of the transportation sector in Nicaragua. It operates under the principles of the General Law of Land transport of 2005, which is the overarching law that regulates the transportation sector. The law establishes the ministry as the entity responsible for regulating the land transport sector, and the General Directorate of National Aquatic Transport and the General Directorate of Civil Aviation are responsible for regulating the water and air transport sectors, respectively. The participation of private entities is allowed in the transportation projects, with the exception of ports where the government retains a monopoly. Incentives to invest in sustainable transportation projects have not been implemented, and tax and legal stability agreements are not available for investors.

Table 6 summarizes our assessment of the institutional framework in Nicaragua through the 19 institutional framework parameters. Each parameter can have the following values: 0

⁸ A stamp tax or stamp duty is imposed when issuing documents necessary for project developments in Nicaragua.

(nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	3,3				
2. Up to date, relevant infrastructure policies.	1,3				
3. Relevant, de-centralized regulator per infrastructure sector.	3,3				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	2,7				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	3,3				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	0,0				
7. National development and infrastructure plans aligned with SDGs and NDCs.	0,0				
8. Multi-year budgeting of infrastructure projects by the responsible ministry.	4,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	0,0				
10. Level playing field for public and private enterprises with equal regulations and incentives.	0,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	0,0				
13. National frameworks and incentives for corporate governance and social responsibility.	1,0				
14. National frameworks and incentives for sustainability and climate risk disclosure.	0,0				
15. Sustainable certification scheme for infrastructure providers.	0,0				
16. National carbon emissions price or national ETS.	0,0				
17. Functional, de-centralized environmental assessment authority.	3,0				
18. National and sectoral frameworks for disaster risk management.	1,0				
19. Formal and functioning frameworks for community consultation.	4,0				

Table 6. Nicaragua's institutional framework parameter scores.

4.6 Peru

4.6.1 General

Peru does not have a centralized entity responsible for public infrastructure works. The infrastructure management system is decentralized, with different ministries responsible for projects under their jurisdiction. For example, the Ministry of Transport and Communications is responsible for the transportation sector. Each public entity enacts and implements relevant laws and policies. An overarching law that covers the infrastructure sector as a whole was not identified in Peru, while a national public infrastructure policy that sets the national long-term objectives for infrastructure is also not available.

The participation of private entities is allowed in the development and operation of projects, without any restriction. Public and private entities are governed under the same laws and regulations and the Peruvian government does not favor public entities, either directly or indirectly (U.S. DOS, 2017b). Initiatives to manage risks of policy change are available, as Peru allows both foreign and national investors to request legal and tax stability agreements. The agreements ensure that income tax, remittance, export promotion, administrative procedures, and labor hiring regimes applicable at the time the project contract is signed remain stable for the following 10 years. The law requires that project investments must exceed \$10 million in the mining and hydrocarbon sectors, and \$5 million within two years in other sectors. Notably, these initiatives are heavily targeted towards foreign investors.

Peru implemented reforms in 2017 to expand its multi-year budgeting framework to include explicit medium-term three-year commitments (IMF, 2017a). Up to 2017, the budget framework included projections and budget estimates without explicitly indicating the amount allocated for infrastructure projects. Peru has implemented extensive efforts to involve domestic capital markets in infrastructure projects, as well as to expand access to institutional (pension and insurance fund) investors. These efforts include a \$1.4 billion pension fund trust for infrastructure investments (Tuesta, 2016) and not imposing portfolio limits for infrastructure investments in pension funds. As such, Peru exhibits the strongest institutional investment penetration in infrastructure projects within the LAC region (EIU, 2017).

In Peru, national standards for social responsibility are not available, but social responsibility is promoted through sector-specific regulations (U.S. DOS, 2017b). For example, the decree 042–2003–EM facilitates corporate responsibility in the mining and energy sectors. It encourages project companies to provide local employment opportunities, support local communities in infrastructure development, and purchase local goods and services. Mining companies are required to publish an annual sustainability report, but this requirement is not applicable to energy projects.

4.6.2 Energy

The Ministry of Energy and Mines is the central public entity responsible for the development of the energy sector in Peru. The General Directorate of Electricity, under the Ministry of Energy and Mines, is responsible for formulating and implementing energy policies. The sector is regulated by the Electric Concessions Law of 1992, which liberalized and divided the energy market in the generation, transmission, and distribution segments, allowing the entry of private companies into the Peruvian energy system. The Energy and Mining Investment Regulator (*Organismo Supervisor de la Inversión en Energía y Minería*), created in 1996, is the energy sector's

decentralized, autonomous public regulator. Peru published in 2010 its National Energy Policy 2010–2040, which sets a long-term vision for the sustainable development of the energy sector.

Ever since the energy sector was liberalized in 1992, Peru has focused considerably on promoting PPPs for energy infrastructure projects. Currently, the State maintains a little less than half of the national generation capacity. Likewise, almost all transmission lines have been transferred to the private sector. Distribution infrastructure was privatized in Lima and some other cities, but several state-owned distribution companies still exist in the interior of the country. For energy projects, domestic and foreign investors can request legal and tax stability agreements for energy infrastructure projects, which grant the same benefits that are applicable to general infrastructure projects, mentioned previously in the general infrastructure section.

Peru has implemented several initiatives to facilitate investments in sustainable energy projects. The decree No. 1058 of 2008 allows accelerated depreciation for income tax purposes of up to 20 percent of the investments in machinery, equipment, and civil construction works for renewable energy projects. Furthermore, the decree established mandatory Renewable Energy Portfolio Standards for utilities, which are required to ensure that 5 percent of their generation capacity comes from renewable energy sources. Finally, the decree No. 1002 of 2008 specifies that renewable energy projects can benefit from Renewable Energy Priority Dispatch, which includes biomass, geothermal, hydropower up to 20 MW, solar, wave, and wind projects.

4.6.3 Water

The National Water Authority (*Autoridad Nacional del Agua*) under the Ministry of Agriculture and Irrigation, is responsible for managing water resources in Peru. The National Water Authority is a decentralized entity, which supervises 14 Water Administrative Authorities, 71 Local Water Administrations, and eight Basin Water Resources Councils. The sector is regulated by the Water Resources Act, which was updated in 2009. The National Superintendence of Sanitation Services is a decentralized, autonomous public entity with its own budget, responsible for market regulation in the water and sanitation sub-sectors. Peru published a National Policy and Strategy for Water Resources in 2012, which sets the medium- and long-term vision for the development of the sector. In 2013, the National Plan for Water Resources was published to specify the initiatives in order to achieve the goals set in the national policy.

The latest Water Resources Act update in 2009 created the National Water Resources Management System. This is a platform made up of all public entities responsible for water management and stakeholders, and includes the actions required to achieve the national water policy goals. The participation of private entities in the development of water infrastructure projects is allowed, but incentives to invest in projects that implement sustainability practices in the water and sanitation sub-sectors were not identified. Nevertheless, initiatives to manage risks of policy change by stabilizing policy, laws, and regulations have been implemented and domestic and foreign investors can request legal and tax stability agreements. The agreements grant the benefits specified previously in the general infrastructure section. Legal and tax stability agreements specifically for the water sector were not observed.

4.6.4 Transportation

The Ministry of Transport and Communications is responsible for the development of the transportation sector in Peru. The ministry is divided into six departments responsible for specific sub-sectors and general aspects in transportation projects: (i) the General Directorate for Land Transport responsible for the development of the land transport sector, (ii) the General Directorate for Civil Aviation for the air transport sector, (iii) the General Directorate for Water Transport for the water transport sector, and (iv) the General Directorate for Roads and Railways responsible for developing technical and operational standards for roads, bridges, and railways, and the development of the railway sub-sector.

Furthermore, the General Directorate for Socio-Environmental Affairs is responsible for evaluating compliance with socio-environmental regulations in transportation projects, and the General Directorate for Concessions in Transports is responsible for promoting private investments in transport infrastructure. The transportation sector is regulated by the “General Law of Transport and Land Transit,” which was last updated in 2012. The Supervisory Agency for Investment in Public Transport Infrastructure (OSITRAN), created in 1998, is a decentralized, autonomous public entity responsible for regulating the transportation sector. In 2012, the Ministry of Transport and Communications published the latest, multi-annual strategy plan for transport, covering the 2012–2016 period. A long-term policy has not been identified for the transportation sector.

Private entities are allowed to develop and operate transportation projects, and the General Directorate for Concessions in Transport under the Ministry of Transport and Telecommunications was created to manage the transportation infrastructure concession program and attract private investment in transportation projects. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations are applicable in the transportation sector. Domestic and foreign investors can request tax and legal stability agreements that grant the same benefits as those mentioned in the general infrastructure section. Furthermore, Peru has established E7.8 ethanol and B5⁹ biodiesel fuel mandates to facilitate investments in sustainable transportation projects (IRENA, 2017). Other tax benefits to invest in transportation projects were not identified.

Table 7 summarizes our assessment of the institutional framework in Peru through the 19 institutional framework parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the ¼ full circle indicates an insufficient value, the ½ full circle indicates an average value, the ¾ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

⁹ The E7.8 ethanol mandate specifies that 7.8 percent of gasoline content should come from ethanol, and the B5 biodiesel mandate specifies that 5 percent of diesel content should come from biodiesel.

	Score	Country	Water	Energy	Transport
1. Up to date, relevant infrastructure legislation.	3,3				
2. Up to date, relevant infrastructure policies.	3,7				
3. Relevant, de-centralized regulator per infrastructure sector.	4,0				
4. Private participation allowed in the infrastructure sector vs. a government monopoly.	4,0				
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.	3,3				
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.	3,0				
7. National development and infrastructure plans aligned with SDGs and NDCs.	0,0				
8. Multi-year budgeting of infrastructure projects by the responsible ministry.	3,0				
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.	4,0				
10. Level playing field for public and private enterprises with equal regulations and incentives.	4,0				
11. National principles for green bonds.	0,0				
12. Local capital markets and policies to expand access to institutional investors.	4,0				
13. National frameworks and incentives for corporate governance and social responsibility.	0,8				
14. National frameworks and incentives for sustainability and climate risk disclosure.	1,0				
15. Sustainable certification scheme for infrastructure providers.	3,0				
16. National carbon emissions price or national ETS.	0,0				
17. Functional, de-centralized environmental assessment authority.	4,0				
18. National and sectoral frameworks for disaster risk management.	1,0				
19. Formal and functioning frameworks for community consultation.	4,0				

Table 7. Peru's institutional framework parameter scores.

4.7 Discussion of Findings

The **comprehensiveness of the institutional framework** varies considerably among the six countries of our sample, with significant differences observed in each infrastructure sector.

Overall, countries have focused on developing more comprehensive laws, regulations, and policies in the energy and transportation sectors, with laws and regulations updates within the last 5 to 15 years on average. In the water sector, we observed that regulations are outdated in most of the countries of our sample. El Salvador and Bolivia lack overarching water legislation and rely on general water principles established more than 100 years ago; potable water legislation in Jamaica was enacted in 1958 and water resource legislation in 1995. This jeopardizes and even hinders alignment with the principles of sustainability and integrated water management.

Sectoral infrastructure policies vary in their comprehensiveness in regards to promoting sustainable sub-sectors and the time period they consider. National policies in the water and transportation sectors assess each sector's needs over a period of 5 to 10 years. Furthermore, in the transportation sector, the national policies in all of the countries focus on highways; only in El Salvador and Chile the policies address specifically the development of BRT systems, primarily in their capital regions. In the energy sector, national policies consider longer periods, and in Chile and Peru national energy policies establish a long-term vision covering the 2010–2040 period (Peru), and the 2010–2050 period (Chile). Yet, these do not specify targets per each renewable sub-sector, but rather focus on the overall percentage that renewable sources can input in their respective energy systems.

In terms of capacities and commitment for effective market regulation, de-centralized, autonomous public entities exist primarily in the energy and water sectors. In the transportation sector, the responsibility for policy-making and regulation in all countries but Peru is centralized, concentrated in a single public entity, leaving little or no responsibility to other entities in the national or regional government. Peru is the only country that has a de-centralized regulator in all three of the sectors we evaluated. Chile, Jamaica, and Peru have the most liberalized infrastructure markets, allowing **private participation** in all three sectors. In the water sector, Bolivia, El Salvador, and Nicaragua prohibit private entities from developing and operating water infrastructure projects. In general, **public and private sector competition** is equal in Chile, El Salvador, Jamaica, and Peru. In Bolivia and Nicaragua, even if an explicit policy that prioritizes public over private entities does not exist, their governments tend to directly or indirectly favor their significant number of state-owned enterprises. **Initiatives to manage risks of policy change** by stabilizing policy, laws, and regulations that cover fiscal rules exist in Chile, El Salvador, and Peru. Bolivia, Jamaica, and Nicaragua have not established initiatives to manage risks of policy change.

Bolivia, Chile, and El Salvador performed poorly in terms of **multi-year budgeting**. Yet, although Jamaica, Nicaragua and Peru explicitly require national and sectoral entities to propose multi-year budgets that cover a fiscal period of three years, this period is often not enough to match timeframes for infrastructure. In terms of **availability of incentives to invest** in sustainable projects, Bolivia is the only country without specific incentives. In the energy sector, all countries but Bolivia have implemented various fiscal incentives and regulatory instruments, most of which are targeted towards promoting renewable energy projects in the energy sector. In the transportation sector, all evaluated countries lack fiscal incentives to promote sustainable projects but focus on subsidizing sustainable fuels. A notable gap exists in the water sector, where incentives to facilitate investments in projects that implement sustainability practices, for instance by reusing greywater or revitalizing polluted ecosystems, were not identified in any of the countries.

In terms of **promoting and ensuring compliance with international commitments**, all evaluated countries but Nicaragua have ratified the Paris Agreement, and then established entities responsible for ensuring alignment of national infrastructure policies and plans with the SDGs and their NDCs. Yet, the evaluations focus on analyzing alignment of national development goals, without yet explicitly indicating whether and how energy, water, and transportation policies, plans and strategies help achieve these goals.

Carbon markets are still in the early development stages in these countries, except Chile which has established a national carbon emissions price. The remaining evaluated countries have not established a carbon emissions price; none of the six countries has an operational ETS. A notable gap exists in regards to **national principles and/or standards for green bonds**. None of the countries has established such principles or issued a green bond for energy, transportation, or water projects.

Similarly, even though efforts to **increase private participation and the role of domestic capital markets in infrastructure** exist in all evaluated countries, these vary in their comprehensiveness. For instance, only Peru has taken concrete steps to expand access to institutional (pension and insurance fund) investors. Yet, other than Peru, the lack of specific policies to expand access to institutional investors has led to limited institutional participation in infrastructure projects. Figure 1 displays the performance score of each country in the institutional framework section.

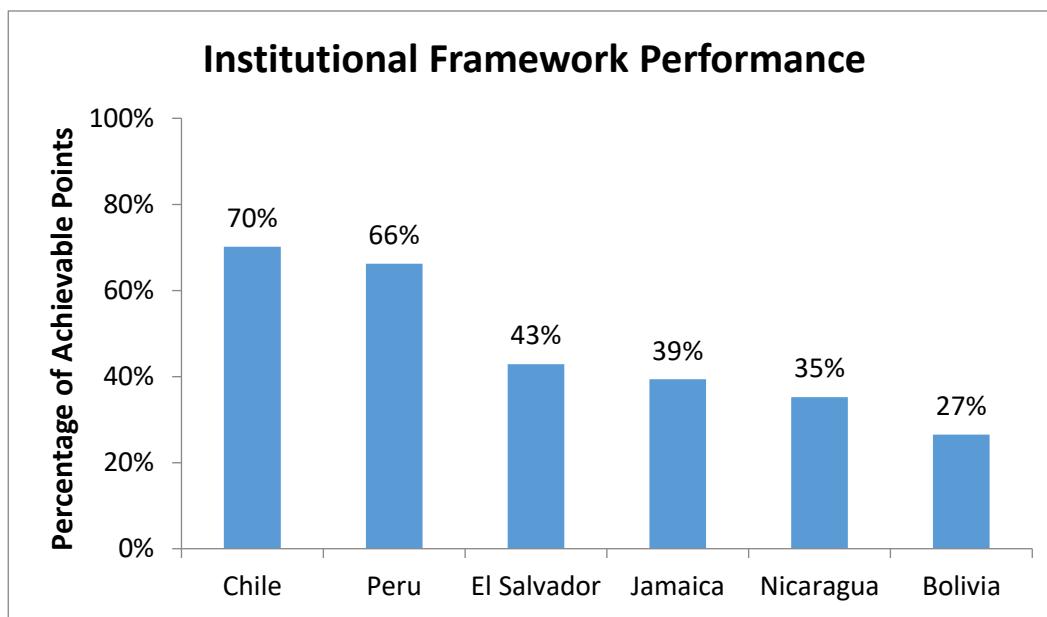


Figure 1. Percentage of total points achieved in the institutional framework section, for all countries.

	Chile	Peru	Jamaica	El Salvador	Nicaragua	Bolivia
1. Up to date, relevant infrastructure legislation.						
2. Up to date, relevant infrastructure policies.						
3. Relevant, de-centralized regulator per infrastructure sector.						
4. Private participation allowed in the infrastructure sector vs. a government monopoly.						
5. Relevant, de-centralized public organizations responsible for infrastructure per sector.						
6. Government entity responsible for alignment of national plans and policies with SDGs and NDCs.						
7. National development and infrastructure plans aligned with SDGs and NDCs.						
8. Multi-year budgeting of infrastructure projects by the responsible ministry.						
9. Initiatives to manage risks of policy change by stabilizing policy, laws, and regulations.						
10. Level playing field for public and private enterprises with equal regulations and incentives.						
11. National principles for green bonds.						
12. Local capital markets and policies to expand access to institutional investors.						
13. National frameworks and incentives for corporate governance and social responsibility.						
14. National frameworks and incentives for sustainability and climate risk disclosure.						
15. Sustainable certification scheme for infrastructure providers.						
16. National carbon emissions price or national ETS.						
17. Functional, de-centralized environmental assessment authority.						
18. National and sectoral frameworks for disaster risk management.						
19. Formal and functioning frameworks for community consultation.						

Table 8. Comparison between all countries; institutional framework parameter scores.

5. Upstream Planning Benchmarking

The upstream planning benchmarking starts with research on the existence and comprehensiveness of long term, multi-sector, integrated national and sector infrastructure portfolio plans and spatially explicit urban or rural plans leading to transparent, prioritized, and bankable project pipelines. National and sub-national entities responsible for national, sectoral, urban, and rural infrastructure planning, as well as efforts to ensure that adequate public resources are reserved, are also assessed. The proposed sources that would fund projects and development plans are evaluated. The use of concessional finance¹⁰ to reduce transaction costs and embed sustainability into integrated, multi-sector participatory plans that go beyond supply and demand and political cycles, is also examined.

Then, national infrastructure planning systems that prepare and evaluate public investments are identified. Requirements for rigorous project assessment (socio-economic impact, affordability, PPP vs. traditional public procurement) and risk assessment (climate, technology, and regulations) during the appraisal and selection of projects are evaluated. In responding to tenders, mechanisms to support private sector development of sustainable project portfolios are identified. Furthermore, efforts to strengthen private sector capacities for planning and risk evaluation of project portfolios, as well as strengthen domestic capital market capacities and role in infrastructure investments are examined. Table 9 summarizes the upstream planning parameters.

-
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.
 2. NDPs that includes the needs and proposed investments per sector/region.
 3. National and sectoral plans to scale up infrastructure services.
 4. Transparent project pipelines with list of planned projects per sector.
 5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.
 6. Use of concessional financing for infrastructure.
 7. National and sectoral infrastructure plans developed and implemented in a participatory way.
 8. Long-term government commitment with renewable energy and/or carbon reduction targets.
 9. National climate change mitigation and adaptation plans.
 10. National public investment system including project preparation and evaluation.
 11. Comprehensive assessment methodologies in the infrastructure planning process.
 12. Sustainability risk analysis and management in investment evaluation.
 13. Prioritization of PPPs in national infrastructure plan.
 14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.
-

Table 9. Upstream planning parameters.

¹⁰ Concessional loans are loans on terms more generous than those offered in the capital market. Concessional loans provide much lower interest rates, longer grace periods, or both, typically as part of international development assistance from multilaterals such as the World Bank.

5.1 Bolivia

5.1.1 General

The Ministry of Public Works, Services, and Housing is responsible for formulating and implementing national infrastructure policies, plans, and programs for public infrastructure in Bolivia. The NDP, known as Patriotic Agenda 2025, contains pillars and goals that shall be achieved by 2025 towards the sustainable development of Bolivia; these cover energy, transportation, and water infrastructure. Although the NDP is not an actual national infrastructure plan, it indicates overall infrastructure needs per infrastructure sector for the country. Medium-term economic and social development plans (the current one covers the period from 2016–2020) are developed to specify the programs implemented to achieve these goals. The Ministry of Sustainable Development and Planning is responsible for the implementation of the SDGs in Bolivia, but the alignment of the country's NDP with its SDGs has not been evaluated.

Concessional financing is utilized for infrastructure in Bolivia, while concessional loans for the development of renewable energy are accepted by law (IRENA, 2015). Most recently, in March 2017, Bolivia received a \$552 million concessional loan from the International Cooperation Agency of Japan for the development of the Laguna Colorada geothermal power plant (International Cooperation Agency of Japan, 2017).

Bolivia has established a national public investment system, although the system does not include stringent criteria to assess and prioritize infrastructure projects. Public investment projects undergo a socio-economic cost-benefit analysis, but not an affordability assessment, a financial viability or bankability assessment, a PPP vs. traditional public procurement value for money assessment, and a market assessment (EIU, 2017).

Bolivia stands out in its efforts to ensure public participation in national development and infrastructure planning. Clear requirements exist to consult with local communities and stakeholders while developing national development and infrastructure plans. It is worth mentioning that public input in Bolivia is strongly encouraged through the Decentralization and Autonomies Framework of 2010, which establishes an autonomous territorial model in the country with more social participation. Furthermore, the Control and Social Participation Act of 2013 promoted a public administration with an effective monitoring from nongovernmental organizations (NGOs).

Bolivia lacks efforts to facilitate the participation of private entities in infrastructure project pipelines. Sustainability risk analysis and management is not required in the investment evaluation process, while concessions are not allowed in infrastructure. PPPs are not prioritized in the national investment system and infrastructure planning and unsolicited proposals for PPPs are not allowed.

Furthermore, Bolivia has set a long-term target for increasing the contribution of renewable energy in the national energy system to 81 percent by 2030. In general, Bolivia focuses on the development of the hydropower sector more extensively, and the NDP states that by 2025, 70 percent of its national renewable electricity generation should be met through hydropower, as compared to its current (2017) 30 percent (Plurinational State of Bolivia, 2016).¹¹ Bolivia has also

¹¹ In 2015 (the latest year with available energy statistics), 27 percent of national electricity needs were covered by hydropower sources and 14 percent by other renewable energy sources (wind, solar PV).

set a national binding target through its NDC to reduce 6 percent of national GHG emissions by 2030, as compared to 2010 levels. However, sector-specific GHG reductions goals are not specified.

5.1.2 Energy

In Bolivia, the Ministry of Hydrocarbons and Energy developed the Energy Development Plan in 2008 to specify the roadmap for the sector from 2008 to 2027. Notably, through its NDP, Bolivia has established a primary goal to achieve universal and equitable access to energy services by 2025. According to the energy plan, aspects related to costs, efficiency, the environment and export possibilities make natural gas and hydropower the most attractive and important sources of energy in Bolivia.

The plan evaluates various scenarios for the diversification of the energy matrix, including the maximization of renewable energy sources in the national energy system, but without setting any specific targets. Nevertheless, the NDP states that 70 percent of electricity generation should come from renewable energy sources by 2025, and includes a list of projects that could be built by 2020 to achieve this goal. The proposed sources of financing for energy projects are not clearly indicated.

Bolivia's NDC commitment to reduce 6 percent of GHG emissions by 2030 will be achieved primarily through initiatives in the energy sector. The Bolivian NDC includes a wide range of proposed initiatives, including the development of renewable energy projects and the promotion of energy efficiency. Yet, Bolivia has not developed a climate change mitigation and adaptation plan for the energy sector.

5.1.3 Water

In Bolivia, according to the Economic and Social Development Plan (2016–2020), access to potable water and basic sanitation services has increased significantly in recent years. However, major challenges remain in the provision of water in rural regions and ensuring the proper maintenance of distribution infrastructure. Primary goals in the NDP include expanding potable water services in urban and rural areas, social participation, appropriate technology, and community responsibility, as well as sewerage and sanitation coverage in the country.

In order to achieve these goals, the Ministry of Environment and Water developed the Institutional Strategic Plan (2014–2018) in 2014, covering all issues related to potable water and sanitation. As part of this effort, in 2015, the Ministry of Environment and Water developed the Sector Plan for the Development of Basic Sanitation 2016–2020, that comprehensively indicates the goals for expanding access to water and sanitation services until 2020. The plan includes the proposed investment programs to achieve these goals, and the proposed sources of financing. Yet, a clear list of the projects that could achieve those goals is not provided. In addition, the contribution of the policy in achieving the SDGs has not yet been evaluated. Furthermore, Bolivia has not established water-specific GHG reduction strategies, and the Bolivian NDC does not indicate if the water sector can contribute to reducing national GHG emissions. Finally, Bolivia hasn't yet developed water-specific climate change mitigation and adaptation plans to ensure that water infrastructure projects address climate change.

5.1.4 Transportation

Bolivia has entities responsible for transportation infrastructure with clearly defined roles, but the country lacks specific development policies. The strategic objectives for the sector are only found within the Economic and Social Development Plan 2016–2020. One of its principal priorities is the integration of the country through different modalities, such as road, river, railway, and air transport, according to the characteristics of the Bolivian territory. Investment initiatives until 2020 that fulfill strategic actions per sub-sector are listed in the plan, along with the proposed sources of financing. Within this plan, departmental and municipal governments will develop maintenance initiatives to improve roads in their respective jurisdictions.

The plan also promotes the strengthening of air transport for the economic and social development of intermediate cities, as well as the importance of mass transit for the integration of remote regions. There is no mention about BRT. The Bolivian authorities have not evaluated if and how the strategic objectives for the transportation sector are aligned with the SDGs.

GHG reduction strategies for the transportation sector have not been established, and it is unclear if the transportation sector would contribute towards the 2030 6 percent emissions reduction target. In addition, a climate change mitigation and adaptation plan for the transportation sector, ensuring that projects are resilient and adaptable to climate change impacts, has not yet been developed.

Table 10 summarizes our assessment of the upstream planning framework in Bolivia through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the ¼ full circle indicates an insufficient value, the ½ full circle indicates an average value, the ¾ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,3				
2. NDPs that includes the needs and proposed investments per sector/region.	2,7				
3. National and sectoral plans to scale up infrastructure services.	1,0				
4. Transparent project pipelines with list of planned projects per sector.	2				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	1,0				
6. Use of concessional financing for infrastructure.	4,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	4,0				

9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	3,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	1,0				
12. Sustainability risk analysis and management in investment evaluation.	0,0				
13. Prioritization of PPPs in national infrastructure plan.	0,0				
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	0,0				

Table 10. Bolivia's upstream planning parameter scores.

5.2 Chile

5.2.1 General

The Ministry of Public Works is the public entity responsible for urban and rural infrastructure planning for public works. Each region in Chile is responsible for conducting its own planning, and specifying its regional infrastructure needs that are then integrated into the ministry's infrastructure project master plans. The Chile 30.30 plan, released in 2014, is Chile's NDP, specifying a long-term vision to address infrastructure challenges and improve the competitiveness of the country and the quality of life of its population. Yet, the plan focuses primarily on transport infrastructure and the development of water resources. The energy sector is mostly addressed through sector-specific plans, such as the Energy Policy 2050, and the National Energy Strategy 2012–2030.

Chile does not have a national integrated, multi-sector infrastructure plan that includes transparent project pipelines per infrastructure sector. Public entities develop infrastructure plans for public infrastructure under their jurisdiction, but these have not yet been integrated into a central, overarching strategy. Nevertheless, the NDP and the sectoral infrastructure plans are developed in a participatory way, as community and stakeholder engagement is strongly encouraged during the planning process, while all national plans and strategies are discussed with local communities and stakeholders through mandatory public consultations.

The Chilean government is committed to developing a long-term sustainable infrastructure sector, having set a long-term target for increasing the contribution of renewables in the national energy system. The National Energy Policy states that 20 percent of national energy generation should come from renewable sources by 2025. Furthermore, through its NDC, Chile has committed to reduce the national GHG emissions by 30 percent by 2030, as compared to the 2007 emissions levels.

Chile does not utilize concessional financing for infrastructure development, as its high national income level prevents it from accessing the most advantageous concessional loans, which are reserved for countries with lower levels of development. Chile has established a national public investment system with stringent criteria to assess and prioritize infrastructure projects. In the

Chilean national investment system, public investments undergo a socio-economic cost-benefit analysis, an affordability assessment, a financial viability or bankability assessment, a PPP vs. traditional public procurement value for money assessment, and a market assessment (EIU, 2017). Furthermore, in order to prioritize the most socially beneficial projects, projects must demonstrate a mandatory positive net present value, and an internal rate of return that exceeds the applicable social discount rate established by the national government.¹²

In regards to efforts to facilitate the participation of private entities in infrastructure pipelines, sustainability risk analysis and management is required in the investment evaluation processes in the national investment system. Furthermore, PPPs are explicitly prioritized in the national public infrastructure planning and procurement process, whereas unsolicited proposals from the private sector on PPPs and concessions are allowed for infrastructure projects. In terms of promoting climate resiliency, in 2014, Chile issued the National Plan on Climate Change that specifies the national climate change mitigation and adaptation actions to promote resilient infrastructure development.

5.2.2 Energy

The Ministry of Energy is the public entity responsible for infrastructure planning in the energy sector. The ministry implemented in 2012 the National Energy Strategy 2012–2030,¹³ specifying a long-term strategy to achieve a clean, secure and competitive energy system. The strategy's first commitment is to further develop clean, renewable energies in order to reduce dependency on oil and the volatility of energy prices. However, it is important to note that the institutional framework of the energy sector has shown significant weaknesses, and the temporary dependence of Chile's matrix on certain sources of fuel, particularly natural gas from Argentina, resulted in the lack of consideration of long-term guidelines for the development of other sources of energy when planning and developing transmission infrastructure for many years.

Dependent on international markets, Chile is very vulnerable to price volatility, which directly affects its national economy. In fact, as mentioned in the National Energy Strategy 2012–2030, the electricity prices in Chile are among the highest in Latin America. The plan states that hydropower will be the main source of electricity for Chile in the coming decades, and also recognizes the growing importance of liquefied natural gas as an alternative source of energy in the long term. According to the plan, Chile will work on strategies for solar, wind, bioenergy, biomass, geothermal, mini-hydro, and tidal energy.

The National Energy Agenda was published in 2014, specifying the actions required to achieve the National Energy Strategy's goals. Yet, the National Energy Agenda does not specify the required investments to achieve those goals, while a list of infrastructure projects is also not provided. However, the Ministry of Energy's Energy Infrastructure division reports monthly on the energy projects that are in development, as well as those that obtained an environmental approval during the year. In addition, the Chile 30.30 Plan briefly discusses the hydropower concessions

¹² The social discount rate is defined and reported by the Chilean Ministry of Social Development on an annual basis and applies to all projects. The social discount rate for projects implemented in 2017 is 6 percent (Ministry of Social Development, 2017).

¹³ In 2012, the Ministry of Energy was called Ministry of Energy and Mining. After 2012, a separate ministry was created for the mining industry, and the Ministry of Energy and Mining was divided in two: the Ministry of Energy and the Ministry of Mining.

and the government's long-term objectives in utilizing multi-purpose reservoir projects for hydropower generation.

The Chilean NDC states that the energy sector would be primarily responsible for achieving the 30 percent by 2030 GHG emissions reduction goal, and includes energy-specific GHG reduction strategies. Chile is also currently developing an energy-specific climate change mitigation and adaptation strategy, as reported in the national climate strategy.

5.2.3 Water

The General Directorate of Waters, under the jurisdiction of the Ministry of Public Works, is the public entity responsible for water infrastructure planning in Chile. The General Directorate of Waters developed the National Water Resources Strategy in 2012, specifying a clear roadmap for water resources management until 2025. According to its water strategy, urban potable water coverage reached 99.8 percent in 2012 across the nation, while sewerage coverage reached 100 percent by the same year. Advances in potable water and sanitation have been outstanding, which highlights not only the current quality of its services but also the continuous evolution in terms of coverage, particularly in comparison with other countries in the region. Overall, Chile has been a pioneer in implementing and updating its water regulation, including aspects such as sustainability and legal certainty. This reflects the country's long and successful tradition in water management.

The Water Strategy, however, does not include the project pipeline that will meet the proposed goals, while the required investments are also not specified. The water project pipeline and the total investments in water infrastructure are specified in the Ministry of Public Works' Infrastructure Master Plan 2010–2025, along with other infrastructure projects under the ministry's jurisdiction. Furthermore, the ministry regularly updates an online database that includes information on every project from the Infrastructure Master Plan, while water infrastructure concessions per region are briefly presented in the Chile 30.30 Plan.

Chile has not implemented water-specific GHG reduction targets or strategies and Chile's NDC does not include information on whether the water sector can contribute towards reducing national GHG emissions in accordance with the goal to reduce GHG emissions by 30 percent by 2030. Furthermore, a water-specific climate change mitigation and adaptation plan has not yet been developed; the national climate change strategy mentions, however, that a water-specific strategy is currently in development.

5.2.4 Transportation

The Ministry of Public Works is responsible for infrastructure planning in the transportation sector. The ministry has not developed a distinct national transportation infrastructure plan, but specifies the needs and objectives of the sector through the Chile 30.30 Plan and the Public Infrastructure Master Plan 2010–2025. The Chile 30.30 Plan briefly presents the transportation concessions, while the Public Infrastructure Master Plan 2010–2025 specifies the total investments and the total number of transportation projects. The ministry regularly updates an online database that includes information on every transportation project from the Infrastructure Master Plan.

Chile developed a Public Transport Infrastructure Plan in 2014, however, the plan seems to be a little superficial compared to the other sector plans, focusing primarily on the connectivity of the

Metropolitan Region through new suburban train services. There is no mention of highways, airports and/or BRT within the national plan. On the other hand, there is a Master Plan for the Transport of Santiago with a long-term view until 2025, which has a section about highways, BRT, and airports. Transportation-specific GHG reduction targets and strategies have not been released.

Chile's NDC mentions that the transportation sector would contribute towards the 30 percent by 2030 GHG emissions reduction target, however, it does not state the percentage of emissions reductions it would cover. The transportation sector lacks a climate change mitigation and adaptation plan with sector-specific objectives, but the Chilean government is in the process of developing one.

Table 11 summarizes our assessment of the upstream planning framework in Chile through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,3				
2. NDPs that includes the needs and proposed investments per sector/region.	2,0				
3. National and sectoral plans to scale up infrastructure services.	3,0				
4. Transparent project pipelines with list of planned projects per sector.	2,5				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	0,8				
6. Use of concessional financing for infrastructure.	0,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	4,0				
9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	4,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	4,0				

12. Sustainability risk analysis and management in investment evaluation.	3				
13. Prioritization of PPPs in national infrastructure plan.	4,0				
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	4,0				

Table 11. Chile's upstream planning parameter scores.

5.3 El Salvador

5.3.1 General

The Ministry of Public Works is the central public agency responsible for public infrastructure planning and policy-making. The Ministry of Public Works, through the Vice Ministry of Housing and Urban Development, along with the Ministry of Environment and Natural Resources, are the agencies responsible for developing El Salvador's National Plan for Territorial Planning and Development, which sets the long-term vision for sustainable development at the national level. El Salvador has not implemented a national infrastructure plan and specifies infrastructure needs through the NDP and sectoral infrastructure plans. Yet, the NDP does not focus in any infrastructure sector in particular, and especially lacks information on the development of the water and sanitation sector. Furthermore, the strategies in the plan specify long-term development goals without explicitly indicating the projects that would be implemented to achieve these goals.

Concessional financing is utilized for infrastructure development in El Salvador, but a designated law to regulate and promote concessional loans has not been enacted. El Salvador has established a national public investment system, but the system lacks a stringent set of criteria to assess and prioritize infrastructure projects. In the national investment system, public investments undergo a socio-economic cost-benefit analysis but there are no requirements for an affordability assessment, a financial viability or bankability assessment, a PPP vs. traditional public procurement value for money assessment, and/or a market assessment (EIU, 2017). El Salvador uses the results-based management approach that requires public investments to contribute to economic, social, and security benefits in order to be implemented. It is important to note that El Salvador created in 1991 the project preparation fund (*Fondo Salvadoreño para Estudios de Preinversión*) to provide financing for studies required during the investment evaluation process.

Furthermore, El Salvador lacks initiatives to facilitate the participation of private entities in infrastructure project pipelines. Sustainability risk analysis and management is not required in the investment evaluation processes, while PPPs are not prioritized in the national investment system and infrastructure planning. Moreover, unsolicited proposals for PPPs and concessions by private entities are not allowed. In terms of long-term government commitments, El Salvador has not established a target for increasing renewable sources in its national energy system. However, in December 2016 at the COP22 Declaration in Marrakech, El Salvador announced its NDC and committed to reducing GHG emissions from energy by 42 percent by 2025, as compared to the 2015 emissions levels. Other sector-specific targets were not provided. Additionally, in 2015, the Ministry of Environment and Natural Resources developed the National Climate Change Plan, including the strategic programs to counter climate change impacts at the national level.

5.3.2 Energy

The National Energy Council is responsible for infrastructure planning in the energy sector in El Salvador. It formulates and implements the national energy policy as well as the energy infrastructure plans in order to achieve the objectives set in the policies. The Council issued in 2010 the National Energy Policy 2010–2024 that specifies the needs and goals of the energy sector. The policy led to the development of the Master Plan for the Development of Renewable Energy in 2012 that focuses on wind, solar PV, and small hydro energy development. Subsequently, in 2012 The Council also issued the Indicative Plan for the Expansion of Electric Generation in El Salvador 2012–2026.

Although both plans specify the long-term vision and goals of the energy sector, the required investments to achieve those goals are not indicated. Furthermore, since El Salvador has not established a national renewable energy target, sub-sector targets are also not available. El Salvador has not implemented energy-specific GHG emissions reduction strategies, but in its NDC it states that the proposed 42 percent GHG emissions reduction by 2030 target would be achieved solely by the energy sector. In addition, a climate change mitigation and adaptation plan has not been developed for the energy sector, but the strategic actions to counter climate change in energy are discussed at the National Climate Change Plan.

5.3.3 Water

The National Aqueduct and Sewer Administration and the Ministry of Environment and Natural Resources are responsible for infrastructure planning in the water sector in El Salvador. The Ministry of Environment and Natural Resources is responsible for formulating and implementing national policies and plans for water facilities, and the National Aqueduct and Sewer Administration is responsible for formulating and implementing national policies and plans for potable water and sanitation infrastructure.

El Salvador issued the National Water and Sanitation Policy 2011–2015 in 2011, aiming to develop a comprehensive framework for water resource management, through river basin plans and regulatory systems that enable full coverage of water demands. Yet, although the plan specifies relevant goals and objectives for the water and sanitation sub-sectors, it does not include a list of projects that could achieve those goals and neither it provides an estimated budget for meeting its goals. The policy has not yet been updated. El Salvador has not developed an action plan to reduce GHG emissions in the water sector, and water-specific GHG emissions reduction targets are not included in its NDC. Furthermore, the water sector lacks a climate change mitigation and adaptation plan, but the strategic objectives to counter climate change impacts in water are briefly described in its National Climate Change Plan.

5.3.4 Transportation

The Vice Ministry of Transport under the Ministry of Public Works, Transport, and Urban Development is responsible for transportation planning in El Salvador. It formulates and implements the national land, air, and maritime transport policies and infrastructure plans. El Salvador does not have a national transportation plan. The country specifies the long-term needs of the sector primarily through its NDP that covers five-year periods, and the national transport

policy of 2010. The national transportation policy identifies the modernization of the BRT sub-sector in San Salvador as a priority, but lacks information on airports and highway development.

Overall, although the national policy and the NDP include goals and objectives for the transportation infrastructure sector, the investments and projects that can achieve those goals are unclear. Furthermore, El Salvador's NDC does not include information on how the transportation sector can help achieve a higher national GHG emissions reduction target; transportation-specific GHG reduction targets and strategies are not specified. In addition, El Salvador has not developed a climate change mitigation and adaptation plan for the transportation sector, while the National Climate Change Plan lacks information on strategies to counter climate change in transportation.

Table 12 summarizes our assessment of the upstream planning framework in El Salvador through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,3				
2. NDPs that includes the needs and proposed investments per sector/region.	2,3				
3. National and sectoral plans to scale up infrastructure services.	1,3				
4. Transparent project pipelines with list of planned projects per sector.	0,0				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	0,0				
6. Use of concessional financing for infrastructure.	4,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	0,0				
9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	3,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	1,0				

12. Sustainability risk analysis and management in investment evaluation.	0,0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Prioritization of PPPs in national infrastructure plan.	0,0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	2,7	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

Table 12. El Salvador's upstream planning parameter scores.

5.4 Jamaica

5.4.1 General

Jamaica does not have a centralized public entity for infrastructure planning. Ministries and sectoral agencies are responsible for public works under their jurisdiction, and the Planning Institute of Jamaica under the Ministry of Finance and Planning coordinates national and sectoral planning to ensure that infrastructure plans and programs align with the NDP *Vision 2030*. Jamaica published the Vision 2030 plan in 2009, establishing action plans for each of the evaluated sectors—water, energy, and transport—in order to cover all the approaches needed to achieve sustainable infrastructure development. Another aspect worth mentioning is that the Vision 2030 Plan is informed at the sectoral level by a group including ministries, departments, and agencies of the government, as well as important stakeholders including the private sector, and NGOs.

Jamaica does not have a national integrated, multi-sector infrastructure plan, but it establishes multi-sector infrastructure strategies through its NDP. Yet, the strategies mostly address long-term development goals without explicitly indicating the projects that could achieve those goals. Each sectoral agency is responsible for developing an infrastructure plan on their respective sector, in order to achieve the goals of the Vision 2030 plan.

Jamaica pursues concessional financing for infrastructure development. It is eligible for concessional financing from the World Bank's International Development Agency, while the Caribbean Development Bank has also provided highly concessional loans and grants. Yet, Jamaica is an upper middle-income country, thus, even though it can access some sources of concessional financing, it cannot access all the sources as it has a higher per capita income than other developing countries. Notably, Jamaica has been receiving concessional loans from Petro-Caribe in exchange for procuring oil from Venezuela.¹⁴

Jamaica has developed a national public investment system with stringent criteria to assess and prioritize infrastructure projects. In the Jamaican system, public investments undergo a socio-economic cost-benefit analysis, an affordability assessment, a financial viability or bankability assessment, a PPP vs. traditional public procurement value for money assessment, and a market assessment (EIU, 2017). In regards to efforts to facilitate the participation of private entities in infrastructure project pipelines, projects are also evaluated through a sustainability risk analysis and management, while PPPs are explicitly prioritized in the national investment system and the

¹⁴ Petro-Caribe is an energy cooperation initiative of Caribbean countries with Venezuela, launched in 2005 by former Venezuelan President Hugo Chavez. The initiative allows Caribbean countries to procure Venezuelan oil on preferential conditions, such as purchasing oil at less than 50 percent of its market value, and with grace periods.

infrastructure planning process. Furthermore, Jamaica allows unsolicited proposals for PPPs and concessions.

In regards to long-term government commitment for sustainable infrastructure, Jamaica has established a long-term target for increasing the contribution of renewable energy sources in the national energy system. The National Energy Plan specifies that 20 percent of electricity generation should come from renewable energy sources by 2030. Furthermore, in 2017, Jamaica committed its NDC to reduce GHG emissions by 7.8 percent by 2030, as compared to the 2005 emission levels. Jamaica has not yet developed a national climate change mitigation and adaptation plan, but briefly specifies its long-term commitments in the Jamaica Vision 2030 NDP, including the overarching strategic goals for the infrastructure sector.

5.4.2 Energy

The Ministry of Energy, Science, Technology and Mining is responsible for infrastructure planning in the energy sector in Jamaica. It formulates and implements national energy policies as well as the national energy development plan. Jamaica has not developed a national energy infrastructure plan, but specifies the long-term development needs of the sector through its National Energy Policy and the Jamaica Vision 2030 NDP. Jamaica's national energy policy sets the pathway to an affordable, reliable, and low-emission electricity system as the country is currently seeking to diversify against an almost exclusive dependence on imported fossil fuels.

The strategic framework of the energy policy addresses energy issues and stimulates the development of renewable energy such as solar and hydro. However, there is no actual legal framework or action plan on how the country is going to increase its renewable generation in the energy mix. Furthermore, the National Energy Policy and the NDP do not include information on the total investments that are required in order to achieve the specified goals, while a list of projects to be implemented is also not provided.

Although Jamaica has established a target since 2009 to increase the contribution of renewable energy in the national energy mix to 20 percent by 2030, targets for renewable energy sub-sectors have not been provided. In its NDC, Jamaica specifies that its 2030 7.8 percent emissions reduction NDC will be met solely by the energy sector. Jamaica has not developed a climate change mitigation and adaptation plan for the sector, to ensure that energy projects address climate change impacts. It does however briefly discuss some strategic actions to counter climate change in the energy section of the Jamaica Vision 2030 NDP.

5.4.3 Water

The Ministry of Water, Land, Environment, and Climate Change, created in 2012, is responsible for infrastructure planning in the water sector in Jamaica. It formulates and implements the national water policies and plans to achieve the goals specified in the policies. The latest National Water Policy was issued in 2004 by the Ministry of Water and Housing (now the Ministry of Water, Land, Environment, and Climate Change), but a Draft Water Sector Policy was published in 2014, setting the national water sector objectives in accordance with Jamaica's Vision 2030 NDP.

The Vision 2030 Plan introduces the ambitious goals of achieving universal access to potable water by 2025, and having sewerage systems in all major towns by 2020. This transformative program includes the implementation of a wide range of projects, totaling an estimated \$100 billion for water supply and a further \$75 billion for wastewater. Yet, the plan does not include a

clear list with the projects that would be implemented in water supply and sanitation to achieve those goals. Furthermore, Jamaica has not provided GHG emissions reductions targets for the water sector, and its NDC reports that the water sector would not contribute towards reducing national GHG emissions. In addition, a climate change mitigation and adaptation plan has not been developed for the water sector, to ensure that water infrastructure projects are resilient towards climate change.

5.4.4 Transportation

The Ministry of Transport and Mining is responsible for infrastructure planning in the transportation sector in Jamaica. It is responsible for formulating and implementing national policies and the development of the sector. Yet, Jamaica has not developed a national transportation infrastructure plan, and the sector's needs and objectives are specified through the Jamaica Vision 2030 NDP. The Vision 2030 plan mentions that the transport system will be expanded to meet the Jamaica's needs by improving road, port, and airport infrastructure as well as completing the highway network. However, there is no information on BRT included within the transport sector overview of the Vision 2030 plan.

Yet, the Vision 2030 Plan does not specify the total investments required to achieve the transportation sector goals, while the plan also lacks information on the infrastructure projects that would be implemented. Furthermore, although Jamaica's NDC states that the transportation sector would contribute towards its 2030 7.8 percent GHG emissions reduction target, it has not specified the percentage that would be covered by the sector. In addition, a climate change mitigation and adaptation plan for the transportation sector is not available, but strategic objectives for countering climate change in the sector are briefly covered in the transportation section of the Jamaica Vision 2030 NDP.

Table 13 summarizes our assessment of the upstream planning framework in Jamaica through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,0				
2. NDPs that includes the needs and proposed investments per sector/region.	2,3				
3. National and sectoral plans to scale up infrastructure services.	1,0				
4. Transparent project pipelines with list of planned projects per sector.	0,0				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	0,0				

6. Use of concessional financing for infrastructure.	3,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	4,0				
9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	3,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	4,0				
12. Sustainability risk analysis and management in investment evaluation.	2,3				
13. Prioritization of PPPs in national infrastructure plan.	4,0				
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	4,0				

Table 13. Jamaica's upstream planning parameter scores.

5.5 Nicaragua

5.5.1 General

The Ministry of Transport and Infrastructure is the public entity responsible for infrastructure planning in Nicaragua. In 2012, Nicaragua developed its National Human Development Plan (2012–2016), which is the overarching national development document. However, the plan does not identify national infrastructure needs, but rather focuses on people development through education and health. In 2016, the Nicaraguan government published its Good Governance Plan that specifies its long-term commitments towards a more efficient national infrastructure system. Nicaragua has not developed an overarching National Infrastructure Plan, but addresses the long-term infrastructure needs on a sector-by-sector basis.

Concessional financing is regularly utilized for infrastructure projects in Nicaragua. In fact, the IMF (2017b) reports that approximately 40 percent of new investments are implemented through highly concessional terms, although the exact amount allocated for infrastructure projects is not reported. Furthermore, there is no information available about whether Nicaragua has implemented or plans to implement initiatives to increase concessional financing for infrastructure development. Nicaragua has established a national public investment system that specifies criteria to assess and prioritize infrastructure projects. Public investments undergo a socio-economic cost-benefit analysis and a financial viability or bankability assessment, but not an affordability assessment, a PPP vs. traditional public procurement value for money assessment, or a market assessment demonstrating that there is a clear need for the planned project in the market.

In terms of long-term government commitment on developing sustainable infrastructure, Nicaragua has set one of the most ambitious targets for increasing the contribution of renewable

energy in its national energy system, aiming to cover 91 percent of its electricity needs through renewable sources by 2027 (Bloomberg New Energy Finance, 2016). Notably, renewable energy already satisfies 49 percent of Nicaragua's annual needs.¹⁵ Yet, Nicaragua has not established a national GHG emissions reduction target. In fact, Nicaragua is the only selected country that was not part of the 2015 Paris Agreement on Climate Change, and has not proposed a NDC for GHG emissions reduction. However, it is important to note that in 2010, Nicaragua issued the National Environmental and Climate Change Action Plan 2010–2015, specifying the strategic objectives and actions to counter climate change. The plan has not been updated, and the Nicaraguan government has not reported when it plans to update it.

5.5.2 Energy

The Ministry of Energy and Mines is the public entity responsible for infrastructure planning in the energy sector in Nicaragua. The Ministry of Energy and Mines has focused extensively on implementing national energy policies and infrastructure plans to expand the national energy matrix through renewable resources and rural electrification. A designated Strategic Plan for Renewable Resources has been developed, currently covering the 2011–2015 period.¹⁶ To guarantee the quality, safety and reliability of the energy system, as well as to ensure the level of regulation required for its National Interconnected System, Nicaragua has also developed an Expansion Plan for the Electric Generation (covering the 2016–2030 period), which evaluates wind, solar, and hydropower projects.

Both plans specify comprehensive strategies for the development of the energy sector; yet, the investments, as well as the proposed sources of financing that would be required for the implementation of the strategies are not specified. Furthermore, the plan lacks a clear project list indicating how it would achieve the goals specified in the plans. Nicaragua has not yet proposed energy-sector specific GHG emissions reduction targets or strategies to reduce emissions from energy infrastructure. It is important to note that in 2015, Nicaragua developed a climate change mitigation and adaptation plan for hydropower, but has not yet developed a plan that covers the entire energy sector.

5.5.3 Water

The National Commission for Water and Sanitary Sewage is the public entity responsible for water planning in Nicaragua. It formulates the national water and sanitation policies and implements national water and sanitation infrastructure plans to achieve the objectives specified in the policies. In 2005, Nicaragua developed a national water sector development plan—Sectoral Strategy on Drinking Water and Sanitation—specifying the water sector's needs and goals over the 2005–2015 period. Yet, the plan has not been updated to better align with the country's current and future demands. In the plan, it is stated that Nicaragua will develop and implement a new model of management of the operation of the sector to provide Potable Water and Sanitation

¹⁵ The latest energy statistics available are for 2015.

¹⁶ Nicaragua's efforts to diversify its national energy system through renewable energy sources were recognized in 2016 by the Climate Reality Project, an international NGO focused on climate change founded in 2006 by the former U.S. Vice President Al Gore, which listed Nicaragua as one of the top three countries in the world along with Sweden and Costa Rica that are an example of the production of energy with renewable sources.

services in a decentralized, participatory manner, and with financial viability, efficiency, and effectiveness. However, there are no updates if this goal was achieved, or the projects to be implemented and the required investments to achieve it in the coming years. Furthermore, Nicaragua has not yet proposed a national GHG emissions reduction target and lacks information on whether it has implemented strategies to reduce GHG emissions in the water sector. In addition, Nicaragua has not yet developed a climate change mitigation and adaptation plan for the sector, but briefly covers it in the National Environmental and Climate Change Action Plan 2010–2015.

5.5.4 Transportation

The Ministry of Transport and Infrastructure is the public entity responsible for transportation infrastructure planning in Nicaragua. A distinct transportation policy and infrastructure plan have not yet been developed, but the long-term needs and objectives of the sector are described in the NDPs. The overarching objective of the transportation sector, as specified in the NDP, is to integrate the national road network with other means of transport, in order to satisfy the increased demand for freight and passenger transportation. The improvement of airports is vital for the fishing and tourism industries in the Caribbean region, and as such the National Human Development Plan (2012–2016) identified key airports that needed to be constructed and/or rehabilitated. Nothing on BRT as a means of transport in Nicaragua was found in the plan.

The Good Governance Plan of 2016 indicates more extensively the national goals and actions for the transportation sector, focusing on the land, air, and maritime sub-sectors. Yet, the plan does not include a clear project list to demonstrate how these goals would be achieved, while the required investment to achieve them is only reported for the port sub-sector. The proposed sources of financing are not indicated in the plan. Furthermore, the Nicaraguan government has not reported if these goals were achieved, or if other projects and programs would be implemented to meet all specified goals in the following years. It is also not known if a similar plan would be issued for the following years. Nicaragua has not yet implemented transportation-specific GHG emission reduction targets, or any strategies to identify how transportation projects could reduce their GHG emissions. Furthermore, a climate change adaptation and mitigation plan has not been developed for the transportation sector, and the sector is not explicitly covered in the National Environmental and Climate Change Action Plan 2010–2015.

Table 14 summarizes our assessment of the upstream planning framework in Nicaragua through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,7				
2. NDPs that includes the needs and proposed investments per sector/region.	2,3				
3. National and sectoral plans to scale up infrastructure services.	2,7				
4. Transparent project pipelines with list of planned projects per sector.	1,8				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	0,0				
6. Use of concessional financing for infrastructure.	4,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	3,0				
9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	3,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	1,0				
12. Sustainability risk analysis and management in investment evaluation.	0,0				
13. Prioritization of PPPs in national infrastructure plan.	0,0				
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	0,0				

Table 14. Nicaragua's upstream planning parameter scores.

5.6 Peru

5.6.1 General

Peru does not have a central agency responsible for infrastructure planning. Sectoral agencies and public entities are responsible for works under their jurisdiction, and for developing national infrastructure strategies that are aligned with Peru's Bicentennial NDP 2011–2021. Peru published the Bicentennial Plan in 2011, setting the country's long-term objectives for sustainable development. According to the plan, the lack of physical infrastructure in the country and the deficit in the quality of the existing infrastructure is notable in all three evaluated sectors—water, energy, and transport—which makes Peru's infrastructure development still very poor as compared to other countries in the region. For the Peruvian government, achieving better levels of development requires not only closing the infrastructure investment gap, but also focusing on enhancing institutional development and governance.

The Peruvian government has stated its commitments to develop a sustainable infrastructure sector by setting a long-term target to increase the contribution of renewables in its national energy system and reduce its national GHG emissions at the same time. The National Energy Plan specifies that 60 percent of the national electricity production should come from renewable energy by 2025. Furthermore, in 2015, Peru ratified its NDC for reducing 20 percent of GHG emissions by 2030, using the emission levels of 2010 as a baseline. In the same year, the country developed its National Strategy for Climate Change, specifying strategic objectives and goals for climate change mitigation and adaptation.

Peru does not use concessional finance for infrastructure, as its development and income levels prevent it from accessing the most advantageous concessional loans that are reserved for countries with lower national development levels. In 2017, Peru established a national public investment system, the National System of Multiannual Programming and Investment Management (INVIERTE.PE). In terms of criteria to assess and prioritize infrastructure projects, the INVIERTE.PE system specifies the most stringent investment evaluation requirements among our six countries group. Specifically, public investments undergo a socio-economic cost-benefit analysis, an affordability assessment, a financial viability or bankability assessment, a PPP vs. traditional public procurement value for money assessment, and a market assessment (EIU, 2017). Regarding the efforts to facilitate the participation of private entities in infrastructure project pipelines, sustainability risk analysis and management is required in the investment evaluation processes and Peru allows unsolicited proposals for PPPs and concessions. PPPs are also explicitly prioritized in the national investment system and the infrastructure planning process.

5.6.2 Energy

The Ministry of Energy and Mines is responsible for infrastructure planning in the energy sector in Peru. In 2014, the ministry published the National Energy Plan 2014–2025 that covers the country's needs and establishes as a national priority the use of renewable energy including solar, wind, geothermal, biomass and hydropower. New goals by sub-sector are established every two years by the Ministry of Energy and Mines, in accordance with the strategic objectives and goals specified in the national energy policy and development plans.

The National Energy Plan has a brief section calculating that, in total, around \$50–\$53 billion should be invested in energy infrastructure in order to achieve the Plan's goals. It does not however indicate sources of finance, the percentage that is expected to be covered by the public or the private sector, or a list of projects to achieve those goals. Furthermore, Peru has not yet implemented energy-specific GHG reduction goals, or other strategies indicating how the energy sector can contribute towards reducing national GHG emissions. In addition, a climate change mitigation and adaptation plan has not been developed for the energy sector, but strategic objectives for the sector are briefly covered in the national climate change strategy.

5.6.3 Water

The National Water Authority is the public entity responsible for water infrastructure in Peru. In 2013, the National Water Authority announced the National Plan for Water Resources, specifying actions to address the imbalances in water infrastructure services between the metropolitan region and the rest of the country. According to the Plan, there has been a considerable increase

in public investment in recent years, in order to provide potable water and sewerage to a larger percentage of the population.

The Plan lists the required investments for the water sector, specifying that, in total, around \$40 billion should be invested in water infrastructure in order to achieve its goals. The allocation of this amount within sectoral departments is defined, yet sources of financing or the percentage covered by the public or private sector is not estimated. Peru has not yet implemented water-specific GHG reduction goals. Furthermore, Peru's NDC does not report whether the water sector would contribute towards reducing national GHG emissions. Peru has not developed strategies and plans for climate change mitigation and adaptation in the water sector, but the national climate change strategy briefly covers the strategic objectives for this sector.

5.6.4 Transportation

The Ministry of Transport and Communications is the public entity that formulates and implements the sector's policies and its development plan in Peru. The ministry is responsible for developing and implementing the National Plan of Railway Development, the National Plan for the Development of the Road Infrastructure Sector, and the National Plan of Port Development. Furthermore, the national plans for these sub-sectors are integrated into a strategic multi-annual transportation plan that covers a five-year period. The latest plan covered the 2012–2016 period, and although the Ministry of Transport and Communications evaluated its performance in May 2017, there is no information about when the next plan would be proposed. As stated in the multi-annual strategic plan, one of the main limitations of infrastructure in Peru is insufficient transportation. Its improvement would significantly contribute to territorial integration and the development of productive activities. Currently, there are projects within the Ministry of Transport and Communications to extend the national road network. Yet, no information on BRT or airports was found within the sector's available programs.

Nevertheless, the strategic transportation plan clearly indicates the proposed transportation infrastructure projects and the required investments for the transportation sector over the five-year period it covers. Transportation-specific GHG reduction strategies are not available, and Peru's NDC does not indicate how the transportation contributes to reducing national GHG. A climate change mitigation and adaptation strategy or plan for the transportation sector has not been developed, but objectives for the sector are briefly mentioned in the national climate change strategy.

Table 15 summarizes our assessment of the upstream planning framework in Peru through the 14 upstream parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	3,7				
2. NDPs that includes the needs and proposed investments per sector/region.	2,3				
3. National and sectoral plans to scale up infrastructure services.	3,0				
4. Transparent project pipelines with list of planned projects per sector.	2,0				
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	0,8				
6. Use of concessional financing for infrastructure.	0,0				
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	4,0				
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	4,0				
9. National climate change mitigation and adaptation plans.	1,0				
10. National public investment system including project preparation and evaluation.	4,0				
11. Comprehensive assessment methodologies in the infrastructure planning process.	4,0				
12. Sustainability risk analysis and management in investment evaluation.	3,0				
13. Prioritization of PPPs in national infrastructure plan.	4,0				
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.	4,0				

Table 15. Peru's upstream planning parameter scores.

5.7 Discussion of Findings

The upstream planning frameworks of the six countries differ in terms of their **commitment and capacities for effective national and sectoral planning**. All evaluated countries have an **NDP** that sets a long-term strategy for sustainable development. Yet, all countries lack an overarching **national infrastructure plan** that specifies a transparent, integrated, multi-sector infrastructure project pipeline to achieve the goals of their NDPs. Even Chile and Peru, which perform best in terms of long-term planning, lack a national infrastructure plan. Notably, Bolivia, El Salvador, and Jamaica establish multi-sector infrastructure strategies through their NDPs, but the strategies specify long-term development goals without explicitly indicating the projects that would be promoted to achieve those goals.

As such, although sectoral public bodies and ministries conduct infrastructure planning with regard to their sector, in all of the evaluated countries there is no clear centralized effort with

respect to establishing a **long-term integrated, multi-sector infrastructure project pipeline and development goals** that help the countries properly assess future infrastructure needs.

In addition, sectoral planning is implemented through a “siloed” approach, with no information on whether national planning entities communicate and collaborate while developing or implementing such plans. Overall, national energy, water, and transportation infrastructure plans in all of the evaluated countries specify long-term goals for expanding access to infrastructure services, but rarely provide specific goals for each sub-sector, or list the projects that could be implemented to achieve these goals.

All countries have established a **national public investment system**, but each investment system specifies a different set of **criteria to assess and prioritize infrastructure projects**. The implementation of a cost-benefit analysis is required in all countries, but just three (Chile, El Salvador, and Peru) have established standardized documents and methodologies for conducting an economic assessment. Furthermore, only Chile, El Salvador, and Nicaragua explicitly require that infrastructure projects must have a positive social value and contribute towards social development, rather than focusing only on implementing projects that have a positive economic value. Yet, it is not clear if the indicators that assess the social value of projects are comprehensive, and whether broader sustainability aspects are part of this process.

In regards to efforts to **facilitate the participation of private entities in infrastructure project pipelines**, the six countries showed different levels of performance, with Chile, Jamaica, and Peru performing better in this aspect. For instance, **sustainability risk analysis and management** is required in the **investment evaluation processes** of Chile, Jamaica, and Peru, but Bolivia, El Salvador, and Nicaragua have not established such a requirement. However, the range of sustainability aspects and risks considered during these processes is not clear. This is a critical aspect to consider in reducing project uncertainties and ensuring investors and private developers that project risks are properly evaluated.

Similarly, only the Chilean and Jamaican governments have explicitly stated the **prioritization of PPPs in the national investment system and infrastructure planning** as one of their goals. Finally, only Chile, Jamaica, and Peru allow **unsolicited proposals for PPPs and concessions**. The remaining countries have not established such a requirement, and lack frameworks and standards to ensure that private entities can participate in the development of infrastructure project pipelines.

The selected countries except El Salvador have set long-term targets for increasing the contribution of renewable energy sources in the national energy system, and are implementing efforts to increase investments in this sub-sector. The specified targets for each renewable energy sub-sector (wind, solar, and hydro, among others) differ from country to country, depending on the availability of each resource in the country.

Finally, all countries except Nicaragua have approved the 2015 Paris Agreement on Climate Change. Yet, only Bolivia, Chile, Jamaica, and Peru have published their NDCs and set **national binding targets for reducing GHG emissions** by 2030. However, none of the evaluated countries has established transportation and water sector-specific GHG reductions strategies and goals to specify the contribution of these sectors in reducing national GHG emissions. In addition, none of the countries has explicitly evaluated the alignment of national transportation, energy, and water policies and infrastructure plans with the SDGs, although all of the countries in our group have approved them. Figure 2 displays the performance of each country in the upstream planning section.

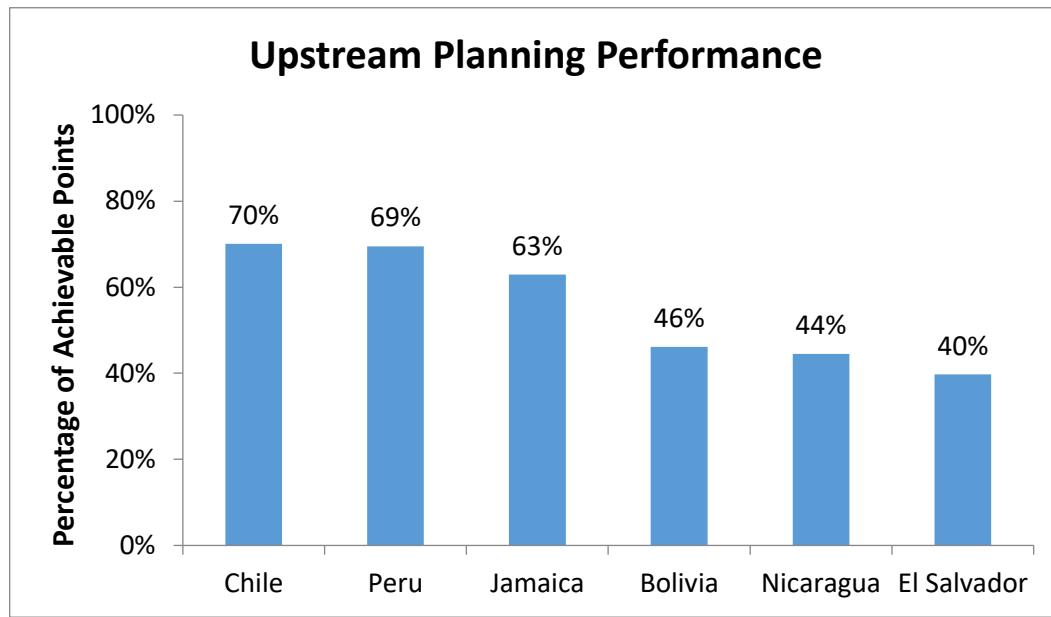


Figure 2. Percentage of total points achieved in the upstream planning section, for all countries.

	Chile	Peru	Jamaica	El Salvador	Nicaragua	Bolivia
1. National and sub-national government entities responsible for urban, rural, and sectoral planning.	●	●	●	●	●	●
2. NDPs that includes the needs and proposed investments per sector/region.	●	●	●	●	●	●
3. National and sectoral plans to scale up infrastructure services.	●	●	●	●	●	●
4. Transparent project pipelines with list of planned projects per sector.	○	●	○	○	●	●
5. Clearly and transparently indicated proposed sources of financing of infrastructure plans.	●	●	○	○	○	●
6. Use of concessional financing for infrastructure.	○	○	●	●	●	●
7. National and sectoral infrastructure plans developed and implemented in a participatory way.	●	●	●	●	●	●
8. Long-term government commitment with renewable energy and/or carbon reduction targets.	●	●	●	○	●	●
9. National climate change mitigation and adaptation plans.	●	●	●	●	●	●
10. National public investment system including project preparation and evaluation.	●	●	●	●	●	●

11. Comprehensive assessment methodologies in the infrastructure planning process.						
12. Sustainability risk analysis and management in investment evaluation.						
13. Prioritization of PPPs in national infrastructure plan.						
14. Unsolicited PPP proposals by private entities allowed for infrastructure projects.						

Table 16. Comparison between all countries; upstream planning parameter scores.

6. Project Procurement Benchmarking

The project procurement benchmarking starts with evaluating the selected countries on national PPP frameworks and whether they have established PPP agencies. Efforts to ensure liquidity and availability of investment are examined. Furthermore, the institutional arrangements for procurement in PPP and sector agencies are assessed, and in particular if they actively participate in project prioritization and procurement or just advise procuring authorities. Sustainability requirements in procurement processes and the tools and approaches for incorporating sustainability are identified.

Countries are also evaluated on whether they ensure conditionality for underperformance and delays, incentives for efficiencies, as well as contractual accountability and risk sharing with contractors and suppliers. Finally, initiatives to ensure that selected contractors are appropriately resourced, and improve procurement performance in transparency and efficiency (e.g., by making contracts publicly available) are examined. Table 17 summarizes the project procurement parameters.

-
1. Existence and comprehensiveness of national PPP law/framework.
 2. Existence and comprehensiveness of national PPP agency.
 3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.
 4. Incentives for sustainable procurement in public infrastructure and PPP procurement.
 5. Renewable energy auctions.
 6. Green bonds issuance.
 7. Environmental management plan and systems requirements in project contracts.
 8. Social impact management system and social development plan requirements in contracts.
 9. Project information monitoring and sustainability tracking.
 10. Climate impact assessment and adaptation plan requirements in project contracts.
 11. Conditionality for underperformance and delays, and incentives for efficiencies.
 12. Efforts to ensure liquidity and availability of investments.
 13. Performance-based contracts with explicit sustainability performance targets for operations.
 14. National and sectoral frameworks and standardized project agreements.
 15. Initiatives to ensure that contractors are qualified.
-

Table 17. Project procurement parameters.

6.1 Bolivia

6.1.1 General

The Ministry of Public Works, Housing, and Services is the central public authority responsible for procuring general public infrastructure projects in Bolivia. It is divided into three Vice Ministries, two of which are responsible for public infrastructure—the Vice Ministry of Transport and the Vice Ministry of Housing and Urban Planning. Notably, the Vice Ministry of Transport has a dedicated

project management unit that is responsible for the procurement of public infrastructure projects under its jurisdiction.

Bolivia has not established a national PPP law and prohibits concessions and the transfer of ownership to private entities in the infrastructure sector. PPPs in specific infrastructure sectors were allowed in the past through sector-specific laws, such as the Drinking Water and Sanitation Law of 1999 for the water sector, but were suspended after the 2009 Constitutional reform. The supreme decree No. 726 of 2009 designated concessions in the mining, electricity, natural resources, and infrastructure services as “Special Temporary Authorizations,” and private entities can request the respective ministry for temporary authorization to access these resources and/or provide services.

However, Bolivia does not explicitly prohibit PPPs, but the Bolivian government determines through the NDP implementation process the specific sectors that require private investments. A designated PPP agency has not been established, and the Ministry of Planning’s Investment Promotion Agency is allowed to pursue PPPs for infrastructure projects.

Bolivia conducts a competitive bidding process for public infrastructure projects and PPPs to select qualified developers and contractors. Yet, there is no information on whether tender processes include a pre-qualification process to evaluate the interested parties and select the most competent developers for the final bid stage. The investment promotion law (*Ley de Promoción de Inversiones No. 516*) includes explicit clauses stating that developers must have proven experience and the technical and financial capabilities to implement infrastructure projects efficiently, yet without mentioning the average standards used to evaluate these capabilities. Infrastructure project contracts include mandatory requirements for the development of environmental management plans to avoid or minimize environmental impacts, but not for social development plans for local communities. Yet, Bolivia established comprehensive social responsibility requirements for project developers through the Constitution reform of 2009, specifying that project companies should assist local communities with capacity-building initiatives and investments in local infrastructure while developing and implementing projects.

6.1.2 Energy

The Ministry of Energy and the Ministry of Hydrocarbons are the public entities responsible for procuring energy projects in Bolivia. The Ministry of Energy is divided into the Vice Ministry of Electricity and Alternative Energy and the Vice Ministry of Other Energy Technologies. The former is responsible for developing innovative energy technologies, such as energy storage and nuclear energy technologies, and the latter for energy projects excluding hydrocarbons. The Ministry of Hydrocarbons is responsible for procuring energy projects from the hydrocarbons sub-sector. The Regulatory Authority for Fiscal and Social Control of Electricity is the energy regulator, responsible for evaluating and regulating energy contracts and services.

Bolivia does not have a national PPP law, and the Bolivian government prohibits private entities from developing and operating energy projects as concessions. Nevertheless, the Ministry of Energy is able to develop energy PPPs in case the NDP specifies that private investments are required for the development of the energy sector. The Ministry of Hydrocarbons can implement joint ventures for hydrocarbon projects with private entities, but it must own the majority of the project shares. In fact, hydrocarbons have been designated as strategic property of the Bolivian People and State and cannot be managed by private entities.

6.1.3 Water

The Ministry of Environment and Water is the public entity responsible for procuring public water infrastructure projects in Bolivia. The Vice Ministry of Drinking Water and Basic Sanitation is responsible for water and sanitation infrastructure projects, and the Vice Ministry for Water Resources and Irrigation is responsible for watershed management and irrigation projects. Both vice ministries are responsible for managing the procurement process for public infrastructure under their jurisdiction. The Ministry of Economy and Public Finance approves project contracts. The Authority for Supervision and Social Control of Drinking Water and Basic Sanitation, created in 2009, under the ministry is responsible for regulating water infrastructure project and service contracts.

Private entities are not allowed to develop and operate water projects. Bolivia lacks a national PPP law, and, as mentioned in the general infrastructure section, Bolivia endeavored to develop water projects as concessions in the past through the Water and Sanitation Law of 1999. The Constitutional reform of 2009 established water as a human right and explicitly prohibited concessions in the water infrastructure sector. The procurement process for water infrastructure projects follows the same stages and is governed by the same laws and regulations as general public infrastructure projects. Therefore, the overarching project contract requirements, developer and contractor responsibilities, and incentives for efficiencies in the water sector do not differ from those mentioned in the general infrastructure section.

6.1.4 Transportation

The Ministry of Public Works, Services, and Housing is the leading public entity for procuring public transportation projects in Bolivia. It manages the procurement process for public transportation infrastructure through the national public investment system, administered by the Ministry of Economy and Public Finance. The Ministry of Economy and Public Finance conducts financial evaluations and approves project contracts. Furthermore, the Regulatory Authority for Telecommunications and Transport is the transport regulator that evaluates, approves, and regulates transportation project contracts and services.

Private entities are not able to develop and operate public transportation projects, as Bolivia does not have a national PPP law and the Bolivian Constitution prohibits concessions in transportation. Transportation projects are developed and implemented following the same overarching stages, regulations, and requirements as general public infrastructure projects. Therefore, the same incentives, contract requirements, and specifications discussed in the general infrastructure section are applicable in transportation infrastructure projects. Table 18 summarizes our assessment of the project procurement framework in Bolivia through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	2,7				
2. Existence and comprehensiveness of national PPP agency.	2,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	0,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	4,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				
9. Project information monitoring and sustainability tracking.	0,0				
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0				
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0				
12. Efforts to ensure liquidity and availability of investments.	0,0				
13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0				
14. National and sectoral frameworks and standardized project agreements.	3,0				
15. Initiatives to ensure that contractors are qualified.	2,0				

Table 18. Bolivia's project procurement parameter scores.

6.2 Chile

6.2.1 General

The Ministry of Public Works, the Ministry of Energy and the Ministry of Transport and Communications (hereafter Ministry of Transport) are responsible for procuring public infrastructure in Chile. The Ministry of Transport is responsible for procuring urban transit public infrastructure projects, whereas the rest of the transportation sector is within the Ministry of Public Works. This ministry is divided into six executive departments; the (i) Coordination of Public Works Concessions, (ii) Airports Department, (iii) Architecture Department, (iv) Hydraulic Works Department, (v) Port Works Department, and (vi) National Roads Department. Each department

is involved in the procurement of public infrastructure projects under its jurisdiction through the national investment system.

The Ministry of Social Development, the Environmental Assessment Service, and the Ministry of Finance are also closely involved in the procurement process. The Ministry of Social Development conducts the project's social profitability analysis, demonstrating that the infrastructure projects are beneficial for local communities and the State. The National Environmental Service grants the environmental qualification resolutions (Chile's environmental permit), and the Ministry of Finance conducts the affordability assessments certifying that a project would not negatively affect the national budget over the long term.

Chile enacted a comprehensive national PPP law in 1992, establishing the National Concessions System and allowing for the participation of private entities in infrastructure projects. The law has been updated in 1996, and then in 2010 to increase the efficiency of PPPs and fill legal gaps. The Concessions Coordination Unit, within the Ministry of Public Works, is the entity responsible for the development of the PPP market and projects. The Concessions Unit is divided into sub-departments that are responsible for overseeing the development, construction, and operations of projects. Notably, the unit can develop PPPs for infrastructure projects that are not under its jurisdiction through a mandate agreement with the respective ministry.

The procurement process for PPPs follows the same general steps as public infrastructure projects, but includes more stringent requirements and oversight by the Chilean government. Projects developed as concessions go through the national investment system and must be evaluated as socially profitable by the Ministry of Social Development and obtain an environmental qualification resolution in order to be implemented. The Ministry of Public Works then proceeds with preparing the tendering documents and initiating the bidding process. The Comptroller General and the Ministry of Finance must approve the tender process and the concession contract, while the Concessions Council, which is made up of key ministers from the infrastructure and public sector, consults on project development aspects. The concession contract is awarded through a presidential decree.

Sustainable procurement is not explicitly incentivized in the Chilean infrastructure procurement process. Yet, developers can use the ChileCompra online market system, a platform that includes information on suppliers and providers that follow sustainability practices. Notably, Chile started using the ChileCompra system for infrastructure projects in 2017. The use of the ChileCompra system is expected to increase the use of suppliers and providers that follow sustainability practices, although requirements mandating their use have not yet been established.

A gap was observed in regards to the incorporation of climate change mitigation and adaptation aspects in the public infrastructure project procurement process. There is no explicit requirement to evaluate the impacts of a changing climate on projects, while project contracts do not ask for a climate change impact and adaptation plan. Yet, disaster risks are regularly assessed and some risks and natural hazards, such as earthquakes and wildfires, are properly evaluated. However, the assessments do not include the impacts of climate change on increasing their frequency and severity.

Infrastructure project contracts include clauses mandating project developers to implement an environmental management plan covering the environmental impacts assessed through the Environmental Impact Assessment (EIA). A gap was detected in the availability of mandatory social development plans in project contracts. Although the EIA evaluates social impacts, project contracts do not explicitly incentivize the creation of social development plans with targeted

initiatives for affected local communities. It is important to note that social development plans have been developed for concessions, although on a case-by-case basis, as the concessions regulations do not include such a requirement for developers (IDB, forthcoming).

Chile has used infrastructure project bonds regularly to ensure liquidity and availability of investments. In fact, Chile issued the first infrastructure bond in Latin America in 1998, and has regularly used bonds for infrastructure development ever since (OECD, 2017b; Tuesta, 2016). Furthermore, in 2016, the Chilean government introduced a bill in Congress to create an infrastructure development fund, which has not yet been approved. The infrastructure fund would be responsible for issuing new concessions and re-tendering existing concessions once they expire in order to use the revenues for implementing new public infrastructure projects.

Infrastructure project contracts for both public projects and PPPs include conditionality clauses for underperformance and delays, as well as incentives for efficiencies, especially in concessions. However, in both cases the contracts penalize underperformance and delays without explicitly rewarding improved performance. In general, direct incentives for efficiencies were not observed.

6.2.2 Energy

The Ministry of Energy is the procuring authority for public energy infrastructure projects in Chile. It is responsible for all stages of the project procurement process, approves the project contracts, and oversees contractors and developers during project implementation. Energy infrastructure projects are planned, developed, and implemented through the national investment system, where the Ministry of Social Development conducts the social profitability assessment to demonstrate that implemented projects provide benefits to the community and the State. The procurement process for energy follows the same steps described in the general infrastructure section. Additional steps or requirements are not specified for energy infrastructure projects.

The Chilean PPP framework covers the energy sector, and energy projects can be developed as concessions. The Coordination of Public Works Concessions Unit within the Ministry of Public Works is the public entity responsible for the development of the energy PPP market and concession projects. The Ministry of Public Works and the Ministry of Energy sign a mandate agreement for energy projects to be developed as concessions by the Ministry of Public works.

Furthermore, the Ministry of Finance approves the concession contract, which is awarded through a presidential decree. The PPP procurement process for energy infrastructure does not differ from the overarching PPP process. Notable differences were not observed between the project contract requirements, incentives, and developer and contractor responsibilities for public energy infrastructure projects and general public infrastructure projects and PPPs.

6.2.3 Water

The Hydraulic Works Department under Ministry of Public Works is responsible for procuring water projects in Chile. The Hydraulic Works Department has total responsibility for the development of water infrastructure throughout the entire project cycle. These are evaluated through the national investment system as general public infrastructure projects and must be evaluated as socially profitable by the Ministry of Social Development in order to be implemented.

Additional requirements for the procurement of water infrastructure projects are not specified in the national investment system.

Water infrastructure projects can be developed as concessions under the provisions of the national PPP framework. The Concessions Unit within the Ministry of Public Works is the public entity responsible for the development of the water PPP market. Water projects fall under the jurisdiction of the Ministry of Public Works and mandate agreements with other ministries are not required for the development of water projects as concessions. Additional steps or requirements were not observed in the PPP procurement process for water infrastructure. Water projects must comply with the regulations, contract requirements, and incentives for developers and contractors applicable to general infrastructure works.

6.2.4 Transportation

The Port Works Department, the Airports Department and the National Roads Department under Ministry of Public Works, as well as the Ministry of Transport, are the public entities responsible for procuring public transportation projects in Chile. The Ministry of Public Work's departments are responsible for airports, ports, and national highways, while the Ministry of Transport is responsible for urban transit projects. Public transportation projects are evaluated and implemented through the national investment system, in close cooperation with the Ministry of Finance that is responsible for approving project contracts and evaluating financial risks.

The national PPP framework allows transportation projects to be developed as concessions in Chile. The Coordination of Public Works Concessions Unit within the Ministry of Public Works is responsible for the development of the transportation PPP market and transportation concession projects. The Ministry of Public Works is responsible for public transportation projects and a mandate agreement with other ministries is not required for transportation projects to be developed as concessions. The Ministry of Finance approves the concession contact, and a presidential decree is published to award the contract. Overall, transportation projects, and highways in particular, have been the cornerstone of the concessions system ever since its founding in 1991, accounting for approximately 80 percent of total concessions investments in Chile.

The Chilean infrastructure procurement framework does not include additional or different requirements for transportation projects. The overarching framework, regulations, and project contract requirements and incentives analyzed in the general infrastructure section are applied in transportation projects. Table 19 summarizes our assessment of the project procurement framework in Chile through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	4,0				
2. Existence and comprehensiveness of national PPP agency.	4,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	1,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	4,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				
9. Project information monitoring and sustainability tracking.	0,0				
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0				
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0				
12. Efforts to ensure liquidity and availability of investments.	4,0				
13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0				
14. National and sectoral frameworks and standardized project agreements.	4,0				
15. Initiatives to ensure that contractors are qualified.	3,0				

Table 19. Chile's project procurement parameter scores.

6.3 El Salvador

6.3.1 General

The Ministry of Public Works, Transport, Housing, and Urban Development is the public entity responsible for general infrastructure procurement in El Salvador. It manages and implements the procurement process for public works and transportation infrastructure through the national investment system. The Ministry of Finance conducts the financial assessments to demonstrate that projects are financially sustainable and is closely involved in the procurement process for public works.

El Salvador enacted its national PPP framework (*Ley Especial de Asocios Público Privados*), in 2013, which was amended in 2014. The Export and Investment Promotion Agency, PROESA, is

responsible for the promotion of the PPP market and assists with the development of PPP projects, while the Audit Office for Public Private Partnerships is responsible for technical oversight. Public entities are responsible for procuring infrastructure PPPs under their jurisdiction. Notably, PROESA's board of directors includes the key ministers for infrastructure development, as well as representatives from private entities (EIU, 2017).

In terms of efforts to ensure liquidity and availability of infrastructure investments, the government of El Salvador has not been utilizing project bonds for infrastructure development and it does not have a public infrastructure-specific fund for infrastructure projects. El Salvador has implemented two renewable energy auctions in 2014 and 2016. The 2014 auction focused on solar PV alone, while the 2016 auction was for both wind and solar PV projects.

Incentives for sustainable procurement in public infrastructure are not available. There is no information on whether suppliers and contractors that follow sustainability practices are documented in the national investment system, as well as on whether the use of such suppliers and contractors is promoted or mandated during the development of infrastructure.

El Salvador has not established requirements for a climate impact assessment and adaptation plan to be conducted during project development. Although natural hazards and disasters are evaluated through the EIA, the impact of climate change in increasing the frequency and severity of such events is not evaluated. When developing infrastructure projects, project developers are mandated to implement an environmental management system that addresses the environmental impacts and aspects specified through the EIA. The PPP law explicitly states that project developers must comply with the requirements of the EIA. There is no such requirement for infrastructure developers to implement a social development plan to help local communities. However, the PPP law mentions that private entities developing PPP projects must implement good practice corporate sustainability initiatives, which often include initiatives to support local communities. Yet, the range of initiatives that should be considered when developing infrastructure projects is not specified in the PPP law.

El Salvador has not established national standardized project agreements for public infrastructure projects and PPPs. Underperformance and delays are penalized throughout the development of infrastructure projects, but project developers and contractors are not explicitly incentivized to pursue performance levels beyond those required in the project contract. In general, performance-based contracts with sustainability targets are not implemented in infrastructure projects. Furthermore, developers are not required to monitor and report sustainability indicators and performance through official reports.

6.3.2 Energy

The National Energy Council is the public entity responsible for procuring energy infrastructure in El Salvador. It manages and implements the procurement process for projects through the national investment system, in close collaboration with the Ministry of Finance, which conducts the required financial assessments.

Private entities are allowed to develop projects as concessions in the energy sector under the national PPP framework in El Salvador. The framework specifies PROESA as the entity responsible to promote the development of the energy PPP market. The National Energy Council is the procuring authority for PPPs in the sector, and is responsible for managing and implementing the procurement process. The Ministry of Finance oversees procurement, conducts

the financial assessments of projects, and approves the concession contracts. There are no differences between the procurement frameworks, incentives, and contract documents for public works and energy infrastructure projects. Notably, energy-specific frameworks and project contract requirements were not identified.

6.3.3 Water

The National Aqueduct and Sewer Administration is the procuring entity for water infrastructure in El Salvador. It has portfolio responsibility over the entire life cycle of water projects and manages and implements the procurement process through the national investment system. The Ministry of Finance is responsible for conducting the financial assessments demonstrating that the projects are financially sustainable and would not introduce liabilities that could jeopardize the national budget.

The PPP framework in El Salvador does not cover the water sector, as private entities are not allowed to develop and operate water infrastructure projects as concessions. Differences between the procurement process of general public infrastructure and water infrastructure projects were not observed. Water-specific frameworks and project contract requirements follow the same principles as those mentioned in the general infrastructure section.

6.3.4 Transportation

The Vice Ministry of Transport under the Ministry of Public Works, Transport, Housing, and Urban Development is the procuring authority for public infrastructure in the transportation sector. It manages the procurement process for public transportation infrastructure through the national investment system. The Ministry of Finance is closely involved in the procurement process, as it is responsible for conducting financial assessments to ensure that the selected public projects are financially sustainable.

The national PPP framework in El Salvador covers the transportation sector, allowing private entities to develop and operate projects as concessions. PROESA is responsible for the promotion and development of the transportation PPP market, while the Vice Ministry of Transport is the procuring authority for PPPs. The Ministry of Finance evaluates the financial risks of projects to ensure that they are financially viable and approves the tendering documents and the concession contracts.

The procurement process of general public infrastructure and the procurement process of water infrastructure projects follow the same stages. The general principles in the procurement frameworks and project contract requirements are the same for both general public infrastructure projects and transportation projects. Transportation-specific frameworks and project contract requirements were not identified.

Table 20 summarizes our assessment of the project procurement framework in El Salvador through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$

full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	2,7				
2. Existence and comprehensiveness of national PPP agency.	4,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	0,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	4,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				
9. Project information monitoring and sustainability tracking.	0,0				
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0				
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0				
12. Efforts to ensure liquidity and availability of investments.	0,0				
13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0				
14. National and sectoral frameworks and standardized project agreements.	3,0				
15. Initiatives to ensure that contractors are qualified.	3,0				

Table 20. El Salvador's project procurement parameter scores.

6.4 Jamaica

6.4.1 General

Jamaica does not have a central public entity responsible for procuring public infrastructure projects, and different ministries are responsible for procuring public infrastructure projects under their jurisdiction. Public infrastructure projects are planned, evaluated, and implemented through the Jamaican Public Investment Management System administered by the Ministry of Finance

and the Public Service. The Ministry of Finance and the Public Service is involved in the procurement process, as it conducts financial assessments for public infrastructure projects ensuring that they would be financially viable.

In 2012, Jamaica developed its national PPP framework “Shaping New Partnerships for National Development: Policy and Institutional Framework for the Implementation of a Public-Private Partnership Program for the Government of Jamaica: The PPP Policy.” The Privatization Agency and the PPP department under the Development Bank of Jamaica are responsible for the development of the PPP market and individual projects. The Jamaican Cabinet approves the concession contracts.

Although Jamaica has established a National Development Bank to spur investments in infrastructure and has used bonds for infrastructure projects in the past, most notably for PPPs such as the Highway 2000, the Jamaican government has not focused on issuing bonds to increase liquidity for infrastructure investments. Furthermore, state-owned infrastructure-specific funds that use public money for infrastructure projects have not been developed in Jamaica. Nevertheless, Jamaica was the first country in the Caribbean to conduct renewable energy auctions, but the latest auction was completed in 2013. The Jamaican government reported in 2017 that it plans to implement more auctions, without providing information on the expected date or other specifics of the auction.

Jamaica has not developed standardized contracts and project agreements for infrastructure projects. In fact, the lack of standard project procedures and contracts has been recognized a key institutional challenge in making the public works and PPP procurement process more effective (EIU, 2017).

The Jamaican government has issued a procurement policy statement for the acquisition of goods, works, and services in public projects that incentivizes sustainable procurement. Specifically, procurement decisions by public entities must align with the principles of the government of Jamaica’s Environmental Guide to Green Procurement, focusing on minimizing environmental impacts and emphasizing disaster preparedness and emergency management. Yet, performance targets for procuring sustainable materials, works, and services in public infrastructure projects have not been established.

Jamaican infrastructure project contracts include clauses that penalize underperformance and delays, but do not explicitly incentivize developers to achieve efficiencies, for example by completing works faster. Project contracts also include clauses requiring the implementation of an environmental management plan that addresses the environmental impacts specified in the project’s EIA. However, developers are not incentivized to implement social development plans for local communities in the project’s area of influence. In addition, performance-based contracts with explicit targets for achieving sustainability performance goals are not available.

6.4.2 Energy

The Ministry of Energy, Science, Technology, and Telecommunications (hereafter the Ministry of Energy) is the public entity responsible for procuring energy infrastructure projects in Jamaica. The ministry manages the energy infrastructure procurement process throughout the entire project cycle and evaluates projects through the Jamaican national investment system. The Ministry of Finance and Planning evaluates the project’s financial risks to ensure fiscal sustainability. Notably, Jamaica has not established an independent public regulator for the

energy sector, and the Ministry of Energy is also responsible for regulating and overseeing project contracts and services, including prices for consumer and industry consumption.

Public energy infrastructure projects can be developed as concessions in Jamaica. The Jamaican PPP framework establishes the Privatization Agency and the PPP Unit of the Development Bank of Jamaica and the PPP Node under the Ministry of Finance and Planning as the entities responsible for PPPs in the energy sector. The Ministry of Energy is the procuring authority for PPPs, and the Privatization Agency and the PPP Unit of the Development Bank of Jamaica are responsible for managing the PPP procurement process. The PPP Node under the Ministry of Finance and Planning evaluates the fiscal impact of projects and approves the tendering documents and the concession contract.

It is important to note that the Jamaican government has focused considerably on promoting PPPs for energy projects, as a substantial amount of investments is required to reduce the dependency on imported fossil fuels and implement renewable energy projects. In fact, the three out of five projects that have been developed from 2012 to 2016 as concessions come from the renewable energy sector (Bloomberg New Energy Finance, 2017).

The Jamaican procurement framework specifies the same requirements for energy projects as for general public works. Thus, the general framework, contract requirements, and incentives discussed in the general infrastructure section are applied in energy projects without exceptions. Specific frameworks and project contract requirements for energy projects were not identified.

6.4.3 Water

The Ministry of Water and Housing is the public entity responsible for the procurement of water infrastructure in Jamaica. It is responsible for ensuring the development and evaluation of water projects through the Jamaican national investment system. The Ministry of Finance and Planning is responsible for ensuring that projects are structured in a way that ensures financial sustainability. The Water Resources Authority regulates and oversees infrastructure project contracts and services as the water sector regulator.

Water infrastructure projects can be developed and operated by private entities as concessions under the national PPP framework. The Privatization Agency and the PPP Unit of the Development Bank of Jamaica are responsible for the development of PPPs in the water sector. The Ministry of Water and Housing is the procurement authority for water PPPs. The Privatization Agency and the PPP Unit of the Development Bank of Jamaica oversee the procurement process, and the Ministry of Finance and Planning evaluates the project's financial risks and approves the tendering documents and the concession contract. Notably, so far, the Jamaican government has not implemented any water infrastructure projects as concessions.

In terms of the procurement framework and contract requirements, differences between the procurement process of general public works and water-specific projects were not observed. The procurement framework, regulations, and contract requirements in water infrastructure are the same as those mentioned in the general project section.

6.4.4 Transportation

The Ministry of Transport and Mining is responsible for procuring public transportation infrastructure projects in Jamaica. It manages the procurement process through the Jamaican national investment system over the entire life cycle of projects. The Ministry of Finance and Planning reviews projects to ensure their financial risks are adequately assessed. Jamaica has not established an independent regulator for the transport sector, and the Ministry of Transport and Mining is also responsible for regulating and overseeing project contracts.

The national PPP framework in Jamaica allows private entities to implement transportation infrastructure projects as concessions. The Privatization Agency and the PPP Unit of the Development Bank of Jamaica are responsible for promoting transportation PPPs. The Ministry of Transport and Mining is the procuring authority and the Privatization Agency, and the PPP Unit of the Development Bank of Jamaica ensures that the procurement process is implemented in accordance with the provisions of the national PPP framework. The Ministry of Planning and Finance conducts the financial viability assessments and approves the tendering documents and the concession contract.

So far, two out of the five projects that have been developed as concessions since the implementation of the PPP framework in 2012 come from the transportation sector. Transportation projects are implemented under the procurement framework, regulations, and project contract requirements discussed in the general infrastructure section.

Table 21 summarizes our assessment of the project procurement framework in Jamaica through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	4,0				
2. Existence and comprehensiveness of national PPP agency.	4,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	0,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	3,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				

9. Project information monitoring and sustainability tracking.	0,0				
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0				
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0				
12. Efforts to ensure liquidity and availability of investments.	0,0				
13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0				
14. National and sectoral frameworks and standardized project agreements.	3,0				
15. Initiatives to ensure that contractors are qualified.	3,0				

Table 21. Jamaica's project procurement parameter scores.

6.5 Nicaragua

6.5.1 General

The Ministry of Transport and Infrastructure is the public entity responsible for procuring general public infrastructure projects in Nicaragua. The ministry manages and implements the procurement process for public infrastructure through the Nicaraguan national system of public investment, which is overseen by the Ministry of Finance and Public Credit (hereafter Ministry of Finance). The Ministry of Finance assesses the financial impact of projects and approves the project contract. Nicaragua published its national Public Private Partnership Law No. 935 (*Ley de Asociación Público Privada*) in October 2016, regulating the participation of private entities in the formulation, contracting, financing, execution, and operation of infrastructure. However, Nicaragua has not yet established a specific entity to promote PPPs. Until an official PPP promotion agency is designated, the Ministry of Finance, through the General Directorate of Public Investment, is responsible for ensuring the implementation of the PPP law and helps ministries with the development of PPP projects. Law No. 935 allows ministries to procure infrastructure projects under their jurisdiction as PPPs.

Nicaragua conducts a competitive bidding process for public infrastructure projects and PPPs to ensure that the chosen developers and contractors are adequately qualified. The tender process includes a pre-qualification process to select the most competent developers for the final bid stage. The PPP law includes explicit clauses stating that developers must have proven experience and the technical and financial capabilities to implement PPPs efficiently, yet without mentioning the average standards considered to evaluate these capabilities.

Incentives to facilitate sustainable procurement are not available, and there is no information about the state of sustainability-certified companies in Nicaragua. In general, performance-based contracts are implemented for PPPs but these do not include sustainability performance targets for operations. Furthermore, there is no explicit mention about the need to monitor sustainability performance and develop a sustainability management plan to specify potential sustainability initiatives. Conditionality clauses for underperformance and delays are included in infrastructure

project contracts, yet a requirement for considering such clauses is explicitly stated only in the PPP law. There is no information about the availability of incentives for achieving efficiencies and exceeding basic requirements in the project contract, either for public infrastructure projects or PPPs. Project developers are mandated to develop an environmental management plan considering the impacts and initiatives specified through the EIA process. Nicaragua does not explicitly require the implementation of social development plans for communities within the project's area of influence, but the PPP law specifies that private entities must incorporate corporate social responsibility good practices during the implementation of PPP projects. However, the range of initiatives that should be considered is not specified.

6.5.2 Energy

The Ministry of Energy and Mines is the public procuring authority for energy infrastructure projects in Nicaragua. It implements the procurement process for energy projects in collaboration with the Ministry of Finance, which is primarily responsible for evaluating the financial performance of projects and approving contracts. The Nicaraguan Energy Institute evaluates and regulates energy project contracts and services.

Private entities can develop projects as concessions in the energy sector in Nicaragua under the national PPP law, with the exception of the transmission sub-sector where the government retains a monopoly. The Ministry of Energy and Mines, in cooperation with the Ministry of Finance, is responsible for the development of the energy PPP market and projects until an official national PPP agency is created. The Ministry of Energy and Mines implements the PPP procurement process and the Ministry of Finance evaluates the financial impacts of PPPs and approves the concession contract. A parliamentary approval is required for hydropower and multi-purpose projects that utilize water for energy production. Public energy infrastructure projects and PPPs follow the same procurement process as general public infrastructure projects and PPPs. The public procurement and PPP frameworks (as well as the project contract requirements and developer responsibilities) for general public infrastructure are applicable to energy infrastructure projects without modifications.

6.5.3 Water

The Nicaraguan Institute of Aqueducts and Sewers is the procuring entity for public water infrastructure projects in Nicaragua. It plans and implements the procurement process for public water infrastructure through the national system of public investment. Nicaragua has not established an independent water regulator, therefore, the Nicaraguan Institute of Aqueducts and Sewers is also responsible for regulating project contracts and services.

The national PPP law in Nicaragua covers the water sector, but the government retains a monopoly in the potable water supply and sanitation sub-sectors and does not allow private entities to develop and operate such infrastructure projects as concessions. General public infrastructure projects and public water infrastructure projects are procured under the same procurement process principles. Water infrastructure projects follow the same guiding principles in the framework, and project contract requirements and incentives are the same as those mentioned in the general public infrastructure projects. Nicaragua has not developed water-specific frameworks and project contract requirements in the overarching procurement process.

6.5.4 Transportation

The Ministry of Transport and Infrastructure is the public entity responsible for procuring transportation infrastructure projects in Nicaragua. It implements the procurement process in the national investment system, which is administered by the Ministry of Finance. The Ministry of Transport and Infrastructure is also responsible for evaluating and regulating the project contract and services, as Nicaragua does not have an independent public transport regulator.

Public transportation infrastructure projects can be implemented as concessions under the national PPP law, excluding the port sector. The Ministry of Transport and Infrastructure, along with the Ministry of Finance, is responsible for the development of the transportation PPP market and PPP projects, since a national PPP unit has not yet been established. The Ministry of Transport and Infrastructure implements the procurement process and the Ministry of Finance conducts financial risk analyses demonstrating that projects are financially viable, and approves the tendering process and the concession contracts. The Nicaraguan procurement process for transportation projects is implemented under the same principles and regulations discussed in the general public infrastructure section. The contract requirements and incentives for developers and contractors are the same, and transportation-specific frameworks and project requirements were not identified.

Table 22 summarizes our assessment of the project procurement framework in Nicaragua through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the ¼ full circle indicates an insufficient value, the ½ full circle indicates an average value, the ¾ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	2,7				
2. Existence and comprehensiveness of national PPP agency.	2,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	0,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	4,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				

9. Project information monitoring and sustainability tracking.	0,0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
12. Efforts to ensure liquidity and availability of investments.	0,0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. National and sectoral frameworks and standardized project agreements.	3,0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
15. Initiatives to ensure that contractors are qualified.	2,0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

Table 22. Nicaragua's project procurement parameter scores.

6.6 Peru

6.6.1 General

Peru does not have a centralized public entity responsible for the procurement of public infrastructure projects, and sectoral public entities are responsible for procuring public works under their jurisdiction. As such, the Ministry of Transport and Communications is responsible for procuring transportation projects, the Ministry of Energy and Mines is responsible for energy, and the National Water Authority for water projects. Infrastructure projects are developed and evaluated through the Peruvian national investment system administered by the Ministry of Economy and Finance.

Peru first allowed private entities to develop and operate public infrastructure projects through law No. 059–96 of 1996. However, it established its official PPP framework in 2008 through the legislative decree No. 1012 in order to regulate the process more effectively, introduce a more decentralized management and redistribute and clearly separate responsibilities for public entities during procurement. The framework was updated in 2015 through the legislative decree No. 1224 and supreme decree No. 410–2015, to optimize the PPP procurement process and align PPP regulations with international good practices. Peru's Private Investment Promotion Agency, ProInversión, is the national PPP entity responsible for the development of the PPP market and projects.

It is important to note that ProInversión develops and implements PPPs for projects of national scale and/or importance. Regional and local projects, and projects not designated as of national importance can be implemented by ministries and regional and local governments. The Ministry of Economy and Finance is responsible for establishing policies for private investment promotion. ProInversión manages the project procurement process and the Ministry of Economy and Finance approves the concession contract.

Peru has focused extensively on ensuring liquidity and availability of capital by issuing infrastructure bonds. In fact, Fitch Ratings reported in 2014 that Peru performs best throughout LAC in terms of utilizing project bonds for infrastructure (Fitch Ratings, 2014). Peru has also

developed a public infrastructure fund, which has been effective in mobilizing both domestic capital markets and foreign institutional investors. Specifically, the Peruvian government created its first \$460 million infrastructure development fund in 2012, 80 percent of which (\$360 million) was covered by domestic pension funds.¹⁷ Notably, the *Corporación Financiera de Desarrollo*, founded in 1971, operates as a second-tier state-owned development bank since 1992, focusing on financing infrastructure projects and sustainable development initiatives.

Furthermore, Peru has enacted a legal framework for the development of renewable energy auctions, through the law No. 28832 of 2006 and decree No. 1002 of 2008. Four renewable energy auctions have been conducted ever since, the latest of which took place in February 2016. The auction process allowed for very competitive prices in the wind and solar sub-sectors.

For general public works in Peru, a competitive bidding process ensures that developers and contractors are adequately qualified. In addition, the tender processes for public infrastructure and PPPs include a pre-qualification process that helps public agencies select the most competent developers for the final bidding stages. Within this combined request for quotation/request for proposal process, project developers are mandated to implement an environmental management system that addresses environmental impacts through an EIA.

In PPPs, another consultant employed by the procuring agency conducts the EIA. In conventional public projects, the developers are responsible for conducting the EIA. Although the environmental management system covers social impacts, developers are not incentivized to develop social development plans to specify social development initiatives for project-affected communities. Also, climate impact assessments and adaptation plans are not mandatory in the process, even if some of the risks of a changing climate are addressed through the project's EIA.

Peru has not developed standardized project agreements and project contracts do not include sustainability provisions. Project contracts for public infrastructure and PPPs penalize delays and underperformance, yet these do not include explicit targets for enhancing sustainability performance during operations. In fact, developers are not incentivized to track, monitor, and report the project's sustainability performance, such as energy and water consumption, as well as social and environmental impacts, preventing opportunities to identify sustainability initiatives that could be implemented.

6.6.2 Energy

The Ministry of Energy and Mines is the public entity responsible for procuring public energy infrastructure projects in Peru. The ministry is in charge of planning, designing, and implementing public energy infrastructure projects through the national investment system and manages all steps of the procurement process for energy infrastructure. The Ministry of Finance is responsible for assessing the financial implications of energy projects during the procurement process, and approves project contracts. Furthermore, the energy regulator OSINERGMIN evaluates project contracts for energy infrastructure.

Energy infrastructure projects can be developed as concessions under the provisions of the Peruvian PPP framework. The framework establishes ProInversión as the public entity responsible for the development of PPPs in the energy sector for public projects of national importance and projects that require investments exceeding \$18 million. The Special Investment

¹⁷ Brookfield Asset Management provided the remaining \$80 million.

Committee of the Ministry of Energy and Mines can develop PPPs for projects that are not designated as of national importance. Furthermore, local and regional governments can develop PPPs for regional or local projects. Overall, the Ministry of Energy and Mines is involved in the procurement process for PPPs, as it provides comments and technical oversight. The Ministry of Finance is also closely involved, as it conducts financial analyses to ensure that risks are properly assessed and the proposed projects are financially viable. The PPP procurement process cannot be launched before the Ministry of Finance and the energy sector regulator OSINERGMIN approve the tendering documents.

The energy infrastructure procurement processes follow the same overarching laws and regulations as all Peruvian public works and PPPs. As such, the project contract requirements, and the responsibilities and incentives for developers and contractors implementing energy projects are the same as those mentioned in the general infrastructure section.

6.6.3 Water

The Ministry of Housing, Construction, and Sanitation is responsible for procuring public water infrastructure projects in Peru. It manages all stages of the infrastructure procurement process and is responsible for evaluating and implementing the project through the national investment system. The Ministry of Finance is closely involved in the procurement process as it is responsible for evaluating the risks of public water projects to ensure that they are financially viable and do not negatively affect the public budget. Water and sanitation project contracts and services are evaluated and regulated by the National Superintendence of Sanitation Services.

The Peruvian PPP framework allows PPPs in the water sector, and private entities can develop and operate water projects as concessions. ProInversión is responsible for the development of the PPPs in the water sector, primarily for projects of national importance. The Ministry of Housing, Construction, and Sanitation, as well as regional and local governments, can develop PPPs for smaller projects not designated as of national importance. The Ministry of Finance evaluates the risks of water projects to ensure their financial viability and approves the tendering documents along with the water sector regulator, the National Superintendence of Sanitation Services. The procurement framework, laws, and project contract requirements for water infrastructure are the same as those mentioned in the general infrastructure section, as water infrastructure projects and PPPs follow the same processes for general public works.

6.6.4 Transportation

The Ministry of Transportation and Communications is the procuring authority for transportation infrastructure in Peru. The ministry implements the procurement process for transport projects, in collaboration with the Ministry of Finance, which is responsible for evaluating the fiscal impact of projects and approving their contracts. The transport regulator OSITRAN is also involved in the procurement process, as it evaluates and regulates transportation contracts and services.

Private entities can develop and implement transportation infrastructure projects under the Peruvian PPP framework. The General Directorate for Concessions in Transport under the Ministry of Transportation and Communications is the public entity responsible for the development of the transportation PPP market and projects. ProInversión develops and

implements concessions for transportation projects of national importance, while MTC is responsible for developing public transit projects as PPPs.

Regional and local governments can procure PPPs for regional or local projects not designated as of national importance. The Ministry of Finance and the transport regulator OSITRAN are responsible for evaluating and approving the tendering documents and the concession contracts. The general procurement principles, laws, and contract requirements and incentives assessed in the general infrastructure section are applied in transportation projects.

Table 23 summarizes our assessment of the project procurement framework in Peru through the 15 project procurement parameters. Each parameter can have the following values: 0 (nonexistent), 1 (insufficient), 2 (average), 3 (comprehensive), and 4 (very comprehensive). The circle figures indicate the performance of each parameter in the three sub-sectors. The empty circle figure indicates a nonexistent value, the $\frac{1}{4}$ full circle indicates an insufficient value, the $\frac{1}{2}$ full circle indicates an average value, the $\frac{3}{4}$ full circle indicates a comprehensive value, and the full circle indicates a very comprehensive value.

	Score	Country	Water	Energy	Transport
1. Existence and comprehensiveness of national PPP law/framework.	4,0				
2. Existence and comprehensiveness of national PPP agency.	4,0				
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.	3,0				
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.	0,0				
5. Renewable energy auctions.	4,0				
6. Green bonds issuance.	0,0				
7. Environmental management plan and systems requirements in project contracts.	4,0				
8. Social impact management system and social development plan requirements in contracts.	0,0				
9. Project information monitoring and sustainability tracking.	0,0				
10. Climate impact assessment and adaptation plan requirements in project contracts.	0,0				
11. Conditionality for underperformance and delays, and incentives for efficiencies.	3,0				
12. Efforts to ensure liquidity and availability of investments.	4,0				

13. Performance-based contracts with explicit sustainability performance targets for operations.	0,0				
14. National and sectoral frameworks and standardized project agreements.	3,0				
15. Initiatives to ensure that contractors are qualified.	3,0				

Table 23. Peru's project procurement parameter scores.

6.7 Discussion of Findings

The evaluated countries, excluding Bolivia, exhibited similar performance in terms of the availability of **frameworks and regulations for infrastructure procurement**, although these vary in their comprehensiveness. The **institutional framework and arrangements for PPPs** vary considerably among the evaluated countries. Chile and Peru, followed by Jamaica and El Salvador, performed best in this aspect as they have the oldest, and most comprehensive PPP laws and frameworks that adequately cover public infrastructure projects. Overall, a designated PPP agency is responsible for the development of the PPP markets in all three sectors. Yet, the responsibilities for developing the PPP tender process, for granting the concession, and for supervising and monitoring projects during operations differ among the evaluated countries. In fact, Peru stands out in this aspect as it has the most decentralized PPP procurement management process; the Peruvian PPP agency is responsible for developing the tender process, each respective ministry in the transportation, energy, and water sectors grants the concession and monitors projects, in close collaboration with the decentralized energy, transport, and water regulators.

Efforts to **ensure liquidity and availability of investments**, such as issuing infrastructure project bonds and/or developing infrastructure funds, are only observed in Chile and Peru. Both countries have focused considerably on developing infrastructure bonds and designated infrastructure funds for public infrastructure projects. In the other countries, bonds for infrastructure development are not regularly used and the national governments have not yet created infrastructure development funds.

Strong gaps are observed in regards to the incorporation of **sustainability in infrastructure procurement process**. All of the evaluated countries focus on avoiding and/or minimizing environmental and social impacts, but not on enhancing the state of natural environments and promoting social development—thus often bypassing significant opportunities for enhancing sustainability performance. All evaluated countries require the **evaluation of relevant environmental and social impacts**, and the implementation of **environmental management systems**. These requirements are applicable in all three of the evaluated sectors. In the case of PPP projects, the requirement to develop an environmental management system is included in the project contract in all of the evaluated countries. Yet, only Bolivia requires the implementation of **social development plans** and initiatives to help local communities develop sustainably. El Salvador and Nicaragua require the implementation of corporate social responsibility initiatives, but the range of aspects and issues evaluated through these initiatives is not clear.

All countries performed poorly in terms of **integrating climate impact mitigation and adaptation** aspects in the project procurement process. Although most of the countries have developed

national frameworks and strategies for addressing climate change and disaster risks, none of the countries has established a requirement for developers to implement a climate impact assessment and adaptation plan when developing infrastructure projects, in all three of the evaluated sectors. As such, climate risks are addressed on a case-by-case basis in infrastructure project procurement. Furthermore, although short-term hazards such as earthquakes, fires, and floods, are regularly assessed in the evaluated countries, the impacts of a changing climate in increasing the frequency and/or severity of such events is not evaluated properly.

Similar findings emerge in the case of **sustainability performance monitoring systems**. None of the evaluated countries have established frameworks and/or incentives for project sustainability performance data monitoring and tracking. Furthermore, all of the evaluated countries lack explicit requirements for the development of a project **sustainability management system** to set sustainability performance goals and specify the initiatives to achieve these goals. Although performance-based contracts are used in Chile and Peru, these do not specify explicit **sustainability performance targets** that the project should aim to achieve during construction and maintenance.

All countries performed poorly in terms of **incentives for sustainable procurement practices** in public infrastructure procurement. Although sustainable certification schemes for providers and suppliers exist in all of the evaluated countries, only Chile has taken steps to ensure that sustainable suppliers are used in the development of infrastructure projects. In terms of initiatives to **ensure that developers and contractors are sufficiently qualified**, Chile, El Salvador, Jamaica, and Peru regularly undertake a pre-qualification process for strategic infrastructure projects and PPP projects, and implement competitive bidding processes. In general, the pre-qualification requirements are transparent and specified early in the tendering process. Figure 3 displays the performance of each country in the project procurement section.

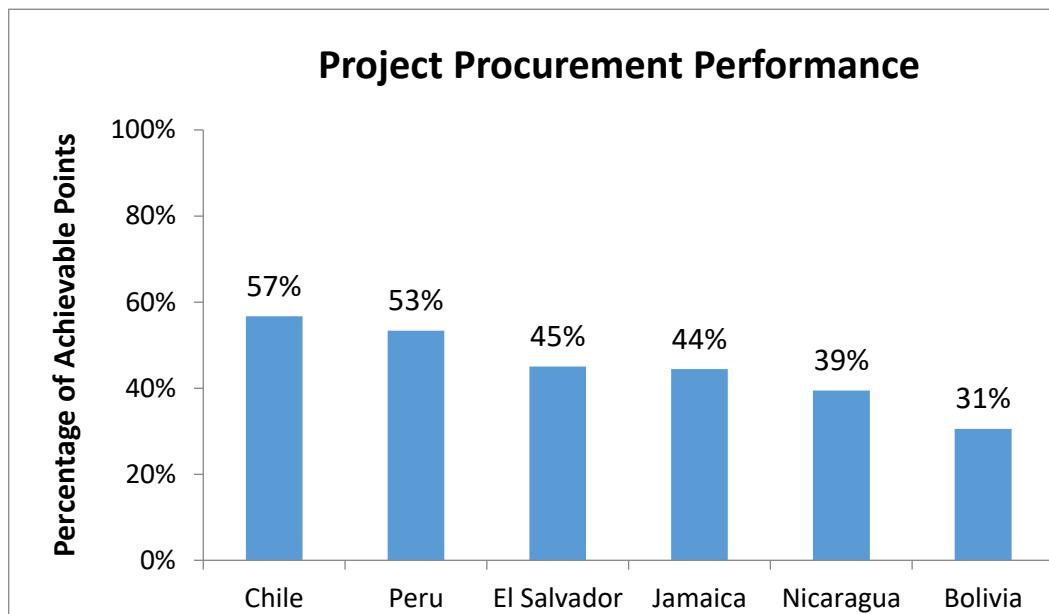


Figure 3. Percentage of total points achieved in the project procurement section, for all countries.

	Chile	Peru	Jamaica	El Salvador	Nicaragua	Bolivia
1. Existence and comprehensiveness of national PPP law/framework.						
2. Existence and comprehensiveness of national PPP agency.						
3. Decentralized institutional arrangements in sectoral agencies for public project and PPP procurement.						
4. Incentives for sustainable procurement in public infrastructure and PPP procurement.						
5. Renewable energy auctions.						
6. Green bonds issuance.						
7. Environmental management plan and systems requirements in project contracts.						
8. Social impact management system and social development plan requirements in contracts.						
9. Project information monitoring and sustainability tracking.						
10. Climate impact assessment and adaptation plan requirements in project contracts.						
11. Conditionality for underperformance and delays, and incentives for efficiencies.						
12. Efforts to ensure liquidity and availability of investments.						
13. Performance-based contracts with explicit sustainability performance targets for operations.						
14. National and sectoral frameworks and standardized project agreements.						
15. Initiatives to ensure that contractors are qualified.						

Table 24. Comparison between all countries; project procurement parameter scores.

7. Country Index

A score and index to measure the institutional capacity of a country is developed by expanding the range of indicators considered in existing tools and methodologies, such as the IMF's PIMA tool. This will allow for a much more comprehensive assessment that covers sustainable upstream project planning and project procurement.

The aspects mentioned in the institutional framework, upstream planning, and project procurement benchmarking sections are formed into questions to develop the indicators of the institutional capacity country score. Each country is evaluated on the range of indicators, with possible answers being "nonexistent," "insufficient," "average," "comprehensive," or "very comprehensive." The "nonexistent" answer gives zero points, the "insufficient" answer gives one point, the "average" answer gives two points, the "comprehensive" answer gives three points, and the "very comprehensive" answer gives four points. A perfect score would require a "very comprehensive" answer in all of the questions. This is a similar methodology to the one followed by IMF when developing the PIMA tool, described briefly in the literature review section.

7.1 Country Performance

The analysis shows that each country's overall performance was in line with its rank in the country selection criteria; Chile and Peru, which were the high-ranking countries, performed best across all evaluated categories. El Salvador and Jamaica, which were medium-ranking countries, performed worse than Chile and Peru, but best than Bolivia and Nicaragua, which were the low-ranking countries. Figure 4 displays the institutional capacity country score for all countries.

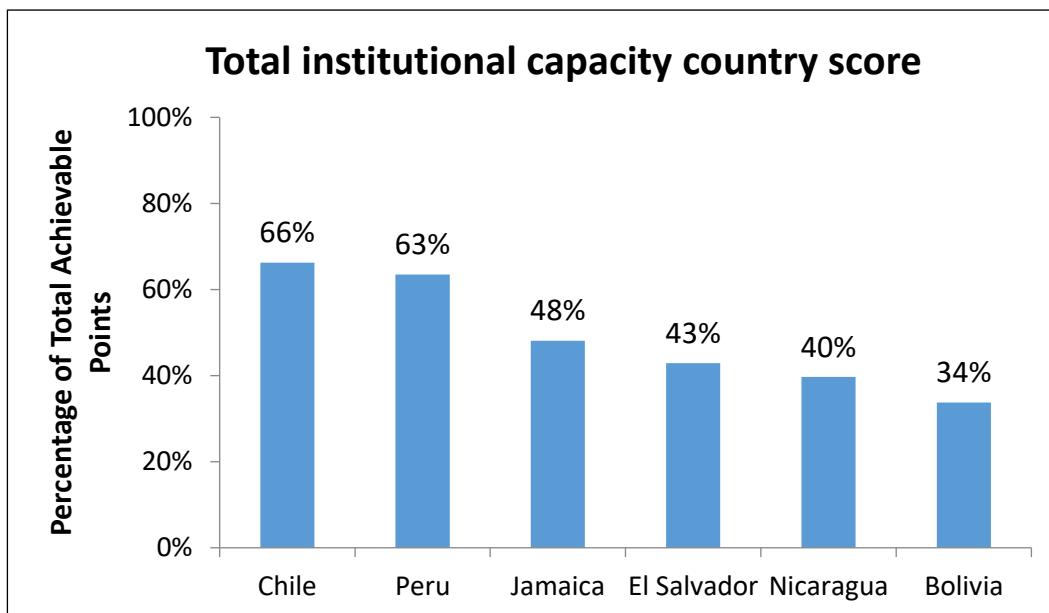


Figure 4. Percentage of total achievable points achieved in all sections, for all countries.

7.2 Discussion of Findings

Our analysis underscores that, in terms of comprehensiveness, the overarching infrastructure planning and preparation frameworks of the countries in our group performed better at the upstream planning section, followed closely by the institutional framework section, and then the project procurement section. In the project procurement section, a notable gap was detected in regards to incorporating sustainability in the procurement process of infrastructure projects, with the exception of Chile whose framework performed well in all categories across all three evaluated infrastructure sectors.

Reviewing the country sector-level infrastructure planning approaches, especially their institutional frameworks on water, energy, transport, and the public infrastructure sector as a whole, shows that in terms of comprehensiveness, the leading sector is energy, and the one with the less comprehensive plans is the transport sector. We also observed that the water sector has the most outdated regulations and policies. Overall, in the infrastructure development process, each country showed a different approach to incorporating sustainability and climate resilience aspects, but most lack specific action plans to ensure that the principles in enacted policies are implemented effectively in projects. As such, although sustainability aspects might be addressed through national policies, the countries lack the capacity to integrate them in projects.

Chile was the country that showed the better approach in infrastructure planning across the energy, transportation, and water sectors. Peru stands out in its efforts to develop a more decentralized, effective, and participatory infrastructure planning and management system across all three evaluated sectors. It was notable that Jamaica is also making a great effort in developing long-term infrastructure development plans.

The analysis on Bolivia, El Salvador, and Nicaragua showed at least one weak sector in regards to infrastructure planning, therefore these countries did not exhibit a strong regulatory and institutional framework overall. El Salvador, for example, has had a gap in water infrastructure institutional development for decades, and only started focusing in developing comprehensive policies for this sector in the last years, although the energy sector has an agenda oriented towards achieving a world-class sector.

Bolivia does not have an overarching national infrastructure plan and relies on the economic and social development plan that contains only general goals for each sector, but has established long-term programs and policies for the water and energy sector. Notably, Bolivia has taken extensive efforts to ensure that infrastructure plans and policies are developed in consultation with the community and stakeholders. Finally, Nicaragua performed poorly in terms of translating long-term development goals in sector-specific plans and policies, especially in the water and transportation sectors.

8. General Findings

8.1 Lack of integrated, multi-sector infrastructure planning approach to specify national infrastructure strategies and project pipelines

Our research shows that the countries in our group develop and implement sectoral infrastructure strategies that guide the development of infrastructure project pipelines for each infrastructure sector. However, all countries lack an integrated, multi-sector national infrastructure plan that transparently specifies the infrastructure needs and projects that would be implemented to cover these needs at the national and regional levels. This leads to multiple lost opportunities, as synergies between infrastructure systems are not properly evaluated when assessing national infrastructure needs. It also increases “stranded asset” risks, as without an integrated, multi-sector infrastructure planning process, the cumulative impacts from many projects from different sectors, or the impacts from projects developed in the same region or within a close distance are not evaluated properly.

8.2 Lack of inter-sectoral and inter-ministerial coordination hinders collaboration and discourages synergies between infrastructure plans and policies

Through our analysis, we observed that sectoral infrastructure plans and strategies are often implemented through a “siloed” approach, with little or no inter-agency and/or inter-ministerial coordination to discuss problems and goals, and identify opportunities for synergies and efficiency gains. In fact, throughout our research we did not identify any requirements or initiatives for cross agency and/or ministry collaboration while developing and implementing sectoral infrastructure plans and strategies. Synergies and opportunities among different infrastructure sectors were discussed and specified only when certain planning agencies or ministries were responsible for planning in more than one infrastructure sector, such as Public Works and Transportation, or Energy and Mining.

8.3 Infrastructure plans and strategies cover short periods and specify unambitious sustainability goals

Transforming existing infrastructure systems into sustainable, resilient, and integrated infrastructure systems is not an easy task. Holistic, integrated strategies and innovative policies are required with clear long-term goals to incentivize the implementation of sustainability practices in infrastructure projects. Yet, with the exception of the energy sector, national and sectoral infrastructure policies and plans in the countries of our sample cover periods that rarely exceed ten years, which is not enough to specify and achieve ambitious long-term strategies that aim for large-scale sustainability transformation.

In addition, the policies and plans do not focus equally on providing goals for sustainable sub-sectors, especially in the water and transportation sectors. For instance, in the transportation sector, national transportation policies and infrastructure plans focus primarily on the development of the highway network and explicitly cover the BRT sub-sector only in Chile and El Salvador. In

the energy sector, we observed that national strategies cover longer periods, which in the case of Peru and Chile extend to 30 and 40 years, respectively. However, in both cases the plans do not specify explicit targets for renewable energy per sub-sector, but rather focus on broadly assessing the role that renewable energy can play in their respective energy systems.

8.4 Further integrating sustainability early in the infrastructure planning process would minimize risks and promote the selection of more sustainable projects

Our analysis shows that several opportunities exist in integrating sustainability further upstream in the investment evaluation process. For example, even though all countries require an economic analysis during investment evaluations to promote projects that have a positive economic value, just three (Chile, El Salvador, and Nicaragua) explicitly require that infrastructure projects must have a positive social value and contribute towards social development. However, it is not known if the range of indicators to assess the social value of projects addresses broader sustainability aspects that promote development co-benefits, resilience, and the enhancement of ecosystems. Notably, integrating sustainability considerations early in the planning process would help ensure investors and developers that investments are targeted towards the right projects, where sustainability risks and benefits are appropriately evaluated, minimizing unforeseen project risks and costs.

8.5 Stronger government action is needed to address perverse incentives and externalities that favor unsustainable infrastructure

Our analysis shows that incentives exist in most of the countries of our sample to develop more sustainable infrastructure projects. However, we also found that planning processes do not explicitly address the sustainability co-benefits of sustainable infrastructure projects and the social cost of GHG emissions and other externalities, thus often indirectly supporting the selection of unsustainable infrastructure. For instance, only Chile discourages projects that generate substantial amounts of GHG emissions in the planning process by pricing carbon emissions in investment evaluations.

Furthermore, although all countries of our sample except Nicaragua have approved the 2015 Paris Agreement, only Bolivia, Chile, Jamaica, and Peru have published their NDCs and set national binding targets for reducing GHG emissions by 2030. Yet, these targets focus primarily on the energy sector, and transport and water sector-specific GHG reduction strategies and goals to specify the contribution of these sectors in reducing national GHG emissions have not been established. Without binding sectoral targets, projects are likely to address GHG emissions and climate change aspects on a case-by-case basis, thus missing opportunities for minimizing or avoiding emissions and improving climate resilience.

8.6 Multiple opportunities exist to incentivize sustainability in procurement frameworks

We observed gaps in the incorporation of sustainability aspects through explicit requirements in project contracts in the procurement process. Overall, the countries follow the conventional “do

“no harm” environmental impact assessment and management approach in the procurement process, focusing on avoiding and/or minimizing impacts. Yet, significant opportunities exist towards implementing social development plans to help communities develop sustainably and enhancing the state of natural environments. However, specific requirements for implementing social development plans are not integrated in project contracts. In addition, the countries do not incentivize projects to develop sustainability management systems, which are instrumental in specifying annual sustainability strategies and goals to enhance sustainability performance.

Similar findings emerged in regards to climate change mitigation and adaptation. Although national climate change mitigation and adaptation strategies exist in the countries of our sample, projects are not incentivized to implement a climate impact assessment plan that identifies climate risks and specifies mitigation and adaptation measures during construction and operations. Another notable gap was observed regarding sustainable procurement. Although sustainable certification schemes exist in all countries of our sample, only Chile incentivizes the use of sustainable certified suppliers and providers while developing infrastructure projects. As such, opportunities to use materials with recycled content and energy and/or water efficient equipment, among others, are not maximized.

8.7 Limited efforts to increase the role of domestic capital markets and mobilize alternative financing sources in infrastructure (pension and insurance funds)

Given the substantial annual needs for infrastructure investments, governments are increasingly considering institutional investors, such as pension and insurance funds, for alternative private sources for financing infrastructure projects. However, in the six countries of our sample, institutional investors are either not allowed by law to invest directly in infrastructure, or face other portfolio restrictions that prohibit them from participating in infrastructure investments. As such, overall, their participation in infrastructure projects remains limited.

Yet, with the exception of Peru, the evaluated countries have not implemented initiatives to ease restrictions and incentivize pension and insurance funds to participate in infrastructure investments. Furthermore, the uncoordinated efforts to evaluate sustainability risks early in the planning process jeopardize sustainability performance and increase uncertainties. This discourages institutional and other private investors to consider investing in infrastructure projects, thus hindering the development of a promising alternative source of financing for infrastructure projects.

9. Conclusion

The institutional capacity of countries to plan, design, and execute prudent infrastructure project pipelines is fundamental in facilitating sustainable infrastructure investments. In fact, deficient institutional capacity leads to the selection of the wrong projects and jeopardizes the achievement of SDG and NDC commitments as part of the 2015 Paris Agreement. Our research reviews country and sector-level approaches to the upstream planning and public works procurement of water, transport, and energy infrastructure projects in Bolivia, Chile, El Salvador, Jamaica, Nicaragua, and Peru. Specific attention is given to how environmental and social sustainability, including climate resilience and mitigation, is part of such processes.

Our research shows that strong gaps exist in the capacities for effective national and sectoral infrastructure planning and delivery in these countries. Although comprehensive national development and sectoral plans exist, the countries lack an integrated, multi-sector approach to assess and specify infrastructure needs through a multi-sector infrastructure plan, missing significant opportunities for synergies and efficiency gains. In addition, effective sectoral infrastructure plans must specify a long-term vision that encompasses the innovative policies and action plans necessary to drive the transformation towards a more sustainable infrastructure system over the long term. Yet, with the exception of energy plans and policies in certain countries, sectoral plans and policies cover periods ranging from 5 to 15 years. Further, the plans should provide specific goals for each sub-sector, and list the projects that would be implemented to achieve these goals.

Capacity building efforts should be focused on stimulating inter-agency and inter-ministerial coordination and communication while planning and implementing infrastructure plans to overcome “silo” thinking and pursue synergies among different infrastructure plans and systems. This would help streamline the infrastructure procurement and delivery process, avoid bottlenecks, and improve the efficiency of infrastructure investments. Moreover, these countries should expand efforts to increase private participation and the role of domestic capital markets in infrastructure, which, overall, remains limited in the LAC region. The example of Peru can be followed to facilitate the participation of institutional (pension and insurance fund) investors in infrastructure projects.

Major opportunities for improvement exist in integrating sustainability further upstream in the investment evaluation process. Countries should follow the example of Chile, El Salvador, and Nicaragua in explicitly requiring that infrastructure projects must have a positive social value and contribute towards social development, rather than focusing only on implementing projects that have a positive economic value. Yet, it is important to specify a comprehensive range of indicators to assess the social value of projects, and incorporate broader sustainability aspects in the process that addresses development co-benefits, resilience, and the enhancement of ecosystems. Notably, doing so would help ensure investors and developers that sustainability risks and benefits are appropriately evaluated, minimizing unforeseen project risks and costs.

Our analysis shows that the countries follow the conventional environmental impact assessment and management approach in the procurement process, focusing on avoiding and/or minimizing impacts. Yet, significant opportunities exist in moving beyond the “do no harm” approach towards implementing social development plans to help communities develop sustainably and enhancing the state of natural environments. Specific and actionable social development requirements

should be integrated in project contracts. In regards to climate change mitigation and adaptation, we found that national climate strategies have not been effective in incentivizing projects to identify and address climate change impacts. The procurement process must explicitly require projects to develop a climate impact assessment plan that identifies climate risks and specifies mitigation and adaptation measures. Doing so would also help evaluate the impacts of climate change in increasing the frequency and severity of disasters and hazards, such as fires and floods.

Furthermore, establishing frameworks and/or incentives for project sustainability performance data monitoring and tracking would help guide the development of project sustainability management systems to set sustainability performance goals and specify the initiatives to achieve these goals. For instance, performance-based contracts can specify explicit sustainability performance targets that the project should aim to achieve during construction and operations. Performance targets should include sustainable procurement practices in public infrastructure procurement. Sustainable certification schemes for providers and suppliers exist in all of the countries, yet only Chile has taken steps to incentivize the use of sustainable suppliers in the development of infrastructure projects.

Overall, our research provides a framework that identifies the main institutional gaps that need to be addressed in the selected LAC countries so they can improve their planning and preparation of sustainable infrastructure projects. We provide a starting point by assessing six countries and three infrastructure sectors; further research can assess additional infrastructure sectors and sub-sectors, and other LAC countries to compare findings at a regional level.

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