Global Himalayan Expedition

## Lighting up the Roof of the World

Core Objective

Global Himalayan Expedition leverages tourism and technology to provide
Clean Energy, Digital Education, Livelihood Creation, and Wireless Connectivity
to remote mountainous communities
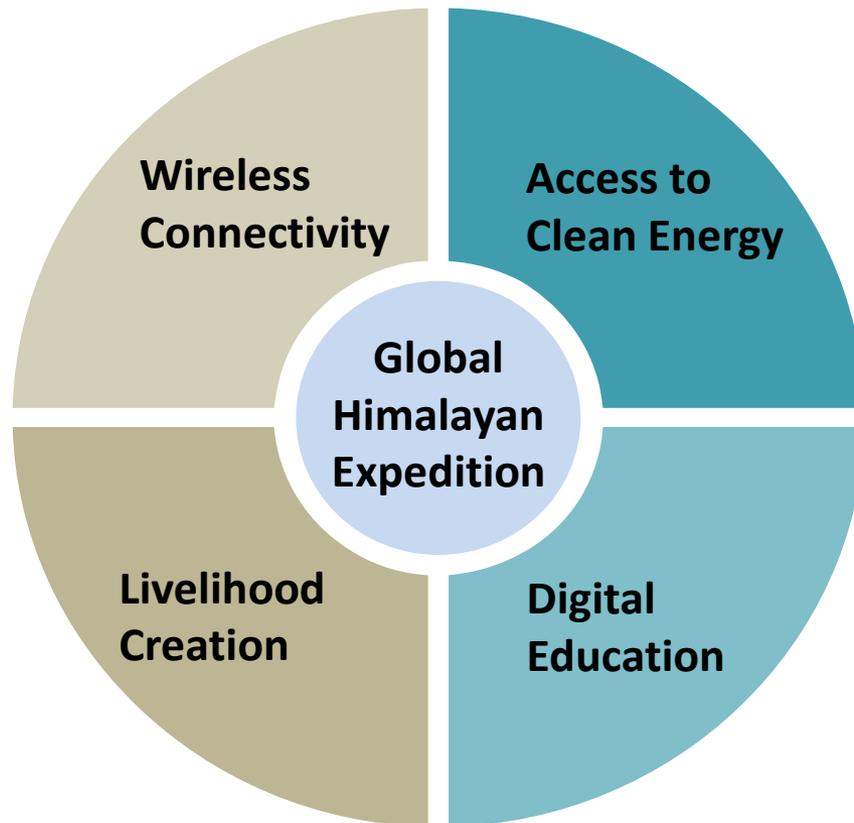
The Himalayan Situation

72 million – Population in Indian Himalayas

70% – Himalayan population without access to more than 10 hours of grid based electricity

Fragile Ecosystem – Large percentage of the world's fresh water and biodiversity

World's Oldest Civilization. Need for **Sustainable Lifestyle** – Minimizing waste generation

India's highest **Solar Insolation** levels – of 1250 w/m². Perfect for solar projects

DC Solar Microgrids (250W – 500W)

GHE's Sustainable Solution
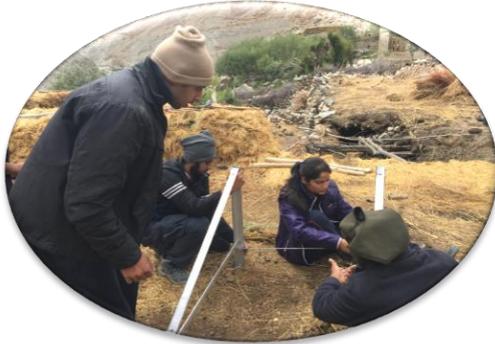
Impact Expeditions

- Impact expeditions to electrify remote villages with support from Tourists
- Team of 10-20 people as part of expedition
- Promotes the theme of responsible leadership and sustainable tourism among the participants.

Village Electrification

- Setup DC solar microgrids to provide electrification to remote off grid villages
- Removal of Subsidized Kerosene Oil from their lives
- Capacity development of Youth to become skilled and maintain these solar projects for various unelectrified villages

Village Solar Homestays

- Develop the homes of villagers for tourists to stay.
- Conduct village immersion tours for tourists to experience local culture
- Results in income generation for the village community and promotes entrepreneurship at village level

Global Himalayan Expedition

Our Ground Approach

1   Identify remote off-beat communities lacking basic infrastructure

2   Conduct surveys for solution design and community mobilization

3   Impact expeditions to remote villages and setup social infrastructure

4   Create a model of sustainability and ownership among community

5   Promote remote destinations as tourist hotspots

Our Ground Approach

1 **Identify remote off-beat communities lacking basic infrastructure**

We search villages through local contacts as there is no database or survey conducted due to their in-accessibility. The team treks sometimes for 5-6 days to reach Villages or need to drive on un- motorable roads

Our Ground Approach

2 **Conduct surveys for solution design and community mobilization**

It's important to have the community as well local leadership buy in before implementing the Solar microgrid. The process also includes educating villagers on the benefits of using Solar and its long term affect

Our Ground Approach

3   **Impact expeditions to remote villages and setup social infrastructure**

Our Ground Approach

3 | **Impact expeditions to remote villages and setup social infrastructure**

Our Ground Approach

4 **Create a model of sustainability and ownership among community**
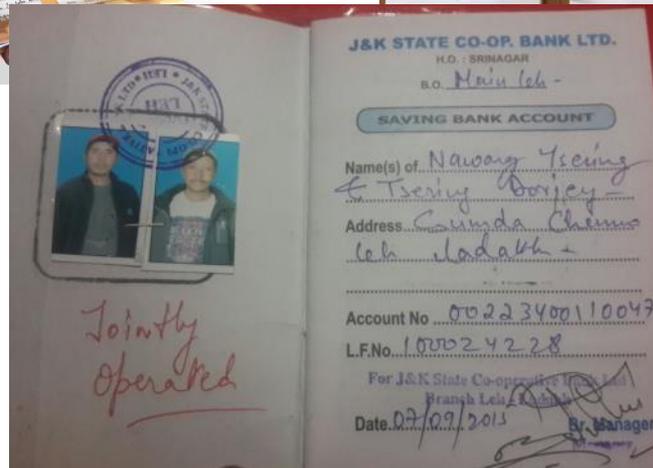
Our Ground Approach

5 **Promote remote destinations as tourist hotspots**

Value Proposition

Energy Efficient DC Appliances

250W Panel

Charge Controller

10A MCB

24V DC BUS

3W LED

3W LED

3W LED

20W LED TV

24V DC BUS

Two 12V 100Ah Battery in Series

UB121000
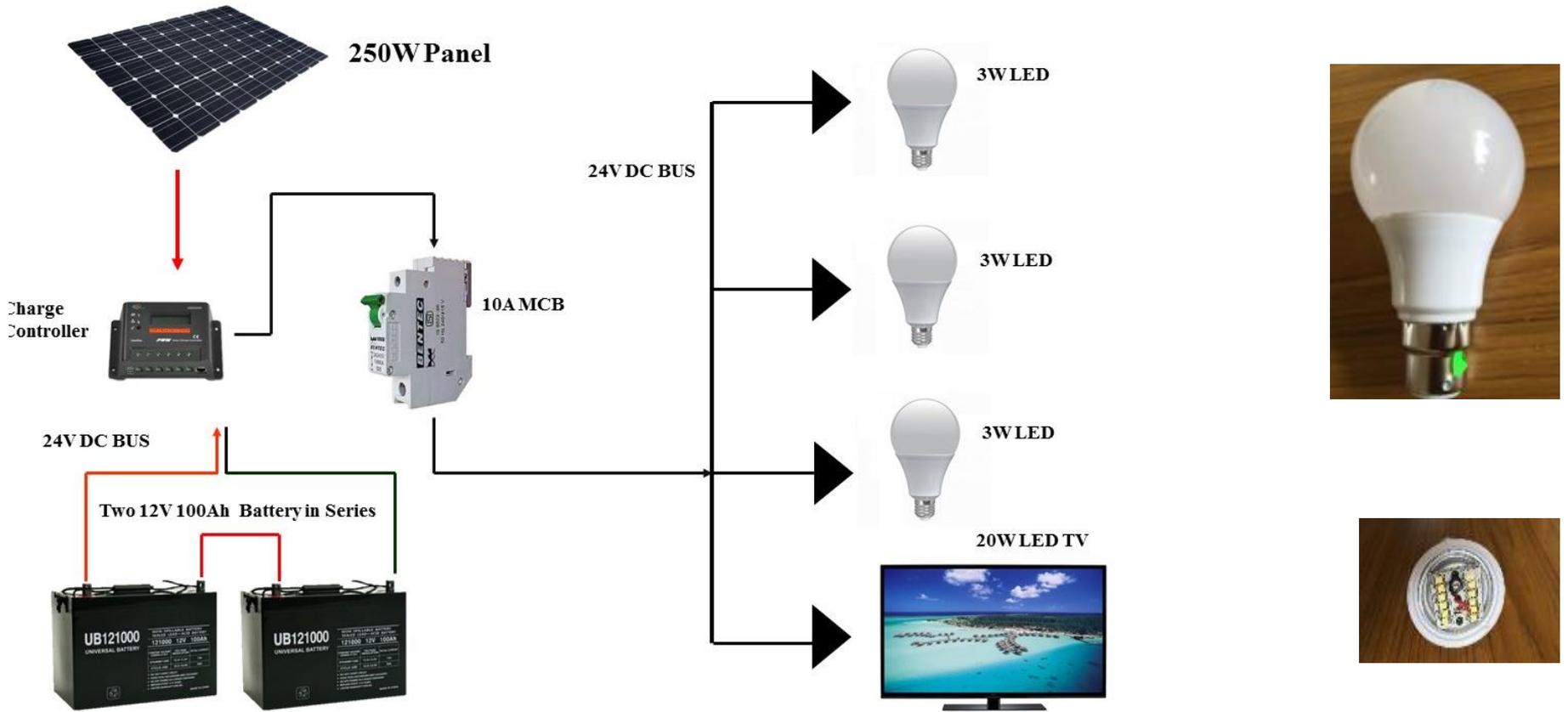
Value Proposition

Impact of Energy Efficiency

A 3W LED Light – 330 Lumens

Value Proposition

Women Electricians

Women run service centre

Value Proposition

STEPS TO TROUBLESHOOT MICROGRID

ཕྱུགས་ཀྱི་སྒྲོམ་སྒྲིང་རྒྱུང་གི་ཉག་རྒྱུལ་མེད་གན་བཚ་ཚེས་པའི་རིང་ག།

Operations དཀའ་ཚོངས།

How does a solar PV system work?
ཉི་ཤར་པི་ཝི་ལམ་གྲུབ་ག་ཉེད་པ་རེད།
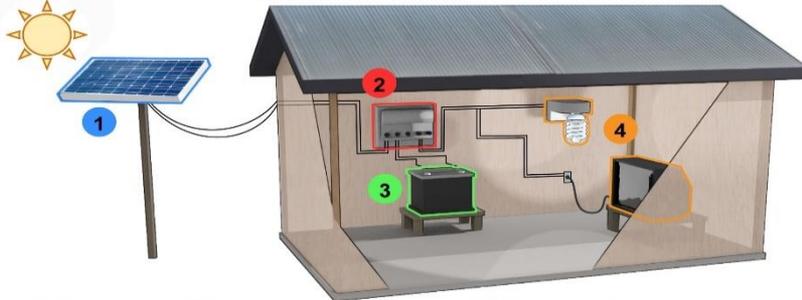
1 Array collects energy from the sun
ཉའ་རེ་ཀུད་ཏི་ཉི་ཐའི་གུལས་ཏེང་ར་རེད།

2 Controller protects battery for long life
ལ་སྒྲ་ཐོག་ཀྲུ་ཏིད་ད་རེད།

3 Battery stores energy for use later
ཏེ་རི་ནུཀས་སྒྲོང་ཏེད་རེད།

4 Energy is used for lighting & entertainment
སེམས་རབཟངས་ལ་ཤན་ལ་རེད།

Note: Do not move or rewire solar PV system

Do not waste energy, use energy efficient appliances
འདི་ཤུགས་གུན་ཡོང་བདག་མི་ཡོས་ཡང་བའི་མ་སོས་སྟེ་དཀོས་ཤོས།

LED ཨེལ་མི་ཏི

Use lights only when needed. Switch off when not needed
དཀོས་དོས་ཡོང་ཚ་ནའི་འོད་གུན་དཀོས་ཤོས་ཡང་མེད་ནའི་འོད་གུན་སད་ཏུ་འཚར་གོས།

OFF
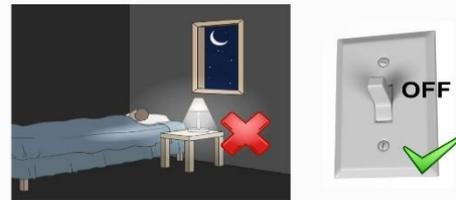
To add extra appliances, consult with solar expert. Do not use appliances which use a lot of power
ཡང་ཚ་ལཔག་དཀོས་ན་ལམ་ཆིད་མགས་པ་དང་སྤུ་ཏེ་ལམ་གུན་ཆིད་གོས་ཤོག་ཤུགས་ཆད་པོ་ཆེར་ཀན་ནའི་ཅ་ལཔག་དཀོས་མ་གོས།

Reduce energy use during cloudy weather and regularly check controller to see how full your battery is
ནམ་ཀྲ་བའི་མོ་མེད་ན་ཉེ་འའི་ཤུགས་གུན་དཀོས་མི་གོས་ཡང་ཏེ་ཏི་ར་སྐྲ་ཏོག་རྒྱ་ལ་ཉེད་གོས།

Operations དཀའ་ཚོངས།

Maintenance ཉེ་གསོ།

Clean dust and dirt from PV array
པི་ཝི་ལའི་རེ་སྐྲོགས་གུན་ཚང་མ་ཉེད་གོས།

Use caution with batteries. Check battery terminals for corrosion and tight connection
ཏེ་ཏི་རེ་སྐྲུ་པོ་དང་ཉམ་པོ་དཀོས་གོས།

Keep PV array shade free
པི་ཝི་ལའི་རེ་ཏིབ་པོག་མི་གོས།

Add distilled water or directly collected (pure) rain water only (for flooded batteries only)
ཏེ་ཏི་རེ་ནད་ལ་ཆུ་ལཔགས་མོ་དཀོས་གོས་ཡང་ན་ཆར་ཆུ་ལཔགས་མོ་སྐྲད་གོས།།

Value Proposition

## Women empowerment – Mountain Homestays

- **Additional income for the family through homestays**
- **Better sanitation and living standards**
- **Engaging in economic activities of the household**
- **Motivation to make Pashmina and other woolen artifacts**

Value Proposition

Low Power Digital Education Centre

Modem for satellite internet dish installed on roof

Raspberry PI computer

Keyboard, mouse, & monitor

Power in from solar panels, batteries, charge controller

Transmits to four identical Raspberry PI computers in the next room

RACHEL Plus Server
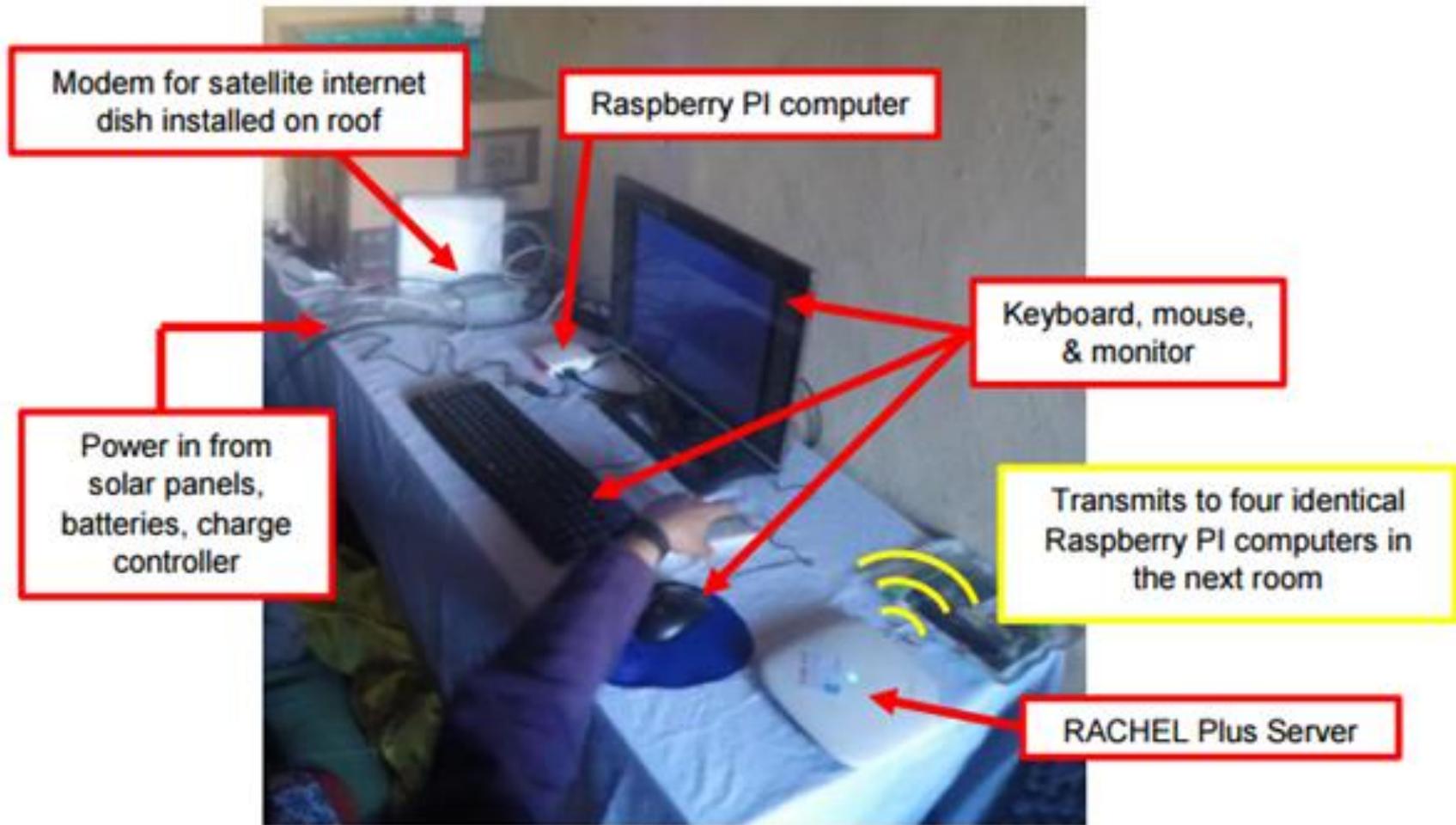
Value Proposition

Value Proposition

## Internet of Things ("IoT") enabled metering and Data Collection

- Mobile based data connectivity directly with Solar Charge controller

- Solar Charge controller communicates with individual Meters

- Mesh Network to upload Tourists data onto the server and transfer it on the device whenever connected

www.ghe.co.in

GHE Impact & Performance

Electrification of 29 Villages

$200,000 Gross Revenue from Expeditions

$25,000 Revenue from Homestays

$7,000 Generated From Handicrafts

$105,000 Bottom Line

* 2x returns from every Impact Expedition

GHE Impact & Performance

Electrification of 29 Villages

15,500 Lives Impacted

Established **20** Woman Entrepreneurs

1,000 Student Lives Impacted

175 Tons of CO^2 Eliminated

- **- 200 Tourists Impacted 15,500 Lives**
- **- 1 Tourist Impacts 7 Lives Directly**
- **- 1 Tourist Impact 35 Lives Indirectly**

Aspirational Loads

December 2014

August 2016

Marketing Strategy

Social Media - Promote the impact expeditions and disseminate information on technological innovations to increase impact

GHE has partnered with media houses such as Nat Geo to show GHE's work. Airing of our documentaries have bought in huge traction and interests from around the world

For sustained revenue, GHE is institutionalising the initiative with corporates and universities that brings in constant revenue for a longer period

Commercialisation of energy efficient DC products that have been designed by GHE for the market that is within as well as outside India

Core Team

Paras Loomba
Founder

Gaganpreet Singh
Homestays Leader

Michiel Roodenburg
Project Finance Leader

Jaideep Bansal
Energy Access Leader

Global Himalayan Expedition

www.ghe.co.in

Strategic Partnerships

Future Plans (Next 5 Years)

Increase Existing Programs

- 100 Electrified Villages in Himalayas
- 100 Impact Expeditions
- Develop Homestays
- Increase in rural handicrafts and education programs
- Quality Digital education

Develop Team and Technology

- Grow Core Team to 10 people
- Refine payment mechanisms and software
- Increase in efficient microgrid systems supporting multiple rural applications

Global Expansion

- Based on lessons learned by GHE in India, expand to the following countries:

Peru, Kazakhstan, Ecuador, Nepal, Bolivia, Ghana, Cameroon, Liberia

Investment Required: US $ 2 million

Global Himalayan Expedition

1400 Year old Lingshed Monastery – 14000ft

Let there be Light!

Thank You!

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