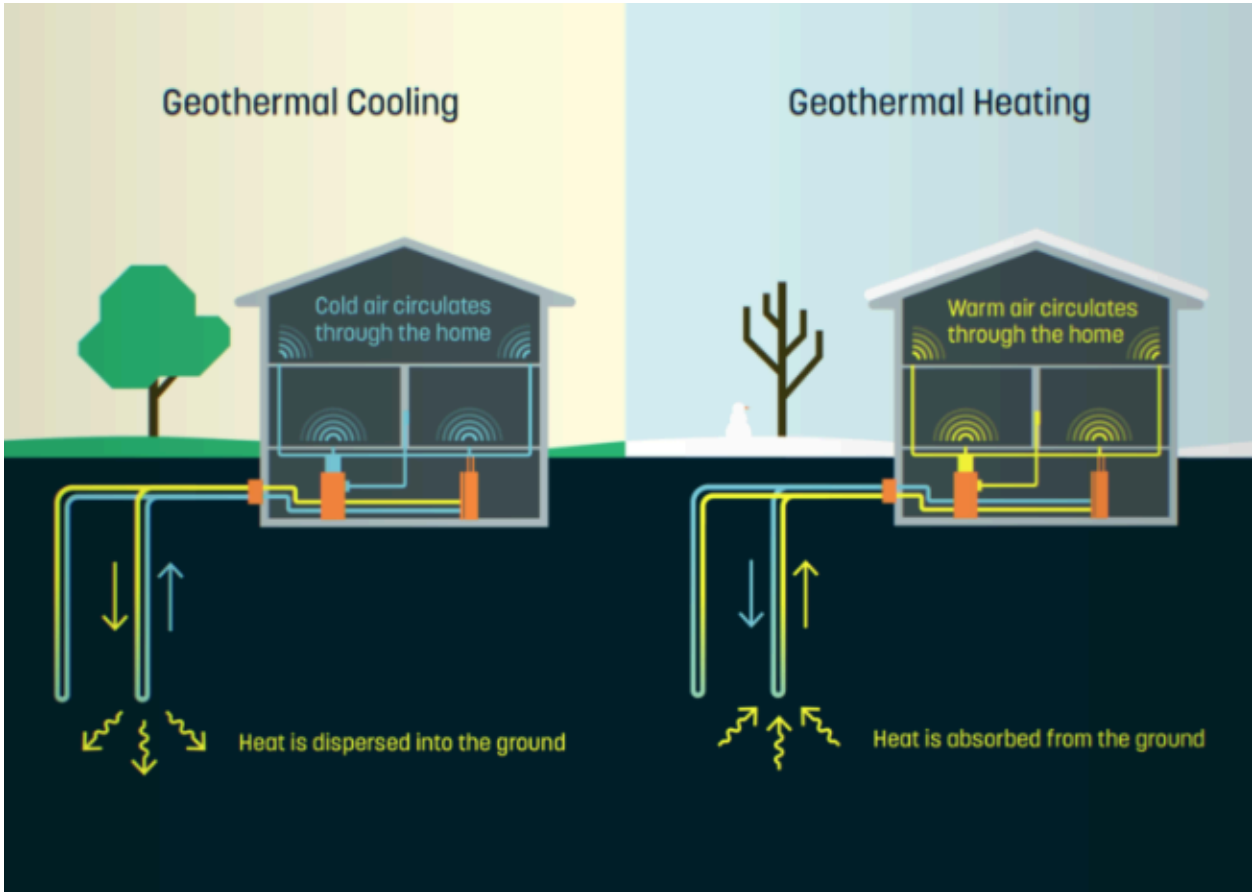


Geothermal energy

Geothermal energy is a type of energy that is gathered from taking heat energy from reservoirs and other hot underground areas and transferring it into heat. It is quite sustainable as the process is easily repeatable. The water is drawn out of the ground and the heat from the water is used to drive turbines to produce electricity. Geothermal energy is especially unique because it can act as a heating and cooling unit all in one. It can absorb heat when the temperature is warmer and can act as a heater when the temperature cools. We can access these reservoirs by drilling deep wells into the ground to access hot water and steam. A benefit of geothermal energy is the fact that it can run 24/7 even if the climate is bad that certain day. One con however is that this source of energy depends greatly on the area that you live in because if you don't live in an area that has these reservoirs then you will be unable to use it. The electricity is also very good as it is sustainable and will also last for hopefully billions of years. The annual utility for Geothermal is around 850 where natural gas comes out to 1579 while propane is 2709. This means that overall it will save you 729 if you're comparing it to natural gases while it will save you 1859 dollars if you are comparing it to propane. The installed costs and net installed costs however is a bit pricey if you are using geothermal. These costs combined are around 42.5 thousand dollars while it is 20 thousand dollars for both natural gas and propane respectively. That means that over the span of 10 years natural gas will cost a whopping 21.5 thousand and propane will cost 36.25k in 10 years. The cheaper alternative of geothermal however is said to only cost a minimal 11.25k in ten years. This is a huge amount of savings if

you are trying to switch to a more cost efficient energy source. Geothermal power plants produce 97% less sulfur compounds that create acid rain and 99% less carbon Dioxide which fossil fuels create every time you use them. 7 year amortization.

Geothermal energy

Geothermal energy is considered an energy where you create a well where you send down water or a water and glycol solution which helps raise the boiling point and lowers the freezing point of the liquid that it is combined with. This is the solution used because it allows for the water to be transported from the ground all the way to home without losing a large amount of its heat or its coolness. You essentially will have a main unit in your home that is attached to wire that runs into the ground that runs the solution through the reservoir to either heat or cool the water depending on what the use for the energy will be. Then it gets sent back up and is converted into either heat energy or it can be used to cool things. It can also be turned into energy by using the steam from the very warm solution then drives a turbine that spins a generator. This in turn creates energy that can be used for day to day necessities.

What are some pros and cons for geothermal energy?

Some pros of geothermal energy is the fact that you are able to store energy while still providing heating, cooling and energy for the rest of your home. This is effective because it allows for you to make sure that even if something were to happen in your area you would still be able to have electricity in your home. Geothermal energy is also useful because it allows for you to have energy 24/7 no matter the weather. This is because as long as you are able to send down the solution you will be able to have sustainable energy for your entire household. One final reason why it may be a pro for you to get geothermal energy is because it is domestic and it allows for secure and reliable energy due to the fact that it is essentially a energy pump that you own that is stationed right in your own home.

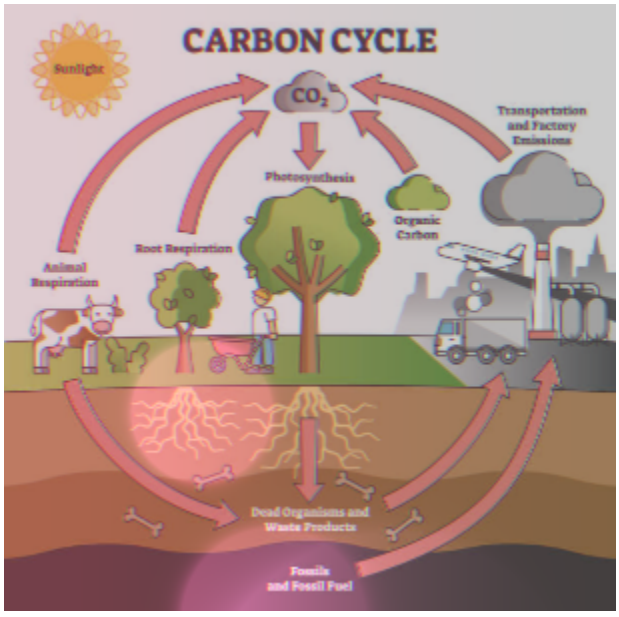
However some cons of using geothermal energy

Pollution is still a huge problem when it comes to geothermal energy. This is because whenever a geothermal pump is in use, it may create hazardous waste which is very harmful to the environment. If not disposed of properly it can result in the damaging of multiple ecosystems. These underwater ecosystems are at the greatest risk as the waste is generally very toxic to oceanic environments. Another con of geothermal energy, is the upfront cost of installing this energy source. The installment of a geothermal energy system can be anywhere from 30 thousand all the way up to 60 thousand depending on where you live and how simple it will be

to install your system for you. One last con of geothermal is the fact that you are unable to use this energy source in certain areas.

How is it cost wise compared to fossil fuels, what does fossil fuels emit that it doesn't

To recover all the cost you had lost setting up the geothermal system, You would need to wait for an estimated 7 years in order to make your money back and to start saving from this huge investment. It is calculated that it costs around 3.6 cents per kilowatt hour when using geothermal energy. While it is a whopping 5.5 cents per kilowatt hour when you are using energy sources like fossil fuels. This means that you save around 1.9 cents per kilowatt hour whenever you use geothermal energy. A kilowatt hour is enough energy for one full hour. Geothermal energy also releases around 98 percent less emissions which can include sulfur compounds and carbon dioxide. These are two emissions that are very harmful to the environment due to the fact that they wreck the ozone layer by eating into it.



Fossil fuels

Fossil fuels are a non renewable energy source that are mined and burned which creates energy in order to power systems. Fossil fuels is also one of the oldest sources of energy as before any of the other new renewable energy sources. Over the last 20 years, fossil fuels were the cause of 3 quarters of the carbon emissions. Fossil fuels consist of natural gases, oils, and

coal. Industries will now mine for these resources in order to harvest and use them. It is also formed from decaying organic matter. More than 50% of coal weight comes from dead plant matter that has decomposed. 80% of the world's energy comes from fossil fuels. Natural gas however is slightly better as it emits 50% less carbon dioxide into the air compared to coal.

What are some pros and cons of fossil fuels

One pro of fossil fuels is the fact that it can be more reliable compared to other energy sources that rely on the environment. An example of this could be where you need the sun in order to harvest solar energy. This is good because fossil fuels can be accessed at all hours of the day due to the fact that it does not rely on things such as the environment. Another pro of using fossil fuels is the fact that they are easy to move around. This is because you can often put them into a truck and wheel it around. This is more efficient than other energy sources such as solar energy because you are able to harvest the energy from one area and move it to another area which could be your home.

While the pros seem great, there are some pretty noticeable cons when using an energy source such as fossil fuels. One con could be that fact that fossil fuels often release some of the most harmful gases into the atmosphere. These gases could be detrimental to the health of the planet we live on. These harmful gases are also a leading factor in climate change. This has made our planet noticeably warmer in the past decade. Another con of fossil fuels is the fact that we will run out eventually. Fossil fuels are not being produced at the same rate that we are using them so we will run out of them eventually. One website goes to say that we will even run out of these fuels by the year 2060 which is only 35 years away. One last con is the fact that fossil fuels are not exactly the safest source of energy. In 2010 a oil mining rig known as the deepwater horizon exploded creating one of the largest oil spills of all time. This was detrimental to the ecosystems that were near that oil rig.

Solar energy

Solar energy is a type of energy that comes from the sun. It uses the energy from the sun in order to convert light rays into energy. This energy source relies heavily on the sun and harnesses its energy by using solar panels. These panels work by harnessing the rays that directly shine onto the panels. This allows photons to knock the electrons which create a flow of

electricity which allows it to generate electricity for your household. Solar energy can produce heat and can also produce electricity. These are two vital necessities for one's household in order to operate certain machines. You will also have to purchase multiple solar panels in order to be able to power a whole home. This energy source is highly renewable as you only have to allow the sun to shine on your home in order to generate electricity for a long time. This energy source is also pollution friendly as it does emit any gases that are harmful to the environment.

What are some pros and cons

Some pros of using solar energy are the fact that you are able to have an energy source that is inexhaustible and unchangeable. The sun that is powering your energy source will not run out for a long time and as long as the sun rays hit your solar panels you will have energy in order to power your home. Another huge pro of using solar energy is the fact that your home's value may increase if you were to use this energy source. This is due to the fact that it is expensive to install these panels and your home's value may increase due to the installment of these expensive items. One obvious reason why this energy source is also better is because it cuts down on emissions that are harmful to the environment. These panels only use energy from the sun which is proven to be environmentally friendly due to the fact that it is not burning anything and is only taking energy from rays that aren't harmful to the environment. You will also gain your money back from purchasing solar panels and saving money on your electricity bill.

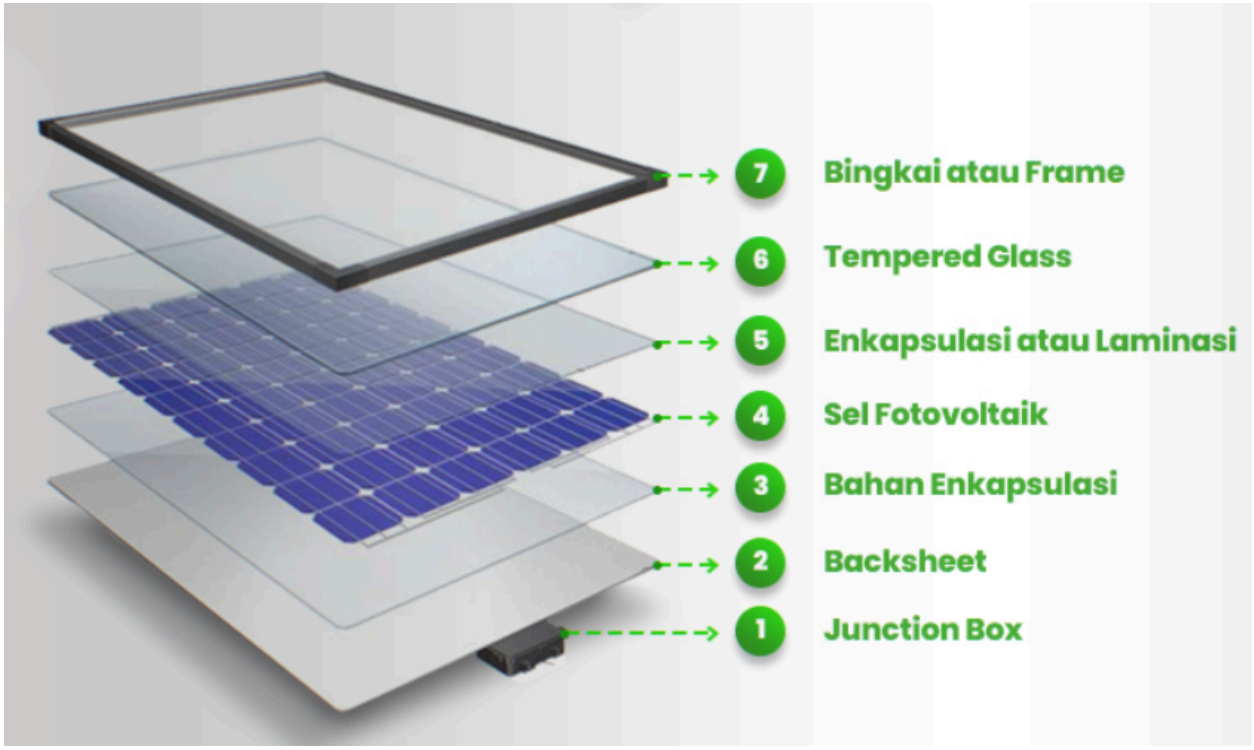
What are some cons of solar energy

Some cons of solar energy however is the fact that you need sunlight in order to power solar panels. The sun will not always be out and you will not be able to use electricity on certain days where it may be raining. In some places it may even snow due to the fact that it is a colder city and that there is bad weather in certain areas. Another con of solar energy is the fact that it is super expensive to install this energy source. The amortization period is 9-12 years for this energy source. This is a super long time because other energy sources' amortization period is around 5-7 years depending on what source they are using. This is bad because it means you are gonna have to wait for a while until you are able to make back your money. Another reason why solar energy is bad is because not all roofs work for this energy source. Some roofs are unable to install solar panels due to the fact that if the roof doesn't face the sun, you will be unable to harness the energy of the sun. One problem is that storing solar energy is super expensive and we still do not have a cheap alternative for this. This means that you will mostly have to rely on when the sun is still shining to harness this type of energy.

Cost of solar energy compared to fossil fuels and emissions

Solar energy costs around four cents per kilowatt hour where fossil fuels could cost anywhere between 5-17 cents per kilowatt hour. However you must count the costs that are included when you purchase and install the solar panels. On average it costs anywhere between 15 thousand and 30 thousand to install these very expensive solar panels. As previously mentioned the

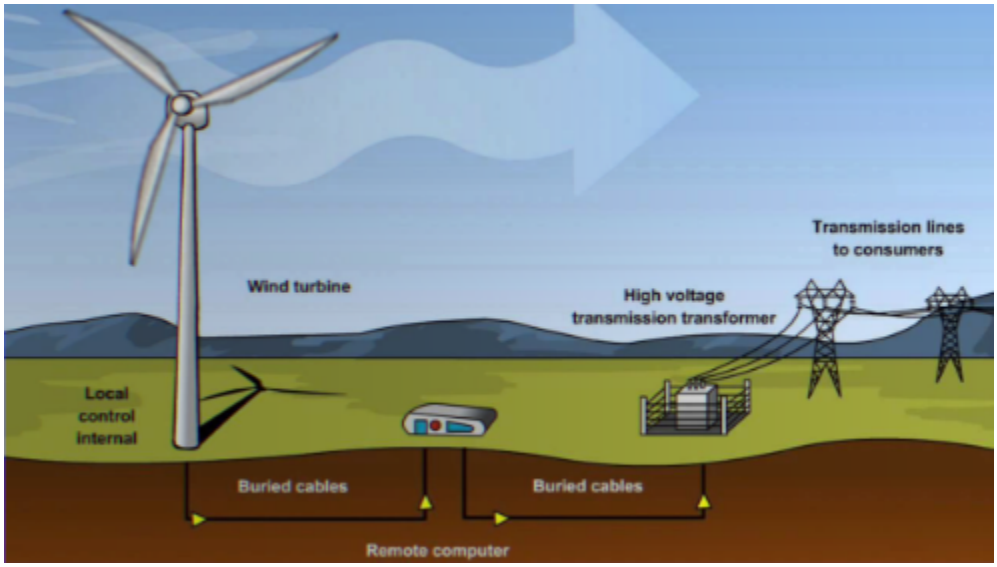
amortization period is 9-12 years which means to be able to experience the benefit of saving money from this energy source, you will need to use this energy source for at the bare minimum or 10 years maybe even more depending on the amortization period. However when you eventually do start saving money on this energy source you will be saving a considerable amount of money per kilowatt hour. This will allow you to save heaps of money in order to spend it on other aspects of life such as food and other utilities. The emissions are around 6kg of co2 emissions per kg of silicon created. You require 660 grams of silicon in order to produce 1 singular solar panel. You will need 16-25 panels in order to fully power a house. That means you will require an average of 20 panels which is 13.2 kgs of silicon. That means that you will be emitting 79.2 kg of co2 emissions. This is very harmful to the environment as you are emitting a similar amount to fossil fuels.



Solar energy

Solar energy or also known as electromagnetic radiation. It is captured when solar technologies

capture the sun rays and turn it into electricity. It is not always the right source of energy as there must be sunlight at the time for it to even become available. If you have little to no sunlight then it might not be the option for you. Another reason why it is not the best renewable energy system is because it costs a lot in the beginning as you have to buy solar panels for your house. However it is really cost efficient in the long run as the solar panels rely on the sun and it also has a very low maintenance cost. Your utility bills will be less because you are not actually using energy from the government rather you are using energy from the sun which is free. The carbon footprint from the creation of the solar panels. However the solar panels are about 20x better for the carbon footprint due to the fact that it's not burning anything. Using fossil fuels is around 5-17 cents per kilowatt hour which is a large amount when compared to the 3-6 cents while using an energy source like solar energy. The problem however with this is that while creating the solar panels you must have very high temperatures which can only be obtained by burning fossil fuels. The carbon emissions that are produced when creating solar panels are the same as when you the emissions show that it is around 6 kg of co2 per kg of silicone produced.



Wind energy

A wind turbine will turn wind energy into energy by spinning turbines like plane wings for example to generate a flow of electricity. This means that it is completely renewable due to the fact that it only relies on turbines spinning in circles to move these huge turbines. This energy source does indeed have a future in the energy industry. These wind turbines that are built on land and are turned into an energy farm of sorts where there are just fields of these turbines.

This energy source is also highly renewable as it does not emit any fumes that are damaging to our environment. This wind source is also usable on farms as these turbines take minimal space so you are able to still plant crops on the land and farm this essentially free electricity. New technology is still coming out on this energy source in order to improve energy generation and make sure that this energy source takes less and less space and make the turbines more light and durable to ensure peak efficiency. They are also making sure that the cost to manufacture these turbines are less to make them a feasible way to produce electricity.

Pros and cons of wind energy

Some pros of wind energy may include the fact that it does not have any emissions that are damaging to the environment. Wind energy is also inexhaustible and is a very abundant resource. This is because you are able to have wind no matter what area you are in and where you are gaining energy from. Wind energy also saves a huge amount of money due to the fact that it stops the emissions from multiple different things. This money could be life changing as we could use it to help better social services and use it to help fund things such as schools that could use a huge boost in funds. Wind energy overall benefits small communities as wind turbines can take up a small field of land in order to help out a larger area of people with their own energy problems. This energy source we now know is also very cost effective as it allows for a loss of money savings. Furthermore, wind energy also helps boost jobs as more then 150000 jobs have been opened up due to this growing industry that could provide power for us in the future.

Some cons however of wind energy may be the fact that wind energy is that wind energy is surprisingly very expensive initially. A singular wind turbine will be very expensive and you may need multiple in order to power your home. Wind energy will pay itself back in around 5-15 years due to the amount of energy you are able to create from these wind farms. Another con of wind energy is the fact that it may block views because of these humongous pillars that are just out in the open. Furthermore these energy sources are quite loud as they are always spinning in order to create energy. One more con is the fact that you will not be able to create just one wind turbine, instead you must opt for using multiple wind turbines in order to be able to get the most money out of your purchase and to be able to have enough electricity for many homes. Some would even say that wind energy is the rich man's energy as you must have enough land and money in order to build these huge turbines.

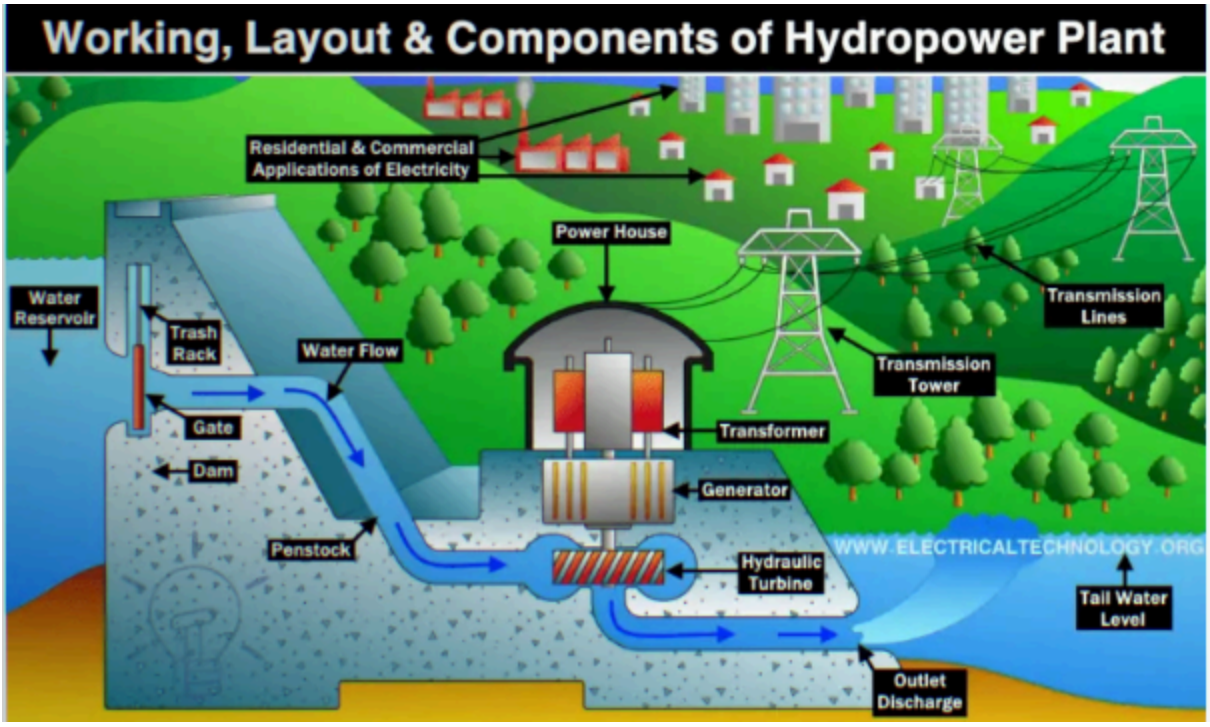
How much does wind energy cost and what emissions does it create?

Wind energy costs a ton as a singular turbine can set you back anywhere from 80 thousand to 110 thousand dollars. These huge turbines however will pay themselves back due to the fact that they produce so much energy, you are able to use some to sell and make a cheap profit

back for yourself. Larger wind farms will however generate more income in the long run due to the fact that this energy source is highly profitable. Essentially the more turbines you have, the more annual income you will be able to earn for essentially free. You must invest in land and turbines in order for this however which can be very pricey. There is also currently no carbon neutral way to create these turbines as carbon emissions are still produced when creating these massive steel beams. Heavy transportation and other metals and supplies are some of the key reasons why fossil fuels are still needed in order to produce these huge turbines.

Wind energy

Wind energy is an energy source where you convert the wind into useful usable energy. This energy source is also considered a better energy source than fossil fuels because it uses the wind which is reusable and turns that wind power into energy. One big problem with wind energy however is the fact that building such big turbines takes a lot of space and also leaves a big carbon footprint. These big turbines are also very expensive to build as it takes up a lot of materials to build up. It mainly converts kinetic energy into electricity by spinning huge wind cycles over and over. This energy source is highly sustainable as it can run 24/7 despite cold weather or warm weather. One pro of this energy source is the fact that it is cheaper in the long run as the wind is highly sustainable and it is very cost efficient because it does not cost a lot of money to maintain yearly. However it may also affect flying organisms as the organism might not see the turbines spinning and just fly into them. They can also be very noisy which can be a problem if you live in a busy city and it is highly populated.



Hydroelectricity

What is hydro electricity? Hydro electricity is a type of energy that relies on the elevation difference from two different areas. Essentially this energy source allows water to drop elevation in order to spin a turbine which creates energy. You will need a dam however in order to use this type of energy because this energy highly relies on the drop in order to spin these huge turbines. This energy can be harvested in many other ways too. Another way that it is harvested is by having a wooden wheel use water power in order to spin to create energy for a smaller area. This energy source is a very good backup as it can generate energy at any given time to a large grid. This energy source even goes back 2000 years and can be traced back to ancient greece. This energy source is not usually used for households but it is used to power a community because the government or whoever owns the dam can release energy to the city whenever they want. In 2019, hydroelectricity was the top renewable energy source at the time but its uses have declined recently as other energy sources have been proven more effective compared to this ancient energy source.

What are some pros and cons of hydroelectricity?

Hydroelectricity is fueled by the elevation drop that water falls so you are able to loop it to spin the turbines essentially 24/7. This is very useful as it makes hydroelectricity powered simply by allowing water to flow in a loop. It is also very useful as it is a domestic energy source allowing countries to have energy for cities without having to rely on transportation resources from other international countries. Hydroelectricity is also considerably low cost for the amount of energy

you are getting. This source is also quite sturdy as the dam will likely remain there as long as it is not removed by outside factors. Furthermore, storing this energy source is quite practical as you are able to store it in case of emergencies and if needed can send out this energy to places that need it. This energy source also creates thousands of jobs which are beneficial to a country's economy as it allows for a wealthier country with less poverty. The water from these dams can also be filtered into pools for recreational activities. This means that the dam can double as an energy source and a pool for your children to have fun. Overall this energy source is quite practical and can have a variety of benefits that are very helpful in today's society.

What are some cons of hydroelectricity

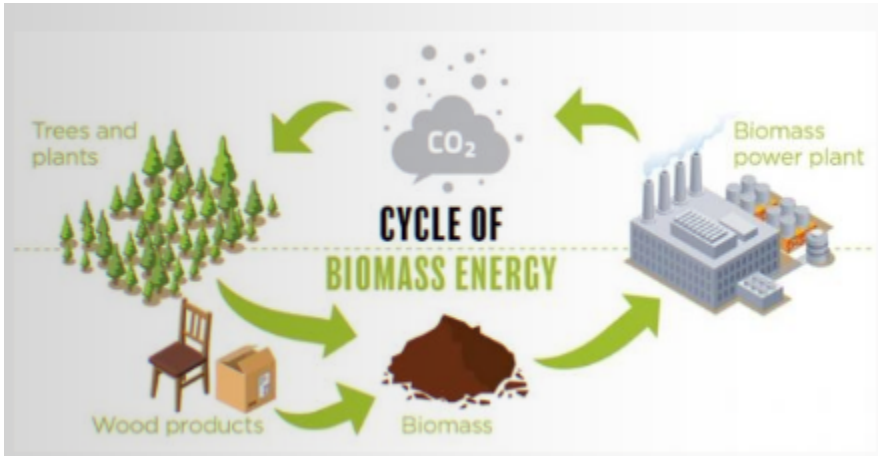
In certain periods of drought this energy source can have problems as the new water is not flowing in therefore you will not have the water to power this energy source. This is a huge problem because climate change is becoming more and more of a problem and now we see precipitation less and less. Another con is the fact that this energy source is very harmful to the environment as you must destroy a fair amount of land in order to build these huge turbines and to create an elevation drop large enough to use this energy source. Another problem of this energy source is the fact that there are fewer and fewer reservoirs that are usable for this energy source. Other cons could include needing a lot of land in order to build these huge turbines with an elevation drop. The cost is also a huge factor as the growing expense for resources is a huge problem.

What is the cost of this energy source and what emissions does using it produce?

The cost of hydro electricity is generally 2-4 cents per Kwh. This is cheaper compared to other energy sources that are still renewable. However, creating these energy turbines can be quite expensive. This energy source is not usually built for a singular household because it is very expensive and it is more efficient if you use it for an entire community. Therefore there is no way to compare the cost of this energy source to others. However if we just account for the cost per kilowatt hour, this energy source is by far the cheapest even though it may be more expensive for the state compared to other energy sources as you will need the fund of the government and permits in order to create a dam to use this energy source. This energy source still emits carbon emissions when they are building the dam because you must burn fossil fuels in order to shape the metal into this type of dam. However the lifespan of an average dam is quite long therefore the amount of emissions that are being emitted into the atmosphere.

HydroElectricity

Hydro electricity is one of the oldest and most renewable energy sources as it uses natural flow to gain energy. Hydroelectricity is better than fossil fuels in the sense that it can pump out a lot of raw energy during peak hours of the day.This is good because the demand for electricity is constant and can easily drop or go up. On a hot summer day the demand may go up as the need for electricity for ac is high. Hydroelectricity is highly reusable because you are able to put it through a cycle where it goes through the dam and then can be sent back to the beginning. It is also very good as you are able to pump energy for the next day. However when you pump energy for the next day the pumped water goes uphill. During the day however the energy goes downhill. This is because you are able to get energy while pumping more water into the reservoir. Going downhill allows it to be sent out back into the river that it was extracted from the day before.



Biomass energy

Biomass is a renewable energy source that uses animals and plants and burns them into fuel. It is a fuel source that can be transported to many different areas and is mainly used for cooking and heating. You can also burn wood and other paper products safely in order to create energy and heating for a household. There are multiple ways you can turn these plants and animals

into energy but some ways may include combustion, thermochemical, biological, and chemical conversion. However direct combustion is the most common method to gain heat from this energy source. Biomass accumulated for 5% of America's energy in 2023. This energy source is mainly used by exporting and burning the energy source when you have it physically. It emits less carbon compared to fossil fuels and could greatly decrease the amount we rely on fossil fuels as a whole. Although this energy source may be carbon neutral it is not nutrient neutral as it still requires nutrients which can emit greenhouse gases.

What are the pros and cons of biomass

Some pros of biomass could include the fact that it is widely available in many areas and is easily accessible.This energy source is also very useful as it helps double as a waste remover. Landfills contribute to carbon emissions and are generally very harmful to the environment if not kept in the correct conditions. Therefore it is super beneficial to use biomass as an energy source because it helps get rid of these huge piles of waste. Biomass is also a very reliable source of energy as it is easily dispatchable to certain areas. This energy source is also very practical as you can always have more as there will always be trash to be burned by this energy method.

What are some cons of biomass

Even though there are some pros to this energy source there are some cons to this energy source too. Some of these cons may include the fact that it is very expensive to store the stuff needed for biomass. This includes all of the plant and animal matter that must be stored which can take up a lot of space in the long run. This energy source can also have negative impacts on the environment in the long run. Deforestation can occur when you need to have plant matter for this energy source. This can result in clear cutting which can be detrimental to many environments and ecosystems. This energy source can also be very costly with transportation, harvesting, and growing of all this matter. There are also certain greenhouse gases that are emitted when using this energy source even though burning it directly is not the main source of it

Cost of biomass and what emissions it produces

Biomass is quite a bit more expensive clocking in at a whopping 5-15 cents per Kwh. This relates to availability of the crops, the technology used for it and transportation and storage. These all relate to the growing cost of this energy source as it has become inefficient as a renewable energy source. Furthermore this energy source still emits some greenhouse gases in its production. Transportation may emit carbon emissions when transporting the resources for

this energy source. You must kill plants in order to harvest them to use which puts less co2 in the air. This can be detrimental as co2 is vital for all living organisms on this planet. However the more cost you input the lower the Kwh will be due to the fact that they are producing so much that it averages out to a lower cost. Overall this energy source could use some improvement as I believe the cons outweigh the pros currently.

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