

How Electricity is made.

The importance of electricity.



Oh no! There **is** no **electricity**! I **was** just about to **finish** my game. I **have to restart** it now. Uh! It **seems** like there **is** some **problem** in the **electricity** supplies. Don't **worry**! It'll **be back** in a **moment**. Wow! It's **back**. We **can't do** anything without **electricity** these **days**. Yeah, but do you **know** where your **electricity comes** from? I **think** it **comes** from that **switch**! Right? You are very right!

How does a generator work? How does it produce electricity? Electromagnetic induction.



Electricity comes to this TV from this **switch** (interruptor). But what about the **source** of all the **electricity** that **comes** to everyone's **home**. Let me **ask** my **friends**: Do you **know** where **electricity comes** from? Do you **want to know** about the **sources** of it and how it **is produced**? Ok, ok. **Take** a look here. What **is** this?

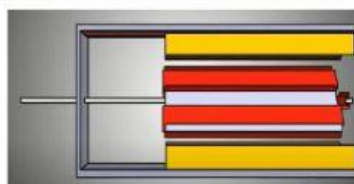
This is a **coil of wire** and **magnet mounted** on a **shaft** (eje). What it **is used** for? It **is used** to produce **electricity**. But how?

If we **spin** a **magnet** around with-in (dentro de) a **coil of wire** **electricity is produced** in the **wire**. Oh, it is so simple! All we **need to have** is a **coil of wire** and a **magnet to make** **electricity**. And just **spin** the **magnet** with-in the **coil**. This process **is known** as **electromagnetic induction**.

Can I **spin** this **magnet**? Oh yes! But let me first **attach** (unir) a small **electric bulb** with the **wires**. Now you **can spin** the **magnet** with the help of the **handle** (mango). Wow, the **bulb is** on! So **guys** now you **know** the basics of **producing** **electricity**! Now something to **remember**! The **machine having** a **magnet** and **coil of wire**, in this way, **is known** as **generator**. So we **need** a **generator** like this to **produce** **electricity**? Yes, in most of the cases a **generator is required**.

Wow! Now I **can produce** **electricity** for my entire **home** with this **generator**. But see, this is too small! This **can light up** (iluminar) only a **small bulb**. You **need** a **big generator** for **getting** more **electricity**. Let me **show** you!

'Big' generators. Let's change the scale! Giant generators



Oh, It does not **look** like the earlier **generator**!

Let's **peep** inside! (Miremos dentro)

Oh yes, it also **has** a **big magnet** **linked** with a **shaft** and **wires** all around it.

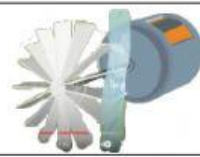
Remember, every **generator has** this kind of arrangement (montaje) inside it. Hmmm, if I **spin** this **generator** **shaft** I can **light up** my entire **home**!

Hmmm, now **try** to **move** it. Ah! Ah! I can't **spin** it. It **is** very **heavy** to **move**. Now **have** a look at these **giant generators**!

Oh, wow! That's so huge. Yeah, these **big generators are used to produce electricity** for a whole city. But how do they **spin** the **magnet** inside these **big generators**? I **can't** even **move** the **smaller** one! To **move** the **magnet** inside the **big generator** a **big fan is attached** to this **shaft**. A **big fan**? Yeah, look here.

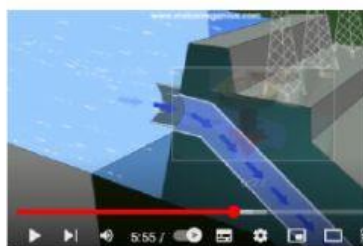


These big fans are called **turbines**.
Turbines? Yeah, turbines.



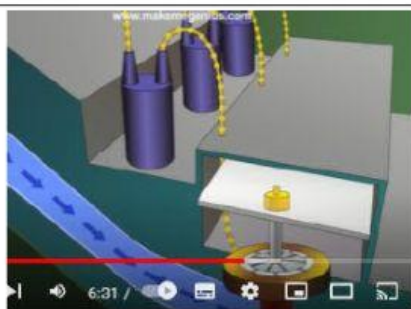
Friends! Hope you **remember generator**, the machine to **make electricity**! Now **remember turbine** that **is** the second most important tool A turbine **helps** the generator to **work** so that it **can produce electricity**. But how **does** this fan, I mean **turbine**, help in **turning** the generator? **Look** here!

Conventional Power Plants: Hydroelectric Power Plants.



In some cases, lot of **water is dropped** on this. The **water makes it turn**. When the **turbine moves**, **shaft of the generator also moves**. Wow! So **water helps in running** the generator! You **got** it right! The **electricity is generated** with the help of the **water**. This kind of **electricity is known as hydroelectricity**. The word **hydro means** related to **water**. But to **turn a big generator**, we **may need** a lot of **water**. Where all this **water will come** from? For that, we **need** to go to a **dam**. **Dam?** What **is a dam**? Let's **go and see**!

Wow! There **is** a lot of **water** here! **Seems like water is being stopped** here! Yes, it is a kind of a **barrier to stop river water**. Lot of **water is collected** here. But why? Well **Jimmy**, this stored **water is used** for water supplies or for **generating electricity**. Oh! That **is** why **there are** a lot of **turbines and generators** nearby! This **is called hydro-electric plant**. **Water** from higher level **flows** into a **pipe that carries** it down to a **turbine**. As **water moves** down, it **gains** a lot of **pressure**. This flowing **water drives** the **turbine that is connected** to the generator.



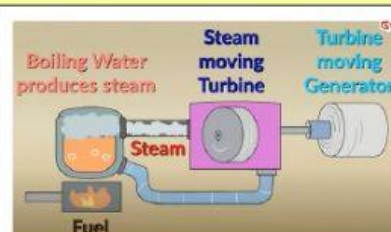
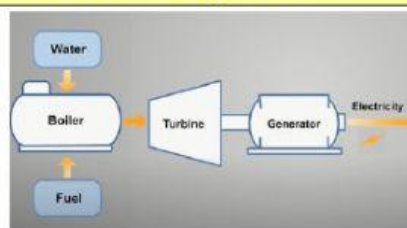
And inside the **generator, there is** a large **electromagnet** in the coil of **copper wire**. When this **magnet rotates** inside the **coil of wire** **electricity is produced**.

Then it **is sent** to our **homes** through **transmission lines**.

Wow! It is so **clear** to me.

Water from the **dam moves** the **turbine**, **turbine drives** the **generator**. And **generator produces** the **electricity**. Guys, **have** a closer look. This **is** how **water helps** in producing electricity.

Conventional Power Plants: Thermal plants and Uranium plants.



Umh! The visit to the damn was interesting but tell me: Is there any other way to turn the turbine? Yeah! There are many ways. In many cases it is moved by steam. Steam? But how can steam move anything? Look at this! Can you spin it? It is very simple! I have to blow some air into it. Pffffff! See, it is spinning. It is the same with turbine. We need some air or gas to blow it. But you said steam. Yeah! Steam is a gaseous form of water. Oh yeah! Steam is a gas. It is just like...air hmmm Let me try to make this turbine spin.

Oh! It did not even move an inch. It is very heavy, We need a lot of pressure. We need lot of air to move it. But from where will we get that much of air?

In most of the electricity generating plants water is put in big tanks. Then it is boiled to produce steam and the turbine is moved with the pressure of the steam like my pinwheel (molinillo). Yep! Now let's see how the whole system works.

Water is heated until it produces steam and the steam moves the turbine that spins shaft connected to a magnet inside the coil of wire but can you name the fuel used for heating the water to produce steam?

We can use electricity to heat water like we use it for a 'guiso' at home. You are right but using electricity to produce electricity can be very costly. Think of!.

We can use coal. Yeah! We can use coal. We can also use natural gases, biomass or uranium, etc... Are those fossil fuels?

So we can use coal and natural gas as fuel to heat the water to produce steam to turn the turbine. And as we use the heat to produce electricity this is also called thermal energy. And this is done in thermal plans. Correct! but the plants where we use uranium as fuel to produce electricity are known as nuclear power plants.

Non conventional Power Plants: Wind mill and Photovoltaic cells or panels.



I am worried! Why? Well If burning all fossil fuels will get over. Then there would be no electricity in this world. Even scientists are worried. They are finding new ways to generate electricity. Like? Some of the electricity is being produced with the help of wind and even sun. Wow! That is great. Can you tell me more about this? This is called a wind mill. The blades (aspas) of windmill act as a turbine. The blades move due to the wind. Oh! So we don't need fuel! We will generate the electricity.

Now tell me about the ways to get electricity from the Sun. Yeah! There it is.

See, sunlight falls on special panels called photovoltaic cells. These cells produce electricity. Wow! We can get electricity for infinite period from them and Sun as they will always be there.

So guys. Some homework for you ... It is ery easy... Watch few videos on dams and electromagnetic induction. Also click on this link to play the quiz on makemegenius.com.