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# The Paris Agreement: What it means for the New Zealand economy.

4 February 2016

- New Zealand has agreed to reduce its greenhouse gas emissions as part of a new global agreement. The proposed target is to reduce emissions by 30% below 2005 levels by 2030.
- New Zealand's target is likely to be met mostly by emitting businesses buying surplus carbon emissions units from forest-owners or from other businesses that have gained units by reducing global emissions.
- The carbon price will need to reflect the true cost of reducing global emissions to encourage behaviour change among emitters and households in New Zealand and overseas.
- The exclusion of agriculture, the country's biggest emitter, from emissions obligations will pass the financial burden of emissions onto other businesses and households.

This report by the Westpac Economics Team explains New Zealand's recent approach to climate change commitments and evaluates the economic efficiency of that approach.

On 12 December 2015, nearly 200 nations and territories concluded the Paris Agreement. The Agreement aimed to reduce greenhouse gas emissions, which are blamed for climate change. New Zealand's proposed headline target is to reduce post-2020 greenhouse gas emissions to 30% below 2005 levels by 2030.

Some believe that the opportunities for New Zealand's emitters to reduce their emissions are nevertheless limited.

This means emitting businesses here will need to purchase surplus carbon units from other businesses or the government to meet their emissions obligations. In New Zealand, emissions targets will likely be met through forestry, which generates carbon units by sequestering carbon, and by buying units from other businesses, whether local or international, that have generated surplus units through reducing emissions.

An economically efficient system to limit climate change requires two things. First, a framework will need to be in place to ensure that carbon units traded internationally represent a genuine reduction in global emissions. Units associated with genuinely lower emissions will carry a commensurate price that will likely lead to behaviour change by emitters and households.

Second, the framework would need to efficiently distribute the cost of meeting emissions targets across polluters. The Government has stated that agriculture, which produces nearly half of this country's emissions, will continue to be excluded from financial obligations because it does not believe there are currently cost-effective ways for the sector to reduce its emissions.

This exclusion passes the cost of agricultural emissions onto taxpayers and other businesses. It means either tighter targets for industries with emissions obligations (energy, landfills, industrial processes and forestry), so that agriculture can continue to emit, or that the Government has to purchase, at taxpayer expense, carbon units to pay for agriculture's emissions. This amounts to an implicit subsidy that will skew the New Zealand economy and land use toward agriculture.

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# History lesson: Earlier climate change frameworks

- New Zealand has operated under both a multilateral (Kyoto Protocol) and unilateral climate change framework in the last decade.
- Access to cheap overseas-originated offset carbon units rendered the first Kyoto Commitment Period (CP) less effective at changing emissions behaviour in New Zealand.
- New Zealand is currently operating a unilateral emissions reduction scheme. This has raised the price per unit, but it is too early to say whether it will encourage emissions behaviour change.

Climate change frameworks underpin an attempt to reduce greenhouse gas emissions blamed for climate change. They can be multilateral, such as the Kyoto Protocol ratified by New Zealand in 2002, or unilateral, such as New Zealand's approach for emissions produced between 2013 and 2020.

## Multilateral frameworks: Kyoto

In the multilateral Kyoto Protocol system, each participating country sets a target for emissions over a particular period, with the aim of reducing global emissions. For instance, in the first Kyoto CP, New Zealand agreed to cut total emissions to 1990 levels. New Zealand was allocated roughly 310 million Assigned Amount Units (AAUs) of emissions for the first CP of 2008 to 2012.

Businesses in countries participating in the Kyoto Protocol that emit CO<sub>2</sub>-equivalent units of pollution are liable to pay for their pollution by purchasing conceptual "carbon units". Businesses that counter emissions, such as forests that sequester carbon, or businesses that emit at a level lower than agreed earn surplus carbon units, which they may then sell. This system of emissions liabilities and assets allows for the trade of carbon units within countries or across borders, allowing the market to determine when, where and how global emissions will be reduced.

The idea of these frameworks is to reduce global emissions. It is less important where emissions are cut, as long as they are. For instance, some believe that the opportunities for New Zealand's emitters to reduce their emissions are limited. This means that under an international framework like Kyoto, New Zealand businesses would likely need to buy carbon units

from others, such as forest owners or businesses that have reduced their emissions.

Within the Kyoto Protocol context, this approach is perfectly acceptable. Somewhere in the world, net emissions would fall. Theoretically, a market mechanism would ensure that emissions would fall most where it is most cost-effective to reduce emissions through less industrial activity or through planting forests. New Zealand emitters could purchase these surplus units. But because emitters would have to purchase units, this would create a cost that they would have to bear or pass on to their customers, incentivising consumers and businesses to change their behaviour.

In New Zealand, the units that can be earned or purchased are called NZUs, and the mechanism by which they are traded is the Emissions Trading Scheme (ETS). These NZUs can be bought either from businesses with surplus units (such as forest owners) at a price agreed on the private market, or at a capped price (currently \$25 a tonne) from the Government.

During the first CP, forestry businesses were required to surrender one NZU per tonne of emissions when deforesting, while other industries covered by the ETS were required to surrender one NZU per two tonnes of CO<sub>2</sub> equivalent emissions. This in effect set an upper bound of \$12.50 per tonne of emissions per non-forestry business that had obligations. The other half of emissions liabilities not paid for by emitters was effectively met by the New Zealand taxpayer.

While signed up to the first Kyoto CP, New Zealand businesses could also purchase international carbon units, commonly referred to as Kyoto units, from businesses with excess units in other countries.

## Marching to our own drum, 2013

While the Kyoto Protocol system continues to operate, New Zealand did not commit to a climate change target for the second Kyoto CP, which began in 2013. Instead, it independently announced an unconditional target of 5% below 1990 emissions levels by 2020. In other words, the commitment was a moderate additional reduction in emissions over the first CP.

Overseas-originated units could no longer be surrendered by New Zealand companies to meet emissions liabilities from mid-2015. This means that from mid-2015, only NZUs could be used to pay for emissions obligations.

## Industries included in the scheme

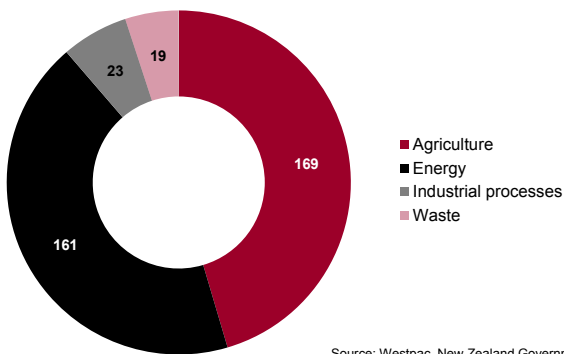
A limited number of industries in New Zealand were covered by the first Kyoto CP and the subsequent unilateral targets period.

Industries that currently have financial obligations in New Zealand to surrender NZUs for emissions (i.e. where a financial cost is imposed) include:

- The stationary energy sector (coal, gas and geothermal energy)
- Producers of iron or steel, aluminium, clinker or burnt lime, glass or gold.
- Landfills
- Forestry (where NZUs are surrendered for deforestation or gained for new planting).

## Agriculture, the largest polluter

Where net emissions came from, 2008-2012 (m tonnes)



Some Energy Intensive Trade Exposed (EITE) businesses that would struggle to pass on cost increases (perhaps because of imports not being subject to emissions costs) were gifted NZUs to ease the burden of transition.

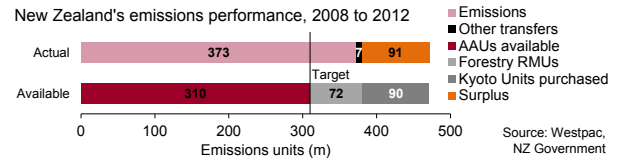
Crucially, the agriculture sector is not required to surrender NZUs although it must report emissions. Agriculture produced 45% of all emissions by industry in the 5 year period of the first CP, yet it had no direct financial obligations. This placed the financial burden of reducing emissions on the other half of emitters, and the costs of growing emissions from agriculture on the taxpayer.

## Have these schemes succeeded?

New Zealand did achieve a surplus in the first CP, whereby emissions were lower than the sum of allocated units available and offset units purchased. This surplus was the result of the purchase of large numbers of cheap overseas-originated Kyoto units, and offsets from forestry. As already highlighted, the purchase of overseas units in and of itself should not be seen as failure, as long as those units are associated with a genuine reduction in global emissions.

New Zealand produced 373 million tonnes of CO<sub>2</sub> equivalent emissions in the first Kyoto CP, from 2008 to 2012, or 63 million tonnes more than its AAUs allowed for. However, new forest planting offset nearly 72 million units, and New Zealand purchased 90 million units of Kyoto units. As a result, New Zealand met its commitments in the first CP, with AAUs called upon slightly below the allotment of 310 million.

## Emissions performance, first CP



During the first CP, New Zealand businesses were able to purchase either NZUs or overseas Kyoto Units. In 2011 and 2012, companies with obligations to surrender units for their emissions made a large-scale switch to internationally traded units. Overseas units were available at much lower prices – as low as 7c to 10c compared with market-traded NZUs that were sold at prices of between \$2 and \$7.

However, there were later suspicions that some overseas units were not the result of a genuine reduction in emissions in the source countries. These units were primarily in the form of Emissions Reduction Units (ERUs) purchased from the Ukraine and Russia. Huge numbers of these units, bought at low prices, were used by some New Zealand companies to meet their ETS obligations.

This access to overseas-originated units at bargain basement prices reduced the ability of the ETS to impose a cost on emissions sufficiently high as to drive behaviour change.

Further, the worldwide economic slowdown in 2008 created a surplus of ERUs in Europe as emitters were not producing as many emissions. As the European emissions trading scheme had no mechanism to limit supply in times of economic weakness, prices fell and emitters who were allowed to trade internationally benefitted from the soft prices.

The unilateral framework period that followed the first CP may yet prove to be somewhat more effective at changing behaviour. The most effective change has been the inability of New Zealand emitters to source offshore units. NZUs cost at least 20 times more although it is too early to know if this higher price will change behaviour significantly.

As discussed later, the price for units may rise. Although New Zealand's new emissions targets are not overly ambitious, higher prices for NZUs could push some emitters in competitive industries to target lower emissions.

# The future: Paris and the ETS review

- New Zealand has agreed to cut greenhouse gas emissions further as part of a new global agreement.
- A review of the current ETS is also being undertaken.
- The Government has stated that the agriculture sector will be excluded from the revised ETS, meaning the primary burden for emissions reduction will continue to fall on emitters responsible for the other half of emissions.
- To change emissions behaviour, a price that encourages behaviour change, and certainty that purchased carbon units are genuinely reducing global emissions will be needed.

The Paris Agreement was concluded on 12 December 2015 at a negotiation attended by around 200 countries. Crucially, countries involved included the United States and China, the world's two largest polluters, and non-participants in Kyoto Protocol-related target setting.

The broad aim of the Paris Agreement is to keep temperature rises to two degrees Celsius above the temperature at industrialisation, with a stated goal of achieving a target closer to 1.5 degrees Celsius.

Scientists have estimated that the targets proposed by attending nations would still imply a temperature rise of above two degrees. This means that for the Agreement to truly be a success, nations will need to continue to screw down their targets at each five-year target review.

## New Zealand's targets post-2020

Prior to the Paris negotiations, the New Zealand Government announced its proposed greenhouse gas reduction targets. An unconditional target to reduce emissions to 5% below 1990 levels by 2020 is already in place. Specific new targets were to:

- provisionally reduce post-2020 greenhouse gas emissions to 30% below 2005 levels by 2030
- conditionally target emissions 10-20% below 1990 levels by 2020, if there is a comprehensive global agreement
- reduce emissions to 50% below 1990 levels by 2050.

Despite there being a global agreement in Paris, it remains to be seen whether this will count as sufficiently comprehensive to warrant New Zealand committing to the tougher reductions of 10-20% below 1990 levels by 2020. At present this seems unlikely given the proposed targets set by other nations.

## How will it work?

The Government is currently reviewing the ETS, to put in place any changes before the 2020 end of the current unilateral emissions reduction period. However, the Government has made it clear that the agriculture sector will not be included in the ETS review or in a new scheme until technologies have developed that would make a significant reduction in agriculture emissions cost-effective.

Instead, the ETS review will consider:

- transitional measures that limited the initial impacts of the ETS (e.g. the two-for-one credit surrender allowance)
- how to improve the operation of the ETS
- any changes that may need to be made to the ETS to meet future emissions reduction targets.

Removing the two-for-one allowance would bring the private cost of emissions into line with the social cost, thus improving the allocation of resources in the economy. If EITE businesses are allocated twice as many units to offset this increased cost, their share of the emissions obligation will continue to be borne by the taxpayer.

A crucial question is whether or not the new commitment period to begin after 2020 will once again allow New Zealand emitters to purchase units from overseas. If they are allowed to purchase overseas, provisions will need to be made to ensure that the units purchased are associated with genuine reductions in global emissions.

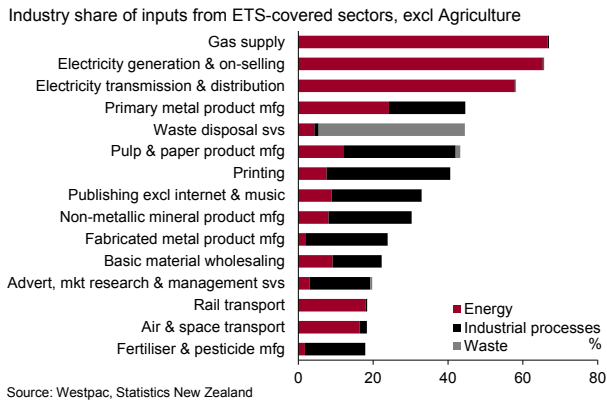
## How the burden flows through

Although only a few industries are covered directly by the ETS, it is expected that they will pass on emissions costs to other businesses and consumers, thus incentivising behaviour change.

To understand how any costs associated with emissions obligations may flow through the economy, we need to consider which industries are most strongly reliant on businesses with obligations. These reliant industries would be the ones that would bear the brunt of any cost pass-through.

Using input-output analysis, we estimate the proportion of intermediate inputs into each industry in New Zealand that comes from sectors covered under the ETS – energy, waste, and industrial processes. The industries currently most exposed to potential cost increases from ETS-covered sectors that provide inputs into their work are set out in the following figure.

## Industry inputs from ETS sectors, excl agri



Industries most affected by the ETS are primarily those directly engaged in mining, manufacturing, and energy production. Unsurprisingly, nearly 70% of inputs into the Gas supply sector are from within the Energy sector, mostly within Gas supply itself, for instance. A similar pattern is seen in electricity.

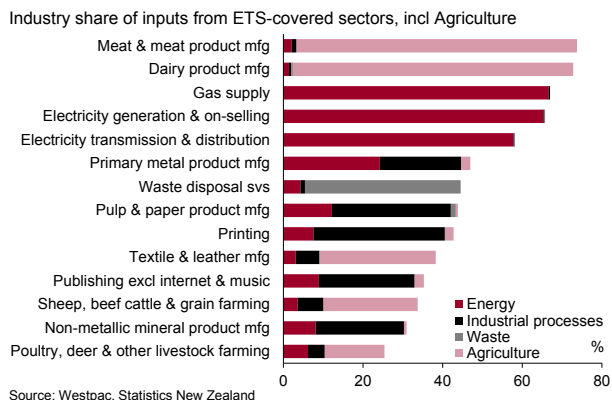
Other industries that use a lot of energy, or produce a lot of emissions through the industrial production process, include metal product manufacturing, pulp and paper, and non-metallic product manufacturing, such as bricks, glass and cement.

But even in an industry like Advertising, market research and management services, around 20% of inputs come from sectors covered by the ETS. A price rise for carbon units due to a supply shortage and/or better verification of international units would likely lead to price rises in Advertising. For instance, if carbon unit prices rise 5%, this would increase costs within Advertising by 1%, if all costs are passed through.

## The ruminant in the room

Yet as has already pointed out, agriculture produces nearly half of New Zealand's emissions, but is excluded from obligations under the ETS. If the ETS were to be expanded to include obligations for agriculture, this would radically change the mix of industries affected by the price of carbon.

## Industry inputs from ETS sectors, incl agri



Meat, dairy, and textile and leather manufacturing would go from being barely impacted at all, to being some of the most affected industries, due to the emissions impact of on-farm activity.

This highlights the skewing impact that exclusion of agriculture is having on New Zealand's proposed approach to dealing with climate change, a topic we explore more in the box on page 6 which examines the macroeconomic impacts of agriculture's exclusion.

## Can we reduce emissions?

There is a risk that New Zealand emissions will not fall as far as the targets we have set. In the first Kyoto CP, emissions exceeded the target by more than 20%, but forestry and offshore credits were available to offset these additional emissions.

If emissions do not fall sufficiently, we will again rely on forestry offsets, or will likely need access to overseas units. New Zealand may not have sufficient NZU reserves to meet our obligations on an ongoing basis without behaviour change, as we discuss later.

But there are a few changes underway that may help:

- **Further reduction in fossil fuel energy sources:** The Huntly coal generators are due to close, ending the era of large coal-fired power stations in New Zealand.
- **Switch to electric vehicles and public transport:** In recent years, New Zealand's major cities have seen a significant increase in public transport use, and estimates suggest that by 2030, 10%-20% of New Zealand's vehicle fleet will be electric. These changes will reduce emissions per capita.
- **Less discretionary travel:** Further changes in behaviour, facilitated by technology, are also reducing the need for travel in New Zealand. Online shopping, home delivery of groceries, and the use of the internet for services that used to require a visit to the city centre, all mean less driving and fewer emissions.

These last two points suggests that innovation and technology are already acting to reduce emissions within the products and services space. But beyond this, units will need to be priced in a way that incentivises further behaviour change among emitters and consumers.

# Keeping the barn door closed: The economic impact of agriculture's exclusion

The elephant in the room when it comes to New Zealand climate change policy is the Government's decision not to include agriculture in the ETS. Although the sector has some reporting obligations, and like all industries will face increased costs for inputs such as fuel, which is subject to the ETS, it doesn't face any direct costs from biological emissions produced on farm.

The Government's argument for not including agriculture in the ETS is twofold. Firstly, it contends that there are not yet cost effective ways of reducing emissions from agriculture, and secondly that it would be unfair to compel New Zealand farmers to pay for their emissions while the agriculture sectors in our trading partners don't. But the exclusion of the agriculture sector from the ETS allows it to avoid confronting the difficult choices it is going to have to make at some point in the future.

While the Government seems content to take the carrot approach, most recently announcing an additional \$20m of funding for the Global Research Alliance on Agricultural Greenhouse Gases, the addition of a stick to complement the carrot would likely result in a bigger inflow of resources to help find a solution. Instead, by announcing that the agriculture sector won't be included in the current review of the ETS, the likelihood of private capital flowing into research on agricultural emissions reductions has fallen. This will leave the Government likely to have to do more of the heavy lifting when it comes to funding research targeted at reducing carbon emissions from agriculture.

By favouring agriculture, which accounts for roughly half of New Zealand's carbon emissions, the rest of New Zealand's productive sector will shoulder agriculture's

share of the cost. At the same time, the farming sector is being further subsidised by centrally funding research to help reduce the sector's carbon emissions. One sector of the economy is benefitting in two ways, while other productive sectors in the New Zealand economy have to pay for emissions without the research support.

This skews the way resources are allocated in the economy. For example, an investor weighing up agriculture or some alternative that does face paying for its carbon emissions may find agriculture more attractive. Similarly, firms in the agriculture sector may be willing to pay more for the same inputs to production e.g. land, than firms operating in other industries. This skewing is likely both toward agriculture from other sectors, and within agriculture, toward dairy rather than sheep, as emissions on sheep farms are much lower than for cattle even adjusted for stocking rates.

At the same time, consumers are showing a willingness to pay a premium for organic or 'ethical' products. In this vein, New Zealand companies such as Fonterra have, for example, been encouraged to develop policies on clean waterways and use of palm kernel extract (PKE). Such policies add costs for farmers, but are also an increasingly important marketing tool. In a world where consumers are likely to become even more aware of the origin of their food and the environmental consequences of their consumption choices, bolstering agriculture's environmental credentials are likely to become progressively more important.

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# The risk of higher NZU prices

- The price of units may well rise because of tighter greenhouse gas targets after 2020, the potential scrapping of the two-for-one rule, an illiquid market, and limits on international units.
- Many forests are reaching harvest age. Forest owners will be required to surrender units at least in the short term, rather than being receivers of units due to carbon sequestration.
- As a result, fewer NZUs are likely to be available for purchase, particularly beyond 2020, which could impact the price of carbon in New Zealand if overseas units are not accessible.

It is unclear at this point whether the Paris Agreement will result in a mechanism that will allow New Zealand emitters to purchase overseas-originated units, and at what price. However, the big surplus of NZUs that New Zealand has experienced over the last several years is about to be increasingly drawn upon.

## An illiquid market

Forest owners have historically been loath to sell NZUs at the low prices that have characterised the New Zealand market, creating an illiquid market.

Forest owners are accumulating large numbers of NZUs from carbon sequestration. At present, estimates are of a surplus of around 140 million NZUs, much of it held by forest owners. However, with current prices for NZUs on the open market so low, businesses with a net surplus are unenthusiastic about bringing them to market.

This creates a challenge when emitters are required to surrender units to cover their emissions, in the absence of a mechanism that encourages holders of surplus units to bring them to market.

Emitters have the option of purchasing NZUs from the Government at \$25 each, but would prefer to pay a lower market rate. As the next surrender window approaches (March 2016), more forest owners will look for opportunities to sell excess units to emitters at a price above the current market price.

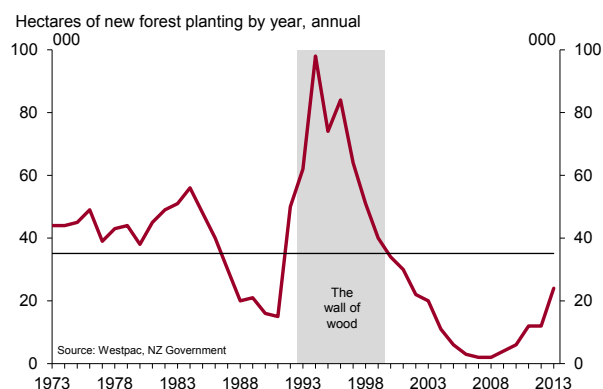
## The wall of wood

Both forests planted before and after 31 December 1989 are liable to surrender units if the right conditions are met. Forests planted before 1990 must pay deforestation liabilities unless they replant or have an exemption.

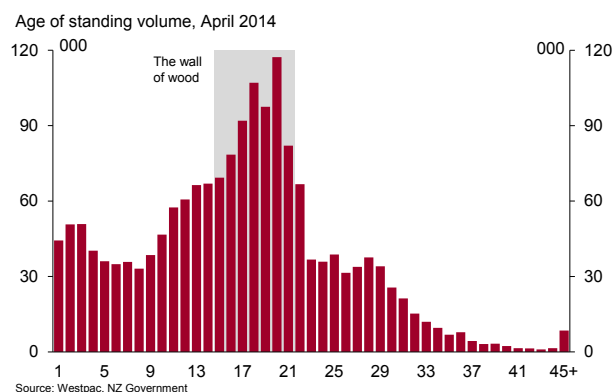
Post-1989 forests are required to surrender units when trees are harvested, not just if they are deforested permanently, if the forests are part of the ETS (participation of these forests is voluntary).

New Zealand has a large standing volume of post-1989 wood that is now reaching maturity – the so-called “wall of wood”. In the 7 years to 1999, approximately 67,600 hectares of forest were planted each year, almost double the 40-year average to 2013.

### Hectares of forest planted by year



### Age of our forests



Radiata pine is typically harvested at around 25 years of age. The 1993 plantings are now 22 years old, implying that within the next three years, it will be time to begin harvesting them.

As harvesting forest owners surrender NZUs, this will reduce the surplus of NZUs and thus the number of units available for sale to other emitters, potentially pushing up the price of NZUs.

Forest owners do not have to harvest at a particular time, so they can keep trees in the ground until a time that suits them better. However, forest owners will need to consider a number of factors in deciding if and when to harvest:

- expected trends in log prices
- the small quality and price gain from leaving the trees in the ground for longer versus cashflow
- the relative price and availability of NZUs and overseas-originated units when the time comes to harvest.

With log prices expected to fall and remain low due to weak Chinese demand, it is likely that forest owners will slow delivery of wood to the market if they can, to avoid a glut. However, there is only so long they can do this from a commercial perspective, especially if other land use options will generate larger profits.

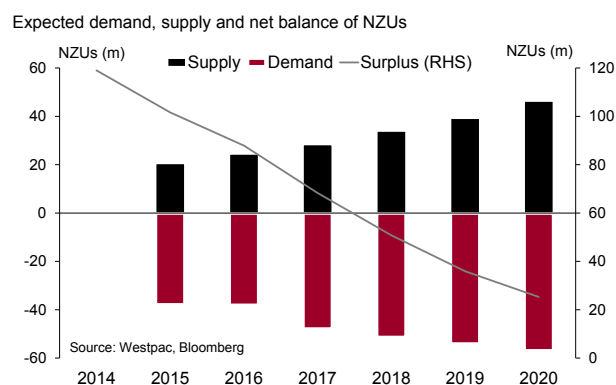
With agriculture excluded from financial obligations under the ETS, there will be an incentive for smaller forest owners to sell their land after harvest to agricultural users, who may be willing to pay more because they have no emissions obligations.

Larger multinational forest owners are less likely to sell land for other uses, as forest ownership is their core business. Nevertheless, we expect that some land use change is inevitable. This change in land use implies that fewer NZUs will be generated by forest owners on a recurring annual basis.

## The falling NZU surplus

Bloomberg estimated that by the end of 2014, the New Zealand ETS would be oversupplied by around 119 million units.<sup>1</sup> However, as forest owners begin to increase harvests, this will push up demand for NZUs to surrender and the number of NZUs on registers is expected to fall. Bloomberg estimated that by 2020, a net 25 million NZUs would remain on registers.

## A falling reserve of NZUs



The Government's Discussion Document for the ETS Review separately estimates that 140 million NZUs were on registers as of 1 July 2015.<sup>2</sup> Its forecasts suggest that between 2015 and 2020, this surplus would fall to 100 million units, far higher than the Bloomberg estimate, under the current ETS rules.

It is unclear what assumptions either estimates use, particularly with regard to land-use change. The assumption may be that all harvested land is replanted.

One possible change from the ETS review is a phasing out of the two-for-one rule. However, it is believed that in the case of EITE businesses, the number of allocated units would also be doubled, meaning there would be no actual effect on the exposure to emissions liability for those businesses.

Businesses not classified as EITEs, such as landfills or energy producers, would see a rise in their emissions liabilities, which would increase demand for units, and would increase operating costs for those businesses. The Government estimates the surplus would fall to 45 million NZUs by 2020 under this scenario. Again, assumptions on how much land switches away from forestry use are uncertain.

Tighter greenhouse gas targets after 2020 will create further pressure on NZU reserves, especially if New Zealand cannot access cheap international units. All else held equal, this could push up the price of NZUs, and therefore the cost to emitters of meeting their obligations.

<sup>1</sup> Bloomberg. (2014). Carbon markets: Global – Research Note. 29 April 2014.

<sup>2</sup> Ministry for the Environment. New Zealand Emissions Trading Scheme Review 2015/16: Discussion document and call for written submissions. 24 November 2015.



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