



Federal Ministry  
for Economic Affairs  
and Energy



MITTELSTAND  
**GLOBAL**  
ENERGY SOLUTIONS  
MADE IN GERMANY

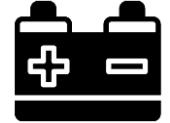
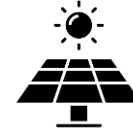
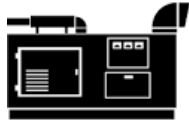
# RE Hybrid Grid Systems for Thai Islands – Feasibility & Business Models

Community-based Renewable Energy Conference 2018

Facilitator



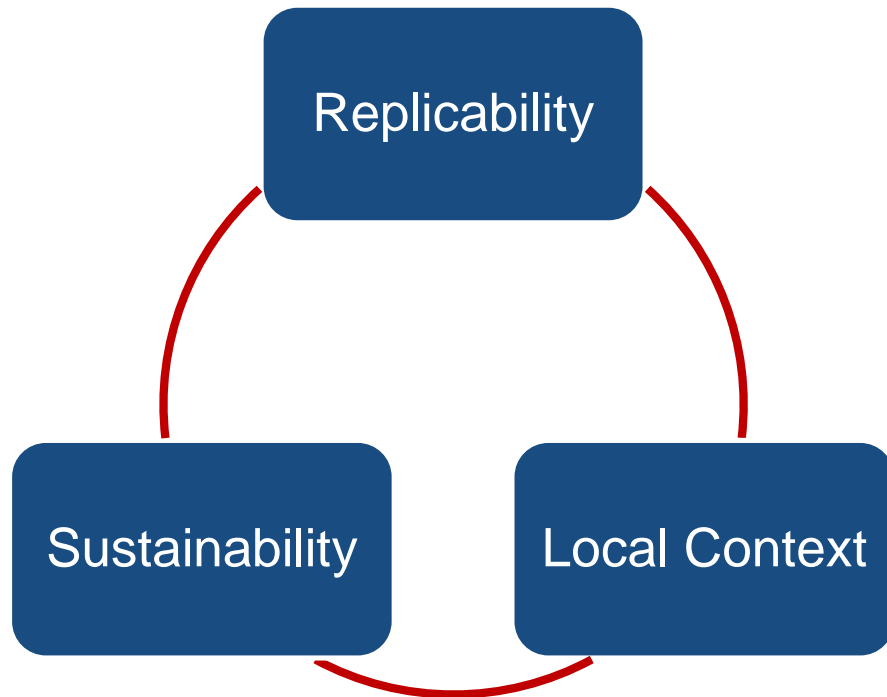
# Why Hybridization?



- Few hours supply
- High fuel consumption/cost
- High generator operation hours; high operation and maintenance cost
- High CO2 emissions; soil pollution

- Up to 24h supply
- Less fuel consumption/cost
- Reduced generator operation hours; long generator lifetime & reduced operation cost
- Reduced CO2 emissions; green image

# Business Models – The Basis...

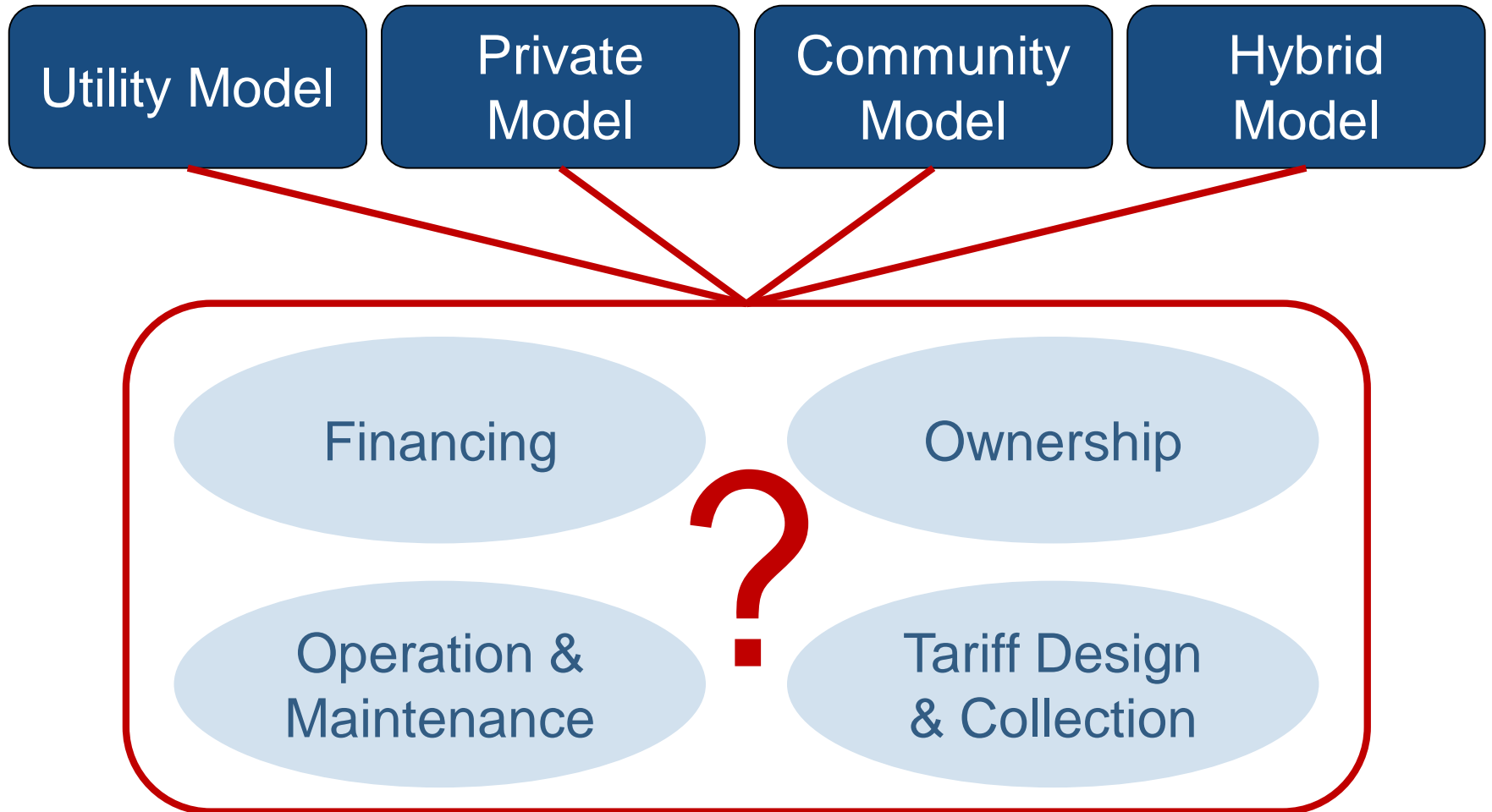


“A mini-grid could consist out of many independent systems. The “link” that makes the mini-grid is the operator, not the copper between users.” [1]

**Claude Ruchet**  
**Deputy Director**  
**Studer Innotec**

Source: [1] Alliance for Rural Electrification (ARE): Risk Management for Mini-Grids

# Business Models - Overview





# Pilot Site Koh Mak Noi

Phang Nga Province





# Pilot Site Mak Noi - Overview

Mosque



Tele. comm. tower



School



Health center



Pier



Water tower



Water pond



Population	1,400
No. of households	250
Area	2.4 km <sup>2</sup>
Distance to Shore	5 km

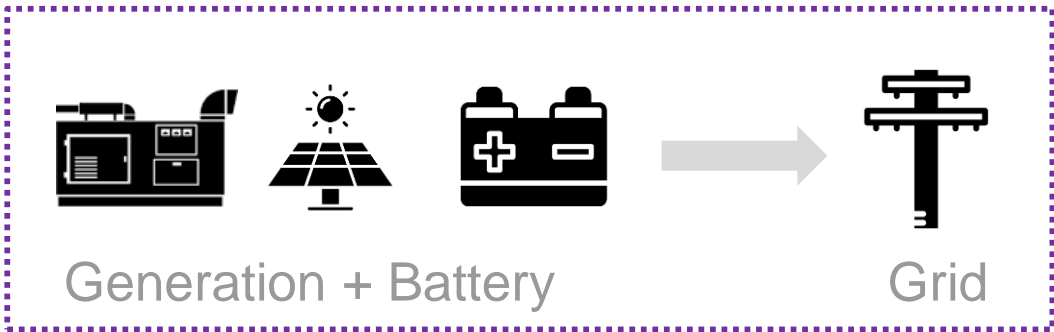
# Pilot Site Mak Noi – Business Model



การไฟฟ้าส่วนภูมิภาค  
PROVINCIAL ELECTRICITY AUTHORITY



Invest, operate, maintain



Buy electricity from PEA

(usual PEA's tariff)



Consumers



# Pilot Site Mak Noi – Feasibility

## Current Situation (CS)

Decentralized setup (here calculated for Khun Abdullah's Grids); 4,5 hrs. of supply

$$\text{LCOE}_{\text{CS}} = 25.15 \text{ THB/kWh}$$

## Submarine Cable

24/7 supply; 30-years project lifetime

$$\text{LCOE}_{\text{SC}} = 44.33 \text{ THB/kWh}$$

## RE-Diesel Hybrid Scenario (RE)

24/7 supply; 30-years project lifetime

$$\text{LCOE}_{\text{RE}} = 16.61 \text{ THB/kWh}$$



# Pilot Site Koh Bulon Don

Satun Province

# Pilot Site Bulon Don - Overview



Lake for retaining of raining water

4 water storage tanks

PV system

Public health centre (with PV system)

Graveyard

PV system (abandoned)

Football field

PV system

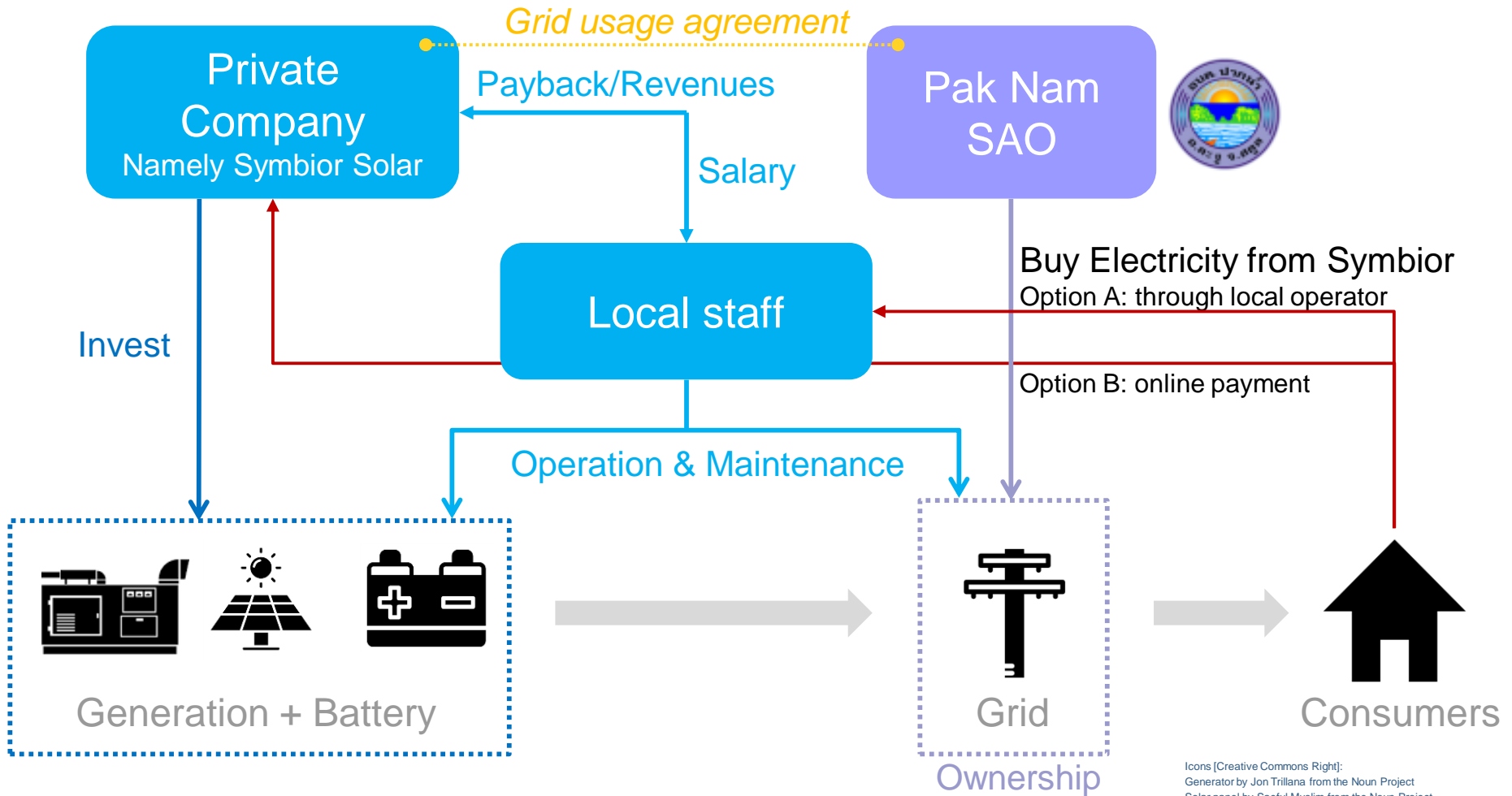
School

Mosque

Island deputy's house

Population	300
No. of households	81
Distance to Shore	22 km

# Pilot Site Bulon Don – Business Model





# Pilot Site Bulon Don – Feasibility

## Current Situation (CS)

Decentralized setup (here calculated for Jaesen's generator); 4,5 hrs. of supply

$$\text{LCOE}_{\text{CS}} = 63.69 \text{ THB/kWh}$$

## 100 % Diesel Scenario (DS)

24/7 supply; 30-years project lifetime

$$\text{LCOE}_{\text{DS}} = 22.53 \text{ THB/kWh}$$

## RE-Diesel Hybrid Scenario (RE)

24/7 supply; 30-years project lifetime

$$\text{LCOE}_{\text{RE}} = 16.44 \text{ THB/kWh}$$



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# Thanks! Any questions?

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Facilitator