Green Schools Network

ACTIVITY SHEET

March 2011

Why talk about MICRO–HYDRO POWER?



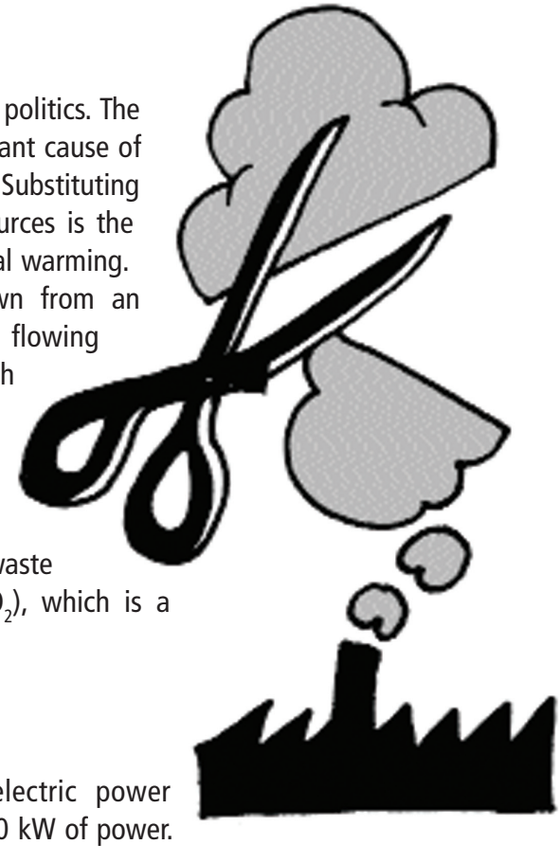
All the fossil fuels — oil, coal and natural gas — are examples of the second category "non-renewables" sources of energy. There is one major problem in using non-renewables sources of energy. Besides being physically limited; they pose a serious threat to our health. Pollution can affect your health in many ways — both short-term and long term. Short term effects can be irritation to the eyes, nose and throat while long term effects can be respiratory diseases, lung cancer, heart diseases. It doesn't end there — it can also damage brain, nerves, liver or kidneys also. Micro-hydro Power, on the other side, is a renewable source of energy and doesn't harm the environment directly.

Name.....

School Name .....

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

Gobar Gyan



Climate change is a burning issue in world politics. The use of fossil fuels is the single most important cause of global warming. So what is the solution? Substituting fossil fuels with energy from renewable sources is the most logical answer to the problem of global warming. Renewable energy is energy that is drawn from an inexhaustible source like sunlight, wind, flowing water or biological growth-based fuels such as Bio-Diesel. Micro-hydro Power has flowing water as its source of energy, which is renewable because of the natural hydrological cycle. It is the most widely used form of renewable energy as it produces no waste and does not produce carbon dioxide (CO_2), which is a major greenhouse gas.

What is Micro-hydro Power?

Micro-hydro is a term used for hydroelectric power installations that typically produce up to 100 kW of power. Let's make it simpler: Micro-hydro power is the small-scale harnessing of energy from falling water. For example, harnessing enough water from a local stream to power a small factory or village. It can particularly work wonders for the hilly and mountainous areas.

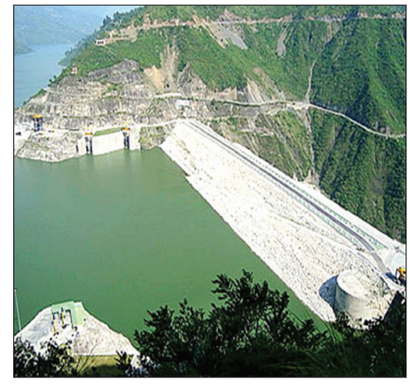


Hi! I am Pandit Gobar Ganesh. You will find me in Gobar Times—a magazine that tells you how your everyday life is linked to the world around you. Hooked, huh? If you want to know more about me and GobarTimes visit us at:

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Activity 1: Find out which countries (and their states) are using micro-hydro power efficiently?

Sr. No	Name of the Country	Name of the States



Gobar Gyan: It must have occured to you that even big dams are constructed for harnessing energy from water. Above all, they can produce much more kilowatts of electricity. Then why do we need to build small hydro power stations when we have big dams? Do you know that the larges dams contribute to global warming? As per the Intergovernmental Panel on Climate Change, the large dams could be the source of three major greenhouses gases that is, methane, carbon dioxide and nitrous oxide. The Indian government has not yet estimated the emission of global warming gases from Indian dams.

Big dams consume a lot of energy and resources in its construction. The reservoir of water created by the dam leads to submergence of a lot of land area which in many cases is forested. With the disappearance of forests the species living off it are displaced. Most importantly, people who have been living in the submergence zone are displaced and they are never adequately relocated.

Refer to activity sheet on Dams and do Activity 2 again.

Activity 3:

Now that you know the negative impacts of big dams, let's talk about micro-hydro power. Do you have the information about the countries and states using micro-hydro power already?Now try to find out about individuals and communities in India using micro-hydro power successfully.

Name of the Village: _____ State: _____

Date of installation:_____ Capacity of the power plant:_____

No. of families supported by the power plant: _____ Installation Expense: _____

Maintenance Cost: _____

Other interesting information: _____

_____

_____

_____

Activity 4:

Take up micro hydro power as an assignment for the school's bulletin board. Divide the class according to the states using micro hydro power efficiently. Each group should collect case studies and record experience of communities Write a small but specific note on projects and then tag them to the map. By doing this you will share major information about the efficient use of micro-hydro power with all your classmates and other school members.

Himachal Pradesh:



West Bengal:

Gobar Gyan:

Micro-hydro Power versus Big Dams:

- Small hydro plants only need a small amount of flow to generate electricity and therefore the stream need not be blocked by large concrete dams, which are very expensive, to build a reserviors of water. Maintenance too is not as costly as large hydro power plants. Large hydro power plant projects also require a lengthy preparation time, involving a lot of planning and testing, because there is no standard and set procedure for constructing a dam. Micro-hydro power plants can be installed quickly.
- Micro-hydro power plants means no reservior and consequently no submergence of huge tracts of land, no loss of flora and fauna and most importantly no displacement of a large number of people.
- Any breach of the dam can also cost lives of numerous humans, trees and animals. In contrast, a micro-hydro plant is a safe option.

Activity 5:

Suppose you notice a river flowing near your house/city. How will you find out its capacity to generate electricity?
It is actually very easy. Let's try!
The flow of the river, the head (length) of the stream or the river and the gravity are major factors in generation of electricity.

Power is measured in Watts, Head in metres, Flow in litres per second, Acceleration due to gravity in metres per second per second.

Gravity is approximately 9.81 metres per second per second, that is, each second an object is falling, its speed increases by 9.81 metres per second (until it hits its terminal velocity).

Equation

Power	=	Head	x	Flow	x	Gravity
(Watts)		(Metres)		(Litres)		(9.81)

Calculate how much electricity a micro-hydro power plant can generate given a flow of 20 litres per second with a head of 12 metres.

The only concern with the micro-hydro power is low-power generation during summer months. Water crisis during summer season is not new to us anymore. In many parts of the country river stream sizw fluctuates drastically during summers. During the summer months it's more likely that the flow of the river will be less and therefore less power will be generated.

Don't forget to send us the case studies on successfully established micro-hydro power plants in different cities/states of India.

Answer of activity 5: Answer: 2,354 watts

If you found the activity sheet interesting, E-mail us at eeu@cseindia.org or write to:
Activity Sheet, Centre for Science and Environment
41 Tughlakabad Institutional Area,
New Delhi-110062 or Call 29955124 Extension 219