EnergyWatch

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EDITORIAL

Putting KiwiRail back on the Rails

What is the next government, regardless of complexion, to do about rail?

This government deserves credit for recognising that it must keep rail: 'Option value' is the term Treasury use. Quadrupling existing heavy truck traffic on even a few roads is politically and financially unsustainable, as well as high-risk. Rail freight has proved its value on the Auckland–Tauranga route, and now Auckland–Christchurch is the next objective (see KiwiRail Turnaround Plan, ref. 23 on p14).

But the Turnaround Plan had too little fat and has failed. Main line derailments are down by two thirds in a decade but rail replacement is still below 1% a year, far below any reasonable catch-up rate. Investment decisions such as increasing axle loads on main routes have been pending for too long.

As Guest Editor, Kerry Wood, former editor of EnergyWatch, retired transport policy specialist and Wellingtonian takes an holistic perspective of the direction that NZ is heading, and the vehicles being used for the journey

Target Railway Progress (TRP, ref. 26 on p15) comments:-

> *[Since forming KiwiRail] …we are back in the position of the Government owning a large commercial transport organization which is in the uncomfortable position of competing with honest hardworking trucking companies while being supported with public-sector hand-outs whenever it needs them.*
>
> *Many people rightly mistrust this arrangement, but paradoxically it does not actually help rail precisely because ministers are loathe to be seen as providing too much taxpayer support and appearing as socialists in a centre-right government.*

On the other hand, KiwiRail has been asset-stripped (see Page 15). If roads had been neglected on the same scale, everyone would know all about it and the remedial programme would eclipse RoNS. Rail is more tolerant, for a while. A great many KiwiRail deficiencies have been 'solved' by reducing the speed limit, sometimes to 10 km/hr, but slow trains lose customers.

TRP suggest that by 2023 a $2 billion upgrading programme could double the freight carried on rail, while increasing speeds by 20% and reducing charges by 20%. Rail could be the dominant player on the Auckland–Christchurch route.

Simply pouring in money won't work, but Treasury monitoring isn't working either. Two worrying examples are Clifford Bay and the new Chinese locomotives (see pages 10 & 15).

There is scope for a five-point plan here: -

- A new Turnaround Plan, with separate estimates for de-asset-stripping and a more ambitious TRP-style modernisation, while accepting an often arbitrary split between them. Hopefully, KiwiRail will be viable within a decade, but upgrading complex heritage systems is a notoriously poor fit with the electoral cycle.
- Find ways to support KiwiRail, such as consistent long-term targets, benchmarking against other railways and staff training and career planning. A new Turnaround Plan might usefully go through an external technical review, if only as a confidence-building exercise. Cross-party political support would certainly help.
- Look seriously at likely large-scale projects. Two possibilities are a Cook Strait upgrade for doubled rail-ferry traffic, and electrifying selected routes (of the order of $600m to complete Auckland–Tauranga and another $400m to complete Auckland–Wellington).
- Bring funding and evaluation for road, rail and coastal shipping onto a reasonably comparable basis. It will never be perfect but doesn't have to be dysfunctional.
- Introduce an adequate carbon charge on transport fuels (replacing failed emissions trading), perhaps offset by reducing GST.

KiwiRail's present 'vertically integrated' organisation looks reasonable but a separation between 'above-rail' (rolling stock and operations) and 'below-rail' (track and route) might be more acceptable politically.

As TRP put it (page 17), this could be a nation-saving investment.

Finally, Paul Young presents visions created by Generation Zero for transport in Auckland and Wellington.

As usual, this issue wraps up with an update on the progress of oil prices, now stabilised at over US$100 per barrel.

Kerry Wood, Guest Editor

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Seven things everyone knows about energy - that just ain't so

This is a summary of a paper by Kurt Cobb, published in Resource Insights[1]*. The US bias is inevitable. The US is the third-largest oil producing country, behind Russia and Saudi Arabia, and much the most transparent.*

The full list of things people think they know is very long indeed and getting longer as the fossil fuel industry (which has little interest in intellectual honesty) continues its skilful manipulation of a gullible and sometimes careless media. These seven statements might charitably be called misleading.

Worldwide oil production has been growing by leaps and bounds in the last several years

Oil companies (with governments following suit) have redefined oil to include natural gas liquids, from propane through to pentanes, and biofuels.

This mishmash is called total liquids or even total oil supply. Renaming quietly invites us to assume that the new additions are just like oil. They make up 10% of total liquids but only about 2% is interchangeable. The rest is almost useless for transport fuels, which is the main driver of oil consumption.

The volumetric energy content of the new additions is only about 65% of the energy in crude oil, and is net energy. It doesn't include the energy used to produce and refine oil, natural gas liquids and especially biofuels. Some studies show that more energy goes into making ethanol than ethanol produces when burned in an engine.

In the US, total liquids have grown at twice the rate of crude oil and condensate (2005–2012): the new term is becoming steadily more misleading, but we are still paying more for it.

Slowing growth coupled with skyrocketing demand in places such as China and India has put a lot of upward pressure on oil prices. Brent Crude averaged US$108.52 in 2013.

US natural gas production is growing by leaps and bounds

This claim is even more misleading. It is true that US natural gas production has grown in recent years, because of hydraulic fracturing of shale deposits. But the rate of production of these wells declines rapidly and the numbers suggest that raising the overall production rate is going to be very difficult and expensive. In fact, since January 2012, monthly U.S. marketed natural gas volumes have been nearly flat despite a more than doubling of natural gas prices from their April 2012 lows.[2]

The easy shale gas has been exploited and now comes the hard stuff.

There is enough natural gas in the US to last a century

This claim uses bad maths on bad numbers, and even that gives only 90 years at 2010 production rates. And here the case runs into the difference between probable, possible and speculative 'technically recoverable' resources.

Technically recoverable is not the same as economically recoverable. Shale gas expert Art Berman suggests we focus on the probable resources category[3] and assume generously that 50 percent of those resources will actually get turned into reserves. These assumptions give the US about 23 years supply

The United States is about to become the world's largest oil producer

This claim depends on the same sleight-of-hand used to inflate worldwide oil production. Yes,

[1] http://resourceinsights.blogspot.com/2013/12/7-things-everyone-knows-about-energy.html

[2] http://www.eia.gov/dnav/ng/hist/rngwhhdd.htm

[3] http://www.theoildrum.com/node/8914

US production rose by 25% in 2005–12, but it is still well behind Russia and Saudi Arabia; both producing about 50% more than the US. It seems unlikely that existing tight-oil wells can make up the difference, when individual well production typically declines by about 40 percent per year.[4]

The US is on the verge of energy independence

The US has long been self-sufficient in coal, and is nearly self-sufficient in gas, but 'energy independence' does not mean 'oil independence'. US oil production averages about 6.5 million barrels/day, but net imports are 7.5 million barrels a day. For oil the imminent expansion does not need to be 150% (myth 4) but 215%. Energy independence is not near.

The US has 250 years of coal left

This claim keeps getting recycled even though a 2007 National Academy of Sciences study concluded that there was no basis for making such a claim. The truth is, nobody knows how much coal is left in the United States; nor how much of that might actually be accessible.

Peak oil is a myth

Peak oil is an empirically demonstrated reality for every oil well, every mature oil field and most oil producing countries.

Those who tell us that peak oil is a myth are conveniently forgetting that US production peaked more than 40 years ago. It worth noting that the optimists have been consistently wrong about prices and supplies in the last decade.'[5]

[4] http://tv.peak-oil.org/shale-oil-in-perspective-with-art-berman/

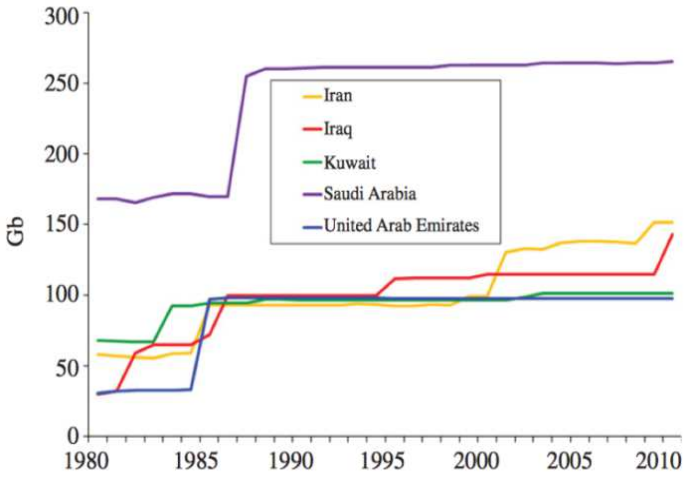
[5] For a contrary view, see the BP Energy Outlook to 2035, http://www.bp.com/content/dam/bp/pdf/Energy-economics/Energy-Outlook/Energy_Outlook_2035_booklet.pdf

MORE ON PEAK OIL

A peak-oil article appeared in December 2013, in the prestigious Philosophical Transactions of the Royal Society *The future of oil supply*[6] by Richard Miller and Steven Sorrell. The authors give a near-term estimate of peak oil effects, only too relevant to the transport articles which follow:

> *…we concluded that a sustained decline in global conventional production appears probable before 2030 and there is significant risk of this beginning before 2020. This assessment excluded tight oil resources since these were classified as unconventional. However, on current evidence the inclusion of tight oil resources appears unlikely to significantly affect this conclusion…(page 17)*

Also included is this graphic representation of Middle East oil reserve estimates. None of the five states plotted show declining reserves, yet Saudi Arabia produced 100 Gigabarrels (Gb) in the period shown, and the UAE 27 Gb.



A telling change over the years is that in this article 'conventional oil' includes 'sour' crude (high sulphur) and 'deep-water' crude (over 500 m). They have become relatively conventional as more extreme sources appeared.

Editor

[6] http://rsta.royalsocietypublishing.org/content/372/2006/20130179.full.pdf+html

SOME NEW DIRECTIONS FOR TRANSPORT POLICY

There follows a group of seven linked articles by Kerry Wood attempting a critique of current freight transport policy in New Zealand and suggesting some new directions

1. For Starters

- More frequent extreme weather events, including low-temperature events, are evidence of climate change. Water evaporation and temperature differences drive weather: a warmer atmosphere can hold more water and is more likely to show extreme variations.
- The world-wide response to climate change is woefully inadequate and New Zealand's contribution appalling.
- Peak oil is no myth and we can expect a sustained decline in transport energy supply by 2030 (see articles above).
- New Zealand transport is particularly vulnerable to peak oil because of an unusually high reliance on cars and trucks in a commodity-based economy.
- There is no internationally agreed emissions target but the UK Met Office has proposed a peak in 2016 then 4% annual decline, to achieve a 50% chance of meeting the 2˚C target (energy use down 33% by 2024 & 80% by 2054). Delaying action can only increase both risk and consequences.
- Transport policy is a disgrace (article on page 19), with a very large turning-circle. New Zealand's existing vehicle fleet has an average age of about 13 years and cannot adapt quickly.[7] Fleet **average** fuel consumption is about 9.8 litre/100 km, 30% worse than claimed for the new Range Rover (TDV6). Transport fuel imports cost about $8 billion a year, roughly equal to the national deficit, and vehicle and part imports cost about the same again.
- Rail freight and coastal shipping have the greatest potential to put New Zealand's domestic freight onto a more sustainable footing, as well as handling export and import freight (see pages 15 and 18).
- New Zealand has developed a strong bias in favour of motorised road transport and against other modes, at many levels. Project evaluation has become a costly joke in bad taste. (see pages 6 and 8).
- Present day rail-freight has about a fourfold carbon-emissions advantage over equivalent road-freight (net tonne-kilometre basis). This can be improved to six fold using modern diesel locomotives and rolling stock, with higher axle loadings, running on heavier rails. Electric locomotives using New Zealand's low-carbon electricity give a further advantage: about twenty-fold. (see page 17). More crudely, coastal shipping is somewhere between diesel and electric rail.
- KiwiRail cannot solve its problems unaided. There is a rail-freight renaissance in many countries but not yet in New Zealand.
- Equal BCRs (Benefit Cost Ratios) for road and rail projects do not indicate equal value. They usually disadvantage rail.
- International shipping links are changing radically: leaving them to the market is another high-risk approach.

A week in Jakarta has clearly illustrated to me how a capital city of 10 million without any passenger rail mass-transit system - either surface or subway - has evolved into dysfunctional chaos. The late model cars that choke the city streets jostle with the ubiquitous motorbikes, tuk-tuk's and taxis to reflect the universal "fatal attraction" of the motor car? *Steve Goldthorpe*

[7] www.transport.govt.nz/assets/Uploads/Research/Documents/The-NZ-Vehicle-Fleet-2012-final.pdf

2. RoNS and Rationality

In EnergyWatch 67 (September 2012) Kerry did a tongue-in-cheek piece on New Zealand's transport policy. Now an article by Michael Pickford in Policy Quarterly[8]*, summarised here, shows just how far government policy has gone astray.*

Value for money in roading projects is assessed with a 'Benefit:Cost Ratio' (BCR), the ratio of social benefits to social costs, both discounted to a present-day monetary value. Benefits include travel time savings (often about three quarters of all savings), travel time reliability, vehicle cost savings, lower fuel costs and fewer crashes. Costs include construction and maintenance, including land-purchase.

Until 2004 Transfund controlled expenditure. Maintenance had first priority, then new construction. Transit NZ and local authorities bid for projects and Transfund checked and approved projects with BCRs of at least 4.0. A decade earlier it had been 5.0.

In 2005/06, with some changes in place, all approved projects had a BCR of at least 2.0, and most were over 4.0. By 2009/10, BCRs of less than 2.0 made up two thirds of all project value and only 3% had a BCR of over 4.0.

From 2008 funder and provider were merged into the New Zealand Transport Authority (NZTA). The new aim was *an affordable, integrated, safe, responsive and sustainable land transport system.*

This has been revised (June 2013) to, *contribute to an effective, efficient, and safe land transport system in the public interest.*

A new requirement (2008) was that the NZTA 'give effect to' the Government Policy Statement on transport (GPS) issued every three years. Ministers had their hands on the tiller. The NZTA needed to adjust policies and it introduced two new criteria: 'Strategic fit' and 'Effectiveness'.

The minimum BCR now accepted by the NZTA is nominally 1.0—nothing is allowed for 'ignorance factor,' despite wide uncertainties.

Strategic fit, effectiveness and economic efficiency are integrated by rating projects as 'low,' 'medium' or 'high' for each. Strategic fit is high if it meets one or more of three criteria:

- A RoNS project;
- [A project having the] *potential for a nationally significant contribution to economic growth and productivity… through significant improvements in one or more of: journey time reliability; easing of severe congestion in major urban areas; relieving capacity constraints …*
- [A project having] *the potential to significantly reduce the actual crash risk involving deaths and serious injuries in accordance with the Safer Journeys strategy.*

These criteria are picking up aspects of the project already in the BCR, which is double-counting. Pickford comments: -

> *In effect, strategic fit means whatever the NZTA wants it to mean, however economically irrational it might be.*

Effectiveness is similar, looking at how the proposed solution helps achieve the potential identified in the strategic fit assessment. This is brownie-points for stuff you would expect anyway, which is more double-counting.

Pickford uses the Kapiti Expressway as an example of the opportunity-cost problem. The estimated project cost is $450m, with benefits of $430m i.e. a net value of -$20m. In contrast:

- Spending the same $450m on a project with a BCR of 1.5 would give a net value of $230m.
- Spending the same $450m on a project with a BCR of 3.0 would give a net value of $900m.

Pickford calls it, *"an outright loss to the economy from …sub-optimal investment."*

[8] http://igps.victoria.ac.nz/publications/files/30aaf9a4518.pdf

It is probably worse. In October 2012 a consultant's study leaked from the NZTA showed a BCR for the Kapiti Expressway of only 0.2.[9]

Let Pickford have the last word: -

> *These comments raise serious doubts about the rationality of the decision-making process. It is ironic that a government that places economic growth and efficiency at centre stage is, through its approach to the evaluation of state highway projects, undermining the very process needed to advance those goals. The inconvenient truth is that the current approach to the ranking and selection of state highway projects… has resulted in many hundreds of millions of dollars of benefits annually being squandered in pursuit of the empty goals of 'strategic fit' and 'effectiveness'.*

It wasn't the last word. NZTA economist Ernest Albuquerque responded with an article in the November edition of *Policy Quarterly*, which also included a brief response from Pickford, arguing mainly from common sense. I am not competent to summarise Albuquerque's article fairly but can comment on one section (p 67): -

> *In line with overseas agencies, the NZ Transport Agency recognises that there are limitations to standard cost-benefit analysis, as not all positive and negative impacts are captured. These limitations include difficulties in assessing the land use changes and traffic changes that can occur as the result of transformational transport projects.*

Albuquerque cites very high growth when the Auckland Harbour Bridge opened; 13%/year, far greater than expected. A new bridge can be a 'transformational' transport project, which conventional benefit estimates may understate.

But how does Albuquerque know that a RoNS project, parallel to an existing road and not much faster, will have the same transformational effects as a direct link from a booming city to nearby undeveloped land? What about induced traffic, generated by the new link but having little economic value? Or is this an article of faith?

Other work by Arthur Grimes,[10] who did the Auckland Harbour Bridge study, looked at the growth of railways and telegraph links in NZ from about 1870. The lengths of wire and rail grew fairly steadily. Length per head of population made an initial spurt and then leveled off as system growth matched population growth. Messages or trips per person also leveled off, but then made a spectacular new spurt. The electric-telegraph spurt doubled per-capita use in eight years or so, twenty years after first leveling off. Grimes comments: -

> *A forecaster in 1896, having seen 15 years of constant messages per person may confidently have forecast a stable outlook for that variable over the coming decade. He would have been mistaken almost by a factor of two within ten years.*

I suggest that the real difference between Albuquerque and Pickford is paradigm change. Albuquerque cites 'overseas agencies' in selected cities and Pickard can cite research and practice in other selected cities. Each is unconvincing to the other because he relies on different sets of assumptions.

But if most of the assumptions on page 5 are accepted, there is little doubt about which Emperor has the clothes.

[9] www.transportblog.co.nz/2012/10/30/kapiti-expressways-BCR-is-actually-0-2/

[10] www.motu.org.nz/files/docs/Motu_note_1_Grimes.pdf

3. RoNS, WEBs and Agglomeration

Since Pickford's paper, the NZTA have revised the discount rate that is used to bring future costs and benefits back to a present-day value. It is down from 8.0% to 6.0% (both plus inflation). At the same time the evaluation period has been increased from 30 years to 40, and 'Wider Economic Benefits' (WEBs) will be introduced this year.

The Government Policy Statement (GPS) is now the controlling document. Economic efficiency, Strategic fit and Effectiveness do little more than conceal the real decision maker. The NZTA has a statutory independent role, helpfully explained in the 2009 GPS (para. 5):

> *The NZTA must give effect to the GPS in developing the National Land Transport Programme and take account of the GPS when approving funding for activities.*

Clearly, the NZTA Board will not be refusing to build the Heatley Holiday Highway to Northland, for which Pickford gives its BCR as 0.8. However, they might delay it a little.

An urgent next step is finding credible ways to generate BCRs that appear to justify policy, and this is where WEBs come in. WEBs are based on agglomeration benefits, summarised by Pickford as: -

> *Agglomeration economies* [savings] *are thought to be generated both from the localization of an industry (i.e., the concentration of firms in a particular locality) and from the urbanization of economic activity (i.e. its concentration in large cities). Businesses may become more productive because they benefit from economies external to themselves, but internal to the locality and city respectively. These may arise from the facilitation of knowledge transfers between businesses, access to deep or specialised labour markets, and the development of specialised input suppliers. Although improvements to transport infrastructure are thought unlikely to create the clusters of activity that generate agglomeration economies, they could encourage the further development of a cluster by reducing travel times and improving connectivity, either by extending its reach or by reducing congestion within it.*

It is all a bit vague. Pickford again: -

> *The NZTA was quick to embrace the concept of agglomeration benefits, yet their evaluation is far from being settled or free of controversy.*

The poster-child of agglomeration is public transport in London, where it was first used to evaluate the Jubilee Line (opened 1999). The new line ran eastwards from Westminster to Canary Wharf and Stratford, with four crossings under the Thames. It made a big difference to public transport links around the southern and eastern fringes of the city, supporting major new business areas; notably Canary Wharf. Planners realised that a capital gains tax on land-value increase around the new stations, triggered by the new line, could fund very substantial passenger transport infrastructure.

Now London is building Crossrail, which is also justified using agglomeration benefits. Crossrail is a sort of super-tube, faster, higher capacity and built to the standard railway loading-gauge. It will link a series of main public transport interchanges: Heathrow Airport, Paddington, Liverpool Street and so on, then into new territory with Canary Wharf and Stratford. There will be 38 stations in all, including 9 new stations linked to existing stations in central London. According to the Crossrail website:

> *Crossrail will bring an extra 1.5 million people to within 45 minutes of central London and will link London's key employment, leisure and business districts, Heathrow, West End, the City, Docklands, enabling further economic development.*

The Crossrail studies explicitly compare London and New York, the two largest financial centres,

which are about equal and very much in competition.

> *A number of factors are important to CEOs of global companies. These include the regulatory environment, the availability of skilled staff and the quality of life of employees. These qualities are often self-reinforcing. The existence of large numbers of educated bankers draws more candidates to the City and helps ensure that they are well trained.* (*The Economic Benefits of Crossrail, para.* 2.1.7*)*

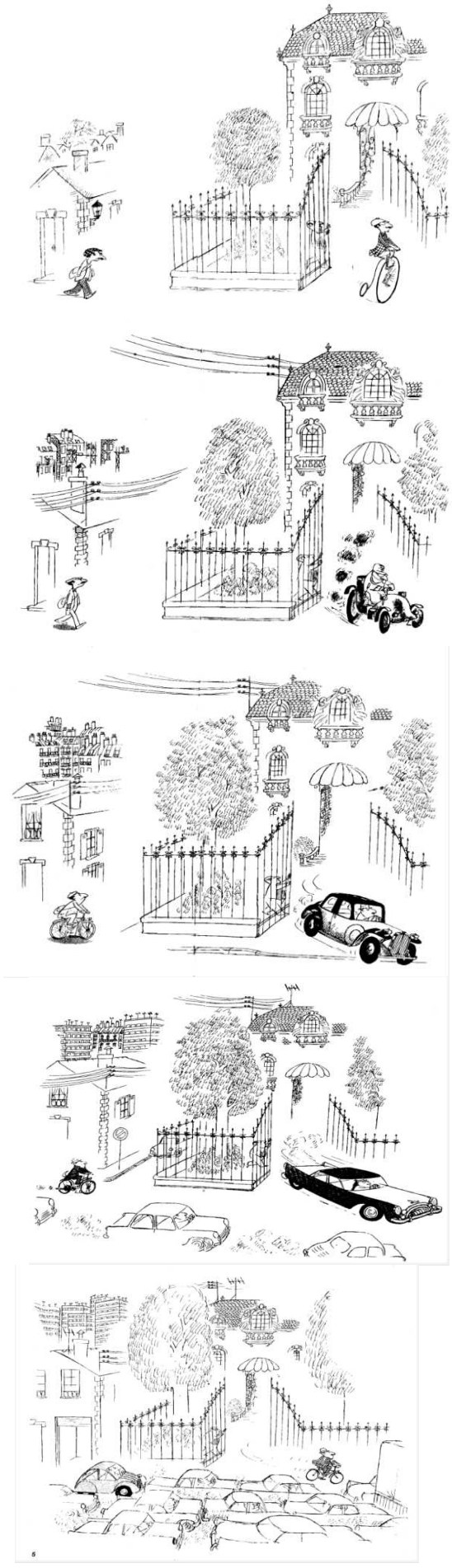
So how do new roads bring such benefits? In London or New York the answer is obvious; they don't. Crossrail's capacity is broadly equivalent to cars on a 15 lane motorway, each way, with even more space for parking and access. An on-street, rubber-tyred Crossrail would not boost London's agglomeration but destroy it.

In Wellington or Auckland the answer is contested. Economists are slugging it out at the macro-economic level, with no agreement in sight. One partial agreement is that BCR benefits should not be added to WEB benefits: that would be double counting. That is why they are presented separately: we are left to decide how they should be combined.

Meanwhile, both cities are trying to move towards more sustainable city transport, more like Crossrail and less like RoNS.

One reason for building Wellington's new Northern Corridor RoNS is to provide for a 50% increase in freight volumes between 2007 and 2017. But in 2014 we have only three years to go, and the national freight traffic index only grew by 3% in 2005–12.

What does the NZTA Board, who are appointees of the Minister of Transport, know that we don't?



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4. Better value than RoNS?

Here are two suggestions for more cost-effective transport projects, one small and local the other big, multi-modal and national. But beware of the implied assumption that any released RoNS funding should go to capital investment in transport. Transfund had it right: adequate maintenance comes first.

4.1: Cycling Provision

The simplest suggestion is continuous, safe cycle routes. They have very large social benefits. BCRs are often around 20 because local cycle routes encourage regular exercise, with huge effects on population health.[11] New Zealand already has some very successful projects, but the next step is to bring them into the cities and everyday use.

Road widening for cycle routes is costly but often unnecessary. Here are a few alternatives: -

- Cycles don't need dedicated space if traffic is reasonably light and the speed limit is 30 km/hr and is passively enforced;
- A four lane road can often be reduced to two lanes plus a continuous merge/right-turn lane, (i.e. a road-on-a diet) with very little effect on motor vehicle capacity. The freed-up lane, with a little readjustment, makes space for cycles;
- Reasonably direct side-streets that are used as shortcuts by motorists may be re-configured as a 'rat-run' for cyclists only.

Even greater potential comes from a combination of safe cycling and shared bicycles. New York is showing the way in the US, where a new bike-sharing scheme[12] was used for five million trips in the first five months.

A recent European study concluded that just over half of commercial deliveries (number not volume) in the city could be made by bicycle, including freight cycles with a capacity of up to 100 kg. In Copenhagen[13] only 40% of households have cars and cargo bikes are filling many gaps.

4.2: Clifford Bay and the Interislander

The government has rejected an apparently excellent use of transport funding for a new inter-island ferry terminal at Clifford Bay.[14] Minister of Transport Gerry Brownlee released a statement on 14 November 2013: -

> *"We have been delivered a thorough and robust report which clearly shows Clifford Bay is not commercially viable as a fully privately funded project, and the level of investment required at Picton over the next decade to extend its life would be substantially less than previously estimated.*
>
> *The project team estimated a ferry terminal at Clifford Bay could be delivered by 2022, at a cost of $525 million. This left a gap the Government would have been required to fill to induce private sector investment in the construction and operation of the terminal.*

The study seems very odd: -

- It was prepared by the Ministry of Transport with assistance from Treasury and the NZTA. KiwiRail was only consulted (Cabinet Paper, para 14).
- It gives a project cost of $338m, plus 25% contingency ($434 in 2014 dollars) but the figure in the press statement and Cabinet Paper is $525m.
- It is heavily 'redacted' (blanked out, under the Official Information Act), for commercial and don't-embarrass-the-Minister reasons. Some

[11] www.tfl.gov.uk/assets/downloads/businessandpartners/benefits-of-cycling-summary.pdf

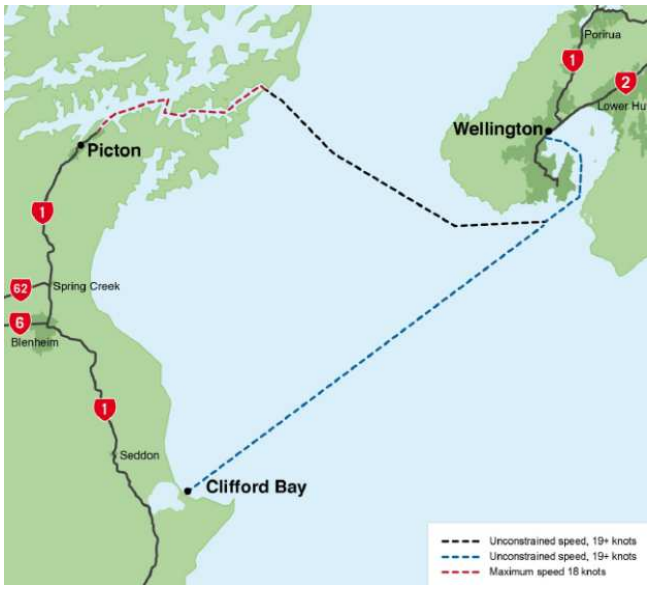
[12] http://www.resilience.org/stories/2014-01-02/2013-the-year-bike-sharing-came-of-age

[13] http://vimeo.com/streetfilms

[14] www.transport.govt.nz/ourwork/sea/clifford-bay-ferry-terminal-not-to-proceed/

of this is justified, such as operator estimates of passenger numbers, but half of 190 pages are completely blank.

- The BCR is given as 1.3, despite an earlier



Steven Joyce, Minister of Transport at the time, said: -

> *There is potential for cost variations that may yet undermine the economic and financial cases for the development. Before we make any final decisions about Clifford Bay, we need a detailed evaluation and a full business case.*[15]

The Deloitte study has not been published, despite a complaint to the Ombudsman that is apparently not resolved.

The study explains that the lower BCR is because some of the 'do minimum' investment originally thought necessary can be omitted. The result is a more robust base-case and a degraded BCR (page 11 of the study report).

Minister Joyce went on to say: -

> *The variance in BCRs is primarily due to the significantly reduced estimates of capital cost requirement at Picton and ferry operator cost savings.*

One reason for a lower BCR is using the NZTA's old evaluation figures (8% discount and 30 years, see *RoNS, WEBs and agglomeration* above), instead of the 6%/40 years used for most RoNS. Both estimates were made but the more favourable is redacted.

Eight percent is a reasonable financial rate for a commercial enterprise, as proposed, but unreasonable for transport evaluation when other and less useful projects are evaluated at the social discount rate of 6%. The OECD notes:[16]

> *The discount rate is normally the most crucial factor in whether medium to long-term projects pass a cost-benefit analysis.*

The project offers excellent time savings:

- 30 minutes on the ferry.
- 100 minutes by rail between Wellington and Christchurch, total saving 2 hr 10 minutes.
- 45 minutes by road between Wellington and Christchurch, total saving 1 hr 15 minutes.
- An **additional** 14 minutes by road between Clifford Bay and Nelson means a net saving of 21 minutes (slightly inconsistent figures here). About half of all passengers take this route, but the proportion of freight traffic is redacted.

The study report states (p 6): -

> *When viewed as a "sea bridge" integral to this national network, the time savings Clifford Bay delivers are orders of magnitude larger than any other enhancements currently under investigation for State Highway 1 or main trunk rail.*

Travel time savings on this scale are rare because the best benefits have already been realised. The time saving by road, 75 minutes, is greater than all the savings from road improvements between Picton and Christchurch in the half century since the ferry service started. For rail services it is much better still.

This one should be bullet-proof.

[15] Dominion Post, 11 November 2011

[16] OECD (2007). Use of discount rates in the estimation of the costs of inaction with respect to selected environmental concerns. *OECD Papers* 7(9), 1–42

The base-case traffic projection for the Cook Strait traffic, taken together, is about 1.7% annual growth (study Figure 12) but the units look odd. They are not tonnes, cars and passengers but 'millions of vehicle-deck lane-metres per year'. Calling it 'the commercial unit' (Page 45) is misleading because some lane-metres are worth more than others:

- Rail ferries have special needs;
- *Kaitake* has 1780 lane-metres in total but only two thirds are for trucks; and
- Vehicle-decks have corners. Cars fit into them, trucks fit to some extent and rail wagons not at all.

The markets for road-freight, rail-freight and passengers were evaluated separately and then lumped together, which glosses over the special case of rail ferries. KiwiRail needs rail-capable ferries because time is important: -

> *It takes too long to unload containers from a freight train on one side of Cook Strait, load them on a ferry and then load them back on a train on the other side.*[17]

The Interislander's leased *Kaitake* is 'not that difficult' to convert to a rail ferry but the critical feature is the vessel's beam, which is route-specific. The Cook Strait rail ferries are 20.5 m beam, compared with 22.5 or 23.4 m for the other vessels. Obviously, extra beam gives greater space and tonnage; see the table below.

Kaitake is slightly shorter than the (lengthened) *Aratere* but with no need to match the rail ferries' beam it has much greater tonnage and capacity (half again the lane-metres and over twice as many passengers) with economies to match. The ferries planned for Clifford Bay in 2002 were to be about 180 m length and 24–26 m beam[18] or up to about 25,000 tonnes.

A rail-ferry's beam matters because rail wagons cannot negotiate the ramps on a standard ferry. They need much more careful alignment of ferry and ramp, at all states of the tide. This needs a long 'link-span' to control the vertical angles, with its centre-line offset from the wharf edge by just half the vessel's beam.

Another common requirement is a rail 'fan' on the link-span, to save space on the ferry (photo - from Italy).

Rail to Ferry transition

Vessel name	Built	Tonnage	Length (m)	Beam (m)	Lane metres	Passengers
Arahura	1982	12,700	148	20.5	760	539
Aratere (as modified)	1998	17,800	184	20.5	1210	670
Kaitake	1994	22,400	182	23.4	1780	1650

Data for Cook Strait Interislander ferries

[17] NZPA, 3 June 2010

[18] *Rails,* 12/2002

The early rail ferries, from 1962, were smaller still, i.e. 18.6 m beam and around 4500 tons. Twenty years later *Arahura* was the first with the present-day beam of 20.5 m. Another 30 years later the ferries need widening again.

This will be why the BCR has halved since the Deloitte study. The principal benefits have been misunderstood and lost because KiwiRail was left out of the study. In practice KiwiRail is already struggling with wharf problems. The study states (Page 28): -

> [At Picton] *The Interislander berths are vessel-specific. When the Kaitaki is berthed, the adjacent road-rail berth cannot be used due to the Kaitaki's length and width.*

The National Infrastructure Plan (2010)[19] recognised the difficulty (Page 36): -

…a new interisland rail ferry is likely to be needed by 2016 to replace the ageing vessel Arahura. This may cost up to $250 million…

No replacement has been announced. *Arahura* will be well over 40 years old by the time Clifford Bay can be opened. KiwiRail has a problem beyond its control. Should it try to keep *Arahura* going until new berths can be funded, or order another small, less-competitive ferry? In either case it can only recommend.

The study has ignored a deadline and deferred critical decisions. The benefits included (without WEBs) are: -

- A reduction in travel time for freight and passenger users;
- A reduction in transport vehicles or vessels' operating costs;
- A reduction in safety and environmental costs due to a reduction in travel distance. (Are other benefits excluded?);
- A reduction in infrastructure costs. This is a benefit of cancellation.
- Induced demand from the freight sector resulting from travel time reduction;
- Residual value of the project—valued as the net benefit streams accruing to the project beyond the evaluation period. (What has this to do with long-term infrastructure provision?); and
- Other benefits (e.g. Picton infrastructure costs avoided, value of land recovered in Picton).

Despite a heavily redacted study the 'missing' benefits are fairly clear:-

- Larger and more productive rail ferries, matching the high capacity and low cost of competing vessels;
- Better use of capital because ferries can make three trips a day instead of two. Bad-weather reliability is also better because the vessels will avoid the worst part of the strait, beam-on to wind and sea;
- Fuel costs for rail freight reduced by 30% between Picton and Christchurch. The figure comes from a Brownlee speech[20] (footnote 12). It should be reflected in the second study benefit and should show greater savings because of bypassed rail gradients out of Picton and on the Dashwood Pass (2.7% and 2.0%). However, no check is possible; and
- Rail services are at least four times more fuel-efficient than comparable road services, improvable to six times with new locomotives and rolling stock. In an energy-constrained world there is little fruit as low-hanging as this.

Arahura is already achieving the benefit of three trips and *Aratere* can match it, but a three-trip timetable to Picton leaves very little time to recover from delays. Even this will be too much for replacement ferries. *Arahura* and *Aratere* are exempted from an 18 knot speed limit in the sounds, but *Kaitake*, Bluebridge and all future

[19] www.infrastructure.govt.nz/plan/mar2010/nip-mar10.pdf

[20] www.beehive.govt.nz/speech/speech-marlborough-chamber-commerce

ferries have to comply. In contrast, a thirty minute saving across the strait makes a three-trip timetable easy. In time, two new rail ferries could match the existing 3-vessel Interislander fleet.

Mainfreight and other road transport operators are building depots with direct rail access. New rail-wagon capacity, on the stretched Aratere, has been matched by new trains. The potential is illustrated by a press release from Mainfreight in May 2011. Managing Director Don Braid said:-

> *It is a big change for us. Absolutely it will increase the amount of freight Mainfreight puts on rail.*
>
> *We want to move more freight by rail and this gives us a quicker transit across the strait. But they must run ferries that can take rail wagons because we need that continuity.*

The PWC study (footnote 29) gives costs for shipping a twenty foot container, assuming $210 for cartage to rail. Taking the road cost as 100%, the rail cost from Auckland to Whangarei is 140%, to New Plymouth 100%, to Wellington 68%, to Blenheim 58% (rail is competitive on the strait) and to Christchurch 46%.[21]

The study looks at the economic (NZ Inc) and commercial (Port-Co) aspects of Clifford Bay. The economic BCR is 1.3 despite the missing benefits: it is the commercial case that fails:

> *This chapter describes the financial case for Port-Co, the entity assumed as building, owning and operating Clifford Bay, and assumed as having access to the private revenue described in the previous chapter. A simplistic but indicative funding model is used to determine if private sector owners of Port-Co would earn an appropriate financial return given the overall characteristics of the project. This enables a conclusion to be reached on whether Port-Co is viable as a project delivered by private sector investment, supported by private revenue.* (p 78)

A new port at Clifford Bay should not be KiwiRail-owned (TranzRail were clear about that in 2002) but the principal benefits are economic and should accrue to NZ Inc. Clifford Bay is predominantly a rail-ferry project.

A more robust and much more transparent approach would have seen KiwiRail call tenders for design, construction and operation, while keeping Treasury informed. KiwiRail could negotiate with Bluebridge or other operators as junior partners, offering them rates agreed with Treasury. Alternatively, Bluebridge might choose to stay in Picton and take over the tourist traffic. Another possibility, ignored in the study, is third party traffic such as logs.

The first target in implementing the KiwiRail Turnaround Plan (published only as a summary sheet)[22] is, 'A step change in the Auckland–Christchurch Route'. The figures above and in the article below show why, but a study beyond KiwiRail's control has put a spanner in the works.

New Zealand's reputation is spreading. An article by Dr Stephen Knight-Leniham in UK e-magazine World Transport Policy and Practice* reaches this conclusion

The paper demonstrates how a government's duty of care and requirement to exercise judgement in the best interests of its citizens can be undermined by what is a legal but arguably unethical use of executive power. In this case, New Zealand has lost momentum towards including meaningful ecological sustainability provisions in the national transport funding allocation process.

In particular, the 2009 and 2012 Government Policy Statements on Land Transport Funding dilute strategies to reduce transport-related greenhouse gas emissions, and pay little regard to empirical evidence showing cumulative ecological decline associated with land use patterns…

* www.eco-logica.co.uk/pdf/wtpp19.1.pdf

[21] This is the distance-advantage of rail, but other advantages mean it can be competitive over short distances. See the shipping article on Page 18.

[22] www.kiwirail.co.nz/uploads/Publications/kiwirail-turnaround-plan.pdf

5. SAVING RAIL

Saving KiwiRail is not yet guaranteed. Achieving it effectively means saving a freight railway, including the Cook Strait link. Long-distance passenger services are too small to make much difference and commuter passenger services are funded separately.

The Government's National Infrastructure Plan[23] (March 2010) struggled to be positive, but 13 months later, KiwiRail had a Turnaround Plan and Treasury had a Cabinet Paper[24]. Treasury found the right words without going as far as 'asset-stripping': -

> *16 Prior to 2004 investment in the rail network and associated rail services was minimal, leading to deterioration in the network and decline in service quality. The condition of the below track infrastructure and rolling stock continues to present serious fit-for-purpose issues. There has been a lack of a consistent and clear customer-focused strategy to preserve market position. This has led to a lack of customer confidence. There has also been an absence of organisational certainty due to differing ownership objectives.*
>
> *17 The net effect is that rail has lost relevance as a time-dependant freight option and has seen its share of the total freight task decline over time….*
>
> *18 The present assessment of renewals CAPEX indicates that 72% of the CAPEX budget is required to meet existing safety requirements* [and] *to maintain service levels, rather than customer service improvements.*

Treasury was positive, if not quite enthusiastic: -.

> *11 Rail has option value, and maintaining a rail network represents an insurance against changed future conditions, such as higher fuel prices. Once closed, it can be extremely expensive to reopen rail corridors, particularly if the land has been converted to other uses, so maintaining intact networks can keep costs down overall. This is particularly important given that forecasts indicate an approximate doubling of the current freight task by 2040.*

A real difficulty for any government is finding assurances that it isn't on the edge of a money-pit, but KiwiRail needs at least a partially open-ended budget. Maintenance arrears are so bad that KiwiRail is still in 'fire-fighting' mode, having to put effort into unplanned maintenance (Treasury's paragraph 18 above).

In the event, Pike River, two earthquakes and the lack of any contingency planning or funding ensured failure. Treasury had pushed KiwiRail too hard. One example is Clifford Bay. (see Page 10) Another is the first new locomotives for 30 years. TRP in a submission to the productivity commission[25] states: -

> *AC traction technology (rejected for KiwiRail's new Chinese built locomotives) means 2 new locomotives could do the work of 3 while improving reliability and cutting maintenance (Page 8)*

An essential part of the Turnaround Plan is wagons: over 500 so far and 3000 over the next decade, each with around 30% greater capacity than existing equivalents. A 2010 press release leaves the impression of a desperate hand-to-mouth operation.

> *…300 container flat deck wagons needed urgently to bolster an ageing wagon fleet…*
>
> *The average age of container flat wagons in our fleet is almost 30 years. Their age and condition is compromising our ability to meet the growing needs of our customers.*
>
> *The new wagons will enable us to respond to the market growth we are experiencing…*

[23] http://www.infrastructure.govt.nz/plan/mar2010/nip-mar10.pdf

[24] http://www.treasury.govt.nz/publications/informationreleases/budget/2010/pdfs/b10-cab-kgtp-14apr11.pdf

[25] www.productivity.govt.nz/submission-number-sub-002-0

Target Railway Progress is an independent consultancy.

Another real difficulty is KiwiRail itself. Despite some outstanding work, e.g. electrification in Auckland and Wellington, it needs a further culture-change, from contraction, make-do and survival to confident purposeful, expansion. That includes recruitment because many skilled staff are close to retirement. This kind of problem needs time and support, backed by consistent objectives and positive signals from the owner. One important signal is avoiding the temptation to fiddle with the structure. It isn't ideologically perfect, but nor is transport.

Treasury complains of KiwiRail putting too much focus on engineering, which is both correct and misguided. Marketing is critical but inevitably takes a back seat when all trains are committed or awaiting repair, or delayed by track repairs. Buying new rolling stock takes months or years, rather than days or weeks for a heavy truck. Treasury will see over-ordering as a cost, but Treasury is clear that New Zealand needs rail: -

> *52 Exiting rail freight in a managed manner avoids the cost of the current operating subsidies now and in the future…*
>
> *53 However, exiting rail removes the option value of rail meeting New Zealand's growing freight demand and has significant risks associated with the management of the exit. We do not consider this to be a viable alternative.*
>
> *54 There is little to commend the status quo option in terms of the wider benefits it might generate. Volume and revenue growth might keep pace with GDP growth, but rail would stand still relative to the competition, and a more likely outcome is that rail would lose ground in terms of relevance and market share. The bare minimum of asset renewal and maintenance would mean ongoing risks around reliability and safety. The end-result is likely to be insolvency and receivership – in effect an unmanaged exit, with higher Crown costs.*

It will be tough: -

> *3 …The objective of the Turnaround Plan is for [KiwiRail] to become, within 10 years, a sustainable freight business that is able to fund its ongoing operating and capital expenditure solely from customer revenue.*
>
> *4 The Turnaround Plan envisages total capital expenditure over 10 years of approximately $4.6 billion, of which the Crown is being asked to contribute some $1.1 billion, largely in the first five years, to complement funding generated from customer revenue. This is achieved by retaining, within the business, all cash surpluses that arise from the increased revenue streams rather than paying any dividends to the Crown.*

KiwiRail has had 844 million so far, but there is a larger gap here. How can it self-fund recovery from asset-stripping, when 72% of capital expenditure goes to meet existing safety requirements and maintain service levels? The plan is to attract new traffic by speeding up the Auckland–Christchurch run by two hours (Treasury, para. 29, higher figures given elsewhere). The figure is rising as RoNS and heavier trucks are funded much more generously.

A very interesting commentary on all this is given by TRP: -

> *We do not advocate pouring more money into the railway sink-hole and hoping for a better result. Based on the innovations outlined in this paper we claim that the following specific targets for rail freight, although challenging, are perfectly achievable by 2023:*
>
> - *Increase average transit speed on key routes by 20%*
> - *Reduce real freight rates by 20%*
> - *Increase rail freight NTK* [net ton-km] *by 100%*
> - *Reduce energy consumed per NTK by 20%*
> - *Become the dominant player on the Auckland-Wellington-Christchurch general freight route.*
>
> *Yes, investment is required and this is going to have to come from the public purse. We believe*

that an investment of the order of $NZ 2 billion would be sufficient to bring this about, offset by rail access charges.

If the alternative is the commercial demise of rail in NZ triggering an orgy of road-building, this will be a nation-saving investment.

This is much more detailed and positive than Treasury. In outline, the proposed TRP innovations are: -

- Increase curve speeds by raising the 'cant' (the outer-rail height above the inner rail). The present maximum is 70 mm, to cover the possibility of an unevenly loaded wagon tipping inwards if stopped on a curve. The proposed work-around is in-motion axle-load detectors, already widely used and able to detect uneven loading. This and larger radius curves in key places will bring the largest time-savings.
- Increase the maximum service speed for freight trains from 80 to 100 km/hr. Most existing and all new rolling stock is suitable.
- Introduce electronically-controlled pneumatic (ECP) braking to overcome two weaknesses of the existing system, i.e. it is slow to apply brakes on long trains and cannot part-release them. A driver wishing to increase train speed on a down-grade must fully release the brakes and the speed may be dangerously high before they can be reapplied. ECP is described as a game-changer. It makes heavier trains practical, with shorter emergency-stopping distances, and trains are about 10% faster because they are easier to handle.
- Increase axle loads, from the present 18 tons (14 tons for many existing wagons) to around 25 tons. Locomotives can be more powerful and wagons more productive. Queensland already uses 26 tons on the same track-gauge as NZ. (At one stage Ontrack were proposing 22.5 tons, and the World Bank rail sector toolkit[26] [p25] says that China, Russia and India use 22.5 tons: it might be enough.)
- Increase clearances for train height and width. This has been going on for years and most clearances are more generous than the originals, but some main routes could do with more. An important milestone is space for new containers 3 m high. (Another milestone might be engines and wagons 'as big as in Queensland or South Africa'—both use KiwiRail's 1067 mm track gauge. This would bring KiwiRail into a much larger rail-vehicle market, including second-hand.)
- Electrify main routes, initially Auckland—Tauranga. TRP states: -

  It is commonly acknowledged that rail freight uses at most 25% of the energy required by road transport to perform the same task. So merely by enabling a modal shift from road to rail, an enlightened transport strategy could make deep cuts in NZ's fossil fuel dependence and carbon emissions. But by joining the worldwide trend to electrification even greater gains could be made in emissions and energy-use. (TRP could also have noted that New Zealand has very low-carbon electricity)

Summarising, TRP states (Page 9): -

All this shows that Rail is sitting on considerable untapped potential to reinvent itself and enable it to offer the business community faster and cheaper freight services. With just the measures outlined we could see freight trains of 3000 and (once some loops and terminals are lengthened) 4500 tonnes, running 3 hours faster over the Auckland-Wellington route that is the key to KiwiRail's future relevance. As freight volumes increase, instead of running more trains KiwiRail would merely lengthen each train, keeping the timetable simple and robust and labour and capital productivity rising.

[26] www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/PDFs/WB_toolkit.pdf

6. A SHIPPING REVOLUTION

New Zealand exports in the 1850s often involved transhipping wool bales in the surf, from horse-drawn wagon to longboat or scow. By 1900, 10,000 ton steamers could be filled with grain, wool, meat and dairy products, and rail was a big part of the difference. Now, larger container ships are calling at fewer ports, and railways are still very effective at filling large ships.

The industry has signalled export container-ships calling at only one principal port in each island. The future could be modern ships carrying around 7,000 twenty-foot equivalent (TEU) containers, to be transhipped in Singapore or Hong Kong. Or it could be older ships carrying around 4,000 TEU, to be transhipped at Sydney or Brisbane (and perhaps transhipped again at Singapore or Hong Kong). Direct container shipment is rarely economic for long distances: bigger ships and transhipments are the way to go: up to 17,500 TEU so far. With New Zealand's long-distance exports the cost difference matters. A study by PWC (11/2012)[27] plays down the uglier Sydney/Brisbane option but is hardly comforting:

> *It is unlikely that this trend will result in a large share of New Zealand's international trade being 'hubbed' through Australian ports.*

A related development is 'inland ports' with port facilities, rail access and a regular rail shuttle service to a main port. The Port of Tauranga runs 'Metroport' in industrial south Auckland, which saves on delivery costs for shippers in Auckland. The port saves on costly dockside storage space, and has the containers arrive at a known time, in a known order, with customs and bio-security clearance already complete. Over half of all export and import container freight through Tauranga now goes by rail.

Inland ports are becoming popular:

- Wiri in south Auckland, serving Ports of Auckland;
- Te Rapa, near Hamilton, owned by Fonterra and serving either Auckland or Tauranga;
- Woolston, in Christchurch, owned by the Port of Lyttelton; and
- Rolleston, south of Christchurch, serving Timaru and likely to open in 2014.

Rolleston is interesting.[28] Timaru has recently lost its export container traffic, but now Tauranga has bought a half-share in the port and a concession to operate the under-used container terminal. This might mean coastal shipping to Tauranga.

The large-scale container-shipping problem is the same as a century ago—how to load a big ship quickly. Today that means within about 20 hours, for a two-tide call. Ports lack the space to stockpile enough containers and the answer is rail shipments from inland ports. Filling the gaps without KiwiRail would be a nightmare.

The government doesn't seem interested in ports policy, despite studies and lobbying. The PWC study was funded by the northern North Island regional councils (many ports are still owned by the local authority). Doing nothing risks a last-man-standing battle between port companies, with stranded assets, bankruptcies and new monopolies. Is this really the best way to reform crucial exports?

A few years ago, as a transport policy-wonk, I chatted with the deputy CEO of one of these ports and he said pointedly, "*If the government were to announce an upgrade of the North Auckland Line, with a link to Marsden Point, that would be a very powerful signal.*"

Marsden Point is the only New Zealand port that can take 7000 TEU ships without dredging—but bringing the railway up to a high enough standard would be costly.

[27] http://www.nrc.govt.nz/Resource-Library-Summary/Transport-publications/Upper-North-Island-Ports-Study/

[28] www.stuff.co.nz/business/industries/9563550/Cargo-snarl-sparks-call-for-inland-port

7. WHAT TRANSPORT POLICY?

The present government shows every sign of satisfaction with dysfunctional transport policies, regardless of cost to either NZ Inc. or the environment.

What would be the social-benefit effect of scrapping the less useful bits of Wellington's Northern Gateway, say the Kapiti Expressway, and going ahead with Clifford Bay instead? We don't know and it won't happen whilst funding is segregated. We can be fairly sure Clifford Bay is a good buy and very sure that the Expressway is a bad buy, but we have no realistic way to prioritise such choices.

Another hint of trouble is in the Treasury paper on the KiwiRail Turnaround Plan:

> *For the [KiwiRail] freight business to move to commercial viability requires the removal of any cross-subsidisation of metro costs.*

A complex EU paper on this topic boils down to three words: Keep It Simple. Removing all cross-subsidies is a fantasy, but mitigating the most important ones is achievable. The NZTA tried separating car and truck costs. The best they could manage was costing a notional road system for cars only, and another for trucks only. The ratio of notional capital and maintenance costs gave the best-estimate cost split on the real system. It is easy to pick holes but very hard to do better.

Rail has similar problems. Auckland City has decided to extend the metro 25 kVAC electrification to Pukekhoe, 53 km south of Britomart, which will be handy when electric freight trains run to Taruanga and Wellington. On the other hand, Ports of Auckland is looking at a thirds track to Wiri, to carry inland-port services during peak commuter hours.

Intermodal is even harder. The best available information is from the Ministry of Transport's study of *Surface Transport Costs and Charges* in 2001 (STCC, 2005: The study is no longer on the web, still with no timetable for new studies).

The standout figure on the roads is $30.4bn for road users own costs, at least 85% of the total. Even the most radical changes could hardly push up total costs by more than 10%. Even that is much less radical than it sounds, because freight transport costs are not isolated. The important figure is the combined cost of transport and logistics, generally about double the cost of transport. Even small changes promote logistic changes which minimise the overall effect.

STCC identified the 'fully allocated costs' of road as $5.6 billion (or maybe 3.6 billion), offset by user and related charges of $3 billion (Table 3.1). Much of the difference lies in arcane economic interpretations and some figures are described as probably within half to double the mid-point estimate. Widespread criticism was inevitable, but no critic put up a detailed case for other figures.

> *User-pays is best, so long as it affects somebody else. Anon*

Road users are certainly subsidised, but by how much? Comparative costs indicate the scale. On the roads, truck operators paid 56% of their true costs, including capital charges and externalities such as noise and pollution. Cars paid 65%. On rail, freight trains paid 77%.

A 2008 IPENZ study, *Transport: engineering the way forward*, commented: -

> *We consider that there is no absolute right way to distribute capital costs to users, and that there should be consistent treatment of capital cost allocation within the modes of road, rail and sea to avoid inadvertently favouring one mode. This also raises the issue of the current public funding allocation criteria which favour incremental development and have difficulty in determining the optimal allocation of funding to modes.*

A 1995 conference paper by Murray King[29] draws attention to three main areas where road/rail competition favours road: -

- Safety is much more costly for rail, and the difference really shows. KiwiRail has investigates many 'incidents' which might conceivably have caused injury, but the total deaths and serious injuries are very largely trespassers and on level crossings. These are the incidents KiwiRail cannot control. It has even been argued (for example *The Economist*, UK 12/2/1992) that making passenger rail **less** safe would make transport cheaper and safer overall. Cheaper fares would attract more passengers to rail and make the roads safer.
- Payment for Infrastructure. King notes: -

  Nowhere does roading have a balance sheet, despite a total value of the roading assets of $26bn.
- Cost recovery, as discussed above.

An example of the many problems facing rail freight is a 4500 ha logging operation near Dunedin,[30] which considered transferring logs to rail at a siding in the forest. Some logs went to export and some to a board mill.

- Rail would cost the logging company $5m more than road, or about the same as road if another customer could share the train. However Toll Rail were only prepared to charter and there was too little time to find another user.
- Road would cost the community $7 million more than rail, mainly for truck crashes.

In the end the decision was road because the company ran out of time.

Part of the trouble was scrambling to find money for infrastructure either not needed for road or readily fundable for road but not rail. Neither Port Otago nor the board mill had sidings suitable for accepting logs.

Today, many countries are investing heavily in rail and rail electrification. One example is Israel, with a larger population than New Zealand in a tenth of the land area. TRP says: -

> *Israel has announced plans to double its rail freight capacity and increase rail's domestic container market share from 8% to 25%, by 2020. In so small a country this is a reminder that rail is not just for long-haul freight…*
>
> *And KiwiRail's outrageous success in the short-haul high-cycle Auckland-Tauranga container trade proves a point: does anyone now believe all that traffic should be carried on road? And would we not say the same once the main trunk became equally successful?*

Ireland is another small, none-too-wealthy country investing heavily in rail, but very few countries can match New Zealand's advantage of near-sustainable electricity. It is time for new commitments to rail:

- Invest aggressively in KiwiRail, to achieve clearly defined objectives within ten years, focusing particularly on express freight on the Auckland–Tauranga and Auckland–Wellington–Christchurch corridors. The objective should be an economically viable KiwiRail.
- Close branches cautiously, if at all, and sell easements very cautiously. The Wairarapa and Stratford–Taumarunui lines back up difficult sections of main line.
- Put road and rail onto similar capital structures, with both paying an effective charge for carbon emissions.
- Seek broad political support for long-term continuity.

It is often said that rail is uncompetitive because of high fixed costs, but is this mainly because road and rail costs are handled differently?

[29] Summarised in *Rails*, October 1995.

[30] NZTA Research Paper 370, Box 5.1 and some personal knowledge.

SMART TRANSPORT VISIONS FOR AUCKLAND AND WELLINGTON

By Paul Young, Generation Zero

New Zealand stands as one of the most car-dependent nations on the planet according to a range of indicators. Imperatives for progressing to a more sustainable transport mix with higher public and active transport mode shares are increasingly clear (and I assume well-known to EnergyWatch readers).

The good news is that Kiwis are moving in the right direction. While certain politicians continue to assert that 'Kiwis just love their cars', per capita car travel and ownership are declining, use of public transport and cycling are on the rise, and public opinion has swing firmly behind investment in these modes[31].

However, you wouldn't guess this from looking at current transport plans for our two largest urban centres. In Auckland, while Mayor Len Brown has been very effective at advancing a public transport vision for the city's future, the 30-year, $34 billion Integrated Transport Programme (ITP) still involves spending the lion's share of the budget (72%) on new roads. The projected outcomes (as far as transport models can be trusted) have road congestion still worsening dramatically and carbon emissions increasing by approximately 21% by 2040 – in flagrant conflict with the Auckland Plan target of a 49% reduction.

In Wellington, transport plans are even more dominated by road projects as a proportion of total capital spend. The vast majority is contained in the Wellington Northern Corridor: a package of motorway projects between Levin and Wellington Airport advanced as one of the National Government's seven RoNS projects. The NZTA estimates the total cost at $2.5 billion (in 2012 NZD). However, with at least one of the projects (Transmission Gully) planned to be funded through a public-private partnership, the total cost will likely be much higher as a result of interest paid on debt.

Mirroring the Auckland situation, a study by Opus Consultants[32] projects that the current plan would fail on virtually all "key outcomes" sought by the Wellington Regional Land Transport Strategy. The results include:

- Reduced mode shares for public transport, pedestrians and cyclists;
- Increased greenhouse gas emissions;
- Increased travel in congested conditions; and
- Slower average freight speeds.

The study directly attributes these outcomes to the RoNS encouraging a shift to car travel.

So, is New Zealand resigned to a future of gridlocked cars spewing ever more carbon into the already full atmosphere, or is there a better way?

The Congestion Free Network

We teamed up with the bright sparks at TransportBlog to develop a new Auckland transport plan. We call it the Congestion Free Network (CFN).

The CFN isolates the top layer of the PT network and shows how this can be expanded and connected, while remaining integrated with the other layers (e.g. local bus networks) to form a complete system. CFN transit services must fulfil three conditions:

- Physically separated from congestion by dedicated right-of-way;
- High frequency service of 5-10 minutes; and
- Efficient transfers to work as part of a complete network.

31 See for example http://bit.ly/1iQ3m1e

32 Available at http://bit.ly/1eFFlXX

Our plan prioritises investment in most of the PT projects in the ITP, adds some new projects (such as light rail on Dominion Rd), and scales back many of the roading projects.

In total, we expect that the complete CFN (shown in Figure 2) could be built for less than $10 billion spread over 17 years. Following completion, 40% of the regional population will be within walking distance of a train or bus station (less than 1 km). With complementary investment in improved cycling amenity, the majority of Auckland's population will be within easy reach of high frequency public transport.

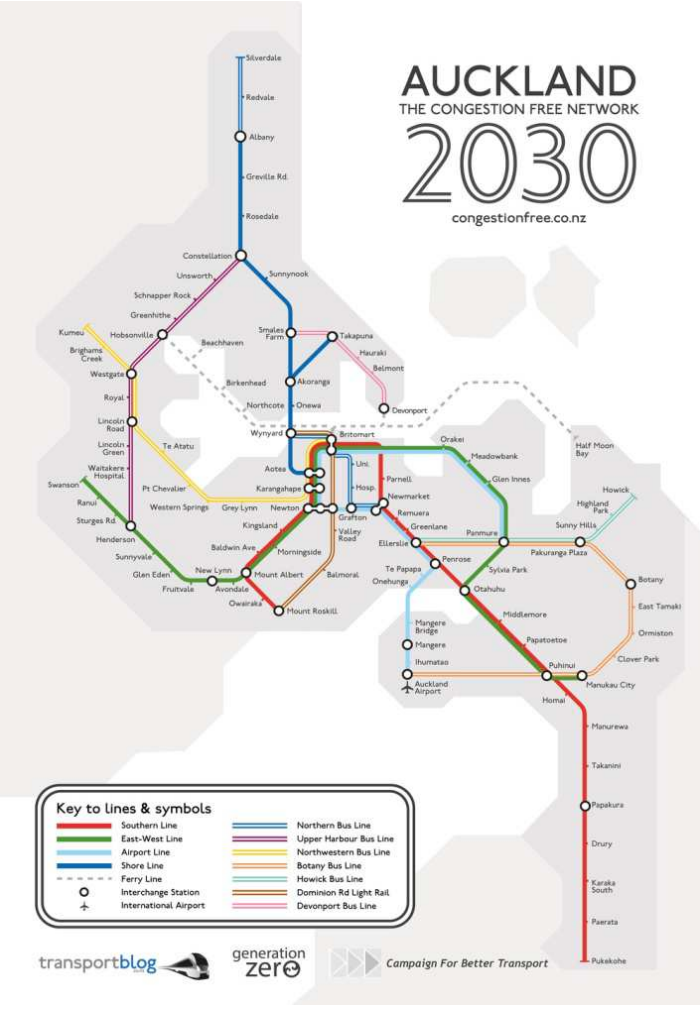


Figure 2: Map of the completed CFN. Maps showing the development in five year intervals can be viewed at www.congestionfree.co.nz.

As for road projects, in very few cases do we advocate completely removing a project contained in the ITP. Instead, we've opted for lower cost solutions because what has been suggested is overkill for the problems actually faced. Examples of this are the Puhoi-Wellsford upgrade, East-West Link and Airport roading upgrades. Other major projects (e.g. AMETI) are included unchanged, though some may be delayed.

In terms of cost, the headline figure is a reduction in expenditure on roading projects from $21.7 billion to just $7 billion. The total cost (roads + PT) of approximately $16.5 billion is roughly half what is proposed in the ITP.

More information on the CFN can be found at www.congestionfree.co.nz.

Fast Forward Wellington

In Wellington, we've worked with transport researchers at Victoria University and other independent analysts to develop a multi-modal transport plan: Fast Forward Wellington (FFW).

While focusing more on Wellington City due to its higher population density and current lack of rapid transit infrastructure, FFW is a region-wide plan. It centres on three main components:

1. A high quality, congestion-free PT network following the same principles as the CFN.

   Light rail is chosen as the main mode for Wellington City to progressively replace high frequency bus lines, for reasons including greater capacity through the narrow CBD corridor. Light rail also provides the opportunity for continuous tram-train services through the station if this becomes viable in the longer-term. The first step is a light rail line from the Railway Station through Newtown to Kilbirnie, for an estimated cost of less than $400 million. Over future years the network is extended outwards to the Airport, Island Bay, Miramar and Karori. Bus-only lanes are also planned for Porirua, Wainuiomata, and Brooklyn.

2. A comprehensive separated cycleway network, comprising around 150 kilometres throughout Greater Wellington. This would work in conjunction with more on-road cycleways and traffic-calming measures to

make the streets safer for all cyclists. With funding of around $20 per resident each year, matched by central government, we estimate this could be completed within a decade.

3. A region-wide car share system, with upwards of 200 electric or high efficiency vehicles rolled out across the region. Car share customers pay a subscription plus a per-use fee, and can rent a car for minutes, hours or days at a time with little notice required. This gives people the option of not owning a car but having the service readily available when they need one. Martin & Shaheen (2011) found that for every car share vehicle put in place, 9-13 vehicles are dropped by owners in the area.

FFW also includes new pedestrian areas and bridges in Wellington City, and a $1 billion fund for improvements to northern rail services. In total, the estimated capital cost is $2.8 billion: similar to the planned expenditure on the Wellington RoNS alone.

Would this work?

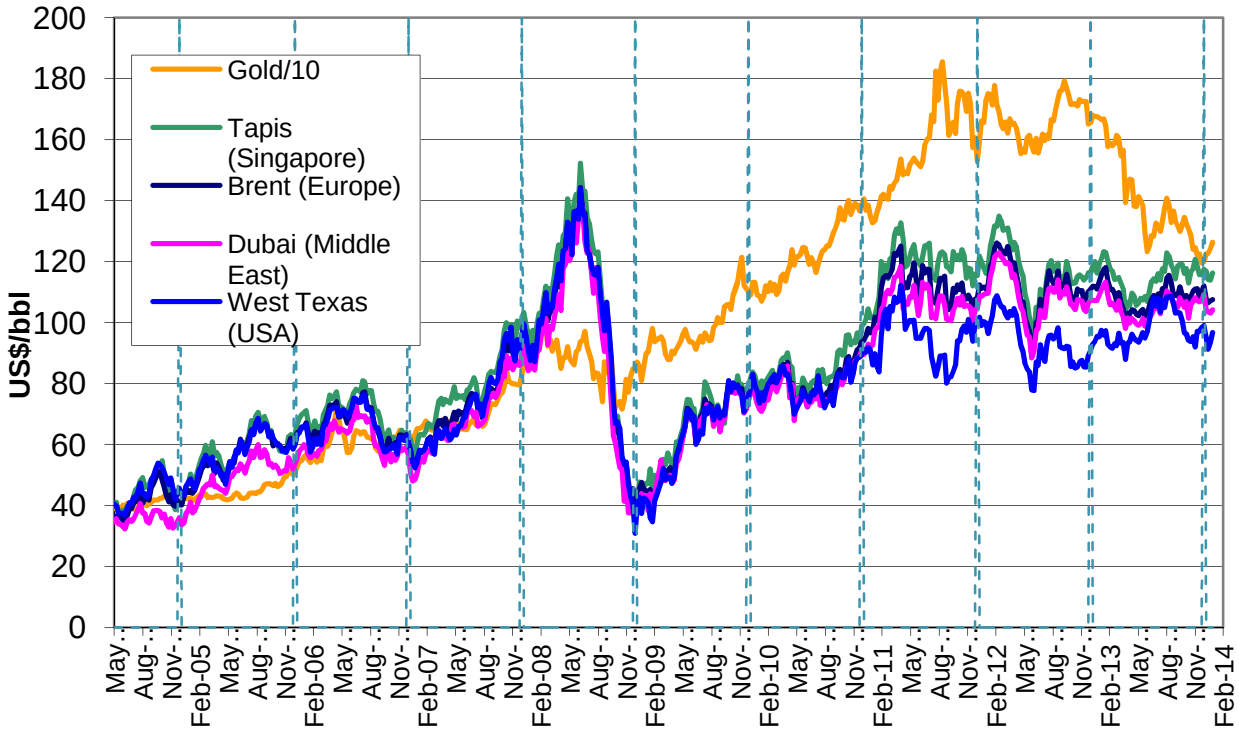
Nothing in what we are proposing is revolutionary. It has all been proven to be excellent value and highly utilised when well-implemented in comparable cities overseas and in New Zealand.

Recent investments in quality public transport show that when you build it well, they will come. For example, Auckland rail patronage has increased nearly five-fold since Britomart opened in 2003, and the Northern Busway has been a huge success, with 51% of people now entering the city from the North Shore in the morning peak by bus. In both cases, outcomes have eclipsed earlier projections.

Looking again at the projected outcomes from the current business-as-usual plans, one question that comes to mind is: 'What do we have to lose?' *Paul Young, Generation Zero*

More information and maps can be found at www.generationzero.org.nz/wellington.
For more info, see the following posts on Transportblog: http://bit.ly/10uSD6H, http://bit.ly/1eAav5U, http://bit.ly/UvbNGh

Neil's Oil Price Chart



Join our sustainable energy news & discussion group

SEF Membership provides a copy of our quarterly EnergyWatch magazine. In addition, many members find the SEFnews email news and discussion facility an easy way to keep up to date with news and views as it happens. The discussion by the group of sustainable energy "experts" who have joined the service offers an interesting perspective.

Non-members are invited to join the SEFnews email news service for a trial. To do this send a blank email to: <SEFnews-subscribe@yahoogroups.com>. To help us stop spammers, non-members need to supply a name and contact details, and a brief statement of their interest and/or involvement in sustainable energy issues, before their trial is approved.

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Publication is now quarterly, and EnergyWatch is posted on the SEF website (www.energywatch.org.nz) as a PDF file, shortly after individual distribution to SEF members.

Contributions Welcomed

Readers are invited to submit material for consideration for publication.

Contributions can be either in the form of Letters to the Editor or short articles addressing any energy-related matter (and especially on any topics which have recently been covered in EnergyWatch or SEFnews).

Material can be sent to the SEF Office, PO Box 11-152, Wellington 6142, or by email to editor@sef.org.nz, or by directly contacting the Editor, Steve Goldthorpe at PO Box 96, Waipu 0545.

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Low income/student	$30
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