

## National Geographic Clip: Renewable Energy 101

What is renewable energy?

Renewable energy is generated from sources that naturally replenish themselves and never run out.

The most common sources are \_\_\_\_\_, wind, hydro, geothermal, and biomass.

Renewable energy has many benefits:

1. Can combat climate change – It creates no direct greenhouse gas emissions
2. Can decrease \_\_\_\_\_
3. Is a reliable source of power

But renewable energy isn't without downsides:

1. Generates power on small scale
2. Building wind farms and dams can disrupt \_\_\_\_\_ and migration patterns and can lead to ecological destruction
3. Power can be intermittent, but \_\_\_\_\_ can store excess energy for later use; however, they are often costly.

### TED-Ed Clip: Can 100% Renewable Energy Power the World

Every year the world uses \_\_\_\_\_ billion barrels of oil.

Scientists estimate that we've consumed about \_\_\_\_\_ of the world's oil.

At this rate, we will run out of oil and gas in \_\_\_\_\_ years and in about 100 years for coal.

BUT we have abundant sun, water, and wind. These are \_\_\_\_\_ energy sources, meaning we won't use them up over time.

Yet only a small portion of our energy needs (13%) are covered by renewable energy. To increase this number, renewable energy must be made both inexpensive AND accessible.

Our technology is already advanced enough to capture energy from renewable resources and there is an ample supply!

The sun continuously emits \_\_\_\_\_ quadrillion watts of solar energy (which is about 10,000 times more than we need at present).

So why don't we just build one massive solar panel and harness that energy?

1. Efficiency Issue

2. Energy Transportation Issue

To maximize efficiency, solar plants must be located in areas with lots of sunshine year round, like deserts. But those areas are far away from densely populated regions where energy demand is \_\_\_\_\_.

There are other forms of renewable energy we could draw from, such as hydroelectric, \_\_\_\_\_, and biomass. BUT they also have limits based on availability and location.

Present day power lines lose about 6-8% of the energy they carry.

Superconductors could be one solution. Such materials can transport electricity without dissipation. Unfortunately, they only work if cooled to \_\_\_\_\_ temperatures, which requires energy (and defeats the purpose).

We need to discover new superconducting materials that operate at \_\_\_\_\_ temperature.

The scientific challenge (with liquid fuels) is to \_\_\_\_\_ renewable energy in an easily transportable form.

While there have been great advances with batteries. We would need a battery weighing about \_\_\_\_\_ tons to power a transatlantic flight.

One promising solution would be to find efficient ways to convert \_\_\_\_\_ into chemical energy.

**Using the next video clip shown in class, explain one way that scientists are working to convert solar energy into chemical energy that we can use.**

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**Using the next video clip, name two other types of biofuels.**

1. \_\_\_\_\_
2. \_\_\_\_\_

**Renewable energy seems like a GREAT option for the future, but is it really that easy to transition? You will be watching a PBS NewsHour Clip on the Dakota Access Pipeline followed by a documentary called "From the Ashes" about coal use in America. Take notes as you watch to help you with the assignment that will follow.**