



# Public Health Facility and Solarization

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*Assessment report of public health facility in association with solarization in Chhattisgarh: Assessing the functionality and utilization of solar energy in public health facility.*

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Climate Change and  
Human Health,  
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Health Resource  
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## **Report on Public Health Facility and Solarisation**

### **Executive Summary**

The document is the report of the assessment of public health facility in association with solarization in Chhattisgarh. The main focus of the assessment is to check the functionality and utilization of solar energy in public health facilities.

The assessment survey was conducted in twenty eight (28) districts and Ninety Nine (99) blocks of Chhattisgarh. It was carried out in nine hundred and eighty four (984) health facilities identified from the list of 1198 health facilities provided by Chhattisgarh State Renewable Energy Development (CREDA) to State Health Resource Center (SHRC).

Solarization of public health facility is not new to the state of Chhattisgarh. It started from 2001. The installation of Solar panels picked a good pace since 2010. Around 99% of public health facilities were found to be solarized by CREDA. Their grievance mechanism for attending and addressing to the faults and any non-functionality of the solar panels was found to be good. Most of the rural health facilities were functional and have been found to be utilizing the solar energy for supporting electrical based medical and administrative equipment daily.

Though it is indicated that health facility has a person made responsible for the maintenance yet a staff under the supervision of managerial staff should be deployed for the responsibility for maintenance in order to inform the issue and faults for better sustainability of solar energy in term of functionality and utilization. Health facility staff should also be oriented for the solar energy for improving the utilization of solar energy for running more equipment. Monitoring and maintenance of solar energy should be encouraged through the health system with the technical support for repairing and other major breakdowns can suggested to CREDA. Partial usage of solar energy is identified as a gap which can be addressed by facilitating an orientation of solarisation. Smaller centers have shown better utilization of solar energy.

Rural healthcare infrastructure - PHCs and particularly sub-centres, is a critical link in ensuring success outcomes envisaged in the National Health Mission. Even as several states continue to lag behind on basic metrics pertaining to maternal mortality or vaccination rates, areas where the PHCs and sub-centres don't have access to grid electricity are particularly under-equipped. The enhancements being planned in the rural health infrastructure in the aftermath of the COVID-19 breakout accords a unique opportunity to direct critical public funding towards electrifying the Sub Health Centers. Powering rural healthcare infrastructure with decentralized renewable energy is an obvious choice now and in the future. The solarization of the sub health center would not only facilitate to deal with the ongoing or any pandemic situation but also to meet the challenge of climate change. A well-coordinated and integrated approach for the planning and implementation of solarization between CREDA and the health department is a must need for various levels of health system which can give better results for the vision for hundred percent solarization of health care in Chhattisgarh.

### **Key Findings:**

- ❖ 99% of public health facilities were found to be solarized.
- ❖ Solar plants were found to be functional in 90% solarized health facility.
- ❖ Good mechanism for receiving and addressing the complaints exists at CREDA
- ❖ Smaller centers were found to utilize solar energy well.

### **Gaps identified**

- ❖ 47% of health facilities use solar energy only during power failures.
- ❖ Partial use of solar energy for equipment in health facility is identified.

### **Recommendations**

- ❖ Rural Health Facility – Sub Health Centers and Primary Health Centers should be given the priority for solarization, as smaller centers are being found to use the solar energy well.
- ❖ Guidance document / Guidelines for Solarization of the health Facility – defining role and responsibility for:
  - a) Selection criteria or identification of the public health facility for solarization, using vulnerability assessment for health infrastructure.
  - b) Orientation of the health facility staff for solar energy for its potential use and climate resilience.
  - c) Accountability – capacity building of the point person.
  - d) Indicators for potential use of solar energy need to be defined for future assessment.
- ❖ A well-coordinated and integrated approach for the planning and implementation of solarization between CREDA and the health department is a must need for various levels of health system.

## **1. Introduction:**

### **1.1. Climate Change and Chhattisgarh**

The climate of Chhattisgarh is tropical. It is hot and humid because of its proximity to the Tropic of Cancer and its dependence on the monsoons for rains. Summer temperatures in Chhattisgarh can reach up to 49 °C (113 °F). The monsoon season is from late June to October and is a welcome respite from the heat. Chhattisgarh receives an average of 1,292 millimetres (50.9 ° C) of rain. Winter is from November to January. Winters are pleasant with low temperatures and less humidity. Ambikapur, Mainpat, Pendra road, Samri, Jashpur are some of the coldest places in the state.

In recent years we are facing extreme threats of climate change, especially due to erratic weather and rainfall.. Several studies have identified Chhattisgarh as one of the most vulnerable states to the impacts of climate change.

Chhattisgarh's State Action Plan on Climate Change and Human Health (SAPCCHH) identifies solarization of the health facilities is an integral approach to deal with the challenges faced by the health care facilities in the state and build their resilience to climate change. SAPCCHH mentions to achieve green and climate resilient health infrastructure through "*100% solarization and cool roofs, rainwater harvesting, solar powered water heaters and water pumps for public health facilities in Chhattisgarh*".

### **1.2. Situational Analysis of Solarization and Health Centres in Chhattisgarh**

According to the information provided by CREDA, Chhattisgarh state has successfully solarized around 1198 Public Health Centre (PHC). Almost all the district hospitals have been solarized and most of the PHCs have been covered too. The challenge remains for the Sub Health Centres (SHC), especially for those which are located in aspirational districts, and in areas that are in difficult geographical reach, face continuous disruptions in power supply and constant voltage fluctuations.

## **2. Rationale**

### **Site Visit Report by SHRC (*The Field Visit Report is attached in Annexure One*)**

In order to understand the performance of the health centers after solarization and challenges in maintenance that may be there, preliminary visits to 5 solarized health centers in Janjgir Champa District of Chhattisgarh was undertaken. Visits were made in the month of June and July 2020 to three primary health centers (PHC) and two community health centers (CHC). The members of State Health Resource Center (SHRC) and CREDA interacted with nurses and resident medical officials to understand the functioning and efficacy of the systems.

#### **2.1.Overall observations from the Site Visits:**

- a) In all the facilities visited solar power was used to only run lights and fans.
- b) There seems to be a lack of knowledge on how to efficiently and effectively use solar power for running health care facilities, especially various medical and administrative equipment's etc.
- c) The lack of full potential of solar power and utility in the health facility was leading to health workers complaining of additional burden of maintenance of batteries. Officials were complaining of space that batteries take in already crammed health centers.
- d) There needs to be a point person from CREDA at the district level who could troubleshoot problems of operations and also educate the health workers to maximize the use of solar power for health facilities.
- e) There are emerging areas of need - like patient transportation that solar powered vehicles could fulfil for PHCs.

It was also felt to conduct a quick Rapid survey around Chhattisgarh to identify the status of solarization before rolling down the much needed facility in the public health centers which is also the future's most reliable source of clean energy.

3. **AIM:** To assess solarization in public health facilities in Chhattisgarh for functionality and its utility.

#### **4. Objectives:**

- 4.1 To assess solarized public health facility and its functionality on solar energy.
- 4.2. To assess solarized public health facility and utilization on solar energy.

#### **5. Methodology**

1. The assessment survey was conducted in twenty eight (28) districts and Ninety Nine (99) blocks of Chhattisgarh.
2. The assessment was carried out on nine hundred and eighty four (984) health facilities identified from the list of 1198 health facilities which were solarized by CREDA. The list received by State Health Resource Center (SHRC) from CREDA office.
3. Questionnaire was developed to assess the solarized health facility for functionality and utility of solarisation. (Attached in annexure 2)
4. District Hospitals (10), Community Health Centers (95), Primary Health Centers (507) and Sub Health Centers (366) were surveyed.
5. Data was collected in the form of interview at the health facility by the field staff.
6. Data was analyzed in excel.

## **6. Results:**

The survey was conducted on the public health facilities based on the list received by CREDA. The list listed around one thousand one hundred and ninety eight (1198) public health facilities. Few of the health facilities were repeated due to increase in KV or for minor reasons. Out of 1198 public health facilities the surveyors visited nine thousand nine hundred and eighty eight and have reported against them on solarization.

### **6.1: Solarization of Public Health Facility by CREDA**

Table 1 indicates that out of the total health facilities that have been reported to be solarized by CREDA, around ninety nine percent of public health facilities have been solarized i.e. out of around nine hundred and eighty four health facilities around nine hundred and seventy seven (977) public health facilities were found to be solarized by CREDA.

**Table 1: Solarization of Public Health Facility by CREDA**

Table 1 Facility Vs Solarization			
Type of Health Facility	Total Health Facility surveyed	Solarised Health Facility	% Solarised Health Facility (n=984)
DH	10	10	100.00
CHC	95	94	98.95
PHC	509	507	99.61
SHC	370	366	98.92
<b>Total Health Facility</b>	<b>984</b>	<b>977</b>	<b>99.288618</b>

Table 1 indicates that 100% District hospitals are solarized followed by Community Health Center (CHC), Primary Health Center (PHC) and Sub Health Centers are 99% solarized.

## **6.2. Solarized Public Health Facility and its status of function on solar energy**

**Table 2** Indicates that out of 977 solarized health facilities which were reported to solarized out of 984 health facilities around eight hundred and seventy seven (877) were reported to be functional i.e. around 90 % of public health facilities.

**Table 2: Solarized Health Facility and health facility functional on solar energy**

<b>Table 2 Solarized Health Facility Vs Functionality</b>				
Type of Health Facility	Total Health Facility surveyed	Solarized Health Facility	Functional with Solarization	% Functional with Solarization (n=977)
<b>DH</b>	10	10	8	80.00
<b>CHC</b>	95	94	85	90.43
<b>PHC</b>	509	507	454	89.55
<b>SHC</b>	370	366	330	90.16
<b>Total Health Facility</b>	984	977	877	89.76

**Table 2** indicates that around 85 CHC's and 330 SHC's were reported to be functional followed by 454 PHC' i.e almost all were 90% functional. It is also indicated that Eight (8) District hospitals (80%) were found to be functional out of 10 district hospitals which are reported to be solarized. This indicates the solar energy was found to be functional almost same in all the health facilities indicating a slight better percentage at rural health facilities than urban health facility.

## **6.3. Utilization of solar power to run the equipment on the day of survey**

In the below table 3 it is indicated that out of nine hundred and seventy seven health facilities which were found to be solarized from that around seven hundred and ninety around 83% of health facilities were running the equipment on solar energy on the day of survey.

**Table 3 Public Health Facility Functional with solar on the Survey day**

Type of Health Facility	Total Public Health Facility surveyed	Solarized Health Facility	Equipments Functional on Solar Energy on Survey day	% Equipments Functional on Survey day (n=977)
<b>DH</b>	10	10	<b>8</b>	<b>80.00</b>
<b>CHC</b>	95	94	<b>81</b>	<b>86.17</b>
<b>PHC</b>	509	507	<b>425</b>	<b>83.83</b>
<b>SHC</b>	370	366	<b>306</b>	<b>83.61</b>
<b>Total Health Facility</b>	<b>984</b>	<b>977</b>	<b>820</b>	<b>83.93</b>

Table 3 indicates that on the day of survey 81 CHC's (86%) were functional on solar energy followed by 425 PHC'S and 306 SHC's both almost equal to around 84%.

Reasons for not being functional were also asked by the health facilities which reported to be functional as qualitative information and based on the qualitative information it was found that most of the remaining health facilities which were found to be functional on solar energy as indicated in table 2, but not functional on the day of survey as indicated in Table 3 had some fault or issue. Few health facilities reported that the facility was visited by the mechanic but the issue was not resolved and was referred further. This was reported only for PHC' and SHC's equally. Few facilities complained of poor battery backup as a continuous challenge. This challenge was mostly faced by the PHC's followed by SHC's and only around ten (10) health facilities reported of not knowing whom to contact for maintenance and complaint and some were still to report or raise a complaint for maintenance.

#### **6.4. Utilization of solar energy by health facilities**

Table 4 below indicates that around 494 health facilities (50%) health facilities are utilizing the solar energy daily and around 463 health facilities (47%) are utilizing it only during power failure.

**Table 4 Utilization of Solar Energy**

**Table 4 Health Facility and Utilization of Solar Energy**

<b>Utilization in Health Facility</b>	<b>Solarized Health Facility</b>	<b>Daily</b>	<b>% Daily (n=975)</b>	<b>Power Failure</b>	<b>% Power failure (n=975)</b>
<b>DH</b>	10	7	70.00	2	20.00
<b>CHC</b>	95	51	53.68	34	35.79
<b>PHC</b>	509	242	47.54	257	50.49
<b>SHC</b>	370	194	52.43	170	45.95
<b>Total Health Facility</b>	<b>984</b>	<b>494</b>	<b>50.20</b>	<b>463</b>	<b>47.05</b>

**Table 4** indicates that the utilization of solar energy is found to be better in rural health facility i.e. in Primary Health Center (PHC) and Sub Health Center (SHC) than in District Hospitals (DH) followed by Community Health Center (CHC). Around 47% health facility utilized solar energy only during power failure. It was reported that only eleven (12) health facilities were utilizing the solar energy all the time and remaining few have reported with other reasons of not been able to utilize daily or during power failure. The Qualitative information shows that they are using the solar energy only for few hours or on hour bases, some solar panels not being installed in the required area where it is needed.

## 6.5. Utilization of solar energy for health facility equipment

Below table 5 indicates that 745 health facilities (76%) utilizes solar energy for both fans and lights. Around 52% of health facility use freezer/ILR/refrigerators on solar energy and around 391 health facilities i.e. around 40% use solar energy for computers and printer.

**Table 5 Health Facility and Equipment Utilized**

**Table 5 Health Facility and Equipment utilized on Solar energy**

Utilizati on in Health Facility	Solarized Public Health Facility	Lights and Fan	% for lights and fans (n=984)	Freezer / ILR / Refrigerator	% for freezer / ILR / Refrigerator (n=984)	Computer / Printer	% Comp / Printer (n=984)
<b>DH</b>	10	5	50.00	3	30.00	0	0.00
<b>CHC</b>	95	78	82.11	68	71.58	60	63.16
<b>PHC</b>	509	413	81.14	305	59.92	247	48.53
<b>SHC</b>	370	249	67.30	138	37.30	84	22.70
<b>Total Health Facility</b>	<b>984</b>	<b>745</b>	<b>75.71</b>	<b>514</b>	<b>52.24</b>	<b>391</b>	<b>39.74</b>

Table 5 indicates the most used or popular electrical equipment on solar energy are lights and fans followed by freezer and Ice Lined Refrigerator (ILR) and lastly it is followed by computer and printer for the administrative use. It is also indicate from table 5 that that utilization of electrical based medical and administrative equipment are mostly utilized in CHC's and PHC's on solar energy . Partial usage of solar energy is identified as a gap.

Based on the qualitative information reported around 42 health facilities PHC's (29) followed by (12) SHC's and (1) CHC's have reported that they have been using the solar energy for baby warmer, sterilizers, water, television and exhaust fan apart from the electrical items. The following equipment are not mentioned in table 5.

## **6.6. Solarized health centers with person responsible for maintenance.**

Table 6 indicates that around 58% of health facility has a person responsible for monitoring and maintenance by the health facility staff. The person responsible informs for support during technical failure. More than 25% of health facilities have no point person for monitoring and maintenance.

**Table 6 Solarization of Public Health Facility and Responsibility for maintenance**

<b>Table 6 Health Facility and Responsibility</b>							
<b>Utilization in Health Facility</b>	<b>Solarized Public Health Facility</b>	<b>Had one person responsible for maintenance</b>	<b>% of person responsible for maintenance (n=984)</b>	<b>CREDA Technician</b>	<b>% CREDA Technician (n=984)</b>	<b>None responsible</b>	<b>% None responsible (n=984)</b>
<b>DH</b>	10	5	50.00	2	20.00	3	30.00
<b>CHC</b>	95	54	56.84	13	13.68	24	25.26
<b>PHC</b>	509	292	57.37	52	10.22	145	28.49
<b>SHC</b>	370	222	60.00	59	15.95	80	21.62
<b>Total Health Facility</b>	<b>984</b>	<b>573</b>	<b>58.23</b>	<b>126</b>	<b>12.80</b>	<b>252</b>	<b>25.61</b>

Around five health facilities reported of not knowing who is responsible for the maintenance. The health facility staffs that are responsible for the monitoring and maintenance are mostly support staff (179) followed by medical staff (145) which included Medical Officer, Staff Nurses, Technical Staff, field staff. There are few places where Mitanin / Jeewan Deep Samithi/ Sanstha / Cluster technician is also made responsible.

## 6.7. Repairing of solar plant

Table 7 indicates that out of eight hundred and sixty one (861) health facilities which needed repair around 78% of health facilities were repaired by CREDA. Though facilities have taken services from private vendors yet it is very less and the same percentage of people responsible at the health facilities does not know who was called for repairing or who repaired.

**Table 7 Repairing of solar plant in health facility**

<b>Table 7 Repairing of solar plant in health facility</b>								
Utilization in Health Facility	Solarized Public Health Facility	Ever Needed Repair	Repaired by					
			CREDA	% CREDA (n=861)	Private	% Private (n=861)	Others / Don't Know	% Others / Don't Know (n=861)
DH	10	10	7	70.00	1	10.00	2	20.00
CHC	95	84	71	84.52	8	9.52	5	5.95
PHC	509	459	354	77.12	55	11.98	50	10.89
SHC	370	308	239	77.60	33	10.71	37	12.01
<b>Total Health Facility</b>	<b>984</b>	<b>861</b>	<b>671</b>	<b>77.93</b>	<b>97</b>	<b>11.27</b>	<b>94</b>	<b>10.92</b>

CREDA is the cell for contact and repair for any breakdowns and repair for solar related issues by the health facility. Around 78% health facilities which needed repairs at any given point were addressed by CREDA. CREDA is the cell for contact and repair for any breakdowns and repair for solar related issues at any given point of breakdown. The technical support for repairing is addressed by CREDA.

Around 97 health facilities (11%) took private service for repair and around almost the same number of health facilities (11%).

## **7. Discussion**

The first solarization of the health facility – Sub Health Centers is reported in the year 2001, followed by a PHC in Dharamjaygarh block of Raigarh District in 2002 and in 2003 SHC of Baikunthpur Block of District Koria. No solarization of the public health facility is reported in between 2004 to 2005. Total 13 were reported to be solarized between 2006 and 2009 with PHC (9), CHC (3), and DH (1). District Hospital in Gariyaband is reported to be solarized in the year 2009. In 2010 around 15 Public health facilities were solarized, most were PHC's. After that Public health facility were solarized continuously with an average of 21 Public Health facilities per year (2011 – 2020).

Table 1 indicates that out of the total health facilities that have been reported to be solarized by CREDA, around ninety nine percent (99%) of public health facilities have been solarized i.e. out of nine hundred and eighty four (984) health facilities around nine hundred and seventy seven (977) public health facilities were found to be solarized by CREDA. Around seven (7) health facilities are reported not to be solarized. It is also indicated that 100% District hospitals are solarized followed by Community Health Center (CHC), Primary Health Center (PHC) and Sub Health Centers (SHC) which are 99% solarized. Almost most of the Urban Health facilities have been successfully solarized. Maharani Hospital 1/2/3/4/5 in Jagdalpur is solarized and is reported to be non-functional at the time of survey due the ongoing renovation activity which removed the solar plant wiring.

Table 2 indicates that around eight hundred and seventy seven (877) were reported to be functional i.e. around 90 % of public health facilities. It is also indicated that Eight (8) District hospitals (80%) were found to be functional against 10 district hospitals. The solar energy was found to be functional almost same in all the health facilities indicating a slight better percentage at rural health facilities than urban health facility. Though almost all the urban health facilities have been solarized yet functionality is found to be better at rural health facilities. Rural health facilities face the challenge of maintenance and repair more as compared to the urban health facilities as indicated in table 7 yet the functionality and utilization of solar energy is also found to be better as indicated in table 3 and table 4 above. The qualitative information indicates that most of the remaining health facilities which were

found to be functional on solar energy as indicated in table 2, but are not functional on the day of survey, indicated in Table 3 had some fault or issue. Few health facilities reported that the facility was visited by the mechanic but the issue was not resolved and was referred further. This was reported only for PHC's and SHC's equally. Few facilities complained of poor battery backup as a continuous challenge. This challenge was mostly faced by the PHC's followed by SHC's and only around ten (10) health facilities reported of not knowing whom to contact for maintenance and complaint and some were still to report or raise a complaint for maintenance. This reflects the lack of coordination between the technical team of CREDA and the health facility.

Table 4 indicates that (50%) health facilities are utilizing the solar energy daily for few equipment and around 47% health facilities are utilizing it only during power failure. The utilization of solar energy is found to be better in rural health facility i.e. in Primary Health Center (PHC) and Sub Health Center (SHC) than in District Hospitals (DH) followed by Community Health Center (CHC). Around 47% health facility utilized solar energy only during power failure. It was reported that only eleven (12) health facilities were utilizing the solar energy all the time and remaining few have reported with other reasons of not been able to utilize daily or during power failure. The Qualitative information reports that they are using the solar energy only for few hours or on hour bases, some solar panels not being installed in the required area where it is needed. This is identified as a gap as solar panels are not being installed at the place in the health facility where it is needed or may be due to any shifting in infrastructural requirement the solar panels have not been shifted to the place where it is needed. Assessment should be considered from time to time especially before the upgradation of the health facility in association with solarization considering the dynamic needs of the facilities

Table 5 indicates that 745 health facilities (76%) utilize solar energy for both fans and lights. Around 52% of health facility use freezer/ILR/refrigerators on solar energy and around 391 health facilities i.e. around 40% use solar energy for computers and printer. It was found that only eleven (12) health facilities were utilizing the solar energy all the time. The area with scarcity of power supply shows good results for the utilization of the solar energy. District

hospitals do not show good utilization of solar energy for equipment could be because urban health facility has no dearth of power supply.

The most used or popular electrical equipment on solar energy are lights and fans followed by freezer and Ice Lined Refrigerator (ILR) and lastly it is followed by computer and printer for the administrative use. The utilization of electrical based medical and administrative equipment is mostly utilized in CHC's and PHC's on solar energy. Partial usage of solar energy is identified as a gap, it can be addressed by facilitating an orientation of solarisation. Smaller centers have shown better utilization of solar energy. The vaccination drive is found to be more associated and reason of solar energy being installed in the health facilities. One of the reasons for the underutilization of solar energy for equipment could be that initially it was only endorsed as a purposeful solution for vaccination (freezer and ILR) which eventually limited the scope of the utilization of solar energy..

Based on the qualitative information reported around 42 health facilities PHC's (29) followed by (12) SHC's and (1) CHC's have reported that they have been using the solar energy for baby warmer, sterilizers, water, television and exhaust fan apart from the electrical items. District hospitals do not show good utilization of solar energy for equipment could be because urban health facility has no dearth of power supply. It is evident that the staff of all types of health facility would need the orientation for solar energy for its utility, monitoring and maintenance to establish sustainability for 100% solarization of health facilities in Chhattisgarh. Partial usage of solar energy is identified as a gap.

Around 58% of health facility has a person responsible for monitoring and maintenance by the health facility staff. The person responsible informs for support during technical failure. More than 25% of health facilities have no point person for monitoring and maintenance. Around 12% of health centers are maintained by CREDA for monitoring and technical support. This could be because after the installation of the solar panel CREDA takes care of the maintenance for next five years.

Around five health facilities reported of not knowing who is responsible for the maintenance. The health facility staffs that are responsible for the monitoring and maintenance are mostly support staff followed by medical staff which included Medical Officer, Staff Nurses,

Technical Staff, field staff. There are few places where Mitanin / Jeewan Deep Samithi / Sanstha / Cluster technician is also made responsible. Though it is indicated that health facility has a person made responsible for the maintenance yet a staff under the supervision of managerial staff should be deployed for the responsibility for maintenance in order to inform the issue and faults for better sustainability of solar energy in term of functionality and utilization. Health facility staff should also be oriented for the solar energy for improving the utilization of solar energy for running more equipment. Monitoring and maintenance of solar energy should be encouraged through the health system with the technical support for repairing and other major breakdowns can be suggested to CREDA.

Table 7 indicates that out of eight hundred and sixty one (861) health facilities which needed repair around 78% of health facilities were repaired by CREDA. Though facilities have taken services from private vendors i.e. around (11%) and the same percentage of people responsible at the health facilities does not know who was called for repairing or who repaired CREDA is the cell for contact and repair for any breakdowns and repair for solar related issues by the health facility.

## **8. Conclusion**

Solarization Public Health Facility is not new to Chhattisgarh. Solarization Public Health Facility started from 2001 in Chhattisgarh. The installation of Solar panels took a good pace since 2010. Around 99% of public health facilities were found to be solarized by CREDA. The grievance mechanism of CREDA for attending and addressing to the faults and any non-functionality of the solar panels was found to be very good. Monitoring and maintenance of solar energy should be encouraged through the health system with the technical support for repairing and other major breakdowns can suggested to CREDA.

Most of the rural health facilities were functional and have been found to be utilizing the solar energy for supporting electrical based medical and administrative equipment daily. Partial usage of solar energy id also identified as a gap which needs to be addressed. Health center staff lacks a comprehensive understanding of the advantages and benefits of solarization, maintenance of solar plant is not considered as part of the job description of the

health center staff. Health facility staff should also be oriented on solarization and its benefits for improving the utilization of solar energy at the health centers. Rural health facilities are utilizing the solar energy better compared to the urban health facilities. The survey also found that DHs were not using solar power to operate baby warmers, computer and printers and were more dependent on the grid for these functions.

The solarization of the Sub Health centers is essential as it the first point of reference of the community for health needs. The fact that sub health centers would also be health and wellness centers which would be the key and direct point of contact with the community health not only for the communicable but also to address the increasing health burden of non-communicable diseases and impact of climate change on human health. Rural healthcare infrastructure, PHCs and particularly sub-centers, is a critical link in ensuring success outcomes envisaged in the National Health Mission. Even as several states continue to lag behind on basic metrics pertaining to maternal mortality or vaccination rates, areas where the PHCs and sub-centers don't have access to grid electricity are particularly under-equipped. The enhancements being planned in the rural health infrastructure in the aftermath of the COVID-19 breakout accords a unique opportunity to direct critical public funding towards electrifying the Sub Health Centers. Powering rural healthcare infrastructure with decentralized renewable energy is an obvious choice now and in the future. The solarization of the sub health center would not only facilitate to deal with the ongoing or any pandemic situation but also to meet the challenge of climate change.

A well-coordinated and integrated approach for the planning and implementation of solarization between CREDA and the health department is a must need for various levels of health system which can give better results for the vision for hundred percent solarization of health care in Chhattisgarh.

## **9. Key Findings:**

- 9.1. 99% of public health facilities were found to be solarized.
- 9.2. Solar plants were found to be functional in 90% solarized health facility.
- 9.3. Good mechanism for receiving and addressing the complaints exists at CREDA
- 9.4. Smaller centers were found to utilize solar energy well.

## **9.5. Gaps identified**

- 9.5.1. 47% of health facilities use solar energy only during power failures.
- 9.5.3. Partial use of solar energy for equipment in health facility is identified.

## **10. Recommendations**

Powering rural healthcare infrastructure with decentralized renewable energy is an obvious choice now and in the future. The solarization of the sub health center would not only facilitate to deal with the ongoing or any pandemic situation but also to meet the challenge of climate change. There is ample evidence that access of electricity is crucial for the health centers to discharge their duties. Enhancements are being planned in the rural health infrastructure in the aftermath of the COVID-19 pandemic provides a unique opportunity to direct critical public funding towards electrifying the SHCs.

**10.1.** Rural Health Facility – Sub Health Centers and Primary Health Centers should be given the priority for solarization, as smaller centers are being found to use the solar energy well.

**10.2.** Guidance document / Guidelines for Solarization of the health Facility – defining role and responsibility for

- **10.2.1** Selection criteria or identification of the public health facility for solarization, using vulnerability assessment for health infrastructure.
- **10.2.2.** Orientation of the health facility staff for solar energy for its potential use and climate resilience.
- **10.2.3.** Accountability – capacity building of the point person.

- **10.2.4.** Indicators for potential use of solar energy need to be defined for future assessment.
- **10.2.5.** A designated staff at the health center level should be appointed by the health center to manage and maintain the solar power plant and coordinate with the engineers at CREDA.
- **10.2.6.** Monitoring and maintenance of solar energy should be encouraged through the health system with the technical support for repairing and other major breakdowns can suggested to CREDA.
- **10.2.7.** Health facility energy audit should be facilitated from time to time.

**10.3.** A well-coordinated and integrated approach for the planning and implementation of solarization between CREDA and the health department is needed for various levels of health system.

