Aloe Energy

COUNTRY REPORT · NOVEMBER 2026

Eritrea: grid and electricity access

Eastern Africa Power Pool

2.7 M
people live without night-time light, a proxy for no power

73%
of them live within 15 km of a power line

324
km of high-voltage lines, 66 kV and above

268
MW of operating power plants, 10 MW and above

2
power plants and transmission lines planned or under construction

About 2.7 million people in Eritrea live where satellites see no electric light at night, and 73% of them live within 15 km of a power line. This page brings together what our open atlases show for Eritrea: about 324 km of high-voltage lines, 268 MW of power plants and the projects still to come.

WHAT THIS MEANS

1.1 million people without power live 2 to 15 km from a line: close enough to plan for the grid, too far for a quick connection.



Map: Aloe Energy EAPP grid atlas. Lines © OpenStreetMap contributors (ODbL).

THE GRID TODAY

Eritrea's mapped high-voltage network runs to about 324 km of lines at 66 kV and above, with 3 substations. The highest voltage on the map is 132 kV. About 162 km come from older World Bank (2017) maps, used where OpenStreetMap has gaps. Installed capacity was about 230 MW (2024). The latest international tracking report puts access to electricity at 55% of people.

NEAR THE GRID, NOT ON IT

About 2.7 million people in Eritrea, roughly 78% of the population, live where satellites see no electric light at night. Of them, 73% live within 15 km of a mapped or predicted power line: 904,000 within 2 km, 1.1 million 2 to 15 km away, and 735,000 farther out. The largest group lives 2 to 15 km out: close enough to plan for the grid, too far for a quick connection. That is where mini-grids built to join the grid later can do the most good.

- Within 2 km of a line: **904,000** (33%)
- 2 to 15 km: **1.1 million** (40%)
- More than 15 km: **735,000** (27%)

"Without night-time light" is a satellite proxy, not a measured access rate.

Mapped line length

Voltage	km
132 kV	56
66 kV	45
Voltage not recorded	62
Gap-fill from older public maps	162
Total	**324**

PLANTS AND PIPELINE

Four operating power plants of 10 MW and above add up to about 268 MW, 100% of it oil. The largest is Hirgigo power plant (134 MW, oil). Another 2 plants totaling about 42 MW are under construction or planned.

Operating capacity by type



Oil: **268 MW** (100%)

EMISSIONS

In 2024, each megawatt-hour used in Eritrea came with about 0.68 tonnes of CO2, including imports. The table also gives the combined margin used for carbon projects.

Grid emission factor, 2024 (tCO2/MWh)

Measure	tCO2/MWh
Generated in country	0.677
Electricity used, with imports	0.677
Combined margin (for carbon projects)	0.715

SECOND LIFE

Between 2026 and 2040, about 831 tonnes of solar equipment and stationary batteries are expected to retire in Eritrea, most of it off-grid solar kits and mini-grids. That is 0.2% of the total for the 49 countries in our second-life atlas.

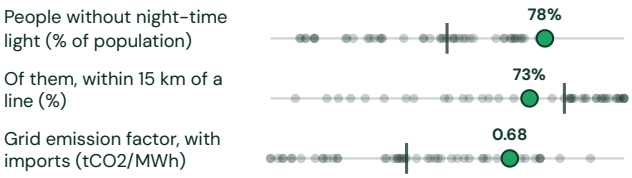
Solar and batteries retiring each year (tonnes)



CLEAN ENERGY CERTIFICATES

I-REC status: not approved yet, so renewable plants here cannot issue I-RECs.

HOW IT COMPARES



Each dot is one country with a page on aloeenergy.org; the line marks the median. Positions only, no ranking.

Sources: Grid lines: OpenStreetMap contributors (ODbL), gap-fill from the World Bank Africa grid (2017); power plants: Global Energy Monitor (September 2026), WRI and public project sources; capacity and access: regulators, utilities and Tracking SDG7 2026; people and distance to the grid: WorldPop 2020 and gridfinder (CC BY 4.0); second life: Aloe second-life model (central case); emission factor: Aloe grid emission factors (Ember).

Aloe Energy

The full page, with the interactive atlas, is at aloeenergy.org/countries/eritrea. The maps are free to view; the data behind them is available on request: brandon@aloeenergy.org. Aloe Energy is a not-for-profit initiative working on energy access across Africa, with open grid maps and data from Southern and Eastern to West and Central Africa.

Scan for the live page and map

Cite as: Aloe Energy (2026). Eritrea country report, November 2026. aloeenergy.org/countries/eritrea. Free to share under CC BY 4.0.

FULL DATA

More about Eritrea

Everything else our research pages show for this country, from published sources. Each section names the page where the method and sources are.

PRICES AND RELIABILITY

LIT BUT OFF THE MAP

Where the lights are and the map is not

Satellites see 42 lit places in Eritrea at night. 16 are within 2 km of a mapped line, 6 are 2 to 10 km away and 20 are 10 km or more from any mapped line. Places lit far from the map point to lines the map is missing, mines and plants with their own power, or mini-grids.

The lit places off the map cover about 135 km² and are home to about 146,693 people.

Lit places by distance to a mapped line

Distance	Lit places	Newly lit
Within 2 km of a mapped line	16	
2 to 10 km away	6	0
10 km or more	20	10

See them on the map: the "Lit but off the map" layer of the grid-edge atlas (aloeenergy.org/research/grid-edge).

CLIMATE AND CARBON

Carbon per new connection

The Mission 300 compact for Eritrea adds about 329,300 new connections by 2030: 205,300 to the grid, 47,900 on mini-grids and 76,000 with solar home systems.

Counted with what household surveys show people use for light now (kerosene is the main light in 5% of homes without power), they avoid about 6,571 t of CO2 a year and add about 50,015 t from the power they use, a net addition of 43,443 t a year.

New connections and CO2, central case

Measure	Value
New connections by 2030	329,253
CO2 avoided (t a year)	6,571
CO2 added (t a year)	50,015
Net CO2 avoided (t a year)	-43,443
Net per 1,000 connections (t a year)	-131.9

The default methodology view and every source: carbon per connection (aloeenergy.org/research/carbon-per-connection).

FROM POWER PLANT TO BATTERY SITE

When the thermal plants close

Eritrea has 1 coal, gas or oil plant site of 50 MW or more, with 134 MW of grid connection. None of it frees up before 2030 in our central case.

Putting solar and batteries on those connections when they free up would save about 1.0 Mt of CO2 between 2026 and 2050, worth about 2.8 times what they cost to build at the US EPA's social cost of carbon.

Largest sites

Plant	Fuel	Connection (MW)	Frees up	CO2 saved 2026-2050 (Mt)
Hirgigo power plant	Oil	134	2036	1.0

Timings, cases and every site: power plant to battery site (aloeenergy.org/research/thermal-to-storage).

WASTE TO WEALTH

Power from waste

Eritrea's sugar mills, landfills, sewage works, factories and crop residues could make about 1 MW of power that is not built yet (central case), avoiding about 13,155 t of CO2e a year.

Power from waste by source (MW, central case)

Source	MW
Landfill gas and biogas	0.1
Industrial waste heat	0.1
City waste	0.3
Crop and sawmill residues	0.1

Every site, costs and the method: power from waste (aloeenergy.org/research/waste-to-energy).

SECOND LIFE

Who could use a second-life panel

Places in Eritrea that could use a second-life solar panel add up to about 88 MWp (range 38 to 196): 66 MWp to cut generator use in towns, 14 MWp for mini-grids, 7 MWp for household systems and 1.8 MWp for 228 health facilities and 10 schools with no light at night.

Mapped by half-degree cell, with years to 2040: where the panels are needed (aloeenergy.org/research/second-life#where-demand).

E-MOBILITY

Electric transport, per km

On Eritrea's grid, an electric motorbike emits about 47 g of CO2 per km from the power it charges with, against 48 g for a petrol one (2% less).

CO2 per km from use (g)

Vehicle	Electric	Petrol or diesel	Difference
Motorbike	47	48	-2%
Bus	876	1,673	-48%
Small car (newer petrol car)	141	125	+13%

Life-cycle figures, a cost calculator and city air: e-mobility (aloeenergy.org/e-mobility#per-km).

Sources: Lit places: NASA Black Marble night lights, compared with our mapped lines (grid-edge atlas). Carbon per connection: compact targets, household lighting surveys (census, MICS, DHS, MTF) and our grid emission factors. Thermal plant sites: Global Energy Monitor, Global Integrated Power Tracker (September 2026), and our thermal-to-storage model. Power from waste: FAOSTAT, Global Energy Monitor and OpenStreetMap sites, in our waste-to-energy model. Second-life demand: grid-edge screening, compact targets, World Bank Enterprise Surveys and health and school facility lists, in our second-life atlas. Transport per km: our grid emission factors and vehicle energy use; running costs from national pump prices and tariffs.