



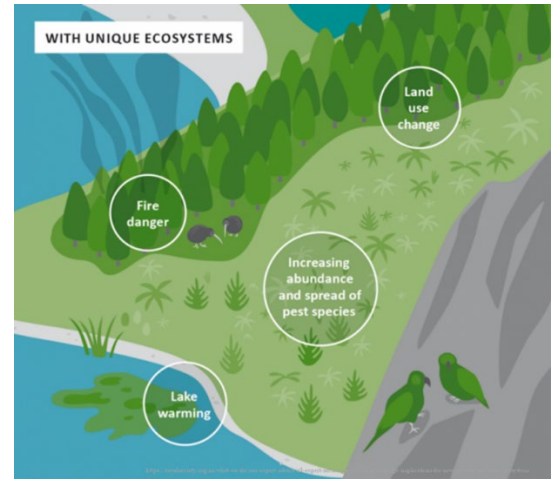
Climate change effects ecosystems

New Zealand, like the rest of the world, is likely to experience climate shifts, and many endemic (that are not found anywhere else) species, already under threat, may face extinction, as they are unable to adapt to the rapid changes in their habitats.

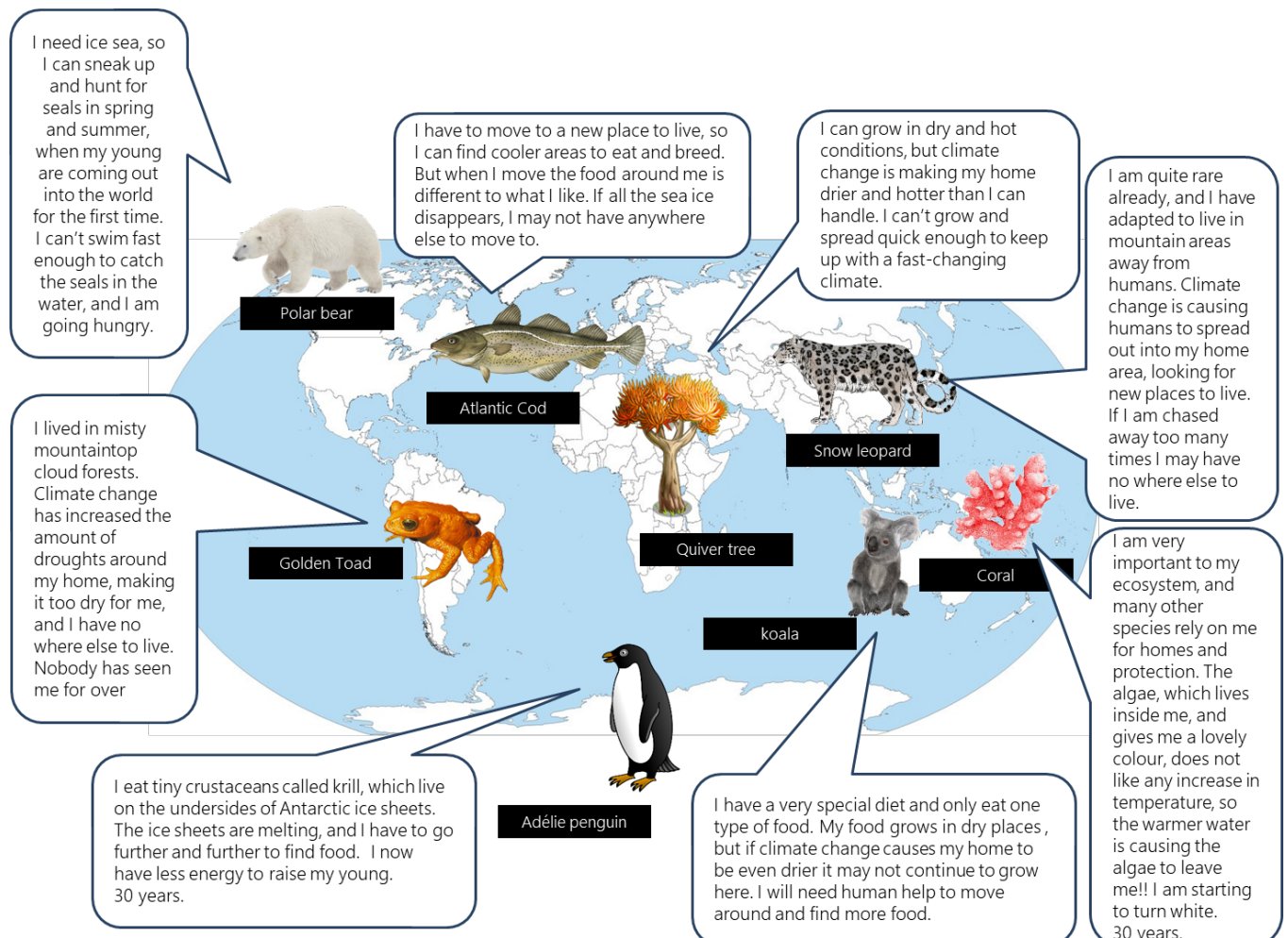
In NZ, we are likely to see ecosystem damage, habitat shifts for plant and animal species, and an earlier start of spring plant growth, migration, and mating events.

Pest species may travel into new areas and threaten our endemic species.

Human populations may have to move into areas that endemic species live.

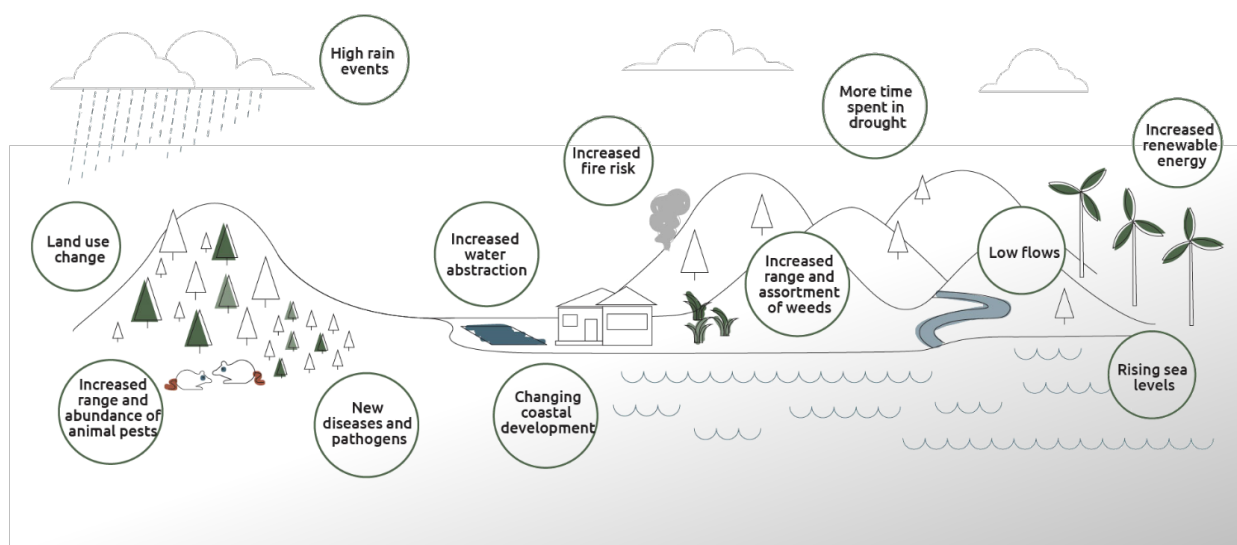


Our World is changing

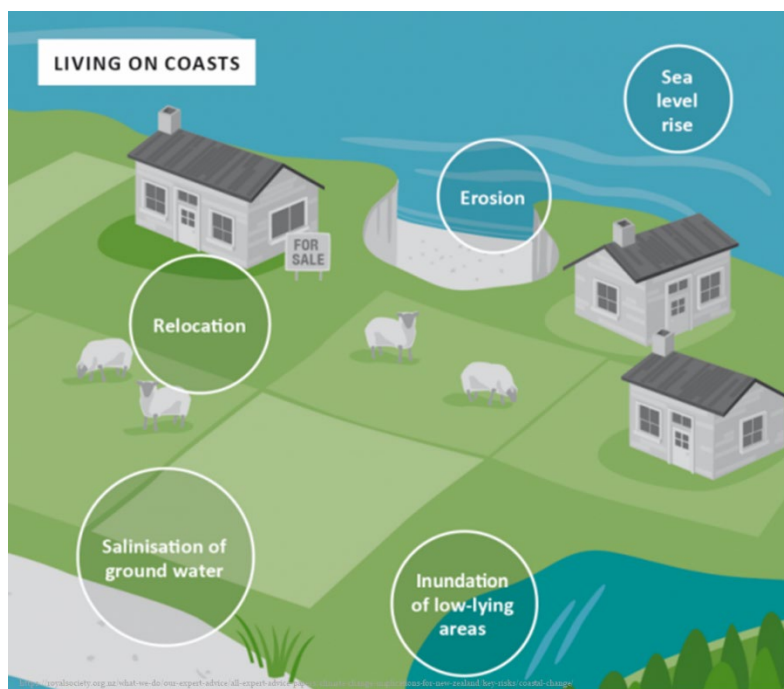


Climate change effects human communities

Climate change will affect the way we produce our food, manage our land and water resources, as well as have an impact on the infrastructure (buildings and structures built for our use) that we rely on in our rural and urban communities.



New Zealand is an Island, and many of our human communities are close to the coast. Those communities are likely to experience multiple effects due to climate change.



Some communities may have to relocate further away from the coast. Barriers may have to be built to keep the water away from the towns.

Farms may have to move away from areas no longer suitable to grow food, and we may have to change the ways that we farm.

Climate Change Adaptation Strategies

Adaptation helps us respond to future problems created by climate change. Every area, and population will face different changes in temperature, rainfall, sea level rise, and other factors. By starting projects to help solve immediate problems and making plans for possible future predicted issues before they arise, we can help humans and other living things cope better with the changes.

New Zealand has already begun planning for adaptation, that will help us avoid, live with, move away from, and protect against climate change impact.

Examples of adaptation strategies include habitat protection, migration corridors between alternative habitats, and coastal planting. Preparation for more frequent extreme weather events could include relocating vital town resources such as power and water supplies to safer sites, building flood barriers, and running drills in response to possible future scenarios. Implementing adaptation strategies in New Zealand will involve working in partnership with iwi / hapū, and making the best use of local knowledge and Mātauranga Māori, to create feasible projects.



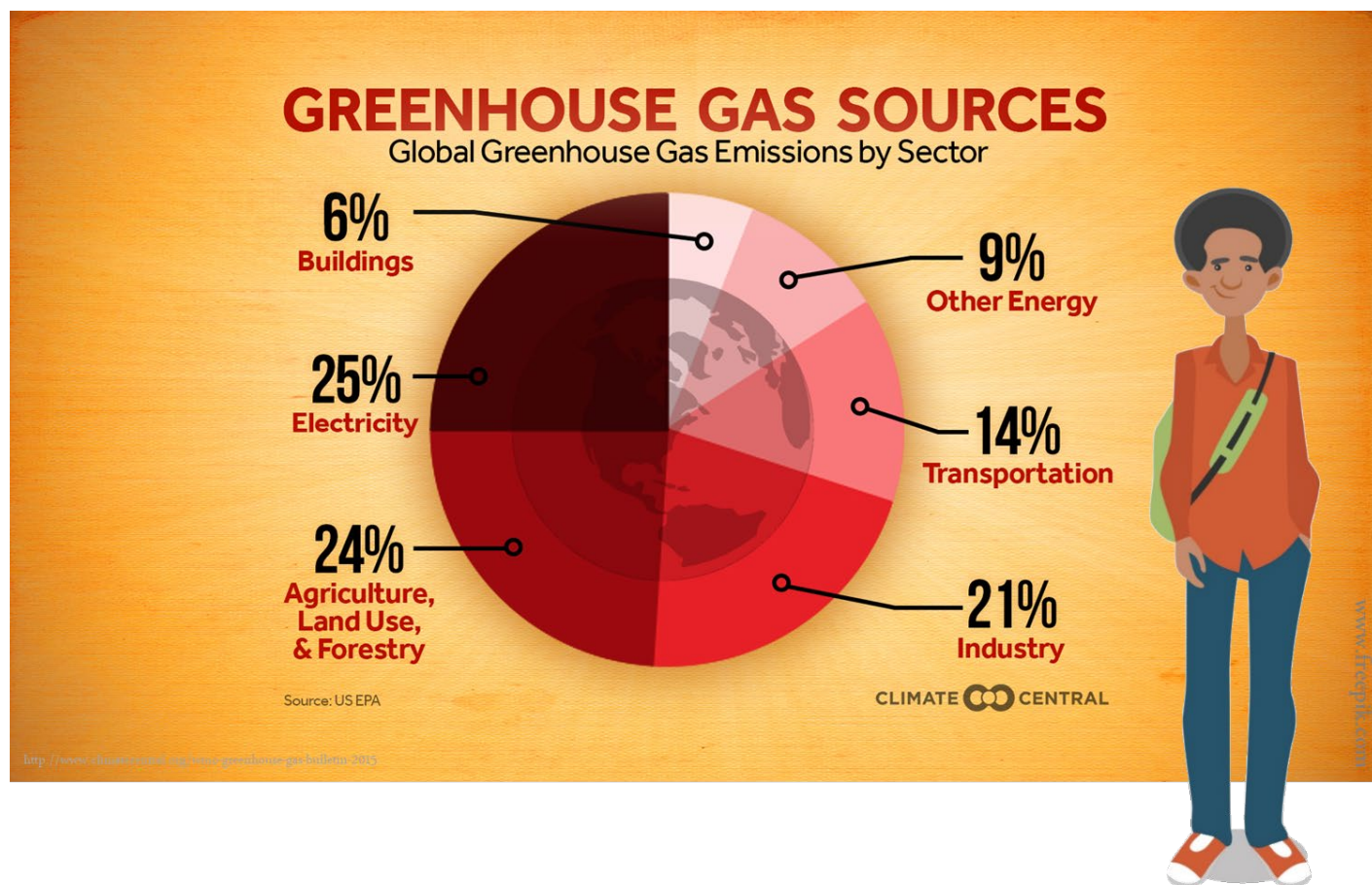
Climate Change Mitigation

Adaptation can help us adjust better to the negative consequences of climate change, but does not prevent the underlying reasons why climate change is occurring.

Mitigation focuses on limiting or controlling the factors contributing to climate change. Mitigation projects can be started by countries, businesses, and individuals. These actions can reduce or prevent carbon dioxide emissions, the main cause of climate change, and this can include limiting energy use, developing alternative low carbon fuel, or sequestering (storing away) CO₂, either natural methods or designing new technology.

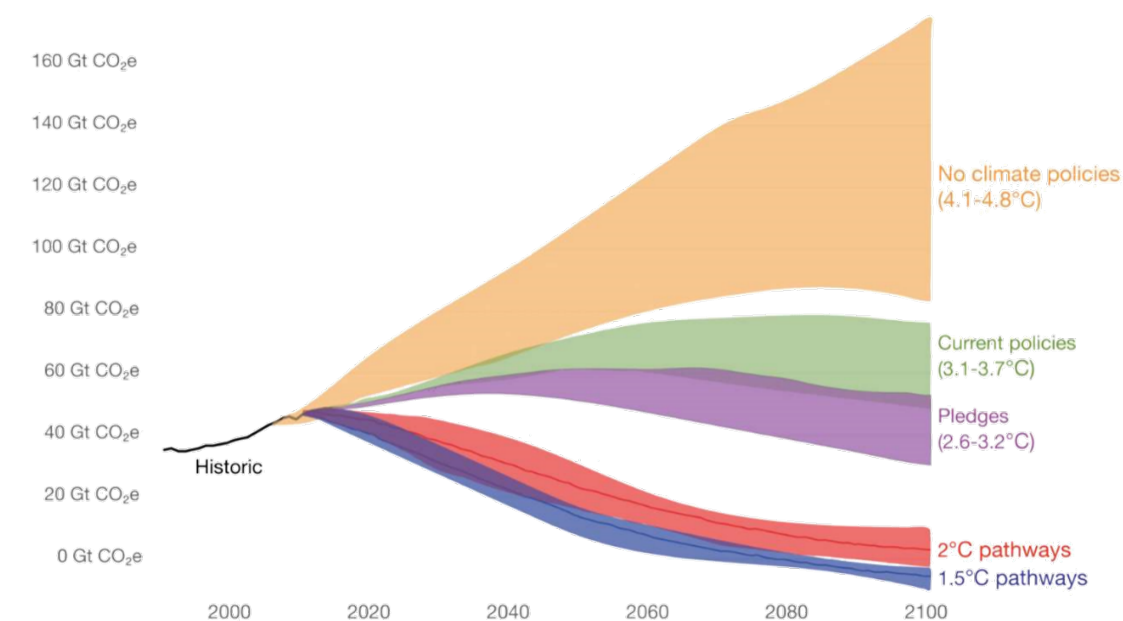


Who produces the CO₂ anyway?



Possible Emissions in the future

The amount of carbon dioxide released in the future, and the resulting global temperature increase, is based on what mitigation steps we take in the very near future. To keep the temperature rise under 2°C, we will need to develop technology to remove CO₂ from the atmosphere



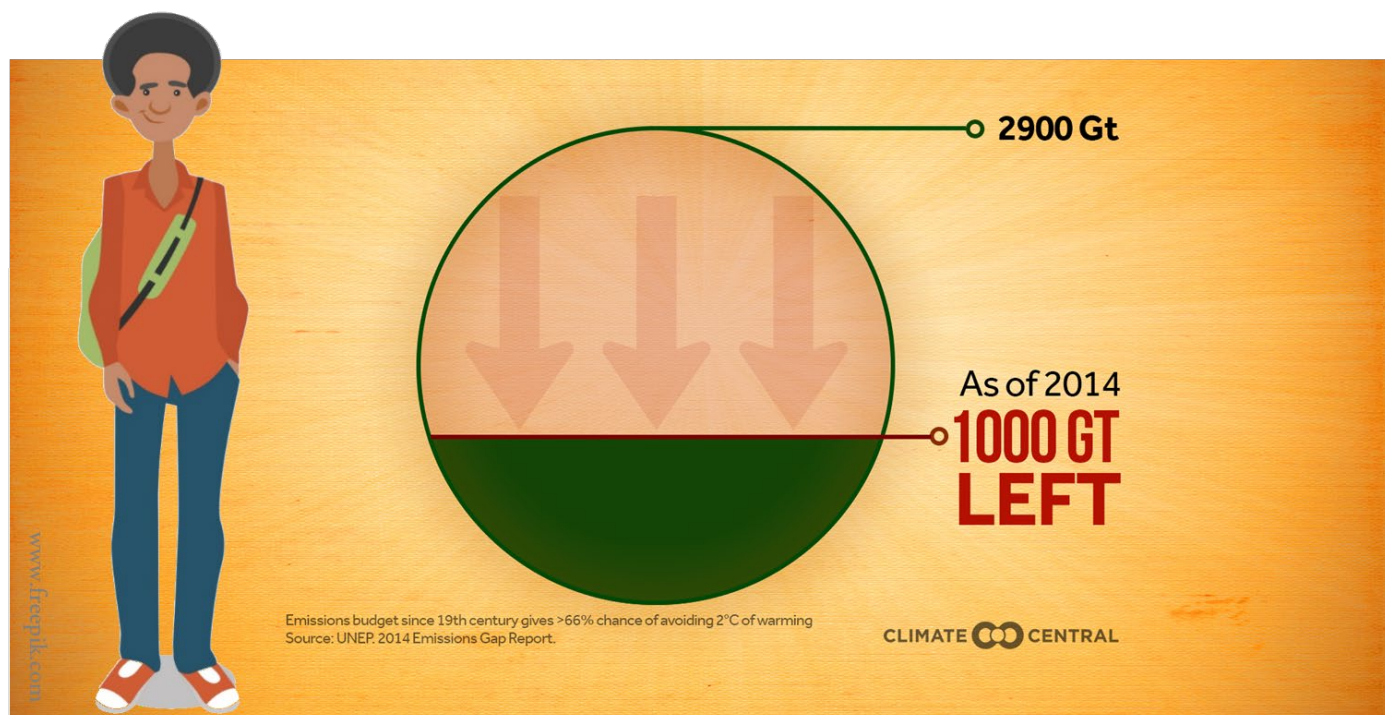
Based on data from the Climate Action Tracker (CAT).
The data visualization is available at OurWorldInData.org. There you find research and more visualizations on this topic.

<https://ourplanet.com/global-warming-future-greenhouse-gas-emission-scenarios/global-future-greenhouse-gas-emission-scenarios/>
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What is the World doing about Climate change?

In 1997, most of the World's governments met together to agree on *the Kyoto Protocol* in 1997, and to reduce the amount of greenhouse gases they released by at least 5% by 2012.

In 2015 most governments (194 countries, including new Zealand) signed the *Paris Climate Agreement*, to reduce their greenhouse gases released so that the global temperature would remain below 2°C rise (above pre-industrial levels)

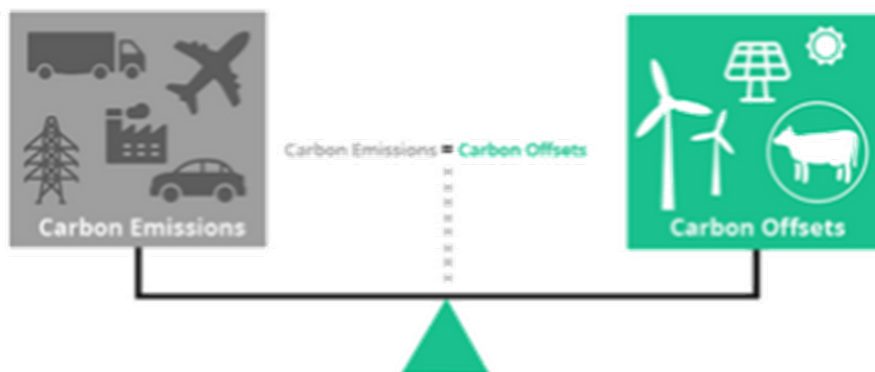


What are carbon credits?

Carbon credits are given to 'developed' countries when they reduce their greenhouse gases (GHG). They are 'traded' away if they produce more GHG than agreed. They can be earned if they reduce GHG, or pay for a project in a 'developing' country to reduce their GHG, called 'carbon-offset programmes'

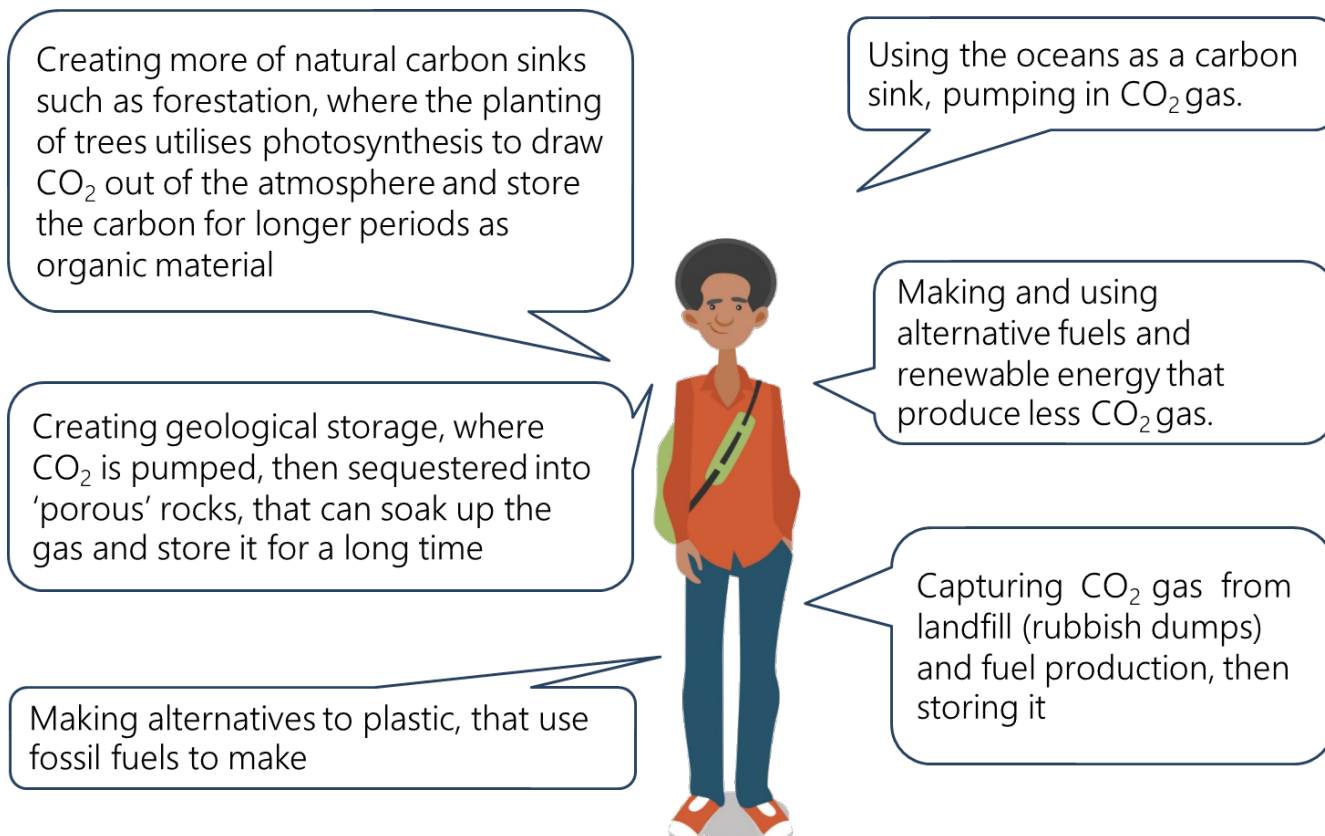
How a Carbon Offset works.

1 CO₂ Offset = 1 Metric Ton of Carbon Dioxide Reductions



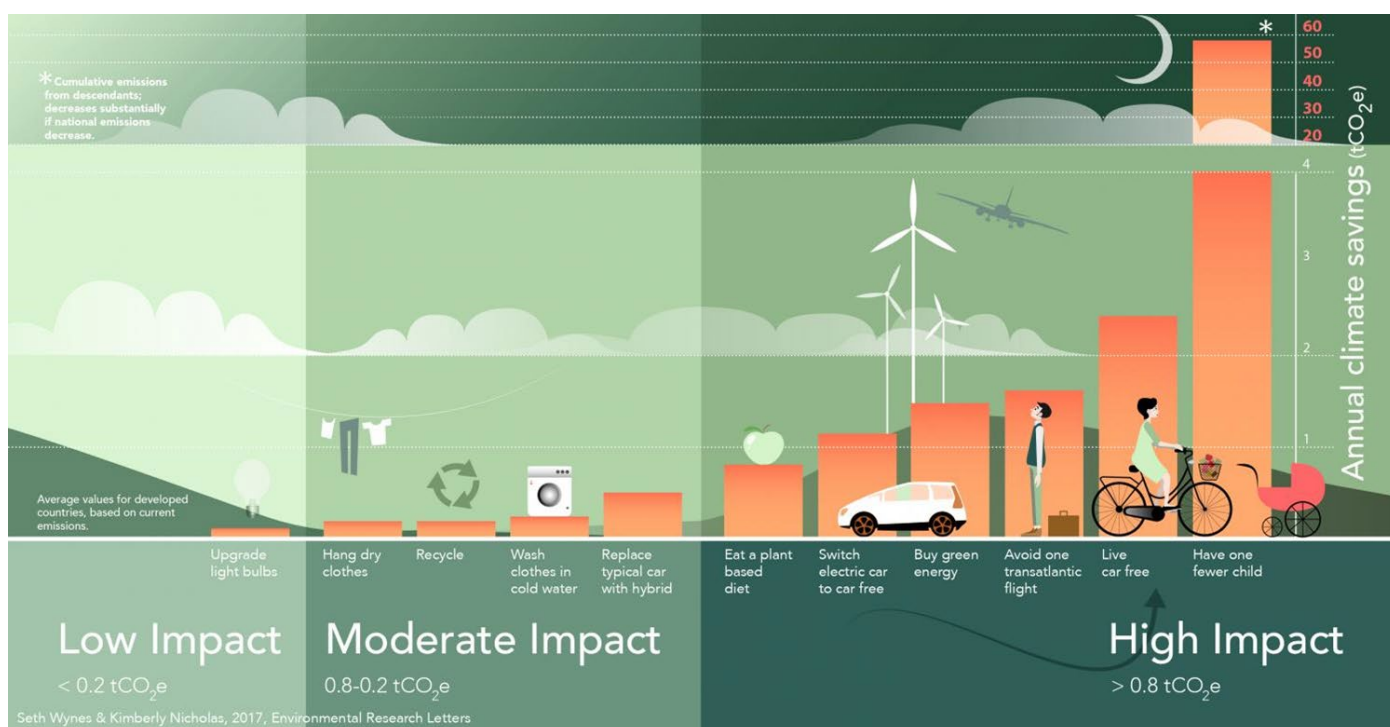
<https://www.indianart.com/proddetail/carbon-offsetting-18990545150.html>

Mitigation to reduce greenhouse gases



What is a carbon footprint?

Industry and individuals have a role to play in mitigation by reducing their *carbon footprint*, the amount of CO₂ emitted each year during production or daily life. Individuals can contribute by reducing their own carbon footprint, in small ways such as tree planting, reducing the energy used in their homes, switching to alternative fuels in their vehicles, or becoming involved in community projects. All of these small ways add up to a big help!



Summing up Climate Change

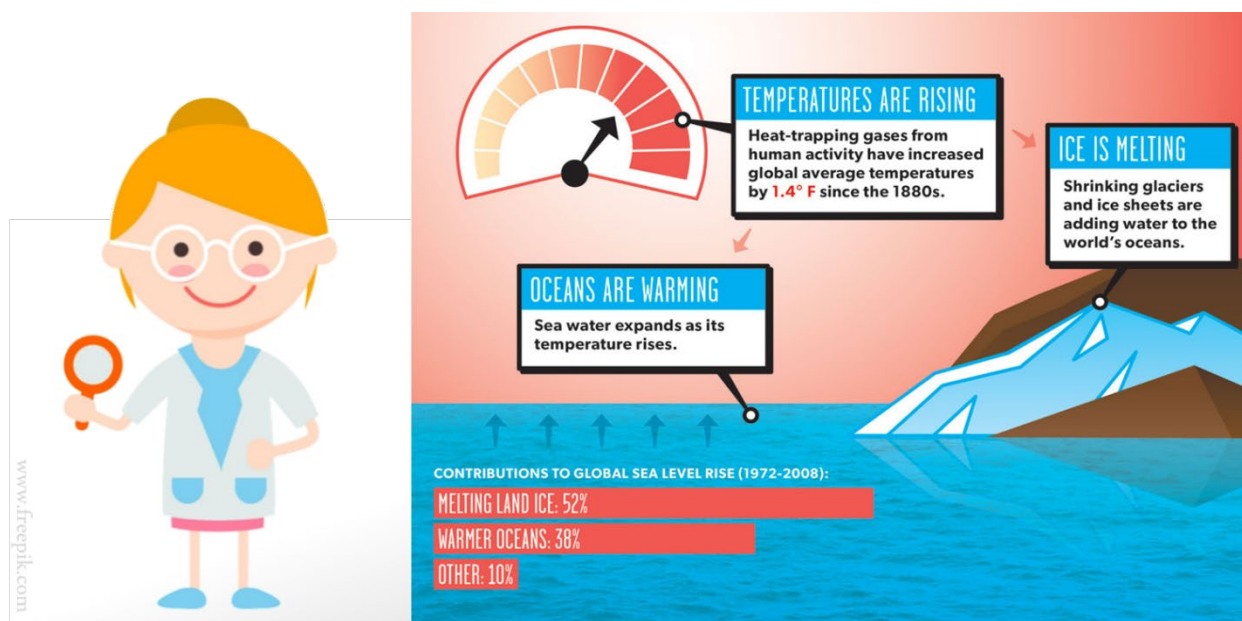
Almost all scientists now agree that human activity, producing CO₂ and other greenhouse gases, have changed the energy balance of the Earth, increasing the average temperature of the Earth, and this is permanently altering the climate around the globe. There is more carbon moving from other reservoirs of the carbon cycle into the atmosphere, than out of it, increasing the CO₂ concentration.

Observations, data and computer now predict more accurately that temperature rise, sea level rise, and an increase of extreme weather events are due to climate change.



The main reason for increasing CO₂ in the atmosphere is the combustion (burning) of fossil fuels for industry, transportation, and energy (electricity mainly) generation.

The greenhouse effect, due from CO₂ and other greenhouse gases, traps heat energy (originally light energy from the Sun), leading to a temperature increase on the Earth's surface. Increasing temperature is accelerating the melting of the cryosphere (frozen water on the Earth), causing the global sea level to rise.



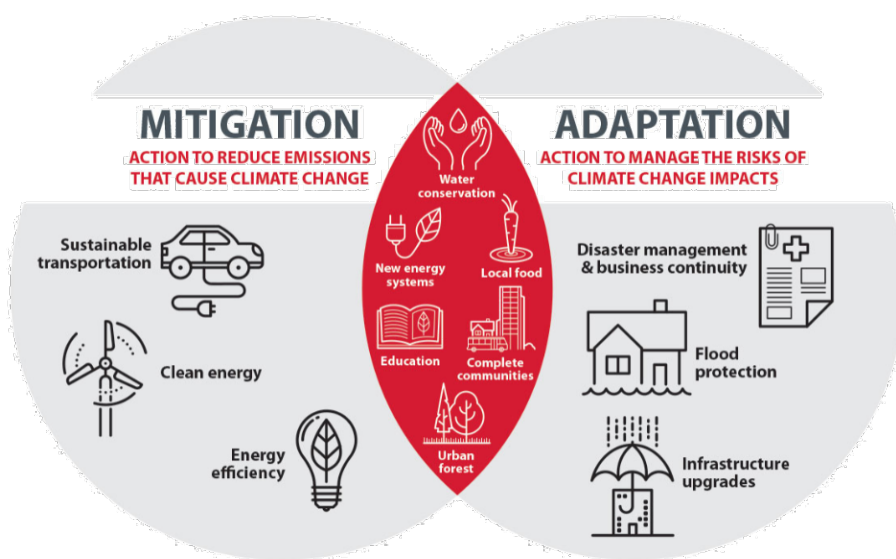
The average temperature in the polar regions is rising quicker than the rest of the planet, partly due to *albedo* reduction, as darker ground under the ice becomes exposed by the melting snow and ice.

In addition, oceans are acting as a major sink of anthropogenic (human-made) CO₂, and becoming acidified.

Governments, industry, and individuals are planning and initiating climate change *adaptation* projects to reduce projected harm to humans and ecosystems. Like many countries, New Zealand is also likely to experience a many consequences, and we must work with our communities to find the most appropriate solutions

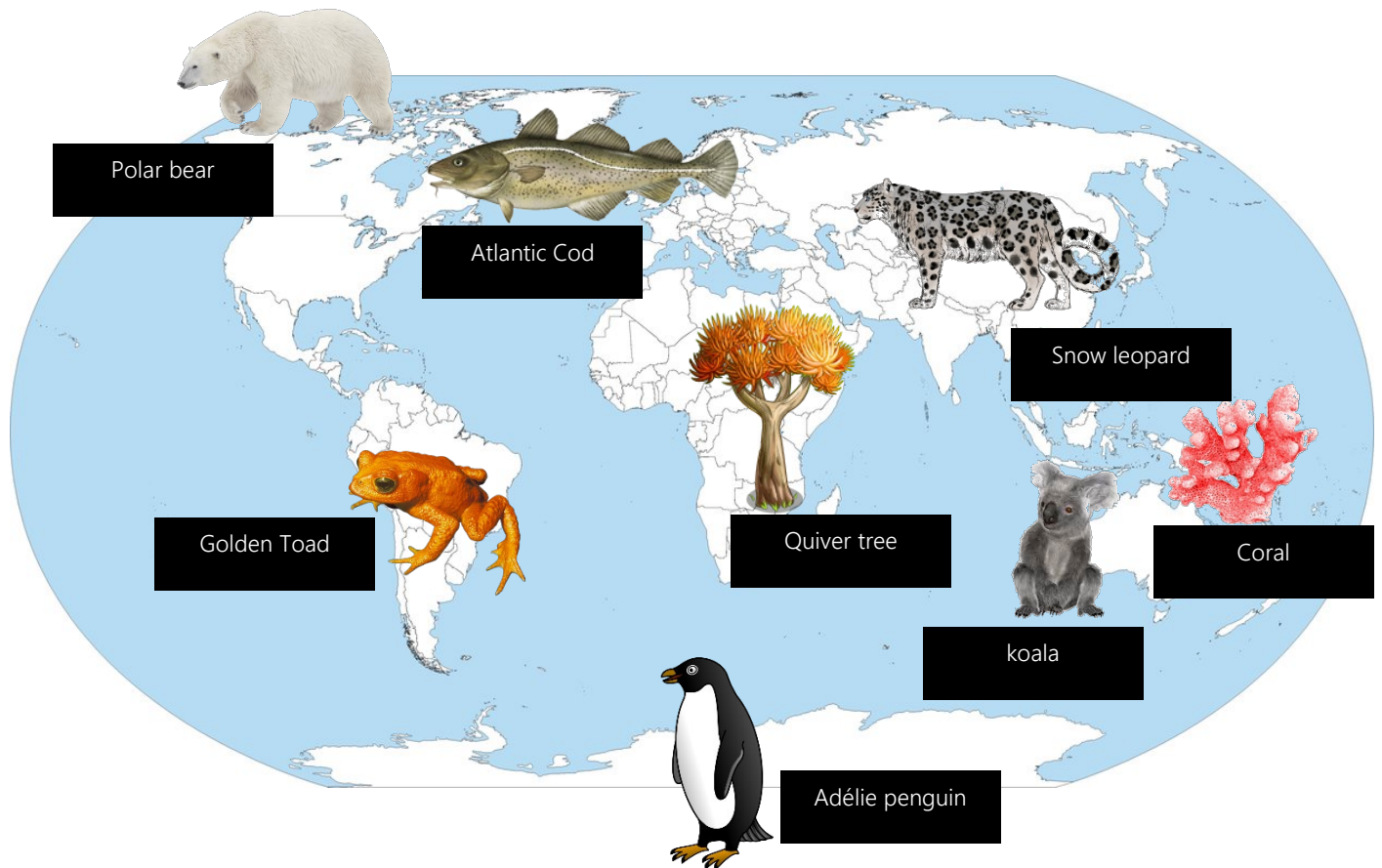


Because current levels of human-made CO₂ will continue to cause a rise in global temperature, mitigation effects are required to reduce greenhouse gas emissions, Guidelines have been signed by many countries to help reduce greenhouse gas emissions, and therefore temperature increases.





1. Hear our stories about how Climate change is affecting our homes, and guess who we are



Our stories	Who am I?
I eat tiny crustaceans called krill, which live on the undersides of Antarctic ice sheets. The ice sheets are melting, and I have to go further and further to find food. I now have less energy to raise my young.	
I can grow in dry and hot conditions, but climate change is making my home drier and hotter than I can handle. I can't grow and spread quick enough to keep up with a fast-changing climate.	
I need ice sea, so I can sneak up and hunt for seals in spring and summer, when my young are coming out into the world for the first time. I can't swim fast enough to catch the seals in the water, and I am going hungry.	
I am very important to my ecosystem, and many other species rely on me for homes and protection. The algae, which lives inside me, and gives me a lovely colour, does not like any increase in temperature, so the warmer water is causing the algae to leave me!! I am starting to turn white.	
I have to move to a new place to live, so I can find cooler areas to eat and breed. But when I move the food around me is different to what I like. If all the sea ice disappears, I may not have anywhere else to move to.	
I lived in misty mountaintop cloud forests. Climate change has increased the amount of droughts around my home, making it too dry for me, and I have no where else to live. Nobody has seen me for over 30 years.	
I have a very special diet and only eat one type of food. My food grows in dry places , but if climate change causes my home to be even drier it may not continue to grow here. I will need human help to move around and find more food.	
I am quite rare already, and I have adapted to live in mountain areas away from humans. Climate change is causing humans to spread out into my home area, looking for new places to live. If I am chased away too many times I may have no where else to live.	