



Wood is the world's most renewable raw material. For this reason forests and the wood they provide are vital in the fight against climate change. As the effects of global warming impact on our environment, the use of renewable and sustainable building materials has never been so important.

The stages of the wood story – planting and renewal, growth, harvesting and use – are part of a renewable cycle that takes and stores carbon dioxide from the atmosphere, making wood a better-than-carbon-neutral building material.

## **Wood is the only construction material which has absorbed CO<sub>2</sub> from the atmosphere when produced, not emitted more**

During its production, one tonne of:

- Concrete – has released 159 kilos of CO<sub>2</sub> into the atmosphere
- Steel – has released 1.24 tonnes of CO<sub>2</sub> into the atmosphere
- Aluminium – has released 9.3 tonnes of CO<sub>2</sub> into the atmosphere
- Wood, however, has absorbed a net 1.7 tonnes of CO<sub>2</sub> from the atmosphere, over and above the energy expended in growing, harvesting and processing.

## **The more timber you use in a house, the more CO<sub>2</sub> you remove from the atmosphere**

- It takes around 20 trees to build an average house frame
- A steel house frame has added 4.5 tonnes of CO<sub>2</sub> to the atmosphere
- A wooden house frame has absorbed 9.5 tonnes of CO<sub>2</sub> from the atmosphere
- Choosing timber options for an average house can take around 20 tonnes net of CO<sub>2</sub> out of the atmosphere (saving the equivalent of 150 trips Auckland to Wellington, or 7.1 years of car use)
- Using alternative materials (concrete, steel, brick and aluminium) can add 24 tonnes net CO<sub>2</sub> to the atmosphere (costing the equivalent of 180 trips Auckland to Wellington, or 8.6 years of car use).

Using wood is something we can all do to help the environment. By demanding and using more sustainably produced wood, we can ensure that more trees will be planted and more carbon dioxide will be absorbed from the atmosphere.

The result is a better world for ourselves, our families and future generations. It's simple.

**Wood. Our most renewable raw material.**

**[www.nzwood.co.nz](http://www.nzwood.co.nz)**

# New Zealand's Greenhouse Gas Inventory

## The Carbon Cycle

Planting trees begins a cycle that continuously removes, releases and reabsorbs greenhouse gases such as carbon dioxide. As trees grow, they absorb carbon dioxide through the process of photosynthesis.

The carbon dioxide absorbed by the growing forest remains stored within the wood products used throughout the lifetime of the building structure or product.

When a structure or product reaches the end of its lifetime, the carbon dioxide is released back into the atmosphere as the wood decays or is burnt as fuel.

Wood can be recycled to extend its lifetime and slow down the natural release of carbon dioxide back into the atmosphere. Once the carbon dioxide is released, it is available to be re-absorbed by growing trees.

When wood materials decay or are burnt as fuel they release carbon dioxide that was absorbed during the growth of the trees and are therefore carbon neutral.

## New Zealand's Greenhouse Gas Inventory – Key Points

In 2013, New Zealand's total emissions were 81.0 million tonnes of carbon dioxide (Mt CO<sub>2</sub>-e). Total emissions for New Zealand are now an estimated 14.2 Mt CO<sub>2</sub>-e higher than in 1990 when emissions totalled 66.7 Mt CO<sub>2</sub>-e.

26.8 Mt CO<sub>2</sub>-e was removed from the atmosphere through the land use, land use change and forestry sector (LULUCF), therefore bringing New Zealand's net emissions to 54.2 Mt CO<sub>2</sub>-e in 2013. It is estimated that forestry land was responsible for removing 33.7 Mt CO<sub>2</sub>-e (net) in 2013, an increase in removals of 3.5 Mt CO<sub>2</sub>-e since 1990.

Agriculture continued to be the biggest contributor to New Zealand's Greenhouse Gas emissions with 49% (39.2 Mt CO<sub>2</sub>-e) of all emissions coming from this sector, while the energy sector was responsible for 39% (31.7 Mt CO<sub>2</sub>-e). Both the waste and industrial processes and product use sectors contributed 6% of the emissions (5.1 Mt CO<sub>2</sub>-e).

New Zealand contributes 0.15% to global emissions, which is 17.21Mt CO<sub>2</sub>-e per person - a high rate for a developed country.

**Source:** Snapshot April 2015 Info 735, New Zealand's Greenhouse Gas Inventory 1990-2013 (MfE)

## Offsetting biological emissions from livestock using a Radiata pine plantation

	Tonnes of CO <sub>2</sub> -e per year from 100 animals	Hectares of new plantation added every 20 years to offset biological emissions
Sheep	38	1.2
Beef	179	5.7
Dairy	273	8.7

**Source:** Climate change and agriculture: Understanding the biological greenhouse gases, Parliamentary Commissioner for the Environment, October 2016

# How New Zealand's Plantation Forests Remove Carbon from the Atmosphere

## How is carbon removed from the atmosphere by New Zealand's forests?

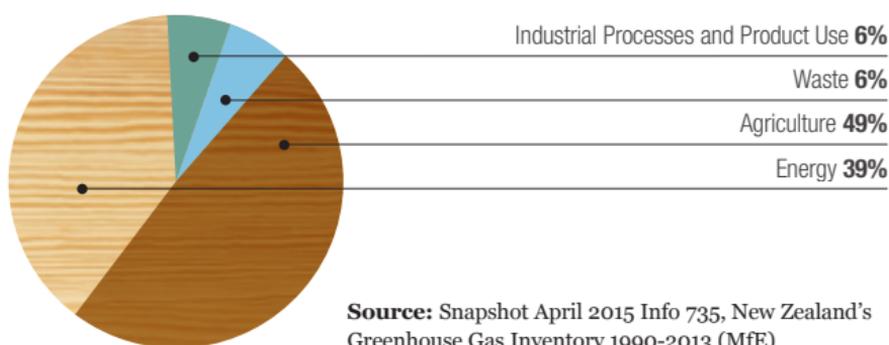
Forests act as carbon sinks – a type of reservoir that removes and stores more carbon from the atmosphere than it releases. Trees use carbon dioxide (CO<sub>2</sub>) as part of their 'breathing' cycle – taking in CO<sub>2</sub> and storing it within roots, trunks and branches – and releasing oxygen.

The amount of CO<sub>2</sub> a forest removes depends on the species grown and place in its growing cycle. A young forest will remove smaller amounts of CO<sub>2</sub> until the trees establish and enter a growing phase – this is when forests will remove the most carbon. As a forest ages and its growing process slows, it will revert to absorbing less carbon again.

At harvesting, the forest ceases to be a carbon sink but instead of releasing all the carbon it has stored, the harvested wood retains some of it. All wood products store carbon that will eventually be released, however the rate at which that carbon is released depends on the type of product and the type of treatment the wood has undergone. Studies are still being conducted into these release rates.

The amount of carbon removed by New Zealand's forests is therefore dependent on the coverage of forestland, the age of the trees and the rate of harvest. In 2013, the net amount of carbon removed by the LULUCF sector was 26.8 Mt CO<sub>2</sub>-e. This number takes into account the approximately 8,500 hectares of forest that was lost in 2013.

## Emissions by Sector As at April 2015



New Zealand plantations and their soils lock up

# 454 MILLION

tonnes of carbon, which is equivalent to 17 days of global fossil fuel emissions.

**Source:** Scion and MfE