Extended Abstract by Paul Minett for the Third International Conference on Clean Mobility and Energy, with the theme of 'Powering prosperity through innovation and clean mobility'

Light fleet fuel purchase cap-and-trade system to encourage innovation and clean mobility

Track 2: The future of urban mobility at a time of digitalization, artificial intelligence and vehicle automation

Sub-track: Which policy instruments best align innovation with public outcomes?

Keywords

Downstream cap-and-trade, light-fleet emissions, elasticity of demand, upstream cap-and-trade, complementary policy instruments.

Motivation and research question(s):

New Zealand has an upstream emissions cap-and-trade scheme (the NZ ETS) that puts a single economy-wide price on emissions, including on emissions from burning transportation fuels. The transportation sector (alone) has continued to experience increases in emissions in spite of many years of the NZ ETS.

Separately, the country is committed to transitioning the petrol light fleet away from per litre fuel excise duty (FED) for the fleet's contribution to transport system costs, to a per kilometre road user charge (RUC). The petrol FED to RUC transition will remove an implicit energy and emissions efficiency discount that existed for more energy efficient vehicles and reduce costs for energy inefficient vehicles, possibly causing an overall increase in VMT and fuel consumption, and a blow-out in emissions.

The research was designed to answer three questions:

1. Does the price of petrol have any impact on the decision-criteria of vehicle buyers (so will rising prices of NZUs drive a reduction in average emissions of the light-vehicle fleet)?
2. Will there be a blow-out in petrol consumption and emissions when the switch from FED to RUC is implemented? and,
3. Could a downstream cap-and-trade system of allowances for purchase of fossil-fuel for use by the light fleet, with a sinking cap, help reduce emissions from the light-vehicle fleet, and if so, what would be involved in putting such a system in place?

Contribution and positioning

Emissions from the global light vehicle fleet continue to grow, and innovations must compete with a status quo (the fossil-fuel and automotive supply chain industry) that has its own built-in resilience. In New Zealand the government eschews transportation emissions-reducing strategies because it expects the NZ ETS to fulfill this role. Economists support this position. However, this expectation is misplaced because the price of emissions under the NZ ETS is unlikely to ever be high enough to have enough impact on mode choice on a trip-by-trip basis, and the transition to electric vehicles is happening too slowly.

Firm in the expectation that the NZ ETS will do its job, policymakers refuse to consider the need for complementary solutions related to urban mobility. Policymakers acknowledge that the NZ ETS is 'broken' at the moment but are confident that it can regain credibility and then it will do its job. This is misplaced confidence.

The project considered a complementary solution in the form of a downstream cap-and-trade system. The NZ ETS emissions price would remain within the price of the fossil fuel. The specification for the downstream solution was developed to maximise societal acceptance, focusing on equity rather than equality for free distribution of allowances to all adult citizens.

The idea of a downstream emissions cap-and-trade solution is not new, but potential implementation alongside an existing upstream solution is new. The idea of downstream cap-and-trade was generally rejected by policymakers when previously considered. This was before the rise of electric vehicles (EVs) and the approaching parity of manufacturing costs of EVs and combustion vehicles. Raising the idea for reconsideration is new and timely.

This matters because a new economic instrument that puts a real cost on conventional mobility would encourage innovation and clean mobility uptake.

Data and methods

I carried out a desk-based stock-take of the tools New Zealand is using to bring about reductions to light-vehicle fleet emissions.

I gathered and summarised international and New Zealand literature about 1) the estimates of elasticities of petrol consumption and vehicle purchase decisions to petrol price changes, 2) the concepts and experience of downstream tradable allowances systems, and 3) other relevant topics as they arose throughout the project.

I gathered and analysed New Zealand data to estimate the New Zealand elasticity of vehicle emissions-related purchase decisions to petrol price changes.

I interviewed vehicle dealers about any relevant data customers receive regarding the expected future prices of fossil fuels, and as a result dug deeper into the details of New Zealand's Clean Car Standard.

I used New Zealand 'Whole of Government' agreed CO_2-e shadow prices for 2025-2070 to forecast the average price of petrol each year, and used estimated elasticities to predict the impact of changes in the price of petrol on the overall consumption of petrol each year and the emissions profile of additions to light-vehicle fleets each year.

I obtained the emissions profile of the current petrol light-vehicle fleet and other relevant data and estimated the change in emissions that might occur when the transition occurs from FED to RUC for petrol vehicles.

I estimated the emissions profile of the fleet through to 2050, modelling different assumptions of interventions including fossil-fuel-vehicle import bans at different years, business as usual, and a downstream tradable fossil-fuel purchase allowance system with a sinking cap.

I developed a strawman specification for a downstream cap and trade system and reached out to experts in the tradable rights field. Together with the Ridesharing Institute I hosted an international online symposium of experts that discussed the overall approach and critiqued the strawman.

Finally, I revised and refined the strawman specification, drew conclusions and drafted recommendations, submitted a draft report for peer review, and incorporated the peer review feedback into the final report.

Key results

Key finding #1: The NZ ETS does not, will not, and was never likely to reduce light fleet emissions to any great extent in the 2050 timeframe. The reason is that the price impact is **trivial** within expected carbon-price scenarios given the low elasticity of fuel purchases to fuel price. This matters because politicians, officials, and economists do not (or choose not to) understand. See Figure 1 for the result of modelling the impact the shadow prices for carbon out to 2070 have on the price of petrol and emissions from petrol vehicles.

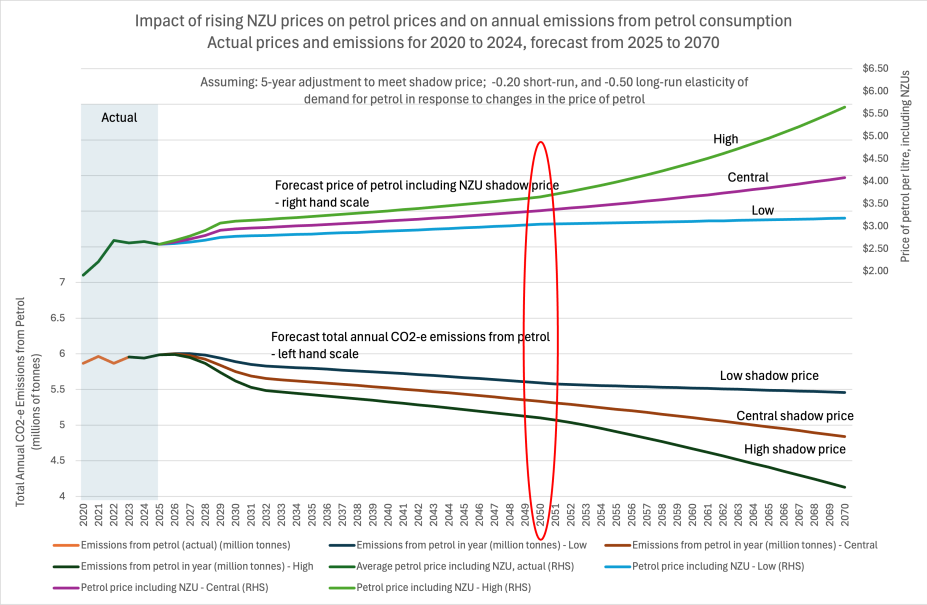

Figure 1: NZ ETS impact on PETROL prices and petrol vehicle emissions assuming 2025 whole of government agreed shadow prices to 2070. The NZ ETS price is included in petrol prices based on the emissions impact of each different petrol grade.

Key finding #2: **A downstream cap and trade system** could be a perfect complement to the NZ ETS to help reduce emissions from the light vehicle fleet, with substantial co-benefits including: positive environmental/climate change impacts; productivity gains (do more at lower costs); better health outcomes (from cleaner air); reduced fiscal risk (under the Paris

Agreement); improved equity (through system design); enhanced resilience (fuel stocks last longer); reduced congestion (more shared trips); and more.

Compared with bans on imports of fossil-fuelled vehicles, the downstream cap and trade system has substantial economic present value gains.

Policy implications

Countries rely on policy settings in other countries as reference points for their own policy decisions. As countries seek policy settings that will bring down emissions, including from the light vehicle fleet, the very existence of the NZ ETS that includes transportation fuel serves as a beacon. An upstream ETS in other countries might be more effective than New Zealand's, but without clear statements about the limitations of the NZ ETS, it would serve as a false beacon.

Investigation of NZ ETS from other countries might reveal that, for various reasons, the NZ ETS is broken, but that there is an expectation that when it is fixed it will do its job on light fleet emissions. Other countries might then reason that if they do a better job of implementation, their own ETS efforts would be successful. The broken-ness, and confidence of efficacy when repaired, potentially make the NZ ETS an even stronger false beacon.

Successful implementation in New Zealand of a downstream cap and trade system could serve as an exemplar complement to ETS in other countries where ETS is already, or becomes, a key tool for bringing down emissions from the light vehicle fleet. With international support, New Zealand, especially because it is a wealthy island nation, could serve as an exemplar for finding the political courage to pilot a nationwide downstream cap and trade system that would lead to light fleet emissions reduction with substantial co-benefits. Success would likely be emulated worldwide, leading to greater and faster uptake of innovation and clean mobility everywhere.

Design and implementation would require careful consideration of concerns raised, including complexity, equity, impact on business, lack of political courage, potential for hoarding of allowances, and risk of political interference over time. All would need to be addressed.

The research project that this proposal focuses on was completed in late 2025. The proposed presentation would include reporting on subsequent efforts to engage decisionmakers in New Zealand about the findings of the project.

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