

## **Factsheet - an introduction to climate change**

### **What is the greenhouse effect?**

The Earth's atmosphere is a layer of gases, commonly known as air, that is made mostly of nitrogen and oxygen. It also contains other gases, including those referred to as 'greenhouse gases'. Greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide and water vapour.

The sun's rays shine on our planet and warm the surface of the Earth. Heat then radiates from the surface. The greenhouse gases trap heat in the atmosphere. This is called the 'greenhouse effect'. It helps keep the planet warm enough for life to flourish. Human activities, such as burning fossil fuels, are increasing the concentrations of these greenhouse gases, particularly carbon dioxide, enhancing the 'greenhouse effect' and warming of the Earth.

'Fossil fuels' form naturally when decaying plants and animals become buried beneath layers of sediment and rock and over millions of years become coal, oil and natural gas. These 'fossil fuels' supply about 80 percent of the world's energy. They provide electricity, heat and transportation. They also feed into processes that create products such as steel and plastic.

The clearing of forest land has also contributed to the changes in the atmosphere. Trees absorb carbon dioxide when they grow and release it if they are cut down, burned or left to rot.

Carbon dioxide levels are now approaching one and a half times the levels prior to the industrial revolution around 200 years ago.

### **How much have global temperatures increased?**

The temperature of the air at the Earth's surface has risen rapidly, especially over the last 50 years. The global average surface temperature over the decade 2011-2020 was the hottest since modern records began.

It is currently increasing by around 0.2°C per decade and has increased by more than 1°C since the second half of the 19th century. This is a large change for the planet as the natural environment is sensitive to changes of only a few degrees Celsius. For example, during the last Ice Age the global average surface temperature was only 4–9°C colder than temperatures today.

Some areas are getting warmer much faster than others. Land areas warm more quickly than the oceans, and large areas of the Arctic are warming 2 to 3 times faster than the rest of the planet.

Scientists have considered a host of factors that can affect the global temperature, including natural changes such as the strength of the sun or volcanic eruptions. They have concluded that the recent increase in global temperatures are due to human actions.

### **What is climate change?**

Climate change refers to a shift in average weather conditions, such as temperature, humidity, rainfall, cloudiness and wind patterns. This includes changes in frequency and severity of extreme weather events.

The Earth's climate has changed throughout its history, in cycles over very long periods of time. This is a natural process.

Today we tend to use the phrase 'climate change' to refer to the very rapid changes in the climate over the past 150 years. The scientific evidence is clear that these changes are not because of long-term natural climate cycles. Instead, their main cause is global warming and the human activities that cause it.

### **What impacts of climate change are we already seeing globally and locally?**

Climate change has profound implications for people and the natural world. Impacts of climate change that are already been seen globally and in Jersey include:

#### **➤ Changes in temperature**

##### *Globally*

- Average global temperatures have risen by more than 1°C since the 1850s
- The warmest six years have all been since 2015, with 2016, 2019 and 2020 being the top three
- 2020 was the warmest year on record for Europe
- Higher average temperatures mean heatwaves are now more frequent and hotter. The increased temperatures also make events such as the recent bushfires in Australia and California more likely and more intense.

##### *Locally*

- The warmest year on record was 2014, with 2020 being the 2nd
- The highest maximum air temperature recorded during 2019 was 35.7°C on 23 July, the second hottest day in Jersey since records began
- The lowest minimum air temperature recorded during 2019 was 0.0°C on 31 January and 3 February

#### **➤ Increased rainfall**

##### *Globally*

- Many parts of the world are getting wetter as the global temperature rises.
- Warmer air holds more water, making heavier downpours more likely as temperatures have increased.
- This increased heavy rainfall can lead to increased flooding.

#### *Locally*

- In Jersey, 2020 was the wettest since records began in 1894, with a total of 1178.4mm of rain.

### ➤ **Changes in the availability of food and freshwater**

#### *Globally*

- Changing weather patterns have affected crop yields – the quantity of crops from an area.
- In some areas of the world climate change has helped yields go up. But overall climate change is reducing crop yields.
- Climate change is disrupting weather patterns, leading to unpredictable water availability, water shortages, contaminating water supplies and soil erosion.
- Rain is more likely to fall in heavy bursts which runs off the land quickly.

#### *Locally*

- More extreme weather events could disrupt Jersey's access to and increase the cost of imported food.
- The agricultural industry may be impacted by increased summer droughts. There will also be an increase in crop damage and soil erosion from storms and crop pests and disease in the warmer and wetter winters.
- In the summer 2019, Jersey experienced a drought (15 consecutive days without rain). The island has limited underground water reserves and no links to external water networks. It relies on rainfall for most of the mains water supplied and is therefore vulnerable to periods of drought.
- Demand for water is expected to increase to 24 million litres a day by 2045. Demand is likely to exceed supply by 8.2 million litres a day during severe drought conditions.

### ➤ **Rising sea levels**

#### *Globally*

- When water heats up, it expands to take up more volume. So, when oceans heat up, they expand too.
- Melting ice sheets and glaciers on land create extra water flowing into the oceans.
- The global average sea level has risen by around 25cm since 1880, with about a third of that in the last 25 years.
- The increasing frequency and intensity of storms and the associated storm surges (the rise in sea water level that occurs during intense storms), means that

existing coastal defences will be used more frequently. This will result in increased flooding and coastal erosion.

- As many cities are in low-lying coastal regions around the world, large populations will be affected.

#### *Locally*

- In line with global averages, the sea level around Jersey is currently increasing by 3mm per year.
- Jersey has suffered extreme events (storm surge combined with high tide) in the past, in particular 2008 and 2014.
- As an island jurisdiction with an increasing population, the impact of sea level rise will be significant. This will affect housing, infrastructure, agriculture and the natural landscape.
- Work has started on increasing the sea defences in the lowest lying areas of the Island such as St Aubin's bay and Havre des Pas.

### ➤ **Loss of biodiversity and nature**

#### *Globally*

- Studies suggest 20-30% of species are at risk of extinction by 2070 if temperatures continue to rise at the current rate.
- In the ocean, the increase in water temperature and uptake of carbon dioxide from the atmosphere is putting pressure on ocean life.
- Live coral has recently declined by up to 50% in the Great Barrier Reef

#### *Locally*

- Jersey is home to beautiful landscapes and iconic species such as the red squirrel.
- Climate change poses risks to our natural environment as species may struggle to adapt to the changing conditions.

### **Limiting global warming to well below 2°C, preferably to 1.5°C**

In 2015, 196 countries adopted a legally binding international treaty on climate change to limit global warming to well below 2°C, preferably to 1.5°C.

Limiting global warming to 1.5°C, rather than 2°C, would reduce the frequency and intensity of extreme weather, reduce the number of people exposed to extreme heatwaves, reduce the impacts on ecosystems, and reduce the risks around food and water security.

The only way to limit temperature rise to well below 2°C is to rapidly reduce greenhouse gas emissions. To meet this target, human-caused carbon dioxide emissions produced will need to be balanced by emissions taken out of the atmosphere, known as carbon neutrality.

**Read more on climate change:**

What is climate change?

- From the Met Office <https://www.metoffice.gov.uk/weather/climate-change/what-is-climate-change>
- From the BBC <https://www.bbc.com/news/science-environment-24021772>
- From [www.gov.je](http://www.gov.je)  
<https://www.gov.je/news/2018/pages/climateprogressvideo.aspx>

Frequently asked questions on climate change

- <https://www.imperial.ac.uk/grantham/publications/climate-change-faqs/>

Why does climate change need to be limited to 1.5C?

- A guide for teachers from the Intergovernmental Panel on Climate Change  
[https://www.ipcc.ch/site/assets/uploads/sites/2/2018/12/ST1.5\\_OCE\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2018/12/ST1.5_OCE_LR.pdf)