Powering Primary Healthcare Facilities through solar in India: Lessons from Chhattisgarh

Sasmita Patnaik

24 April 2019
CEEW – Among South Asia’s leading policy research institutions

Energy Access

Renewables

Power Sector

Industrial Sustainability & Competitiveness

Low-Carbon Pathways

Risks & Adaptation

Technology, Finance, & Trade

Centre for Energy Finance
Agenda

• Change in electrification situation in Primary Healthcare Centres in India

• Impact of electricity access on service provision and other aspects of healthcare

• Chhattisgarh’s experience with solar PV for Primary Health Centres

• Lessons and Discussions
Public healthcare system in India

- Specialist hospitals
- District hospitals
- Community Health Centres (Every four PHCs)
- Primary Health Centres (20000-30000 population)
- Sub-centres (3000-5000 population)

First point of contact with Medical Officer
Access to regular electricity supply at PHCs in India has improved between 2007-08 and 2012-13

Situation of electricity supply in PHCs from the grid

<table>
<thead>
<tr>
<th></th>
<th>DLHS-3 (2007-08)</th>
<th>DLHS-4 (2012-13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No electricity connection</td>
<td>13%</td>
<td>9%</td>
</tr>
<tr>
<td>Irregular electricity supply</td>
<td>51%</td>
<td>41%</td>
</tr>
<tr>
<td>Regular electricity supply</td>
<td>36%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Situation improved yet half of the PHCs without regular electricity supply

Clarity around the term ‘regular’ in surveys
Service provision with improvement in electrification status of the PHCs

Service provision by the electrification status of PHCs

<table>
<thead>
<tr>
<th>Service provision</th>
<th>No electricity connection</th>
<th>Irregular electricity supply</th>
<th>Regular electricity supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>24x7 services provided</td>
<td>23%</td>
<td>52%</td>
<td>63%</td>
</tr>
<tr>
<td>Laboratory services provided</td>
<td>28%</td>
<td>62%</td>
<td>66%</td>
</tr>
<tr>
<td>Delivery services provided</td>
<td>33%</td>
<td>74%</td>
<td>81%</td>
</tr>
<tr>
<td>Deliveries conducted when a labour room is available</td>
<td>44%</td>
<td>81%</td>
<td>91%</td>
</tr>
</tbody>
</table>
Indirect impact of lack of electricity access in primary health centres

Reasons for not conducting deliveries despite the availability of a labour room:
- Unavailability of doctors and staff: 79%
- Lack of equipment: 62%
- No power supply: 41%
- Poor physical state: 37%
- Other reasons: 12%

Reasons for not conducting deliveries in the labour room:
- Unavailability of doctors and staff: 79%
- Lack of equipment: 62%
- No power supply: 41%
- Poor physical state: 37%
- Other reasons: 12%

Percentage of resident medical staff under different electricity access scenarios:
- MO residing when a room is available:
  - No Electricity connection: 18%
  - Irregular power supply: 46%
  - Regular power supply: 62%
- LHV residing when a room is available:
  - No Electricity connection: 21%
  - Irregular power supply: 42%
  - Regular power supply: 61%
- Staff Nurse residing when a room is available:
  - No Electricity connection: 21%
  - Irregular power supply: 59%
  - Regular power supply: 62%
What does it take to run a Primary Health Centre?

Essential requisites for delivery of primary medical care

- Infrastructure
  - Building and Furniture
  - Medical equipment
  - Medicines
- Manpower
- Finance
  - Water
  - Electricity
Evaluation of PHCs in Chhattisgarh
Evaluation of Solar PHCs in Chhattisgarh

Context:
• According to DLHS-4 (2012-13), one-third of the PHCs did not have regular power supply in Chhattisgarh.

Intervention:
• CREDA installed 2 kWp solar PV rooftop systems across 570 PHCs between the years 2012 and 2016, which would provide a backup of three to four hours everyday.

Evaluation:
• In 2017, CEEW conducted a primary survey of 147 PHCs (83 solar and 64 non-solar) in 15 districts with the objective to understand the impact of improved electricity access (through rooftop solar PV system) on health service delivery.
Some key findings of the study
Lenses for analysis

PHCs (147)

- **Power deficit** (Supply of 20 hours and below)
  - 48% (71)
    - With Solar: 26% (38)
    - Without Solar: 22% (33)

- **Power non-deficit** (Supply of 21 hours and above)
  - 52% (76)
Electricity access situation in power-deficit and non-deficit PHCs

**Electricity access in PHCs**

- **Proportion of PHCs with power back-up other than solar**
  - Power non-deficit: 29%
  - Power deficit: 26%

- **Proportion of PHCs with regular power cut of one hour or more**
  - Power non-deficit: 11%
  - Power deficit: 55%

- **Proportion of PHCs with regular voltage fluctuation**
  - Power non-deficit: 16%
  - Power deficit: 43%

**Proportion of PHCs reporting power cuts in the evening**

- **Overall**
  - Power non-deficit: 31%
  - Power deficit: 36%
- **Power non-deficit**
  - Power non-deficit: 28%
Prioritise alternative sources for key services among power deficit PHCs

41% of the power deficit PHCs that provide 24x7 services have a solar back-up, 14% deprived of any form of back-up.

37% of power deficit PHCs have critical equipment, 28% are getting back-up from solar systems.
Staff perception (1/2)

Proportion of PHCs reporting ease in delivery of services due to solar

- **OPD Services:** 59%
- **In-patient Services:** 77%
- **Deliveries:** 78%
- **Laboratory Services:** 45%

**Solar has helped the day-to-day operations of the staff/doctors in the PHC:** 98%

**Solar provides back-up as promised:** 79.5%

**Experienced cost savings on electricity expenditure:** 89%

Source: CEEW Analysis 2017
Staff perception (2/2)

Benefits:

- Overall PHC services less affected by power cuts
- Solar has also helped PHCs facing high voltage fluctuations, especially for cold chain points
- **Specific improvement in ease of services due to solar**: cold chain points, in-patient and delivery services
- Services during the night, especially delivery and emergency services have benefitted from solar

Concerns:

- Maintenance of solar was a concern raised, especially in PHCs with older systems
- Some PHCs asked for expansion in capacity of solar systems
Lessons and Discussions (1/2)

• Mainstream electricity access as a critical component of health system infrastructure.

• Augment electricity supply with alternative systems with prioritisation:
  – Power-deficit health facilities and 24x7 services
  – Labour rooms
  – Staff quarters for improving residential facilities
  – Cold chain points in power deficit PHCs

• Tailor solar system design based on local needs. Need better understanding of energy needs at the facility level to design cost-effective and resilient solutions

• Criticality of O&M for sustainability and budget allocation for the same

• Energy efficiency important, even in existing set-ups

• Dependence on electricity defined by functions – e.g. delivery services vs in-patient services
Lessons and Discussions (2/2)

• Integrated approach – collaboration among ministries, but also explain the political economy (target setting, etc.)

• Accounting for the maintenance of systems in public financing

• Mixed methods of evaluation - not focus on numbers alone but include quality of service, short-term and long-term assessments

• Comprehensive approach to understanding infrastructure – multidimensional and systems approach (water access, staff retention, etc.)

• Recycling and re-use policies (now)
Thank You

sasmita.patnaik@ceew.in
_ceew.in | @CEEWIndia