

NS-221 - Public Lighting Energy Efficiency

Colombia

NAMA Seeking Support for Implementation

A Overview

A.1 Party

Colombia

A.2 Title of Mitigation Action

Public Lighting Energy Efficiency

A.3 Description of mitigation action

A market survey conducted by FINDETER and IDB showed that there is interest from municipalities to modernize their street lighting systems, but perceive a risk in structuring projects of this type.

According to the information recorded in the system SUI of the Superintendence of Public Services, the use of electricity for public lighting in Colombia is approximately 2.7% of electricity consumption in the country, representing 1,407 GWh / year and the annual emission of 526,587 tons of carbon dioxide equivalent (tCO₂e). This energy costs about 145.6 million dollars a year (@ COP \$ 3.000 / \$ 1).

In Colombia, municipalities are responsible for providing public lighting. According to Article 365 of the Constitution of Colombia, public services are inherent to the social purpose of the State. The State should ensure its efficient delivery to all inhabitants of the country. Public services may be provided by the State, directly or indirectly, by organized communities or individuals. In any case, the State shall maintain the regulation, control and monitoring of these services. Article 191 of the National Development Plan 2014-2018 indicates that the public lighting is an essential public service. The Government, through the Ministry of Mines and Energy, shall regulate their provision in order municipal and district authorities can assure issues such as those mentioned below:

- Improving the quality of life and security of the people in the national and territorial level.
- The financing of public lighting service within the framework of fiscal sustainability of the local authority.
- An efficient and continuous provision of public lighting.
- Expanding coverage in the provision of public lighting.
- The provision of public lighting, inherent in the public service of electricity, shall be governed by the following principles:

a. The principle of coverage seek to ensure full coverage of all urban areas of the municipalities and districts and towns in the rural areas where technical and financially viable, in accordance with local planning and with the other principles set in this

article.

b. Under the principle of quality service provided must meet the technical requirements established for it.

c. The principle of energy efficiency aims to be maximized through good practices in technological upgrading.

d. The principle of economic efficiency means, among other things, the proper allocation and use of resources so as to guarantee the provision of public lighting at the lowest economic cost with technical quality criteria.

e. Under the principle of financial capacity it will promote the service providers have efficient recovery of costs and expenses of all activities associated with the service and obtain a reasonable return.

f. Costs and efficient expenditure for all activities associated with the provision of public lighting will be recovered by the municipality or district that has run its provision through a special contribution earmarked for financing this service.

g. The power supply to the Facility of public lighting should be through contracts supported in mechanisms of coverage that for the purpose the Ministry of Mines and Energy determines or the delegated authority.

Colombia has approximately 1,400,000 streetlights, of which 610,000 are under concession contracts. Most of these lights are sodium vapor technology of high pressure.

In order to contribute to the national goal of reducing electricity consumption, in 2014 FINDETER, national development bank, backed by the government, he launched a line of special funding to finance energy efficiency investments in public lighting. FINDETER as a second-tier bank would lend to local financial intermediaries who will use these resources to finance loans to the final beneficiaries. This special financial line, aims to support efforts to replace a certain percentage of luminaries of sodium vapor high pressure technology by more efficient for the modernization and expansion of lighting services in Colombia. The beneficiaries of this line are customers of the public and private sector and Government segment (cities, dealers and private companies that provide public services). Besides reducing energy consumption, the projects in this line of credit will reduce costs for the municipalities of Colombia and also support the sustainability and development plans of the municipalities.

The energy efficiency projects in public lighting can be structured under two different schemes: the first scheme is when the city requested funding and hire a provider of energy efficiency projects who supply and install the technology; in this case, the city is absorbing most of the risks of the project results, which are required to have a number of mechanisms to ensure that the project will generate sufficient cash flows to cover its

costs investment, operation and financing.

The second funding scheme is where the supplier or provider of energy efficiency projects (or a third) is who makes the investment, and then recovered through savings generated by the project. In this case, most of the risks of the project results are absorbed by the supplier of the energy efficiency project and not by the municipality.

However, despite this very interesting investment opportunity for municipalities and investors, after launched the credit line the market showed that there are still barriers to successful implementation of such projects. Based on initial studies of market assessment, conducted by FINDETER and IDB on opportunities and barriers to financing energy efficiency in the field of public lighting, it was identified that many of the barriers to access to credit a potential strategy for financing energy efficiency projects are related to:

(I) lack of knowledge of local financial intermediaries and final beneficiaries (lack of technical knowledge to assess and lead technologies and projects in a reliable way by municipalities; distrust of investors regarding the performance of energy efficiency projects)

(ii) the lack of confidence of investors in projects with providers of new technologies, and lack of confidence in the high amounts of investment combined with low creditworthiness of municipalities interested in conducting this type of investment .

(iii) the lack of a sound legal framework for public-private partnerships between actors (prior contractual commitments, specifically the concession contracts for the management, operation and maintenance of municipal public lighting systems, change of administration the cities).

To address barriers that prevent the successful implementation of projects to modernize public lighting, NAMA seeks to have measures and mechanisms integrated in addition to the financing line of FINDETER (Local Development Bank). Those measures and mechanisms are aimed to manage the following aspects:

- Knowledge gaps on public lighting modernization projects
- Actual or perceived risks by municipalities on public lighting modernization projects
- That funded projects are the result of a legal framework for public-private partnerships between actors, and reflect savings of electricity and reduction of GHG emissions.

The NAMA not only seeks to reduce and mitigate the various barriers and risks associated with financing schemes for energy efficiency projects in public lighting, while seeking to create market conditions that stimulate demand for such projects, both

by municipalities and the private sector, and building trust among stakeholders. FINDETER placed at least US \$ 25 million in loans to municipalities / financial intermediaries / energy service providers to modernize public lighting systems.

Given that in Colombia there has not been a comprehensive program like the one proposed, this NAMA will lay the necessary methodological bases to structure and implement comprehensive financing and modernization programs of public lighting systems.

The NAMA considers four components, each of which seeks the development of tools to address the risks of technology and performance, as well as risks that can meet the energy service companies.

The components are:

- (I) Technical assistance and legal mechanisms
- (II) Financial mechanism
- (III) Monitoring, reporting and evaluation
- (IV) Capacity building and communication mechanisms

The financial elements of the NAMA will be designed to be attractive to cities and dealers, and to incentive the large scale replacement in all interested cities.

The NAMA will tend to improve the operational mechanisms and systems required to monitor the results and benefits of the funding strategy. The benefits from energy savings will be a key incentive for municipalities to invest in such kind of projects.

A.4 Sector

<input 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 type="checkbox"/> Cleaner Fuels
<input checked="" type="checkbox"/> Energy Efficiency	<input type="checkbox"/> Geothermal energy
<input type="checkbox"/> Hydropower	<input type="checkbox"/> Solar energy
<input 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 type="checkbox"/> Project: Investment in machinery
<input 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
	<input type="checkbox"/> Other <input type="text"/>	

B National Implementing Entity

B.1.0 Name	FINDETER S. A.
B.1.1 Contact Person 1	María Mercedes Abondano
B.1.2 Address	103rd street N. 19-20 Bogotá, Colombia
B.1.3 Phone	(57 1) 623 0311 (57 1) 623 0388
B.1.4 Email	mmabondano@findeter.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>Findeter, whose creation was authorized by Law 57 of 1989 and amended by Decree 4167 of 2011, is a national company of mixed economy, the type of anonymous, organized as a credit institution, under the Ministry of Finance and subject to monitoring by the Financial Superintendence of Colombia.</p> <p>Among its functions Findeter supports and manage design, construction, maintenance and provision projects to mitigate or compensate for environmental impacts associated with all types of economic activities.</p>

C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	10
C.2	Expected start year of implementation	2016

D Currency

D.1	Used Currency	<input type="text" value="AED"/>
		Conversion to USD: 1

E Cost

E.1.1	Estimated full cost of implementation	65000000
E.1.2	Comments on full cost of implementation	
E.2.1	Estimated incremental cost of implementation	25000000
E.2.2	Comments on estimated incremental cost of implementation	

F Support required for the implementation the mitigation action

F.1.1	Amount of Financial support	13000000
F.1.2	Type of required Financial support	<input checked="" 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"/>
		<input type="checkbox"/> Guarantee <input type="checkbox"/> Equity <input type="checkbox"/> Carbon finance
F.1.3	Comments on Financial support	

- F.2.1 Amount of Technological support
 F.2.2 Comments on Technological 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 type="checkbox"/>	Systemic level
<input type="checkbox"/>	Other <input type="text"/>

- F.3.3 Comments on Capacity Building support
 F.4 Financial support for implementation required
 F.5 Technological support for implementation required
 F.6 Capacity Building support for implementation required

G Estimated emission reductions

G.1 Amount	0.112876
G.2 Unit	<input type="text" value="MtCO2e"/>
G.3 Additional information (e.g. if available, information on the methodological approach followed)	<p>Emission reductions are based on the <i>FINDETER-IDB Market Study on Energy Efficiency in Public Lighting Sector in Colombia</i> completed in 2013, where field information from 19 municipalities were compiled.</p> <p>From the above study was extrapolated to 59 cities with over 100,000 inhabitants (not Bogota nor Medellin) calculating the energy consumption, the cost of providing this energy and GHG emissions associated with the operation of public lighting system.</p> <p>It was took into account the Resolution N. 91304 of November 25, 2014, issued by the Ministry of Mines and Energy of Colombia, which suggests the adoption of marginal factor of greenhouse gases in the national grid (to which Public Lighting systems belong) at a value of 0.374 tonCO₂ / MWh.</p> <p>The study estimates an approximate annual savings of 34,492 MWh by replacing about 150,000 luminaires.</p>

H Other indicators

H.1 Other indicators of implementation	<p>Possibly the NAMA will incorporate the following aspects in the monitoring system:</p> <ul style="list-style-type: none"> - Number of cities or municipalities intervened. - Amount of luminaires replaced / base amount of luminaries to change (month to month cumulative) - Amount of luminaires properly disposed / amount of luminaires replaced. (Rating of waste management month to month and in a cumulative way). - Public lighting system end coverage / initial coverage of the public lighting system. This measurement will be based on km of roads covered by the public lighting in respect to the total of
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routes where there should be coverage. It also can be measured in m² for areas such as parks, squares and similar.

- Current amount of luminaires per 1000 inhabitants / initial amount of luminaires per 1000 inhabitants. Measurement every semester until completing the project.

- Public lighting last month consumption (kWh / month) / base monthly average consumption of the public lighting system (kWh / month), the base is built with the consumption of last year divided into 12. Values are estimated from load and operating hours. It could be directly measured with remote management.

- Current Unit Cost (\$ / kWh) of energy versus base Unit Cost (\$ / kWh) of energy. It is required analyzing each particular case because the contracts are different.

- Amount of complaints during current period / amount of complaints during last year

- Amount of jobs created / base amount of jobs to be created

- Current amount of street robberies per month / amount of street robberies in the same month of the last year. It can be done a comparison between rates of violence for two periods. Rates of violence can be obtained by crossing data bases of police or from Ministerio del Interior.

- Amount of traffic accidents at night (with new lighting period) / amount of traffic accidents at night (base period)

I Other relevant information

I.1 Other relevant information including co-benefits for local sustainable development

Environmental impacts

Reducing costs of recycling of light bulbs and luminaires

Reducing solid waste and / or special waste

kWh reduction in electricity consumption in public lighting systems (increasing energy efficiency by 15 to 50%)

Social impacts

Increased security in public spaces

Reduction in the amount of traffic accidents

Employment generation

Improving the quality of life of citizens

Improving understanding of the advantages of LED technology and its impacts

Supporting sustainability and development plans of municipalities

Economic impacts

Reducing energy consumption

Reduction in public lighting costs for the municipalities of Colombia

Generating investment opportunities

Creating options to promote economies of scale for lighting purchasing

Creating lighting production capacity in cities and strengthen the industry in the country

Improving confidence in the performance of energy efficiency projects

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

J.1 Relevant National Policies

The Ministry of Mines and Energy issued Resolution 181 331 of August 6, 2009, whereby the RETILAP (Technical Regulation on Lighting and Public Lighting) is adopted (to take effect on 20 February 2010). By adopting Resolution 180265 of February 19, 2010 was postponed entry into force the regulation until 1 April 2010. As of April 1, 2010, took effect the RETILAP.

This regulation establishes requirements and measures to be met by lighting systems and public lighting, aimed to ensure: levels and qualities of light energy required in visual activity, the security of energy supply, consumer protection and environment preservation; preventing, minimizing or eliminating the risks arising from the installation and use of electric lighting.

By Resolution 180 540 of 30 March 2010 it is clarified the GENERAL ANNEX of RETILAP and requirements for minimum performance and service life of lamps is established, and other transitional arrangements to facilitate its implementation. By Resolution 181 568 of September 1, 2010 it is clarified and amended RETILAP regarding the scope of products for decorative lighting and lighting efficiencies of some sources. By resolution 182544 of 29 December 2010 it is amended RETILAP regarding the transience extension on requirements for incandescent bulbs and minimum performance for T8 fluorescent tubes. In Resolution 180173 of 14 February 2011 it is amended RETILAP regarding clarification on the transience of incandescent bulbs. By Resolution 91872 of December 28, 2012 RETILAP is clarified with respect to the requirement of maximum levels of mercury and plumbum in lighting sources and some general requirements for ballasts are clarified. By Resolution 90980 of November 15, 2013 it is clarified and added to RETILAP aspects in relation to include relevant aspects of the Consumer Statute and to specify the requirements for decorative and lighting ballasts.

Furthermore, Article 2 of Decree 2424 of 2006 "by which the provision of public lighting is controlled" defined thus:

"Article 2. - Public Lighting Service Definition: It is the non-home public service provided in order to provide lighting to public property exclusively and other areas of free movement with vehicular or pedestrian traffic within the rural and urban area of municipality or district. The public lighting service comprises the activities of providing energy to the lighting system, management, operation, maintenance, modernization, replacement and expansion of public lighting system.

Paragraph. The lighting of the public areas into closed building units or buildings or residential, commercial or mixed units, subject to the respective property regulation, is not part of the public lighting service and will be in charge of co-ownership or condominium. Also it is excluded from the public lighting service the road lighting that is not the responsibility of the municipality or district."

The municipalities and districts are responsible for ensuring the delivery of service. They can provide the service directly or indirectly through other utilities or other public lighting providers. (Decree 2424 of 2006 Article 4)

The municipal budget should include the costs associated with providing the service and, if so, the income tax for public lighting, which can be used to finance the service.

It is up to the Energy and Gas Regulation Commission the function of establishing a methodology for the determination of the maximum costs to be applied by municipalities or districts to remunerate the service providers and the use of assets linked to the public lighting system. Decree 2424 of 2006.

Some municipalities hold concession contracts and service tax collection agreements with public utilities companies, which must comply with the elements set out in Article 29 of Law 1150 of 2007, as well as the relevant regulations.

Sometimes fiduciary assignments are constituted by the contractors and the collected money is intended to cover the costs of energy supply, as well as payment of agreements or contracts relating to the activities of provision of public lighting (administration, operation, maintenance, modernization, replacement and expansion of public lighting system).

Additionally, the country has the Colombian Low Carbon Development Strategy (CLCDS) since 2012. The CLCDS is a development planning program in the short, medium and long term, seeking to decouple the growth of greenhouse gas emissions (GHG) of national economic growth.

The aim of the CLCDS is to design and implement new policies, programs and actions in specific productive sectors to improve efficiency and competitiveness. The set of policies, programs and actions in specific productive sectors has been called mitigation sectorial action plans (PAS for its acronym in Spanish).

For the electricity sector it has been formulated the respective PAS, comprising a set of mitigation measures classified as policies, programs and actions to reduce emissions of greenhouse gases compared with a projected baseline emissions in the short, medium and long term. The analysis of policies and programs are conducted in accordance with the perception of sectorial experts regarding the importance of the policy / program within the sector, alignment with sectorial priorities and the review of the co-benefits of implementation.

The Electric Power PAS in its policy line No. 1 focuses on energy efficiency on the demand side, whose policy guideline is the promotion and development of the energy efficiency policy nationwide. The objective of this policy is to reduce GHG emissions through savings in energy consumption generated by energy efficiency programs and actions. One of the actions of this policy line is to promote energy efficiency in public lighting, which includes the following sub-actions:

- Develop incentive schemes for energy efficiency in outdoor lighting
- Develop a program to support options analysis and the development of public lighting contracts in municipalities that require it
- Promote and support the implementation of energy efficiency projects in public lighting
- Develop a program to strengthen the control and monitoring of RETILAP compliance

Therefore, the NAMA becomes a fundamental tool for the implementation of these lines of PAS.

On the other hand, the resolution 180919 of 2010 the Ministry of Mines and Energy, for which the Indicative Action Plan 2010-2015 is adopted to develop the Program of Rational and Efficient Use of Energy and Other Forms of Non-Conventional Energy (PROURE), considered for the commercial, public and services sectors an electricity potential savings of 4.4% to 2015 and set a goal of electricity savings of 2.66% to 2015.

In addition, Law 1715 of 2014 creates the Fund for Non-Conventional Energy and Efficient Energy Management (FENOGE) to finance programs in Non-Conventional Energy Sources and efficient energy management.

J.2 Link to other NAMAs

K Attachments

K Attachments

Title	Description
Support Letter (1).jpg	
Support Letter (2).jpg	

K.1 Attachment description

These are the support letters from the Ministry of Mines and Energy addressed to the Ministry of Environment and Sustainable Development

K.2 File

Browse...

L Support received

L.1 Outside the Registry

FINDETER and Inter-American Development Bank applied to the sixth window of Global Environmental Facility in the category Request for One-Step Medium-Sized Project Approval

L.2 Within the Registry

Support provided	SupportType	Amount	Comment	Date
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