

Energy Centre Energy Research Briefings

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The Energy Centre's research team targets top international peer-reviewed journals as their benchmark. The Energy Research Briefings series translates their work into plain language summaries for businesses, government agencies and the community, highlighting the impacts for practice and policy.

Where and how to decarbonise in New Zealand: Lessons for firms, investors and policymakers from recent emissions drops

Forty percent of New Zealand's (NZ) greenhouse emissions come from producing and consuming energy. This 40% is much easier to tackle than the 50% from agriculture. So energy researchers, policymakers, company planners and investors will welcome a recent complete profile,* both nationwide and sector-by-sector, of energy-related emissions. The study ingeniously twins two methods: "environmental inputs and outputs analysis" and "structural decomposition analysis". By minutely dissecting NZ's emissions drop of almost 3% over 2007-13, it draws lessons for where and how to decarbonise to reach the far more demanding national target of net zero by 2050.

Immigration-driven population growth, plus greater consumption and production per head, put upward pressure on emissions over 2007-13. Fortunately though, key falls in "emissions intensity" – CO₂ or equivalent per unit of GDP – outweighed that pressure, as the Emissions Trading Scheme set a sinking lid on cheap carbon. The Electricity Generation sector scored top marks. It slashed its intensity by switching to renewables. Other sectors at least shaved their intensity, partly by more efficient production. Where increased carbon intensity raised emissions, as in Chemicals, electrification might be possible. High-end manufacturers are on notice to use less emissions-intensive methods.

Transport released nearly half of "direct emissions" – ones a sector can control. It also accounted for almost a quarter of indirect emissions, through the likes of upstream CO₂ in building roads. Decarbonisation should prioritise this sector. Urgent policy priorities include more incentives for electric vehicle (EV) adoption, so far just 1.2% of light vehicles, and faster expansion of charging infrastructure. That said, question marks remained over the carbon impact of EVs' manufacture and importation. The study also urged behaviour change. Typically that means getting ourselves out of cars and planes and onto buses, trains, Shanks' pony (i.e., good old-fashioned legs) or (e-)bikes.

Greening strategies in Transport and Electricity should dovetail. Among the most promising resources in NZ's quest for 100% renewable generation by 2035 is wind. But long-term wind investment only pays if electricity demand rises. Electrifying transport could give just the fillip needed. And for consumers, an EV plugged into a home's solar power microgrid dovetails by doubling as an overnight battery. Earlier Energy Research Briefings feature Energy Centre findings on both complementarities.

In what economists call final demand, all energy emissions end up feeding either private consumption, government spending, investment spending or exports. Consumption always dominates. Strikingly, the research reveals that in 2007-13 exports overtook government spending in their emissions toll, probably boosted by the 2008 NZ-China Free Trade Agreement. Policy can target consumption and exports, which heavily impact indirect emissions. NZ consumers were already opting for carbon-light purchases; energy-efficient building standards, Energy Star-rated appliances and schemes to retrofit insulation could build on that. Lastly, while a full picture of trade effects was beyond this study, NZ's export mix should reduce the share held by carbon-intensive products.

** For the full article by Le Wen, Fengtao Guang, Yiqing Wang and Basil Sharp see "Decarbonization in New Zealand – where and how: a combination of input-output approach and structural decomposition analysis", New Zealand Economic Papers, 2023, DOI:10.1080/00779954.2023.2196676*