**Terms of Reference for activities/components to be procured**

**REGIONAL**

**INE/ENE**

Consultancy to support a Preparatory Study and Readiness Assessment for Electrification Planning under RG-T2898

**TERMS OF REFERENCE[[1]](#footnote-1)**

1. **Background**

In 2015 the Energy Division (ENE) of the Inter-American Development Bank (IDB) approved a new Energy Sector Framework with four thematic lines that will guide energy sector work in Latin America and the Caribbean (LAC):

1. Energy access – coverage, quality, reliability, and affordability;
2. Energy sustainability – energy efficiency, renewable energy, and climate change adaptation;
3. Energy security – energy infrastructure and regional energy integration; and,
4. Energy governance – institutions, regulation, policies, and information.

In the same context, ENE has been implementing several activities to promote energy innovation and improved knowledge in the LAC region, including the global initiative Sustainable Energy for All (SEforALL) launched at the United Nations (UN) General Assembly in September 2011. The IDB is the regional hub for LAC ([SEforALL Americas](http://www.iadb.org/en/topics/energy/se4allamericas/home,17743.html)) to help countries meet the three global [SEforALL goals by 2030](http://www.se4all.org/our-vision_our-objectives): (i) to ensure universal access to modern energy services; (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](https://sustainabledevelopment.un.org/sdgsproposal.html)), approved on [September 25, 2015](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E) as part of the post-2015 Sustainable Development Agenda, a universal set of targets that all 193 UN member states will use in framing their political policies and development agendas from 2016 to 2030, replacing the Millennium Development Goals that ended in 2015.

Among all regions in the world, Latin America and the Caribbean could be the next region to achieve universal access to electricity services. In 2014, the region had an estimated 96% electricity service coverage. However, 25 million people still lack electricity, 90% of these concentrated in 11 countries. Almost all countries need public policies to achieve 100% coverage. It has been estimated that between 2015 and 2030, US$ 600 million each year would be needed to achieve this goal. But even if funding were available, there are not enough projects that meet the minimum standards necessary to receive financing. Therefore it is crucial to make plans for underserved communities to understand which energy solution is the right fit for each case within a particular time frame and with defined resources.

1. **Consultancy objective(s)**

The Inter-American Development Bank (IDB) is seeking the services of a “Consultant” (firm or consortium) to undertake a preparatory study and readiness assessment for selected countries in the area of planning for Universal Electricity Access. The purpose of this work is to determine the scope of work needed to undertake geospatial electrification technical planning for each country’s underserved populations, and to guide local energy practitioners in initial steps to prepare for this work in the near future.

1. **Main activities**

While the overall approach to geospatial electrification planning can be generalized, planning for a specific country, region or area requires localization of this approach. This local assessment involves attention to several factors including the following main activities:

**Activity 1:** **Assessment of the readiness to face the task of planning for universal electricity access in 4 countries.**

* **Sub Activity 1.1: Assessment of the most recent, comprehensive and accurate spatial data available for the target area, and the possible need for additional data gathering**. The Consultant shall review the available datasets that inform electricity demand (location of villages, social infrastructure), supply (grid infrastructure, energy sources), and related costs and technical factors, based on the data provided by the countries on the information listed in Annex. Such list of data shall be submitted to the countries for their inputs (if available) prior to the field visits. The Consultant shall identify data gaps that may hinder electrification planning and assess the potential for rapid data gathering efforts by local practitioners to fill those gaps. Geospatial electrification planning is, first and foremost, a data-driven process. In practice, the most common need is for a rapid program for gathering geolocated data for medium voltage grid line and transformers.
* **Sub Activity 1.2: The existing preparedness and skill level of local staff to undertake geospatial electrification planning, and the related needs for training.** Local electricity system planners vary greatly from one country or region to another in their preparedness to undertake geospatial electrification planning. The most important foundation for electrification planning includes three main elements: a) Institutional framework and multi sectorial coordination, b) basic GIS principles and skills in GIS software, and c) key quantitative software skills to support rapid data analysis and reporting. Other common gaps may relate to skills necessary for sizing, cost and planning of off-grid systems of various kinds (home systems, micro-grids).
* **Sub Activity 1.3: Communicating the need for longer term ongoing support to local planners including a range of geospatial data system needs.** One-off geospatial planning exercises are valuable in establishing, for a given time, the technical and investment needs to achieve greater access. However, as electrification plans proceed, and populations, demands and other local conditions change, it may be valuable to repeat or revise plans or planning methodologies. Depending upon the manner and frequency of such revisions, this may require more intensive training of local planners to use and perhaps locally host the software tools necessary for this work. These software tools may include various web-based systems, including: systems to track changing conditions “on the ground” (such as geo-located populated places, construction or installation of electricity systems, etc.); or systems to perform algorithmic demand estimation, technical sizing and costs, or least-cost comparison of various electrification options. If these data systems are to be used over a prolonged period, local technical capacity is a fundamental consideration.

These 3 sub activities shall be done in each of the 4 countries: Bolivia, Ecuador, and Honduras. The level of capacity and of available information varies from country to country; hence, the plan of action resulting of this consultancy will also differ from country to country depending on these factors and the level of involvement of the agencies during the execution of this work. An audio-conference with the IDB Energy Specialist in each of the 4 country offices will be held once the contract is effective to coordinate the preparatory work needed prior to the visits.

**Activity 2: Preparation and presentation of a demonstrative model for universal electricity access in 1 country.**

The consultant shall perform a pilot demonstrative model with the defined approach to electrification planning using available data gathered from the country counterparts.

1. **Reports / Deliverables**

**Report 1:** Review and recommendations regarding the data received from each one of the countries under Sub activity 1.1.

**Report 2:** The final output should be a summary report with sections for each country, outlining:

1. **The status of available data for the target areas of each country**, with attention to data gaps, concluding with an assessment of whether existing data is sufficient to achieve – with an acceptable degree of accuracy – the electrification planning goals envisioned for the target area. Target areas would be priority areas per country determined by the Government.
2. **Additional data gathering requirements for electrification planning**, with approximate estimates of resources needed to undertake these activities, including the capacity building needs and a proposed training program.
3. **The data system needs associated with electrification planning**, with attention to whether the planning work is achievable with a short-term effort easily supportable by Columbia University, or whether local practitioners would prefer (or require) to establish a different or longer-lived data systems to support ongoing data gathering and revisions of electrification plans.
4. **A detailed plan of action for the next steps** for going forward with the planning process, and the development of an investment prospectus.

**Report 3:** A summary report of the preparation and presentation of the demonstrative model

Every report must be submitted to the Bank in an electronic file. The report should include a cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations.

1. **Payment Schedule**

20% upon submission of the work proposal

40% upon delivery and approval of Report 1

30% upon delivery and approval of Report 2

10% upon delivery and approval of Report 3

1. **Team members’ qualification**

* Lead Planning Engineer (Team Leader): Ph.D. in Engineering Science or equivalent and minimum of fifteen (15) years of relevant professional experience in electrification planning, energy access, rural electrification, energy infrastructure and electricity modelling, or the equivalent combination of education and experience.
* Geospatial Electrification Planning Specialist: Masters’ degree in Engineering or equivalent and minimum of ten (10) years of relevant professional experience in geospatial electrification and electrification planning, infrastructure and electricity networks, or the equivalent combination of education and experience.
* GIS Specialist: Masters’ degree in Geography or equivalent and minimum of ten (10) years of relevant professional experience in geographical information systems, energy and infrastructure planning, geospatial planning, or the equivalent combination of education and experience.
* Power Systems Engineer: Masters’ degree in Electrical Engineering or equivalent and minimum of ten (10) years of relevant professional experience in electricity projects, power systems, electricity grids, or the equivalent combination of education and experience.
* Senior Software Developer: Masters’ degree in Computer Science or equivalent and minimum of fifteen (15) years of relevant professional experience in software development, spatial software, and data gathering system, or the equivalent combination of education and experience.

1. **Characteristics of the Consultancy**

* **Consultancy category and modality**: Products and External Services Contractual, Lump Sum
* **Contract duration:** 10 months
* **Place(s) of work:**
* **Coordinator:** Roberto Gabriel Aiello ([raiello@IADB.ORG](mailto:raiello@IADB.ORG)), Energy Principal Specialist, in coordination with respective COF Specialists.

1. **Annex B Information to be collected by Country teams under Activity 1**

Note: Throughout this list, "geo-located" means that the data includes latitude and longitude information.  For some information types such as MV lines, this information may be encoded in a "shapefile" or "MapInfo" format, or similar GIS format.  For other information types, such as locations of "points" like villages, schools, and clinics, this could be an Excel or CSV file \*as long as it includes latitude and longitude information\*.

**Data type 1:  Geo-located information for human settlements and (if possible) whether or not they have grid access (typical source: census or statistics agencies):**

1.1. geo-located human settlements (most important are rural areas, such as villages, hamlets or small towns) with either population or number of households

1.2. information regarding whether each settlement has ANY grid access / connections

1.3. if possible: information for the fraction or percent of households in each settlement that have grid access / connections

Note: If the geographic area of interest is for instance 20 km by 20 km, the above information is needed for 100 km by 100 km area and not just for the 20 km by 20 km.

**Part 2: Geo-located Medium Voltage Grid Infrastructure (typical source: electric utility; sometimes field collection is needed or creation from paper or jpeg maps):**

2.1. geo-located medium voltage grid lines, including their number of phases (MV usually includes 11, 22 and 33 kV, but 66 kV and higher are considered high voltage). Note that low-voltage or LV wire is generally 415 V & 220V and 110V in some places.

2.2. geo-located transformers

**Part 3: Geo-located isolated generation systems**

3.1. geo-located of mini grid generation systems like Hybrid systems, mini or micro hydro, diesel generators

3.2. geo-located of mini distribution grids, in MV and/or LV

3.3 geo-located of individual systems like SHS

Note:  Data types 1 and 2 above are \*by far\* the two most important data categories.  Also, note that if good location data for settlements and good location data for the grid are both available, then grid access can be estimated at least to a satisfactory level. Data for geo-located MV grid lines quite often requires a data gathering effort of some kind.

The following three data types are either less important immediately, or can usually be acquired later in the data gathering process through interviews.

**Part 4. Geo-located "social infrastructure" / social service institutions (typical source: health and education ministries, NGOs, etc.)**

4.1. geo-located data for schools -- the location, type (primary, secondary, etc.), and whether the school has grid access, are most important

1B. helpful attributes for schools include:  size / number of students / number of full time teachers

4.2. geo-located data for health facilities -- the location, type (clinic, health post, hospital, etc.), and whether the facility has grid access are most important

4.2 2B.  helpful attributes for health facilities include:  size / number of beds / number of full time doctors & nurses, whether the facility has operating theater or offers surgery

**Part 5:  Household / residential electricity demand data (typical source: electric utility)**

5.1. Range of annual electricity demand (in kWh/household) for households connected to the grid, and the average peak load (in kW/household).  It is important here to understand the RANGE of values, particularly for rural households, since they will be the ones getting new access.  Often the most important number is the low extreme for rural households.

**Part 6:  Costs for grid extension (typical source: electric utility):**

6.1. The typical cost to extend medium voltage grid line per km (including all equipment, such as wires, poles, cross-beams, insulators, etc.)

6.2. The typical cost to extend low voltage grid line per km (including all equipment, such as wires, poles, etc.)

6.3. The cost for a utility to connect a new customer (cost for a meter, a "service drop" etc.)

https://ssl.gstatic.com/ui/v1/icons/mail/images/cleardot.gif

**Part 7: Average Costs for Isolated generation Systems installed in the country**

7.1. The average costs of isolated generation systems in US$/kW installed

7.2. The average costs of isolated mini grids in US$/kmLV and US$/kmMV

7.3 The average costs of individual systems like the SHS

**Part 8: Geo-located maps of Renewable energy resources**

8.1. Solar Resource

8.2. Wind Resource

8.3. Geothermal Resource

8.4. Micro and Mini Hydro resource

8.5. Other renewable resources

**Part 9: Geo-located maps of country strategic considerations**

9.1. Protected areas like national parks, ecological reservations, water reservoirs or indigenous settlements

9.2. Priority areas due to strategic reasons (development, security, etc.)

9.3. Geothermal Resource

**Terms of reference for individual contractual**

**REGIONAL**

**INE/ENE**

Consultancy to support a Study on Modern Cook Stoves and Space Heating under RG-T2898

**TERMS OF REFERENCE[[2]](#footnote-2)**

1. **Background**

In 2015 the Energy Division (ENE) of the Inter-American Development Bank (IDB) approved a new Energy Sector Framework with four thematic lines that will guide energy sector work in Latin America and the Caribbean (LAC):

1. Energy access – coverage, quality, reliability, and affordability;
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In the same context, ENE has been implementing several activities to promote energy innovation and improved knowledge in the LAC region, including the global initiative Sustainable Energy for All (SEforALL) launched at the United Nations (UN) General Assembly in September 2011. The IDB is the regional hub for LAC (SEforALL Americas) to help countries meet the three global [SEforALL goals by 2030](http://www.se4all.org/our-vision_our-objectives): (i) to ensure universal access to modern energy services; (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](https://sustainabledevelopment.un.org/sdgsproposal.html)), approved on [September 25, 2015](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E) as part of the post-2015 Sustainable Development Agenda, a universal set of targets that all 193 UN member states will use in framing their political policies and development agendas from 2016 to 2030, replacing the Millennium Development Goals that ended in 2015.

Among all regions in the world, Latin America and the Caribbean could be the next region to achieve universal access to electricity services. In 2014, the region had an estimated 96% electricity service coverage. However, 25 million people still lack electricity, 90% of these concentrated in 11 countries. Almost all countries need public policies to achieve 100% coverage. It has been estimated that between 2015 and 2030, US$ 600 million each year would be needed to achieve this goal. But even if funding were available, there are not enough projects that meet the minimum standards necessary to receive financing. Therefore, it is crucial to make plans for underserved communities to understand which energy solution is the right fit for each case within a particular time frame and with defined resources.

1. **Consultancy objective(s)**

The Inter-American Development Bank (IDB) is seeking the services to undertake a study with an approach 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.

1. **Main activities**

This study 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.

Activities will be defined on a work plan prepared by the contractual and approved by the team.

1. **Reports / Deliverables**

**Report 1:** Work plan proposed and schedule, including an outline of the study and potential references and partners identified.

**Report 2:** Draft report for comments and revision

**Report 3:** Final Report

Every report must be submitted to the Bank in an electronic file. The report should include a cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations.

1. **Payment Schedule**

30% upon submission of the work proposal

40% upon delivery and approval of Report 1

40% upon delivery and approval of Report 2

1. **Team members’ qualification**

* Academic Degree/Level of Professional Experience: Higher degree in the energy sector or equivalent and at least 10 years of experience in developing issues and the energy sector, especially regarding clean cooking and heating.
* Languages: English and Spanish
* Areas of Expertise: Energy Sector, Energy Access and Rural Electrification
* Additional Skills: Have published previous research reports, books or working papers in the energy sector, and should have a clear understanding of energy access.

1. **Characteristics of the Consultancy**

* **Consultancy category and modality**: Products and External Services Contractual, Lump Sum
* **Contract duration:** 6 months
* **Place(s) of work:** To be defined
* **Coordinator:** Roberto Gabriel Aiello ([raiello@IADB.ORG](mailto:raiello@IADB.ORG)), Energy Principal Specialist, in coordination with respective COF Specialists.

1. These TOR are indicative; the components can be performed in phases in separate contracts. [↑](#footnote-ref-1)
2. These TOR are indicative; the components can be performed in phases in separate contracts. [↑](#footnote-ref-2)