Financial Aspects of Community Energy Resilience

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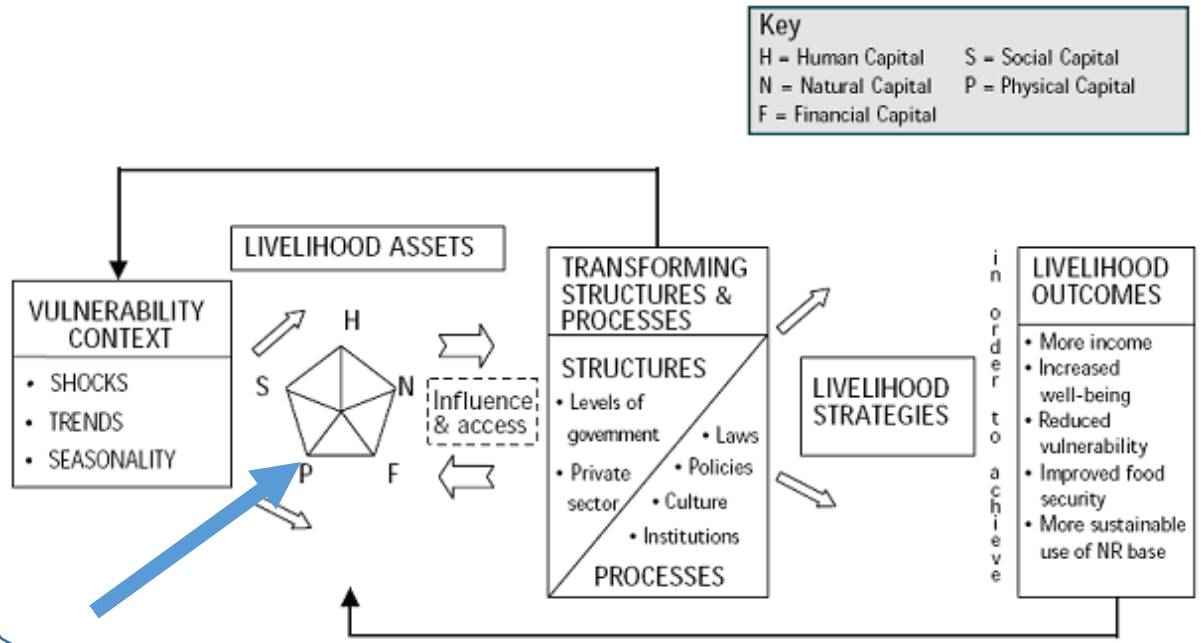
Outline

- Energy Resilience and Sustainable Livelihood
- Lessons from Malawi Solar-Wind Villages and Biogas Project
- Impacts of (Non-)resilient Energy Systems
- Pie Trilemma as a Challenge for Delivering Resilient Energy Systems
- Conceptual Framework for Community Energy System Resilience
- Energy Business Opportunities in Malawi
- Conclusion

Energy Systems Resilience and Sustainable Livelihood

Energy systems are physical assets for achieving livelihood outcomes



Energy Systems Resilience and Sustainable Livelihood

Hazard + Weakness = Vulnerability leading to disaster

Energy Systems should be *"capable of planning and preparing for, absorbing, recovering from and adapting to any adverse events that may happen in future"* (Sharifi, A & Yamagata, Y; 2016)

"Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents" (Sandia National Laboratories)

Lessons from Malawi Solar-Wind Villages

Weaknesses

Technical:

55 % of the areas (outlined by stakeholders) that could have been done better in the micro-grid power systems relate to professional standards and code of practice –poor earthing and poor lightening protection; design procedures not clear

Financial:

Users were only paying an equivalent of US$0.44 contributing towards wages for powerhouse technician;
No deliberate savings for maintenance financing

Socio-political:

Community ownership; willingness-to-pay; deployment model

Hazards

External factors:

Lightning
Strong winds
Theft

Expected failures:

Batteries coming to an end of life

As a Consequence:

All not working due to a number of reasons (turbine blades broken, inverters damaged, batteries dead) **but mainly because of lack of long term financing mechanisms for system maintenance**

Lessons From the Choma and Karonga Biogas Project

Weaknesses

Technical:

Manual dung collection

Financial:

Users were not paying for the gas;

No deliberate savings for maintenance financing.

Socio-political:

Community ownership; willingness-to-pay; deployment model;

Cultural beliefs

Hazards

External factors:

Floods

theft

Expected:

Cows dying

As a Consequence:

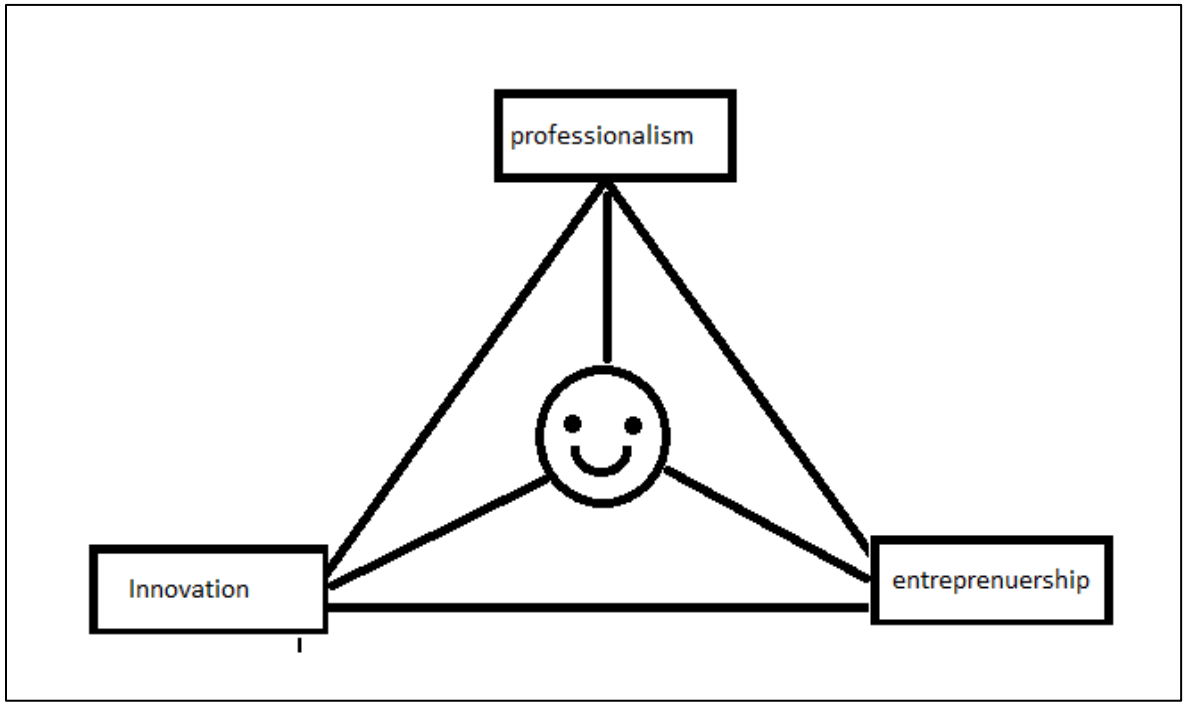
Many not being used

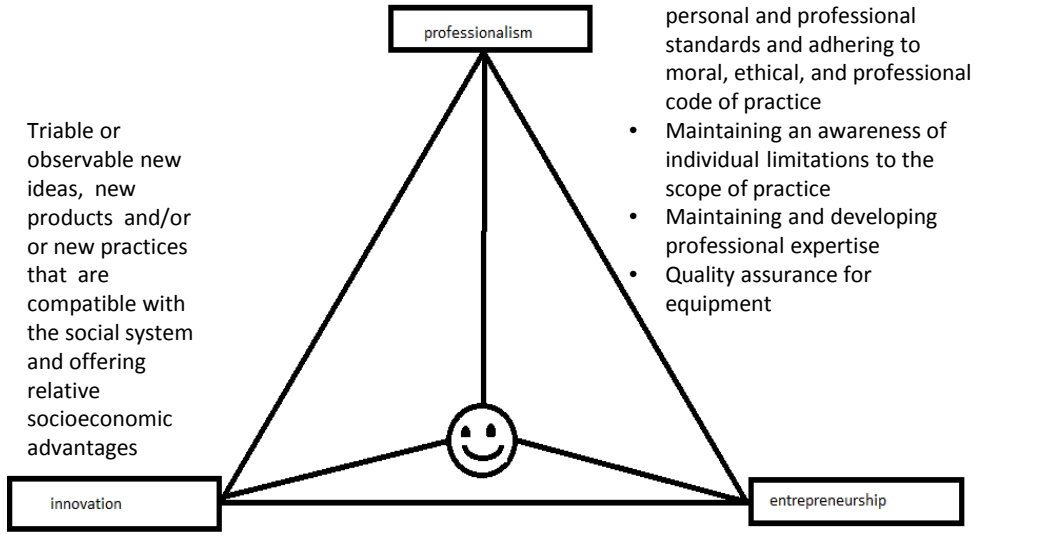
Impacts of (Non-)resilient Energy systems

Resilient Communities and Impacts Can Stay for Long:

- Value for money
- Enhanced cash inflow due to businesses remaining open until late
- School going children could study adequately
- Improved well-being resulting from use of safe
- Trust in the technology
- Each biogas plant saved about 5 kg of wood per day
- Community members could access information and communication education from TVs – one woman indicated could learn she could learn businesses ideas from TV
- More free time for other socioeconomic activities
- Reduced vulnerability to diseases
- Improved health services delivery

PIE Trilemma as a Challenge for Delivering Energy Systems Resilience



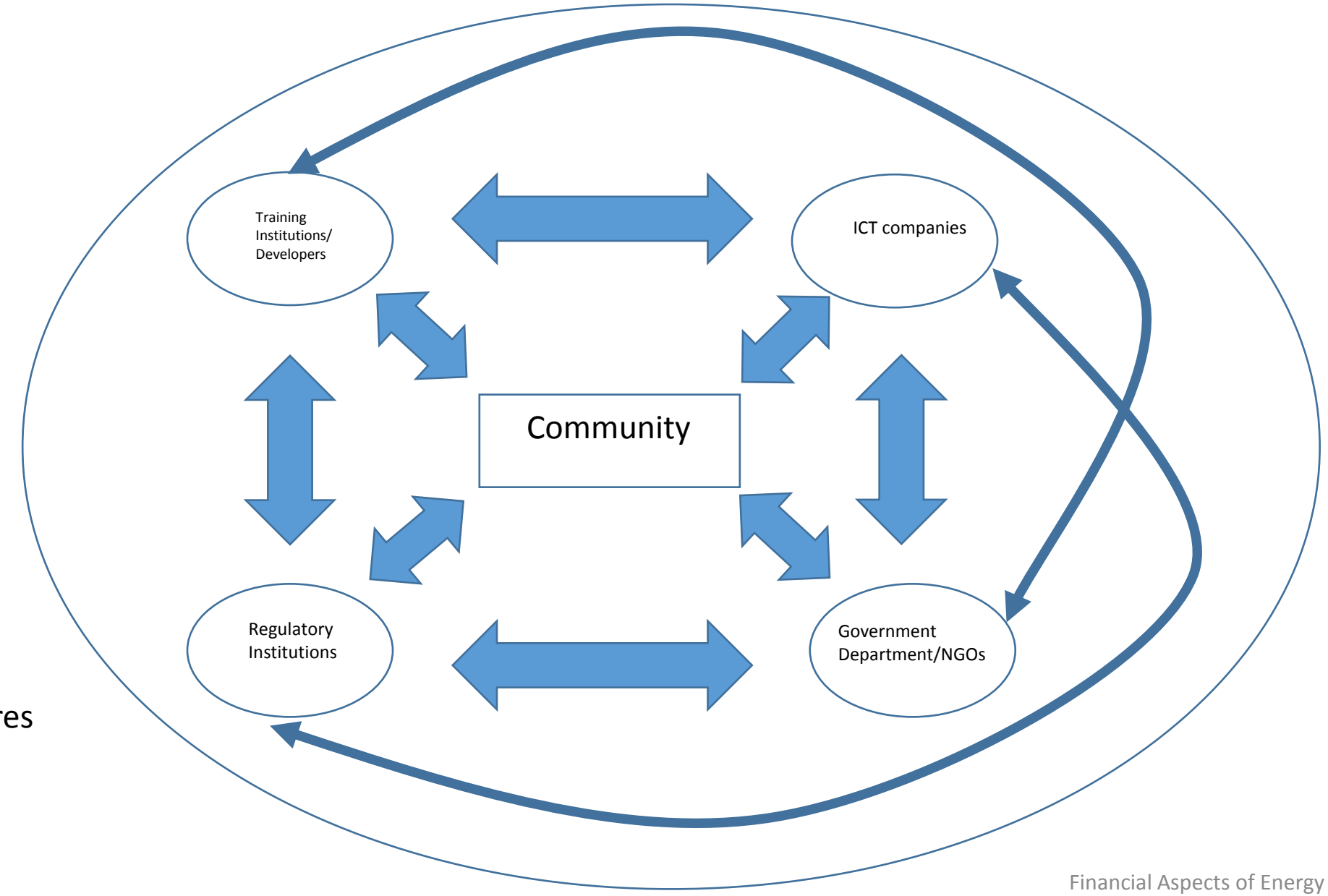


- Working within the defined regulatory framework of personal and professional standards and adhering to moral, ethical, and professional code of practice
- Maintaining an awareness of individual limitations to the scope of practice
- Maintaining and developing professional expertise
- Quality assurance for equipment

Triable or observable new ideas, new products and/or or new practices that are compatible with the social system and offering relative socioeconomic advantages

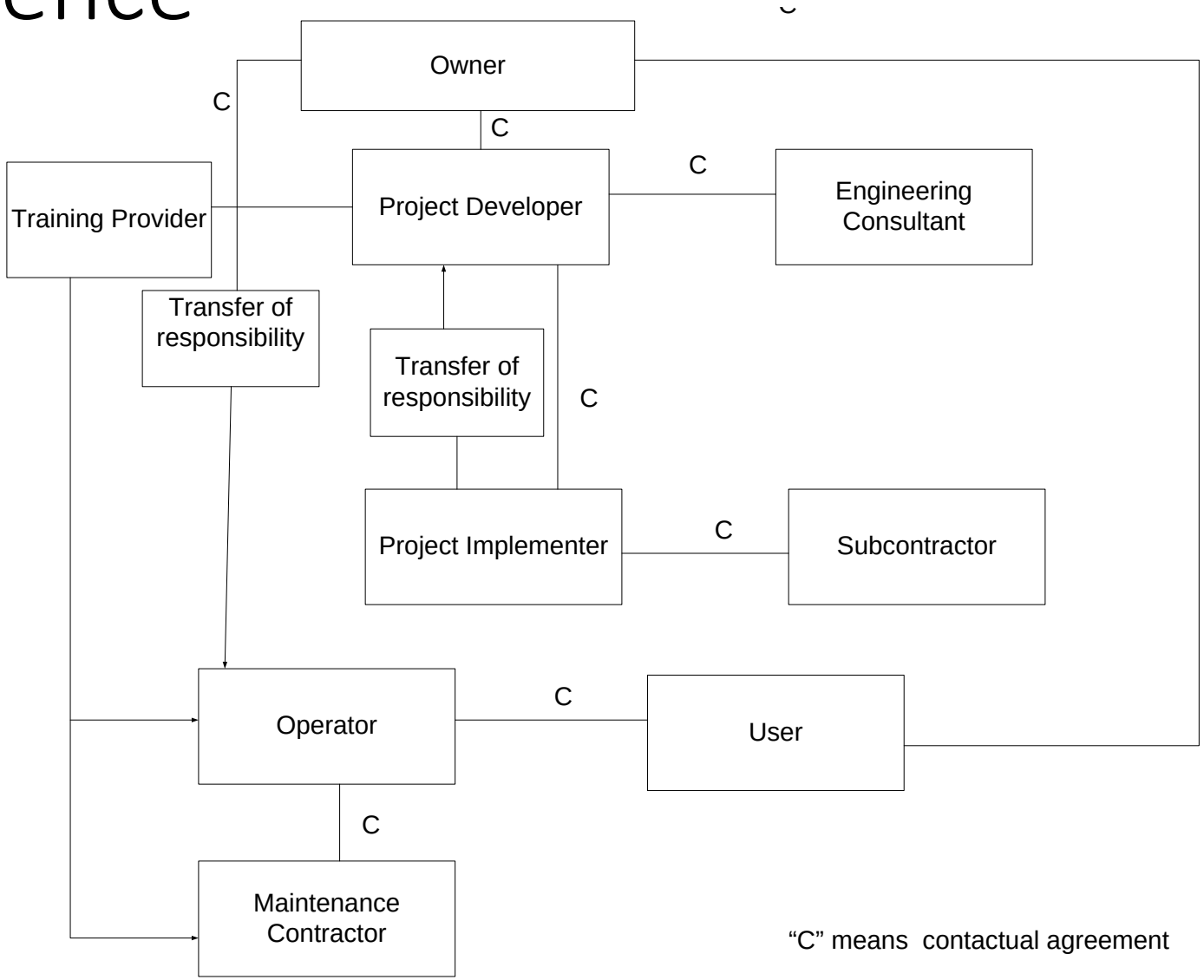
- The capacity and willingness to develop, organise, and manage a business venture along with any of its risks in order to make a profit- **substandard systems is not an entrepreneurial risk**

Socioeconomic Framework for Community Energy Resilience



Delivering resilient energy systems requires deep rooted collaboration among stakeholders

Technical Framework for Energy Systems Resilience



MS 889-3: 2011

Contracting, joint ventures, subcontracting should be done in line with appropriate regulations

Energy Business Opportunities in Malawi

Energy Mix Projections for Malawi- *Source:* Draft Reviewed Energy Policy (2018)

Energy Source	2015	2025	2035
Liquid Fuels and Biofuels	10%	13%	13%
LPG, Biogas and Natural Gas	0.12%	4%	10%
Electricity from Renewable Sources	7%	16%	23%
Electricity from Non-Renewable Sources	0%	5%	15%
Coal	2%	5%	8%
Electricity from Nuclear Energy	0%	0%	0.1%
Biomass	80%	57%	31%
Total	100%	100%	100%

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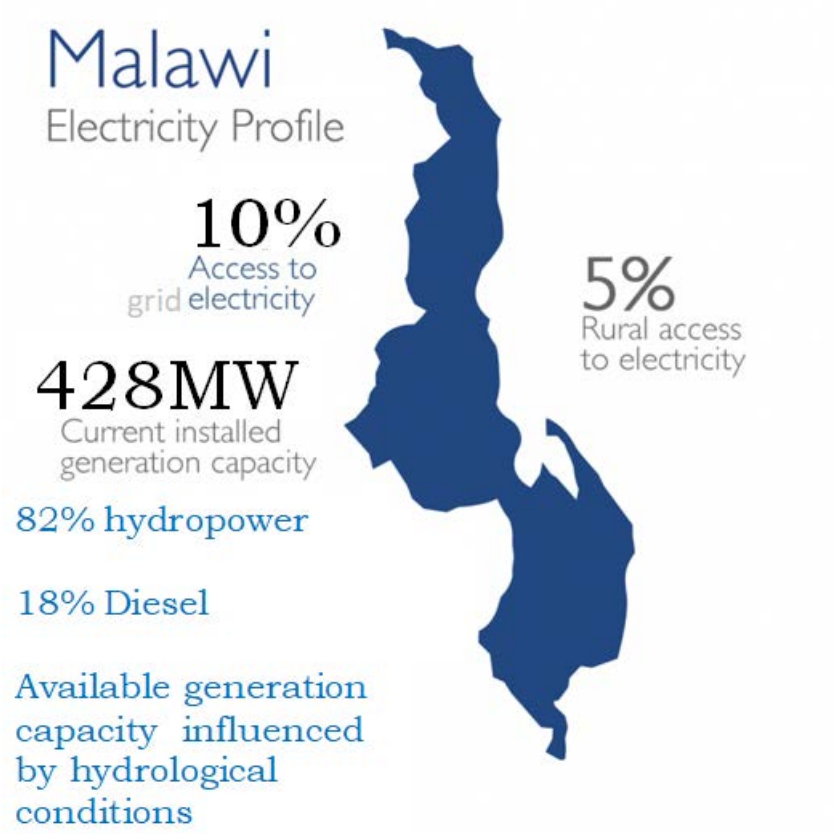

- 50 renewable energy minigrids by 2025 envisioned by the Malawi's Renewable Energy Strategy.

- **Important Energy Policy Stipulations**

➢ Diversify use of Rural Electrification Levy (REL) to significantly promote development of renewable energy mini grids in support of priority area of rural electrification; and

➢ Finance off-grid solutions, from the Rural Electrification Fund, the cost of transformers and associated infrastructure, where it is intended to serve a minimum prescribed number of customers as approved by Government.

Conclusion

- The need for increasing energy access offers business opportunities
- Developers should invest in energy system resilience for long term impacts
- Community energy resilience is interdisciplinary
- Delivering resilient energy systems requires programmatic approach
- Cost-planning for technical and socioeconomic resilience approaches

Thank you