AFRICA MINIGRIDS PROGRAM

Webinar

ENHANCING CLIMATE-RESILIENCE OF MINIGRIDS IN RURAL AFRICA

23 July 2025, 3:00-4:30pm WAT, Virtual

Supported by: gef, UNDP

In partnership with: RMI, African Development Bank

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

Interpretation

AGENDA

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Allocated time	Agenda item	Speaker/Panelist
10 mins	Welcome and Introduction	Alberto Rodriguez, **RMI** Christelle Odongo, **UNDP**
15 mins	**Session 1: Presentation** Climate change, its impacts, and the need for climate-resilient minigrids in rural African communities	Deji Ojo, **RMI**
15 mins	**Session 2: Presentation** Off-grid solar resilience and adaptation framework	Tom Stevenson, **Practical Action**
5 mins	**Session 3: Live Demonstration** A geospatial approach to planning climate-resilient minigrids	Angus Dutton, **VIDA**
20 mins	**Session 4: Panel Discussion** Building climate-resilient minigrids – measures, tools, and key considerations	Okenwa Anayo Nas, **Nayo Tech.** Julien Simery, **UNDP** Irene Calve, **SE4All**
10 mins	**Q&A**	
5 mins	Poll	N/A
5 mins	Closing remarks	Alberto Rodriguez, **RMI**

SPEAKERS

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Alberto Rodriguez
RMI

Christelle Odongo
UNDP

Ayodeji Ojo
RMI

Tom Stevenson
Practical Action

Angus Dutton
VIDA

Collins Dadzie
RMI

Okenwa Anayo Nas
Nayo Tropical Technologies

Irene Calve Saborit
SE4All

Julien Simery
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**

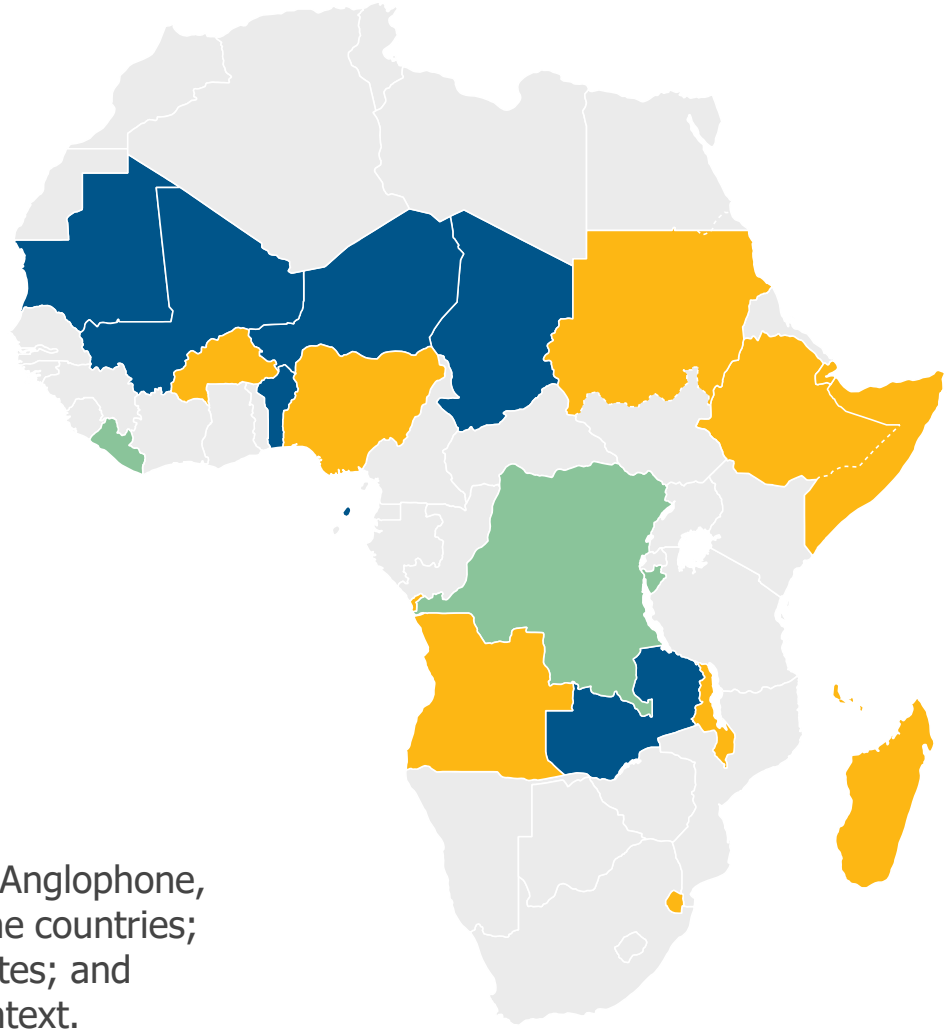
2nd ROUND: 7
GEF June 2021

- **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.

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SESSION 1: CLIMATE CHANGE

What it is, its impacts, and the need for climate-resilient minigrids

Ayodeji Ojo, RMI

OUTLINE

1. Understanding climate change impacts in rural Africa
2. Why rural Africa is vulnerable to climate change
3. Case studies
4. The need for climate-resilient minigrids
5. Building climate-resilient minigrids
6. Key takeaways

DOWNLOAD THE TOOLKIT

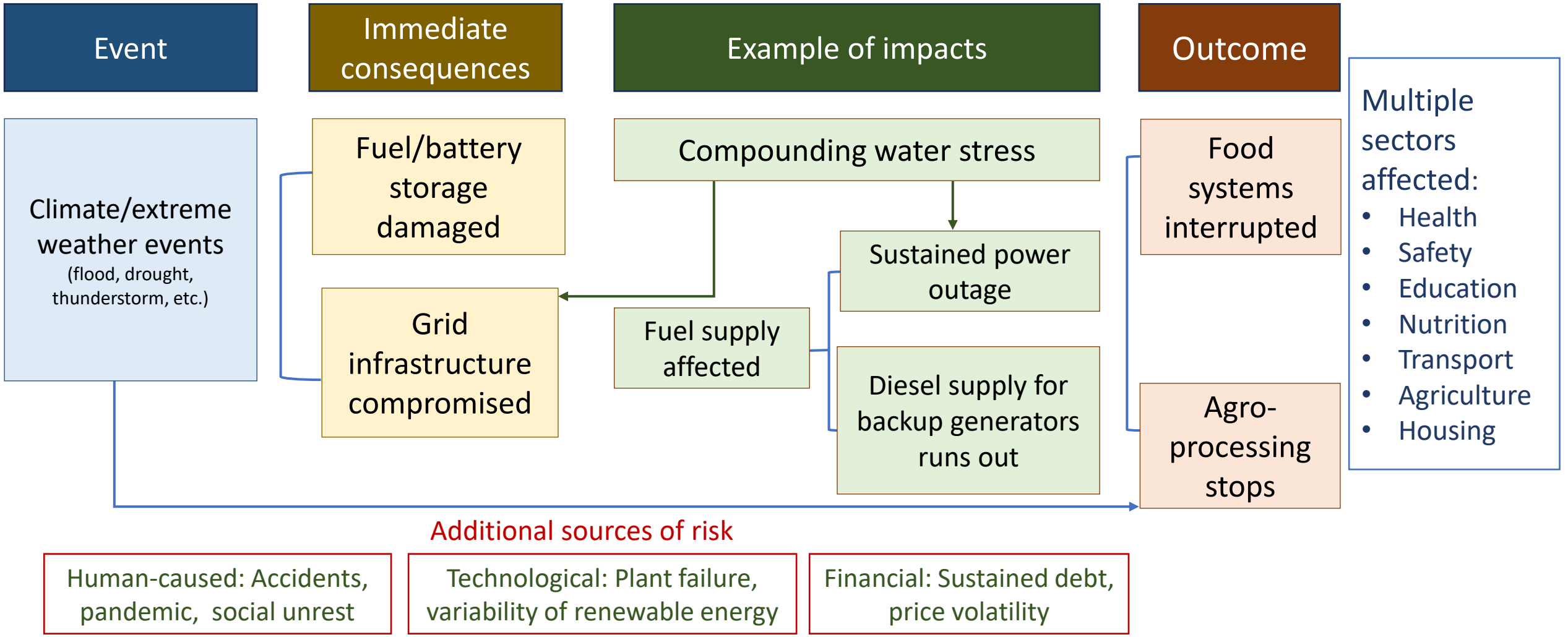
1. Understanding climate change impacts in rural Africa

Structural vulnerabilities and climatic exposure undermine Africa's adaptive capacity

- Climate change disproportionately impacts rural and underserved communities.
- Africa loses an estimated $7 billion to $ 15 billion annually due to climate-related impacts (AfDB, 2022).
- Effects manifest through extreme weather—floods, droughts, and storms, which constrain agricultural productivity, cause livestock and asset losses, damage critical infrastructure, and threaten health and food security.

A woman wades through Mokwa flood with her two sheep in June 2025.
(Photo credit: Niger State & Truth Nigeria, 2025)

Adverse climate events undermine rural infrastructure, food systems, and key economic sectors in Africa



Impact of climate change on rural African communities
Source: RMI, 2021

2. Why rural Africa is vulnerable

Rural communities, with limited resources, face the brunt of climate-induced economic disruptions.

- Africa is the world's **least climate-resilient region**, with high exposure and limited response capacity (AfDB, 2022).
- Over **690 million** rural Africans, whose livelihoods depend largely on agriculture, are at the greatest risk.
- Reliance on **rainfed agriculture** leaves smallholder farmers especially **vulnerable** to climate shocks.

A climate-resilient Mthembanji solar PV minigrid in Malawi
Source: RMI

3. Case studies of adverse climate change impacts in rural Africa

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Climate events have triggered major losses in Africa's agriculture, energy, water, and transport systems.

Date	Event type	Location	Lives lost/displaced	Key sectors affected	Estimated value of the losses
May 2022 – Oct. 2022	Floods	Nigeria (33 States)	603 deaths 1.4 million displaced	Agriculture, housing, transport	$9 billion
Oct. 2022 – Oct. 2023	Drought	Somalia	43,000 deaths 1 million displaced	Agriculture, water	$1 billion
Mar. 2023 – May 2023	Cyclone Freddy	Malawi, Mozambique, Zimbabwe	1,434 deaths 1.4 million displaced	Agriculture, education, transport	$2 billion
May 2024	El Nino floods	Kenya & Tanzania	522 deaths (Kenya) 161 deaths 503,000 displaced	Agriculture, housing, energy, transport	$267 million
May 2025	Heavy rainfall & dam collapse	Mokwa, Nigeria	206 people deaths, 1,000 missing, 3,000 displaced	Agriculture, housing, energy, health, transport	N/A

4. The need for climate-resilient minigrids in the face of uncertainties

Climate change threatens minigrid sustainability by disrupting infrastructure, productive uses, and user affordability.

- **Infrastructure damage**: **Extreme heat, flooding, and windstorms** can **damage generation, storage and distribution** components, **reducing efficiency** and causing outages.
- **Disruption to productive uses**: Climate shocks **disrupt agriculture and small industries** that **rely** on **minigrid electricity**, reducing demand and complicating energy planning.
- **Financial strain on users**: **Weather-related income losses** can **impair** users' ability to pay, **constraining** the **financial viability** of minigrid operations.

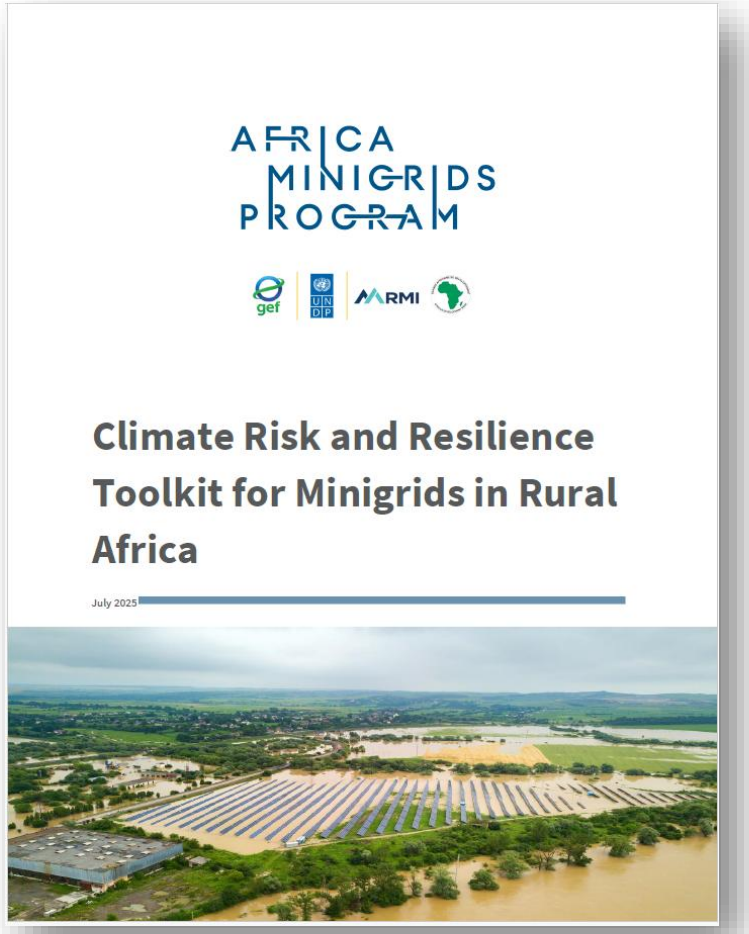
Cascading failure of T-slot risers and top-down clamps on Cariacou, Grenada during Hurricane Beryl.
(Photo credit: July 2024 | Source: RMI)

5. Minigrids can be built with climate resilience considerations

Climate-resilient minigrids can address some of these challenges by designing for disruption and anticipating failure points, not reacting to them.

A climate-resilient minigrid is built with:

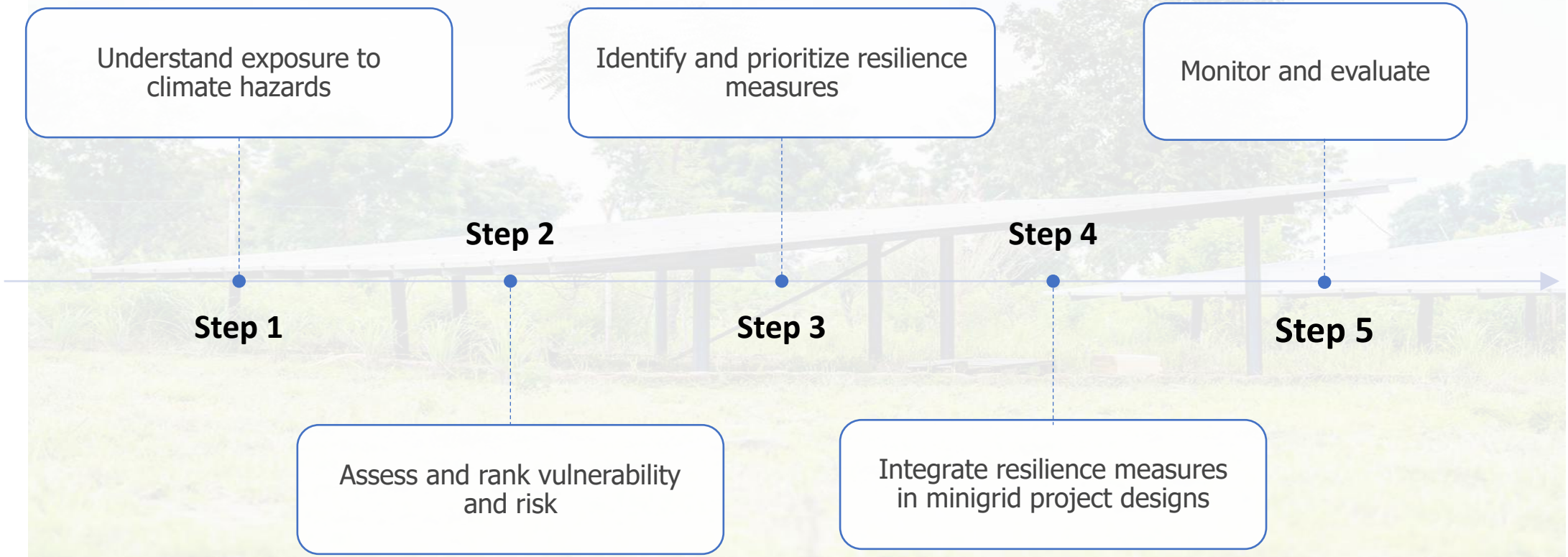
- **Flood-proof** and **wind-resistant infrastructure**, including elevated substations and **weather-resistant materials** for enhanced durability.
- A **hybrid energy system** with **solar, wind, and battery backup**, **ensuring** redundancy when necessary and **a continuous power supply** even if one source fails.
- **Smart monitoring** and controls **using real-time sensors for early detection** of issues and automatic energy balancing during grid failure.
- **Adaptive planning** and **community integration** using **local climate data –** such as flood zones and extreme temperatures – and strong community ownership to enhance resilience.



Climate risk and resilience toolkit

5. Building climate-resilient minigrids

Minigrid resilience begins with data, and it succeeds with design.



6. Key takeaways

Minigrids enable resilient infrastructure that supports rural economic growth and climate adaptation.

- Africa is the world's least climate-resilient region, with rural communities facing the most severe impacts.
- Climate hazards, including floods, droughts, and windstorms, destroy lives, property, and critical infrastructure.
- Climate-resilient minigrids protect critical assets through elevated platforms, remote monitoring, and data-informed design.
- Developing climate-resilient minigrids requires hazard mapping, vulnerability assessment, tailored design, and ongoing evaluation.

A rural minigrid in Niger State, Nigeria

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SESSION 2: IMPROVING COMMUNITY RESILIENCE

Off-grid solar resilience and adaptation framework

Tom Stevenson, Practical Action

OFF-GRID SOLAR RESILIENCE AND ADAPTATION FRAMEWORK

Produced by Practical Action in partnership with GOGLA and Efficiency for Access with funding from the IKEA Foundation

Practical ACTION

GOGLA

Report findings

Decentralised energy solutions function as **critical infrastructure**, enhancing the resilience of electricity supply and community resilience.

Example contributions:

- **Infrastructure:** Power health facilities and specific medical devices and appliances (fans, ventilators, refrigerators for vaccine storage, etc.)
- **Livelihoods:** Power small and medium-sized enterprises and specific productive use appliances; e.g., water pumping for irrigation
- **Climate information and early warning:** Power weather stations and communication centres; e.g., local radio stations and communication devices (radios, TVs, mobile phones, etc.)

Resilience outcome often depend on combining energy access with other measures.

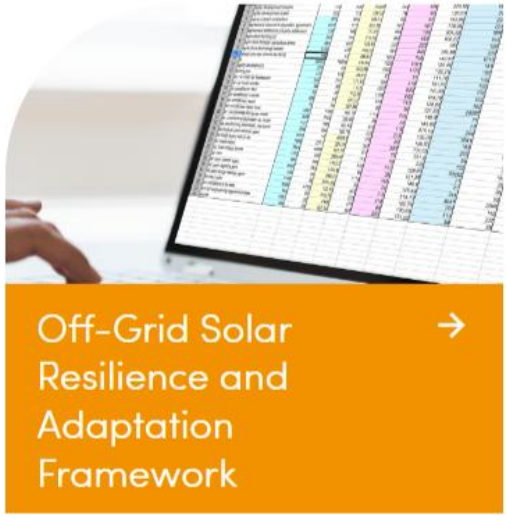
Resources

Purpose:

- Design, communicate, and improve contributions
- Intentional, feasible, credible

Content:

- Clear steps aligned to current best practice
- Guidance: concepts, questions, case studies, resources, recommended outputs



Purpose:

- Measure OGS contributions to R&A
- Monitor progress across the sector

Content:

- Repository of measurement indicators
- Framing indicators: 1 or 2 per impact area, aligned with climate funds' priorities

Sector Guidance

1. Understand climate risk

Assess climate risk (hazards, exposure, vulnerability) incl. for different groups

2. Be intentional in addressing risk

Be intentional in using OGS to address risk and vulnerability

Establish outputs, outcomes, impacts, and assumptions of linkages

Identify limitations where additional services and support are needed

These steps help to balance **credibility** and **feasibility:**

- Aligned with best practice
- Include guiding questions, examples, resources and outputs
- Tailored to different contexts

What does this look like in practice?

Roles, abilities and responsibilities to enact different steps will be different in different contexts

Assessing vulnerability to inform energy access planning and investment:

- Nithio developed its own Climate Vulnerability Index (CVI) to help investors understand how best to reach climate-vulnerable communities.

- VIDA is a GIS software that allows users to assess levels of climate risk and DRE potential e.g. distance to infrastructure, presence of light at night, road access

- **Other resources:**
  - **Climate risk assessment tools** e.g. ThinkHazard!
  - **Participatory tools** e.g. Practical Action's Missing Voices Approach

Developing a Theory of Change

Resilience is tricky to enhance and measure!

Developing a Theory Change can help you to design, implement, measure and evaluate changes

Important to distinguish:

- **Outputs:** activities, products and services produced or improved by interventions.
    - Example: Households with energy access or uptake of specific appliances
- **Outcomes:** short-or-long-term changes associated with different elements of resilience
    - Examples: Improved agricultural productivity, knowledge of climate hazards etc
    - Not an end but a step to achieving longer term impacts e.g. wellbeing, poverty reduction
    - Unintended negative outcomes that enhance climate risk are considered maladaptive

Measurement Framework

- **Link indicators to a Theory of Change** i.e. inputs, outputs, outcomes, impacts
- **Combine with qualitative assessments** to evaluate initial assumptions in ToC and make improvements
- **Energy is not a silver bullet.** Extent of contribution to resilience can be shown by distinguishing outputs from outcomes and testing assumptions. Can still articulate progress.
- **Think holistically** – some outcomes can only be achieved by combining with other measures:
  - Improved long-term food security depends on a) uptake of solar water pump and b) use of sustainable farming practices to improve soil health as well as c), d), e) etc
- **Measure holistically** – use multiple indicators to avoid maladaptive changes
  - Increased agricultural productivity could hide damage to soil due to water overextraction

Next steps

- Practical Action and GOGLA will host a webinar with IKEA Foundation to showcase the resources later in the year

- GOGLA plan to pilot the resources with member companies later in 2025 and then to update in early 2026 based on feedback (Practical Action to support)

- Practical Action's new strategy prioritises adapting to climate change and preparing for shocks. Energy access-adaptation nexus will play an important role

Links:

- Resources: https://gogla.org/climate/resilience-adaptation/
- Practical Action blog on resources: https://practicalaction.org/news-stories/increasing-climate-resilience-with-off-grid-solar-energy/

Practical ACTION

GOGLA

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Thank YOU

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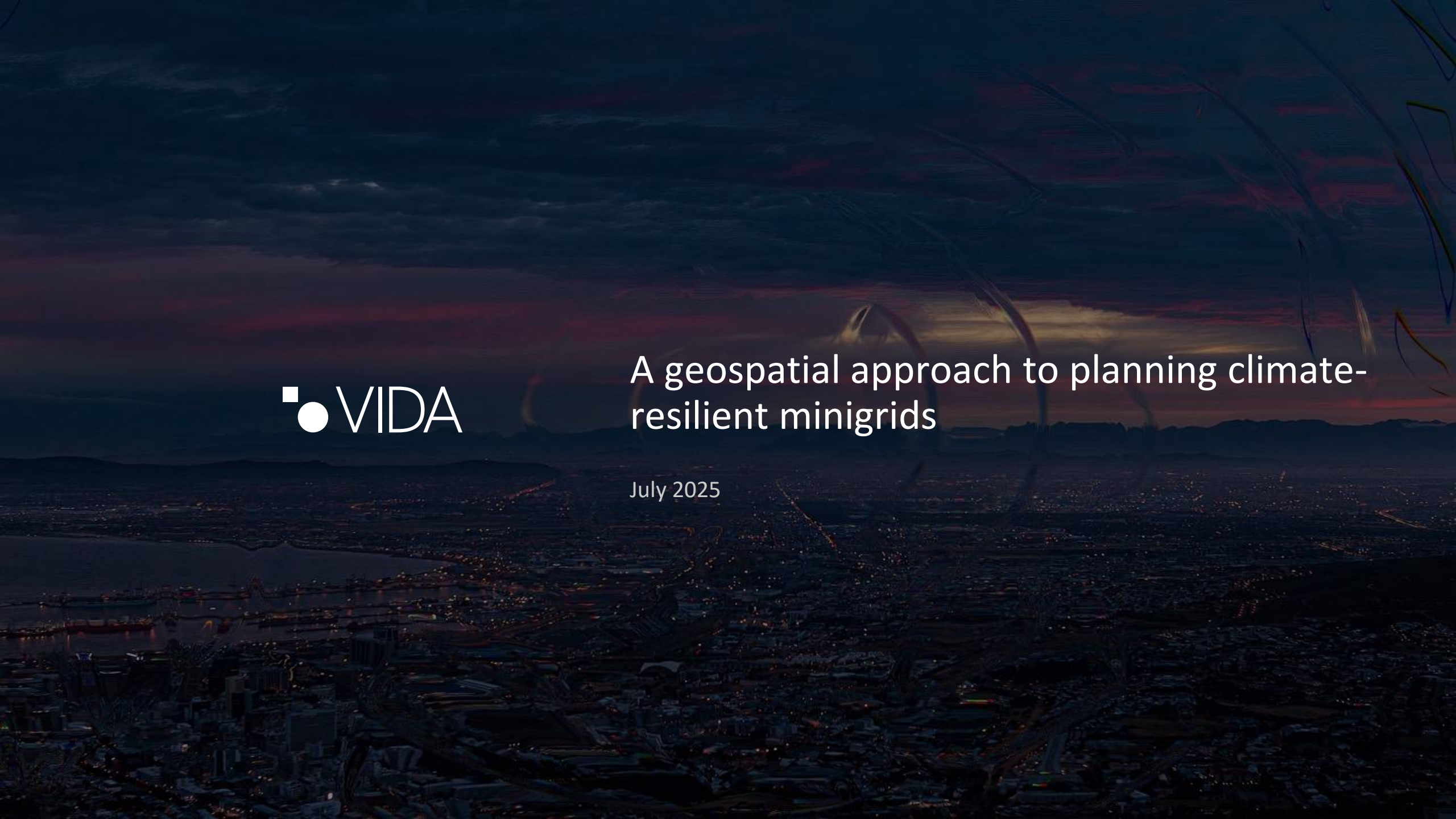
SESSION 3: LIVE DEMONSTRATION

A geospatial approach to planning climate-resilient minigrids

Angus Dutton, VIDA



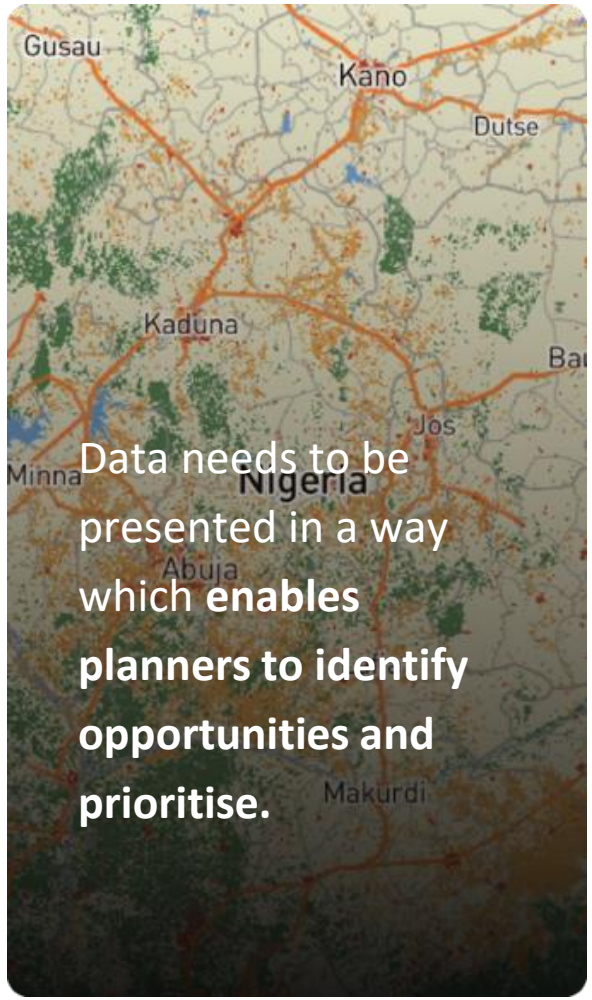
A geospatial approach to planning climate-resilient minigrids

July 2025

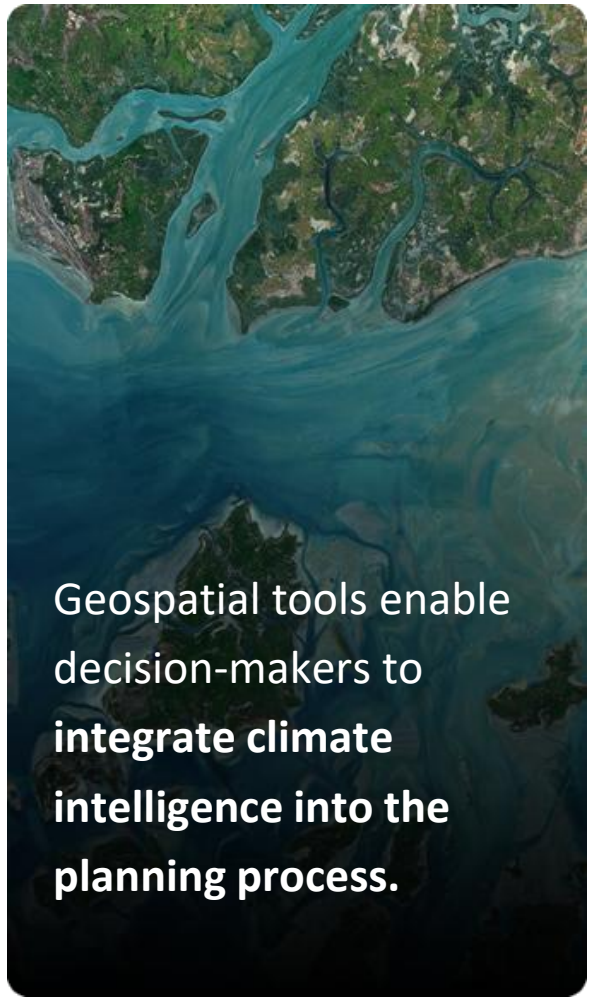
Making climate-resilient minigrids **a reality**

Detailed **climate and development data is required** to plan climate-resilient minigrids.

But **access remains a challenge** - data is often unreliable and fragmented.



Data needs to be presented in a way which **enables planners to identify opportunities and prioritise.**



Geospatial tools enable decision-makers to **integrate climate intelligence into the planning process.**

Want to learn more?

Speak with us

Visit our Linkedin

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Business Development Manager
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With support from

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SESSION 4: PANEL DISCUSSION

Building climate-resilient minigrids – measures, tools, and key considerations

Building climate-resilient minigrids – measures, tools, and key considerations

PANELISTS

Okenwa Anayo Nas
Nayo Technologies
Founder & CEO

Irene Calve Saborit
SE4All
Program Manager – Energy Access Partnerships

Julien Simery
UNDP
Climate Change & Adaptation Specialist

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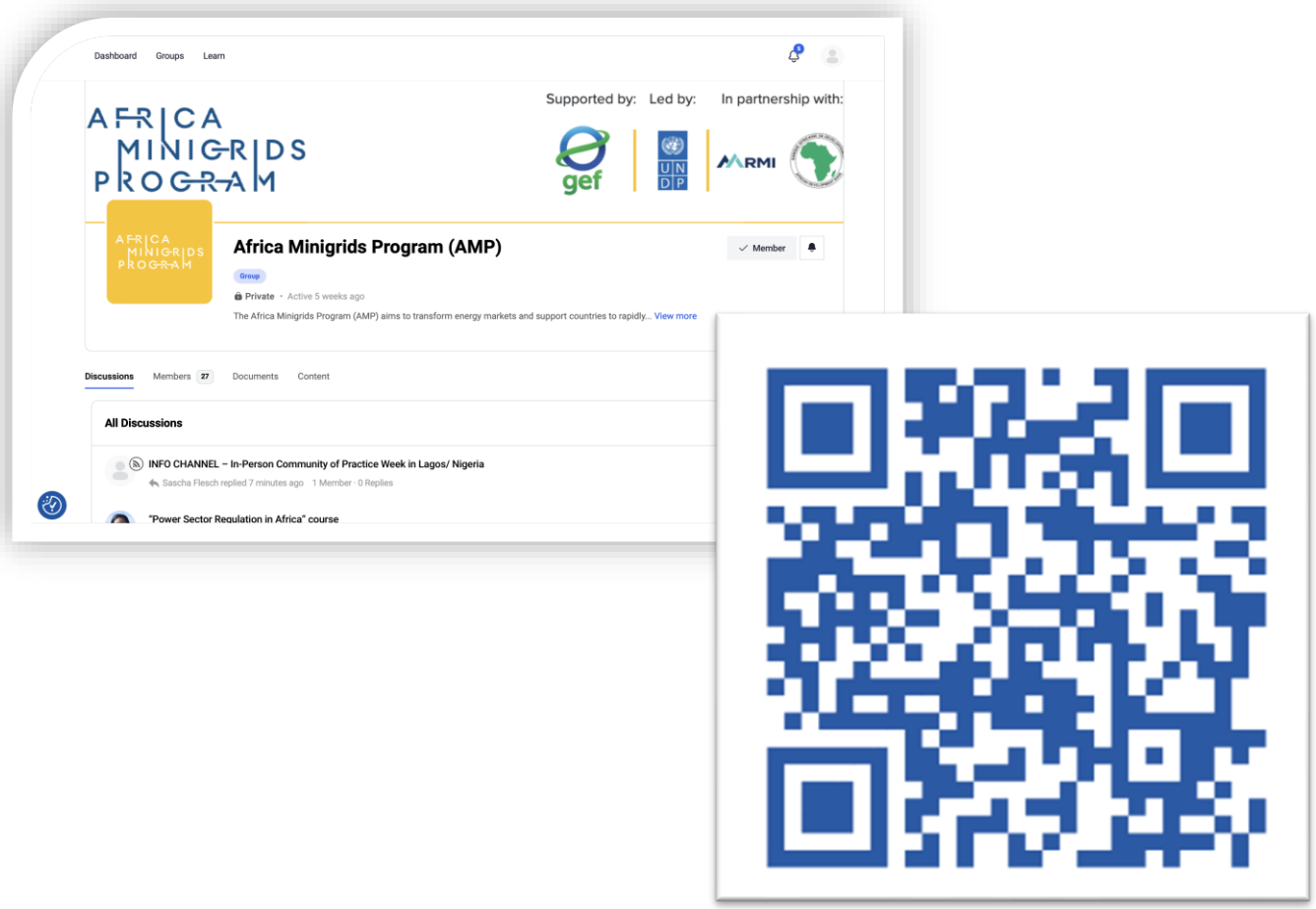
THANK YOU

- Scan for the latest updates and community resources
- Scan to join the discussion in our COP Platform.



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