



6°C - 18 kph wind

go **green**
small change, big impact



Climate science

Science of climate change is clear

Over the past few years concerns have been raised about the reliability of the science behind climate change. This has not been helped by poor communication between some scientists and inaccurate reporting in some of the media.

However, despite the concerns the basic science remains certain. The climate is changing and we need to reduce our emissions now.

There are four important facts widely acknowledged as such by scientists and those who are more sceptical of the importance of climate change.

First, the greenhouse effect exists and is essential for maintaining life. Greenhouse gases in the atmosphere trap energy (heat) radiated back out from the Earth into space, and this makes the planet about 33°C warmer than it would otherwise be. Without the greenhouse gases the Earth's average temperature would be around 18°C below freezing.

Second, carbon dioxide is the most

significant of the greenhouse gases. Water vapour is also an essential part of the warming story, but its presence in the atmosphere is mainly because of the rise in temperature caused by the longer-lasting greenhouse gases, such as CO₂.

Third, the level of CO₂ in the atmosphere is increasing rapidly and has done so since the industrial revolution of the 1800s. The level of increase has been even faster since the middle of the last century.

The 'concentration' in the atmosphere of this important greenhouse gas is about 39% higher now than it was at the beginning of the industrial revolution. Fourth, the increase in CO₂ is being driven by increased use of coal, oil and gas, collectively known as fossil fuels. We know this because CO₂ from fossil fuels has a unique finger print compared with CO₂ from more 'natural' processes. Without question, the increase we have witnessed in the past century has been from our burning of fossil fuels.

Bringing all this together paints a very



Burning fossil fuels is one of the main drivers of rising CO₂ emissions

clear picture:

- The greenhouse effect exists and keeps the earth's temperature higher than it would otherwise be;
- the most important greenhouse gas in the atmosphere is carbon dioxide;
- CO₂ emissions are rising rapidly;
- this rise is due to our burning of fossil fuels.

Now, if the rise in emissions was small and much slower than we're experiencing, there would be little reason for concern. But this is

not the case. Emissions of all greenhouse gases are already high and are rising at an alarming rate. So where does this leave us? Although some scientific uncertainties remain, the main message is absolutely clear: unless we take urgent action to dramatically reduce emissions, future generations will suffer the consequences of our carbon-intensive behaviour.

■ **Professor Kevin Anderson is research director at the Tyndall Centre for Climate Change**