Decentralized Renewable Energy in Healthcare: The energy-health nexus

Karuna Trust in partnership with SELCO Foundation

by

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Karuna Trust
“Reaching the Health Care to Unreached”

• Karuna Trust delivers Comprehensive (Preventive, Promotive, Curative and Rehabilitative) Primary Health care to 1.5 million people in 5 states of India.

• It reaches out to remote, hilly tribal areas where there is poor or no power supply and telephone connectivity.

• Provides Primary Health care at a cost of US$3/- per person per year.
"Reaching Health Care to the Unreached"
Health Centres Managed by Karuna Trust

Map of India showing regions managed by Karuna Trust for health care.

Key:
- Green: Proposed
- Red: Existing

- Govt. PHCs
- Govt. MMUs
- CSR PHCs
- CSR MMUs
- Population Covered

Map Not to Scale
Health - Energy Projects

• Energy access at the Health Centers
• Energy efficient vaccine refrigerator (Surechill)
• Cold Chain Management
• Energy Efficient Labor Room
• Model Sub Centre
• Comprehensive Healthcare Kit
• Non-Communicable Diseases Screening Kit (NCD Kit)
• Mobile NCD Screening Unit
• Mobile School Health Screening Unit
• Solar TV for health education
Sustainable Energy at Health Centers

- Energy Audit
- Alternate sources of energy: Solar Energy and Solar water heater
- Changing to energy efficient bulbs and fans
- Energy efficient equipment installed: Solar Refrigerator & TV
- Availability: Erratic 8-10 hrs power cut to 24x7 uninterrupted power supply
- Quality: Erratic Voltage (100 to 170 V) to stable 220-230 V
- Affordability: 30-70% of reduction in electricity unit consumption and cost reduced by 15 to 30%
- Being implemented in 15 Primary Health Centers and 4 Sub Health Centers.
Model Sub Health Centre

• To create a model energy efficient sub center with local resources
• Being implemented in Karnataka and North East India
Energy Efficient Labor (Delivery) Room

- To create a model labor room which is energy efficient and effective

- Being implemented in 5 PHCs across Karnataka and North East India

<table>
<thead>
<tr>
<th>Name of Equipment</th>
<th>Typical Usage</th>
<th>Daily Usage (h)</th>
<th>Energy (Wh) Existing</th>
<th>Power (W)</th>
<th>Energy (Wh) Efficient and Replaced</th>
<th>Power (W)</th>
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</thead>
<tbody>
<tr>
<td>Baby Warmer (Essential)</td>
<td>Every Delivery</td>
<td>4</td>
<td>800</td>
<td>3200</td>
<td>380</td>
<td>1520</td>
</tr>
<tr>
<td>Suction Machine (Essential)</td>
<td>Every Delivery</td>
<td>1</td>
<td>400</td>
<td>400</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Spotlight for Delivery (Essential)</td>
<td>Every Delivery</td>
<td>4</td>
<td>100</td>
<td>400</td>
<td>20</td>
<td>80</td>
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Cumulative Power and Energy Reduction (Only Essential) 58%

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<tr>
<th>Name of Equipment</th>
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<th>Energy (Wh) Existing</th>
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<th>Energy (Wh) Efficient and Replaced</th>
<th>Power (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo Therapy (Desirable)</td>
<td>1-2 per month</td>
<td>8</td>
<td>270</td>
<td>2160</td>
<td>20</td>
<td>160</td>
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<tr>
<td>Oxygen Concentrator (Desirable)</td>
<td>Emergency</td>
<td>4</td>
<td>400</td>
<td>1600</td>
<td>350</td>
<td>1400</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1970</td>
<td>7760</td>
<td>870</td>
<td>3261</td>
</tr>
</tbody>
</table>

Cumulative Power and Energy Reduction (Essential + Desirable) 58%
Solar vaccine refrigerator (Surechill)

• Solar energy based vaccine refrigerator where vaccines are stored for immunization Programme

• Currently being implemented in 13 PHCs
Solar powered Maternal Health Kit

• To help community health workers in reach inaccessible and remote areas for ANC check up and follow up

• Currently being implemented in 4 PHCs
Non Communicable Diseases (NCD) Screening Kit

• For screening six diseases:
  – Hypertension
  – Diabetes Mellitus
  – Cardiovascular Diseases
  – Chronic respiratory illness
  – Anemia
  – Cancer: Oral, Breast and Cervical
  – Vision
Solar powered Mobile Non Communicable Diseases Screening Unit

- Diseases screened:
  - Diabetes Mellitus
  - Hypertension
  - Cancers: Oral, Breast & Cervical
  - Respiratory illness
  - Anemia
  - Buerger disease
  - Refractory errors
Solar Powered Mobile School Health Screening Unit

- School health screening across 2 districts in Karnataka
- General, oral and vision check ups are done
Centre for Decentralized, Renewable, Sustainable Energy for Health Care

• Training Centers at Mysore (Karnataka) and Tezu (Arunachal Pradesh) Focusing on integration between health and energy
• Two Mobile Health Skill and Sustainable Energy Lab
• Scaling up to all the Health Centers run by Karuna Trust and later to Government run Health Centers
Integrated Neonatal corner

• The objectives of this project are:
  – To develop a safe, cost-effective and energy efficient equipment for new born at Primary Health Centers.
  – To develop this model with a simple interface, making it easy to be used by the Health Workers (ANMs and ASHAs)
• Instead of 5 separate equipment's this all-in-one model will have the following components:
  – Radiant Warmer: to treat hypothermia (Peripheral Temperature < 36.5 degree Celsius)
  – Phototherapy LED: to treat cases of neonatal jaundice
  – Oxygen Concentrator: to supply oxygen for cases having hypoxemia
  – Suction Equipment: for use in case of any airflow obstruction
  – Monitor Screen: to view the vital signs like pulse rate, respiratory rate and oxygen saturation etc.
PHC Etalin

PHC building

Medical officer

PHC building

Road to Etalin
Road to PHCs

Road to Dambuk & Anpum

Road to Walong

Road to Dambuk & Anpum

Road to Etalin