



# Benin



## Equipment



Industrial  
Electric Motors



Distribution  
Transformers

Energy efficiency benefits from industrial electric motors and distribution transformers with the implementation of Minimum Energy Performance Standards at two levels of ambition (minimum and high).

## ANNUAL SAVINGS IN 2030\*



Reduce electricity use by over **11 GWh** which is  
**1.1%** of current national electricity use

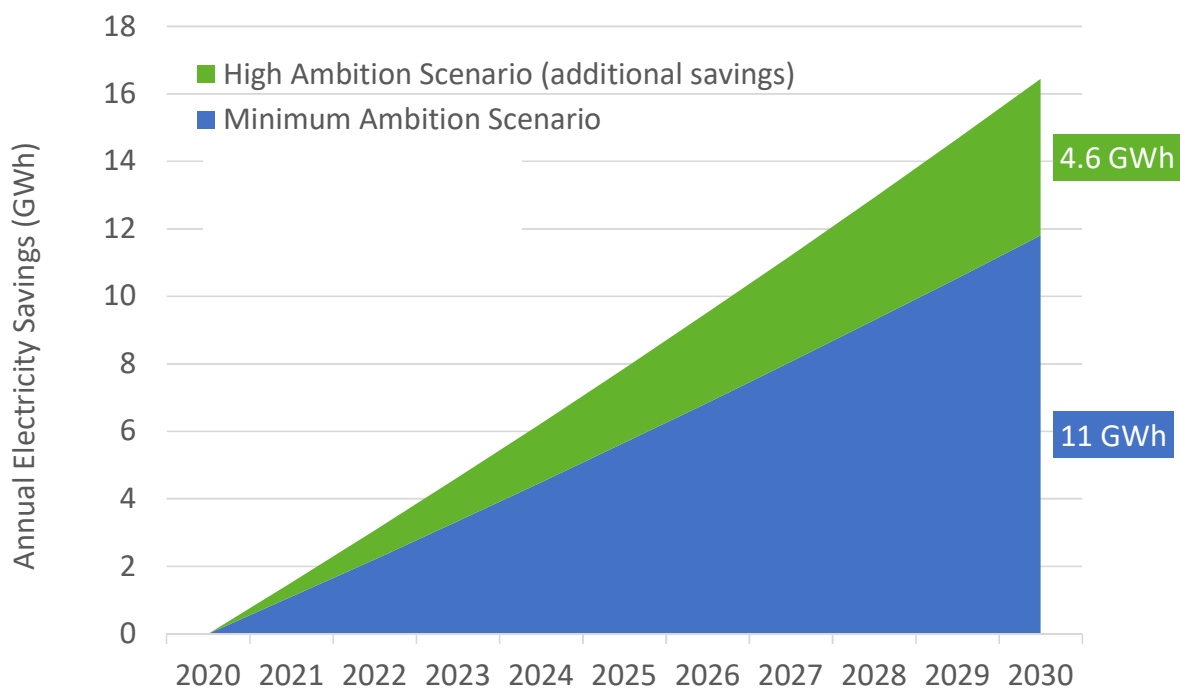


Save electricity worth **1.9 Million US\$**  
equivalent to over **2 Power Plants [1MW each]**



Reduce electricity CO<sub>2</sub> emissions by over **9.3 Thousand tonnes**  
equivalent to **5.2 Thousand Passenger Cars**

## EVEN GREATER SAVINGS POSSIBLE WITH MORE STRINGENT REGULATION



\* Denotes savings are from the Minimum Ambition Scenario.

# DETAILED BENEFITS

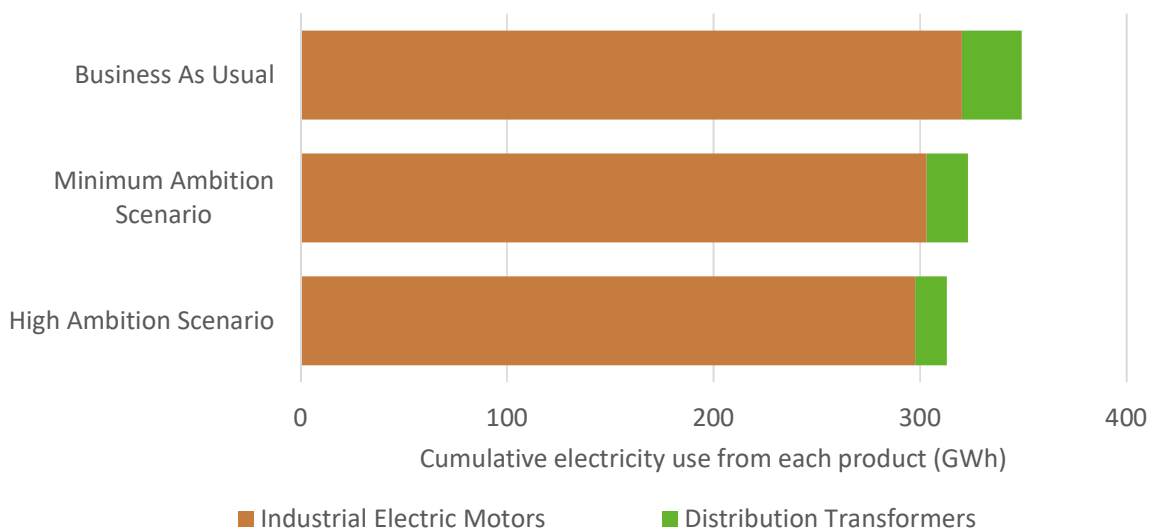
## ANNUAL SAVINGS IN 2025, 2030 AND 2040\*

|                                                                                   |                                  | Industrial Electric Motors |      |      | Distribution Transformers |      |      |
|-----------------------------------------------------------------------------------|----------------------------------|----------------------------|------|------|---------------------------|------|------|
|                                                                                   |                                  | 2025                       | 2030 | 2040 | 2025                      | 2030 | 2040 |
|  | Electricity (GWh)                | 4.3                        | 8.5  | 17   | 1.4                       | 3.3  | 8.9  |
|  | Electricity Bills (Million US\$) | 0.7                        | 1.4  | 2.7  | 0.2                       | 0.5  | 1.4  |
|  | CO2 Emissions (Thousand tonnes)  | 3.4                        | 6.8  | 14   | 1.1                       | 2.6  | 7.0  |

## CUMULATIVE SAVINGS BY 2030 AND 2040\*

|                                                                                     |                                  | Industrial Electric Motors |      | Distribution Transformers |      |
|-------------------------------------------------------------------------------------|----------------------------------|----------------------------|------|---------------------------|------|
|                                                                                     |                                  | 2030                       | 2040 | 2030                      | 2040 |
|    | Electricity (GWh)                | 47                         | 180  | 16                        | 78   |
|   | Electricity Bills (Million US\$) | 7.5                        | 29   | 2.6                       | 12   |
|  | CO2 Emissions (Thousand tonnes)  | 37                         | 140  | 13                        | 62   |

## CONTRIBUTION TO CUMULATIVE ELECTRICITY USE BY 2040



\* Denotes savings are from the Minimum Ambition Scenario.

# Country Data and Input Assumptions



| GENERAL INFORMATION             |               | ELECTRICITY MARKET                        |                 |
|---------------------------------|---------------|-------------------------------------------|-----------------|
| Population                      | 11.5 Million  | Residential Electricity tariff            | 0.16 US\$ / kWh |
| GDP per capita                  | 902 US\$      |                                           |                 |
| Electrification level           | 36.3%         | Transmission and distribution loss factor | 9.2%            |
| CO <sub>2</sub> Emission Factor | 0.72 kg / kWh |                                           |                 |

## ASSUMPTIONS

| Product                                                                                                                              | Efficiency Level  |                           |                        | Type of Product                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------|------------------------|---------------------------------------------------------------------------------|
|                                                                                                                                      | Business As Usual | Minimum Ambition Scenario | High Ambition Scenario |                                                                                 |
|  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 liquid-filled<br>Three-phase dry-type<br>Single-phase liquid-filled |

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 new industrial electric motors and distribution transformers. 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

- Electricity savings from each product are estimated using a top-down approach using data including electricity consumption (total, industrial and motors) and industrial GDP as detailed below.
- Industrial GDP (2018) comes from the World Bank with future growth forecasts derived from the Shared Socioeconomic Pathway (SSP3) used in the Intergovernmental Panel on Climate Change's (IPCC) sixth assessment.
- Current total electricity consumption comes from the World Bank and the U.S. Energy Information Administration (EIA) with industrial share based on the International Energy Agency's (IEA) World Energy Outlook 2018. Motors electricity consumption is taken IEA reports and other internet research.
- Future electricity demand is based on forecasts from the IEA's World Energy Outlook 2018 and the IPCC's SSP3 scenario.
- 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 World Energy Outlook 2018 and the World Bank.
- CO<sub>2</sub> 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.
- 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.