

Energy cultures: breaking out of business-as-usual

Dr Janet Stephenson, Centre for Sustainability, University of Otago

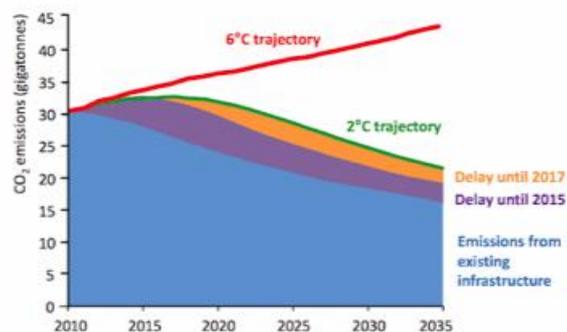
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The globe faces an energy T-intersection: one way leads towards a liveable planet with a transformed energy system, the other towards business-as-usual and global catastrophe.

The thousands of scientists who in 2007 agreed that climate change was 'unequivocal' and 'very likely caused by human actions', have been now joined by a growing chorus of concern at the reality of the rapidly unfolding consequences of climate change. Lord Nicholas Stern (author of the ground-breaking Review on the Economics of Climate Change (2006)), stated a week ago at the World Economic Forum that he had underestimated the risks of climate change, and that "effects are coming through more quickly than we thought." The World Bank warns of dire consequences if the global community fails to act quickly enough to reduce human-generated greenhouse gas emissions.

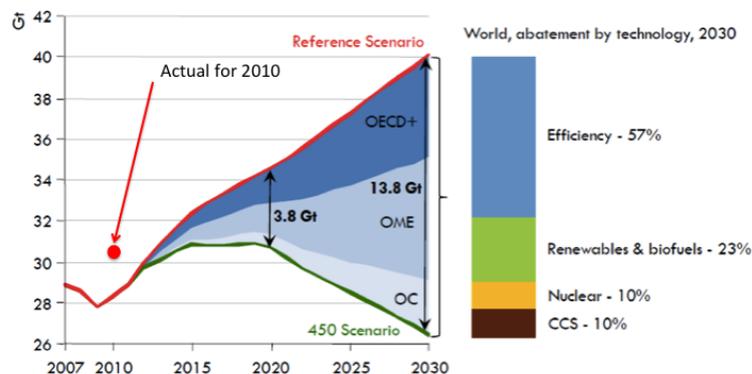
The International Energy Agency gives the globe less than 5 years to achieve a significant shift away from business-as-usual energy use if we are to stay within 2 degrees. If not, all emissions permitted under the 450 scenario will be 'locked in' by our increasingly expanding fossil fuel infrastructure, and the world will be moving towards a dangerously hot future. The **Energy and Environmental Revolution** is the title that the IEA has given to the needed abrupt reversal of emissions trends. But unlike most revolutions, this is unlikely to come just from a groundswell of action from the grassroots. The IEA repeatedly emphasises the need for strong policy action to support a shift to renewable energy supplies, the uptake of green technologies, and, most crucially, more efficient energy use.



Without further action, by 2017 all CO₂ emissions permitted in the 450 Scenario will be "locked-in" by existing power plants, factories, buildings, etc

IEA World Energy Outlook 2012

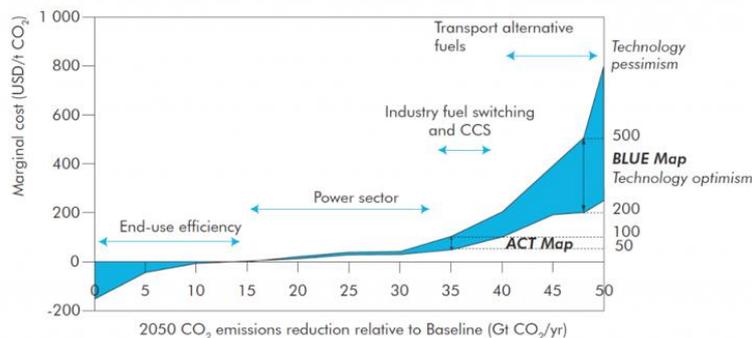
Energy efficiency, the ignored, unsexy cousin to renewable energy, is in fact the Cinderella, promising the majority of emissions reductions, around 60%, up to 2030. [Slide 5] For the most part these have a negative cost (that is, they save money!).



<http://www.worldenergyoutlook.org/>



Figure ES.1 Marginal emission reduction costs for the global energy system, 2050



World Energy Outlook 2012

An energy transformation of the scale required to limit climate change to 2 degrees is entirely feasible, as painstakingly pointed out in technical detail by the IEA. And New Zealand, more than most countries in the world, has the potential to achieve, and benefit from, such a transformation - if only we would grasp that opportunity and run with it.

What might this new direction entail? Taking my cue from the IEA, I suggest that as global citizens, we need to decarbonise our economy, and anticipate the risks of a volatile oil market by becoming as energy-independent as possible. And we need to grasp the real opportunities for NZ businesses and households in transforming our energy system. Taking my cue here from thought leaders such as Sir Paul Callaghan, Pure Advantage, the Hikurangi Foundation and numerous researchers, some known options for New Zealand include 90-100% renewable electricity generation; a smart electricity grid; widespread walking and

cycling infrastructure; well-functioning bus, rail and coastal shipping; equitable access to energy services; scaled up biofuels production; pathways for the uptake of electric vehicles; and, most importantly, greatly increased energy efficiency in all sectors. And more possibilities are emerging, including innovations within New Zealand. We need to position ourselves to stay on top of the game and quickly adopt those that suit New Zealand's needs.

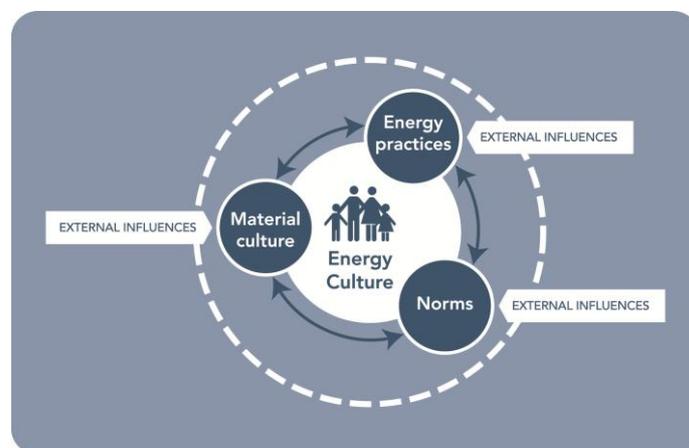
But we're not doing it. Or, in a few instances, painfully slowly. Why is it so difficult to change?

Because we're talking about more than technology, we're talking about people. In fact we're talking about behaviour. We can have all of the theoretical technical solutions we need to address the energy problem, but that is no help if we can't bring ourselves to adopt new technologies, or change our energy-using practices, at the scale and rate that is urgently required.

I suggest that this terrible inertia is a problem of 'energy culture'.

Together with Rob Lawson, I co-lead a research programme called 'energy cultures' which for the past 3½ years has been examining the energy cultures of NZ households, and has started applying the concept in different sectors.

What is energy culture? It is the distinctive set of interactions between what we **have** ("material culture") that involves energy use, like how our house is built, whether it has insulation, what appliances we have and use, and so forth; what we **do** that uses energy ("energy practices") like driving the kids to school, how long our showers are, how warm we heat our houses; and our "norms": what we think is the 'right thing to do'. These are strongly interactive, so that a household, for example, will tend to become locked into patterns of behaviour and expectation that become self-reinforcing. But, importantly, its not just the household: there are many external influences going on, and these can either lock us into that pattern of behaviour, or (sometimes) entice us into new patterns. This is what we call the Energy Cultures Framework.



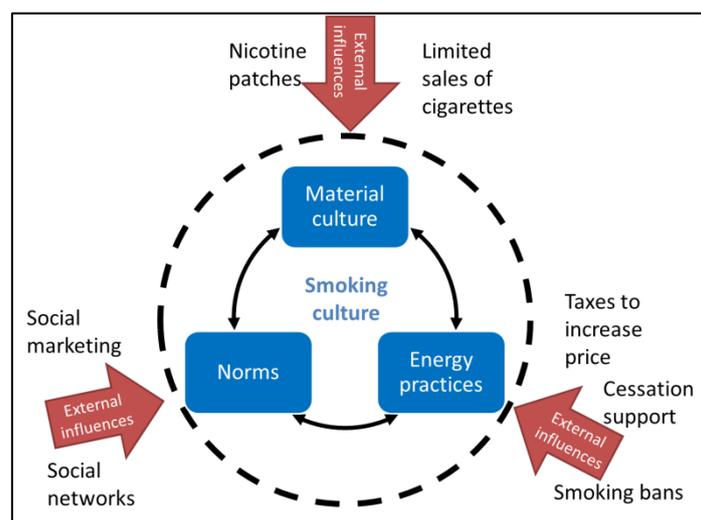
The Energy Cultures Framework

So rather than being what you might think of as ‘free agents’ to adopt a new energy-efficient heating system, or walk to work rather than take the car, we are in fact entangled in a web of forces that make change hard, rather than easy. Our research in the timber industry has reinforced how this lock-down can occur even when green options are clearly more cost-effective.

To achieve a change, particularly at the scale and rate needed, its necessary to alter the external influences so that they are all aligned to support that change. A great example is smoking. When I was a child, our school bus driver chain-smoked for the entire ½ hour bus ride to school; people smoked in movie theatres, and ash-trays were on every cafe table (often still trailing smoke from poor-stubbed cigarettes). New Zealand had a strong smoking culture, seemingly impossible to change.

So what caused the cultural shift away from accepting this as the norm? Through the energy cultures lens, we can see that policy action was aimed at each element of the framework.

The material culture was changed through things like limiting sales outlets and providing nicotine patches; practices were changed by taxes to hike up prices, funded smoking cessation schemes, and new law banning smoking from public buildings; and norms were changed by powerful advertising campaigns and also a widespread societal rejection of smoking that was given legitimacy by the new laws and policies. And our smoking culture changed because of this alignment of influences.



Changing NZ's smoking culture

To achieve a shift in energy culture is in many ways more complex, as energy is fundamental to almost every service in our home lives and businesses. But the approach, I would suggest, needs to be similarly comprehensive.

Let's look for a moment at some of the distinctive characteristics of New Zealand's current energy culture, with a focus on households and their transport.

From a material culture perspective (what we have), our national energy infrastructure has lots of renewables – hydro and geothermal, and increasing amounts of wind – generating around 75-80% of our electricity. We are famous for our cold, poorly insulated houses. We import all the petrol and diesel we use, and our transport systems are 99% reliant on these. We have lots of cars – the 3rd highest car ownership rate in the world according to the Economist in 2012, although other measures have us down to 8th if you measure it differently and count places like Monaco and Luxembourg. Lots, anyway. And that car fleet is very old, with an average age of 13 years. But when we do buy new cars we generally like them large: in 2011, 30% of new cars were SUVs.

If you look at measures of our household energy practices, we have a low household energy use per capita, and a low percentage of that energy spent on space heating. Our use of energy within our houses is at the low end of the OECD. In contrast, we use lots of transport energy. We drive a lot, with our vehicle kilometres per capita being second only to the USA. We are generally poor drivers, paying very little attention to efficient driving practices. These habits, together with our inefficient fleet, mean that our household spend on transport energy is high. In fact, we are at the top of the OECD when it comes to our household transport energy costs as a percent of our total household energy costs.

And our norms are pretty idiosyncratic. On average we don't believe in putting huge amounts of energy into our houses, and what little we do largely disappears out of the walls pretty quickly, so we've adjusted our expectations to cold houses. We've managed to turn woolly underwear into a sex symbol. We have a love affair with cars, and generally shun public transport apart from in Auckland and Wellington where congestion and improved services are making a difference.

What are the big problems with these household and transport energy cultures?

In housing, some excellent work has been done in research by Philippa and her teams, and in policy support for home insulation with the WUNZ programme. From an energy perspective we can certainly do much more to achieve more effective energy use in homes and businesses, but from a climate change and risk perspective that's not where our major problem lies.

The big issue, the moa in the room, is transport.

The supply and consumption of energy accounted for 44% of NZ's emissions in 2009, and national transport made up almost half of that. Compared to 1990 levels, energy sector emissions are 31% above, which is bad enough, but domestic transport emissions are a whopping 63% above 1990 levels.

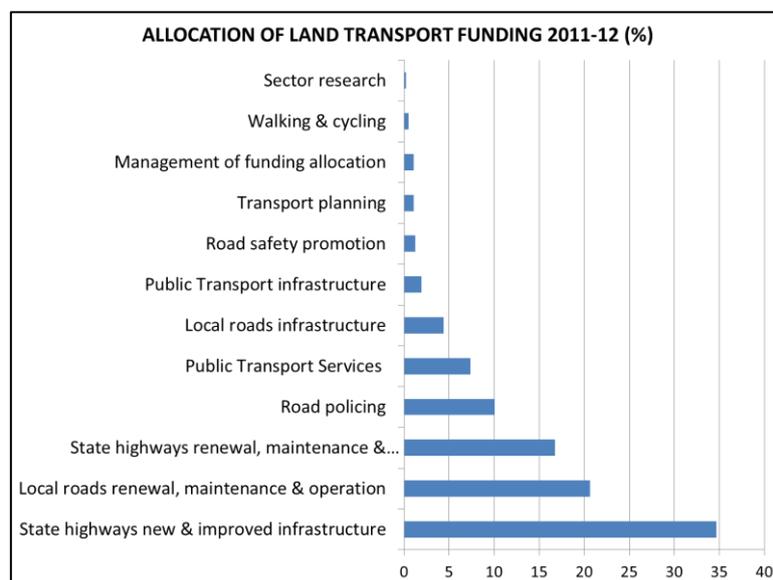
Even without the emissions problem, our reliance on fossil fuels places us in a very risky space. As the AA pointed out in December, our fuel prices are currently buffered by the high NZ dollar, but this may not last for long. This has implications not just for households, but for the profitability of all NZ businesses.

Yet it seems to be incredibly hard to change tack. Some individuals, councils and companies are doing innovative work, but by and large the country remains on track to increasing emissions and fossil fuel dependency, and the risks that these entail.

What locks us in? From an energy cultures perspective, lets now look at the key external influences that are reinforcing our fossil-based transport culture.

Firstly, our material culture. We have a highly developed roading system which gives primacy, both practically and legally, to motorised vehicles. I contrast this with Sweden, which has a population density not too much greater than NZ, and where conscious policy decisions have been made to build rail and cycle infrastructure, a result of which is a high level of public use of cycling and public transport. Sometimes this is as simple as a line of paint along a footpath. As a result, it is a strong norm to ride bikes as an everyday way of getting around, from youth to the elderly.

But in NZ, the government spend on transport through the NZTA is almost entirely directed at continuing to maintain and develop the roading system, with around 10% for public transport and a mere fraction for walking and cycling.



NZ Transport Authority 2012

This spending imbalance is backed by a fragmented set of high-level policies across the New Zealand Transport Authority (NZTA), Ministry of Transport (MoT) and the Ministry of Business, Innovation and Employment (MBIE) (the government agencies responsible for transport and energy) which between them give primacy to the status quo.

The IEA calls for governments around the world to take leadership in addressing climate change issues, and in particular to ensure that policies are designed so as to consistently head in the direction of reducing greenhouse gas emissions. In contrast, New Zealand's summary of policy for transport, *Connecting New Zealand*, has three key areas of focus: economic growth and productivity; value for money, and road safety. Policies are overwhelmingly focused on reinforcing a fossil transport culture, rather than directing real effort and setting tangible goals towards a transformed transport system. And the statements of Intent from both NZTA and MoT makes it clear that there is no intent to steer the country away from business-as-usual.

The IEA has also made specific policy recommendations to increase energy efficiency in transport. These include taking action on fuel efficient tyres; mandatory fuel efficiency standards for light-duty vehicles; fuel economy of heavy-duty vehicles; and eco-driving.

We fail on all of these counts. For example the country does not have fuel efficiency standards, only emissions standards – which is argued to be an equivalent, only that this is not tested apart from ensuring there is no visible smoke out of the exhaust pipe. According to the Motor Industry Association, New Zealand is the only country with emission standards but no emission testing.

Developing our Energy Potential, the NZ Energy Strategy (which incorporates the energy efficiency and conservation strategy), has a single target, and no actions, for transport energy efficiency, and I quote: “By 2016: The efficiency of light vehicles entering the fleet has further improved from 2010 levels.” Full stop. Even business-as-usual will achieve this, just from the fact that new cars entering the fleet are generally more efficient than the older fleet! And, concerningly, there are no targets to improve the fuel economy of the heavy vehicle fleet.

And of the desired long term outcomes in the NZTA *Statement of Intent*, the one that would specifically address energy efficiency in transport is the only one that has “[n]o 2011-2014 strategic priority linked to this impact”.

Clearly, improving the efficiency of the fleet is not a serious goal for the government, which is curious given the close relationship between efficiency gains and productivity gains, and the negative cost of many efficiency actions.

Looking now at influences on driver practices, the NZTA is jointly responsible with the Energy Efficiency and Conservation Authority (EECA) for administering the ‘Fuelsaver’ and ‘Rightcar’ websites which provide information on efficient driving and the relative efficiency of car types. This is laudable, but not enough to achieve practice change at the scale and rate required. Apart from an award for companies with efficient driving practices, there appears to be no policy commitment to support eco-driving training. And certainly no

strong policy support for actively working to shift travel habits beyond the car to other modes.

So the policy infrastructure as a whole maintains the fossil culture in our transport infrastructure, vehicles and fuels; and in our transport practices. By omitting to take a lead for change, the norm of a fossil-dependent car culture is reinforced.

As shown by the cigarette example, it takes active promotion to change dominant social norms, backed by action on practices and material culture. Policy leadership is crucially important to achieve a transition to an energy future in which risks are minimised and very real opportunities are realised. Our current energy culture, particularly our transport culture, is in a state of stasis because what we have, what we do, and how we think, are self-reinforcing and are also entangled in a spiderweb of policy forces that lock them in and make change an uphill battle.

I think it's pretty obvious what we need.



Sam Gamgee fights Shelob the spider in Lord of the Rings: The Return of the King

Joking aside, my message is that New Zealand needs to develop strong and consistent high-level policy to support a greening of our material culture, energy practices and norms, to remove the web of inertia, and to achieve the needed transition of our energy culture.

Policy change is part of the answer only, but absolutely crucial. As a researcher who is just beginning a project looking at the future of New Zealand transport, it is already evident to me that many far-sighted businesses, communities and councils are aware of the risks of assuming that the future can be a continuation of the past. Many are actively working to realise the opportunities of inventing a future of two degrees. As well, many of the government agencies I have mentioned are carrying out excellent work in this space, albeit necessarily in a small way. I applaud them. I hope that these efforts will be supported by the realignment of regulations, policies and investments to support a widespread shift to a low-carbon energy culture for New Zealand.