Tipping the Scales in favor of the SDGs in Latin America and the Caribbean: the Role of Sustainable Infrastructure

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1. Introduction – No More Business As Usual

Latin America and the Caribbean face the challenge to substantially increase investment in infrastructure to achieve integrated and equitable growth and regional competitiveness. Recent analyses have indicated that investments of up to five percent of Latin America's GDP (USD 250 billion) will be required to close the gap between future needs and existing infrastructure (Serebrisky 2014). Yet, only two to three percent of GDP are invested annually in developing and expanding infrastructure (Serebrisky 2014).

Latin America and the Caribbean is not the only region in need for increased investments in infrastructure. Global demand for new infrastructure from 2015 to 2030 is estimated at USD 90 trillion (Global Commission on the Economy and Climate 2014). That is twice the current stock of infrastructure worldwide. And a figure challenging to reach, as current annual infrastructure spending of USD 2.5 - 3 trillion a year falls halfway short to meet the USD 6 trillion which are needed each year to close the infrastructure gap until 2030 (Bielenberg et al. 2016).

Yet, closing the infrastructure gap goes beyond just spending more money on roads, power plants, and water sewage systems. There is an urgent need for transformation of the way infrastructure is being planned, developed and operated. New infrastructure has to meet the challenges of the 21st century. The two ambitious international agreements of 2015 – the U.N.'s Sustainable Development Goals (SDGs) and the Paris climate accord – made it perfectly clear that business as usual is no longer an option.

To put it with Bhattacharya, Oppenheim and Stern (2015): "The agendas of accelerating sustainable development and eradicating poverty and that of climate change are deeply intertwined. Growth strategies that fail to tackle poverty and/or climate change will prove to be unsustainable, and vice versa. A common denominator to the success of both agendas is infrastructure development".

Therefore, the development of sustainable infrastructure is one of the key development challenges of our times. It is a crucial component for containing global temperature increases below the agreed target of 2C° over pre-industrial levels. Furthermore, all SDGs are either directly or indirectly dependent on sustainable infrastructure as it enhances access to basic services, promotes environmental stability and supports inclusive growth (see figure 1). This includes increased energy security and reduced air pollution from investing in renewable energy (SDG 7, 13), and reduced commuting times

and traffic congestion from investing in more compact cities and urban mobility (SDG 11). Moreover, access to infrastructure services is indispensable for achieving the SDGs related to health, education, gender, and poverty (SDG 1, 2, 3, 4, 5, and 6).

In addition, the transformation towards more sustainable infrastructure has to go hand in hand with a mind shift away from mere technological considerations but to the customer needs and the services infrastructure delivers. Therefore, infrastructure has to be designed and evaluated as a function of the services that it provides (Serebrisky 2014, Bowditch 2016).

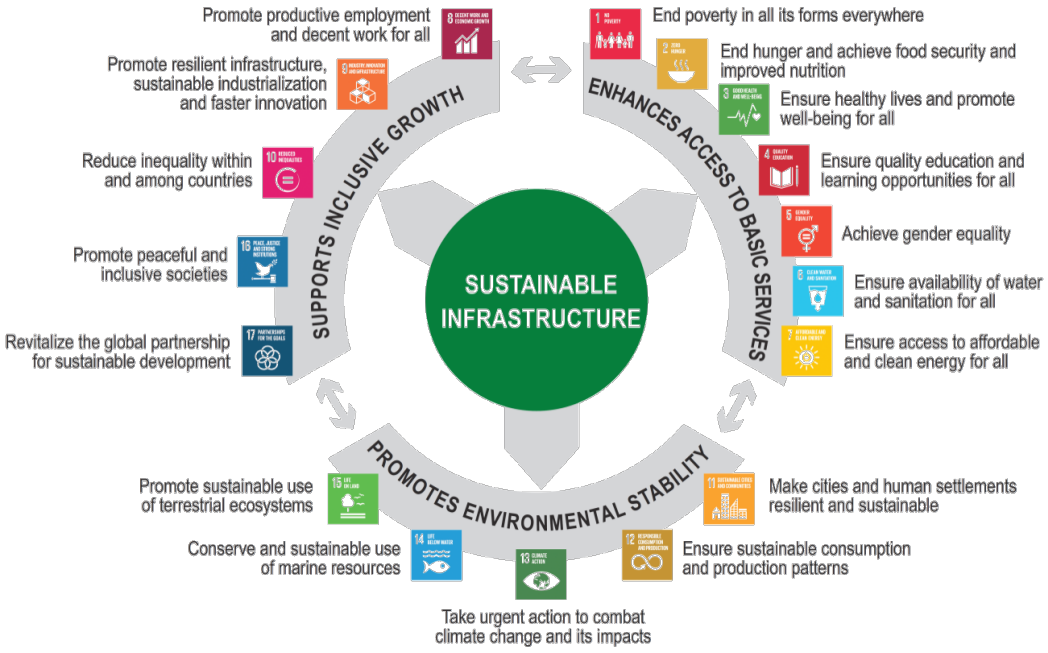

Fig. 1: Sustainable Development Goals and Their Relation to Sustainable Infrastructure
Source: Bhattacharya 2016, slide 9.

2. Infrastructure Challenge of Latin America and the Caribbean

Latin America and the Caribbean is an extremely heterogeneous region in terms of economic development, geography and social history. Looking at it today we see a region that is highly urbanized with 80% of its population (482.5 million people) living in cities (IDB 2016a). Many municipalities struggle already to deliver services to informal settlements with insecure property rights in high natural-disaster-risk areas (Watkins 2014). The task to provide infrastructure services that will increase quality of life in complex urban settings will become even more difficult with urbanization rates expected to continue to rise up close to 90% by 2050 (UN- Habitat 2015).

The region's growing middle class, which is expected to reach 42% of the population by 2030 compared to 29% in 2009 (Ferreira et al. 2013), will further increase demand for infrastructure services.

By 2030, 183 million new vehicles are expected to hit the streets causing rapid growth in gasoline consumption and rising greenhouse gas emissions, increasing costs in terms of traffic congestion, road accidents and air pollution (ECLAC 2014). By 2040 demand for electricity will have grown by 91% reaching over 2,970 terawatt-hours. Electricity production has to be ramped up by nearly 1,500 terawatt-hours to meet the additional demand. That is eighteen times the electricity generated by the Itaipu hydro power plant in 2014 (Balza et al. 2015). To prevent Latin America and the Caribbean to become a larger emitter of CO_2 emissions and to maintain its relatively clean energy mix, investments in sustainable energy and energy efficiency are crucial. Especially, since basic electricity supply still needs to reach 22 million people in Latin America and the Caribbean (Balza et al. 2015). Likewise, access to water and sanitation has to reach more than 77 million people in the region (The Nature Conservancy 2016).

Furthermore, climate change is a significant threat to Latin America and the Caribbean as this is already the region most vulnerable to natural disasters worldwide (IDB 2014). The IDB estimates that by 2050 rising sea levels, changes in rainfall patterns and temperature increases will cause annual cost of around 2-4% of the region's GDP (IDB 2016b). The region may face complete loss in functionality of infrastructure, including water supply systems depending on glacier run-off in the Andes, urban or tourism infrastructure threatened by sea-level rise along the coastal areas, and other impacts. To such an extent that coastal refineries, pipelines, and transmission infrastructure may have to be relocated altogether (Vergara et al. 2013; World Bank 2014).

These projections underline that new infrastructure projects have to include measures to increase resiliency against climate change impacts. Moreover new infrastructure projects have to contribute to a low carbon development path to avoid lock in effects. How infrastructure is built over the next fifteen years will determine the climate future of the world as well as the effectiveness of infrastructure to address changed climate risks.

Yet, as threatening as climate change may be for the countries in the region, the challenge of sustainable infrastructure goes beyond it. It entails all aspects of economic, social and environmental sustainability.

Especially, since infrastructure projects may also result in considerable negative impacts on quality of life and the environment if poorly designed and failing to take into account impacts on natural habitats and concerns of local communities. Moreover, neglecting social and environmental issues usually incurs high risks on infrastructure projects. Not addressing the worries and grievances of affected populations and stakeholders leads to tensions which are often aggravated by lack of communication and lack of trust. These conflicts can cause serious delays, cost overruns, and eventually termination of projects.

The region has ample examples of projects seriously affected by such conflicts. Just recently, in August 2016, the Brazilian environmental agency canceled the process for licensing the 8 gigawatt São Luiz do Tapajós hydro power dam on the Tapajos River in the Amazon. The project consortium had failed to provide information on the impact it would have on aquifers, on deforestation, on plant and animal life and the loss of farm land for indigenous communities. Without the environmental permit the project is bound to stop (Boadle 2016). In Chile, the 531 megawatt Alto Maipo hydro power project is facing strong opposition from communities and NGOs. Its start of operation is now projected in 2019, one year later as originally anticipated (Valenzuela and Orellana 2016). In Mexico, in 2012 the 396 megawatt Mareña Renovables wind power project has

been brought to a complete stop by indigenous groups because of lack of communication and distrust between the stakeholders (Sandoval 2015).

To put it in a nutshell, the infrastructure challenge of Latin America and the Caribbean is twofold: Addressing the need for new and rehabilitated infrastructure projects to deliver services in increasingly complex urban and rural settings, while at the same time effectively manage the risks and impacts associated with infrastructure projects that have consequences for many different stakeholders and environments.

3. The Conceptual Framework of Sustainable Infrastructure

In 1987 sustainable development was defined by the Brundtland Report as "development to meet the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). The concept of sustainability was further described as the triple bottom line of social, environmental and economic responsibility (Elkington 1997). Sustainable infrastructure can be seen "as systems (and services) that not only address material demands now, but can continue to meet the demands of use for future generations" (Georgoulias et al. 2010).

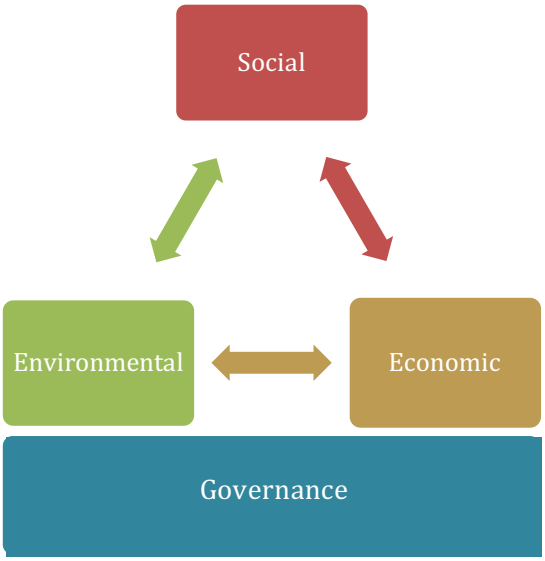

Fig. 2: Dimensions of Sustainable Infrastructure

Thus, the framework for sustainable infrastructure can be arranged along the classic concept of the sustainability triangle with its three dimensions of economic, social, and environmental sustainability. Plus, adding governance as a strong foundation of the triangle (see figure 2).

With the intention to provide general orientation rather than offering a specific definition the following characteristics should give guidance for what sustainable infrastructure encompasses:

On the governance level, projects that

- Are set within a clear policy framework and an integrated and cross-sector planning context
- Are planned and designed to deliver accessible, affordable and cost effective infrastructure services

On the social level, projects that

- Take into account the perspectives of public, private, and civil society stakeholder
- Promote inclusion of vulnerable groups, gender equality and diversity

On the environmental level, projects that

- Are low-carbon, have minimum impact on natural habitat and biodiversity, and consider the value of ecosystem services
- Preserve natural resources or use them in the most efficient manner
- Are resilient and adaptable to changes in climate and the environment (and demand)

On the economic level, projects that

- Are built to minimize costs of operation and maintenance over the whole lifecycle of the project
- Are economically and fiscally viable and thus attractive for private capital and innovative financing models

It should be noted that there is no holy grail of sustainable infrastructure. Rather, there are projects and project portfolios that exhibit the characteristics of sustainability to different degrees. Therefore, it is important to understand how infrastructure projects can be improved and their sustainability ensured and assessed.

4. Ensuring Sustainability in Infrastructure Projects

In essence, there are four key areas to improve the quality and enhance social, environmental and welfare benefits of infrastructure:

- Better upstream planning

This includes first and foremost the development of a long-term sustainability vision by national, regional and municipal governments and constituents. This vision should guide the process of integrating sustainability and climate change goals into sector strategies and connecting administrative and institutional silos (Roth et al. 2015). The development of national determined contributions (NDCs) could serve as a model for this exercise.

In the next step these more general objectives have to be translated into integrated sector and (urban) land use plans where alternatives have been considered, forecasting and backcasting scenarios analyzed, stakeholders involved, cross-sector linkages taken into account, and where changing future conditions as well as demand and supply patterns have been accounted for (Gordon 2012; Roth et al. 2015).

While this can be cumbersome, especially in complex project environments, and oftentimes institutional capacity may be limited, this step is a crucial pre-requisite for successful project implementation. It helps to identify project risks and conflicting interests upfront and allows for the development of risk management strategies at an early stage.

An example of good planning from Latin America and the Caribbean is the integration of natural habitats into the design and operation of infrastructure projects. This lead to restoration projects, endangered species conservation action plans as well as environmental education (Quintero 2012). The 3,150 km long Bolivia-Brazil pipeline project (GASBOL) for example was able to address its environmental challenges by a thorough environment management plan which included the conservation of the Kaa-Iya National Park in Bolivia (Quintero 2007).

- Sustainable project design and execution

Applying a sustainability lens to the project design as well as during construction and operation offers a way to turn broad aspirational goals and plans for sustainability into meaningful projects. A broad set of methodologies is available for assessment and planning of sustainable infrastructure at the project level (Georgoulias et al. 2010; Watkins 2014). Some of these methodologies are sector-specific such as INVEST (Infrastructure Voluntary Evaluation Sustainability Tool) for transport projects, or even technology-specific such as the Hydropower Sustainability Assessment Protocol.

There are only a few assessment methodologies that are designed to evaluate all types and sizes of civil infrastructure: Envision (USA), Civil Engineering Environmental Quality Assessment (CEEQUAL; UK) and Infrastructure Sustainability Rating Scheme (Australia). These methodologies offer a holistic framework for integrating sustainability into project planning and design as well as assessing the performance during construction and operation (Diaz-Sarachaga et al. 2016).

The Envision rating system for example, which was jointly developed by the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design and the Institute for Sustainable Infrastructure (IS), follows an extensive catalogue of 60 performance objectives grouped in five categories (quality of live, leadership, resource allocation, natural world, climate and risk). The level of achievement is measured in five levels (improved, enhanced, superior, conserving and restorative) corresponding to four award categories for project owners and companies.

In addition to this and as a result of growing interest of the financial sector in enhancing, promoting, and monitoring sustainable practices on the portfolio or company level, standards for sustainable infrastructure investments, such as the SURE standard promoted by the Global Infrastructure Basel Foundation (GIB 2016), or the GRESB Infrastructure standard (GRESB 2016), are currently being developed.

- Effective engagement of stakeholders and local communities

As infrastructure is mostly financed by taxpayers' money, infrastructure should obviously be by the people and for the people. Without public support and the backing of local communities most projects will not happen (Roth et al. 2015). Experience from Latin America and the Caribbean shows that proper consultation and participation processes are essential to prevent conflicts with local groups and to mitigate project risk (see chapter 2). In addition, projects can benefit even more from community engagement when issues arise at an early stage or opportunities for broadening the scope are being created (Roth et al. 2015). In order to guarantee effective stakeholder engagement throughout the project cycle institutional agreements and organizational relationships have to be established (Watkins 2014).

Involvement of local communities is good, active participation is even better. Mechanisms through which local communities can benefit from infrastructure projects include local employment and associated training, technology and knowledge transfer, creation of local demand and support of local service providers. That way perception might be changed that the project is not only benefiting distant populations while entailing costs for communities close to it (Watkins 2014).

- Building a better business case

Value for money and cost effectiveness lie at the heart of any infrastructure investment. To determine the most cost-effective approach (and to overcome prevailing misconception that integrating sustainability aspects results in higher projects cost) sound data on the costs and benefits of infrastructure projects is critical (Watkins 2014).

Hence, cost-benefit analyses need to be applied with a broad scope to factor in economic, environmental and social impact and externalities. This is needed in order to evaluate the complex long-term consequences of investment decisions and compare alternatives or competing projects. In this regard, full life cycle cost assessment that accounts also for operation, maintenance and decommissioning of projects helps to provide a more accurate portrayal of the actual economic costs.

In addition, life-cycle risk management has to be applied vigorously as an element of project selection and planning. Taking into account climate vulnerability, environmental challenges, changing demand patterns and customer behaviors is key to ensure project execution and cash flow generation (Beckers and Stegemann 2013). The assumption is that projects that have been developed as outlined in this chapter would be having a lower risk profile than conventional projects.

Lastly, ensuring bankability and linkage to innovative funding mechanisms, including public-private partnerships as well as options to tap into climate financing, should be considered for the development of sustainable infrastructure projects (Watkins 2014).

5. Conclusion

Responding to Latin America and the Caribbean's infrastructure challenge requires sound and smart sector-specific solutions e.g. in the field of transport, energy, water and sanitation. Since these sectors interact with each other, it is important to enhance planning procedures that follow a cross-sectoral approach and are based on a long-term vision for economic, industrial and social development. The bigger picture has to be thought through and translated into projects that focus on achieving growth and socio-economic as well as environmental benefits.

In other words, the added-value created by sustainable projects is making sure that alternatives have been considered, linkages to other sectors taken into account, stakeholders involved, financing secured and welfare increased.

As an accelerator for more robust and stable economic growth sustainable infrastructure can tip the scales in favor of the SDGs in Latin America and the Caribbean. The challenge will be to break down broad aspirational goals for sustainability and climate change into concrete measures for concrete projects. Efforts are needed from all sides: governments on municipal, regional and state level, municipal and rural stakeholder, private sector and civil society. Only then sustainable infrastructure can become the better business as usual.

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