



# Cleantech Forum **Asia**

**Singapore** | November 13-14, 2018



Cleantech Forum **Asia** | Singapore

# PART 1

Powering the Region:  
Off-Grid, Microgrids, and Related  
Business Opportunities in a World of  
Decentralized Power Systems



# Cleantech Forum **Asia** | Singapore

## PART 1 Powering the Region



**MODERATOR:**  
**KATARINA**  
**UHEROVA**  
**HASBANI**  
Founder, Enrupt



**NATASHA ALLEN**  
Founder &  
Executive  
Director, Mee  
Panyar



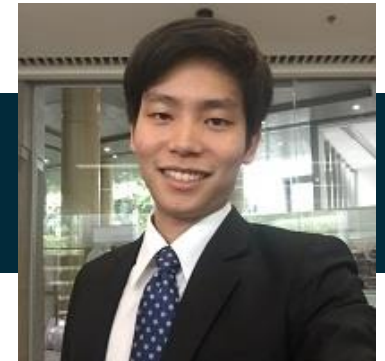
**FOOK HOONG**  
**CHOO**  
Co-Director and  
Programme  
Director, REIDS,  
Energy Research  
Institute @ NTU



**CARLALBERTO**  
**GUGLIELMINOTTI**  
CEO & General  
Manager, ENGIE EPS



**DR. WUTHIPONG**  
**SUPONTHANA**  
Managing  
Director, Leonics



**WARIT**  
**TAECHAJINDA,**  
Manager,  
Electricity  
Value Chain  
Project, PTT



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## PART 2

Powering the Region:  
Off-Grid, Microgrids, and Related  
Business Opportunities in a World of  
Decentralized Power Systems



# Cleantech Forum **Asia** | Singapore

## PART 2 Powering the Region



**SEBASTIAN GROH**  
Managing Director, SOLshare

An aerial photograph of a village in Bangladesh at dusk. The image shows several houses with corrugated metal roofs. A network of glowing orange lines and squares is overlaid on the image, representing a solar sharing network. The lines connect various points across the village, including a large solar panel array on the left and several smaller panels on different roofs. The background is dark, and the sky is a deep blue.

**solshare** 

Create a network. Share electricity.  
Brighten the future

# Building the energy utility of the future in Bangladesh

[www.me-solshare.com](http://www.me-solshare.com)  
Dr. Sebastian Groh  
CEO of ME SOLshare Ltd.  
[sebastian.groh@me-solshare.com](mailto:sebastian.groh@me-solshare.com)

**For those in the dark, no access to  
electricity means:**

Average rent-out price for light:

**US\$ 3.50/kWh**

Average rent-out price for mobile charging:

**US\$ 10.50/kWh**



solshare

Create a network. Share electricity.  
Brighten the future

Bangladesh  
-our design lab-

25 million people w/  
Solar Home Systems

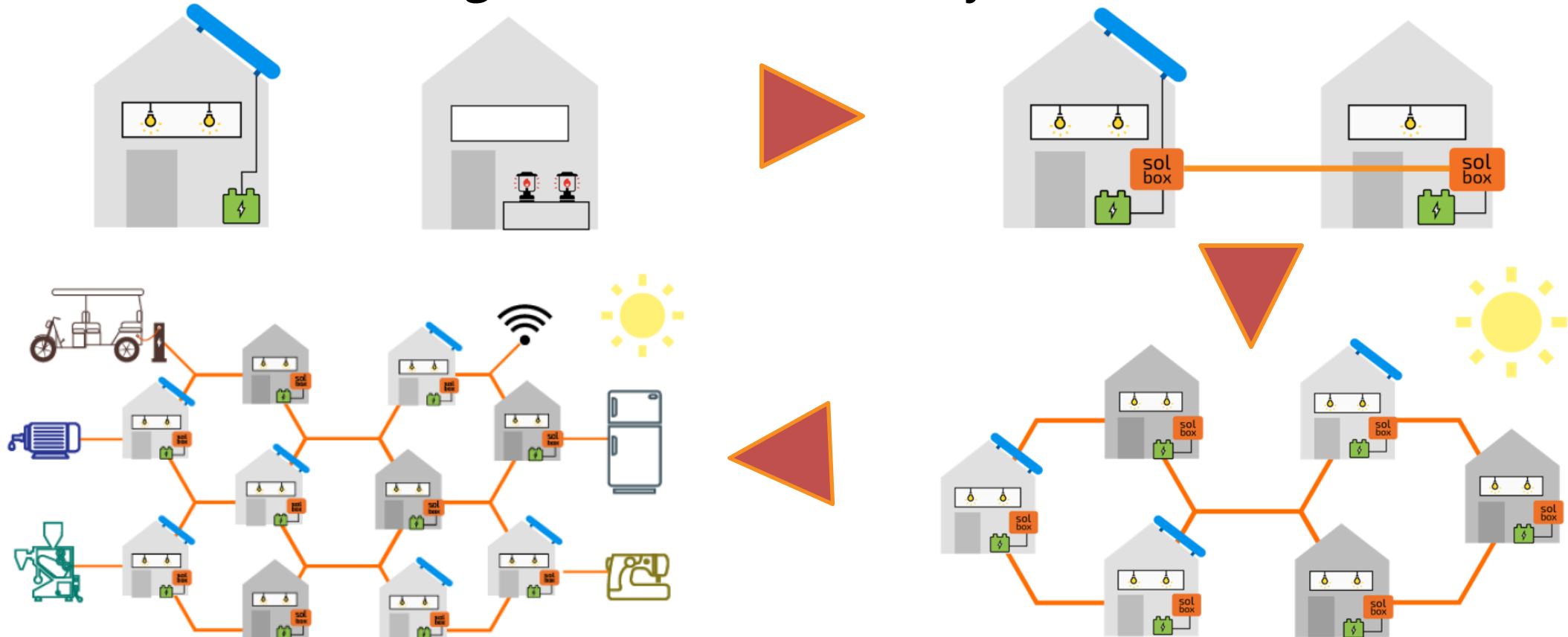
# Opportunity

600,000 kWh

daily excess energy in Bangladesh  
that cannot be stored by  
individual solar systems

# P2P solar grids – bottom-up

*Interconnecting solar home systems into a microgrid that can grow with the needs of its customers.*





11/27/2018

# Solar P2P grids in Bangladesh

=

# The future of utilities globally



## \$ 1.66M A-series closed



# OUR PARTNERS

## CORPORATE



## DEVELOPMENT



## RESEARCH & OUTREACH



# AWARDS



**Momentum for Change**  
Change for Good



**Start Up  
Energy Transition  
Award**



**ASHOKA**

*Everyone A Changemaker™*

**WORLD  
ECONOMIC  
FORUM**

COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD



**MIT IDE  
INCLUSIVE  
INNOVATION  
CHALLENGE**

**SOCIAL  
alpha**

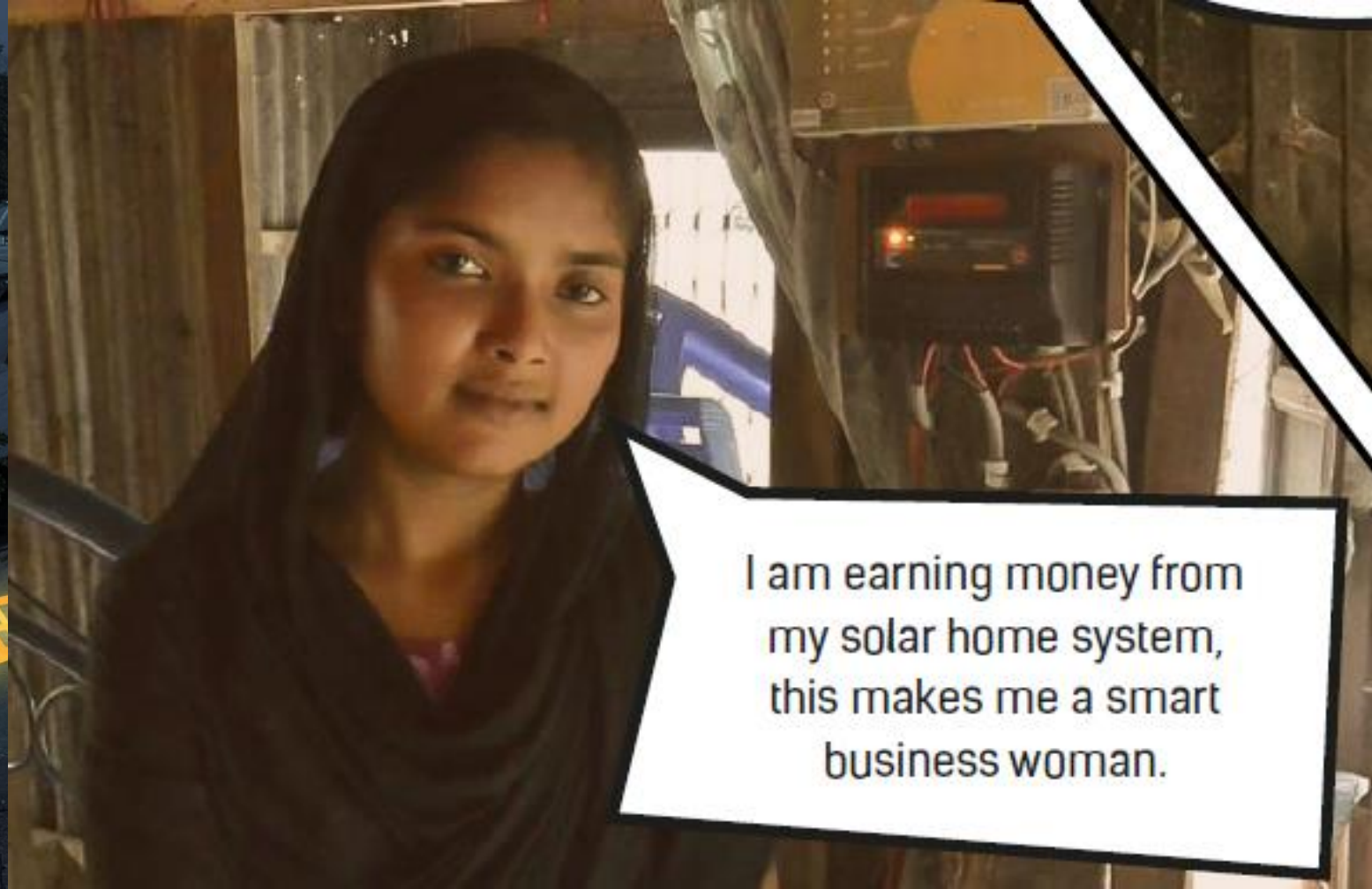
**IKU**

Der Innovationspreis für  
Klima und Umwelt 2017



# solshare<sup>®</sup>

Create a network. Share electricity.  
Brighten the future



I am earning money from  
my solar home system,  
this makes me a smart  
business woman.

Create a network. Share electricity.  
Brighten the future

[www.me-solshare.com](http://www.me-solshare.com)

# THANK YOU



# Cleantech Forum **Asia** | Singapore

## PART 2 Powering the Region



**AFNAN HANNAN**

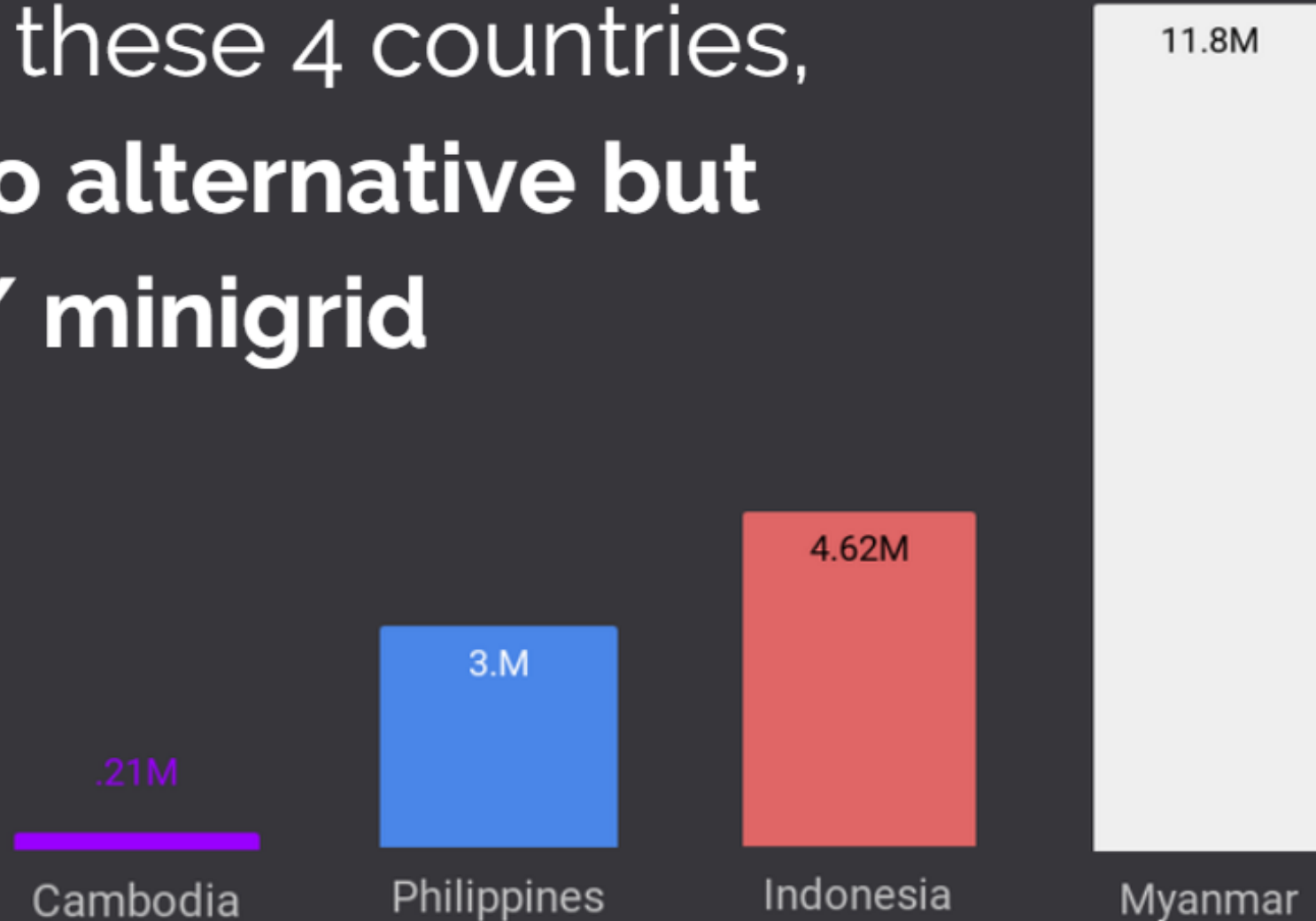
Co-Founder and Engineer, Okra

Plug & Play Microgrids

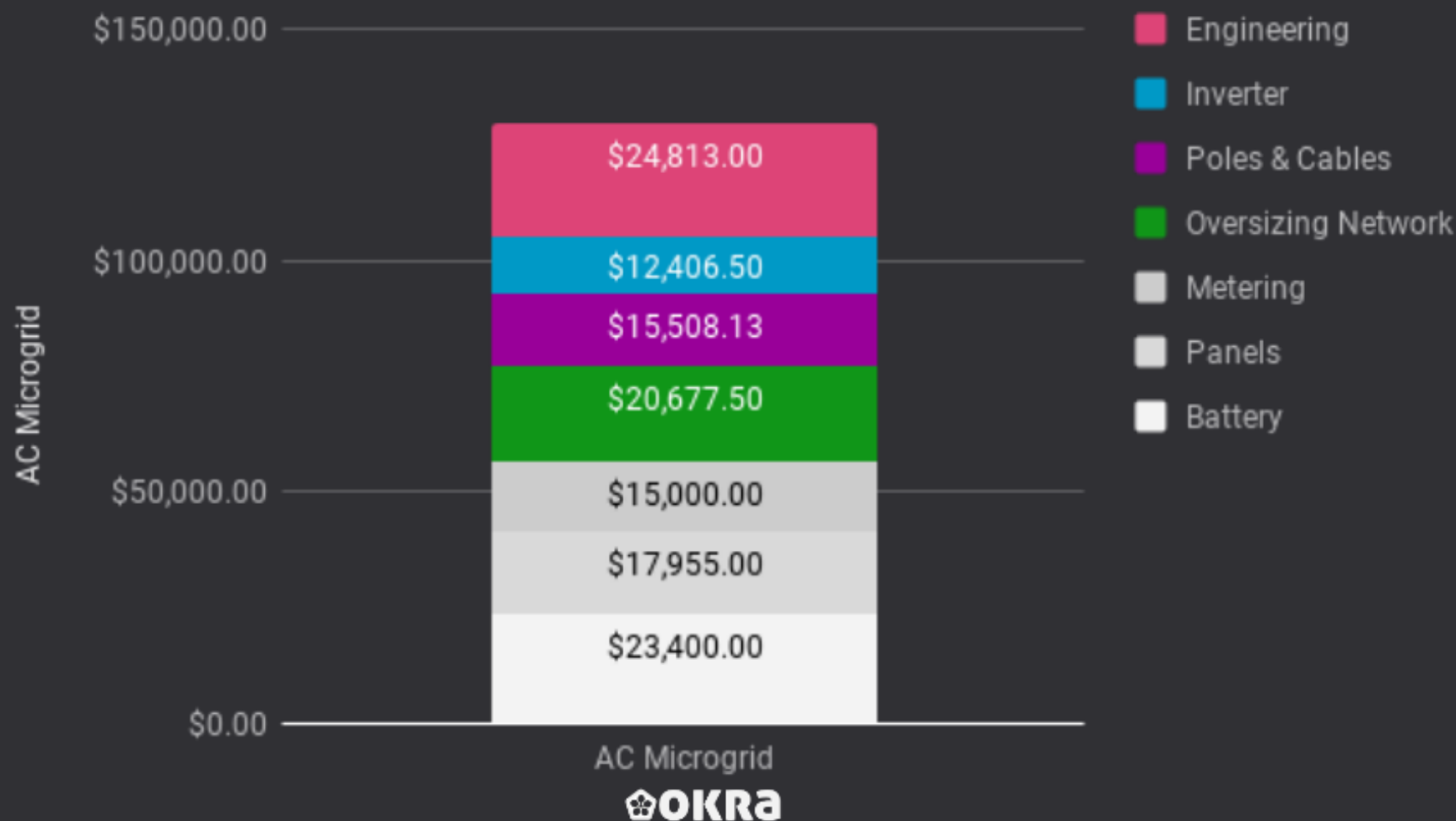


95% of the population in Asia are  
connected to the grid, we've saved  
the ~~best~~ hardest for last

For almost **20 million** people in these 4 countries, there is **no alternative but off-grid / minigrid solutions**



More than **50% of the setup costs of microgrids** are due to **costs related to inverters** (converting power to AC for distance)

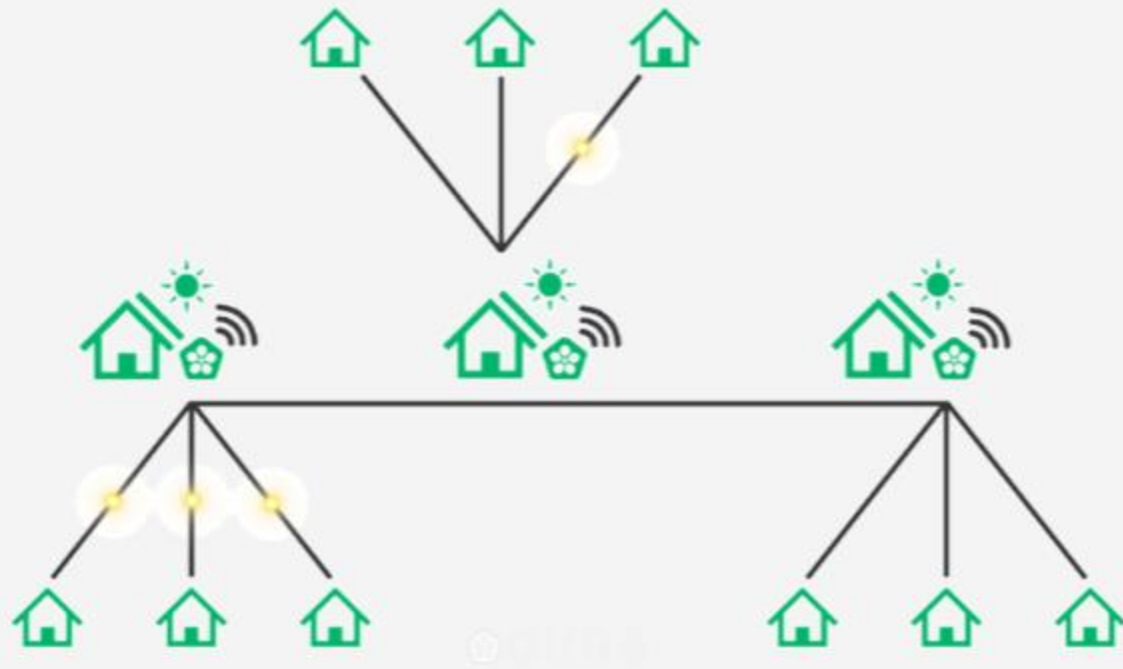


 **OKRa**  
IoT Pod  
(1 per house)

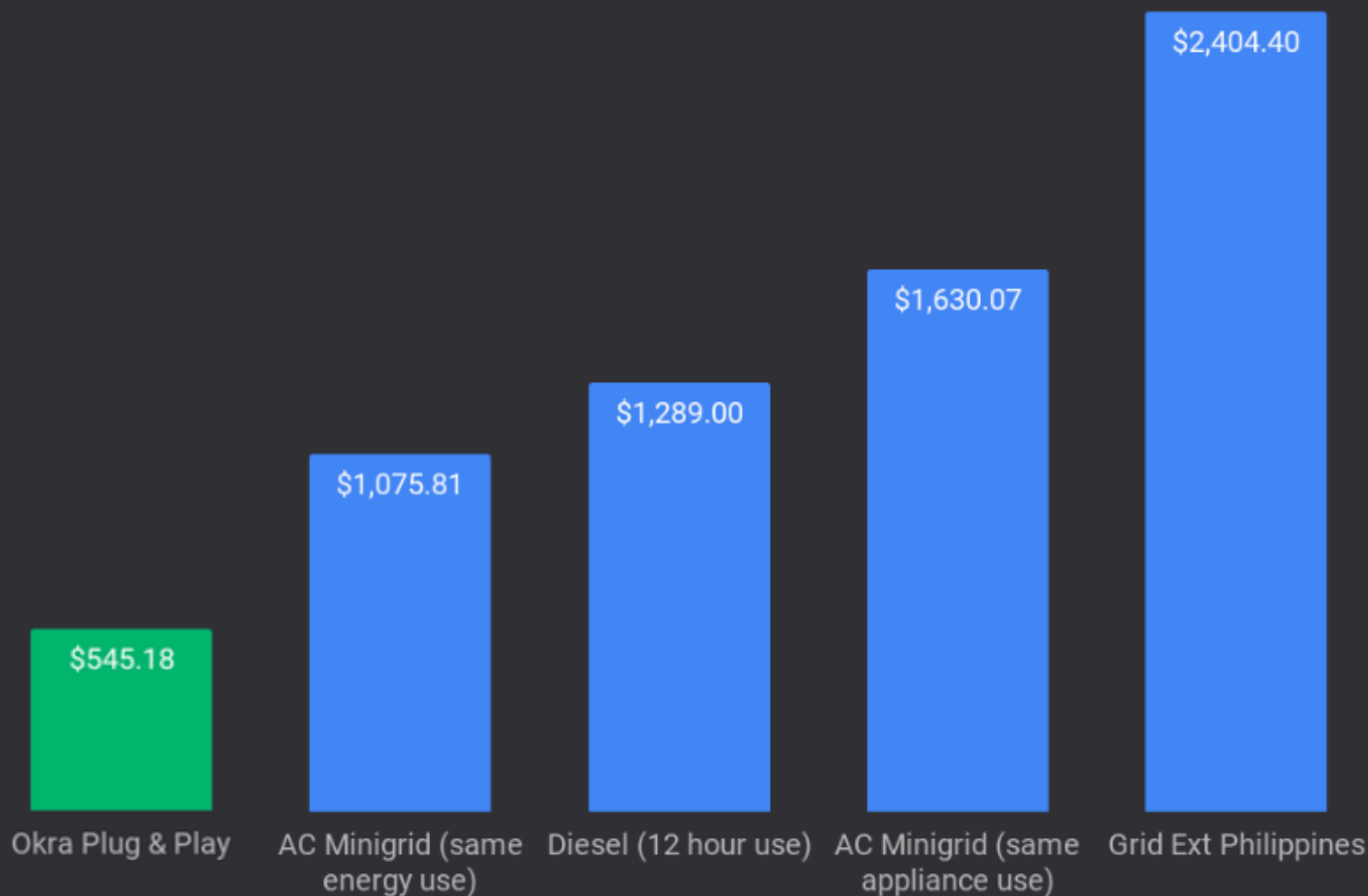


# Smart Distribution

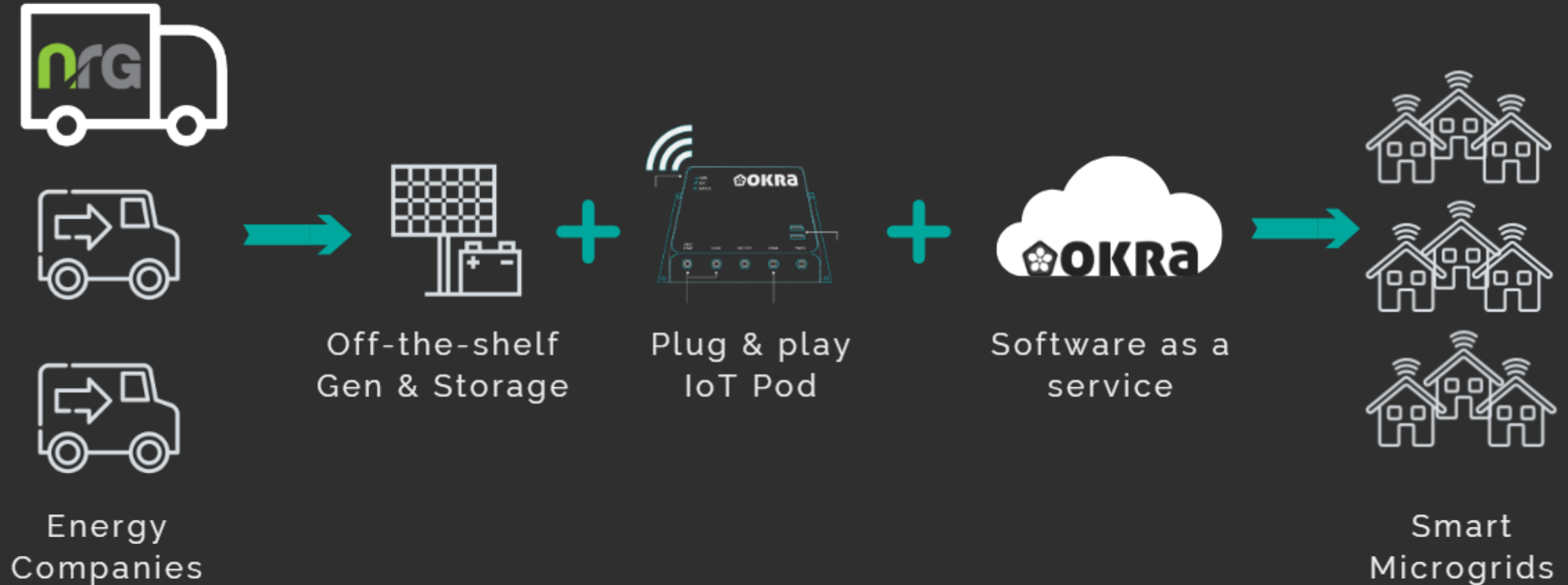
Okra plug & play **smart grids are controlled by software**. Machine learning distribution & charging algorithms send power down the most efficient route meaning long distances aren't travelled and **inverters aren't required**



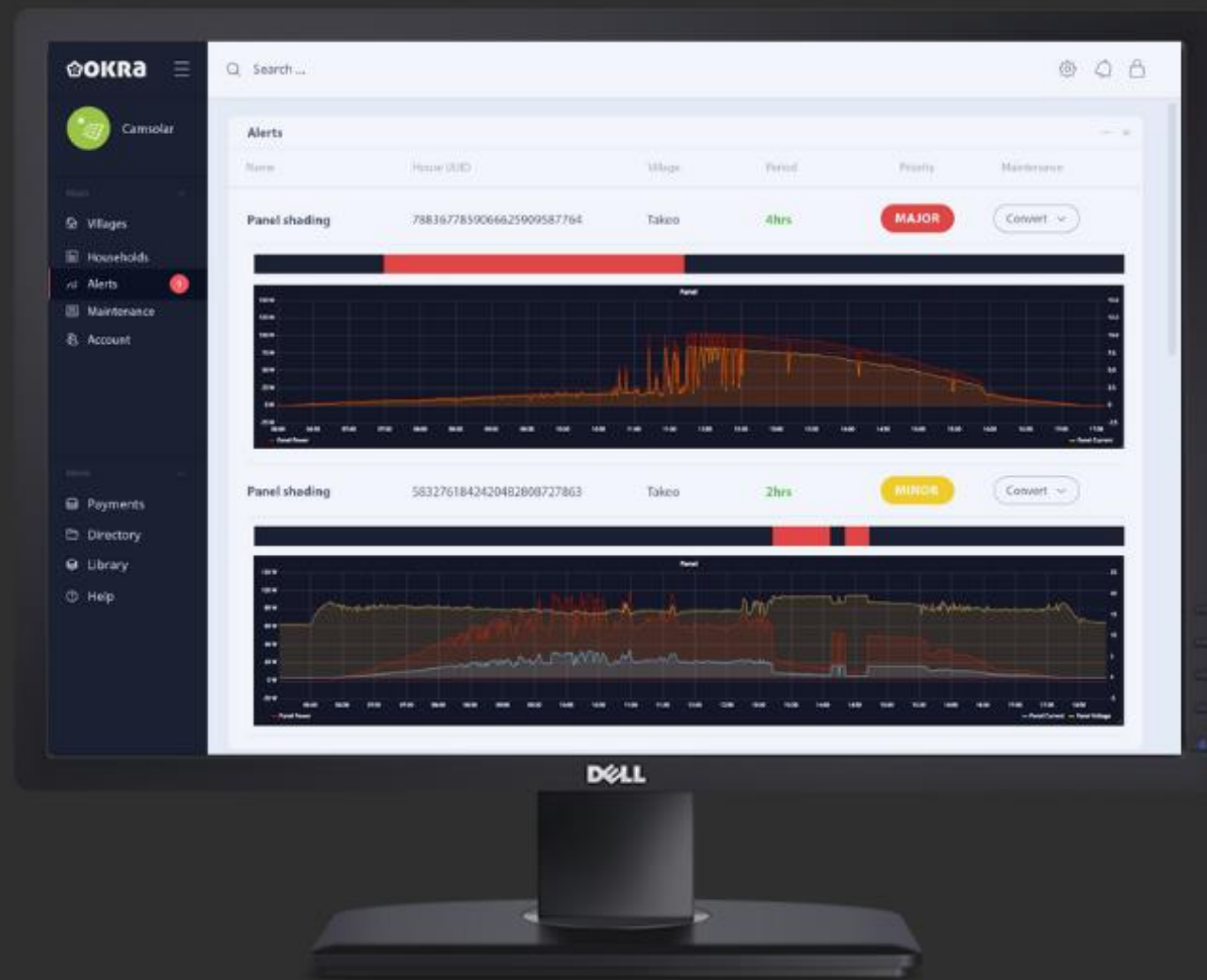
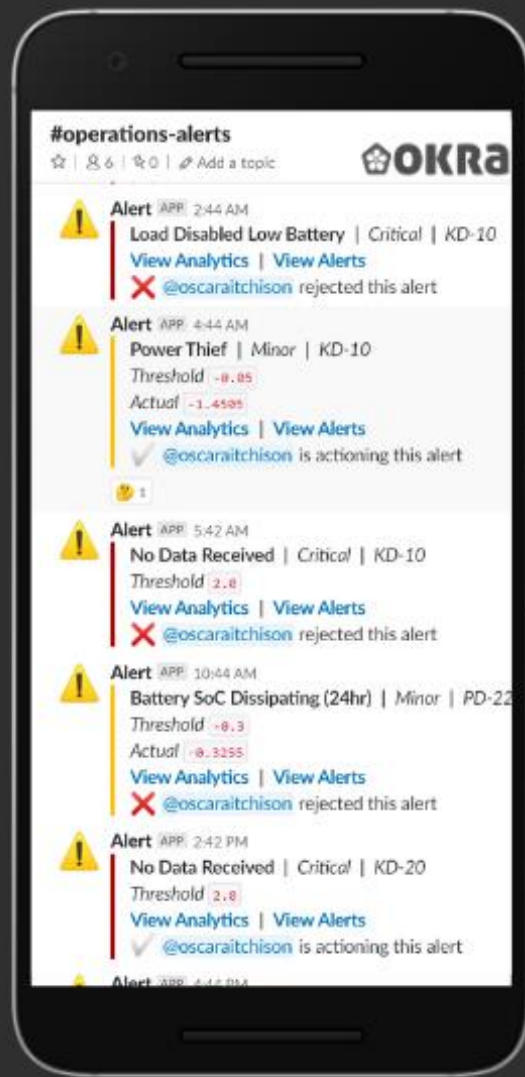
# 10 year NPV cost per household (300Wh/day load +10%YoY growth)



# We can multiply impact with multiple partners



# Smart software for smart DESCOs



# Case Study - Prey Pdao, Takeo, Cambodia



**\$35/mo for energy**  
**\$675/yr savings for**  
**Sopha**  
**<1.5 year payback (3.5 yrs**  
**for non prod load)**

Flexible Grid -  #hh connected

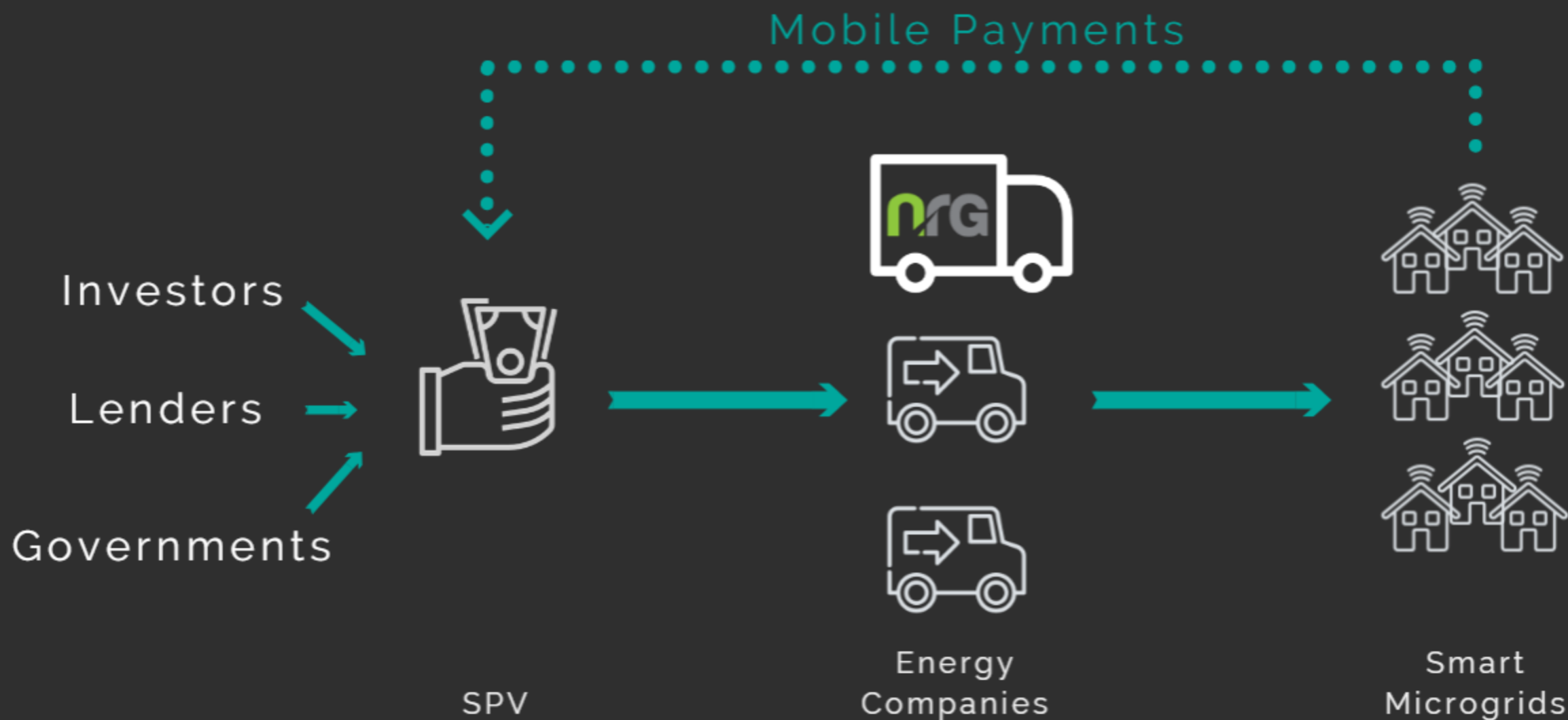


 Load Growth 6 months

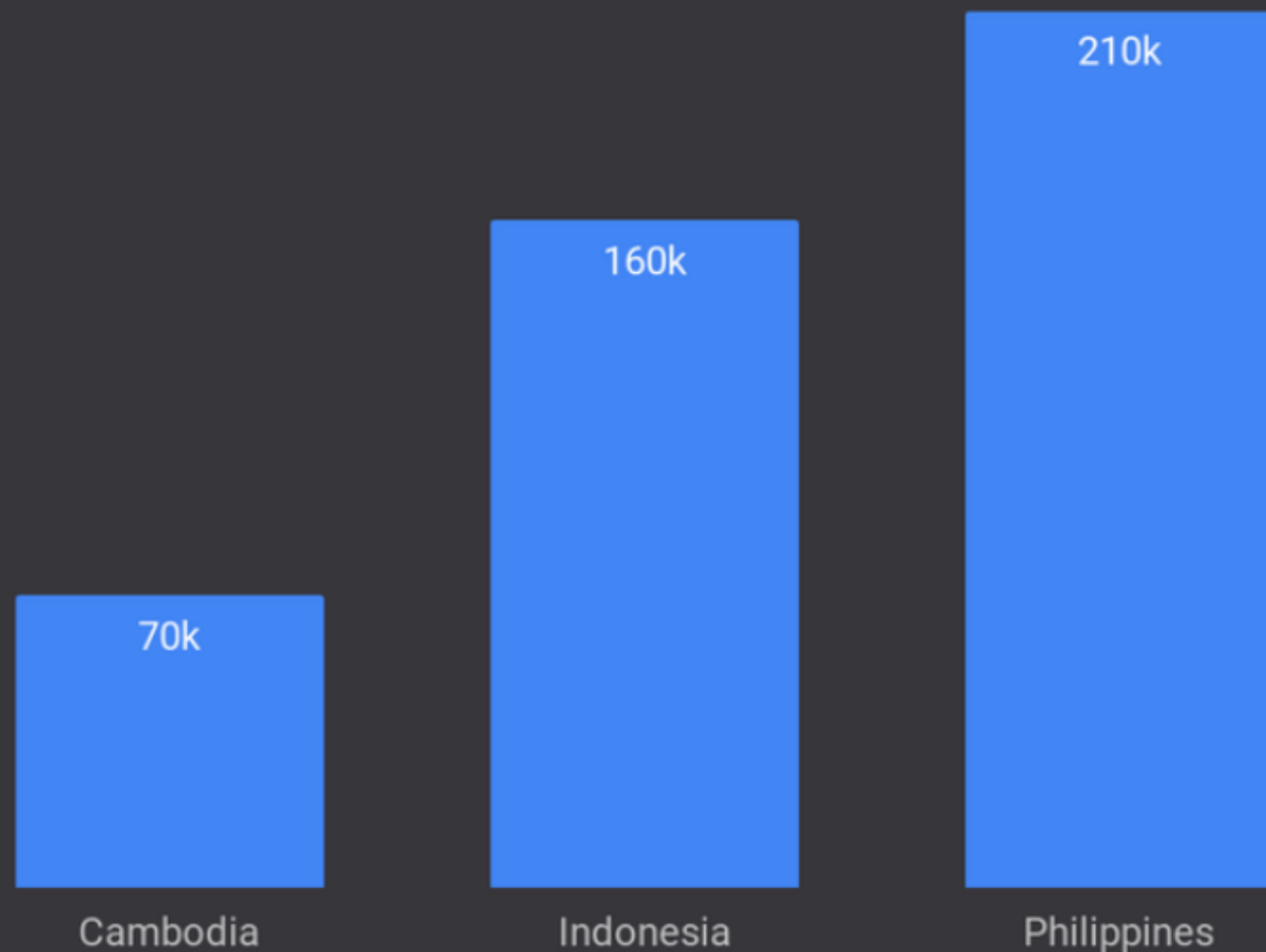
**9.8kWh/hh/mo**

**19kWh/hh/mo**

# Financing Model to Reach Scale



# Forecast # of people energised by our partners in next 2 years



The background of the image shows a clear blue sky with a few wispy clouds. In the foreground, the top of a corrugated metal roof is visible, featuring a small solar panel. Several tall palm trees are scattered across the scene, with two particularly prominent ones in the center-left. The overall setting appears to be a tropical or semi-tropical environment.

 **OKRa**



# Cleantech Forum **Asia** | Singapore

## PART 2 Powering the Region



**SOMBOON (JOE) LERTSUWANNAROJ**  
Managing Director, Impact Solar



Cleantech Forum Singapore

November 2018

## “First Private-PPA Solar Rooftop in Thailand”

since  
**2015**

Over USD  
**55 m**  
Investments

Over  
**55MW**

Saving  
**>550k**  
tCO2

**175**  
MW in  
2021

**>85%**  
EBITDA  
margin

**>40**  
professional  
staffs

[www.impact solar.co.th](http://www.impact solar.co.th)

Our recognition and partnership



SAHAPAT



**AlsoEnergy**  
beyond measure



Creating new values from  
Finance x Services x Business Expertise

Tokyo Century Corporation

Private and confidential



# Our long term goal is to provide the people with access to clean, price affordable, and sustainable energy



## Centralized Project

(Under Subsidy, Large Scale Based )

## Decentralized Project

(Under Subsidy, Small Scale Based )

## Decentralized Project

(No Subsidy, Cost Competitive, Peer to Peer Trading )

## Our Mission

### Dematerialized Project

(Decentralized generation, Smaller size, Efficiency increase robust)

### Democratized Project

(Household generation, equipment is more retail, Cost/Eff lower grid)

**Portable Energy**

## What We Do



### ONE-STOP SERVICE

We make it easy for you to go green. We provide customized one-stop solutions, from project planning, financing, construction, to long-term maintenance.



### FLEXIBLE SAVINGS PLANS

We offer savings plans that fit your needs, from our zero-investment-cost Solar PPA, to maximum-savings Solar Sale and Solar Lease.



### EXPERIENCED TRACK RECORD

Our executive team has more than 10 years and 100 MW of solar project development experiences in the Asia Pacific region.



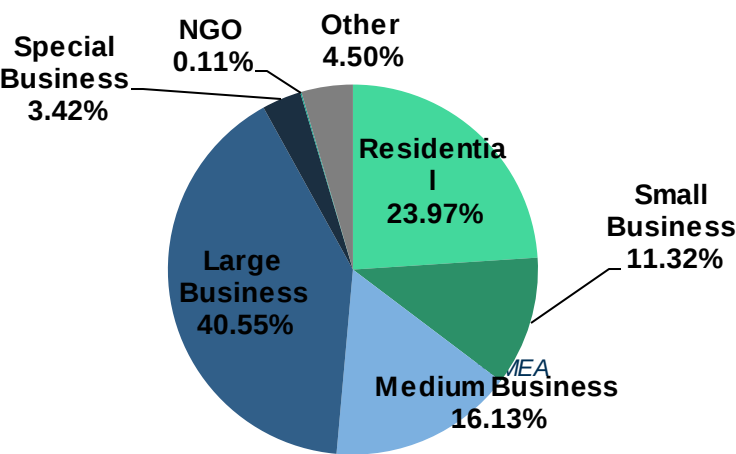
### CREDITABLE STAKEHOLDERS

Our reputation earns trusts from creditable stakeholders, including JCM, Sharp, ItalThai, Big C, and Kerry.

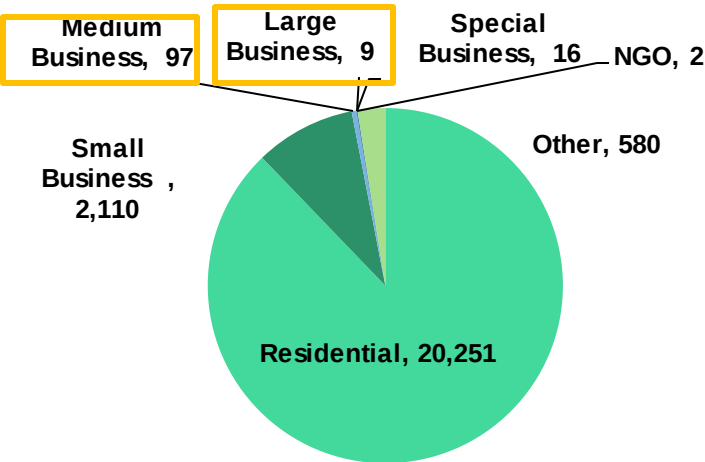
- Impact Solar is currently deploying 55MW of Private PPA Solar Rooftop for the C&I customers in Thailand and SEA region
- Our Group Company has implemented the renewable energy project since 2008 and as a pioneer in SEA, we gain an experienced of the project since it is subsidized (by the Govt.) and centralized pattern, flow with the development until we create Impact Solar in 2015 to lead the trend of decentralized and Private PPA model in Thailand.
- We believe that the future of energy sector is yet to come, more clean and price affordable energy is just the first step of the modernized era of energy that will be portable and mobilized between place more efficiency without grid. It will disrupt even the way people go to Mars
- The key success behind is not only the business model or how we deploy it commercially but it is waiting for the technology of energy storage development until it capable our dream.

# Market Potential of Private Rooftop Solar in Thailand

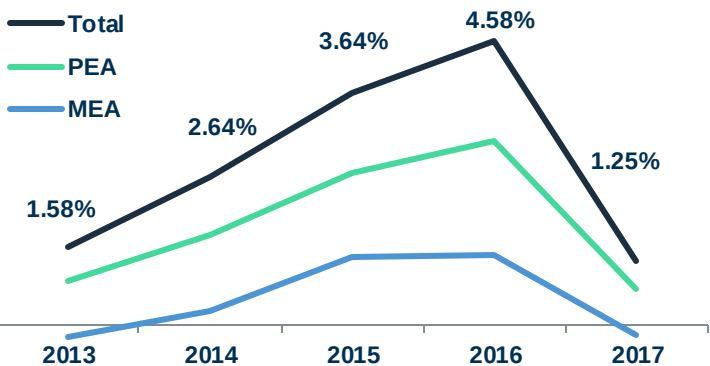
Demand (kWh) in 2017



Demand (User Account in '000) in 2017



Demand Growth Rate in last 5 yrs

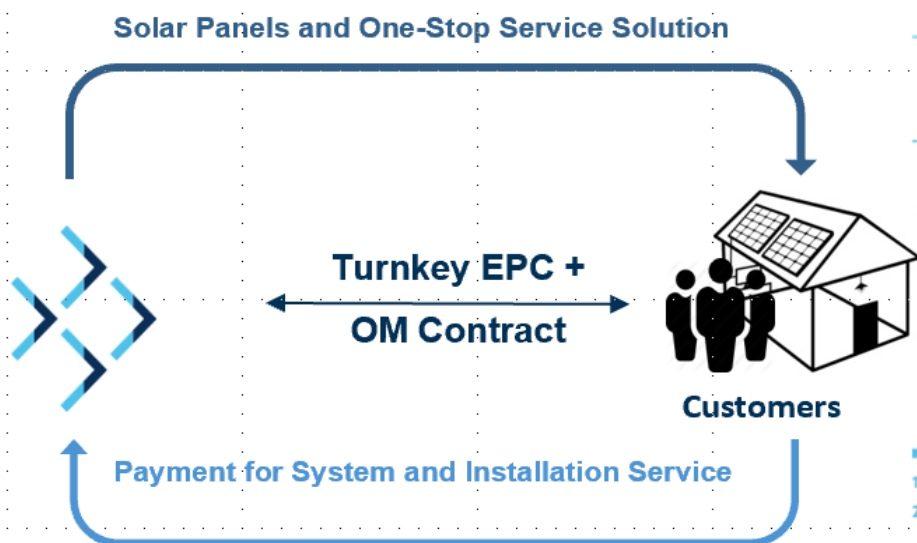
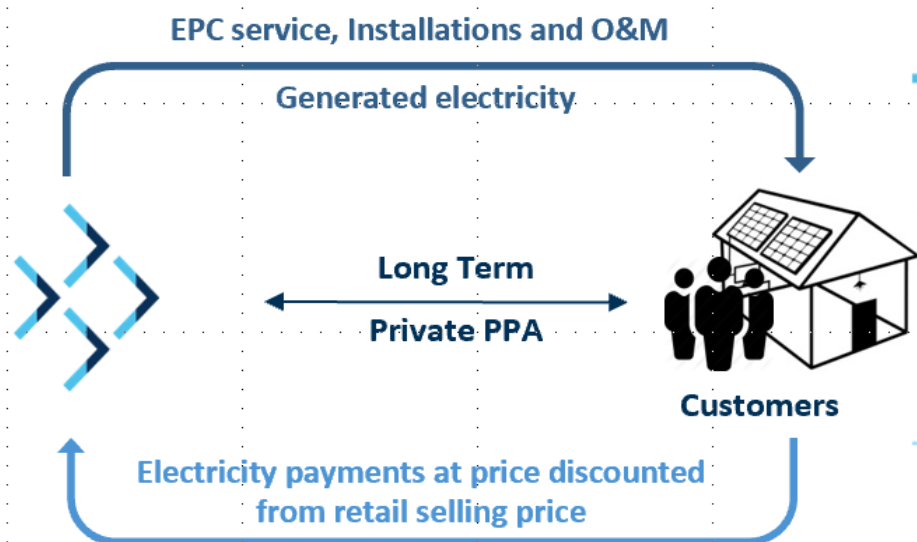


## Market Key Highlights

- Thailand’s annual electricity consumption was 185,124 GWh in 2017 with an average growth rate of 3.64% dominated by PEA’s customers
- Consumption in the “Large Business” and “Medium Business” customer types accounted for over half of the country’s demand
- Residential users with potential customers of over 19 million accounts
- “Net Metering” program policy is on the proceed of cabinet approval

Private and confidential

|                           | No. of Users in 2017 | Consumption in 2017 (GWh) | Average Consumption per User in 2017 (kWh) |
|---------------------------|----------------------|---------------------------|--------------------------------------------|
| Medium Business           | 97,038               | 29,853                    | 307,642                                    |
| Large Business            | 8,978                | 75,072                    | 8,361,773                                  |
| Medium and Large Business | 106,616              | 104,926                   | 984,149                                    |
| Residential               | 20,250,873           | 44,374                    | 2,191                                      |



## 1 Solar PPA

## 2 Solar Sale

|                           |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ★ Key features            | We invest, own, operate and take care of all costs while you simply enjoy savings through solar.                                                                                                                                                                                | You buy the system outright while we provide full turnkey solution for your new solar system.                                                                                                                                                    |
| 📈 Investment cost         | 0                                                                                                                                                                                                                                                                               | < THB 50/Wdc <sup>1</sup>                                                                                                                                                                                                                        |
| 💰 Monthly payment         | Pay with a discount from what you pay now                                                                                                                                                                                                                                       | None                                                                                                                                                                                                                                             |
| 👤 Ownership               | Impact Solar <sup>2</sup>                                                                                                                                                                                                                                                       | You                                                                                                                                                                                                                                              |
| 🔧 Operation & maintenance | Free                                                                                                                                                                                                                                                                            | Free for 2 years                                                                                                                                                                                                                                 |
| ✅ System warranty         | Free                                                                                                                                                                                                                                                                            | Free                                                                                                                                                                                                                                             |
| 🔒 System insurance        | Free                                                                                                                                                                                                                                                                            | Optional                                                                                                                                                                                                                                         |
| ❤️ Your benefits          | <ul style="list-style-type: none"> <li>• Ensure savings since day one with zero investment cost</li> <li>• Guaranteed discount regardless of utility tariffs</li> <li>• Worry-free as we handle construction, operation and maintenance throughout the contract term</li> </ul> | <ul style="list-style-type: none"> <li>• Hedge against rising utility tariffs</li> <li>• No long term contract which maximizes your flexibility</li> <li>• Enjoy BOI tax privileges for system owners at up to 50% of investment cost</li> </ul> |

<sup>1</sup> Subject to technical requirements and other factors

<sup>2</sup> With free transfer to you at the end of contract term



Private and confidential



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## PART 2 Powering the Region



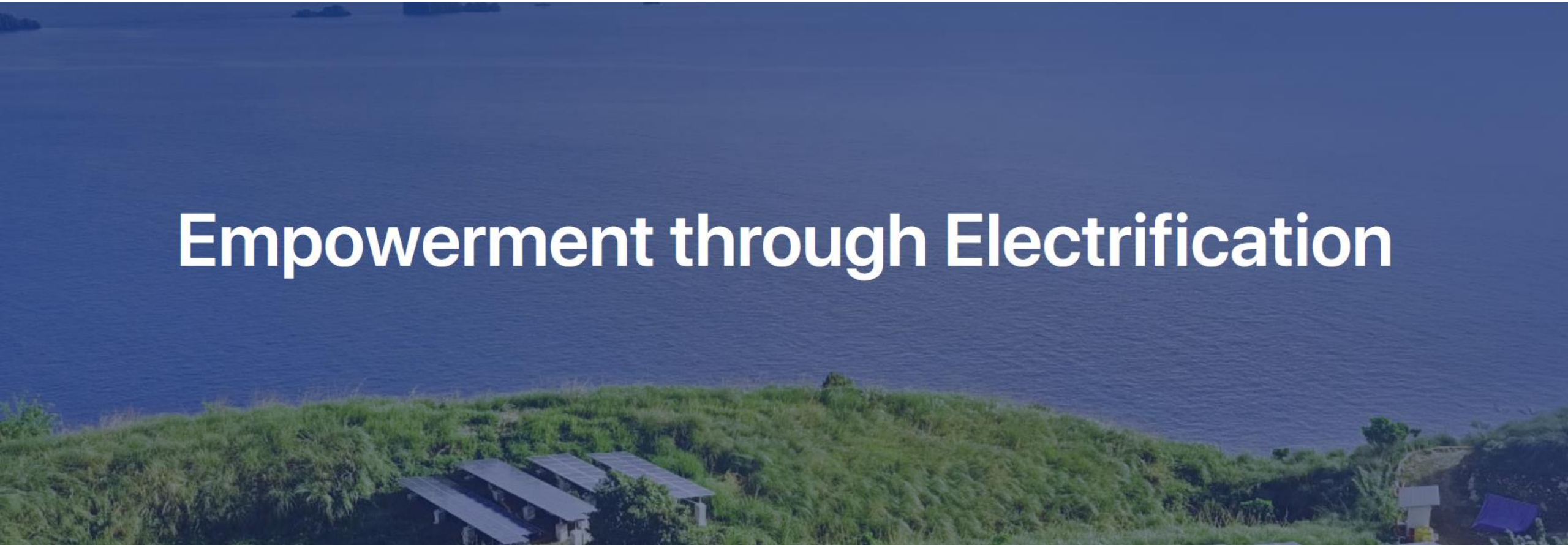
SUJAY MALVE

Co-Founder & CEO, Canopy Power

# Cleantech Forum Asia



# Empowerment through Electrification



## Sectors Served



Tourism



Agriculture



Remote Communities



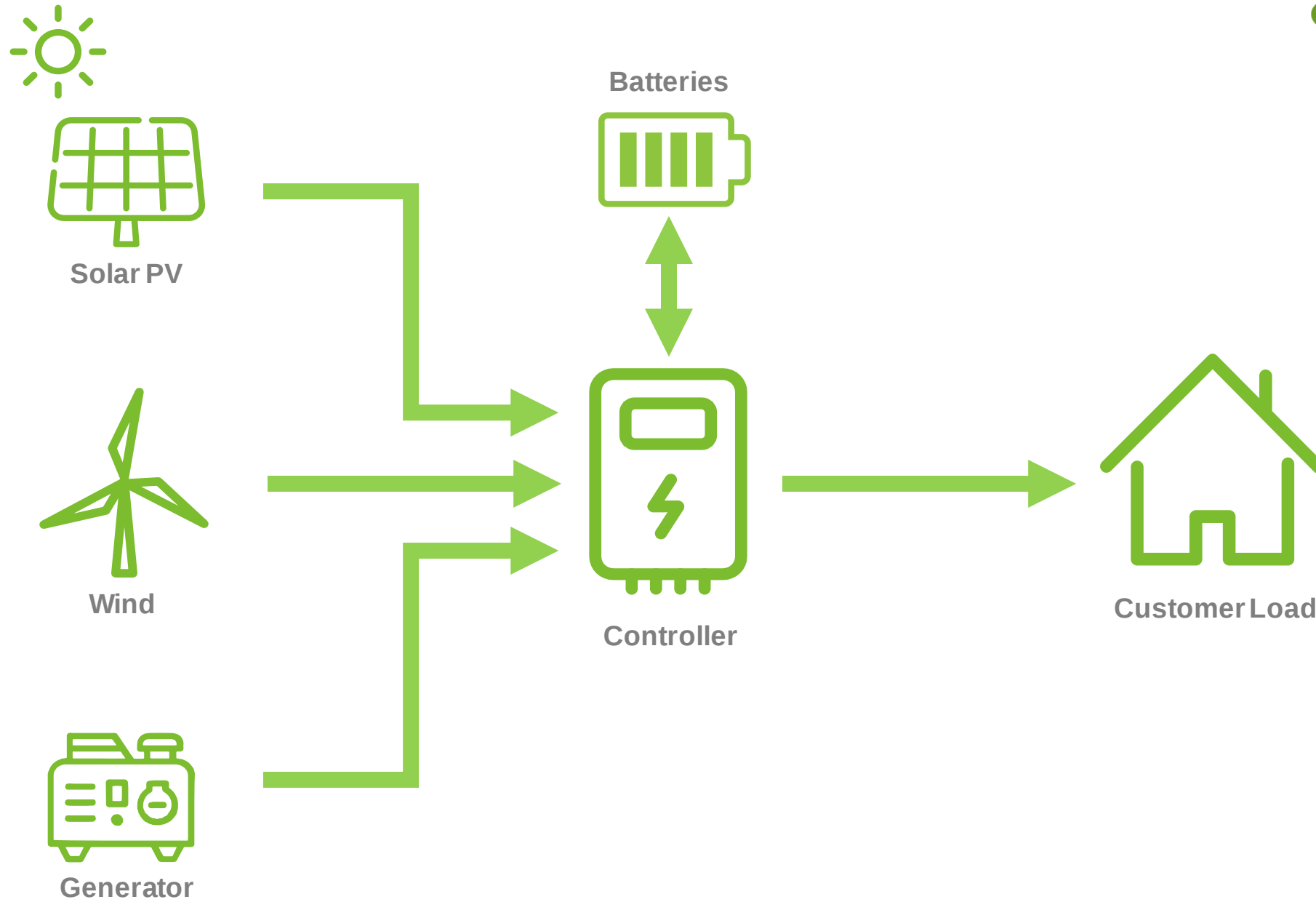
Mining



Fishery



Remote Industries



# Scale?



Turnkey Solutions



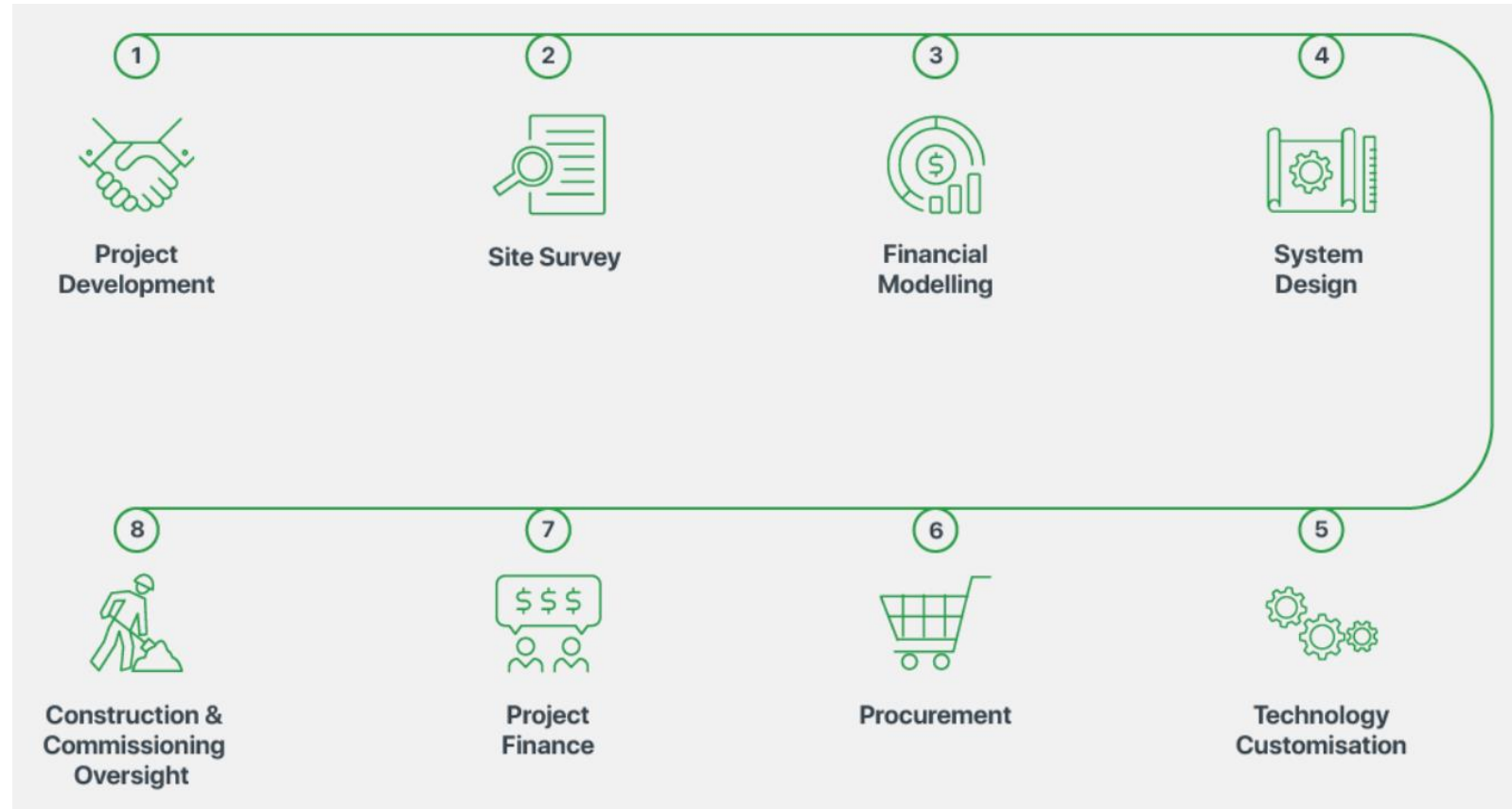
CANOPY  
POWER



## Turnkey Solutions



## Engineering Services





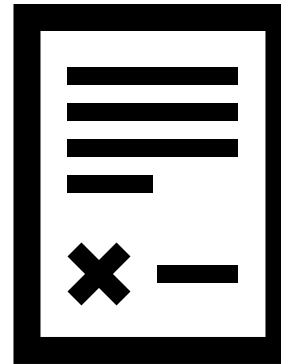
**Turnkey Solutions**



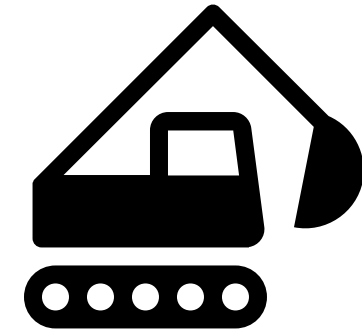
**Engineering Services**



**Project Finance**



PPA



Lease to Own



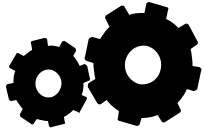
**Turnkey Solutions**



**Engineering Services**



**Project Finance**



**Remote Monitoring &  
Management Tech**



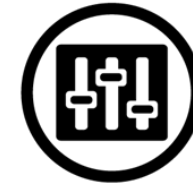
**Remote Monitoring and Management Technology –  
A Cost Effective & Universal System**



**Data Acquisition**



**Data Visualization**



**Real Time Control**



**Data Analytics**





# Cleantech Forum **Asia** | Singapore

## PART 2 Powering the Region



**TED MARTYNOV**  
CEO, SolarHome



**Market Leader in  
Pay-As-You-Go  
Solar Home Systems  
in Southeast Asia**

# Enormous Market in SEA

**27M**

Off-Grid  
Households \*

**\$2B**

Annual Spend on  
Legacy Energy  
Sources

Key Geographies:

Myanmar, Indonesia, Philippines, Cambodia

## Massive Social Costs

- Fire Hazard from Kerosene
- Exposure to Carcinogens
- Limited Earnings After Dark
- Reduced Educational Time
- Decreased Productivity
- Environmental Contamination
- CO2 Emissions

Typical Customer:

Rural, Farming, Low Income



## How Does It Work

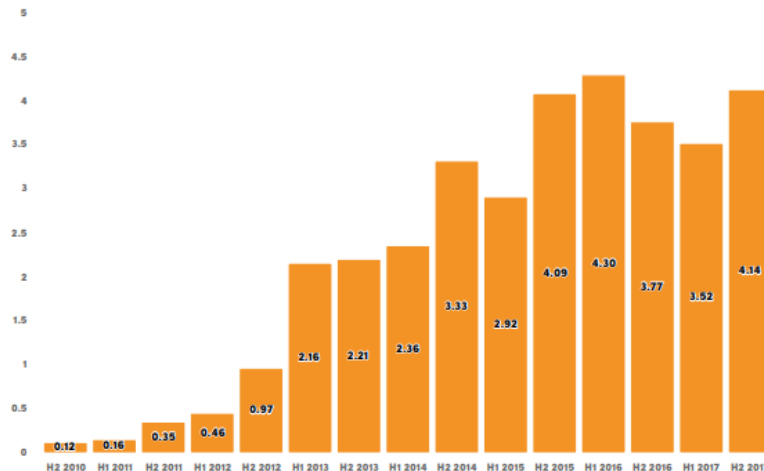
1. Purchase Solar Home System (“SHS”), with small downpayment.
2. Purchase Energy Tokens (daily/weekly/monthly top-up credits) through scratchcard or mobile money.
3. Use Energy Tokens to activate device for a defined period of time (enter PIN into system).
4. After 2 years of Energy Token purchases, device is “unlocked” and no more top-ups are required.

# PAYG SHS Is The Best Solution For Offgrid

**\$780M**

Total Debt and Equity  
Capital Raised by PAYG SHS  
Operators Since 2012 \*

**Global SHS Unit Sales \***



**PAYG SHS** **Low upfront and lifecycle cost**



**High reliability**

**OEM warranty**

**Grid  
Extention**

Huge investment



High Sign-Up Fee by Customer

Low reliability

**Mini-Grid**

High system installation cost



Complicated maintenance

Must sign up majority of village

**Component Home  
Systems**

Low quality components

No warranty



Frequent breakdown

# What is SolarHome

SEA Market Leader

25,000 customers onboard

3,000-3,500 new customers per month

6-24 months subscription (installment) for a unit

5 manufacturers on a shelf

Full-scale distribution/lending/payment infrastructure in-house



# Our Business Model Is Based On Retail Field Distribution

- Strong Myanmar coverage:
  - 20 hubs nationwide
  - Over 300 field sales and installers
  - Digital LeadGen channel under pilot
- Expanding to Indonesia, Cambodia, Philippines:
  - Recruiting Country Managers
  - Starting market entry research
  - Target launch: 2019



# Consumer Lending

- Centralized Underwriting, Verification, Customer Support
- Leveraging world-class tools including scorecards and Big Data to minimize TTY
- Standardized central delinquency management process
- Robust Credit MIS
- Well validated Repossession process on deep delinquency buckets
- BASEL-based Ops Risk management



# SolarHome PAYG – At the forefront of CleanTech

1

## **Enabling credit top-ups via mobile phones**

Connecting billing technologies to the rural community by developing our own top-up distribution network



2

## **Combining different manufacturers in one product**

Working with different manufacturers to integrate back-end hardware with proprietary back-end software



3

## **Overcoming logistical challenges via electronic maps**

Developing electronic maps of rural Myanmar to aid our sales and post-sale servicing/maintenance teams when traveling to rural off-grid communities





Thank you!