

# Microgrid deployment in Africa

## Barriers & Opportunities

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Ekistica



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## WHO ARE WE

- Engineering and technical advisory consultancy based in Alice Springs in Central Australia
- Wholly owned by the Centre for Appropriate Technology, an Aboriginal NGO with 35 years experience in service delivery to remote indigenous communities
- Broad project experience but among our core capabilities is the design and implementation of micro-grid systems
- Project experience across remote locations in Australia, the Pacific, South East Asia, India and Africa

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## WHAT WE BELIEVE

**The presence of complexity** should never be a justification for not achieving good technical outcomes;

**Context is everything:** it defines the relationship of technical solutions to people and place. An awareness and understanding of context allows us to find a pathway through complexity;

**Continuous Engagement** is how we understand the story of every stakeholder and project. It is through these stories, and the translation of these stories for our various stakeholders; that we are able understand and define context;

Our experience in deployment of over 300 Micro-grids in 12 different countries provides us with a unique appreciation of the key issues



## KEY DISCUSSION AREAS

- Micro-grids and energy service delivery
- Structural barriers to Micro-grid deployment
- Innovation vs Standardization

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## MICRO-GRID

- The term “Micro-grid” is a very broad and covers a wide range of on and off grid architectures and applications
- The following discussion is based upon the more traditional micro-grid, the remote off grid power system.
- The findings are however broadly applicable to other micro-grid architectures and to remote infrastructure delivery in general

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## ENERGY ACCESS

- Energy Access is a term that is open to wide interpretation
- It is important to differentiate between qualitative outcomes of different energy delivery models
- Substitutionary models are critically different from surplus energy models
- Energy Access is ultimately measured by quality and quantity of the Energy Service that is delivered

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## ENERGY SURPLUS

- Where the energy supply meets consumers' existing energy service needs with additional capacity to meet other (planned) – usually productive – demand
- Provides potential to stimulate and influence economic development
- Key strength of Micro-grid
- Microgrids are the only off-grid supply option that provides aggregate surplus supply

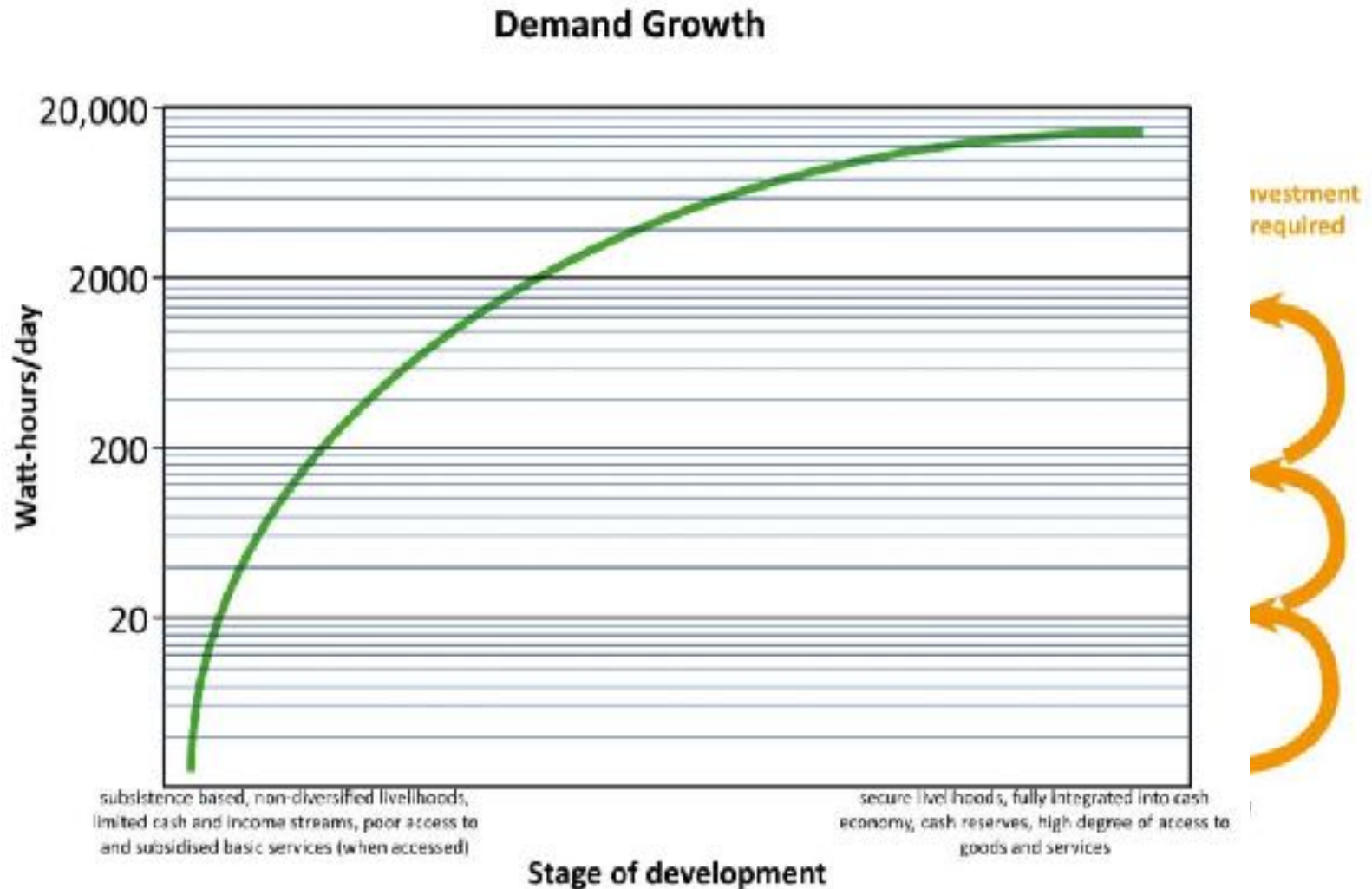
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## APPLES & ORANGES

- Devices & Home Energy Systems are generally substitution approaches;
- Good: but neither provide surplus energy;
- Current Microgrid practice tends to compete for constrained resources in a substitution framework;
- Thereby comparing value of investments against completely different outcomes

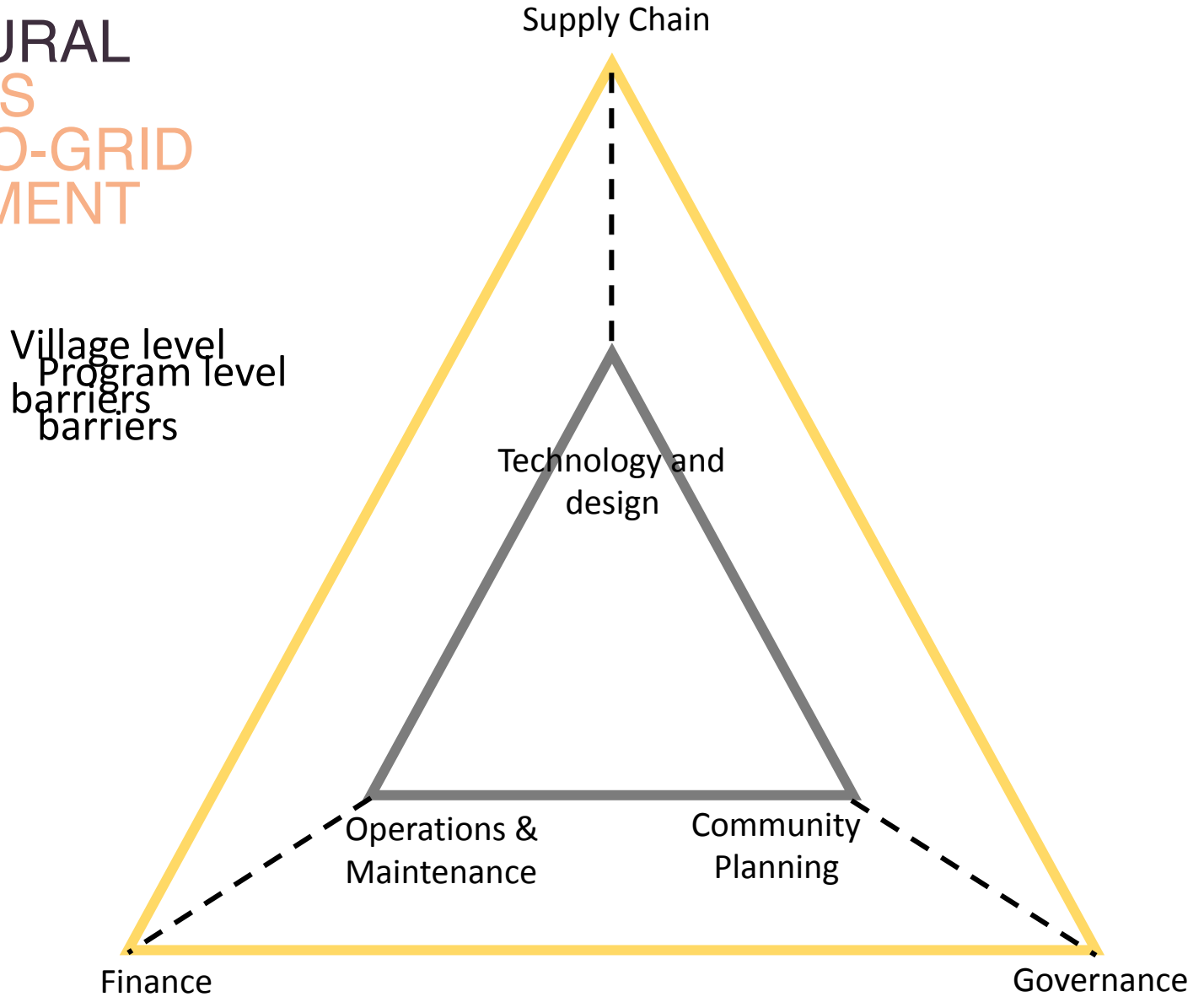


# ENERGY SERVICE CONTINUUM



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# STRUCTURAL BARRIERS TO MICRO-GRID DEPLOYMENT

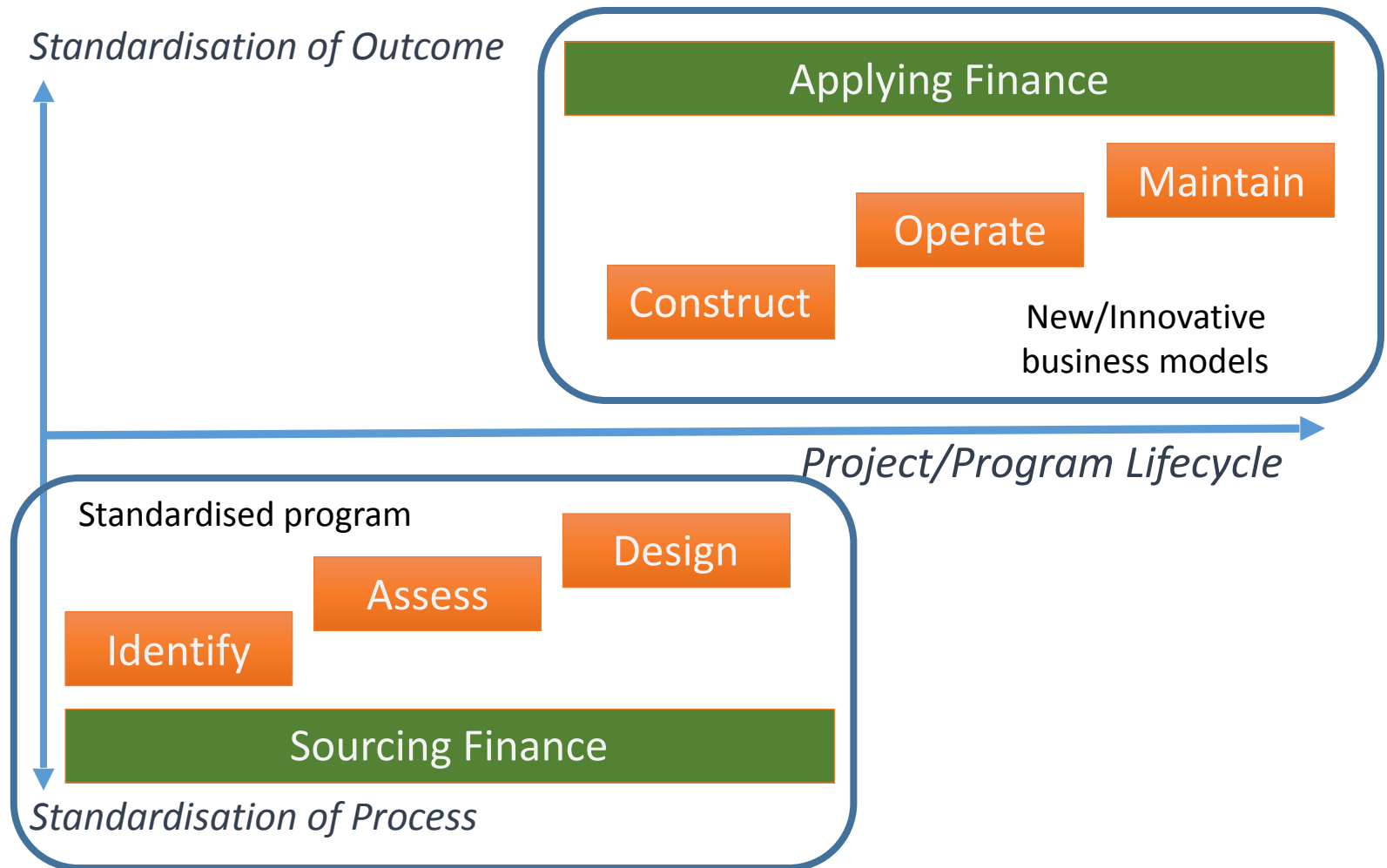


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## DEPLOYMENT REPLICATION

- To deploy Micro-grids at scale requires a model that appropriately balances standardization and innovation
- Ability for models to replicate at scale is constrained by the framework in which they are developed;
- Innovation in the absence of an effective program level structure fails to address core finance barrier: perception and management of risk; however,
- Pre-empting technical design at a program level stifles innovation and cost reduction during application

# STANDARDISATION VS INNOVATION



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## CONCLUSION

- Technology is rarely, in and of itself, the core issue
- Rural Micro-grids are fundamentally different to urban or peri-urban Micro-grids
- Demand must be assessed in context of growth not substitution
- Core outcome of a viable model must be an ability to scale rapidly and efficiently by:
  - Lowering aggregate cost of finance by reducing risk through standardization; while,
  - Achieving maximum flexibility in deployment models at local and regional level