Climate change and the built environment

Flooding in Texas. © Shutterstock.

Wildfires in Greece. © Shutterstock.

The rise in temperatures around the globe is leading to extreme weather events with loss of life, migration from uninhabitable environments, adverse changes to animals and plants, food shortages, and potential conflicts over essential natural resources like water.

Even in a cool climate like Scotland, the effects are noticeable right now through increased rainfall, flooding and degradation of older buildings, but there are many places around the world that are suffering far more.

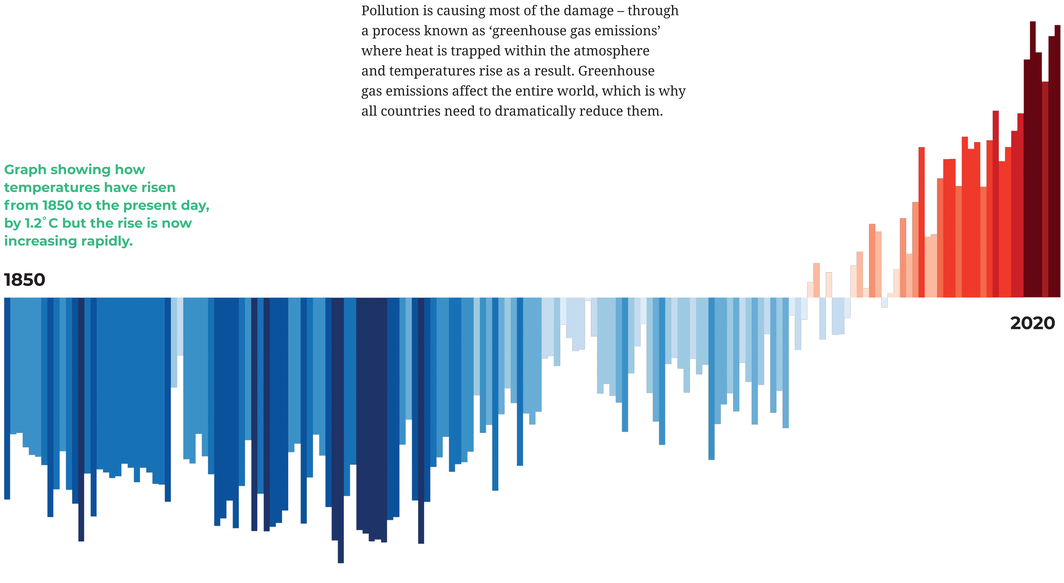
There is no doubt that climate change is caused by human activity, particularly industrialisation, which has been increasing in intensity for more than 200 years and is still accelerating.

Pollution is causing most of the damage – through a process known as 'greenhouse gas emissions' where heat is trapped within the atmosphere and temperatures rise as a result. Greenhouse gas emissions affect the entire world, which is why all countries need to dramatically reduce them.

Temperatures are rising quicker than ever before, and we now face a climate emergency. If we don't cut down our greenhouse gas emissions immediately, the world will be in serious trouble. The climate emergency is a bigger threat to a healthy future than Covid 19 and there is a real sense of urgency.

Like the rest of the planet, Edinburgh's climate is changing. It's getting warmer, rainfall patterns are changing, and weather extremes are becoming more frequent. Scotland's 10 warmest years on record have all occurred since 1997, with 2014 the hottest on record. You can see the warming trend clearly in the tracked average temperatures since the late 1800s.

Graph showing how temperatures have risen from 1850 to the present day, by 1.2˚C but the rise is now increasing rapidly.



The canal at Fountainbridge, where regeneration is well advanced. © Jon Barnes.

The densely occupied Old Town near Waverley Station. © Jon Barnes.

Why is the built environment so important?

Greenhouse gas emissions come from numerous activities such as food production and air travel, but buildings and transport are by far the largest sources – a staggering 40% of the total.

In Scotland, this applies to everyday things such as energy consumption for heating, lighting, and equipment, but it also includes construction processes and materials, building maintenance and travel.

We already know many of the things we can do to cut down these emissions. Architects, engineers, builders, researchers, and many others have the expertise, so it is now vital to translate theory into practice by implementing wide-ranging changes across both our existing and new buildings, our towns and our cities, including Edinburgh.

The reductions we need to make are very substantial, but the examples shown at SpACE show that they are not only possible but will also result in a better-designed, cleaner, more pleasant built environment.

What is carbon?

There are many greenhouse gas emissions but by far the largest is carbon-dioxide, known as CO2 or ‘carbon’ for short. Carbon emissions come from burning fossil fuels like coal, oil and gas.

In the UK we don’t use as much coal as we once did, but the use of oil and gas in buildings, vehicles and industrial production is vast. Carbon is relatively easy to measure, so by focusing on carbon reduction we are, in effect, reducing most greenhouse gases at the same time.

What is meant by net-zero carbon?

The climate emergency is so serious that policymakers have agreed on various methods of reducing carbon emissions to zero, but this is near-impossible in the short term. Instead, by electrifying buildings and vehicles and making them much more efficient, carbon emissions can be reduced substantially, and the remainder can be ‘offset’. This results in net zero carbon, which is a more significant commitment than what is sometimes called carbon neutral.

Offsetting is the process of compensating for the carbon emissions you produce by investing in schemes which save emissions elsewhere. This could be anything, from paying for adequate waste treatment projects in the majority world to ensure they aren’t left to emit large amounts of methane, to planting vast forests which can absorb excess carbon.

As a result, government and council policies are called ‘net’ zero carbon rather than actual zero and it seems likely that offsetting schemes will be necessary for several years. But offsetting is difficult and limited in scope and we can’t use it as an excuse to avoid the changes required to save very large amounts of carbon.

Princes Street with electric tram. © Rab Bennetts.