

## TECHNICAL COOPERATION DOCUMENT (TC-DOCUMENT)

### I. BACKGROUND INFORMATION FOR TC

<b>Country:</b>	Paraguay		
<b>TC Name:</b>	Diagnosis and development of broadband and cyber-security plans		
<b>TC Number:</b>	PR-T1151		
<b>Team Leader/Members:</b>	Miguel Porrúa (IFD/ICS), Team Leader; Eduardo Feliciangelli (ICS/CPR); Felix González Herranz; Nathalia Foditsch; y Enrique Iglesias (IFD/ICS); Felipe Capella (LEG/SGO) and Melissa Gonzalez (IFD/ICS)		
<b>TC Taxonomy:</b>	Client Support (CS)		
<b>Reference to request:</b>	<a href="#">IDBDocs#37785044</a>		
<b>Date of TC Abstract authorization:</b>	7/10/2013		
<b>Donors providing funding:</b>	Special Program for Broadband Services (BBD, for its abbreviation in Spanish)		
<b>Beneficiary:</b>	Paraguay		
<b>Executing agency and contact name:</b>	IDB through IFD/ICS		
<b>IDB Funding Requested:</b>	IDB:		US\$500,000
<b>Local counterpart funding:</b>	Local:		<u>US\$ 0</u>
	<b>Total:</b>		US\$500,000
<b>Execution period:</b>	27 months	<b>Disbursement period:</b>	30 months
<b>Required start date:</b>	September, 2013		
<b>Types of consultants:</b>	Firm and individual consultants		
<b>Prepared by Unit:</b>	Division of Institutional Capacity of the State (IFD/ICS)		
<b>Unit of Disbursement Responsibility:</b>	IDB (IFD/ICS)		
<b>TC included in Country Strategy:</b>	No	<b>TC included in CPD:</b>	No
<b>GCI-9 sector priority:</b>	Mentioned under current sector strategy: “Institutions for Growth and Social Welfare”.		

### II. OBJECTIVES AND JUSTIFICATION OF THIS TC

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<sup>1</sup>.

- 2.2 Paraguay is one of the countries in the LAC region that faces challenges to effectively harness the benefits brought about by broadband connectivity, as it is characterized by: (i) low levels of penetration, with only 5.43 lines per 100 inhabitants adding both fixed and mobile broadband penetration<sup>2</sup> versus an average of 6,24 lines per 100 inhabitants in LAC countries and 32 lines per 100 inhabitants in OECD countries<sup>3</sup>; (ii) low broadband quality, in terms of speed, averaging approximately 1.8 Mbps for fixed broadband versus 3.7 Mbps in LAC and 19.9Mbps in OECD countries<sup>4</sup>; and (iii) very high prices, where the average plan costs nearly US\$60 PPP per Mbps, while the average cost for LAC and OECD countries is US\$53.17 and US\$7.26 PPP per Mbps<sup>5</sup> respectively.

<sup>1</sup> Garcia-Zaballos, A. / López-Rivas, R.: Governmental control on socio-economic impact of broadband in LAC countries. IDB, 2012.

<sup>2</sup> ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>3</sup> Internal calculation out of ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>4</sup> Galperín, H.: Broadband prices and quality in Latin America (2012).

<sup>5</sup> Ibid.

- 2.3 In this line, the main barriers found in Paraguay to increase broadband penetration, adoption and use are: (i) limited awareness of the benefits that broadband and Information and Communication Technologies (ICTs) have particularly regarding their potential for innovation and competitiveness in sectors such as health, education, government, trade, finance and Small and Medium-Sized Enterprises (SMEs), as well as a general lack of skills for their adoption by public officials, policy makers, entrepreneurs and citizens; (ii) insufficient institutional capacity and lack of a governance model to design, implement and monitor specific policies promoting the adoption and effective use of ICTs for all the population; (iii) outdated regulatory frameworks that fail to adequately attend the recent evolution of the telecommunications sector; (iv) inadequate deployment of infrastructure and technology; and (v) lack of reliable, measurable and updatable data to monitor and evaluate ICT policies, the regulatory situation, the level of infrastructure deployment and the prevalence of ICT applications and services.
- 2.4 Paraguay needs to be prepared for the future increase in internet traffic that will follow the deployment of broadband infrastructure. Broadband and cyber security should also be considered together at all levels: infrastructure, public policy and regulation. Deploying an infrastructure without considering the cyber security implications will increase the country's exposure to a negative usage of that infrastructure or any critical infrastructure as was the case in 2012 when a cyber-attack levied against the Paraguay's national energy utility raised questions of the resilience of the country's critical infrastructure.
- 2.5 The Government of Paraguay has recognized the importance of addressing these two challenges, one in broadband and one in cyber-security. The capacity of the Government to deliver health services to all Paraguayans will be bolstered with use of e-health tools to reach remote areas. The quality and coverage of public education, shown in neighboring Uruguay, can be greatly enhanced with well-planned use of the possibilities offered by ICTs. As for the cyber-security aspect, it is noteworthy that its importance has become greater in the past few years. Cyber-attacks in Paraguay and elsewhere have highlighted that secure networks are needed to ensure the uninterrupted provision of government services to citizens, promote economic and social development, maintain international competitiveness, and include citizens in the democratic process. For that reason, Paraguay launched its national Computer Security Incident Response Team (CSIRTpy) in late 2012, illustrating its will to invest in cyber security initiatives.
- 2.6 Three institutions in the Government of Paraguay have a significant role in broadband and cyber security matters, and they represent the beneficiary counterpart of this Technical Cooperation (TC): (i) the Ministry of Finance (MOF) as the owner of the most expansive connectivity network in the country; (ii) CONATEL (*Comisión Nacional de Telecomunicaciones*) as the telecommunications regulatory body; and (iii) SENATICs (*Secretaría Nacional de Tecnologías de la Información y la Comunicación*) as the institution responsible for cybersecurity and e-government.
- 2.7 In light of the many challenges observed to promote broadband in Paraguay and the importance of tackling the cyber-security risks, the Government requested technical and financial support from the Inter-American Development Bank (IDB) to address these issues through this TC.
- 2.8 **Objectives of the TC:** The objective of this TC is to provide support to the Paraguayan Government in the process of promoting broadband universalization in terms of access, as well

as to support in cyber-security strategic policies and regulation, taking into account the efforts that the government is already making in both arenas.

### III. DESCRIPTION OF ACTIVITIES

- 3.1 The activities proposed in this TC are divided into four main components, which define its strategic approach. Component 1 includes a diagnostic and analysis of the supply and demand for broadband services in Paraguay and the infrastructure requirements to meet the existing access gap. This analysis will be crucial for the government to make proposals to their FONACIDE fund (*Fondo Nacional de Inversión Pública y Desarrollo*)<sup>6</sup>. Component 2 proposes a cyber-security national plan (including its corresponding governance model and an assessment of the cyber security infrastructure) and a review and update of the legal and regulatory framework on cyber security matters. Component 3 includes a review of the existing national broadband plan along with a review of the telecommunications regulatory framework to promote the necessary investment and boost broadband adoption and usage. Component 4 includes specific workshops and training sessions, one corresponding to each of the previous components. Given the strong emphasis on knowledge-generation, the leadership of the different Paraguayan institutions related to broadband and cyber-security will be critical in the definition of the specifics of the products to be generated as well as the research process to create them will be critical. As will be the process of socializing the findings and assure its value for the Paraguayan government.
- 3.2 **Component 1: Diagnosis and analysis of alternative infrastructure for broadband deployment.** The objective of this component is to conduct a feasibility study to determine the required investments that will allow the government to move towards universal access and service of broadband. The feasibility study on broadband connectivity involving the main stakeholders in the government, will be essential for the government as an input to create proposals to the FONACIDE fund, with a particular focus on educational center and health centers. This activity includes:
- (i) A diagnostic of the access gap in the country, specifically the gap between supply (considering backbone, backhaul and last-mile networks) and demand and how this gap may be bridged through appropriate state policy that promotes the use of ICTs to modernize education, health and other government services in order to increase the demand for connectivity thereby contributing to justify the required infrastructure investments that will generate the supply needed.
  - (ii) To properly conduct the activity described in part (i), a field-study to analyze the design of the necessary infrastructures to meet the estimated demand will be required. This study will analyze the existing and planned infrastructure deployments as well as the estimated demand based on a bottom-up model that takes into account the geographic and socio-economic characterization of the country. The result will be an estimation of the costs associated with the necessary networks' deployment per type of technology because the analysis will take into consideration all the technological alternatives. The analysis will tackle the connectivity for education institutions (schools, universities, training centers), health institutions (hospitals, health centers), government facilities and telecenters (or other places where internet is offered to citizens).

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<sup>6</sup> Decreet No: 10.082.

- (iii) Analysis of the economic return associated with the different alternatives for deploying broadband networks (FTTx, HFC, WiMAX, 3G, among others), taking into account the different deployment scenarios (high-density urban areas, urban, and rural). An estimation of the Net Present Value 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 number of lines or the minimum service penetration that makes the deployment economically viable; and of the price levels associated with the different types of services. The demand analysis will place special focus on present and future plans to implement e-government services as well as the resulting traffic from e-health and e-education initiatives. To estimate the revenues associated, the study will also identify and explain the exploitation model for the network. This financial analysis will be done per type of technology alternative in each of the segments of the network (backbone, backhaul and last mile) and will also include a pros and cons analysis of each type of technology.

3.3 **Component 2: Review and update the national cyber-security plan and as well as the legal and regulatory framework in terms of cyber security.** The objectives of this component are two. On the one hand, it is to support the update of the cyber-security and cybercrime policy and plan to make it comprehensive and engaging for all relevant stakeholders while addressing the range of cyber-security challenges in a strategic and forward-looking manner. The cyber-security policy/strategy shall incorporate a regulatory/auditing regime. On the other hand, it is to review and propose updates to the regulatory and legal framework in terms of cyber security. In that sense, as indicated by the Paraguayan government during the conversations with the broadband initiative specialists, specific cyber-security legislation is crucial for Paraguay to enhance the country's capabilities to pursue and prosecute cyber-crime and set up the foundations that permit ICT's development in cutting-edge technologies such as e-commerce, e-banking and digital signature. In order to provide the government of Paraguay with the necessary tools to guide its policy decisions, in close coordination with CSIRTpy, the following activities will be undertaken under this component:

- (i) Review of any existing cyber-security policies.
- (ii) Review of existing cyber-security legislation and regulatory framework (assessment and proposal for enhancement), composition of an action plan and timeline for modernizing the legislation, if necessary. Special attention will be placed on aspects associated with e-commerce, e-banking and digital signature.
- (iii) Review of the plan outlining Paraguayan cyber-security goals and priorities assessing the needs in terms of cyber-security infrastructure, especially regarding electronic commerce and banking and digital signature.
- (iv) Outline and define mechanisms to cooperate and share information both domestically and internationally; proposing improvements and modifications where applicable and updating the data.
- (v) Definition of roles and responsibilities of all key cyber-security stakeholders in Paraguay; including lead – and regulating – agencies (governance model).
- (vi) Composition of an implementation chronogram with an estimated budget for achieving goals laid out in cyber-security plan, including specific action items; and
- (vii) Assessment of the cyber-security infrastructure (with a map of the critical infrastructure) in Paraguay both in terms of software and hardware to identify the cyber security infrastructure needs for the country. The technical assessment will be accompanied by a

financial model including the CAPEX and OPEX associated to the infrastructure deployment.

- 3.4 **Component 3: Review of the existing national broadband plan and of the regulatory framework for telecommunications.** The objectives of this component are also two. On the one hand, it is to review the existing national broadband plan proposing enhancements and modifications. On the other hand, it is to review and propose updates to the telecommunications regulatory framework in order to boost broadband access, adoption and usage. This component is particularly relevant as the decision of investing in the deployment of access infrastructures by the private sector requires a stable and predictable regulatory framework that creates the conditions to facilitate investments, thus promoting universality in access. This component includes the following activities:
- (i) Review of the existing national broadband plan, proposing improvements and modifications or updates where applicable; and
  - (ii) Review (assessment and proposal for enhancements) of the telecommunications regulatory framework paying special attention to the following aspects: access, interconnectivity, radio-electric spectrum and universal service.
- 3.5 **Component 4: Workshops to disseminate results, to provide cyber security training and communication activities.** The objective of this component will be to hold a workshop with key stakeholders after completing the Components 1, 2 and 3. The objective will not only be to present the results but also to provide specific relevant training on cyber security issues such as incident response and cyber investigation for government officials and key private sector actors, including critical infrastructure owners and operators. Additionally, within this component, there will be activities to disseminate the results.
- 3.6 **Expected outputs:** In particular, the project will provide technical assistance for a:
- (i) Diagnostic of the connectivity gap between supply and demand.
  - (ii) Study to identify broadband infrastructure requirements in Paraguay and the economic return associated to its deployment, according to different technologies and geographic areas.
  - (iii) National Cyber-security Plan, including an action plan, governance model and an implementation chronogram with goals and an estimated budget.
  - (iv) Proposal to update the specific legislation and regulations on cyber security.
  - (v) Review of the existing National Broadband Plan with specific proposals for enhancement; and
  - (vi) Review of the telecommunications regulatory framework.
- 3.7 **Expected results:** As a result of this project, the Government of Paraguay will have a better understanding of the current status of broadband and cyber-security in the country, as well as specific proposals to update the legal and regulatory framework for both broadband and cyber security as a necessary initial step to design appropriate policies and regulations aimed at accelerating broadband penetration, adoption and usage coupled with cyber-security infrastructure, policies and regulations. Ultimately, a greater penetration of broadband connectivity is expected to increase competitiveness and social inclusion, and facilitate greater economic interaction of Paraguay with external markets.
- 3.8 **Alignment of TC with strategies of the IDB.** The Special Program and Multidonor Fund for Broadband Services (GN-2704) aims at strengthening the capacities of relevant entities to pursue the objectives of universal broadband access, usage, and adoption. Paraguay's Country Strategy with the Bank (GN-2541-1) sets up as a priority objective the access to primary-preventive care,

especially in rural areas, through cost-efficient mechanisms. In what relates to municipal and urban development, the country strategy places an emphasis in the need to support the process of decentralization and strengthening of the fiscal and administrative management of the municipalities. Both objectives will be supported by an adequate and secure connectivity infrastructure. The current Sector Strategy: “Institutions for Growth and Social Welfare” (GN-2587-2) highlights the need to work towards strengthening institutions, and has specifically recognized the importance of improving policies and governmental action in the ICT sector (5.21 of the referred Sector Strategy). Consistent with the Strategy, this TC supports the design of ICT policies and the modernization of ICT-related legal frameworks.

**Table 3.1: Indicative matrix of the results**

Suggested indicator	Measurement Unit	Baseline	Target at the end of the TC
<b>Output Indicators:</b>			
Component 1: - Diagnosis of the connectivity gap between supply and demand in Paraguay - Study to identify broadband infrastructure requirements in Paraguay - A financial analysis document	No. of Documents	0	3
Component 2: - Updated National Cyber-security Plan, action plan and governance model, including also an assessment in terms of cyber security infrastructure - Set of proposals of modifications and enhancements to the regulatory and legal framework in terms of cyber security	No. of Documents	0	2
Component 3: - Set of proposals of modifications and enhancements to the National Broadband Plan - Set of proposals to update the telecommunications regulatory framework	No. of Documents	0	2
Component 4: workshops to disseminate results (one on broadband and one on cyber security) and communication activities	No. of Workshops	0	2
	No. of events where the results were presented	0	5
<b>Outcome Indicator:</b>			
Increased government awareness and understanding of the current status of broadband and cyber-security in the country and additional related action to accelerate the penetration, adoption and use of broadband services and development of cyber-security.	No. of actions undertaken in broadband and cybersecurity	2	4

**Table 3.2: Budget of reference**

Activities	Description	IDB	Total
Component 1: Diagnosis and analysis of alternative infrastructure for broadband deployment.	Consultancy: estimation of the infrastructure requirements and the financial implications associated	180,000	180,000
Component 2: Review and update the national cyber-security plan and review of the legal as well as the regulatory framework in terms of cyber security.	Consultancy: identification of actions to promote cyber-security among institutions and development of the governance model that allows its effective execution. It also includes the necessary review and update of the legal and regulatory frameworks in terms of cyber security	150,000	150,000
Component 3: Review of the existing national broadband plan and of the regulatory framework for telecommunications.	Consultancy: identification of areas for improvement on the national broadband plan and the telecommunications regulatory framework	80,000	80,000
Component 4: Workshops and other communications activities to disseminate results and to provide cyber security training.	Workshops conducted by consultants to present results and conduct training on cyber security (US\$20,000). Editing, graphic design and presentation of main documents at relevant events (US\$20,000).	40,000	40,000
Contingencies		50,000	50,000
<b>Total</b>		<b>500,000</b>	<b>500,000</b>

#### IV. EXECUTING AGENCY AND EXECUTING STRUCTURE

- 4.1 In response to the petition from the MOF of Paraguay and given the institutional weaknesses of the technical institutions involved, the TC will be executed by IFD/ICS.

- 4.2 In order to ensure full ownership of the knowledge products generated by this TC as well as the maximum involvement of the Paraguayan authorities in their generation and use, a project Steering Committee comprised of the Ministry of Hacienda, SENATICs (*Secretaría Nacional de Tecnologías de la Información y la Comunicación*) and CONATEL (*Comisión Nacional de Telecomunicaciones*), along with the IDB, will be established. A representative will be designated for each organization by the highest authority of the respective institution, with direct reporting line to such authority. The IDB will be represented by the ICS specialist based in the Bank's representative in Paraguay. . The Steering Committee will share technical expertise and elaborate the TC work plan. It will also provide guidance on the most important activities and products included in this TC. It will meet approximately once a month and at any time one of the members may request it. Each of the four members will have a vote on the Committee. Additional members representing the private sector or other relevant stakeholders such as the ministries of health or education could be added if the original members deem it appropriate.
- 4.3 The procurement of individual consulting services will be carried out by the IDB in accordance with Human Resources Department (HRD) policies. The procurement of firm consulting services will be carried out by the IDB in accordance with the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (GN-2350-9). The procurement of consulting services different from consultants will be carried out by IDB in accordance with Corporate Procurement Policies.

## **V. PROJECT RISKS**

- 5.1 This project presents two risks that could affect the impact, quality or sustainability of the expected results: (i) weakness of CONATEL to play an active role in some of the planned activities; and (ii) that the results of the project are not taken into account to increase broadband connectivity and cyber-security 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/ICS Division, as per the government's request. In addition, the creation of a Steering Committee, where CONATEL will work coordinately with SENATIC and the Ministry of Hacienda, will contribute to mitigate the institutional weakness of CONATEL. 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 and cyber-security in the country. Current efforts such as the ICTs plan (Plan Director de TIC) or the CSIRTPy team is evidence of the government's commitment to effectively address the broadband access and cyber-security gaps 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 link: [IDBDocs#37789908](#)).

**Required Annexes:**

- Letter of Request (see [IDBDocs#37785044](#))
- Terms of Reference (see [IDBDOCS-#37959101](#))
- Procurement Plan (see [IDBDOCS-#37910843](#))



## TERMS OF REFERENCE

### IFD/ICS

#### **PR-T1151: Diagnosis and update development of broadband and cybersecurity plans**

*Component 1: diagnosis and analysis of alternative infrastructure for broadband deployment*

### **I. BACKGROUND**

- 1.1 **Justification:** Broadband penetration in Paraguay is significantly lower than the LAC's average and is hindering the capacity of the government to provide more efficient public services and to increase the competitiveness of the country. In addition, cyberattacks have posed a growing threat to the nation's critical infrastructure and to the advancement of the knowledge-based society. The Government of Paraguay is making an effort to address both issues and the IDB will provide technical support through the consulting services to be provided through this consultancy.
- 1.2 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<sup>1</sup>.
- 1.3 Paraguay is one the countries in the LAC region that faces challenges to effectively harness the benefits brought about by broadband connectivity, as it is characterized by: (i) low levels of penetration, with only 5.43 lines per 100 inhabitants adding both fixed and mobile broadband penetration<sup>2</sup> versus an average of 6,24 lines per 100 inhabitants in LAC countries and 32 lines per 100 inhabitants in OECD countries<sup>3</sup>; (ii) low broadband quality, in terms of speed, averaging approximately 1.8 Mbps for fixed broadband versus 3.7 Mbps in LAC and 19.9Mbps in OECD countries<sup>4</sup>; and (iii) very high prices, where the average plan costs nearly US\$60 PPP per Mbps, while the average cost for LAC and OECD countries is US\$53.17 and US\$7.26 PPP per Mbps<sup>5</sup> respectively.
- 1.4 In this line, the main barriers found in Paraguay to increase broadband 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,

<sup>1</sup> Garcia-Zaballos, A. / López-Rivas, R.: Governmental control on socio-economic impact of broadband in LAC countries. IDB, 2012.

<sup>2</sup> ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>3</sup> Internal calculation out of ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>4</sup> Galperín, H.: Broadband prices and quality in Latin America (2012).

<sup>5</sup> Ibid.

entrepreneurs and citizens; (ii) insufficient institutional capacity and lack of a governance model to design, implement and monitor specific policies promoting the adoption and effective use of ICTs for all the population; (iii) outdated regulatory frameworks that fail to adequately attend the recent evolution of the telecommunications sector; (iv) inadequate deployment of infrastructure and technology; and (v) lack of reliable, measurable and updatable data to monitor and evaluate ICT policies, the regulatory situation, the level of infrastructure deployment and the prevalence of ICT applications and services.

- 1.5 On top that, Paraguay needs to be the ready, in terms of cyber-security, to an explosion in traffic thanks to the increasing deployment of broadband infrastructure. Broadband and cyber security should also be considered together at all levels: infrastructure, public policy and regulation. Deploying an infrastructure without considering the cyber security implications will definitely increase the country's exposure to a negative usage of that infrastructure or any critical infrastructure at it was the case in 2012 when a cyber-attack levied against the Paraguay's national energy utility raised questions of the resilience of the country's critical infrastructure.
- 1.6 The Government of Paraguay has recognized the importance of addressing these two challenges, one in broadband and one in cyber-security. As for the latter, it noteworthy that its importance has become greater in the past few years. Cyber-attacks in Paraguay and elsewhere have highlighted that secure networks are needed to ensure the uninterrupted provision of government services to citizens, promote economic and social development, maintain international competitiveness, and include citizens in the democratic process. For that reason, Paraguay launched its national Computer Security Incident Response Team (CSIRTpy) in late 2012, illustrating its will to invest in cyber security initiatives.
- 1.7 In light of the many challenges observed to promote broadband in Paraguay and the importance of tackling the cyber-security arena in present times, the Government requested technical and financial support from the Inter-American Development Bank (IDB).
- 1.8 The activities comprised in the project in reference are divided into three main components: (1) diagnosis and analysis of alternative infrastructure for broadband deployment; (2) development of a national cyber-security plan and review of the legal framework; and (3) review the existing broadband plan and the telecommunications regulatory framework. Additionally, there will be specific activities for training and dissemination. These terms of reference define the required background and expertise, as well as the objectives, activities and the products to be carried out and delivered by a Consulting Firm or Institution hired under the project. This product corresponds to **Component I** of the Regional project in reference.

## **II. CONSULTANCY OBJECTIVES**

- 2.1 The objective of this consultancy is to undertake the tasks associated to the first component of this project, specifically, to conduct an analysis of alternative infrastructure for broadband deployment. The analysis will be based on the conclusions of a feasibility study to determine the required investments that will enable the government to extend broadband penetration in the country to all of its population. This activity includes the design of a bottom-up model that, based on the geographic and socio-economic characterization of the country and considering existing infrastructure, estimates the costs associated with the networks' deployment per type of technology.
- 2.2 The objective of the model consists of calculating the required investment and the costs to be incurred by the operator to deploy the broadband infrastructure, analyzing the different alternative technologies. In particular, the study should allow the government to:
- Quantify the required investment to respond to a predetermined level of demand
  - Obtain the weight of each deployed network in relation to the whole network infrastructure
  - Identify the specific cost elements that comprise the total cost of the network infrastructure and quantify the associated costs (CAPEX and OPEX)
  - Estimate financial ratios
- 2.3 The model will allow the consultancy firm to calculate the required equipment and means to channel the infrastructure for different levels of aggregation. The dimensioning of the equipment will be specific to the different alternative technologies.
- 2.4 The design of the model should be friendly for the user (Government) and should allow for the introduction of different parameters for every technology of access, in order to analyze the sensitivity of the network's deployment.
- 2.5 The modeling of every technology of access will contain at least the following aspects:
- Technical specifications
  - Topology of the infrastructure by density
  - Model limitations, by distance and capacity
- 2.6 Finally, the model should allow for both, an assessment of the evolution of the monthly costs by clients as a function of the penetration factor (penetration analysis) and the distribution of the monthly costs by client as a function of the classification of the equipment. These elements are intended to ensure that the user has the possibility to compare different scenarios and technologies, particularly based on the penetration analysis.

## **III. CHARACTERISTICS OF THIS CONSULTANCY**

- 3.1 **Type of Consultancy:** Firm
- 3.2 **Starting date and duration:** from ... 2013, to ... 2014
- 3.3 **Working place/travels:** This consultancy will be carried out by a consulting firm. Although the tasks may be carried out in the country of origin, the firm will be required to travel at least in two occasions to Paraguay, one at the beginning of the consultancy and one at the end to present and disseminate the results.
- 3.4 **Qualifications:** The firm will have extensive experience in the telecommunications sector, with senior team members involved in projects in LAC and other developing regions. Specific domain in the development of domestic and international infrastructure deployment is required, as well as in the design of the analytical financial models corresponding to the technologies involved. The firm must have a proven capability to deliver detailed and accurate recommendations and of understanding sector trends, as the results of this component will serve as critical inputs for the development of other components in the framework of this project.

#### IV. ACTIVITIES AND PRODUCTS

- 4.1 This component is structured in four activities:
- 4.2 **Activity 1: Socio-economic characterization of the population and expected demand.** This line of action will include : (i) socio-economic characterization of the population in terms of population density, age, gender, occupation, propensity to consume and purchasing power (measured as percentage of their monthly salary); (ii) study to estimate the current demand (traffic in Mbps) for broadband-enabled services specifying the service and the device used to access that service, including the demand coming from schools, health centers and government institutions; and (iii) forecast of the demand (estimate of the demand – traffic in Mbps – for broadband-enabled services after the improvement of infrastructure not only by carrying out surveys but also by benchmarking with other countries where such a deployment has happened before), including the demand coming from schools, health centers and government institutions. The objective of this activity is to elaborate the curves of socio-demographic characterization out of densification variables, which are key elements to estimate the expected demand for services and the subsequent return on investment. For all the aforementioned points, the analysis will have a geographic approach (by department)
- 4.3 **Activity 2: Design and modeling of the different technologies of access (technical study).** This line of action will include the design and modeling of each technology of access based on the socio-demographic characterization performed in activity 1, on the analysis of the projected demand and on the analysis of the current supply of broadband infrastructures. These will be used to estimate the needs of infrastructure to provide broadband services.

- 4.4 As for the supply, and under the same geographic approach as for the demand, the analysis will contain a detailed study of the existing broadband infrastructure and services to identify clearly the gap between estimated demand and supply. In that regard, the analysis will include: (i) study of the current supply of telecommunications services (type of service, technology, price and penetration); (ii) study of the existing supporting infrastructure (type of technology, coverage, real usage in terms of used capacity, purpose and user, and owner of the infrastructure) including the existing and planned interconnection points among networks; (iii) study of the infrastructure planned to be deployed, including coverage, capacity, purpose, user, timing and owner; and (iv) use of (if existing) infrastructure maps to identify infrastructures that can support the deploy of broadband networks.
- 4.5 With the infrastructure gap between forecast of the demand and infrastructure, the activity will include an analysis that gathers all the considerations for deploying the necessary infrastructure (backbone, backhaul and last-mile<sup>6</sup>) to bridge that gap, including the structure of the network and the different technological alternatives through the development of a technical study.
- 4.6 The activities for the technical study should include: (i) orographic study according to the distribution of the population; (ii) design of the logic diagram of the network (nodes and links); (iii) identification of technological alternatives associated to the physical design (for backbone, backhaul and access) indicating the advantages and disadvantages of each of them; (iv) physical design of the network defining the specific location and typology of the nodes, the links between the nodes (the design will consider and show the existing infrastructure), the interconnection points with existing networks and the necessary physical supporting infrastructure indicating whether some of the existing can be reutilized (e.g. high-tension); (v) determination of the requirements in terms of capacity and sizing of each of the elements of the network according to the expected traffic that results from the demand study; (vi) determination of the auxiliary elements associated to each of the elements of the network that are necessary indicating whether they exist (e.g. facility to host the nodes); (vii) recommendation of selection of the best technology to attend the estimated traffic; (viii) deployment Plan and Implementation Schedule; and (ix) set of public policies that would facilitate the deployment.
- 4.7 It is important to note that the last-mile networks will prioritize connectivity to education institutions (schools, universities, training centers), health institutions (hospitals, health centers), government facilities and telecenters (or other places where internet is offered to citizens)
- 4.8 Additionally the technical analysis will also assess Paraguay's international connectivity and their needs according to the gap between forecast demand and current supply of international bandwidth. This is crucial to the objective of contributing to the integration

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<sup>6</sup> Last mile will include connectivity to health centers, education centers, government facilities and telecenters

of Paraguay with other countries of the region and to increase trade and exchange of information and internet traffic, especially for a country like Paraguay, which does not have access to submarine cables. In that sense, the study will identify public policies and governance models, and potential public-private partnerships that may contribute to a better regional integration of Paraguay in terms of infrastructure of telecommunication. This analysis will leverage lessons learned from other experiences around the world where a similar situation has happened.

- 4.9 **Activity 3: Financial analysis and its corresponding sensitivity analysis.** Based on the analysis conducted in the Activity 2, a financial study will be conducted, estimating the deployment investments (CAPEX) and operating costs (OPEX) associated with each of the parts of the network (backbone, backhaul and last-mile) and for each of the technological alternatives. The financial analysis on the backbone will be a single one (CAPEX and OPEX). As for the backhaul and last-mile networks, there will be one financial analysis per department (CAPEX and OPEX). The analysis will identify clearly all the unitary costs of the elements involved (e.g. cost of node, cost of kilometer of fiber optic, etc.). The model must also provide with the ability to switch between different technological alternatives in different areas, providing the specific financial analysis for each of them.
- 4.10 Additionally, the analysis will include: (i) the development of a business model and an exploitation model for the network; (ii) an estimation of the revenues associated according to the projected demand; and (iii) an estimation of the Net Present Value (NPV), Internal Rate of Return (IRR) associated with the investment and the break-even point given the estimated cash flows for each of the alternatives identified. The estimations should be accompanied by the corresponding conclusions especially in regards with the recommendation of the technology alternative chosen for each of the networks and geographies indicating also the PROS and CONS of each technology beyond the mere cost-efficient approach.
- 4.11 As for the network, the consultancy will analyze the suitability of a PPP model to build and operate the network and will recommend the best approach if it is not a PPP model.
- 4.12 The identification of the investment parameters, per type of technology, that are more sensitive to the socio-economic characteristics will be an essential element to conduct a sensitivity analysis on those variables (price, demand, unitary costs, etc.). The sensitivity analysis will also include an assessment on which variables the model is most sensible to (e.g. tornado analysis)
- 4.13 **Activity 4: recommendations.** Finally, taking into account the socio-demographic characterization and the findings of the models, policy and regulatory recommendations will be provided on how to increase broadband penetration in terms of access (infrastructure). Additionally, recommendations will be made to facilitate the identification of potential public-private partnerships to provide the required investment, which will lead Paraguay towards universal and affordable broadband services.

- 4.14 **Expected results.** As a result of this consultancy, the following outputs are expected (with the level of detail explained in the activities' description): (i) a socio-demographic characterization of the current and forecast demand; (ii) a technical analysis of the necessary infrastructure to bridge the gap between current supply of forecast of demand (including an analysis of the different technology alternatives); (iii) a financial model performed and presented in a Microsoft Excel file will be provided; (iv) set of recommendations as described above.

## **V. METHOD OF PAYMENT**

- 5.1 Payment will be made as per the following schedule, upon approval by the Team Leader responsible for this project (see item VI below):
- 5.2 **Schedule of payments:**
- a. 30% upon contract signature;
  - b. 30% upon approval of draft report; and
  - c. 40% upon approval of final report

## **VI. COORDINATION**

- 6.1 The supervision and coordination of this consultancy will be the responsibility of Miguel Porrúa (IFD/ICS), Team Leader of this operation, mporrua@iadb.org, tel. (202) 312-4102.

## **TERMS OF REFERENCE**

### **IFD/ICS**

## PR-T1151: Diagnosis and update of broadband and cybersecurity plans

### *Component 2: update of a national cyber-security plan and review of the legal and regulatory frameworks on cyber-security*

#### I. BACKGROUND

- 1.9 **Justification:** Broadband penetration in Paraguay is significantly lower than the LAC's average and is hindering the capacity of the government to provide more efficient public services and to increase the competitiveness of the country. In addition, cyberattacks have posed a growing threat to the nation's critical infrastructure and to the advancement of the knowledge-based society. The Government of Paraguay is making an effort to address both issues and the IDB will provide technical support through the consulting services to be provided through this consultancy.
- 1.10 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<sup>7</sup>.
- 1.11 Paraguay is one the countries in the LAC region that faces challenges to effectively harness the benefits brought about by broadband connectivity, as it is characterized by: (i) low levels of penetration, with only 5.43 lines per 100 inhabitants adding both fixed and mobile broadband penetration<sup>8</sup> versus an average of 6.24 lines per 100 inhabitants in LAC countries and 32 lines per 100 inhabitants in OECD countries<sup>9</sup>; (ii) low broadband quality, in terms of speed, averaging approximately 1.8 Mbps for fixed broadband versus 3.7 Mbps in LAC and 19.9Mbps in OECD countries<sup>10</sup>; and (iii) very high prices, where the average plan costs nearly US\$60 PPP per Mbps, while the average cost for LAC and OECD countries is US\$53.17 and US\$7.26 PPP per Mbps<sup>11</sup> respectively.
- 1.12 In this line, the main barriers found in Paraguay to increase broadband 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) insufficient institutional capacity and lack of a

<sup>7</sup> Garcia-Zaballos, A. / López-Rivas, R.: Governmental control on socio-economic impact of broadband in LAC countries. IDB, 2012.

<sup>8</sup> ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>9</sup> Internal calculation out of ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>10</sup> Galperín, H.: Broadband prices and quality in Latin America (2012).

<sup>11</sup> Ibid.



governance model to design, implement and monitor specific policies promoting the adoption and effective use of ICTs for all the population; (iii) outdated regulatory frameworks that fail to adequately attend the recent evolution of the telecommunications sector; (iv) inadequate deployment of infrastructure and technology; and (v) lack of reliable, measurable and updatable data to monitor and evaluate ICT policies, the regulatory situation, the level of infrastructure deployment and the prevalence of ICT applications and services.

- 1.13 On top that, Paraguay needs to be the ready, in terms of cyber-security, to an explosion in traffic thanks to the increasing deployment of broadband infrastructure. Broadband and cyber security should also be considered together at all levels: infrastructure, public policy and regulation. Deploying an infrastructure without considering the cyber security implications will definitely increase the country's exposure to a negative usage of that infrastructure or any critical infrastructure at it was the case in 2012 when a cyber-attack levied against the Paraguay's national energy utility raised questions of the resilience of the country's critical infrastructure.
- 1.14 The Government of Paraguay has recognized the importance of addressing these two challenges, one in broadband and one in cyber-security. As for the latter, it noteworthy that its importance has become greater in the past few years. Cyber-attacks in Paraguay and elsewhere have highlighted that secure networks are needed to ensure the uninterrupted provision of government services to citizens, promote economic and social development, maintain international competitiveness, and include citizens in the democratic process. For that reason, Paraguay launched its national Computer Security Incident Response Team (CSIRTpy) in late 2012, illustrating its will to invest in cyber security initiatives.
- 1.15 In light of the many challenges observed to promote broadband in Paraguay and the importance of tackling the cyber-security arena in present times, the Government requested technical and financial support from the Inter-American Development Bank (IDB).
- 1.16 The activities comprised in the project in reference are divided into three main components: (1) diagnosis and analysis of alternative infrastructure for broadband deployment; (2) update of a national cyber-security plan and review of the legal framework; and (3) review the existing broadband plan and the telecommunications regulatory framework. Additionally, there will be specific activities for training and dissemination. These terms of reference define the required background and expertise, as well as the objectives, activities and the products to be carried out and delivered by a Consulting Firm or Institution hired under the project. This product corresponds to **Component II** of the Regional project in reference.

## II. CONSULTANCY OBJECTIVES

- 2.1 The main objective of this consultancy is to develop a national cyber-security plan and to provide a set of recommendations after the review of the cyber-security legal and regulatory framework.

### III. CHARACTERISTICS OF THIS CONSULTANCY

- 3.1 **Type of consultant:** Firm
- 3.2 **Start date and duration:** from ....., to ....., 2014.
- 3.3 **Place of work /travel:** This consultancy will be carried out by a consulting firm. Although the tasks may be carried out in the country of origin, the firm will be required to travel at least in two occasions to Paraguay, one at the beginning of the consultancy and one at the end to present and disseminate the results.
- 3.4 **Qualifications:** The firm will have extensive experience in cyber-security, with senior team members involved in projects in LAC and other developing regions. Specific domain in regulating cyber-security as well as in providing cyber-security training. The firm must have demonstrated knowledge of the most advanced international experiences a proven capability to deliver detailed and accurate recommendations and a good understanding of sector trends.

### IV. ACTIVITIES AND PRODUCTS

- 4.1 This component is structured in five activities:
- 4.2 **Activity 1: Review of the existing cyber-security policies:** the objective of this activity is to review the existing cyber-security policies if any to have a clear understanding of the starting point.
- 4.3 **Activity 2: Drafting a plan outlining Paraguayan cyber-security goals and priorities:** the objective of this activity is to develop a comprehensive cyber-security strategy including a specific set of public policies and the stakeholders who are in charge of implementing those. The results of the activity 1 will be used as an input and a benchmark of the best international cyber-security strategies and policies will be also considered to build the specific national cyber-security strategy for Paraguay.
- 4.4 **Activity 3: Assessment of the cyber-security infrastructure** (with a map of the critical infrastructure) in Paraguay both in terms of software and hardware to identify the cyber security infrastructure needs for the country. The technical assessment will be accompanied by a financial model including the CAPEX and OPEX associated to the necessary infrastructure deployment. The analysis will also propose a PPP model for the required investments. The assessment of the needs in terms of cyber-security infrastructure will pay special attention to electronic commerce and banking and digital signature.

- 4.5      **Activity 4: Define a governance, implementation and information sharing model for the cyber-security national strategy:** this activity will outline and define the mechanisms to cooperate and share information both domestically and internationally; proposing improvements and modifications where applicable and updating the data. Moreover, the activity will define the roles and responsibilities of all key cyber-security stakeholders in Paraguay; including lead – and regulating – agencies (governance model). Additionally, the study will propose an implementation chronogram with an estimated budget for achieving the goals laid out in the cyber-security plan, including specific action items.
- 4.6      **Activity 5: Reviewing existing cybercrime legislation and regulatory framework:** this activity will propose potential enhancements, if needed, and will define an action plan and timeline for modernizing the legislation, if necessary. Special attention must be placed in aspects such as e-commerce, digital signature and e-banking. It is important to note that the proposals in terms of legislation and regulation will consider international and regional best practices in an effort to contribute towards the harmonization of the Paraguayan’s legislation and regulation in the international arena.
- 4.7      **Expected results.** As a result of this consultancy, the following outputs are expected (with the level of detail explained in the activities’ description): (i) an updated national cyber-security strategy; (ii) an assessment of the critical infrastructure and the associated financial analysis; (iii) a governance model for the cybersecurity strategy; and (iv) a set of recommendations to improve and update the legislation and regulation in terms of cybersecurity.

## V. METHOD OF PAYMENT

- 5.1      Payment will be made as per the following schedule, upon approval by the Team Leader responsible for this project (see item VI below):
- 5.2      **Schedule of payments:**
- d. 30% upon contract signature;
  - e. 30% upon approval of draft report; and
  - f. 40% upon approval of final report

## VI. COORDINATION

- 6.1.      Supervision and coordination of the consultant’s work will be the responsibility of Miguel A. Porrúa (IFD/ICS), Team Leader, mporrua@iadb.org, tel. (202) 312-4102.

## TERMS OF REFERENCE

### IFD/ICS

#### **PR-T1151: Diagnosis and development of broadband and cybersecurity plans**

*Component 3: Review the existing national broadband plan and the regulatory framework for telecommunications*

### **I. BACKGROUND**

- 1.1 **Justification:** Broadband penetration in Paraguay is significantly lower than the LAC's average and is hindering the capacity of the government to provide more efficient public services and to increase the competitiveness of the country. In addition, cyberattacks have posed a growing threat to the nation's critical infrastructure and to the advancement of the knowledge-based society. The Government of Paraguay is making an effort to address both issues and the IDB will provide technical support through the consulting services to be provided through this consultancy.
- 1.2 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<sup>12</sup>.
- 1.3 Paraguay is one the countries in the LAC region that faces challenges to effectively harness the benefits brought about by broadband connectivity, as it is characterized by: (i) low levels of penetration, with only 5.43 lines per 100 inhabitants adding both fixed and mobile broadband penetration<sup>13</sup> versus an average of 6,24 lines per 100 inhabitants in LAC countries and 32 lines per 100 inhabitants in OECD countries<sup>14</sup>; (ii) low broadband quality, in terms of speed, averaging approximately 1.8 Mbps for fixed broadband versus 3.7 Mbps in LAC and 19.9Mbps in OECD countries<sup>15</sup>; and (iii) very high prices, where the average plan costs nearly US\$60 PPP per Mbps, while the average cost for LAC and OECD countries is US\$53.17 and US\$7.26 PPP per Mbps<sup>16</sup> respectively.
- 1.4 In this line, the main barriers found in Paraguay to increase broadband 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

<sup>12</sup> Garcia-Zaballos, A. / López-Rivas, R.: Governmental control on socio-economic impact of broadband in LAC countries. IDB, 2012.

<sup>13</sup> ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>14</sup> Internal calculation out of ICT World Indicators Database, International Telecommunications Union (June, 2012).

<sup>15</sup> Galperín, H.: Broadband prices and quality in Latin America (2012).

<sup>16</sup> Ibid.

general lack of skills for their adoption by public officials, policy makers, entrepreneurs and citizens; (ii) insufficient institutional capacity and lack of a governance model to design, implement and monitor specific policies promoting the adoption and effective use of ICTs for all the population; (iii) outdated regulatory frameworks that fail to adequately attend the recent evolution of the telecommunications sector; (iv) inadequate deployment of infrastructure and technology; and (v) lack of reliable, measurable and updatable data to monitor and evaluate ICT policies, the regulatory situation, the level of infrastructure deployment and the prevalence of ICT applications and services.

- 1.5 On top that, Paraguay needs to be the ready, in terms of cyber-security, to an explosion in traffic thanks to the increasing deployment of broadband infrastructure. Broadband and cyber security should also be considered together at all levels: infrastructure, public policy and regulation. Deploying an infrastructure without considering the cyber security implications will definitely increase the country's exposure to a negative usage of that infrastructure or any critical infrastructure at it was the case in 2012 when a cyber-attack levied against the Paraguay's national energy utility raised questions of the resilience of the country's critical infrastructure.
- 1.6 The Government of Paraguay has recognized the importance of addressing these two challenges, one in broadband and one in cyber-security. As for the latter, it noteworthy that its importance has become greater in the past few years. Cyber-attacks in Paraguay and elsewhere have highlighted that secure networks are needed to ensure the uninterrupted provision of government services to citizens, promote economic and social development, maintain international competitiveness, and include citizens in the democratic process. For that reason, Paraguay launched its national Computer Security Incident Response Team (CSIRTpy) in late 2012, illustrating its will to invest in cyber security initiatives.
- 1.7 In light of the many challenges observed to promote broadband in Paraguay and the importance of tackling the cyber-security arena in present times, the Government requested technical and financial support from the Inter-American Development Bank (IDB).
- 1.8 The activities comprised in the project in reference are divided into three main components: (1) diagnosis and analysis of alternative infrastructure for broadband deployment; (2) development of a national cyber-security plan and review of the legal framework; and (3) review the existing broadband plan and the telecommunications regulatory framework. Additionally, there will be specific activities for training and dissemination. These terms of reference define the required background and expertise, as well as the objectives, activities and the products to be carried out and delivered by a Consulting Firm or Institution hired under the project. This product corresponds to **Component III** of the Regional project in reference.

## II. CONSULTANCY OBJECTIVES

- 2.1 The main objective of this consultancy is to review the existing national broadband plan as well as the telecommunications regulatory framework to provide specific recommendations to improve and enhance those. This is particularly relevant as the decision of investing in the deployment of access infrastructures by the private sector requires a stable and predictable regulatory framework that creates the conditions for secure investments, thus facilitating universality in access.
- 2.2 In this line, the specific objectives of this activity are to: (i) review the current regulatory framework in Paraguay; (ii) identify best practices at a regional and worldwide level at least in those aspects associated with infrastructure sharing with other utilities, interconnection, open & equal access, retail and wholesale tariffs, universal service, other wholesale services at both the national and international levels, separated accountability and market analysis; and (iii) propose new regulations to the current regulation in areas suitable to be included such as the aforementioned, spectrum and universal access.

### III. CHARACTERISTICS OF THIS CONSULTANCY

- 3.1 **Type of consultant:** Firm
- 3.2 **Start date and duration:** from ....., to ....., 2014.
- 3.3 **Place of work /travel:** This consultancy will be carried out by a consulting firm. Although the tasks may be carried out in the country of origin, the firm will be required to travel at least in two occasions to Paraguay, one at the beginning of the consultancy and one at the end to present and disseminate the results.
- 3.4 **Qualifications:** The firm will have extensive experience in the telecommunications sector, with senior team members involved in projects in LAC, especially in Paraguay, and other developing regions. Specific domain in the development of domestic and international ICT national plans, especially concerning broadband, is required. The firm must have a proven capability to deliver detailed and accurate recommendations and of understanding sector trends, as the results of this component will serve as critical inputs for the development of other components in the framework of this project.

### IV. ACTIVITIES AND PRODUCTS

- 4.1 This component is structured in 5 activities:
- 4.2 **Activity 1: Review of the national broadband plan:** The objective of this activity is to review and enhance the current national broadband plan in order to complement them with: (i) strategic policies to stimulate and develop broadband both on supply (to promote broadband coverage in areas non financially appealing to the private sector) and demand (to boost adoption and usage); and (ii), if necessary, an enhanced adoption and usage strategy focused on specific content, applications/services and devices for the

aforementioned sectors: health, education, government, productivity (i.e. private businesses), communication and information (i.e. media) and citizens (to improve their digital literacy).

- 4.3 As for the review, the analysis will take into consideration the socio-economic characterization of the population and a benchmark of best practices from other countries so that the enhancements to the existing national broadband plan are tailored to the Paraguayan population's need.
- 4.4 **Activity 2: Review (assessment and proposal for enhancements) of the telecommunications regulatory framework.** The objective of this activity is to review and propose regulation that may enhance the existing regulatory framework of the telecommunication sector.
- 4.5 **Activity 3: Identification of best international practices in terms of universal access and radio-electric spectrum**
- a. Analysis of the current situation in North America, Europe and Asia, based on the selection of a total of 5 countries belonging to the mentioned regions. Specifically, the current regulatory models by sector will be analyzed and best practices will be identified.
  - b. Description of the current regulatory situation in Bolivia based on the conclusions reached in activity 1, and a comparative analysis of the differences and similarities observed in relation to the identified best practices.
  - c. A final report presenting the gap observed between Bolivia and the best international practices, and identifying the legislation susceptible to be added (in terms of "reglamentos" in Spanish) to address current sector trends in terms of universal access and radio-electric spectrum.
- 4.6 **Activity 4: Proposal for the creation of regulations.** Taking into account the conclusions of activities 1 and 2, this activity will cover the proposals of creation of regulations, specifically in the areas covered by activity 1 related to universal access and radio-electric spectrum policy to guarantee the effective, universal and affordable use of broadband. In addition to that, justification for the proposals is needed, identifying specific benefits for the country, the companies, the final consumers and the market, in terms of in terms of universal access and radio-electric spectrum while promoting effective competition and investment.
- 4.7 **Activity 5: Interconnection and access.** This last activity will propose specific regulation for interconnection, access, retail and wholesale services at both national and international levels, together with separated accountability and market analysis. The recommendations will also include and take into account quality (i.e. bandwidth and technical quality of service parameters) when analyzing the interconnection regulation. As for the access, the regulatory recommendations will define the framework and the necessary conditions for open access and equal access.

## **V.METHOD OF PAYMENT**

5.1 Payment will be made as per the following schedule, upon approval by the Team Leader responsible for this project (see item VI below):

5.2 **Schedule of payments:**

- g. 30% upon contract signature;
- h. 30% upon approval of draft report; and
- i. 40% upon approval of final report

## **VI. COORDINATION**

Supervision and coordination of the consultant's work will be the responsibility of Miguel A. Porrúa (IFD/ICS), Team Leader, mporrua@iadb.org, tel. (202) 312-4102.



## DIAGNOSIS AND DEVELOPMENT OF BROADBAND AND CYBERSECURITY PLANS

## PROCUREMENT PLAN

No. Ref.	Description and type of the procurement contract	Estimated contract Cost	Procurement method <sup>1</sup>	Review (ex-ante or ex-post)	Source of financing and percentage		Prequalification (Yes/No)	Estimated dates		Status (pending, in progress, awarded, cancelled)	Comments
					IDB %	Local / other %		Publication of specific procurement notice	Completion of contract		
<b>1</b>	<b>GOODS</b>										
	N/A										
<b>2</b>	<b>WORKS</b>										
	N/A										
<b>3</b>	<b>NON-CONSULTING SERVICES</b>										
	Component 4: Training and dissemination workshops	40,000	CQS	n/a	100%	0%	No	N/A	2015	Pending	
<b>4</b>	<b>CONSULTING SERVICES (Individual)</b>										
	N/A										
<b>5</b>	<b>CONSULTING SERVICES (Firms)</b>										
5.1	Component 1: Diagnosis and analysis of alternative infrastructure for broadband deployment	180,000	QCBS	n/a	100%	0%	No	N/A	2014	Pending	
5.2	Component 2: Development of a national cyber-security plan and review of the legal and regulatory framework in terms of cyber security.	150,000	QCBS	n/a	100%	0%	No	N/A	2014	Pending	
5.3	Component 3: Review of the existing national broadband plan and of the regulatory framework for telecommunications.	80,000	QCBS	n/a	100%	0%	No	N/A	2014	Pending	

<sup>1</sup> **Goods and Works:** ICB: International competitive bidding; LIB: limited international bidding; NCB: national competitive bidding; PC: price comparison; DC: direct contracting; FA: force account; PSA: Procurement through Specialized Agencies; PA: Procurement Agents; IA: Inspection Agents; PLFI: Procurement in Loans to Financial Intermediaries; BOO/BOT/BOOT: Build, Own, Operate/Build, Operate, Transfer/Build, Own, Operate, Transfer; PBPP: Performance-Based Procurement; PLGB: Procurement under Loans Guaranteed by the Bank; PCP: Community participation procurement. **Consulting Firms:** QCBS: Quality- and Cost-Based Selection QBS: Quality-Based Selection FBS: Selection under a Fixed Budget; LCS: Least-Cost Selection; CQS: Selection based on the Consultants' Qualifications; SSS: Single-Source Selection. **Individual Consultants:** NIQC: National Individual Consultant selection based on Qualifications; IICC: International Individual Consultant selection based on Qualifications.