SCALING UP RENEWABLE ENERGY PROGRAME IN TANZANIA

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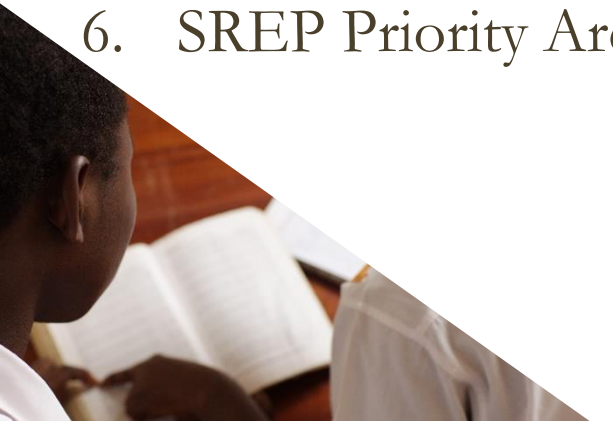


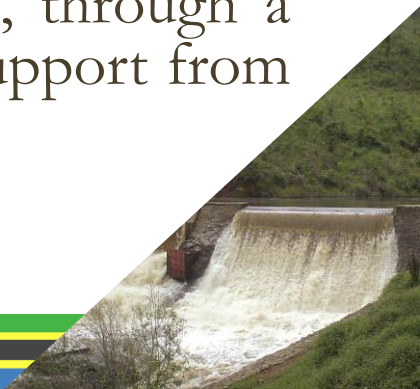
1. Introduction

Tanzania is endowed with diverse forms of renewable energy resources, ranging from biomass and hydropower to geothermal, solar, and wind, much of which are unexploited.

Tanzania is one of the pilot countries that were selected to prepare SREP Investment Plans in October 2012.

The objective of the SREP-Tanzania Investment Plan is to catalyse the large-scale development of renewable energy to transform the country's energy sector from one that is increasingly dependent on fossil fuels to one that is more balanced and diversified, with a greater share of renewable energy sources.

The SREP-Tanzania IP was prepared by the Government of Tanzania (GoT), through a National Task Force led by the Ministry of Energy and Minerals (MEM) with support from the Multilateral Development Banks (MDBs).

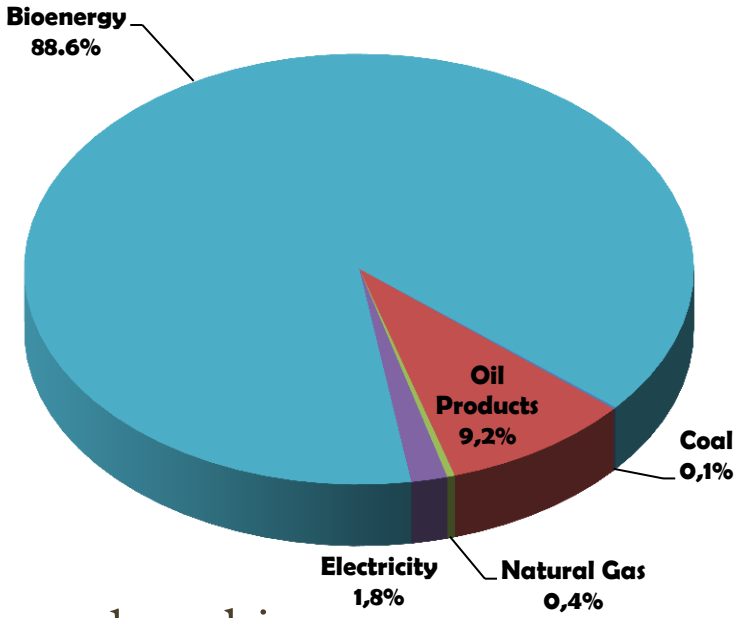


2.The Energy Sector and its Challenges

Energy Sector

- About 80% of the population of Tanzania live without access to electricity.
- Petroleum products which are almost all imported provide 9.2 percent of the total energy consumption.
- Most of the people (about 90%) are using traditional biomass for cooking and other activities.

Fig 1: Energy Sources and Uses in Tanzania



- The country has a potential of utilising renewable energy sources such as biomass, geothermal, solar, wind, etc., to increase energy access especially in rural areas where the majority of Tanzanians live.

2.1 Challenges

- Fast increasing power demand due to accelerating productive investments and a growing population.
- Risk of interruption of electricity generation associated with price shocks due to fluctuating price of oil and increasing unpredictability of hydropower.
- Uncertain creditworthiness of the utility, mainly due to poor infrastructure and dependence on expensive thermal power.
- Low access to reliable electricity due to dispersed and low density of population which makes grid extension too expensive.
- Health risks and environmental degradation from household reliance on biomass energy, causing annual loss of forest cover of about 100,000 - 125,000 hectares.

2.2 Strategy to Address the Challenges

Measures being taken by the Government to address the mentioned challenges include:

- Increasing the generation capacity from different sources
- Restructuring/Reform the State Utility (TANESCO)
- Construction of new distribution and transmission lines
- Development of new/review current policy, legal and regulatory frameworks
- Development of mini-grids and stand-alone projects
- Committed Government Budget and funds from DPs
- Implementation of projects for green sources of power

3. Constraints on Renewable Energy Development

- **Institutional, Regulatory, and Legal**
  - Inadequate data and power planning tools to integrate renewable options;
  - Policy and regulatory framework for renewable energy incomplete;
  - Lack of incentive to develop mini-grid projects due to uncertainty of when the grid expansion reaches the project area;
  - Unregulated biomass resource extraction from forests.

- **Knowledge and Capacity**
  - Limited local capacity in undertaking feasibility studies, detailed design, and construction of renewable energy power plants;
  - Lack of quality information on resources: mini hydro, wind, and geothermal;
  - Lack of sound forest resource information and sustainable harvesting plans;
  - Lack of awareness to consumers on standards and technology choices.

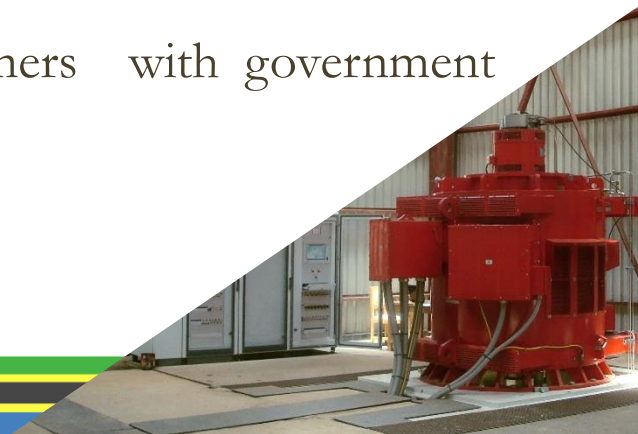
- **Economic and Financial**
  - High capital cost for renewable energy projects;
  - Scarcity of equity financing;
  - Off-taker, resource, and currency risks for renewable energy projects;
  - Un-affordability of electricity in some rural areas.

4. Key achievements in Renewable Energy Development

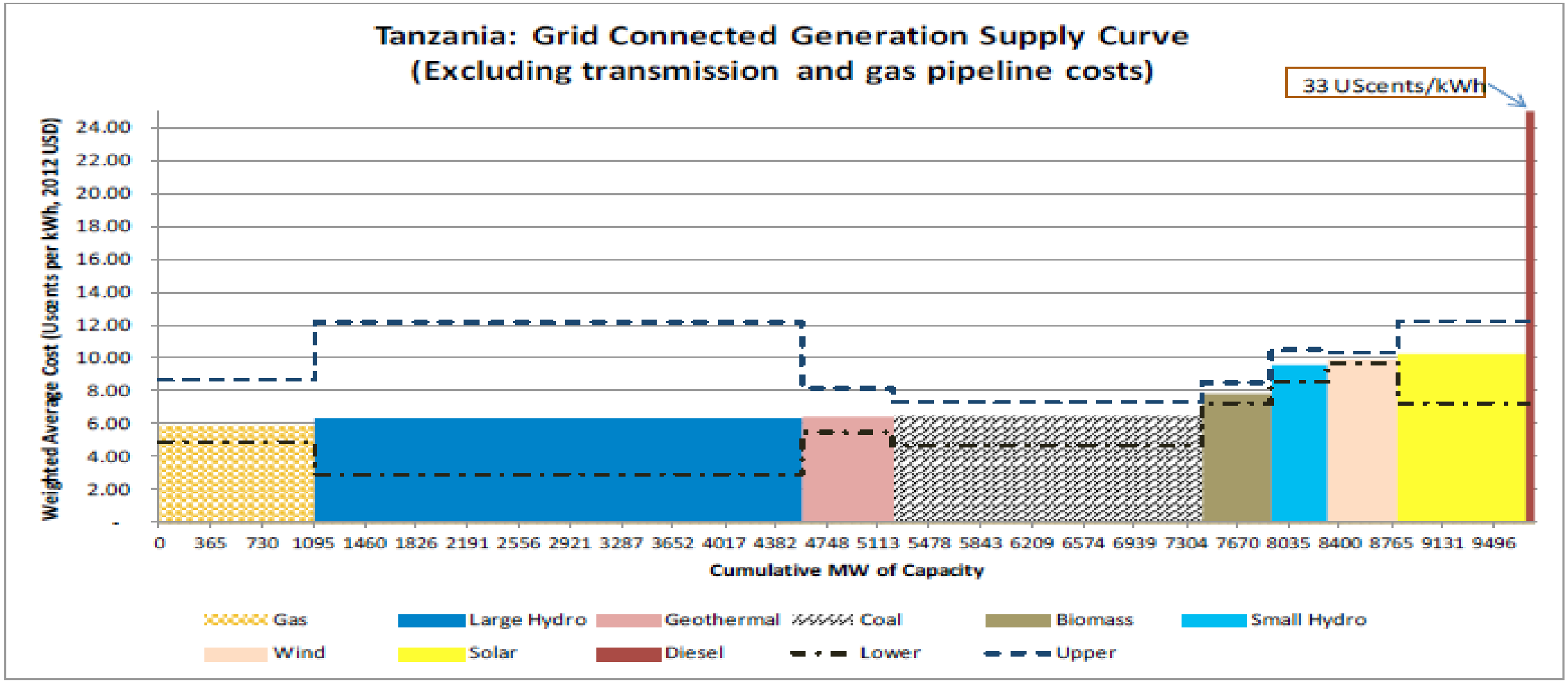
- **Policies, Legislation, and Institutional Framework**
  - The government has instituted a range of energy sector reforms which have attracted private-sector investment to boost electricity supply.
  - Establishment of key policies and legislation pieces including: National Energy Policy, 2003; Energy and Water Utilities Authority Act, 2001 and 2006; Rural Energy Act, 2005; Electricity Act, 2008; Public Private Partnership Act. No. 18, 2010; Environmental Management Act, 2004; National Adaptation Plan for Action, 2007; and Sector Environmental Action Plan, 2011–2016.

- **Private-Sector and NGO Participation**
  - Power Producers and Small Power Producers have become key contributors to economic growth in numerous sectors.

- **Contribution of Development Partners**
  - There is a well-coordinated and inclusive partnership of development partners with government supporting sustainable energy development in Tanzania.



5. Viability of Renewable Energy



Source: SREP Task Force calculations.

6. SREP Priority Areas

Three top priority areas were identified as potential investments to support the national development priorities. These include:

1. Geothermal Power Development
2. Renewable Energy for Off-grid Electrification
3. Alternative Biomass Supply Options for Heat Applications

Technology	Criteria		
	SREP Criteria	National Criteria	Grand Total
Grid Connected			
Geothermal	26	10	36
Solar or Wind	21	7	28
Small Hydro	19	8	27
Biomass Power	21	8	29
Off-grid			
RE Minigrids	27	10	37
Stand-alone Solar	24	9	33
Biomass	25	9	34

The GoT is to focus the SREP-Tanzania on the first two priorities. If additional SREP resources are forthcoming, such resources will be used to implement the forthcoming strategy from Biomass Energy Strategy Tanzania.

7. SREP Program Description and Process

- **Objective:** SREP-Tanzania will scale up the deployment of renewable energy to transform the country's energy sector, principally the electricity sub-sector, from one that is increasingly fossil-fuel dependent to one that uses a more balanced supply of diverse energy sources.

- The two principal components proposed for SREP funding, along with other co-funding are:
  - Geothermal Power Development
  - Renewable Energy for Rural Electrification

- The SREP program will be implemented through an integrated approach that includes:
  - investments in renewable energies, particularly the infrastructure needed for their production and distribution;
  - capacity building for national institutions and stakeholders ;
  - integration with dynamic Public-Private Partnerships (PPPs);
  - Provision of adequate technical-assistance services.

7.1 Geothermal Power Development

- The Geothermal Power Development project aims to catalyze the development of about 100 MW of geothermal power, principally by the private sector and establish enabling environment for large-scale geothermal development.

- The project will be undertaken in various stages:

  Stage 1: Setting up the enabling environment for geothermal development

  Stage 2: Resource confirmation and feasibility studies

  Stage 3: Power generation project development

  Stage 4: Investment in about 100 MW of power (according to resource confirmation)

Each stage will depend on the results of the previous one.

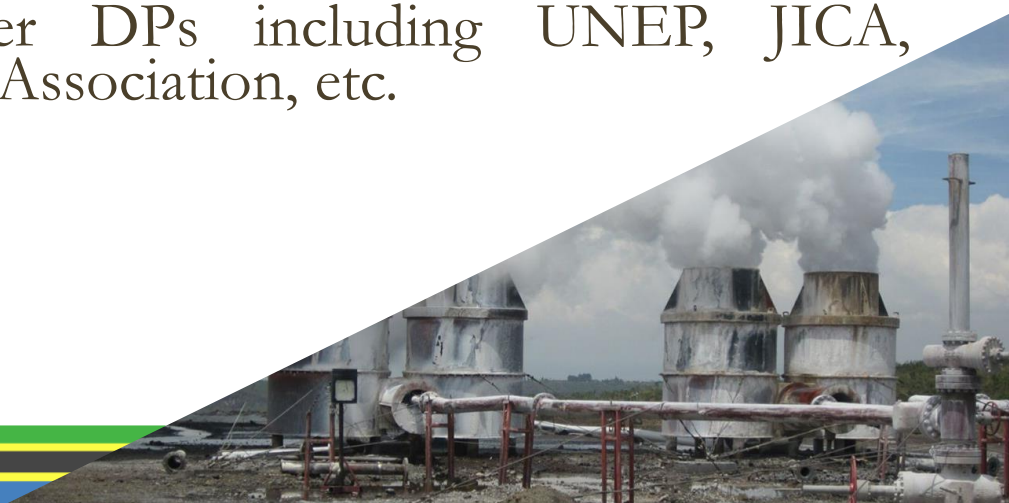
- Implementing Agency: MEM - Supported by: AfDB

7.1 Proposed Key Features (Geothermal Project)

- **Approach**: Given its potential development risks and high investment costs, geothermal development must be undertaken strategically. Opening the door to private sector investments implies that GoT will (i) establish an enabling environment for large-scale geothermal development and (ii) reducing the risks by financing the exploration phase and providing risk mitigation mechanisms.

- The project will provide financing for capacity building and institutional development; policy and regulatory framework development; resource exploration, feasibility studies and test drilling; transaction advisory services for selecting the adequate private operator; risk mitigation mechanism, etc.

- Close collaboration will be sought with other DPs including UNEP, JICA, ICEIDA/NDF, BGR/KfW, DFID, US Geothermal Association, etc.



7.2 Renewable Energy for Rural Electrification (RERE)

- Leveraging private-sector investments is at the core of the RERE Project
- RERE Project aims to (i) build an efficient and responsive off-grid electrification project development infrastructure for RE-based rural electrification, and (ii) demonstrate its effectiveness by supporting a time-slice of private-sector investments in off-grid electricity enterprises
- The project encompasses three renewable energy electrification schemes:
  - Mini grids of several hundred kilowatts and up to 10 MW serving a group of villages, as well as larger customers
  - Micro grids powered by a small, centralised PV array and battery bank, biomass gasifier, biogas, or other renewable technology
  - SSMPs, supplying electricity services to essential public-service and community facilities (e.g. schools and health clinics), plus sale to private customers using stand-alone solar PV systems
- Implementing Agency: REA, Supported by: World Bank / IFC

7.2 Cont. Proposed Components (RERE project)

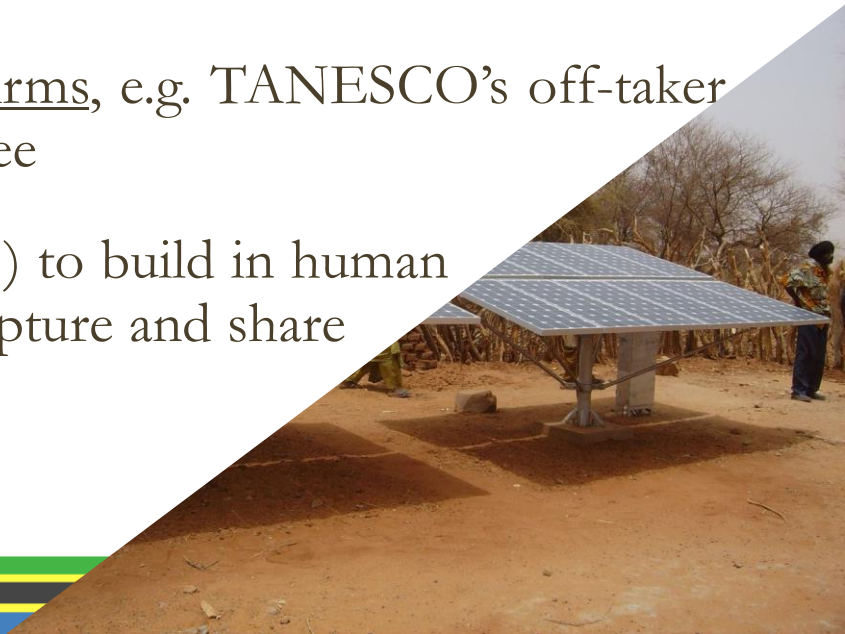
- Based on lessons learned, REA proposes to (i) scale-up successful instruments and (ii) develop new instruments that would target remaining barriers; as follows:

- **Co-financing through a credit line** funded by SREP/MDB/DPs to offer long term financing through commercial banks and **performance grants** to buy down the costs of household connections through REA

- **Transaction Advisory Services Facility** to provide firm-level support for pre-feasibility and feasibility studies, regulatory compliance, technical design and evaluation, procurement, preparation of business plans and models, financial and economic modelling, market and risk assessments, and financial closure.

- **Risk mitigation instruments** to cover most detrimental risks for firms, e.g. TANESCO's off-taker risk, through a letter of credit and backed up by a partial risk guarantee

- **Capacity building** for key stakeholders (REA, TANESCO, MEM…) to build in human resources, technical and administrative capacity for the scale-up, to capture and share lessons learned and to mainstream gender in the new operation.



8. Funding of the Program and Sources

- The total estimated budget for the SREP-Tanzania is USD 719.25 million with a SREP contribution of USD 50 million.

- The program is seeking contributions from the MDBs and other development partners, including:
  - A total of USD 45 million from the AfDB to finance the Geothermal Power Development Project;
  - USD 50 million from the World Bank Group to support the RERE Project.

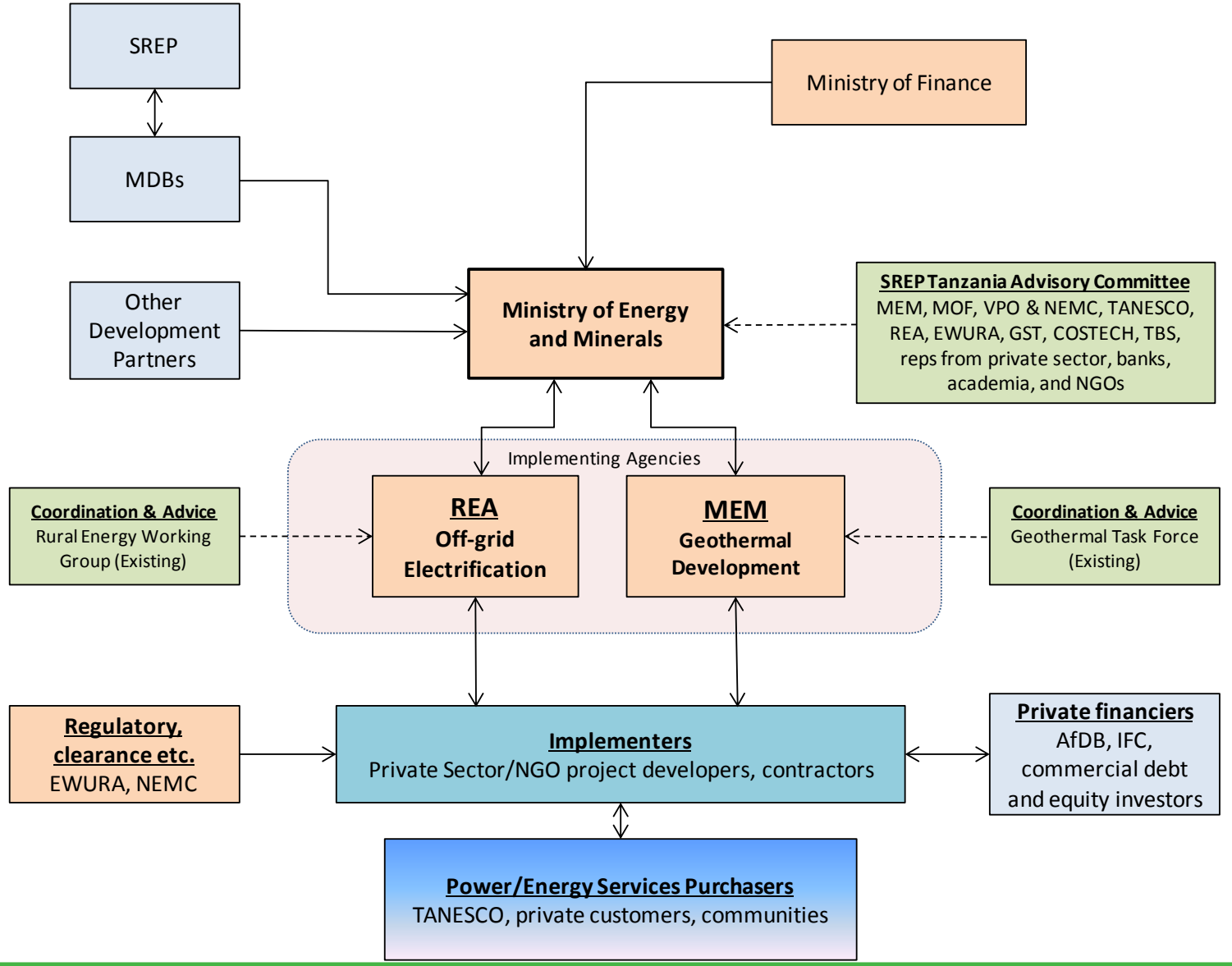
8. Cont. Funding of the Program and Sources

SREP Indicative Financing Plan

SREP Project	SREP	Gov't. of Tanzania	World Bank Group	AfDB	Private Sector	Commercial Banks	Other Development Partners	Total
Geothermal Power Development	25.00	1.50	-	45.00	142.50	317.50	5.30	536.80
Renewable Energy for Rural Electrification	25.00	2.40	50.00	-	30.48	28.03	46.54	182.45
Total	50.00	3.90	50.00	45.00	172.98	345.53	51.84	719.25

SREP Leverage 13:1

9. Implementation Arrangements

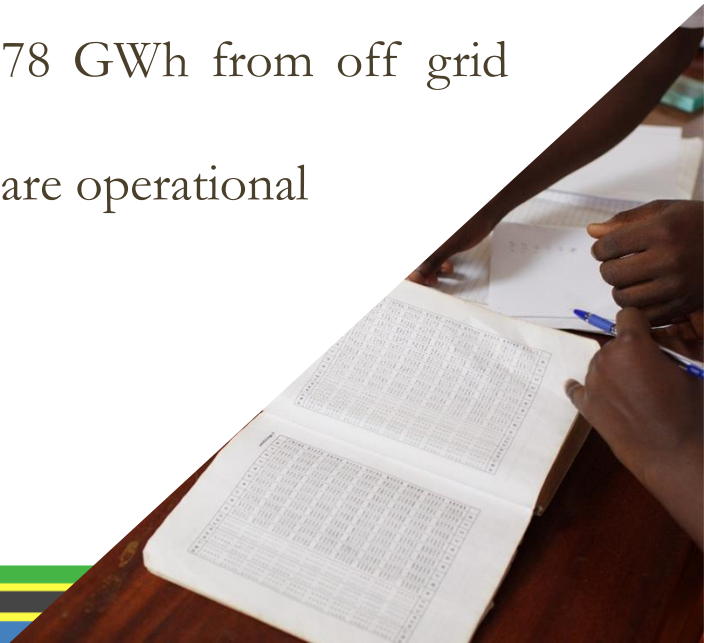


10. Monitoring and Evaluation

Expected SREP results by 2020:

- **SREP transformative impact:** Support low carbon development pathways by reducing energy poverty and/or increasing energy security
  - National measure of energy poverty: Per capita electricity use increases from 78 to 350 kWh
  - Annual electricity output from renewable energy: increased from 370 to 2000 GWh/year
  - Increased public and private investments in renewable energy: ~ USD 1 billion

- **SREP program outcomes:**
  - Increased supply of renewable energy: 700 GWh from geothermal and 178 GWh from off grid renewables
  - Avoided GHG emissions (697345 tons CO2e per year) once SREP projects are operational
  - Increased access to modern energy services: about 9.2 million people
  - SREP funds leverage – 13:1



11. Conclusion

- The SREP-Tanzania Investment Plan offers a unique opportunity to propel Tanzania's future development along a low-carbon pathway by reducing energy poverty and increasing energy security.

- The appropriate exploitation of the country's abundant renewable energy resources has great potential to move it toward achieving universal access to modern energy services.

- The Government of Tanzania, with support from the international community, is committed to adopting a green growth approach to ensure immediate and longer-term social, economic, and environmental benefits from a well-performing and sustainable energy sector.

Asante Sana!
Thank you very much!

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