# Eswatini, Kingdom of

| 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.

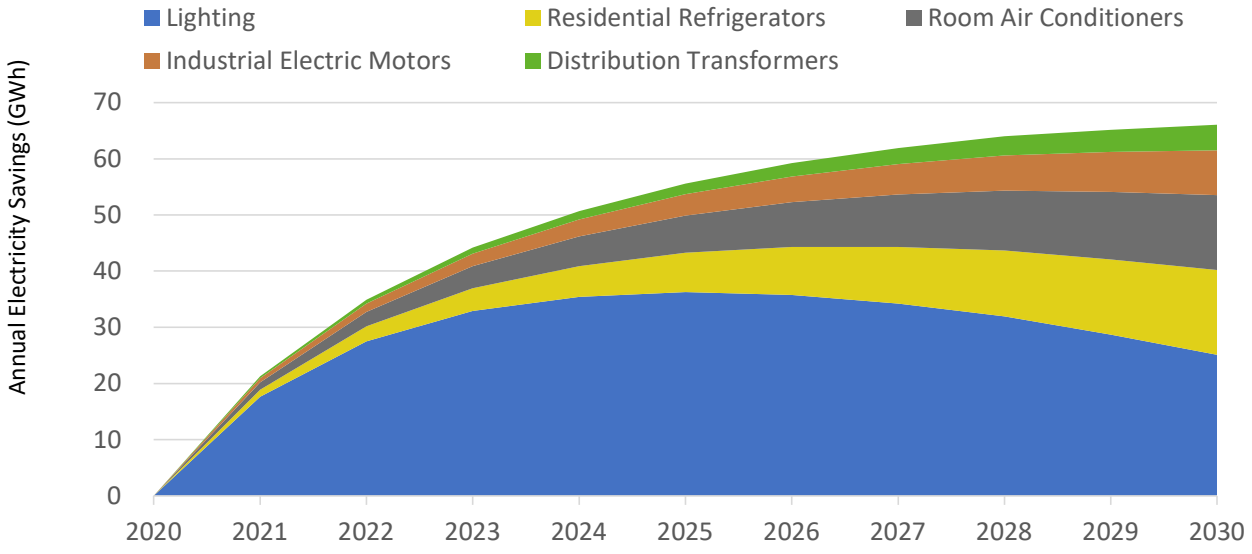
## ANNUAL SAVINGS IN 2030*

Reduce electricity use by over **66 GWh** which is **4.3%** of current national electricity use

Save electricity worth **8 Million US$** equivalent to over **3 Power Plants [5MW each]**

Reduce electricity $CO_2$ emissions by over **48 Thousand tonnes** equivalent to **27 Thousand Passenger Cars**

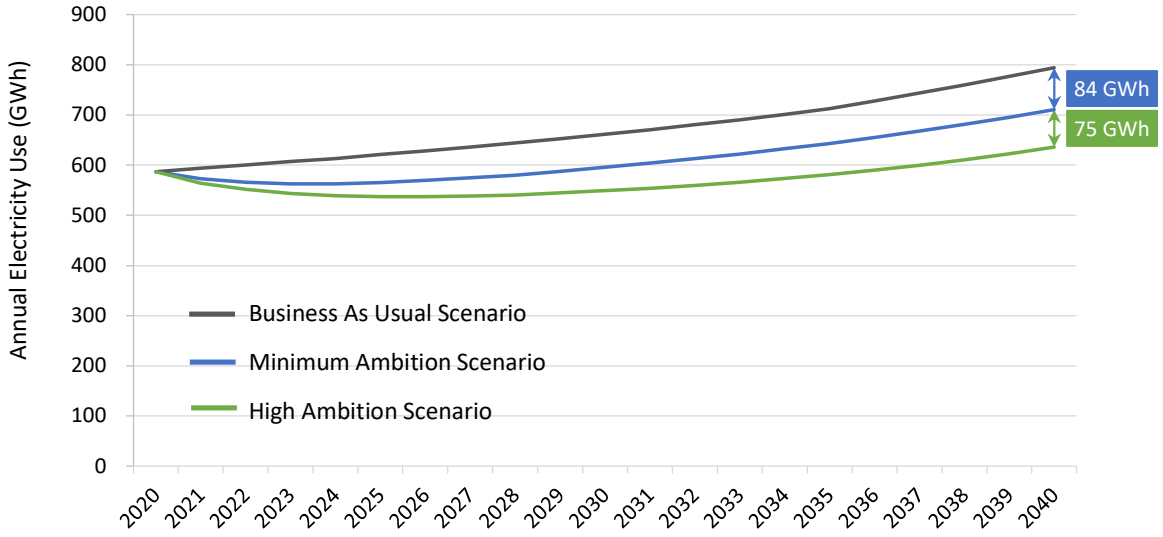
## ELECTRICITY SAVINGS OVER TIME*



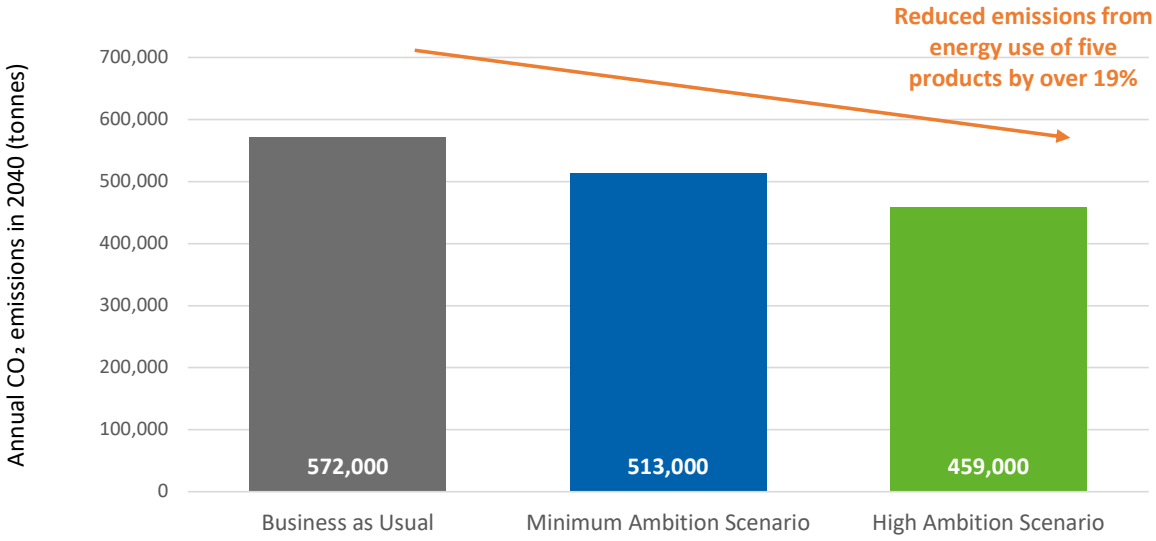

* Denotes savings are from the Minimum Ambition Scenario.

# AND EVEN MORE BENEFITS

## THE MORE AMBITIOUS THE REGULATION, THE MORE SAVINGS ARE POSSIBLE




## MEET GLOBAL CLIMATE GOALS BY SIGNIFICANTLY DECREASED EMISSIONS




## OTHER BENEFITS ACHIEVED IN 2030*

Increased grid connection to **33 Thousand households**

Reduced cumulative direct GHG emissions by **4 Thousand tonnes**

* Denotes savings are from the Minimum Ambition Scenario.

# DETAILED BENEFITS

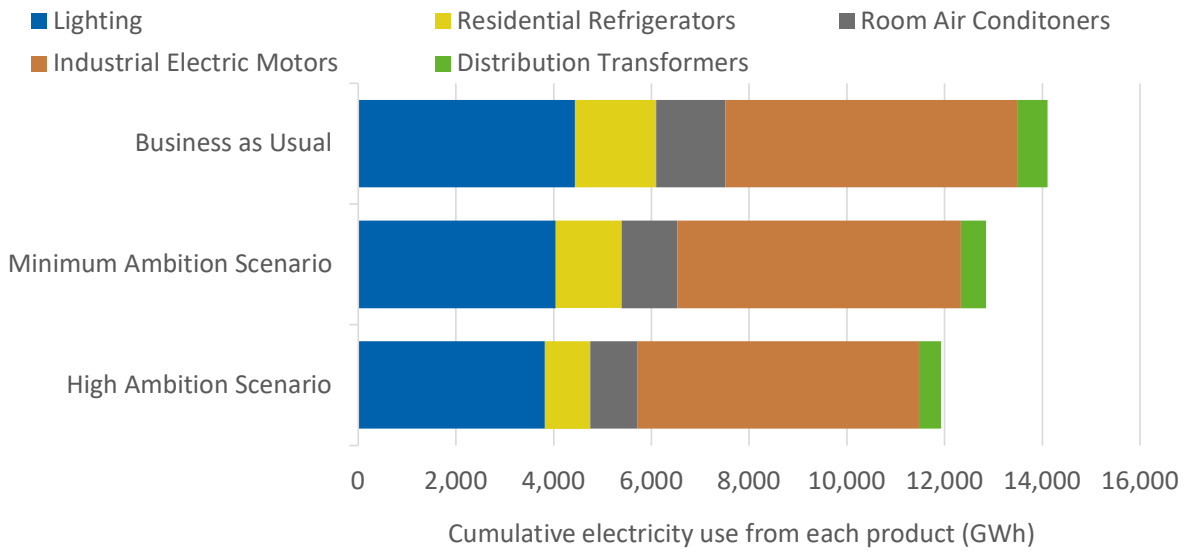
## ANNUAL SAVINGS IN 2030 AND 2040*

| | | 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) | 25 | 2.1 | 15 | 29 | 13 | 23 | 8.0 | 17 | 4.5 | 12 |
| | Electricity Bills (Thousand US$) | 3,000 | 250 | 1,800 | 3,500 | 1,600 | 2,800 | 960 | 2,000 | 550 | 1,500 |
| | CO2 Emissions (Thousand tonnes) | 18 | 1.5 | 11 | 22 | 10 | 17 | 5.9 | 12 | 3.3 | 9.0 |

## 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) | 310 | 390 | 80 | 320 | 73 | 270 | 43 | 170 | 23 | 110 |
| | Electricity Bills (Million US$) | 37 | 47 | 10 | 38 | 8.8 | 32 | 5.1 | 21 | 2.7 | 13 |
| | CO2 Emissions (Thousand tonnes) | 220 | 290 | 59 | 230 | 54 | 200 | 31 | 130 | 17 | 79 |

## CONTRIBUTION TO CUMULATIVE ELECTRICITY USE BY 2040




* Denotes savings are from the Minimum Ambition Scenario.

# Country Data and Input Assumptions

## GENERAL INFORMATION

| | |
|---|---|
| Population | 1.39 Million |
| GDP per capita | 4,140 US$ |
| Electrification level | 79.3% |
| CO2 Emission Factor | 0.64 kg / kWh |

## ELECTRICITY MARKET

| | |
|---|---|
| Residential Electricity tariff | 0.12 US$ / kWh |
| Transmission and distribution loss factor | 12.7% |

## ASSUMPTIONS

| | Product | Unit Energy Consumption (kWh/year) or Efficiency Level: Business As Usual | Minimum Ambition Scenario | High Ambition Scenario | Type of Product |
|---|---|---|---|---|---|
| Lighting | *GSL* | *15W CFL* 15 | *10W LED* 10 | *7W LED* 7 | 800 lumen light bulb: 1,000 hrs/year |
| | *Linear* | *36W T8* 108 | *20W LED* 60 | *16W LED* 48 | 4 foot tube: 3,000 hrs/year |
| | *HID* | *70W HPS* 307 | *50W LED* 219 | *40W LED* 175 | Poletop street light: 4,380hrs/year |
| Cooling | Residential Refrigerators | 340 | 247 | 123 | 2-door refrigerator freezer of average size 210 liters |
| | Room Air Conditioners | 813 | 526 | 386 | 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.