



BEST PRACTICE BRIEF
JANUARY 2021

ARGENTINIAN CITIES SHIFT TO EFFICIENT STREET LIGHTING: An Innovative Business Model and International Assistance to Replicate Success

1. Street lighting: huge opportunity, multiple benefits, but challenging in practice

Electric street lighting has been a feature of urban settlement since the end of the nineteenth century and in many ways acts to define the modern city. As economies grow and populations expand the demand for lighting increases and the street lighting market is growing globally. Street lighting is a key to the health and well-being of citizens for reasons of safety and it ensures smooth and safe traffic flows and the overall quality of life, in addition to its potential role in the shift to smart cities (Wi-Fi connectivity, electrification for other services such as electric vehicles).

Worldwide, there were around 320 million street-lighting poles in 2019,¹ and street lighting can represent up to 40% of municipal electricity bills.² Available lighting solutions, such as the switch to more intelligent, energy-efficient light-emitting diodes (LED), can help developing and emerging economies achieve annual electricity savings of 40% to 60% and be a simple yet effective way of pursuing GHG emissions mitigation. Moreover, LED prices have seen rapid declines in recent years. For instance, the price of LED lighting on the US market has fallen 59%, from 1.7 US\$/kilolumen in 2014 to 0.7 US\$/kilolumen

¹ "The Evolution of Street Lighting Market", Arthur D. Little, October 2019.

² "Global Smart Street Lighting & Smart Cities: Market Forecast (2019-2028)", from <https://www.researchandmarkets.com/reports/4849803/global-smart-street-lighting-and-smart-cities>

in 2017, making the switching to LED lighting a global trend.³ Because of falling LED costs and quality improvements, payback periods can be less than three years of the initial investment in lamp replacement. Incorporating higher performance, controls and efficiency into existing and planned lighting infrastructure can lead to cost savings and improvements to service quality, as well as contributing to the expansion of lighting access at low or zero additional cost and electricity consumption.

Despite the multiple benefits of modern high-performance LED street lighting, as of today average LED penetration globally is still below 15 per cent. The street lighting market is driven by several factors, among which are regulatory policies, LED prices and the culture and morphology of each area, meaning that countries and municipalities differ greatly in LED penetration and business models. For instance, South America has an average rate below 5 per cent compared to Japan or Canada, where rates are around 45-50 per cent.⁴ Differences in LED penetration also exist within the same country: some big cities have already reached a 100 per cent switch to LEDs, while smaller ones are still struggling, mainly due to financial, know-how and capacity barriers.

The above observations also apply to Argentina in South America. In 2019 the capital, the Autonomous City of Buenos Aires, completed the transformation of street lighting to LED. Meanwhile, the majority of smaller cities across the country still mainly rely on old and expensive lighting technologies, such as mercury vapor, high-pressure sodium, compact fluorescent lighting (CFL) or metal halide, as their primary lighting sources.



LED lighting penetration might differ a lot within the same region in a country. This picture shows the significant lighting difference between Buenos Aires city and the surrounding neighbourhoods.

2. Some Argentinian cities, with international support, have found an innovative solution for replacing street lighting

To address common challenges in accessing funding for retrofitting street lighting, a group of small and medium-size cities have come together in their search for a solution. In November 2020, the first delivery of modern LED lamps for street lighting marked a milestone in their implementation. With financial contributions from nine municipalities, these cities have established an Extraordinary Fund of US\$ 121,000 and purchased 652 modern LED lamps. Some of the cities included in this group, such as Centeno, Rauch, Arequito and Villa Eloísa, are small, with just 3,000 to 15,000 inhabitants.



The LED street lights start to arrive in the nine municipalities that made a bundled purchase through an innovative business model.

The first delivery aims at illustrating the robustness of the business model and the transformative changes in retrofitting municipal street lighting. Based on international technical support, the Argentinian Network of Municipalities against Climate Change (RAMCC) has created a fund, with detailed rules and responsibilities to attract financing and roll out the retrofitting of street lighting to its more than two hundred member municipalities.

2.1 The RAMCC Trust Fund

The RAMCC brings together more than two hundred municipalities and acts as an instrument to promote local public policies and coordinate climate change actions. The RAMCC Trust Fund was created bottom-up by nine mayors of RAMCC cities in December 2019. Its main objective is to accelerate investments by removing the legal, financial, and technical barriers that local governments face in accessing climate finance in order to be able to implement the adaptation and mitigation measures in their Sustainable Energy and Climate Action Plans (SECAPs). These collaborations and funding mechanisms are particularly important for small and medium-size cities.

³ "The Evolution of Street Lighting Market," Arthur D. Little, October 2019.

⁴ "The Evolution of Street Lighting Market," Arthur D. Little, October 2019.

The Trust Fund provides RAMCC with an independent and transparent body to administer the funds it receives from its member municipalities (Extraordinary Contribution) and/or third parties (Third-Party Contribution). It demonstrates a high degree of replicability and scaling-up, as it can pool funds (own resources, loans, and grants) to implement a variety of climate measures involving a flexible number of local governments.

The decision-making body of the Trust Fund is the Mayors' Council, formed by, at most, twenty representatives of the municipalities elected during the Ordinary Assembly of Trustors. It makes the critical decisions and approves budgets, internal policies, and applications from new members. The Executive Secretary of RAMCC is responsible for obtaining resources and contributions from third parties and providing support to develop projects and programmes. Lastly, the Trust Fund has a trustee (Banco Municipal de Rosario Mandatos y Negocios S.A) to manage the available funds, based on the decisions of the Mayors' Council and the Executive Secretary.

Through an ordinance passed by the City Council, mayors sign a contract through which municipalities become trustors and beneficiaries. Municipalities provide an initial contribution and commit to providing an annual contribution to maintain the fund, which must be approved in their annual budget. Moreover, every two years they are required to develop and present to the Executive Secretary an updated version of the SECAPs.

All the liabilities of the Trust Fund are met only from its assets. Neither the trustee nor the trustors are obliged to face or guarantee the payments with their funds.

On the other hand, all goods and services purchased through the Trust Fund must be compliant with the Trust Fund's Procurement Policy, which aims at prioritising suppliers committed to sustainability when the prices and terms of payment are similar among multiple suppliers. It integrates the environmental, social, and economic aspects with the technical features and adopts fundamental principles, best practices and international standards that promote, develop, and manage sustainable procurement proceedings.

The sustainable procurement principles with which all projects implemented by the Trust Fund must comply are:

A. Value for money, which implies maximising the benefits obtained for the money invested through an effective, efficient, and economical use of resources.

- B. Fit for purpose, which means complying with the objectives and results of the purchase, having due regard to the context and the risk, value, nature, and complexity of the acquisition.
- C. Integration of environmental, social, and economic dimensions.
- D. Transparency, publicising, and dissemination.
- E. Ethics, according to Integrity Principles.
- F. The arm's-length principle, by means of which offers, interested parties and suppliers are free to present offers and be treated equally.
- G. Efficiency to achieve the expected result, taking into account the price, quality and suitability of offers, in light of the needs, context, size, nature and complexity of the purchase.
- H. Innovation to promote sustainable results along the supply chain
- I. Continual improvements to be made to both the internal process and the supply chain of suppliers and interested parties.

2.2 International support behind the efforts

International technical assistance to RAMCC in providing more energy-efficient lighting first started in 2018, with the collection of data and street lighting assessments developed by United for Efficiency (U4E) for 38 Argentinian municipalities. The assessment gave several small cities a better understanding of their existing lighting infrastructure and the energy efficiency savings and performance improvements associated with transforming their existing street lighting into new digital LED street lighting. This pre-feasibility study was the cornerstone of additional energy-efficient related activities.



MoU signing by Peter Skotner (Deputy Director of UNEP DTU Partnership) and Mr Ricardo Bertolino of Asociación Civil Red de Acción Climática (ACRAC) took place during the Danish State visit to Argentina, in the presence of His Royal Highness Crown Prince Frederik of Denmark as well as Mr Nicolás Dujovne, the then Argentinian Minister for Finance.

Note: C2E2 is part of the UNEP DTU Partnership, while RAMCC is part of ACRAC.

The RAMCC members' interests and difficulties in accessing funding to retrofit their street lighting efficiency attracted the attention of the Copenhagen Centre on Energy Efficiency (C2E2)' SEforALL Energy Efficiency Hub. In March 2019, C2E2 signed an agreement with RAMCC to provide support to local energy efficiency projects, including the development of large-scale public lighting projects, light bulb replacement programs and associated support materials for energy-efficient systems.



**RED ARGENTINA DE
MUNICIPIOS FRENTE AL
CAMBIO CLIMÁTICO**

RAMCC is a civil association that gathers, currently, 225 Argentinian municipalities located in 18 provinces, with the main goal of implementing climate projects and policies, through the mobilisation of local, national, and international resources. RAMCC enhances the multiple environmental, productive, geographical, and demographic contexts involved, highlighting the "bottom-up" approach that allows local governments to identify the needs of citizens and translate them into endogenous projects. By integrating global targets in local development, municipalities gain increased access to partnerships, finance, and technical support for achieving the desired outcomes. For more information, please visit www.ramcc.net.

In March 2020, a three-day regional capacity-building workshop was held, the first of its kind to target energy efficiency and financing for Latin American municipalities. The event was hosted in Buenos Aires and jointly organized by C2E2, RAMCC, and the Friedrich Ebert Foundation. The event brought together more than sixty mayors and municipalities from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Peru, Paraguay and Uruguay. It consisted of presentations from the Counselor of the Danish Embassy in Buenos Aires, financial

institutions (BID, CAF, World Bank), United for Efficiency and the Copenhagen Center on Energy Efficiency. At the workshop, national authorities across the region exchanged best practices on energy efficiency initiatives, shared experiences of local energy efficiency projects, discussed viable models of implementation for sustainable energy use in cities, and worked on planning possible future collaborative projects.

As a result of the collaboration, an administrative trust fund was established, a direct outcome of the 'project bundling'/'bulk procurement' business model promoted by C2E2. The model effectively scales up the installation of energy efficiency measures in small cities, allowing municipalities across Argentina to combine their procurement, financing and investment in a single bundled project. Without the bundle, it was unfeasible for each municipality to replace its street lighting individually because the small investment size and lack of necessary credit ratings of some municipalities deprive them of access to financing. The bundling solution enhances economies of scale and reduces transaction costs and project risks.

3. The resources and technical support from U4E and the C2E2

LED street lighting is a cost-effective technical solution for saving energy, reducing the energy expenses of municipalities, improving lighting quality and urban safety, and reducing GHG emissions. To effectively help developing and emerging economies tap the opportunity to introduce LED street lighting, C2E2 has selected street lighting as one of its core technical areas in its effort to scale up energy efficiency implementation in cities. C2E2 and the United Nations Environment Program (UNEP) initiative *United for Efficiency (U4E)* have partnered to develop a set of resources and capacity-building program. The resources include tools for street lighting assessments and financing, a sourcebook on energy efficiency project



The Regional Workshop on Energy Efficiency in Latin American Municipalities, took place in Buenos Aires from 10-12 March 2020, with more than sixty attendees from across Latin America.

bundling, and guidelines for sustainable public procurement. Moreover, both online and in-person training is offered on these resources.

1) Tool for Street Lighting Assessments

The *Online Assessment Tool* can support estimation and analysis of the potential energy and CO₂ savings, as well as providing a straightforward cost-benefit overview for any locality, city or country based on their current street lighting technologies.

The tool quantifies the energy, financial and climate-saving potentials for moving away from existing inefficient street lighting technologies to intelligently controlled and efficient LED systems. It aims to provide local govern-

ment decision-makers with a detailed understanding of the specific savings and financial opportunities in their municipalities and cities. The tool has been designed as a self-assessment savings tool and is available online for municipalities to complete a number of key local data inputs on the current status of their locality or city public lighting system. A straightforward and short report on the assessment results (available in different languages) is automatically generated after data input and can be downloaded. The report includes annual electricity and financial savings and CO₂ emissions reductions from the conversion to modern, higher performance, lower maintenance, energy-efficient LED technology, as well as the estimated investment cost and payback period. The results are given in graphics: the figures below give an example of the first input page and the results report.

STREET LIGHTING Energy efficiency calculator

BASIC INFORMATION

First name: _____ Surname: _____
 Job title: _____ E-mail: _____
 Location: _____
 Population of the city: _____ Average of sun light hours/year in the country: _____
 Price of electricity (USD/kWh): _____ Year of data submission: _____

OUTDOOR LIGHTING STOCK AND TECHNOLOGY

Name of technology	Lamp power (Watts)	Stock of fixtures (Number)	Local cost of lamp (USD/lamp)
Mercury Vapour	Choose Watts	Add stock	Add cost
Metal Halide	Choose Watts	Add stock	Add cost
High Pressure Sodium	Choose Watts	Add stock	Add cost
Compact Fluorescent Lamp (CFL)	Choose Watts	Add stock	Add cost
Incandescent	Choose Watts	Add stock	Add cost
LED	Add Watt	Add stock	Add cost

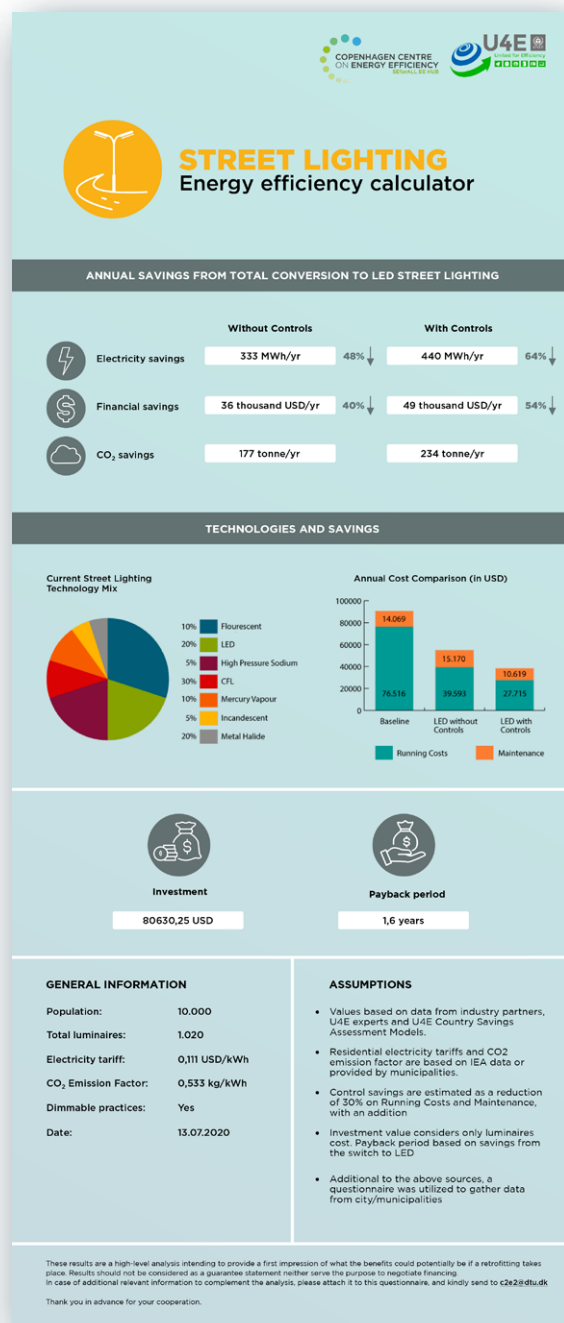
DIMMING PRACTICES FOR STREET LIGHTING

What is the percentage (%) of lamps dimmed: _____ For how many hours a year is the lighting dimmed: _____
 What is the reduction (%) of light output when dimmed: _____

RUNNING COST AND MAINTENANCE

Average number of fixtures replaced (or % if known) per year: _____
 Average cost of man labour (USD/hour): _____
 Average cost of equipment (USD/hour): _____

Are there any other remarks you would like to make about your outdoor street lighting installations?
 Yes, I would like to view my results.

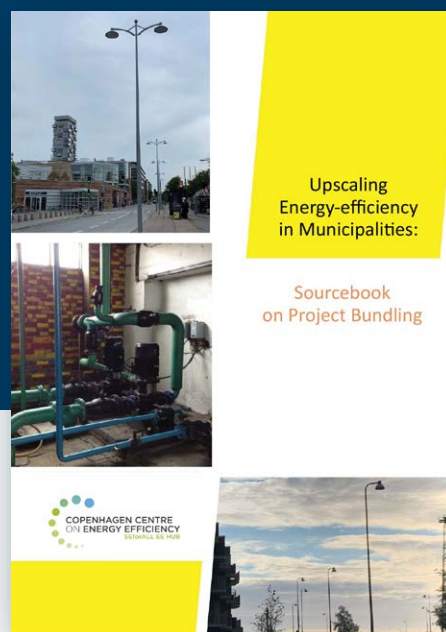


2) Street Lighting Financing Tool

The Copenhagen Centre on Energy Efficiency (C2E2) has developed the Street Lighting Financial Tool (SLFT) under the framework of the best-practice deliverables of public lighting led by the Institute for Climate Protection, Energy and Mobility (IKEM). It is in this context that C2E2 has developed an SLFT aiming to improve municipalities' decision-making processes so they choose the most suitable financial scheme for upgrading their street lighting infrastructure.

The SLFT provides the following functionalities:

- The tool recommends the most suitable financial instrument based on the project, the municipality and the country's characteristics
- Users are guided through the questions with explanations of the different financial instruments and some case studies
- A final report is provided giving the user an overview of the best financial scheme for their case, with the option of exporting it as a PDF.



3) Project bundling sourcebook

EE projects proposed by municipalities are often small and therefore not appealing to financiers. This results in projects not being implemented. Combining projects or elements of projects into a single project or portfolio of projects with the aim of achieving economies of scale could be a significant contribution to scaling up EE initiatives. Components such as administration, tendering, contracting and procurement, project design, deliveries and others can be streamlined, which significantly increases efficiency and decreases transaction costs. The financial component can, in a similar way, be bundled, thus making the financing requirement larger and more attractive. Because of all these benefits, project bundling is an effective way to promote and enable investments in EE projects and thereby scale up project implementation.

The Sourcebook has been published in both English and Spanish and can be downloaded at the publication section of the C2E2 website <https://c2e2.unepdtu.org>. Moreover, the C2E2 experts have offered online training to Argentina (in Spanish) and Mozambique (in English) based on the contents of the Sourcebook. Recordings and presentations of the training sessions are available at the e-learning section of the Knowledge Management part of the C2E2 websites.

4) Guidance on Sustainable Public Procurement

Another important component of the international technical support to Argentinian cities for the shift to efficient street lighting is Sustainable Public Procurement (SPP) practices. SPP practices are able to transform markets by leveraging the power of public purchases to drive markets towards sustainability, thus reducing governments' environmental footprints and contributing to achieving considerable GHG emissions reductions while at the same time creating significant financial savings for state and semi-state entities. Stimulating SPP can help gear government spending towards sustainability, but it also can foster private-sector and changes to consumer behavior, enabling the overall transition to a green, sustainable economy.

Currently, SPP is not sufficiently embedded in sectoral policies or overarching sustainable development strategies, resulting in a lack of market readiness and response capacity from governments in purchasing sustainable and green products and service alternatives. Acting on this premise, U4E has developed a set of Technical Guidelines and Specifications for Sustainable Public Procurement as a key strategic instrument to provide an array of technical specifications for countries. The requirements for procuring more energy-efficient outdoor and indoor lighting products are included and thus complement and strengthen national and local governments' efforts for market transformation towards more energy-efficient, higher performance, low maintenance LED lighting. The U4E SPP guide includes a step-by-step approach on how to apply current best technical criteria for the selected products in accordance with the best international regulatory, social and environmental practices. It also introduces the rationale to be adopted by procurement practitioners, technical staff and related officers when selecting a set of LED products, system designs and services.

The new 2020 suite of higher performance LED street lighting tools and resources is built on a myriad of experiences from U4E and C2E2 across the existing worldwide country and regional projects. They aim at achieving greater and faster knowledge transfers to governments and local stakeholders to help them adapt the relevant parts for their own use and to increase energy efficiency savings, thus achieving the energy transition and meeting the climate change goals at the same time.



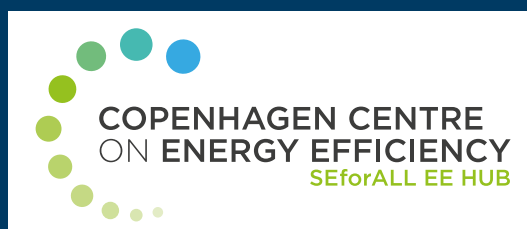
United for Efficiency (U4E) is a global initiative led by UN Environment (UNEP), funded by the Global Environment Facility (GEF), and supported by leading companies, expert organisations and public entities with a shared interest in transforming global markets for lighting, appliances and equipment, saving all electricity consumers, including government, \$ Billions at the same time.

To learn more about U4E's work and to download the "U4E Technical Guideline and Specifications for the Public/Green Procurement of Energy Efficiency Lighting" among other multiple tools and resources (Policy Guides, Model Regulations and Country Savings Assessments), please visit

www.united4efficiency.org

For more information, please contact:

u4e@un.org



The Copenhagen Centre on Energy Efficiency

functions as the global thematic Energy Efficiency Hub of Sustainable Energy for All (SEforALL), and accordingly works directly to support the SEforALL objective of doubling the global rate of improvement in energy efficiency by 2030.

The Copenhagen Centre fulfills its mission through:

- assisting policy change in countries and cities, with knowledge, insights and technical support
- accelerating action through innovation in project development and finance
- raising the profile of energy efficiency by communicating success stories and supporting outreach.

For more information, please visit

www.energyefficiencycentre.org or contact us at c2e2@dtu.dk.

Visit Copenhagen Centre's Knowledge Management System at kms.energyefficiencycentre.org

The Copenhagen Centre on Energy Efficiency is institutionally part of UNEP DTU Partnership (UDP). UDP is a UN Environment Collaborating Centre and a leading international research and advisory institution on energy, climate and sustainable development.