POWER SECTOR IN SOUTH SUDAN

Presented by
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OUTLINE OF PRESENTATION

Introduction
Status of electricity supply in South Sudan
Key issues to be addressed with regards to power development
   Planned hydropower projects
   Grand Fula Hydropower Project
   Regional interconnections
Off-grid renewable energy development opportunities
Recommendations
Concluding remarks
The Ministry of Energy and Dams is mandated to generate, transmit and distribute electricity, oversight and policy framework.

It is guided by a vision and mission that is to provide cost-effective, reliable, affordable and quality electricity services to meet the social, economic and development needs of the nation.
South Sudan is an immensely large expanse of land with a small population scattered in communities separated by hundreds of kilometers. 99% of the population still has no access to modern energies, and electricity in particular. 83% of the South Sudanese population lives in rural areas.
The main challenge facing the electricity sector is not only limited to weak power generation and distribution systems, but also low per capita consumption of 1 – 3 kWh. Hence, South Sudan is classified as the most underdeveloped country, not only in the region, but in the world.

Despite this, South Sudan is rich in minerals and hydropower potential that can be developed to generate reliable and affordable electricity to provide basic services to its citizens and cheap power for economic development.
Decentralized grids are unreliable and diesel generation is very expensive.

**CURRENT ELECTRIFICATION**

No interconnected transmission grid. Electricity sector comprised of:
- Commercial centers networks: Juba, Malakal, Wau
- Rural mini-grids: Yei, Kapoeta, Maridi

Customers are upper-income residential and some businesses

Industry and business relies on self-generation with diesel generators.

Remaining population relies on firewood/biomass for energy

Renewable energy supply is not yet tapped

**Only 1% of South Sudan’s population has access to electricity**
DEMAND FOR ACCESSIBLE AND AFFORDABLE ELECTRICITY IN SOUTH SUDAN OUTSTRIPS SUPPLY IN MAJOR CITIES AND IS POISED TO GROW IN RURAL AREAS

Expected Electricity Demand in South Sudan (MW)

- Demand is estimated at 300 MW today, and is expected to rise to 1400+ MW by 2030.
- Growth of electricity sector suppressed by supply, not demand.
- Demand for electricity is expected to increase 7-8% per annum based on the economic growth rates.
- Per capita electricity consumption is 1-3 kWh.
- Consideration of gradual tariff increase to match generation cost is underway.

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>300</td>
</tr>
<tr>
<td>2015</td>
<td>400</td>
</tr>
<tr>
<td>2020</td>
<td>500</td>
</tr>
<tr>
<td>2025</td>
<td>1000</td>
</tr>
<tr>
<td>2030</td>
<td>1400</td>
</tr>
</tbody>
</table>

Generation Cost: 0.70/kWh
Current Tariff: $0.45/kWh (subsidized)

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KEY ISSUES TO BE ADDRESSED
THE GOVERNMENT HAS PRIORITIZED THE DEVELOPMENT OF POWER GENERATION AND TRANSMISSION SYSTEMS.

DEVELOPMENT PRIORITIES

Increase **generation capacity** through implementation of planned projects and proposed new sources of power generation.

**Build new transmission lines** and substations (National Grid)

Mobilize **financial resources for electricity** projects, especially those linked to economic activities, such as mining and industry.

**Invest in regional interconnection**, including the **East Africa Power Pool (EAPP)**, to access wider power market.

Develop, expand and reinforce generation and distribution networks in the state capitals.

**Support rural electrification by off-grid renewable energy sources.**

Government priorities will be achieved through effective private sector participation, public-private partnerships and public sector initiatives guided by proper master planning.

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# PLANNED HYDROPOWER PROJECTS
Projects with Feasibility studies completed

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Description</th>
<th>Estimated capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grand Fula</td>
<td>890 – 1080</td>
</tr>
<tr>
<td>2</td>
<td>Beden</td>
<td>540 – 780</td>
</tr>
<tr>
<td>3</td>
<td>Lakki</td>
<td>410</td>
</tr>
<tr>
<td>4</td>
<td>Shukole</td>
<td>235</td>
</tr>
<tr>
<td>5</td>
<td>Fula Rapids HPP</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Sue multipurpose mini-hydro dam</td>
<td>10.4</td>
</tr>
</tbody>
</table>
GRAND FULA HYDROPOWER PROJECT

The Grand Fula Hydropower Project is a priority of the MED. It is easy to develop, and its power is enough to meet the development needs of South Sudan in the short term.

This picture shows how the River Nile enters the Republic of South Sudan at ninety degrees from the western side of Uganda.

Its hydro power potential has not yet been tapped.

This is a priority long term project.

Feasibility study has been conducted by Consultant SMEC, but the FS documents have not been handed to the MED due to non-payment to the Consultant.

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<table>
<thead>
<tr>
<th>Project</th>
<th>Voltage</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia – South Sudan</td>
<td>220 kV</td>
<td>Transmission line.</td>
<td>Requires funding for feasibility study and construction.</td>
</tr>
<tr>
<td>Sudan – South Sudan</td>
<td>220 kV</td>
<td>Transmission line.</td>
<td>Has been contracted.</td>
</tr>
<tr>
<td>Uganda – South Sudan</td>
<td>400 kV</td>
<td>Transmission line.</td>
<td>Both Uganda and South Sudan have paid their contribution as requested by the African Development Bank (AfDB) for feasibility study.</td>
</tr>
</tbody>
</table>
The Government encourages the use of solar power, especially in rural areas.

South Sudan experiences approximately 12 hours of sunshine per day year-round — Solar radiation is 4.0 – 6.0 KWh/m²/day.

There is a potential for small-scale Photo-voltage (PV) installations to serve schools, health centres, irrigation projects and businesses.

The Ministry plans to investigate energy diversification, specifically renewable energy to supplement thermal power generation.

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There is a potential for larger scale solar-thermal power plants. Given favourable conditions for agricultural production, there is significant potential for combined food production and biomass-based power generation projects in various parts of the country.

The Government is hoping to attract investors to restart two large-scale sugar and co-generation projects at Melut and Mangalla; and a large-scale oil-palm mill and co-generation plant at Anzara.

The Government is also interested in proposals for urban waste-to-power projects in Juba and other major towns.
RECOMMENDATIONS

Recognizing the hydropower potential in South Sudan, there is a necessity to pursue regional cooperation and regional power trade opportunities.

Both the medium- and long-term plans of the MED can be achieved through effective private sector participation, public–private partnerships and public sector initiatives, guided by proper energy master planning.

Renewable energy is a viable option for rural electrification. Nevertheless, without government subsidy, it is unaffordable to the majority of the rural population.

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Despite the abundant resources available for power generation, the energy sector requires adequate funding in the form of investments to enable South Sudan to develop its energy infrastructure to achieve a reliable and cheap power supply to meet its socio-economic and development needs.

The high costs of energy in South Sudan can be reduced through development of cheaper energy resources i.e. hydropower resources.
CONCLUSION REMARKS

It must be emphasized that the success of the South Sudan Development Plan, now and to a large extent in the future, is dependent on the availability of electricity.

For energy security, the energy sector in this sub-region should be provided with adequate political and financial support for implementation of the national development programs.
Thank you for listening