TC DOCUMENT

I. Basic Information for TC

▪ Country/Region:	Regional
▪ TC Name:	Planning for Universal Access to Sustainable Energy for All in LAC
▪ TC Number:	RG-T2898
▪ Team Leader/Members:	Team Leader: Roberto Aiello (INE/ENE); Team Members: Arnaldo Vieira de Carvalho (INE/ENE), Julio Lopez Pena (INE/ENE), Sergio Ballón (ENE/CBO), Carlos Echeverria (ENE/CEC), Carlos Jacome (ENE/CHO), Stephanie Suber (INE/ENE), and Betina Hennig (LEG/SGO).
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination	Client Support
▪ Date of TC Abstract authorization:	08 Dec 2016
▪ Beneficiary:	Latin American and Caribbean IDB member countries[1].
▪ Executing Agency:	IDB
▪ Donors providing funding:	Ordinary Capital Strategic Development Program for Infrastructure (INF)
▪ IDB Funding Requested:	$500,000.00
▪ Disbursement period (which includes Execution period):	24 months
▪ Required start date:	June 2017
▪ Types of consultants:	Firms and/or Individuals
▪ Prepared by Unit:	Energy Division (INE/ENE)
▪ Unit of Disbursement Responsibility:	INE/ENE
▪ TC Included in Country Strategy (y/n):	Yes, Ecuador (p.2 – par 3.4) Bolivia (p. 9 – par 3.7 y 3.12)
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	(i) social inclusion and equality; and (ii) climate change and environmental sustainability

II. Objectives and Justification of the TC

2.1 **Objective:** The objective of this TC is to develop a geospatial based least-cost Universal Electricity Access Plan in at least three provinces in Ecuador and in a

[1] Once a country is selected, the beneficiary would send a letter to INE/ENE expressing interest in participating and having the Bank as the Executing Agency.

demonstration area in Bolivia as a foundation for further country-wide planning. The TC will also help building capacity on energy access planning in at least two countries in the region, and develop a LAC oriented framework to help catalyze further work on expanding more efficient cooking stoves (integral to the United Nations (UN) Sustainable Energy for All (SEforAll) initiative)) and space heating.

2.2 Geospatial planning identifies and incorporates into access planning the actual physical and demographic distribution of households without access in order to enable planners to better evaluate least-cost options for connecting these households. Different inputs are used for the geospatial aspect, including satellite imagery and census information. The process culminates with the development of an investment plan and prospectus. A geospatial, least-cost electrification plan begins with the collection of high resolution datasets with geo-located information of existing energy infrastructure and demand points (settlements, households, etc.), followed by a demand forecast and a cost estimate for grid and off-grid technologies at all demand points. These costs are compared for each demand point in order to generate a cost optimal system plan. This plan is then used to create an investment prospectus using country-specific costs and indicating the phased expenditures needed to achieve the electricity access targets. The process incorporates various factors such as demographics, demand, technology choice, existing infrastructure, renewable energy options and costs, and expected gaps over a defined planning horizon. The plan will provide estimates and recommendations for long-term electrification systems, as well as short- to medium-term options for interim electrification during the years required for grid expansion. The process is iterative and involves local stakeholders, thereby providing an opportunity for capacity building on energy planning and data collection and management.

2.3 The proposed geospatial planning process provides an effective and practical tool to increase the capacity of government decision-makers to develop national or regional access expansion plans. The reliance of this approach upon geospatial data ensures that the plan's outputs are anchored in the best available information on the actual location of households, of electricity demand, and of existing grid infrastructure, thereby helping to achieve more realistic results that respond to the actual situation on the ground, covering broad geographic areas, including potentially the entire country. The geospatial approach supports a least-cost aspect approach that considers alternate grid and off-grid options for electrification. This then allows the development of a financing plan and investments prospectus. The process is iterative in nature and as such, with training of local practitioners, it can allow for future updates making planning a dynamic, iterative, and localized process.

2.4 The results of this work and associated knowledge products will be disseminated in the region to support knowledge sharing and to increase regional capacity in these areas.

2.5 In 2015, the Inter-American Development Bank (IDB) approved a new Energy Sector Framework Document with four thematic lines which guide our energy sector work in Latin America and the Caribbean (LAC):

i. Energy access – coverage, quality, reliability, and affordability;
ii. Energy sustainability – energy efficiency, renewable energy, and climate change adaptation;

iii. Energy security – energy infrastructure and regional energy integration; and,
iv. Energy governance – institutions, regulation, policies, and information.

This TC is aimed directly to the thematic lines: I. Energy access; and, II. Energy sustainability, since it will assist at least two countries to build capacity to identify the best sustainable solutions to increase access to energy for each remaining community without such services.

2.6 **Justification**: The IDB has implemented several activities to promote energy innovation and improved knowledge, including joining the global initiative SEforALL launched at the UN General Assembly in September 2011. The IDB is the regional hub for LAC (SEforALL Americas) and in this role, it aids countries to meet the following three global SEforALL objectives by 2030: (i) to ensure universal access to modern energy services, including electricity and modern cook stoves; (ii) to double the global rate of improvement in energy efficiency (EE); and (iii) to double the share of renewable energy (RE) in the global energy mix. These goals are aligned with the new Sustainable Development Goal #7 (SDG7), approved on September 25, 2015 as part of the post-2015 Sustainable Development Agenda. They replace the Millennium Development Goals which ended in 2015 and they form part of a universal set of targets that all 193 UN member states will use to frame their political policies and development agendas from 2016 to 2030. In 2014, during the SEforALL Annual meeting in New York, the IDB officially offered to support the development of Universal Access Plans for countries that requested help. Priorities for the period 2016-2021 agreed at the last SEforALL Advisory Board Meeting in Brussels on June 15-16, 2016 called for accelerated efforts to help countries meet their targets.

2.7 LAC could be the next developing region to achieve universal access to electricity services. In 2015, the region had an estimated 97% electricity service coverage[2]. Almost all countries need public policies to achieve 100% coverage. The top 15 countries with access needs are (in increasing access rate): Haiti, Honduras, Guyana, Nicaragua, Bolivia, Suriname, Guatemala, Belize, Peru, Panamá, El Salvador, Dominican Republic, Colombia, Ecuador and Trinidad and Tobago. See table 1:

[2] Source: Latin American Energy Organization (Organizacion Latinoamericana de Energía – OLADE).

Table 1: Access to electricity in Latin American countries in 2015

Country	% Electricity coverage rate
Haiti	30.0%
Honduras	79.9%
Guyana	80.5%
Nicaragua	85.3%
Bolivia	88.0%
Suriname	90.3%
Guatemala	92.0%
Belize	93.0%
Peru	93.3%
Panamá	93.9%
El Salvador	95.4%
Dominican Republic	96.9%
Colombia	97.0%
Ecuador	97.2%
Trinidad and Tobago	98.0%
Jamaica	98.0%
México	98.5%
Argentina	98.8%
Venezuela	98.9%
Costa Rica	99.3%
Brazil	99.3%
Paraguay	99.3%
Chile	99.7%
Uruguay	99.7%
Barbados	99.8%

Source: OLADE, 2015

2.8 Achieving universal access by 2030 has been estimated by the Bank to cost over US$600 million of investment annually. Even if funding were available, there are not enough projects identified that meet the minimum standards necessary to receive financing. Therefore, it is crucial to make plans for underserved communities to provide access to energy solutions that are the right fit for each case given the time and resources available.

2.9 Dependence on biomass for cooking in LAC involves about 80 million people and is quite high for some countries, e.g. the proportion of the population using firewood or charcoal in Haiti is 90%. Other countries are lower yet significant with Guatemala at 56.7%, Nicaragua at 54.1%, Honduras at 51%, Paraguay at 49.1%, Peru at 31.4% and Bolivia at 29%. The population (number of people) using biomass for cooking in LAC is also high, including Mexico at 15.7 million, Brazil at 10.8 million, Peru at 10.6 million and Haiti 9.1 million. Many people still burn biomass energy on primitive and inefficient stoves which emit a significant amount of smoke that fills the home with pollution. This smoke has been associated with several chronic and acute respiratory illnesses including bronchitis and pneumonia. Where demand for local biomass exceeds the natural regrowth of local resources, environmental problems can result.

2.10 Through the TC "RG-T2608 (ATN/OC-15064-RG) - Regional Hub for SEforALL in LAC," the IDB in partnership with Columbia University (CU) has developed a toolkit to provide countries with guidelines and methodologies to design geospatial plans to achieve universal access to modern energy services. CU has a proven track record in this area in other regions in the world. A readiness and gap analysis on energy access data is presently underway for Ecuador, Bolivia, Honduras and a pilot area in Mexico that will result in detailed action plans to develop geospatial access plans in those countries.

2.11 The work alluded above is a necessary precursor to the assistances for the actual development of elements of the geospatial access plans. However, it will not be possible to finance those elements through the ongoing TC given that the costs exceed available funds; thus, the need for the proposed TC.

2.12 This TC is aligned with the Bank's Update of the Institutional Strategy 2010-2020, especially with the (i) social inclusion and equality; and (ii) climate change and environmental sustainability given that access planning in unserved areas would identify least cost solutions involving RE-based decentralized systems. The regions without energy access are usually those located in the rural areas where there is a lack of other services. In fact, those specific regions are the ones being considering by the planning tools and methodologies considered in this TC. Likewise, the solutions that will be proposed mainly tackle the lack of electricity by suggesting low carbon and zero emissions technologies, such as solar and hydro. Therefore, this TC incorporates climate change and environmental sustainability into the core of the solutions. Additionally, this TC is fully aligned with the IDB Energy Sector Framework Document that incorporates the three pillars of SEforALL on access, energy efficiency, and renewables.

III. Description of Activities/Components and Budget

3.1 This TC will expand activities from previous IDB work and comprises 3 components:

3.2 **Component 1 – Geospatial Access Planning (USD370,000)**: This component will finance the development of a geospatial universal electricity access plan in Ecuador and in a demonstration area in Bolivia. It will provide different levels of support on access planning to each country depending on their capabilities and previous experience in undertaking geospatial-type analysis. Firms will be considered, depending on the task or phase of the implementation. Specifically:

a. In Ecuador, ENE conducted a pilot demonstration activity for the Pastaza (Amazonia) region. This TC would provide support to extend the demonstration activity so as to implement a geospatial mapping exercise for at least three provinces. It will build on the in-country expertise developed as part of the demonstration project, and will expand upon this capacity to enable the implementation of a broader geospatial universal access planning process. It will provide input for the development of an investment prospectus to be financed by the Government of Ecuador with, to the extent needed, other partner funding. It will also provide valuable insights and lessons for assisting other LAC countries undertake similar access planning exercises. The estimated cost of this sub-component is $270,000.

b. In Bolivia, this TC will finance similar geospatial mapping activities but for a limited demonstration area, including related capacity building activities for Bolivian government officials. This will provide Bolivia with the foundation to subsequently extend the activity to the entire country and to develop an investment prospectus. The estimated cost of this sub-component is US$100,000.

3.3 **Component 2 – Modern cook stoves and space heating (USD40,000).** This component will finance the development of an options paper to address existing challenges to modern fuels for cooking and heating based on international best practices. This options paper will be used as a dialogue tool with participating countries for defining a roadmap to find best solutions for access to sustainable cooking. This will include an initial stocktaking exercise on existing work relevant for LAC on the topic, and the preparation of a report describing and evaluating available technical alternatives/solutions for specific situations, e.g., efficient biomass cook stoves, LPG/electric induction stoves, etc. Regulatory and energy service sustainability dimensions will be considered as part of the capacity building for universal energy access planning. Priority will be given to countries considering criteria that combines lower energy access rates, higher number of inhabitants without access to energy, and commitment to engage in this work, through assignation of personnel to perform tasks and implement the plans. Consultation and coordination with other development partners will be undertaken as deemed appropriate.

3.4 **Component 3 – Knowledge sharing and project management (USD90,000)**: This component will finance capacity building and dissemination activities. A workshop on geospatial energy access planning will be organized to share knowledge and experience from the Ecuador and other countries with Honduras and Panama as targeted initial beneficiaries. Other countries may also participate. As a result of this TC, participating countries are expected to have a more robust understanding of available technical and economic solutions to achieve universal access to modern energy services, including grid and off-grid schemes. Dissemination activities will be developed using communications channels and instruments (e.g. videos, blogs, etc). In addition, this component will finance the development of a knowledge product on lessons learned in rural electrification projects from a private developer's perspective.

3.5 **Budget**. The total cost of the operation will be US$500,000 and will be IDB funding through the Ordinary Capital Strategic Development Program for Infrastructure (INF). The TC has a budget summarized in Table 2.

Table 2. Indicative Budget

Activity/Component	Description	IDB/Fund Funding	Total Funding
Component 1: Geospatial Access Planning	Data assessments, geospatial plans, investment prospectuses	$370,000.00	$370,000.00
Component 2: Modern cook stoves and space heating	Options Paper and related dialogue	$40,000.00	$40,000.00
Component 3: Knowledge sharing and project management	Workshops, knowledge products and information dissemination	$90,000.00	$90,000.00
	Total	**$500,000.00**	**$500,000.00**

IV. Executing Agency and Execution Structure

4.1 Given the regional nature of this TC, the IDB will directly execute this TC through INE/ENE in order to provide a centralized coordination of the studies and activities, while ensuring the quality of the products that the countries require. INE/ENE will coordinate internally with the different units within the IDB, as required to support SEforALL, particularly under Component 4. These may include Climate Change and Sustainable Development Sector (CSD/CSD), Inter-American Investment Corporation (IIC), External Relations (EXR), and the Office of Outreach and Partnership (ORP), which have already been involved in this support in previous operations.

4.2 **Procurement.** The Bank will contract individual consultants, consulting firms and non-consulting services in accordance with current Bank procurement policies and procedures.

V. Major Issues

5.1 The team has identified potential issues as well as mitigation measures, as described in the following table.

Table 3. Project risks and mitigation measures

Risks	Mitigation measure
The SEforALL initiative loses momentum if countries do not see value from the activities related to the initiative.	The team will keep a close dialogue with countries and partners as the Hub lead for SEforALL in the Americas.
Not having the minimum digitized information required for geospatial planning.	The team is currently doing a readiness and gap analysis that will deliver a detailed action plan to manage and mitigate this risk
The private sector may only seek large-scale energy investment opportunities	The knowledge product on business models for isolated areas will help mitigate this risk.

VI. Environmental and Social Strategy

6.1 No social or environmental impacts are expected form the project. Based on the IDB's Environmental and Safeguards Compliance Policy OP-703. This TC has been classified category "C" according to the Safeguard Policy Filter Report (SPF) and the Safeguard Screening Report (SSF)

6.2 While this TC will not finance infrastructure investments, the access plans to be developed are expected to lead to future investments in power infrastructure. The proposed TC recommends to undertake consultation and to consider guidelines of the Bank's safeguards policies before completion of the plans.

Required Annexes:

- Annex I: Results Matrix
- Annex II: Terms of Reference for activities/components to be procured
- Annex III: Procurement Plan

PLANNING FOR UNIVERSAL ACCESS TO SUSTAINABLE ENERGY FOR ALL IN LAC

RG-T2898

CERTIFICATION

I hereby certify that this operation was approved for financing under **The Ordinary Capital Strategic Development Program for Infrastructure (INF)** through a communication dated June 16, 2017 and signed by Felipe Caicedo (ORP/GCM). Also, I certify that resources from said fund are available for up to US$500,000 in order 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.

Original Signed — 06/27/2017

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

Date

Approved: Original Signed — 06/27/2017

Rigoberto Ariel Yepez-Garcia
Division Chief
Energy Division
INE/ENE

Date