

Technical & Economic Assessment of Mercury-Free Lighting: Latin America & the Caribbean Region

Latin America and Caribbean Region

If a 2025 LFL phase out date is negotiated and adopted at Minamata COP5– reflecting the position of the Clean Lighting Coalition – it would avoid the sale of 913 million linear fluorescent lamps in the Latin America and Caribbean Region, and result the following cumulative benefits (2025-2050):

1. avoid **6.9 metric tons** of mercury pollution from leaking into the environment.
2. avoid **190 million tons of CO2** emissions.
3. save approximately **860 TWh of the region's total electricity consumption** and
4. save **\$137 billion USD**

The data above reflects the benefits of a global fluorescent phase-out to all countries in Latin America and the Caribbean Region, not just parties to the Minamata Convention on Mercury and based on CLASP's MEPSy model¹

Lighting Market Overview

The LAC region is a net importer of fluorescent lamps, with nearly no manufacturing of fluorescent lighting. Most existing regional CFL manufacturers have already transitioned to produce LEDs.

Furthermore, there are over 45 LED manufacturing and assembly companies present in several countries across the region, accounting for an important share of the LAC LED market. These companies include:

1. **Argentina** – Lutron, Indular, LedScene, I-LED, Cosmel
2. **Brazil** – City Lumi, DirectLight, Fortlight, Prolumi
3. **Chile** – SERI, Megabright, EGLO
4. **Colombia** – Distecsa, Roy Alpha, EFEL, Sylvania
5. **Costa Rica** – Sylvania
6. **Honduras** – Equipos Industriales, Lumiart, Larach
7. **Mexico** – LED Mexico, LEDLAB, The LED Shop, LJ Iluminación, New Light, Forlighting, Assic Maquiladora
8. **Peru** – Kranzz, Portalamparas, LED Design, Lumicenter, Inkalux
9. **Uruguay** – Tarmax, Imtran
10. **Venezuela** – TEDAS, Obralux

¹ <https://clasp.shinyapps.io/mepsy/>

A complete phase-out of fluorescents in this region would further encourage domestic LED industry growth. This move would stimulate economic growth, generate employment opportunities, mitigate toxic mercury pollution, and reduce reliance on lighting imports.

The Clean Lighting Coalition developed a dashboard that provides a global overview of LED lighting technology manufacturers available by country². The figure below shows the current LED manufacturing and assembly in Latin America and the Caribbean.

[Global LED Manufacturer Map](#)



² The interactive map is [here](#)

Comparing Costs: LEDs vs LFL

LED lamps are more expensive than the fluorescent lamp on a first-cost basis, but payback for themselves quickly, 2.9 months and 5.1 months respectively for T8s and T12s. The map below provides an inventory of the average payback periods across different countries in the region for T8s.

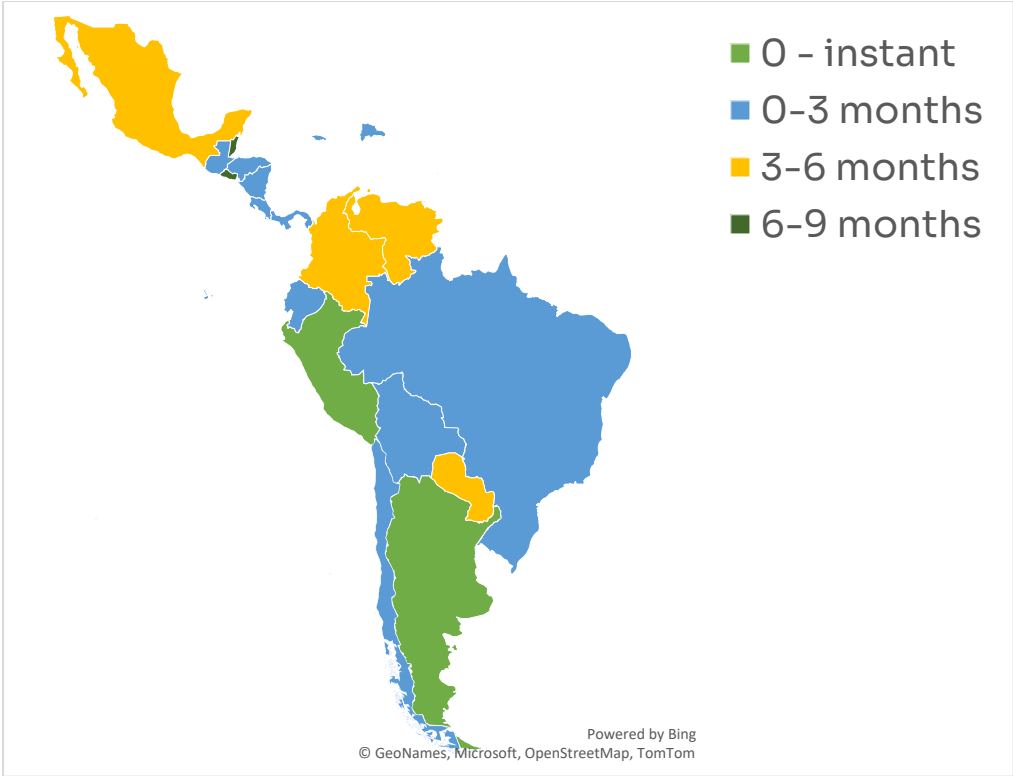


Figure 1 LED T8 Payback Periods in Assessed Countries

Additionally, the LED lamp consumes half as much power as fluorescents – so electricity bills are halved over the lamp lifetime. Finally, on average, LAC consumers save 50% on lifecycle costs when they replace LFLs with LEDs. Figure 2 summarizes the cost savings for LED T8s. The graph below details this further

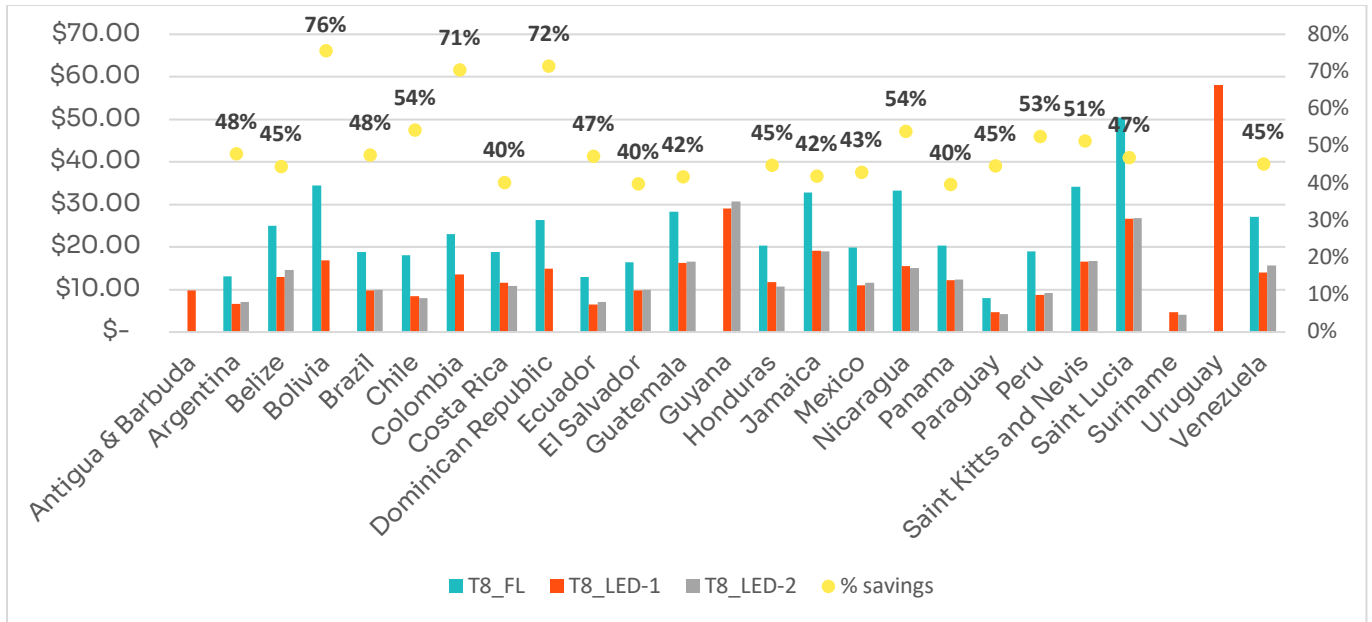


Figure 2 Lifecycle Savings of LEDs over Fluorescents

Tables 1 and 2 provide comparative information about the cost of light for LFL vs LED lamps across countries in the region.

Table 1 True Cost of Light: T8 Lamps

	LFL PRICE	LED PRICE	PAYBACK PERIOD	ANNUAL ENERGY SAVINGS WITH LED
Antigua & Barbuda		XCD 19.25 (US\$7.13)		
Argentina	ARS 880 (US\$6.74)	ARS 740 (US\$5.67)	instantaneous	ARS 768.69 (US\$5.88)
Belize	BZD 2.3 (US\$1.15)	BZD 15 (US\$7.5)	6.3 months	BZD 24.24 (US\$12.12)
Bolivia	BOB 10 (US\$1.45)	BOB 12 (US\$1.74)	0.2 months	BOB 114.71 (US\$16.6)
Brazil	BRL 19.9 (US\$3.86)	BRL 29.97 (US\$5.81)	2.8 months	BRL 43.16 (US\$8.37)
Chile	CLP 2990 (US\$3.42)	CLP 3550 (US\$4.06)	0.8 months	CLP 8278.2 (US\$9.48)

Colombia	COP 2400 (US\$0.56)	COP 17800 (US\$4.18)	4.3 months	COP 42678.72 (US\$10.03)
Costa Rica	CRC 1830.6 (US\$2.83)	CRC 2900 (US\$4.48)	2.5 months	CRC 5101.21 (US\$7.88)
Dominican Republic	DOP 120 (US\$2.18)	DOP 186.04 (US\$3.37)	1.3 months	DOP 617.65 (US\$11.2)
Ecuador	USD 1.39 (US\$1.39)	USD 1.76 (US\$1.76)	0.8 months	USD 5.49 (US\$5.49)
El Salvador	SVC 1.45 (US\$1.45)	SVC 5.31 (US\$5.31)	6.6 months	SVC 7.01 (US\$7.01)
Guatemala	GTQ 15.23 (US\$1.97)	GTQ 24 (US\$3.1)	1.1 months	GTQ 94.74 (US\$12.22)
Guyana		GYD 1500 (US\$9.78)		
Honduras	HNL 28.49 (US\$1.16)	HNL 78.07 (US\$3.19)	2.4 months	HNL 245.64 (US\$10.03)
Jamaica	JMD 810 (US\$5.28)	JMD 1173.33 (US\$7.65)	2.1 months	JMD 2031.84 (US\$13.24)
Mexico	MXN 60 (US\$2.98)	MXN 144 (US\$7.15)	5.2 months	MXN 194.47 (US\$9.66)
Nicaragua	NIO 60 (US\$1.67)	NIO 95 (US\$2.65)	0.7 months	NIO 645.38 (US\$17.99)
Panama	PAB 1.39 (US\$1.39)	PAB 3.2 (US\$3.2)	2.5 months	PAB 8.78 (US\$8.78)
Paraguay	PYG 9000 (US\$1.29)	PYG 18000 (US\$2.58)	4 months	PYG 26671.77 (US\$3.82)
Peru	PEN 8.53 (US\$2.22)	PEN 7.69 (US\$2)	instantaneous	PEN 39.75 (US\$10.35)
Saint Kitts and Nevis	XCD 19.5 (US\$7.22)	XCD 30 (US\$11.11)	3 months	XCD 41.39 (US\$15.33)
Saint Lucia	XCD 10.44 (US\$3.87)	XCD 36 (US\$13.33)	4.6 months	XCD 66.28 (US\$24.55)
Suriname	*Fluorescent tubes were not available in the market	SRD 136 (US\$5.5)	*Fluorescent tubes were not available in the market	
Uruguay	*Fluorescent tubes were not available in the market	UYU 199 (US\$4.83)	*Fluorescent tubes were not available in the market	
Venezuela	VES 1.2 (US\$1.2)	VES 5 (US\$5)	3.4 months	VES 13.3 (US\$13.3)

Table 2 True Cost of Light: T12 Lamps

	LFL PRICE	LED PRICE	PAYBACK PERIOD	ANNUAL ENERGY SAVINGS WITH LED
Antigua & Barbuda	XCD 15 (US\$5.56)	XCD 19.25 (US\$7.13)	2 months	XCD 25.87 (US\$9.58)
Argentina	ARS 1372 (US\$10.5)	ARS 740 (US\$5.67)	instantaneous	ARS 939.51 (US\$7.19)
Belize	BZD 4.08 (US\$2.04)	BZD 15 (US\$7.5)	4.4 months	BZD 29.63 (US\$14.82)
Bolivia	BOB 19 (US\$2.75)	BOB 18 (US\$2.6)	instantaneous	BOB 127.46 (US\$18.45)
Costa Rica	CRC 4538 (US\$7.01)	CRC 2,900 (US\$4.48)	instantaneous	CRC 8,016 (US\$12.39)
Ecuador	USD 5.55 (US\$5.55)	USD 11.12 (US\$11.12)	7.8 months	USD 8.57 (US\$8.57)
El Salvador	SVC 10.9 (US\$10.9)	SVC 21.7 (US\$21.7)	8.3 months	SVC 15.52 (US\$15.52)
Guatemala	GTQ 11.63 (US\$1.5)	GTQ 26.46 (US\$3.41)	1.2 months	GTQ 148.88 (US\$19.21)
Guyana	GYD 700 (US\$4.56)	GYD 1500 (US\$9.78)	2.7 months	GYD 3613.5 (US\$23.55)
Honduras	HNL 73.85 (US\$3.02)	HNL 78.07 (US\$3.19)	0.1 months	HNL 676 (US\$27.61)
Jamaica	JMD 951.63 (US\$6.2)	JMD 2586 (US\$16.85)	6.1 months	JMD 3192.89 (US\$20.81)
Mexico	MXN 176 (US\$8.74)	MXN 303 (US\$15.05)	7 months	MXN 218.78 (US\$10.87)
Nicaragua	NIO 84 (US\$2.34)	NIO 95 (US\$2.65)	0.2 months	NIO 645 (US\$17.98)
Panama	PAB 1.29 (US\$1.29)	PAB 11.12 (US\$11.12)	7.5 months	PAB 15.69 (US\$15.69)
Paraguay	PYG 9500 (US\$1.36)	PYG 22000 (US\$3.15)	5.1 months	PYG 29635.3 (US\$4.24)
Saint Kitts and Nevis	XCD 25 (US\$9.26)	XCD 43.5 (US\$16.11)	4.8 months	XCD 45.99 (US\$17.03)
Saint Lucia	XCD 7.65 (US\$2.83)	XCD 39.55 (US\$14.65)	4.7 months	XCD 81.01 (US\$30.01)

Suriname	*Fluorescent tubes were not available in the market	SRD 150 (US\$6.07)	*Fluorescent tubes were not available in the market	
Uruguay	*Fluorescent tubes were not available in the market	UYU 400 (US\$9.72)	*Fluorescent tubes were not available in the market	

The displayed prices in columns 1-2 were recorded in retail stores and on-line shops in each country. Columns 3-4 illustrate the benefits associated with switching to mercury-free LED technology. The Payback Period column shows the amount of time needed for the energy savings from the LED lamp to pay for its higher cost. If the LED is less expensive than the fluorescent lamp, then the payback is 'instantaneous'. The column labelled 'energy savings with LED' indicates the savings on energy bills over the lifetime of the LED lamp. The tables also detail comparative cost across countries. Please note that the value in brackets is the equivalent cost in US\$.

Energy Efficiency Comparison

The energy efficiency of a light bulb is measured in lumens/watt. The graphic below depicts the ranges of energy efficiency of different types of bulbs available across Latin America and Caribbean markets. It represents efficiency quartiles (0%, 25%, 50%, 75%, 100%) of the data we collected when sorted from lowest to highest efficiency. The box with numbers represents the 25th-75th quartile while the thin lines with the dots represent the lowest and highest efficiency per technology on either end.

The average efficacy of the LED lamps is markedly higher than that of the fluorescent pairs, 96lm/W against 75lm/W.

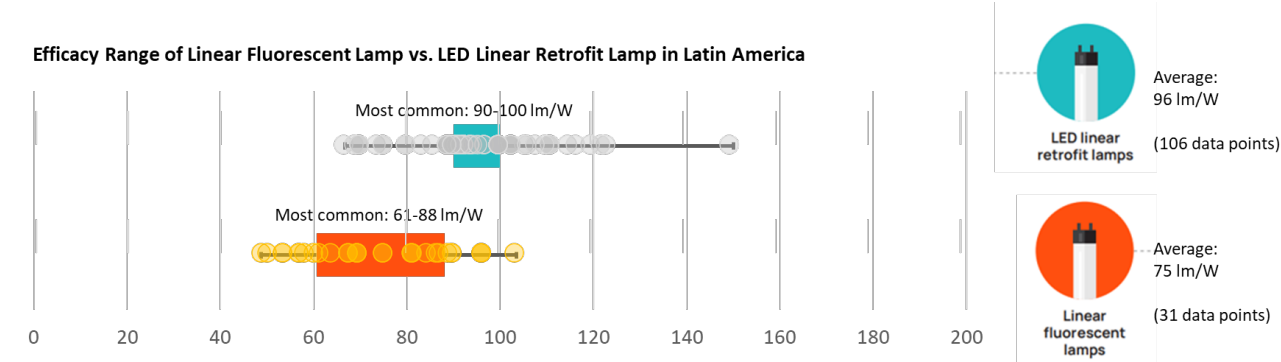


Figure 3 Efficacy Comparison Between LEDs and Fluorescents

Lighting Policy & Legislative Landscape

Many countries in the region are shifting towards LED only markets through energy efficiency policy and/or mercury regulation. Some of the notable regulations include:

1. **Chile** - [Updated MEPS for general lighting](#), to phase out inefficient lamps: 40 lm/W by 2021, 70 lm/W by 2023, 85 lm/W by 2025. Shifts market to LED by 2023.
2. **Uruguay** - [Decree No. 15/019](#). Since 2020, it prohibits fluorescent lamps unless the manufacturer/importer presents and implements a comprehensive end-of-life management plan. Practically shifted market to LED since 2020.
3. **Argentina** - [Efficient Lighting Plan \(PLAE\)](#) will replace existing luminaires in public lighting by LED technology.

Compatibility/Retrofits for LED lamps

In all LAC markets where data was collected, LED retrofits were easily available for fluorescent lamps. This availability confirms that in nearly all cases, rewiring of old lighting fixtures will not be necessary. In the few cases (6 to 9%) where the LED lamps available in the market are not compatible with the fixtures, the ballast can be 'by-passed' with mains voltage at the sockets, so that the fixture can remain in place.

End of Life Management for Lighting

Collection and safe recycling/disposal of fluorescent lamps is difficult – especially in regions with low levels of general e-waste collection and processing. Various countries across the region have e-waste or mercury waste regulations, including Uruguay, Mexico, and Colombia. Where mercury treatment facilities do exist in the region, there are still important awareness, logistics and infrastructure challenges that limit the region's ability to sustainably manage mercury-containing lamps at their end-of-life.

The few fluorescent lamp recycling programs that do exist usually focus on commercial users, rather than residential. A few companies and non-governmental organizations, such as Alianza Contaminación Cero in Panama, are working on

awareness-raising campaigns and encouraging governments to bolster fluorescent lamp recycling programs. Some businesses have lamp collection programs in place. UN agencies have supported several governments in the region in the development mercury inventories and sound end-of-life policy proposals, such as the [mercury emissions inventory in Costa Rica](#), supported by UNDP/GEF, and the [mercury emissions inventory in Panama](#), supported by UNEP. Despite these efforts, the regional share of sound end-of-life management of electronic waste (including fluorescent lamps) is estimated at 2.7%, according to a UNIDO- GEF report [published in 2023](#).

Accelerating the transition to LEDs would turn off the mercury tap – eliminating hazardous waste and mercury contents from new lighting imported to developing and lower-income countries. The proposed African Lighting Amendment would more quickly remove toxic fluorescent e-waste from the LAC market, mitigating environmental pollution and public health safety concerns.

ANNEX OF COUNTRY LEVEL DATA

Argentina



Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Argentina

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	59,400,000	53,600,000	48,200,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	446	402	361	kg of mercury
National electricity savings	56	51	46	TWh of electricity
National financial savings from avoided electricity use	8.7	8.0	7.2	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	16.0	14.5	13.0	Mt CO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- Resolution 71/2019 established the need for Prior Informed Consent for the import and export of products with added mercury.
- Resolution 75/2019 prohibited the production, import, and export of products with mercury as of January 1, 2020, as specified in the Minamata Convention Annex A. This includes compact fluorescent lamps ≤ 30 W with more than 5 mg of mercury, triband phosphor linear fluorescent lamps < 60 W with more than 5 mg of mercury, halophosphate phosphor lamps ≤ 40 W with more than 10 mg of mercury, high-pressure mercury vapor lamps, and cold cathode fluorescent as specified in Annex A.
- The Efficient Lighting Plan (*Plan de Alumbrado Eficiente* – PLAE) promotes replacing public lighting with LED technology. Incorporating this higher-efficiency technology can result in up to 50% energy savings over current consumption (IRAM AADL J 2022-2). PLAE beneficiaries are offered non-refundable contributions to make LED technology replacements in public lighting systems throughout the country’s provinces and/or municipalities that meet the requirements and criteria established in the [General Regulations](#), including:
 - potential for energy savings and/or efficiency
 - adequate infrastructure or adequacy capacity
 - ability to execute the work in a timely manner, and
 - speed of execution of work

Map of LED Companies in Argentina

Argentina

Country Profile

Download Country Profile

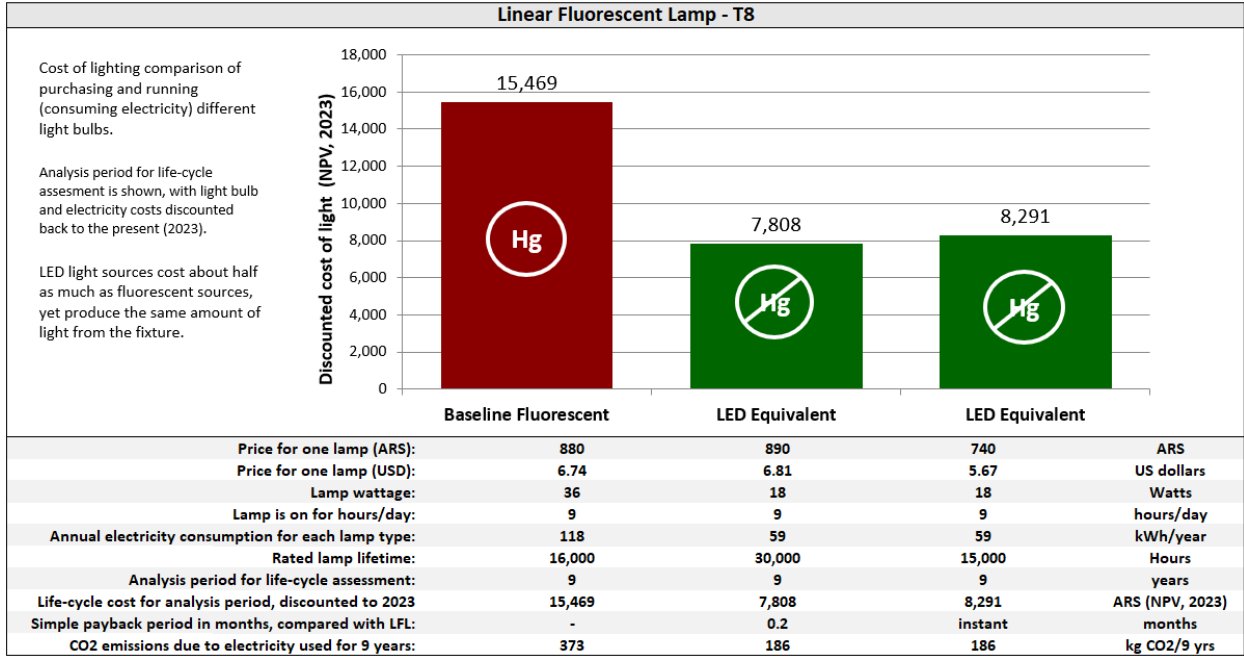
of Companies: 5
Mercury Savings (2025): 446 kg
Financial Savings (2025): 8.7 Billion USD
Energy Savings (2025): 56 TWh
CO2 Savings (2025): 16 Mt CO2

LED Manufacturers

Download Manufacturer Data

1. Lutron LED Lighting +
2. indular +
3. LedScene +
4. I-LED SA +
5. COSMEL Electronica +

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Argentina.

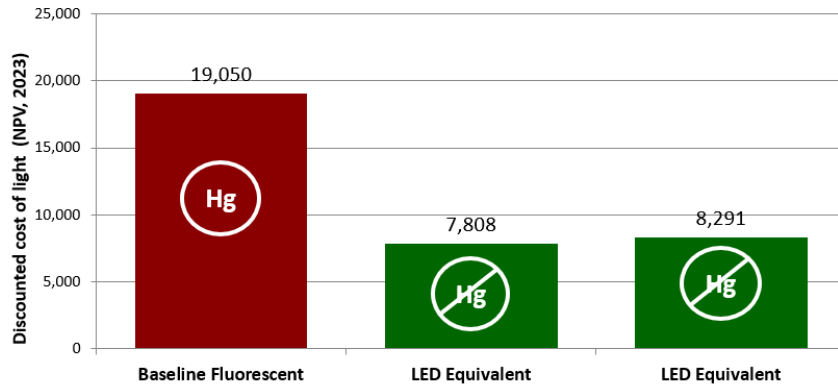


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (ARS):	1,372	890	740	ARS
Price for one lamp (USD):	10.50	6.81	5.67	US dollars
Lamp wattage:	40	18	18	Watts
Lamp is on for hours/day:	9	9	9	hours/day
Annual electricity consumption for each lamp type:	131	59	59	kWh/year
Rated lamp lifetime:	10,000	30,000	15,000	Hours
Analysis period for life-cycle assesment:	9	9	9	years
Life-cycle cost for analysis period, discounted to 2023	19,050	7,808	8,291	ARS (NPV, 2023)
Simple payback period in months, compared with LFL:	-	instant	instant	months
CO2 emissions due to electricity used for 9 years:	414	186	186	kg CO2/9 yrs

Antigua and Barbuda



National Policies, Regulations, and Initiatives Around Mercury and Lighting

- There are mandatory energy-efficiency labels and testing methods in place for LED lamps (IEC ABNS 62612:2013) and for CFLs (IEC ABNS 60969:2016).
- The Ministry of Energy, the Antigua Public Utility Authority, the Department of Environment, and the Environmental Awareness Group are all public sector actors with interests in the health of society and the ecosystem. They have supported initiatives to phase out mercury projects.
- The National Solid Waste Management Authority Act of 2005 was created to manage the distribution and pollution of solid waste in the country. This kind of waste includes biomedical, hazardous, and any litter.
- Zero Waste Antigua and Barbuda is working to reduce the use and importation of mercury and mercury products and to implement proper disposal methods and containers for these. The organization carried out its first project, Phase Down/Phase Out Mercury, with the aim of decreasing the amount of mercury on the islands by 10-20%. The project was executed from 2019 to 2021.
- The Mercury Phase-Out Program was implemented by the Marine Ecosystems Protected Area Trust, the Medical Association of Antigua and Barbuda, the Christian Union Church, and Zero Waste Antigua and Barbuda. It was supported by GEF/UNDP and raised awareness about mercury in fluorescent lamps, also placing lamp collection bins throughout the country. Through this program, an amount equivalent to 5% of the fluorescent lamps sold in the country each year were collected, destroyed, and contained.

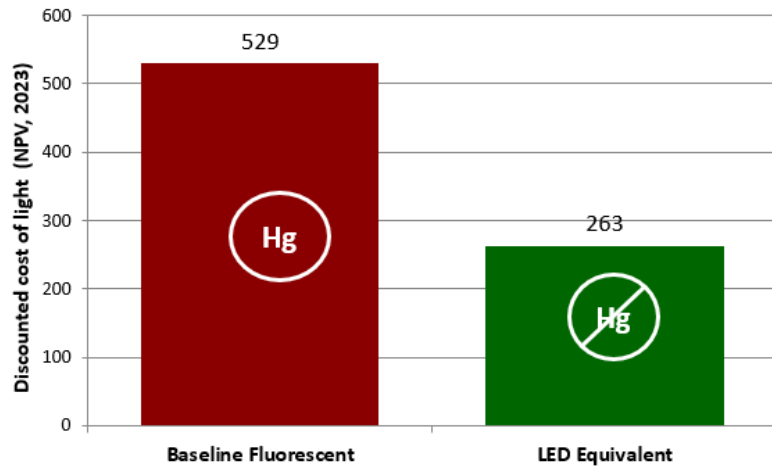
The following table compares the costs and benefits of fluorescent and LED lighting technologies in Antigua and Barbuda.

Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (XCD):	15	19	<i>XCD</i>
Price for one lamp (USD):	5.56	7.13	<i>US dollars</i>
Lamp wattage:	34	17	<i>Watts</i>
Lamp is on for hours/day:	9	9	<i>hours/day</i>
Annual electricity consumption for each lamp type:	112	54	<i>kWh/year</i>
Rated lamp lifetime:	20,000	50,000	<i>Hours</i>
Analysis period for life-cycle assessment:	10	10	<i>years</i>
Life-cycle cost for analysis period, discounted to 2023	529	263	<i>XCD (NPV, 2023)</i>
Simple Payback period in months, compared with LFL:	-	2.0	<i>months</i>
CO2 emissions due to electricity used for 15 years:	546	265	<i>kg CO2/10 yrs</i>

Belize



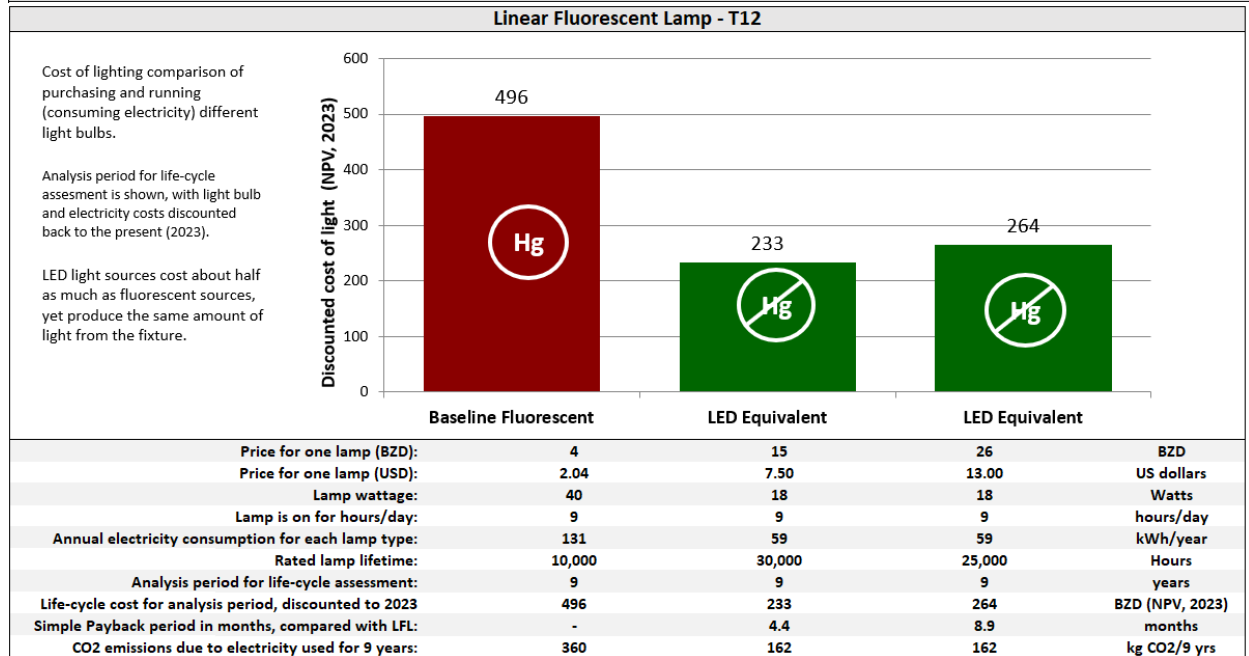
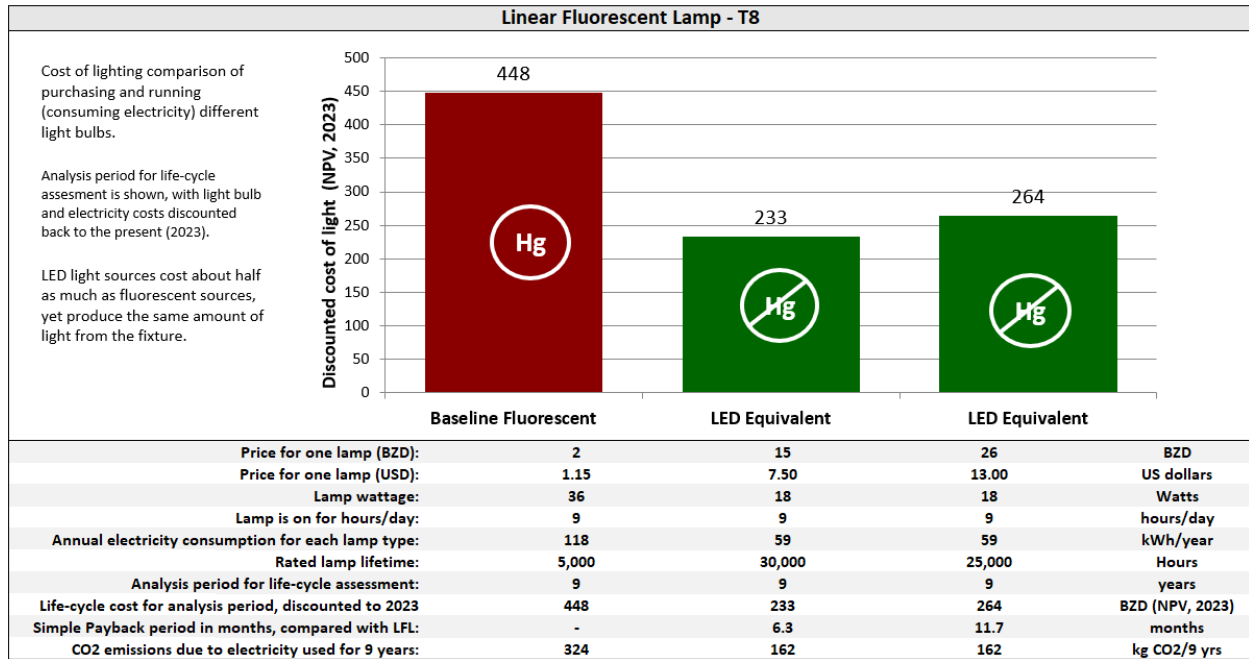
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Belize

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	544,000	499,000	455,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	4	4	3	kg of mercury
National electricity savings	0.51	0.47	0.43	TWh of electricity
National financial savings from avoided electricity use	0.13	0.12	0.11	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.12	0.11	0.10	Mt CO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2013, Belize was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed within the framework of Proyecto Mesoamerica and supported by the United Nations Environment Programme/Global Environment Facility (UNEP/GEF) en.lighten initiative (United for Efficiency).
- Energy efficiency is Belize's first priority, highlighted in the five pillars that constitute its Sustainable Energy Roadmap 2030. Within this framework, Belize is working to develop energy standards and labels for lighting and other appliances, with the support of the Organization of American States – Sustainable Energy Capacity Building Initiative (OAS-SECBI).
- The Energy Unit within the Ministry of Public Service, Energy, and Public Utilities – in collaboration with the electrical students of the Institute for Technical and Vocational Education and Training (ITVET) Stann Creek – carried out energy conservation measures by installing LED lights in public buildings. A total of 185 LED tubes were installed. The operating cost of fluorescent tubes over five years were calculated at \$55,302.91 USD. Comparatively, the operating costs of the LED replacements will amount to only \$27,651.46 USD over the same five-year period. This reflects a combined estimated savings of \$27,651.46 USD, accumulated over the next five years, for replacing the fluorescent tubes with LEDs.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Belize.





Bolivia

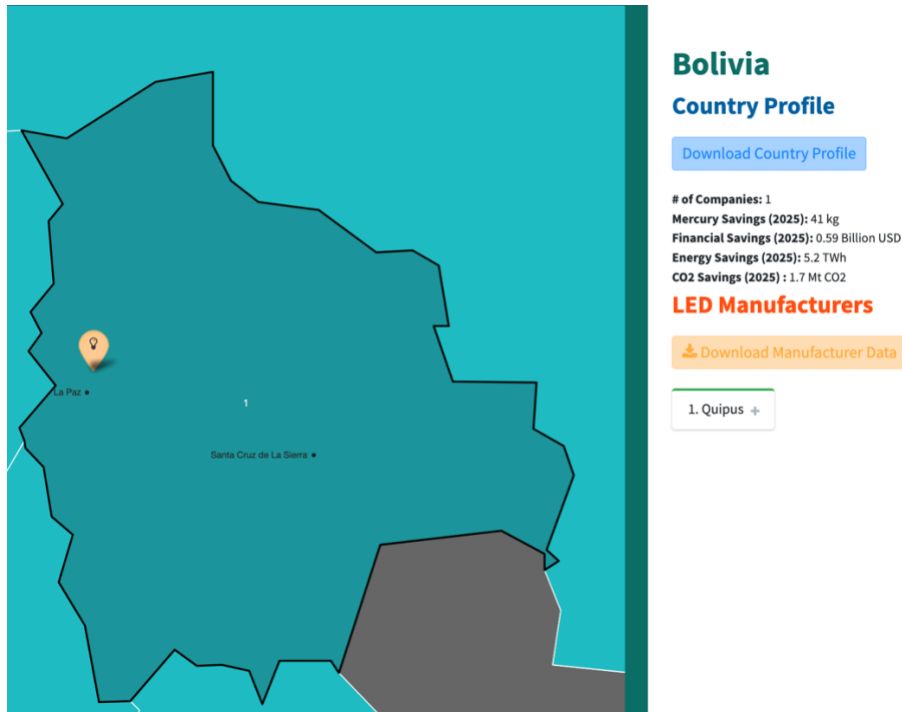
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Bolivia

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	5,410,000	4,870,000	4,340,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	41	37	33	kg of mercury
National electricity savings	5.18	4.72	4.26	TWh of electricity
National financial savings from avoided electricity use	0.59	0.54	0.48	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	1.68	1.52	1.36	Mt CO ₂

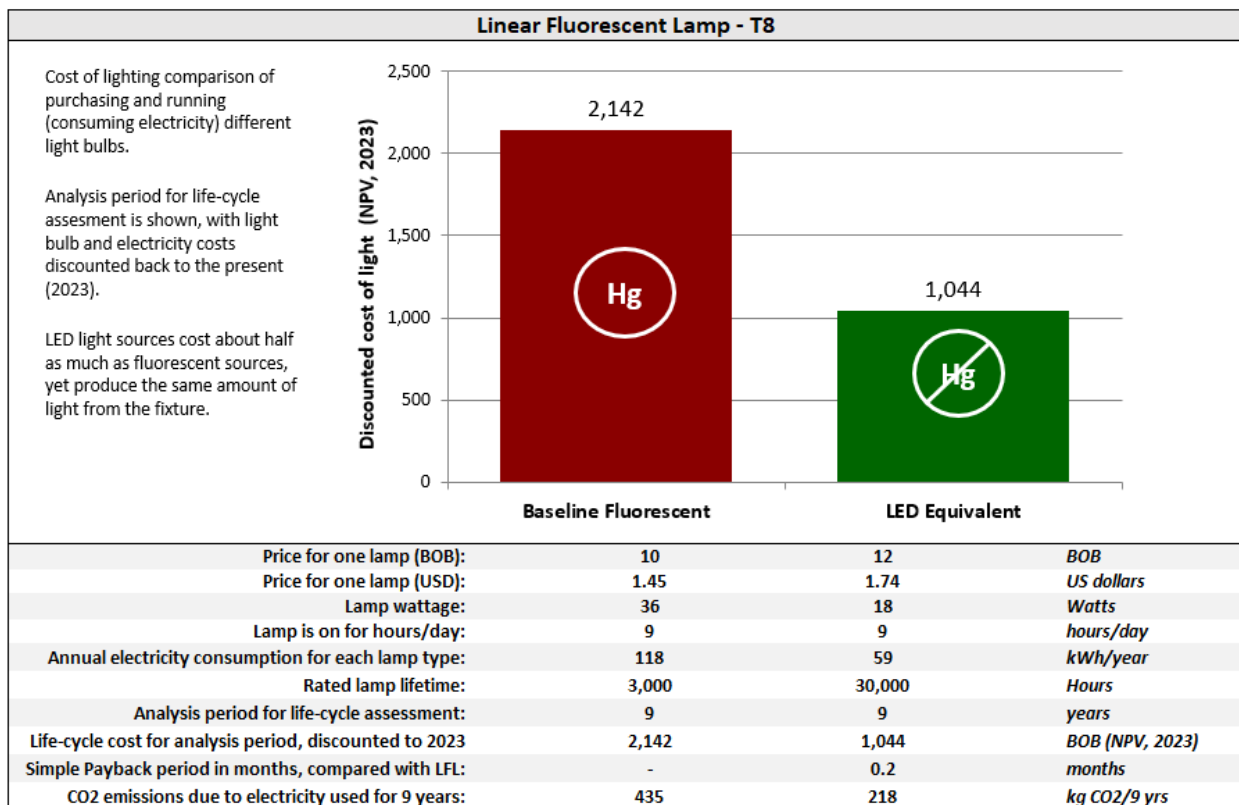
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- The Supreme Decree 4959 of June 14, 2023 and Resolution 325 of the Ministry of Environment and Water define the national mercury registry and requirements for importing/exporting mercury.
- The Transitioning to Energy-Efficient Lighting (*Realizando la Transición hacia la Iluminación Eficiente – RTIE*) initiative, implemented by UNEP/GEF, the Ministry of Environment and Water, and the Ministry of Hydrocarbons and Energy, promotes the transition to LED lighting and raises awareness about its benefits.
- Through a National Energy-Efficient Public Lighting project, President Arce has committed \$7 million USD to install 14,000 LED lights in Trinidad.

Map of LED Companies in Bolivia



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Bolivia.

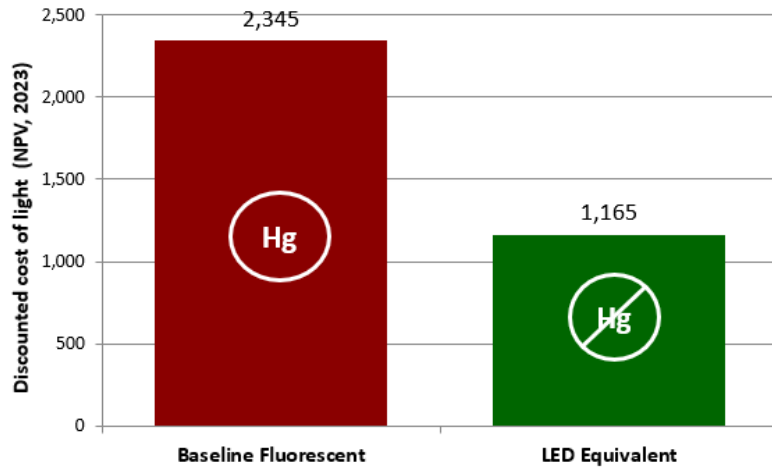


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (BOB):	19	18	<i>BOB</i>
Price for one lamp (USD):	2.75	2.60	<i>US dollars</i>
Lamp wattage:	40	20	<i>Watts</i>
Lamp is on for hours/day:	9	9	<i>hours/day</i>
Annual electricity consumption for each lamp type:	131	66	<i>kWh/year</i>
Rated lamp lifetime:	12,000	30,000	<i>Hours</i>
Analysis period for life-cycle assessment:	9	9	<i>years</i>
Life-cycle cost for analysis period, discounted to 2023	2,345	1,165	<i>BOB (NPV, 2023)</i>
Simple Payback period in months, compared with LFL:	-	instant	<i>months</i>
CO2 emissions due to electricity used for 9 years:	484	242	<i>kg CO2/9 yrs</i>



Brazil

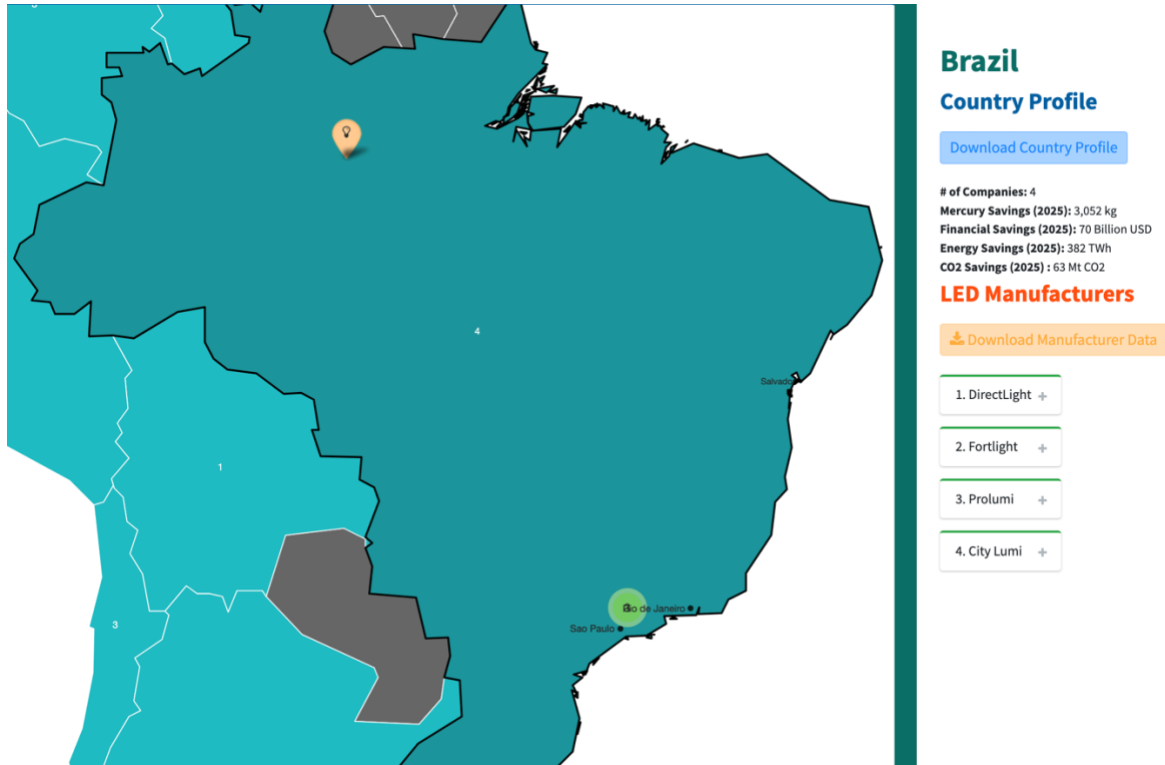
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Brazil

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	407,000,000	375,000,000	343,000,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	3,050	2,810	2,570	kg of mercury
National electricity savings	382	355	329	TWh of electricity
National financial savings from avoided electricity use	70.1	65.6	60.4	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	62.5	57.8	52.8	Mt CO ₂

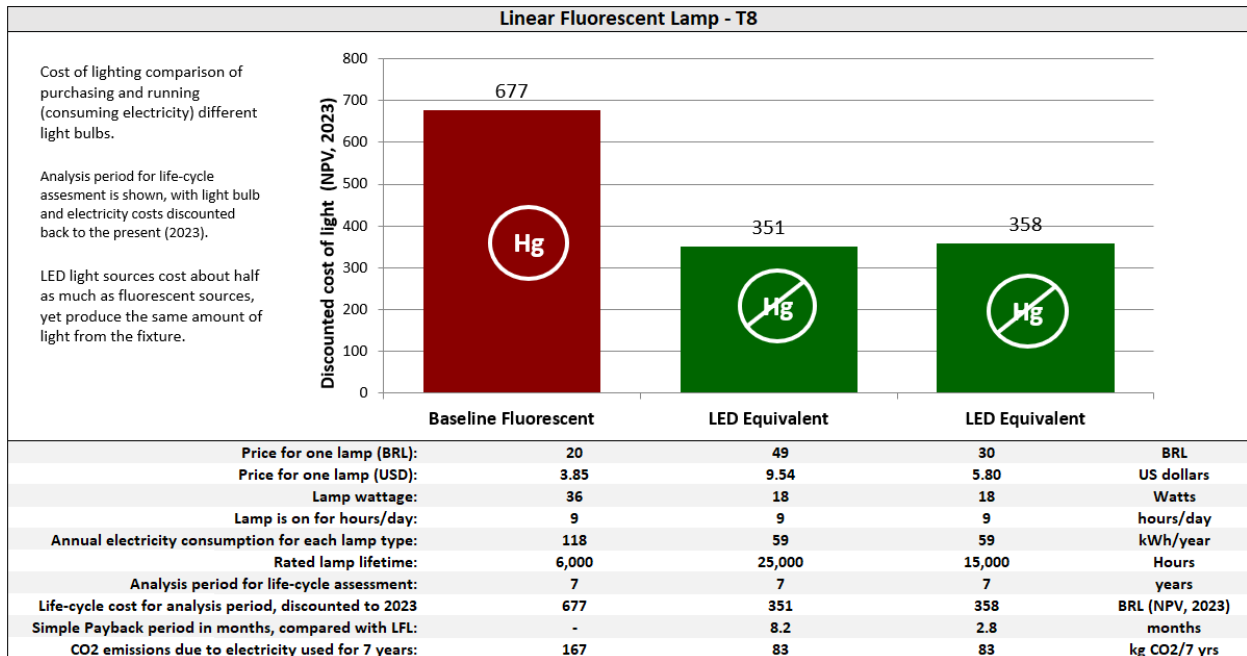
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- [The 2050 National Energy Plan \(Plano Nacional de Energia, PNE 2050\)](#) was launched by the Ministry of Mines and Energy (MME) and the Brazilian Energy Research Company (EPE). For the next 30 years, energy policy making will be supported by its analysis and projections for economic growth, energy demand, and output potential.
- The Brazilian Development Bank (BNDES) and the MME are offering financial instruments to transition public lighting to LEDs. Public-private partnership bids have already been selected for projects in Macapá, Petrolina, Teresina, Porto Alegre, and Vila Velha, with upcoming projects in Curitiba, Canoas, Caruaru, and Jaboatao dos Guararapes. These projects have already updated over 570,000 lighting fixtures to LEDs, benefitting over 7 million people. BNDES has also funded energy efficiency projects in small and medium-sized enterprises, which include transitioning to LED lighting.
- On March 13, 2015, INMETRO granted [Ordinance no. 144](#), which approves the Conformity Assessment Requirements for LED lamps intended to enter the Brazilian market. Then, on February 15, 2017, INMETRO approved the administrative [Rule No. 20, 2017](#), establishing the technical and conformity criteria for street lighting using discharge lamps and LED technology.
- In 2018, the Ministry of Mines and Energy published a [Guidebook for the Development of Municipal Public Lighting Policies](#), which recommends the adoption of LED technology and explains different mechanisms to obtain federal funding to finance the transition to energy-efficient public lighting in municipalities.
- Following Law 5490/20, which defines the National Plan for the Erradication of Mercury Contamination, the Ministry of Health published the Sectoral Plan for the Implementation of the Minamata Convention on Mercury. This Plan effectively phases out all mercury-containing lamps, except for those included in Annex A of the Minamata Convention on Mercury.

Map of LED Companies in Brazil



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Brazil.



Chile



Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Chile

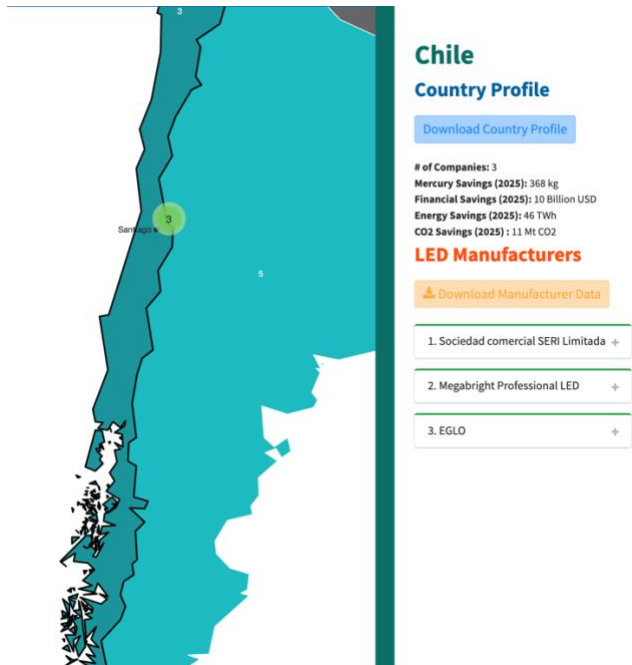
Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	49,100,000	44,900,000	40,900,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	368	337	306	kg of mercury
National electricity savings	46.1	42.7	39.2	TWh of electricity
National financial savings from avoided electricity use	10.4	9.7	8.9	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	11.3	10.4	9.4	Mt CO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

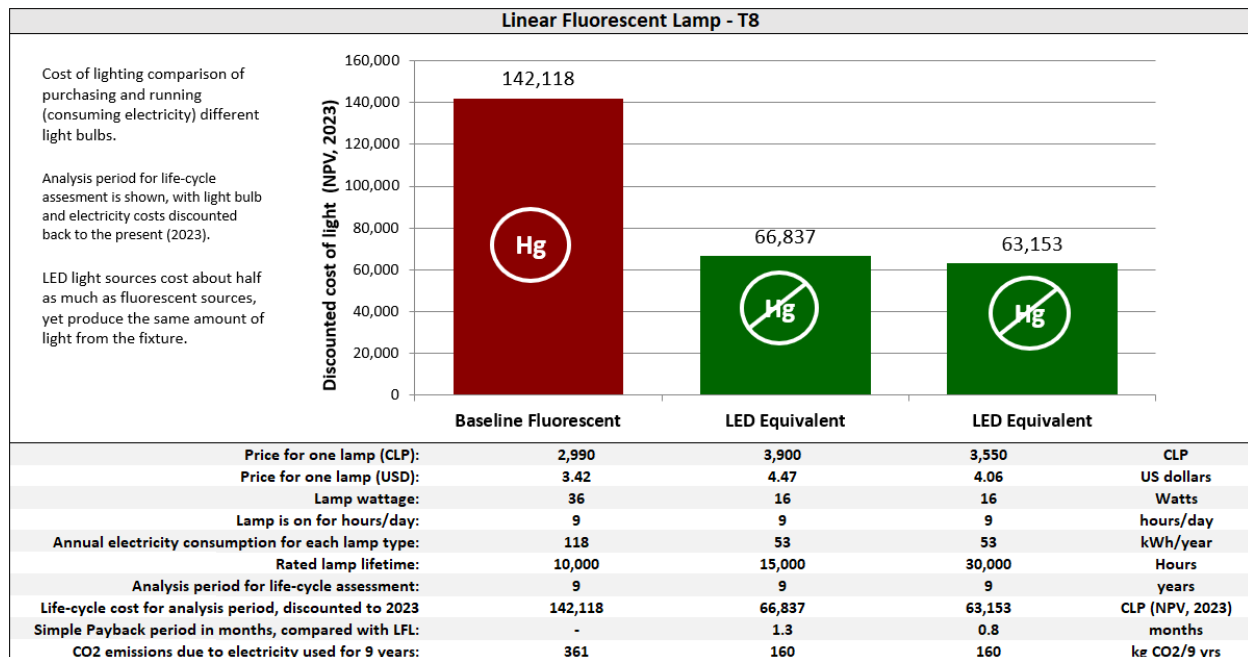
- In 2013, Chile's Ministry of Energy and Fundación Chile, with the support of the UNEP/GEF enlighten initiative (United for Efficiency), developed its National Efficient Lighting Strategy. This strategy established general minimum energy performance standards (MEPS) that phased out inefficient (incandescent) lamps, and proposed mercury labels and a sound end-of-life management system for mercury-containing lamps.
- Through Ministerial Resolution N. 10/2020, the Ministry of Energy updated MEPS for general lighting to phase out inefficient lamps as follows: 40 lm/W by 2021, 70 lm/W by 2023, and 85 lm/W by 2025. This update effectively phases out fluorescent lamps as they do not currently achieve those MEPS, thus driving the shift to LED lighting.
- In 2021, Chile published its first [Energy Efficiency Law \(No. 21,305\)](#) to promote the rational and efficient use of energy resources. According to the terms of this new law, the Ministry of Energy is required to prepare a National Energy Efficiency Plan and it must include, at least, the following matters:
 - residential energy efficiency
 - minimum standards and artifact labelling
 - energy efficiency in construction and transportation
 - energy efficiency and smart cities
 - energy efficiency in the productive sectors, and
 - education and training in energy efficiency
- In addition, the plan must establish short-, medium- and long-term goals, as well as the programs and actions necessary to achieve those goals. The 10% reduction in energy intensity targeted for 2030 is expected to lead to cumulative savings of \$15.2 billion USD and emissions reduction of 28.6 MtCO_{2e}.

- Following Law 21,305, new homes will be required to have an energy-efficiency label, like those found on electric appliances, indicating their energy running costs. Large energy consumers will be required to implement an energy management system and to report annually on their consumption and other indicators.

Map of LED Companies in Chile



The following table compares the costs and benefits of fluorescent and LED lighting technologies in Chile.



Colombia



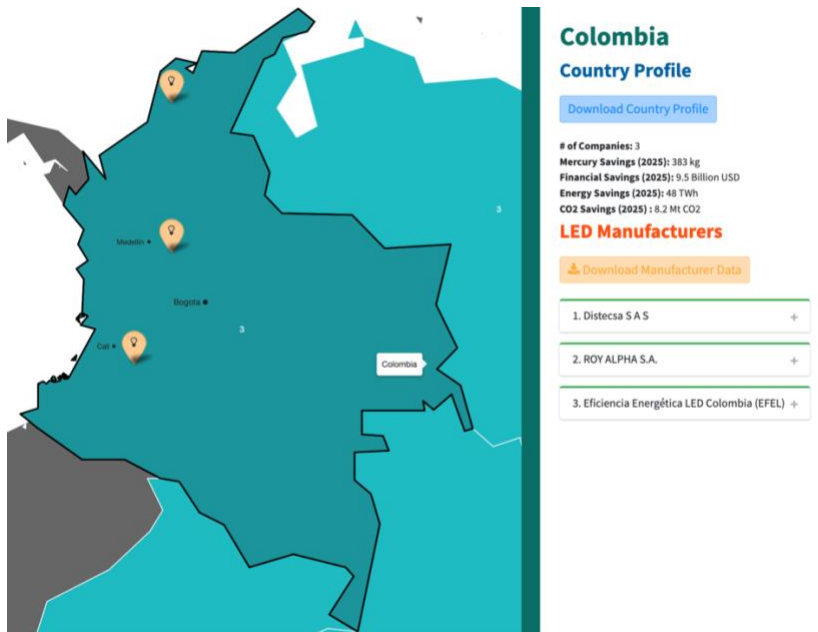
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Colombia

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	51,100,000	46,800,000	42,600,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	383	351	319	kg of mercury
National electricity savings	48.0	44.4	40.8	TWh of electricity
National financial savings from avoided electricity use	9.48	8.82	8.06	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	8.20	7.53	6.84	MTCO ₂

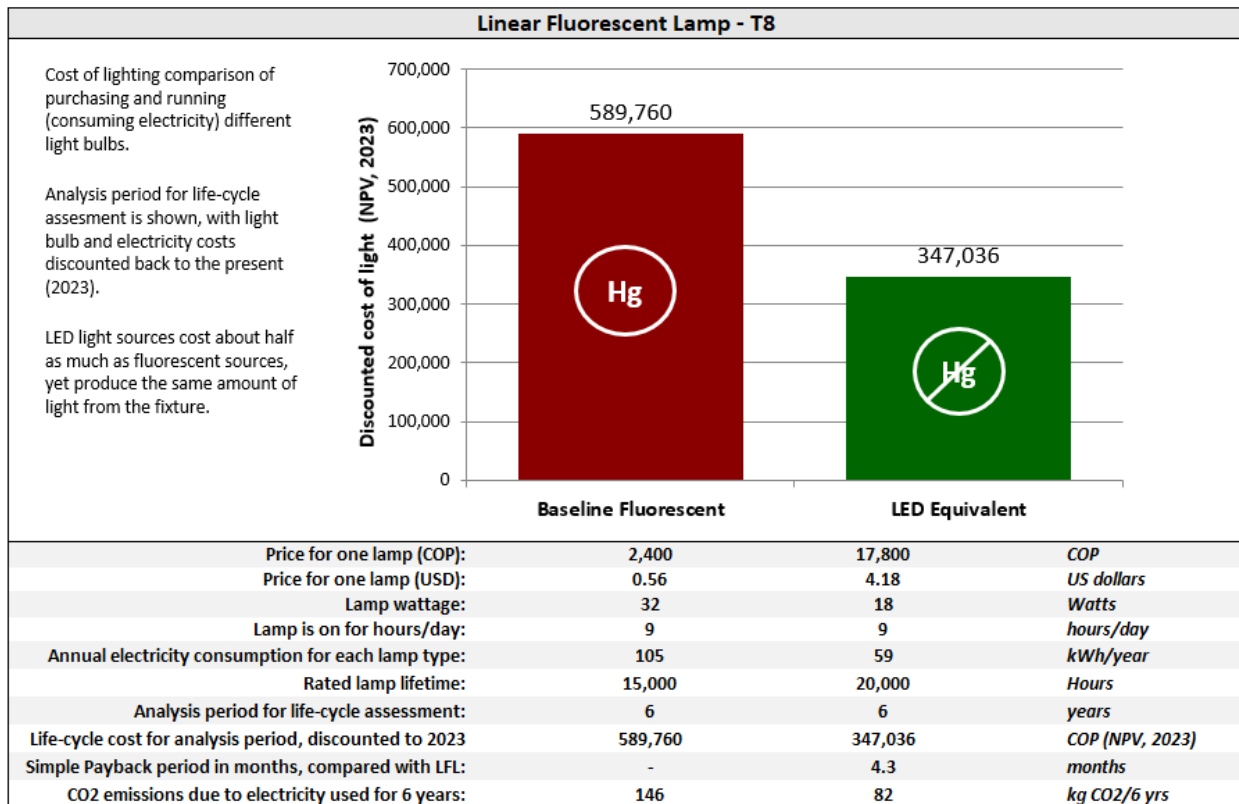
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- On 23 April 2021, the president of Colombia, Iván Duque, signed a decree that prohibits the manufacture, import, and export of products containing added mercury.
- In 2010, the Ministry of Energy of Colombia issued Technical Guidelines for General and Public Lighting (RETILAP). This document provides thorough minimum energy performance standards, testing parameters, and labeling requirements for all lighting appliances in Colombia. The document has been updated several times since its release.
- Following Law 1658 of 2013, a group of Ministries (Energy and Mines, Environment, Health, Labor, Agriculture, Transportation, Commerce, Industry and Tourism) published the Comprehensive National Mercury Plan (*Plan Único Nacional de Mercurio – PUNHg*) in 2018, with the aim of reducing and progressively eliminating the use of mercury in the country.

Map of LED Companies in Colombia



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Colombia.



Costa Rica



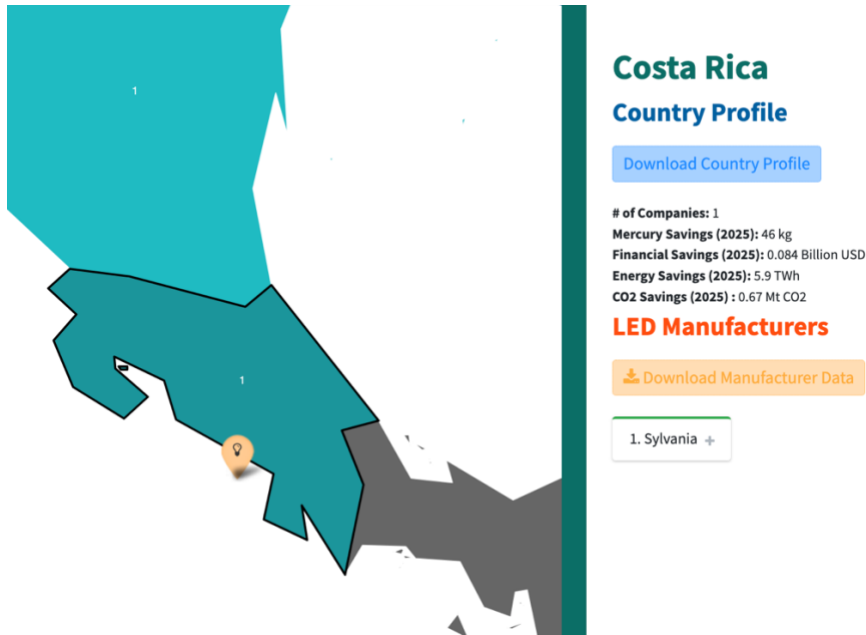
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Costa Rica

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	6,160,000	5,510,000	4,870,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	46	41	37	kg of mercury
National electricity savings	5.93	5.36	4.80	TWh of electricity
National financial savings from avoided electricity use	0.08	0.08	0.07	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.67	0.60	0.53	MTCO ₂

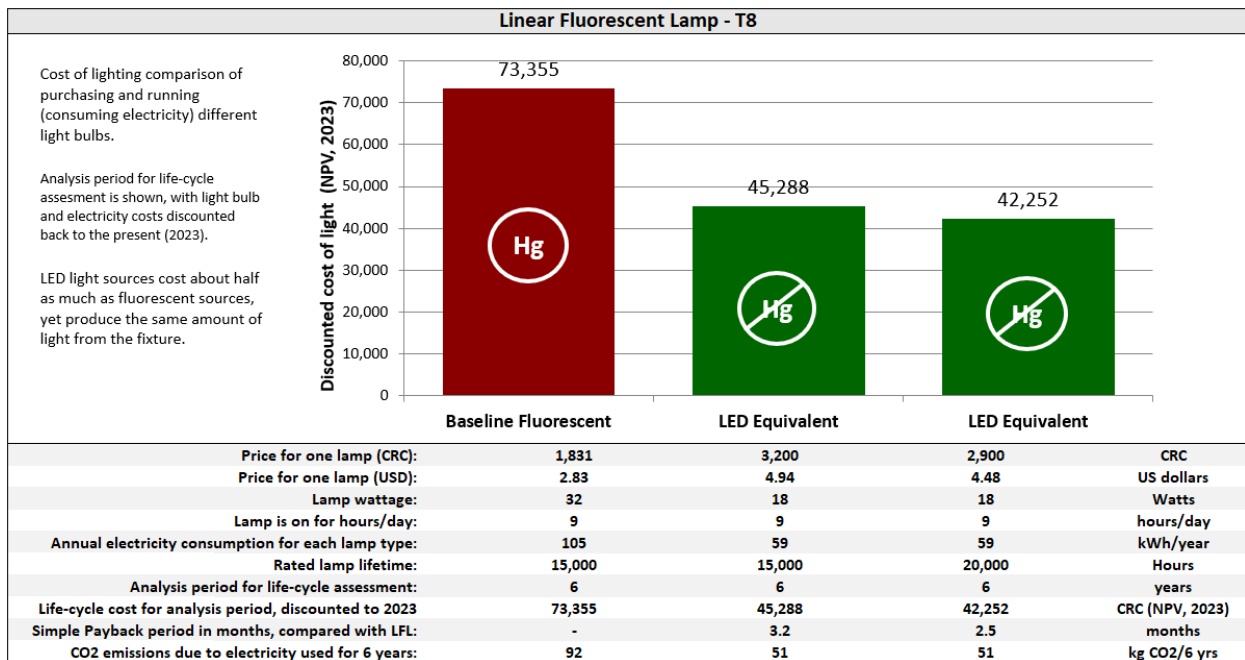
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, Costa Rica, along with other Central American countries that form part of *Proyecto Mesoamerica*, launched the [Regional Strategy for Energy-Efficient Lighting](#). This strategy called for the phase-out of incandescent lamps and established an integrated policy approach to ensure proper end-of-life management for fluorescent lamps.
- The Costa Rican Institute of Electricity hosts the Energy Efficiency Laboratory, which is fully equipped to do lighting tests, including flicker and stroboscopic effect tests. They are capable of testing lamps for the whole region.
- The SICA Energy Efficiency Technical Working Group is working on regional standards for public and general lighting with a focus on promoting the adoption of efficient LED lighting.

Map of LED Companies in Costa Rica



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Costa Rica.

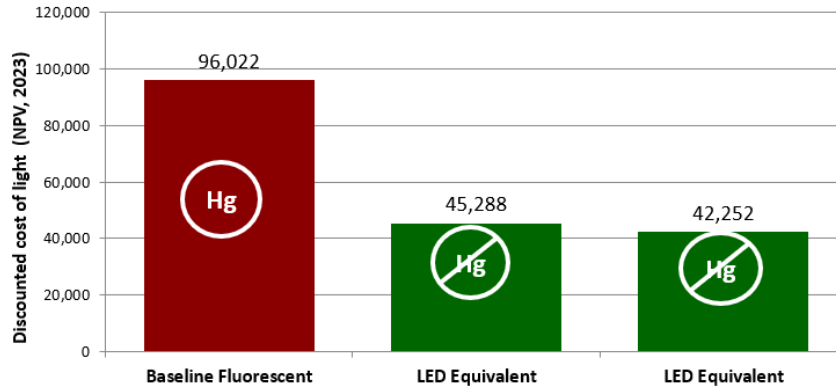


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (CRC):	4,538	3,200	2,900	CRC
Price for one lamp (USD):	7.01	4.94	4.48	US dollars
Lamp wattage:	40	18	18	Watts
Lamp is on for hours/day:	9	9	9	hours/day
Annual electricity consumption for each lamp type:	131	59	59	kWh/year
Rated lamp lifetime:	13,000	15,000	20,000	Hours
Analysis period for life-cycle assesment:	6	6	6	years
Life-cycle cost for analysis period, discounted to 2023	96,022	45,288	42,252	CRC (NPV, 2023)
Simple Payback period in months, compared with LFL:	-	instant	instant	months
CO2 emissions due to electricity used for 6 years:	114	51	51	kg CO2/6 yrs



Dominican Republic

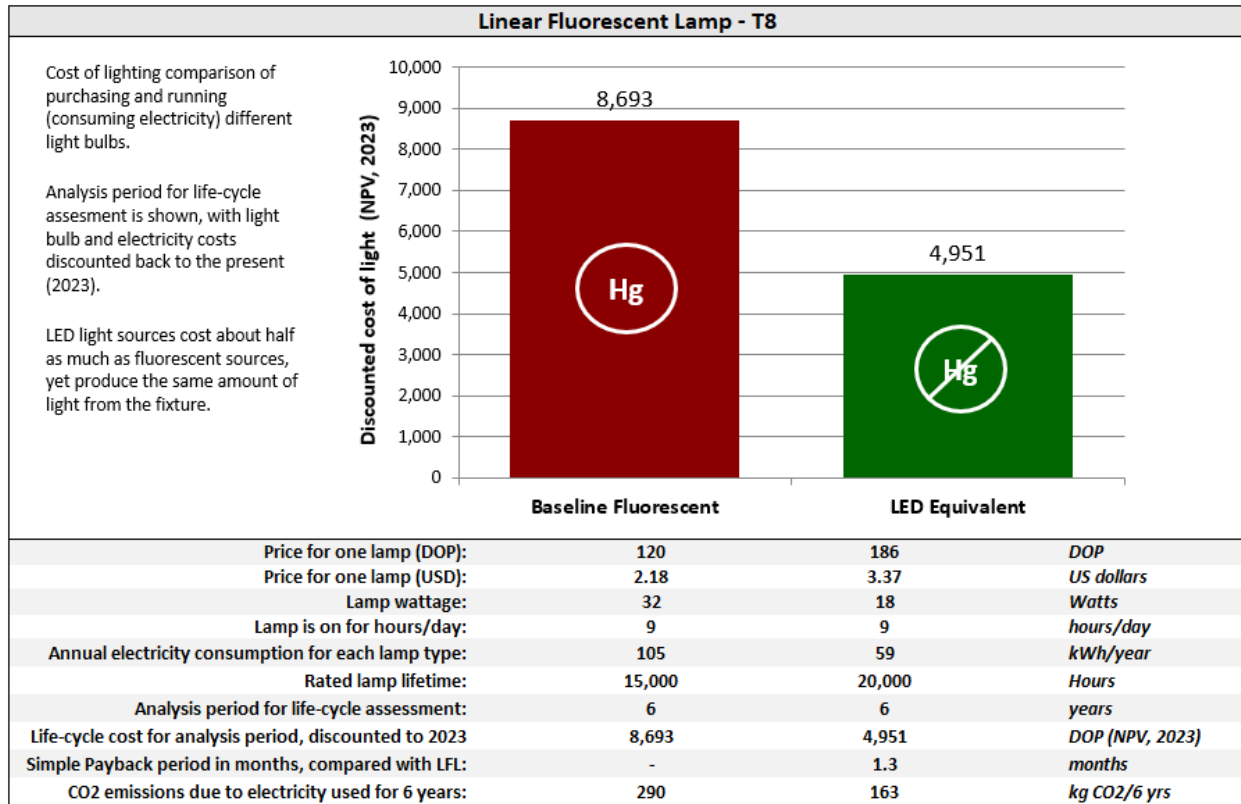
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in the Dominican Republic

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	8,430,000	7,440,000	6,470,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	63	56	49	kg of mercury
National electricity savings	8.17	7.30	6.44	TWh of electricity
National financial savings from avoided electricity use	1.61	1.45	1.27	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	3.07	2.73	2.38	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, the Dominican Republic, along with all other Central American countries that form part of *Proyecto Mesoamerica*, launched a [Regional Strategy for Energy-Efficient Lighting](#). This strategy called for the phase-out of incandescent lamps and also established an integrated policy approach to ensure proper end-of-life management for fluorescent lamps.
- In 2018, then Minister of Environment Francisco Dominguez Brito announced the prohibition of mercury-containing lamps and an ambition to make the Dominican Republic the first 100% LED island nation in the world.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in the Dominican Republic.



Ecuador



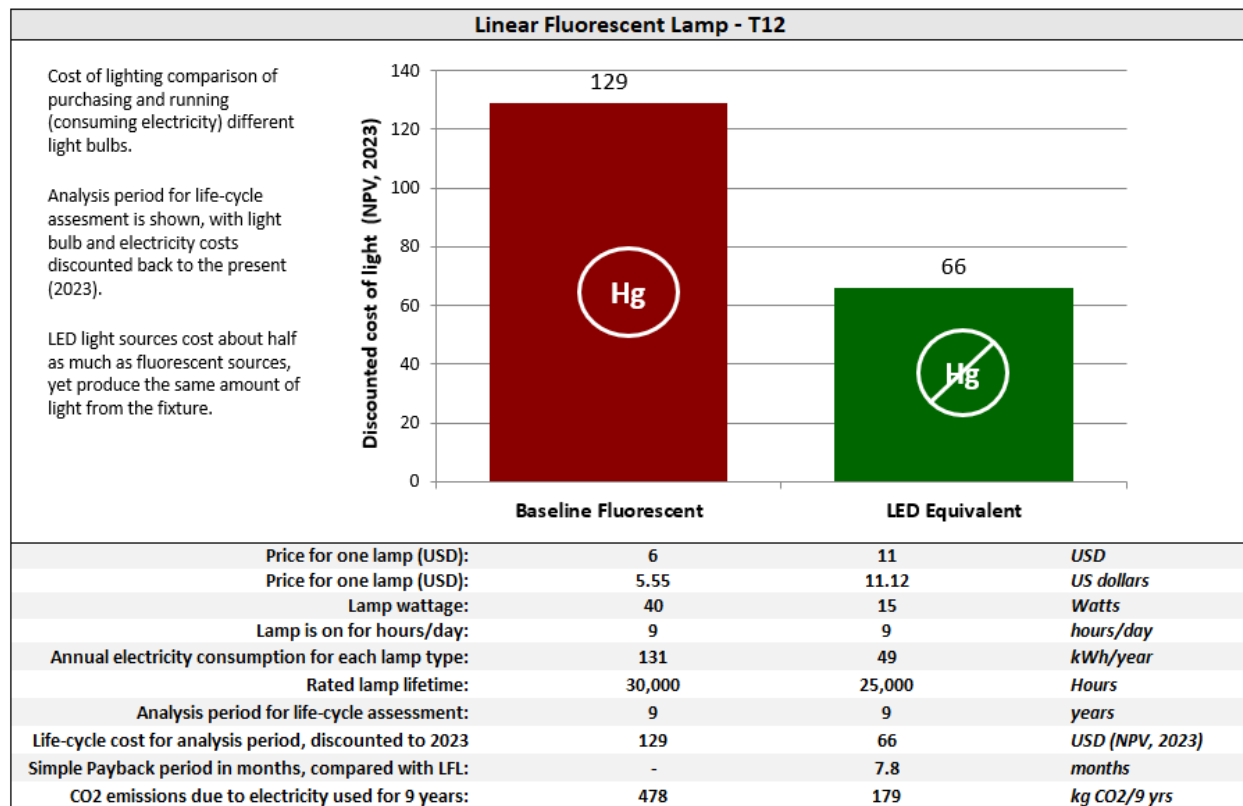
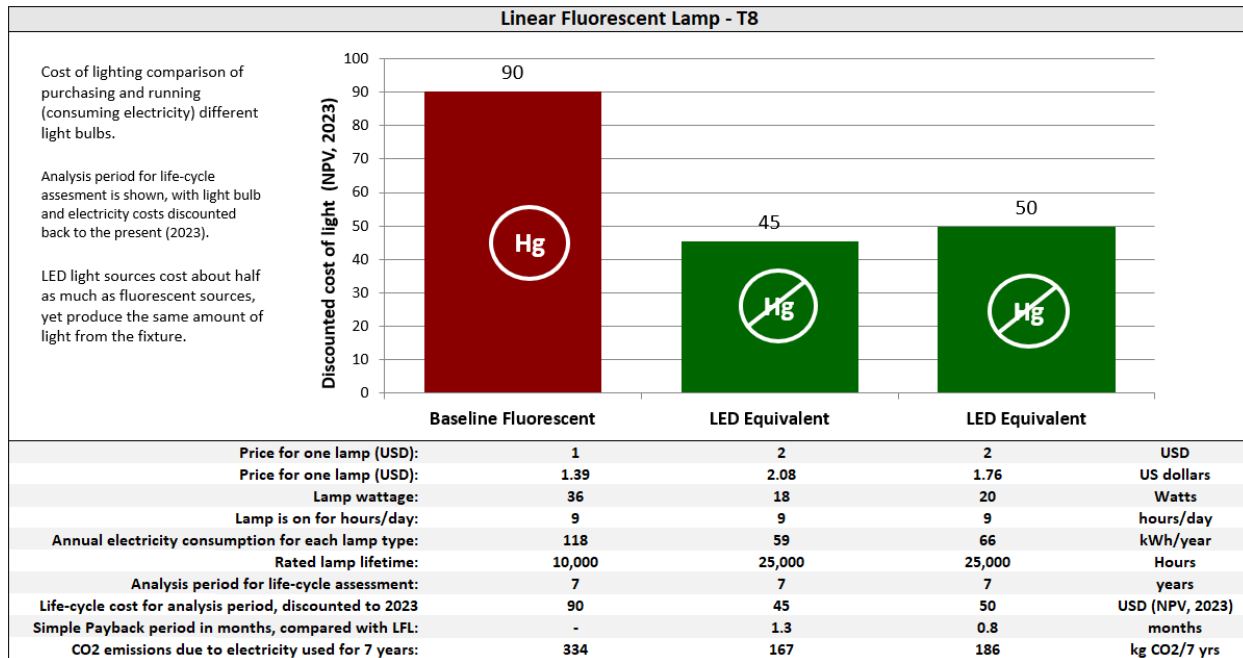
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Ecuador

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	17,700,000	16,300,000	14,900,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	133	122	111	kg of mercury
National electricity savings	16.6	15.4	14.2	TWh of electricity
National financial savings from avoided electricity use	2.34	2.19	2.01	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	5.23	4.82	4.39	MtCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- The National Electricity Corporation (CNEL) has [an energy efficiency plan for 2016-2035](#), with a goal of avoiding 543 MBOE, saving \$84,131 million USD, and 65 MtCO₂e.
- A research project by the Universidad de la Loja, with the support of the Latin American Energy Organization (*Organización Latinoamericana de Energía – OLADE*), made a cost-benefit analysis of the transition to LED in public lighting, showing potential savings of \$36 million USD per year.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Ecuador.



Guatemala



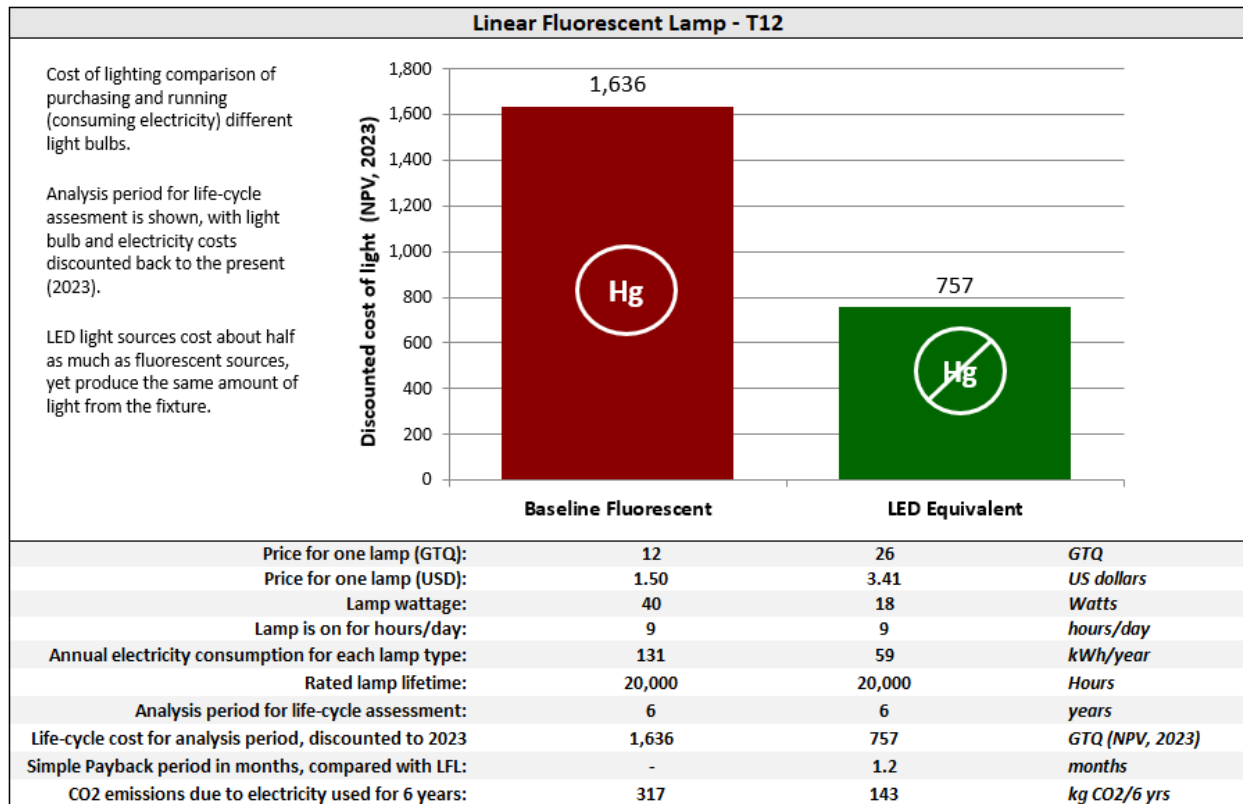
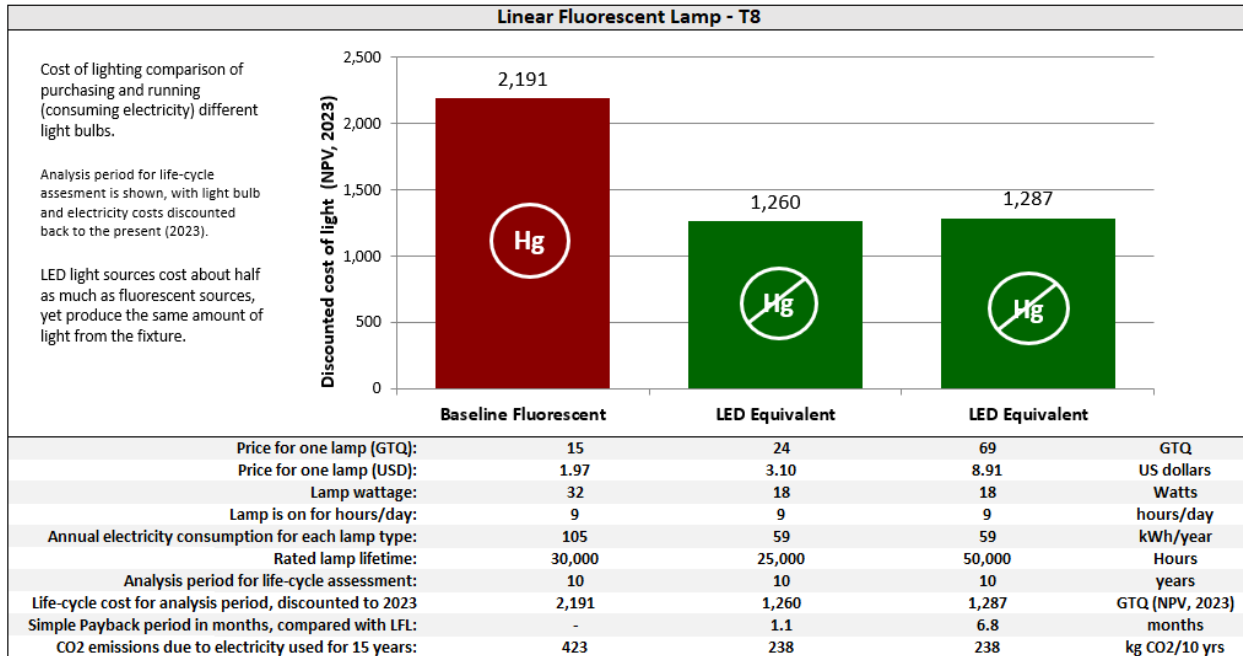
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Guatemala

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	8,720,000	8,020,000	7,340,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	65	60	55	kg of mercury
National electricity savings	8.19	7.61	7.03	TWh of electricity
National financial savings from avoided electricity use	2.43	2.27	2.09	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	2.59	2.39	2.18	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, Guatemala was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed in the framework of *Proyecto Mesoamerica* with the support of the UNEP/GEF en.lighten initiative (United for Efficiency).
- The Ministry of Energy and Mines has a National Energy Efficiency Plan (2019-2032), which aims to avoid 69,790 TJ by 3032 compared to the BAU model. These savings represent 15.1% of the energy consumption countrywide.
- The Ministry of Energy and Mines also approved an Energy Efficiency Act (2023-2050), which mentions the Minamata Convention and the phase-out of mercury in its preamble.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Guatemala.



Guyana



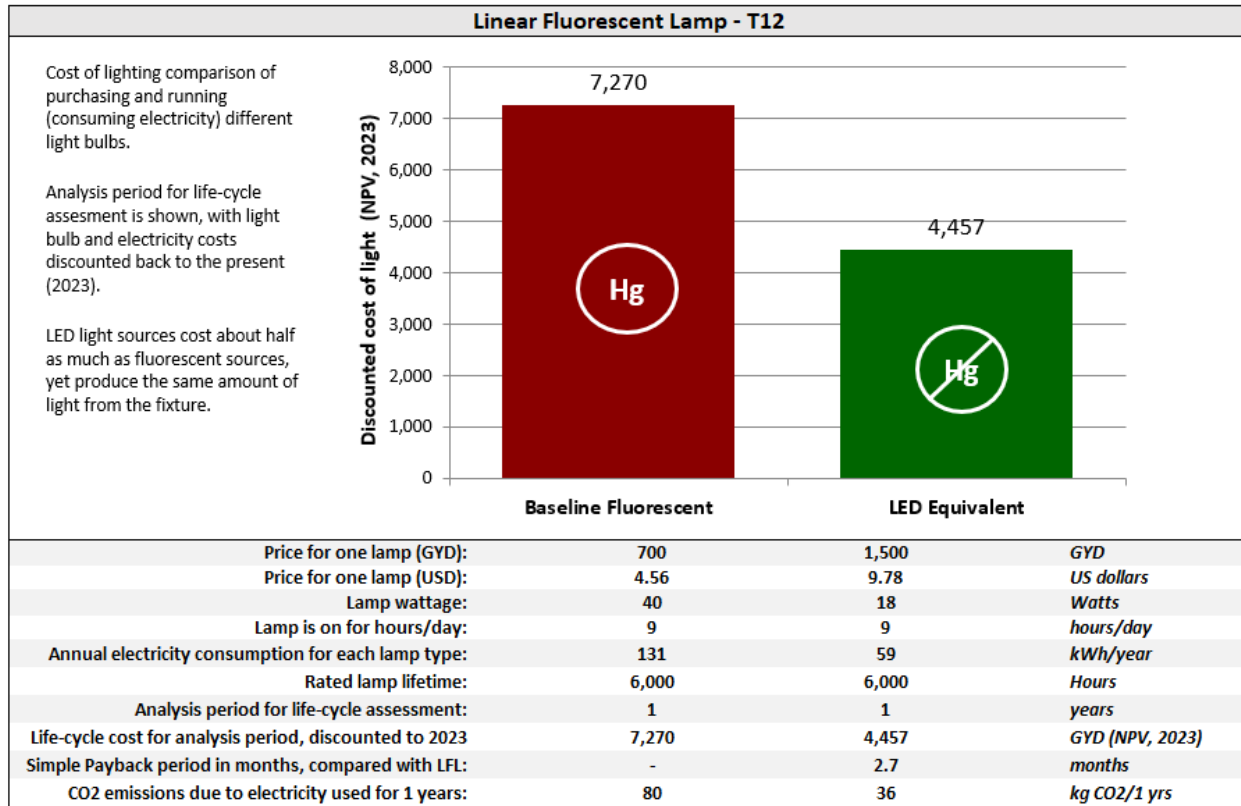
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Guyana

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	979,000	901,000	822,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	7	7	6	kg of mercury
National electricity savings	0.93	0.86	0.80	TWh of electricity
National financial savings from avoided electricity use	0.35	0.33	0.30	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.49	0.46	0.42	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- The Guyana Energy Agency installed 602 stand-alone solar-powered LED streetlights across all ten of its administrative regions.
- Under the hinterland LED lighting project, the Guyana Energy Agency initiated an energy conservation initiative that will replace energy-inefficient lights with energy-efficient lights. Beneficiaries are customers of the six hinterland utilities.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Guyana.



Honduras



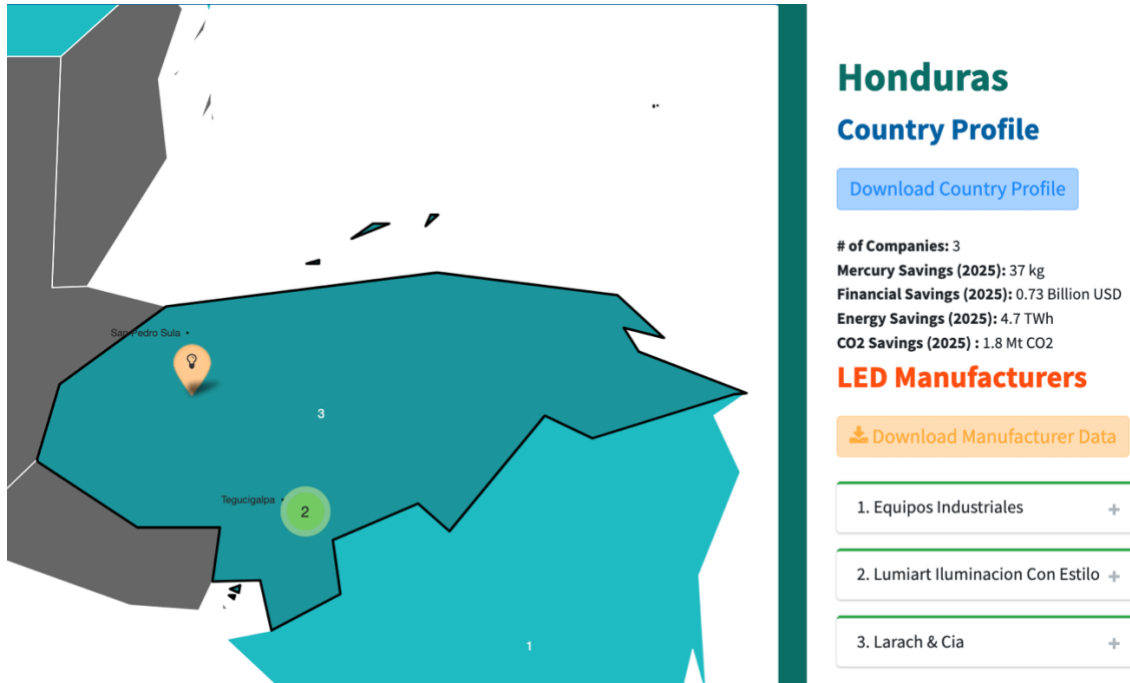
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Honduras

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	4,890,000	4,430,000	3,970,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	37	33	30	kg of mercury
National electricity savings	4.69	4.30	3.90	TWh of electricity
National financial savings from avoided electricity use	0.73	0.67	0.61	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	1.81	1.65	1.48	MTCO ₂

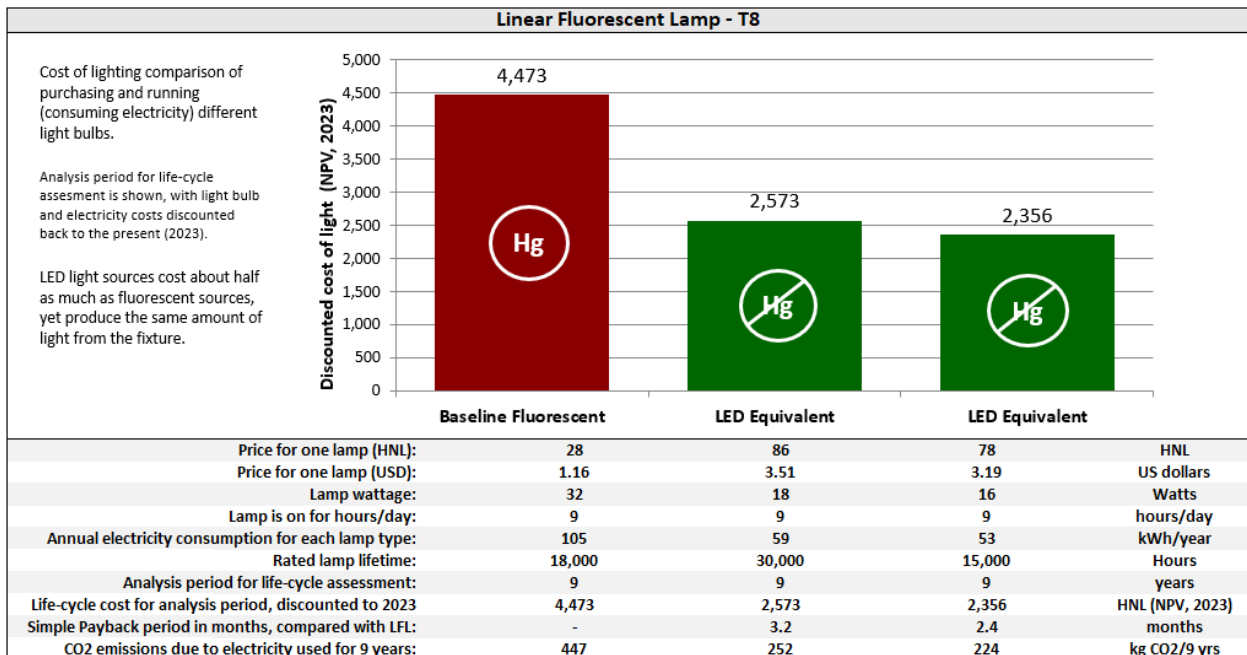
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, Honduras was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed in the framework of *Proyecto Mesoamerica* with the support of the UNEP/GEF en.lighten initiative (United for Efficiency).
- In 2023, the Energy Secretariat, along with the Secretariat for Governance, Justice, and Decentralization, signed an agreement to distribute 5.2 million LED bulbs through the framework of the Education in Energy Efficiency Program (PEEE). There are plans to extend this activity with the support of mayoral offices throughout the country.
- A Rational and Efficient Use of Energy Act is currently in discussion.

Map of LED Companies in Honduras



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Honduras.

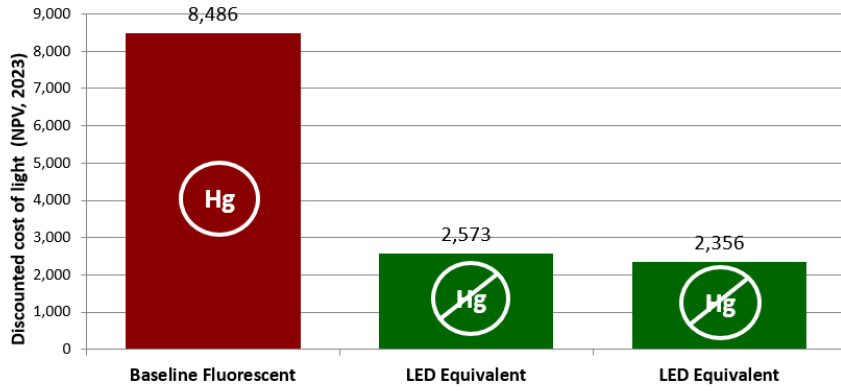


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (HNL):	74	86	78	HNL
Price for one lamp (USD):	3.02	3.51	3.19	US dollars
Lamp wattage:	60	18	16	Watts
Lamp is on for hours/day:	9	9	9	hours/day
Annual electricity consumption for each lamp type:	197	59	53	kWh/year
Rated lamp lifetime:	12,000	30,000	15,000	Hours
Analysis period for life-cycle assesment:	9	9	9	years
Life-cycle cost for analysis period, discounted to 2023	8,486	2,573	2,356	HNL (NPV, 2023)
Simple Payback period in months, compared with LFL:	-	0.2	0.1	months
CO2 emissions due to electricity used for 9 years:	839	252	224	kg CO2/9 yrs

Jamaica



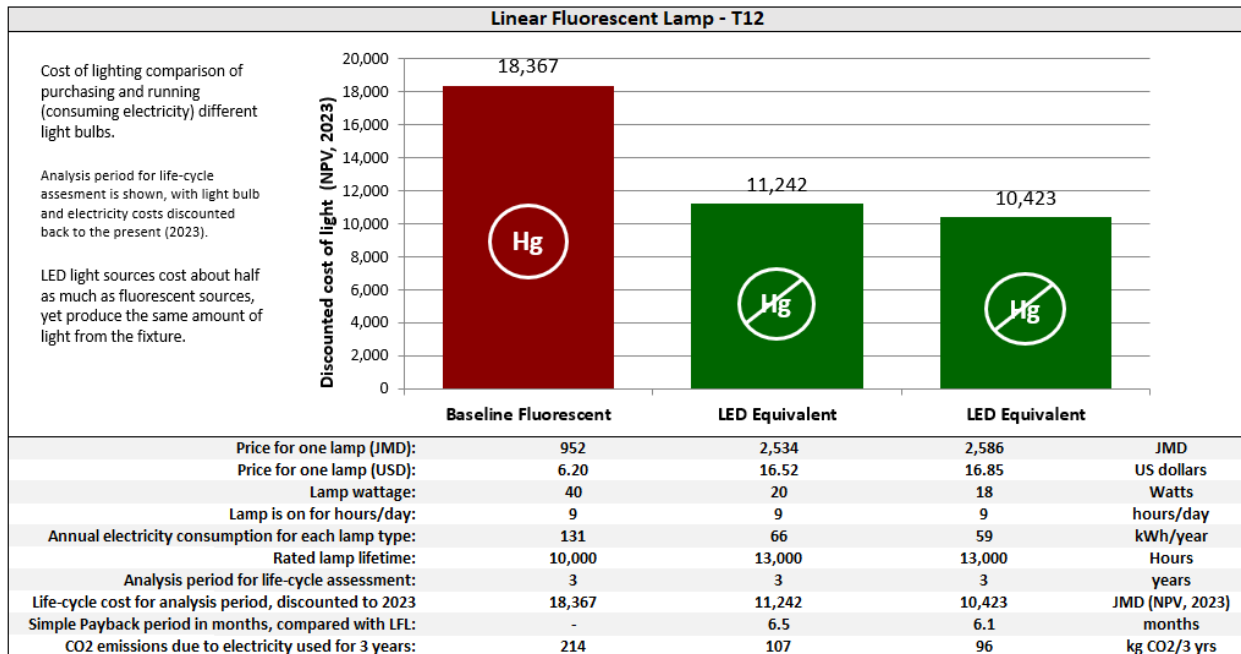
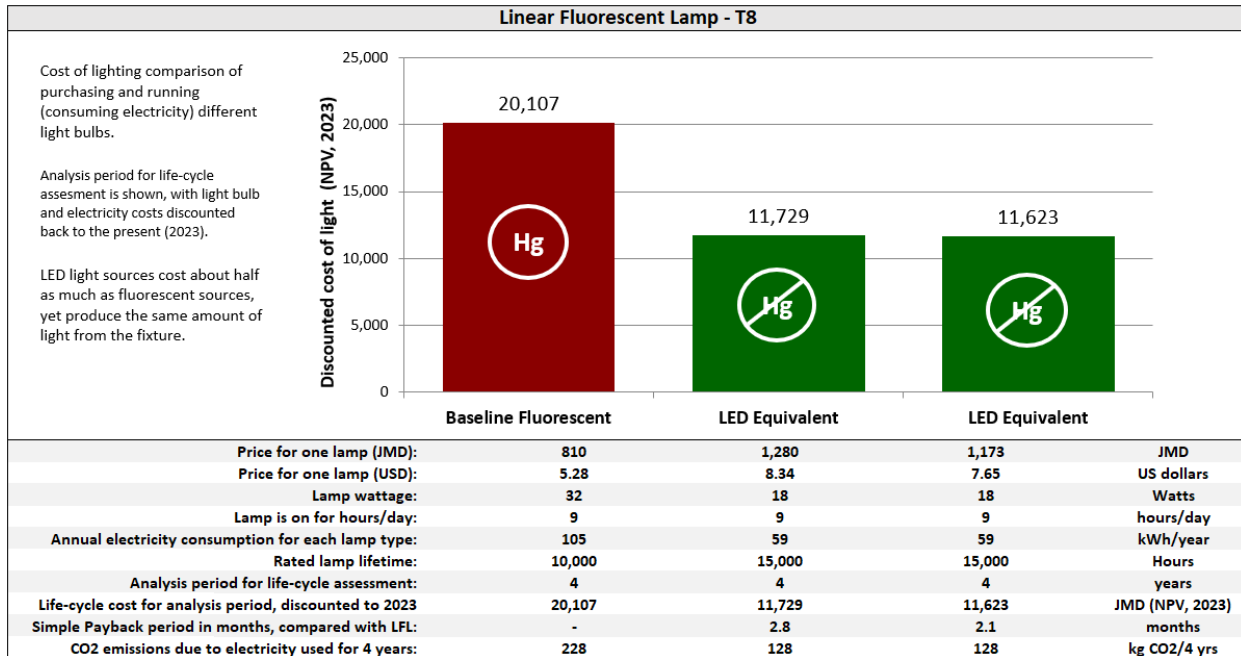
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Jamaica

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	1,840,000	1,650,000	1,470,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	14	12	11	kg of mercury
National electricity savings	1.76	1.60	1.45	TWh of electricity
National financial savings from avoided electricity use	1.12	1.03	0.92	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.92	0.83	0.74	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- Jamaica Public Service Company Limited, with the support of USTDA, is implementing a project to transition 110,000 streetlights to LED, also installing intelligent controls and metering capabilities for revenue generation.
- As of 2020, two-thirds of the public lighting in Jamaica was LED.
- In 2017, the Minister of Finance and the Public Service at the time, Audley Shaw, inaugurated the Energy Management and Efficiency Programme (EMEP), with support from the Japan International Cooperation Agency and the Inter-American Development Bank. At the inauguration event, the Minister promoted LED lights and encouraged the population to transition to these to reduce utility bills and electricity consumption.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Jamaica.



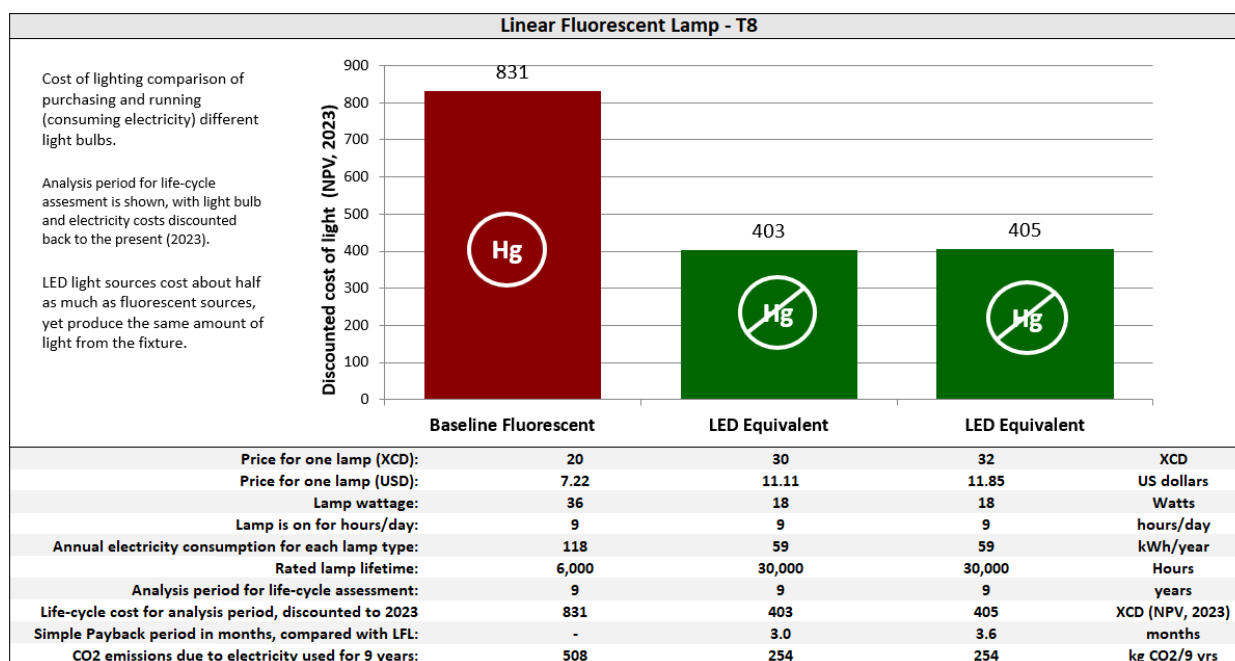
Saint Kitts and Nevis



National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, Saint Kitts and Nevis replaced 323,000 residential light bulbs with LED bulbs – costing about \$2.5 million USD.
- In 2020, The St. Kitts Electricity Company installed LED streetlights under the Street and Floodlight Retrofit Project, supported by the Caribbean Development Bank’s \$5,792,000 USD contribution.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Saint Kitts and Nevis.

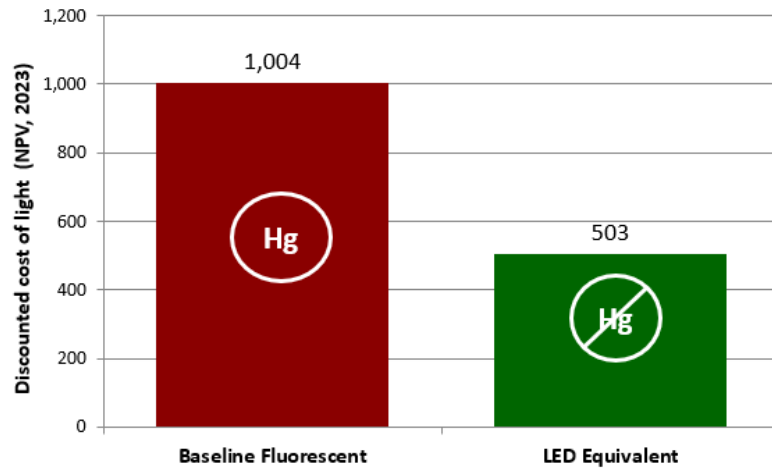


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (XCD):	25	44	<i>XCD</i>
Price for one lamp (USD):	9.26	16.11	<i>US dollars</i>
Lamp wattage:	40	20	<i>Watts</i>
Lamp is on for hours/day:	9	9	<i>hours/day</i>
Annual electricity consumption for each lamp type:	131	66	<i>kWh/year</i>
Rated lamp lifetime:	10,000	35,000	<i>Hours</i>
Analysis period for life-cycle assesment:	10	10	<i>years</i>
Life-cycle cost for analysis period, discounted to 2023	1,004	503	<i>XCD (NPV, 2023)</i>
Simple Payback period in months, compared with LFL:	-	4.8	<i>months</i>
CO2 emissions due to electricity used for 10 years:	627	313	<i>kg CO2/10 yrs</i>

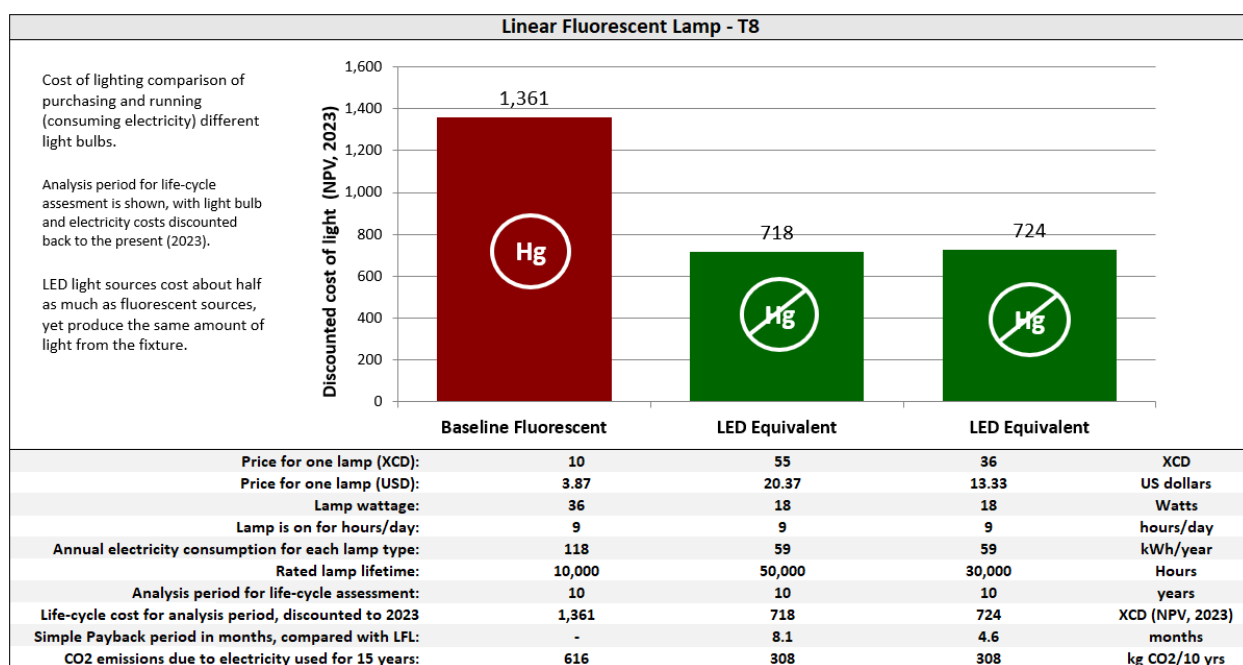
Saint Lucia



National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2015, the St. Lucia Electricity Services company installed 250 LED streetlamps in Castries and announced plans to replace all 20,000 streetlamps in the country with LEDs.
- In 2018, St. Lucia, with the support of GEF, UNEP, and the Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean, developed the Minamata Initial Assessment, supporting the phase-out of mercury-added lamps.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Saint Lucia.

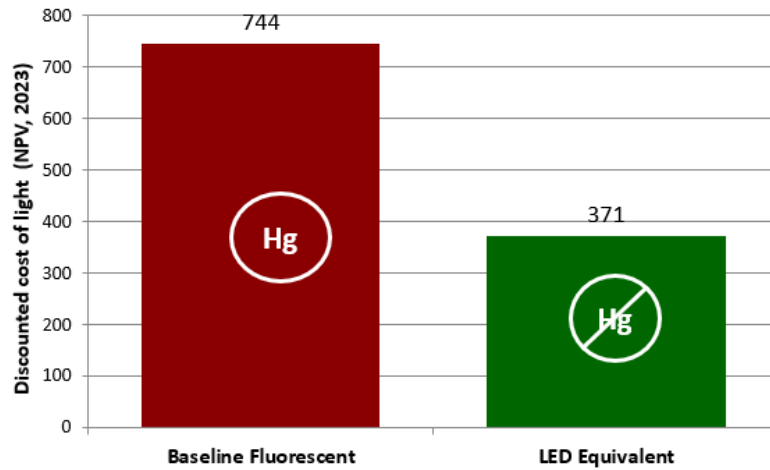


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (XCD):	8	40	<i>XCD</i>
Price for one lamp (USD):	2.83	14.65	<i>US dollars</i>
Lamp wattage:	40	18	<i>Watts</i>
Lamp is on for hours/day:	9	9	<i>hours/day</i>
Annual electricity consumption for each lamp type:	131	59	<i>kWh/year</i>
Rated lamp lifetime:	18,000	18,000	<i>Hours</i>
Analysis period for life-cycle assesment:	5	5	<i>years</i>
Life-cycle cost for analysis period, discounted to 2023	744	371	<i>XCD (NPV, 2023)</i>
Simple Payback period in months, compared with LFL:	-	4.7	<i>months</i>
CO2 emissions due to electricity used for 5 years:	342	154	<i>kg CO2/5 yrs</i>

Mexico



Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Mexico

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	182,000,000	165,000,000	148,000,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	1,370	1,240	1,110	kg of mercury
National electricity savings	174	159	144	TWh of electricity
National financial savings from avoided electricity use	14.7	13.5	12.2	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	44.9	40.8	36.5	MTCO ₂

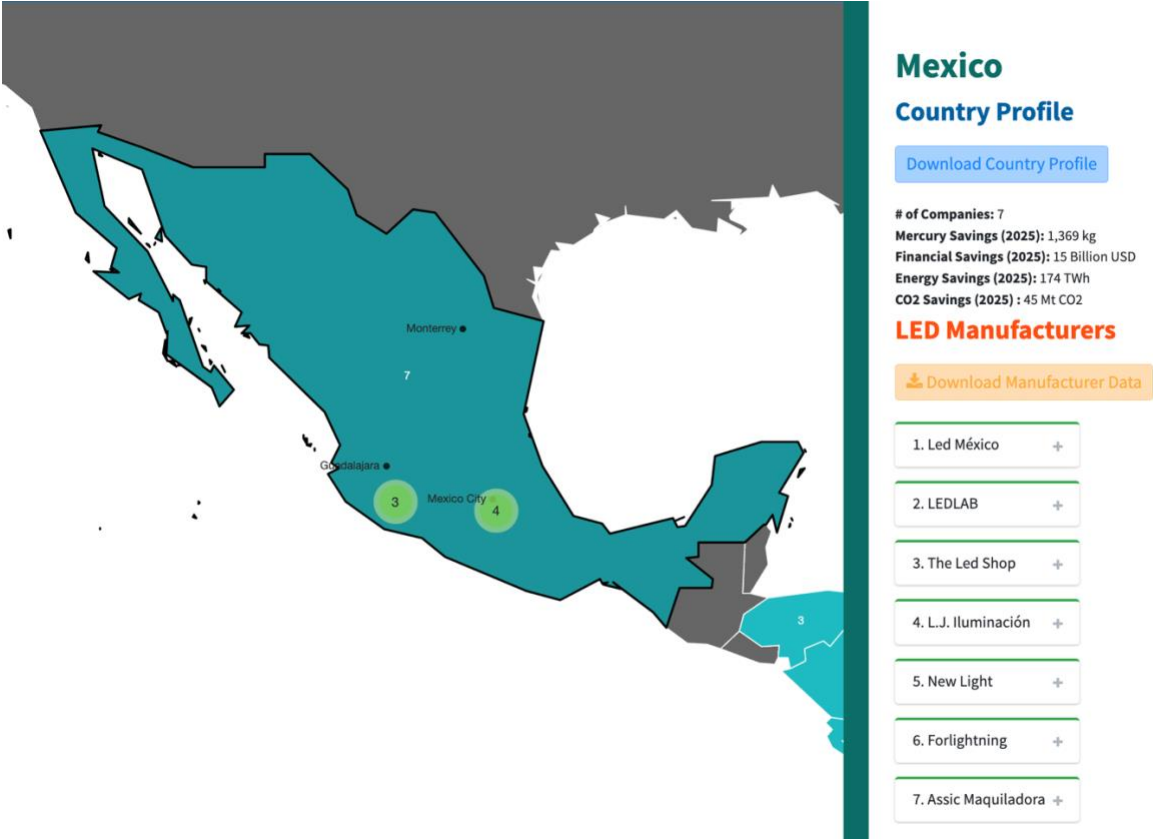
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2018, the National Institute of Ecology and Climate Change (INECC) published an initial assessment report to investigate the readiness of Mexico’s current legal framework and to propose modifications to allow the Minamata Convention to be adopted in the country.
- In Mexico, regulations for lighting products are based on nine official Mexican standards (currently in force). The report mentioned above identified that the following norms must be revised and adapted to satisfy the Minamata Convention obligations:
 - NOM-017-ENER/SCFI-2012, Energy efficiency and safety requirements of self-ballasted compact fluorescent lamps. Limits and test methods.
 - NOM-028-ENER-2017, Energy efficiency of lamps for general use. Limits and test methods.
- Notably, Mexico also has NOM-030-ENER-2016 and NOM-031-ENER-2019 in place, which define the minimum energy efficiency and safety standards for LED lamps for general use and for public lighting use, respectively. These standards are an important step in protecting the national market from low-quality lighting products.
- Mexico is an important actor in the global LED market, accounting for 4.6% of global LED luminaires exports and 0.6% of LED packages/dies. A growing number of LED lamp manufacturers/assemblers are based in Mexico.
- There are several policies, institutions, and mechanisms in place that support the transition to more efficient and cleaner technologies, such as:
 - The Energy Efficiency Program, which is promoted through the Trust Funds for Rural Development (FIRA)
 - The Energy Efficiency Program in the Federal Public Administration (2020-2024), which is promoted through the Ministry of Energy (SENER) and the National Commission for the Efficient Use of Energy (CONUEE). This program

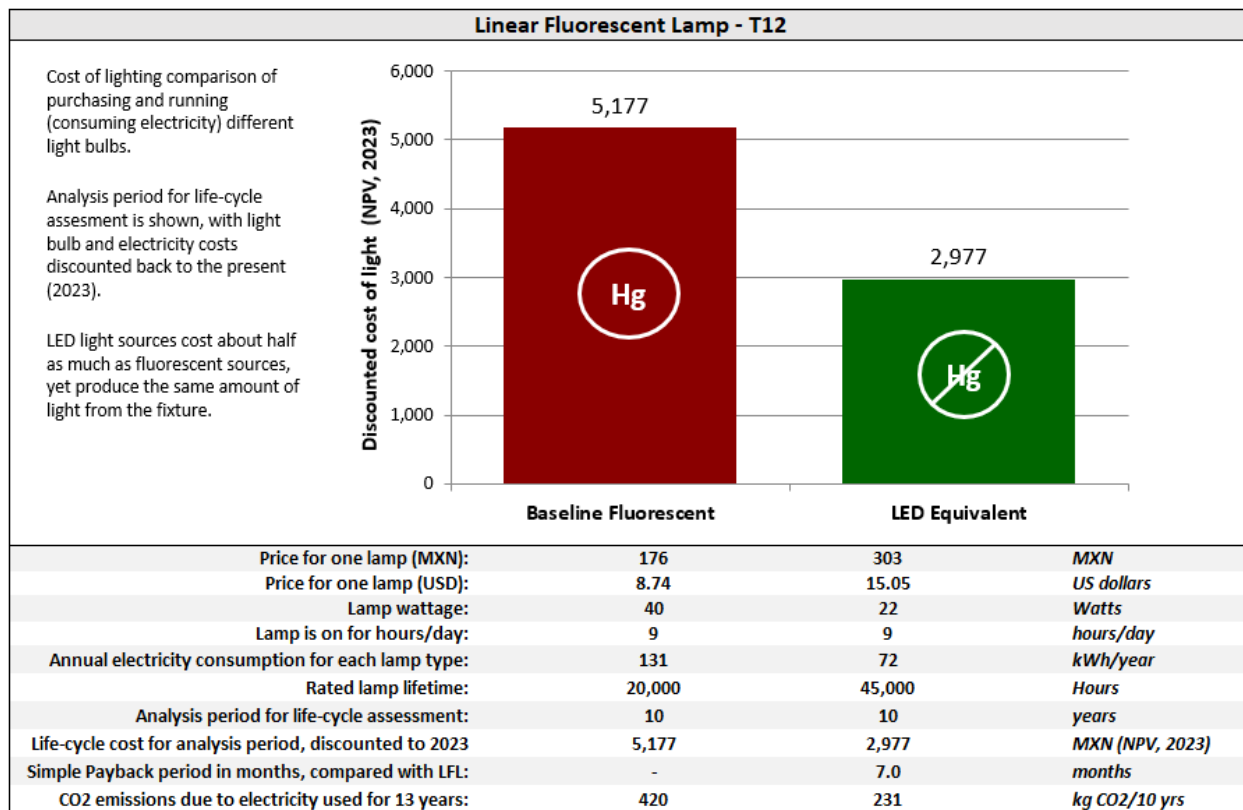
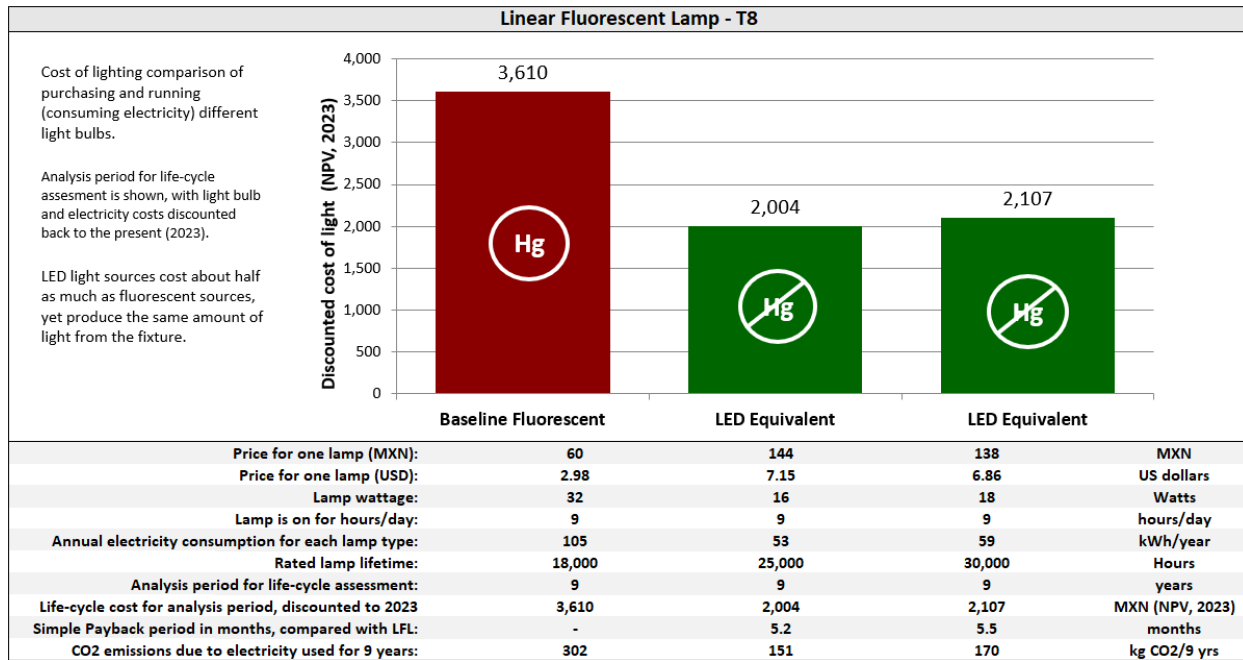
establishes specific annual energy savings goals for participating buildings, vehicle fleets, and industrial facilities.

- The FIDE substantive programs, which are promoted through the Trust for the Saving of Electric Energy. FIDE is a private, non-profit fund created through the Federal Electricity Commission (CFE)'s initiative to contribute to the saving and efficient use of electrical energy. These programs include FIDE's voluntary certification of energy-efficient products.

Map of LED Companies in Mexico



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Mexico.



Nicaragua



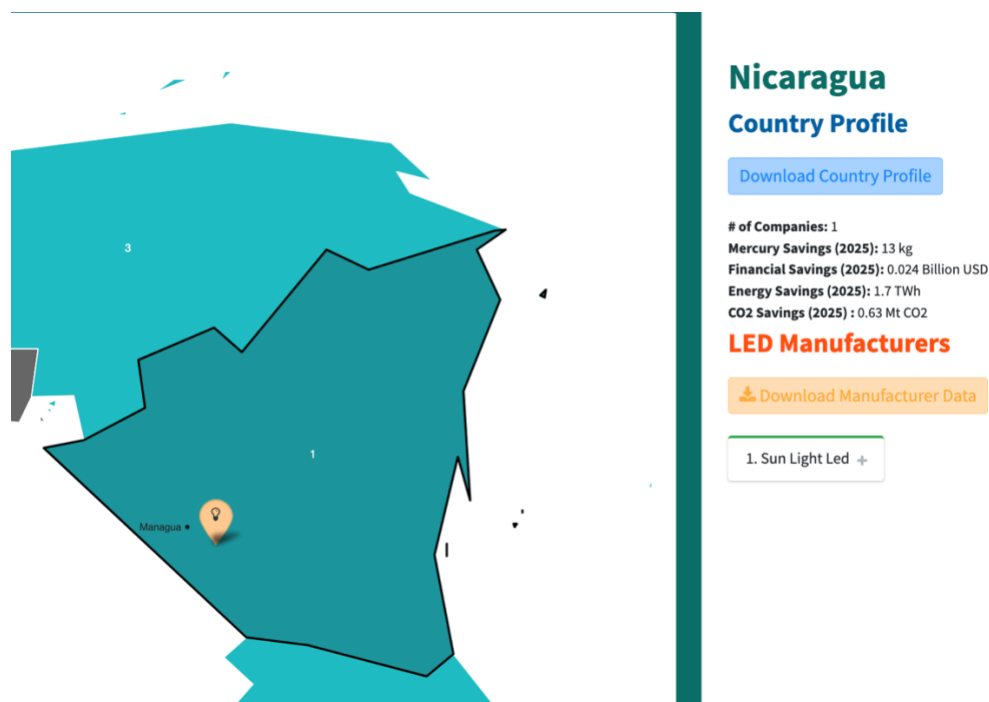
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Nicaragua

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	1,780,000	1,620,000	1,460,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	13	12	11	kg of mercury
National electricity savings	1.69	1.55	1.41	TWh of electricity
National financial savings from avoided electricity use	0.02	0.02	0.02	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.63	0.58	0.52	MTCO ₂

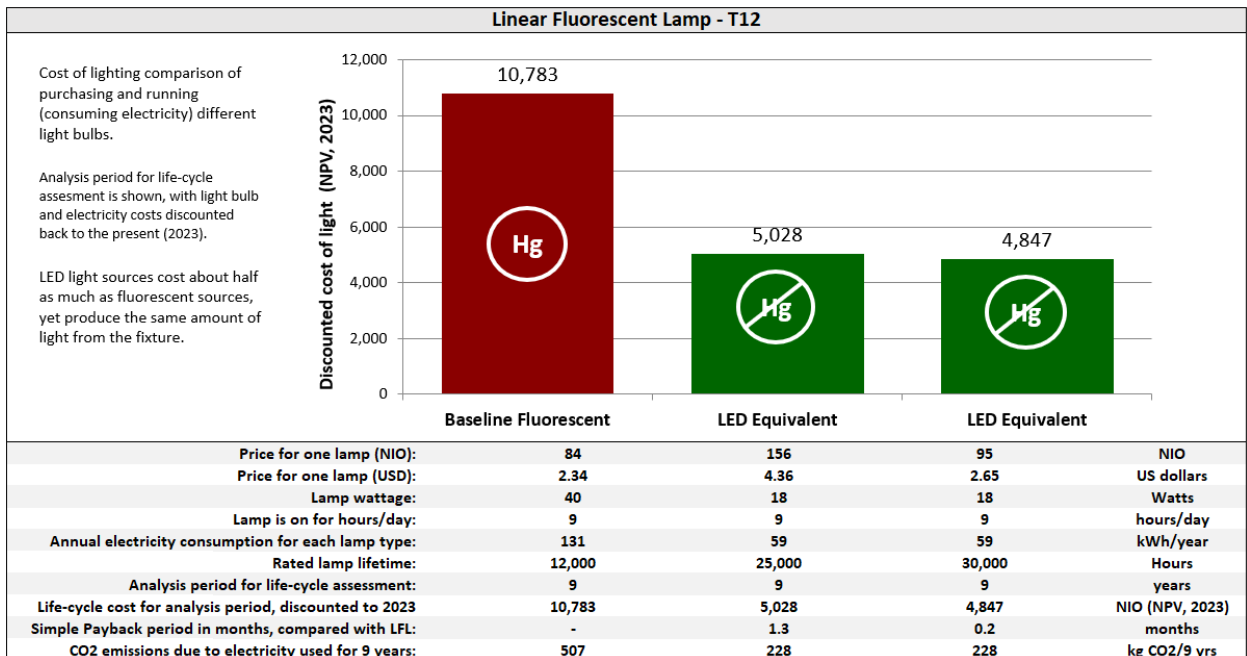
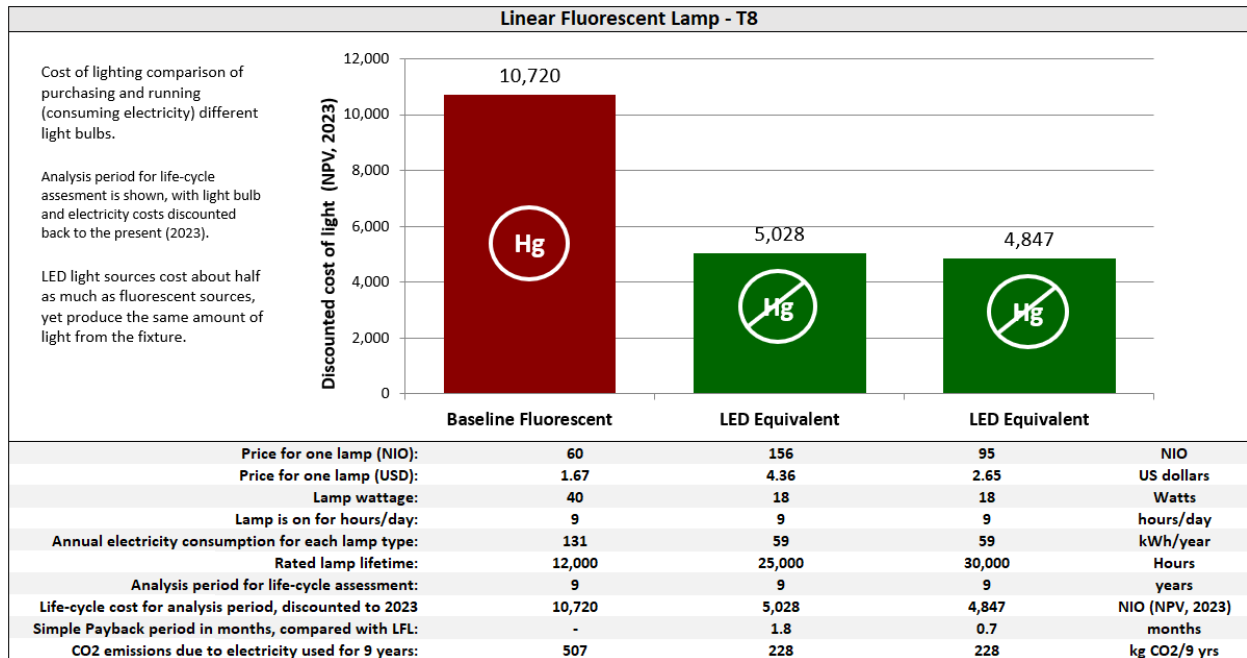
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, Nicaragua was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed in the framework of *Proyecto Mesoamerica* with the support of the UNEP/GEF en.lighten initiative (United for Efficiency).
- The Energy Efficiency Act 956 of 2017 establishes the framework for all national and regional energy efficiency programs.

Map of LED Companies in Nicaragua



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Nicaragua.



Panama



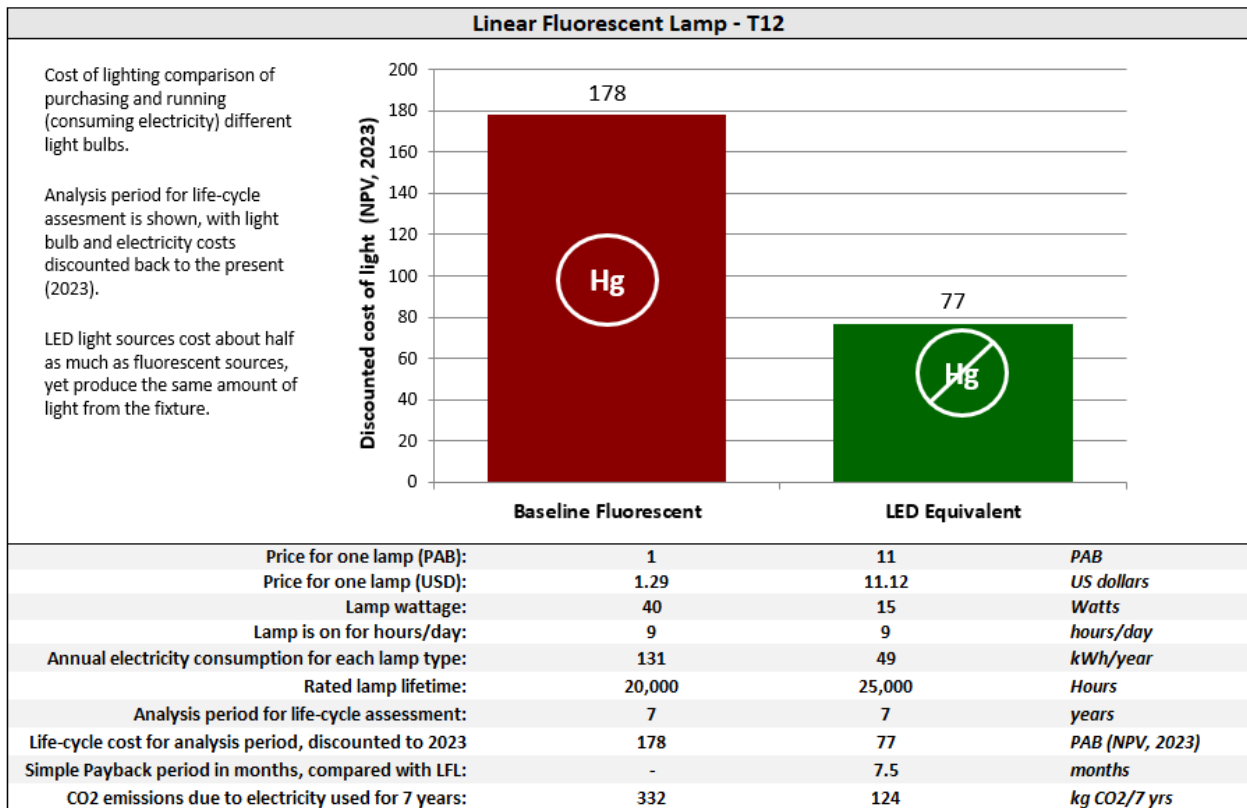
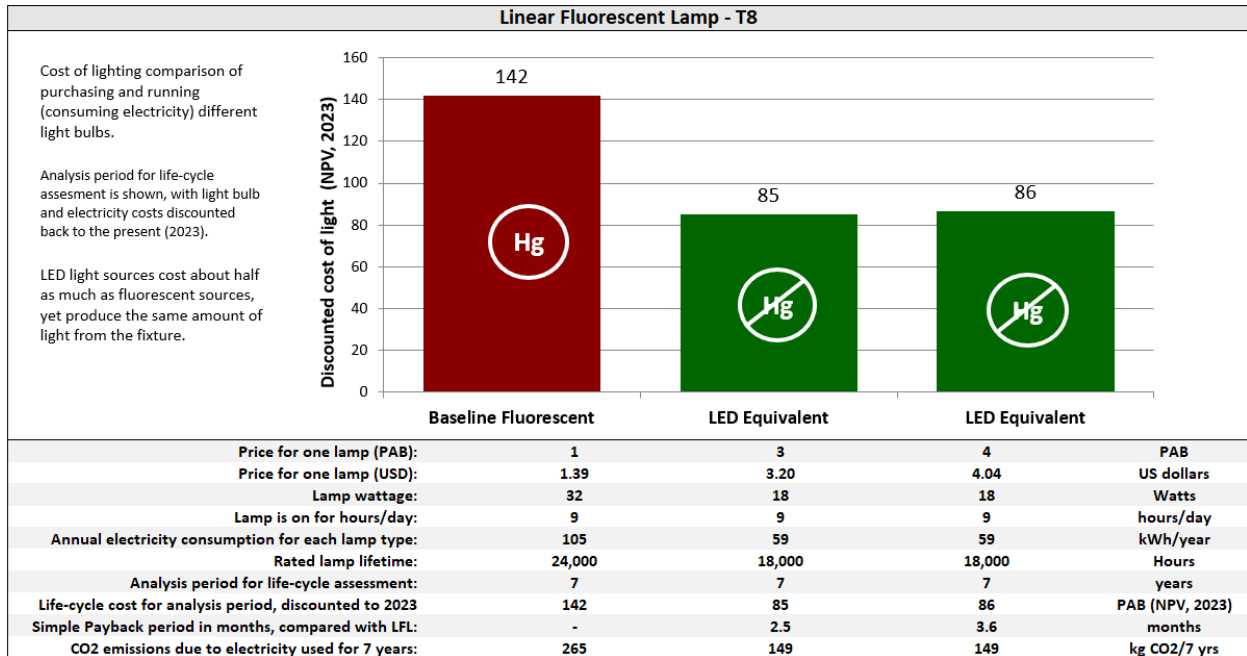
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Panama

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	5,850,000	5,230,000	4,640,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	44	39	35	kg of mercury
National electricity savings	5.60	5.07	4.55	TWh of electricity
National financial savings from avoided electricity use	1.66	1.51	1.35	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	1.63	1.47	1.30	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2013, Panama was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed in the framework of *Proyecto Mesoamerica* with the support of the UNEP/GEF en.lighten initiative (United for Efficiency).
- In 2018, the [Government of Panama prohibited appliances](#) (i.e., air conditioners, lamps, and refrigerators) that do not meet certain minimum energy efficiency requirements from entering the country. Promoting efficient equipment is one of the aspects included in Law 69 of 12 October 2012, which establishes a policy for the rational use, and efficiency, of energy (UREE).
- Law 69 is [regulated by the Ministry of the Presidency of Panama through Executive Decree No. 398 of 19 June 2013](#). This regulation seeks to raise awareness among consumers to achieve rational and efficient energy use and to promote the development of new energy technologies in the country.
- At the end of 2020, the [Panamanian government approved a ten-year energy transition policy roadmap](#) that considers universal access to electricity as “priority one.” Although Panama has been working to expand rural electrification in recent years, it is estimated that approximately \$350 USD million of new investment is needed to achieve universal access by 2030.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Panama.



Peru



Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Peru

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	27,700,000	24,700,000	21,800,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	208	185	163	kg of mercury
National electricity savings	26.7	24.1	21.5	TWh of electricity
National financial savings from avoided electricity use	6.79	6.16	5.47	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	6.32	5.66	4.99	MTCO ₂

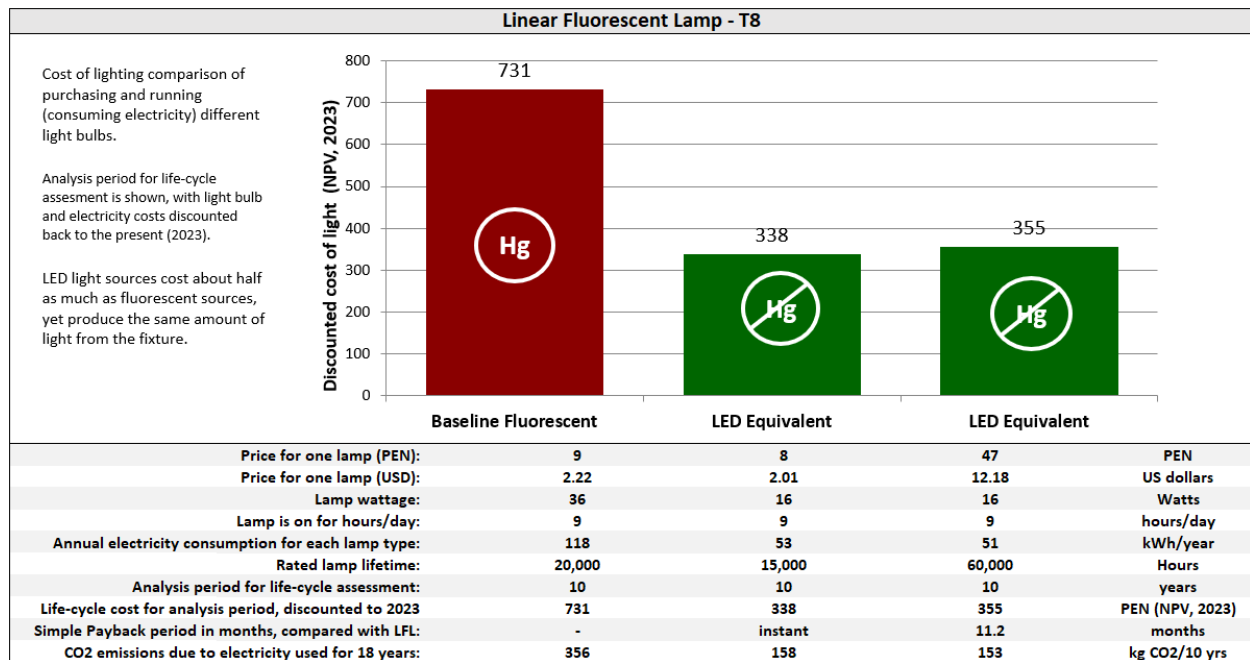
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2019, Peru approved its national plan for the implementation of the Minamata Convention on Mercury, through Supreme Decree No. 004-2019.
- A lighting market study developed by MINEM in 2015 projected that, from 2021, the purchases of spotlights in the country would migrate massively towards the purchase of LED bulbs and that, from 2024, incandescent bulbs would disappear from the national market.
- Peru has a climate change mitigation measures program, which includes transforming the residential lighting market through more efficient technology.
- Peru has a technical regulation on energy efficiency labeling for energy equipment, approved in 2017 by MINEM through Supreme Decree No. 009-2017-EM. This technical regulation aims to establish energy efficiency labeling as an obligation, also defining the technical requirements and energy efficiency ranges for equipment classification to protect the environment and safeguard consumers' and users' right to information.
- In 2016, a Supreme Decree approving measures for efficient energy use (Supreme Decree No. 004-2016-EM) was promulgated. This regulation requires that entities and/or public companies acquiring or replacing energy equipment must do so with the most efficient technology that exists in the market at the time of purchase.

Map of LED Companies in Peru



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Peru.



Paraguay



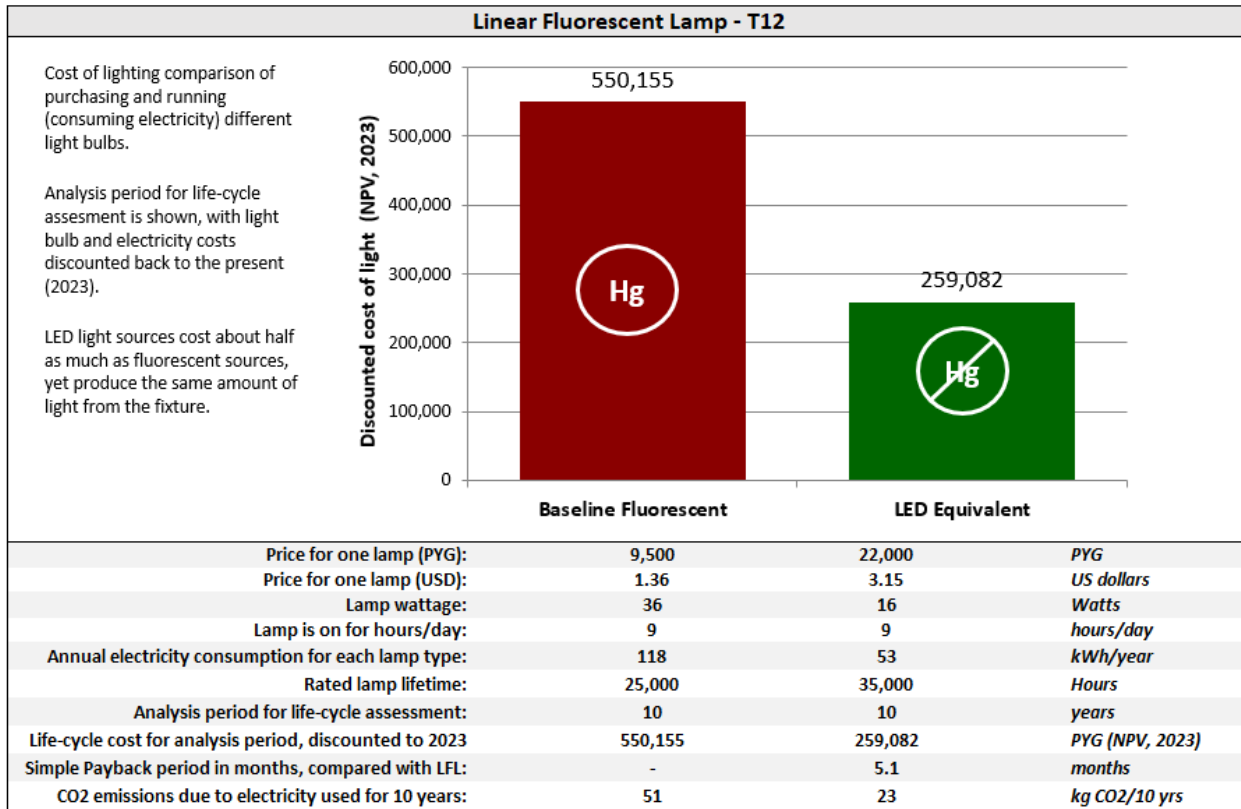
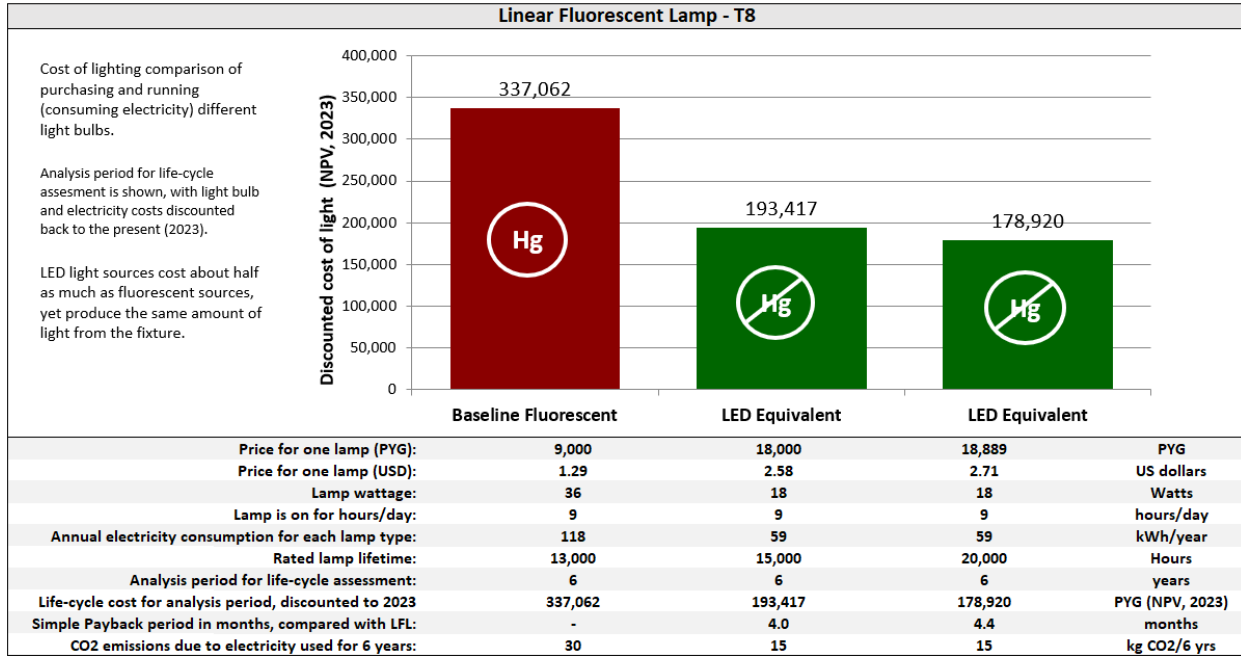
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Paraguay

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	7,040,000	6,330,000	5,630,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	53	48	42	kg of mercury
National electricity savings	6.75	6.14	5.53	TWh of electricity
National financial savings from avoided electricity use	0.67	0.61	0.55	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.27	0.25	0.22	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- The National Energy Efficiency Committee (CNEE) was created in 2011 by Decree N. 6377 with the purpose of developing and implementing the National Plan for the Efficient Use of Energy in the Republic of Paraguay. This plan takes into consideration energy efficiency policies for lighting products.
- Paraguay's National Energy Policy 2040 establishes the guidelines and goals for the development of any energy efficiency regulations in the country.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Paraguay.



El Salvador



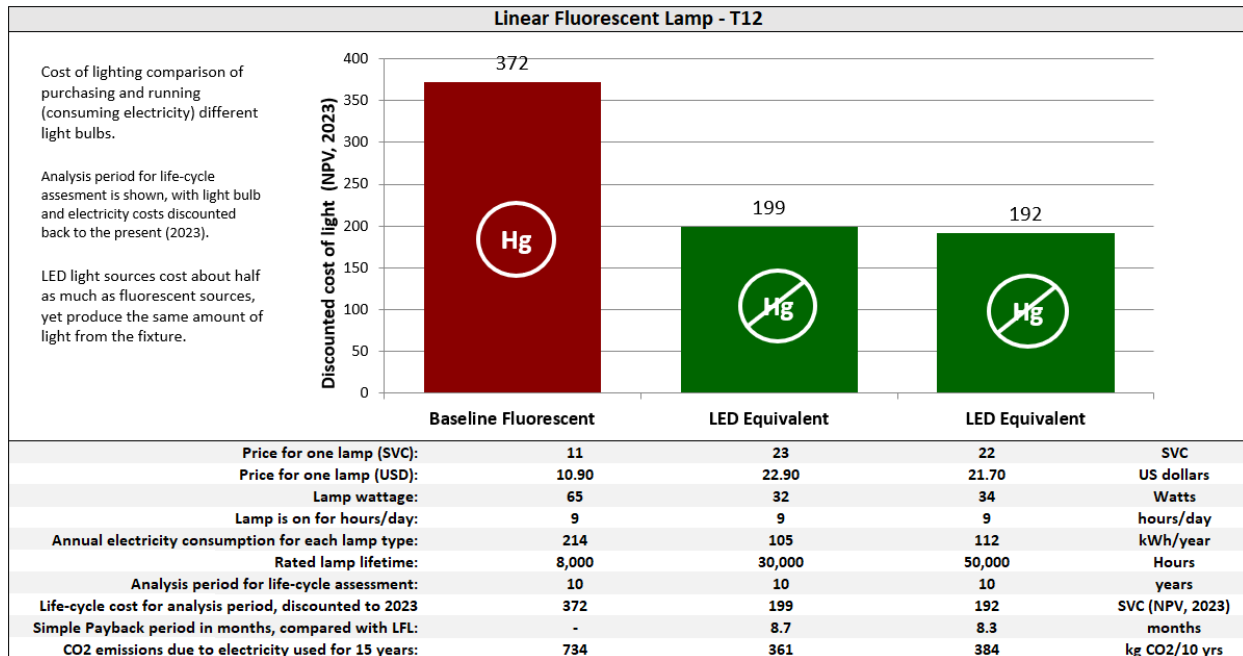
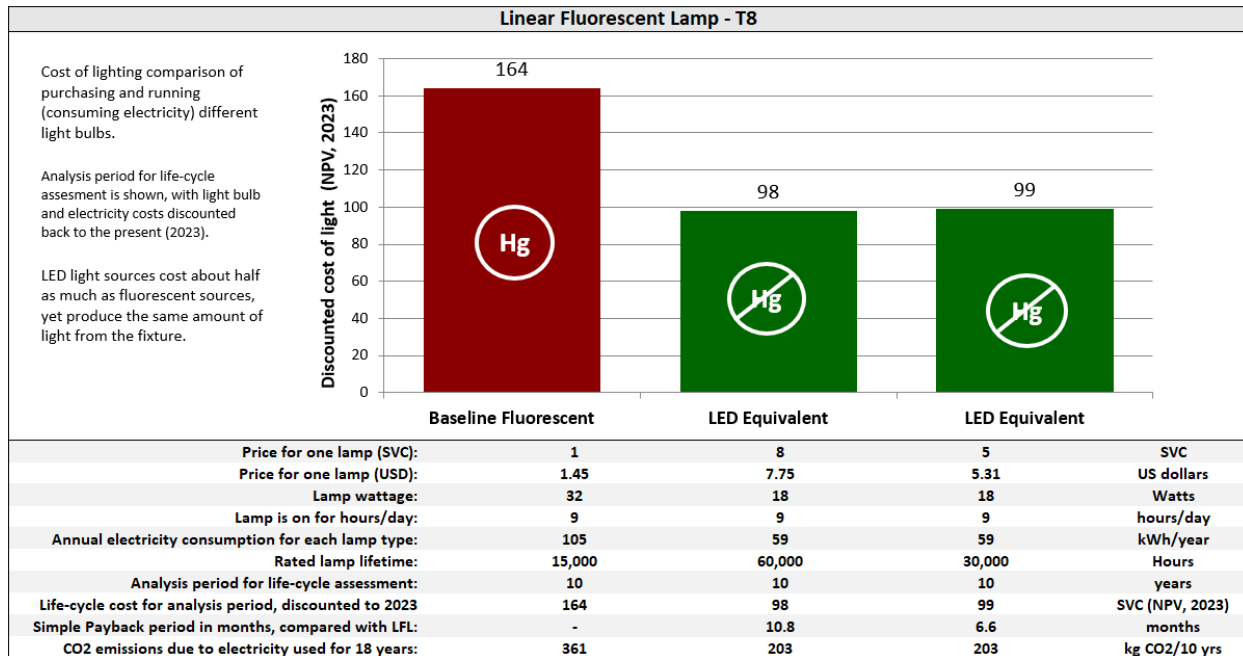
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in El Salvador

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	4,390,000	3,990,000	3,600,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	33	30	27	kg of mercury
National electricity savings	4.17	3.84	3.50	TWh of electricity
National financial savings from avoided electricity use	0.82	0.76	0.69	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	1.13	1.03	0.93	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2014, El Salvador was one of the co-signatories of the Central American Regional Efficient Lighting Strategy, a document developed in the framework of *Proyecto Mesoamerica* with the support of the UNEP/GEF en.lighten initiative (United for Efficiency).
- RTS 29.02.01:21, which entered into force on 23 February 2023, establishes technology-specific MEPS for lamps and luminaires at 65 lm/W for LED lamps and 40 lm/W for CFLs.
- El Salvador has eight other energy efficiency technical regulations to reduce energy consumption, also establishing MEPS for air conditioning, electric motors, and refrigeration.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in El Salvador.



Suriname



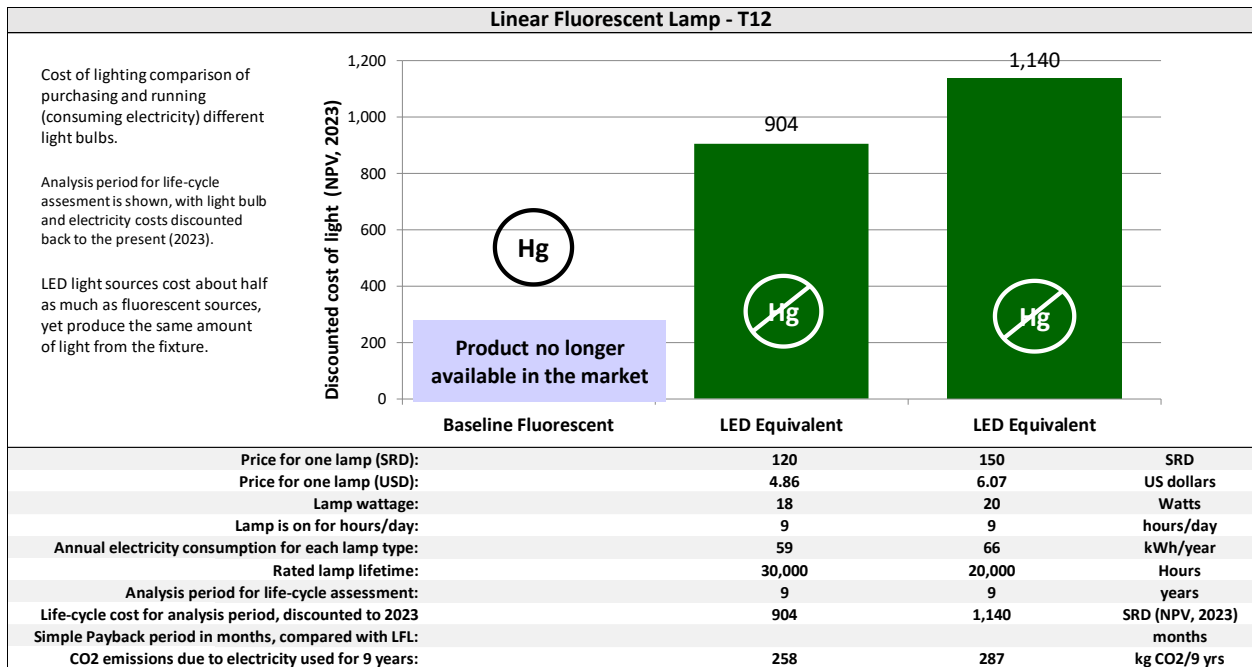
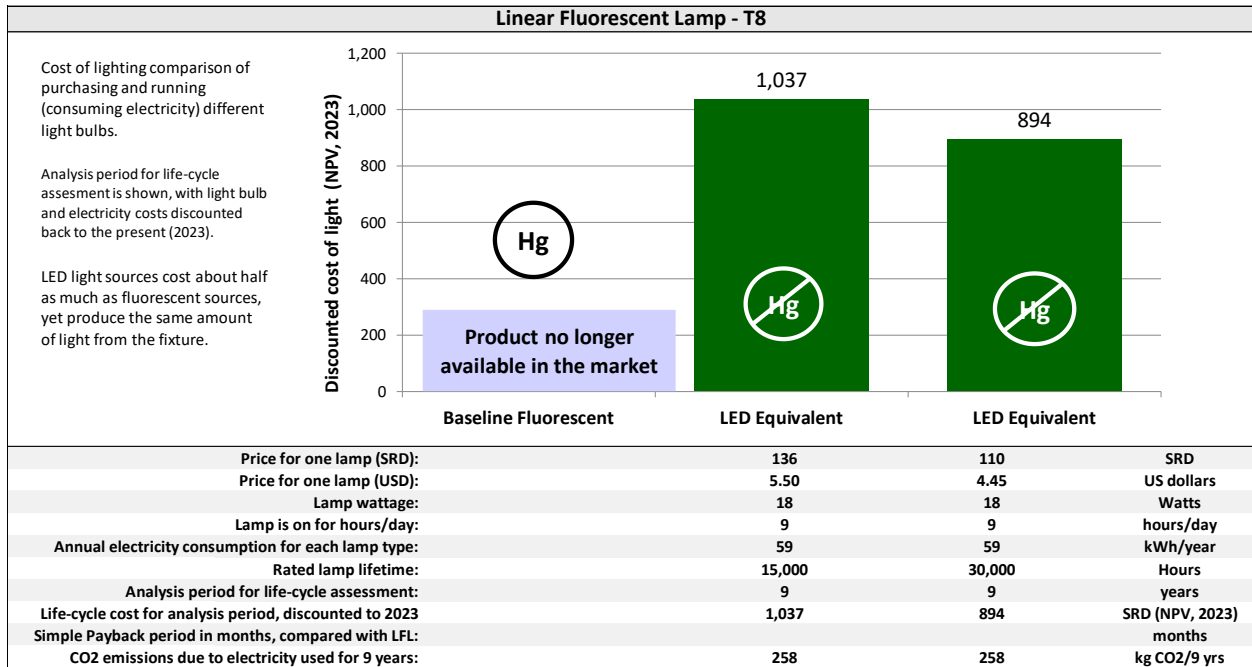
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Suriname

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	1,550,000	1,430,000	1,310,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	12	11	10	kg of mercury
National electricity savings	1.43	1.34	1.24	TWh of electricity
National financial savings from avoided electricity use	0.08	0.08	0.07	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	0.54	0.50	0.45	MTCO ₂

National Policies, Regulations, and Initiatives Around Mercury and Lighting

- In 2018, the Caribbean Development Bank approved a loan of \$30 million USD to Suriname to replace its 40,000 streetlights with LED lamps.
- Since 2016, the Electricity Act has provided a framework for the adoption of energy efficiency policies in the country.

The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Suriname.





Uruguay

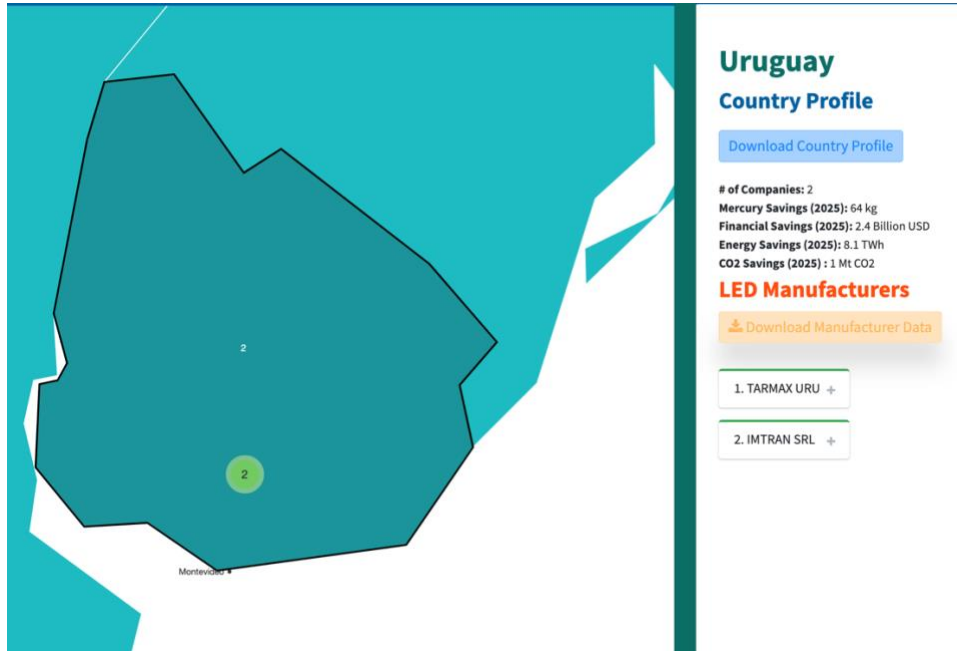
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Uruguay

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	8,520,000	7,780,000	7,050,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	64	58	53	kg of mercury
National electricity savings	8.08	7.45	6.82	TWh of electricity
National financial savings from avoided electricity use	2.39	2.22	2.03	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	1.02	0.93	0.85	MTCO ₂

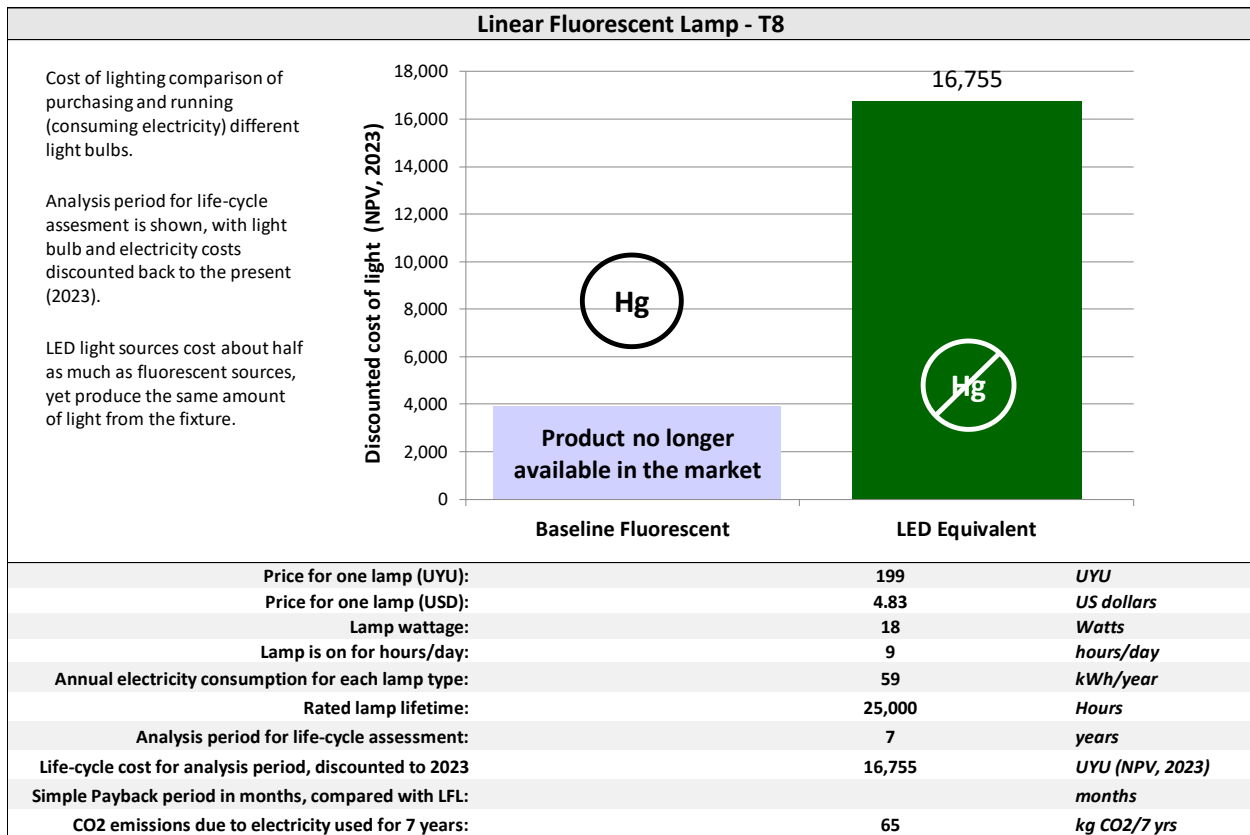
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- Decree 15/2019 of the Ministry of Environment of Uruguay (MVOTMA) regulates and promotes the adequate management of mercury-containing products. This includes products covered in Annex A of the Minamata Convention (i.e., compact and linear fluorescent lamps, high-pressure mercury vapor lamps, cold cathode fluorescent lamps, external electrode fluorescent lamps, high-discharge lamps, thermometers, and pressure measuring devices). These products may not exceed the maximum mercury content established in the Minamata Convention.
- Decree 15/2019 also establishes the obligation for importers of mercury-containing products to design and implement a sound end-of-life management system, including the reception, collection, storage, treatment, and destination of the mercury-containing waste.
- In 2013, the MVOTMA, with the support of the UNEP/GEF en.lighten initiative (United for Efficiency), developed its National Efficient Lighting Strategy. This strategy set the goals for phasing out inefficient lamps and certain mercury-containing lamps such as high-pressure mercury lamps used for public lighting. It also presented plans for the sound management of mercury in fluorescent lamps.
- As per CLiC's research partners in Uruguay, fluorescent lamps are not found for sale in the country as of May 2023.

Map of LED Companies in Uruguay



The following tables compare the costs and benefits of fluorescent and LED lighting technologies in Uruguay.

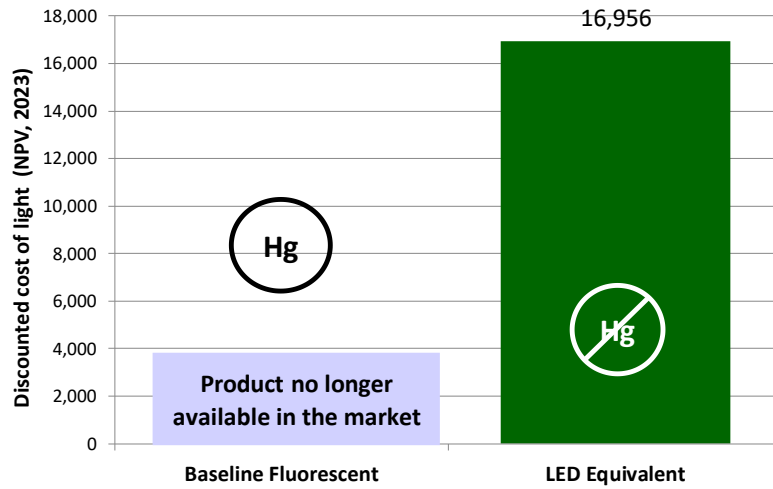


Linear Fluorescent Lamp - T12

Cost of lighting comparison of purchasing and running (consuming electricity) different light bulbs.

Analysis period for life-cycle assesment is shown, with light bulb and electricity costs discounted back to the present (2023).

LED light sources cost about half as much as fluorescent sources, yet produce the same amount of light from the fixture.



Price for one lamp (UYU):	400	UYU
Price for one lamp (USD):	9.72	US dollars
Lamp wattage:	18	Watts
Lamp is on for hours/day:	9	hours/day
Annual electricity consumption for each lamp type:	59	kWh/year
Rated lamp lifetime:	25,000	Hours
Analysis period for life-cycle assesment:	7	years
Life-cycle cost for analysis period, discounted to 2023	16,956	UYU (NPV, 2023)
Simple Payback period in months, compared with LFL:		months
CO2 emissions due to electricity used for 7 years:	65	kg CO2/7 yrs



Venezuela

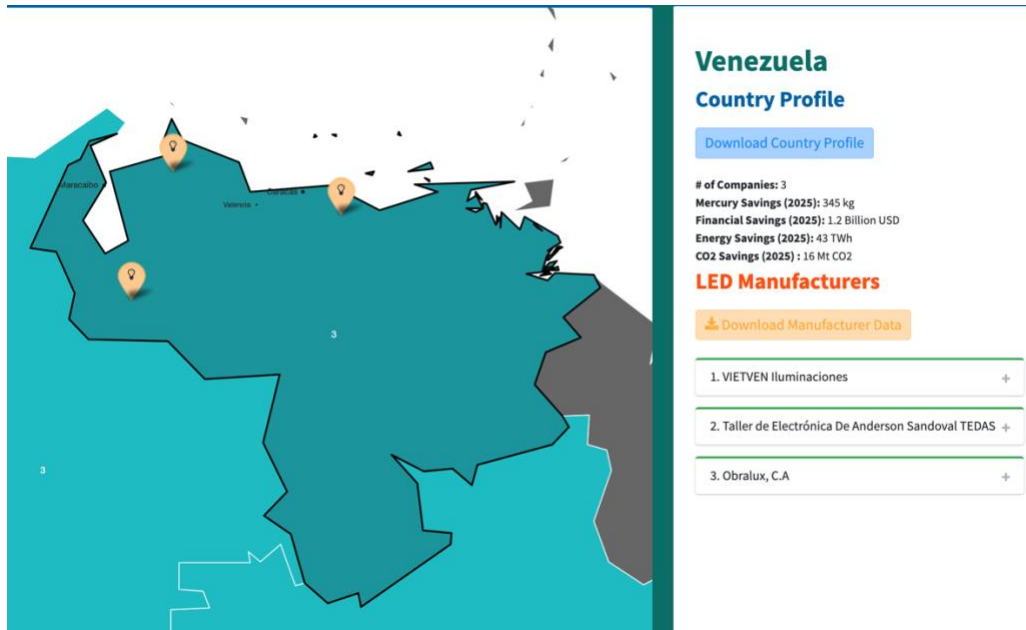
Table 1. Benefits of LFL Phase Out in 2025, 2026, and 2027 in Venezuela

Benefits of Fluorescent Lighting Phase Out	LFL Phase Out in 2025	LFL Phase Out in 2026	LFL Phase Out in 2027	Unit
Avoided lamp sales	46,000,000	42,100,000	38,300,000	Units of lamps
Total avoided mercury uses in fluorescent lamp manufacturing	345	316	287	kg of mercury
National electricity savings	43.2	39.8	36.5	TWh of electricity
National financial savings from avoided electricity use	1.22	1.13	1.03	Billion USD
Total CO ₂ emissions mitigated from avoided electricity use	16.1	14.8	13.4	MTCO ₂

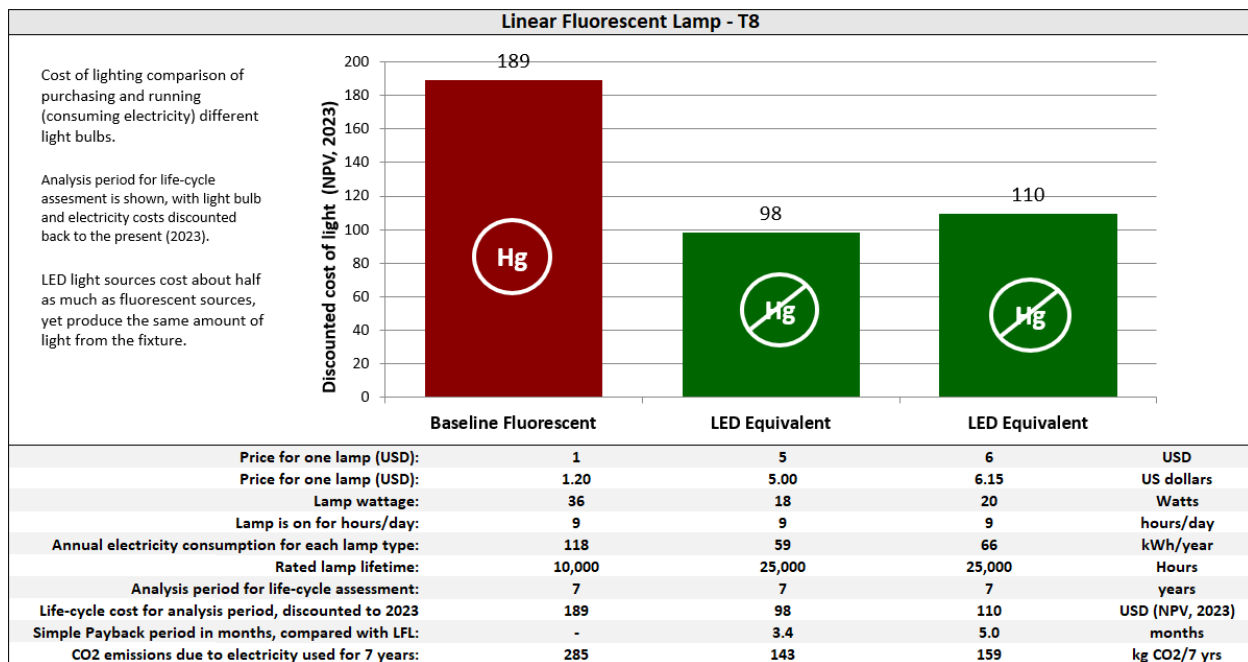
National Policies, Regulations, and Initiatives Around Mercury and Lighting

- The Rational and Efficient Use of Energy Act (UREE) establishes a framework for energy efficiency activities in the country.
- Corpoelec, the national electricity provider, has implemented a Rational and Efficient Use of Energy campaign to educate Venezuelans about energy efficiency and incentivize the transition to more efficient appliances.
- In 2021, Corpoelec announced the distribution of 1.5 million LED bulbs to organized communities, targeting more than 300,000 families.
- In 2022, Corpoelec installed more than 125,000 LED streetlights throughout the country.

Map of LED Companies in Venezuela



The following table compares the costs and benefits of fluorescent and LED lighting technologies in Venezuela.



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