CAT PROJECTS

BUSH LIGHT INDIA

The Bushlight India Model

Reducing the structural impediments to remote village energy service provision at scale



Michael Tuckwell

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What it is not:

- Lighting programme
- Technology deployment programme
- Specifically a GHG mitigation programme
- A one size fits all solution
- Supply side driven

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What it is:

A highly replicable model for the delivery of electricity services in remote un-electrified villages that are:

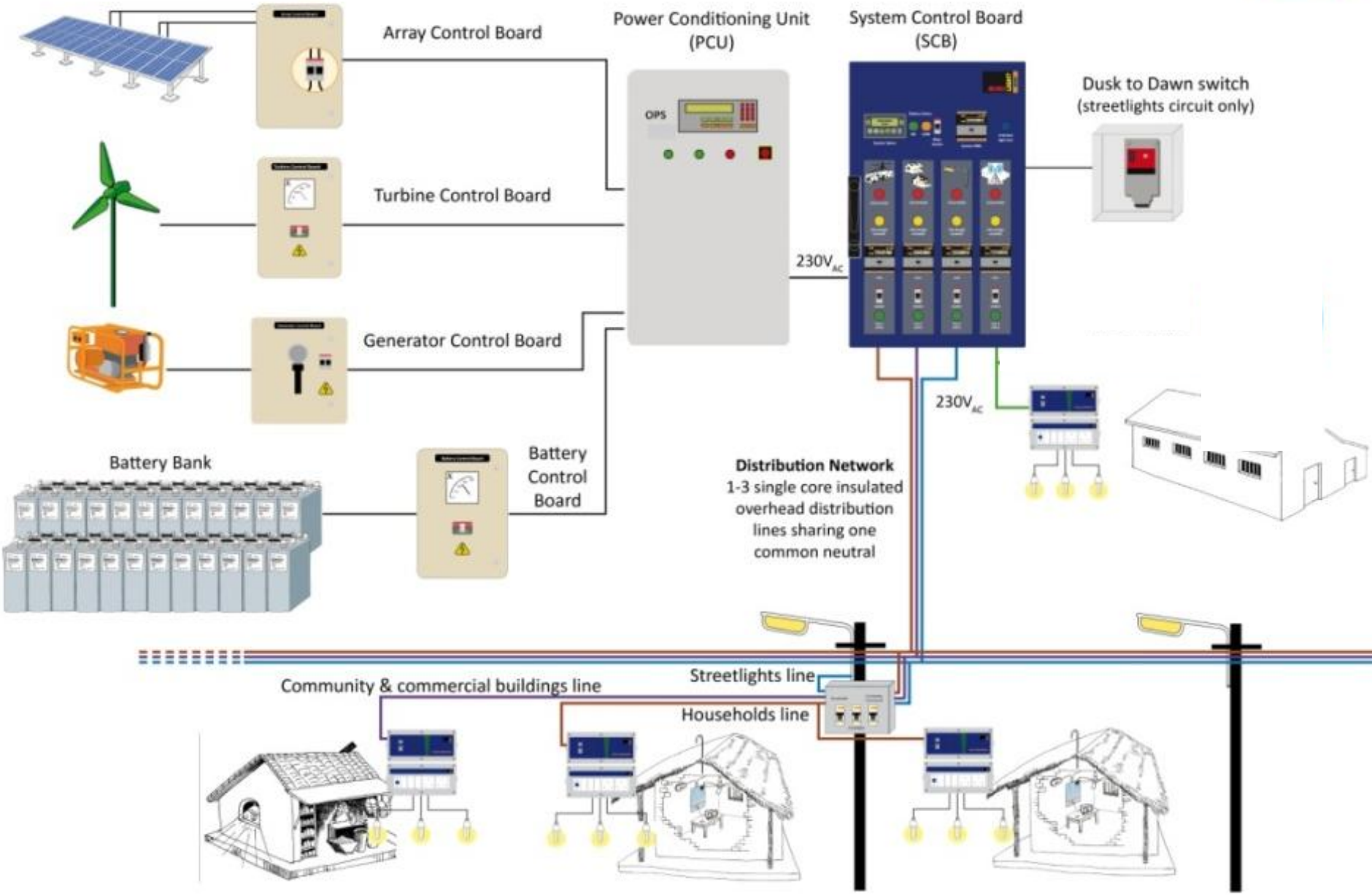
- Reliable
- Equitable
- Of know amount determined by the consumers
- Of known (planned) cost

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Background

- Collaboratively developed with grassroots NGOs, RE industry representatives, rural energy experts and government agencies
- Adapted from the highly successful **Bushlight** indigenous community renewable energy program in Australia (140 communities since 2002)
- Only appropriate for villages with the human and economic resources and capacities to manage, pay for and productively utilise the energy produced from the system
- Readily adaptable to other energy supply technologies

Bushlight India system architecture

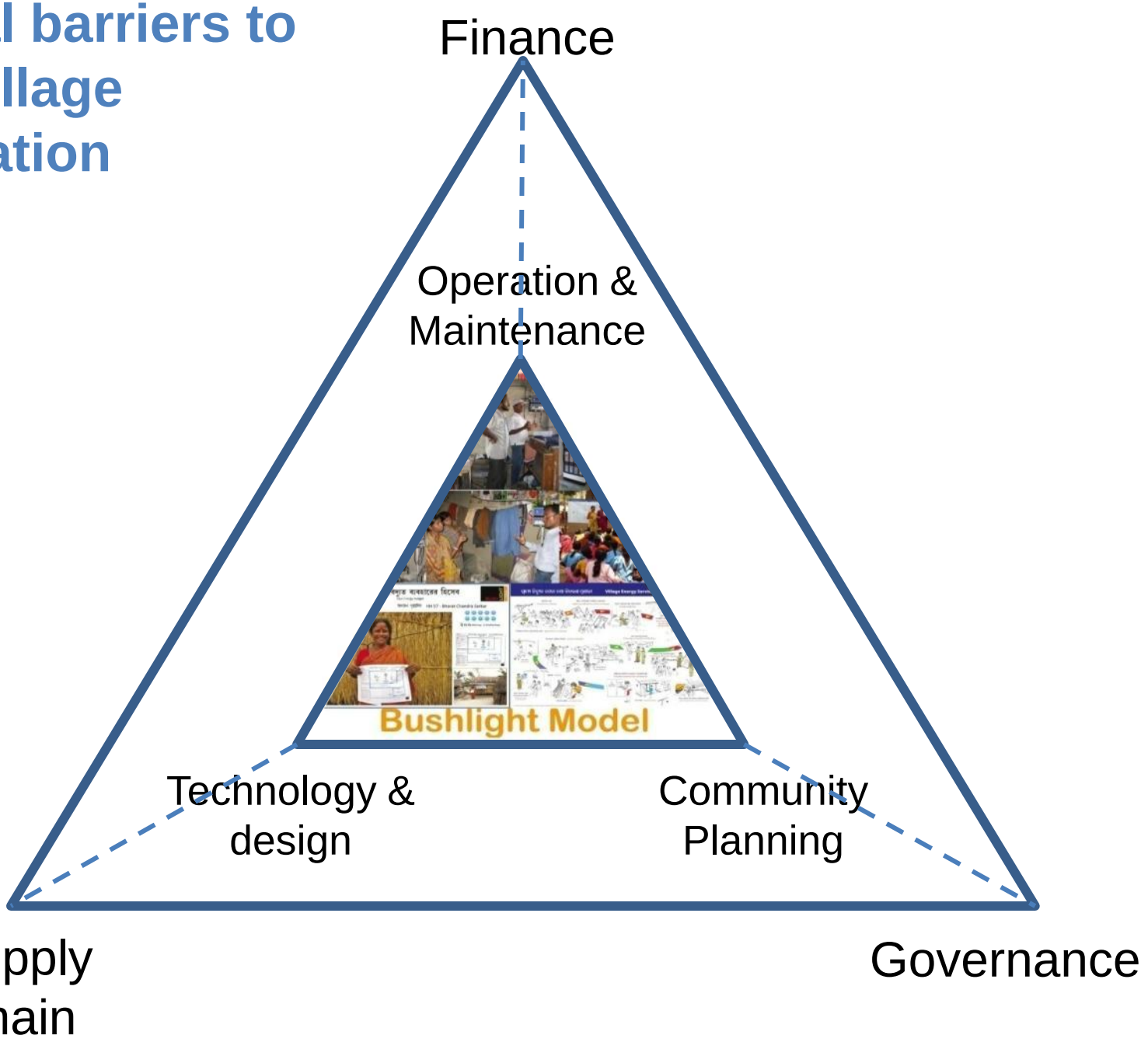


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Outcomes

- Residents' expectations and capacity to pay for energy services are successfully understood
- Energy budgeting ensures people are able to match their livelihood needs to their financial capacities and aspirations
- Energy systems have the capacity to meet agreed expectations
- Consumers given the tools to choose how and when they use their 'daily energy budget'
- Residents become consumers of energy (as opposed to owners/operators of power systems)
- Training & support for local governance structures & operators

Structural barriers to remote village electrification



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The Bushlight Model

A comprehensively documented and resourced, stage-wise process involving:

- Village Selection
- Village Energy Planning (VEP)
  - Education & Information
  - Energy budgeting
- System design
  - Technical
  - Financial modelling
  - Comparative life cycle cost assessment
- Establishment of institutional management & support structures
- Training and support program

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Urja Bandhu

- Designed and developed by CAT Projects
- Manufactured in India.
- Individually programmed to limit the total daily amount of energy used by each consumer to the daily energy budget selected during the VEP.
- Initial cost: ~Rs 3500 including switchboard and mounting plate.
- Intuitive display links in with the energy budgeting process.



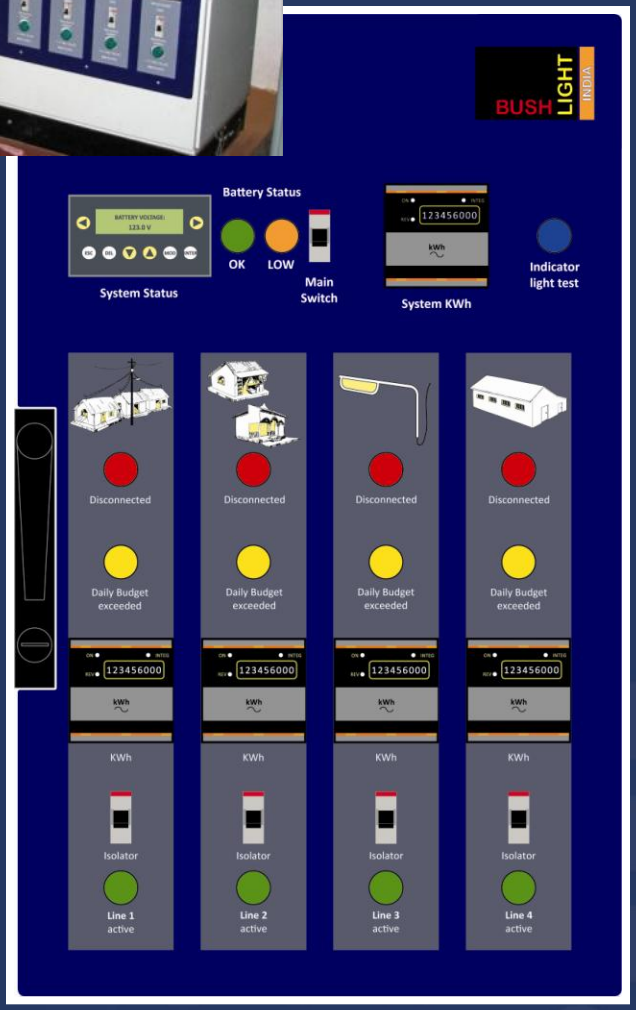


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System Control Board



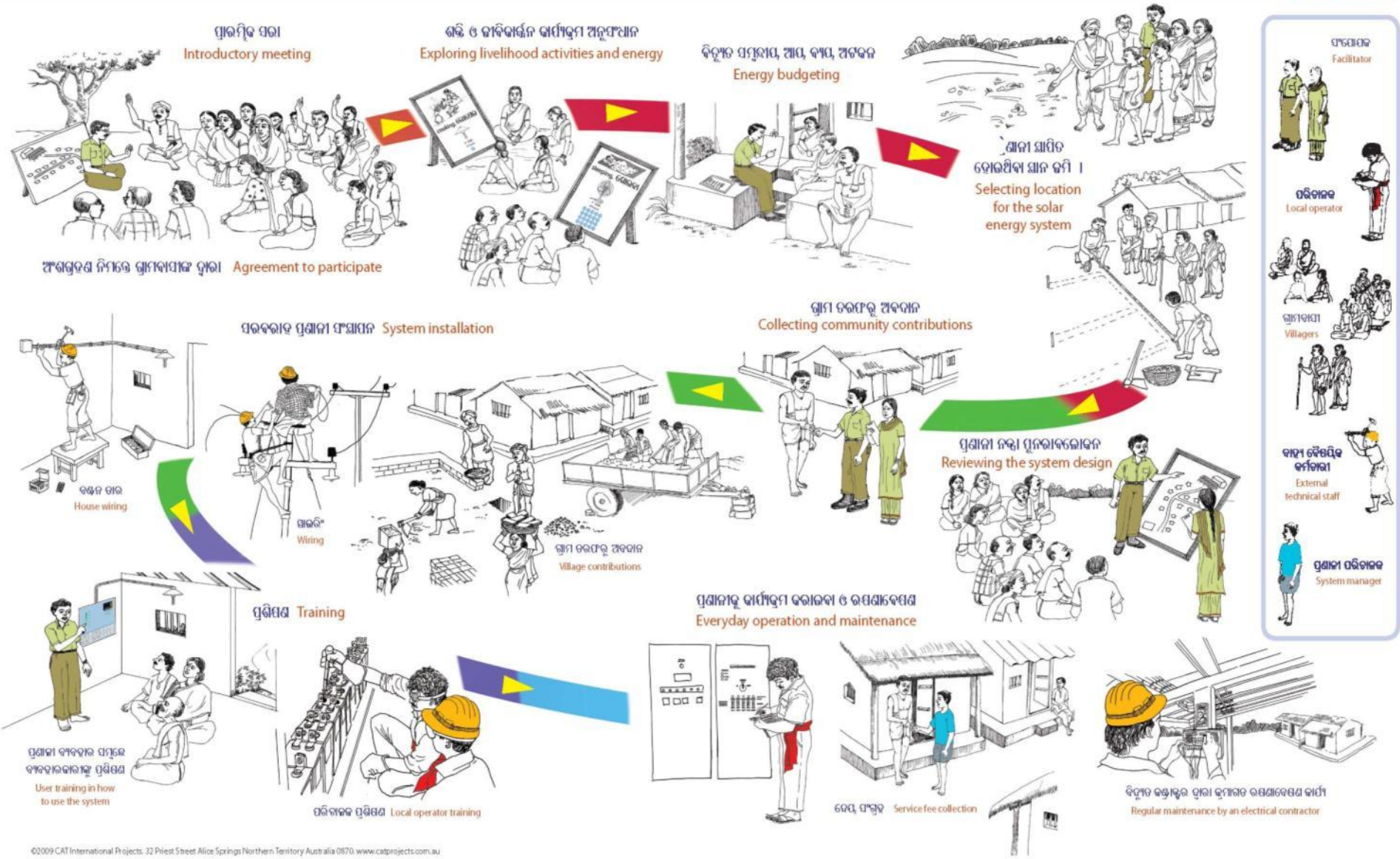
- Designed and developed by CAT Projects
- Manufactured in India.
- ‘Smart’ central distribution board with 4 individually monitored & controlled outgoing feeder lines.
- Automated battery voltage based stage-wise load shedding system.
- Intuitive interface allows operators to easily monitor system performance and identify faults.



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Village Energy Service Delivery Model

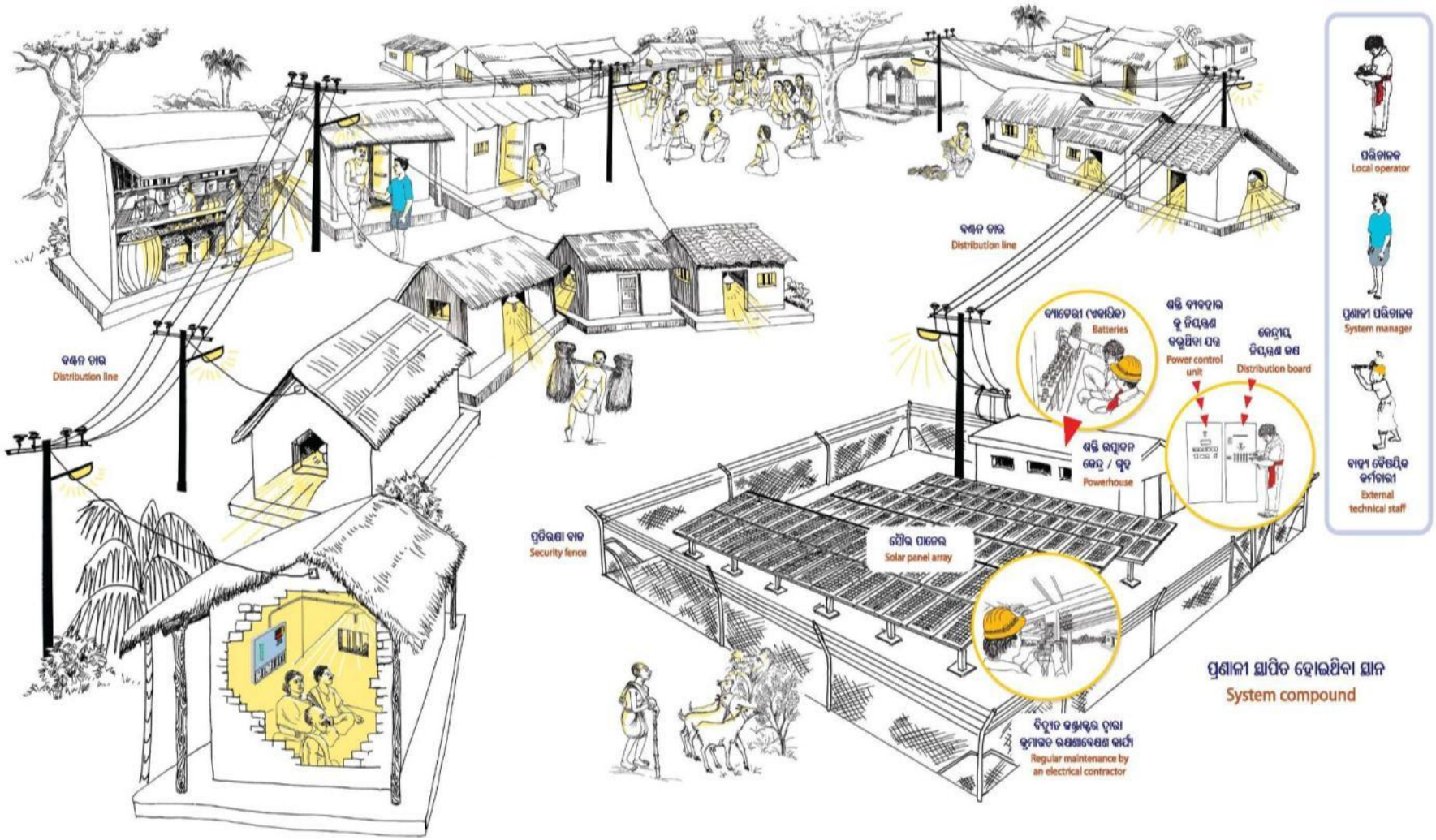
BUSH LIGHT INDIA



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ବୁଶ୍ ଲାଇଟ୍ ଦ୍ୱାରା ସ୍ଥାପିତ ଏକ ସୌରଶକ୍ତି ପ୍ରଣାଳୀ ଗ୍ରାମ କିପରି ଦେଖାଯାଉଥାଏ । What does a Bushlight village solar energy system look like?

BUSH LIGHT IN INDIA

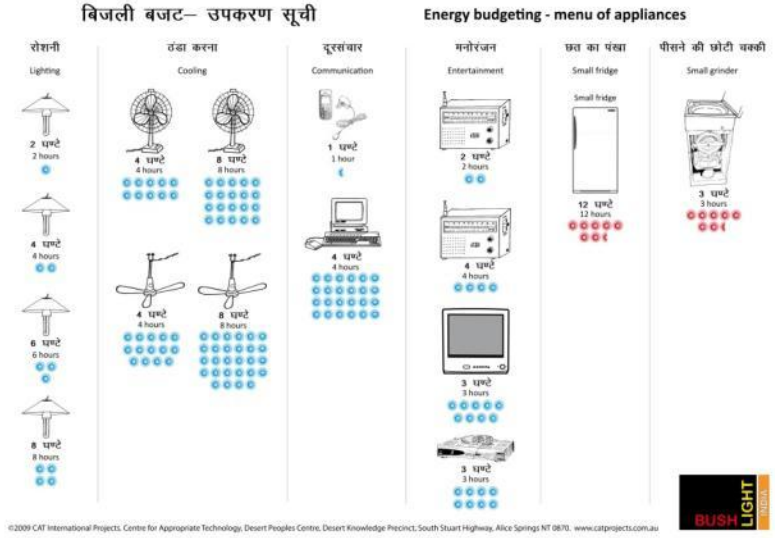


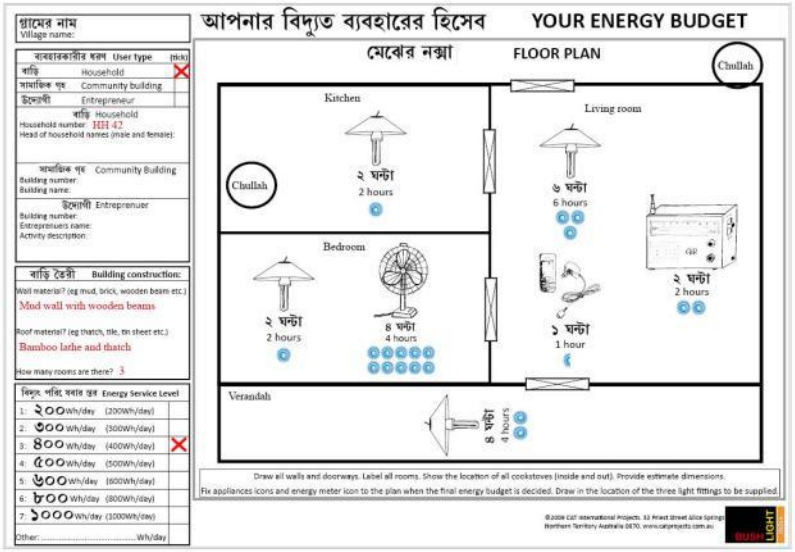
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Village Activity cards





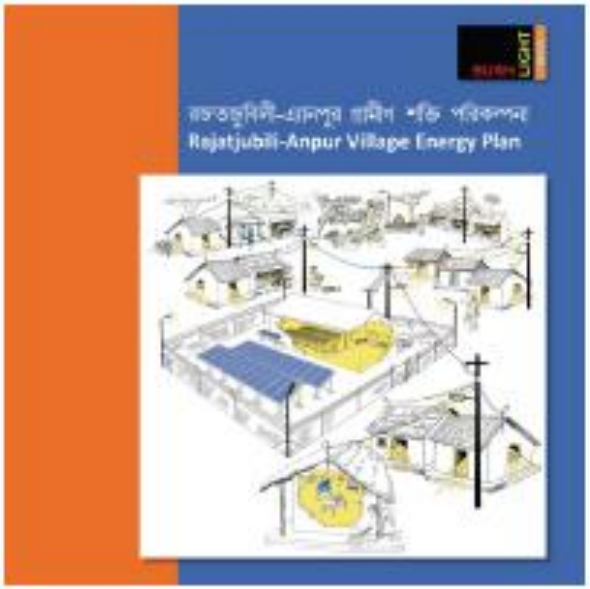
Energy Budgeting Resources


YOUR ENERGY BUDGET
FLOOR PLAN

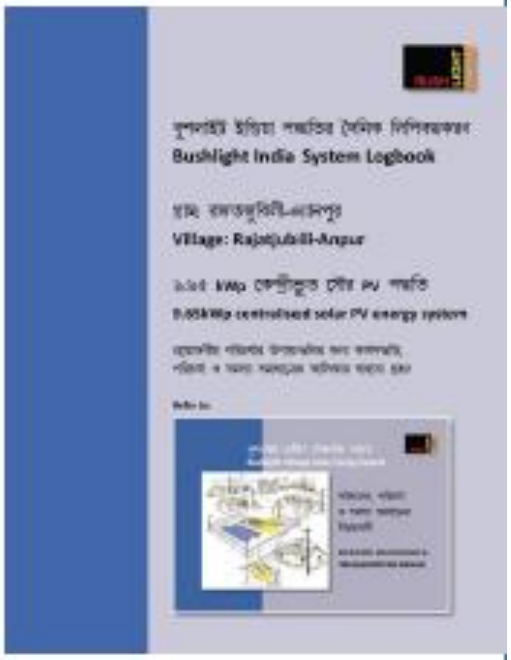







রাজতুষিলী-এনপুর গ্রামীণ শক্তি পরিকল্পনা
Rajatjubili-Anpur Village Energy Plan


Bushlight India
System Control Board
Operation and Maintenance Manual
System:
Midipam, Kalahandi, Orissa


বুশলাইট ইন্ডিয়া পদ্ধতির দৈনিক লিপিবদ্ধকরণ
Bushlight India System Logbook
গ্রাম: রাজতুষিলী-এনপুর
Village: Rajatjubili-Anpur
Bushlight India System Logbook


বুশলাইট গ্রামীণ সৌরশক্তি পদ্ধতি
Bushlight Village Solar Energy System
পরিচালন, পরিচর্যা
ও সমস্যা সমাধানের
নিয়মাবলী
OPERATION, MAINTENANCE &
TROUBLESHOOTING MANUAL


Bushlight India
Urja Bandhu
OPERATION,
MAINTENANCE &
TROUBLESHOOTING
MANUAL


URJA BANDHU
INSTALLATION MANUAL




SHANTI
SHANTI


আপনার বিদ্যুত ব্যবহারের হিসেব
YOUR ENERGY BUDGET
মেঝের নক্সা
FLOOR PLAN
Living Room
১ ঘন্টা
1 hour
৪ ঘন্টা
4 hours
৪ ঘন্টা
4 hours
Varandah
Kitchen
2 hours
Chullah
Chullah

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Demonstration systems

Demonstration of effectiveness of model.

Centralised solar PV based energy systems supplying power for domestic, community and commercial loads through a 230V AC distribution system.

Implemented by local partners Gram Vikas (Kalahandi, Orissa) and WWF-India (Sundarbans).



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Challenges for a scale roll-out

- Capacity building of in-country implementing partners; and technical, ‘quality control’ partners
- Development of effective supply chain strategies
- Development of cost trajectories that optimise economies of scale
- Identification of key mechanisms for enabling development of local livelihoods and economies to maximise the impacts of electrification





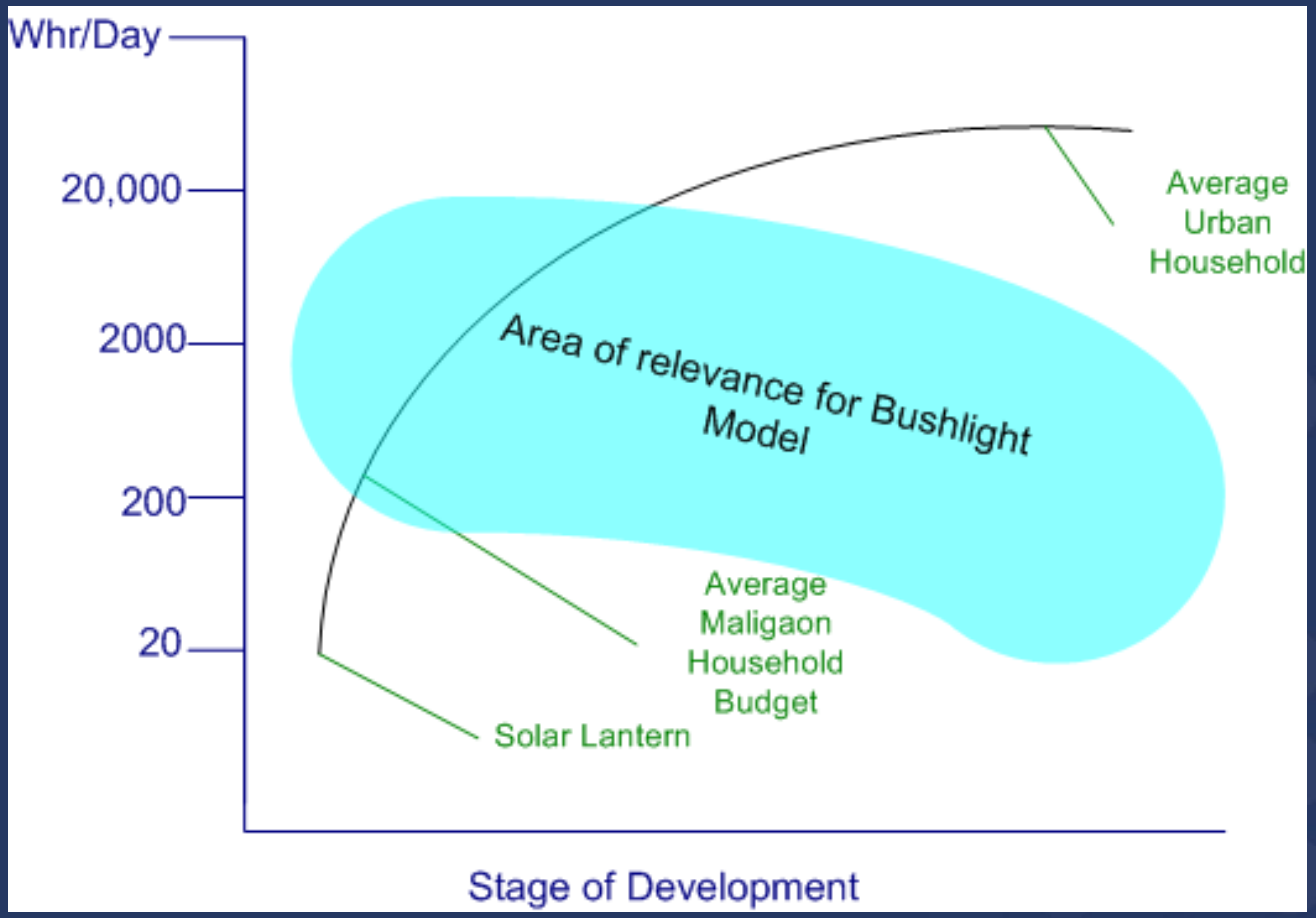

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Service Expectation & Demand Growth



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Optimisation Required for Scale Up

