

## South Africa

### National Electrification Rate [1]

- National: 91%
  - Urban: 92%
  - Rural: 90%
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### Population

- Total: 59.3 million [2]
- Urban ratio: 67.4% [2]

### Population growth

- Medium population growth: 1% [2]
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Average household size, urban: 2.3 people [3]

Average household size, rural: 2.7 people [3]

Average electricity consumption per

- Household: 1990 kWh/year
- Capita: 796 kWh/year (Tier 3) [1], [4]

Low demand target<sup>38</sup>: U3-R1

High demand target: U4-R3

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### 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): 0.039 \$/kWh
- Expected on-grid cost (high): 0.052 \$/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: ~7146 MW/year

Grid connection limit: ~2.5% population/year

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<sup>38</sup> U: Urban households; R: Rural households; 1-5: Electrification Tiers as defined by ESMAP's Multitier framework

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