

# NS-222 - Energy with Renewable Sources in non-interconnected areas

## Colombia

### NAMA Seeking Support for Preparation

#### A Overview

A.1 Party

Colombia

A.2 Title of Mitigation Action

Energy with Renewable Sources in non-interconnected areas

A.3 Description of mitigation action

Law 855 of 2003, "whereby non-interconnected areas defined" enunciated that "for all purposes related to the provision of public electricity service non-interconnected areas refer to municipalities, districts, towns and villages not connected to the national grid."

In Colombia there are 32 departments with locations non-interconnected, of which, based on the rural coverage criteria, 17 are under management of the Institute of Planning and Promotion of Energy Solutions for non-interconnected areas (IPSE) either partially or completely. This means that 26 departments are sheltered by the National Interconnected System (NIS), 11 departments have NIS areas and areas under the management of IPSE simultaneously, and 6 departments receive exclusive management of the IPSE.

From the above, it is worth mentioning that Decree 1140 of 1999 gave rise to the Institute of Planning and Promotion of Energy Solutions -IPSE, transforming it into a public establishment which should focus its role in engaging regional entities and private sector in the implementation and operation of energy projects, provide technical, administrative and financial support to established businesses, identify and promote investment projects in isolated zones; and if required, financed with resources from the national budget to develop such projects, not directly involved in their implementation and subsequent operation.

In general, isolated zones are characterized by:

- Being scattered areas with low population density
- Having a high average level of unmet basic needs (NBI)
- Lack of physical infrastructure
- Weak state presence
- Significant activity of armed groups outside the law

As a result in that areas there are high levels of violence and

underdevelopment of the country to come forward, which results in social and economic marginalization.

As for public electricity service, the characteristics of isolated zones are:

- Low coverage in the provision of public electricity service
- Low power consumption
- Low affordability of the public electricity service because of low incomes
- High levels of debt portfolio by users to service providers
- Low collection by companies or operators service providers
- Low levels of turnover caused, among other things, by low levels of micro-measurement, especially in the areas of difficult access
- Distant points and paying attention
- High costs of providing the service
- High level of losses in electricity distribution systems
- Deterioration of the client-provider relationship by difficulty in communication and mismanagement in service by companies, municipalities and governorates
- The companies providing energy services do not provide information to government entities because they do not have it, and the cases they have they provide it partially
- Lack of appropriate mechanisms for inspection, monitoring and control
- Constant assistance of the Nation resources for maintenance, replacement of the electrical infrastructure, supply of fuels and investment for the expansion of the service.
- Difficulty following up on subsidies

Colombia has more than 48.2 million inhabitants, of which there are about 1.9 million people without electricity service.

According to the Electricity Coverage Indicative Expansion Plan 2013- 2017, there are a total of 11.7 million households in the country, of which 94.3% have electricity service, 1.5% have service in isolated zones, and 4.2% (0.49 million households) have no electric service. Of the latter group, but in relation to the total of Colombia, 1.9% of homes could be connected to the NIS in an economically viable manner (they are interconnectable) and 2.3% are considered as not interconnectable.

In Colombia there are 18,504 localities not interconnected, of which 2,913 cannot be interconnected and in which there are 55,809 homes without electricity service.

In the departments under the management of IPSE there are 1450 non-interconnected villages, representing 201,742 users. From these locations are estimated to be 916 not interconnectable, representing 152,093 users.

The energy supplied in areas under IPSE management comes from four sources of generation:

- Interconnection with neighboring countries
- Diesel Plants
- Renewable energy sources (Small Hydro -PCH's- and photovoltaic systems)

The operational capacity under management in areas under the management of IPSE is 215,568 kW; 187,439 kW correspond to Diesel plants. Larger capacities correspond to San Andrés (68,736 kW), Chocó (32,783 kW), Nariño and Amazonas, which all represent 69.5% of total operating capacity. The capacity of diesel plants varies from tens of kW to thousands of kW.

The amount of operating diesel plant is 1505, most of which they are of the Lister, Perkins and Cummins brands.

The FNCER are used today in five locations:

- Nazareth (Guajira) with 320 kWp and 307 kW diesel SFV
- Titumate (Chocó) 105 kWp and 124 kW diesel SFV
- Bahia Solano (Chocó) with 1875 kW and 1800 kW diesel PCH
- Bahía Cupica (Chocó) with 125 kW and 125 kW diesel PCH
- Isla del Fuerte (Bolívar) with 175 kWp and 300 kW diesel SFV

Most of the renewable capacity is depicted in two PCH's with a total capacity of 2000 kW and 600 kW photovoltaic system (SFV). It should be noted that Nazareth and Titumate have battery banks and inverters connected to the local network.

Nazareth has decommissioned two turbines of 100 kW capacity each, and the PCH La Vuelta in Choco of 4 MW is out of service.

Regarding electrification projects for non-interconnected areas, there are 10 projects of PCH's, (5 in Chocó, 2 in Putumayo, 1 in Vaupes 1 in Amazonas and 1 in Magdalena) that represent 7840 kW of installed capacity, with the largest in Vaupes Mitu of 3 MW. It is noteworthy that in Ciénaga (Magdalena) is having a PCH 142 kW in operation, on which detailed engineering is advanced for further upgrading to 130 kW.

The total amount of companies providing electricity services in 17 departments is 109, registered with the SSPD. Chocó, Nariño, Meta and Caquetá have the greatest number of them. According

to Article 74 of Law 143 of 1994, companies providing public electricity service located in isolated zones can be developed in an integrated manner covering the generation, distribution and commercialization. According to the National Register of Providers, RUPS, administered by the SSPD, most of the companies providing electricity services in isolated zones are municipal mayors and corporations organized as Public Utilities (SA ESP).

The motivation for designing and implementing the NAMA is based on the fact that attempts by the state to establish electrification solutions in non-interconnected areas with alternative sources (solar, hydro, wind and biomass) have not had the impact, operation or sustainability desired due to flaws in the design, operation or business model, from economic, technical or cultural difficulties. Additionally electrification in these areas is limited mainly to meet needs of lighting and appliances without it becoming an engine of economic development in combination with the use of other forms of energy and in combination with other services.

The possible general objectives of the NAMA are:

1. Bringing electricity to non-interconnectable localities by individual power generation systems based on photovoltaic technology, or by mini-networks with hybrid systems of power generation involving non-conventional renewable energy sources.
2. Giving Sustainable Rural Energy Plans continuity (PERS for its acronym in Spanish) in order to support local or regional production schemes with significant energy component and community participation in isolated or rural areas of Colombia.
3. Develop and implement energy projects related to small infrastructure systems of isolated or rural areas, starting with energy conversion in water purification plants.
4. Formulate and implement projects to replace power generation plants based on fossil fuels in Colombia in interconnectable locations in the cases when the possibility of early interconnection is low (according to considerations of sectorial actors) and they represent major GHG emissions.

It will be established an institutional arrangement between Ministry of Mines and Energy, IPSE (Institute of Planning and Promotion of Energy Solutions for non-interconnected areas)

and UPME (Mining and energy Planning Unit) for the allocation of resources, effort and oversight of the projects mentioned above.

Institutional arrangements between IPSE and Ministry of Housing, City and Territory will also be established for allocating resources, and monitoring efforts on alternative energy projects in water treatment plants in rural or isolated areas of Colombia.

And as transversal components of the NAMA we have the following:

1. Completion of policy documents and regulation concerning electrification in non-interconnected areas
2. Activities of coordination and support between sector entities
3. Construction and improvement of information systems
4. Capacity building for the actors of the sector
5. Consolidation of quality standards for electricity generation systems in ZNI
6. Disclosure mechanisms for the above components

A.4 Sector

<input checked="" type="checkbox"/> Energy supply	<input type="checkbox"/> Transport and its Infrastructure
<input type="checkbox"/> Residential and Commercial buildings	<input type="checkbox"/> Industry
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Forestry
<input type="checkbox"/> Waste management	

Other

A.5 Technology

<input type="checkbox"/> Bioenergy	<input checked="" type="checkbox"/> Cleaner fuels
<input type="checkbox"/> Energy Efficiency	<input type="checkbox"/> Geothermal Energy
<input type="checkbox"/> Hydropower	<input checked="" type="checkbox"/> Solar Energy
<input checked="" type="checkbox"/> Wind Energy	<input type="checkbox"/> Ocean Energy
<input type="checkbox"/> Carbon Capture and Storage	<input type="checkbox"/> Low till / No till
<input type="checkbox"/> Land fill gas collection	

Other

A.6 Type of action

<input checked="" type="checkbox"/> National/ Sectoral goal	<input checked="" type="checkbox"/> Project: Investment in machinery
<input checked="" type="checkbox"/> Strategy	<input checked="" type="checkbox"/> Project: Investment in infrastructure
<input checked="" type="checkbox"/> National/Sectoral policy or program	<input type="checkbox"/> Project : other

Other

A.7 Greenhouse gases covered by the action

<input checked="" type="checkbox"/> CO2	<input type="checkbox"/> CH4
<input type="checkbox"/> N2O	<input type="checkbox"/> HFCs
<input type="checkbox"/> PFCs	<input type="checkbox"/> SF6

Other

## B National Implementing Entity

B.1.0 Name	Ministry of Mines and Energy
B.1.1 Contact Person 1	María Victoria Reyes
B.1.2 Address	43rd Street N. 57 - 31 CAN - Bogotá D.C., Colombia
B.1.3 Phone	(57 1) 2200 300 Ext. 2650
B.1.4 Email	mvreyes@minminas.gov.co
B.1.5 Contact Person 2	
B.1.6 Address	
B.1.7 Phone	
B.1.8 Email	
B.1.9 Contact Person 3	
B.1.10 Address	
B.1.11 Phone	
B.1.12 Email	
B.1.13 Comments	<p>Ministry of Mines and Energy is responsible in Colombia of the following actions:</p> <ul style="list-style-type: none"> <li>- Formulate, adopt, direct and coordinate the policy of generation, transmission, distribution and commercialization of electricity</li> <li>- Formulate policy on expansion of electricity service in non-interconnected areas</li> <li>- Formulate, adopt, direct and coordinate policy on activities related to the integral use of non-renewable natural resources and all of the country's energy sources</li> <li>- Adopt general power generation expansión plans and network interconnection and establish the criteria for the planning of transmission and distribution</li> <li>- Manage the Financial Support Fund for the Electrification of non-interconnected areas - FAZNI</li> <li>- Manage the Financial Support Fund for the Electrification of Interconnected Rural Areas - FAER</li> </ul>

## C Expected timeframe for the preparation of the mitigation action

C.1	Number of months for completion	8
-----	---------------------------------	---

## D Currency

D.1	Used Currency	<div style="border: 1px solid black; padding: 5px; display: inline-block;">AED</div> Conversion to USD: 1
-----	---------------	--

## E Cost

E.1.1 Estimated full cost of preparation	
E.1.2 Comments on full cost of preparation	It will be defined after the analysis that will be performed with the Ministry of Mines and Energy and the Institute of Planning and Promotion of Energy Solutions for non-interconnected áreas.

## F Support required to prepare the mitigation action

F.1.1	Amount of Financial support
-------	-----------------------------

F.1.2 Type of required Financial support	<input type="checkbox"/> Grant <input type="checkbox"/> Loan (sovereign) <input type="checkbox"/> Loan (Private) <input type="checkbox"/> Concessional loan <input type="checkbox"/> Other <input type="text"/>
F.1.3 Comments on Financial support	<input type="checkbox"/> Guarantee <input type="checkbox"/> Equity <input type="checkbox"/> Carbon finance
F.2.1 Amount of Technical support	
F.2.2 Comments on Technical support	
F.3.1 Amount of capacity building support	
F.3.2 Type of required capacity building support	<input type="checkbox"/> Individual level <input type="checkbox"/> Institutional level <input checked="" type="checkbox"/> Systemic level <input type="checkbox"/> Other <input type="text"/>
F.3.3 Comments on Capacity Building support	
F.4 Financial support required	<input type="checkbox"/>
F.5 Technological support required	<input type="checkbox"/>
F.6 Capacity support required	<input type="checkbox"/>

**G Relevant National Policies strategies, plans and programmes and/or other mitigation action**

G.1 Relevant National Policies	<p>The country has the Colombian Low Carbon Development Strategy (CLCDS) since 2010. CLCDS is a program of development planning in the short, medium and long term, which seeks to decouple growth in emissions of greenhouse gases (GHG) from national economic growth.</p> <p>The objective of the CLCDS is to design and implement new policies, programs and actions in specific productive sectors to improve efficiency and competitiveness and provide important sustainable benefits to people. The set of policies, programs and actions in specific productive sectors is called Sectorial Mitigation Action Plans (SMAPs)</p> <p>NAMAs become significant tools for implementing SMAPs.</p> <p>SMAPs has been formulated for the electricity sector, which comprises a set of mitigation measures classified as policies, programs and actions to reduce GHG emissions compared to a projected baseline emissions in the short, medium and long term. The analysis of policies and programs was performed according to the perception of sectorial experts concerning the importance of policy / program within the sector, the alignment with sectorial priorities and the review the co-benefits from their implementation.</p> <p>The Electricity SMAP in its Policy Line No. 3 focuses on non-conventional sources of renewable energy in the national energy system and considers the promotion of non-conventional renewable energy sources in off-grid areas with criteria of</p>
--------------------------------	---

reliability and environmental, social and economic sustainability to reduce GHG emissions generated by diesel, using non-conventional renewable energy sources to replace or supplement diesel generation in isolated zones.

For this, the SMAP seeks to implement a program to increase the participation of non-conventional energy sources, of hybrid projects in the municipalities, and to implement thermal solutions with non-conventional energy sources.

Additionally, Law 1715 of 2014, through which the integration of non-conventional renewable energy to the National Energy System is regulated, considers options for achieving the substitution of diesel generation in off-grid areas, generating exclusive service areas electricity and fuel gas, and the development of an incentive scheme for providers of electricity service in off-grid areas. This Law gives priority to projects that are incorporated within the Sustainable Rural Energizing Plans at departmental or regional level.

G.2 Link to other NAMAs

#### H Attachments

H Attachments  
 H.1 Attachment description  
 H.2 File

**Title Description**

Browse...

#### I Support received

I.1 Outside the Registry

We have received support from Olade (Energy Latin American Organization) to analyze information of non-interconnected areas in Colombia and prepare a NAMA proposal.

We are receiving support from PNUMA in order to analyze possible business models to design and implement in non-interconnected areas for individual systems and/or mini-networks with hybrid systems.

I.2 Within the Registry

Support provided	Support Type	Amount	Comment	Date
------------------	--------------	--------	---------	------