NZIER INSIGHT
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Tourism recovery – without stepping on the gas

With borders closed for the foreseeable future New Zealand tourism is facing a loss of substantial revenue from the lack of foreign visitors, who would usually maintain demand for tourism businesses after the end of the peak summer holidays for domestic tourists. But after the COVID-19 set-back, what will recovery look like in a world attempting to curb its emissions of greenhouse gases and global warming?

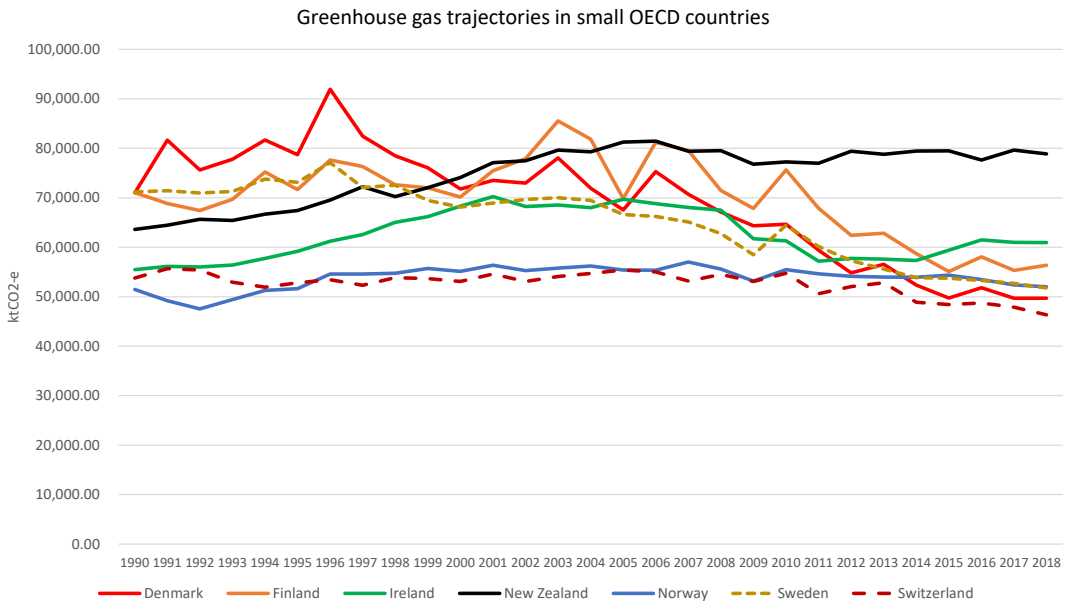
New Zealand legislation now aims to achieve net zero carbon emissions by 2050, government declared a climate change emergency last year, and the Climate Change Commission (CCC) set up to design a road map for getting there has just issued its first draft report for consultation. While tourism operators may hope to get back to how things were before COVID-19 appeared, is that feasible in the current climate?

New Zealand's greenhouse gas emissions have yet to show significant downturn…

Climate change is a problem too big for New Zealand to solve alone. Accounting for just 0.2% of global greenhouse gas emissions, no amount of change in New Zealand's emissions will substantially affect the climate it receives. But demonstrating reduction in New Zealand emissions could encourage other countries to contribute to more substantive international action to reduce emissions. To date that has not happened.

As shown in Figure 1, New Zealand's greenhouse gas emissions rose from 1990 to peak in 2006, and after slight reduction following the Global Financial Crisis have remained fairly level since then. This contrasts with the emissions of six other OECD countries of similar size or similarly low population densities, who have reduced or maintained emissions closer to 1990 levels.

Figure 1 Gross greenhouse gas emissions in New Zealand and other countries



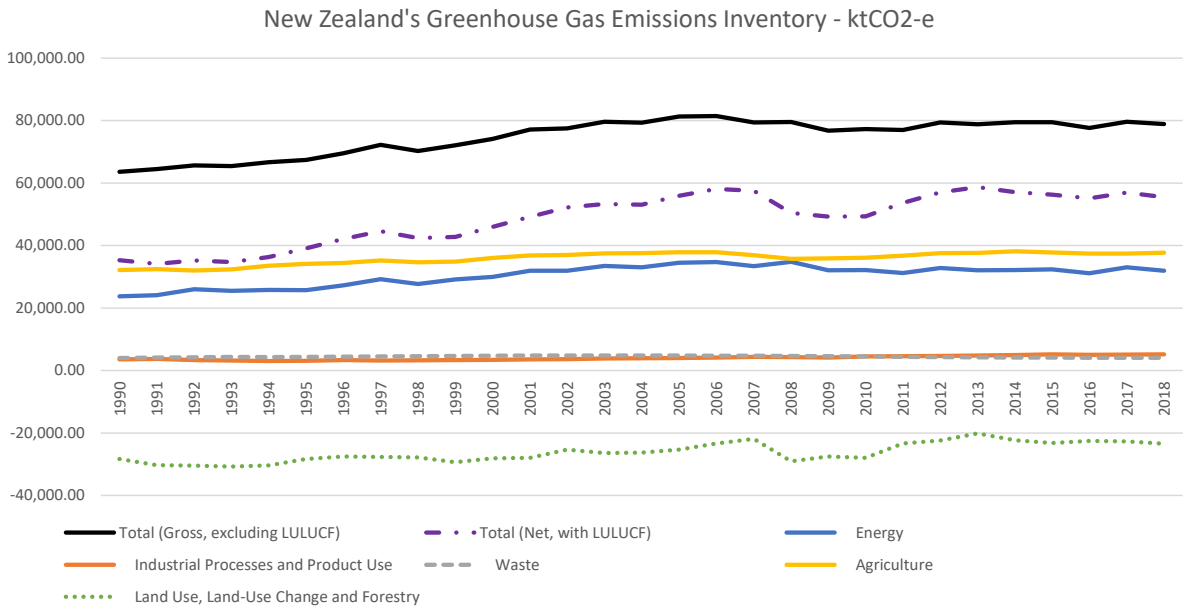
Source: OECD Greenhouse Gas Emissions by Country 2020

While New Zealand has achieved some reduction in emissions per capita and per dollar of production, rising population and incomes offset that and its emissions remain high relative to other countries. New Zealand's well-being depends on climate stability, but it appears a laggard in reducing its greenhouse gas emissions.

...and it is uniquely challenged by the composition of its greenhouse gas emissions

Figure 2 shows New Zealand's emissions as recorded in the Greenhouse Gas Inventory for five emission sources. This shows a dip in energy emissions following the Global Financial Crisis in 2008 and a pronounced drop in net emissions over the same period, but that ended around 2013 and net emissions have flat-lined since then.

Figure 2 Emissions recorded in the New Zealand Greenhouse Gas Inventory



Source: New Zealand Greenhouse Gas Inventory 2020

Agriculture is the largest source of emissions, closely followed by energy (including transport). Emissions from industrial processes (other than combustion) and waste management each contribute similar but smaller shares to national emissions, while LULUCF (land use, land use change and forestry) has been a net sink or "negative emitter" of carbon in all years (with some variation). New Zealand's large share of agricultural emissions of predominantly methane (CH_4) and nitrous oxide (N_2O) give it a unique emission profile among OECD countries.

Table 1 presents summary highlights of some of the changes portrayed in Figure 2, including the starting and end-date tonnages of emissions, the differences between them and the percentage change over the period and as an annual average. Over 28 years between 1990 and 2018, New Zealand's gross emissions from all sources rose by 24%, equivalent to an annual average per cent change of 0.8% – slightly lower than Australia at 1% but well above the all-OECD average of 0.1%. But New Zealand's net emissions rose by 57%, albeit on a smaller base. Emissions rose over that period from all categories of emission sources, with the exception of waste.

Agriculture increased annual emissions, largely driven by expansion in dairy farming. Carbon sequestration by LULUCF was 17% smaller in 2018 than in 1990 due to a reduction in net forestation. Carbon sequestration from the forestry and land use sectors reached a low point in 2013, partly due

to the availability of cheap carbon credits from abroad, some of dubious provenance, which undermined incentives to create carbon sinks in New Zealand. After the use of such cheap credits ceased in 2015, afforestation increased, but not up to the level recorded in 1990. The largest incremental growth in greenhouse gas emissions, in declining order of magnitude, has been from energy (including transport), agriculture and the reduction in forest sink creation.

Table 1 Highlights of greenhouse gas emissions changes between 1990 and 2018

Emissions of carbon dioxide equivalent (CO_2-e), changes between dates (Δ), annual average percent change

	1990 ktCO_2-e	2018 ktCO_2-e	ΔktCO_2-e	Δ%	aapcc
Total, Gross	**63,591**	**78,862**	**15,271**	**24%**	**0.8%**
Total, Net of LULUCF	**35,294**	**55,468**	**20,174**	**57%**	**1.6%**
Energy	23,778	31,946	8,168	34%	1.1%
Industrial processes	3,580	5,158	1,578	44%	1.3%
Wastes	4,048	4,057	10	0%	0.0%
Agriculture	32,182	37,697	5,515	17%	0.6%
Land use, land use change & forestry	-28,297	-23,394	4,903	-17%	-0.7%

Source: Ministry for the Environment, New Zealand Greenhouse Gas Inventory 2020[1]

As emissions net of LULUCF have risen, reduction in gross emissions will be needed to drive net emissions to zero by 2050, as described in the Climate Change Commission's recent draft emissions budget report.[2] Obtaining carbon credits from more tree planting in New Zealand may help but it is not a long-term solution, as the carbon sequestration depends on converting low carbon density land cover to higher carbon density land cover, so offsetting successive years' emissions requires finding more land to convert and an increasing opportunity cost in forgoing other potential land use. New Zealand may obtain emission credits from overseas to hit the target, but that cost may escalate if other countries do the same.

New Zealand needs a mix of measures that in combination are the most effective in reducing emissions with the lowest cost and least disruption to economic activity and people's well-being. And it needs all sectors to face emission restraint, to incentivise them to find cost effective emission reductions or offset measures.

New Zealand is also challenged by agriculture's role in the economy and emission profile

Figure 3 presents emissions by industries and households, consistent with national economic accounts and the UN's System of Environmental-Economic Accounts (SEEA). This shows the combined primary industries of agriculture, forestry and fishing are the largest source of emissions, mostly of methane and nitrous oxide. The energy, waste and water industries, manufacturing sectors and service sectors each account for similar aggregate volumes of emissions, while mining and construction account for relatively small shares of

1 https://www.mfe.govt.nz/climate-change/state-of-our-atmosphere-and-climate/new-zealands-greenhouse-gas-inventory

2 https://www.climatecommission.govt.nz/get-involved/our-advice-and-evidence/

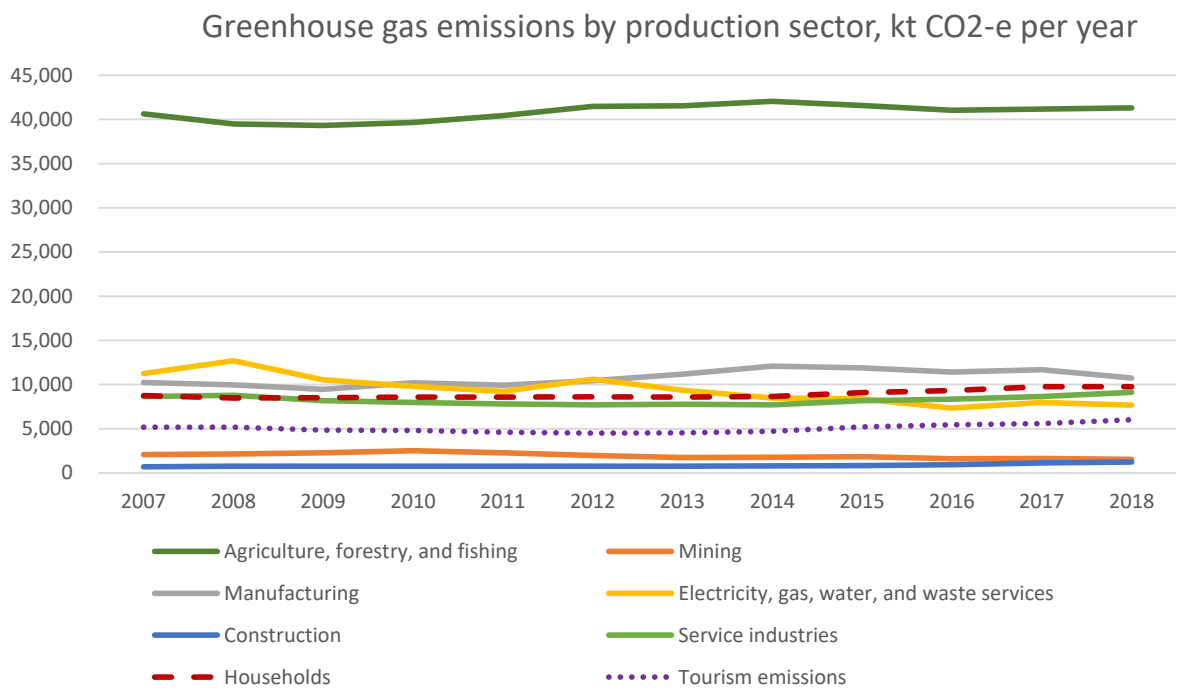
total emissions: however emissions attributed to construction are of the construction activities themselves, not the emissions embedded in building products (which are recorded against other supply industries) or the future emission potential of the buildings in operation due to their design, size and energy efficiency.

Households account for similar aggregate levels of emissions to each of the manufacturing, utilities and service sectors, through their use of fossil fuels for heating and mainly transport. In accounting terms households are 'producers' of the services of heating and transport for their own use, using inputs of energy and equipment to do so. Under SEEA accounting conventions, emissions from household use of reticulated gas or electricity are attributed to the electricity and gas supply industries, not to households.

Figure 3 also shows emissions attributable to tourism as a 'memorandum item which is not additional to the other sector emissions, as tourism is a diverse sector comprising parts of the outputs of many other industries, including accommodation, hospitality, transport, retail and visitor attractions and site management. Emissions from tourist activity declined after 2008 with the effects of the Global Financial Crisis, then rose from 2014 with recovery and global expansion of tourism.

Figure 3 CO_2-e emissions produced by New Zealand industry and households

Note: tourism is a cross cutting industry, so its emissions are drawn from, not additional to, those of other industries



Source: Statistics New Zealand Greenhouse gas emissions – industry and households, 2018, Table[3]

From another perspective New Zealand emissions aren't as high as commonly depicted…

Figure 4 displays New Zealand's greenhouse gas emissions from three different accounting perspectives. The first is the Ministry for the Environment's Greenhouse Gas Inventory used for reporting emissions against international agreements and targets (displayed in light grey). The second is Statistics New Zealand's production-based assessment consistent with the SEEA and the

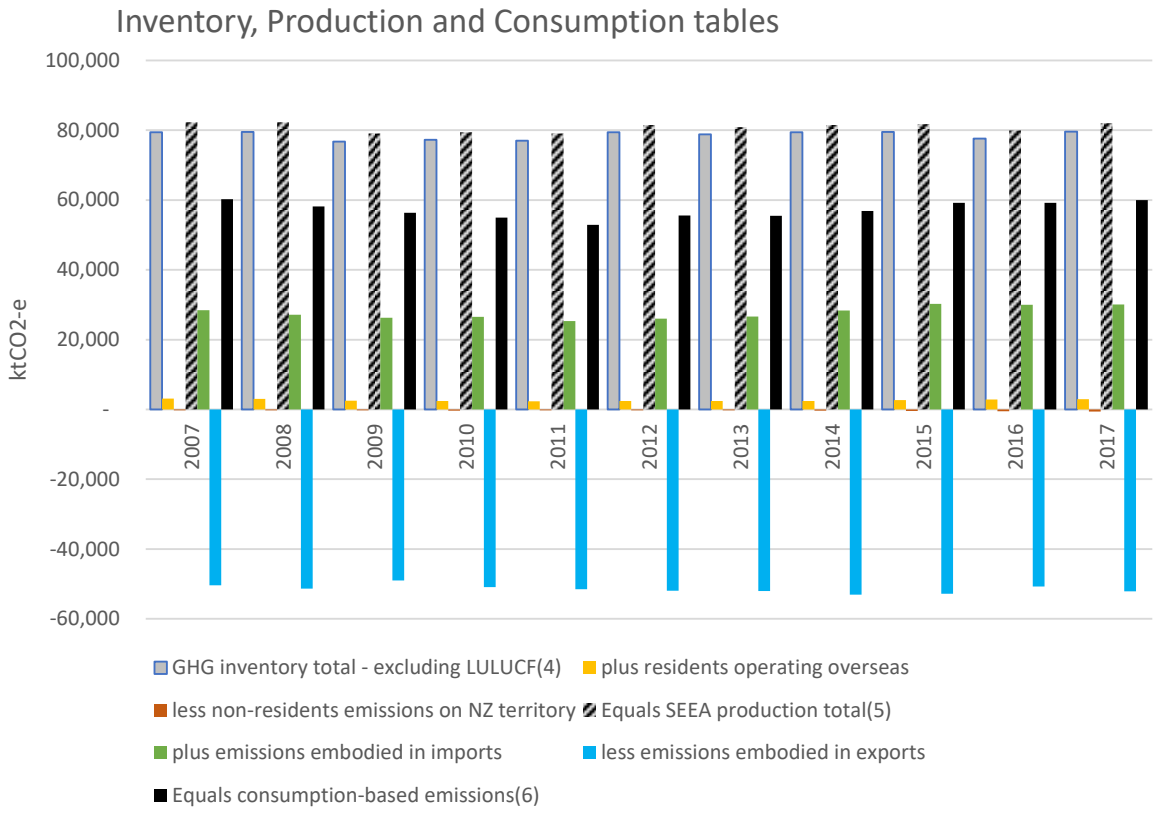
[3] https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-industry-and-household-year-ended-2018#:~:text=For%20the%20year%20ended%20December,1%2C033%20kilotonnes)%20in%20household%20emissions.

industry classification used in New Zealand's national accounts, in which New Zealand emissions (depicted in grey stripes) comprise the Inventory's total emissions plus emissions of residents operating overseas and minus emissions of non-residents emitting in New Zealand. The third is Statistics New Zealand's SEEA-consistent assessment of emissions due to consumption by New Zealand residents in New Zealand (depicted in black), comprising the Production-based total plus emissions embodied in imports and minus emissions embodied in exports.[4]

Total emissions under the production-based assessment are slightly larger than those in the Inventory, due to inclusion of New Zealanders' production emissions overseas. But the consumption-based assessment is substantially smaller, as it reflects the deduction of emissions embodied in exports from New Zealand, which outweigh the addition of emissions embodied in imports to New Zealand. Of the 82 million tonnes of CO2-e emitted by production in New Zealand in 2018, 64% were embedded in exports, but the equivalent of 36% were embedded in imports into the country. Having removed production-based emissions in New Zealand incurred to meet consumption demands from overseas, the consumption-based assessment is the closest estimate of the emissions of New Zealanders' lifestyles, and amounts to about 60% of emissions produced here. Between 2007 and 2017, total consumption emissions declined by 0.04% per year on average while GDP per capita increased by 1.4% per year, a modest level of emission restraint.

Figure 4 The scale of emissions varies with the perspective taken

Greenhouse gas emissions in inventory, production and consumption tables



Source: NZIER, drawing on the GHG Inventory, Statistics NZ's GHG Emissions, industry and households 2018 and Statistics NZ's GHG Emissions Consumption Based Year ended 2017 Table 7

[4] https://www.stats.govt.nz/information-releases/greenhouse-gas-emissions-consumption-based-year-ended-2017

In the consumption-based account, New Zealand's emissions profile appears rather lighter than that commonly depicted, because such a large share of emissions is driven by export of high emitting agricultural goods to meet demands in other countries. For instance, using production-based estimates the Ministry for the Environment's *Environment Aotearoa 2019* states (page 94) that in 2015, New Zealand emitted 17.5 tonnes of carbon dioxide equivalent greenhouse gases per person, 33% higher than the industrialised countries average of 13.2 tonnes. The consumption-based figures attribute to New Zealanders 12.9 tonnes per capita in 2015.

As there is no international standard on how to calculate consumption-based emissions, direct comparison with other countries is problematic: estimates on the web use differing methods and are commonly for CO_2 only, missing the substantial share of CH_4 emissions in New Zealand's total emission inventory and in its exports. But the different approaches to measuring emission impacts have implications for the design of policy, the costs and consequences of implementing it, and conclusions about "fair shares" in reducing emissions.

For instance, farming is commonly singled out as a large contributor to New Zealand's emissions and requiring commensurably large cuts in production to reduce them, but that is derived from viewing it through the greenhouse gas inventory that does not distinguish where the demand that drives emissions comes from. As New Zealand dairying has one of the world's lowest greenhouse gas emissions per tonne of milk produced,[5] and its pasture-based meat production is less emission-intensive than feedlot systems widely used overseas, deep cuts in New Zealand agriculture would not only be costly to the New Zealand economy but also counter-productive for global atmospheric composition if that forgone production were picked up by increases in other countries' more emission-intensive production, a process known as 'carbon leakage'.

It matters whether emission reduction policy is guided by reporting protocols or considerations of planetary impact. Under current greenhouse gas reporting, which measures emissions where they are produced rather than where demands for goods that drive them come from, New Zealand's emission levels look high because of its agriculture, but that can still serve global emission reduction by displacing higher emitting activities elsewhere. Other countries are curbing their greenhouse gas emissions and New Zealand can do more than it has to date, but it is not efficient to lean heavily on activities for which it has an international comparative advantage in low emitting production. In lowering its emissions trajectory New Zealand has few levers for influencing emission behaviour in overseas markets, but it can more effectively address consumption activities within its territory and target emissions sources that are worse emitters than comparable activities elsewhere.

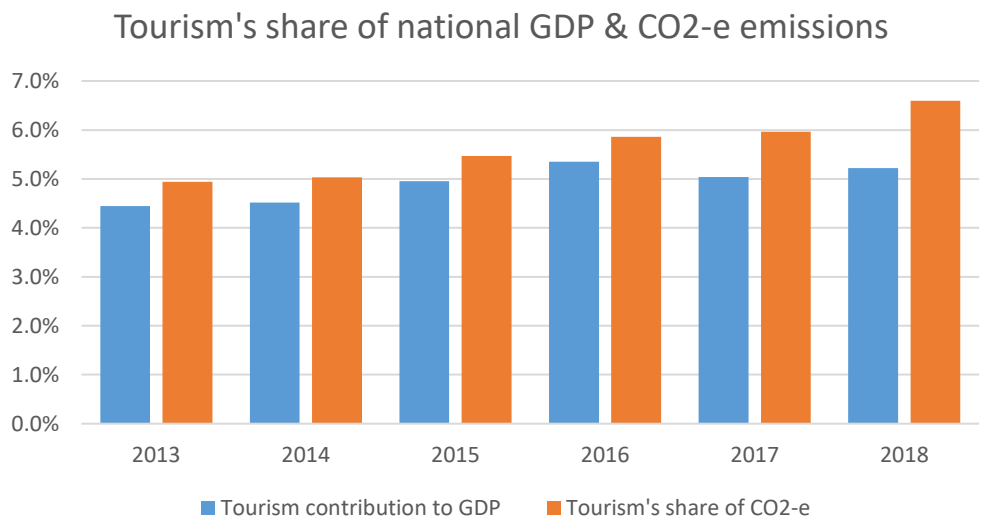
New Zealand tourism's share of greenhouse gas emissions is bigger than its share of GDP…

Hosting foreign tourists is an export industry for New Zealand, but unlike other exports the target market comes to New Zealand and 'the goods' are consumed here. This means policies to curb emissions from consumption in New Zealand can influence the emissions caused by other countries' residents while here. But if emission curbs on domestic residents are weak, they will have little effect on foreigners here as well.

Figure 5 shows that over the recent period of tourism growth between 2013 and 2018, tourism's share of greenhouse gas emissions rose faster than its share of national GDP: tourism's GDP share was roughly static from 2015 to 2018 while its share of emissions continued growing. Tourism is emission-intensive, and while it is not the most emission-intensive sector in producing GDP, its emission intensity (tonnes CO_2-e per $mGDP) declined at about half the rate (-2.1% per year on average) as that of the whole economy (-4.2%) between 2013 and 2018.

[5] https://www.dairynz.co.nz/news/research-shows-nz-dairy-the-world-s-most-emissions-efficient/

Figure 5 Tourism's emissions have grown faster than tourism value



Source: NZIER based on Statistics NZ Greenhouse gas emissions – industry and households, 2018, Table 9

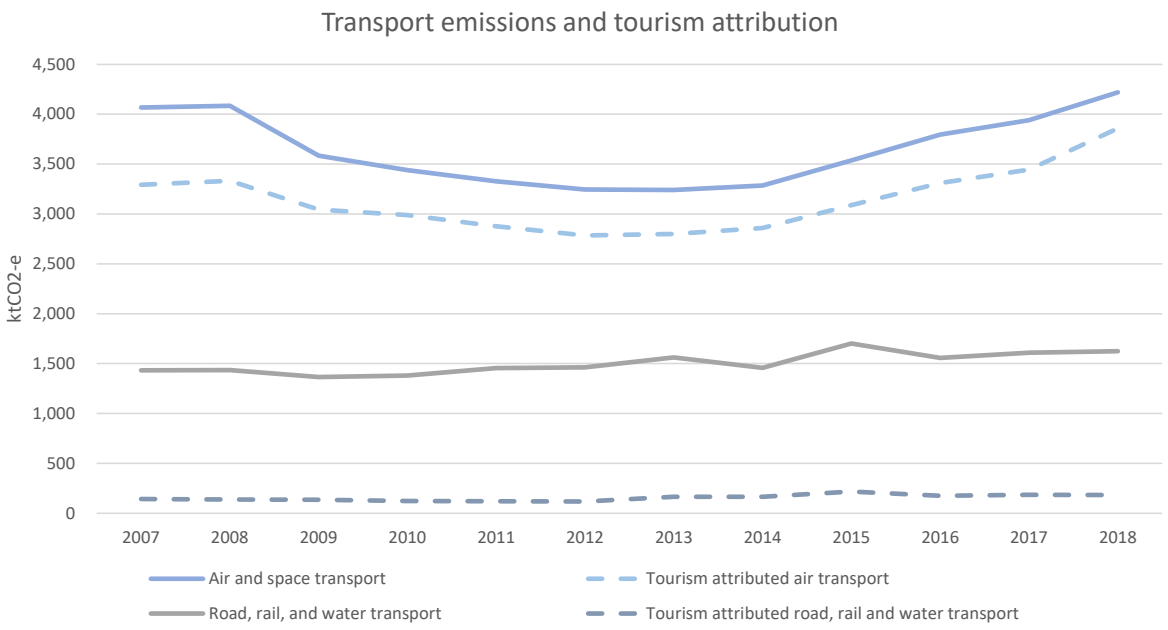
...which reflects a prominent role of transport (particularly air transport) in tourism activity

Figure 6 shows tourism accounted for over 90% of air transport emissions (which comprise 70% of New Zealand's transport emissions), but just over 10% of land transport emissions (which are 27% of national transport emissions). It also accounted for 70% of other transport and tour services (3% of national emissions).

It is not surprising that tourism predominates in air transport emissions, as "tourism" is defined as activities undertaken by people more than 40 kilometres from home, including both overnight and day trips, foreign visitors and domestic households, and leisure, business and government travel.

As air passenger services usually involve flights between centres more than 40 km apart, and flight-seeing trips are also tourism-related, most domestic aviation will involve tourism, apart from a proportion attributed to freight transport in baggage compartments and the relatively low flight kilometres of agricultural and general aviation activities. International aviation emissions are only counted for national carriers, so emissions from other countries' airlines bringing tourists here do not appear in New Zealand's emissions accounts.

Figure 6 Tourism contribution to transport emissions



Source: Statistics New Zealand Greenhouse gas emissions – industry and households, 2018, Table 9

Conversely, surface transport emissions are predominantly attributable to cross-country freight movements and transport by households, much of it over short distances for commuting to work, shopping, school pick-ups and so on, but some of it tourism-related. Emissions from inter-city bus and train services and cross-Strait ferries are predominantly attributable to tourism, apart from attribution to freight on these services.

Tourism has a modest share of national emissions but still has distorted incentives to create more

Tourism has a modest share of New Zealand's greenhouse gas emissions which COVID restrictions on cross-border travel will have lowered, but will international tourism recover to former levels even when it becomes possible? It may take years before community infections are sufficiently controlled by wide scale vaccination to allow borders to reopen without isolation and quarantine requirements and without the risk of new border closures at short notice if infections emerge within the community. And years for airline capacity to recover.

Tourism was on a growth roll before COVID-19 emerged, prompting debate about "over-tourism" and its costs: crowding in popular destinations; degradation of the natural environment; and social impacts on host communities in which tensions can arise between those who benefit from tourism growth, and those who view it as a corrosive pressure on community and environment. Growth need not be problematic if the prices of tourism services adequately reflect their costs, which the New Zealand Emissions Trading System aims to do with respect to greenhouse gas emissions. However, if tourism consumes services without facing their cost, either in the human economy or in the natural ecosystem services that underpin it, tourism can be "excessive", degrading its asset base and diminishing a destination's reputation for future visitors.

New Zealand's main emission curbing tool has been the Emissions Trading Scheme, but historically it has been watered down by exemptions and access to cheap overseas credits and it has not yet delivered significant emission reduction. Even though those exemptions are now being phased out, the ETS price does not reflect the full cost of carbon emissions - the contribution of each tonne of emissions to warming and consequent increases in climate change costs such as increases in damaging storm intensity, droughts and wildfire risk - but is rather created by the cost of restricted supply of emission entitlements relative to demand for them.

Some New Zealand policy already recognises this. In its infrastructure planning assessments, the New Zealand Transport Agency in 2016 adopted a value of emissions reduction of $64/tCO2-e in 2016-dollar terms, well above the ETS price, in recognition that the social cost may be higher. Some international sources suggest a cost of hundreds of dollars per tonne and a price of similar magnitude may be necessary to achieve sufficient switching out of emitting technologies to achieve the net zero target.

A long haul to recovery to a new normal unlike that which preceded it

Another source of mispricing is international air travel, a growing source of greenhouse gas emissions which accounted for 2.8% of global emissions pre-COVID disruption but which are currently not attributed to countries under the emission inventory reporting. Long haul air travellers to New Zealand generate an externality of unpriced emissions, and promoting their return without addressing that externality would be contrary to the intent of the Zero Carbon Act and policy proposals currently being considered to implement it.

Tourism recovery cannot ignore the emission blind-spots in policy, as even if emissions are currently unaccounted for, ways of bringing them into account are likely in future. Further work by the UN's World Tourism Organisation on integrating accounts such as the greenhouse gas inventory, the tourism satellite account and the system of environmental-economic accounts, aim to provide a more coherent picture of all types of tourism activity – inbound from other countries, domestic within countries and outbound residents going abroad – and their relative impacts on the environment and host communities, to help improve the sustainability of tourism.

Some accounting for international flight emissions is being introduced by the International Civil Aviation Organisation's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which requires airlines to purchase carbon offsets to cover their emissions above 2019 levels, starting with a voluntary trial from 2021 to 2023. That scheme only targets additional growth over that baseline level, and has little effect on the average price of flights.

A stronger price signal would come from applying a full cost of carbon emissions to international flight fares at similar rates to emissions in the domestic economy. If flights between Auckland and London faced the full cost of their carbon emissions, this would increase airfares per passenger by about $120 at $30/tonne CO_2-e or $200 at $50/tonne, which is a range of carbon prices that the draft CCC report suggests might be required to achieve incentives for substitution to lower emitting activities. The Parliamentary Commissioner for the Environment has suggested a departure tax on flight fares in lieu of effective international emission pricing, which would add $155 to the fare from Auckland to Europe.[6]

Such charges would not make long haul fares prohibitive but would curb some demand for flights at the margin. Europeans and North Americans with a taste for volcanic landscapes used as fantasy film backdrops might visit Iceland more and New Zealand less.

The CCC's draft report excludes consideration of international aviation and shipping, consistent with the limitations of current emissions inventory reporting. It only refers to tourism twice, as an activity in which opportunities for reducing emissions are not well understood, due to their cross-sector nature and lack of climate change focus by government agencies responsible for their oversight. In its public consultation there will likely be much refinement of the CCC's proposals as the costs of implementing them become more transparent.

An implication of evolving climate change policy is that international travel is likely to become more costly, in the short term because of recovery from the COVID pandemic disruption, and in the longer term because of the search for lower emitting aircraft fuels. This will make it more costly for foreigners to visit New Zealand, and for New Zealanders to travel overseas, so even when borders open there is likely to be some rebalancing towards fewer international visitors, and more domestic tourists holidaying in New Zealand.

[6] https://www.pce.parliament.nz/publications/not-100-but-four-steps-closer-to-sustainable-tourism

This will be tough for those businesses that have come to rely on international tourists, unless they can diversify to other business than hosting foreign tourists. Tourist attractions based on particular sites or locations may need to think about how they can become venues for domestic visitor activity, and how they can periodically refresh their offering to create new experiences to encourage people to visit again.

New businesses targeting foreign visitors need to allow for the risk of asset stranding and build the capability to switch to other things to cover future disruptions. Business diversification, amalgamation and rationalisation may be necessary as the country settles into a new post-COVID normal.

Ultimately consumption drives the demand for goods that create emissions, so ensuring consumer prices reflect the emission consequences of consumption choices is part of the emission-curbing toolbox. Producers may be targeted to bear the cost of emissions that will be passed through to the prices they offer their customers, incentivizing both consumers and producers alike to choose lower emitting substitutes where they can. Precautions against COVID in the short term, and climate change in the longer term, will change the face of tourism for years ahead.

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