Electricity utility reforms in Sub Saharan Africa

APUA Leadership Workshop on Governance and Losses Reduction in African Power Utilities

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1. **CPCS background**
2. Why reform?
3. Typical reform process
4. Status of reforms in SSA
5. CPCS experience and perspectives
CPCS has a 45 year history in Transport, Energy & PPP

1969
Canadian Pacific Consulting Services Limited was established as a wholly owned subsidiary of Canadian Pacific Limited, which was a conglomerate, owning CP Rail, CP Ships, CP Air, among others.

1989
Management buyout – CPCS Limited becomes fully independent of Canadian Pacific.

1996
CPCS Limited merges with transportation arm of Hickling (Hickling Transcom). CPCS Limited becomes CPCS Transcom. Providing full spectrum of transport advisory services.

2007
CPCS Transcom is rebranded as ‘CPCS’. Power and urban development advisory practices established, in addition to full service transport advisory.

2015
Trusted management consultants in transport, power and public private partnerships.

Sectors
- ENERGY
- TRANSPORT
- PPP

Services
- STRATEGY
- POLICY & ECONOMIC ANALYSIS
- REGULATORY REFORM
- GEOGRAPHIC INFORMATION SYSTEMS
- TRANSACTION ADVISORY SERVICES
CPCS has 15 offices on three continents

1,375 projects in 120 countries
CPCS Power Experience

POWER SECTOR ADVISORY SERVICES - AFRICAN EXPERIENCE

1. SECTOR REFORMS - RESTRUCTURING & REGULATORY
2. TRANSACTION ADVISORY
3. PROJECT DEVELOPMENT / STUDIES
4. DUE DILIGENCE & MARKET STUDIES
5. GEOGRAPHICAL INFORMATION SERVICES - GIS

CPCS Solutions for growing economies
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The traditional utility model is efficient in theory, but in SSA it is associated with numerous challenges

**Traditional utility company model**

**Definition:**
- Generates, transmits, distributes and sells electricity to the public
  - Vertically integrated
  - State-owned monopoly

**Key characteristics:**
- Essential service provider for social and economic development ("Utility" service)
- A large asset base (grid)
- Wide geographic and population coverage
- Huge financial flows
- Big workforce

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**Areas of challenge in SSA utilities**

- Governance
- Planning
- Supply availability and reliability
- Business procedures, processes and IT systems
- Technical and commercial losses
- Cost reflectivity of tariffs
- Operations and maintenance
- Funding of infrastructure investments
- Staff capacity
Power sector reforms are expected to help overcome these challenges

Three drivers for power sector reform

1. Mobilize financing resources for capacity expansion and electrification
   → Growing demand
   → Unserved rural areas and small towns

2. Improve the utility’s performance
   → Poor governance
   → Abuse of power
   → Bad (or low quality) services
   → Inefficiencies in investments and operations

3. Foster technological innovation
   → Economies of scale and scope
   → Opportunity for competition

Power sector reform usually driven by electricity utility reform
The motivations behind reforms are not the same in OECD and non-OECD countries

<table>
<thead>
<tr>
<th></th>
<th>OECD countries (from 80s)</th>
<th>Non OECD countries (from 90s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong></td>
<td>Sufficient or excess capacity and stable institutions</td>
<td>Insufficient and unreliable supply, low access, weak institutional capacity and governance issues.</td>
</tr>
<tr>
<td><strong>Main Drivers</strong></td>
<td>Improvement of the operational efficiency and the electricity sector as a whole (Optimal efficiency)</td>
<td>Financing gap, sector viability and MFIs structural adjustment programmes</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>Raise performance, commercial standards and practices, through competition</td>
<td>Raise funding for the sector, hence reduce fiscal pressure, and improve supply and access</td>
</tr>
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From vertically integrated, state-owned monopoly to a fully liberalized market: a typical, stepwise reform process

1. Corporatization / Commercialization
   • Separate utility from Ministry and governance (Administrative and financial autonomy)
   • Business oriented and profit aim

2. Sector legislation and Independent regulation
   • Legal framework for reform (no monopoly, independence of regulation, REA, private or foreign participation, etc.)
   • Regulation authority, mandate and scope (consumer protection, competitiveness, investment encouragement, etc.)

3. Independent Power Producers (IPPs)
   • Private sector participation (PSP) in generation
   • Power Purchase Agreements (PPAs)

4. Unbundling
   • Vertical and/or Horizontal separation of generation, T&D with the future possibility to privatize profitable functions and introduce competition

5. PSP in Utilities
   • Shares, transfer of full ownership, ...
   • Concessions, management contracts, ...

6. Competition
   • Wholesale market
   • Retail market

Source: Sen, 2014; Gratwick and Eberhard, 2008; Joskow, 2008; Victor and Heller, 2007
But not all countries follow the exact same path: reform steps can be carried out in different order

Out of a sample of 20 non-SSA countries...

<table>
<thead>
<tr>
<th>Step</th>
<th>No. of Countries that carried out this reform as 1st step</th>
<th>No. of Countries that carried out this reform as 2nd step</th>
<th>No. of Countries that carried out this reform as subsequent step</th>
<th>Total No. of Countries that carried out this reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporatization</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Electricity law</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Regulation setup/improvement</td>
<td>3</td>
<td>5</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Independent Power Producers (IPPs)</td>
<td>3</td>
<td>-</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Unbundling</td>
<td>-</td>
<td>3</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>PSP in utilities</td>
<td>-</td>
<td>3</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Competition</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

The 20 countries sampled are Argentina, Bolivia, Brazil, Chile, China, Colombia, Czech republic, El Salvador, Hungary, Orissa (India), Indonesia, Jamaica, Malaysia, Morocco, Pakistan, Panama, Peru, The Philippines, Poland and Thailand. Source: Jamasb, Tooraj. 2006. "Between the State and Market: Electricity Sector Reform in Developing Countries." Utilities Policy 14(1):14–30. Elsevier Ltd.
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Progress towards more private participation is uneven: in 18 SSA countries, no IPP has come online yet

<table>
<thead>
<tr>
<th>Level of private sector participation in 50 SSA countries *</th>
<th>Sector is vertically integrated (38 countries)</th>
<th>Sector is vertically unbundled (12 countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence of a regulatory body</td>
<td>25 countries</td>
<td>12 countries</td>
</tr>
<tr>
<td>No private sector participation as of Jan 2017 (NB. In several countries, IPPs are underway)</td>
<td>15 countries Burkina Faso, Burundi, CAR, Chad, Comores, RCongo, Equatorial Guinea, Eritrea, Guinea-Bissau, Malawi, Mauritania, Niger, Seychelles, Somalia, South Sudan</td>
<td>3 countries Ethiopia, Lesotho and Sudan</td>
</tr>
<tr>
<td>Private sector participation is effective</td>
<td>19 countries Botswana, Cape Verde, Gabon, Gambia, Guinea, Ivory Coast, Liberia, Madagascar, Mali, Mauritius, Mozambique, Namibia, Rwanda, Senegal, Sao Tome and Principe, Swaziland, South Africa, Tanzania, Zambia</td>
<td>8 countries Angola, Benin, Ghana, Kenya, Nigeria, Togo, Uganda and Zimbabwe</td>
</tr>
<tr>
<td>Independent Power Producers (IPPs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSP in utilities</td>
<td>6 countries DRC, Ivory Coast, Gabon, Guinea, Mali and Sierra Leone</td>
<td>3 countries Cameroon, Nigeria and Uganda. N.B: Kenya and Uganda have listed utilities</td>
</tr>
</tbody>
</table>

* https://www.loc.gov/rr/amed/guide/afr-countrylist.html

Focus on ECOWAS area: countries stand at different stages of the reform process

- Vertically Integrated State Owned Monopoly
- Single Buyer with Generation, Transmission and Distribution in a Non-Regulated Market
- Single Buyer with Generation, Transmission and Distribution in a Regulated Market
- Single Buyer with Gen. and Transm. in a Regulated Market

Source: Data from ERERA
Uganda’s experience shows how a well conducted power reform can bring significant improvements

| Challenges | • Post conflict country in 1990 with dilapidated infrastructure  
• Low generation capacity  
• High system losses  
• Very low tariffs maintained for long (big gap with cost reflectivity)  
• Low levels of access  
• No PSP |

| Timeline | • 1999: Electricity sector restructuring and privatization strategy + The new Electricity Act  
• 2000: Regulator (ERC) becomes operational  
• 2001: Unbundling of UEB into three(3) registered companies: UEGCL, UETCL and UEDCL  
• 2002: Concession for generation awarded to ESKOM Enterprises  
• 2003: Rural Electrification Board set  
• 2005: UMEME awarded 20 year distribution concession |

| Key Stakeholders | • Ministry: MEMD  
• Regulator: ERA  
• Electricity Disputes Tribunal  
• Utilities: UEGCL, UETCL and UEDCL(UMEME)  
• Rural Electrification Agency (REA)  
• IPPs  
• Consumers |

| Resulting improvement | • Independence of regulation (both politically and financially)  
• Cost reflective tariffs regularly adjusted  
• 60% of generation (862MW in 2016 from 380MW in 2003) from Private sector  
• PSP in new distribution geographical areas  
• Losses reduced from 38% in 2000 to 18% in 2017  
• Most efficient power utility among 39 countries surveyed in SSA (WB-2016)  
• Limited improvement in access(from 8% in 2000 to 22% in 2017) |
After 20 years of reforms in SSA, some progress done but success stories remain very few

- Legal framework for sector liberalization in place in most countries
- Most of the SSA utilities have made governance reforms (Corporatization, Performance contracts, International accounting standards, etc.)
- Growing share of IPPs
- Success stories:
  - Reforms in Kenya and Uganda showing positive outcomes: Losses reduced, higher investments and service coverage,…
  - Privatization (with the introduction of a wholesale market) in Nigeria well concluded.
  - Bond issuance by Eskom, KenGen, NamPower, etc.
- Legal framework enacted but not fully implemented
- Privatization or Management contracts utilities have in general failed in the 2000s
- Regulation not effective (but improving)
- Dominance of State ownership or influence in utilities still prevailing
- Tariff adjustment dependent to social-political context
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CPCS experience in Africa covers all the steps of the standard reform model.

Reform Steps in CPCS
African Experience

1. Corporatization / Commercialization
2. Sector Legislation / Regulation
3. Independent Power Producers (IPPs)
4. Unbundling
5. PSP in Utilities
6. Competition

Other Energy Reform Experience
Iraq, Nepal, Oman
Example: CPCS’ Experience Reforming the Power Sector of Nigeria

**Pre-Reform Status**
- High costs of self generation
- Low tariff of grid power
- Very high distribution losses
- Limited maintenance, assets deteriorated

**CPCS Work (2007-2013)**
- Power sector audit
- Privatization strategy and implementation plan
- Market structure and related institutional framework
- Commercial and regulatory reform (contractual framework for PSP, MYTO, etc.)
- Unbundling of the existing utility PHCN and privatization of the successors (5 Gencos and 11 Discos)

**Challenges to Long Term Success**
- Revenue gap (not covering all the costs)
- Unpredictable Fuel (Gas) availability
- Limited transmission capacity
- Inadequate sector regulations
- Public patience for outcomes
Key lessons: reform must be carefully designed and planned, suited to the country’s needs, and aligned with stakeholders’ interests

- **Work on factors enabling fulfillment of conditionalities/covenants**
- **Aligning reform implementation with investments funding and the growing institutional capacity**

- **Reform is a process that requires political commitment and strong government involvement**
- **Utility leadership remains powerful and a key stakeholder**
- **Expected outcomes and timing to be clearly communicated to the public**
- **Handle and/or budget social implications**

- **Agree on reform objectives and potential gains:**
  - Competition “for” and/or “in” the market
  - Operational and financial viability
  - Sector recovery
  - Increased access

- **No “One size fits all”; choice of power market model is specific to each country characteristics**
- **The public sector and/or the utility still need to continue financing some infrastructure (Gx, T&D) projects**
- **Phased approach and gradual implementation recommended**
Loss reduction investments, a key strategy to align with reforms

**Aggregate Technical, Commercial and Collection (ATC&C) Loss**
- Part of the cost of Utility value chain (Generation, Transmission, Distribution and Sales)
- Output – Sales(Revenue Collected) = Kwh energy = Dollar amount
- Higher loss high tariff, Lower loss low tariff
- Part of incentives mechanism for Operators/Utilities

**Average Losses Benchmarking***
- OECD countries: Below 10%
- Asia: Between 10 and 15% (Transmission and Distribution)
- LAC: Between 15 and 20% (Distribution)
- SS Africa: Above 20% (Transmission, Distribution and Sales)

**Key findings for Africa**
- Network system and bill collection losses account for a majority of utility quasi-fiscal deficits in half of African countries
- Both system optimization and tariff increases are needed in addition to operational efficiency

⇒ Undertake a Grid audit/Energy Loss Assessment and Loss Reduction Strategy
  - Impact on technical losses requires significant investment and takes a longer time. Cost-benefit ratio usually quite high
  - In the short term, easier and more cost-effective to focus on the reduction of non-technical losses (Distribution and Sales)

* Various
** Trimble et al., World Bank (2016)
Loss reduction investments, a key strategy to align with reforms

<table>
<thead>
<tr>
<th>CPCS Reform activities</th>
<th>Loss reduction initiatives</th>
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<tr>
<td><strong>Cameroon</strong></td>
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</table>
| • Technical support for the reorganization of the electricity sector in Cameroon for the setup of a transmission company (SONATREL) out of the utility ENEO (World Bank funding) | • Investment Plan for the Transmission subsector. (Sponsor: World Bank/GoC)  
• Est. Budget: 1 Bn USD  
• Operationalization TA of SONATREL (WB) |
| **Nigeria**             |                           |
| • Unbundling of the existing utility PHCN and privatization of the (5 Gencos and 11 Discos) successors (GoN funding) | • Feasibility Study for a Financing Facility for “Loss Reduction and Network Reinforcement in Distribution” (AFD)  
• US$100 million distribution sector credit facility(AFD) and €2.3 million grant for TA (African Infrastructure Trust Fund of the EU) |
| **Sierra Leone**        |                           |
| • Technical oversight of power activities, incl. support to reforms and the created (EGTC and EDSA) utilities out of the existing utility NPA (MCC THP) and the new regulator (EWRC) | • EDSA Contract Management (WB)  
• Rehabilitation of primary distribution network, loss reduction and performance improvement of EDSA, incl. acquisition of 20,000+ prepaid meters (WB)  
• Least Cost Planning (MCC)  
• EDSA Customer census, Database cleansing and GIS Mapping (MCC) |
CPCS has already the needed capacities to conduct assignments in power sector reform

### Capacities for Power Sector Reform in SSA

- Power Sector/Utility restructuring strategy
- Business planning
- Losses reduction strategy study and investment plan
- Operational and financial sustainability study
- Transaction Advisory Services (Project development, procurement and negotiation/contracting)
- Credit rating and related TA
- Security accounts and guarantees structuring
- Other revenue streams: Leasing excess fiber capacity, infrastructure use, IT systems sharing...
- Evolving forms of utilities: Mini grids, Gx and Tx SPV, smart grids,...
“88% expect future power utility business models will be transformed by 2030, with a quarter of them saying they will be unrecognizable from those operating today”.

*PwC Africa Power & Utilities Survey*
*(November 2014-March 2015)*

Thanks