

Business Models for rural Electrification by PV

**by Prof. Peter Adelman
University of Applied Science Ulm / Germany**

**PV Solar Home Systems
are often the least cost
option for rural
electrification**

-

**Sometimes the 1st
investment is a obstacle**

**What business models
can help to overcome
this obstacle?**

Different Business Models

- Fee For Service
- Micro credits
- Hardware
- Step by Step
- New Idea:
- Power Step by Step



Fee for Service

- User pay a fixed amount every month
- Service provider is owner
- Service provider is responsible for the exchange of all broken components



Fee for Service

Advantages for user

- User pay only if system deliver service

Disadvantage for user

- Relative high cost for service
- Discussion necessary if system need to be extended or changed



Fee for Service

Advantages for service provider

- System can be moved if user stop to pay

Disadvantage for service provider

- User is not the owner and feel not responsible
- High effort necessary to keep system running
- Efforts to collect money



Fee for Service

Projects with fee for service in Africa:

- Namibia (totally failed)
- South Africa (partly failed)
- Morocco (still running)



Fee for Service

Problems Namibia (Suntechnics)

- Due to technical problems user stop to pay
- System was then converted to normal SHS



Fee for Service

Problems South Africa (Shell-Eskom)

- Due to technical problems user pay not regular
- Collecting of money was more expensive than the amount which was collected
- Systems have been given for free to the users



Fee for Service

Experience in South Africa (Raps)

- Systems can run for long time if user and market is analysed carefully
- Subsidy still necessary to keep some parts of the market running



Fee for Service

Experiences in Morocco
(Tenesol, BP, Isofoton):

- Installation still ongoing
- 9\$ fee per month



Micro Credit

- User get a micro credit
- User is owner of the system
- Sometimes the bank business and system integration are separated



Micro Credit

Advantages for user

- Relative small payment every month; Amount lower than current cost for kerosene & batteries
- Often user can choose his individualized system
- User can choose supplier



Micro Credit

Disadvantages for user

- Relative high interest rate for financing (up to 20%)
- User have sometimes to deal with 2 organisations



Micro Credit

Advantages for Micro Bank

- User feel responsible and protect system against environment and thieves

Problem for Micro Bank

- How to collect the money



Micro Credit

Experiences from from
Micro Credit

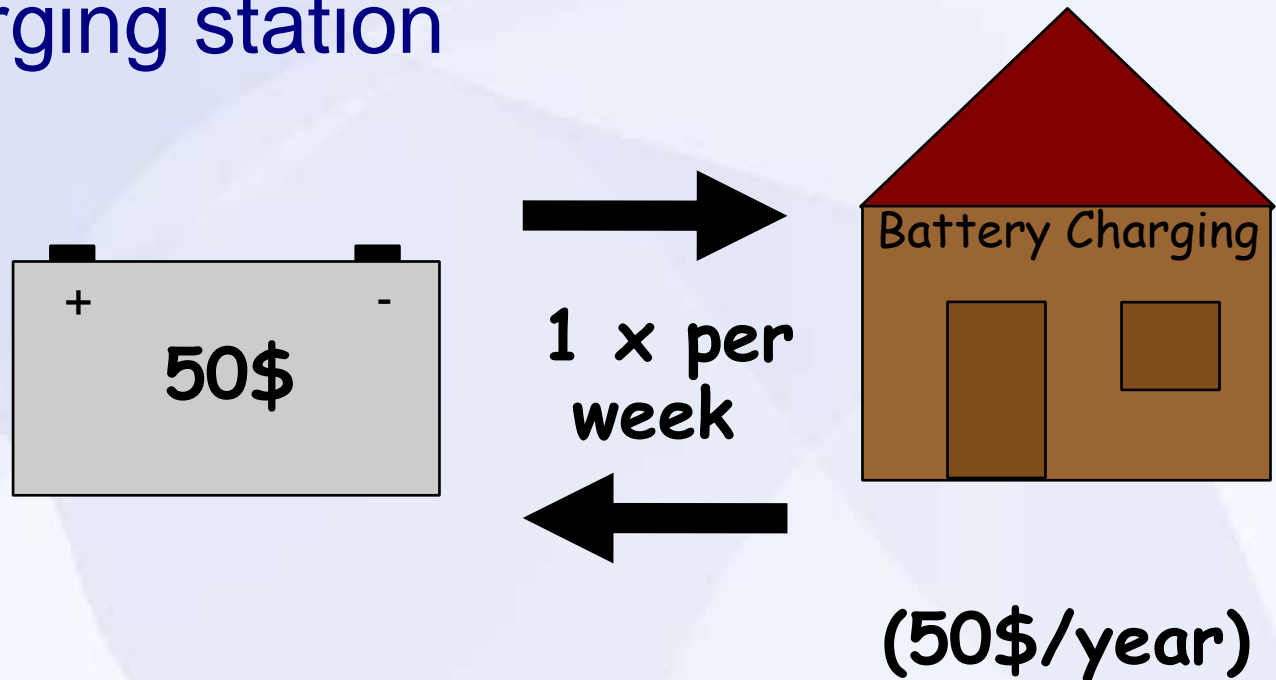
- In Bangladesh is the worlds largest and most successful rural electrification project partly done over micro credit



Hardware Step by Step

Principle

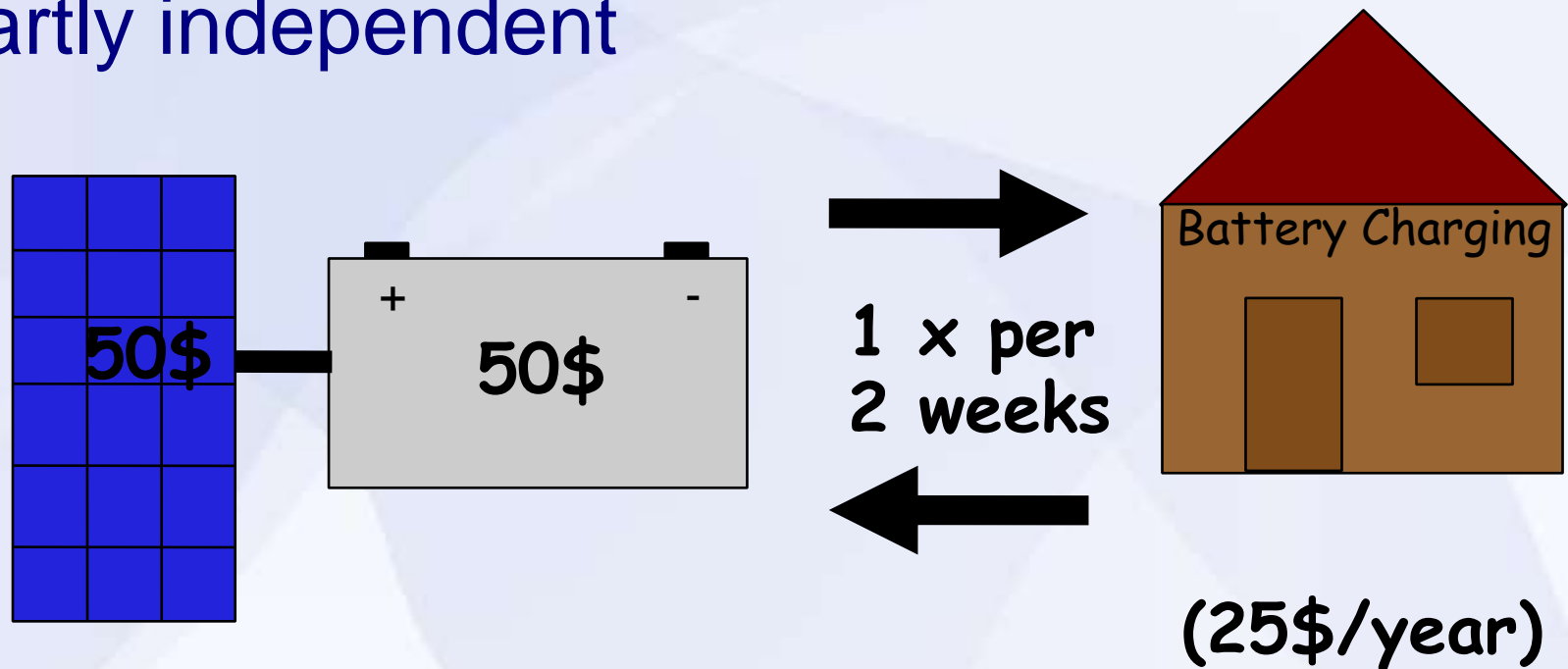
- User buy a battery and bring this battery weekly to the charging station



Hardware Step by Step

Principle

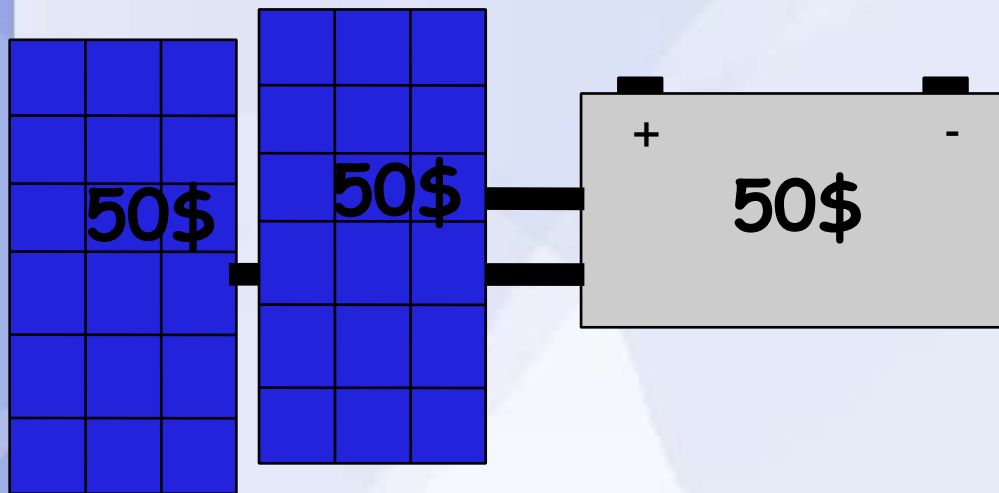
- After some time user buy one solar module and is partly independent



Hardware Step by Step

Principle

- User buy a second module and is completely independent



**No more
charging
over station**

Hardware Step by Step

Advantages

- User pay only small amount per step
- No micro credit necessary
- Ownership and responsibilities are clear at any moment



Hardware Step by Step

Advantages

- User pay only small amount per step
- No micro credit necessary
- Ownership and responsibilities are clear at any moment



Hardware Step by Step

Experiences from Kenya

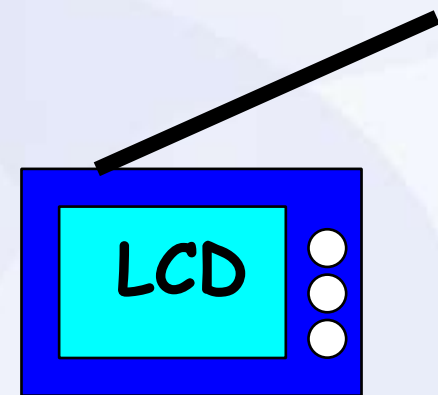
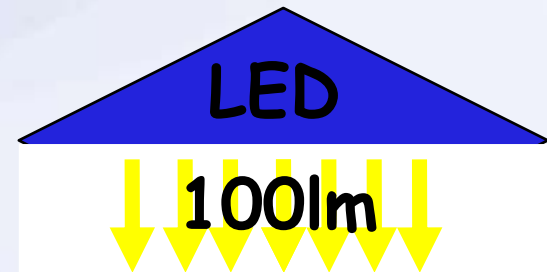
- 3-4 Millions Kenyans are electrified over solar energy
- BUT
- Cost could be further decreased if better hardware would be used



New Idea: Power Step by Step

Idea:

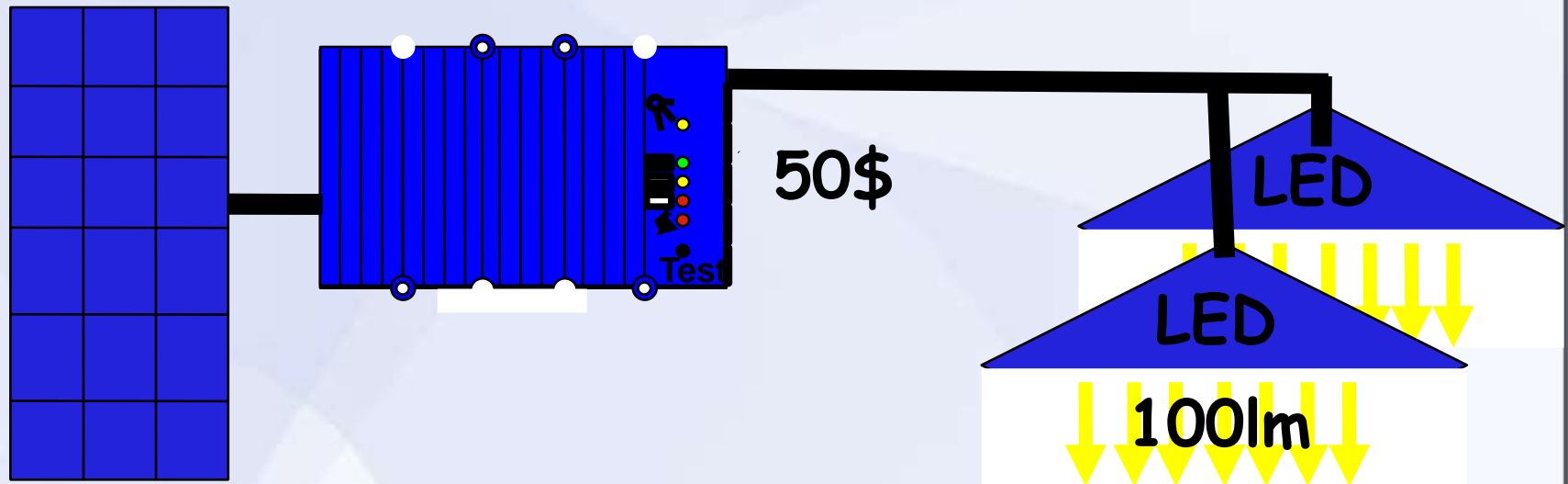
- High efficient loads use need very little power
- (LED 1W = 100lm)
- (TV 4W @ 8")
- New Li based batteries allow parallel connection



New Idea: Power Step by Step

Idea:

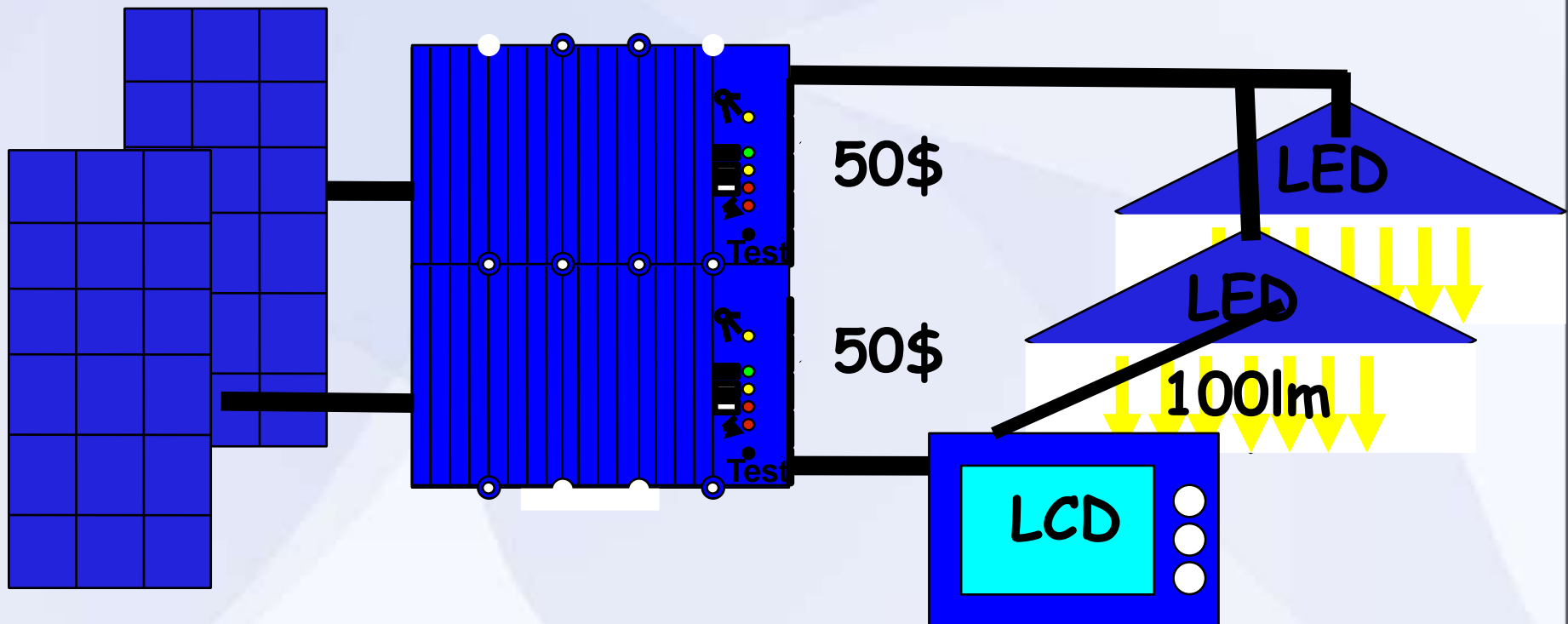
- User buy system for light



New Idea: Power Step by Step

Idea:

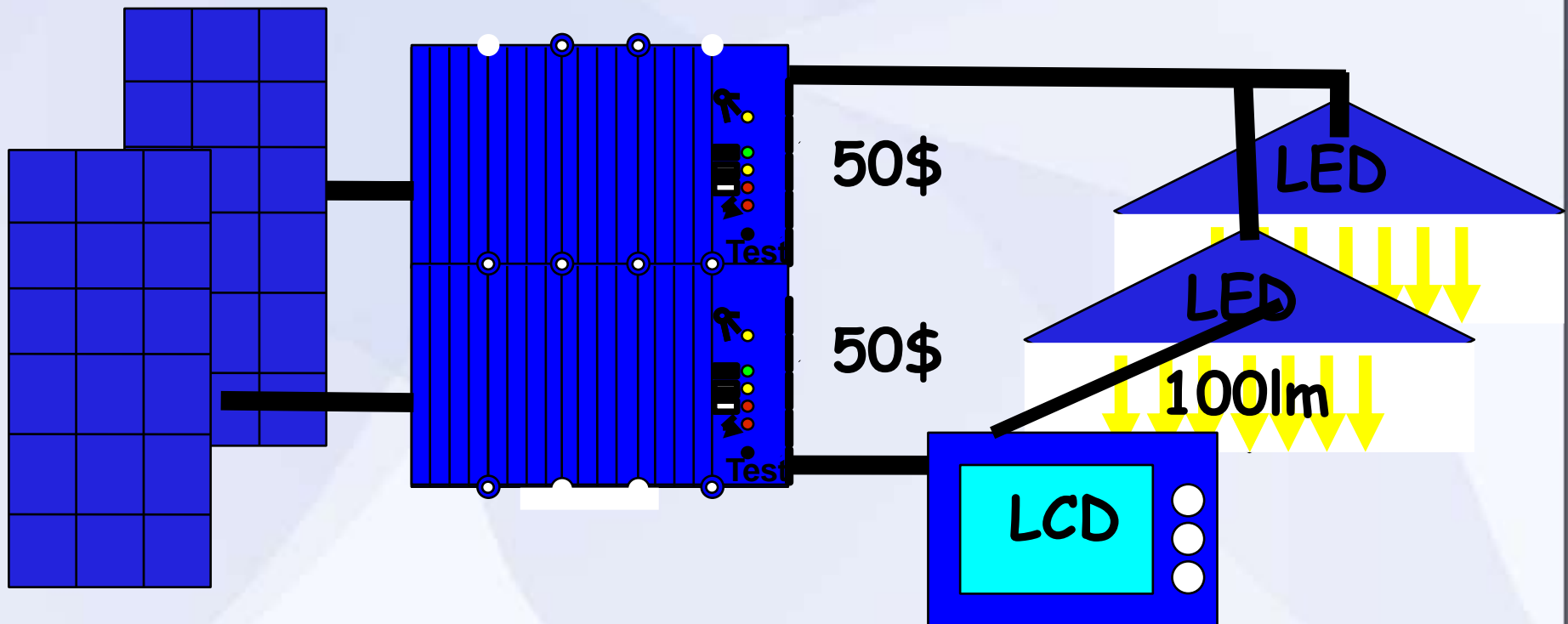
- User buy second system for TV



New Idea: Power Step by Step

Idea:

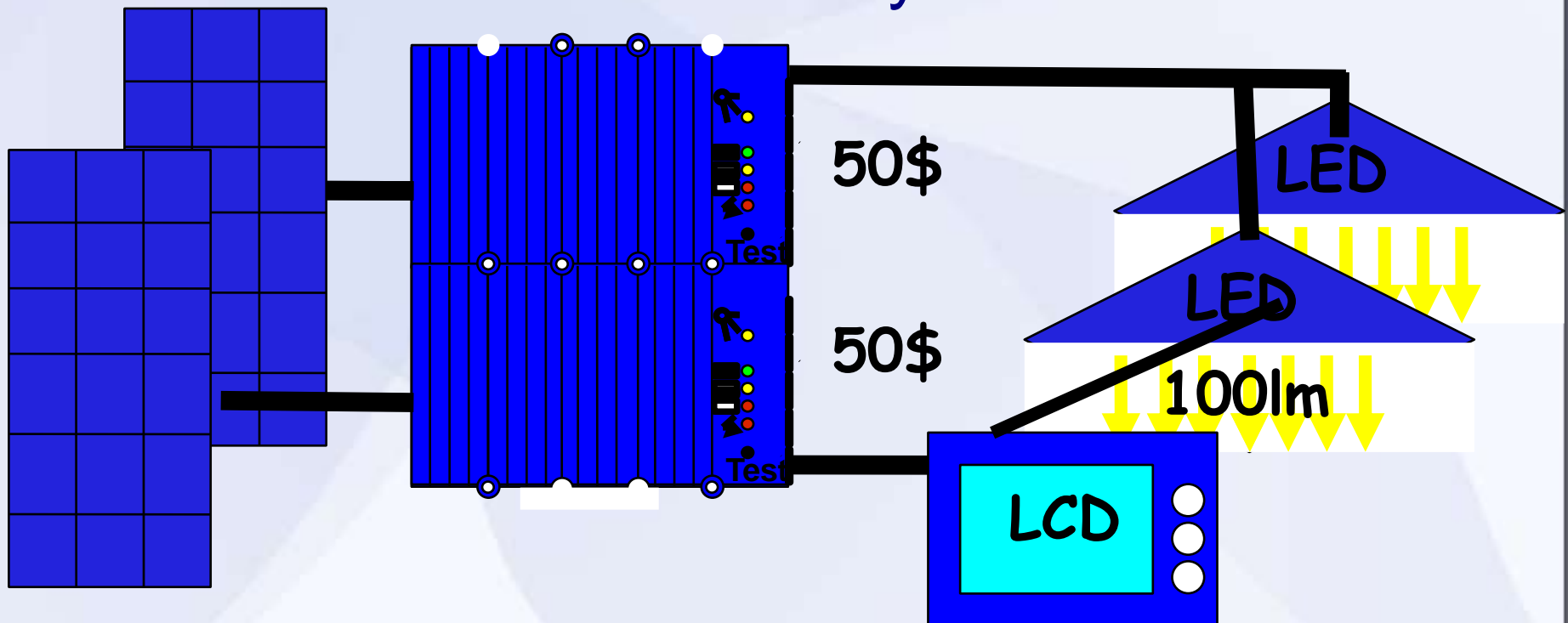
- Further expansion possible
Systems are parallel and synchronone



New Idea: Power Step by Step

Advantages:

- Ownership and responsibilities are clear
- No micro credit necessary



Conclusions:

- There are several ways to bring solar energy to people
- If people want full power they will need financing
- Financing cost money
- Efficient loads and new battery technology will help to decrease the cost