

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!

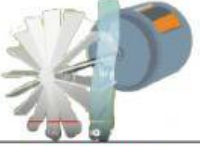
'Big' generators. Let's change the scale! Giant generators



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.

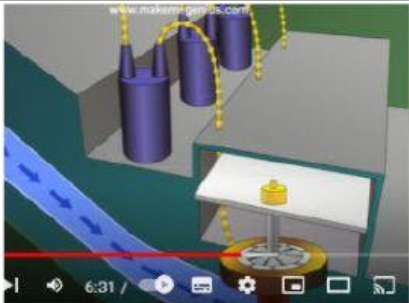
Remember, every generator has this kind of arrangement (montaje) inside it. Hmm, if I spin this generator shaft I can light up my entire home!		Hmmm, now try to move it. Ah! Ah! I can't spin it. It is very heavy to move . Now have a look at these giant generators !
Oh, wow! That's so huge. Yeah, these 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.

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**!

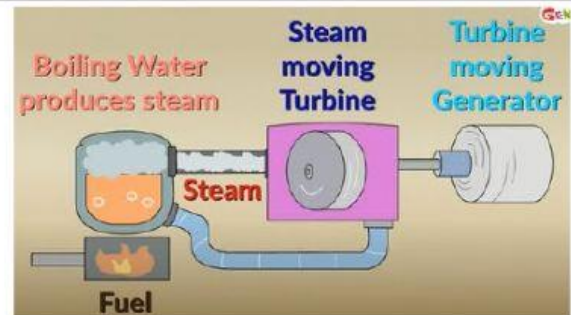
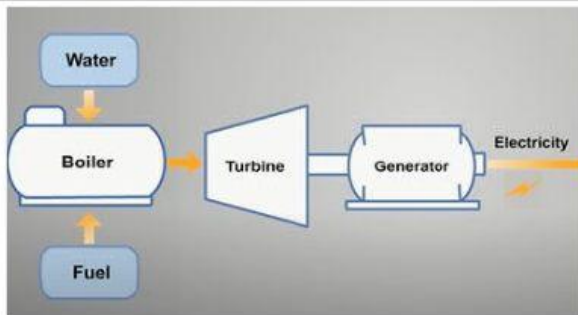


Wow! There **is** a lot of **water** here! **Seems** like **water is being stopped** here! Yes, it is a kind of a **barrier** to **stop** river **water**. Lot of **water is collected** here. But why? Well **Jimmy**, this stored **water is used** for water supplies or for **generating** electricity. Oh! 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.
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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**?

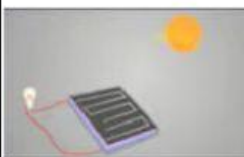
So we **can use** **coal** and **natural gas** as **fuel** to **heat** the **water** to **produce steam** to **turn** the **turbine**. And as we **use** the **heat** to **produce electricity** this **is also called** **thermal energy**. And this **is done** in **thermal plans**. Correct! but the **plants**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

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 **scientics** **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.*