TECHNICAL COOPERATIONABSTRACT

BOLIVIA

I. BACKGROUND

Country:	Bolivia
TC Name:	Development of Bolivian Broadband ICT Infrastructure Services – Broadband Data Center
TC Number:	BO-T1246
Team Leader/Members:	Antonio Garcia Zaballos (Team Leader, IFD/CMF); Joaquín Domínguez (Alternate Team Leader, IFD/CMF); Felix Gonzalez (IFD/CMF); Enrique Iglesias (IFD/CMF); and Cecilia Bernedo (IFD/CMF).
TC Taxonomy:	Client Support (CS)
Reference to request:	IDBDocs#39473719
Date of TC Abstract authorization:	April, 2015
Donors providing funding:	Knowledge Partnership Korea Fund for Technology and Innovation (KPK)
Beneficiary:	Bolivia – *Ministerio de Obras Públicas, Servicios y Vivienda*
Executing agency and contact name:	Inter-American Development Bank (IDB)
IDB Funding Requested:	US$550,000
Local counterpart funding:	None
Disbursement period:	30 months (execution: 24 months)
Required start date:	May, 2015
Types of consultants:	Consulting Firms
Prepared by Unit:	Capital Markets and Financial Institutions Division (IFD/CMF)
Unit of Disbursement Responsibility:	IFD/CMF
TC included in Country Strategy:	N/A **TC included in CPD:** N/A
GCI-9 sector priority:	The current Sector Strategy: "Institutions for Growth and Social Welfare" identifies improving innovation and productivity as a major area where the Bank can help the Region overcome the challenges that hinder growth and social welfare. To this end, the IDB will work towards strengthening institutions, and has specifically recognized the need to improve policies and governmental action in the ICT sector (¶5.21 of the referred to Sector Strategy). Consistent with the Strategy, the Bank has been working in the design and implementation of a Broadband Platform to accelerate the penetration rate and usage of broadband services in the Region.

II. OBJECTIVES AND JUSTIFICATION OF THIS TC

2.1 There is evidence that the acceleration of broadband penetration, adoption and effective use brings clear social and economic benefits. In particular, it is estimated that increases of 10% in broadband penetration in Latin American and Caribbean (LAC) countries, on average, have associated increases of 3.19% in GDP, 2.61% in productivity and a net generation of more than 67,000 jobs[1].

2.2 Bolivia is one of the countries in the LAC Region that faces the greatest challenges to effectively harness the benefits brought about by broadband connectivity, as it is characterized by: (i) low levels of penetration[2]; (ii) low broadband quality, in terms of speed[3], and (iii) high prices[4]. Not surprisingly given this context, the use of Information and Communications Technologies (ICT) in Bolivia is also low compared to international standards[5].

2.3 In this line, the main barriers found in Bolivia to increase broadband services penetration, adoption and use are: (i) limited awareness of the benefits that broadband and ICTs have particularly regarding their potential for innovation and competitiveness in sectors such as health, education, government, trade, finance and SMEs, as well as a general lack of skills for their adoption by public officials, policy makers, entrepreneurs and citizens; (ii) need to continue pushing, implementing and monitoring specific policies promoting the adoption and effective use of ICTs for all the population (the government of Bolivia has a comprehensive ICT policy framework that is now implementing); (iii) outdated regulatory frameworks that fail to adequately attend the recent evolution of the telecommunications sector; and (iv) inadequate deployment of infrastructure and technology with scarce participation by the private sector in the investment and provision of technology.

2.4 In light of the many challenges observed to promote broadband in Bolivia, particularly regarding the lack of understanding of the broadband status quo given the absence of appropriate data, the Government requested technical and financial support from the Inter-American Development Bank (IDB) to address these issues through this technical cooperation. This technical cooperation will support technical work to be carried out for the design of a national broadband cloud computing infrastructure, regulatory frameworks, as well as other activities for the preparation of any upcoming related operation that may appear in the future.

2.5 **Objectives of the project.** The goal of this Technical Cooperation (TC) is to support the Government of Bolivia develop a sustainable environment for the efficient and effective use of broadband services, enable business continuity, consolidate systems, and protect critical information and infrastructure for the public and private sectors, through the establishment of cloud-computing broadband infrastructure.

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[1] García-Zaballos, A. / López-Rivas, R.: Governmental control on socio-economic impact of broadband in LAC countries. IDB, 2012.

[2] ICT World Indicators Database, International Telecommunications Union (June, 2012).

[3] Galperín, H.: Broadband prices and quality in Latin America (2012) .Data for 2010.

[4] Ibid.

[5] According to the ICT utilization indicator by the World Economic Forum (2012) usage by government, businesses and individuals is well below the average levels found in LAC and OECD countries.

III. DESCRIPTION OF ACTIVITIES

3.1 The activities proposed in this project are divided into five main components, which define its strategic approach. Component 1 includes a diagnostic and analysis of the supply and demand of cloud-computing infrastructure for government and private sector broadband services in Bolivia and the requirements to meet the existing gap. Subsequently, and based on the information gathered in this analysis, Component 2 involves the design and modeling of cloud-computing and additional infrastructure investments, and the formulation of a strategy for execution. Component 3 consists of the review, and proposal of updates, to the institutional, legal and regulatory framework affecting data collection, storage and processing to advance cloud services development. Component 4 involves preparation of corresponding institutional, financial and administrative arrangements that will support the preparation and implementation of the project. Finally, Component 5 involves an environmental and social impact analysis for the proposed infrastructure.

3.2 **Component 1: Diagnostic and analysis of cloud-computing infrastructure for broadband services.** The objective of this component is to conduct a market assessment of demand and supply of government broadband supported services to all the population, public and private sectors in Bolivia. These are key elements to determine the scope, requirements of the proposed infrastructure to advance broadband services and subsequent return on investment. This activity includes:

(i) Elaborate on the current estimation and future (five years) demand for government broadband enabled services throughout various sectors, to the population, private companies, government and non-government organizations in the country.

(ii) Analyze the current and future supply of broadband and ICT enabled services, needs for data storage, processing and security; assess the capacity of the government existing facilities and planned deployment of broadband infrastructure; diagnose the gaps between the supply and demand of government broadband services to the individuals, private and public sectors.

(iii) Design public policies to bridge the gap through the deployment of cloud-computing infrastructure and alternative technologies.

3.3 **Component 2: Design and modeling of recommended cloud-computing and additional infrastructure investments.** Based on the previous section, the objective of this component is to evaluate the technical, economic, and financial feasibility of migration of existing independent data centers into a consolidated cloud network, determine the appropriate scope investments, inter-operability standards and strategy to foster broadband services, through a close collaboration between the public and private sectors. The result is to enable more effective delivery of services to government, business, and citizens while at the same time yielding substantial cost savings. This component includes the following activities:

(i) Identify the key design criteria and technical specifications for the overall cloud-computing infrastructure and services related to the technology and the facility support infrastructure, keeping in mind the availability requirements, security,

power and cooling dynamics, and business objectives. Determine standards and approaches specific to technologies selected to be compliant with ecological and legal regulations. Conduct site selection for the main and back-up data centers and conceptualize the cloud-computing facility in diagram format, detailing the components and systems that will comprise the project investment.

(ii) Recommend network investments to allow the infrastructure to connect all the government offices and institutions and the local and international telecommunication carriers.

(iii) Identify services to be provided by the Cloud Computing Platform, including the main horizontal services that will be used across government and the specific verticals of some applications. Since the services will be introduced gradually, their introduction should be done in phases, specifying in detail the ones for the first five years, while only generally the others that will be developed in the following five years.

(iv) Quantify all the investments described in the previous three items, for the first five years of the operation of the Cloud Computing Platform.

(v) Calculate the revenues and operational expenditures for the first five-year period. Formulate a five-year operating and commercial management strategy. Identify commercial and operational alternatives including ownership structure (PPP), management mechanisms and options for operations and maintenance.

(vi) Evaluate the investment and analyze of the economic return associated with the different alternatives for deploying Cloud Computing infrastructure, taking into account the different deployment scenarios. An estimation of the Net Present Value (NPV) and Rate of Return (IRR) associated with the investment is required, which implies an estimation of the expected demand for services; the operative break-even point, defined as the minimum investment or the minimum service penetration that make the deployment economically viable; and of the savings associated with the online provision of different types of services as compared to the current situation.

(vii) Create a roadmap for project schedule and development of services, expanding on stages for detailed design and engineering, construction, operations, service introduction, monitoring etc.

3.4 **Component 3: Review and proposal of updates to the IT institutional, legal, and regulatory, framework.** The objective of this component is to review of, and propose updates to, the IT institutional, legal and regulatory framework to advance cloud services development. This component is particularly relevant as the decision of investing in cloud infrastructure by the government and private sector requires a stable and predictable regulatory framework that creates the conditions to facilitate investments, as well as a coordinated government investment policy and administrative arrangements. This component includes the following activities:

(i) Review and analysis of the current IT administrative regulatory and legal framework including, inter-alia, data privacy, security, intellectual property rights protection, digital signature, and consumer protection.

(ii) Elaboration of a proposal to modify and/or update the existing IT institutional, legal and regulatory framework to meet international best practices, defining the steps required for its implementation; and

(iii) Workshop to validate and disseminate results with key stakeholders.

3.5 **Component 4: Preparation of corresponding institutional, financial and administrative arrangements that will support the preparation and implementation of the project.** The objective of this component is to work in close collaboration with the Government of Bolivia and other stakeholders to prepare institutional, financial and administrative arrangements that will support the preparation of a loan proposal, taking into account the previous components. This component includes the following activities:

(i) Design the execution and governance mechanism for the implementation of a project related to an infrastructure deployment and loan operation.

(ii) Preparation of administrative, financial and technical inputs for the preparation of the loan operation, including a proposal for the financial structure of the loan.

(iii) Support the coordination of a workshop to validate results from all studies with stakeholders.

3.6 **Component 5: Environmental and Social Impact Analysis.** The objective of this component is to ensure the proposed infrastructure is compliant to legal, regulatory and administrative processes for the protection of the environment, natural habitats, and cultural resources in accordance to the Government of Bolivia and the IDB norms and regulations. This component includes the following activities:

(i) Development of the Environmental and Social Impact Management Plans (EMPs) for the project, consistent with the Bolivian and IDB Environmental and Social Safeguards and Regulations.

(ii) Support the coordination of a workshop to validate results from all studies with stakeholders.

3.7 **Expected outputs.** In particular, the project will provide technical assistance to:

(i) Diagnostic of supply and demand for cloud computing network services.

(ii) Design and Identification of technology, data center infrastructure, network and Services for Cloud Computing service deployment.

(iii) Financial and economic analysis of Cloud Computing Platform and its five-year operating and commercial strategy.

(iv) Review and propose revisions of Bolivia IT institutional, legal, and regulatory frameworks to promote Cloud Computing services.

(v) Administrative, financial and technical arrangements for the preparation of the project, including a proposal for the financial structure of the loan.

(vi) Environmental and social impact management plans.

3.8 **Expected results.** As a result of this project, the Government of Bolivia will have a better understanding of the current status of broadband services in the country, as a necessary step to deploying appropriate technologies aimed at accelerating broadband services provision, adoption and use in the country. Ultimately, a greater penetration of broadband services is expected to increase competitiveness and social inclusion, and

facilitate greater economic interaction of Bolivia with external markets, thus, contributing to the consolidation of commercial regional and global integration.

Table 1: Indicative matrix of the results

Suggested indicator	Measurement Unit	Base-line	Target at the end of the TC
Output Indicators:			
Component 1: Diagnostic and analysis of broadband services in Bolivia.	No. of Documents	0	1
Component 2: Design and modeling of recommended cloud-computing and additional infrastructure investments.	No. of Documents	0	1
Component 3: Review and proposal of updates of the IT institutional, legal, and regulatory, framework.	No. of Documents	0	1
Component 4: Preparation of corresponding institutional, financial and administrative arrangements that will support the preparation and implementation of the project.	No. of Documents	0	1
Component 5: Environmental and social impact analysis.	No. of Documents	0	1
Workshops to validate results from all studies with stakeholders.	No. Workshops	0	3
Outcome Indicators:			
The Government of Bolivia will have a better understanding of the current status of broadband services in the country, as a necessary step to deploying appropriate technologies aimed at accelerating broadband services provision, adoption and use in the country.	No. of citations of the TC products in national government strategic documents	0	3
Development of National Cloud Computing Infrastructure	No. of Loan Operation	0	1

Table 2: Budget of Reference

Activities	Description	IDB	Total
Component 1: Diagnostic and analysis of cloud-computing infrastructure for broadband services in Bolivia	Conduct a market assessment of demand and supply of government broadband supported services to all the population, public and private sectors in Bolivia.	125,000	125,000
Component 2: Design and modeling of recommended cloud-computing and additional infrastructure	Evaluate the technical, economic, and financial feasibility of migration of existing independent data centers into a consolidated cloud network, determine the	250,000	250,000

Activities	Description	IDB	Total
investments.	appropriate scope investments, commercialization methods and strategy to foster broadband services.		
Component 3: Review and proposal of updates of the IT institutional, legal, and regulatory, framework.	Review and update the existing IT institutional, legal and regulatory framework in Bolivia to foster cloud computing development.	75,000	75,000
Component 4: Preparation of corresponding institutional, financial and administrative arrangements that will support the preparation and implementation of the project.	Administrative, Financial and Technical Arrangements for the preparation of the project, including a proposal for the financial structure of the loan.	25,000	25,000
Component 5: Environmental and social impact analysis.	Preparation of Environmental and Social Impact Management Plans.	50,000	50,000
Dissemination.	Dissemination	25,000	25,000
Total		**550,000**	**550,000**

IV. EXECUTING AGENCY AND EXECUTING STRUCTURE

4.1 The executing agency will be the Capital Markets and Financial Institutions Division (CMF)IFD/CMF Division, which will operate in coordination with the staff from the Ministry of Public Work, Services and Housing and specifically the Vice ministry of Telecommunicacions.

V. PROJECT RISKS

5.1 This project presents two risks that could affect the impact, quality or sustainability of the expected results: (i) lack of institutional capacity in the Ministry; and (ii) that the results of the project are not taken into account to increase broadband services due to a lack of formal commitment to undertake regulatory and policy reform and deploy additional infrastructure once the project is finished.

5.2 The first risk will be mitigated by the fact that the project will be executed by the IFD/CMF Division, as per the government's request. In addition, the project will include a monitoring process throughout the implementation of the project to allow for the different Bolivian institutions to get involved from the beginning to the end of the project.

5.3 The second risk is mitigated by the fact that this project is a direct response to the interest presented by the Government to the Bank, as it seeks to further promote broadband penetration in the country. Current efforts such as the deployment of fiber optic networks evidence the government's commitment to effectively address the broadband access gap in the country, thus, there is reason to believe that the

government will find the resulting products of the project valuable for future undertakings.

VI. EXCEPTIONS TO THE POLICY OF THE BANK

6.1 There are no exceptions to the policy of the Bank.

VII. ENVIRONMENTAL STRATEGY

7.1 Given that the current TC revolves around a study, there are no social or environmental risks associated with it. This operation is classified as a Category "C" according to the classification toolkit of the Bank (see the link: IDBDocs#39552040).