

## TC DOCUMENT

### I. Basic Information for TC

▪ Country/Region:	Regional
▪ TC Name:	Infrastructure Services in Latin America and the Caribbean – Background research for the DIA 2020
▪ TC Number:	RG-T3175
▪ Team Leader/Members:	Tomás Serebrisky (Team Leader), José Luis Irigoyen (Alternate Team Leader), Michelle Hallack, Ancor Suarez-Alemán, Cinthya Pastor, Andreas Wohlhueter, María Cecilia Ramirez Bello, María Fernanda Villa Gonzalez (INE/INE); Esteban Diez Roux (INE/TSP); Fabiana Machado (INE/WSA); Eduardo Cavallo, Andrew Powell, Aglae Parra (RES); Mónica Centeno Lappas (LEG/SGO).
▪ Taxonomy:	Research & Dissemination
▪ Date of TC Abstract authorization:	January 19, 2018
▪ Beneficiary:	IDB's borrowing member countries
▪ Executing Agency:	Inter-American Development Bank (IDB)
▪ Donors providing funding:	Ordinary Capital Strategic Development Program for Infrastructure (INF)
▪ IDB Funding Requested:	US\$2,000,000
▪ Local counterpart funding, if any:	N.A.
▪ Disbursement period:	24 months
▪ Required start date:	February, 2018
▪ Types of consultants:	Firm and/or individual consultants
▪ Prepared by Unit:	INE/INE
▪ Unit of Disbursement Responsibility:	INE/INE
▪ TC Included in Country Strategy (y/n):	N/A
▪ TC included in CPD (y/n):	N/A
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Social inclusion and equality; productivity and innovation; economic integration; climate change; environmental sustainability; and institutional capacity.

### II. Objectives and Justification of the TC

- 2.1 The primary research produced through this TC will serve as input for the 2020 edition of the IDB flagship publication DIA: “Improving LAC Infrastructure Services: for today and for the future.” The main question to answer in the DIA 2020 is When it comes to infrastructure services: How can Latin America and the Caribbean improve today and prepare for the future? To that end, the primary research produced through this TC will deliver major inputs for the three sections of the book: (i) Changing the focus to infrastructure services, and assessing infrastructure services in LAC; (ii) How to improve infrastructure services today: the role of institutions, regulations and policies on the performance of infrastructure services in LAC; and (iii) Preparing for the future: sustainability, innovation and financing dimensions. The specific objectives of this TC are to: (i) create a comprehensive database to face the notable lack of data related to infrastructure services; (ii) identify policies that improved the performance of

infrastructure services; and (iii) model future scenarios incorporating technological changes and sustainability goals.

- 2.2 **Infrastructure is vital for economic growth and development.** Production in modern societies and the provision of basic services such as education or health would be impossible without reliable roads, water, sanitation, and electricity. Infrastructure spurs growth by increasing productivity, reducing production costs, facilitating the accumulation of human capital (through easier access to educational opportunities), helping diversify the productive structure, and creating employment (IDB, 2014).<sup>i</sup>
- 2.3 **Latin America and the Caribbean has a sizable quantitative infrastructure gap.** The lack of infrastructure services in LAC makes it difficult for the region to compete with the rest of the world (Cerra et al., 2016).<sup>ii</sup> Low investment levels –on average 3.5% of regional GDP according to Infralata data (2017)– have created a sizable infrastructure gap in LAC. A range of studies conclude that LAC needs to invest around 5% of GDP in infrastructure for a prolonged period to close the gap (IDB 2014, 2013; Bhattacharya et al., 2012; ECLAC, 2010; Kohli and Basil, 2010; Fay and Yepes, 2003; Calderón and Servén, 2003; Perrotti and Sanchez, 2011).<sup>iii</sup> Additionally, the quality of infrastructure services provided in the region remains poor (Serebrisky et al., 2015). Such investment would be equivalent to an additional US\$100 billion a year.
- 2.4 **Latin America and the Caribbean has a sizable qualitative infrastructure gap.** Additional to (and certainly in part caused by) the low investment in infrastructure, the quality of infrastructure services remains poor. The World Economic Forum’s survey on perceptions of infrastructure quality<sup>iv</sup>—the most cited and used survey worldwide—reveals that the quality of infrastructure in LAC is lagging, particularly compared with advanced economies and high-growth Asian economies. This lag has hardly been closed in the last few decades. In fact, the trend in LAC is cause of concern: 12 out of 17 LAC countries experienced a drop in their quality index between 2010 and 2017 (by an average of 0.47), despite the average investment of about 3.5% of GDP between 2008-2015.<sup>v</sup>
- 2.5 Infrastructure services in energy, transport, and water and sanitation, present enormous shortcomings in the region, which impede both competitiveness and quality of life. To mention some dreadful figures, 34 million people still lack drinking water, 106 million people lack adequate sanitation, and 30 million people lack access to electricity.<sup>vi</sup> Average electricity losses in LAC are estimated to reach as much as 16% of total electricity produced, compared to about 6% for OECD countries.<sup>vii</sup> The World Bank shows that losses from power outages in Latin America reached US\$68 billion in 2012.<sup>viii</sup> Losses due to electrical outages, as a percentage of annual sales, reached 1.2% in LAC, compared to 0.1% in OECD countries.<sup>ix</sup> The prevailing infrastructure gap impedes the region’s ability to compete with the rest of the world.
- 2.6 **There is an urgent need to focus on infrastructure services.** Beyond the provision of infrastructure assets what users (households and industries) demand is infrastructure services of adequate quality. However, most of the attention has been devoted to how much infrastructure investment LAC needs, while little attention has been devoted to infrastructure services. While infrastructure assets represent 3.5% of GDP,<sup>x</sup> infrastructure services represent approximately 20% of GDP.<sup>xi</sup> These numbers call for a change in focus from assets to services, or in more intuitive terms from roads to trucking services, from treatment plants to water at home, from dams to electricity services.

- 2.7 The lack of sufficient investment in infrastructure and maintenance, commonly known as the “infrastructure gap,” has received most of the attention in reports produced by MDBs and think tanks in the LAC region.<sup>xii</sup> However, the lack of investment is only part of the problem: the management, regulation and governance of services are fundamental determinants for the availability and quality of infrastructure services. Policies have focused on the hardware of the sector, largely ignoring its software, forgetting that failing to debug and upgrade the software is a key performance driver for even the best hardware.
- 2.8 **The infrastructure sector suffers from a notable lack of information that impedes the formulation of adequate policy recommendations.** Given the limited attention that infrastructure services have received in the literature in the past, there is an enormous lack of data that needs to be filled. A comparison of the quality and availability of data between infrastructure and other sectors, like health and education, is proof of the relative disadvantage of the ability to produce policy recommendations for the infrastructure based on sound evidence. The compilation of data is necessary to detect key variables of interest in this context and allow for international benchmarking exercises. Therefore, a solid groundwork of information is paramount in order to allow for a rigorous analysis and well-elaborated policy recommendations.
- 2.9 The present TC is aligned with the Update to the Institutional Strategy 2010-2020 (AB-3008) and is aligned with the development challenges of: (i) social inclusion and equality; (ii) productivity and innovation; (iii) economic integration; (iv) climate change (v) environmental sustainability; and (vi) institutional capacity, given that the outputs of this TC have the objective of contributing to the body of policy-oriented knowledge that aims to improve the quality of infrastructure and infrastructures services in LAC and thus, all the mentioned development challenges which are positively correlated with infrastructure. This TC is also consistent with the Sustainable Infrastructure Strategy for competitiveness and inclusive growth. Lastly, this TC is aligned with the priority of competitive regional and global integration as it will address the needs of infrastructure to facilitate integration both regionally and globally. The main value added by the present TC will be: (i) the generation of today non-existing data and knowledge on the current state of infrastructure services in the region, together with the macro quantification of the consequences of underestimating the importance of the “software” component of infrastructure policies; (ii) the identification of cross sectoral and specific constraints for the sectors, together with a compilation of successful policies that tackle those constraints; and (iii) the identification of emerging trends and technologies that may affect infrastructure services of tomorrow; and recommendation of potential policies to help adopt innovation in the provision of services.

### **III. Description of Activities/Components and Budget**

- 3.1 **Component 1: Infrastructure services in LAC: definitions, measurement and assessment.** This first component aims to generate evidence and analyses to change the focus from infrastructure assets to infrastructure services. Therefore, the first step of this component is to come up with a definition of infrastructure services and measure their participation and relevance in the countries of the region. It should be highlighted that there is not a common standard or methodology to measure infrastructure services. There has been attempts by bureaus of statistics to adopt a common approach to measure infrastructure services, but not much progress has been made. This component attempts to define a methodology and produce estimates to measure the size and recent evolution of infrastructure services in LAC economies. Preliminary

estimations show that infrastructure services account 20% of GDP, three times more than the annual investment in physical infrastructure assets.

- 3.2 In a second step, a database with the main performance indicators for each sector (transport, energy, water and sanitation) for all the countries of the region (to the extent possible) will be built; in such a way that the definitions are homogeneous and the data comparable in order to allow for inter-regional and international benchmarks. It could be assumed that a database of basic infrastructure services with such characteristics already exists for each sector; however, currently there is none for descriptive neither for analytical purposes. Indicators vary in its availability (for all LAC countries and historical evolution) and nature (energy and water might have a focus on access, affordability, service properties like interruptions or drinkability, while transport will require different indicators such as frequency or road conditions). There are some institutions that have an inventory of certain data. Nevertheless, this data is neither available for all the countries in the region, nor does it come as a time series. Moreover, published data usually is not homogenized since it comes from censuses or surveys, which vary across LAC countries because each one can define the variables in a different way.
- 3.3 This component is expected to produce the first economy-wide impact analysis of a comprehensive set of infrastructure policies. As most of the available assessment of infrastructure services are done at the sector level, they tend to underestimate or simply ignore the spillovers and more generally, the macroeconomic consequences of infrastructure services performance. Poor service can, for instance, imply high costs and hence translate into poor international competitiveness, unaffordable access of services to the poor, lost employment opportunities for newly skilled workers and mismatches between skills needs and supply. Any of these issues can slow down the growth potential of the region and reduce the scope for self-financing of the sector. Relying on a Computable General Equilibrium (CGE) model, calibrated for at least 5 economies in LAC, it will be possible to simulate how infrastructure policies (including improvements in quality, efficiency, technology adoption, carbon taxes, among others) impact macro variables like economic growth, unemployment, fiscal balance and income distribution.
- 3.4 Activities within this component include: (i) definition and measurement of infrastructure services; (ii) creation of a database of infrastructure indicators: identification of most relevant indicators, data availability and homogeneity across countries; (iii) analysis of infrastructure service performance in the region based on data collected and organized in ii; and (iv) simulation of infrastructure policies' impact on macro variables.
- 3.5 **Component 2: How to improve Infrastructure services today: the role of institutions, regulations and policies on the performance of infrastructure services in LAC.** The provision of infrastructure is a complex task. The project cycle of infrastructure projects (strategic policies, portfolio planning, procurement and contracting, detailed design, financing, construction, operation & maintenance and decommissioning) is extremely complex. Incentives and information issues at each stage provoke a set of difficult trade-offs in the contracting environment. How to ensure good governance and regulation in the presence of institutions of varying strengths is a significant challenge in many emerging economies including LAC.
- 3.6 This component intends to answer questions of the following nature: Are public sector institutions in the domain of infrastructure services in LAC efficient? Can governance

structures be improved? Is it possible to streamline infrastructure delivery?<sup>xiii</sup> Is there a bias against maintenance? Which are the policies to reduce this bias? Is there a backlog of maintenance that is reducing the life of infrastructure assets and reduces the quality of services? There is a widespread belief that there is a bias against maintenance and in favor of building new infrastructure. Data to answer these questions is extremely difficult to find as countries do not properly report maintenance in budgetary accounts. This TC will attempt to build estimates of the maintenance backlog for the road sector in LAC (main roads), study its change and volatility in time and compare it with total budget allocation to roads.

- 3.7 There are sector specific supply and demand characteristics that prevent improving sectors' performance. A second part of this component includes the identification of constraints (legal, behavioral) that negatively impact the sectors performance such as: (i) Economy-wide legal and regulatory regimes: that set prices, investment requirements, import controls, buy local regimes, unnecessary service obligations, weak enforcement of laws and regulations; (ii) Governance: How has corporate governance affected the performance of services in LAC? Has the region improved the quality of its corporate and regulatory governance? This TC will finance a database with the most representative regulators and firms in the LAC region to identify governance gaps; and (iii) Demand management/Incentives to alter behavior to realize key economic targets: It is surprising how little information exists on the demand for various infrastructure services. How does the demand for services in the region respond to changes in prices? And how do they vary across the income distribution? Latin America has seen its middle class grow strongly and with it the growth of motorization. This implies a much greater demand for road services. Should supply increase or should prices (tolls, taxes) be used to prevent demand from growing? Do electricity rates reflect the opportunity cost of the resources necessary for its production? Can technology (e.g. smart meters and applications to give users information) impact demand to avoid building new infrastructure?
- 3.8 To address sector specific issues, it is necessary to analyze the current state of each sector regarding access, affordability, efficiency, quality of services, governance, and financial performance. This will allow for an understanding on the performance of each of the sectors and the identification of key supply and demand constraints.
- 3.9 After identifying and analyzing cross-sectoral and specific constraints, the last part of this component includes a compilation and analysis of policies that have worked (and failed) in LAC and other regions. This analysis will reflect lessons learned from case studies of the application of different policies and instruments such as: congestion charges (peak and load prices), programs to generate behavioral changes (incentives to water connection, programs to influence demand such as incentives to purchase energy-saving appliances, electric cars, lower water consumption, auto generation of electricity). This is an important added value to the literature as it goes beyond simple diagnostics and general policy recommendations and instead identifies successful policies and available tools on how to improve on or solve some of the identified constraints and to respond to future trends.<sup>xiv</sup>
- 3.10 Activities in this component include: (i) an efficiency analysis of the delivery and operation of public infrastructure services; (ii) the identification of constraints that negatively impact the sector's performance such as: (a) economy wide legal and regulatory regimes as well as institutional structures, (b) governance, and (c) demand management/Incentives to alter behavior to realize key economic targets; (iii) an analysis of the current state of each sector regarding access, affordability, efficiency,

quality of services, and financial performance –this will allow for an understanding of the performance of each of the sectors and the identification of key supply and demand constraints; and (iv) a compilation and analysis of policies that have worked (and failed) in LAC and other regions. This analysis will be based on case studies that assess the implementation of a wide range of policies and instruments in the LAC region aimed at improving the performance of infrastructure.

**3.11 Component 3: Preparing for the future: understanding emerging trends and technologies related to infrastructure services and identifying policies and institutional frameworks to foster innovation in the provision of services.** The objective of this component is to identify how infrastructure services will be affected in the future by technological changes and the need for more sustainable infrastructure services. The world is changing and so are the challenges for infrastructure.

**3.12** Activities within this component include: (i) understanding what sustainable infrastructure services imply, this involves: the modeling of scenarios in order to comply with Nationally Determined Contributions (NDCs) or zero emission targets, analyze the role of natural/green infrastructure to adapt to climate change and the investment needs, and study how better planning and land use regulation can reduce the demand for infrastructure services in cities; (ii) determining the impact of technology and innovation in the provision of infrastructure services, this includes: the production of scenarios to measure the significance for and impact on infrastructure services caused by the roll out of electric vehicles and autonomous cars, digitalization of the energy sector, distributed electricity generation or technological changes in the water sector (e.g. smart metering, desalination technologies). Technological changes and trends are already changing the economy's composition and productivity. This activity plans to simulate the impact of infrastructure technology and innovation on a micro level (how the composition and level of demand will change with technology adoption) as well as on a macro level; and (iii) understanding the infrastructure services financing in LAC: research will focus on the funding and financing sources of infrastructure services in LAC. Beyond data collection to identify cost recovery in infrastructure services, special attention will be devoted to answer the following questions: What are the main barriers for infrastructure to become an asset class? Lack of a robust pipeline of well-prepared projects? Absence of tariff-based funding source that allows for predictable and full cost recovery? Inadequate risk allocation? Financial sector regulations (Basel III)? Do regulatory constraints imposed to institutional investors hinder the channeling of domestic savings to infrastructure?

**Indicative Budget**

<b>Component</b>	<b>Description</b>	<b>IDB/Fund Funding</b>	<b>Counterpart Funding</b>	<b>Total Funding</b>
Component 1	Collect data, build database and indicators, purchase databases, travel	1,370,000	0	1,370,000
Component 2	Collect information, purchase database, travel	335,000	0	335,000
Component 3	Analyze future trends and their macroeconomic impact, purchase database, travel	295,000	0	295,000
		<b>2,000,000</b>	<b>0</b>	<b>2,000,000</b>

**3.13** The estimated total cost of this TC is US\$2,000,000, to be financed in its entirety by the Ordinary Capital Strategic Development Program for Infrastructure (INF).

- 3.14 INE/INE will have technical and supervisory responsibility through the Team Leader, and will monitor the progress of all TC activities.

#### **IV. Executing agency and execution structure**

- 4.1 This operation will be executed by the IDB (Infrastructure and Energy Sector-INE/INE), which will be responsible for all aspects of this TC, including disbursements. This TC is of regional nature. Since no other regional entity with legal capacity to execute this TC could be identified and in order to guarantee the sustainability of the implementation of the project this TC is Bank executed. The Bank is ideally positioned, given its vast presence in the region, its capacity to engage the most relevant stakeholders, and its knowledge across all infrastructure sectors, to undertake the data collection and studies necessary to complete the project, and to disseminate the results among relevant actors in the region.
- 4.2 If any activity is required in any of the beneficiary countries, the TL will request the non-objection of the respective government entity of the respective country.
- 4.3 The Bank will contract individual consultants, consulting firms and non-consulting services in accordance with the Bank's current procurement policies and procedures for Bank-executed operations: For the recruitment of individual consultants the Bank will apply the AM-650. For the contracting of consulting firms, the Bank will use the "Policy for the Selection and Contracting of Consulting Firms in Bank-Executed Operational Work" (GN-2765-1) and its operational guidelines OP-1155-4. For the contracting of non-consulting services, the Bank will apply its "Corporate procurement policies" (GN-2303-20).
- 4.4 It is expected that all IDB's borrowing member countries will be beneficiaries of the outputs of this TC.

#### **V. Major issues**

- 5.1 Risks of implementation of this TC will be low. This TC aligns with the INE Infrastructure Department's objectives and the work will be under the direct guidance of INE's Principal Economic Advisor.
- 5.2 A common concern within the infrastructure sector relates to the ability of finding and gathering the necessary data for the project. However, the team has already identified most of required data sources, so this risk is partially mitigated.

#### **VI. VII. Exceptions to Bank policy**

- 6.1 None apply.

#### **VII. Environmental and Social Strategy**

- 7.1 As per the Environment and Safeguards Compliance Policy (OP-703), the project Classification is "C". The project implementation has no associated potential negative environmental and/or social impacts (see [Safeguard Policy Filter Report](#) and [Safeguard Screening Form](#)).

#### **Required Annexes:**

- Annex I: [Results Matrix](#)
- Annex II: Terms of Reference ([I](#), [II](#), [III](#) and [IV](#))
- Annex III: [Procurement Plan](#)

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- <sup>i</sup> Inter-American Development Bank., 2014. Sustainable infrastructure for competitiveness and inclusive growth. IDB Infrastructure Strategy.
- <sup>ii</sup> Cerra, V., Cuevas, A., Góes, C., Karpowicz, I., Matheson, T., Samaké, I. and Vtyurina, S., 2016. Highways to Heaven: Infrastructure Determinants and Trends in Latin America and the Caribbean.
- <sup>iii</sup> IDB (Inter-American Development Bank). 2014. Megacities and Infrastructure in Latin America: What Its People Think. Infrastructure and Environment Department, Washington, DC.
- Bhattacharya, A., M. Romani, and N. Stern. 2012. Infrastructure for Development: Meeting the Challenge. Centre for Climate Change Economics and Policy, London. <http://www.cccep.ac.uk/Publications/Policy/docs/PP-infrastructure-for-development-meeting-the-challenge.pdf>.
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- Kohli, H. A., and P. Basil. 2010. "Requirements for Infrastructure Investment in Latin America under Alternate Growth Scenarios: 2011–2040." *Global Journal of Emerging Market Economies* 3 (1): 59–110.
- Fay, M., and T. Yepes. 2003. Investing in Infrastructure: What Is Needed from 2000 to 2010? vol. 3102. Washington, 30 DC: World Bank
- Calderón, C., and L. Servén. 2003. "The Output Cost of Latin America's Infrastructure Gap." In *The Limits of Stabilization: Infrastructure, Public Deficits and Growth in Latin America*, ed. W. Easterly and L. Servén, 95–118. Stanford, CA: Stanford University Press.
- Perrotti, D. E., and R. Sánchez. 2011. "La brecha de infraestructura en América Latina y el Caribe." *Economic Commission for Latin America and the Caribbean (ECLAC)*. Santiago de Chile, Chile.
- <sup>iv</sup> This indicator ranges from 1 to 7 and is based on self-reported perceptions of quality, not the objective quality of infrastructure. Still it provides a good proxy of reality. For more information refer to <https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1>
- <sup>v</sup> Estimates are based on calculations using data from <https://www.infralatam.info>
- <sup>vi</sup> IDB (2015). Development Effectiveness Overview. What worked and what didn't. Lessons on Development 2012-2015.
- <sup>vii</sup> Jiménez R., T. Serebrisky, J. Mercado (2014). Power lost. Sizing Electricity Losses in Transmission and Distribution Systems in Latin America and the Caribbean. IDB Monograph. Washington, Washington, DC: Inter-American Development Bank.
- <sup>viii</sup> World Bank (2012). Enterprise Survey. Washington, D.C.: World Bank.
- <sup>ix</sup> World Bank (2010). Enterprise Survey. Washington, D.C.: World Bank.
- <sup>x</sup> Infralatam. Average LAC 2008-2015.
- <sup>xi</sup> Coremberg (forthcoming), preliminary estimations for Mexico.
- <sup>xii</sup> This is documented for example in Serebrisky, T., A. Suárez-Alemán, D. Margot, and M. C. Ramirez. 2015. Financing Infrastructure in Latin America and the Caribbean: How, How Much and by Whom? IDB Monograph. Washington, DC: Inter-American Development Bank; Perrotti, D., and R. J. Sánchez. 2011. La brecha de infraestructura en América Latina y el Caribe. Serie Recursos Naturales e Infraestructura 153, United Nations, Santiago, Chile; CAF (Corporación Andina de Fomento). 2013. La Infraestructura en el desarrollo integral de América Latina. IDEAL 2013. Bogotá.
- <sup>xiii</sup> According to a forthcoming IDB study potential efficiency gains may add up to 40 percent of public infrastructure investment. Serebrisky, T., Suárez-Alemán, A., Pastor, C., and Wohlhueter, A. (forthcoming). Increasing the efficiency of public infrastructure delivery. Evidence-based potential efficiency gains in public Infrastructure spending in Latin America and the Caribbean.
- <sup>xiv</sup> At most, some boxes are included in papers identifying one or two successful policies applied that are related to the paper's topic.



INFRASTRUCTURE SERVICES IN LATIN AMERICA AND THE CARIBBEAN – BACKGROUND RESEARCH FOR THE  
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CERTIFICATION

I hereby certify that this operation was approved for financing under **Ordinary Capital Strategic Development Program for Infrastructure (INF)** through a communication dated January 19, 2018 and signed by Felipe Caicedo (ORP/GCM). Also, I certify that resources from said fund are available for up to **US\$2,000,000** to finance the activities described and budgeted in this document. This certification reserves resource for the referenced project for a period of four (4) calendar months counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, represent a risk that will not be absorbed by the Fund.

CERTIFIED BY:

  
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Sonia M. Rivera  
Division Chief *FC*  
Grants and Co-Financing Management Unit  
ORP/GCM

*February 8, 2018*  
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Date