

Sudan

National Electrification Rate [1]

- National: 60%
 - Urban: 84%
 - Rural: 47%
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Population

- Total: 43.8 million [2]
- Urban ratio: 35.3% [2]

Population growth

- Medium population growth: 2.3% [2]
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Average household size, urban: 5.5 people [3]

Average household size, rural: 6.5 people [3]

Average electricity consumption per

- Household: 1727 kWh/year
- Capita: 288 kWh/year (Tier 4) [1], [4]

Low demand target⁴⁰: U4-R1

High demand target: U5-R3

Off-grid technology cost [5]–[12]:

- Expected Hydro mini-grid cost: ~3000 \$/kWp
 - Expected hybrid mini-grid component costs:
 - o PV panels: 503 \$/kWp
 - o Batteries: 139 \$/kWh
 - o Inverter: 80 \$/kWp
 - o Charge controller: 142 \$/kW
 - o Diesel generator: 261 \$/kW
 - o Wind turbine: 2800 \$/kW
 - Expected PV stand-alone (or SHS) costs:
 - o ~9620 \$/kWp if kW < 0.02
 - o ~8780 \$/kWp if 0.02 < kW < 0.05
 - o ~6380 \$/kWp if 0.05 < kW < 0.1
 - o ~4470 \$/kWp if 0.1 < kW < 1
 - o ~6950 \$/kWp if kW > 1
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Grid generating cost [13]–[15]

- Expected on-grid cost (low): 0.03 \$/kWh
- Expected on-grid cost (high): 0.051 \$/kWh

T&D costs [16], [17] [18], [19] [8], [20]–[25]:

- HV line (69-132 kV): ~53000 \$/km
- MV line (11-33 kV): ~7000 \$/km
- LV line (0.2 – 0.4 kV): ~4250 \$/km
- HV to MV substation (1000 kVA): ~25000 \$/unit
- MV to V substation (400 kVA): ~10000 \$/unit
- Service transformer (50 kVA): ~4250 \$/unit

Grid generation capacity cap per year: ~491 MW/year

Grid connection limit: ~2.5% population/year

⁴⁰ U: Urban households; R: Rural households; 1-5: Electrification Tiers as defined by ESMAP's Multitier framework

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