



SMART VILLAGES
New thinking for off-grid communities worldwide



June 2016

OFF-GRID ENERGY FOR REMOTE ISLAND COMMUNITIES IN SOUTHEAST ASIA

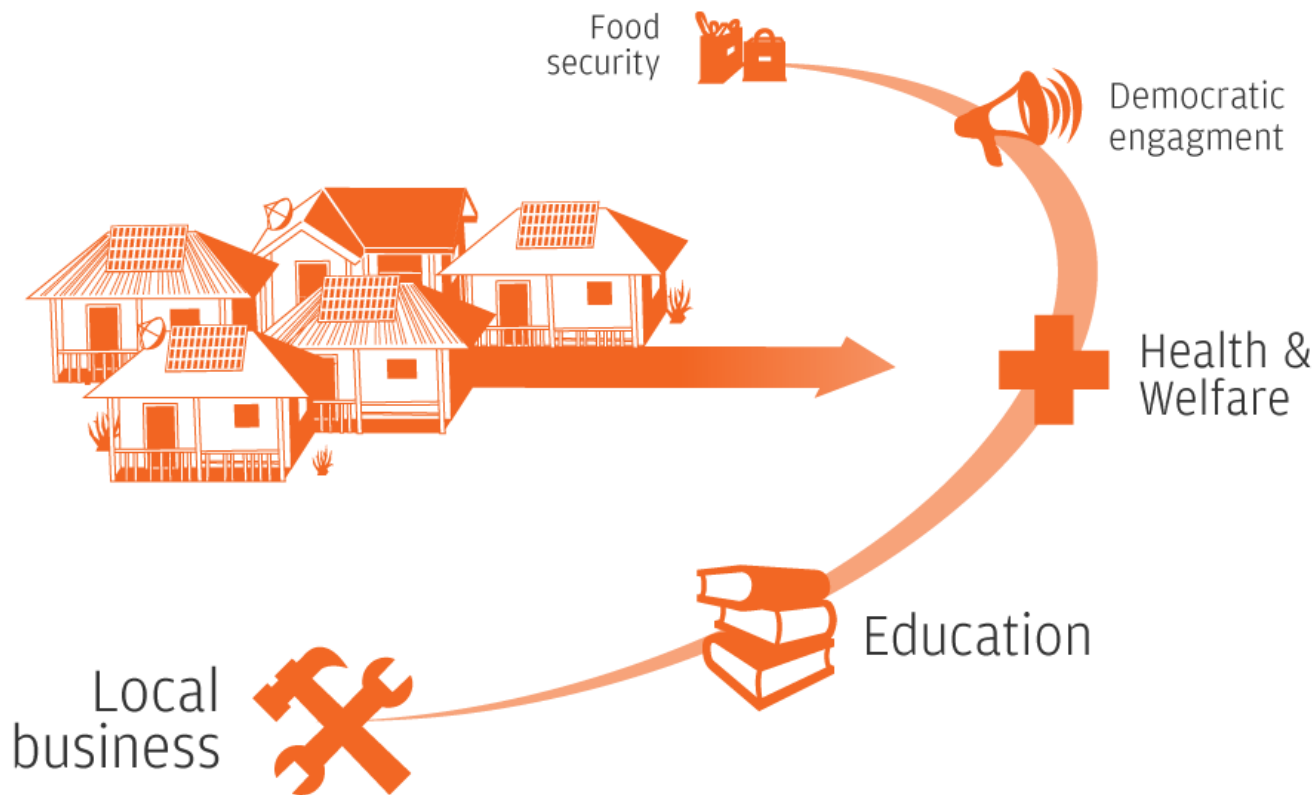
Dr Mike Price
University of Cambridge



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ENERGY AS A CATALYST FOR DEVELOPMENT



SMART VILLAGES: SOME KEY FEATURES



Education and health services

- ICT connectivity: distance learning and world's knowledge base
- Modern health services and tele-medicine



Foster entrepreneurship in provision and use of energy services

- Capture more of the agricultural value chain
- Create new businesses



Through ICT connectivity, participate in governance processes

- At local, regional and national levels
- Smart communities with strong rural/urban linkages



Building more resilient communities better able to respond to shocks

- Clean water and sanitation
- Affordable and healthy food

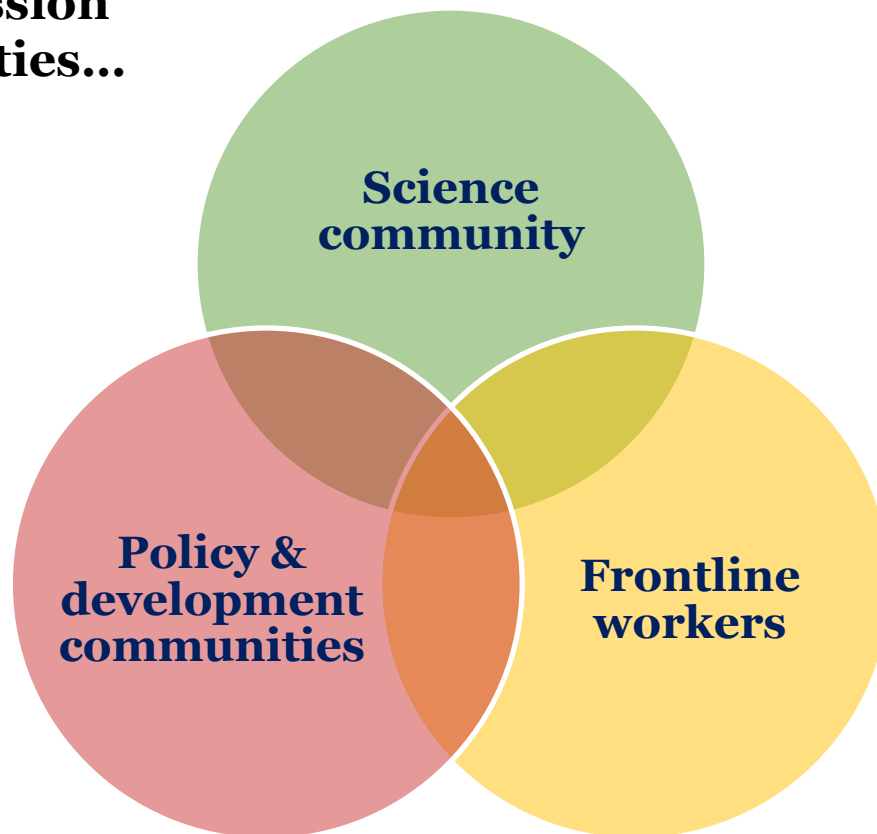
**All enabled by access to
modern ENERGY**



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**Facilitating discussion
between communities...**



**...on the barriers to energy access for rural
development and how they can be overcome**

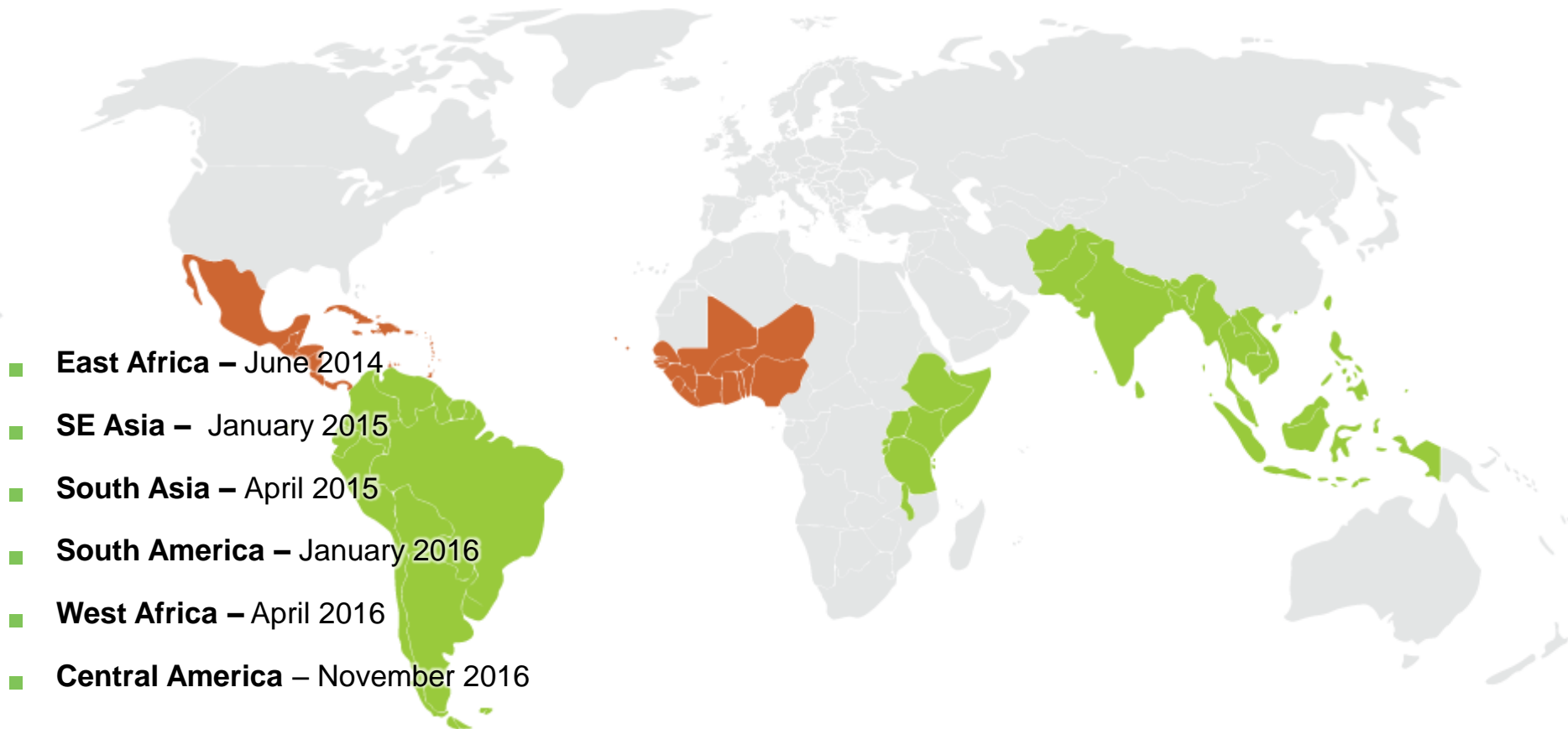
e4sv.org



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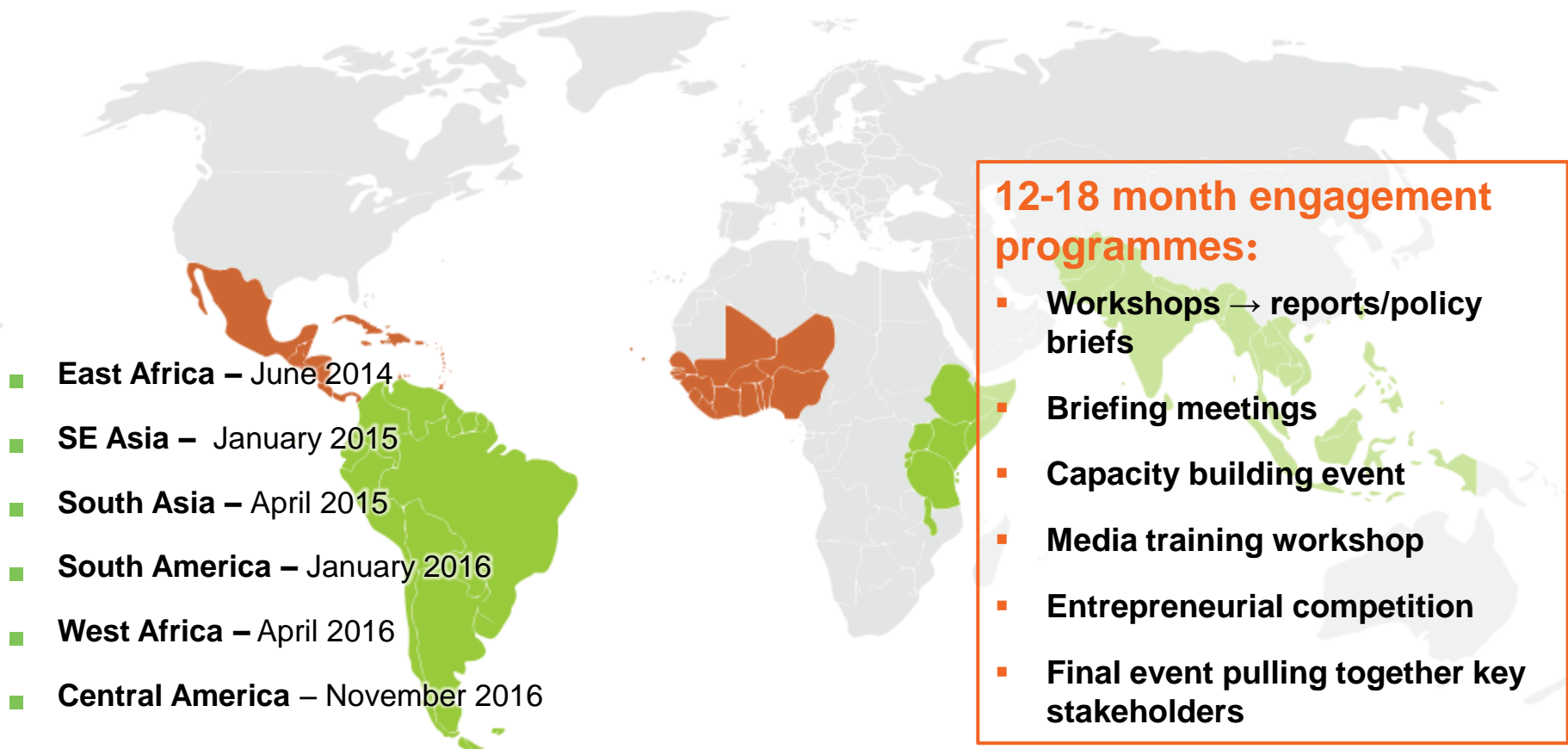
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SIX REGIONAL ENGAGEMENT PROGRAMMES





SIX REGIONAL ENGAGEMENT PROGRAMMES





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LESSONS FROM THE SMART VILLAGES AND KOPERNIK WORKSHOP ON ISLAND ENERGY – BUNAKEN ISLAND, INDONESIA, NOVEMBER 2015



Workshop participants pause for a group photo



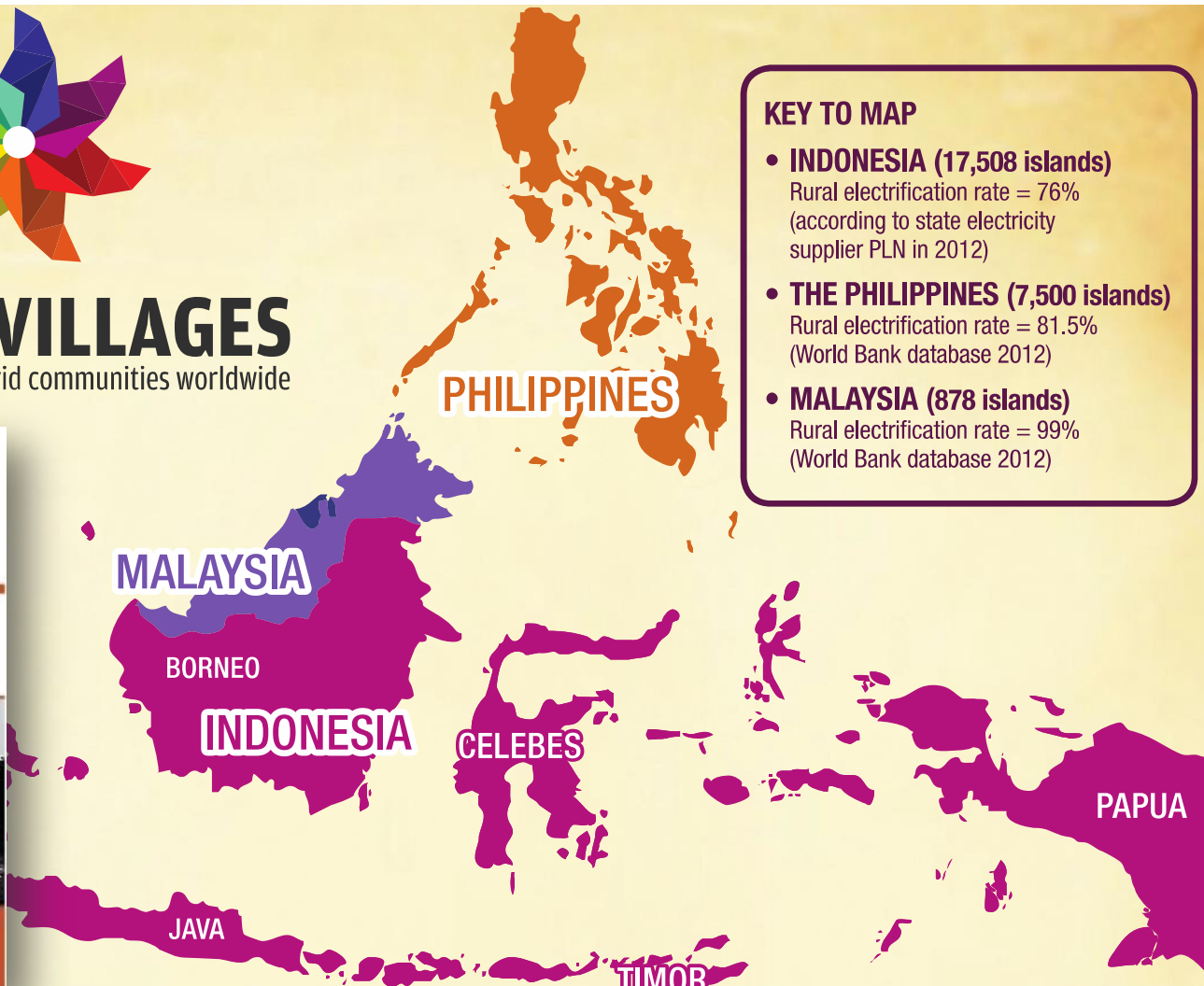
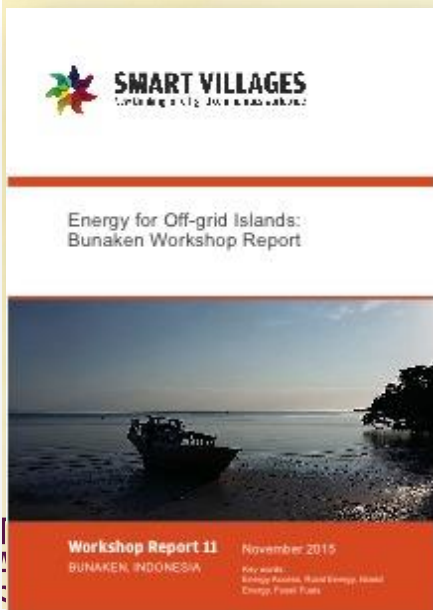
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KEY TO MAP

- **INDONESIA (17,508 islands)**
Rural electrification rate = 76%
(according to state electricity supplier PLN in 2012)
- **THE PHILIPPINES (7,500 islands)**
Rural electrification rate = 81.5%
(World Bank database 2012)
- **MALAYSIA (878 islands)**
Rural electrification rate = 99%
(World Bank database 2012)



BUNAKEN ISLAND CASE STUDY

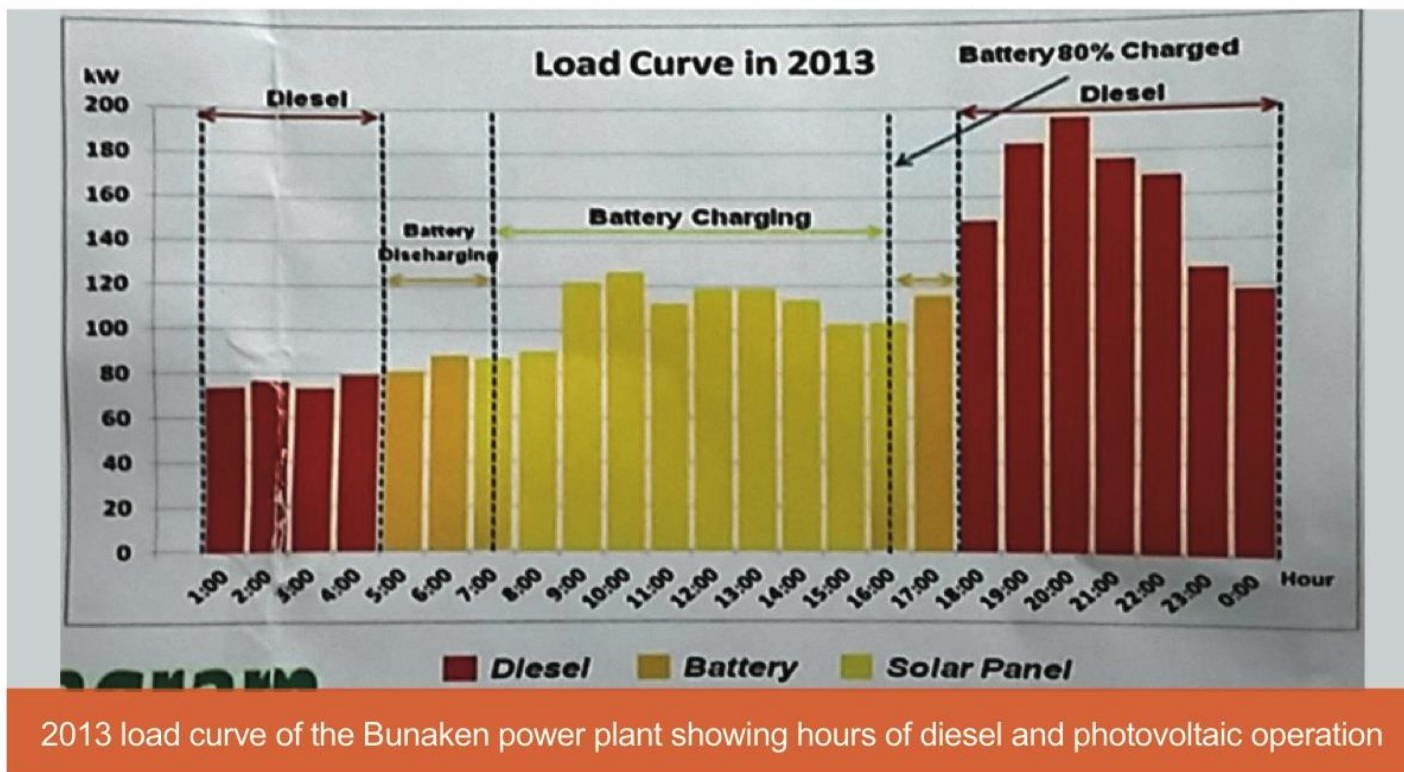
- 360 kWp solar hybrid system installed 2011
- Non-operational due to lack of parts and technical maintenance



Workshop presenters (Julia Macdonald and John Holmes) overlook the Bunaken solar power plant



BUNAKEN ISLAND CASE STUDY



2013 load curve of the Bunaken power plant showing hours of diesel and photovoltaic operation



8 KEY POINTS FROM THE WORKSHOP

- 1 Community engagement
- 2 Cost of electricity
- 3 Photovoltaics (hybrid diesel or battery minigrids)
- 4 Productive uses of energy
- 5 Long term viability
- 6 Female empowerment
- 7 Tourism
- 8 Demonstration projects





1 COMMUNITY ENGAGEMENT

- Community ownership models, such as those used by IBEKA and Kopernik, were shown to be successful in off-grid island contexts. “Change should be 70% social and 30% technological”.



4 PRODUCTIVE USE OF ENERGY

- Islands have distinctive energy demands
 - freezing ice for fishing,
 - power for copra drying
 - water pumping, desalination (if required)
 - effluents can provide biogas for cooking



5 LONG TERM SUSTAINABILITY

- There is a balance between affordability for island communities, and a need for financial and operational sustainability
- Tariff management can improve community ownership and energy efficiency, and provide incentives for maintenance.



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IMAGINING A SMART ISLAND

WHAT COMPONENTS DOES YOUR IDEAL OFF-GRID ISLAND/ VILLAGE COMMUNITY HAVE?



THERE ARE DRYING FACILITIES FOR KOPRA AND CASSAVA, ALONG WITH **SEAWEED DRYING**

THERE IS A **VISIONARY COMMUNITY LEADER** TO ENSURE EVERYONE SHARES A COMMON VISION



ENERGY SCHEMES TO MEET BASIC NEEDS

THE COMMUNITY PROVIDES ITS OWN **ENERGY** USING THE ISLAND'S NATURAL RESOURCES



POWER SOURCES FROM WIDE RANGE OF **WIND, SOLAR AND BIOMASS**

LARGE RAINWATER CATCHMENT TO AVOID RELIANCE ON DESALINATION PLANTS

BALANCE IS ACHIEVED IN LAND USE BETWEEN FOOD FOR ISLANDERS AND CROPS TO **SELL**



THERE IS AN **ISLAND COOPERATIVE** OWNING KEY ASSETS, SUPPORTING TRADE AND MANAGING FUNDS

SMART ECO RESORT FOR TOURISTS



THERE IS A **NO WASTE** POLICY FOR EVERYTHING **PLASTIC BAGS ARE BANNED**



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Thank you for your attention

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