

# Economic Analysis – Work in Progress

FORTALECIMIENTO DE ESTÁNDARES DE EFICIENCIA ENERGÉTICA EN ILUMINACIÓN  
Primera Reunión y Taller Presencial del Grupo Técnico de Eficiencia Energética (GTEE)

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# Economic Analysis

For each country in SICA

- Calculation for economic benefit for General Lighting Lamps and for Street Lighting
- Comparison of incandescent, halogen, CFL and LED



Lamp type	Incandescent	Halogen	CFL	LED	
Lamp wattage:	60	52	15	7	Watts

- Comparison of HPS with three different LED replacements



Technology type:	150W HPS	110lm/W LED	130lm/W LED	150lm/W LED	
Lamp wattage:	165	83	70	61	Watts

# Spreadsheet Table Calculation

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Takes Inputs from the country and calculates the following:

- Electricity consumption and savings
- Life-cycle cost of one lamp over the analysis period shown
- Payback period and internal rate of return
- CO<sub>2</sub> emissions calculations

# Overall Spreadsheet Table

## Costa Rica

Spreadsheet to look at cost-effectiveness of efficient lighting policy measures.



Country:	Costa Rica	Colón
Currency conversion to US\$:	0.0017	CR Colón
Lamp is on for hours/day:	4.00	hours/day
Electricity price:	0.15	US\$/kWh
Electricity price:	88.24	Colón/kWh
Annual change in price of Electricity:	7.0%	percent
Electricity CO2 intensity:	0.053	kg CO2/kWh
Discount Rate	7.0%	percent

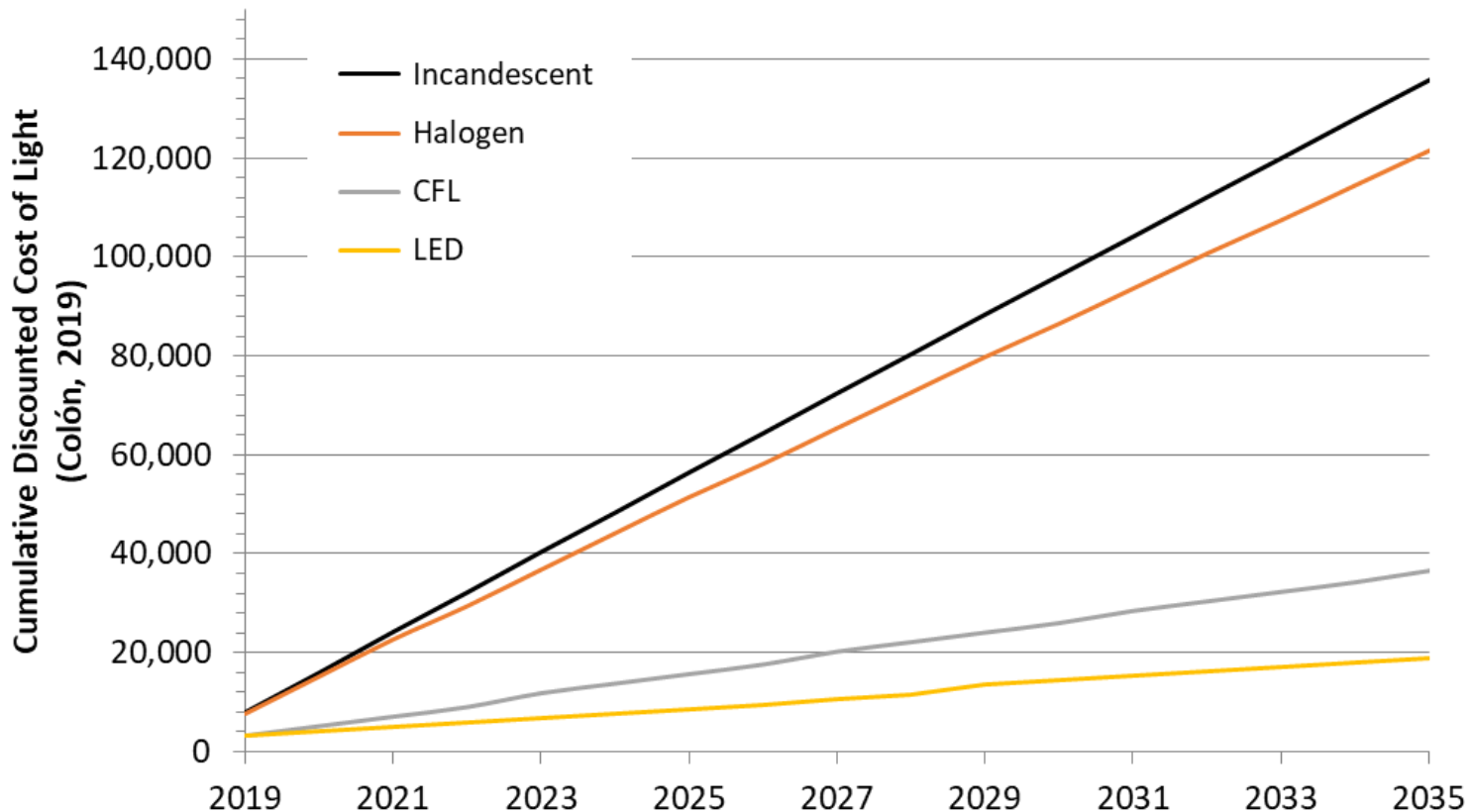


Lamp type	Incandescent	Halogen	CFL	LED	
Lamp wattage:	60	52	15	7	Watts
Rated lamp lifetime:	1000	2000	6000	15000	Hours
Price for one lamp (USD):	0.50	1.50	2.00	4.00	US\$/lamp
Price for one lamp (Colón):	294	882	1,176	2,353	Colón/lamp
<b>Electricity consumption and savings calculations</b>					
Annual electricity consumption for each lamp type:	88	76	22	10	kWh/year
Annual electricity savings compared to incandescent lamps:	---	11	66	77	kWh/year
Percent electricity savings compared with incandescent lamps:	---	13%	75%	88%	percent
Electricity cost for operating the lamps each year:	7,729.41	6,721.23	1,932.35	901.76	Colón/year
Financial savings of electricity costs per year vs. incandescent:	---	1008.18	5797.06	6827.65	Colón/year
<b>Life-Cycle Cost (LCC) of one lamp over analysis period shown</b>					
LCC time period of analysis:	10.0	10.0	10.0	10.0	years
LCC of operating lamp for 10 years, discounted to 2019:	80,352.94	72,573.60	22,082.24	11,370.59	Colón (NPV, 2019)
LCC savings of more efficient lamp compared with an incandescent:	---	7,779.34	58,270.70	68,982.35	Colón (NPV, 2019)
Percent LCC savings compared with incandescent lamps:	---	10%	73%	86%	percent
LCC savings are (X) times larger than halogen LCC savings:	---	---	7.5	8.9	times greater
<b>Payback period and Internal Rate of Return calculations</b>					
Simple Payback period in years, compared with incandescent:	---	0.58	0.15	0.30	years
Simple Payback period in months, compared with incandescent:	---	7.0	1.8	3.6	months
Payback period is (X) percent better than halogen payback period:	---	---	74%	48%	shorter
Internal Rate of Return (IRR), compared with incandescent:	---	91%	746%	378%	percent
<b>CO2 emissions calculations</b>					
CO2 emissions due to electricity for one lamp operating for 10 years:	46.4	40.4	11.6	5.4	kg CO2/10 yrs
CO2 savings compared with an incandescent lamp:	---	6.1	34.8	41.0	kg CO2/10 yrs
CO2 savings is (X) percent more than halogen CO2 savings:	---	---	475%	577%	percent

## Graphical Results – 1 of 2 – Example for Costa Rica

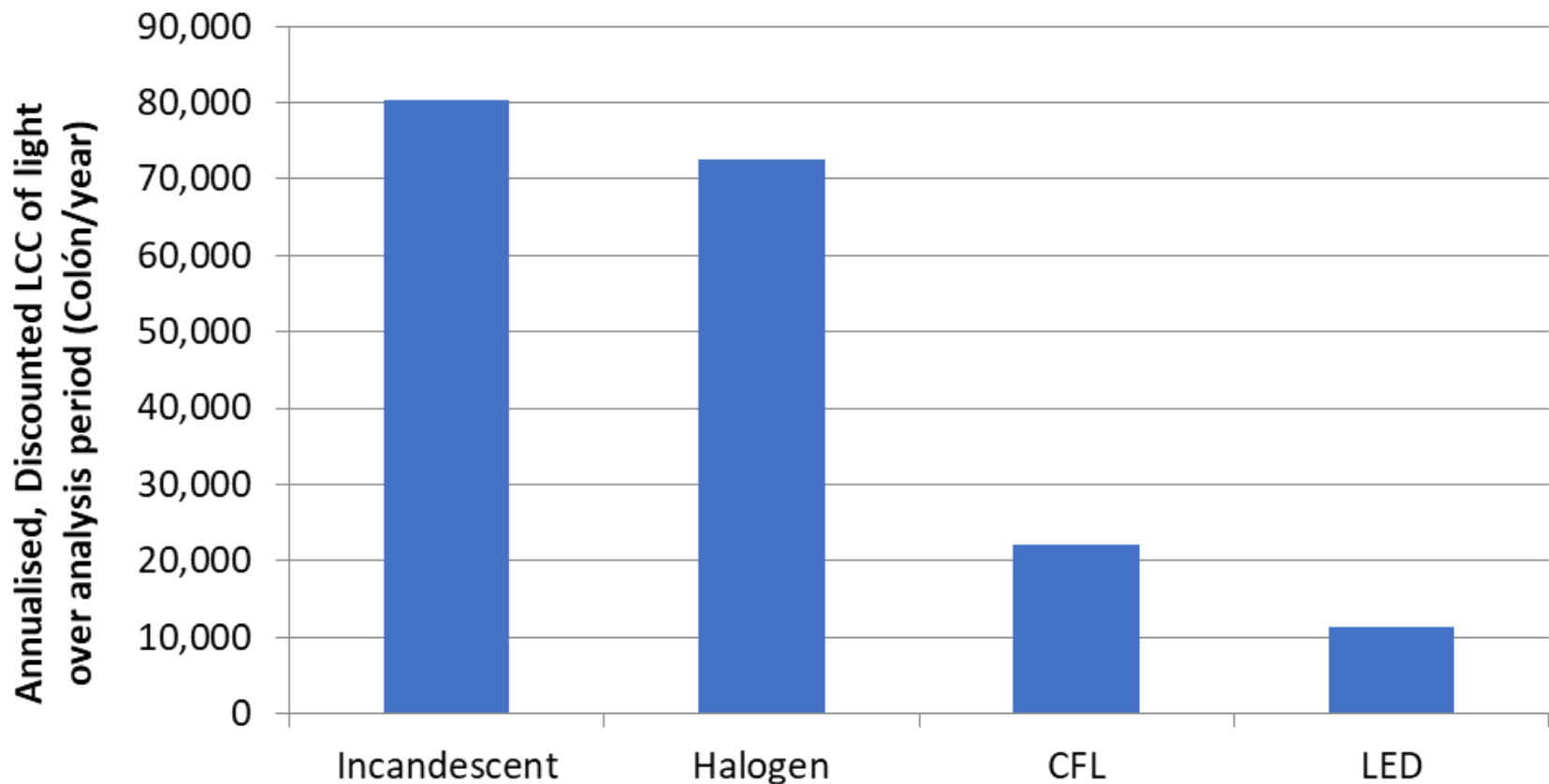
Cumulative, discounted cost of light (including lamps and electricity only, labor is assumed to be no cost) over time.

Incandescent and halogen lamps are already more expensive even from the first year – running costs.



## Graphical Results – 2 of 2 – Example for Costa Rica

Life-Cycle Cost of Operating the Lamp for 10 years, discounted to 2019.



Switch to Excel to show the spreadsheet

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# Data Requested

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- Electricity price – average household and street lighting
- Electricity price – percent annual increase
- Discount rate - Consumer and Utility/Municipal
- General lamp prices – 60W equivalent (800 lumens)
  - Incandescent, halogen, CFL, LED
- Street light prices – (e.g., municipal tenders, estimates)
  - 150W HPS – replacement lamp / new luminaire
  - Three LED luminaires – good, better, best quality



# Thank you, any questions?

For more information visit [www.clasp.ngo](http://www.clasp.ngo) or contact:

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