REGIONAL ENERGY INTEGRATION IN AFRICA

WORLD BANK ENGAGEMENT

ESMAP / AfDB WORKSHOP, MAY 10, 2023
Regional Markets is Important Area of WBG and ESMAP Support

- Regional energy integration (REI) initiatives are on the rise
- Energy Transition entails unprecedented expansion and transformation of power sector infrastructure.
- REI is an effective solution to achieve the goal of ensuring universal access to affordable, reliable, sustainable, and modern energy by 2030 and the goals of the 2015 Paris Agreement on Climate Change

WB Climate Change Action Plan 2021-2025: “...The WBG’s priorities in the sector include... regional power cooperation and trade.”

COP26 Green Grid Initiative – One Sun One World One Grid (GGI-OSOWOG): “...Interconnected green grids can be transformational, enabling meeting the Paris Agreement targets to prevent dangerous climate change, accelerate clean energy transition, and achieve the SDGs...”
Regional connectivity will be paramount to boost renewables integration and to ensure security/flexibility of operations in order to achieve the targeted levels of renewable energy share in future generation mix.
Regional Energy Integration is an integral element of ESMAP Foundations for Energy Transition Program

Policy, Planning and Regulations (PPR): Create the environment for investment in the sector, promote the least cost, high quality and inclusive service delivery, and facilitate the transition to a new decarbonized, decentralized and digitalized energy sector.

Energy Markets, Connectivity, & Regional Trade (MARCOT): Regional integration and electricity trade allow the exploitation of economies of scale and comparative advantage to lower the supply cost, facilitate the transition to greener sources, and maintain competitive pressure on utilities.

Energy Subsidy Reform Facility (ESRF): Getting price signals right is key for sector to recover efficient costs, attract investment, limit its fiscal burden, and ensure utilities can provide quality service. Energy subsidies are deliberate policy actions that reduce the net cost of energy purchased, produced or delivered; or increase revenues for producers/suppliers.*

Utilities for the Energy Transition (U4ET): Well-performing utilities can take advantage of new technology opportunities to improve performance and prepare the grid for the clean energy transition; enabling regulation is needed to create incentives for high-quality service delivery including to under-served communities.

Closing Gender Gaps in Energy: Energy policies are not gender-neutral. Addressing gender gaps in energy will increase efficiency and productivity and decreases costs by providing access to markets to 100% of the population, tackling climate change issues and increasing human rights access.

Markets

Pricing

Utilities

Gender

Ensure access to affordable, reliable, sustainable and modern energy for all.

Affordable and Clean Energy

* Energy subsidies are deliberate policy actions that reduce the net cost of energy purchased, produced or delivered; or increase revenues for producers/suppliers.
# State of Power Pools in Africa and Key Building Blocks of Hard and Soft Infrastructure

## Regional Infrastructure and Generation Infrastructure

<table>
<thead>
<tr>
<th></th>
<th>CAPP</th>
<th>EAPP</th>
<th>WAPP</th>
<th>SAPP</th>
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<td>Hard Infra</td>
<td>Regional Interconnection and Generation Infrastructure</td>
<td>No regional system, only a few segments of transmission line between CAPP members.</td>
<td>4 separate system islands (including 10 of 11 countries). Mostly through ‘weak’ interconnections. In the next 2 years, 8 countries expected to have high capacity interconnections.</td>
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<td>Planning and Investment Coordination</td>
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<td>Regional Institutional Architecture</td>
<td>Regional institutional framework at nascent stage. Secretariat remains main executive institution and lacks staffs and resources.</td>
<td>Regional institutional framework exists, but some institutions still to be operationalized, regional institutions with overlapping mandate</td>
<td>Regional institutional framework is developed and to be implemented in 3 phases. Phase 1 operationalization started in 2018</td>
<td>Regional institutional framework highly developed, but some institutions still need to be fully operationalized</td>
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The amount of trade is picking up but remains low.

Increasing political instability – both within and outside of Africa – is threatening to roll back the results of past progress and is hampering the implementation of major regional integration activities in many of the regional power pools (e.g., COVID-19, coup d’états, Russian invasion in Ukraine, fuel price and food crisis).

Limited institutional capacity and unclear institutional architecture – coupled with political instability – leads to inadequate political commitment.

Fragile financial standing of national utilities (especially given the pandemic-related shocks), resulting in their inability to honor trade contracts, is one of the main sources of power trade risks.

Finally, despite the progress on building hard infrastructure, regional transmission infrastructure remains limited. Massive scale up of financing and unlocking of climate funding is required.
# Challenges and Solutions

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<th>POTENTIAL SOLUTIONS</th>
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<td><strong>1.2</strong> Limited institutional capacity and unclear institutional architecture – coupled with political instability – leads to inadequate political commitment</td>
<td>Greater focus on institutional development and an enabling environment, combined with efforts at the national level too</td>
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<td><strong>1.3</strong> Fragile financial standing of national utilities (especially given the pandemic-related shocks), resulting in their inability to honor trade contracts, is one of the main sources of power trade risks</td>
<td>MARCOT to potentially take a greater role in supporting national level measures aimed at improving transparency and competition, including possibly competitive procurement of RE generation and ancillary services (e.g., storage), design of new and restructuring of legacy PPAs, managing DER/DM.</td>
</tr>
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<td><strong>1.4</strong> Finally, despite the progress on building hard infrastructure, regional transmission infrastructure remains limited. Massive scale up of financing and unlocking of climate funding is required.</td>
<td>More global awareness raising/advocacy efforts utilizing global partnerships (G20, GGI, OSOWOG, RETA) and events (G20, COP28, other). Hold dedicated REI meetings with all ESMAP donors, utilize the high-level policy decision meetings. Explore an option of establishing REI window in climate funds.</td>
</tr>
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# ESMAP/MARCOT Support Structure and Theory of Change

## Activities

**National Electricity Markets**
- Global knowledge products
- Capacity building and knowledge exchange: Market Learning Academy, BBLs, workshops, Community of Practice
- Just-in-time advice to region/country teams

**Regional Electricity Markets Connectivity**
- Preparing feasibility studies
- Projects preparation support
- Financing/ securitization tools
- VRE integration studies & RE roadmaps

**Soft Infrastructure**
- Developing regional plans
- Establishing/ improving markets
- Regulatory tools
- Storage/ System flexibility studies
- Technical and fiduciary staffing
- Strengthening competencies
- Data reporting and management
- Training and study tours

**Hard Infrastructure**
- Reports, studies developed/ published/ disseminated
- Capacity building activities delivered
- Knowledge exchange arranged

## Outputs

**Feasibility studies prepared**
- RE and grid & transmission projects prepared/ approved/ financed

**Regional system plans developed**
- New market and trade instruments developed/ adopted
- Training delivered to regional and national market/ regulatory/ policy entities
- Staff trained

## Outcomes

**Number of countries inter-connected/synchronized/ trading increased** (number)
- Power transmission capacity increased (MW)
- Power trade between countries increased (MWh per year)
- Utility-scale RE capacity increased (MW)
- Number of regulators supporting new frameworks, market structures, and regulatory tools aiming at accelerating the energy transition increased (number)
- Number of countries with new markets for energy services increased – both domestic and regional (number)
- Financing facilitated or mobilized, including private (US$ million)

## SDG-7 Outcomes

- Reduction in average cost of power supplied (US$/kWh)
- Increased access to the electricity supply (%)
- Carbon per unit of power generated in all ESMAP-eligible countries decreased (from 741 to 700 kg CO2 equivalent/MWh)

## Other Programs of ESMAP
(Utilities, Subsidies, Renewable Energy, Access, Coal Transition, Gender)

## Funding Sources
- World Bank/ Other DFIs/ Private Sector Funding
- Grants
- Own-managed work

## Knowledge Products
- Global knowledge products
- Capacity building and knowledge exchange: Market Learning Academy, BBLs, workshops, Community of Practice
- Just-in-time advice to region/country teams

## Knowledge Exchange
- Reports, studies developed/ published/ disseminated
- Capacity building activities delivered
- Knowledge exchange arranged

## Training and Study Tours
- Regional system plans developed
- New market and trade instruments developed/ adopted
- Training delivered to regional and national market/ regulatory/ policy entities
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## Feasibility Studies
- Preparing feasibility studies
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- Reports, studies developed/ published/ disseminated
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## ESMAP/MARCOT Pipeline in Africa

<table>
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<tr>
<th>Region</th>
<th>Delivery Timeline</th>
<th>Specific Projects</th>
<th>Grant Amount</th>
<th>RETF/BETF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Africa: Southern Africa</strong></td>
<td>FY24</td>
<td>Regional Energy Transmission, Trade and Decarbonization (RETRADE) Multi-Phase Approach Program (P175190), including</td>
<td>$1 000 000</td>
<td>BETF</td>
</tr>
<tr>
<td></td>
<td>FY24</td>
<td>- Advancing Regional Electricity Market and Operationalization of Regional Transmission Infrastructure Financing Facility (RTIFF)</td>
<td>$5 000 000</td>
<td>RETF</td>
</tr>
<tr>
<td></td>
<td>FY24</td>
<td>- Zambia-Tanzania Transmission Interconnection Project</td>
<td>$2 000 000</td>
<td>RETF</td>
</tr>
<tr>
<td></td>
<td>FY25</td>
<td>- Angola-Namibia Transmission Interconnection Project</td>
<td>$2 000 000</td>
<td>RETF</td>
</tr>
<tr>
<td></td>
<td>FY26</td>
<td>- DRC-Angola Transmission Interconnection Project</td>
<td>$1 000 000</td>
<td>RETF</td>
</tr>
<tr>
<td></td>
<td>FY24</td>
<td>Namibia: Transmission Expansion and Energy Storage - (P177328)</td>
<td>$150 000</td>
<td>BETF</td>
</tr>
<tr>
<td></td>
<td>FY24</td>
<td>Mozambique: Regional Green Energy Corridors Project - (P179797)</td>
<td>$250 000</td>
<td>BETF</td>
</tr>
<tr>
<td><strong>Africa: Eastern Africa</strong></td>
<td>FY26</td>
<td>Horn of Africa Regional Integration for Sustainable Energy Supply (HOA RISES) Project (P174175)</td>
<td>$300 000</td>
<td>BETF</td>
</tr>
<tr>
<td></td>
<td>FY24</td>
<td>Uganda-Tanzania Interconnector Project - (P171243)</td>
<td>$400 000</td>
<td>BETF</td>
</tr>
<tr>
<td></td>
<td>FY25</td>
<td>Ethiopia-Somalia (Somaliland) Interconnector</td>
<td>$300 000</td>
<td>BETF</td>
</tr>
<tr>
<td></td>
<td>FY25</td>
<td>EAPP Regional Power Market Support Phase 2</td>
<td>$3 000 000</td>
<td>BETF</td>
</tr>
<tr>
<td><strong>Africa: West Africa</strong></td>
<td>FY25</td>
<td>Ghana-Cote d'Ivoire Interconnection Project - (P178923) - Regional Liquidity Enhancing Revolving Fund (LERF)</td>
<td>$5 000 000</td>
<td>RETF</td>
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<td></td>
<td>FY25</td>
<td>Ghana-Cote d'Ivoire Interconnection Project - (P178923)</td>
<td>$250 000</td>
<td>BETF</td>
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<td></td>
<td>FY25</td>
<td>Mali-Mauritania Interconnector / Mauritania Energy Transition Acceleration Program - (P179383)</td>
<td>$750 000</td>
<td>RETF</td>
</tr>
<tr>
<td><strong>Africa: Central Africa</strong></td>
<td>FY26</td>
<td>CAPP: 2nd Phase - Institution and capacity strengthening for regional power trade P168185</td>
<td>$500 000</td>
<td>BETF</td>
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</table>
MARCOT: PARTNERSHIPS

Market Development: Innovative Catalytic Solutions

- ISolar Alliance
  - One Sun One World One Grid
  - https://isolaralliance.org/work/osow

Strategic Advisory

- Global PST Consortium
  - ENERGINET
  - EIRGRID Group
  - NREL
  - California ISO

- ERCOT
  - National Grid
  - https://globalpst.org

Think Tank / Incubator

- MI Mission Innovation
- http://mission-innovation.net/

- RETA Regulatory Energy Transition Accelerator
- IEA
- IRENA
- OFGEM
- RAP
- MARMI

- ESMAP
- THE WORLD BANK
- https://retatheaccelerator.org
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WAPP
- Regional Interconnection and Generation Infrastructure: 3 separate system islands (including 14 countries).
- Planning and Investment Coordination: Regional master plan for Transmission and Generations.
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- Technical and/or Regulatory Harmonization: Harmonization completed in paper. Ongoing enforcement.
- Regional Institutional Architecture: Regional institutional framework is developed and to be implemented in 3 phases. Phase 1 operationalization started in 2018.

SAPP
- Regional Interconnection and Generation Infrastructure: One synchronized grid, with 9 out of 12 countries interconnected.
- Planning and Investment Coordination: Regional master plan (Pool Plan). Regional planning of priority projects.
- Cross-border Trading Arrangements: Bilateral market and Forwards physical markets. Day ahead, Intra-day markets exist.
- Technical and/or Regulatory Harmonization: Operational rules harmonized/synchronized, grid codes are guidelines.
- Regional Institutional Architecture: Regional institutional framework highly developed, but some institutions still need to be fully operationalized.
THANK YOU