

## The Electricity Journey – From the Generator to You

When you flick the switch on your kettle to boil water for your cup of tea, do you ever think about how the electricity used to power it has reached your house?

Electricity supply is a complex system involving many different players which make sure the electricity generated in one place arrives at its destination without a hitch. To make this complex industry easier to understand, this fact sheet describes the four main sectors in more detail: generation, transmission, distribution and retail.

### Generation

The first step in the system involves generator companies creating electricity, also called power, from the energy of fossil fuels, wind, thermal, hydro or geothermal sources.

In New Zealand, there are a number of small generator companies and five large generator companies: Meridian Energy, Contact Energy, Genesis Power, Mighty River Power, Trust Power and Todd Energy.



**Transmission lines carry high-voltage electricity from the power plant to end users. Transformers reduce voltage so that electricity can be used by homes and businesses.**

Meridian Energy, Genesis Power and Mighty River Power are all state-owned enterprises (SOEs), which means that they are registered companies that are currently 100% owned by the government. The generator companies sell the power on the wholesale electricity market.

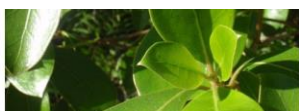


**Te Ahi o Maui will generate approximately 15 megawatts of electricity, which is enough to power 100,000 standard light bulbs.**

Each generator company is capable of producing a certain amount of electricity. It is expected the Te Ahi o Maui geothermal plant will produce approximately 15 megawatts of electricity (MWe), enough to power 100,000 standard light bulbs at any one time. The combination of all the electricity supplied by the different generator companies ensures New Zealanders have enough power to work, live and play.

### Transmission

An SOE called Transpower maintains and operates the 'National Grid', which is a network that connects the generators with towns and cities around the country. Transpower transfers this electricity via a network of subsea cables, and lines supported by poles or towers, that make up the National Grid. The National Grid is a spider web of approximately 12,000 kilometres of transmission lines that are carried by almost 42,000 supporting towers (also called pylons) and wood or concrete poles.



The transmission lines carry electricity from the generator plants to substations where the voltage is reduced. Voltage is a measurement of the strength of the electricity. For example, a car battery voltage is 12 volts.

The common voltage supplied to homes is between 110 and 240 volts. Electricity is transported through the National Grid at a high voltage and the voltage is reduced using transformers to supply energy to homes and businesses.

## Distribution

The electricity is delivered from the substations to 28 different distribution companies, also known as 'lines companies' or 'network companies', or to a few directly connected customers such as big industrial sites like the mills in Kawerau.

The distribution companies operate and maintain the lines that connect individual homes and businesses with the National Grid. The distribution network controls a variety of voltages to transport energy efficiently.

Horizon Energy Distribution Limited is the Eastern Bay of Plenty's sole distribution company. Horizon Energy distributes electricity to more than 23,000 consumers over approximately 2300km of transmission lines.



**Transmission lines distribute electricity from the power plant to homes and businesses.**

## Retail

Before retailers sell electricity to their customers, they must buy it from the wholesale market. The wholesale price of electricity is determined by the New Zealand Stock Exchange (NZX), which is contracted by the Electricity Authority to operate the electricity market.

The generators make an offer to sell a certain amount of electricity at a certain price and the retailers indicate the expected electricity demand. The NZX then matches supply and demand as well as determining price. This is done for every half hour of the day. The wholesale price is often called the 'spot price'. Spot prices can vary significantly across trading periods; for example, the prices are lower in summer when demand is less.

## Legislation - laws for the electricity market

A great deal of legislation has been put in place by the New Zealand government to protect New Zealanders every step of the way through the electricity market. Under the Electricity Industry Act 2010, the Electricity Authority was created to make and oversee the rules for the New Zealand electricity market. It keeps track of all companies in the market and ensures they all stick to the rules. The Commerce Commission keeps an eye on the distribution companies, who have no real competitors, to make sure that their prices are set according to the rules.

Now, the next time you make a cup of tea, you can really enjoy it knowing how much work has gone on behind the scenes to power your kettle!

## Questions? Please contact us

The Te Ahi o Maui Geothermal Project is a partnership between Eastland Group Ltd and Kawerau A8D Ahu Whenua Trust.

For more information:

Visit [www.taom.co.nz](http://www.taom.co.nz) or call 07 308 2574

