

# Private Sector led solar micro-grids in remote and rural Nepal



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GM, Gham Power



# Gham Power: Solar project developer; social enterprise

Started in 2010

Deployed over  
2MW of Solar PV  
System

Installed more  
than 1500 Solar  
PV Systems

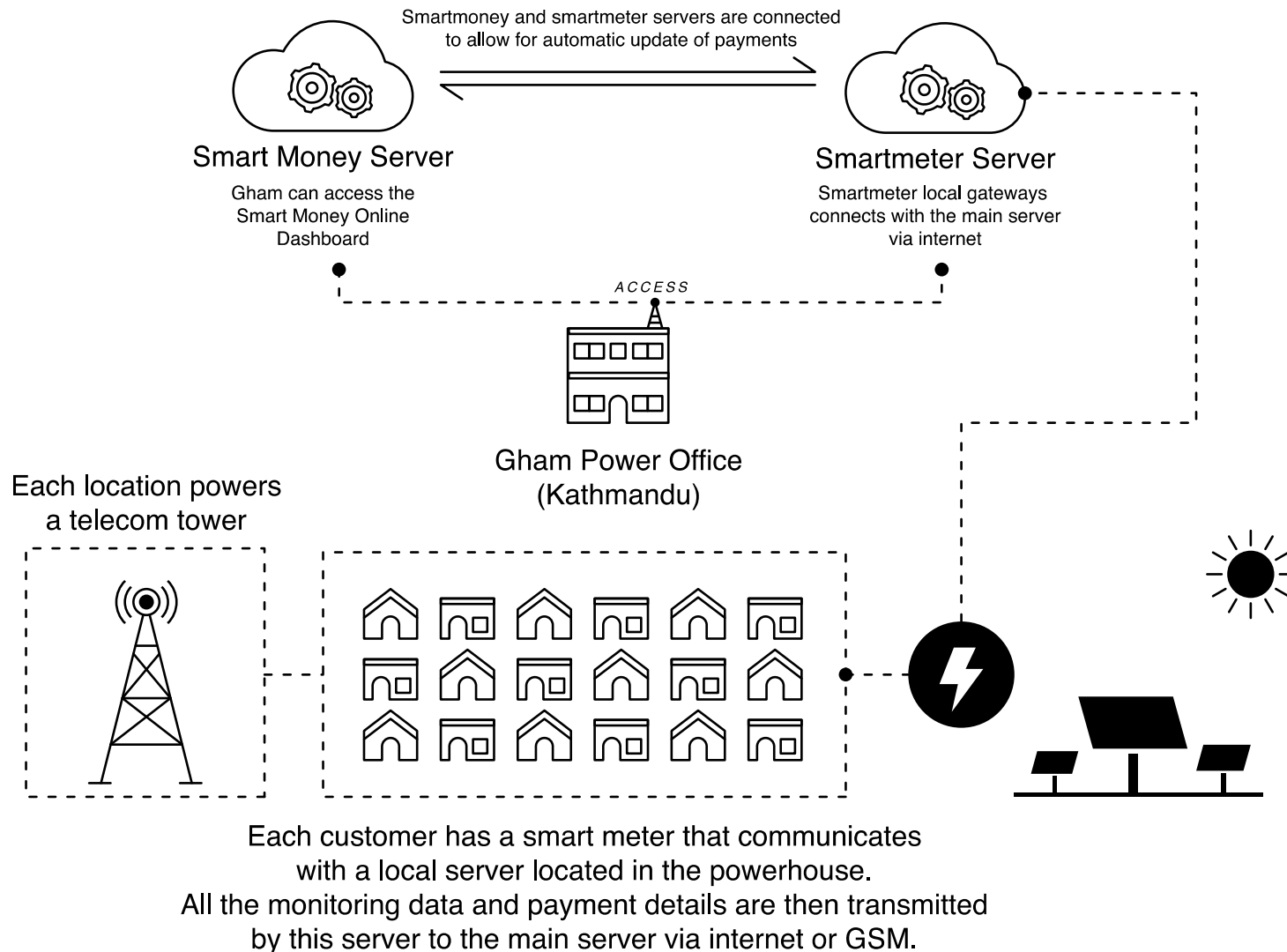


## 2013: Started developing microgrids

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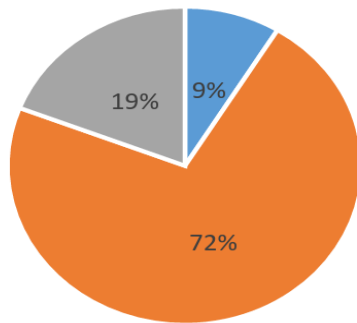
- Co-ownership –SPV's co-owned with investors from the community.
- Commercial debt – Started sourcing debt from a commercial bank
- Developing an asset class – Bundling of several microgrids together
- Use of anchor tenants – Partnership with Ncell (a mobile operator in Nepal) signed a Power Purchase Agreement (PPA) with a solar microgrid for the first time.
- Pre-paid metering – Operational data + revenue collection using mobile money.

# Example Microgrids: Project Structure



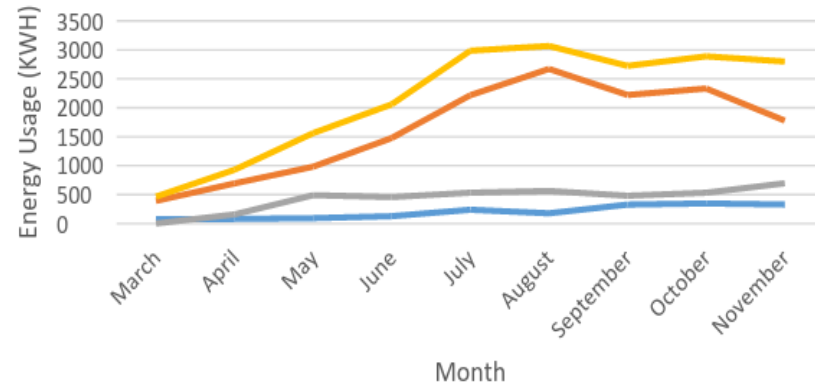
# Learnings : Business growth is not organic always

Village A Total Consumption



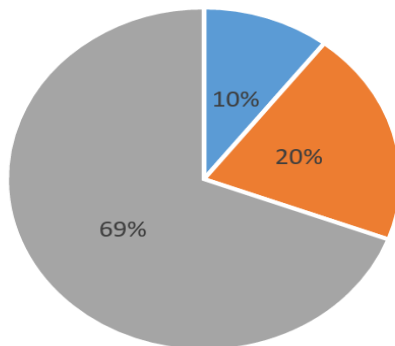
Households Businesses Tower

Village A Energy Usage



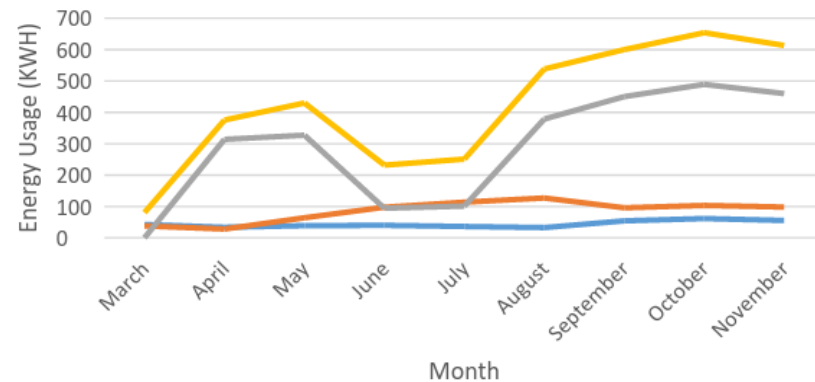
Households Businesses Tower Total

Village B Total Consumption



Households Businesses Tower

Village B Energy Usage



HH Biz Tower Total



# Productive end use(PEU) loads



Grinding Mill – 1.8 kW



Computer Center – 2.5 kW



Petrol Pump – 3.5 kW

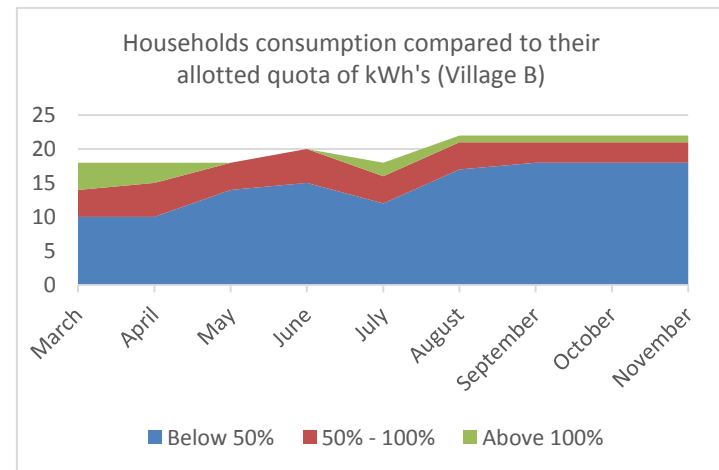
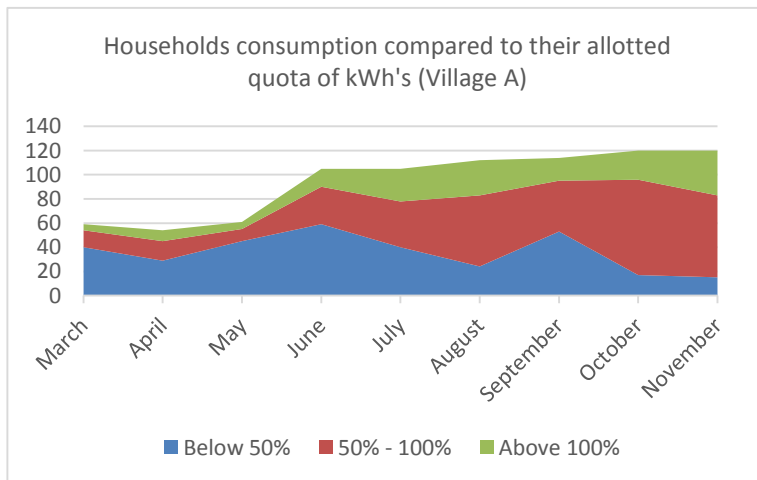
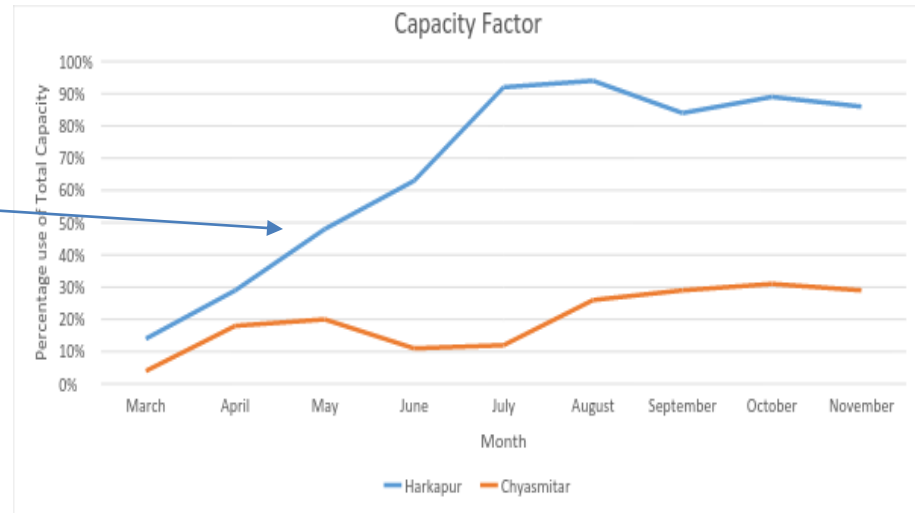


Restaurant – 2.5 kW

# Learnings : Latent time/seasonal revenue patterns

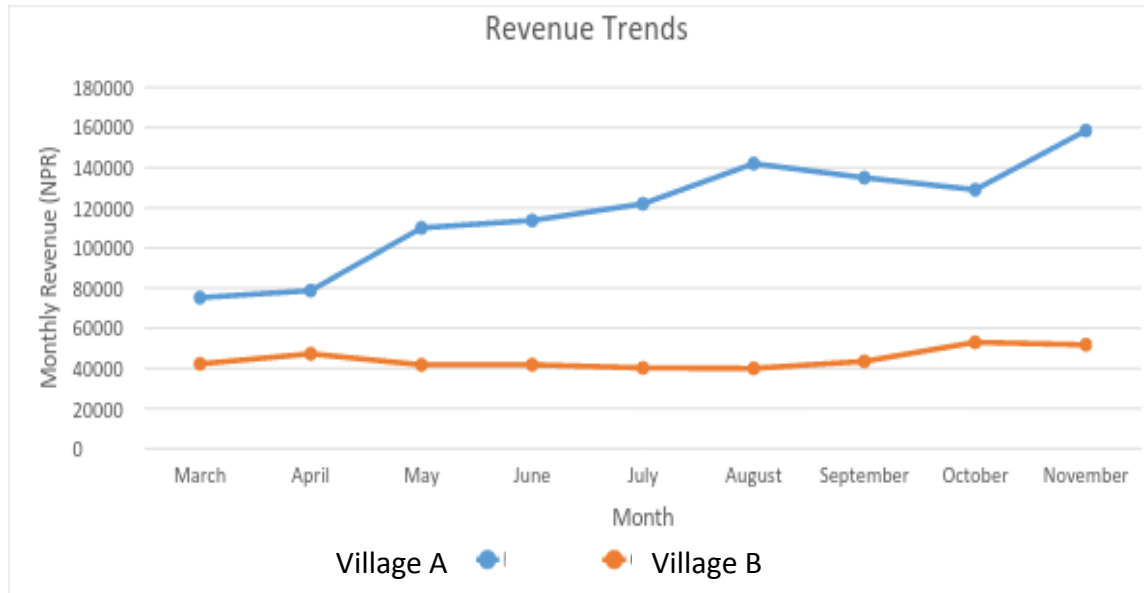
Latent time before  
usage picks up

Village A – 5 months  
Village B – 9 months and  
counting



# Learnings : Revenue

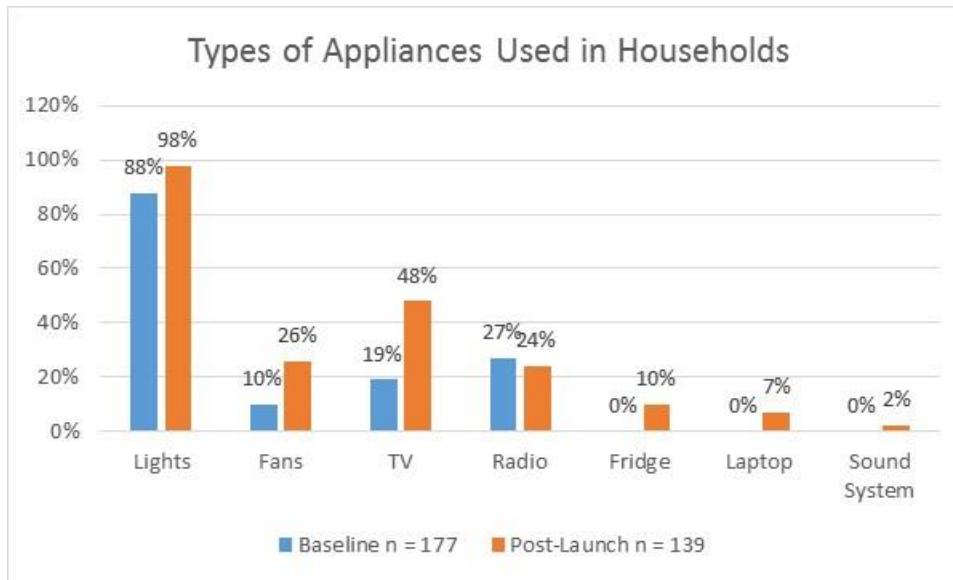
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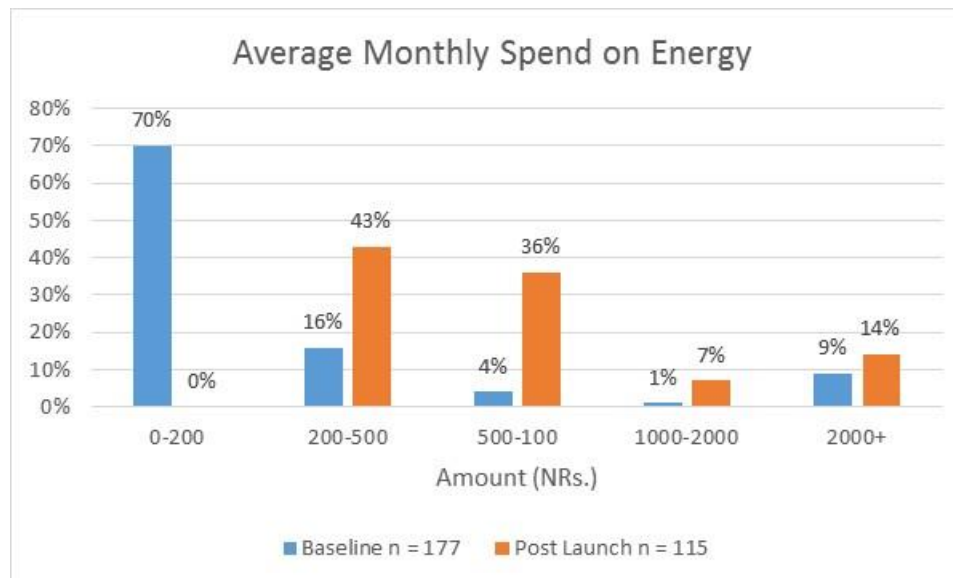
- IRR(10 years):Village A – 12%; Village B – 4%
- Hard to recover costs with just HH's; tower helps but businesses make the microgrid profitable



# Learnings : Quality of Life



Increase in household appliances – mostly TV and Fridge



Monthly energy costs have also gone up;  
Businesses generating more revenue; HH's spending on luxury

# Learnings : Community ownership

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- Implementation Model:
  - Multiple projects owned by a single SPV with community representation
  - Gham Power provides EPC + O&M services for 10 years
  - After 10 years, project ownership transferred to community
- Organizing board meetings is a major challenge
- Impossible to make future investment related decisions

# Diversify revenue streams

- Shops/organizations provide services / generate revenue
- Manage fluctuations/seasonality and diversify revenue

Communication



Telemedicine



Waterpumping

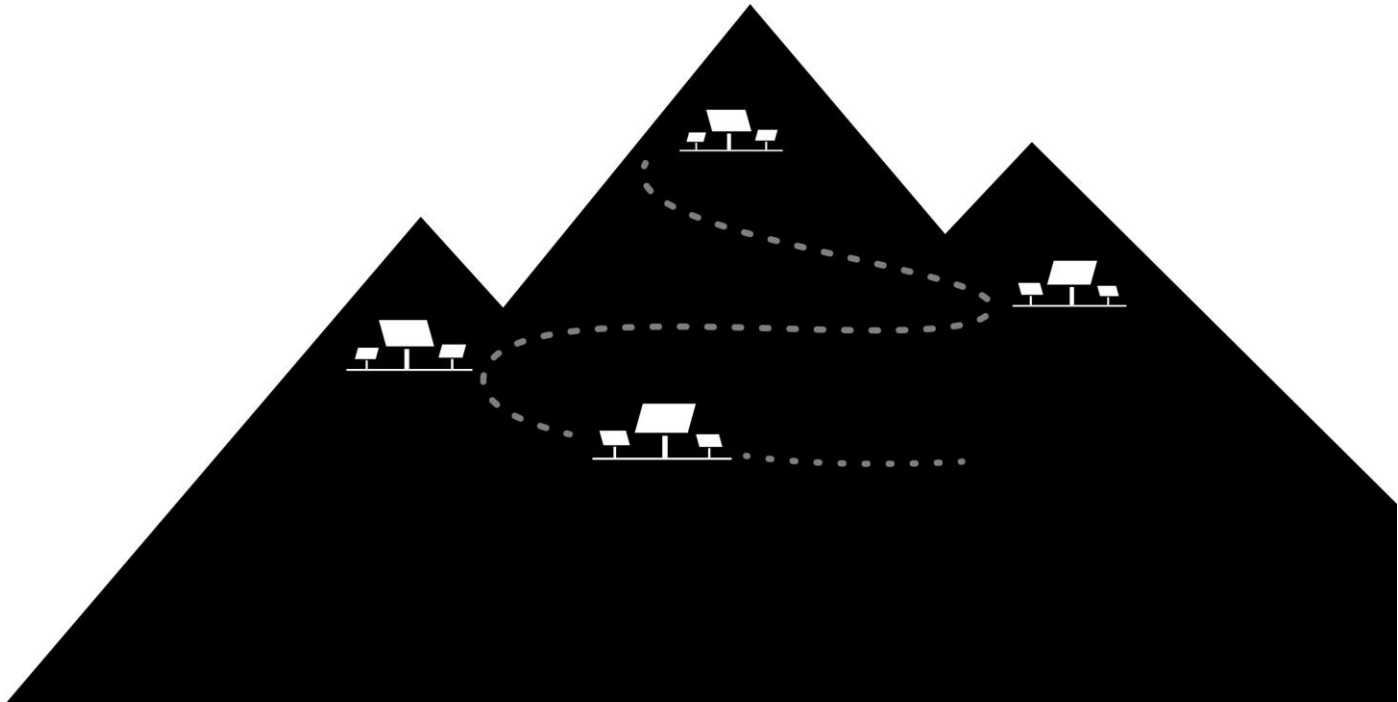




# Target transit points

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- Regions that can attract cash
- Focus on tourism/pilgrimage sites
- Develop energy infrastructure & capacity



# Raising funds

## Objective

Fund Raising program for 20 microgrids along scenic trekking trails

## Program

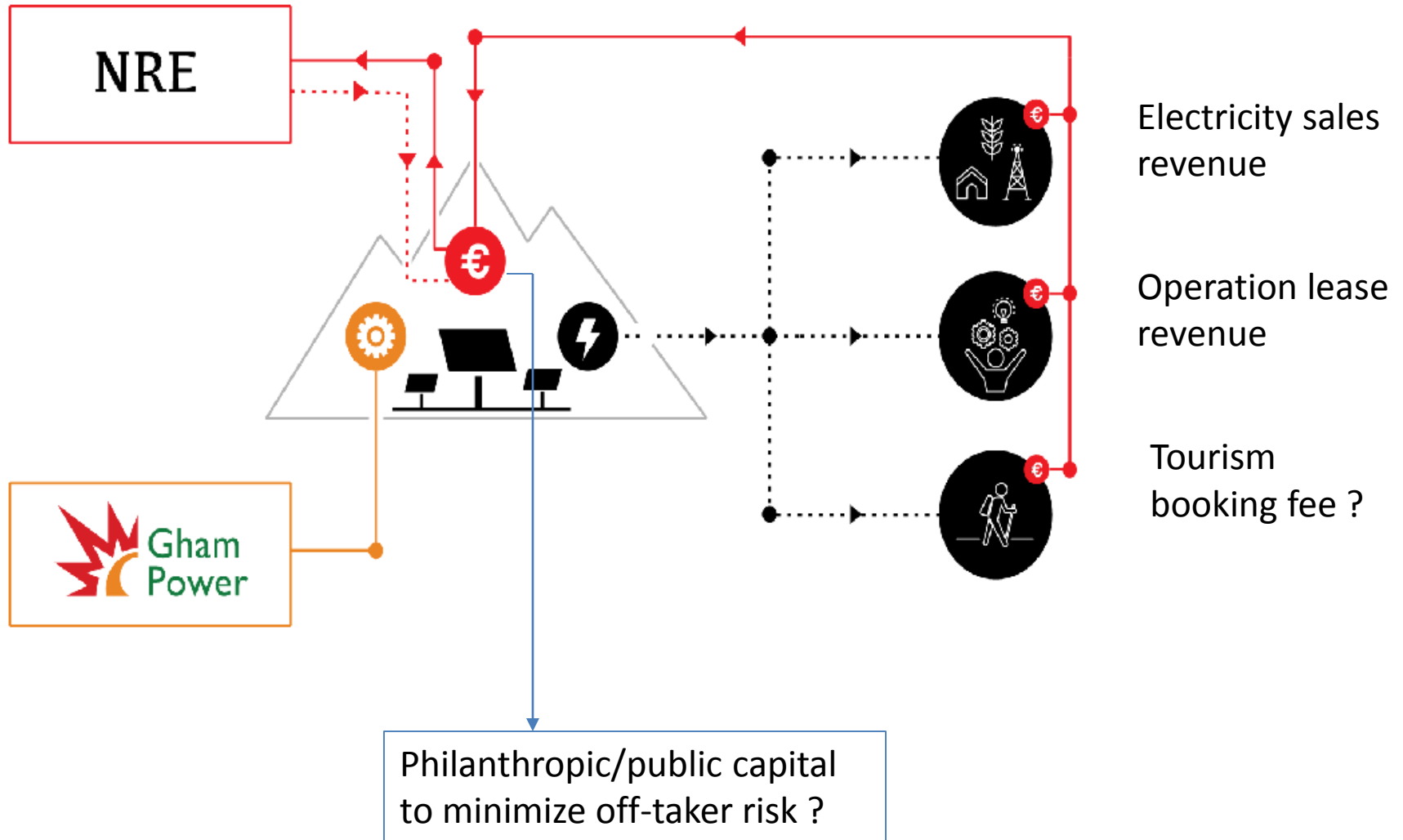
One week cycling challenge- Annapurna Base Camp

## Result

Created a Renewable Energy Fund (NRE)



# NRE: structure





# Phased-wise approach ?

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- First lease solar powered equipment
- Extend to microgrids only when profitable
- Advantages:
  - Low project development costs
  - Can be replicated with little donor support
  - Faster payback
  - Immediate value to the users
  - Further opportunity to aggregate projects together to increase capital requirements

# Thanks!



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