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The future of mini-grids: from low cost to high value.

Using demand driven design to maximize revenue and impact.




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Context

- 700M people need energy
- Many groups trying
- Although many successful none have truly reached replicable scale
- Opportunity to develop a different paradigm for minigrids through partnerships and strengths based analysis

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Why Electrify?

What is the core reason for electrification?

- Poverty alleviation through
  - Improved living conditions
  - Better communal facilities
  - Economic development through livelihoods
- Core objective informs response

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Substitution Model

- Where an existing energy service, eg Kerosene lanterns is replaced by Solar Lanterns.
- No net increase in energy utility is gained by the household
- There may be other benefits
- Achieves:
  - Improved living conditions
  - Better communal facilities

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Surplus Model

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

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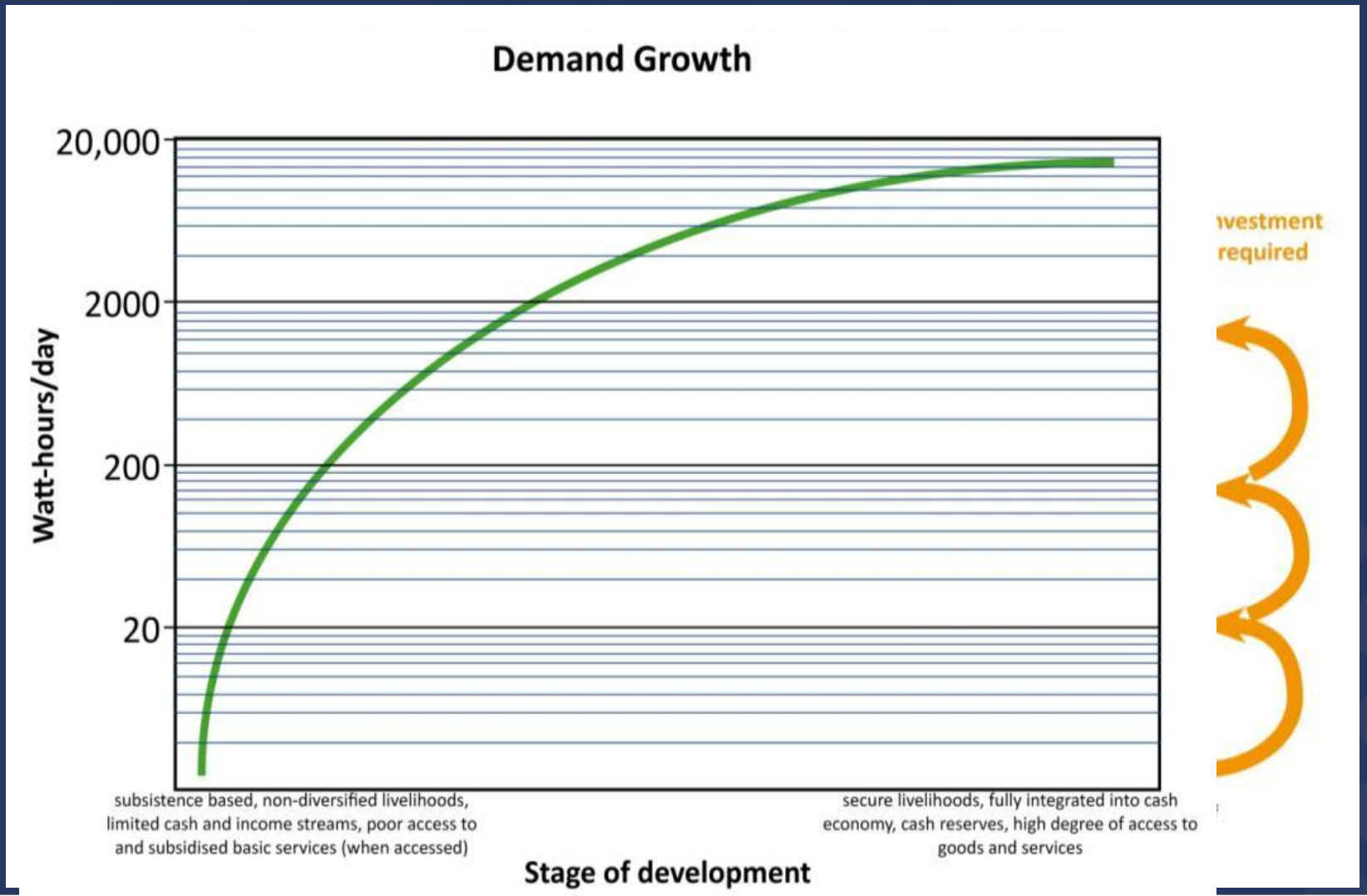
Demand Curve



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Apples and Oranges

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

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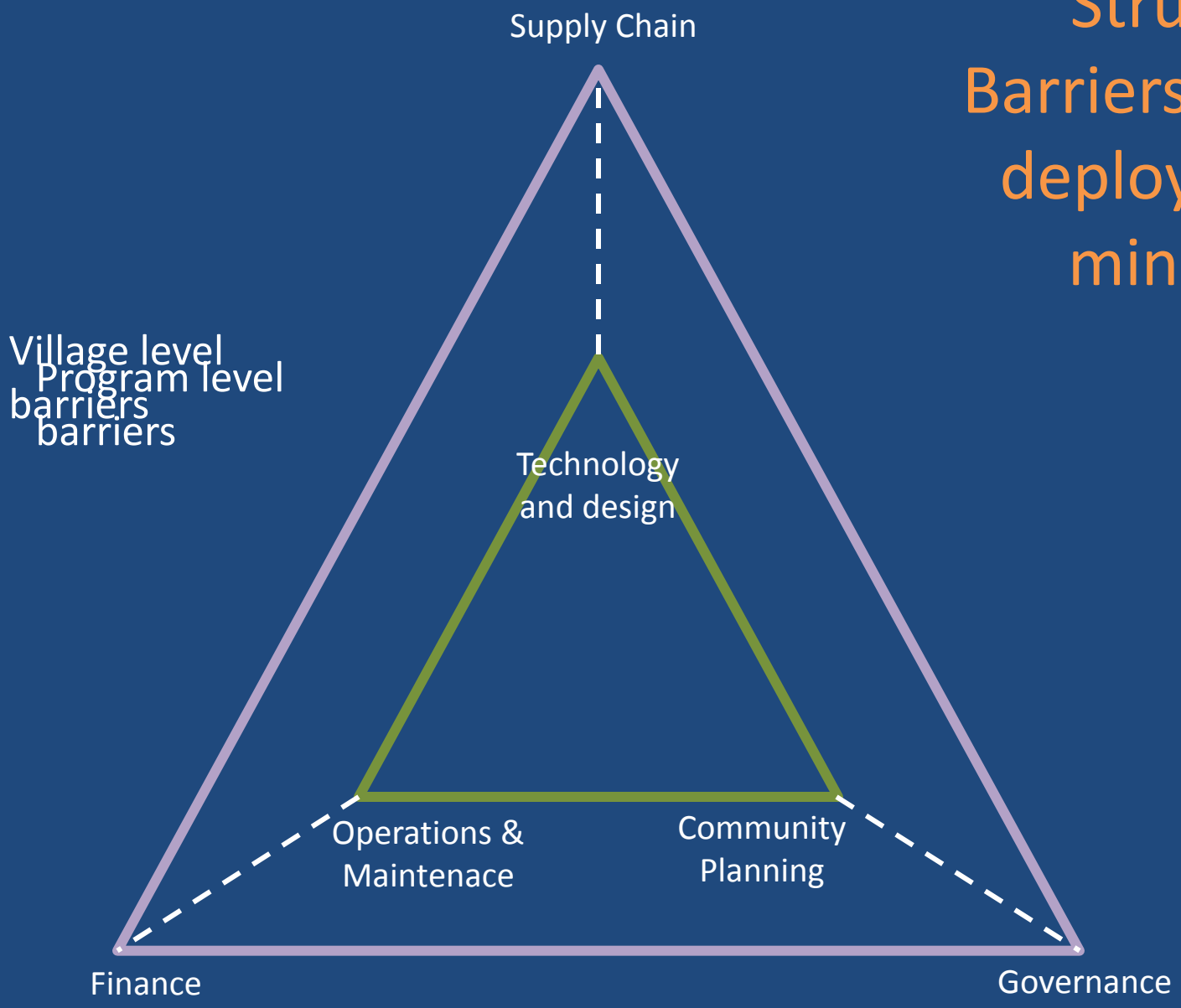
Why minigrids?

- Only mini-grids are capable of surplus supply
- Surplus supply is the end goal of village electrification because it allows local productive activity to take place
- Building mini-grids that cannot provide surplus power negates their ultimate benefit
- Building mini-grids that cannot provide surplus power severely restricts their ability to leverage—and maximise—potential revenue
- Mini-grid viability depends on leveraging the maximum potential revenue from consumers

Structural Barriers to scaled deployment of mini-grids



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Assessing Viability

Viability is defined by assessing whether:

- Program characteristics address respective barriers;
- Program addresses barriers at appropriate levels;
- Program is appropriate to context;
- Program can be replicated.

Demonstrated mechanism to build demand through livelihood development

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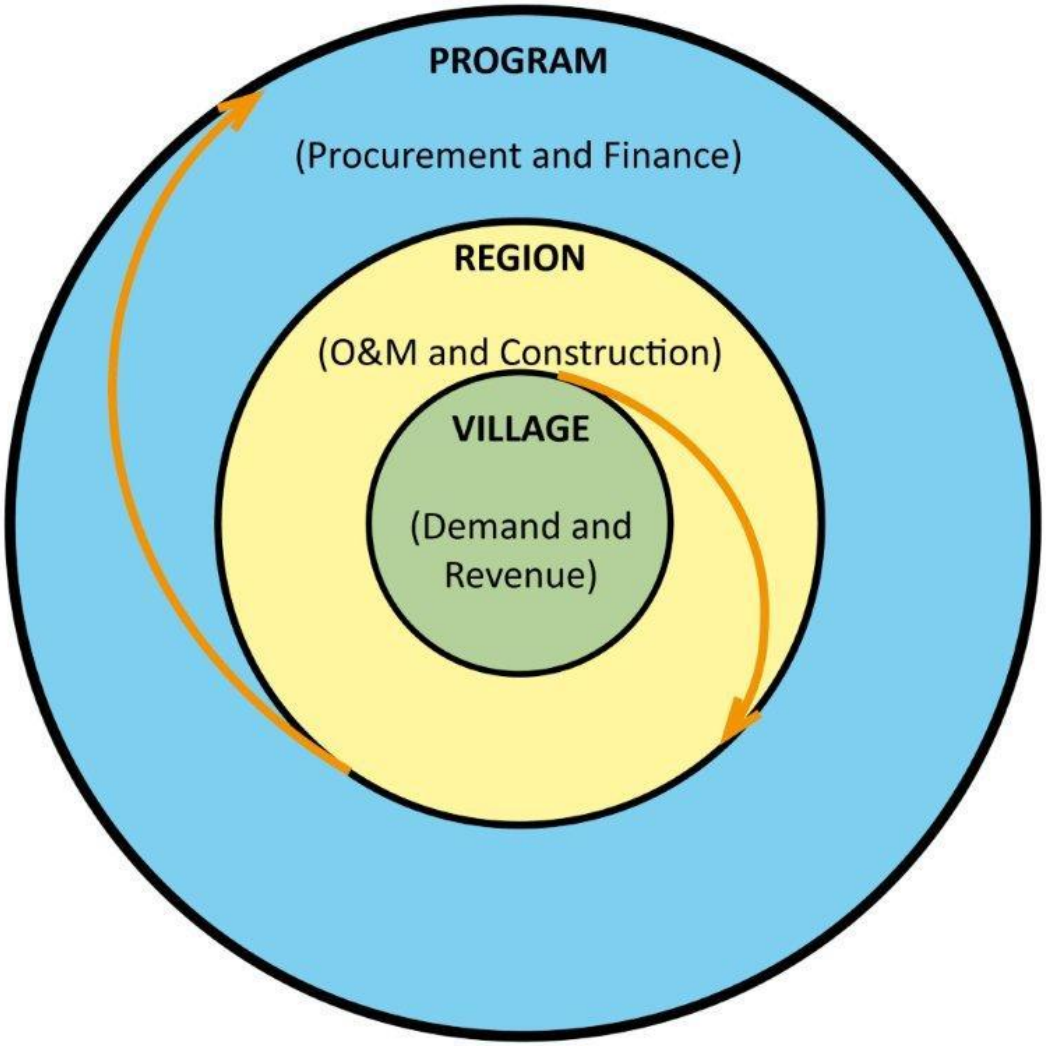
Characteristics of a viable model

- Aggregated demand
- Maximised revenue
- Tailored technical design
- Optimised supply chain
- Mobilisation of Finance



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Existing models

- Given viability characteristics, and barriers, existing models can be generally classified as focused toward:
  - Finance (both private and public, grant debt and equity);
  - Supply Chain (technology providers, construction companies, engineers); or,
  - Consumers (including individual consumers, co-operatives, NGO's). Each has unique strengths and motivations
- Each has unique strengths and motivations

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Current Models

Many existing models with core strengths:

- Huskpower (Supplier);
- Bushlight (Consumer);
- Simpa Networks (Consumer);
- Sun Edison (Supplier);
- National Township Electrification Program - PRC (Finance);
- Electricity Services in Rural Areas Project – Senegal (Finance);

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Capacity Gap

- Although all participants operate with best intent, often their ability to break through some of the barriers is impeded by their relationship or position relative to the barriers.
- Critically, few if any, of the existing participants have the capacity to aggregate demand at scale.

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Way Forward

Recognising weaknesses - Playing to strengths

An effective model facilitates participants playing to their strengths in partnership with others, each resolving the barriers they best understand:

- Finance providers can aggregate and organise finance at a large scale;
- Suppliers can develop technical solutions to variable demand and environmental and resource contexts and build effective supply chains; and,
- Consumers can aggregate themselves locally to reduce administration costs, while ensuring effective revenue streams to support the finance model;

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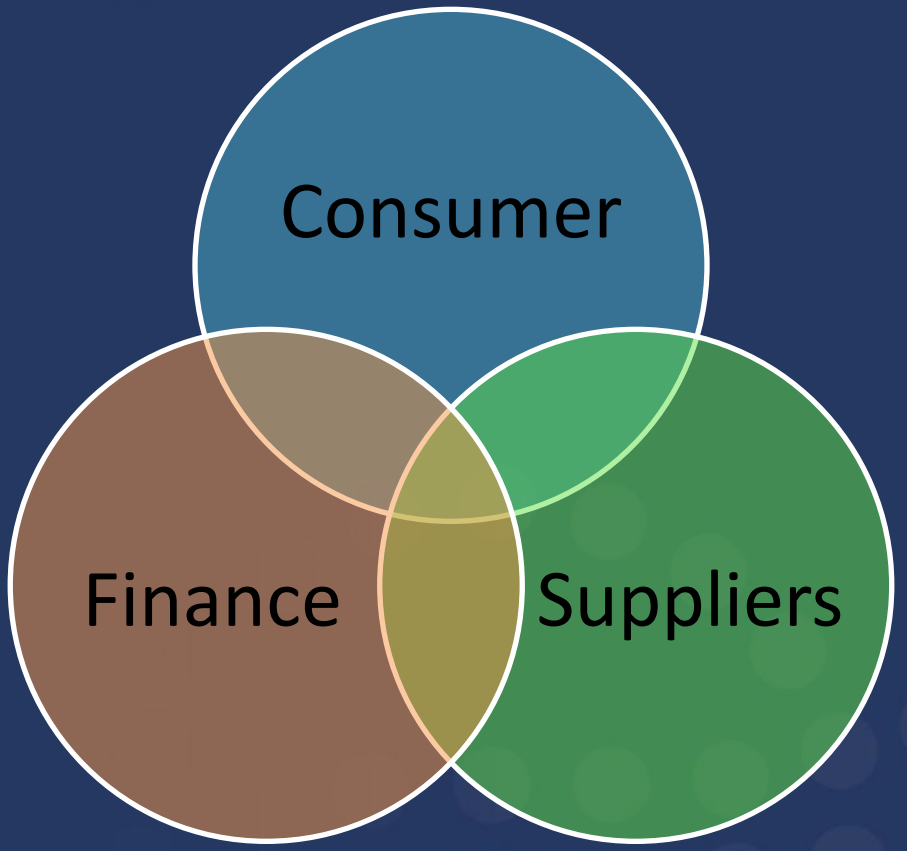
A new paradigm

- Aggregate ownership and management model;
- Clustered, mutually supportive systems;
- Providing opportunities for maximizing the domestic and productive impact of mini-grid systems;
- Building efficiencies in planning and financing, program administration, equipment supply, and operation and maintenance.



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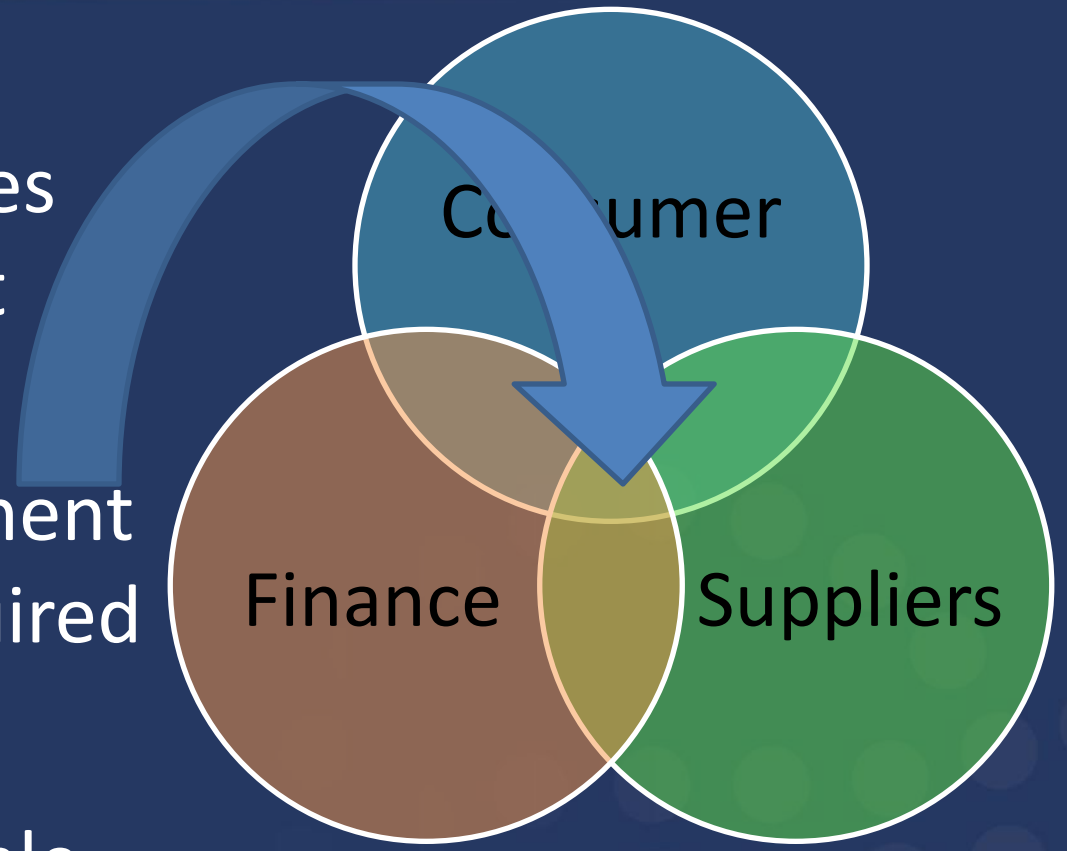
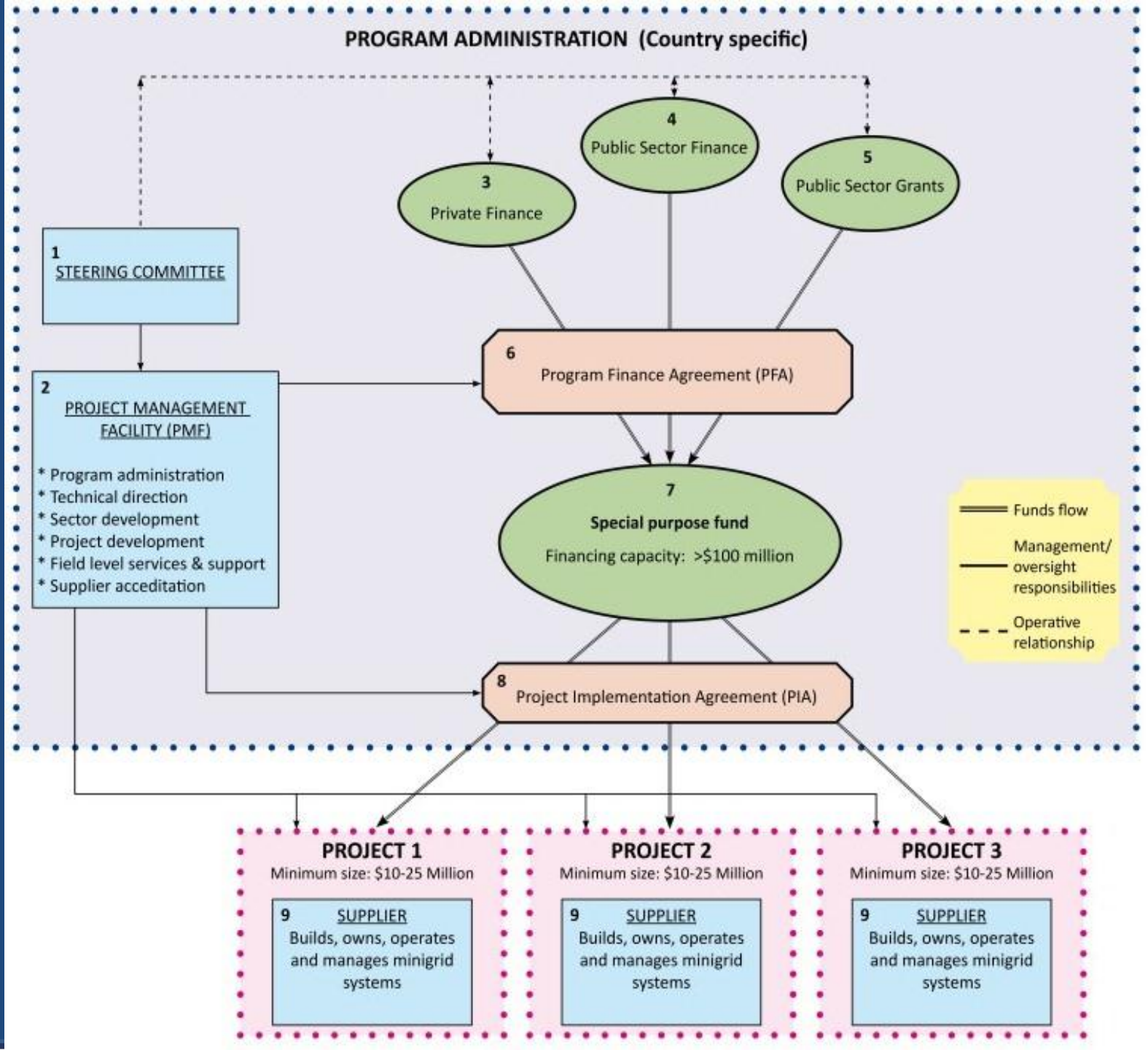
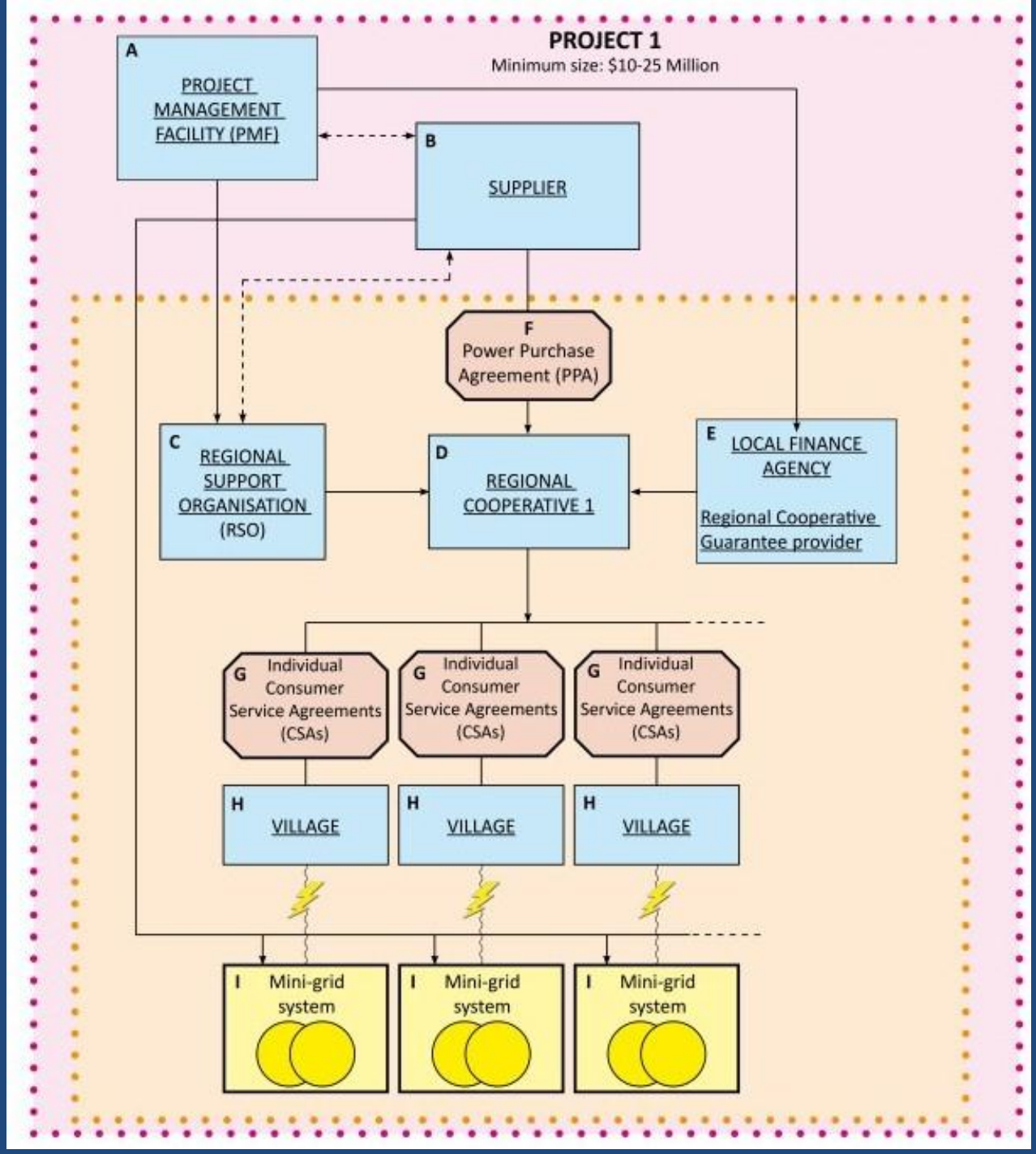
A new paradigm

- The intersection of capabilities identifies the area of greatest strength
- Facilitated engagement in this space is required



So what does a possible model look like?


PROGRAM ADMINISTRATION (Country specific)
1
STEERING COMMITTEE
2
PROJECT MANAGEMENT FACILITY (PMF)
* Program administration
* Technical direction
* Sector development
* Project development
* Field level services & support
* Supplier acceditation
3
Private Finance
4
Public Sector Finance
5
Public Sector Grants
6
Program Finance Agreement (PFA)
7
Special purpose fund
Financing capacity: >$100 million
8
Project Implementation Agreement (PIA)
Funds flow
Management/ oversight responsibilities
Operative relationship
PROJECT 1
Minimum size: $10-25 Million
9 SUPPLIER
Builds, owns, operates and manages minigrid systems
PROJECT 2
Minimum size: $10-25 Million
9 SUPPLIER
Builds, owns, operates and manages minigrid systems
PROJECT 3
Minimum size: $10-25 Million
9 SUPPLIER
Builds, owns, operates and manages minigrid systems


PROJECT 1
Minimum size: $10-25 Million
A
PROJECT MANAGEMENT FACILITY (PMF)
B
SUPPLIER
F
Power Purchase Agreement (PPA)
C
REGIONAL SUPPORT ORGANISATION (RSO)
D
REGIONAL COOPERATIVE 1
E
LOCAL FINANCE AGENCY
Regional Cooperative Guarantee provider
G
Individual Consumer Service Agreements (CSAs)
G
Individual Consumer Service Agreements (CSAs)
G
Individual Consumer Service Agreements (CSAs)
H
VILLAGE
H
VILLAGE
H
VILLAGE
I
Mini-grid system
I
Mini-grid system
I
Mini-grid system

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Conclusion

- Implementation will not look the same in all regions;
- All elements of a program must share a common set of objectives and must be:
  - Planned and coordinated;
  - Structured; and,
  - Delivered in an integrated manner.

Importantly the focus MUST be on achieving higher value NOT lowest cost outcomes.