

## Build your own electricity distribution system

### Introduction

When an electric current passes through a wire some of the electrical energy is transformed into heat energy. This is a problem if you want to distribute electrical energy over long distances. The longer the wire, the more electrical energy is transformed into heat energy.

This heating effect depends on the size of the electrical current. Large currents cause more heating than small currents. It is therefore a good idea to keep the current as low as possible. However, if you want to distribute the same amount of power you will also need to raise the voltage. This can be done with a device called a step-up transformer. The process can be reversed with a step-down transformer, which lowers the voltage and raises the current.

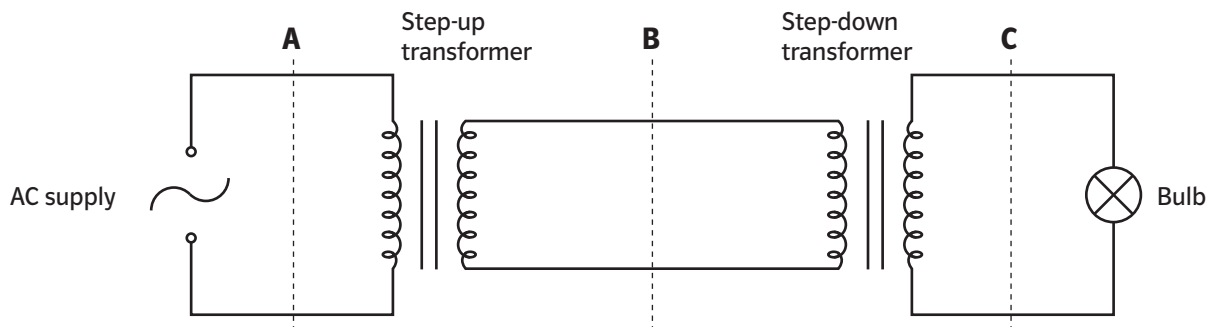
The instructions below will show you how to build your own model of an electricity distribution system.

### What you need

- Two small audio transformers
- A low voltage alternating current (AC) supply
- A voltmeter and ammeter
- Jumper leads and crocodile clips
- A small light bulb and holder

### Building the electricity distribution system

The diagram below shows how to put together the main parts of the distribution system. The most important thing to remember is that the transformers have to be installed the correct way round.



### Using the distribution system

Once your distribution system is ready to go, make sure your power supply is set at its lowest setting and then switch on.

Your teacher will recommend a safe voltage to use. This will depend on the transformers you are using. If you suspect the apparatus to be overheating switch your power supply off.

Measure the voltage and current at the positions marked A, B and C in the diagram above.

### Extension task

- Work out the electrical power at each of the positions marked A, B and C.
- What can you say about the level of power at each position?