



EASE Research and Dissemination

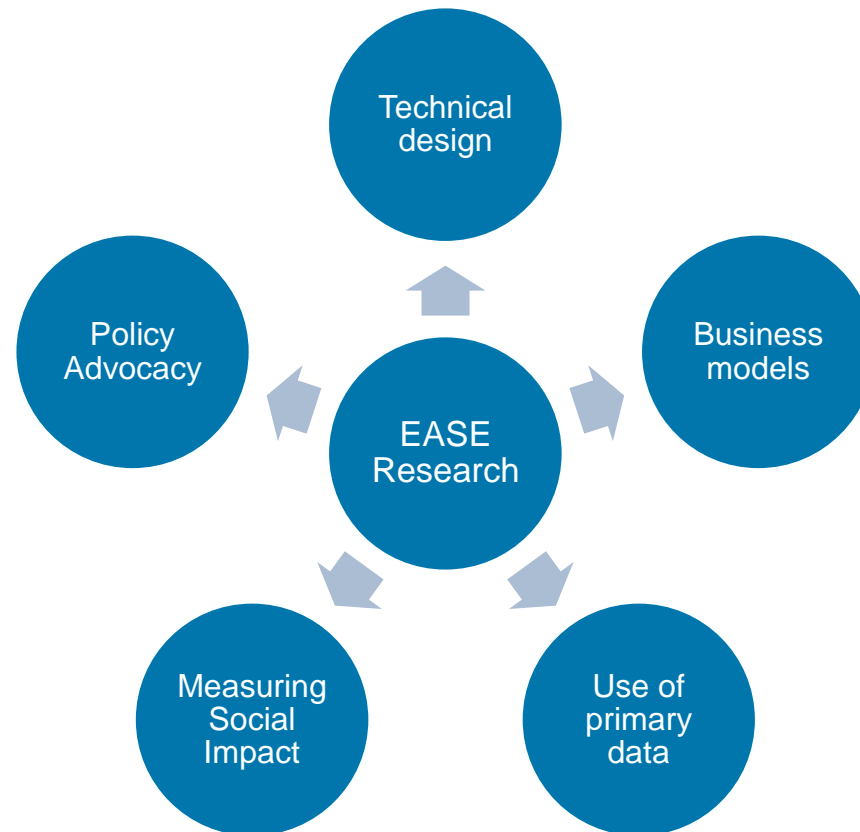
Rural Energy Access through Social Enterprise and Decentralisation
Project Closing Dissemination Event
Blantyre, April 2024

Dr Aran Eales
University of Strathclyde

<https://ease.eee.strath.ac.uk/>

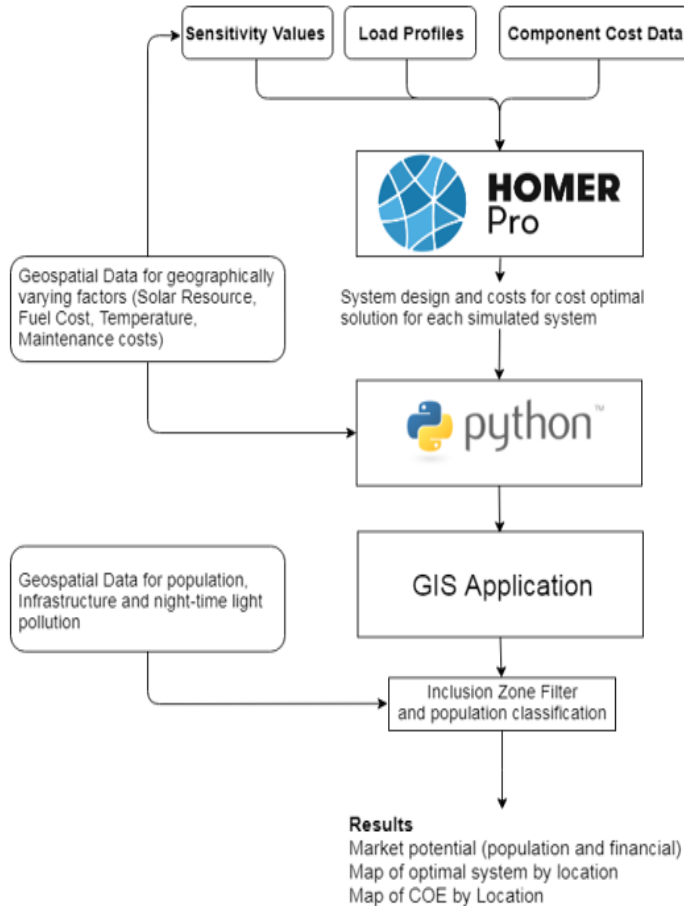
EASE Research Objectives and Themes

- How to make off-grid systems sustainable in Malawi?
- Is a Social Enterprise business approach feasible?
- How can primary data improve understanding of minigrids and off-grid systems?
- What policy advocacy and other interventions in the off-grid energy ecosystem can accelerate SDG7?

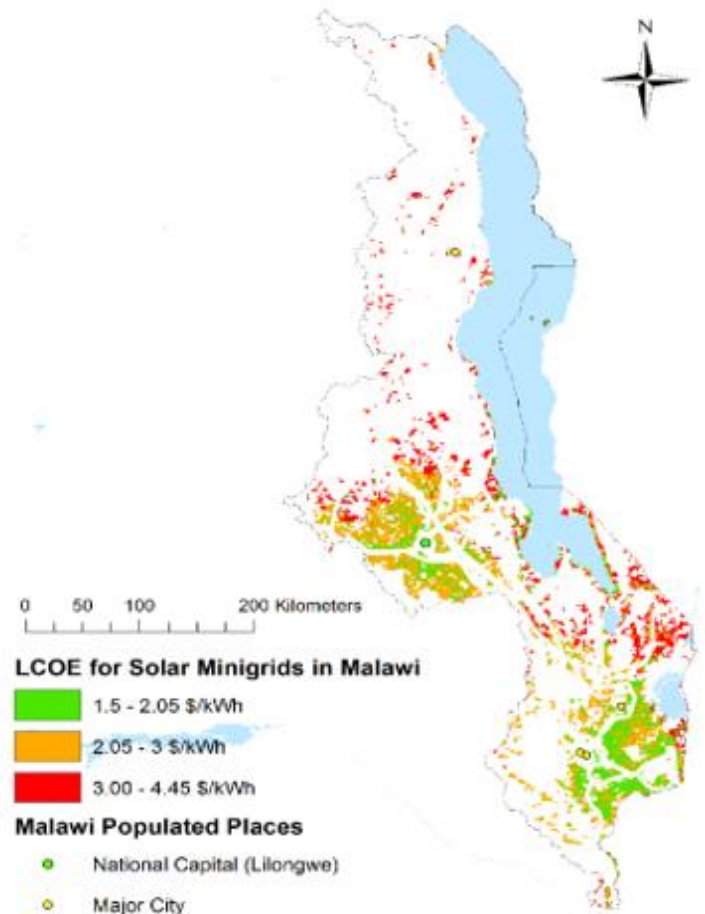


Assessing the market for solar photovoltaic (PV) microgrids in Malawi

Hapres Journal of Sustainability Research



Process flowchart for Quantifying the Market



Cost of Energy for Optimally designed Solar Microgrid in Malawi

Understanding Solar Microgrid Sustainability and Social Impact through a Novel Key Performance Indicator Framework

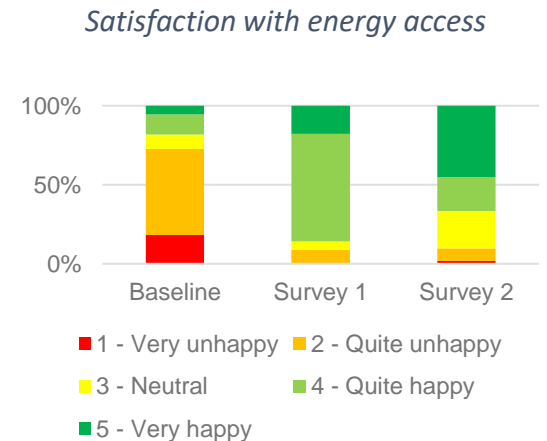
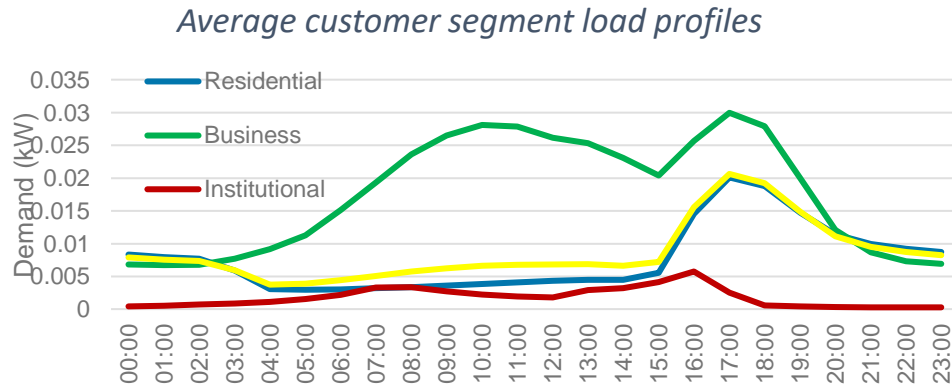
Environmental Research: Infrastructure and Sustainability

Special Issue: Focus on Community Energy and Infrastructure Resilience

Proposes a new framework for measuring performance and impact of microgrids

Uses social impact metrics alongside technical and economic data

Tested on primary data from EASE microgrids



PhD: Assessing the feasibility of a Solar Microgrid Social Enterprise in SSA

Assess financial sustainability

- Feasibility for a defined use case
- Conduct market assessment
- Business modelling for scale-up



Monitoring and evaluating the performance and impact

- Technical
- Economic
- Social Impact



Recommendations for the microgrid ecosystem

- Policy makers
- Investors and donors
- Practitioners



Improved business models for SMSE

- Enterprise: Achieving financial sustainability
- Social: maximising positive impact

Demonstrating the value of generating and sharing data on off-grid energy systems: a case study from Malawi

Damien Frame, Million Mafuta, Stuart Galloway, Aran Eales

2023 IEEE Global Humanitarian Technology Conference (GHTC)

- PhD research at MUBAS, deployed advance monitoring equipment for forecasting generation
- a case study deployment of Distributed Energy Resource Systems in Malawi, demonstrating the application and benefits of high levels of instrumentation and monitoring.
- Proposed a classification of minimum, preferred and desirable levels of data gathering and sharing

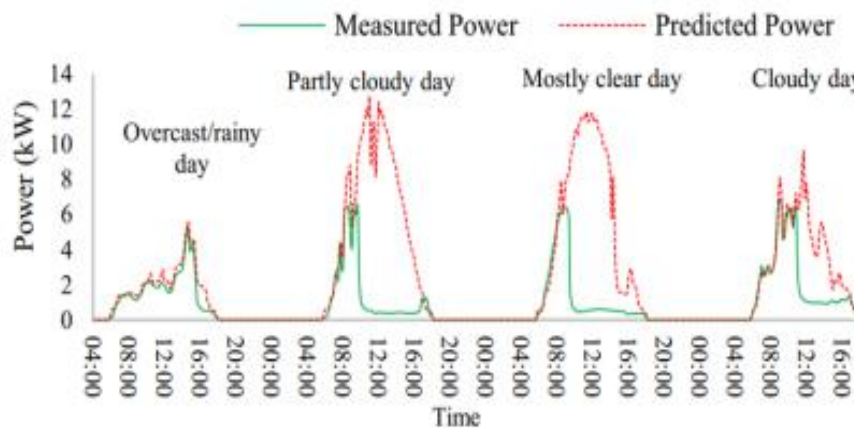


Figure 8 Microgrid power generation profiles (measured and predicted)

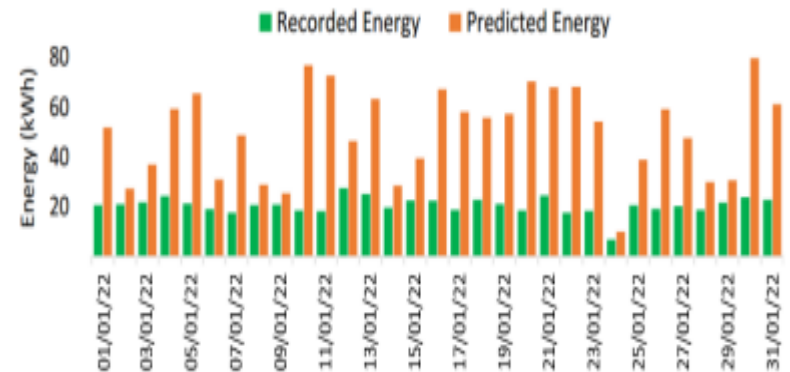


Figure 9: Recorded and Predicted Daily Energy Yields

EASE Policy Briefs

<https://ease.eee.strath.ac.uk/>



District Energy Officers: Mainstreaming Energy in Malawi's Local Governance Structures

Policy Brief

Damien Frame¹, Louis Yona², Estrida Nyirenda², Aran Eales¹, Edgar Bayani²

¹University of Strathclyde

²Community Energy Malawi

Foreword by WASTHED: Kelvin Tembo, Million Mafuta and Salule Masangwi



Deploying Solar Microgrids in Malawi Lessons Learned and Implications for the Malawian Microgrid Ecosystem

Aran Eales, Elizabeth Banda, Will Coley, Goodwill Laineke and Damien Frame



EASE Policy Brief

Energy poverty constrains economic growth and livelihoods, a significant challenge for Malawi where 82% live without access to electricity. Solar PV microgrids offer a cost competitive, low carbon solution to addressing SDG 7 whilst enhancing socio-economic wellbeing through improved quality of life, access to public services, job creation and entrepreneurship opportunities. As a relatively new technology in Malawi, there is a recognised lack of proven business models, field experience and data on microgrid performance and impact, which is stymying their wide scale deployment.

Through the Rural Energy Access through Social Enterprise and Decentralisation (EASE) project (funded by the Scottish Government, two solar microgrids have been installed in the rural villages of Mthembanji and Kudembe in Dedza district, generating and distributing power for domestic and productive customers. The systems are owned and managed by United Purpose (UP) through a social enterprise framework, with technical support and research activities provided by the University of Strathclyde (UoS). Detailed monitoring and evaluation and analysis of microgrid performance is being carried out by UoS to inform the Malawian renewable energy and off-grid sector. The motivation for the project is to pilot and demonstrate a social enterprise ownership model for solar microgrids in Malawi, with aims to use this project as a platform to set up further microgrids at other identified sites across Malawi.

The microgrids installed in Dedza offer reliable, renewable electricity to over 500 people through solar PV generation, low voltage distribution networks and smart meters. Performance monitoring through robust data collection is highly beneficial to multiple stakeholders in the microgrid sector including system operators, donors, investors and policy makers seeking to increase the scale and impact of the sector. A key aim of EASE has been to capture operational data through remotely monitored smart meters, and social impact through surveys to inform positive interventions in the microgrid ecosystem.

The purpose of this policy brief is to disseminate EASE project learning through sharing first hand experiences and primary data on technical, economic and social impact from two solar microgrids.

Deploying Solar Microgrids in Malawi: Lessons Learned and Implications for the Malawian Microgrid Ecosystem



EASE Technical Report

Aran Eales¹, Elizabeth Banda², Goodwill Tauro², Will Coley², Damien Frame¹

¹University of Strathclyde and ²United Purpose Malawi

Rural Energy Access through Social Enterprise and Decentralisation (EASE)

November 2022



Other EASE online resources

<https://ease.eee.strath.ac.uk/>

Blog

Updates from EASE!



New EASE Policy Briefs Released

19th October 2022
Five updates to EASE's open access project library to inform the renewable energy sector's transition to clean and safe energy. [Read this >](#)



Accelerating Energy Access in Malawi: EASE Webinar October 2022

19th October 2022
The webinar will be most useful for those registered on EASE Malawi, highlighting some key messages and recommendations for accelerating energy access in Malawi. [Read this >](#)



Data visualisation platform released to provide insight on microgrid performance

19th October 2022
Dash is a platform for the microgrid to be able to identify operational or technical performance and overall performance through real-time, remote monitoring and analysis. [Read this >](#)



EASE Microgrid Policy Brief and Social Impact Evaluation

19th October 2022
During 2022 we published from the University of Strathclyde a social impact evaluation of the EASE microgrid of Malawi. [Read this >](#)

Webinar recordings

THE EASE PROJECT

Kudembe: First "Built in Malawi" microgrid

- Locally assembled generation system housed in a shipping container
- Some components (PV modules and batteries etc) sourced from South Africa, most locally purchased
- Builds local capacity and stimulates local value chain

MORE VIDEOS

▶ 🔊 38:40 / 1:30:21

🗨 ⚙️ YouTube 🗑



Elizabeth Banda

Video

Elizabeth Banda
EASE Project Manager, United Purpose Malawi

▶ ⏪ ⏩ 🔊 0:08 / 3:02

Tackling energy poverty in Malawi

United Purpose Subscribe 👍 6 🗨 🔗 Share 📄 Download ⋮

Research agendas going forwards

Business modelling:
techno-economic
analysis, tariff setting and
financial modelling

Microgrid performance
monitoring through data
acquisition and analysis

Understanding demand:
customer segmented
load profiles and load
growth

Geospatial analysis, site
prospecting and portfolio
planning for scale up

Asset management and
maintenance frameworks
for multiple microgrid
sites

Microgrid distribution
grid design and
optimisation

Interconnection of
microgrids and the
national grid

Productive Use of Energy
in agricultural value
chains

Measuring and
understanding microgrid
social impact



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