

DSM Activities in MSEDCL

Energy Conservation Measures Undertaken in DSM Projects

A) Replacement of Old Ceiling fans by 5 Star rated Ceiling Fans

- Old 1200 mm and above ceiling fans with over 7 years vintage typically have a power consumption of approximately 80 watts as against the BEE-labelled 5-star rated 1200 mm ceiling fans with power consumption of not exceeding 55 watts.
- These 5 Star ceiling fans consume only 50 Watts of energy which is 30% less than the conventional ceiling fan.
- The power consumption measured for sample old ceiling fans 7 found that these ceiling fans consume power consumption in range of 80W-105 W.
- The Pilot program designed to demonstrate the results of switching over to 5-star rated ceiling fans from existing ceiling fans among the selected MSEDCL substations & section offices. The pilot is also assessing the measurement and verification process. The pilot is designed on the same lines as that of a large program vis-à-vis utility benefits etc.

- Rationale:

Using 5 star rated ceiling fans will lead to substantial strategic conservation.

- Reduced costly power purchase will reduce overall tariffs of our substation. Further the pilot aims for annual saving of 0.30 MUs at user end and 125 kW demand savings are expected.

Execution of pilot project

- Pilot program is undertaken for replacement of existing Ceiling fans by 5-star rated (BEE Labelled) ceiling fans for MSEDCL 33/11 KV substations, section offices. The Substations & section offices are commercial consumers of MSEDCL.
- The supply order placed with M/S Orient fans to supply 5000 nos of 5 star rated fans at MSEDCL stores, at rate of Rs.1134.56 per fan
- The fans are replaced departmentally.
- At present 4998 old ceiling fans are replaced as detailed below-
- Further after Evaluation , Measurement & verifications of pilot program is being carried out by installing Hour meters & energy meters at sample selected.

STATUS OF INSTALLATION OF FANS and M&V UNDER DSM

SN	Zone	No. of fans allotted	No. of fans installed at Various substations & offices	M&V carried out
1	Bhandup	334	334	142
2	Kokan	150	150	0
3	Nashik	608	608	26
4	Jalgaon	522	522	24
5	Pune	208	208	14
6	Kolhapur	322	320	16
7	Baramati	486	486	9
8	A'bad	329	329	37
9	Nanded	399	399	24
10	Latur	616	616	43
11	Amravati	524	524	20
12	Nagpur Urban	205	205	81
13	Nagpur	297	297	35
		5000	4998	471

Initial Measurement & Verification Report for Energy saving.

- From the initial M&V report, the following observations are made-

No. fans to be installed in Substations	M&V carried out	No. fans to be installed in Sections/offices	M&V carried out
4039	258	961	266

From initial analysis of 256 fans, the usage in hrs per fan is 10.88 hrs.

Offices	No. fans to be installed	Wattage of old fans	Wattage of new fans	Saving of watts	Avg Per day use in hrs	Use for Days per annum	saving in Mus
Substations / Section offices/ Division Offices	5000	80	55	25	10.88	300	0.408

However, the savings in MUs will be more after generation of complete M&V reports

B) Pilot Agricultural DSM Program: Replacement of Old Agr Pumps by Star rated pumps

- Pilot Project of **Agricultural DSM Program** -Replacement of Old Agr Pumps by 4 Star rated pumps is implemented on Brahmapuri, Nandeshwar, Borale, Bhose & Kharatwadi Feeders under Mangalwedha area, Solapur Dist, with help of Bureau of Energy Efficiency.
- Total 3530 Pumpsets were targeted for replacement. Free replacement/maintenance of Pumpsets will be provided for 5 Years
- BEE appointed MITCON for preparation of Detailed Project Reort. Further MITCON & PwC carried out Measurement & Verification of Old pumps & new star rated pumps.
- Project Cost: Rs. 7.063 Crores.
- **Agency:- m/S CRI Pumps, Coimbtur.**
- Rationale: Using 4-5 star rated pumps saves energy to the tune of 30% & will lead to substantial strategic conservation. Education to farmers to use star rated Agricultural pumps.
- **The uptodate pumps replaced 2208 nos. The scheme is short closed as on 31.12.2012 due to non availability of Water in wells due to water scarcity situation in area.**
- *The M&V Report is awaited from BEE.*

Final Progress Report Of AG DSM Scheme in Mangalwedha area (Pandharpur Dn), Dist Solapur

SN	Name of the Feeder	Target pump set	Customer list Received	Agreement Completed	Survey Completed	Pumpsets Installed			
						Mono-block	Open well	Submersible	Total
1	Bhose	684	551	418	370	166	75	98	339
2	Brahmapuri	580	428	345	335	154	9	103	266
3	Nandeshwar	884	817	580	534	134	162	204	500
4	Borale	852	850	740	718	247	230	195	672
5	Kharatwadi	530	508	470	451	104	163	165	432
TOTAL		3530	3154	2553	2408	805	639	765	2209

2) The Measurement & Verification is done by BEE thru' third party agency MITCON. The first report for 1400 pumps is recd & is as under-

SN	Feeders	Baseline Energy Consumption, kWh * For 1400 Pumps Presently Replaced	Energy Consumption with EEPs in kWh	Energy Savings from Pumps Replacement, kWh	% savings
1	Bhose	1.915	1.434	0.481	25.10%
2	Brahmapuri	2.056	1.541	0.515	25.10%
3	Nandeshwar	3.153	2.316	0.837	26.50%
4	Borale	4.145	3.122	1.022	24.70%
5	Kharatwadi	3.314	2.474	0.84	25.30%
	Total	14.583	10.888	3.695	25.30%

C) Coating roofs with white color to reduce room temperatures and energy use

- Cool roofs, which are defined as roofs with high solar reflectance and high thermal emittance, are typically light in color and absorb less solar radiation than does a conventional dark-colored roof. Installation of a cool roof significantly reduces the heat ingress from the roof to the space beneath. Such reduction in heat ingress or heat flux reduces the requirement of energy for space cooling.
- In India, there is a wide variation in the climatic conditions. BIS proposed five climatic zones in India in 2005 that include following categories:
 1. Hot and dry
 2. Warm and humid
 3. Temperate
 4. Composite
 5. Cold
- A study was done at the Satyam Computer building in Hyderabad during 2005 and 2007 period. Its main goal was to estimate the reduction in Air Conditioning (AC) use by comparing two identical buildings in this company. One building was coated with white roof and compared with the other building. Both buildings were provided multiple inputs during which AC, temperature, air flow and other data were collected for one year. The most significant result from this assessment was a 20% decline in AC electricity use.
- Based on this knowledge, MSEDCL chose to put together similar experiment in its Vidyut Bhavan, Katol Road, Nagpur. The building does not have air conditioning (AC) in it. Coating the roof with white color could thus offer a significant drop in the temperatures in the building. It may be noted that the properties of the building envelope, such as materials used, specifications of wall and roof sections, thickness of construction layers, type of glazing used etc. are based on the use of local materials and construction practices. Hence, conducting this study was quite important to estimate and demonstrate the use of local coating devices.

Execution of pilot project

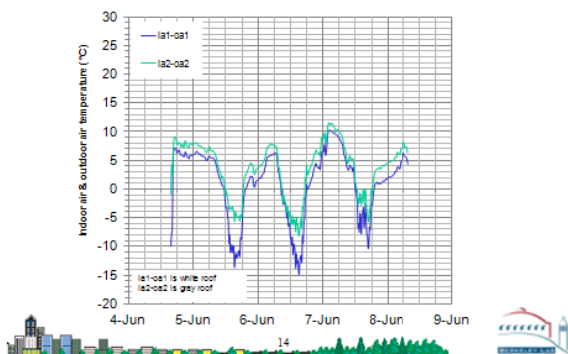
- Pilot program was undertaken over the Vidyut Bhavan building for painting of existing roof cover with a white color device(High albedo paint).
- MSEDCL staff provided two rooms identical by converting their size, resetting windows, ceilings, and doors, and covering the windows to match the energy inputs in each room, etc.
- The supply orders were placed to convert room roofs to white and grey colors that included temperature collection data loggers, etc.
- The setting was completed in early June 2013 which led to continuous data collection since then during the summer, rainy, and winter seasons.

- The temperature data was collected with help of dataloggers for every 15 minutes at four locations in each of the two rooms. Four sets of data were collected, two surface and air temperature probes on the terrace and two inside each room.

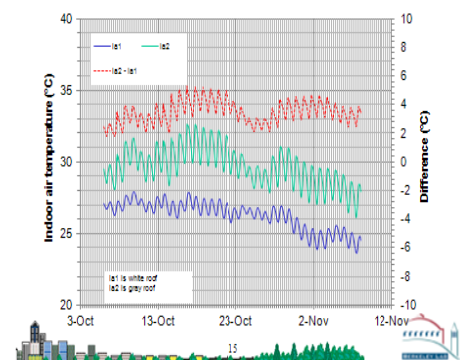
Initial Measurement & Verification Report for Temperature Drops

- The two charts below show the changes in temperature during a one week hot season in early June and during the rainy season in June, July, August, and September.
- The hot 50 degree season in early June shows the maximum drop between roof and room temperatures was 15 degrees in a room with white colored roof, and only 8 degrees in the room with a grey colored roof.
- The two room temperatures were respectively at 36 and 43 degrees, which provides a very comfortable location for staff working during the summer season in the room with white colored roof.
- The temperatures during the later months are also important but the maximum differences were about 5 degrees and room temperatures were 28 and 33 degrees during mid-October.

Nagpur MSSEDCL Building Data Example
White Roof outdoor and indoor temperature difference is 15 degrees compared to 8 degrees difference in Grey Roof.



Nagpur MSSEDCL Building Data Example
Indoor air temperature of cool and grey roof and their difference



- The above measurements are continuing. AC's could be added next to also measure the reduction in energy use in the two room locations.