



PROJECTS



# Bushlight approach to energy efficiency and demand management for remote village electrification

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Project Director

Bushlight India Project

CAT Projects



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# Bushlight India

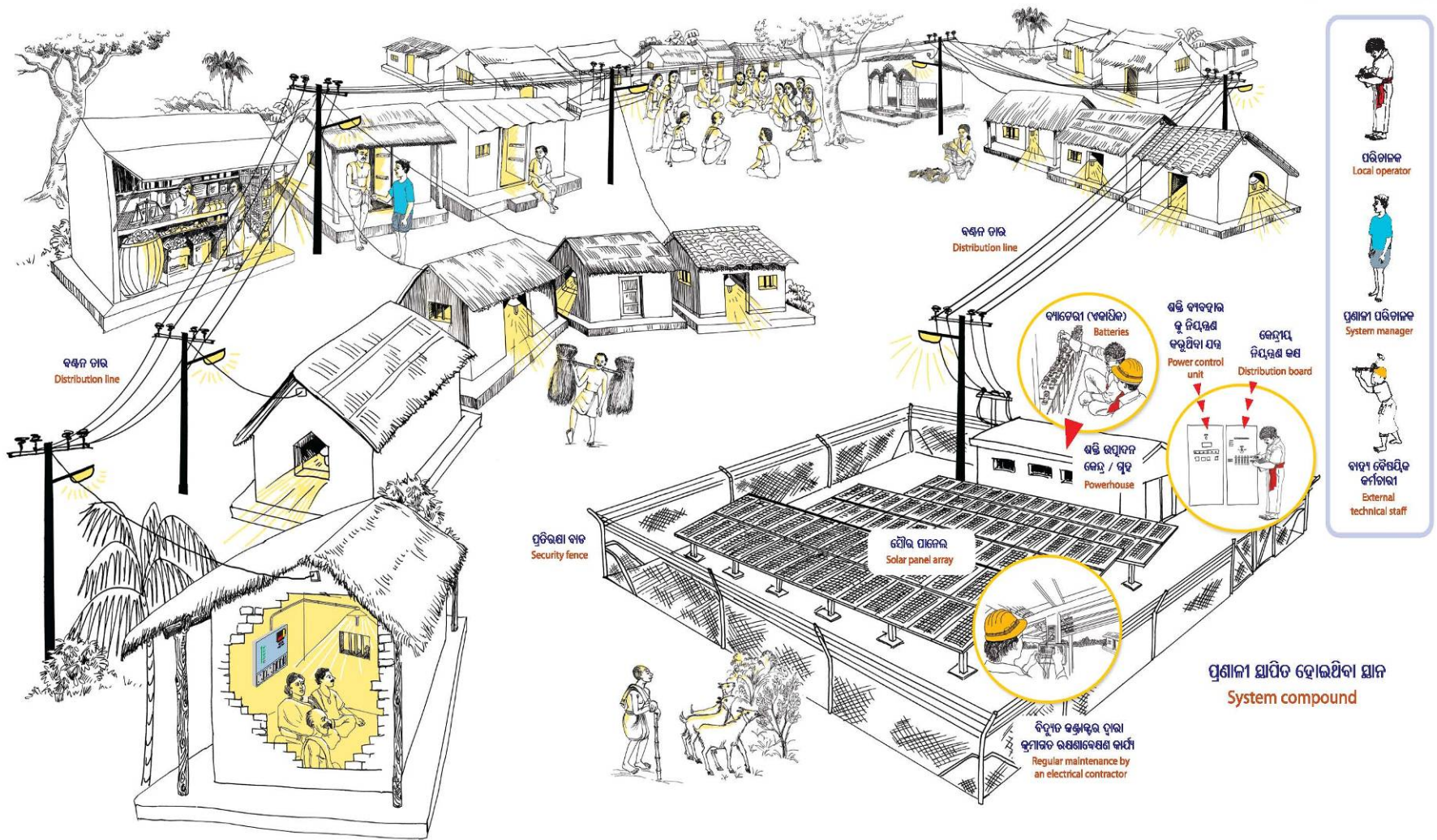
- AUD \$3m, 2 ½ year project
- Funding provided by the Australian government through the Asia Pacific Partnership on Clean Development and Climate
- Managed by CAT Projects, a subsidiary company of the Centre for Appropriate Technology
- Project will conclude in December 2010

*Collaboratively develop and demonstrate a model for the delivery of:*

- reliable*
- financially sustainable*
- locally managed*

*centralised renewable energy systems in remote villages, based on an adaptation of the 'Bushlight' implementation model.*

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



-  ପରିଚାଳକ  
Local operator
-  ପ୍ରଣାଳୀ ପରିଚାଳକ  
System manager
-  ବାହ୍ୟ ବୈଷୟିକ କର୍ମଚାରୀ  
External technical staff



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# Bushlight India

## The Village Energy Service Delivery Model (VESDM):

1.Village Selection

2.Village Energy Planning (VEP)

- Education & Information
- Energy budgeting

3.System design (solar PV)

- Technical
- Financial modelling
- Comparative life cycle cost assessment

4.Establishment of institutional management & support structures

5.Training and support



# বিদ্যুৎ পরিষেবার স্তর Energy service Levels

বিদ্যুৎ পরিষেবার স্তর ১  
SERVICE LEVEL 1

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

২০০ Wh/day (200Wh/day)



বিদ্যুৎ পরিষেবার স্তর ২  
SERVICE LEVEL 2

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

৩০০ Wh/day (300Wh/day)



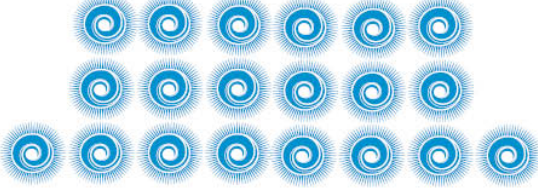
বিদ্যুৎ পরিষেবার স্তর ৩  
SERVICE LEVEL 3

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

৪০০ WH/DAY (400WH/DAY)



# বিদ্যুৎ পরিষেবার স্তর Energy service Levels

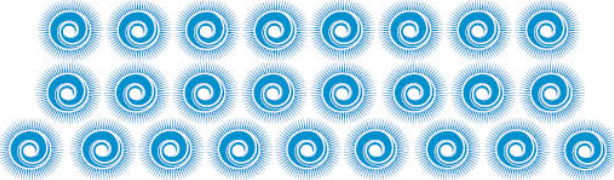
বিদ্যুৎ পরিষেবার স্তর ৪  
SERVICE LEVEL 4

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

৫০০ WH/DAY (500WH/DAY)



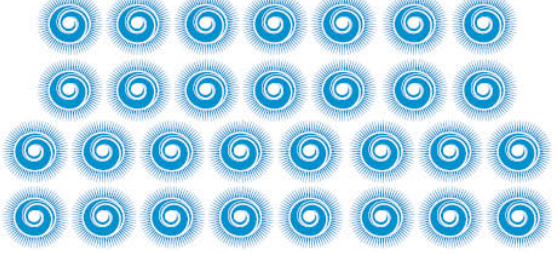
বিদ্যুৎ পরিষেবার স্তর ৫  
SERVICE LEVEL 5

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

৬০০ WH/DAY (600WH/DAY)



বিদ্যুৎ পরিষেবার স্তর ৬  
SERVICE LEVEL 6

পরিষেবা মূল্য  
Service fees

/২৪ ঘন্টা

Rs /day

৮০০ WH/DAY (800WH/DAY)



# बिजली बजट- उपकरण सूची

# Energy budgeting - menu of appliances

## रोशनी

Lighting



2 घण्टे  
2 hours



4 घण्टे  
4 hours



6 घण्टे  
6 hours



8 घण्टे  
8 hours

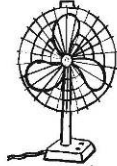


## ठंडा करना

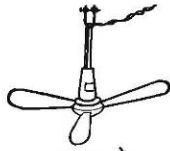
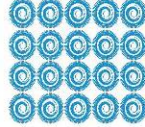
Cooling



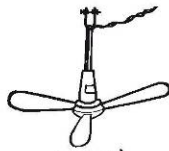
4 घण्टे  
4 hours



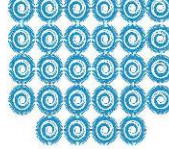
8 घण्टे  
8 hours



4 घण्टे  
4 hours



8 घण्टे  
8 hours



## दूरसंचार

Communication



1 घण्टे  
1 hour



4 घण्टे  
4 hours

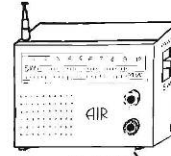


## मनोरंजन

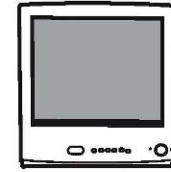
Entertainment



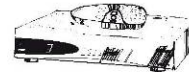
2 घण्टे  
2 hours



4 घण्टे  
4 hours



3 घण्टे  
3 hours



3 घण्टे  
3 hours



## छत का पंखा

Small fridge

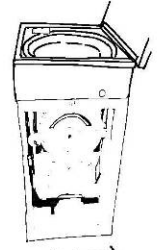


12 घण्टे  
12 hours



## पीसने की छोटी चक्की

Small grinder



3 घण्टे  
3 hours



গ্রামের নাম

Village name:

ব্যবহারকারীর ধরণ User type (tick)

বাড়ি Household

সামাজিক গৃহ Community building

উদ্যোগী Entrepreneur

বাড়ি Household

Household number: HH 42

Head of household names (male and female):

সামাজিক গৃহ Community Building

Building number:

Building name:

উদ্যোগী Entrepreneur

Building number:

Entrepreneurs name:

Activity description:

বাড়ি তৈরী Building construction:

Wall material? (eg mud, brick, wooden beam etc.)

Mud wall with wooden beams

Roof material? (eg thatch, tile, tin sheet etc.)

Bamboo lathe and thatch

How many rooms are there? 3

বিদ্যুৎ পরিষেবার স্তর Energy Service Level

1: 200 Wh/day (200Wh/day)

2: 300 Wh/day (300Wh/day)

3: 800 Wh/day (400Wh/day)

4: 500 Wh/day (500Wh/day)

5: 600 Wh/day (600Wh/day)

6: 800 Wh/day (800Wh/day)

7: 1000 Wh/day (1000Wh/day)

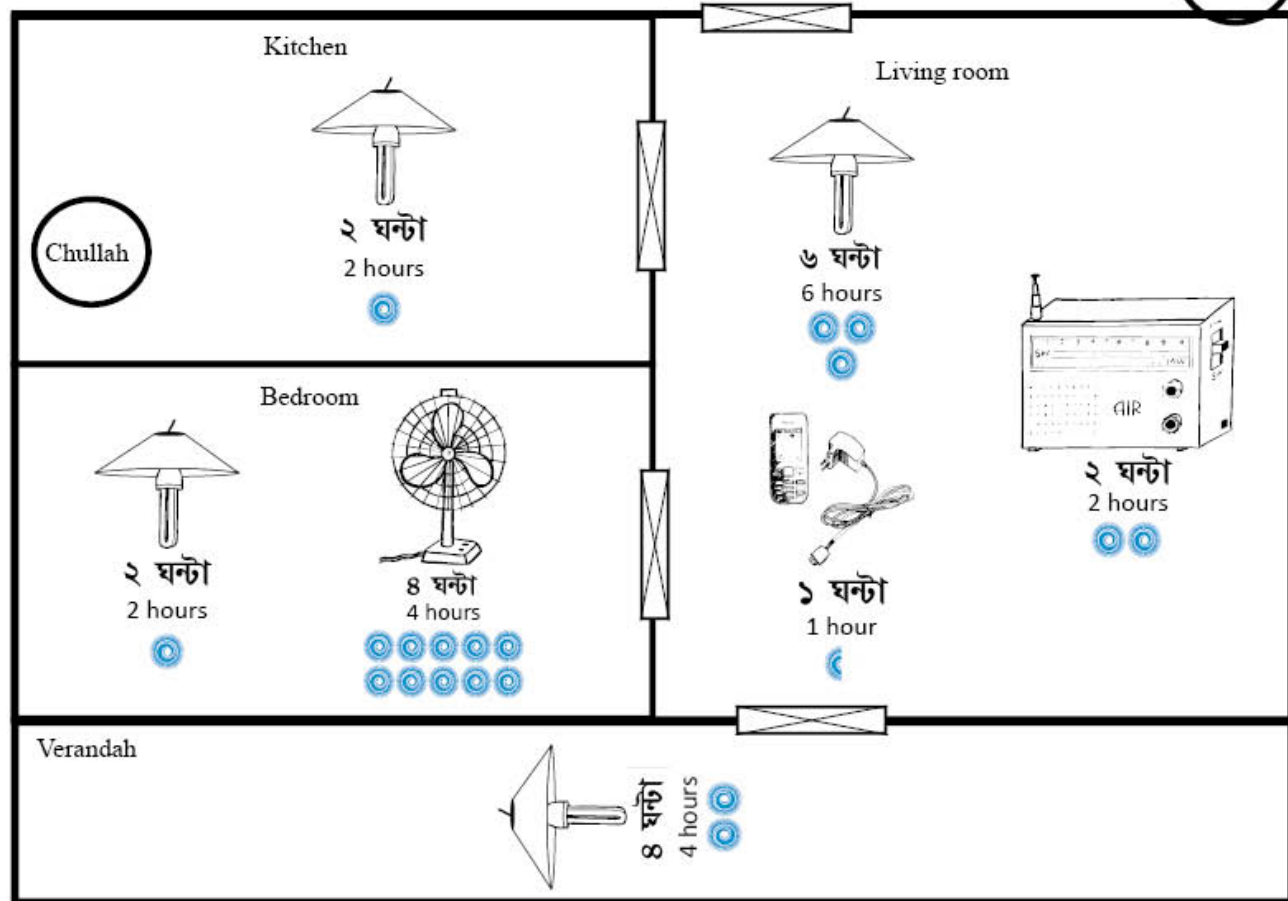
Other: .....Wh/day

আপনার বিদ্যুৎ ব্যবহারের হিসেব

YOUR ENERGY BUDGET

মেঝের নক্সা

FLOOR PLAN

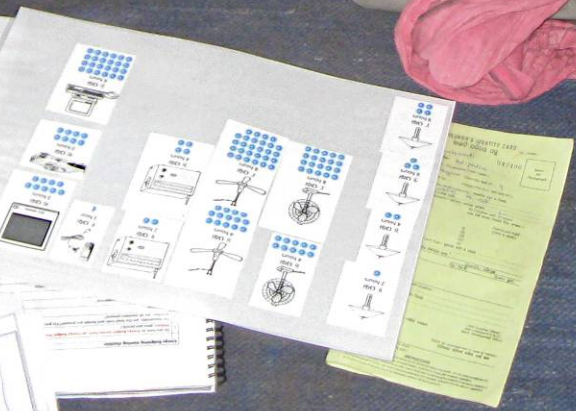
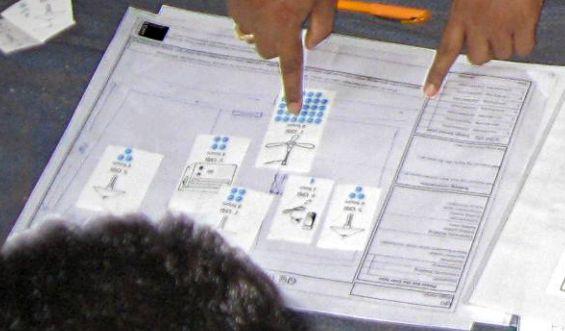


Draw all walls and doorways. Label all rooms. Show the location of all cookstoves (inside and out). Provide estimate dimensions.  
Fix appliances icons and energy meter icon to the plan when the final energy budget is decided. Draw in the location of the three light fittings to be supplied.





YOUR ENERGY BUDGET



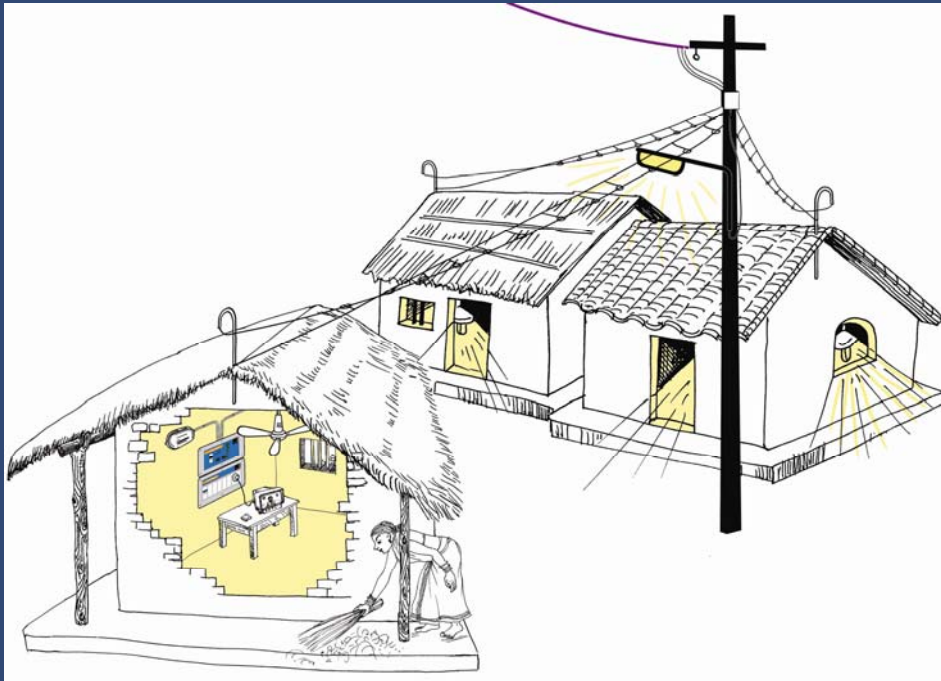
YOUR ENERGY BUDGET  
FLOOR PLAN

YOUR ENERGY BUDGET  
FLOOR PLAN



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## The Urja Bandhu

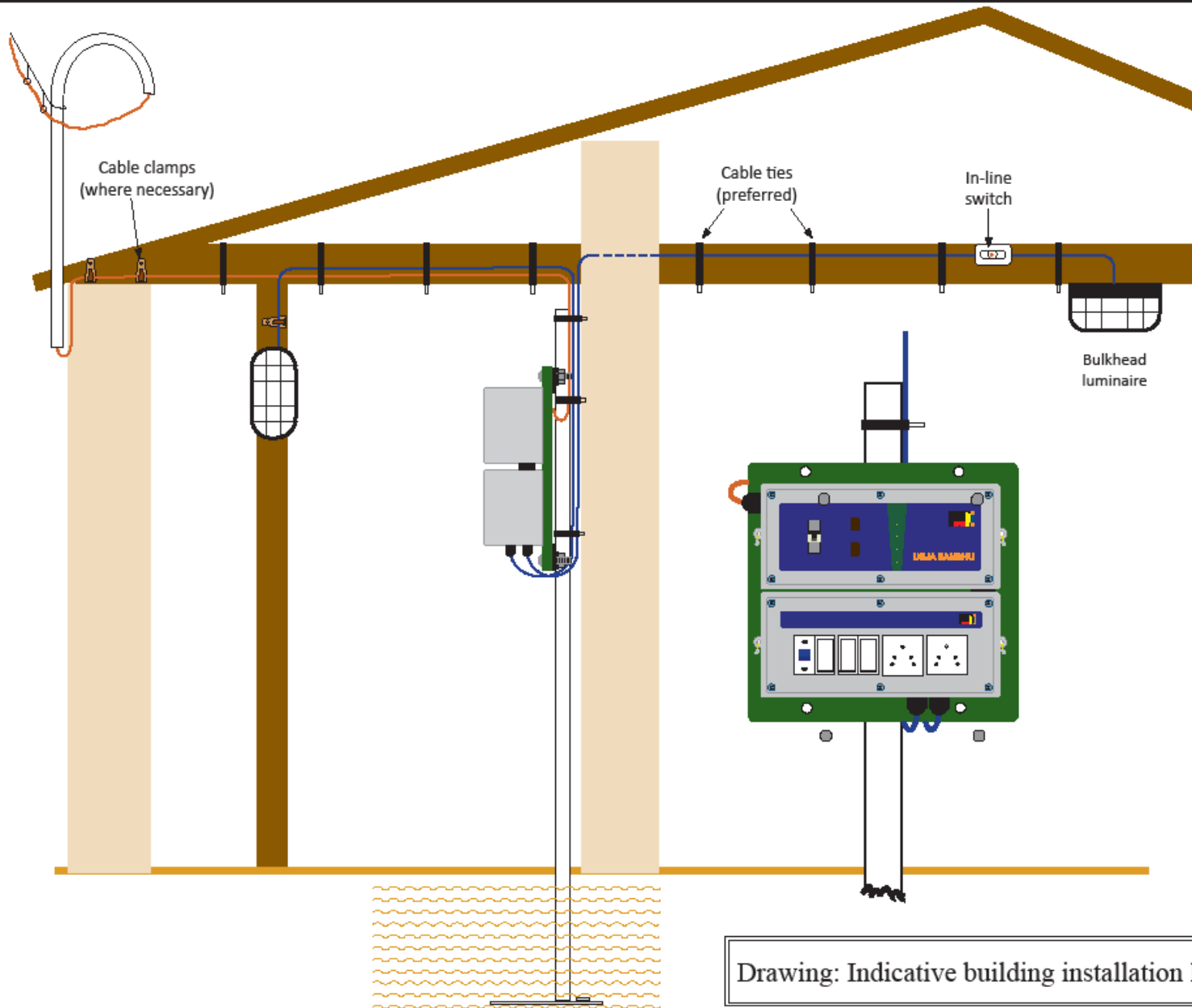
Designed, developed and manufactured in India.

Programmable device for limiting the total amount of energy used by each customer over a 24 hour period.

Low cost: Rs 3000 including switchboard and mounting plate.

Intuitive display links in with the energy budgeting process.





Drawing: Indicative building installation layout



# CAT PROJECTS

## System Control Board

Designed, developed and manufactured in India.

Allows for central control and monitoring of four separate main feeder lines.

Incorporates a smart load shedding system whereby power is cut to the various lines on a prioritised basis.

Intuitive display allows operators to easily monitor system performance and identify instances of power theft.



System Status

Battery Status



OK LOW Main Switch



System KWh



Indicator light test

Feeder Line	Line 1	Line 2	Line 3	Line 4
Icon	House	House	Street Light	Warehouse
Status	Disconnected	Disconnected	Disconnected	Disconnected
Budget	Daily Budget exceeded	Daily Budget exceeded	Daily Budget exceeded	Daily Budget exceeded
kWh	123456000	123456000	123456000	123456000
Isolator	Isolator	Isolator	Isolator	Isolator
Line Status	Line 1 active	Line 2 active	Line 3 active	Line 4 active



PROJECTS

For more information:

[www.catprojects.com.au](http://www.catprojects.com.au)

[www.bushlight.org.au](http://www.bushlight.org.au)

[grant.behrendorff@catprojects.com.au](mailto:grant.behrendorff@catprojects.com.au)