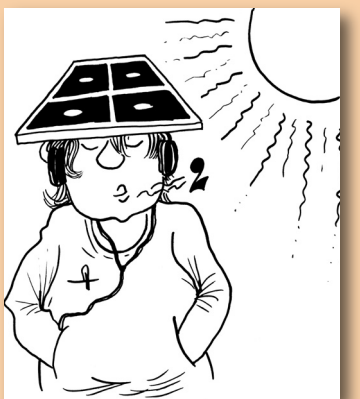
Gobartimes

Green Schools Network

ACTIVITY SHEET

June 2011

Why talk about Solar Energy?



There are various forms of renewable energy, solar being just one of them. So what makes it THE renewable form of energy that the future will mostly depend upon? The earth's atmosphere, oceans and land masses absorb approximately 3,850,000 exajoules (EJ) of solar energy per year. This implies that the sun provides the earth with as much energy in an hour as the human civilisation uses every year. That is a huge potential. Let's figure out how we can tap into this renewable source available to us.

Name.....

School Name .....

Class..... **Date** .....

Gobar Gyan

Solar energy is a free, renewable and clean source of energy. No worries about pollution, release of harmful gases or other by-products. However, it is 10 times costlier than conventional coal-based power with revenue being just one-fifth.

Activity — 1

Discuss with your friends, Google, or just ask your teachers and find out:

Pros of solar energy	Cons of solar energy

Don't you think the advantages far outweigh the disadvantages? And those too are mostly technological barriers that can be overcome with advances. Discuss the impact in class.

Gobar Gyan

To generate electricity two types of technologies are available, Thermal and Photovoltaic.

Solar thermal electric energy generation concentrates the light from the sun to create heat. A working fluid is heated to run a heat engine which turns into a generator to make electricity. The working fluid that is heated could be liquid or gas, anything from water, oil, salts, air, nitrogen to helium. Different engine types include steam engines, gas

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turbines, etc. These engines are often 30 to 40 percent efficient and can produce tens to hundreds of megawatts of power. Heat can be stored during the day and then converted into electricity at night. Solar thermal plants that have storage capacities can drastically improve both the economics and the distribution of solar electricity. Heat storage is a far easier and efficient method, which is what makes solar thermal so attractive for large-scale energy production.

Photovoltaic, or PV energy conversion, on the other hand, directly converts the sun's light into electricity. Hence, solar panels are only effective during daytime as storing electricity is still not a viable option. So you see, using different technologies, solar energy can have various applications. From something as simple as drying your clothes in sunlight, to heating, cooking, power generation to lighting. The uses are vast and the list is unending.

Activity — 2

Now rack your brains and list various applications of solar energy. Don't limit yourself to domestic use. Figure out its use in various industries, from cars to architecture. Also find out which applications use thermal and which use photovoltaic technology. Discuss this in class and create a representative chart and put it on the dashboard for all to see.

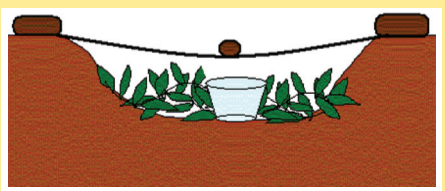
Domestic application	Architecture and Urban Planning	Agriculture	Water treatment	Industry X,Y,Z

Now let's roll up our sleeves and get our hands dirty. We will do something as simple as collect water using solar power, a survival tactic!

Activity — 3

Solar survival – Getting water from plants
This experiment will teach you how to draw water from plants using the power of the sun. With just a shovel, a plastic sheet and a jar you will learn how you can get fresh water from virtually any vegetation.

Material you need:
A shovel
A clear plastic sheet
A jar to collect water
Any kind of plant matter
Stones for weight



Procedure:

Step 1: Use a shovel to dig a hole in an open area which gets a lot of direct sunlight. The hole can be around 10 inches deep and 20 inches wide on each side. Now collect fresh green vegetation from your garden (weeds, leaves, mowed grass) or kitchen (vegetable peels) and place it in the hole.

Step 2: Clear some space in the centre of the hole, make sure the base is flat and place your jar on this patch.

Step 3: Cover the hole with a clear plastic sheet so you can see what happens inside. Weigh down the edges with the stones you collected so that the sheet does not flap around. Minimise the leakage of air inside.

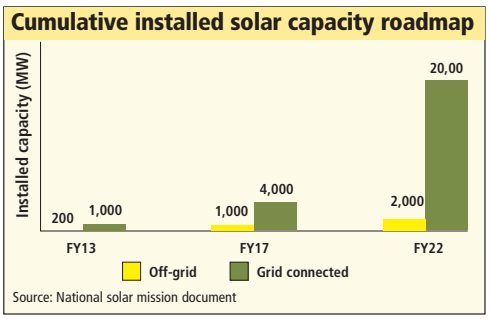
Step 4: Place a stone in the middle of the sheet, directly above the centre of the jar. This will make the sheet dip a little into the jar.

Note down your observations:
- Report and explain your findings.
- Calculate how much water you are able to collect in how much time.
- Try the same experiment in a sand pit without any vegetation. Report your findings.

Gobar Gyan

The Jawaharlal Nehru National Solar Mission aims at generating 20,000 MW of grid-connected solar power by 2022. This will be produced using both solar thermal and photovoltaic technologies. This is a major initiative by our government to promote ecologically sustainable growth. However, it is currently riddled with challenges of financing and research. The objective is to establish India as a global leader in solar energy, but it is a long and tough road ahead.

Activity — 4



Read up on India's solar mission and critique it in class. Debate on two key issues – why is funding a problem and what are the challenges in forecasting the generation of solar energy from a location where a plant is proposed. Then make a solar mission for your class.

What can each of you change in your house, your school, neighbourhood or community to maximise the use of solar energy? Create a chart and track it over a period of 6 months. Then share your good work with us at panditji@cse.org. We will put it up on our website so that others get inspired by your work!

Gobar Gyan

Wow! You've come a long way now. You have a wholesome perspective on the pros and cons, types of technology, applicability, and our country's solar mission. However, there is one more hidden aspect that I really want you to think about. Researchers, scientists and international negotiators all talk about solar being expensive, its huge space requirement and the lack of funding. But we have seen many a common man in far off rural areas with low incomes do wonders with solar energy. We want you to research such case studies and talk about them in class. It is important to know what government, technology and money can do but you will be amazed at how societies have used solar power with their limited resources, packed with desire and common sense, to improve their livelihoods.

Activity — 5

Make five groups of five students each in your class. Each group must research one case study in detail. The case study should be of villagers, societies or individuals who have made an example by using solar power to improve their livelihood.

Group I		Group II		Group III		Group IV		Group V	
Case Study	Impact	Case Study	Impact	Case Study	Impact	Case Study	Impact	Case Study	Impact

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