



University of
Strathclyde
Engineering

THE FACULTY OF **ENGINEERING**

www.strath.ac.uk/engineering

EASE

Rural Energy Access through Social Enterprise and Decentralisation

Damien Frame

Senior Knowledge Exchange Fellow

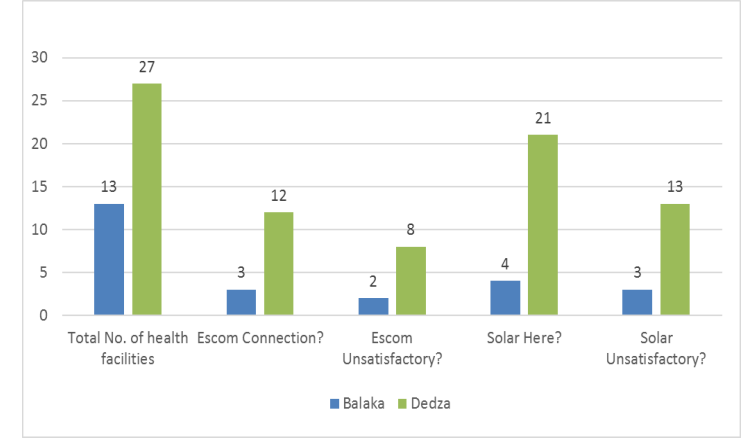
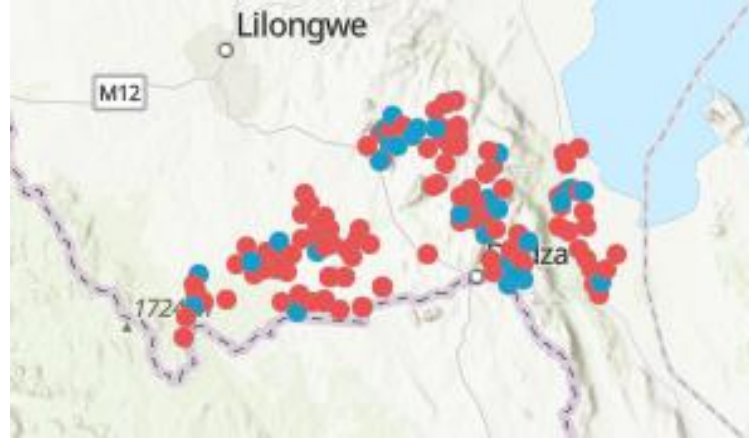
Institute of Energy and Environment

The University of Strathclyde

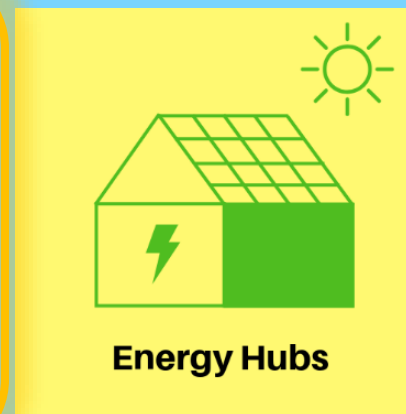
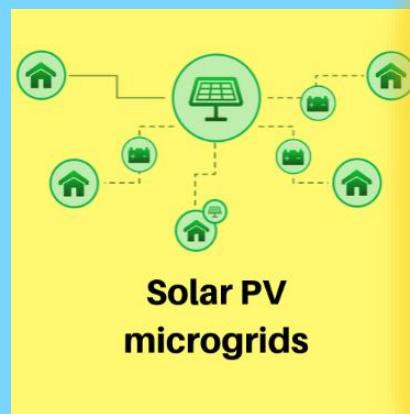


EASE District Energy Officers

Foundations and Project Design



District Energy Officers within EASE



Increased access to
sustainable energy
enables economic
development and
improved livelihoods for
rural communities in
Malawi



Building on solid foundations

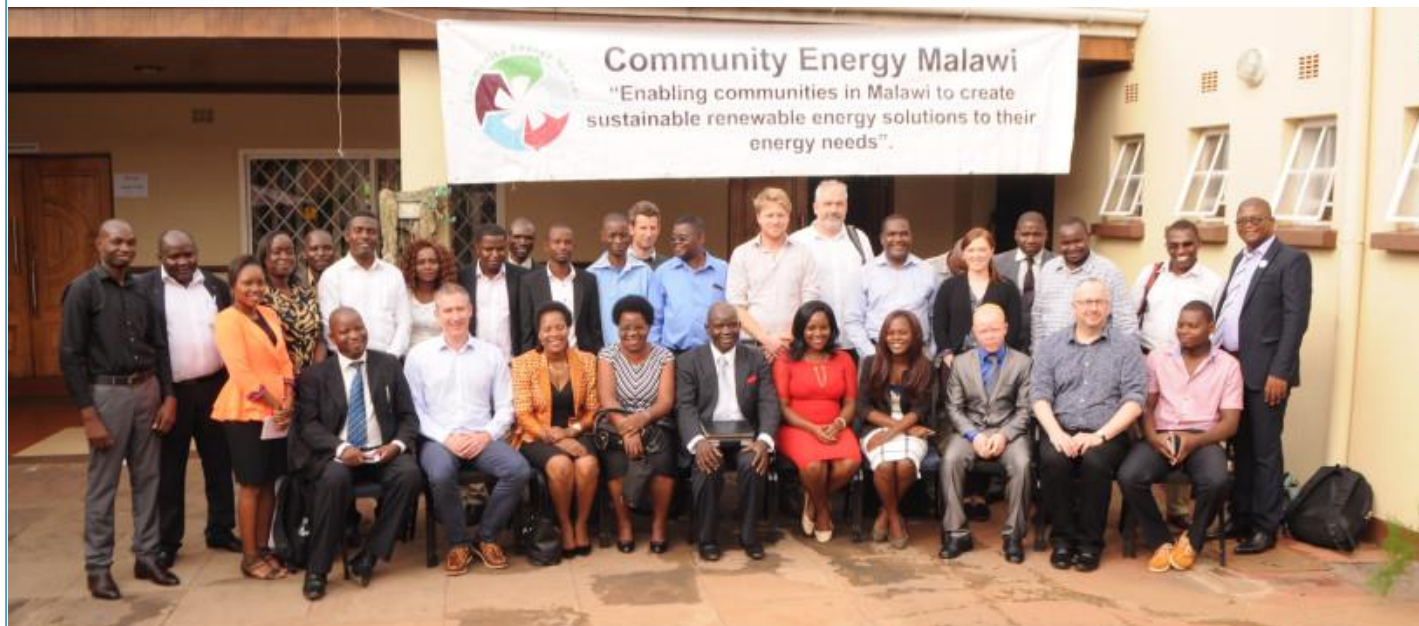
Prior to the EASE project, several initiatives were undertaken by CEM, UoS and academic partners in Malawi and the UK, with support from the Scottish Government.



Blueprinting the DEO Role

- Literature review on: *current energy policy and background in Malawi; lessons learnt from energy decentralisation in other African countries (mainly Rwanda and Kenya); lessons learnt from the broader decentralisation process in Malawi; community based natural resource management case studies and opportunities and challenges for decentralised energy.*
- Expert interviews were conducted and opinions were collected from local institutions (district assembly/council and officers in other decentralised sectors as well as public affairs committee), central government (Department of Energy Affairs, Department of Science and Technology and Malawi Bureau of Standards), local communities (through focus group discussions), Malawi in-country academics working on renewable energy and Malawian renewable energy practitioners.
- Insights were also derived from stakeholder feedback during an in-country workshop

A Collaborative Process



Original Article | [Open Access](#) | [Published: 05 May 2020](#)

Decentralization: the key to accelerating access to distributed energy services in sub-Saharan Africa?

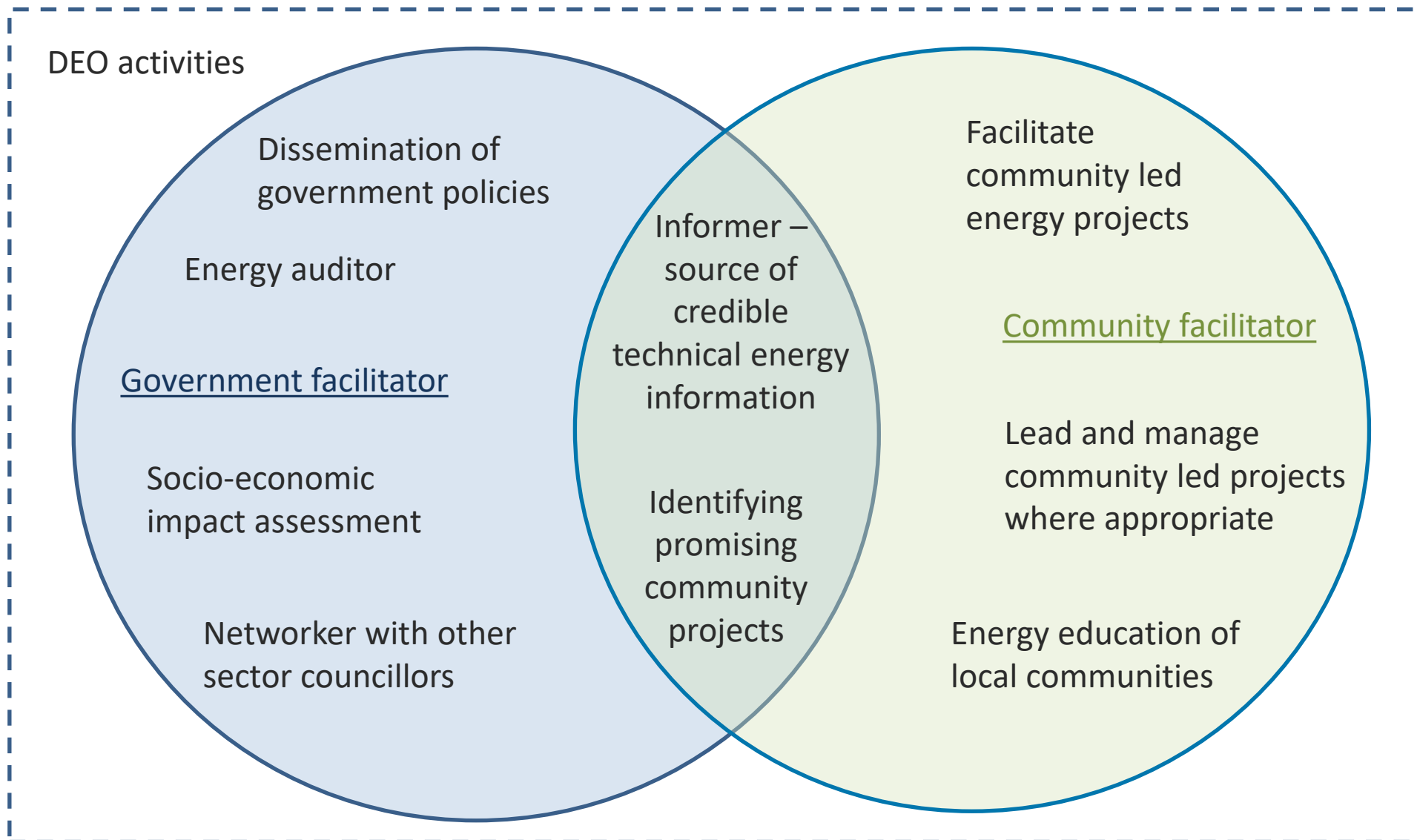
[Collen Zalengera](#), [Long Seng To](#) , [Richard Sieff](#), [Alison Mohr](#), [Aran Eales](#), [Jon Cloke](#), [Hannah Buckland](#), [Ed Brown](#), [Richard Blanchard](#) & [Simon Batchelor](#)

Journal of Environmental Studies and Sciences **10**, 270–289 (2020) | [Cite this article](#)

4155 Accesses | **5** Citations | **9** Altmetric | [Metrics](#)



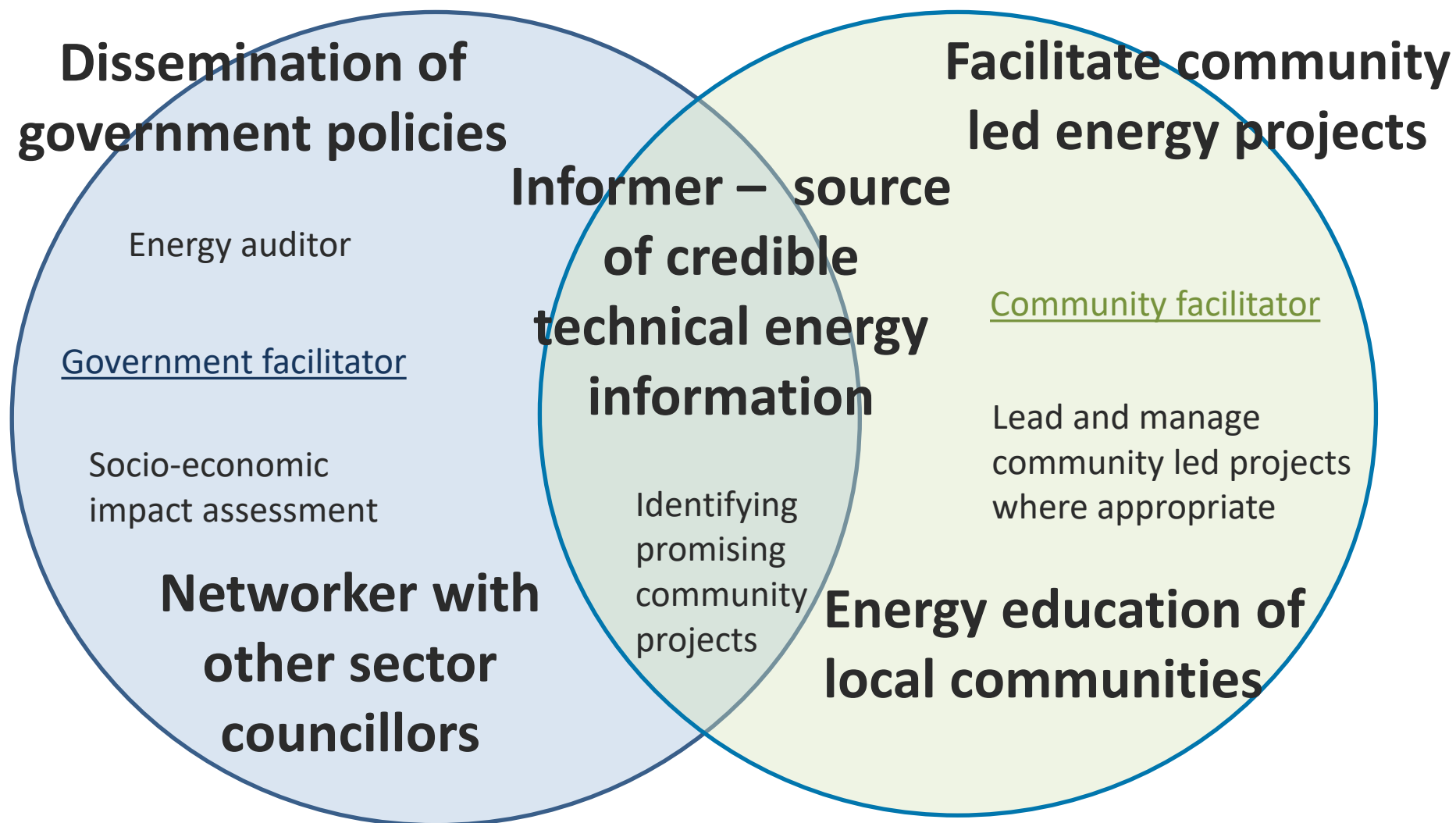
Blueprinting the DEO role



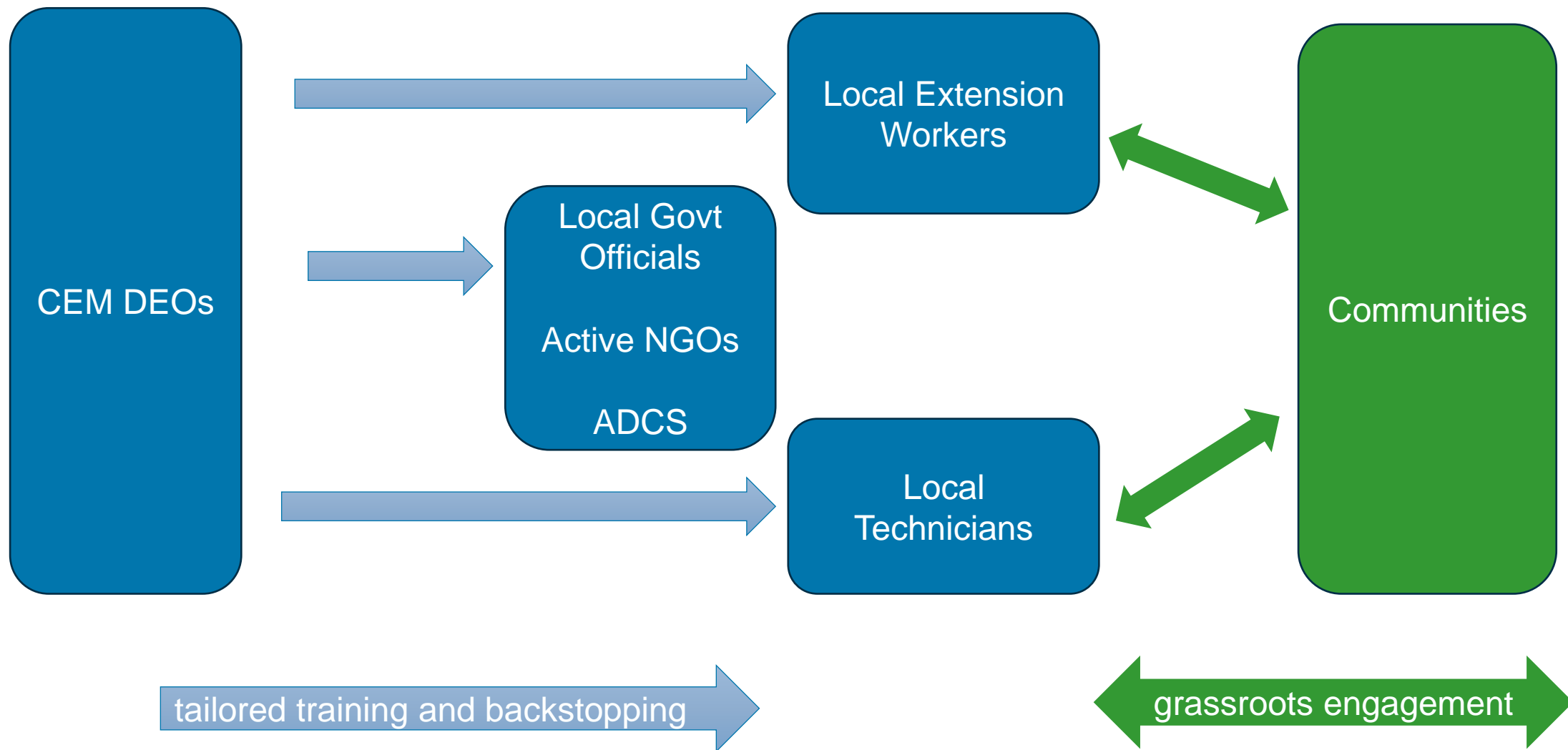
Approach and Limitations

- Not a full placement of District Energy Officers
- CEM staff enacting a subset of DEO activities
- Project designed to pilot some DEO functions, assess benefits and feed learning into GoM as they evolve their approach to deployment of DEOs
- Key principles:
 - Build capacity of existing structures on energy through training and ongoing support
 - Assess the benefits and challenges of key DEO functions

DEO Pilot Focus Areas – Education and Support



Approach



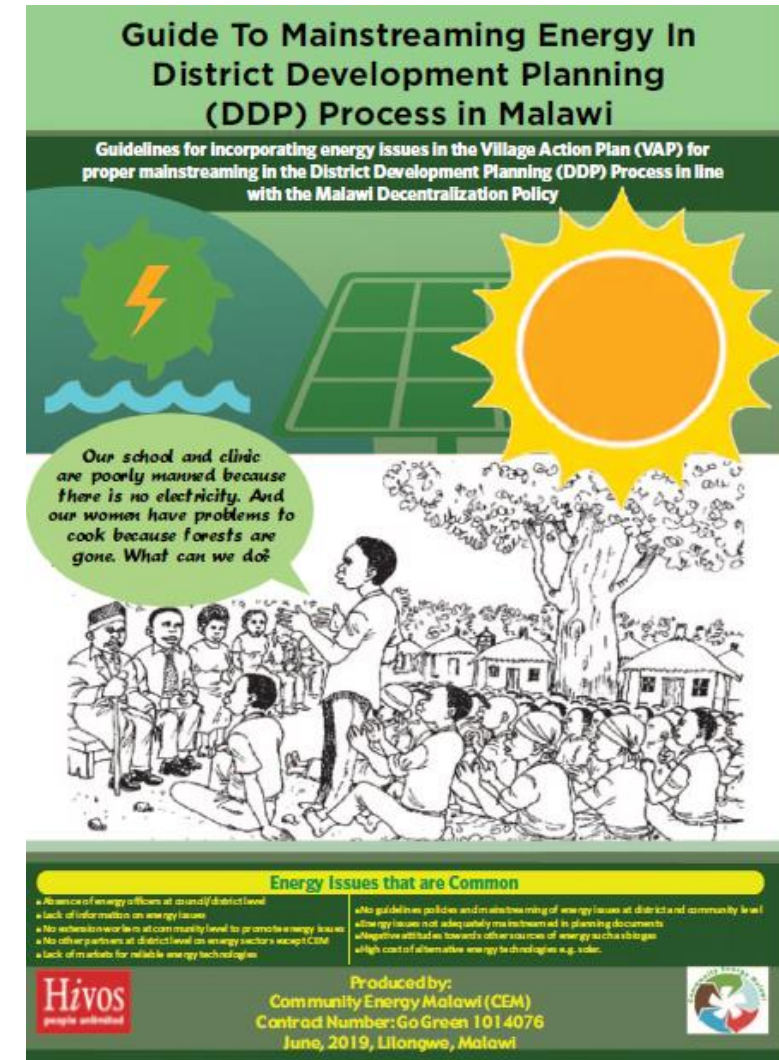
Capacity Building with Key District Stakeholders

- Tailored presentations targeting District Council Directorates, NGOs and private sector players in Dedza and Balaka (200+ attendees across all workshops)
- Sensitise participants on Renewable Energy Technologies using bespoke toolkits
- Discussions on cross-cutting nature of energy to their different sectors, building on SDGs as over-arching development policy and demonstrate how Goal 7 on energy directly impacts the other goals
- Case studies from Malawi and outside to illustrate how energy has helped to transform communities or inspire holistic development



Training of Frontline Extension Workers

- Extension workers are the frontline officers that interface with community members at the grassroots, covering development priority areas such as agriculture, health, education, water, forestry, community development and more.
- Integral to Village Action Planning, feeding into DDPs
- 170 extension workers and Area Civic Education Coordinators trained during EASE
- Bespoke training package developed - based on existing guidelines for local development planning and renewable energy toolkits developed previously by CEM



Impact

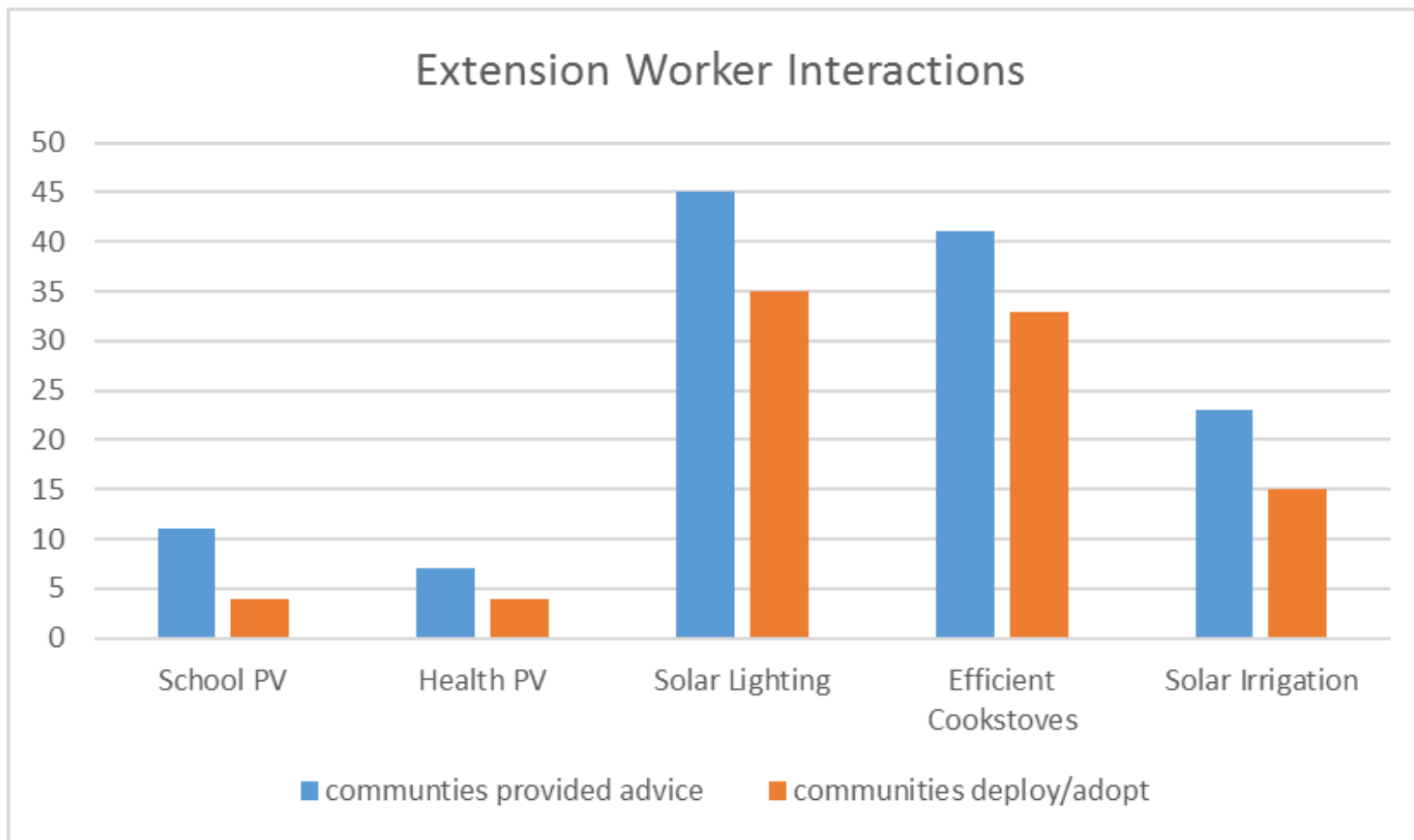
Surveys and feedback sessions were used to capture information on the level of energy focussed engagements the extension workers achieved with community groups and whether that engagement led to progression of energy projects.

- *318 groups were directly engaged on Renewable Energy issues*
- *Of these, 182 lead to further discussions, planning or linking with agencies offering support*
- *132 community groups went on to adopt Renewable Energy in some form*

Extension workers described the most common next step they felt able to take was link communities with programmes in the district promoting Renewable Energy.

The extension workers report a high conversion rate following on from linking communities with ongoing support of RE programmes. Some were able to estimate the numbers of portable solar lighting and efficient cook toves that were bought/distributed as a result. Estimates are in the region of 9,000 PSP and 20,000 efficient cook stoves

Impact - Trained Extension Workers

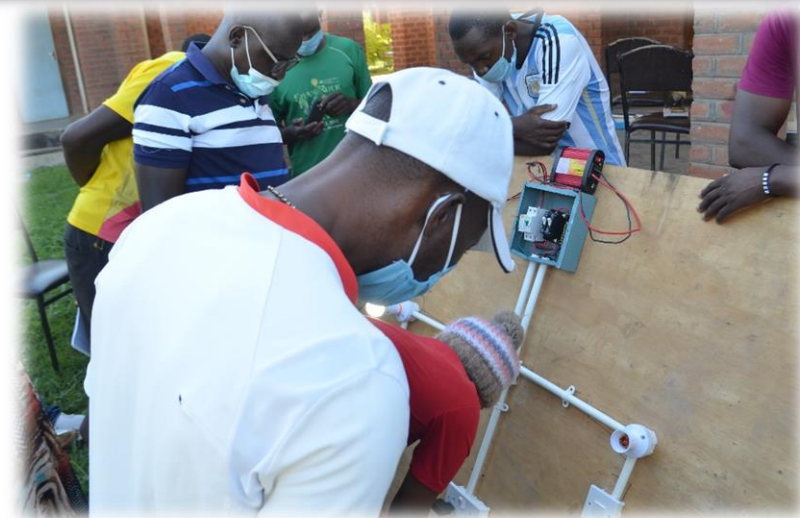


Training of Frontline Extension Workers

Opportunities	Challenges
Energy access is a priority issue - strong interest/demand from communities	Proliferation of poor quality products has created distrust of RE in some communities
Active NGO programmes on PSP, cookstoves, and irrigation in the district provide rapid route to impact once communities have been made aware	RE products are viewed as very expensive, particularly as size of system increases.
After sensitization, more communities felt empowered to develop proposals on energy projects	Knowledge and cost barriers, combined with lack of access to reliable suppliers, prevents progress for larger, more complex projects (e.g. school, health center).
Extension workers felt empowered to discuss energy in most recent VAP process	Limited knowledge base – desire for more training and support
Extending reach of singular District Energy Officer to many communities	Extension workers require resources for additional travel and community engagements
	Integrating energy into reporting frameworks to track progress of energy projects

Training of Local Technicians

- Local technical capacity for installation, operation and maintenance of solar PV systems is a long-standing sustainability challenge
- The CEM DEOs trained 20 local technicians to provide technical support under DEO oversight
- Training covered design, installation and maintenance of solar PV systems
- In addition to improving the local capacity to maintain already existing renewable energy equipment, the technicians help identify renewable energy infrastructure needing support through the process of energyscaping.

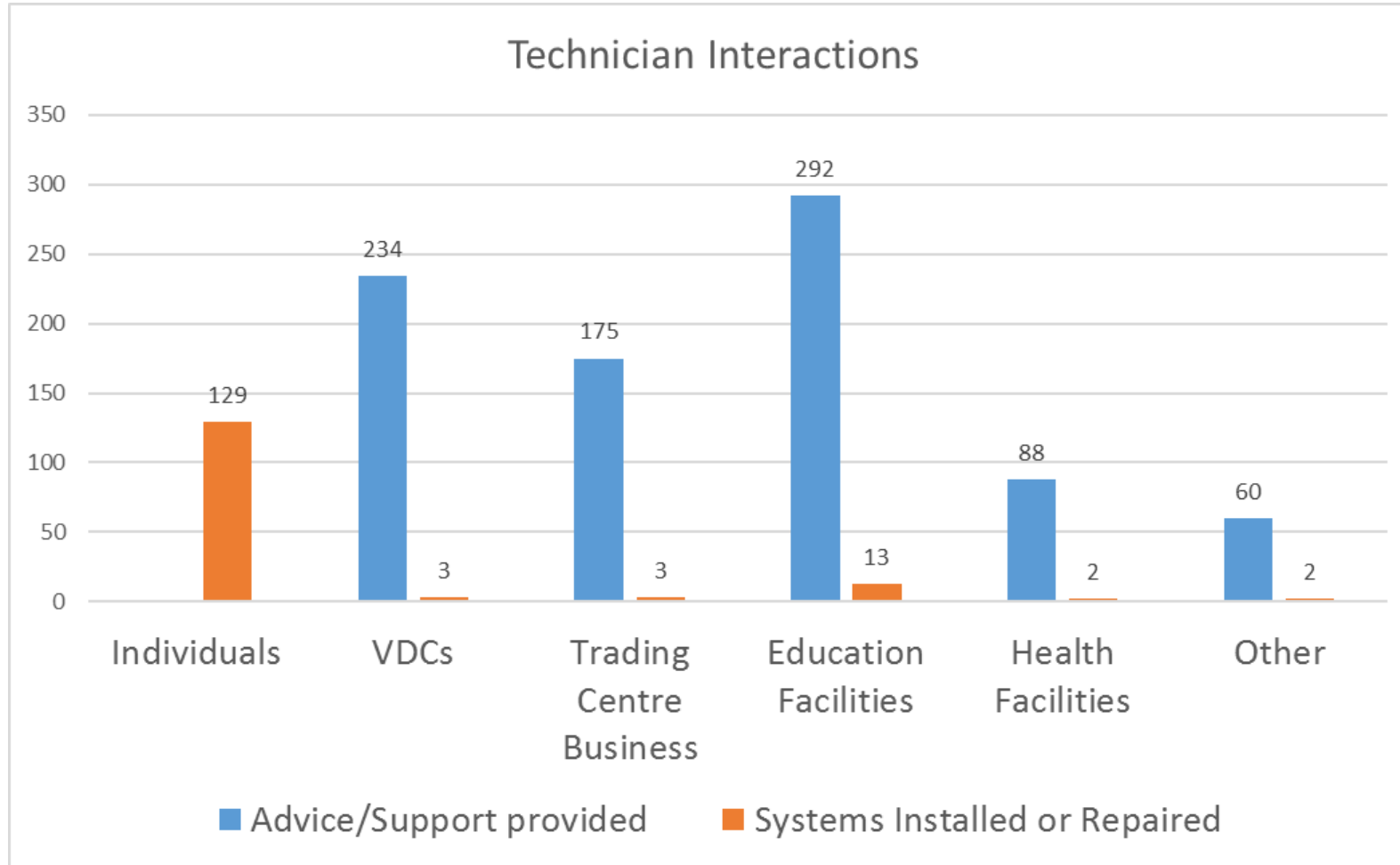


Impact

- The technicians keep records of their interactions, allowing impact to be tracked over time. Interactions are grouped as indirect (advice/support given per category) and direct (systems installed or repaired per category)
- Engaging at a community level, the technicians experienced high demand from individuals, self-financing small solar PV home system purchase or repair. Furthermore, household demand for quality lighting prompted some technicians to set up as agents for Portable Solar Products (working with accredited suppliers)
- The local technicians recorded over 2,000 engagements, repaired or installed 152 RE systems and directly distributed 449 Portable Solar Products



Impact – Local Technicians



Training of Local Technicians

Opportunities	Challenges
Energy access is a priority issue - strong interest/demand from communities	Quality RE products are often unaffordable for rural community members
Low levels of electrification of education and health institutions – high potential impact of RE installation	Lack of budget (or will to prioritize energy) from health and education budget managers
Installed capacity of many solar PV systems in need of minor maintenance and repairs at education and health institutions – high potential impact with low CAPEX requirement	Obtaining buy-in and collaboration from local education and health institution managers
Local technical capacity allows rapid support for community issues – avoiding delays and cost of bringing external support	Limits on technical knowledge and capacity of technicians – DEO oversight and support creates a constraint/bottleneck
Positive gender messaging by training female technicians	Truly empowering female technicians with the confidence to fully participate in historically male dominated role

Energyscaping

Background

- Aim – to demonstrate a method for gathering relevant information on energy needs, priorities, and opportunities throughout the district
- Working with a cohort of local technicians trained through the project, data on access to electricity was gathered across the districts
- Making this information available to stakeholders such as local planners and other actors interested in developing energy infrastructure should help direct and align investment with local and national priorities



Energyscaping

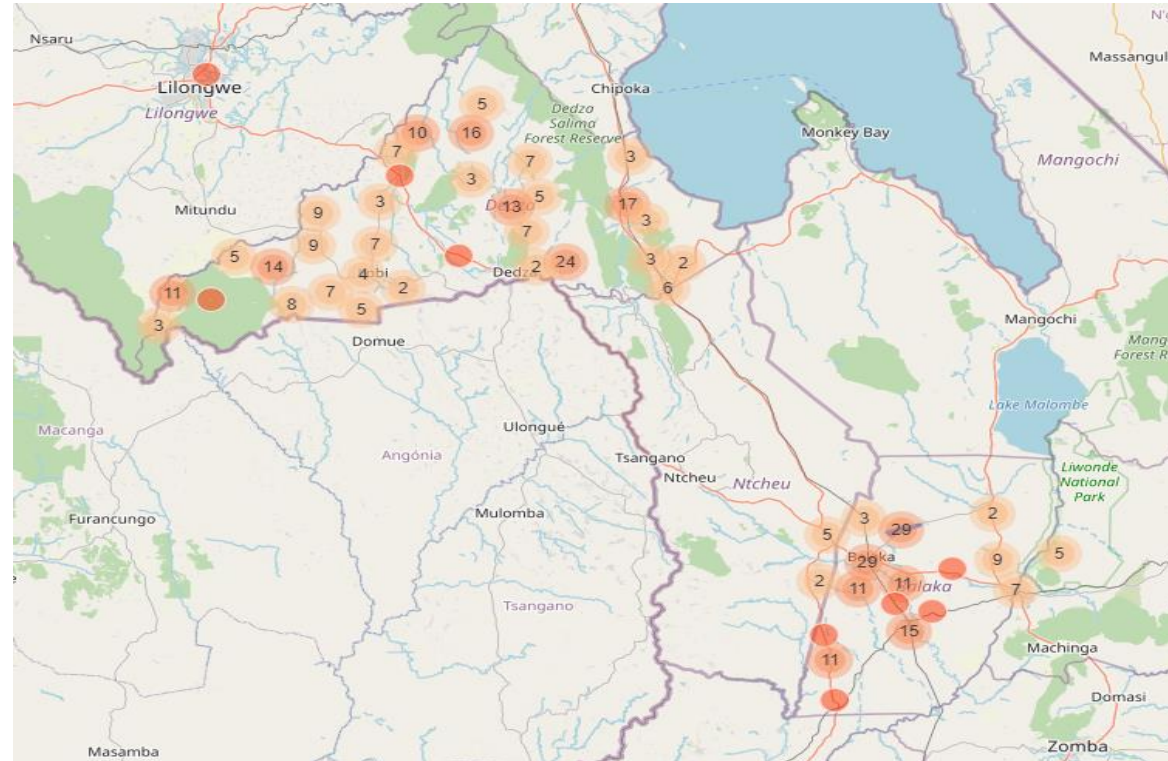
Method

- KoboCollect app to implement a short survey
- Free App and cloud service
- Focus on education facilities, health facilities, trading centres, irrigation schemes and potable water sources



Energyscaping

Results



- 368 surveys completed by end of 2021
- Surveys mapped by GPS coordinate
- Can be exported to Google Maps or other hosting platforms

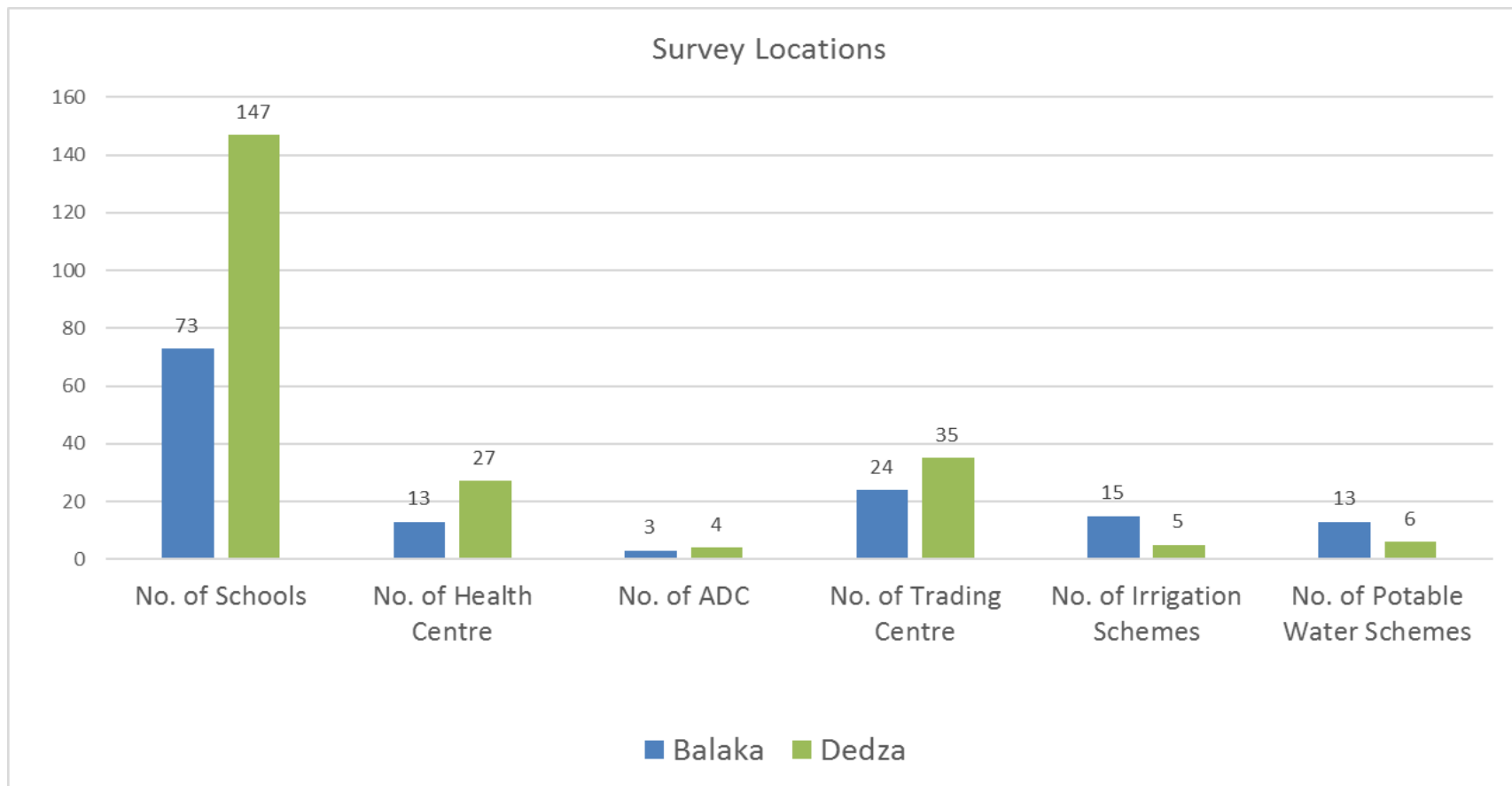
Energyscaping

Results

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do...																
T23																
	A	B	E	G	H	I	J	K	L	M	N	O	P	Q	R	
1	start	end	District	GVH	Village	GPS	_GPS_L	_GPS_L	_GPS_a	_GPS_p	Choice	Name	Numbe	Numbe	Numbe	
2	2021-03-04	2021-03-04	Dedza	Gbh	Gujarat	-14.35855	-14.3586	34.42463	1598.165	4.288	Trading Centre					
3	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.35883	-14.3588	34.42442	1569.529	4.288	Trading Centre					
4	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.35524	-14.3552	34.43034	1561.903	4.288	School	Bembeke CDSS		6		
5	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.35764	-14.3576	34.4245	1565.823	3.216	Health Centre					
6	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.36298	-14.363	34.40265	1557.036	3.216	School	Kantchito FP		9		
7	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.37142	-14.3714	34.40013	1564.704	3.216	Trading Centre					
8	2021-03-04	2021-03-04	Dedza	Kapenuka	Kamgultse	-14.37365	-14.3737	34.39882	1552.458	3.216	School	Moonekera FP		6		
9	2021-03-05	2021-03-05	Dedza	Kapenuka	Kamgultse	-14.36876	-14.3688	34.43672	1559.212	4.288	School	Nachilambo primary		5		
10	2021-03-05	2021-03-05	Dedza	Kapenuka	Kamgultse	-14.39863	-14.3986	34.4368	1511.538	4.288	School	Mtonya primary		6		
11	2021-09-20	2021-09-20	Dedza	Lodzanyama	Khombe	-14.37821	-14.3782	33.89606	0	4099.999	School	Lifidzi	8	9		
12	2021-09-20	2021-09-20	Dedza	Chinkwita	Chinkwita	-14.38514	-14.3851	33.91942	0	5000	School	Chinkwita	10	3		
13	2021-09-20	2021-09-20	Dedza	Yonani	Chibwezo	-14.44442	-14.4444	33.99851	0	3299.999	School	Nchenkhu	8	3		
14	2021-09-20	2021-09-20	Dedza	Kasonda	Chinphalika	-14.44474	-14.4447	33.99851	0	3299.999	School	Chinphalil	6	3		
15	2021-02-23	2021-02-23	Dedza	Chikimba	Kamuyisa	-14.12014	-14.1201	34.55297	473.7512	3.216	School	Nankhwazi		0		
16	2021-02-23	2021-02-23	Dedza	Bwanali	Madziasatsi	-14.27877	-14.2788	34.5455	516.2013	3.216	Irrigation Scheme					
17	2021-02-23	2021-02-23	Dedza	Chikomba	Helani	-14.13317	-14.1332	34.52187	495.4485	4.288	School	Mchezime primary		2		
18	2021-02-15	2021-02-16	Dedza	Kakhome	Gome	-14.15401	-14.154	34.52539	505.4	4.84	School	Matowe		4		
19	2021-02-11	2021-02-11	Dedza	Kasumbu	Kasumbu	-14.33356	-14.3336	34.39342	0	4472	Trading Centre					
20	2021-02-11	2021-02-11	Dedza	Kasumbu	Kasumbu	-14.28085	-14.2809	34.3476	0	4813	School	Kasumbu primary		3		

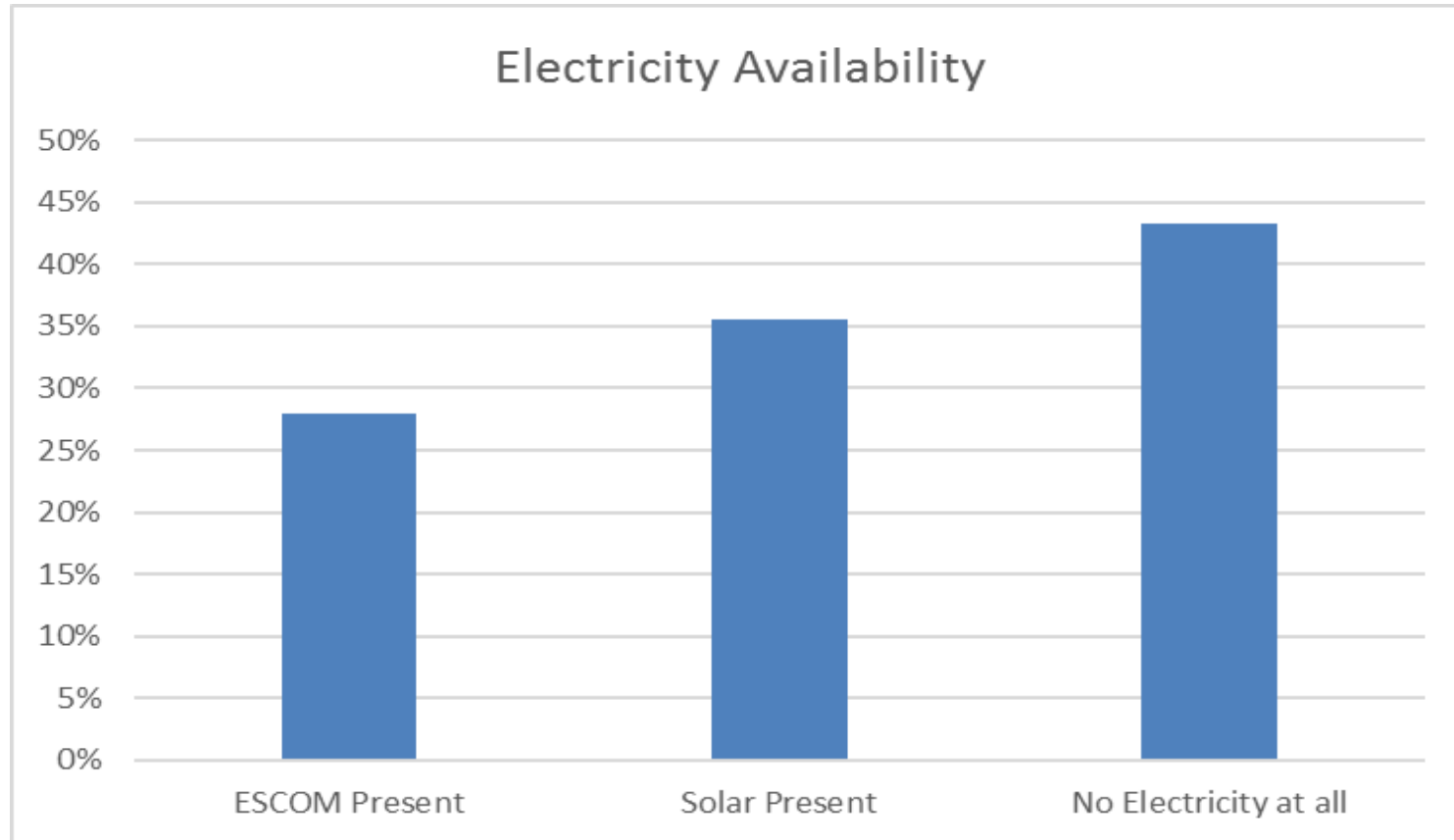
Energyscaping

Results



Energyscaping

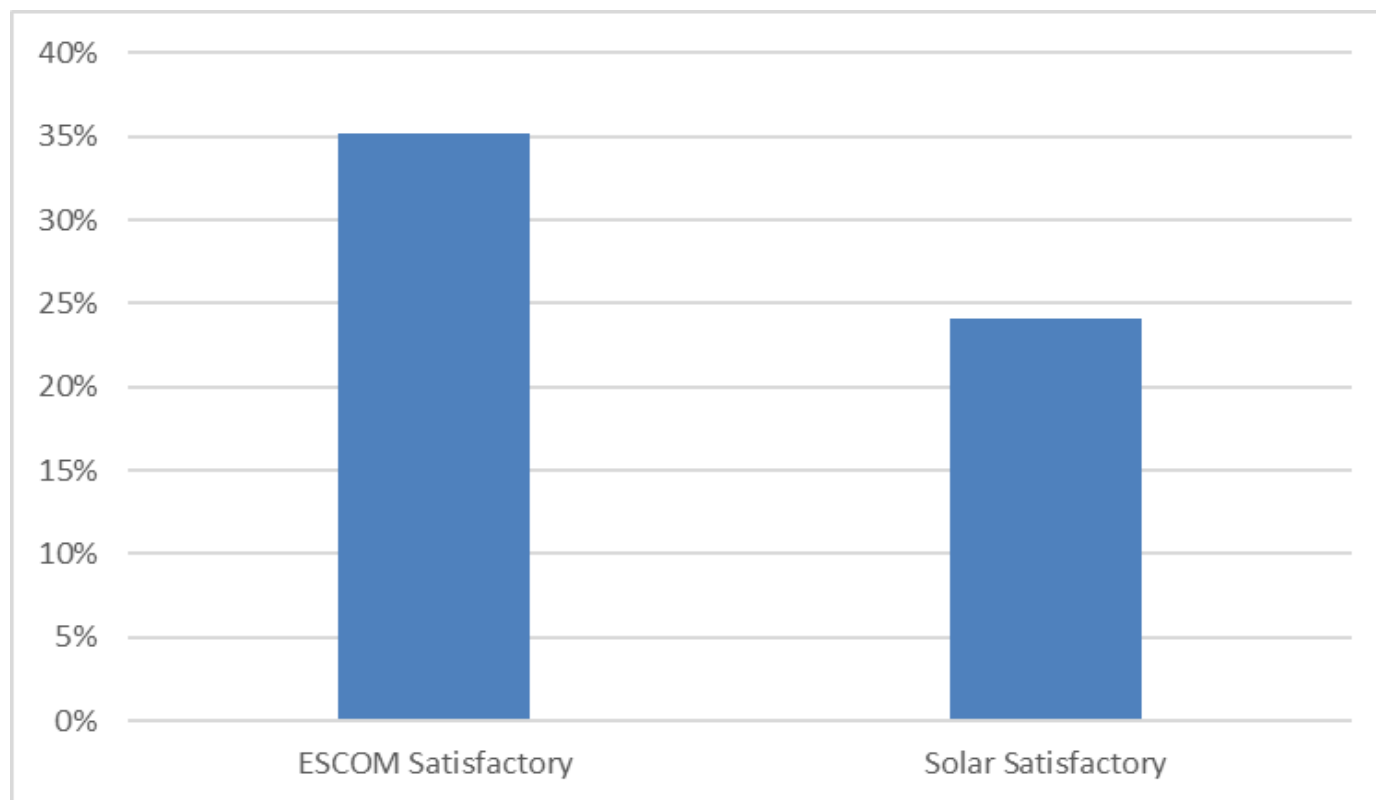
Results



There was no electricity source at 141 (43%) of the locations surveyed, and only 91 (28%) had an ESCOM supply present. 116 (36%) had solar powered electricity sources present

Energyscaping

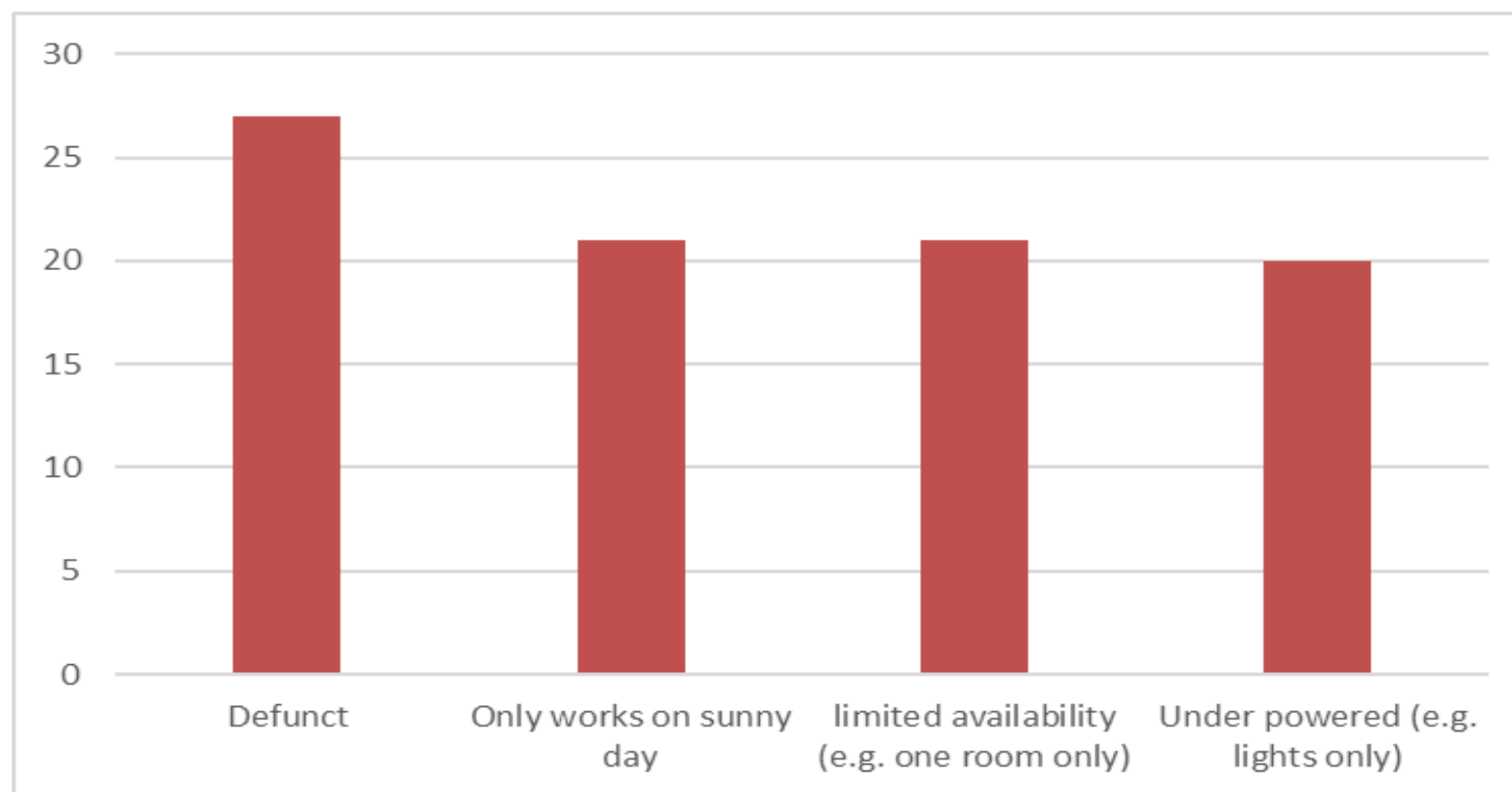
Results



Where electricity supply sources were present, satisfaction with the services was not high. Where ESCOM supply was present, only 35% indicated they were satisfied, with the dominant reason for dissatisfaction being poor reliability and high costs

Energyscaping

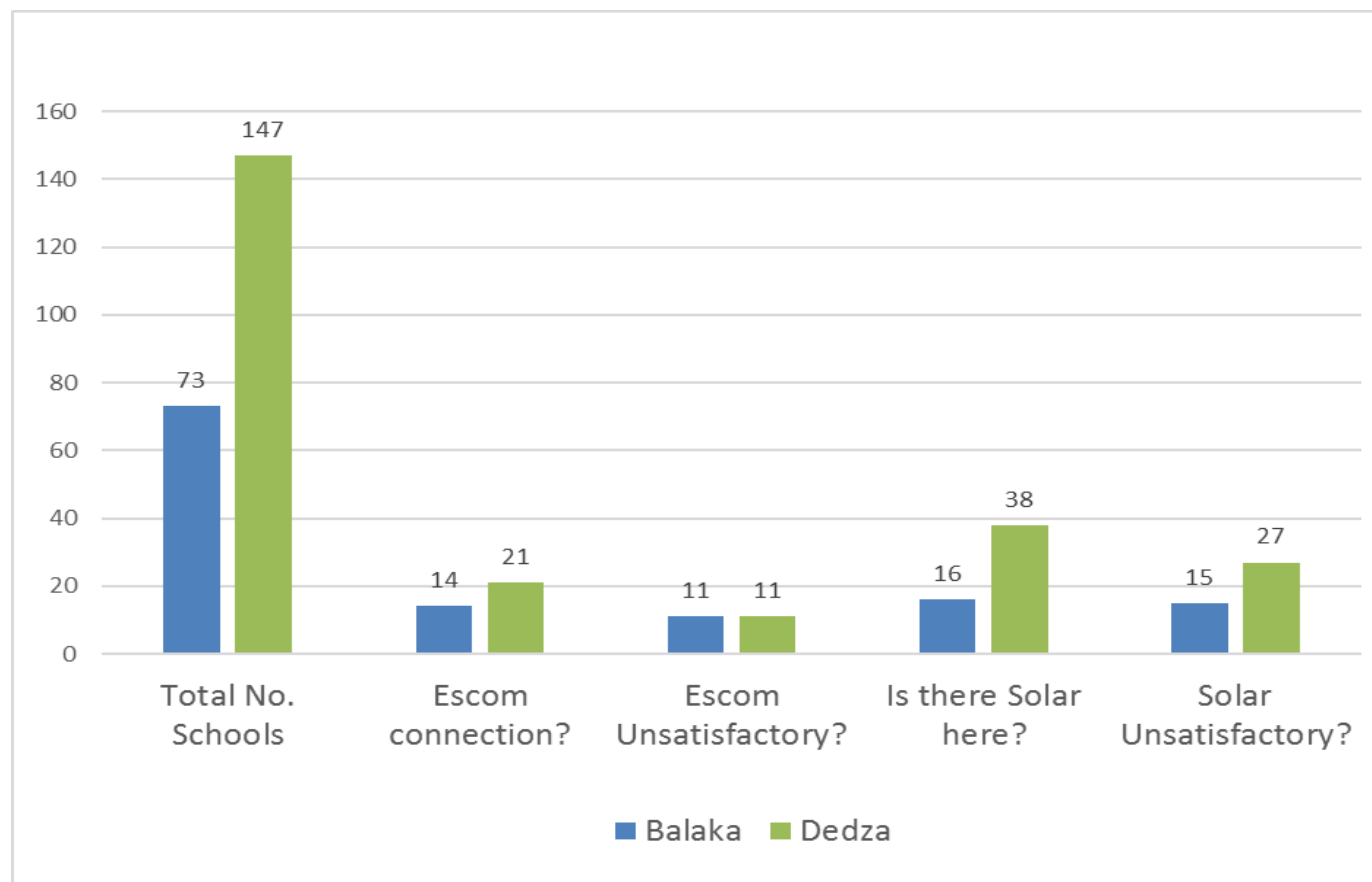
Results



Where solar electricity supply was present, only 24% indicated they were satisfied, largely due to issues around reliability and extent of service provided.

Energyscaping

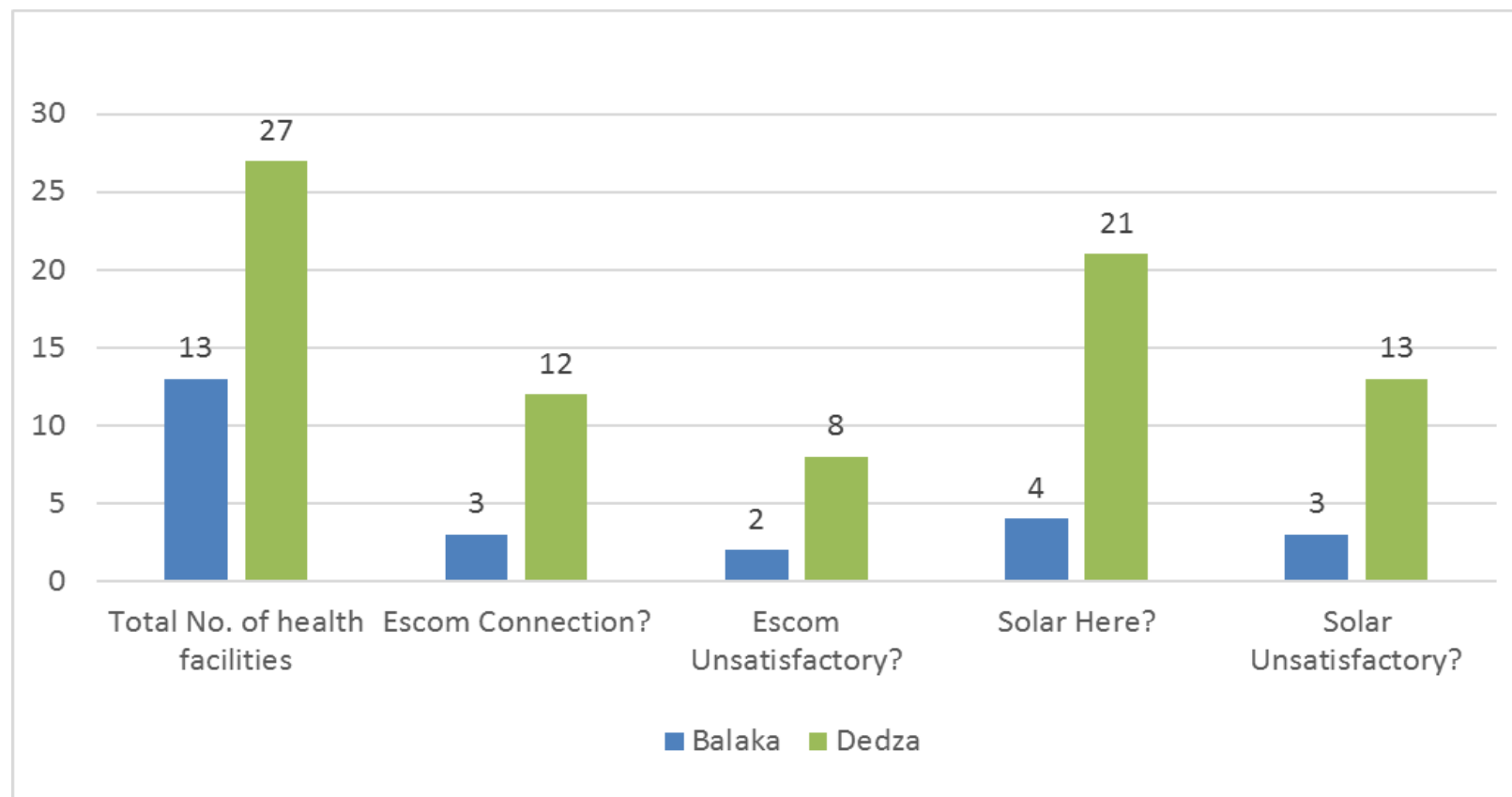
Results



Of the 368 surveys conducted, 220 were conducted at schools. The majority had no electricity access, with 35 stating they had ESCOM connections and 54 stating some kind of solar installation. There was low satisfaction with either source

Energyscaping

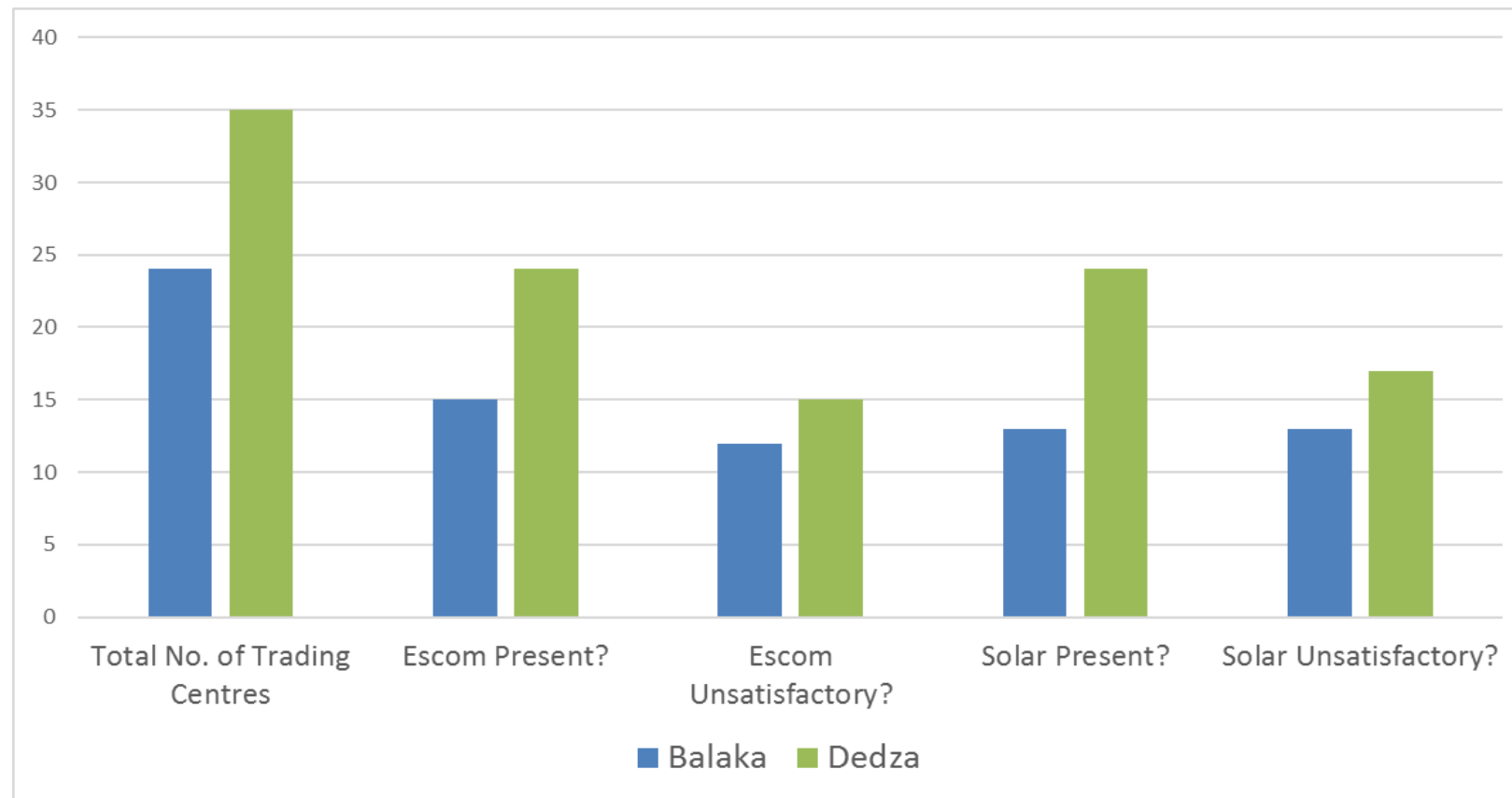
Results



40 surveys conducted at Health Centres. The majority had no electricity access, with 35 stating they had ESCOM connections and 54 stating some kind of solar installation. There was low satisfaction with either source.

Energyscaping

Results



59 surveys at Trading Centres. Although 66% stated ESCOM was available and 67% reported people were using solar at the trading centre, satisfaction was again low with both electricity sources.

Energyscaping

Results

- Energyscaping provides a method for rapid assessment of energy access situation in an area
- Free professional survey software enables a simple process for data collection and processing (led by a person with ICT competence)
- Requires presence of a local team of enumerators with smartphones who can undertake the surveys

Dedza and Balaka key findings:

Electricity Access is low across all locations and even where ESCOM or solar are being used, satisfaction is low. ESCOM is highly unreliable and is viewed as expensive (at Trading Centres). The majority of solar electricity systems deployed appear to be performing poorly, being undersized and poorly maintained.



Renewable Energy Standards Awareness

- Substandard renewable energy equipment that fails to comply with recognised national or international standards has become an increasing problem in Malawi in recent years and information gaps have prevented the empowerment of communities to recognise and refuse substandard products
- The CEM DEOs organized 4 awareness campaigns (2 in each district), collaborating with MERA and MBS to bring information to the community level



Renewable Energy Standards Awareness

Key Learning

- Renewable Energy standards booklets are technical, in English, and are not available for free, communities have no capacity to access – DEOs can help provide more accessible messaging.
- MERA and MBA operate at national level with little local representation – DEOs can effectively support sensitization at a local level.
- Consumer rights on demanding evidence of regulatory and standards compliance, along with minimum guarantees are not widely known – DEOs can effectively support local dissemination of this knowledge.
- MBS aim to reduce proliferation of substandard RE products through market spot checks and audits – DEOs can support and facilitate efforts to ensure standards compliance.

Key Learning

The DEO strand of the EASE project has demonstrated a set of DEO activities that deliver enhanced access to sustainable energy at a district level. There are clear benefits to multiple development areas from the presence of DEOs operating in a district.

Education and support for key stakeholders, local extension workers and local technicians can improve:

- Mainstreaming energy in the local planning process
- Supporting communities to identify and develop energy projects
- Building local technical capacity to improve sustainability and overcome barriers of access to renewable energy
- Local empowerment that results in substantial increases in renewable energy access

Key Learning

- DEO led sensitization events and campaigns and improve local awareness of renewable energy product standards and associated consumer rights – this helps bridge a barrier between the current format and accessibility of standards information
- DEOs can lead successful energyscaping campaigns, utilizing open source software to accumulate valuable datasets to support local and national planning and energy access tracking – determining *what* data should be collected is critical

Feedback from Stakeholder Workshops

- *DEOs should continue capacity building by offering learning journeys to communities with successful renewable energy projects (e.g. solar microgrids), and ensuring knowledge exchange on business models that can unlock off-grid potential*
- *DEOs should develop Standard BoQs on solar PV systems for education and health institutions – supporting engagement with NGOs and other potential funders*
- *Councils need support in engaging with national rural electrification initiatives (MAREP and mini-grid developers) in order that local priorities influence investment decisions. The DEO should lead on this.*
- *Councils recognize that highlighting local energy priorities in District Development Plans is vital for securing investment. DEOs must ensure that energyscaping and capacity building efforts result in energy issues are discussed through VAP process and into DDP development.*
- *Advocacy to MPs and Councilors who manage constituency and district development funds is a vital function of the DEO to unlock investment.*

Recommendations going forward

Mainstreaming energy in the local planning process

- With a bespoke training package that updates local development planning guidelines, DEOs have the opportunity to ensure energy is properly considered in the planning process, from VAP through to DDP.
- Building the capacity and help local planners feed priorities into national rural electrification planning. However, local planners must widen their focus beyond grid extension – including decentralized energy projects within investment plans, providing national government and other sustainable energy funders with ‘pipeline’.
- The effectiveness of this work depends on the resources provide to maximise the reach of the training and enable DEOs to backstop the VAP process through widespread community engagement.

Recommendations going forward

Supporting communities to identify and develop energy projects

- By building local technical capacity and providing ongoing oversight and support, DEOs can empower communities to deploy and maintain renewable energy systems in response to local priorities.
- When this addresses energy access for social institutions like schools and health facilities, the potential for social impact is maximized. However, these efforts need to be formally linked to existing asset management (maintenance) frameworks in the education and health sectors, following the guidance and suggestions provided by key district stakeholders.
- Access to funding for decentralised renewable energy is key to unlocking the full potential impact of the DEO work.

Recommendations going forward

Information and awareness

- With DEOs in place and network of trained associates in the field, there is the opportunity for widespread data gathering.
- Mapping activities like energyscaping highlight areas of need, support planning and prioritization, and enable progress tracking - providing a valuable resource for local and national planning and energy access monitoring – a clear framework on key indicators needs to be commonly agreed.
- Whilst MERA and MBS operate at a national level, DEOs can provide a mechanism to effectively disseminate information at a local level and help monitor standards compliance. Formal relationships, clear roles and responsibilities, and access to resources for community engagement are required to implement this effectively.

Next Steps

- A DEO workshop was held 17th April in Balaka
- Attended by the Minister of Energy and high level delegations
- Sharing EASE learning and MoE updates
- Positive discussions on collaborations moving forward

Next Steps

- A roadmap for devolution has been published by MoE
- Management frameworks are in place
- Job roles Defined

1 x Chief Energy Officer (Grade F) who will be in charge of Division of Energy in the District

1 x Principal Energy Officer (Grade G)

1 x Senior Energy Officer (Grade H),

1 x Energy Officer (Grade I),

1 x Assistant Energy Officer (Grade K)

1 x Energy Assistant (Grade M)



Next Steps

- Working in collaboration with the Ministry of Local Government Unity and Culture
- Ministry of Energy's new structure supports devolution
- Human Resources, budget transfers, recruitment
- Balaka have completed a structural review, including Energy Officers and budgets are up for approval
- A template for moving forward



Thank you for your attention





University of
Strathclyde
Engineering

THE FACULTY OF **ENGINEERING**

www.strath.ac.uk/engineering