Mozambique

U4E United for Efficiency

Product scope	**Lighting**	**Cooling**		**Equipment**	
	All Lighting	Residential Refrigerators	Room Air Conditioners	Industrial Electric Motors	Distribution Transformers

A summary of the benefits attained from improved energy efficiency through the implementation of Minimum Energy Performance Standards at two levels of ambition (minimum and high). More detailed reports for lighting, cooling and equipment can be downloaded from the United Nations Environment Programme (UNEP) United For Efficiency (U4E) website.

ANNUAL SAVINGS IN 2030*

Reduce electricity use by over **780 GWh** which is

5.5% of current national electricity use

Save electricity worth **95 Million US$**

equivalent to over **1 Power Plant [100MW each]**

Reduce electricity CO_2 emissions by over **1.1 Million tonnes**

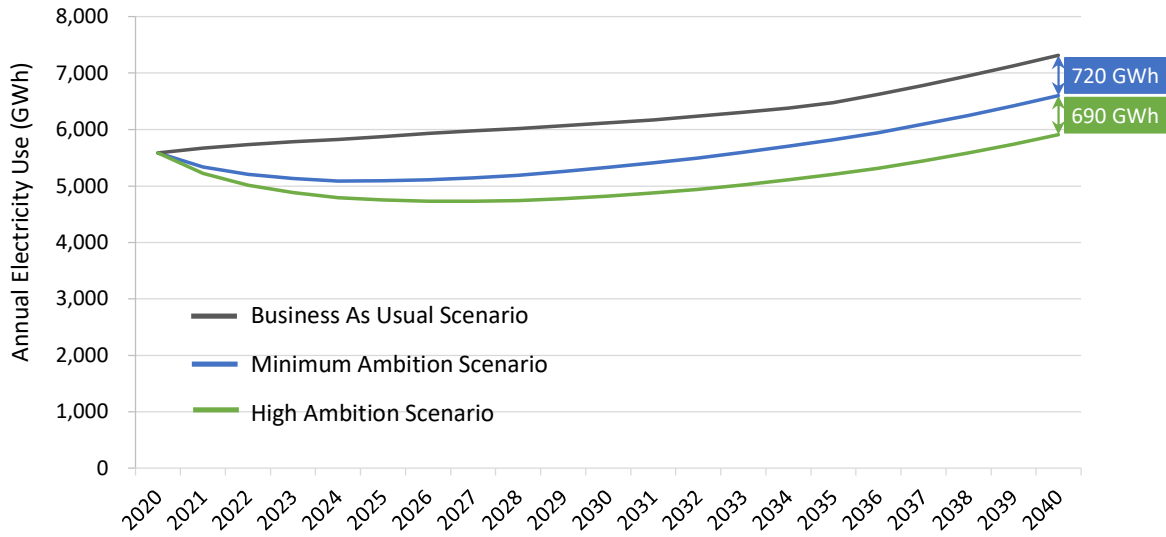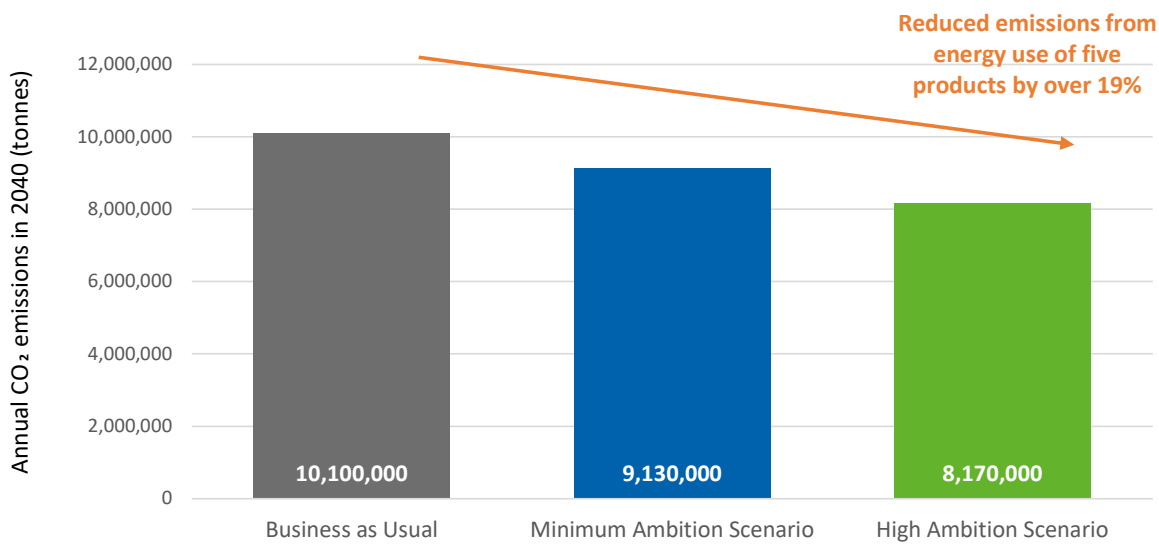equivalent to **620 Thousand Passenger Cars**

ELECTRICITY SAVINGS OVER TIME*
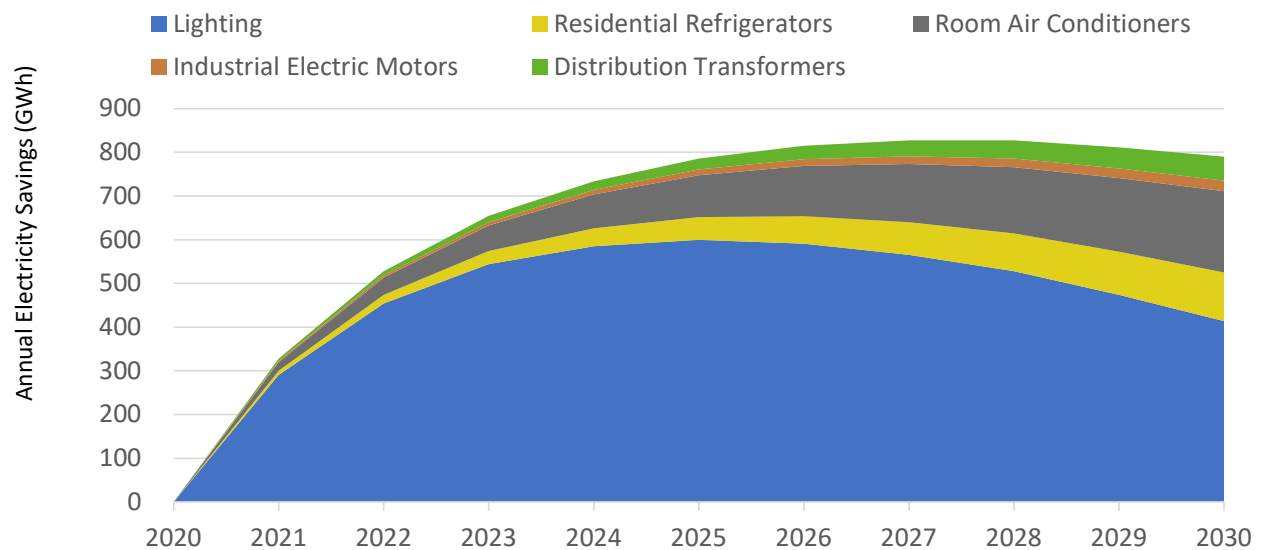
Legend: Lighting, Residential Refrigerators, Room Air Conditioners, Industrial Electric Motors, Distribution Transformers

Y-axis: Annual Electricity Savings (GWh)

AND EVEN MORE BENEFITS

THE MORE AMBITIOUS THE REGULATION, THE MORE SAVINGS ARE POSSIBLE

Annual Electricity Use (GWh)

— Business As Usual Scenario
— Minimum Ambition Scenario
— High Ambition Scenario

720 GWh
690 GWh

MEET GLOBAL CLIMATE GOALS BY SIGNIFICANTLY DECREASED EMISSIONS

Reduced emissions from energy use of five products by over 19%

Annual CO_2 emissions in 2040 (tonnes)

Business as Usual	Minimum Ambition Scenario	High Ambition Scenario
10,100,000	9,130,000	8,170,000

OTHER BENEFITS ACHIEVED IN 2030*

🏠 Increased grid connection to **390 Thousand households**

❄ Reduced cumulative direct GHG emissions by **17 Thousand tonnes**

* Denotes savings are from the Minimum Ambition Scenario.
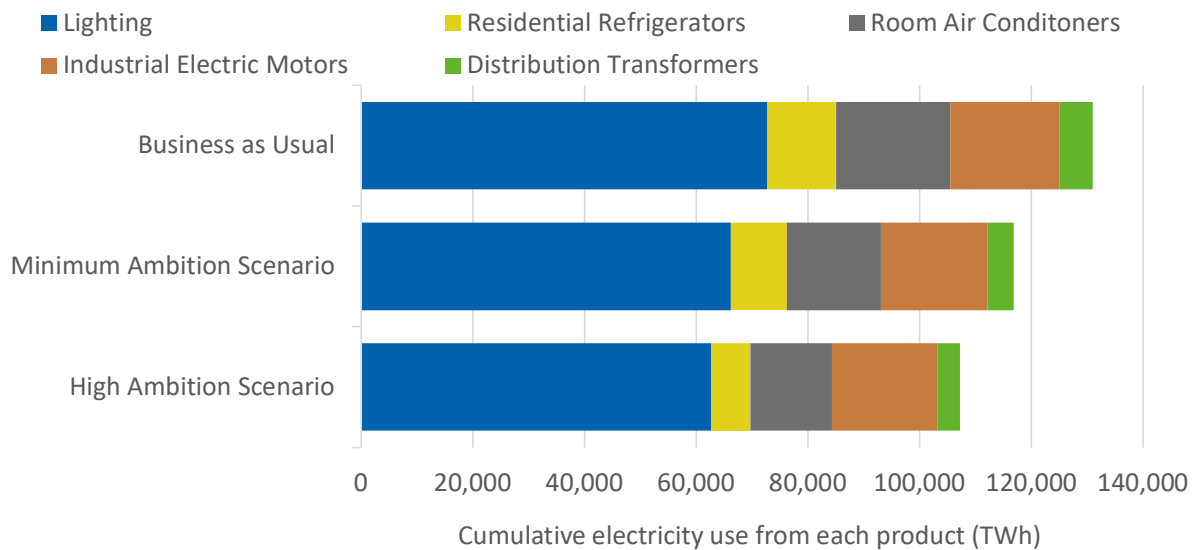U4E COUNTRY ASSESSMENT, OCTOBER 2020 (UPDATE)

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DETAILED BENEFITS

ANNUAL SAVINGS IN 2030 AND 2040*

		Lighting		Cooling				Equipment			
				Residential Refrigerators		Room Air Conditioners		Industrial Electric Motors		Distribution Transformers	
		2030	2040	2030	2040	2030	2040	2030	2040	2030	2040
	Electricity (GWh)	410	34	110	210	190	300	24	48	55	130
	Electricity Bills (Million US$)	50	4.0	13	25	22	36	2.9	5.8	6.6	16
	CO2 Emissions (Thousand tonnes)	590	48	160	290	260	420	35	68	78	190

CUMULATIVE SAVINGS BY 2030 AND 2040*

		Lighting		Cooling				Equipment			
				Residential Refrigerators		Room Air Conditioners		Industrial Electric Motors		Distribution Transformers	
		2030	2040	2030	2040	2030	2040	2030	2040	2030	2040
	Electricity (GWh)	5,000	6,500	590	2,300	1,000	3,600	140	510	290	1,200
	Electricity Bills (Million US$)	610	780	70	270	130	440	16	61	34	150
	CO2 Emissions (Thousand tonnes)	7,200	9,200	840	3,200	1,500	5,200	190	720	410	1,800

CONTRIBUTION TO CUMULATIVE ELECTRICITY USE BY 2040

Legend:
- Lighting
- Residential Refrigerators
- Room Air Conditoners
- Industrial Electric Motors
- Distribution Transformers

Categories (y-axis): Business as Usual, Minimum Ambition Scenario, High Ambition Scenario

X-axis: Cumulative electricity use from each product (TWh) — 0, 20,000, 40,000, 60,000, 80,000, 100,000, 120,000, 140,000

Country Data and Input Assumptions

GENERAL INFORMATION

Population	30.5 Million
GDP per capita	490 US$
Electrification level	29.3%
CO2 Emission Factor	1.00 kg / kWh

ELECTRICITY MARKET

Residential Electricity tariff	0.12 US$ / kWh
Transmission and distribution loss factor	30.0%

ASSUMPTIONS

Product	Unit Energy Consumption (kWh/year) or Efficiency Level			Type of Product
	Business As Usual	Minimum Ambition Scenario	High Ambition Scenario	
Lighting GSL Linear HID	15W CFL 15 36W T8 108 70W HPS 307	10W LED 10 20W LED 60 50W LED 219	7W LED 7 16W LED 48 40W LED 175	800 lumen light bulb: 1,000 hrs/year 4 foot tube: 3,000 hrs/year Poletop street light: 4,380hrs/year
Cooling Residential Refrigerators	340	247	123	2-door refrigerator freezer of average size 210 liters
Room Air Conditioners	3,198	2,049	1,503	A mix of 3.5 kW and 7 kW split units with a weighted-average cooling capacity of 5 kW
Equipment Industrial Electric Motors (IEC level)	IE0	IE2	IE3	3-phase induction motors used in the industrial sector
Distribution Transformers (Model regulation level)	See note	Level 1	Level 2	Three-phase and single-phase liquid-filled and three-phase dry-type power distribution transformers

Distribution transformers Note: it is assumed that distribution transformers have losses in line with those assumed in the CENELEC harmonization research for the development of the EU standards.

METHODOLOGY

The analysis uses the UNEP-U4E's Country Savings Assessment Models to estimate the impacts of implementing policies that improve the energy efficiency of each product analysed. The savings potential in each scenario assumes Minimum Energy Performance Standards (MEPS) are introduced in 2020 at two different levels of ambition (minimum and high) as shown above.

ASSUMPTIONS AND DATA SOURCES

■ Market size is based on data from industry partners, the UN COMTRADE database and market penetration forecasts generated by U4E Country Savings Assessment Models using data on population, climate, income and other macroeconomic indicators as detailed below.

■ Population (2019 and future forecasts) comes from the UN Population Division.

■ GDP per capita data (2018) comes from the World Bank with future growth forecasts derived from the IPCC's SSP3 scenario.

■ Cooling Degree Days are based on average monthly temperatures from weatherbase.com, degreedays.net or given by wunderground.com.

■ Current total electricity consumption comes from the World Bank and the US Energy Information Administration (EIA) with future forecasts derived from the International Energy Agency's (IEA) World Energy Outlook 2018.

■ Residential electricity tariffs are based on IEA data.

■ Transmission and distribution loss factor is a regional average calculated from electricity production and consumption data published by the IEA.

■ Electrification levels come from the IEA's Word Energy Outlook 2018 and the World Bank.

■ CO2 emission factors come from the IEA and the Institute of Global Environmental Strategies (IGES) and are assumed constant in future years.

■ Product typical characteristics are based on analysis from the UNEP-U4E Model Regulation Guidelines and other data from UNEP-U4E industry partners and technical experts including the US Lawrence Berkeley National Laboratory (LBNL), the International Copper Association (ICA) and GIZ.

■ The approach of calculating the potential direct emissions saving of refrigerators and air conditioners is based on expert input from GIZ and LBNL.

■ Additional to the above sources, a questionnaire was used to gather data from country officials.

■ In a small number of instances, additional data was obtained from internet research or by using proxy data from similar markets.

Further details of the modelling approach and assumptions are available on the U4E website. For more information contact: U4E@un.org

* Denotes savings are from the Minimum Ambition Scenario.
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