Sarawak Alternative Rural Electrification Scheme
Providing electricity to off-grid communities in Sarawak
Sarawak Rural Electrification Coverage and Projection

<table>
<thead>
<tr>
<th>Year</th>
<th>Coverage Percentage</th>
<th>Households Electrified in each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>55.8%</td>
<td>17,039</td>
</tr>
<tr>
<td>2011</td>
<td>61.8%</td>
<td>9,136</td>
</tr>
<tr>
<td>2013</td>
<td>71.1%</td>
<td>11,915</td>
</tr>
<tr>
<td>2015</td>
<td>77.0%</td>
<td>14,950</td>
</tr>
<tr>
<td>2017</td>
<td>82.8%</td>
<td>17,500</td>
</tr>
<tr>
<td>2019</td>
<td>87.1%</td>
<td>20,300</td>
</tr>
<tr>
<td>2021</td>
<td>90.0%</td>
<td>22,500</td>
</tr>
<tr>
<td>2023</td>
<td>99.7%</td>
<td>22,500</td>
</tr>
<tr>
<td>2025</td>
<td>100.0%</td>
<td>22,500</td>
</tr>
</tbody>
</table>
Rural Electrification Status

Rural electrification coverage is 90% (end 2017)

Un-electrified villages:
- Village: 1,252; Household: 27,448

Category 1 (near to grid and with ready road access):
- Vil: 265; HH: 4,977

Category 2 (near grid but need road access):
- Vil: 747; HH: 14,664

Category 3 (far from grid and not practical to connect to grid):
- Vil: 232; HH: 7,600

Legend:
- Category 1
- Category 2-1
- Category 2-2
- Category 3
- Existing 132kV
- Existing 275kV
- Proposed 132kV
- Proposed 275kV
- Proposed 500kV
Existing Electricity Supply for Off-grid Communities
Solution for Off-grid Electrification: Solar Power System
Solar Power System Sizing

Service level is sufficient for a typical rural household

a. Capacity at 1000W / household
b. Usage of 2 kWh / household per day
c. Electricity provided free of charge

1 kW  2 kWh  3 Days
SARES: Sarawak Alternative Rural Electrification Scheme

SARES Modus Operandi:

I. Government-community partnership projects

II. Sarawak Energy to implement SARES

III. Community are trained to operate and do simple maintenance.

IV. Sarawak Energy to provide support.
SARES: Sarawak Alternative Rural Electrification Scheme

SARES Implementation

1. Timely project delivery and maintain the overall cost within budget in order to reach out as many villages as possible

2. Develop local competency and capability in solar that are required to ensure sustainability of the programme

3. Involve local communities in project implementation so that they can draw some benefits from project execution
Social Engagement
Transportation to Remote Locations
Electrical And Civil Works
Solar Panel, Inverter And Battery
Community Training
SARES Sustainability

- Sarawak Energy Commitment
  - Provide sustainable solution to rural electrification
  - Technical experience with solar technologies
  - Capacity in rural project execution

- Providing O&M supports to communities.
  - Empowering local community through training
  - Technical support structure in place to handle faults and maintenance
SARES Progress & Planning

- Completed Villages: 106
- Households: 2,601
- Population: 12,650

### Yearly Progress

<table>
<thead>
<tr>
<th>Year</th>
<th>Villages</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>58</td>
<td>1,369</td>
</tr>
<tr>
<td>2017</td>
<td>59</td>
<td>1,600</td>
</tr>
<tr>
<td>2018</td>
<td>75</td>
<td>1,962</td>
</tr>
<tr>
<td>2019</td>
<td>73</td>
<td>2,101</td>
</tr>
<tr>
<td>2020</td>
<td>75</td>
<td>1,907</td>
</tr>
<tr>
<td>TOTAL</td>
<td>340</td>
<td>8939</td>
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SARES Moving Forwards

- Improving SARES system
  - System performance analytic
  - Energy Storage System: Lithium Ion Batteries

- Microhydro Technologies
  - Run of river microhydro
  - Hydro Kinetics
SARES Achievement

ARE Award 2018 for Best Government project in Africa, Asia and Latin America
(Sicily, Italy on 13-March-2018)
SARES Team
Thank you!

Christopher Wesley Ajan
christopherwesley@sarawakenergy.com.my
Challenges
Cost Breakdown

Solar Equip: 62%
Civil: 14%
Electrical: 13%
Logistic: 11%