



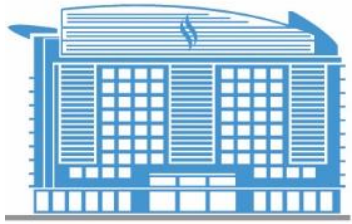
SARES

(Sarawak Alternative Rural Electrification Scheme)

Towards Full Electrification Coverage by 2025

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About Sarawak Energy



Started in 1921 as a unit in Public Works Department and is now a fully **integrated energy development company** and power utility **wholly owned by Sarawak Government**



Serving close to 3 million people across largest state in Malaysia. **680,000 accounts** covering domestic, commercial, industrial and export customers

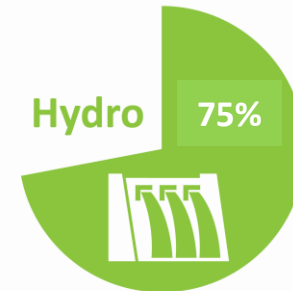


Lowest tariffs in Malaysia and amongst the lowest in ASEAN



Workforce

5,000 strong multidisciplinary team and largest employer of professional Sarawak talent



Largest generator of **renewable energy** in Malaysia

State Coverage



Rural Coverage



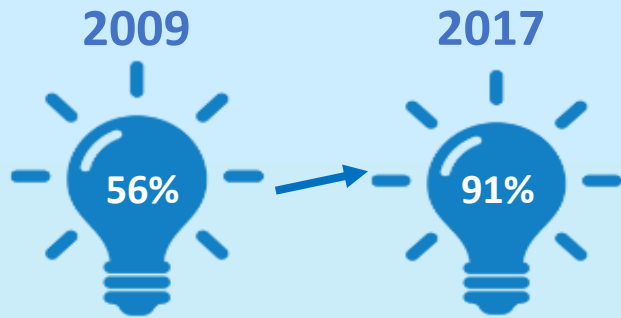
Target



To electrify 20,000 more households by 2020
Rural coverage increases to 97% (statewide 99%)

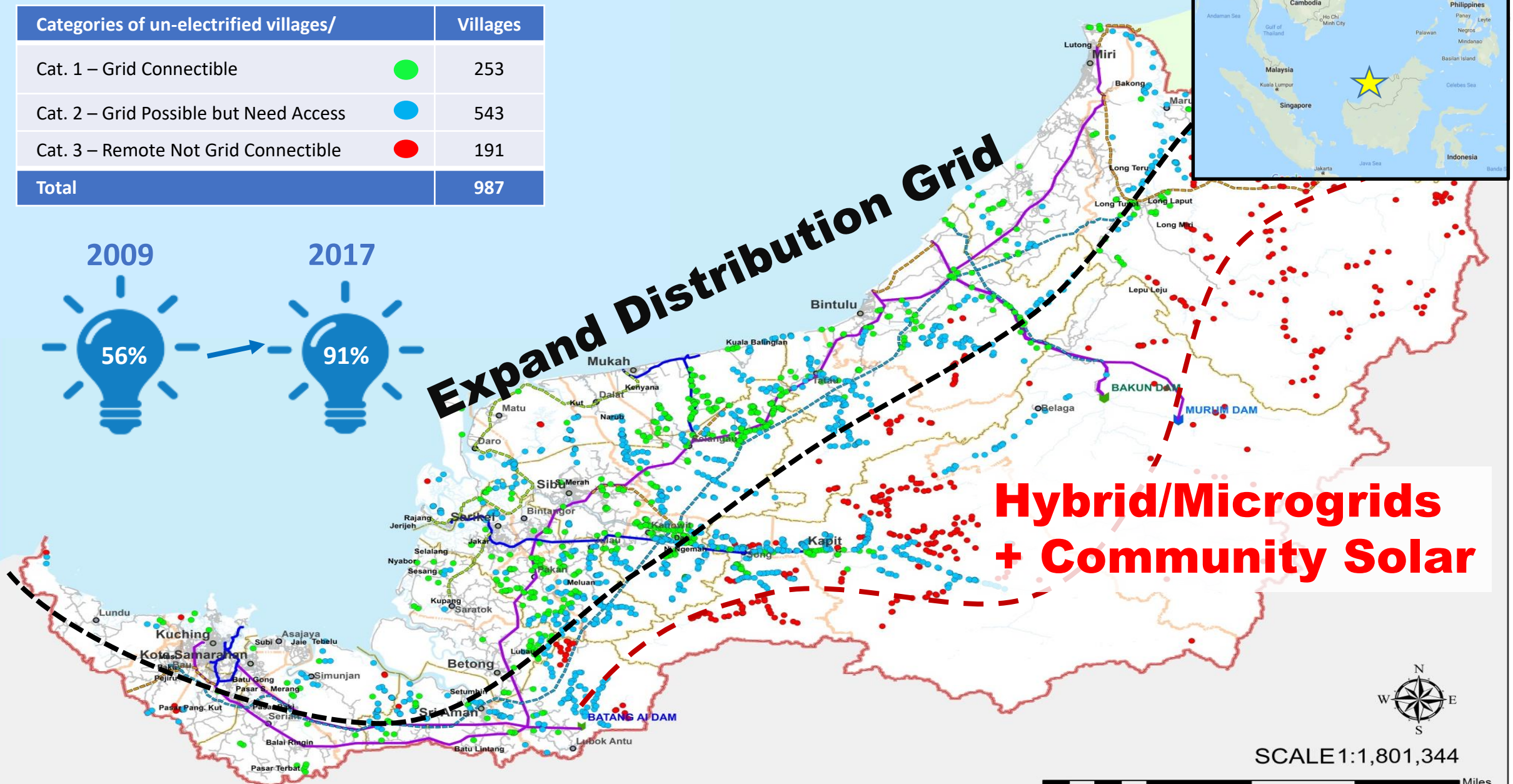
Full Electrification by 2025

Categories of un-electrified villages/		Villages
Cat. 1 – Grid Connectible	●	253
Cat. 2 – Grid Possible but Need Access	●	543
Cat. 3 – Remote Not Grid Connectible	●	191
Total		987

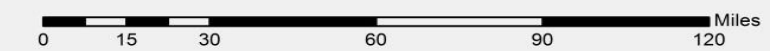


Expand Distribution Grid

Hybrid/Microgrids + Community Solar



SCALE 1:1,801,344



Accelerating Rural Electrification Projects



- To electrify 20,000 more households by 2020
 - Rural coverage increases to 97% (statewide 99%)

Grid

Expansion of grid infrastructure to rural areas

- For villages near to grid and/or more accessible by roads

- EHV and MV Substations: 2 EHV and 9 MV substations at strategic locations as reliable sources of energy at rural areas
- MV Covered Conductor Lines: 33kV lines connecting main grid to new MV substations at rural locations
- RES Last-Miles: HT/LT lines that link up the rural villages to existing grid or new MV substations

Off-grid

Stand-alone systems for rural and remotest villages

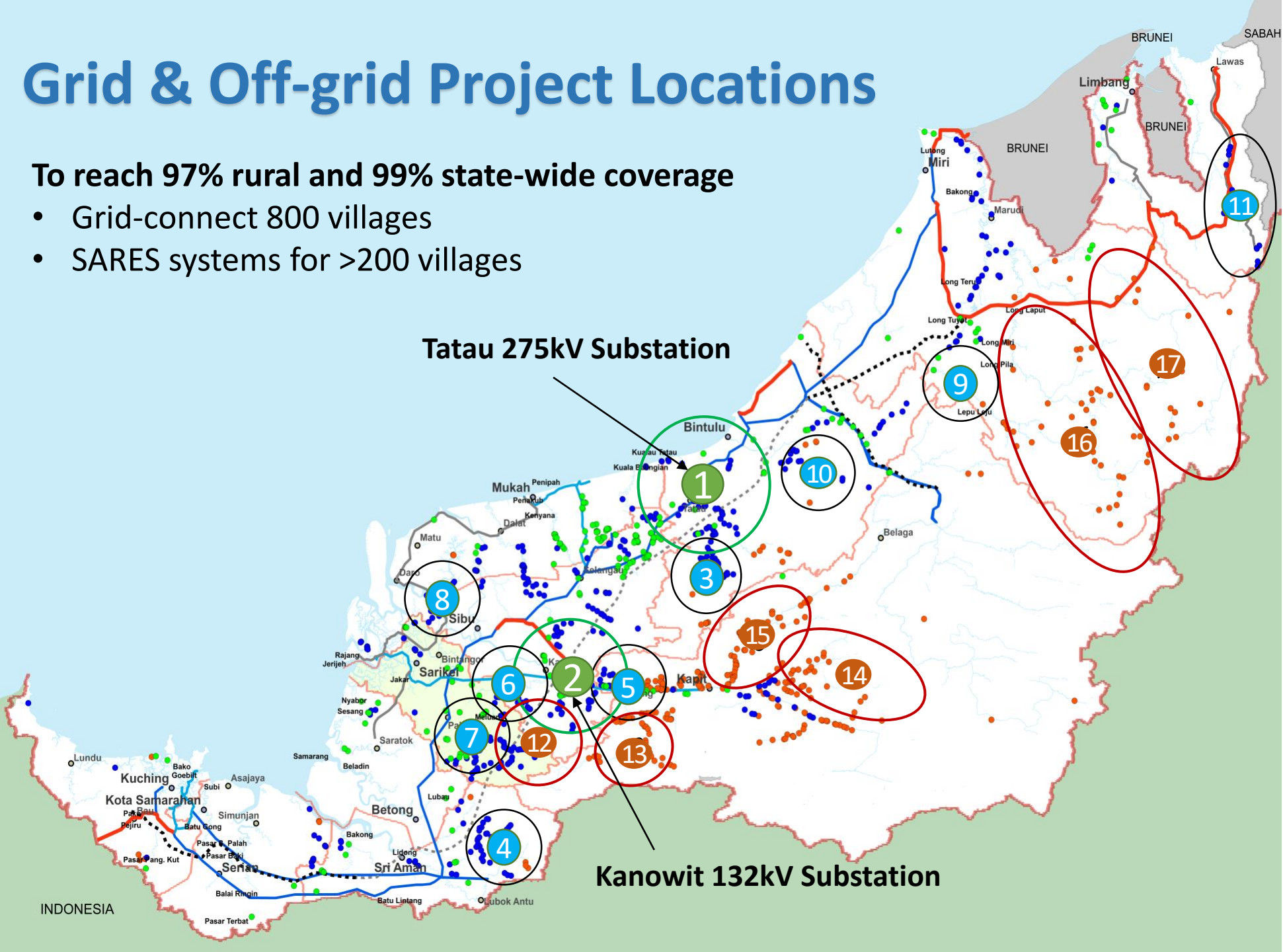
- For those unreachable (not practical or economical) by grid infrastructure

- Total funding amount of RM 3 billion (USD 750 mil)

Grid & Off-grid Project Locations

To reach 97% rural and 99% state-wide coverage

- Grid-connect 800 villages
- SARES systems for >200 villages



Tatau 275kV Substation

Kanowit 132kV Substation

RPSS & RES

A. Rural EHV Substations

1. Tatau 275kV
2. Kanowit 132kV

B. Rural MV Substations

3. Sangan
4. Batang Ai
5. Ngungun
6. Julau
7. Pakan
8. Dalat
9. Tinjar
10. Sebauh
11. Bakelalan

SARES Cluster

C. Off-Grid

12. Julau
13. Song
14. Bukit Mabong
15. Rejang & Belaga
16. Telang Usan
17. Mulu/Bario

Existing Electricity Supply for Remote Communities





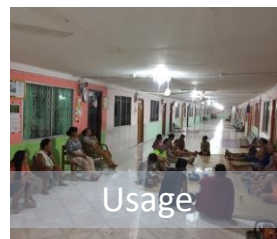
SARES

Community Based Solar Schemes

- Villages in remote locations where state grid currently not possible
- Simple design and ease of O&M
- Limited disposable household income
- No charge/bill for electricity used
- Technical Support provided



SARES Capacity



To provide a basic level of service for every household



- Power capacity 700 – 1000 W per household
- Daily energy up to 3000 Wh per household
- Able to cope for 3 continuous days of bad weather

Every door is installed with an energy limiter to manage usage



- To preserve the lifespan of the battery to reach or go beyond its design life of 5 years
- Battery State of Charge (SOC) must not drop below 30%

SARES – Stakeholders Engagement

1

**Government
& Ministry**



2

**Local Government &
Community Leaders**



3

**Community
Engagement**



4

**Joint Survey
with Contractors**



SARES Implementation: Transportation to Remote Locations



SARES Implementation: Electrical and Civil Works



SARES Implementation: Major Solar Equipment





Completed Villages



Community Training

Basic Operation & Maintenance

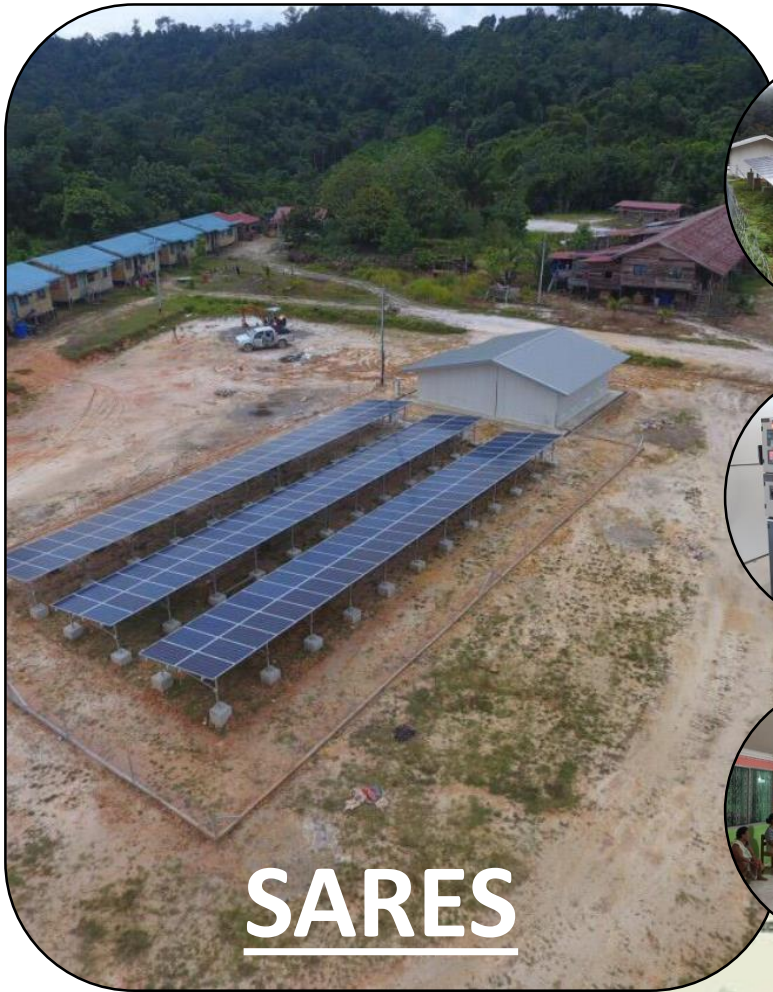
1. Energy consumption and electrical safety
2. Solar panels cleaning, vegetation control and general cleanliness
3. Shutdown and restarting Main Switch
4. Monitor battery status indicator light
5. Reporting of faulty system to Sarawak Energy





Ceremonies & Celebration

SARES Solar Progress



Completed Villages

- 238



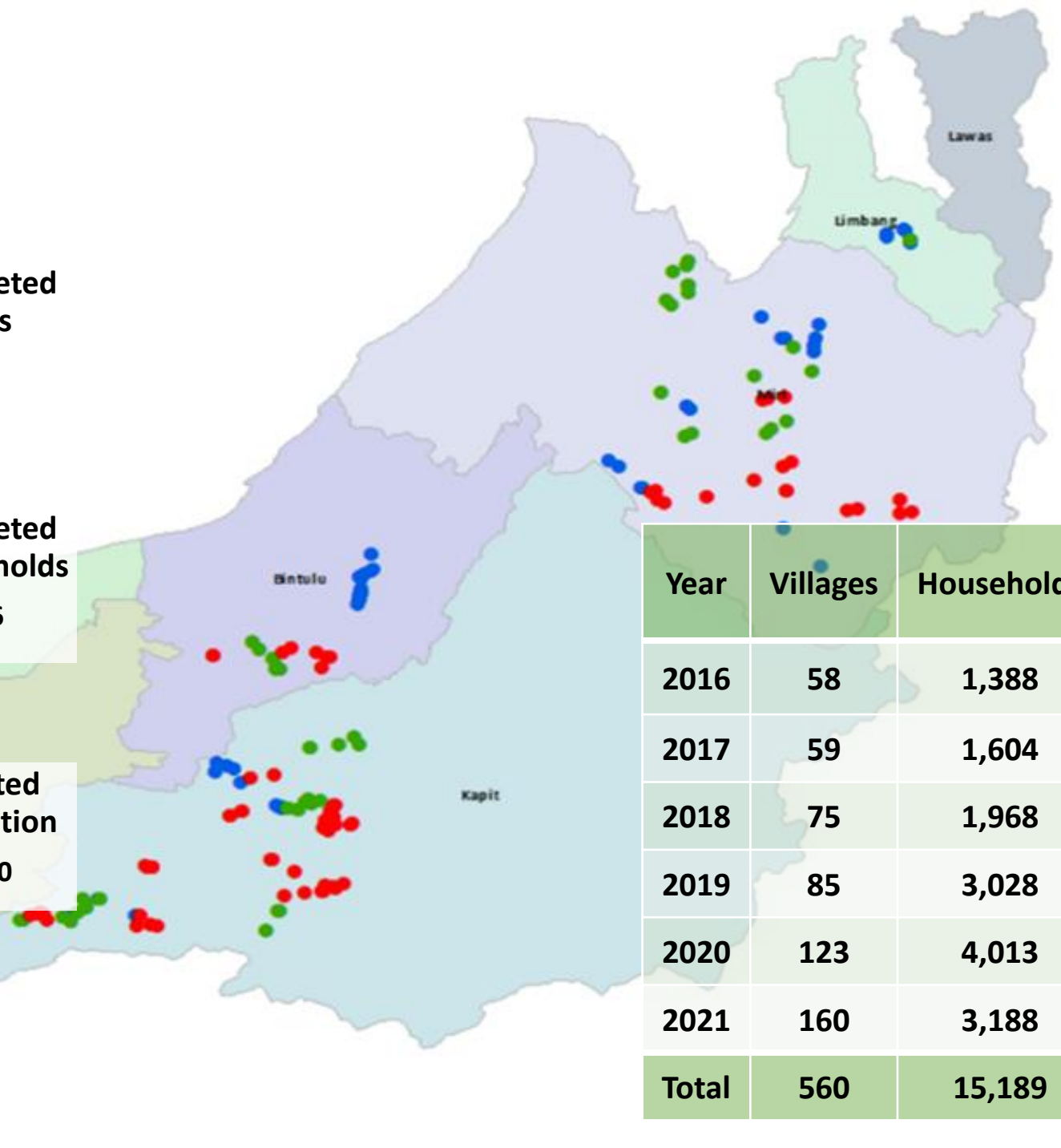
Completed Households

- 6,346



Benefited Population

- 45,000



Year	Villages	Households
2016	58	1,388
2017	59	1,604
2018	75	1,968
2019	85	3,028
2020	123	4,013
2021	160	3,188
Total	560	15,189

Lessons Learned & Success Factors



Key stakeholder (government-community-utility) partnerships

- Community ownerships
- Government committed on fund allocation
- Utility (and contractors) long term support



Appropriateness of design focusing on practicality

- Provide basic but reliable electricity supply
- Component design to suit rural locations
- Simplify O&M for local communities



Training and Competence

Contractor development and local competency

- Partnerships to develop local capacity in solar system engineering
- Developing off-grid solar training and certification of competencies

Thank You



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