


## SOLAR PHOTOVOLTAIC PROGRAMME IN HARYANA

Solar Photovoltaic Technology converts the sunlight into DC electricity through solar cells. The generated electricity can either be used directly during the day or may be stored in the batteries for use during night hours for various applications. Haryana Renewable Energy Development Agency (HAREDA) is promoting the following solar photovoltaic (SPV) devices for running tube lights, fans and TV etc.

### SALIENT FEATURES OF SPV DEVICES


- No noise
- Easy to install
- Simple to operate
- Pollution free
- Low maintenance cost
- Solar Photovoltaic has a long life

### SOLAR LANTERN

System description	A solar photovoltaic (SPV) lantern (Solar lantern) is a lighting system consisting of a 7 watt CFL, 12V 7AH battery and electronics, all placed in a suitable housing, made of metal or plastic or fiber glass, and a photovoltaic (PV) module of 10Watt. Electricity generated by PV module charges the battery. The lantern is a portable lighting device suitable for either indoor or outdoor lighting, covering a full range of 360 degrees working for 3-4 hours per day. A lighting device which does not have omni-directional lighting will not be classified as a solar lantern in the present context.	
System cost	Rs. 2300/- (approx.)	
State Subsidy	Rs. 1000/-	
User Share	Rs. 1350/-	
Eligibility	All residents of Haryana	

**Note : The subsidy can be changed at any time.**

## LED HOME LIGHTING SYSTEM

System description	The system is based on solar Photovoltaic Technology which converts the sunlight energy into DC electricity through solar cells. The generated electricity is to be stored in the batteries and can be used to run two LED lights during night hours. The system consists 12 watt spv module, 12 volt 20 ah and illuminance minimum 15 lux when measured from a height of about 2.5 metre and illuminated over an area of at least 2.5 metre diameter with 2 luminar(3 watt each) working for 4 hours per day.	
System cost	Rs.4500/-	
State Subsidy	Rs.2500/-	
User Share	Rs.2000/-	
Eligibility	All residents of Haryana	

Note : The subsidy can be changed at any time.

## SOLAR STREET LIGHTING SYSTEMS:

A stand alone solar photovoltaic street lighting system (SLS) is an outdoor lighting unit used for illuminating a street or an open area. The Solar Street Lighting System consists of solar photovoltaic (SPV) module, a Luminaire, storage battery, control electronics, inter-connecting wires/cables, module mounting pole including hardware and battery box. The Luminaire is based on White Light Emitting Diode (W-LED), a solid state device which emits light when electric current passes through it. The Luminaire is mounted on the pole at a suitable angle to maximize illumination on the ground. The PV module is placed at the top of the pole at an angle facing south so that it receives solar radiation throughout the day, without any shadow falling on it. A battery is placed in a box attached to the pole.

Electricity generated by the PV module charges the battery during the day time which powers the Luminaire from dusk to dawn. The system lights at dusk and switches off at dawn automatically.



<b>Systems Technical Description</b>	<b>9 Watt LED Luminaire, 12 V-40 AH Lead Acid Battery, 40 Wp PV Module, Control Electronics, Inter Connecting Wire/Cable, Module Mounting Hardware, Battery Box.</b>
<b>Cost</b>	<b>Rs.13,850/- with 5 year warranty</b>
<b>Subsidy</b>	<b>Rs.150/- per watt or 30% of the cost of systems, whichever less from MNRE and Rs.4,000/- per street lighting system from Haryana State Government</b>
<b>User Share</b>	<b>Rs.9850/-Without MNRE Subsidy.</b>  <b>Rs.5695/- with MNRE subsidy if Project is under cluster mode and subject to approval from MNRE, GOI .</b>
<b>Eligibility</b>	<b>All categories of non-commercial institutions/ organizations, SNAs, Electricity Board, Gram Panchayat, Zila Parishad, Group Housing Society, Registered Colony &amp; Municipal Councils/ Corporations</b>

## SOLAR POWER PLANTS:-

In Haryana, due to rapid growth of industrialization, the demand for energy has increased manifold, which has led to frequent power cuts during the peak hours. Solar energy is available in abundance in Haryana, which can be tapped to generate electricity through solar photovoltaic technology. This technology is employed for directly converting the solar energy into electrical energy by using "Solar Silicon Cells". The electricity generated from Solar can be utilized for different applications directly or through battery storage system.

HAREDA has two type of programme to promote Solar power plant projects:-

### 1. OFF - GRID SOLAR POWER PLANTS:-



<b>Systems Description</b>	<b>The System consist Mono/Multi Crystalline Silicon Solar Cells PV Module of 1 KWp to 100 KWp with and without battery bank alongwith Power conditioning Unit (PCU).</b>	
<b>SPV System</b>	<b>Capacity</b>	<b>Benchmark cost (Rs./KWp)</b>
<b>SPV Power Plant (With Battery Bank having 6 Hours Autonomy)</b>	<b>&gt; 300 Wp to 1 KWp</b>	<b>Rs.2,10,000/-</b>
	<b>&gt; 1 KWp to 10 KWp</b>	<b>Rs.1,90,000/-</b>
	<b>&gt; 10 KWp to 100 KWp</b>	<b>Rs.1,70,000/-</b>
<b>SPV Power Plant (Without Battery)</b>	<b>Up to 100 KWp</b>	<b>Rs.1,00,000/-</b>
	<b>&gt; 100 KWp to 500 KWp</b>	<b>Rs.90,000/-</b>
<b>GOI Subsidy</b>	<b>30% of Benchmark cost or 30% of the actual project cost whichever is less</b>	
<b>State Subsidy</b>	<b>30% of the project cost for Govt./ Semi Govt. Sector only</b>	
<b>User Share</b>	<b>1. 70% of cost for all categories of Commercial, Non-commercial institutions/organization, Health Centers</b>	

	and Domestic House Holds. 2. 40% of cost for Govt./ Semi Govt. sector building/institutions
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## 2. CENTRALIZED OFF GRID SOLAR POWER PLANT WITH LED STREET LIGHTS:-

Centralized Solar power plant with LED Street Lights consists of array of Solar module, Battery Bank, Solar Charge Controller, Inverter/Power Conditioning Unit, LED Based Street Lights, poles and other fitting accessories. The Solar Power plant with battery bank and Power Conditioning Unit is installed on a central location and LED Based Street lights shall be installed on the roads/street to illuminate these roads /streets.


The Solar module converts the Sun light into electricity (DC) in day time and this generated DC electricity is stored into a battery bank by Solar Charge Controller. Thereafter, the stored DC electricity converted into AC electricity by Inverter/Power Conditioning Unit use for energies LED Street lights or to run other applications i.e. computers, fans, lights etc at day time/night.

<b>Systems Description</b>	The System consist Mono/Multi Crystalline Silicon Solar Cells PV Module of 1 KWp to 100 KWp with battery bank alongwith Power conditioning Unit (PCU) and nos. of LED Based Street Lights (Max.7 nos. of 20 watt/KWp) with 5 meters pole, Pole to pole wiring, with all fitting accessories.	
<b>SPV System</b>	<b>Capacity</b>	<b>Benchmark cost (Rs./KWp)</b>
<b>Street lights through SPV Power Plant</b>	Up to 100 KWp	Rs.3,00,000/-
<b>GOI Subsidy</b>	30% of Benchmark cost or 30% of the actual project cost whichever is less	
<b>State Subsidy</b>	30% of the project cost for Govt./ Semi Govt. Sector only	
<b>User Share</b>	1. 70% of cost for all categories of Commercial, Non-commercial institutions/organization, Health Centers and Domestic House Holds.  2. 40% of cost for Govt./ Semi Govt. sector building/institutions	

## CFL BASED SPV HOME LIGHTING SYSTEM WITH TWO LIGHTS AND ONE DC FAN

Models	Model-III	
<b>System description</b>	<p>The system is based on solar Photovoltaic Technology which converts the sunlight energy into DC electricity through solar cells. The generated electricity is to be stored in the batteries and can be used to run lights and fan during night hours. The system consist 37 watt solar panel, two 9 watt CFL, one 15 watt DC fan, 12 volt 40Ah tubular lead acid battery, working for 2 -3 hours per day.</p>	
<b>System cost</b>	Rs. 9700/-	
<b>Subsidies available</b>	Rs.4000/-	
<b>Users share</b>	Rs.5500/-	
<b>Eligibility</b>	<p>All categories of individual beneficiaries &amp; non profit institutions/ organization. No individual would be given more than one system</p>	

## DISH TYPE SOLAR COOKER

<p><b>System Description</b></p>	<p>The concentrating type parabolic dish solar cooker will be useful for individuals in rural as well as urban areas and also for small establishments like dhabas, tea shops etc. The solar cooker has an aperture diameter of 1.4 meter and a focal length of 0.28 meter. The reflecting material used for its fabrication is anodized aluminium sheet that has a reflectivity of over 75 %. The tracking of the cooker is manual and so has to be adjusted in 15 to 20 minutes during the cooking time.</p> <p>It has a delivery power of about 0.6 KW that can boil 2 to 3 liters of water in half an hour. The temperature achieved at the bottom of the vessel could range from 350 to 400°C which is sufficient for roasting, frying and boiling. A cooker with about 40% thermal efficiency can meet the needs of around 15 people and can be used from one hour after sunrise until one hour before sunset on clear days. It can be easily dismantled and assembled. and therefore can be transported anywhere in the country. It can also be placed at a convenient level for its users.</p> <p>The cooker can save up to 10 LPG cylinders a year on full use in small establishments. The metallic structure reflecting sheets may, however, have to be replaced once in 5 years.</p> <p style="text-align: center;"><b>DESCRIPTION</b></p> <ul style="list-style-type: none"> <li>• Parabolic dish made of single/multiple reflectors fixed firmly to a rigid frame. The size and shape of the reflectors will be such that when joined/fixd they automatically form a perfect parabolic dish which when exposed to the Sun in the normal direction a point focus is formed.</li> <li>• Dish diameter : 1.4 m minimum</li> <li>• Reflector Material : Bright anodized aluminium sheets of thickness 0.4 mm.</li> <li>• Reflectivity : &gt;80% with a maximum degradation of 10% in 5 years</li> <li>• Useful life : 5 years minimum</li> <li>• Tying cords : the reflector fins should be tied with the supporting rings with a metallic cord so that it does not wear out over a span of time</li> </ul> <p>Focal spot : It will be of a size such that all the reflected rays are exactly focused at the bottom of the vessel (5 litre pressure cooker for 1.4 m dia. Dish.) Thermal efficiency : min 40%.</p>	
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<b>Cost</b>	Rs. 5710/-	
<b>GOI Subsidy</b>	Rs.1500/-	
<b>User Share</b>	Rs.2497/-	
<b>Eligibility</b>	All Residents of Haryana	

### BOX TYPE SOLAR COOKER

Models		
<p><b>System description</b></p>	<p>Box-type solar cookers consists of an insulated box, metallic cooking pots inside the box, double glass lid on the cooking tray, and a reflecting mirror fitted on the underside of the lid of the box. The cooking tray is insulated on the sides and bottom. The incoming solar radiation falls onto the double glass lid and passes through it to strike the blackened cooking pots and the cooking tray. The heat is absorbed by the blackened surface and gets transferred to the food inside the pots to facilitate cooking. The mirror reflector is set in such a way to reflect the solar radiation falling on it to the cooker box. Up to four black painted vessels are placed inside the box. The box type solar cooker takes 1½ to 2 hours to cook</p>	



	<p>vegetables, rice, dals, cake etc.</p> <p><b>DESCRIPTION</b></p> <ul style="list-style-type: none"> <li>• <b>size 550mmx550mmx170 mm ± 20 mm with four matt black coated cooking pots (with lid) ( made of stainless steel IS 4536 Part-I, II/ IS 5522)</b></li> <li>• Cover plate double glazed made of <b>toughened glass</b> with over all transmittance of not <b>less than 65%</b>.</li> <li>• <b>Thermal performance not less than 0.12</b></li> <li>• Reflectivity of the reflector either of mirror or Ano-Fol Anodized Aluminum Sheet may not be less than 65%.</li> </ul>	
<b>System cost</b>	<b>Rs. 3150/-</b>	
<b>Subsidies available</b>	<b>Rs.1000/-</b>	
<b>Users share</b>	<b>Rs.1205/-</b>	
<b>Eligibility</b>	<b>All Residents of Haryana</b>	