AFRICA MINIGRIDS PROGRAM

Webinar

Community-Centric Minigrids: Toolkit and Insights

4 December 2025, 3:00-4:30pm WAT, Virtual

Supported by: gef, UNDP

In partnership with: RMI, Banque Africaine de Développement / African Development Bank

For French interpretation, kindly click the "globe" icon and select French

Interpretation

WEBINAR OBJECTIVES

- Introduce **a framework for community-centric approach** to enhance minigrid delivery

- Share **hands-on community-centric project experiences** along with **learnings and insights**

- **Encourage discussions** on how community-centric approach can be integrated with minigrids deployment and broader rural electrification efforts

The webinar is designed to be **engaging and informative**, we invite you to ask questions and share your ideas.

SPEAKERS

AFRICA MINIGRIDS PROGRAM

Faris Khader
UNDP

Zihe Meng
RMI

Frank Bergh
NRECA

Ayu Abdullah
COMET

Collins Dadzie
RMI

Sascha Flesch

Washima Mede
PradoPower

AGENDA

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Allocated time	Agenda item	Speaker/Panelist
10 mins	Welcome and Introduction	Zihe Meng, **RMI** Faris Khader, **UNDP**
10 mins	**Session 1: The Community-Centric Minigrid Toolkit** Introduce the Community-Centric Minigrid Toolkit and lessons to date	Zihe Meng, **RMI**
10 mins	**Session 2: Presentation** Share insights on benefits of community-centric approach	Frank Bergh, **NRECA**
10 mins	**Session 3: A Community Demand-Side Tool** Demonstrate what enhanced community engagement can look like	Ayu Abdullah, **COMET**
30 mins	**Session 4: Panel Discussion** Panel discussions highlighting field experiences and learnings	Sascha Flesch Washima Mede, **PradoPower** Frank Bergh, **NRECA** Ayu Abdullah, **COMET**
15 mins	**Q&A**	
5 mins	Feedback and Closing remarks	Zihe Meng, **RMI**

About AMP

Faris Khader, UNDP

THE AFRICA MINIGRIDS PROGRAM (AMP)

The AMP is a country-led technical assistance program for minigrids.

Its objective is to support access to clean energy by increasing the financial viability of, and promoting scaled-up commercial investment, in renewable energy minigrids in Africa, with a **focus on cost-reduction levers and innovative business models.**

Comprised of **country-level interventions in an initial 21 countries in Africa** and complemented by a **'regional platform'** acting as the advocacy, coordination, and knowledge management hub for the program.

Implementation began in Q3 2022 and is expected to continue until 2027.

- 1st Round - fully designed; moved into implementation Q3 2022
- 2nd Round – approved by the GEF – Implementation started in 2024/2025
- 3rd Round – approved by the GEF – Implementation start in 2025

AMP PARTICIPATING COUNTRIES

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These 21 countries together host an estimated total of **400 million people without electricity**, or more than two thirds of the **571 million** total people without access to electricity in Sub-Saharan Africa (SDG7 Progress Report 2024).

1st ROUND: 11
GEF Dec. 2019

- **Angola****
- **Burkina Faso**
- **Comoros**
- **Djibouti**
- **Eswatini**
- **Ethiopia**
- **Madagascar****
- **Malawi**
- **Nigeria**
- **Somalia**
- **Sudan**

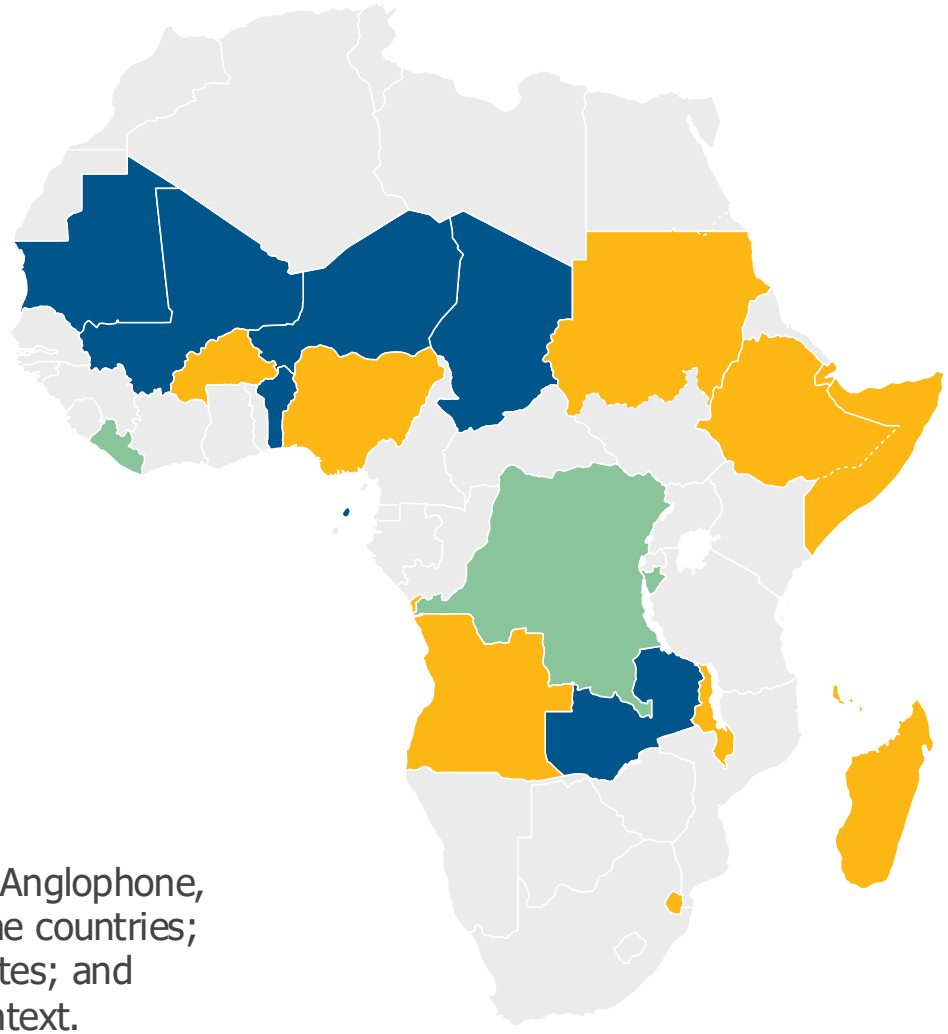
2nd ROUND: 7
GEF June 2021

- **Benin**
- **Chad****
- **Niger**
- **Mali**
- **Mauritania****
- **Sao Tome e Principe**
- **Zambia**

3rd ROUND: 3
GEF June 2022

- **DRC**
- **Burundi****
- **Liberia****

** (third-party-funded)



Large and smaller markets; Anglophone, Francophone, and Lusophone countries; Small Island Developing States; and countries in a post-crisis context.

The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations or UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

SESSION 1:
Community-Centric Approach

Zihe Meng, RMI

The community-centric approach can bridge and enhance existing minigrid delivery models

Minigrid delivery model: It defines who owns, finances, builds, operates, and maintains the minigrids.

Community-centric approach: not a standalone delivery model, but a flexible set of design principles that can be embedded into any existing delivery model

Continuous community buy-in is crucial for long-term success of minigrid projects, and there is a need to strengthen rural electrification and integrate more meaningful community roles.

The Community-Centric Minigrid Toolkit offers:

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1. An adaptable design framework
2. Preconditions for implementing community-centric projects
3. Guidance in applying key principles to projects and integrating the approach to minigrids delivery
4. Monitoring, evaluation and learning considerations
5. Lessons learned and insights to date
6. Case studies

DOWNLOAD THE TOOLKIT

We introduce a community-centric framework consisting of five key aspects:

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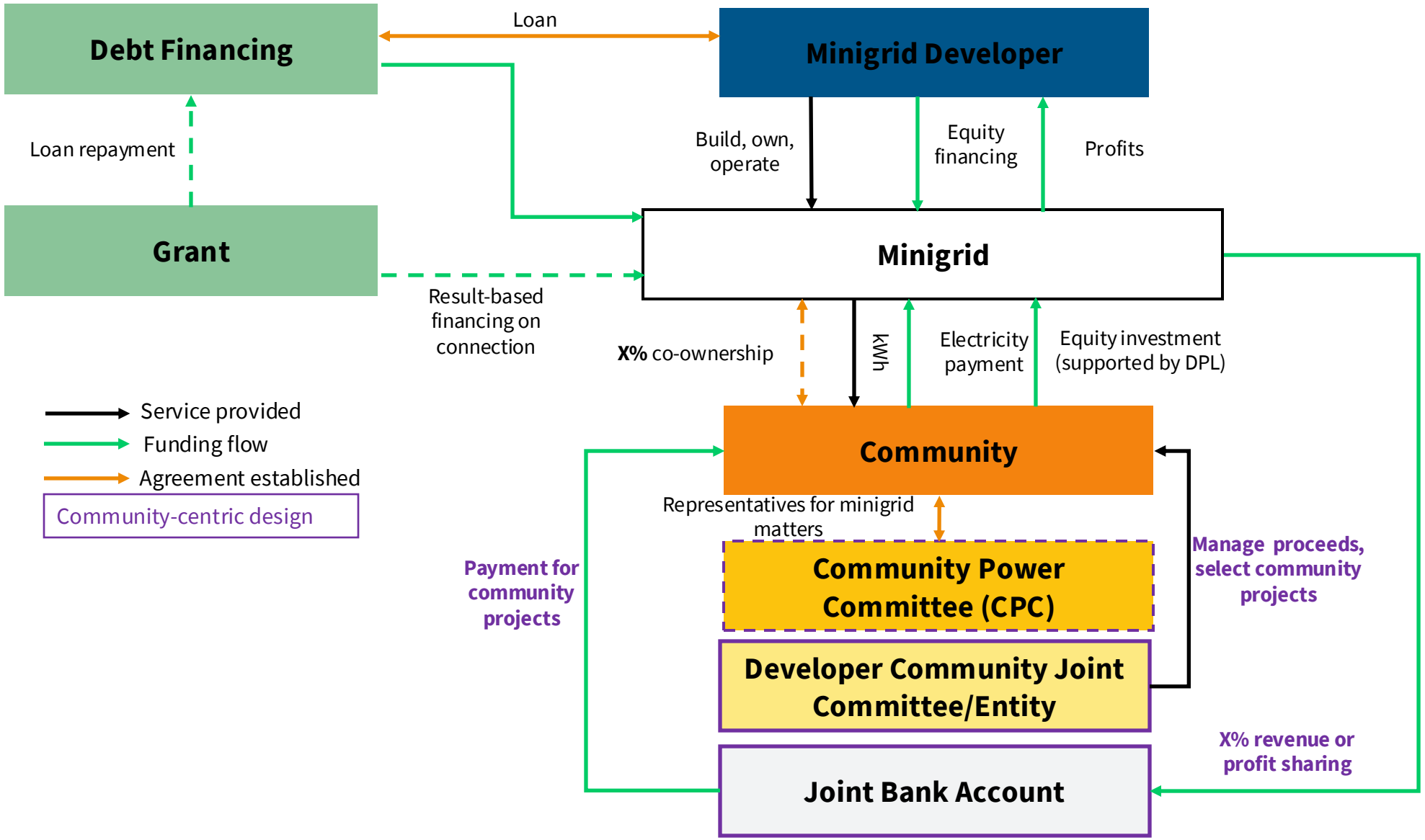
1. **Community Ownership or Co-Ownership**
   - To which degree does the community own the minigrid assets?
2. **Governance Structure**
   - How will the community be empowered in decision-making?
3. **Benefit Sharing**
   - How will revenue, profit, or utility be shared with host communities?
4. **Social and Environmental Safeguards (SES)**
   - How is the approach ensuring SES?
5. **Structure to Safeguard Community Investment**
   - How will community investments be safeguarded?

Applying the key design aspects to minigrids can take various forms, and we summarized some possible options in the Toolkit



Case studies illustrate context-specific adaptation is necessary and feasible

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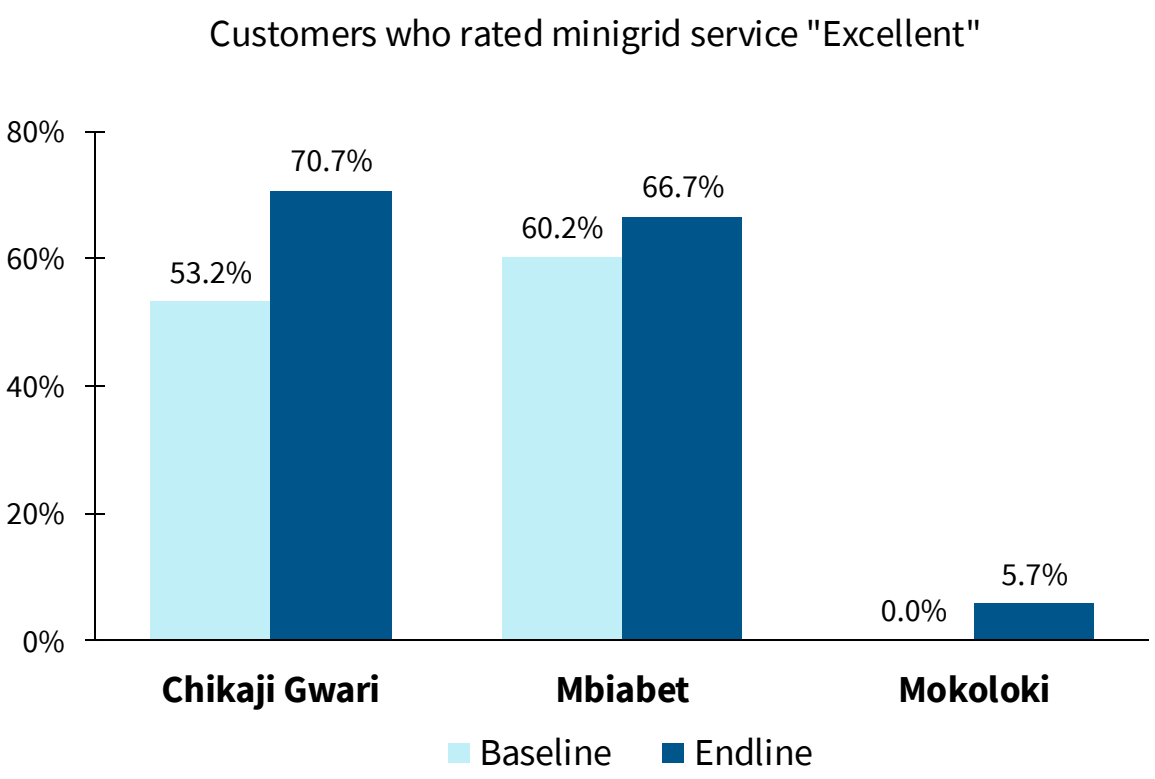
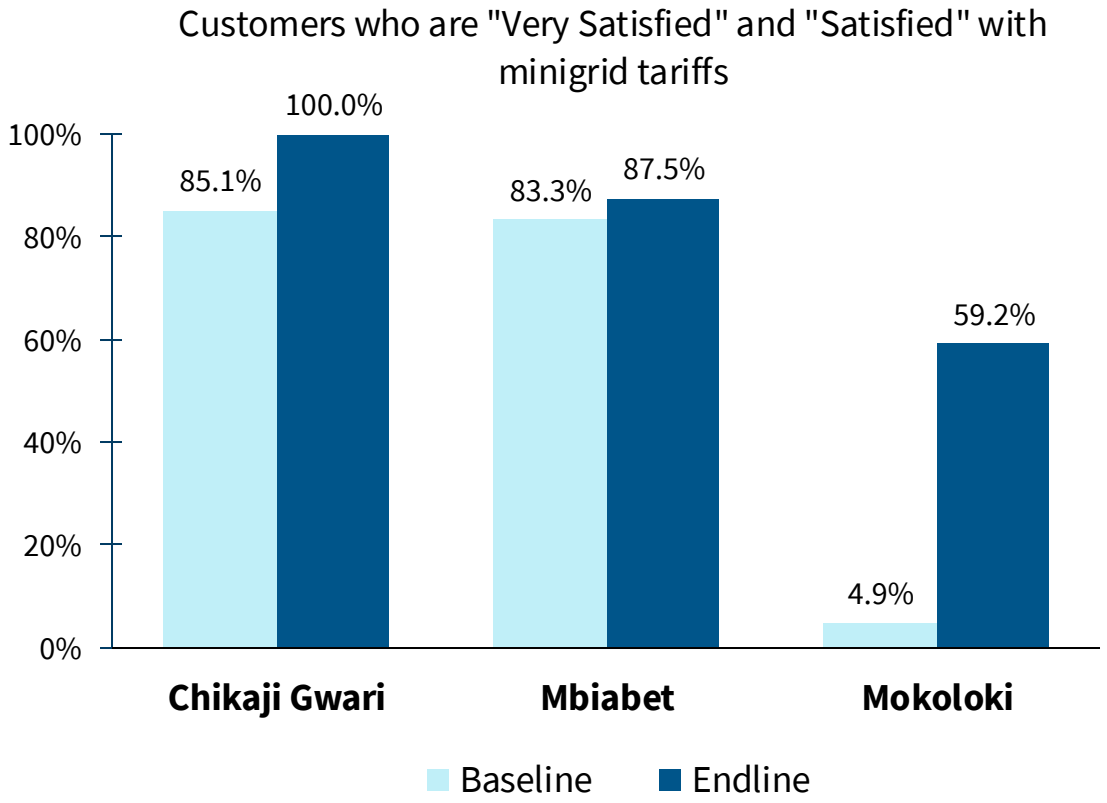
Project	Ownership	Notable Community-Centric Design Features
Mbiabet, Akwa Ibom, Nigeria Developer: Prado Power	**20%** community co-ownership	20% profit sharing; 20-year reinvestment plan; Women/youth and rotating roles in governance bodies
Mokoloki Niger, Nigeria Developer: NayoTT	**11%** community co-ownership	11% profit sharing in joint signatory account; community invited to co-design system upgrade and to understand tariffs
Chikaji Gwari / Hausa Kaduna, Nigeria Developer: Konexa	No formal co-ownership	**5% revenue sharing**; grid extension to increase utilization; cross-community governance with SES quotas
Alagye Nasarawa, Nigeria Developer: Husk	**18%** co-ownership of distribution assets	18% profit sharing in joint signatory account; targeted support for women-led micro, small, and medium enterprises
Jamataka, Botswana Developer: African Sun Energy	**100%** community-owned	Revenue used for local infrastructure and agriculture projects; solar apprenticeship program for women/youth

Although we observed some promising early trends, financial viability remains complex and underexplored





** Survey results from RMI's Sharing the Power pilot projects.*

Here are some additional lessons learned to date

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- **Strong partnerships are key:** establishing collaborative community partnership is foundational, and public partners can play a catalytic role for impact at scale.
- **Tailored technical assistance is necessary**: minigrid developers, private or public, can benefit from support navigating through various legal, financial, and operational arrangements. Meanwhile, community needs a voice to advocate for them.
- **Concessional and innovative financing is required** to unlock pipeline: there is opportunity to integrate community-centric efforts with rural electrification funds, and leverage public-private partnerships, impact funds and diaspora funding.
- **Social inclusion and women empowerment** can drive community trust and development impacts.

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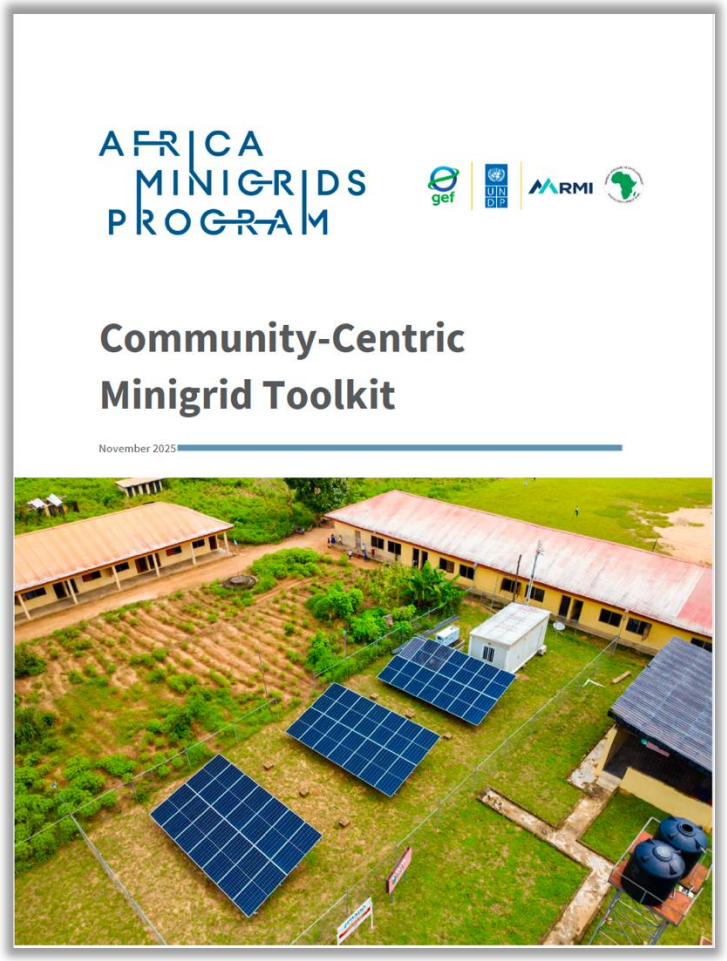
THANK YOU



SCAN TO DOWNLOAD THE COMMUNITY-CENTRIC MINIGRID TOOLKIT

Supported by: gef

Led by: UNDP

In partnership with: RMI, African Development Bank

SESSION 2:
Insights from enhanced community engagement and participation

Frank Bergh, NRECA International

Rural Electric Cooperatives: Powering Community Resilience

Frank Bergh, P.E.
Senior Engineer, NRECA International

NRECA International

ABOUT US

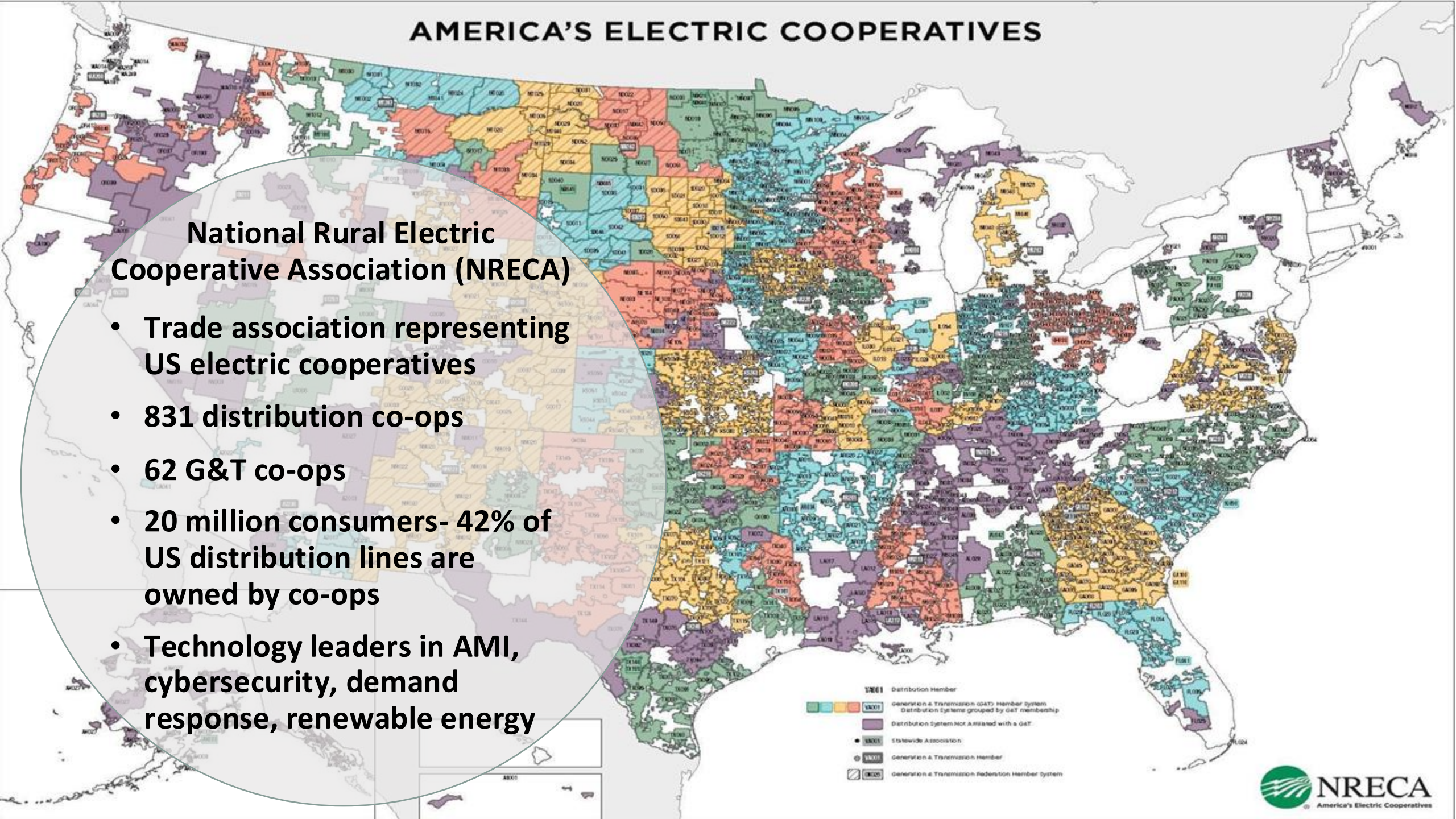
NRECA International

We implement electrification programs to improve the quality of life in rural communities and developing economies.

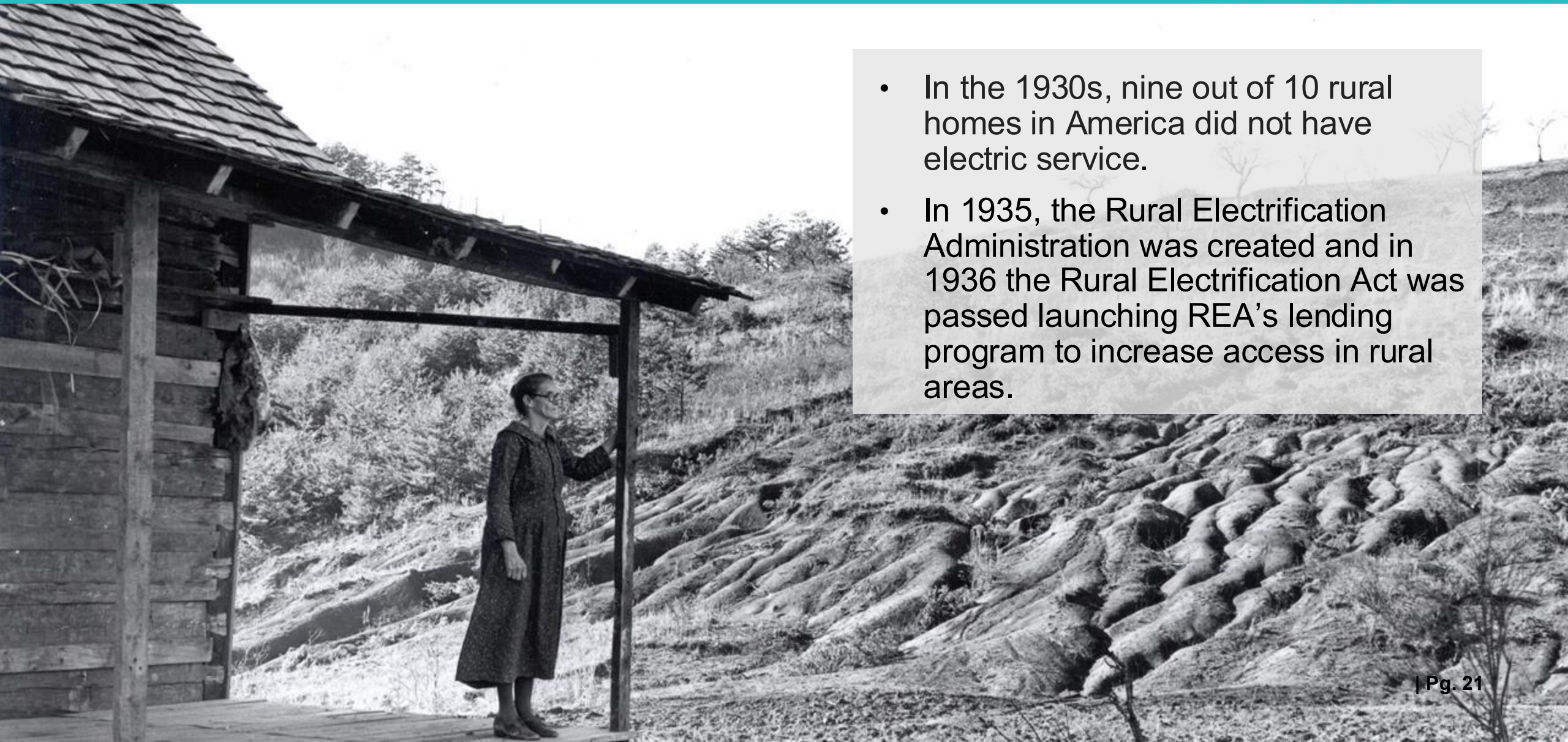
- Established in 1962
- Brought power to 220 million people in 48 countries
- Established 250 utilities & electric co-ops worldwide
- Supported by 900 US-based electric co-ops

CORE SERVICES

- **Electrification Strategy and Investment Planning**
- **Electric Cooperative Development**
- **Renewable Minigrid Design and Optimization**
- **Engineering and Geospatial Electrification Design and Analysis**
- **Utility Management and Perfomance Improvement**
- **Smart Grid, Distribution Design and Construction Oversight**
- **International Cooperative Assistance**
- **Productive Use of Electricity Programs**

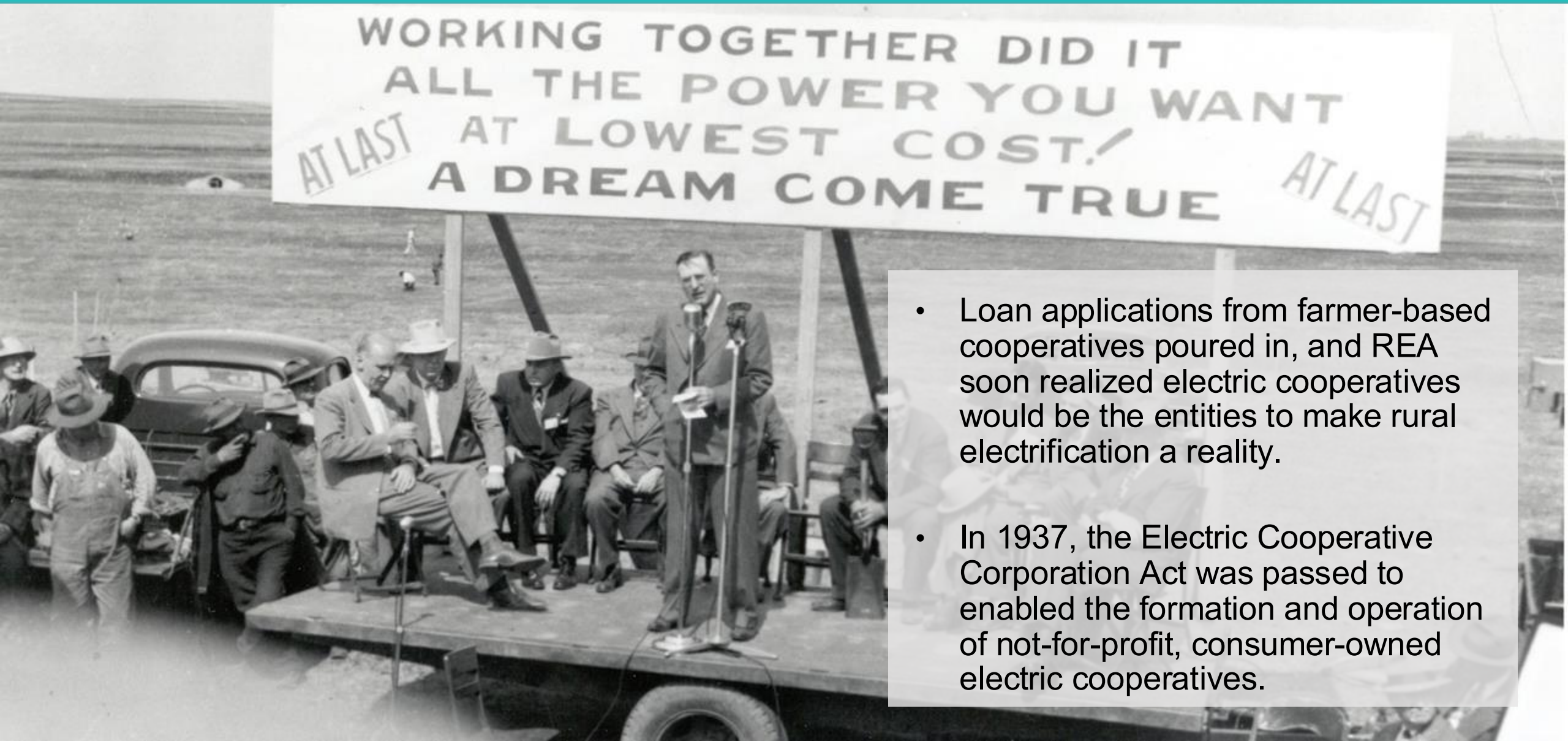

AMERICA'S ELECTRIC COOPERATIVES
National Rural Electric Cooperative Association (NRECA)
• Trade association representing US electric cooperatives
• 831 distribution co-ops
• 62 G&T co-ops
• 20 million consumers- 42% of US distribution lines are owned by co-ops
• Technology leaders in AMI, cybersecurity, demand response, renewable energy
Distribution Member
Generation & Transmission (G&T) Member System
Distribution Systems grouped by G&T membership
Distribution System Not Affiliated with a G&T
Statewide Association
Generation & Transmission Member
Generation & Transmission Federation Member System
NRECA
America's Electric Cooperatives

Sharing Lessons from America's Electric Cooperatives



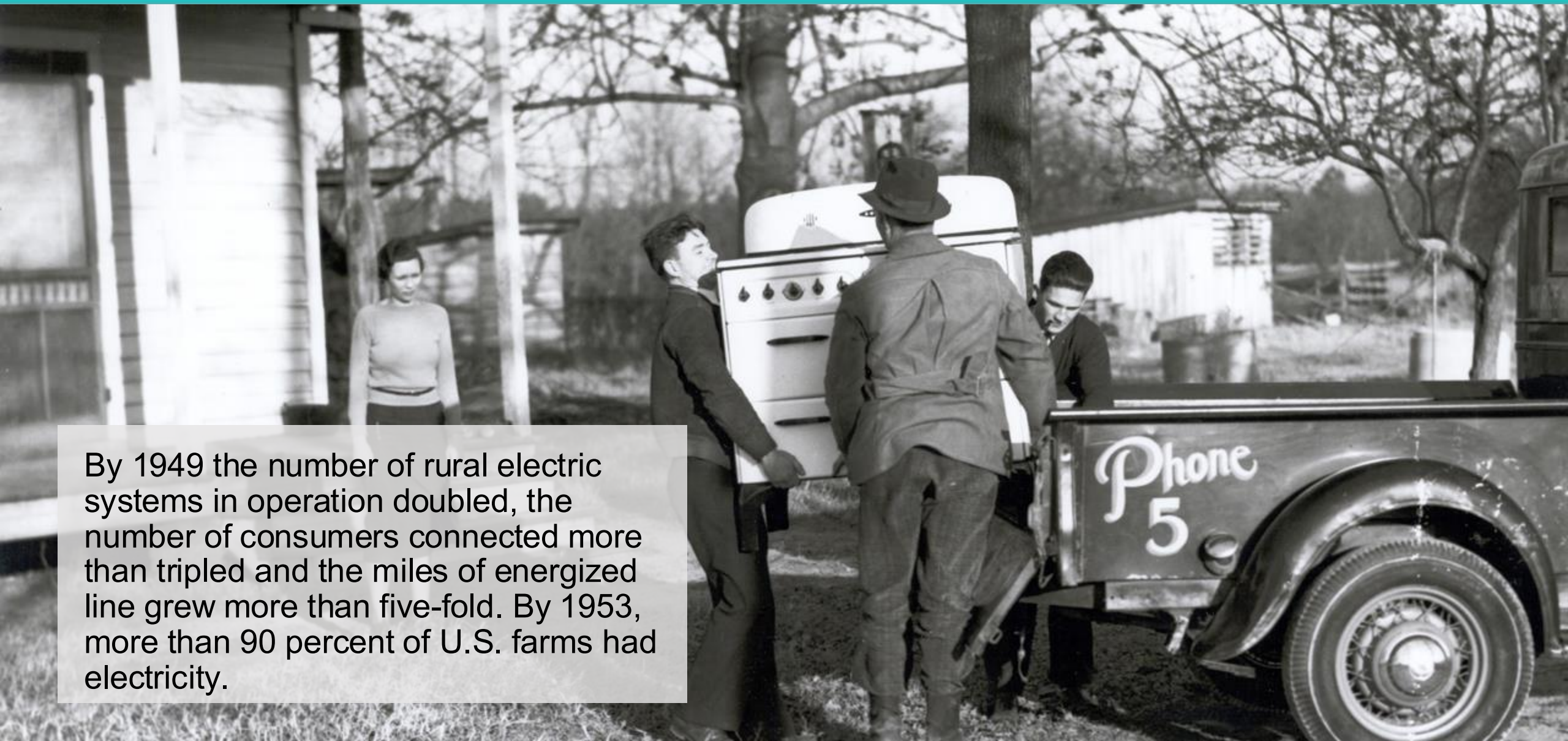
- In the 1930s, nine out of 10 rural homes in America did not have electric service.
- In 1935, the Rural Electrification Administration was created and in 1936 the Rural Electrification Act was passed launching REA's lending program to increase access in rural areas.

Sharing Lessons from America's Electric Cooperatives



- Loan applications from farmer-based cooperatives poured in, and REA soon realized electric cooperatives would be the entities to make rural electrification a reality.
- In 1937, the Electric Cooperative Corporation Act was passed to enabled the formation and operation of not-for-profit, consumer-owned electric cooperatives.

Sharing Lessons from America's Electric Cooperatives



By 1949 the number of rural electric systems in operation doubled, the number of consumers connected more than tripled and the miles of energized line grew more than five-fold. By 1953, more than 90 percent of U.S. farms had electricity.

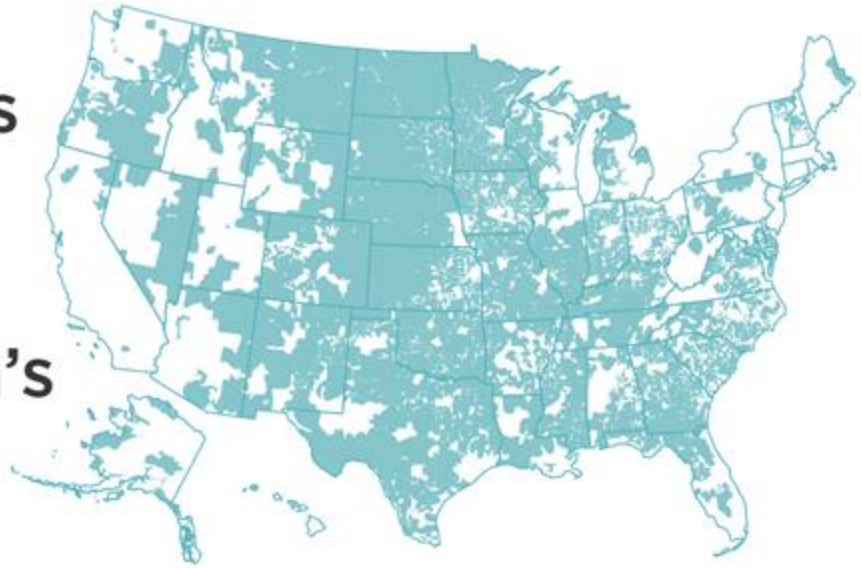
America’s Electric Cooperatives

Today, about 99 percent of American farms have electric service. Most rural electrification is the product of locally owned rural electric cooperatives that got their start by borrowing funds from REA to build lines and provide service on a not-for-profit basis.

REA is now the Rural Utilities Service, or RUS, and is part of the U.S. Department of Agriculture.

From booming suburbs to remote rural communities, America’s electric cooperatives are energy providers and engines of economic development. Electric cooperatives play a vital role in transforming communities.

Cooperatives power 56% of the nation’s landmass.



Our co-ops serve 42 million people, including **92% of persistent poverty counties.**

Power over 21 million businesses, homes, schools and farms **in 48 states.**

Returned more than $1.5 billion in capital credits **to their consumer-members** in 2020.

NRECA International

Cooperative-led Rural Electrification Programs

Country	Bangladesh	Philippines	Bolivia	Costa Rica
Program Commencement	Rural Electrification Board established 1977	National Electrification Administration established in 1969	Cooperativa Rural de Electrificación formed in 1968 in Santa Cruz.	Founded in 1965
Original number of cooperatives and customers	13 cooperatives 13,000 consumers	2 pilot cooperatives	1 cooperative 10,000 consumers	4 cooperatives 5,000 consumers
2020 number of cooperatives and customers	80 cooperatives 25 million consumers	119 cooperatives 12 million consumers	CRE now serves over 800,000 consumers in Santa Cruz and surrounding regions.	4 cooperatives now serve over 200,000 consumers
Additional Comments	Estimated 2 million customers added annually serving over 100 million people in 58,500 villages.	Gross revenues of electric cooperatives exceeded $1 billion in 2015.	CRE is now recognized as the largest electric cooperative in the world.	The cooperatives own and operate more than 100 MW of hydro and 25 MW of wind and solar generation capacity.

What is an electric cooperative?

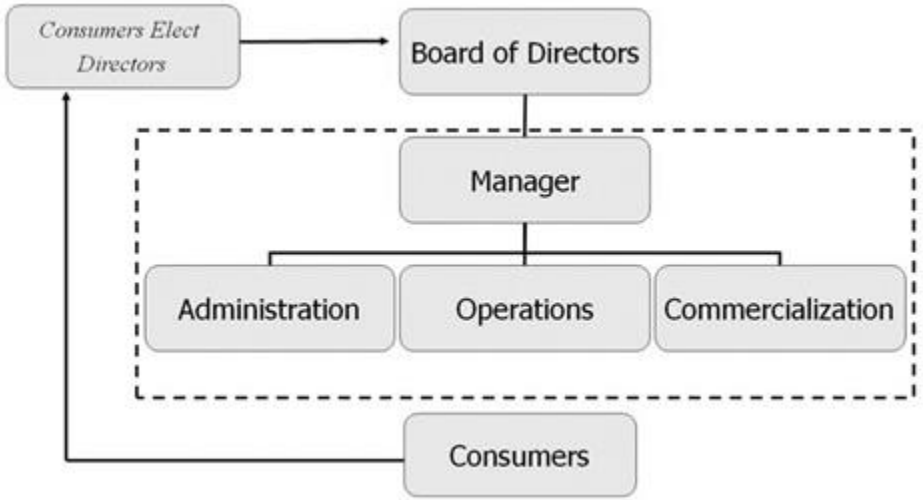
Electric cooperatives are:

- Private utilities owned by their customers and operated as a sustainable business.
- Each cooperative member owns an equal share in the business regardless of their connection type or how much electricity they purchase.
- Like all cooperative businesses, the rural electric cooperative model is rooted in the seven Cooperative Principles which reflect the values of equality, democracy, self-help, mutual aid, and solidarity.

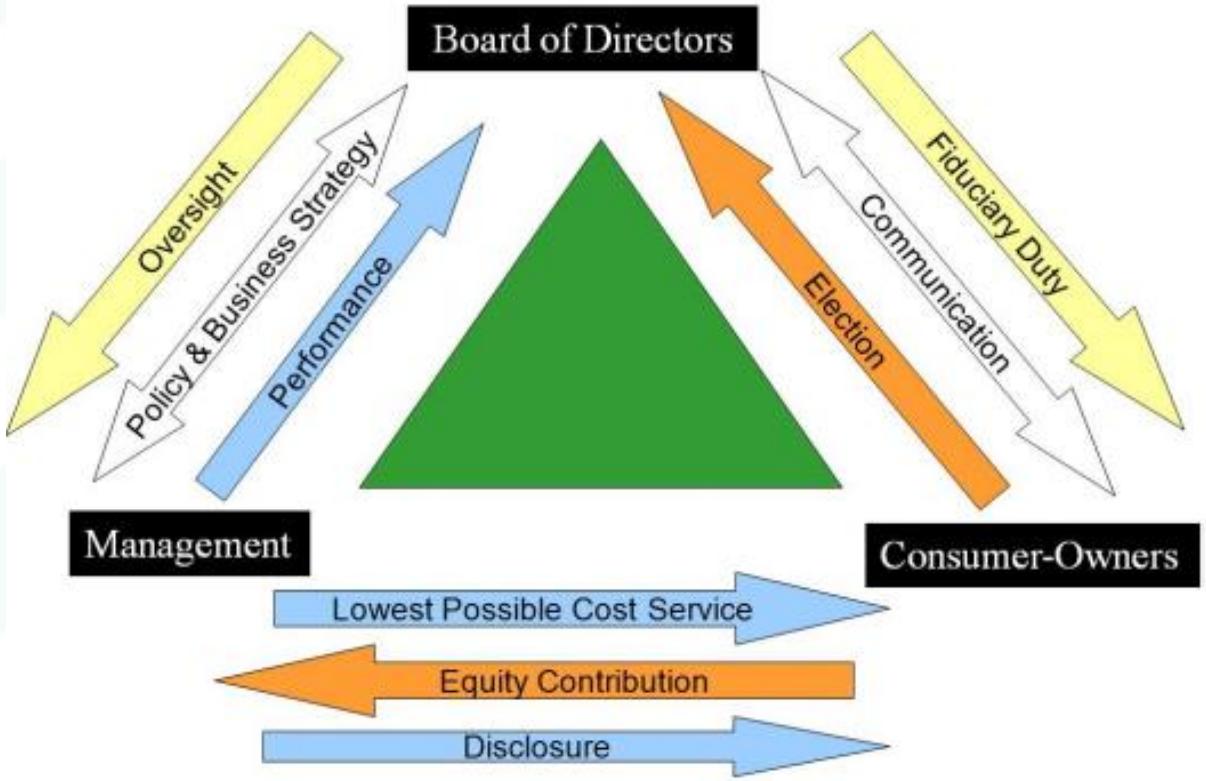
What is an electric cooperative?

Cooperative difference

Electric cooperatives are community-focused organizations that work to efficiently deliver affordable and reliable electricity to consumer-members of the co-op. They operate for the benefit of people, not investors.



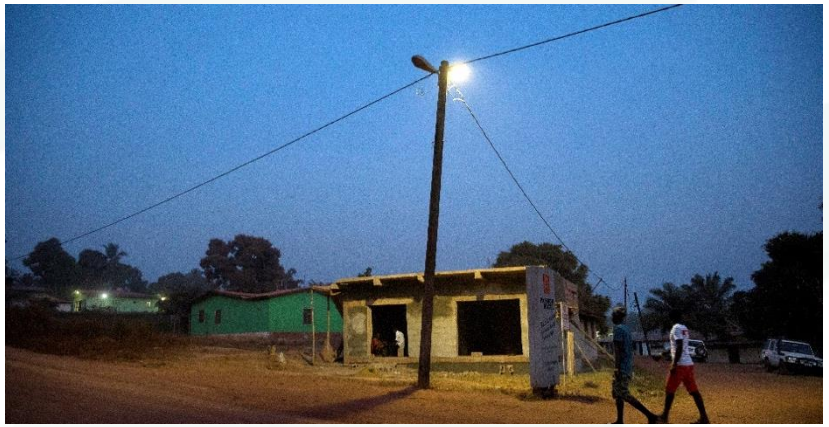
Effective governance at its core



While public utilities and private-sector investor-driven mini-grid programs may also achieve effective rural electrification outcomes, cooperative governance offers a proven model for community driven utilities.

Seven Cooperative Principles

TEC – Liberian electric cooperative



- Totota Electric Cooperative (TEC) became the first private power producer to be licensed by the Liberia Energy Regulatory Commission (LERC) to produce, distribute, and sell electricity in Liberia.
- TEC has owned and operated its solar mini-grid since 2018. The cooperative has already doubled its membership from 200 to 400 and its peak load from 30 kW to over 60 kW. The mini-grid capacity was increased in 2021.
- TEC has become financially self sustaining with its revenues exceeding expenditures on an annual basis. Recently TEC voted to implement a time of use tariff, increasing electricity costs for its largest customers, due to heavy overnight electricity use which increased diesel fuel consumption.

NRECA International

Totota Electric Cooperative

- Established in 2018 with support from America's electric cooperatives, the Totota Electric Cooperative (TEC) is acknowledged by USAID, the Liberian government, and other African nations as a success and a model to be replicated.
- The largest customers of the cooperative are cold storage facilities for agricultural produce along a major highway between Monrovia and Cote d'Ivoire.
- The community of Totota consists of over 500 households, 400 of which have joined TEC.
- After an expansion in 2021, the mini-grid includes:
  - 72 kW solar
  - 120 kWh lithium-ion batteries
  - 80 kVA diesel generator
  - 8km distribution network

NRECA International

Ntatumbila Power Electric Cooperative (NPEC)

The Ntatumbila Power Electric Cooperative (NPEC) was incorporated as Zambia's first electric cooperative in July 2023 and began commercial operation in March 2025.

The mini-grid serves 340 homes and businesses including the local health center, two schools, a regional police station, and four electric hammer mills which offer agricultural processing capability for maize farmers in the region.

The generation plant was funded by NRECA International with the distribution network funded by the REA.

NRECA International

Ntatumbila Power Electric Cooperative (NPEC)

The community of Ntatumbila consists of 477 households. The cooperative has benefitted from capacity building on Gender Equity and Social Inclusion (GESI) as well as governance, accounting, management, technical training.

The mini-grid generation plant consists of:

- 122 kWp solar
- 310 kWh batteries
- 90 kW bidirectional battery inverters
- 81 kW solar string inverters
- 50 kVA diesel generator

NRECA International

Katiirwe Solar Mini-Grid

Kyegegwa Rural Electric Cooperative Society Limited (KRECS) was founded in April 2012 and registered under the Cooperative Societies Act.

KRECS operates the Katiirwe min-grid which was constructed in 2021 with support from America's electric cooperatives. The system serves two milk chilling plants in the town, one public and one private. Access to electricity enhances the agricultural value chain, reducing overhead cost, fuel consumption, and carbon intensity of local dairy farmers.

Typically, cows are milked early in the morning and milk trucks may not arrive until 2:00 p.m. Therefore, solar energy offers very favorable performance to milk chillers during the peak load hours of 10:00 a.m. until 2:00 p.m. while sustaining 24-hour electricity service to the community.

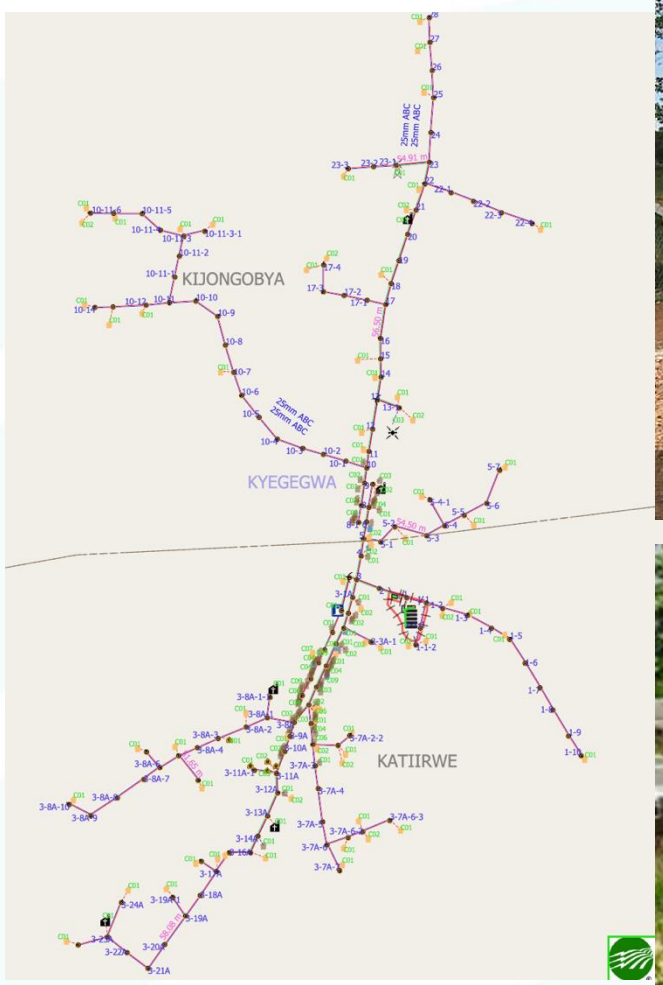
Katiirwe Solar Mini-Grid

- The community of Katiirwe consists of 176 households.

- The mini-grid power station was funded by NRECA International, REA funded the construction of the distribution network, which was designed by NRECA International.

The Katiirwe mini-grid consists of the following system components:

- 58.5 kWp solar array
- 154 kWh lithium-ion battery system
- 50 kVA bidirectional inverter
- 55 kVA diesel generator set
- 5.7 km of LV distribution network



It Starts With Power

Electric Power

Building renewable energy at the community scale reduces the greenhouse gas emissions for all households and businesses.

Powerful communities

When communities have access to clean, reliable and affordable power, the results are powerful. Resilient communities are the bedrock of climate resilience.

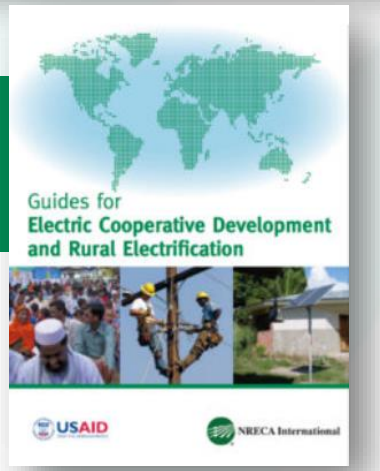
People Power

Co-op members exhibit solidarity, concern for community, and social inclusion in all aspects of cooperative governance and infrastructure management.

Question & Answer

Frank Bergh, P.E.
Senior Engineer
NRECA International
frankbergh@nreca-intl.org

Free Resource:
Electric Cooperative Development Guides
https://www.nrecainternational.coop/



NRECA International

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SESSION 3: A Community Demand-Side Tool for Minigrids

Ayu Abdullah, COMET

COMET

COMMUNITY ENERGY TOOLKIT

A COMMUNITY DEMAND-SIDE TOOL FOR MINI-GRIDS

December 4, 2025 | Ayu Abdullah

www.cometapp.net

COMMUNITY ENGAGEMENT IN MINI-GRIDS

VALUE & AFFORDABILITY
"WHAT WILL CHANGE FOR US?"

Electricity, tariffs, and monthly bills are abstract until people see them against real uses in their lives. Affordability depends on the value electricity enables.

SERVICE LEVELS & SUSTAINABILITY
"WHAT SERVICE & RULES MAKE SENSE?

Communities need to decide what levels of service feel right, what limits and arrangements are fair, and what it will take to keep the system running.

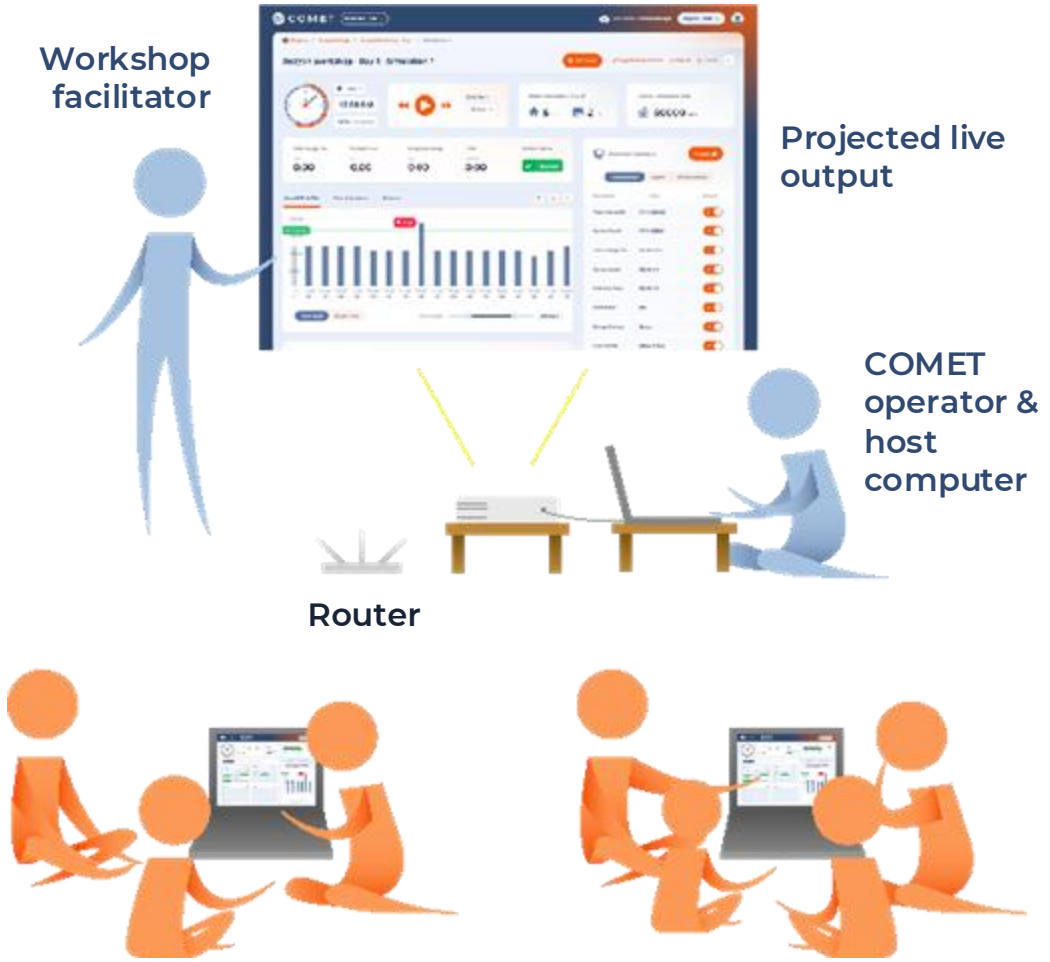
PRODUCTIVE USE & SUPPORT
"WHAT CAN WE DO WITH THIS POWER?"

People need to test which PUEs feel feasible, and understand what support would make them work.

Community-centered means decision-centric

COMET IN PRACTICE

- Communities simulate future use
  - Households & enterprises build daily load profiles
  - COMET shows expected bills, peaks & system limits
- Participants discuss and iterate
  - Groups try different appliance & tariff choices
  - They explore, discuss affordability, service levels, PUE ideas
- COMET translates choices for project teams
  - Aggregated demand profiles & PUE options
  - Indicative tariff bands & community-agreed operating rules



COMET participants & networked client computers / tablets

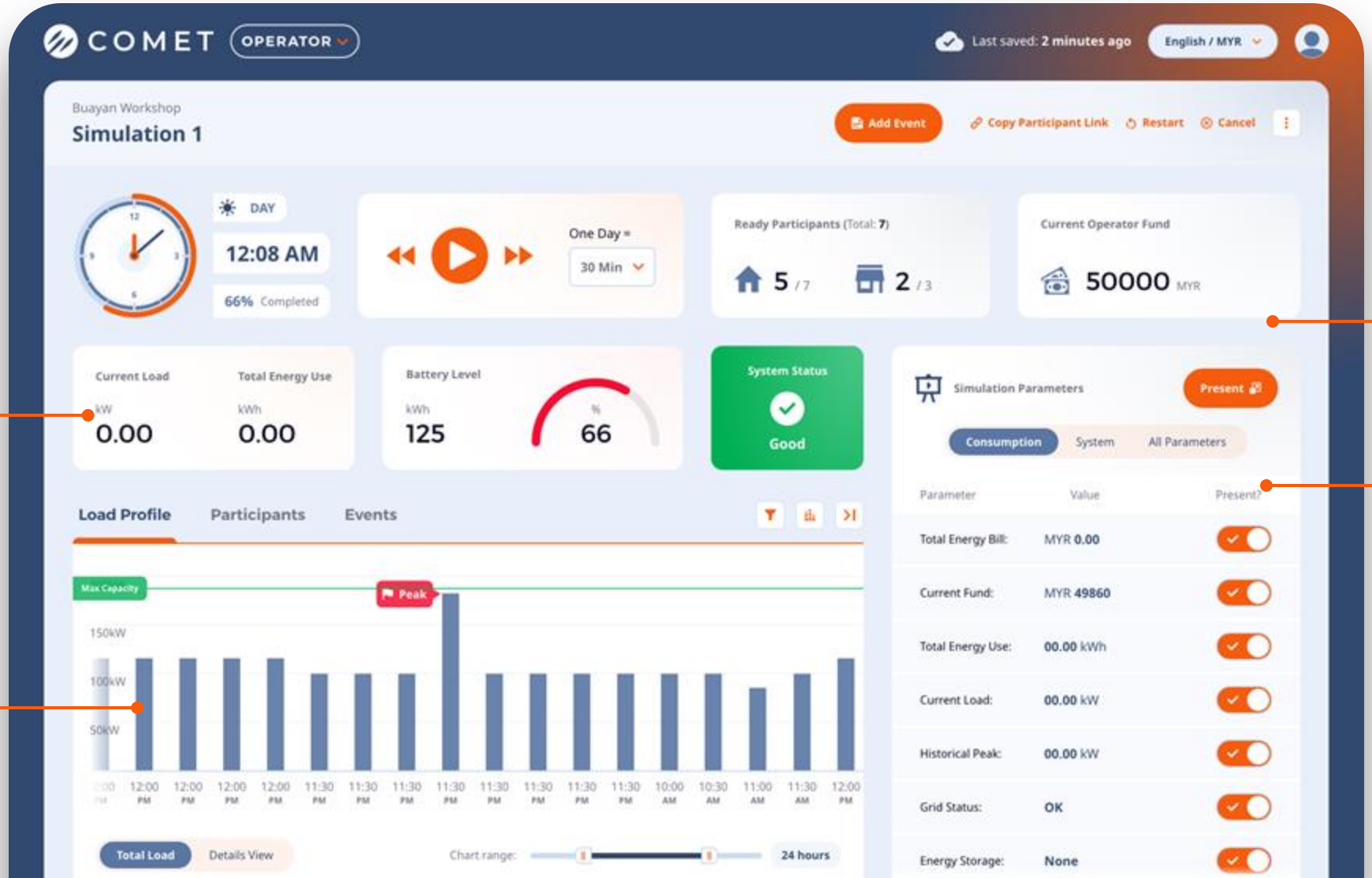
WORKSHOP MODULES:

- Demand exploration
- Demand-side management
- Productive use of energy
- Demand stimulation
- Tariff & payment structures
- All-female workshops

OPERATOR EXPERIENCE

Monitor simulation progress

Obtain dynamic load profiles in real time and generate realistic energy projection reports



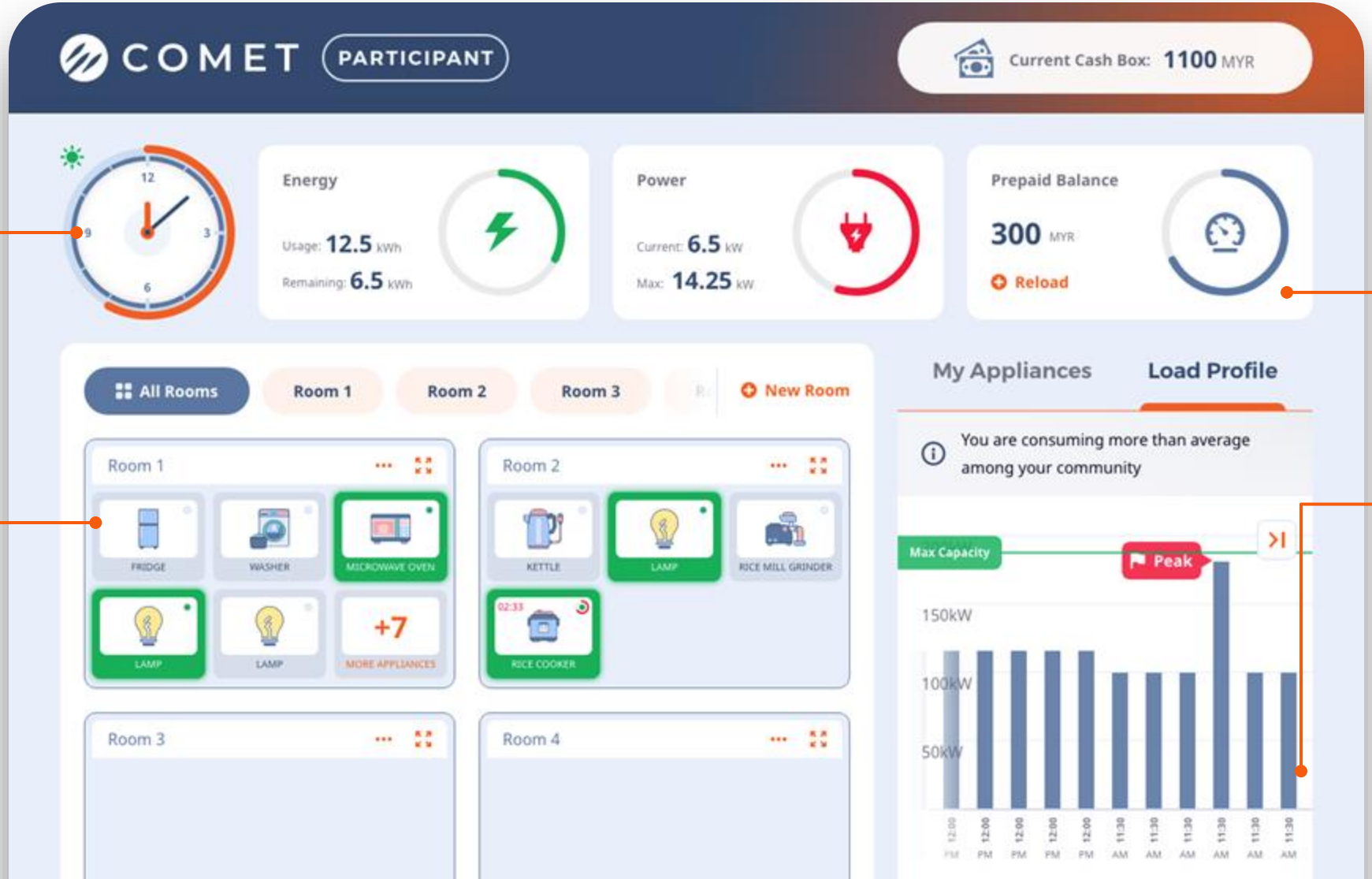
Monitor operating revenue and expenses

Customize mini-grid and consumption parameters

END USER (PARTICIPANT) EXPERIENCE

Simulate daily use and generate monthly bills based on energy scenario

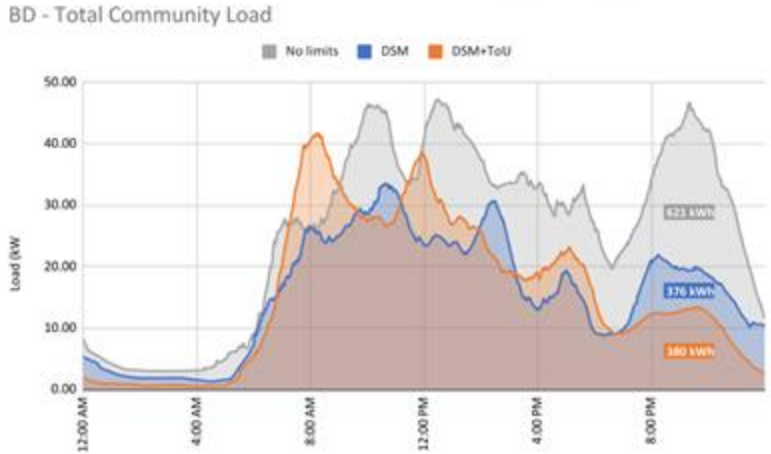
Purchase & operate virtual appliances as a household or enterprise



Monitor and manage energy consumption & spending

COMET IN ACTION

CASE STUDY: SOMALILAND (2021)



Key benefit: COMET for optimized storage sizing.

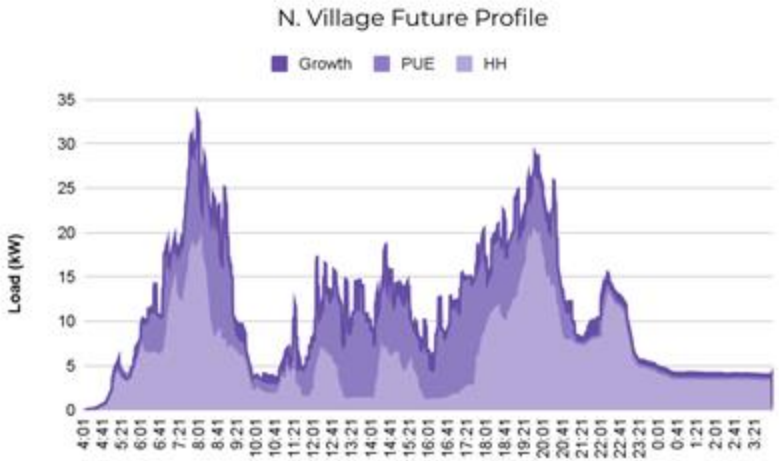
DEMOGRAPHICS:

- ✓ Pop.: 2,800 (360 HH, 102 bus., 14 public services)
- ✓ Border town economy: livestock & trading
- ✓ Average monthly income: $100, WTP - $10

KEY OUTCOMES:

- ✓ Demand depends on pricing and DSM
- ✓ Improved system utilization with ToU rates and load limits
- ✓ Community expectations aligned with pricing and DSM plan.

CASE STUDY: NEPAL (2023)



Key benefit: COMET for demand stimulation.

DEMOGRAPHICS:

- ✓ 870 HH connections
- ✓ Agriculture and livestock-based economy
- ✓ Avg. monthly income: $112. Avg. WTP - $3.70

KEY OUTCOMES:

- ✓ Main PUE users: furniture factory, bakery, soap factory
- ✓ Main drivers of HH growth: rice cookers, fridges & irons
- ✓ E-cooking (rice cookers & kettles) behind HH peak time consumption


Bajura, Nepal (UNDP Nepal)


Tongod, Sabah (RE2 Consortium)


Naruwai, Fiji (ASU LEAPS)


Cool Qaday, Somaliland (Innovate UK/SVRG)

CASE SNAPSHOT - POS TITOM, MALAYSIA

Part of the RENDANG project (Innovate UK, ENCAT10)

Context: Indigenous communities with new clustered solar systems

Workshops: Households & potential small businesses simulated daily use and bills

Decisions surfaced & outputs:

- Prioritised appliance lists for households & enterprises
- Agreed service levels and basic management rules
- PUE options that felt realistic, understanding of day-to-day business operations (hours, personnel, costs)

✓ Implementer gained early signals in demand patterns, tariff comfort, support needs

COMET FOR COMMUNITY-CENTRIC MINI-GRIDS

DECISION-CENTERED ENGAGEMENT

Communities practise decision-making based on the value of energy to them, ownership and governance choices are informed and made with/by the community.

DEMAND-SIDE RISK MANAGEMENT

Workshops generate demand curves, tariff comfort ranges, and PUE pathways that support viable businesses and livelihoods, with clearer roles and aligned expectations.

A COMMUNITY DEMAND-SIDE TOOL

Used in utility-run, developer-run, and community-based systems, turning community input into design, tariffs, and productive-use planning and support.

COMET IN ACTION

Video credit: Energy Action Partners

Find out more:

www.cometapp.net

Contact us:

info@cometapp.net

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SESSION 4: PANEL DISCUSSION

Learning from field experiences

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PANELISTS

Sascha Flesch

Washima Mede
PradoPower

Frank Bergh
NRECA

Ayu Abdullah
COMET

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We welcome your feedback

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