# Environmental Impact

Energy Use in Devices

As of 2017, it is estimated that two billion computer systems are in use in the world. While one individual device may not need much energy to operate, two billion systems require vast amounts of electricity.

Some devices such as desktop PCs and consoles plug directly into mains electricity, and battery-powered devices such as smartphones need to be charged frequently.

Energy Use in Devices

"Mining" for the cryptocurrency is power-hungry, involving heavy computer calculations to verify transactions.

In February 2021, Cambridge University reported that mining Bitcoin uses more energy per year than many countries, including Argentina. In fact, if Bitcoin was a country it would be in the top 30 energy users worldwide.
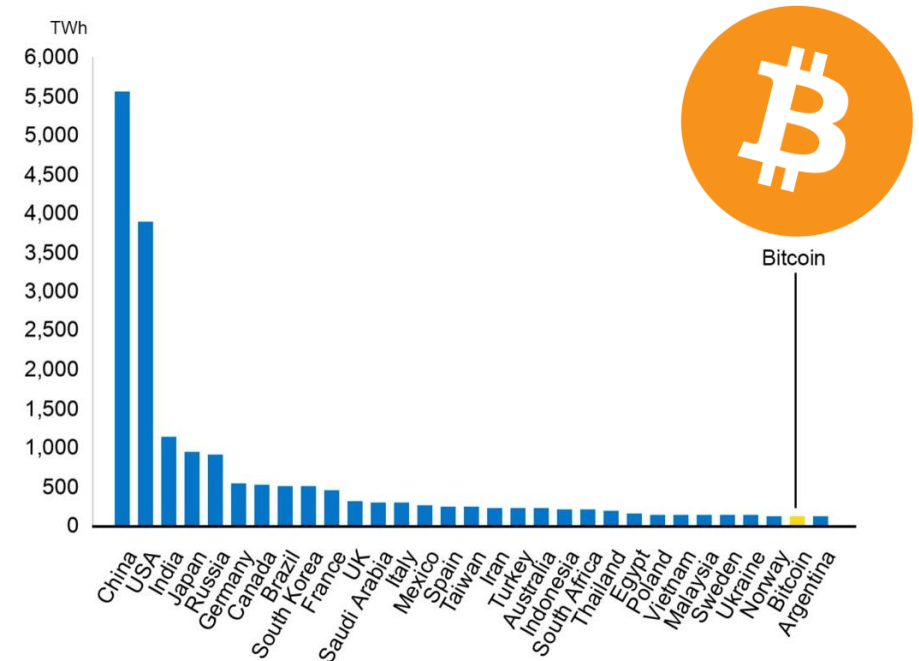
Energy Use in Devices

In general, the larger the computer system the more energy it will consume, i.e. desktop PCs use more energy than laptops, laptops more than tablets and tablets more than smartphones.

The main problem with the electricity being consumed by computers is that almost all of the world relies on the burning of fossil fuels to generate electricity. As a user, you should consider ways to reduce unnecessary energy use to reduce your carbon footprint.

Reducing Your Energy Consumption

There are a number of ways to reduce the amount of electricity a computer consumes. In National 5, the three areas to consider are:

1. Monitor settings
2. Power down options
3. Standby settings

Monitor Settings

There are many things you can do with your monitor to reduce power consumption, or extend the battery life of a mobile device before you have to charge it again:

- Reduce the brightness of the monitor
- Switch on low-power mode, which often reduces the number of background processes running

Monitor Settings

There are other things you can do with your monitor to reduce power consumption:

- Avoid using a screensaver instead of going in to standby mode, as screensavers use just as much energy
- Choose an energy efficient device, one that usually displays the energy efficient logo

Power Down Options

Devices, particularly PCs and laptops, include power settings to help users reduce unnecessary energy consumption.

Users can change these settings to:

- power down the monitor after a set period of inactivity
- power down the desktop or laptop after a set period of inactivity (see the Standby Options slides)
- control settings for individual components, for example turning off wi-fi and Bluetooth adapters, which constantly use energy to send and receive data, and scan for other devices to connect to.

Standby Options

Most PCs will offer standby settings within the settings to help reduce power consumption. The two main options are:

- sleep
- hibernate

At National 5 you should know the difference between sleep mode and hibernate.

Sleep Mode

Sleep mode can be set to activate after a period of inactivity, or can also be triggered using a button or by closing a laptop or tablet cover.

In sleep mode:
- the screen is put into standby mode
- hard disks and backing storage devices are powered down
- RAM continues to be powered unless the battery is low (in this case the computer will hibernate)

Sleep mode uses more power than hibernate, but allows the user to resume working quickly as data being used is still in RAM.

Hibernate

Hibernate can be triggered in the same way as sleep mode.

In hibernate:
- the screen is put into standby mode
- the contents of RAM are copied onto backing storage, then the whole system is powered down, including hard disks and backing storage devices

Hibernate uses less power than sleep mode, but it will take longer to start up again, as the system has to reload the previous state back into RAM so that you can resume where you left off.

Stand By or Power Off?

It is often better to use standby or hibernate settings instead of shutting a system down, as powering on a PC can cause a surge in power to components.

While modern computer components are more reliable, in general it is better to minimise the number of times components receive a surge in power.

For this reason, standby or hibernate is a better option if you are going to use the system again after a short period of inactivity.