

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.

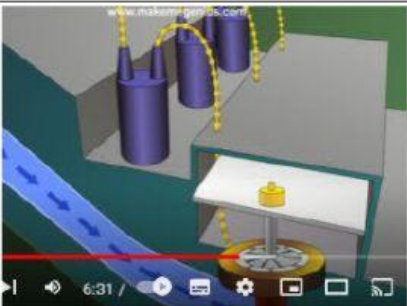
Remember, every generator has this kind of arrangement (montaje) inside it. Hmmm, if I spin this generator shaft I can light up my entire home!		Hmmm, now try to move it. Ah! Ah! I can't spin it. It is very heavy to move . Now have a look at these giant generators !
Oh, wow! That's so huge. Yeah, these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

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**!

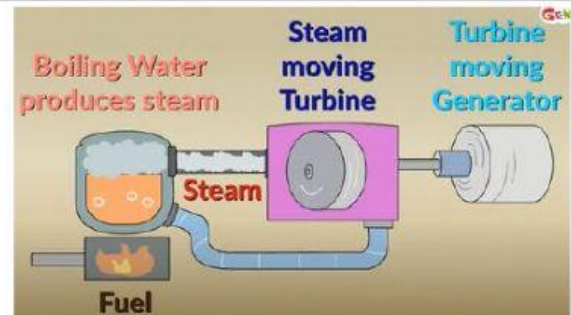
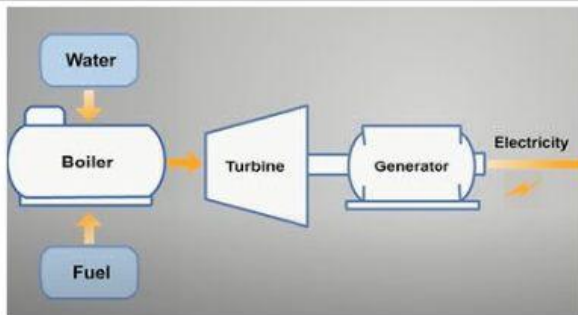


Wow! There **is** a lot of **water** here! **Seems** like **water is being stopped** here! Yes, it is a kind of a **barrier** to **stop** river **water**. Lot of **water is collected** here. But why? Well **Jimmy**, this stored **water is used** for water supplies or for **generating** electricity. Oh!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

	<p>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.</p> <p>Then it is sent to our homes through transmission lines.</p> <p>Wow! It is so clear to me.</p> <p>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.</p>
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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**?

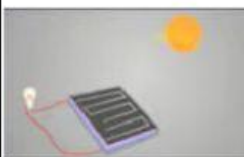
So we **can use** coal and **natural gas** as **fuel** to **heat** the **water** to **produce steam** to **turn** the **turbine**. And as we **use** the **heat** to **produce electricity** this **is also called** **thermal energy**. And this **is done** in **thermal plans**. Correct! but the **plants**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