



Federal Ministry
for Economic Affairs
and Energy



MITTELSTAND
GLOBAL
ENERGY SOLUTIONS
MADE IN GERMANY

Thailand PV Market Trends

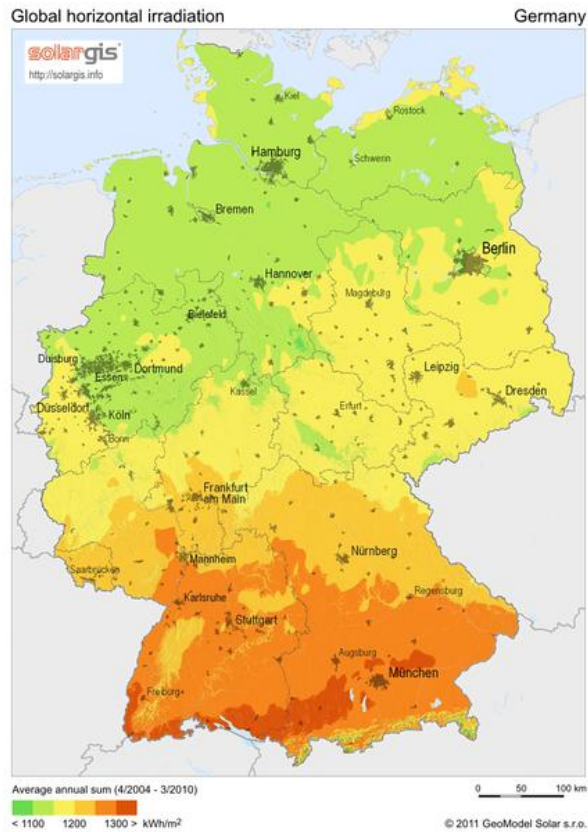
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Solar Potential in Thailand



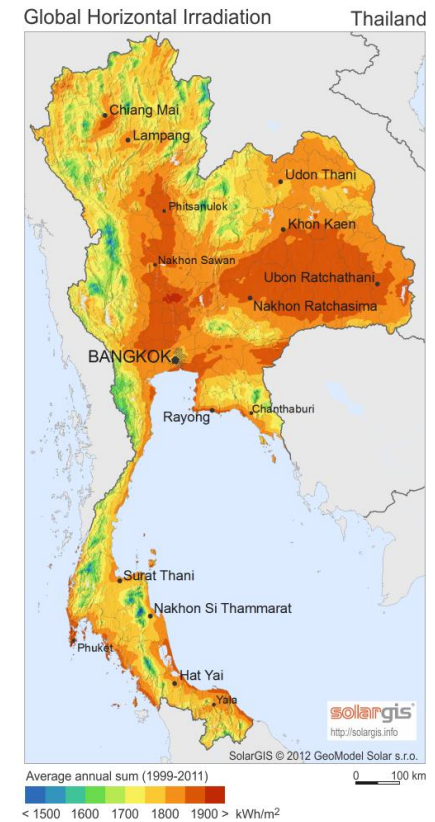
Germany

Average: 1,055 kWh/m²/year



Thailand

Average: 1,825 kWh/m²/year



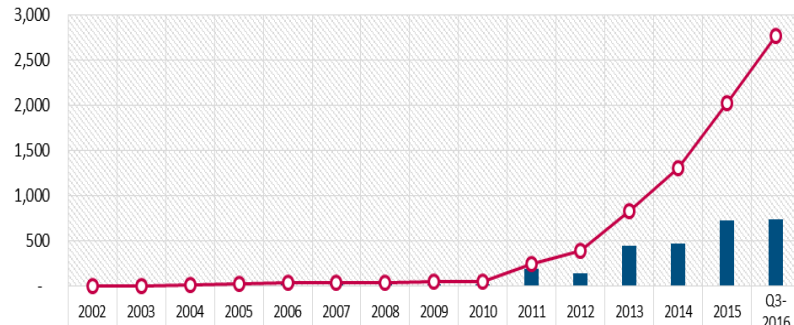
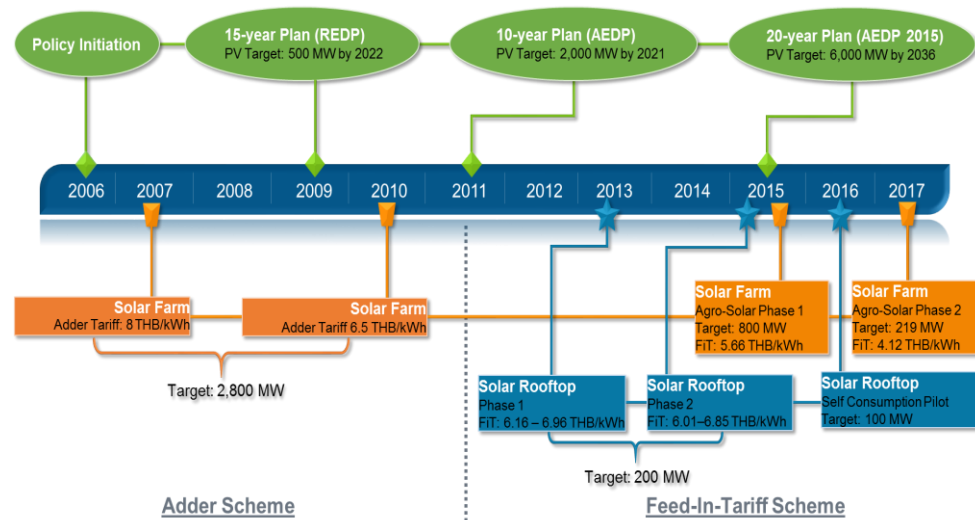
Thailand's PV Development

Key Drivers:

- Policy/Schemes
- Attractive tariffs
- Decreasing CAPEX

Key Barriers:

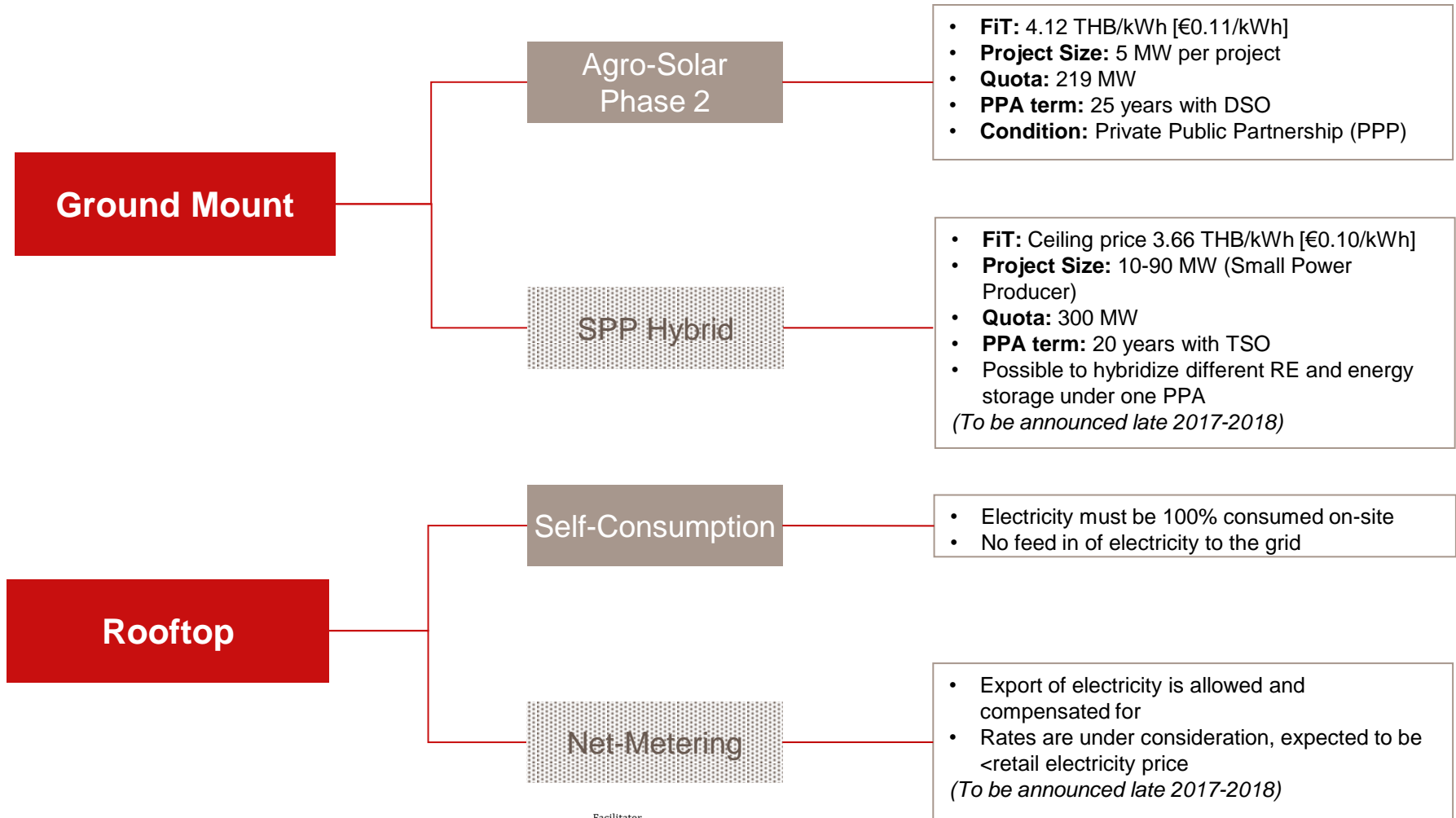
- Quota limitations
- Spontaneous announcement of schemes



2017 Projection = 500 MW
 Ground Mount: 200 MW
 Rooftop: 300 MW

Source: GIZ Solar PV Policy Update,
www.thai-german-cooperation.info/project/content/16

Upcoming scheme/trends in PV



Self-Consumption Rooftop Market

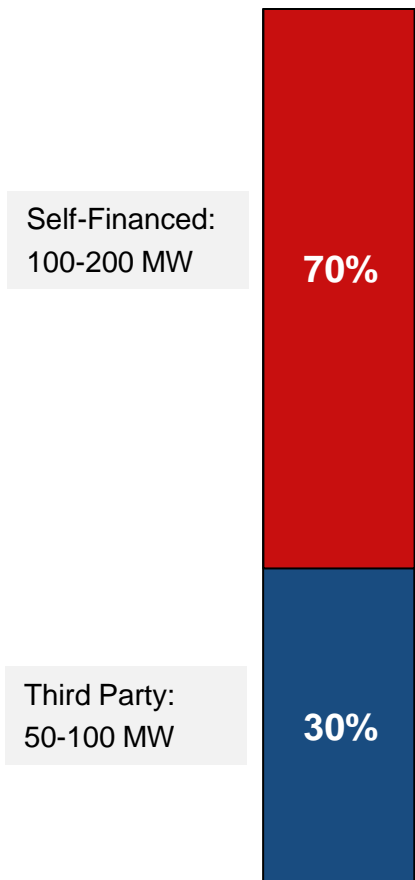
Self-financed:

- Large corporations are going solar
 - Tesco lotus installed 10 MW in 2016 and 20 MW more in 2017

Third party financing/ownership:

- Private-Private PPAs/Leasing models are emerging
- Giving 10-15% discounts off retail electricity prices [€0.10/kWh]
- Largest third party deal:
 - 15 MW at Thammasat University

Current Market



Industry Trends: PV + Storage

- Attractive BOI incentives:
 - 8-year corporate income tax exemption / Exemption of import duty / etc.
- Influx of foreign PV manufacturer despite limited domestic demand
 - 2017, BOI approved \$3 billion investment for 4 projects

2013

6 PV Module Manufacturers

Annual production capacity: ~ 200 MW/year

Main local manufacturers: Solartron, Ekarat, Bangkok Solar, Full Solar

2017

10 PV Module Manufacturers

Annual Production Capacity: ~ 1,500 – 2,000 MW/year

Main foreign manufacturers: Trina Solar, Canadian Solar, Yingli solar, Techen

2018+

Li-ion Battery Manufacturers

Companies planning for Li-ion manufacturing:

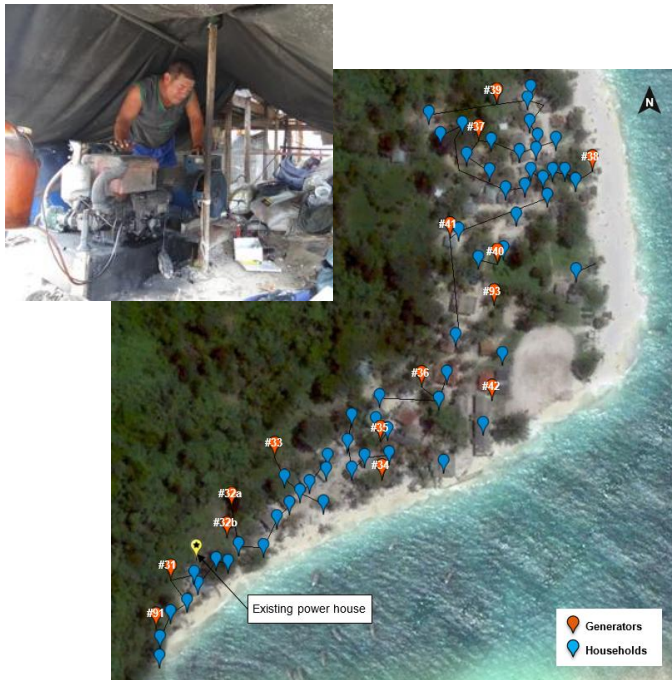
EA, ENSERV, BETA Energy, GPSC

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RE Hybrid Grid for Off-grid islands

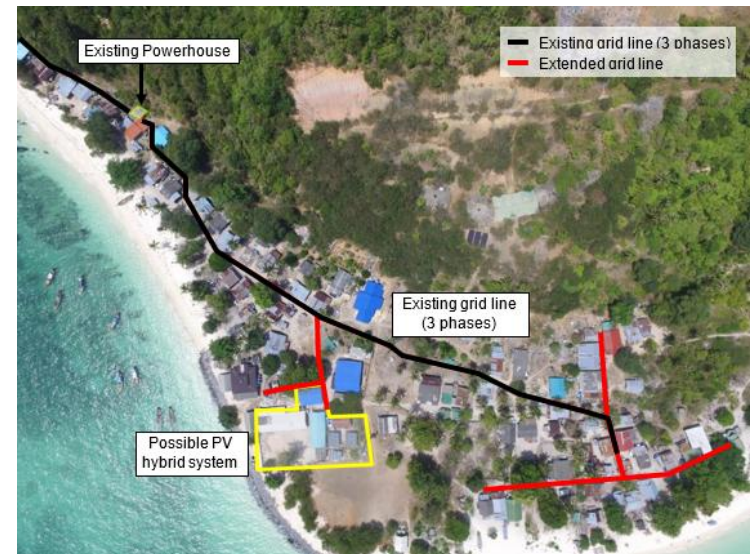
Current Situation

- 15 small DGs supplies electricity to group of households



Prelim. Proposal

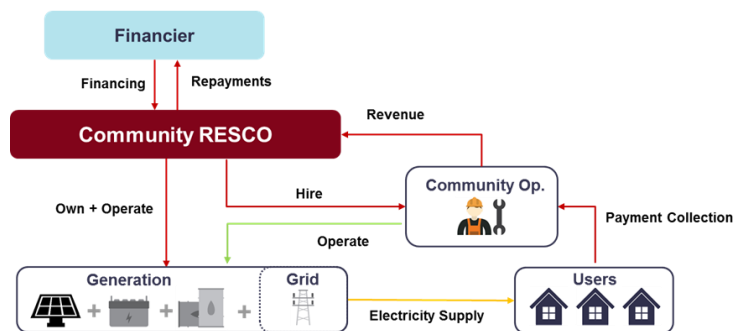
- Centralized PV/Diesel hybrid system supplying the whole island



Business Model

- Getting the local community involved in the project as much as possible
- While ensuring sustainability and replicability models

Community Model: RESCO



Pros

- Reduced risk of conflict with users
- Full retainment of revenues in the community
- Can start immediately using existing channels

Cons

- Difficult to find commercial financing
- Community have to take liability of repayments
- Risk of defaults

Key success factors

- Strong community commitment and leadership
- Community sees benefit in owning the assets
- Getting the right financier



*RESCO = Renewable Energy Service Company

Exploring Blockchain solutions

- Digital technologies allow to embed intelligence and communication capacity in the new energy hardware
- Blockchain as a single, unquestionable, immutable view of truth with decentralized governance and 100% uptime allows for many applications, esp. off-grid power distribution and payments^{ts}
- Solarcoin project with a decentralized infrastructure (100% uptime – unhackable by design) maintained by network of computers is aiming to restructure how we conceive value. A global, government independent solar support scheme could follow
- We are aiming to explore concrete use cases in our island projects





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