The Solar Ice Maker Pilot Project
Advancing Coastal Fishery through RE

Problem: Indonesia: 100,000 km coastline, doubling of fish production, growing cold demand

Question: how to extend the cold chain to remote areas and create additional incomes locally?

Higher added value on fish and improved market access will lead to higher incomes for local fishermen.
Electrification in Indonesia

Typical ice production in local ports

Inefficient cooling of fish

Plastic waste ends up in the ocean

RURAL ELECTRIFICATION MAP

www.remap-indonesia.org

Shortage of ice on many outer islands
Solar-Powered Ice Machine
The Idea Behind

**PV SYSTEM**
25 kWp
5-6 kWh/m²/d

**DC CONNECTION**
no main battery

**ICE MACHINE** ~100 kWh/ton
✓ frequency control
✓ thermal storage
✓ smart software
✓ natural refrigerant

**ICE BLOCKS**
1 ton/day
✓ 30% cost reduction (to diesel genset)

**ICE MACHINE**
800 SMALL FISHING PORTS
250 kg/day/vessel (<10GT)
625 kg/day cold storage of ice demand

**PV SYSTEM**
25 kWp
5-6 kWh/m²/d

**DC CONNECTION**
no main battery

**ICE MACHINE** ~100 kWh/ton
✓ frequency control
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Methodology
Pilot Project Transfer Model

Connect actors → success story
Technology adaption in Indonesia
Local O&M

working prototype
feasible concept
local manufacturing established
market-ready solution
bottom-up approach

100,000 km coastline
‘doubling of fish’
(2014-2019)
800 local ports
20 MW
Pilot Project

How to plant the seed…
Pilot Project Timeline

- Engineering & Implementation: 2016 – 2018

  - Concept, identification of partners, commissioning
  - Detailed engineering design
  - Manufacturing of prototype and testing
  - Implementation at pilot site

2016  2017  2018  Q3 2019

Product

Business Model
TEST & FINAL TECHNOLOGY TRANSFER
27.08.-31.08.2018

► transfer achieved
► production in Indonesia
► system successfully tested

ILK Dresden  AIREF  ATWSolar
Benefits of the System

Keynote
100% GHG emission-free block ice in Indonesia

100% powered from Solar PV
25.2 kW_p

Running on Natural Refrigerant
R290 Musicool by Pertamina
100% energy self-sufficient
independent from external power supply
only requires freshwater
Automated Technology

Dynamic Operation
ice generation synchronous to solar power
brine storage (no main battery system)

Remote Access and Monitoring
1.2 tons of block ice per day
powered by the sun – no fuel needed
cheaper than Diesel
competitive ice price
Way Forward

What are the next steps?
Implementation at Pilot Site
Seeing is Believing

✓ Q3 2019
✓ partnership with Tinamitra Mandiri
✓ local business model
✓ service and O&M

Tinamitra Mandiri
Towards a sustainable future

INCOME
Sales of Ice
INCOME
Add. Value for fish on ice
Results in 2019
Ready to Order…

✓ A functioning prototype and a business model in operation, increasing local value creation on an island

✓ An established manufacturing supply-chain in Indonesia, from manufacturer to EPCs

✓ Monitoring results from operation and lessons-learned for future models

...a success story...
ready to disseminate and upscale
Terima kasih banyak

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