Integrated Electrification Pathways
Community of Champions Webinar Series

17 September 2019
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<td>Zambia country case study – <em>Dr. Lloyd Ngo, Electrification Advisor, Ministry of Energy, Zambia</em></td>
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<td>Overview of donor support programmes for IEP - <em>Various</em></td>
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Introduction to IEP

Olivia Coldrey, Lead Finance Specialist, SEforALL
Hadley Taylor, Associate Energy Access Specialist, SEforALL
Underinvestment means the gap will widen: electrification deficits in high-impact countries in 2017 (million people)

618 million people

Source: Tracking SDG7: The Energy Progress Report 2019
Bridging the Gap
SEforALL’s Integrated Electrification Pathways Primer - Approach

• Process to get here
  • Experience with AAs/IPs, speaking to policy makers
  • Electrification Accelerator
  • Stakeholder Consultation

• 3 country case studies (including videos)
What is an IEP?

A set of inclusive planning approaches and policy measures that support using grid, mini-grid and off-grid technologies to provide electricity and the associated energy services necessary to meet human needs and contribute to sustainable development.
Recognize electricity access as essential for achieving other development goals

- Power the development vision of the country’s future
- Develop a framework for input and close coordination with Ministries of Finance, Infrastructure, Health, Education, Rural Development, Gender/Women

Consider all sustainable technologies and delivery models available

- Grid extension/densification, mini-grid and off-grid/stand-alone technologies where appropriate
- Appropriate data and Geo-spatial modelling very important at this stage to identify appropriate solutions against tier of service required and affordability constraints
Establish high-level political support for coordinated government planning

- Commitment at the highest political level builds confidence in investors, donors and private sector

Develop policy measures that encourage private sector investment

- Consultation with relevant sector stakeholders is of utmost importance for successful implementation
- IEP should include an overview of both financial and non-financial incentives to private sector investment and project development
IEP Process

1. Establish coordinating body
   - Empower with high-level support
   - Include broad stakeholder representation
   - Focus on development goals

2. Solicit expert engagement
   - Ensure breadth of knowledge
   - Coordination across expert communities
   - Coordination across donor organizations
   - Build local capacity

3. Obtain data, use planning tools, adjust
   - Gather geospatial data
   - Use model for least-cost solution
   - Adjust solution for desired development outcomes

4. Develop supportive policy measures
   - Adjust legal and regulatory framework to create level playing field
   - Create tariff regulations that work for service providers and consumers

5. Mobilize finance and build the ecosystem
   - Develop appropriate finance
   - Support all technology types and business models
   - Support consumers to stimulate demand
   - Engage in investment promotion, public education, skill-building
Zambia Case Study

Dr. Lloyd Ngo, *Electrification Advisor, Ministry of Energy, Zambia*
RURAL ELECTRIFICATION AUTHORITY

ELECTRICITY SERVICE ACCESS PROJECT

Integrated Electrification Pathways – A case study for Zambia

DR. LLOYD NGO – ELECTRIFICATION ADVISOR

17-09-2019
1. Overview of Energy Sector in Zambia
2. Background and Status on Rural Electrification
3. Route to Universal Access – Integrated Electrification Pathway
4. Development of GIS Least Cost Plan
5. Next steps
Overview on Zambia

- Located in Southern Africa, covers 752,614 m²
- In 2015, Central Statistical Office (CSO) estimated Zambia’s population at 15.5 million and is projected to reach 23.6 million by 2030.
- As at 2015 most of the population lived in rural area accounting for almost 60% and the remaining 40% in urban areas.
- Zambia has one of the lowest population densities in Southern Africa varying between 6 and 31 persons per square kilometre), which makes providing access to services particularly challenging.
1.0 Overview of the Energy Sector

- Major source of energy in Zambia is wood fuel (i.e. firewood and charcoal);

- Large hydro is the major electricity generation source;

- Petroleum is wholly imported.
Overview of Energy Sector

- Electricity installed capacity is 2,878.6 MW
- 85% is hydro based
- 13.3% thermal (Coal, HFO and Diesel) and,
- 1.7% renewable comprising of solar and small hydros
- Maximum peak demand of about 1,900 MW
- Electricity Access:
  - National = 31.4%, Urban = 67%, Rural = 4.5%.
- Adjustment of tariff towards cost reflectivity
Overview of Energy Sector

• Energy Policy of 2008
  • Electricity Act
  • Energy Regulation Act
  • Rural Electrification Act

• Vision 2030
  • To increase rural electricity access to 51% by 2030
  • Urban areas access to 90% by 2030
  • Increase contribution of renewable and alternative energy sources in the country’s energy mix from < 2% to 15% by 2030

• Seventh National Development Plan
• SGDs
3.0 Rural Electrification Status

- The Rural Electrification Authority and Rural Electrification Fund (REF) were established under the Rural Electrification Act No. 20 of 2003.
- REA commenced implementation of rural electrification projects in 2006.
- The Rural Electrification Master Plan (REMP) is the principal source of rural electrification projects.
- REMP identified 1,217 Rural Growth Centres throughout the country as targets for electrification during the period 2008-2030 using various technologies.
- A total amount of US$ 1.1 billion or US$ 50m per year was required for achieving rural electricity access rate from 3.1% in 2006 to 51% by 2030.
Route to Universal Access: NEP is a vision and plan for comprehensive and sustained action

**Vision**

Electricity for all in Zambia by 2030 “Secure, adequate and affordable”

**Plan**

- Clear targets, roles and intermediate milestones for monitoring
- Comprehensive framework and sound rollout plan
- Sector-wide programmatic framework
NEP shifts delivery from fragmented projects to sector-wide development focused on results

“Taking advantage of new technologies and the best solutions from around the world, Zambia is ready to do more”
NEP is a country-led, results focused, long-term sector development program

“Many Players, One Team, One Plan”

The Ministry of Energy will lead the energy sector through a comprehensive process to:
- Redefine electrification targets
- Clarify the roles of the sector's main agencies
- Ensure joint sector engagement and accountability across all stakeholders
- Identify the essential investments for public, private, and cooperating partner financing

Stakeholders:
- Government
- Development Partners
- ZESCO
- REA
- Regulatory Authority
- Local Government
- Sector Ministries
- Private Sector
- Consumers
The Government will guide the development of NEP from a plan to implementation.
Least cost electrification planning steps

1. Identification of localities from detailed population layer (clustering)
2. Prioritization of the localities
3. Demand forecast
4. Identification of potential and locations for solar home systems

5. Identification of best electricity supply option for each locality:
   • Grid densification
   • Grid extension
   • Renewable-based mini-grid

6. Investment planning
7. Preliminary results indicate that off-grid systems will play a significant role if universal access has to be achieved by 2030.
Next steps

- High level engagements for awareness and buying in.
- Training in GIS for technical staff in key institutions.
- Verification of GIS data for renewable energy resources especially hydro
- Verification of the GIS data for MV/LV distribution lines especially those done by REA.
- Study tour to countries that have implemented the IEP (Rwanda, Tanzania and Ethiopia).
- Concept note on implementation structure.
END OF PRESENTATION
IEP Support Programs

Africa Clean Energy Technical Assistance Facility
Joyce DeMucci – Deputy Team Leader, ACE TAF

Global Electrification Platform, World Bank
Dana Rysankova – Senior Energy Specialist, World Bank
Benjamin Stewart – Geographer, World Bank
Global Electrification Platform

Integrating technology solutions for achieving SDG7 on time, and at least-cost

A Global Good

September 24th, 2019
Population without access (%)

- Sub-Saharan Africa: 68%
- Central Asia and Southern Asia: 21%
- Other: 11%

With access 89%
Without Access 11%

Source: World Bank Global Electrification database 2017
Universal Access to Electricity by 2030
WELCOME TO THE
Global Electrification Platform

Explore least cost electrification strategies around the world, interacting with country contextual data and different investment scenarios.

01 MODELS 35 COUNTRIES

START EXPLORING LEARN MORE
Welcome to the Global Electrification Platform

Explore least cost electrification strategies around the world, interacting with country contextual data and different investment scenarios.

01 MODELS  35 COUNTRIES
Rwanda

Scenario: Population Growth
- Medium population growth (2.1%)
- High population growth (2.4%)

Scenario: Electricity demand target
- Bottom-up demand target - Low (U2R1)
- Bottom-up demand target - High (U3R3)
- Top-down demand target (Poverty-GDP)

Intermediate investment plan
- Not capped
- Capped annual connections

Grid generating cost of electricity
- Estimated on-grid cost (0.042 $/kWh)
- High on-grid cost (0.055 $/kWh)

PV system cost
- Expected PV cost
- High PV cost (+25%)
- Low PV cost (-25%)

Summary:
- People connected: 16 M of 16 M
- Investment required: $157 M
- Added capacity: 25 MW
Open data and analytics for a sustainable energy future.
Global Electrification Platform

**GEP**
The Global Electrification Platform (GEP) is an open portal for electrification investment data, analysis and research.

✉️ theGEPadm@gmail.com

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**Repositories**

- **explorer**
  Web application of Global Electrification Platform
  - JavaScript
  - MIT
  - 2
  - 24 issues need help
  - 2
  - Updated 2 days ago

- **data-service**
  Data service of Global Electrification Platform
  - JavaScript
  - MIT
  - 2
  - 1
  - 2
  - Updated 2 days ago

- **gep-onsset**
  Modified version of the Open Source Spatial Electrification Tool (OnSSET) to serve GEP objectives
  - Python
  - MIT
  - 0
  - 4
  - 0
  - Updated 25 days ago

- **docs**
  Documentation for Global Electrification Platform (GEP)
  - JavaScript
  - MIT
  - 0
  - 1
  - 1
  - Updated on Jun 6
Universal Access
EMP-A (Energy Modelling Platform Africa)
Addis Ababa – January 2018

SDSS (Sustainable Development Summer School)
Trieste, Italy – June 2018

EMP-A
Cape Town, South Africa – January 2019

SDSS
Trieste, Italy – June 2019

~20 Countries – 40 % of SSA – 50 % of SSA un el.pop
**Consistency:** Annual event June 2020, 2021, 2022

**Collaboration:** Inviting organizations to join as hosts

**Participants:** or send trainees to existing trainings.

**Economies of Scale!**
About the Community of Champions

Kia Muukkonen – Assistant Program Manager, GOGLA
The Community of Champions
Community of Champions

The Community of Champions was formed as an opportunity for high-level, ongoing exchange between governments, the private sector and development partners to work collaboratively towards creating a supportive policy environment to help achieve universal energy access in Africa.

- Lisbon May 2018
- Kigali November 2018
- Addis Ababa March 2019
Kigali – 1 November 2018
Ethiopia  Lebombo
Rwanda  Madagascar
Kenya  Benin
Uganda  Niger
ECREEE  Togo
EACREEE  Nigeria

Addis Ababa – 27 March 2019
Ethiopia
Kenya
Uganda
Zambia
EACREEE
What’s next:

1. The next CommChamp events will be in Dakar in October 2019 and Nairobi in February 2020.

2. The next webinar in this series is titled ‘Macro-economic Balancing in the Off-Grid Sector’ hosted by USAID/Pow... Bank in November 2019 focusing on:
   • Tax generation benefits versus socio-economic and job creation benefits
   • Productive uses of energy

3. For more information, please check our website or get in touch with me.
Contact us:

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Thank you!

For more information visit: https://www.seforall.org/interventions/electricity-for-all-in-africa/integrated-electrification-pathways

Or email: electrification@seforall.org