IRENA INNOVATION WEEK 2025

Productive uses of energy:

Rethinking perspectives and drivers for innovation

Organised in partnership with

GOGLA

12 June 2025 | 13:30-15:00

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#1053254

IRENA INNOVATION WEEK 2025

Keynote

Gauri Singh

Deputy Director
IRENA

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Scene Setting

Kavita Rai

Senior Programme Officer - Energy Access
IRENA

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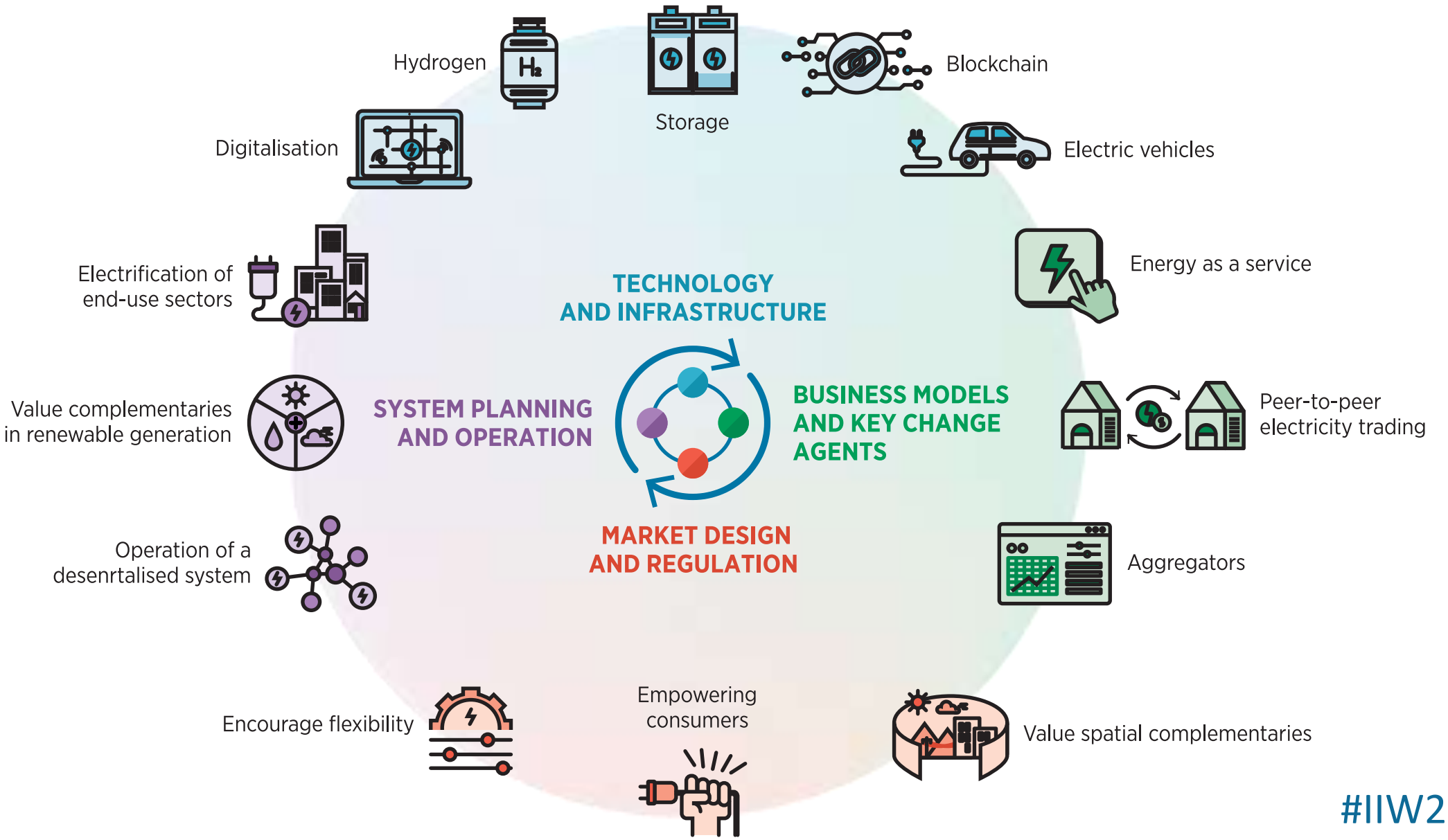
Systemic innovation is key for successful solutions



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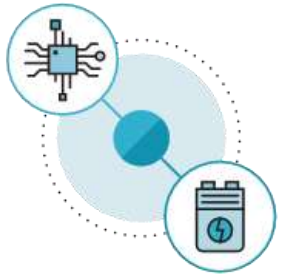
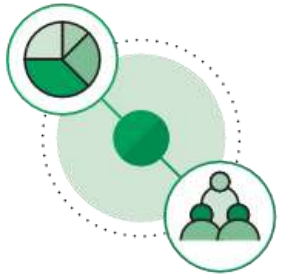
The Innovation Toolbox is designed to build solutions for rural development through decentralised productive uses



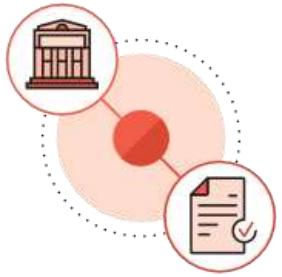
TECHNOLOGY AND INFRASTRUCTURE

- Renewable mini-grids
  Small scale batteries
- Digitalisation
- Smart and autonomous systems
- Energy efficient appliances
- RE based electrification of heating, cooling and cooking
- Electric Vehicles



BUSINESS MODELS AND KEY CHANGE AGENTS

- Key change agents to support renewable development
- Powering a green health and education ecosystem
- RE for agriculture and farming
- Energy community
- Decentralised productive uses
- Peer to peer trading
- Pay as you go
- Crowdfunding and financial funding



MARKET DESIGN AND REGULATION

- Regulation for mini-grids

SYSTEM PLANNING AND OPERATION

- Harmonizing grid and off-grid development

Innovation drivers needed for promoting productive uses of energy

Technology

- *Appliance (e.g., adjusted to climate)*
- *Smart tech integration*
- *Energy efficient appliances*
- *Hybrid systems*

Policy & Institutional

- *Integrated cross-sectoral policies (and convergence) & interministerial coordination*
- *Regulatory reforms*
- *Standards and quality assurance*
- *National roadmaps*

Financing

- *Blended finance (incl.public-private)*
- *Results based finance*
- *Carbon finance*
- *Subsidy innovation*

Business Model

- *PAYGo for Productive Appliances*
- *Energy as a Service (EaaS)*
- *Cooperative/Community Led Ownership*

System planning and operation

- *Harmonising grid and decentralised systems*
- *Cross-sectoral technical assistance*

Programmatic

- *Bundled approaches*
- *End-to-end value chain design*
- *Market access and aggregation platform*

Social & Gender Inclusivity

- *Design for inclusion*
- *Women-led ownership models*

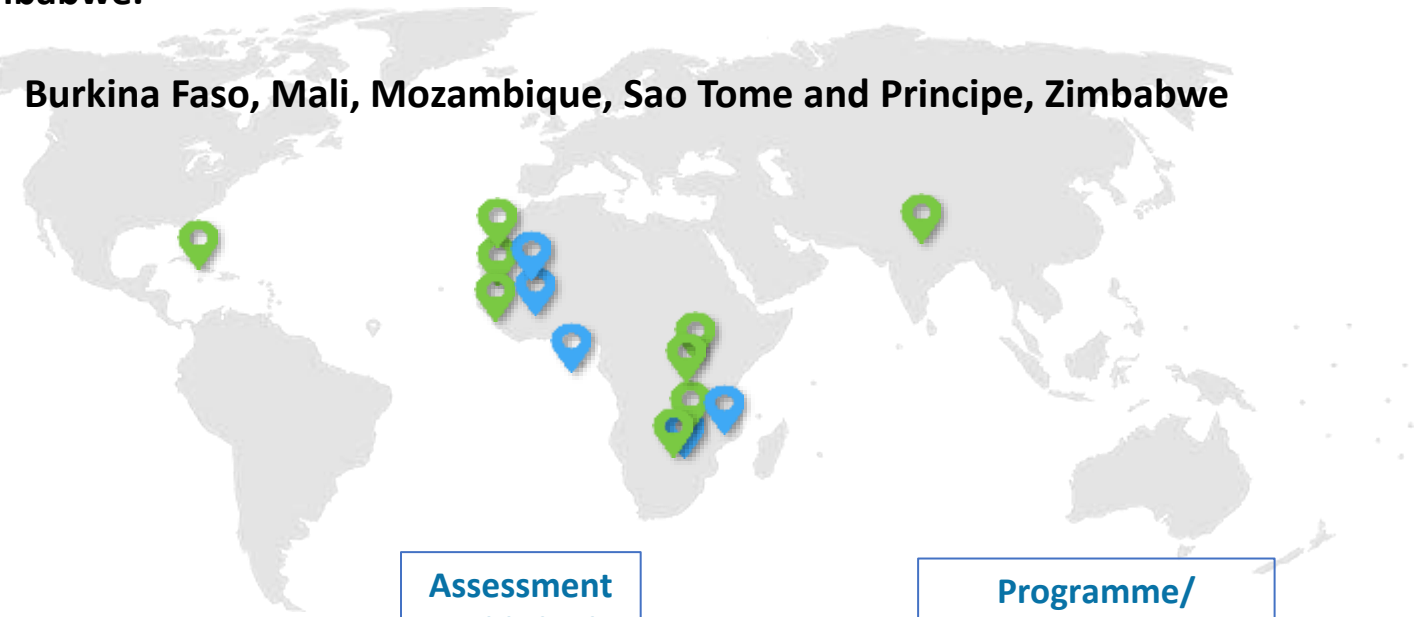
IRENA's Work on Cross-Sectoral (including productive uses)

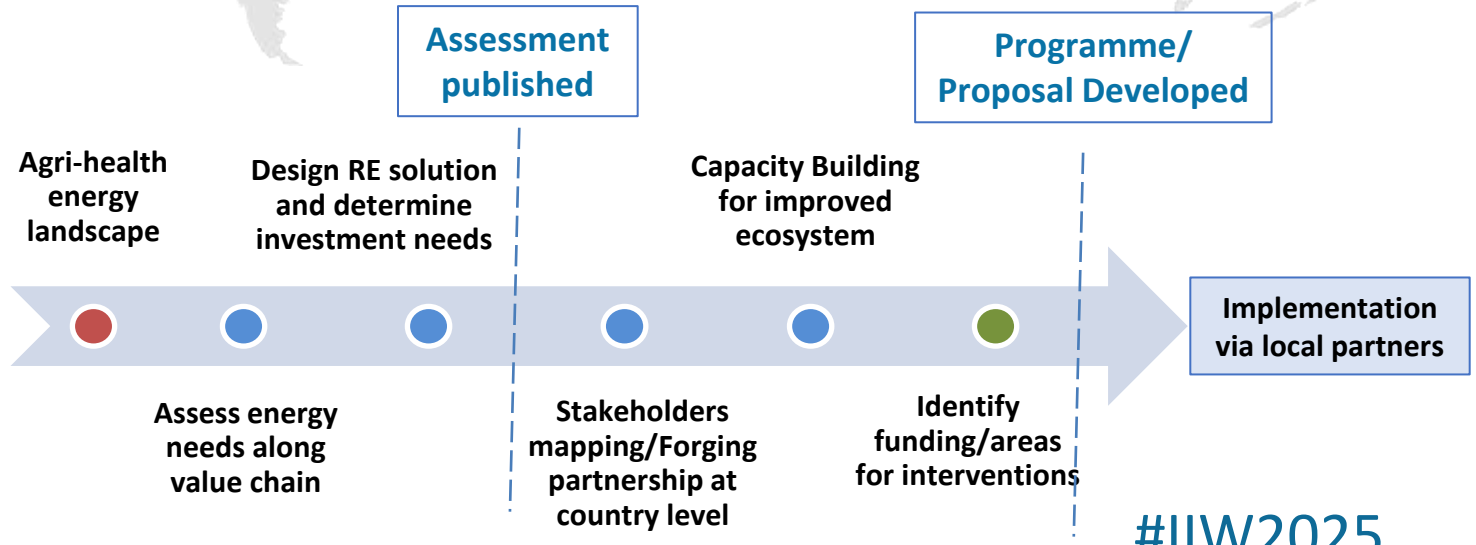
Empowering Lives and Livelihoods: Renewables for Climate Action

1. Connect people and improve livelihoods through renewables
2. Stimulate climate adaptation with mitigation benefits
3. Catalyse systemic energy transformation of agri-food/health
4. Improve resilience and productivity in agri-food/health

Cuba, Guinea, The Gambia, Malawi, Mauritania, Nepal, Rwanda, Uganda, Zimbabwe.

Burkina Faso, Mali, Mozambique, Sao Tome and Principe, Zimbabwe





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Renewables Across Agriculture Value-Chains

Livelihoods of 2.5bn people dependent on agriculture

30% share of food systems in world's energy consumption

14% of food produced globally is lost between harvest and retail

Irrigation
- RE-power pumps
- RE-powered lift irrigation

Mechanised Land Preparation
- RE-powered machinery

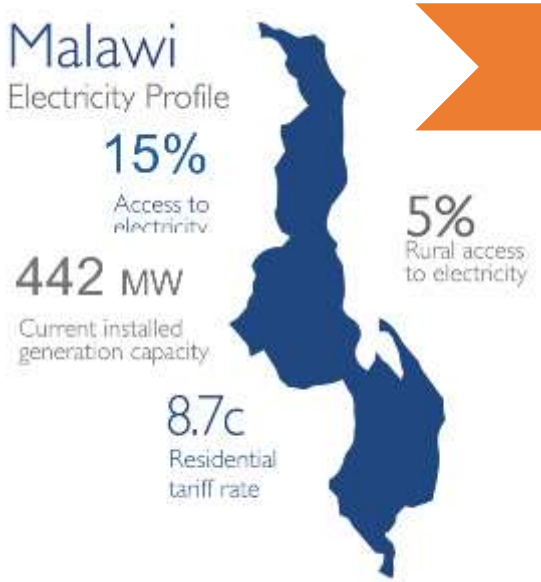
Cold Storage
- RE-powered refrigeration to reduce post harvest losses

Processing
- RE power for milling, drying, packaging

Transport & Distribution
- E-vehicles, RE-powered mobile refrigerators

Digital Solutions
- RE-powered ICT tool and digital technologies for market access

Malawi: Catalyzing Finance for Renewable-Powered Dairy Sector



Dairy → Rice → Aquaculture → Legumes → Olericulture

Insights and Implications

22000 smallholder farmers

150+ milk bulking groups

52% of dairy farmers lack reliable energy

45.5 liters (=$79.25) of milk/month/farmer

Investment Requirement

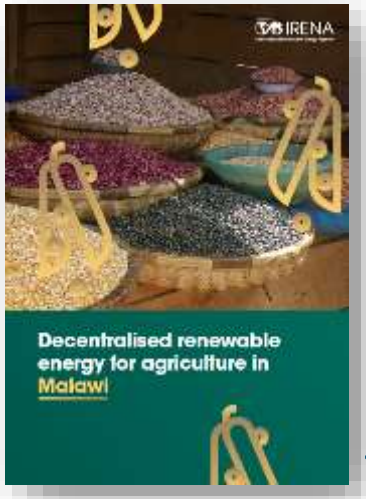
$15 M: De-risk projects, Demonstrate viability, enable scalability and replication

Expected Impacts

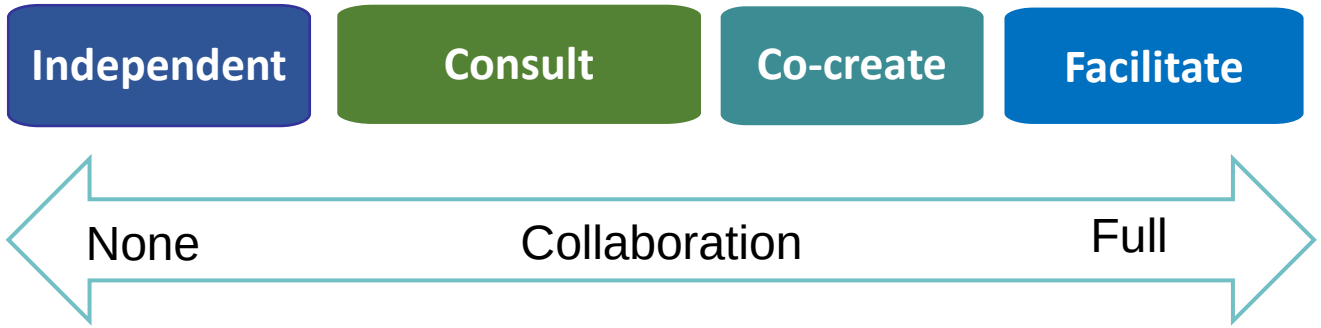
Reach **18000** smallholder farmers reduce milk losses by **50%**

Create **2000** Jobs

- **Infrastructure development: cold chain etc.**
- **Financing: credit line, risk mitigation facility**
- **Technical assistance and capacity building (milk bulking groups, off takers)**
- **Policy advocacy and stakeholder engagement**
- **Research**



Working in partnerships: Agri-energy coalition led by GOGLA



i. Encourage agriculture and water sector stakeholders to partner with energy sector stakeholders to promote productive uses of renewable energy

ii. Demonstrate cross-sector partnerships to governments

iii. Establish programmatic partnerships between cross-sector stakeholders

iv. Build a body of evidence

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Panel discussion

Moderator:

Carlos Sordo

GOGLA

Panelists:

Ulrich Zimmermann

Zimpertec

Matthew Matimbwi

Tanzania Renewable Energy Association

Divya Balakrishnan

GET.invest/GIZ

Barbara Richard

Energising Development (EnDev) GIZ

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IRENA INNOVATION WEEK 2025

Enabling innovation towards growth in productive uses of energy across sectors: differences in global markets

Ulrich Zimmerman

Chief Operations Officer
Zimpertec

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Enabling innovation towards growth in productive uses of energy across sectors: differences in global markets

Energy to Enable Cooling **Integrated Approach**

The DC SHS & LS DC Family

- Through larger plug and play solar home systems, shop owners, families and farmers can improve their standard of living. They get new opportunities in education, security, agriculture, and energy independence.
- The systems are PayGo enabled and use with LFP battery one of the most long-lasting battery solutions.
- Used in Latin America, Africa and ASEAN countries.

Dual Load Output

To **securely run** crucial loads like fridges, the SHS has a dedicated battery capacity.

DC Fridge/Freezer

Energy-efficient solar off-grid powered refrigerators and freezers using high quality, durable long-life components.

Volume: 50/100/160/400L

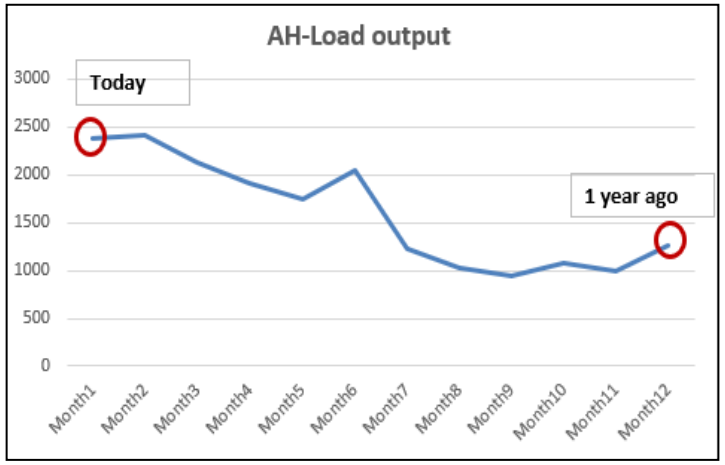
Leveraging the **Data for Design and After Sales**

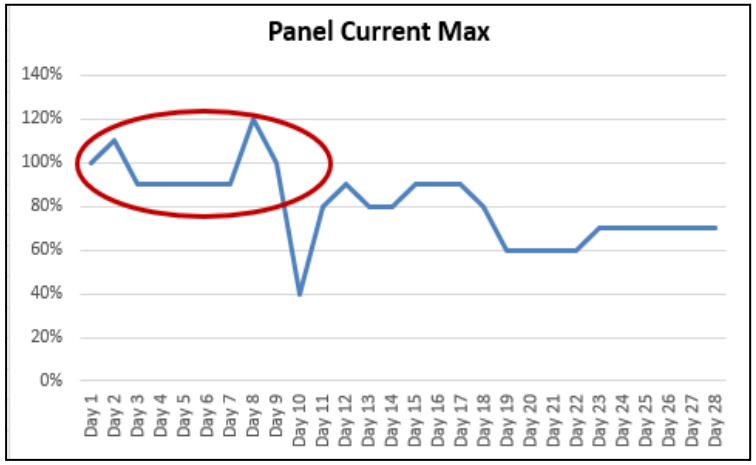
Battery Health
With embedded datalogging, it is possible to check battery health over the course of time. If the battery would be an issue after sales, this can easily be identified.

Root Cause Identification
Why is an installation not performing well? Maybe additional appliances have been added or a leakage at the fridge occurred, such information can be retrieved from the SHS data.

End-Customer Involvement
Importance of panel positioning and continuous cleaning of panels. Example: *Since the panel cleaning, it increased from an average 70% utilization back to 90-110% utilization.*

	V_max	V_min	SOC avg min	SOC avg max	V_max Cell1	V_max Cell2	V_max Cell3	V_max Cell4	V_min Cell1	V_min Cell2	V_min Cell3	V_min
m Number:	M1	M2	M7	M8	M26	M27	M28	M29	M34	M35	M36	M37
Month1	14.2 V	12.9 V	53%	93%	3.56	3.56	3.56	3.56	3.24	3.25	3.23	3.25
Month2	14.2 V	13.0 V	60%	93%	3.56	3.56	3.56	3.56	3.26	3.27	3.24	3.27
Month3	14.2 V	12.9 V	60%	93%	3.56	3.56	3.56	3.56	3.25	3.25	3.23	3.25
Month4	14.2 V	13.0 V	53%	100%	3.56	3.56	3.56	3.56	3.26	3.26	3.24	3.26
Month5	14.2 V	11.0 V	53%	93%	3.56	3.56	3.57	3.56	2.78	2.78	2.79	2.74
Month6	14.2 V	13.0 V	53%	93%	3.56	3.57	3.57	3.56	3.26	3.26	3.24	3.27
Month7	14.2 V	13.0 V	47%	100%	3.56	3.56	3.56	3.56	3.26	3.26	3.25	3.27
Month8	14.2 V	13.0 V	47%	93%	3.56	3.56	3.56	3.56	3.26	3.26	3.25	3.27
Month9	14.2 V	12.9 V	53%	100%	3.56	3.56	3.56	3.56	3.23	3.24	3.22	3.24
Month10	14.2 V	12.9 V	47%	100%	3.56	3.56	3.56	3.56	3.25	3.25	3.24	3.25
Month11	14.2 V	13.0 V	53%	100%	3.56	3.56	3.56	3.56	3.27	3.27	3.25	3.27
Month12	14.2 V	13.0 V	60%	100%	3.56	3.56	3.56	3.56	3.27	3.27	3.25	3.27





Energy to Enable Agro-Processing

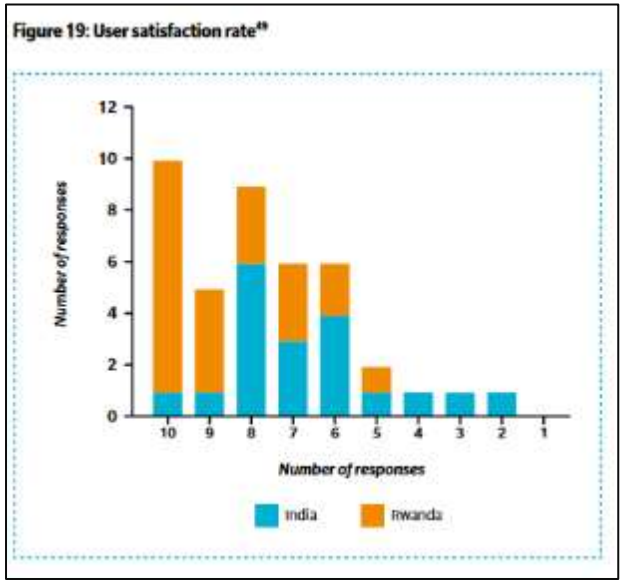
The LS AC and Agri Processing

Through larger **AC** Plug and Play Solar Home Systems, families and farmers can improve their standard of living. The systems are PayGo enabled and still plug and play, which is currently a big problem for access to these technologies. Used in Africa in first pilots, **big regional dependency on the solution**.

Enabling innovation towards growth in productive uses of energy across sectors: differences in global markets

Call to Action:

- Incentivize reliability over cheapness
- Easier access to finance is needed as the demand for capital is bigger
- Focus on scaling what works



In Rwanda 95% of the end-users using Zimpertec's SHS would recommend the set up to their friend/s. 50% of the refrigerator cost was subsidised by the IFAD Green Technologies to Facilitate Development of Value Chains for Perishable Crops and Animal Products (GreenTech) grant.

India: 80% of the refrigerator cost was subsidised by the LEIA programme with the end-user contribution of 20%

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Policy and regulatory enablers to grow the productive use market across sectors

Matthew Matimbwi

Executive Secretary
Tanzania Renewable Energy Association

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Policy and Regulatory Enablers to Grow Productive Use of Energy Across Sectors

1.0 Policies

Countries should develop policy statements and strategic objectives to drive the productive use of renewable energy in the following sectors.

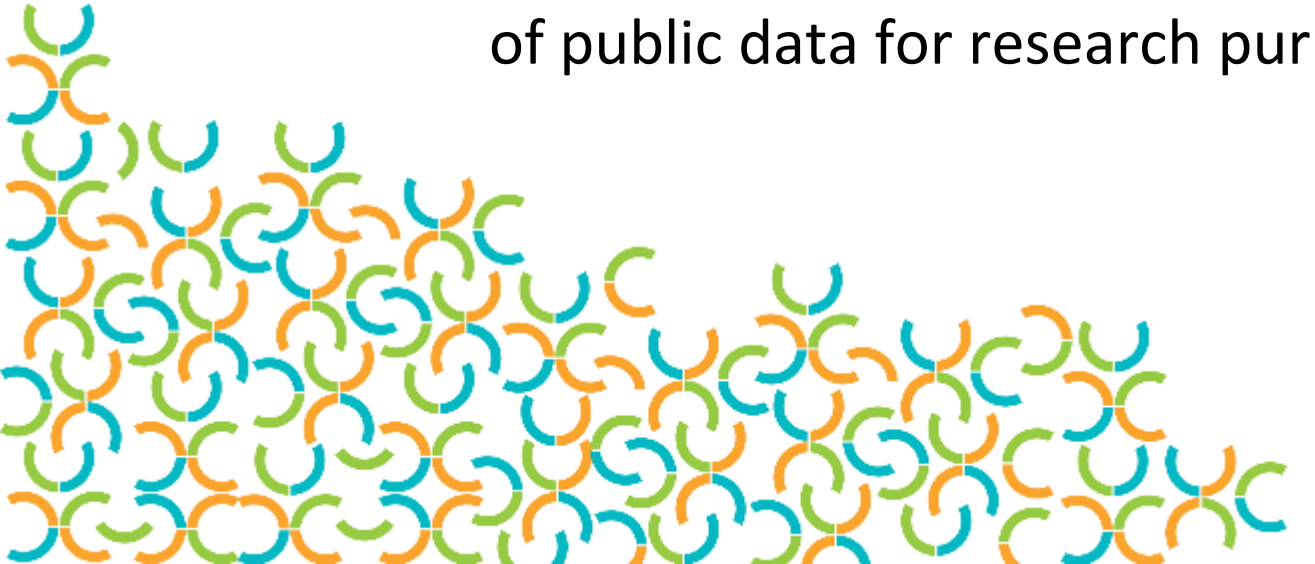
i) Energy (electricity, mechanical and heat energy generation)
ii) Science and technology (Research and development)
iii) Agriculture (crop protection, irrigation, processing, storage)
iv) Blue economy (fishing)
v) Animal husbandry (light, insect-repelling, milking, storage)
vi) Transport (e-mobility)
vii) Industries (powering machines)
viii) Finance (SMEs financing)
ix) Service industries (Cooling, heating, cooking, food processing)
x) Water (water pumping and processing)
xi) Communication (telephone, internet, fund transfers)

Policy and Regulatory Enablers to Grow Productive Use of Energy Across Sectors

2.0 Regulatory Environment

Governments should develop and enforce enabling regulatory frameworks in the following areas:

i) Incentives on the productive use of renewable energy solutions (technology and finance)
ii) Technology transfers
iii) Emerging technological solutions (green hydrogen, e-mobility, agricultural cooling)
iv) Public use research environment (rules and guidelines that govern the use of public data for research purposes)



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Financing productive uses taking consumer interests and needs: how can we innovate to bring profitability?

Divya Balakrishnan

Senior Advisor
GET.invest GIZ

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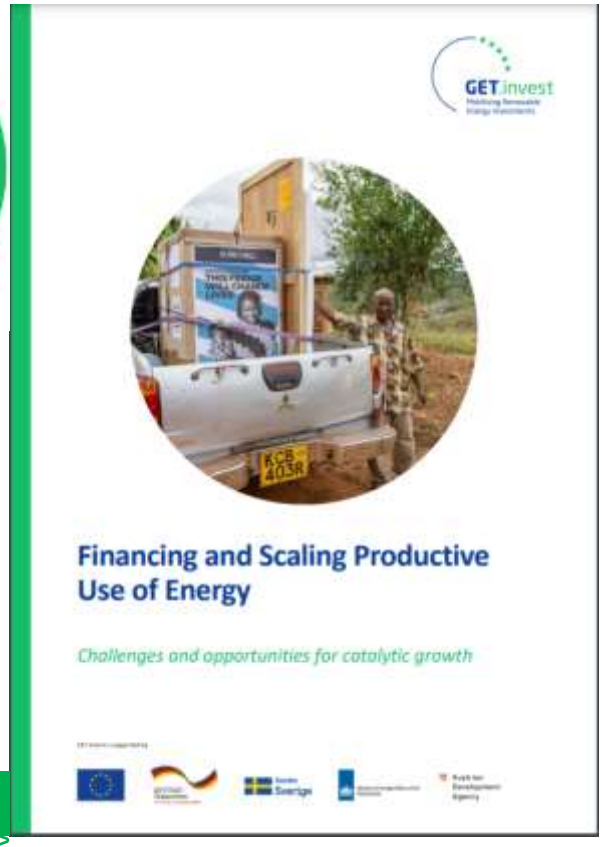
The GET.invest PuE Portfolio

Total Clients supported	91
Currently active clients	46
Clients successfully introduced to financiers	37
Clients at financial close	25

Total investment volume mobilised = **~€49M**

Insights from the field
Main challenges

- Financing tickets *(small and segmented)*
- Local debt *(limited appetite)*
- FX mismatches *(high and compounded risks)*
- Ability to pay and margins *(limited, albeit high demand)*
- PuE treated as ancillary, set to fail
  - Falls through financing and policy strategy gaps
  - Downscaling appraisal & underwriting principles of C&I/IPP are applied to PuE
- On the project developer's side,
  - Low utilization rate (~50%)
  - Business Model not always well structured
  - Fine-tuning of financial viability of systems required



Link here

Innovative Approaches to Scale PuE

CORE SERVICES	Business Development Support	Investment Strategy Support	Structuring Support	Financial Modelling	Finance Access Support	Transaction Support	Post-Investment Support

Advisory Approaches:

- Build long-term strategic partnerships (farmer associations, cooperatives etc.) to improve financier confidence
- Lower end user up-front costs (leasing, PAYG etc.)

Financing approaches:

- Engage with local banks and MFIs for end-customer financing (asset facility from LFIs or MFIs)
- Access concessional loans and/or investment grants
- Help hardware suppliers access capital to provide supplier financing
- Harness crowdfunding more efficiently
- Structure risk sharing between product manufacturers and distributors
- Improve local currency debt capacity, along with FX hedging tailored to PuE businesses
- Structure first loss/loss diminishing instruments for PuE lenders
- Securitise receivables and finance against this security

Specific Opportunities to Strengthen Finance for PuE

For Financiers

- Urgent early-stage equity injection required
- Facilitate long-term working capital aligned to inventory cycles
- Strengthen end-user financing capacity
  - Enable innovative sales models (PAYG/lease-to-own etc.)
  - Engage as specialised intermediaries (MFIs)
  - More PuE specific crowd funding aligned to PuE business challenges (CAPEX, utilization rate etc.) required

For Donors

- Build domestic financial institutions' capacity to lend locally
- Support innovative financing models to strengthen capital structure
  - Asset pool securitisation
  - Revenue sharing asset finance
  - De-risking equity funds
- Enable more grant funding (repayable & non-repayable) to enable sector growth/maturity.

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Innovations and experiences on PUE
What have we learnt over the past decade and what more could we do?

Barbara Richard

Team Leader
Energising Development (EnDev) GIZ

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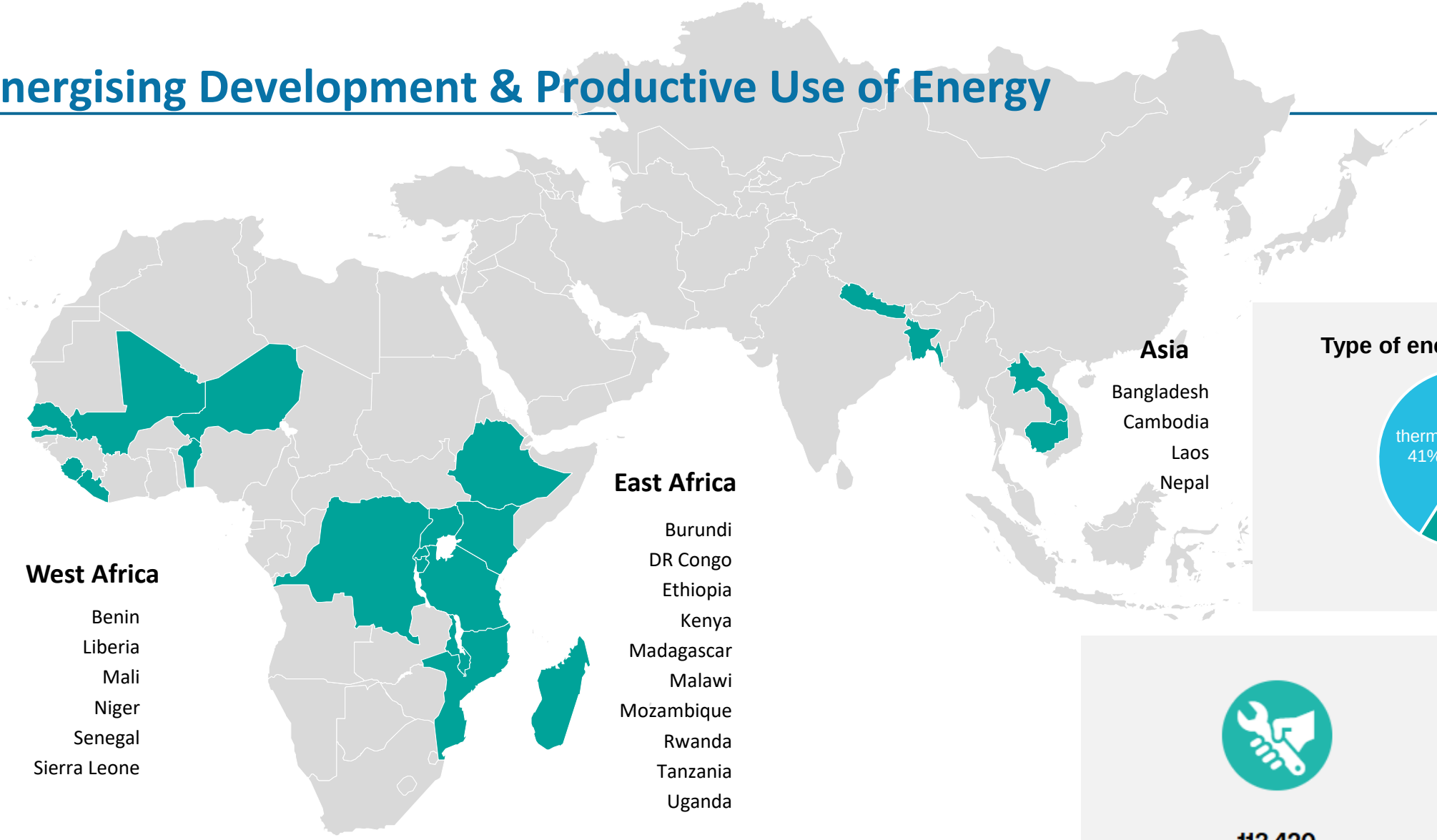
Energising Development & Productive Use of Energy



West Africa

Benin
Liberia
Mali
Niger
Senegal
Sierra Leone

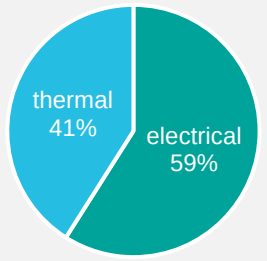
East Africa

Burundi
DR Congo
Ethiopia
Kenya
Madagascar
Malawi
Mozambique
Rwanda
Tanzania
Uganda

Asia

Bangladesh
Cambodia
Laos
Nepal

Type of energy since 2005



113,420

micro, small and medium-sized enterprises benefit from productive uses of energy

EnDev & PUE

Strategy

Fostering the PUE is an integral pillar combining in an integrated approach access for households, for MSMEs and social institutions.

Bottom-up approach

While strategic orientation is given on portfolio level, interventions are planned with key stakeholders on country level to ensure alignment with national political priorities, acknowledge different market development stages and address the specific needs of the population.

Impact and sustainability

- Energy as an enabler for local economic development (income and jobs)
- MSMEs as reliable “able to pay” customers for private sector energy companies and local banks/MFIs

Success Factors

Additionality	Integrated approach – energy and beyond		Product diversity
Targeting specific groups	**Value chain approach**	**PUE as one element in broader approach**	**Focus on supply side & technology**
• (Woman-led) MSMEs • Communities/villages • Smallholder farmers	• Agriculture • Aquaculture • Other	• Energy access projects • RBF programs	• R&D grants • Quality assurance • Product catalogues

Needs to be complemented by:
- Improving the enabling environment
- Ensuring access to finance for target groups
- Reducing risk to attract investors and financiers

Challenge of high diversification of:
- Target groups
- Value chains
- PUE appliances

More Information

- Website

  endev.info/productive-use-of-energy

- LinkedIn

  @Energising Development (EnDev)

endev 20 years

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Audience Q&A

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Closing remarks

Kavita Rai

Senior Programme Officer - Energy Access
IRENA

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Renewables and Digitalisation for a Sustainable Energy Future

Thank you!

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Reception at the City Hall

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