

Solar Water Heating Programme

Introduction:- The cold Himalayan and sub-Himalayan Region in India covers the states of J&K. Himachal Pradesh. Uttarakhand, Sikkim and parts of North Eastern States, West Bengal & Jharkhand. Due to the cold climate, the population living in these areas requires hot water throughout the year. Despite large hot water requirements, the penetration of solar water heating systems has been low in this region.

Background and objective-

Jawaharlal Nehru National Solar Mission is a major initiative of the Government of India with active participation from states to promote ecologically sustainable growth while addressing India's energy security challenge. It plays a major role in India's contribution to fight against the issues of climate change which is a big concern across the globe.

Solar water heating is one of the most important applications of solar energy. This is a device that helps in heating water by using solar energy. The solar water heater (SWHs) is being used in domestic, commercial and non-commercial sectors to replace use of electricity.

The climatic conditions of the Uttarakhand require the use of Solar Water Heating systems (SWHs). The availability of the sun is approx. 300 days in a year and the requirement of hot water is approx. for 9 months in a year.

The major applications of the SWHs in the State are:- Domestic Sector- hot water for cooking and bathing. Non-commercial/commercial sector-hot water requirement in hostel/educational institution, hotels, hospitals, Govt/semi Govt. Depts; Etc.

Uttarakhand has installed more solar water heating systems compared to the eastern and north eastern Himalayan region. Till 2012-13 a total 1814500 LPD solar water heating systems, both flat plate type and evacuated tube collector type have been installed by UREDA in various public and private buildings like hospitals, hotels, guest houses, residential buildings etc.

In last three years i.e; 2010-11, 2011-12, 2012-13 and 2013-14, since the launch of JNNSM Mission, total capacity of 1424300 LPD Solar Water Heating System have been installed in the state of Uttarakhand and UREDA is instrumental in installing the SWHs.

The details of systems installed in last three years in Uttarakhand are furnished below:

Year	Capacity Installed (in LPD)	App. Area (In Sqm)
2010-11	167425	2999
2011-12	316575	5224
2012-13	520300	8152
2013-14	420000	7200



Concentrating Solar Technology (CST)

Introduction:- Concentrating solar technology (CSTs) basically focus the sunlight at receiver to achieve higher temperatures for various applications. Since these technologies can focus the direct radiation coming from the sun, they need to be tracked along with the sun. The technologies can be based on single axis(E-W) tracking as well as dual axis (E-W& N-S) tracking Depending on their tracking arrangement they can put in the category of medium or high temperature applications.

In India 3 types of concentrating solar technologies are presently in promotion. These are i) manually tracked Dish solar cookers to cook food for 10-40 people, ii) Fixed focus E-W automatically tracked disher for direct indoor cooking for about 50-100 people & for steam generation for the purpose of community cooking , laundry, space cooling etc of any capacity and iii) Dual axis fully tracked Fresnel dishes for process heat, cooling, laundry application etc. These technologies are in implementation for last many years with support from MNRE.

There are about 20 suppliers of Dish cookers, 8 of fixed focus E-W tracked dishes and one of fully tracked dishes. Over 10,000 dish cookers, 100 indoor cooking systems &80 steam generating systems have been installed so far in the country with a cumulative figure of 40,000 sq.m. of dish area. Yearly installation is around 4000-5000 sq.m. The systems are being installed as per the technical specification of MNRE and are made available at its website.

Concentrating solar systems have been found to be quite suitable for cooking food for hundreds and thousands of people in community kitchens especially at religious places and institutional/industrial canteens. The world's largest system is functioning at shirdi for cooking food for 20000 people /day. The systems have also found applications for process heat, laundry and food processing in industries. These include systems at Gujaraj Drycleaners, Ahmed Nagar, Maharashtra: ITC Maurya, Delhi and Tapi Food industries, Valsad, Gujarat . The system are being installed mainly at places where steam generated through conventional boilers is already being used for cooking application. Installed in hybrid mode, these systems could save a significant amount of fuel oil at such place.

Recently these system along with vapour absorption machines have been demonstrate for air conditioning also. The systems have been installed at places where power cuts are high and electricity . These include 100 TR air conditioning plant at muni seva Ashram, Vadodara; 92 TR at TVS, Suzuki factory near Chennai; 212 TR at Civil Hospital , Thane near Mumbai; 30 TR plant at magnetic Mareli, Gurgaon, 100 TR for process cooling at Mahindra Vehicle Manufacturers Ltd, Chakan, Pune etc.

For promotion of these systems, support upto 30% of the cost of solar field subject to certain benchmarks is available under off-grid scheme of JNNSM . Higher support of 60% is available in special category states. The systems are being installed through State Nodal Agencies/ accredited private channel partners as per technical specifications laid down by MNRE.

The details of systems installed in last three years in Uttarakhand are furnished below:

S.No.	Name of Site/Beneficiary	Capacity (sqm.)
1	Shantikunj, Haridwar for cooking of food to 1000 persons	160
2	Gau Tirth Ashram, Koteshwarpuram, Tehri for distillation of cow urine for medicinal use	16
3	Jindal Refinery, Kashipur for 30,000 ltr. of water heating to feed in boiler	480
4	Unique Hotel and Restaurant Pvt. Ltd., 97 Rajpur Road, Dehradun for water heating	80
5	Swami Ramtirth Mission, Rajpur Road, Dehradun for cooking	16
6	Rajiv Gandhi Navodaya Vidyalaya, Shikarpur, Haridwar for cooking of food for 300 childrens (under installation)	64
7	Rajiv Gandhi Navodaya Vidyalaya, Chaunoliya, Almora for cooking of food for 300 childrens (under installation)	64
8	Indian Institute of Technology (IIT), Roorkee for cooking food in hostels (under installation)	976



Biogas Power Generation

Biogas based power units can be a reliable decentralized power generation option in the country. In order to promote this route of power generation, specifically in the small capacity range (3 kW to 250 kW), based on the availability of large quantity of animal wastes and wastes from forestry, rural based industries (agro/food processing), kitchen wastes, etc; a number of projects of different capacities and applications will be taken up for refining the technical knowhow, developing manpower and necessary infrastructure, establishing a proper arrangement of operation & maintenance and large scale dissemination.

The projects to be taken up by any village level organization, institution, private entrepreneurs etc. in rural areas as well as areas covered under the Remote Village Electrification (RVE) programme of MNRE other than the industries and commercial establishments covered under Urban, Industrial & Commercial Applications (UICA) programmes for sale of electricity to individual/community on mutually agreeable terms. The implementing organizations must ensure that sufficient feed stock/ materials for proposed biogas plants size are available on sustainable basis and the beneficiary organization gives an undertaking that the plant would be maintained and operated for a minimum period of ten years.

The detail of systems installed in Uttarakhand:-

Sl. No.	Title of the project	Capacity of Biogas plant Sanctioned/ Installed	Cost of the project with 4 Years AMC (In Lac Rs.)
1	Shri Nityanand Paad Ashram, Shri Gaur Radhakrishna Mandir Parma, Halduchaur, Nainital	60 m ³ Bio gas Plant with 8 Kw. Electricity generating	13.50
2	Uttarakhand Gau Sambardhan, Gau-Tirthashram, Koteshwarpuram, Tehri Garhwal	85 m ³ Bio gas Plant with 10 Kw. Electricity generating	15.00
3	Shri Radhey Krishna, Gau-Seva Sadan Trust, Vill. Lakhanpur Beria Road, Bajpur, U. S. Nagar	60 m ³ Bio gas Plant with 8 Kw. Electricity generating	13.50
4	Bhadraraj Gaudham Gaushala Samiti, Vill. Charba, Sahaspur, Dehradun.	35 m ³ Bio gas Plant with 4 Kw. Electricity generating	11.30
5	Rajkiya Training Dairy Farm, Pashulok, Rishikesh, Dehradun	25 m ³ Bio gas Plant with 3 Kw. Electricity generating	10.40
6	Shri Krisnayan Desi Gauraksha avam Gaulok Dham, Gandikhatta, Haridwar	85 m ³ Bio gas Plant with 10 Kw. Electricity generating	15.00
7	Bhartiya Gramya Vikas avam Gau Raksha Nyas, Haridwar	35 m ³ Bio gas Plant with 4 Kw. Electricity generating	11.30
8	Pashu Prajnan Farm, Kalsi, Dehradun	60 m ³ Bio gas Plant with 8 Kw. Electricity generating	13.50





National Biogas Manure Management Programme (NBMMP)

Family Size Biogas Plant

Introduction:- To provide clean bio-gaseous fuel mainly for cooking purposes and also for other applications for reducing use of LPG and other conventional fuels. To meet 'lifeline energy' needs for cooking as envisaged in 'Integrated Energy Policy. To provide bio-fertilizer/ organic manure to reduce use of chemical fertilizers; To mitigate drudgery of rural women reduce pressure on forests and accentuate social benefits;

To improve sanitation in villages by linking sanitary toilets with biogas plants; To mitigate Climate Change by preventing black carbon and methane emissions.

Capacity	App. Project cost	Central Subsidy	App. Beneficiary Share
2 m ³	26,000.00	10,000.00	16,000.00
3 m ³	32,500.00	10,000.00	22,500.00
4 m ³	36,500.00	10,000.00	26,500.00

Systems Installed in Last Years

Sl.No.	Year	No. of Systems Installed
1	2009-10	272
2	2010-11	879
3	2011-12	1000
4	2012-13	600
5	2013-14	455



Dish type Solar Cooker

Introduction:- It is concentrating type parabolic dish solar cooker with aperture diameter of 1.4 meter and focal length 0.28 meter. The reflecting material used for fabrication of this cooker is anodized aluminum sheet which has a reflectivity of over 75%.

The tracking of the cooker is manual and thus has to be adjusted in 15-20 minutes during cooking time. It has a delivering power of about 0.6 KW which can boil 2 to 3 liters of water in half an hour. The temperature achieved at the bottom of the vessel could be around 350 to 400 c which is sufficient for roasting, frying and boiling. The cooker having a thermal efficiency of around 40% can meet the needs of 10 to 15 people and can be used from one hour after sunrise to one hour before sunset on clear days.

Dish solar cooker is being fabricated and promoted in the country by a few manufacturers/suppliers. The cooker can be easily dismantled and assembled by anybody and thus may be nicely packed and transported anywhere in the country. The cooker is user friendly as the place of vessel to be kept for cooking is at a level which is convenient for the people to use. The cooker could be useful for individuals in rural as well as urban areas and also for small establishments like dhabas, tea shops, etc. on road sides.

The cost of the cooker is Rs 8800/- and the Central subsidy is Rs. 5,280/-, it can save up to 10 LPG cylinders/year on full use at small establishments.

The details of systems installed in primary schools under mid-day meal programme and individual users during last years in Uttarakhand:-

SI.No.	District	Total
1	Dehradun	159
2	Haridwar	90
3	Tehri	217
4	Uttarkashi	129
5	Pauri	224
6	Rudrapryag	127
7	Champawat	275
8	Almora	774
9	Bageshwar	81
10	U.S. Nagar	54
11	Pithuragarh	61
12	Nanital	588
13	Chamoli	339
Grand Total		3118



Details of Biomass Power Projects (BPP) Commissioned and Under Execution in Uttarakhand:-

Sl. No.	Address	Name of the Plant	Installed capacity & fuel
1	Sidharth Papers Ltd. (unit-2) 7 th km., Moradabad Road, Kashipur-244713	Co-generation Bio mass based plant	6.0 MW Bio-mass
2	Siddheshwari Paper Udyog Ltd. 7th km., Moradabad Road, Kashipur-244713	Co-generation Bio mass based plant	6.0 MW Bio-mass
3	Kesoram Industries Ltd., Laksar, Haridwar	Biomass co generation	7.5 MW (non baggase)
4	Rai Bahadur Narain Singh Sugar Mills Ltd. Laksar-247663, Dist Haridwar, Uttarakhand	Baggase Cogeneration	29.60 MW Baggase
5	Uttam Sugar Mills Ltd., Libberheri, Roorkee, Haridwar, Uttarakhand	Baggase Cogeneration	15 MW Baggase
6	Gujarat Ambuja Exports Ltd. C-50, ELDECO SIDCUL Ind. Park, Sitarganj, U.S. nagar, Uttarakhand	Industrial Waste to Power	1.890 MW Industrial Waste
7	Laxmi Sugar Mill, Iqbalpur, haridwar	Baggase Cogeneration	20 MW Baggase
8	Avani Tripura Devi, Village Chachret, Berinag, Pithoragarh	Pine needles based power generation	0.12 MW Pine Needle
9	BAHL Paper Mill Kasipur, US Nagar	Biomass based	4 MW Rice husk based
10	Hanung Toys & Textiles Roorkee, Haridwar	Biomass based	3 MW Rice husk based (Under Installation)
11	Patanjali Food & Herbal Park, Kankhal, haridwar	Biomass based	0.625 MW Herbal Biomass
12	Shree Shyam Pulp & Board Mill, Kashipur, US Nagar	Biomass based	16 MW Rice husk (Under Installation)



Details of Gasifier Projects Commissioned and Under Execution in Uttarakhand:-

Sl. No.	Address	Name of the Plant	Installed capacity & fuel
1	Tirupati Structural Ltd., Roorkee	Thermal Gasifier	300 kW
2	Durga Silicon Chemicals (India), Bajpur, U.S. Nagar	Gasifier	750 kWth
3	Rishi Chemicals Works Pvt. Ltd., 5- 10, Govt. Industrial Area, Haridwar	Gasifier	750 KW
4	Reliance Food Processing Company, 9, Co-operative Industrial Estate, Saharanpur Road, Dehradun	Gasifier	300 KWth

