

THE SUCCESS OF COSTA RICA

Shruthi Rao

Generating energy from eco-friendly renewable resources has become an imperative for the long-term sustenance of our planet. How did Costa Rica, a small Central American nation become the first to achieve 100% energy production from renewable sources? What are the advantages and disadvantages of different kinds of energy sources? This article examines Costa Rica's achievement in the context of the current energy scenario in the world and also explores factors that might aid or hinder the development of renewable energy resources.

Introduction

Media reports are full of depressing news about the state of the earth. Headlines warn us about global warming. News analysts alert us to depleting global reserves of fossil fuels. Websites publish lists of the top 10 polluted countries in the world. Environmental magazines carry articles about how the Earth is being pumped full of toxins. These reports, unfortunately, are quite true.

One of the main reasons that has contributed to the Earth reaching this state, is the growing energy needs of human beings. The energy we currently rely upon is produced mainly by burning up fossil fuels. Fossil fuels are non-renewable (and therefore exhaustible); also, burning them causes pollution. The solution to our energy needs lies in harnessing renewable energy--the kind of energy that is constantly and naturally replenished, and doesn't pollute, the way fossil fuels do.

With the knowledge that this kind of clean and green energy is essential to a secure future, a growing number of countries are trying to reduce their dependence on traditional sources of energy

and invest in the development of renewable energy sources.

But can renewable energy technology become widespread? Is it feasible? Can we dare to hope that one day in the future, the earth will be largely powered by renewable sources of energy?

Costa Rica shows us the way

Part of the answer arrived in the month of March of 2015, in the form of a cheerful piece of news, from the country of Costa Rica, in Central America. Costa Rica became the first country in the world to run on 100 percent renewable energy, i.e. Costa Rica has fuelled 100 percent of the energy requirements for the entire country, for 75 continuous days this year, by using only renewable sources of energy.

But why exactly is this piece of news so remarkable? To understand this, let's first take a quick look at the energy situation in the world.

The energy needs of the world

Nearly 70 percent of the total energy produced in the world is from fossil fuels--coal, oil and natural gas. Nuclear energy, which is the energy

generated when atoms are fused or split, constitutes about 11 percent of the total energy in the world. Though it does look like a clean and efficient way to produce energy, disposing of hazardous nuclear waste is a major problem. Besides, there can be disastrous consequences in case something goes wrong with a nuclear plant.

On the other hand, renewable sources of energy are safer, relatively less non-polluting, and are not exhaustible. In hydroelectric power, for instance, electricity is produced by making use of the gravitational force of water falling or flowing. The force of the water operates a turbine, which turns a generator to produce electricity. Though it is a form of clean energy, it comes with its own problems. It involves building large dams, and so requires vast tracts of land, resulting in communities being displaced. Today, 15 percent of the earth's energy needs are fulfilled by hydroelectric power.

Less than 5 percent of the total energy being produced in the world now comes from solar, wind, biomass, and geothermal energy. In our efforts to sustain human life on the planet, these are the sources of energy that we need to tap into extensively.

Of these, solar energy is the most abundant source of energy on Earth. In fact, the amount of solar energy that falls on Earth in one hour is enough to fuel the energy needs of the entire planet for more than a year! But converting solar energy into electricity involves the use of photovoltaic panels, which are still quite expensive.

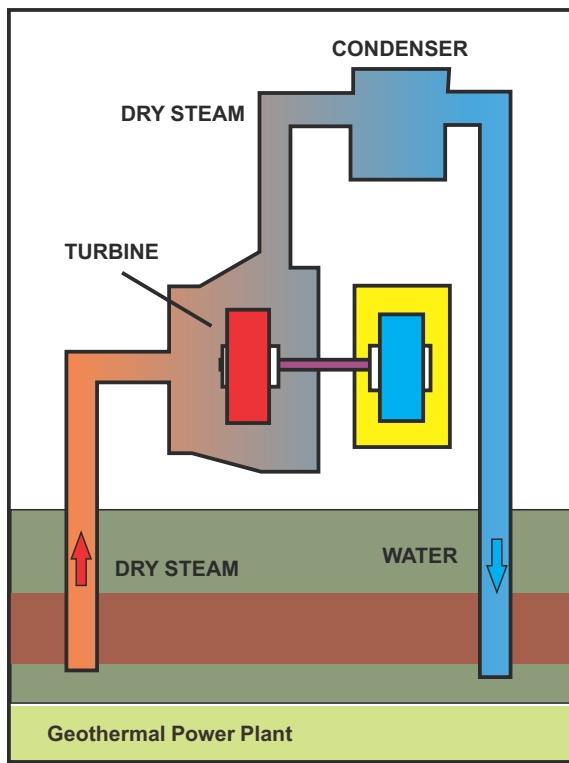


Solar Powerstation in Hong Kong

Source: https://en.wikipedia.org/wiki/Solar_power

WING CC BY-SA 3.0. Creative Commons Attribution-Share Alike 3.0 Unported

Wind energy is another abundant resource, where a wind turbine powered by the wind, produces electricity. Biomass energy, where biomass or materials of plant origin is used to produce energy, is also widely used. It is the earliest form of energy to be used by humans. Geothermal power plants use underground steam to move turbines, and produce electricity. There are several other ways to produce energy, for example, those that make use of ocean tides and waves.



But you can see the picture--renewable energy sources are a very small fraction of the total energy mix in the world.

The scenario is not that different in India. Today, 60 percent of India's energy is produced by fossil fuels, 16 percent from hydroelectricity, and only about 13 percent from other renewable sources of energy.

The Costa Rica story

Now that we've seen these numbers, let's come back to Costa Rica. Nearly 80 percent of the energy requirements of Costa Rica are fulfilled by hydroelectric energy, about 16 percent by wind, geothermal and other clean energies. Only about 4 percent is through fossil fuels. The contrast with elsewhere in the world is quite remarkable.

In those 75 days in which the country was fuelled completely by renewable sources of energy, Costa Rica didn't have to use the 4 percent energy from fossil fuels at all. Hydroelectric energy made up for it, hence achieving 100 percent renewable energy.

But is it easy for other countries to achieve this milestone?

There are some things that we must keep in mind in the context of Costa Rica's achievement. The fact that this 100 percent was achieved was mainly because during this time, there was abundant rainfall in the catchment areas of the four large hydroelectric stations in the country.

Besides, Costa Rica is a small country, the size of Punjab. Its population is less than even the population of Tripura. This country is mainly involved in tourism and agriculture, and doesn't have energy-intensive industries. And, Costa Rica is fortunate in terms of location - it is situated in an area with an abundance of two renewable sources - both hydropower and geothermal energy.

That should not take away credit from Costa Rica's achievement. Their determination to achieve this milestone is commendable. For a long time, Costa Rica has been a fore-runner among countries that have efficiently utilised renewable energy. This is due mainly to The Costa Rican Electricity Institute (ICE), which has been noted for its efficiency, foresight, and its stress on environmental sustainability. Costa Rica also has the ambitious aim of becoming a carbon neutral country by 2021, i.e. it intends to keep its carbon emissions to zero. This achievement has gone a considerable way in fulfilling that goal.

Costa Rica has its share of problems too

There are some problems with maintaining Costa Rica's impressive record. Hydroelectric power is a major part of the energy mix in Costa Rica. It is not practical to depend solely on this, since hydroelectric power is dependent on the weather. In summer, if there are water shortages, the country will have to fall back on fossil fuels. In fact, this was exactly the case in the drought of



2014 that resulted in a lack of drinking water, and caused damage to crops and livestock. During this period, diesel generators had to be pressed into service to fulfil the country's energy requirements.

The most exciting alternative is another source of energy that Costa Rica has in abundance--volcanic geothermal energy, which is continuously generated, and does not depend on weather conditions. But potential locations for geothermal plants are inside Costa Rica's national parks. Building geothermal plants will entail building roads, and drilling to reach underground resources. So, the country will have to make a choice between utilising geothermal energy and protecting national parks. Also, conservationists have argued that the country has not sufficiently explored the possibilities of wind energy to justify building geothermal plants inside national parks.

Conclusion

In spite of these problems, it cannot be denied that Costa Rica's achievement is a big step ahead. One hopes that it will serve as an inspiration to other countries, and spur them to step up their own renewable energy efforts, towards the ultimate aim of creating a greener planet.



Shruthi Rao is a writer based in Fremont, USA. She has an M.Tech in Energy Engineering. Her short fiction has won several awards, and her articles on science, travel and lifestyle appear regularly in renowned publications.