LOCAL RESOURCE GUIDE

THE ELECTRICAL GRID

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Have you ever wondered where electricity comes from and how we can summon it on command? Most houses are able to get electricity because they are part of an electrical grid. Electrical engineers work hard to make sure that electricity can travel safely during its long journey from power plants to our homes. With this local resource guide, we will take a look at some components of Whittier's electrical grid.

Before we begin: Please observe but don't touch!

Your journey might take you to some very electric places.

What is an electrical grid?

An electrical grid helps carry electricity from where it is produced (made) to where it is consumed (used). Electrical grids are made up of:

- power stations (a.k.a power plant or generating plant) generate electricity.
- electrical substations transform the voltage of electricity so that it can travel safely.
- electric power transmission to carry electricity over long distances
- a way to send electricity to an individual location (like a home, school or business). This is called electric power distribution.

Mapping the journey to your home to a substation (and beyond).

What happens when you turn on a power switch in your home?
Turning on a switch allows electricity to enter the lightbulb and/or electronic devices.

Behind your power switch there are wires that travel through your home's walls and to what's called an electric meter. An electric meter measures how much electricity your home (school and/or business) uses.

Electric meters often look like this and are located on an outside wall of your home. Can you find the one for your home?

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So, what is next? How does the electricity get to the meter, can you find it? You probably have to look up!

To track how electricity gets to our homes, we will retrace its steps. While walking around outside you may notice large wooden power poles around your neighborhood. Each home is connected to them. You might even see the power lines that connect your home to the nearest power pole.

If you look closely, you should also see a white cylinder called a transformer (A). Electricity is easier to transport if it is a higher voltage but we need it at a lower voltage to use in our homes, so the transformers decrease the voltage to the standard level.

The small transformers we see on power poles are actually the second time the voltage is lowered. Before that, an electrical substation does this. Here the very high voltage is reduced to a medium-level before taking it to your local power poles (B). You can take a drive past a local Whittier substation, the Murphy Substation, and take a look from outside the fencing (C).

13238 Mulberry Dr, Whittier, CA 90602

Now, before the electricity reaches the substation, it usually travels over longer distances through power lines on steel transmission towers. At this point the power lines carry electricity with high voltage which can be very dangerous if touched.

Stop and Think: Power poles by your home are often made out of a different type of material than the larger towers that you might see elsewhere. Why do you think people have used different materials?

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Finally we see where it all begins, at a power plant. There are many different ways to generate power, for example, coal, wind, solar, and nuclear, all of which need a lot of space to work which is why moving electricity quickly and efficiently across the power grid is so important to keep our homes running.

One power plant that is close to Whittier is the Puente Hills Power Plant located on 2800 Workman Mill Road Whittier, CA

Also – have you ever seen solar panels on the roof of a home (like the one pictured on the left)? What do you think they do? Are they using or producing electricity? How would they fit into your map of an electrical grid?

Now – can you draw a picture of the electrical grid?
Where does electricity get produced?
Where is it used?

If you liked this resource, and we hope you did, check out these places to learn more about the electrical grid:

- Here is a great video about power grids and another on solar panels from PBS
- Here is another video on energy from How Stuff Works

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