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*Thaddeus J. Huetteman, Team Lead, Electricity Analysis*
*U.S. Energy Information Administration*

- Africa generation projection includes major growth and contains uncertainty
  - Expanding urbanization, but large rural population without electricity access
  - Lower pace of transmission development and grid integration
  - New opportunities associated with off-grid generation

- Uncertainties masked by single region, centralized grid-only view of Africa
  - Results in *over-optimized* projected generation mix in which hydro and solar dominate

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**Single Region Africa**

<table>
<thead>
<tr>
<th>Year</th>
<th>Billion KWh</th>
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<tbody>
<tr>
<td>2019</td>
<td>700</td>
</tr>
<tr>
<td>2030</td>
<td>800</td>
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<tr>
<td>2050</td>
<td>1,000</td>
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IEO2020 regional differences include greater electricity demand growth potential in the Africa South region

- Africa North
  - Greater electricity access
  - More mature electric sector infrastructure
  - Significant reliance on natural gas

- Africa South
  - Lower electricity access
  - Higher potential for electricity demand growth and investment
  - Significant reliance on coal/hydro, with new offshore gas reserves discovered in Mozambique and Tanzania

- Full electric access by 2030, met by:
  - Maximum Grid Expansion
  - Maximum Off-grid Expansion

IEO2020 highlights regional differences in generation mix growth

• Highlights transmission limits between regions

• Differing role of natural gas in Africa North and coal in Africa South

• Natural resources availability influences generation fuel-mix

• Expanding investment in LNG facilities for both import/export

Comparative Reference (Two Region)

IEO2020 calculates bounds for off-grid generation in Africa South and potential for significant expansion of renewables

• Assumes Africa South reaches full electricity access by 2030 with incremental demand by sector:
  – Residential: unserved urban and rural areas achieve full electricity access by 2030 at average electricity consumption levels
  – Commercial/Industrial: replacement of lost load for commercial and industrial customers attributed to Africa’s less reliable power supply and delivery systems

• Maximum Grid Expansion case assumes full incremental demand is met by least cost dispatch of centralized-grid power

• Maximum Off-Grid Expansion case assigns incremental demand to be met by off-grid supply either in mini-grid or stand-alone solar photovoltaic systems
Africa South Maximum Grid Expansion maintains growth in fossil fuel generation versus solar growth in Maximum Off-Grid case.

Africa South electricity generation by fuel source in Comparative Reference (Two-Region) case (CRC)

Change in Africa South generation from CRC by fuel source: Maximum Grid Expansion/ Maximum Off-grid cases

IEO2020 projects opportunities for growth in renewables and fossil generation in Africa North and South

Conclusion: Off-grid development could increase solar generation, but bypass of centralized grid is unlikely

• Lack of interconnection and slow transmission infrastructure development reinforces reliance on regional fuels

• Greater off-grid development boosts solar share

• Limited interregional transmission and grid cost-competitiveness at higher demand levels make bypass of the grid less likely

• Demand growth for fossil fuels in Africa projected to increase demand for imports, including LNG