



## Integrated Electrification Pathways

*Community of Champions Webinar Series*

17 September 2019



# Agenda

5 mins	Sign-on and roll-call
15 mins	Overview of SEforALL's IEP Framework – <i>Olivia Coldrey, Lead Finance Specialist and Hadley Taylor, Associate Energy Access Specialist, SEforALL</i> <ul style="list-style-type: none"><li>• Background and Approach</li><li>• Definition and Guiding Principles</li><li>• Process</li></ul>
15 mins	Zambia country case study – <i>Dr. Lloyd Ngo, Electrification Advisor, Ministry of Energy, Zambia</i>
35 mins	Question and answer / facilitated discussion
10 mins	Overview of donor support programmes for IEP - <i>Various</i>
5 mins	About the Community of Champions – <i>Kia Muukkonen, Assistant Project Manager, GOGLA</i>
5 mins	Closing, more information – <i>SEforALL</i>



# Introduction to IEP

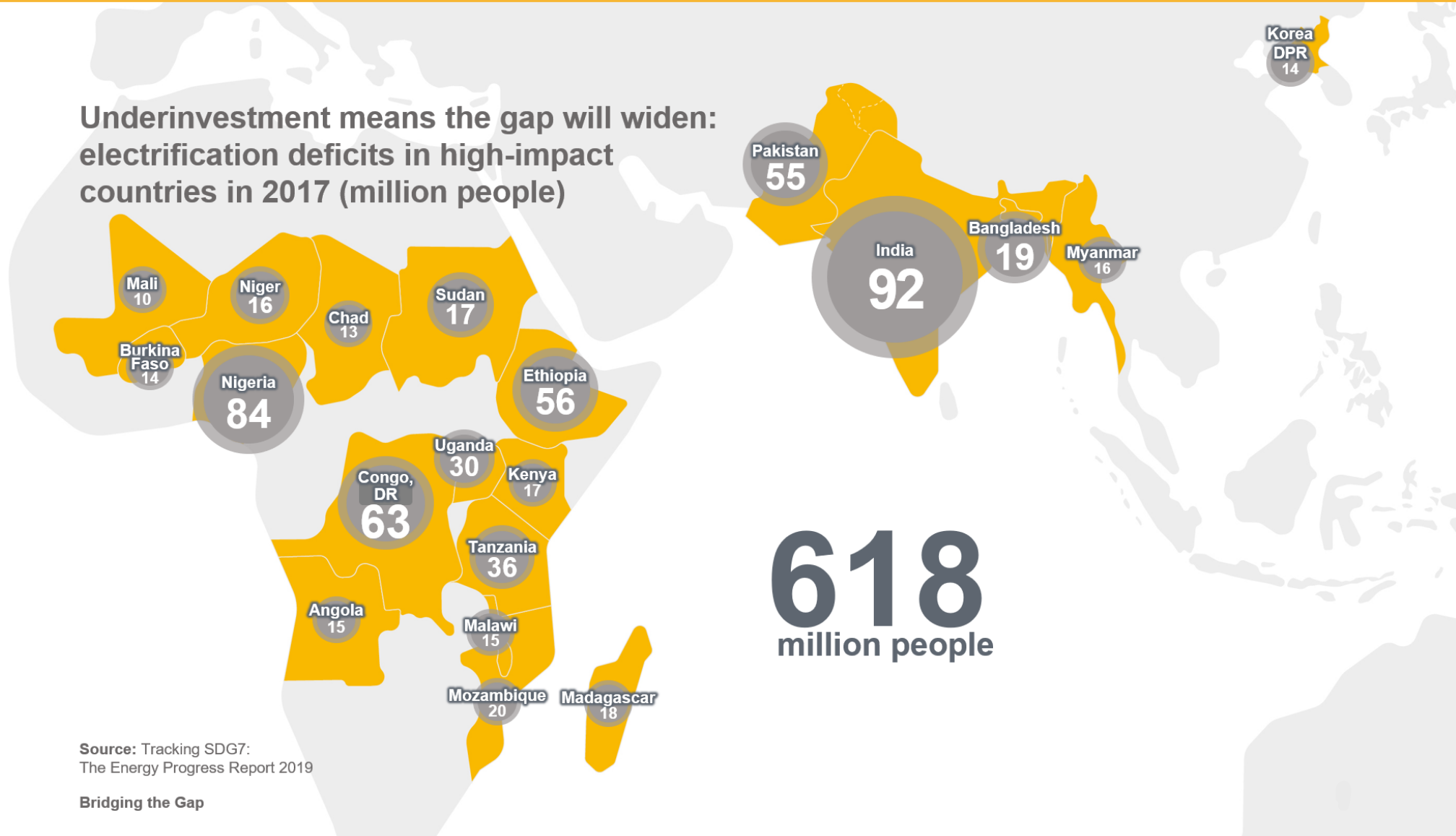
Olivia Coldrey, *Lead Finance Specialist, SEforALL*

Hadley Taylor, *Associate Energy Access Specialist, SEforALL*



# Background

Underinvestment means the gap will widen:  
electrification deficits in high-impact  
countries in 2017 (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**.*



# IEP Guiding Principles (1)

## 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



## IEP Guiding Principles (2)

### **Establish high-level political support for coordinated government planning**

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

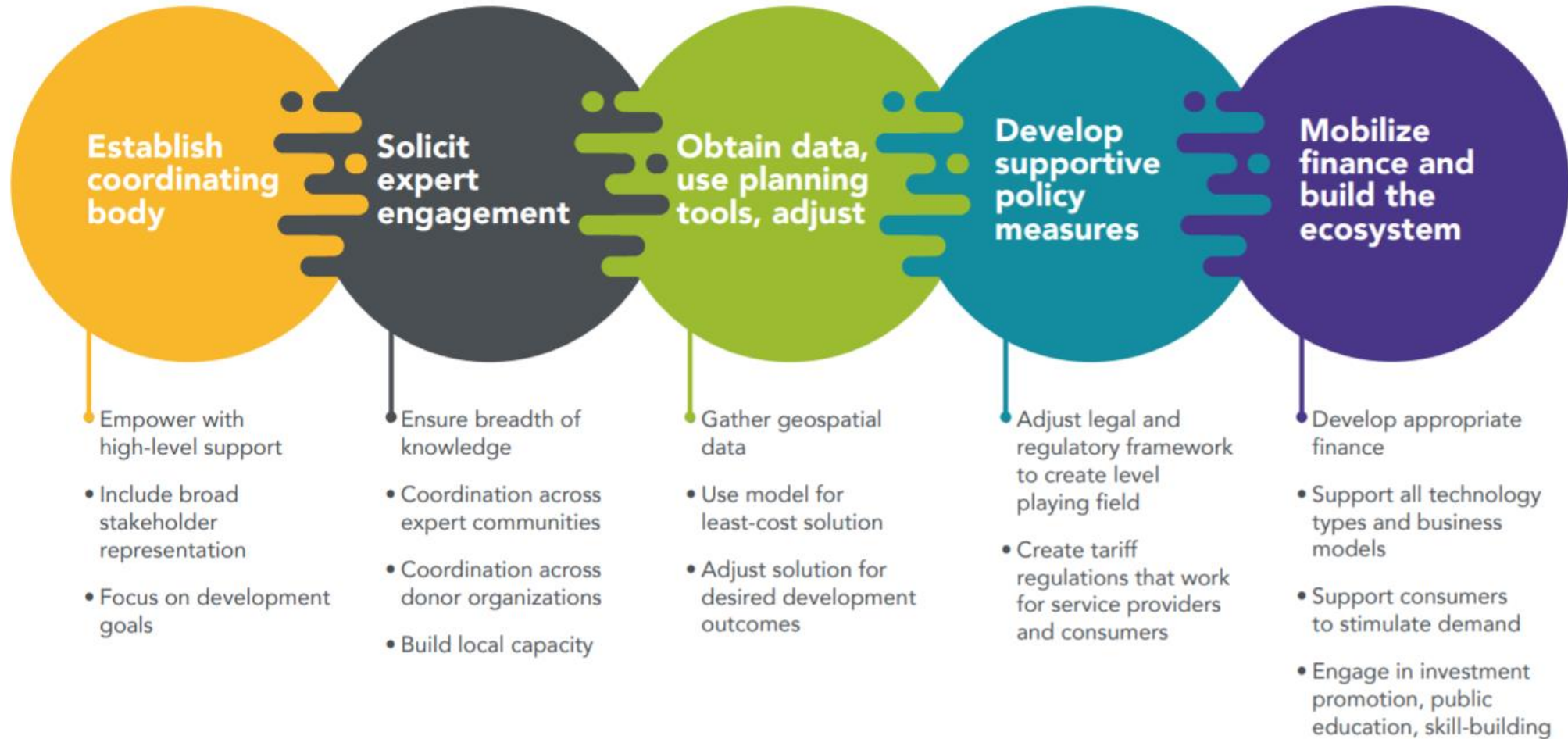
### **Develop policy measures that encourage private sector investment**

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





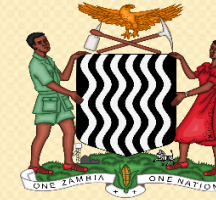
# IEP Process



# 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**



# PRESENTATION OUTLINE

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 m<sup>2</sup>
- 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, 878.6MW
- 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

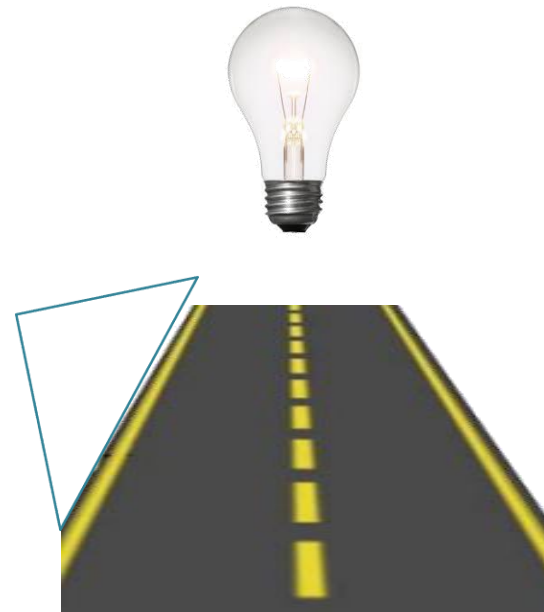
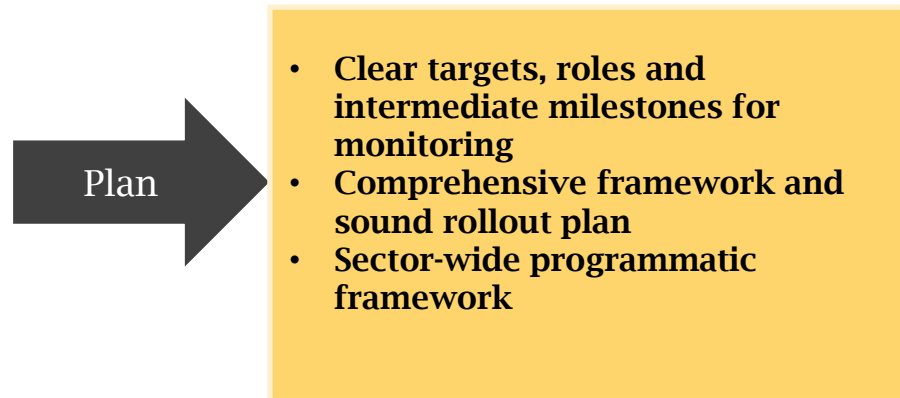
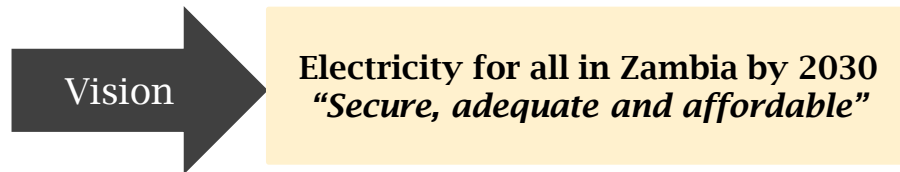
- Energy Policy of 2008
  - Electricity Act
  - Energy Regulation Act
  - Rural Electrification Act
- Vision 2030
  - To increase rural electricity access to 51% by 2030
  - Urban areas access to 90% by 2030
  - Increase contribution of renewable and alternative energy sources in the country's energy mix from < 2% to 15% by 2030
- Seventh National Development Plan
- SGDs



### **3.0 Rural Electrification Status**

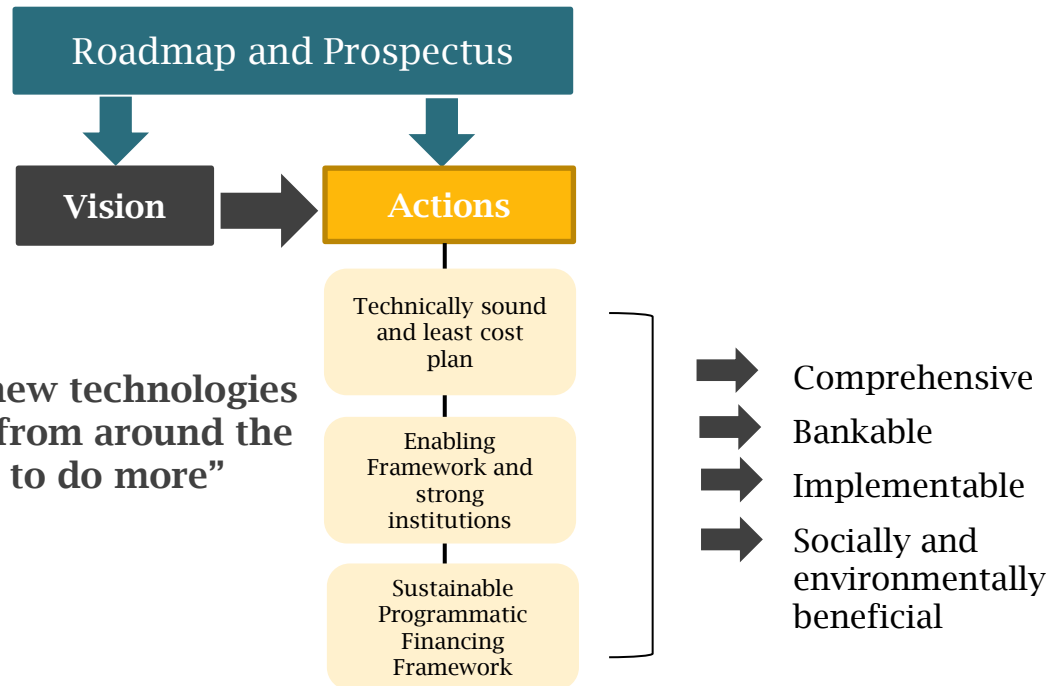
- The Rural Electrification Authority and Rural Electrification Fund (REF) were established under the Rural Electrification Act No. 20 of 2003.
- REA commenced implementation of rural electrification projects in 2006.
- The Rural Electrification Master Plan (REMP) is the principal source of rural electrification projects.
- REMP identified 1,217 Rural Growth Centres through out 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



# 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

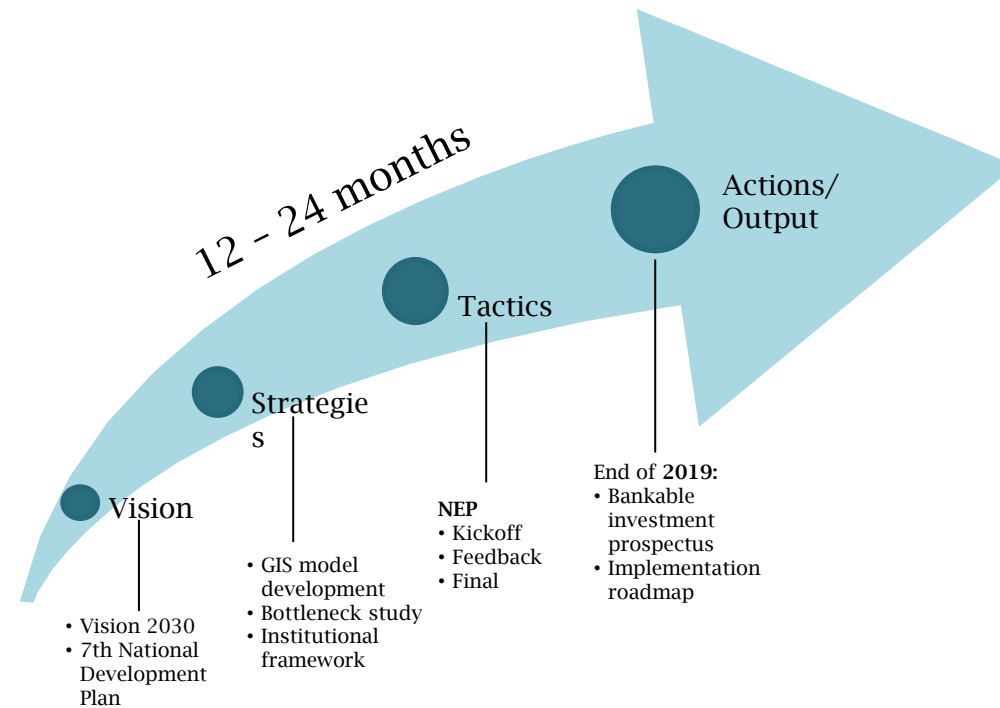
## “Many Players, One Team, One Plan”

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



# 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**



# Q&A / Discussion



# 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



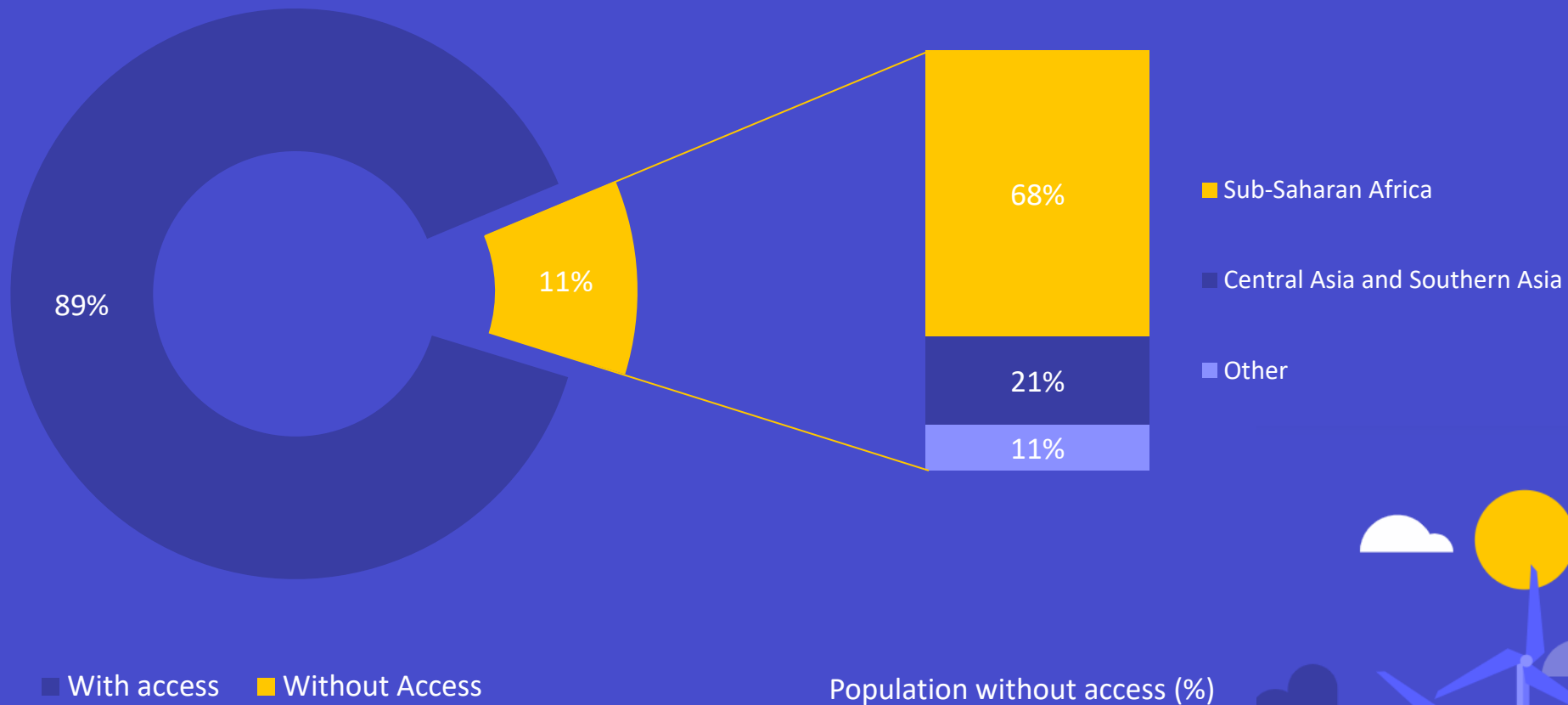
# Global Electrification Platform

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

A Global Good

September 24th, 2019







## Universal Access to Electricity by 2030





WORLD BANK GROUP



## CONSORTIUM





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

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**01** MODELS

**35** COUNTRIES

START EXPLORING

LEARN MORE







Togo



Congo (Democratic Republic of the)



Angola



Central African Republic



Rwanda



South Sudan



Cameroon



Sao Tome and Principe



Chad



Mauritania



Somalia



Madagascar



Benin



Ghana



Congo



Guinea-Bissau



Côte d'Ivoire



Gabon



Comoros



Sierra Leone



Senegal



Namibia



Burkina Faso



Burundi



### Population Growth

- Medium population growth (2.1%)
- High population growth (2.4%)

### Electricity demand target

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

### Intermediate investment plan

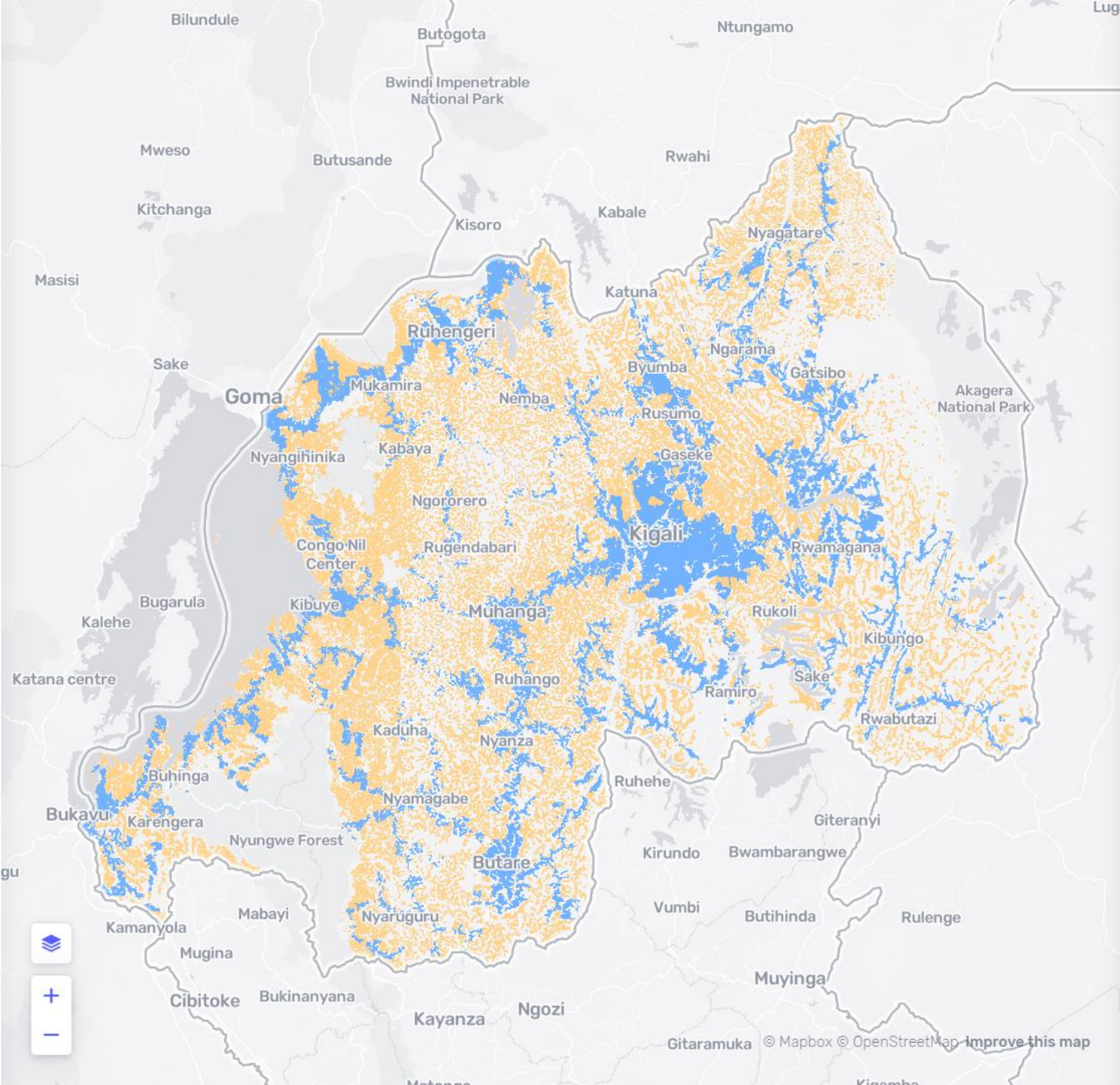
- Not capped
- Capped annual connections

### Grid generating cost of electricity

- Estimated on-grid cost (0.042 \$/kWh)
- High on-grid cost (0.053 \$/kWh)

### PV system cost

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



## Summary

RESULTS FOR 2030

- Grid extension
- Stand-alone - Photovoltaic



16 M OF 16 M

PEOPLE CONNECTED



\$157 M

INVESTMENT REQUIRED



25 MW

ADDED CAPACITY



SCENARIOS

FILTERS

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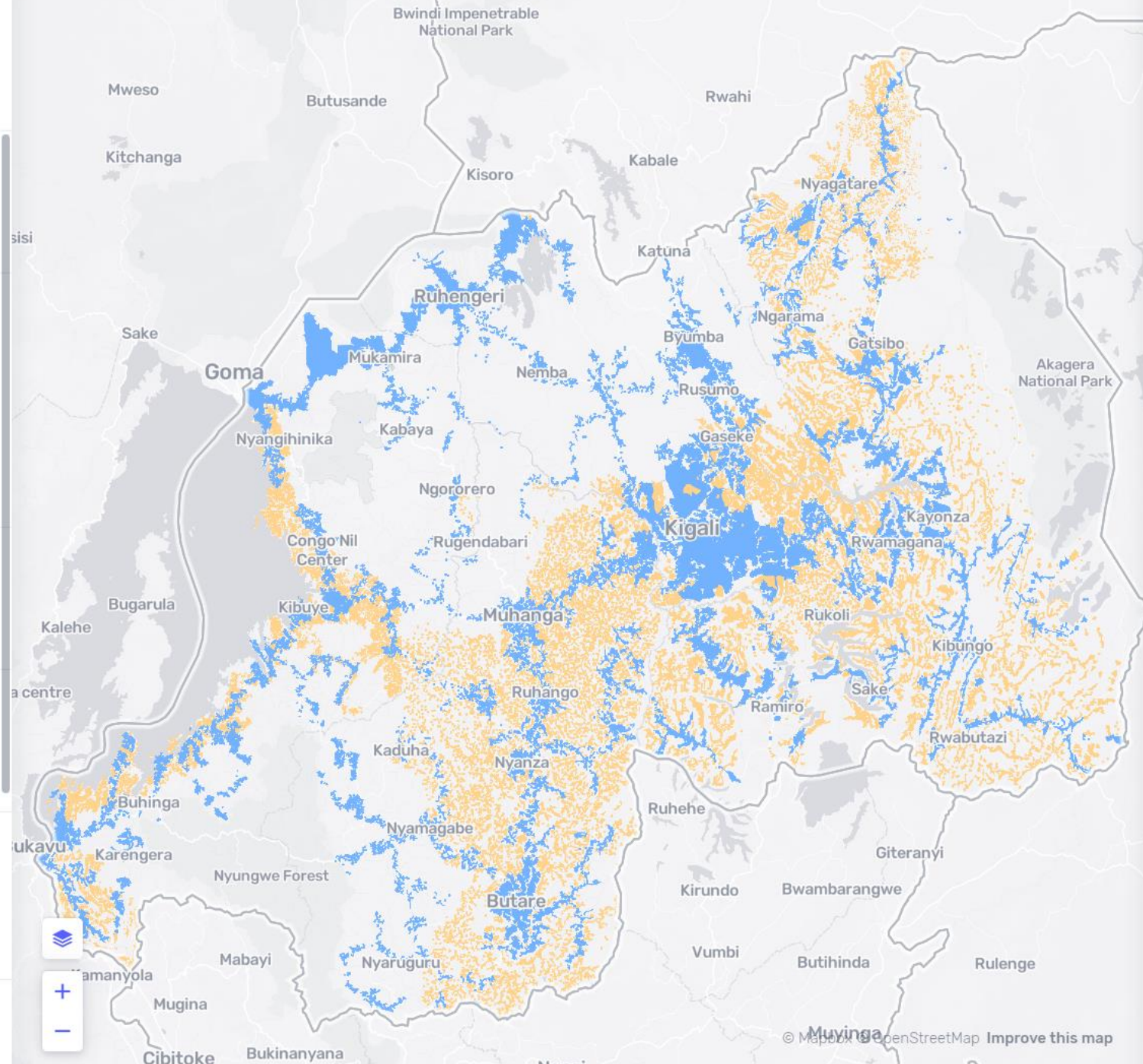
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RESET

2025

APPLY



## Summary

RESULTS FOR 2025

- Grid extension
- Stand-alone - Photovoltaic



PEOPLE CONNECTED



INVESTMENT REQUIRED



ADDED CAPACITY

DOWNLOAD

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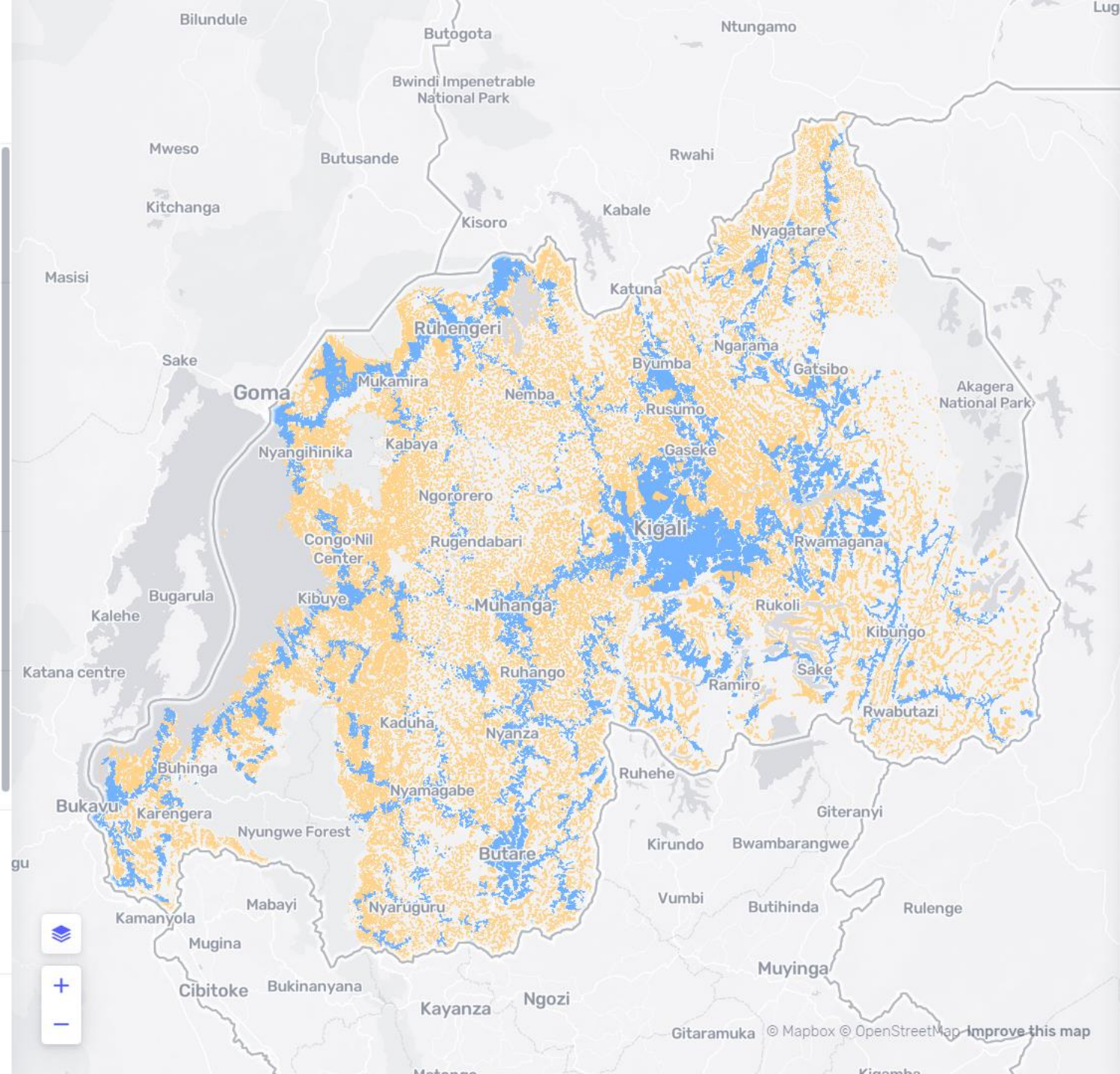
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## Summary

RESULTS FOR 2030

- Grid extension
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PEOPLE CONNECTED



INVESTMENT REQUIRED



ADDED CAPACITY

# Open data and analytics for a sustainable energy future.

Search datasets

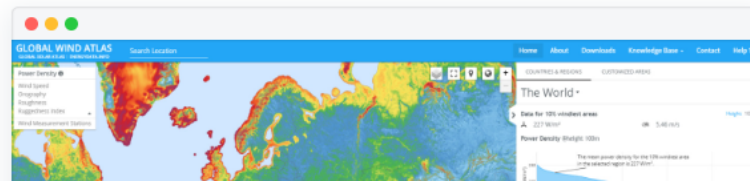
593  
DATASETS

18  
ORGANIZATIONS

164  
COUNTRIES

16  
APPS

## Featured Apps





Search or jump to...



Pull requests Issues Marketplace Explore



# Global Electrification Platform



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

✉ theGEP.adm@gmail.com

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📦 Packages

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👥 Teams

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Find a repository...

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Customize pins

📄 New

## explorer

Web application of Global Electrification Platform

🟡 JavaScript 📄 MIT 🍷 1 ★ 2 ⓘ 24 (2 issues need help) 🛠 2 Updated 2 days ago



## data-service

Data service of Global Electrification Platform

🟡 JavaScript 📄 MIT 🍷 2 ★ 1 ⓘ 7 🛠 2 Updated 2 days ago



## gep-onsset

Modified version of the Open Source Spatial Electrification Tool (OnSSET) to serve GEP objectives

🟢 Python 📄 MIT 🍷 0 ★ 0 ⓘ 4 🛠 0 Updated 25 days ago



## docs

Documentation for Global Electrification Platform (GEP)

🟡 JavaScript 📄 MIT 🍷 0 ★ 1 ⓘ 1 🛠 1 Updated on Jun 6



### Top languages

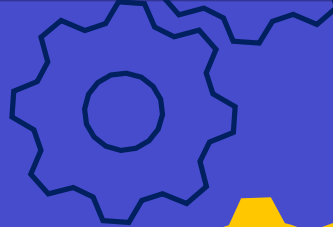
🟡 JavaScript 🟢 Python 🟠 HTML

### People

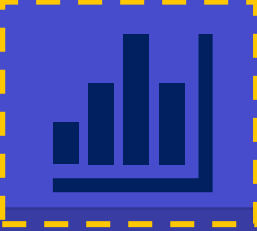
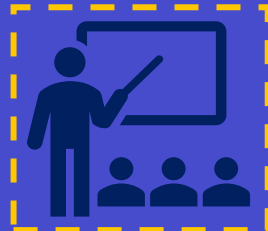
8 >



Invite someone



**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

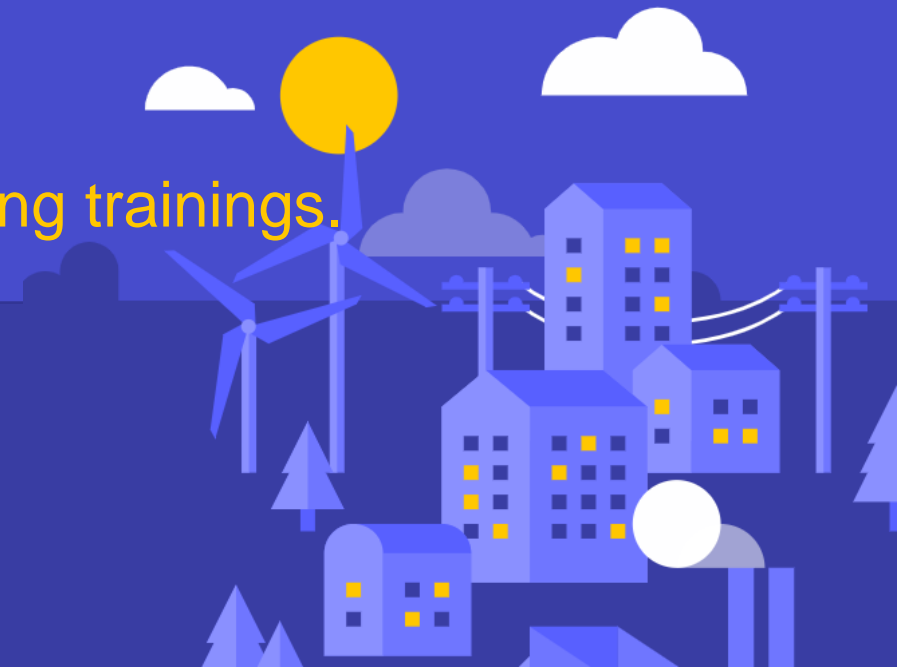


**Collaboration:** Inviting organizations to join as hosts



**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

Lesotho

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/Power Africa, GOGLA and the World 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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[www.gogla.org](http://www.gogla.org)

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The Netherlands





# Thank you!

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

Or email: [electrification@seforall.org](mailto:electrification@seforall.org)

