

Independence Generation Plan Summary

Fact Sheet: General Information on Generation and Electricity

What is a Generation Asset?



- Any device or combination of equipment and devices that produces an electrical output
 - For example: steam turbine generator, wind turbine generator, gas turbine generator, solar array, or a battery bank.

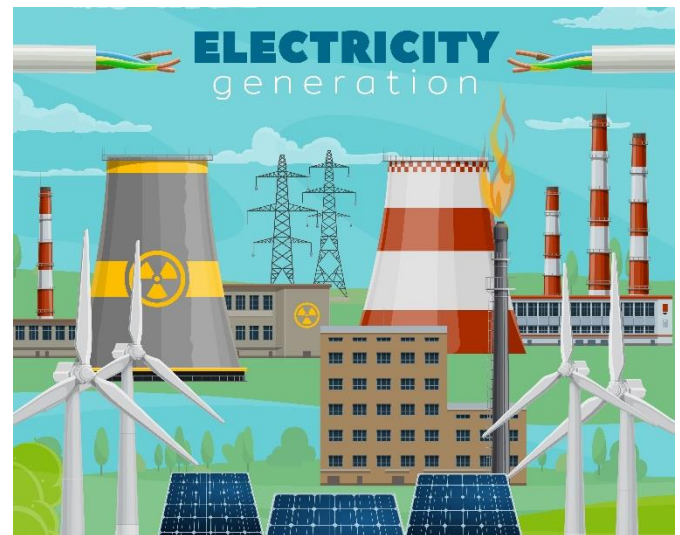
How Do We Generate the Electricity that is Used All Over?



- In general, there are different forms of power generation: fossil fuels, nuclear power, and renewables.
- The majority of electricity is generated by steam powered turbines.
 - The steam is created in a variety of different manners, burning of fossil fuels like coal or natural gas or through the fission process in nuclear reactors.
- Some turbines are gas powered, much like an airplane's jet turbine engine, that are directly coupled to an electric generator.
- All electrical energy (with the exception of battery and solar) is produced by the rotation of a generator which converts mechanical energy to electrical energy.
 - Utilities produce this energy within large power plants, often referred to as *generation stations*.



- IPL has a diverse electricity portfolio.
 - Our owned generation portfolio consists of coal, natural gas, fuel oil, wind, and solar.
 - Through SPP, we receive electricity from many different sources, and this will vary day-to-day.
 - The City of Independence doesn't own any nuclear or hydroelectricity but since it is part of SPP's membership portfolio, it is part of the collective pool of energy.



What is an Electric Generator?



- An electric generator makes electricity by using the effect a moving magnet has on a nearby coil of wire.
 - Magnetism in motion will cause electrons to move within the metal wire; this is electricity.
 - A magnet rotating within a coil of wire will create electricity that continuously reverses direction; this is called *alternating current*.

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Understanding Capacity



- *Full capacity* is known as the maximum amount of electricity that a given power plant can provide in a exact time and under specific conditions.
- *Accredited capacity* and *capacity rating* take into account how much a generating asset will run and how much output you can expect from it throughout the year.
- In order to guarantee a consistent supply of electricity to customers, operators of electric power system ask SPP members to produce and provide a certain amount of electricity at any given moment to meet electricity demand and balance it.
- Oftentimes a power plant will not generate electricity at full capacity every moment throughout the day.



What is Mechanical Energy?



- It is energy that is stored within a given object by tension and it is a type of potential energy (U.S. Energy Information Administration).
 - A rubber band that is stretched out is an example of mechanical energy.

What is Kinetic Energy?



- This type of energy is noted by motion of an object, whether it is vertical or horizontal motion (U.S. Energy Information Administration).
 - Electricity is an example of kinetic energy, involving the movement of electrons.



Additional Resources:



- **City of Independence**
 - indep.us/utilities
- **Our Electric System**
 - indep.us/pl/electsys
- **Electricity Generation**
 - <https://bit.ly/3fNkA3W>
- **Power Generation**
 - <https://bit.ly/3nO70BL>
- **Smart Grid Technologies**
 - <https://bit.ly/3BazJ9z>
- **Power Generation**
 - <https://bit.ly/3nO70BL>
- **Southwest Power Pool**
 - <https://bit.ly/3sMG3jM>