

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?

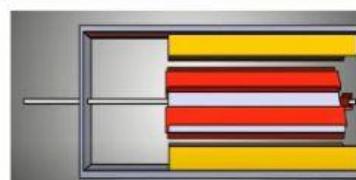
This is a **coil of wire** and **magnet mounted** on a **shaft** (eje). What it **is used** for? It **is used** to produce **electricity**. But how?

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.

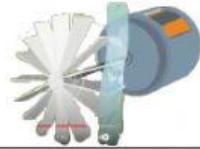
Remember, every **generator has** this kind of arrangement (montaje) inside it. Hmm, if I **spin** this **generator shaft** I can **light up** my entire **home**!

Hmm, 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.



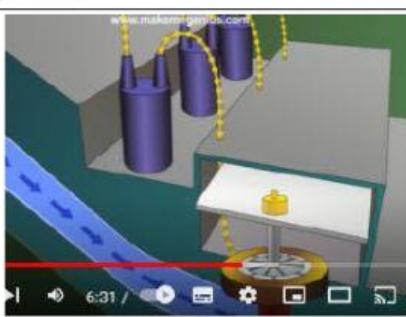
Friends! Hope you **remember** **generator**, the **machine** to **make** **electricity**! Now **remember** **turbine** that **is** the second most important **tool**! A **turbine helps** the **generator** to **work** so that it **can produce** **electricity**. But how **does** this **fan**, I mean **turbine**,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



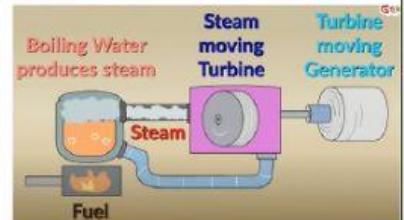
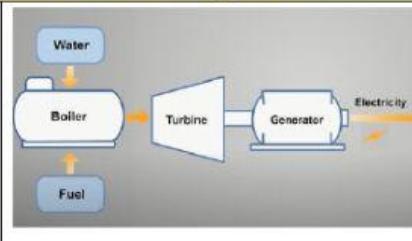
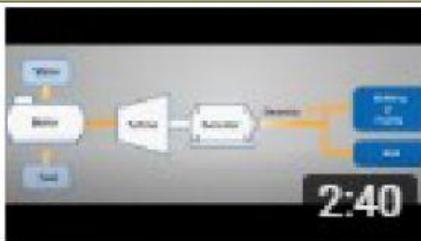
And inside the **generator**, **there is** a large **electromagnet** in the **coil** of **copper wire**. When this **magnet rotates** inside the **coil of wire** **electricity is produced**.

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.



Uhm! 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. Pfffff! 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 plants**. 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.