



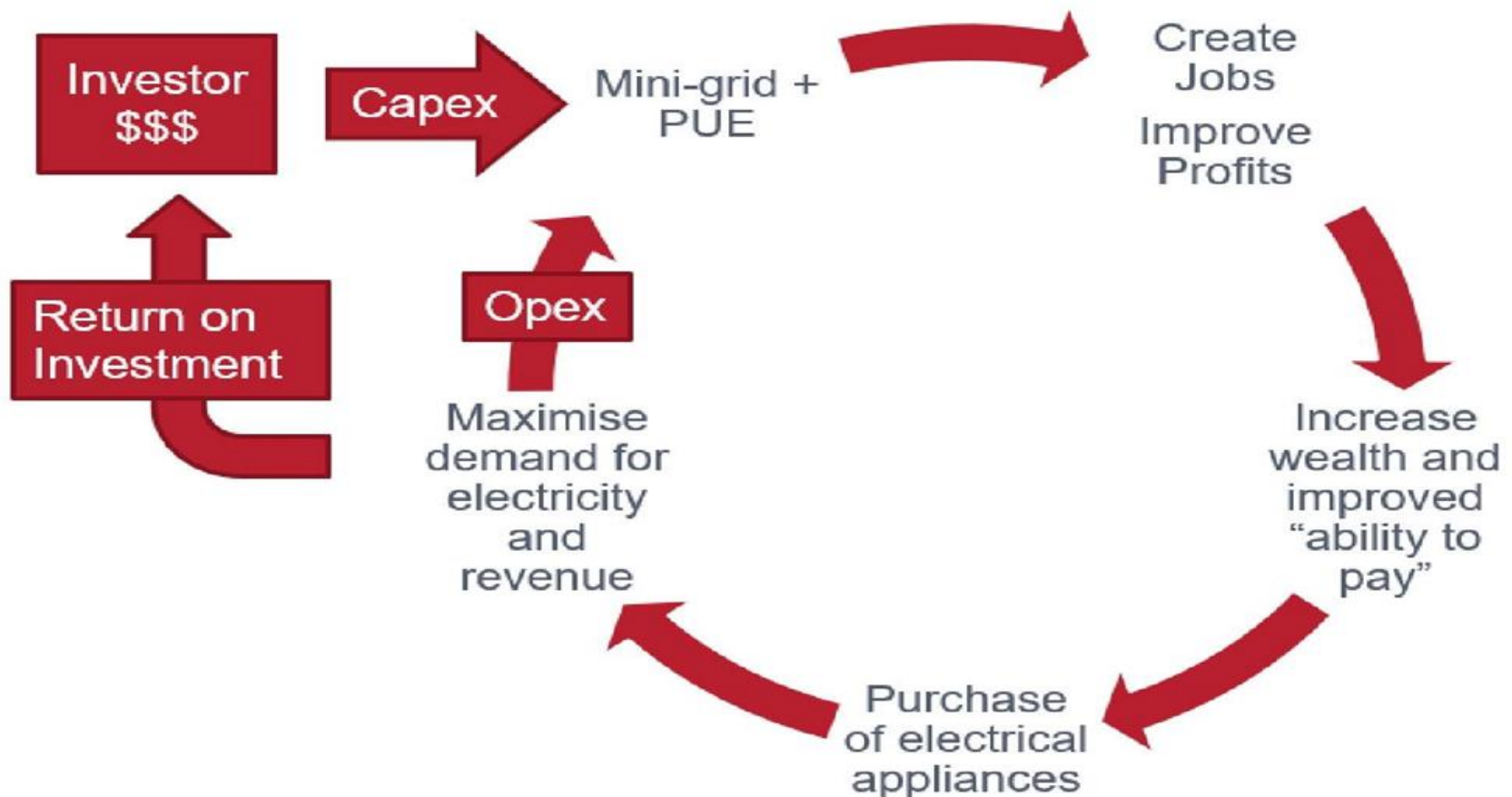
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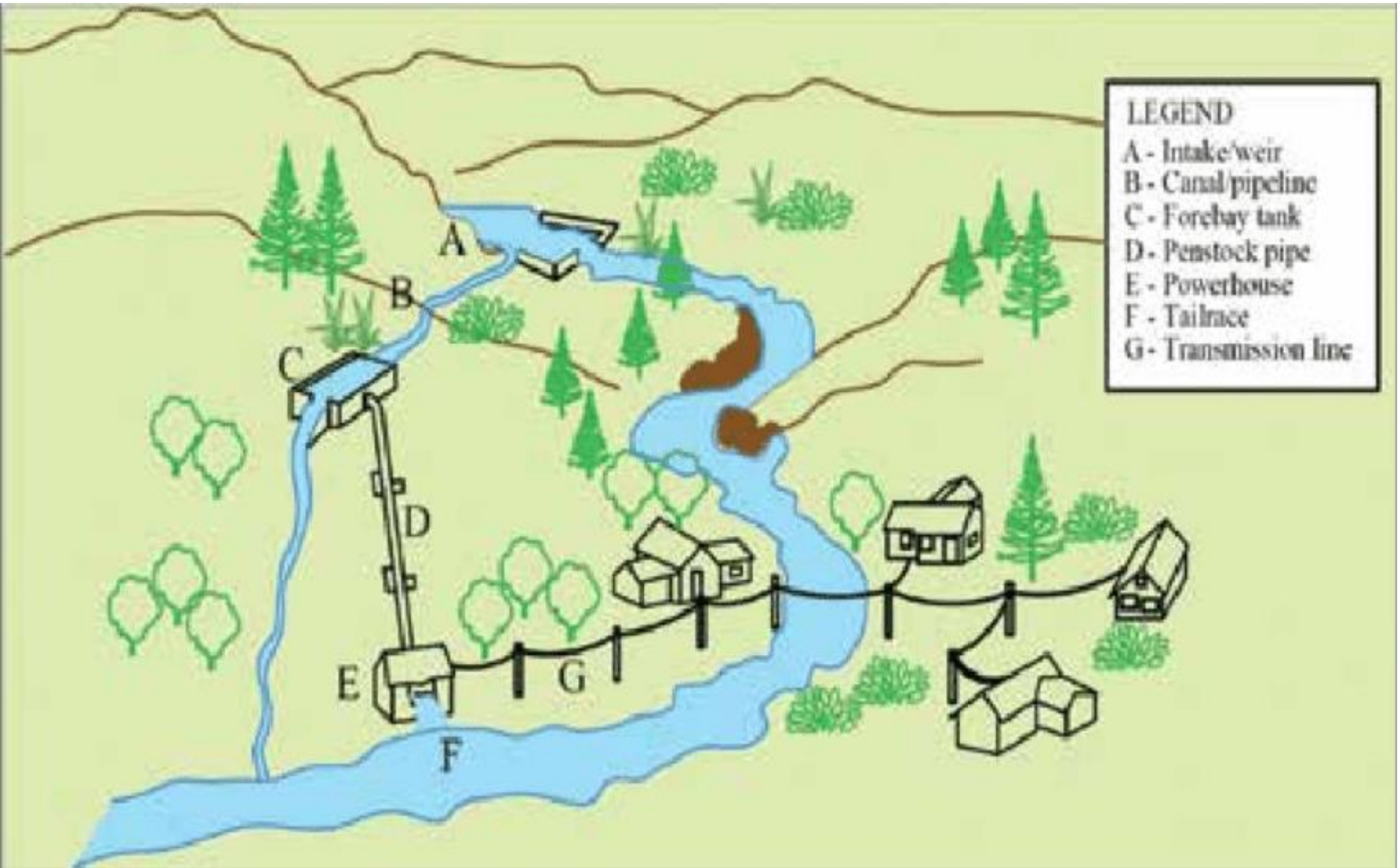
***Whole Village* Economic Growth
through
Micro Hydropower Mini-grids
at Scale**

The '*Whole Village*' approach to rural electrification

Self-sustaining Mini-grids



Run-of-River Hydropower – ‘Levelised Cost of Electricity’ (LCoE) = \$0.20 per kWh

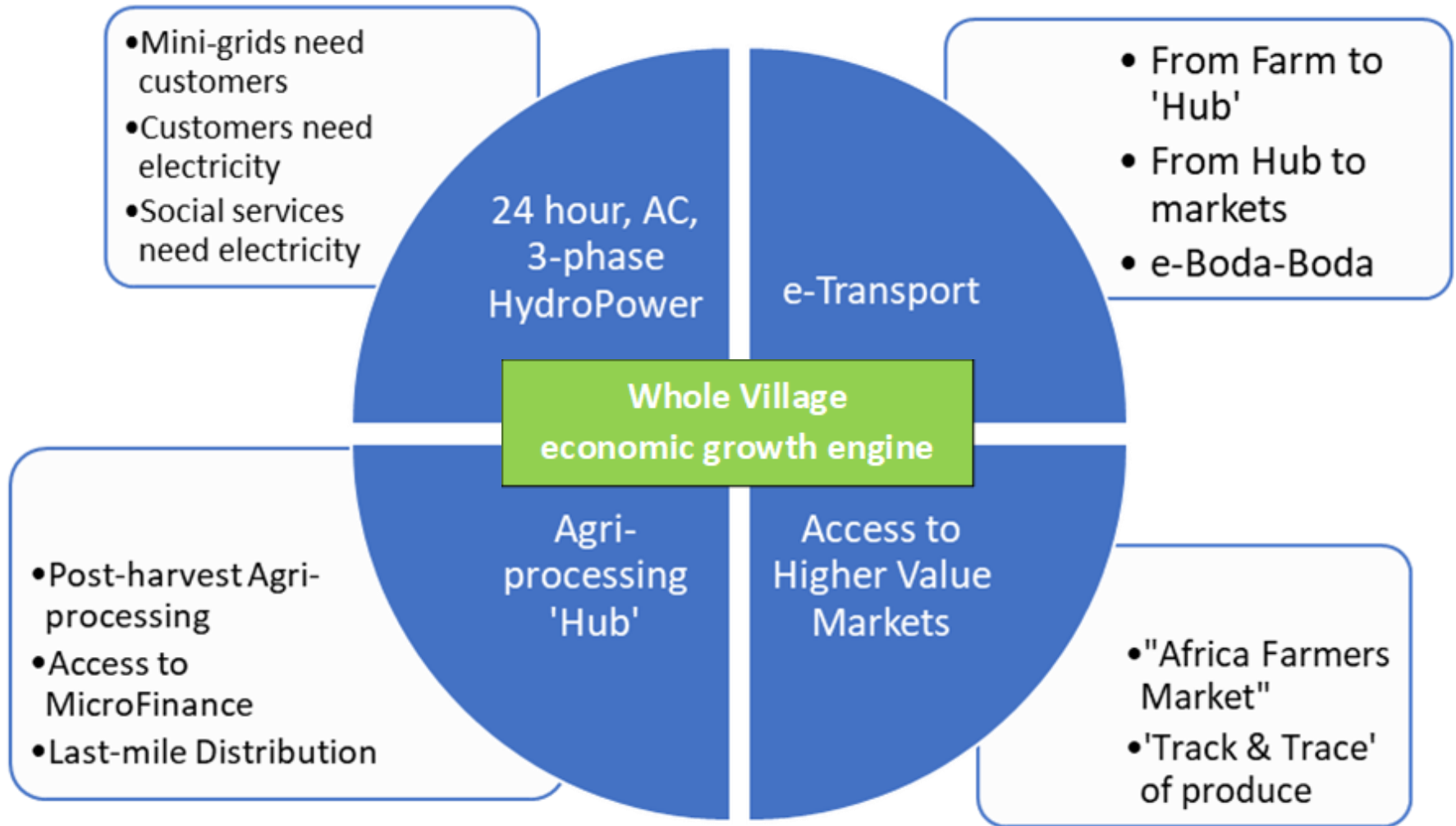


Barriers to investment in ‘run-of-river’ micro hydropower mini-grids?

- ***Ticket size** – must be >\$10m*
- ***“Poor Bankability”** (Will we get our money back?)*
- ***Industry Strength** – not enough engineers to provide quality-assured maintenance contracts*

Remove the Barriers

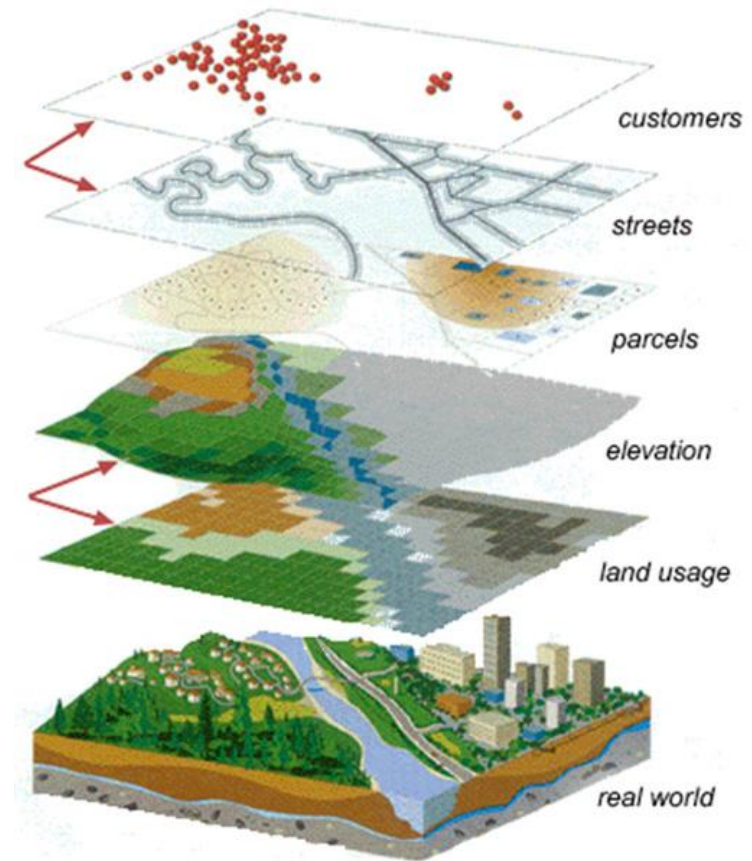
- **Affordable Electricity + PUE** to act as immediate **Anchor Clients**
- **Clean-cooking** facilities to boost usage
- **PUE** creates **jobs** and reduces **Post-Harvest Losses**
- **Gender** re-balancing **improves wealth-creation**
- Use of Internet-of-Things improves KPI monitoring (for carbon credits and **RBF**)
- **Upscaling / Replication Pipeline** of opportunities catalyses **investment** an **Capacity Building**



ISMO is a Satellite-based Earth-observation Tool for identifying:

- River Flow
 - Gradient of River
 - River Bank characteristics
 - Proximity of roads, schools, trading centres, health centres etc.
 - Proximity of National Grid connectivity
 - Land owners?
 - Site of special scientific importance?
 - Existing abstraction license
 - Flood risk areas
 - Nature conservation areas
- Etc. etc.

All this leads to a “candidate” site with potential for development



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Example: Use of **ISMO** in Manica Province (Mozambique)

>30kW output, 24 hours a day, 365 days a year

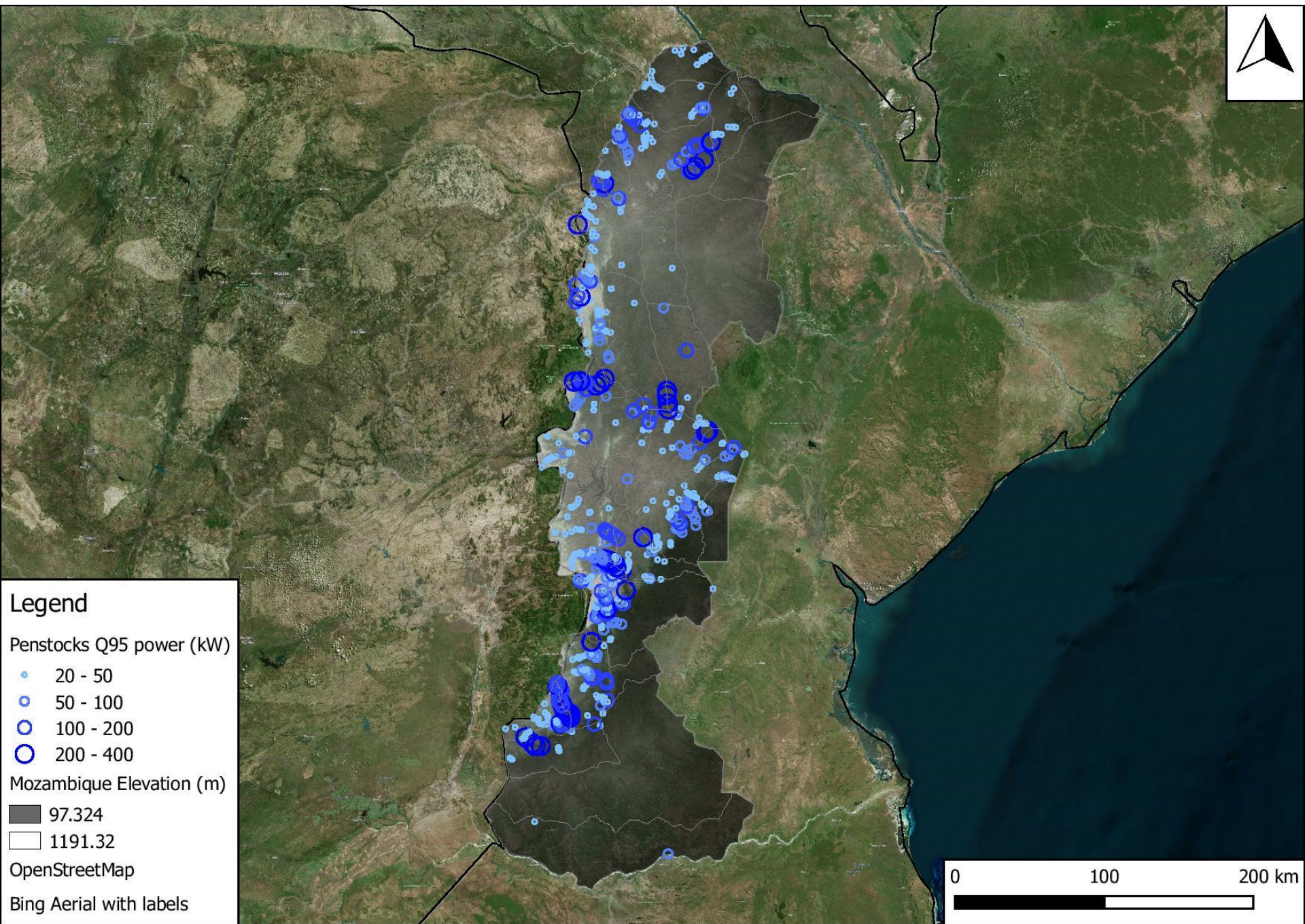
> 5km from nearest grid infrastructure

<1km from nearest school, health-centre, trading centre

<1km from a good road

Population within 1km radius of hydro >100
households

Not in a National Park



ISMO Pre-feasibility Study Mozambique

– Total of **676 sites in Manica Province.**

21 sites – output is between 20kW and 21kW

93 sites – output 21kW – 25kW

53 sites – output 25kW – 30kW

56 sites – output 30kW – 35kW

143 sites – output 35kW – 55kW

70 sites – output 55kW – 75kW

46 sites – output 75kW – 100kW

51 sites – output 100kW – 150kW

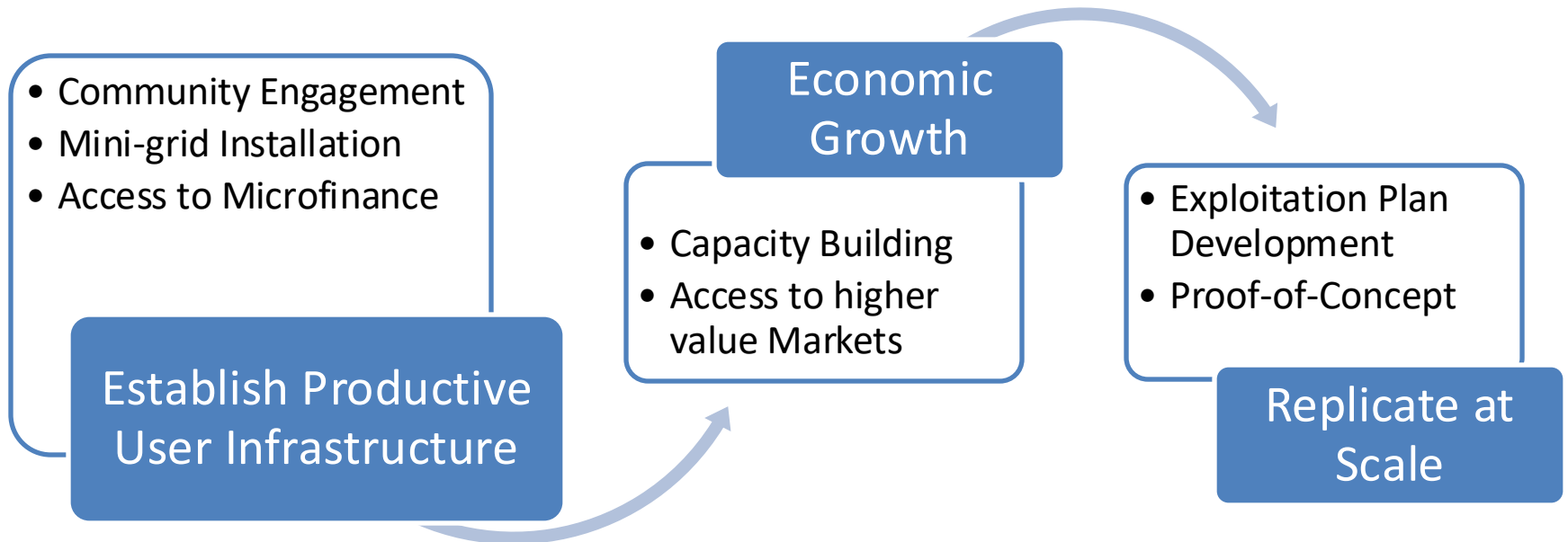
87 sites – output 150kW – 400kW

22 sites – output 400kW – 946kW

Why is SCALE important?

- Economies of Scale in **both** procurement and installation (**LCoE < \$0.10 per kWh?**)
- Interest from the private sector **investors** (“**ticket**” size of \$60m)
- **Business Opportunity Pipeline** to boost an under-developed industry

Aligning Policy and Business Environment means multi stakeholders (Ministry of Agriculture, Education, Health, etc.)



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- Whole Village micro hydropower mini-grids at scale – needs a conversation:
 - *How does the national regulator, ‘reserve’ a list of, say, 400 sites for one single development.*
 - *Strategic Development needs collaboration with Ministries of agriculture, health, education, tourism, etc.*
 - *In-country manufacturing of equipment*
 - *Vocational training of the workforce*