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SNTA Supports Street Lighting PPPs in Belo Horizonte and Rio de Janeiro

PPIAF's Sub-National Technical Assistance Program (SNTA) and its World Bank Group partners—the International Finance Corporation (IFC) and the Energy Sector Management Assistance Program (ESMAP)—have been working with the Brazilian municipalities of Belo Horizonte and Rio de Janeiro to bring energy-efficient investment to public street-lighting systems. The program, which includes early-stage feasibility analyses and technical assistance, has prompted Belo Horizonte to begin implementing a 178,000 points-of-light (PoL) system under a PPP structure. Rio plans to incorporate a 320,000-PoL system in its 2017-2020 city development plan. These projects will reduce energy costs and green-house gas (GHG) emissions. The study is also influencing investigators who are evaluating how to introduce energy-efficient street-lighting to other small and large municipalities across the country.

Local authorities have an increasingly recognized role in the global landscape of climate-change mitigation actors, given that what happens in cities accounts for 70 percent of global CO₂ emissions. Urban street-lighting systems in the developing world consume as much power as Germany, the world's fourth-largest economy. Street lighting represents almost four percent of Brazil's electricity consumption and accounts for between 10 and 40 percent of municipal energy expenditures, depending on the number of lights and their efficiency.

A large-scale implementation of efficient street-lighting technology therefore has the potential to bring significant gains. Most current lighting systems in Brazil use mercury or sodium vapor, which require an average of more than 160 watts to maintain sufficient lighting levels (lumen ratings); light-emitting diodes (LEDs), on the other hand, require less than half that wattage to achieve the same lumen levels. They can also last up to twice as long as vapor-based technologies. Cost does remain a factor for LEDs, with current global prices averaging about three times that of older technologies. Prices are projected to decline over the next few years, but it is difficult to know by how much.

PPIAF SUPPORT

PPIAF, in partnership with the IFC and ESMAP, recently conducted a pre-feasibility study for investments in energy efficiency in the public street-lighting sectors of Rio de Janeiro and Belo Horizonte. It highlighted a number of systemic changes happening in the policy and market areas that make the Brazilian public street-lighting sector particularly attractive for energy-efficient investments. An important development is the re-assumption by large municipalities of lighting assets, as mandated by law; in many cases these had been on the books of Distribution Electricity Service Companies (DISCOs). Transferring ownership of these assets from the DISCOs to the municipalities will give the cities more control over a significant budget item and enable them to implement the appropriate structures to bring efficiency gains to the sector. There has also been strong legislative support to the sector, particularly with the implementation of a levy on consumers' power bills that can be dedicated as a structured revenue stream for the financing of efficient street-lighting projects.

Rio de Janeiro Lighting Project

In January 2011, Rio passed the Municipal Law on Climate Change and Sustainable Development that set the city's voluntary GHG reduction targets of eight, 16 and 20 percent for the years 2012, 2016, and 2020, when compared to 2005 levels. As part of the program to reduce emissions, the city used ESMAP's Tool for Rapid Assessment of City Energy (TRACE) to conduct a high-level energy audit of six sectors—public lighting; public buildings; solid waste; water and wastewater; transportation; and power. The estimates from the TRACE tool—based on the benchmark approach—indicated that the city could mitigate nearly 1,000 tCO₂e over a 15-year period by implementing a city-wide LED street-lighting program.

PPIAF and ESMAP prepared a study building on the findings and recommendations of the TRACE report, with the goal of proposing a project structure for a large-scale LED-system implementation. The study identified a potential PPP that would replace 75 percent (representing 320,000 PoL) of the current sodium-based street lights with LEDs. The project has been included in the city's development plan for 2017-2020.

Belo Horizonte Lighting Project

Similarly, Belo Horizonte chose a PPP structure for its ongoing 178,000 PoL project. The selection of a PPP structure reflected

the municipality's recognition of the return on investment and the ability to outsource the technology risk. When the decision was made, municipalities in Brazil did not have substantial experience with LED public lighting. The municipality also recognized that waiting would cost them about BRL1 million per year. Since then, the price of electricity has risen by 40 percent in most of Brazil, and the project is even more attractive.

OUTCOMES

The LED projects will have an immediate impact on the two cities' GHG emissions and energy expenditures. In addition to the 750,000 tCO₂e saved over the life of the proposed projects, electricity consumption will be reduced by nearly 3,025 GWh. This is equivalent to saving the annual power demand of 125,000 Brazilians, or \$750 million at 2015 prices.¹ When coupled with the 500,000 PoL system currently under tender in São Paulo, these projects will also create economies of scale that will further drive down the price of LED units, especially as manufacturers look to kick-start domestic manufacture once the market has reached an appropriate size.

The successful identification of impactful and viable models for energy-efficient street lighting in Rio de Janeiro and Belo Horizonte led to the demand for the consideration of a country-wide street-lighting initiative. Based on the opportunities for city energy efficiency identified under this grant, the World Bank team secured an additional \$1.2-million grant from ESMAP's City Energy Efficiency Transformation Initiative (CEETI) to develop business models that can bring to scale investments in energy-efficient public street lighting, as well as other sectors (including buildings, transport and industry). These include project bundling and other pooling structures to accommodate projects in smaller and medium-sized cities where the costs of executing a transaction need to be spread across multiple projects. This work, coupled with the successful implementation of the LED street-lighting projects, will provide a roadmap for the transformational implementation of energy-efficient street lighting for Brazilian municipalities nationwide.

RELATED ACTIVITIES

2014: BRAZIL: Financing Options for Municipal Energy Efficiency Projects in the City of Rio de Janeiro, \$69,685

¹ Estimations of power demand based on World Bank Data from 2011: <http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC> Accessed July 13, 2015.