TRANSPORT TRANSITIONS IN NEW ZEALAND: A SCOPING STUDY

Report Prepared for the Energy Efficiency and Conservation Authority (EECA)

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EXECUTIVE SUMMARY

As concerns about energy security and greenhouse gas (GHG) emissions become more pronounced, establishing an energy-efficient low-carbon transport system has increasingly become a priority for businesses, government and communities.

This report set out to discover the range of agents conducting transport initiatives aligned with these goals, and how their actions might relate to more widespread transition of the transport system.

Transport systems are highly complex networks containing multi-level, multi-loop and multi-agent feedback systems. For such systems the use of models and frameworks can help conceptualise key interactions and opportunities for change, enabling significant and widespread transitions to be achieved. We have found the Energy Cultures framework to be particularly helpful due to its simplicity and its integrating perspective.

Working mainly from prior studies, we first identified thirty-three different types of transport initiatives, such as uptake of efficient low-carbon vehicles, alternative fuels, improved driver efficiency, and greater use of public and active transport.

Using the energy cultures framework, these transition opportunities can be grouped into 5 main categories for analysis: (1) material culture changes (e.g. adoption of new technologies); (2) practice changes (e.g. driving more efficiently); (3) changing norms (expectations and aspirations); (4) modal shifts (when technology and practices change simultaneously, e.g. cycling rather than driving); and (5) contextual changes (changes to the wider context in which transportation decisions are made).

An exploratory Internet search revealed eighty-five New Zealand case studies covering 132 niche innovations that aligned with the transition opportunities.

For nearly half of the case studies, the transition agents are private enterprises. The rest are spread across public service, community groups, NGOs and NPOs, and individual consumers. Just over half operate at the municipal or regional, and the rest are multi-regional, national, or international. The largest number of case studies is from the transport sector, followed closely by NGO and community-based advocacy groups, local government, and the tourism industry. Three-quarters of the case studies had an initial start date post 2005.

Whilst eighty-five case studies spanned most of the thirty-three types of initiative identified, the distribution of initiatives appears to be influenced by type of transition agent responsible. A cluster analysis revealed 4 clusters of main transition agents and their primary areas of activity: (1) Business/behaviours; (2) Business/technologies; (3) Community & NGO/advocacy; and (4) Local government/modal shifts.

A thematic analysis revealed 10 different sources of motivation, which are not spread evenly across the different clusters. Environmental motivations are most widely shared.

Looking holistically, it is evident that different agents are involving themselves in different aspects of the energy cultures framework; also that the transport transition field is highly fragmented, with each agent offering a distinctive product or service to a relatively limited audience.
With a lack of connection or overlap between different initiatives and between organisational sectors, the combined impact of the transition agents is perhaps not as effective as if they were better networked. Transition agents are currently not harnessing real traction in transforming the transportation system, and many of the initiatives struggle to find the funding and levels of interest needed to continue.

In terms of the energy cultures framework, transitional change occurs when norms, practices and material culture, as well as the wider contextual influences, are aligned with a new set of imperatives. We suggest that, in order to achieve transitional change in transport, what is required is a shift in all of the elements of the framework, and for these shifts to be aligned and consistent. For this to occur, a much higher level of communication, networking and collaboration between transition agents is needed.

A desire to change from business-as-usual is evident across many sectors, but the case studies are mostly initiatives that do not require a significant change in the underlying structure of the transportation system. The focus on implementing small and low cost changes raises the question of whether a focus on ‘low-hanging fruit’ will actually achieve transitional change, if there is not also a commitment to fundamental changes to the system.

In the New Zealand context, a commitment to integrated multi-level action has yet to materialise on a widespread scale. To grow from niche to more widespread engagement means that the diversity of interests of different sectors must be recognised and supported.

The leadership challenge is to create a context that supports greater connectivity between niche leaders, enables the alignment of transitional norms, practices and material culture, and creates a context within which low-carbon energy-efficient transport becomes a straightforward and pragmatic choice for businesses and households.

Opportunities for major shifts in the transport system will only occur if individuals, businesses, policy makers, municipalities, communities, the market and other players see benefits in change, and are able to act.

Further research is needed to understand the roles and experiences of transition agents in greater depth, and to gain a better understanding of how to support the growth of such initiatives from niche to mainstream.
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1. INTRODUCTION

Nearly all of New Zealand’s transport-related consumer energy usage is derived from imported oil-based fuels, predominantly petrol and diesel. As concerns about energy security and greenhouse gas (GHG) emissions become more pronounced, establishing an energy efficient transport system has increasingly become a priority for businesses, government and communities (MED, 2011b).

However there is as yet little sign of change to business-as-usual. A recent report on changes in energy use in New Zealand between 1990 and 2011 (Elliot et al., 2012) showed that energy consumption has increased across both freight and passenger transportation. Between 1990 and 2011 the proportion of freight travelling by road increased from 54% to 67%, whilst that transported by coastal shipping and rail decreased from 27% to 16% and from 18% to 16% respectively. And despite the gains in efficiency due to load factors, fuel efficiency, and maintenance, the overall consumption due to increased activity has risen by 14 PJ. Consumption due to passenger transport has also increased, rising by 39 PJ between 1990 and 2011. Again this is largely due to increased activity, which has not been offset by increases in efficiency. Mode shifts did not significantly impact these values either, with the main mode shift resulting in a switch from cars to domestic air travel. New Zealand is thus heavily embedded in a business-as-usual transport system, within little evidence of tracking away from this pattern at a national level.

Efficient low-carbon vehicles, alternative fuels, improved driver efficiency, and greater use of public and active transport are some of the ways in which New Zealand’s transportation system could move away from business-as-usual and reduce dependence on petroleum, but in order to achieve a widespread transition it is also necessary to understand the appetite for change.

While some attention has been paid to critiquing the broader economic and socio-political landscape that is said to stabilise and maintain the current transport system, there have been relatively few attempts to collate and document the experimental, novel and niche transport innovations that are presently underway in New Zealand. This is the role of this report.

This report, produced for the Energy Efficiency Conservation Authority (EECA), examines who, what and where low-carbon and efficient transport initiatives are being undertaken, using an internet-based stocktake. The term transport transition is used in this report to refer to a change from the current transport system, which is dominated by relatively inefficient fossil fuelled vehicles and high levels of private car use, to a system that is more efficient, has lower carbon emissions, and a higher uptake of public and active transport. The term transition agent(s) is used to refer to individuals or organisations that are taking leadership in creating change towards transport transitions.

1.1 SETTING THE SCENE

In 2012, the Ministry of Development (MED, 2012a) reported that at 38.5%, the transport sector represents the largest energy end-use sector in New Zealand, consuming slightly more than the industrial sector (35.1%); over 3.2 times as much as the residential sector; and over 4 times as much as either the commercial or agricultural sectors. Additionally, nearly all of New Zealand’s transport-related consumer energy usage is derived from oil-based fuels (99%); predominantly petrol (52%) and diesel (39%) use in land transport, as illustrated in Figure 1 (MED, 2012).
The transport sector is responsible for 45.7% of New Zealand’s energy-related GHG emissions as shown in Figure 2 (MED, 2011a), far greater than that of the electricity generation sector (15.7%) and manufacturing industries (16.6%). Although energy-related emissions are relatively low in New Zealand compared to countries that generate more electricity using fossil fuels, these figures still highlight transport as a key focal area for improvement in New Zealand.

Within the transport sector, road transport constitutes the majority of the emissions, accounting for over 90% of total transport emissions. The current transport system is thus highly dependent on road transport fuelled by fossil fuels, which creates a challenge if the aim is to reduce dependence on imported fuels and reduce GHG emissions.
1.2 NEW ZEALAND’S TRANSPORT PRIORITIES

The New Zealand Energy Strategy 2011-2021 includes a priority to develop a more energy efficient transport system, with a “greater diversity of fuels and alternative energy technologies” (MED, 2011b). The rationale for this comes primarily from a focus on energy security and economic development; most of the oil used in New Zealand’s transportation system is imported, exposing the economy to volatile international energy prices and exchange rates. Additionally, the Strategy emphasises the potential savings that domestic and commercial users could harness from improvements in efficiency of both transport technologies and driver behaviour. To create their vision of a more energy efficient transport system with an “efficient mix of integrated modes and travel options”, the New Zealand Government promises continued investment in roads, rail, and public and active transport infrastructure.

The Government Policy Statement on funding for land transport highlights that “economic growth and productivity is a key priority for the government” and this means a system that moves people and freight around as “quickly, efficiently and safely as possible” (NZTA, 2011). The Statement sees this priority being achieved by improving journey time reliability, easing congestion, investing in more efficient supply chains and making a better use of transport capacity. However, despite these aspirations for an integrated and efficient transport system, the Government continues to invest heavily on maintenance of existing roads and development of new ones, leaving only 7.7% of the budget allocated toward public transport and 0.5% for active transport.

Whilst the Government does acknowledge that more transport options and a secure and resilient transport network also contribute toward economic growth and productivity, current funding allocations combined with high-level policies directed at petroleum exploration seem to reinforce a fossil based transport culture, rather than a transformation of the transport system (NZTA, 2011).

Opportunities for major shifts in the transport system will only occur if individuals, businesses, policy makers, municipalities, communities, the market and other players see benefits in change, and are able to act. As the transformation of New Zealand’s transport system does not appear to be being facilitated through a top-down approach, it is useful to examine the role of other these other agents (Geels & Schot, 2007) and their appetite for changing from business-as-usual transport systems.

1.3 REPORT ROADMAP

This report looks at individuals and groups in New Zealand are currently leading initiatives that would support a transport transition.

The aims of the research that gave rise to this report were to address the following questions:

1. What options are available for achieving a change in New Zealand’s transportation system?
2. What identifiable groups in New Zealand are involved in leading transitions towards greater transport energy efficiency and/or lower carbon transport?
3. What specific transitions are they undertaking, how long have they been under way, and what numbers of people are involved?
4. What has been the experience of these agents in implementing the transport transition, their aspirations, and their drivers and barriers for change, and how these might be addressed to enable change to occur more widely?

In Section 2 we discuss the methods used to answer these questions. In Section 3 we outline the options currently available in New Zealand to create a change in the transportation system, and in Section 4 the various groups involved in transport initiatives are identified and described. Section 5 presents an analysis of the 85 case studies, using the framework of energy cultures, and discusses the drivers and motivations for change expressed by the organisations involved. In Section 6 we discuss the patterns of transitions, the problems identified, and what can be learnt from the case studies about the challenges of transition. Section 7 offers conclusions and recommendations for supporting further transitional change in New Zealand’s transport system.
2. METHODOLOGY

To identify the transport transitions underway in New Zealand, and evaluate the potential for future change, the research reported here proceeded in four phases:

**Figure 3: Four phases of the project**

| Phase 1: Identifying Potential Transitions | What lower carbon transportation transitions are available in NZ? |
| Phase 2: National Stocktake of ETT based on Case Studies | Who is currently engaging with EET initiatives in NZ? |
| Phase 3: Case Study Analysis | How were the changes produced? (trends/drivers/barriers)? |
| Phase 4: Moving Forward | What can be learnt for future interventions? |

The first phase of the research involved a review of low-carbon and high-efficiency transportation options currently available to New Zealand businesses and households. Data were collected through a variety of methods: initially conversations were held with national transport experts across a number of organizations including EECA, Z Energy, and NZ Post. These experts identified key literature\(^1\), which was used along with Internet searches to find further documentation. Having reached an apparent saturation of transport options from the literature, the compiled list of possible low-carbon high-efficiency transport alternatives was reviewed by the New Zealand transport experts. Additionally, six international transportation experts were interviewed about their perceptions of key elements of transport transitions, and the transportation alternatives identified by these experts were compared to the list compiled from the literature and NZ experts. The Energy Cultures Framework (Stephenson et al., 2010, see Section 3) was used to assist with structuring the resulting list of realistic potential transportation initiatives.

The second phase of the research involved a national stocktake of active transport transition initiatives. An extensive internet-based search was carried out to identify and document energy-efficient and low-carbon transport technologies, practices and strategies currently being developed or adopted across New Zealand, and by whom. Each initiative was described according to the structure of the organisation responsible for it, the scale over which the initiative operates, the particular sector targeted, the start data of the initiative, its contribution to a low carbon

\(^1\) Becken, 2001; Schiller, 2012; Accenture, 2009; Lane & Potter, 2007; Duncan et al., 2010; MRCagney, 2012; Licella, 2013; Katzev, 2003; Munheim, 1998; Shaheen et al., 1998; Meijkamp & Theunissen, 2000. See reference list for full citations.
transport transition, the particular innovation or innovations employed by the initiative, the drivers for actions, barriers to implementation identified by the organisation, and whether or not any partnerships had been formed with other initiatives.

Using the internet as the basis for the search was considered appropriate given how ubiquitous it has become in recent years, especially for groups for whom a public profile would be advantageous, as is likely to be the case with transport initiatives. Due to the study’s exploratory nature, the 85 case studies are not intended to be a definitive survey of all agents or projects. The focus was rather to tease out the breadth and diversity of agents and initiatives actively engaged in paving the way towards a lower carbon and energy-efficient transport system for New Zealand.

In the third phase of the research, a more detailed analysis of the data collected in the previous two phases was undertaken. The analysis began by determining the different transport cultures that were evident across the case studies. A cluster analysis was run on the data, using the key criteria identified in Phase 2, and drivers for change were investigated for each of the emerging transport cultures via thematic analysis on the data collected about each case.

In the fourth phase, the data was drawn together to determine the key lessons learned from the stocktake and analysis.
3. TRANSITIONS IN THE TRANSPORT SYSTEM

Transportation systems are highly complex, incorporating a multitude of actors across multiple scales. To achieve transitions within complex systems it is “essential to find useful models to help conceptualise the key interactions and opportunities for change” (Stephenson et al., 2014). The Energy Cultures framework (Stephenson et al., 2010) takes an approach to complex systems whereby the focus in on the way individuals or groups develop a ‘culture’ or way of behaving that is driven by the interactions between three core elements over which they have some influence, and an external context over which they have little or no influence (Fig 4). The framework was developed for consideration of energy-related behaviours but has been found to be equally applicable to transport behaviours (Stephenson et al., 2014). Although a number of other models have been used in recent years to help understand the kind of complex interplay between people, technologies and infrastructure that is involved in transportation systems – e.g., socio-technical approaches (Geels, 2010), system dynamics modelling (Struben, 2008), automobility approaches (Urry, 2008), practice theory (Shove, 2002), and norm activation models (Schwartz, 1977) – we have found the energy cultures framework to be most helpful in both its simplicity and its integrating perspective.

3.1 DEFINING THE ENERGY CULTURES FRAMEWORK

The Energy Cultures framework proposes that any given ‘energy culture’ is defined by the interactions between material culture, practices and norms. For the purposes of the framework, material culture consists of all of the technologies and other physical materials that influence how energy is used. Applied to transport, this would include vehicles, fuels and infrastructure. Practices are actions that influence how energy is used, and in transport would include driving styles, walking to work or taking a bus. Norms are personal and social expectations about how life should be lived, including (in relation to transport) such things as expectations about speed of travel and car ownership.

The energy cultures framework is a simple but powerful model that “represents key influential elements in any transport system, is applicable across different scales and contexts, helps understand heterogeneity and, importantly, can depict opportunities for systemic change” (Stephenson et al., 2014). It explains behaviour (and behaviour changes) according to the interactions between material culture, energy related practices, and norms and aspirations, situated in a particular context of “wider systemic influences on behaviour” (Stephenson et al., 2010).
Figure 4: The Energy Cultures Framework

New Zealand’s prevailing transport culture is one in which the material culture is mainly fossil-fuel powered vehicles; practices are predominantly reliant on these vehicles for personal travel, business travel and freight; norms (expectations and aspirations) are mainly focused on ownership of personal vehicles; and external influences such as infrastructure and policy is largely supportive of the status quo.

For the purposes of this scoping report, the framework offers a useful basis for analysis using its pared-down set of attributes. We use the framework at various points during this report to assist with presenting conclusions from the analysis.

3.2 IDENTIFYING TRANSPORTATION TRANSITIONS

The review of literature and discussions with experts revealed thirty-three different transportation transition opportunities. These transition options are shown in Table 1.

Table 1: Alternative, lower carbon transportation options available in New Zealand

<table>
<thead>
<tr>
<th>Material Culture Changes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Next generation internal combustion engines (ICE)</td>
<td>Improvements in ICE Design mean that more mpg can be achieved. VW and Toyota ICEs already close to 5.65L/100km, further improvements could herald 2.8 L/100km ICEs by 2030.</td>
</tr>
<tr>
<td>Hybrid vehicles (HEVs)</td>
<td>Integrate ICE, generator, storage battery, and electric motor to optimise engine size and operation, and therefore increase efficiency. Electric motor complements ICE (either in series or parallel configurations). Batteries cannot be recharged by plugging in to electricity system; instead they are recharged through regenerative breaking or via the ICE.</td>
</tr>
<tr>
<td>Plug in Hybrid Electric Vehicles (PHEVs)</td>
<td>A variation of HEVs, but with larger battery that can be re-charged from external source, therefore bi-fuel vehicle. Can be driven on ‘electric only’, but ICE kicks in for higher speeds or battery recharge.</td>
</tr>
<tr>
<td>Battery Electric Vehicles (BEVs)</td>
<td>A type of electric vehicle that uses chemical energy stored in rechargeable battery packs. BEVs use electric motors and motor controllers instead of ICEs.</td>
</tr>
</tbody>
</table>
Transitions in the transport system

Biofuels
Alternative to fossil fuels, produced from living organisms in a biomass conversion. Used in ICE either neat or blended with gasoline. Includes first generation made from sugar, starch, or vegetable oil (e.g. ethanol, propanol, butanol, biodiesel, biogas, syngas) and second generation made from biomass.

Higher octane fuel
Higher-octane fuels can be used in more efficient engines with higher compression, without the risk uncontrolled ignition.

CNG/LPG
CNG is made by compressing natural gas, and is a more environmentally “clean” alternative to conventional fuels. LPG is a flammable mixture of hydrocarbon gases and can provide a reduce fuel consumption compared to petrol. LPG can only be used in engines designed for LPG, or cars can be converted from petrol to LPG for about $5K - $6K

Waste to fuel
The production of transport fuel from municipal waste. This technology is largely lab based at present and little legislative or financial support exits to develop further.

Renewable Synthetic Diesel
Similar to diesel from fossil fuels, but instead produced from various biomass sources e.g. woody waste.

Hydrogen fuel cells
A fuel cell generates electricity from the chemical reaction between hydrogen and oxygen. This electricity is used to power an electric motor in the vehicle.

Elevated fuels
Chemical additives to fuel to improve efficiency.

Wind power
Fit sails to cargo ships.

Low rolling resistance tyres
Energy needed for the tyre to roll is reduced, which increases overall fuel efficiency.

Appropriate vehicle choice
Choosing most appropriate vehicle for purpose, commercially and residential.

(2) Energy Practice Changes

Driver behaviour
Shifting driver behaviour to improve efficiency with which drivers utilise vehicles.

Carpooling
Users share the same car to travel similar route.

Car sharing
Car sharing schemes where multiple people have access to shared vehicles (which they can book out for use).

Vehicle maintenance
Vehicle and engine maintenance to ensure that highest performance is being achieved.

Journey planning
Reduced time spent in traffic, increased driving efficiency. Ensure maximum load on maximum number of miles, and minimize miles travelled with no freight.

(3) Shifting Norms and Aspirations

Raising awareness
Advocacy, activism and communication programs dedicated to shifting social norms and influencing public-policy and resource allocation decisions away from a private car-culture towards alternative and active forms of transport.

Community visioning
Initiatives aiming to bring together local communities to plan and design resilient and sustainable systems to manage the challenges of climate change, peak oil, and economic volatility.

(4) Modal Shifts

Public transport (PT)
Use of busses, trains, etc. instead of private vehicle use.

Active transport (AT)
Travel by walking, cycling etc.
Virtual travel
An alternative to transport, e.g., the use of Skype, GoToMeeting etc. instead of physically travelling.

Alternative mode
E.g., use barges instead of rail, sea instead of road and air.

(5) Contextual changes

<table>
<thead>
<tr>
<th>Change Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban form</td>
<td>Changes to urban form, which may shift local transportation requirements.</td>
</tr>
<tr>
<td>More efficient vehicle design</td>
<td>More efficient cars, vans, cargo vessels (e.g., sails, aerodynamic design, body paints) due to non-engine efficiency improvements.</td>
</tr>
<tr>
<td>Road infrastructure improvement</td>
<td>Increase weight limits on roads so that heavy commercial vehicles can carry the loads they have been spec’d to. Also improvements to road surface for reduced rolling resistance.</td>
</tr>
<tr>
<td>PT/AT infrastructure improvements</td>
<td>The addition of dedicated cycle lanes or bus lanes to help facilitate active transport and promote public transport.</td>
</tr>
<tr>
<td>Charging infrastructure</td>
<td>The addition of charging infrastructure for electric vehicles that can help to support material culture changes.</td>
</tr>
<tr>
<td>ICT innovations</td>
<td>The development of information and communication technology to help with travel planning.</td>
</tr>
<tr>
<td>Flexible work hours</td>
<td>Use of flexitime to reduce hours spent in rush hour traffic</td>
</tr>
<tr>
<td>Alternative transportation options</td>
<td>The provision of additional alternative transportation options, e.g. free buses put on by organisations for members of their community.</td>
</tr>
</tbody>
</table>

Using the Energy Cultures framework as a basis for analysis, these can be grouped into five main contributors to transition: (1) material culture changes corresponding to shifts in transportation technology, with practices remaining relatively unchanged; (2) practice changes, including changes in the way that transportation technologies are used, but not relying on any change in the technology used; (3) shifting of norms (expectations and aspirations); (4) modal shifts, occurring when both transportation technology and transportation practices change simultaneously; and (5) contextual changes, which are changes to the wider context in which transportation decisions are made. These are shown in Figure 5, suggesting that a transition in transport cultures involves changes in all of these five areas.

Figure 5: Changing transport cultures
3.3 SUMMARY OF TRANSPORTATION SYSTEMS AND INNOVATION

- Transportation systems are highly complex, and the use of models and frameworks to help conceptualise key interactions and opportunities for change are essential to achieve transitions.

- We have found the energy cultures framework, defined by material culture, practices, and norms, as well as their interactions and context, to be particularly helpful due to its simplicity and its integrating perspective.

- Using the energy cultures framework we have identified thirty-three different transportation transition opportunities and innovations spanning material culture, practices, norms, and context. These have subsequently been grouped into 5 main categories for analysis.
4. AGENTS INVOLVED IN TRANSPORT TRANSITIONS

Many organisations are already involved in initiatives to change some aspect of New Zealand’s prevailing ‘transport culture’. In our scoping exercise, each community initiative, municipal government strategy, technological development or advocacy group could be considered to be part of the transport transition, taking action to achieve more efficient and/or lower carbon transport systems. The collection of case studies presented in the pages below offer a starting point to begin to give shape and personality to New Zealand’s transition in transport. Appendix A presents an overview of the case studies, with full details for each in Appendix B.

4.1 AN OVERVIEW OF ORGANISATIONS

In total, 85 case studies covering 132 niche innovations were gathered and collated into a database. Each case study includes a summary table and a brief description of the initiatives’ intentions, design and structure (for details see Appendix B).

The case studies were described according to the nine criteria outlined in Table 2.

Table 2: Internet search criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational Structure</td>
<td>The type of social entity that the initiative is structured around</td>
</tr>
<tr>
<td>Scale (City/Region)</td>
<td>The geographic and spatial distribution of the initiative</td>
</tr>
<tr>
<td>Sector Focus</td>
<td>The industry or sector focus of the initiative</td>
</tr>
<tr>
<td>Initiative Start Date</td>
<td>The year the initiative was started</td>
</tr>
<tr>
<td>Contribution to Transport Transitions</td>
<td>The type of change the initiative supports as categorised by the Energy Cultures Framework</td>
</tr>
<tr>
<td>Niche-innovation</td>
<td>The lower carbon or energy reduction activities undertaken (from Table 1)</td>
</tr>
<tr>
<td>Drivers for Action(s)</td>
<td>The stated drivers described as prompting action and establishing the transport innovation</td>
</tr>
<tr>
<td>Barriers/Issues/Trends</td>
<td>The stated barriers, issues or trends described as being critical for the success or limitations the initiative</td>
</tr>
<tr>
<td>Partnerships</td>
<td>The agencies or companies that have supported, funded or aided in the development of the initiative</td>
</tr>
</tbody>
</table>
4.2 ORGANISATIONAL STRUCTURES

Achieving a wide distribution of organisational entities was a major consideration when locating the case studies. A concerted effort was made to capture a broad cross-section of different consumers, producers, community programmes and government initiatives at each scale (local, regional, national, international). The 85 case studies reflect the diversity of organisations involved in transport transition activities (Table 3).

Table 3: Distribution of organisational structures of the case studies

<table>
<thead>
<tr>
<th>Organisational Structure</th>
<th>Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Enterprise</td>
<td>40</td>
</tr>
<tr>
<td>Public Service</td>
<td>16</td>
</tr>
<tr>
<td>Community Groups</td>
<td>15</td>
</tr>
<tr>
<td>NGOs and NPOs</td>
<td>11</td>
</tr>
<tr>
<td>Consumers</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85</strong></td>
</tr>
</tbody>
</table>

Private enterprises represented nearly half of all the case studies (40). The initial stages of the search focused on collating the private enterprise case studies of sustainable best practices as identified through a range of accreditation, certification and association agencies including agencies such as Energy Efficiency and Conservation Authority (EECA), Tourism Energy Efficiency Programme (TEEP), GreenFleet, Sustainable Business Network, and Association for the Promotion of Electric Vehicles (APEV). The search for commercially available liquid biofuels led us to www.liquidbiofuels.org, which provided a detailed overview of the sector in New Zealand. The newer and perhaps more novel initiatives were collected from newspaper articles, and colleagues and acquaintances that knew of interesting technological developments.

Public services initiatives accounted for 16 cases. A review of current council modal shift initiatives was undertaken to get a sense of the municipal sector’s involvement in New Zealand’s transport transition. Due to time constraints, data collection was restricted to City Councils and the two District Councils (Hastings and New Plymouth) that were part of the NZTA’s Model Communities Project. The focus of these case studies was on large urban areas where the relationship between transportation modal shifts and a reworking of the urban form has been argued to have a significant carbon-reduction potential for New Zealand’s transport system (Chapman, 2008).

The third area of investigation was on community groups (15 cases). Transition Town initiatives are part of an international grassroots movement in which inhabitants of towns and villages come together to take action and improve resilience to climate change and peak oil. Transport is one of the key priorities of the Transition Town movement. Using the Transition Towns New Zealand-Aotearoa website as a starting point, a detailed exploration of 65 Transition Towns across New Zealand was conducted in an effort to explore to what extent these transitional movements are engaging with transportation. The search found only 15 out of 65 transition town websites specifically mentioning transport; this is not to say that others are not involved, but transport did not appear to have an online presence in their discussion boards, Facebook pages or Internet postings. The ones who did discuss transport were often leaders in promoting modal shifts within their communities (e.g. Transition Valley 473 - Dunedin, Case# 73).

NGO and other non-profit organisations comprised 11 cases. Their initiatives were primarily dedicated to advocacy and awareness campaigns, such as the Generation Zero: 50/50 Campaign (Case #22), NZ 100% Possible Campaign (Case #52), Cycling Advocates Network (Case #14), and Living Streets Aotearoa (Case #44).

Finally, we were also interested in how individual consumers were responding opportunities to acquire more efficient or lower-carbon vehicles. Using the data provided by the New Zealand Motor Vehicle Registration Statistics 2012,
we investigated the numbers of Battery Electric, CNG and LPG fuelled lightweight vehicles (cars and trucks used primarily for road use) on New Zealand’s roads. At the year-end of 2012, electricity fuelled 85 cars, 9 trucks and 15 motorcycles; CNG fuelled 18 cars, 64 trucks, and 1 motorcycle; and LPG fuelled 1098 cars, 379 trucks, and 92 motor caravans. Unfortunately we were not able to determine the number of hybrid vehicles from the New Zealand Motor Vehicle Registration Statistics 2012.

4.3 SPATIAL COVERAGE OF THE CASE STUDIES

A broad spatial distribution was also sought for this study. As Figure 6 indicates, just over half of the case studies involved initiatives at the regional and municipal level (51). The regional and municipal cases were often difficult to distinguish from one another as they were often the product of collaborations between organisations, as in the case of cycling strategies and walking plans. International initiatives comprised a small percentage and consisted of three carpooling websites that were run and operated outside of New Zealand but had an active presence within it (i.e. Carpool King, Case #7; Carpool World, Case #9; Snowpool Case #61). Air New Zealand was also included in the international scale for the reason that more fuel efficient flying has international implications.

Figure 6: Spatial coverage of case studies

The six trans-regional cases consisted primarily of two sectors: transport and tourism. The trans-regional scale presents an interesting case in that it included conventional approaches to reducing transportation-related emissions and costs with more novel innovations such as car-sharing (cityhop, Case #11) and hybrid electric taxis (Greencabs, Case #24).

4.4 SECTOR FOCUS

Achieving a balanced distribution of different sectors was not a guiding search criterion for the development of the cases. However, the distribution of sector types from the cases shown in Figure 7 reveals no major surprises. The majority of case studies were directly involved with the transport sector (28), followed closely by various NGO and community-based advocacy groups (23) dedicated to promoting their particular visions of low carbon or energy reduced transportation, such as through modal shifts and developing a general awareness of transport-related issues through political engagement and events. Local government (15) has a strong presence in the case studies as they play a major role in the promotion and development of various modal shift programmes. The tourism industry (5) is also taking a lead role in the promotion of lower carbon forms of transportation, which is perhaps not so surprising as the industry relies heavily on the 100% Pure New Zealand image. Emerging markets and demand for alternative fuels has helped to establish a burgeoning demand for electric vehicle infrastructure (5) and commercially available biofuels (4). The rest of the single sector cases concerned fleet audits and driver training programmes undertaken by
some private enterprises for fuel and cost reduction benefits.

**Figure 7: Distribution of sector types**

![Distribution of sector types](image)

4.5 TIME DISTRIBUTION

Three-quarters of the case studies had an initial start date of 2006 or later (Figure 8). The cases that started prior to 2006 were typically transport advocacy groups such as the Cycling Advocates Network (CAN) (Case #14) and Living Streets Aotearoa (Case #44), as well as several municipal level cycling and walking strategies which began emerging at the turn of the millennium following the enactment of the NZ Transport Strategy (2002) and the “Getting there - on foot, by cycle” strategy established in February 2005. The newer initiatives include sustainable transport advocacy campaigns (e.g. NZ 100% Possible Campaign, Case #52), those involved with BEV infrastructure (e.g. Z Energy Recharge Point, Case #84) and innovative ICTs like CabChooze (Case #6). There were also 10 cases where the start date could not be identified.

The low number for 2013 could be partially accounted for by the fact that the scoping was undertaken partway through 2013, and newer initiatives might not yet have a web presence.

**Figure 8: Time distribution of the cases according to start date of the initiative**

![Time distribution of the cases](image)
4.6 SUMMARY OF AGENTS INVOLVED IN TRANSPORTATION TRANSITIONS

- Eighty-five case studies covering 132 niche innovations were gathered and collated into a database.

- Each initiative was described according to the type of organisation responsible for it, the scale over which the initiative operates, the particular sector targeted, the start data of the initiative, its contribution to a low carbon transport transition, the particular innovation or innovations employed by the initiative, the drivers for actions, barriers to implementation identified by the organisation, and whether or not any partnerships had been formed with other initiatives.

- A diverse range of organisations was sought, spanning private enterprise, public service, community groups, NGOs and NPOs, and individual consumers.

- The case studies covered a broad spatial distribution with just over half involving initiatives at the regional and municipal level, and the rest being multi-regional, national, or international.

- Most case studies were directly involved with the transport sector, followed closely by various NGO and community-based advocacy groups, local government, and the tourism industry.

- Three-quarters of the case studies had an initial start date of 2006 or later.
5. TRANSITION AGENTS

This section explores the case studies in greater depth in an effort to better understand the experiences of these transition agents, and to identify what these pockets of innovation tell us about the current transition landscape.

As the case studies illustrate, transitional change in parts of the transport system has been occurring for some time, but is mainly occurring in niche situations. If one considered each case study in isolation, there would be little evidence that any transition is actually occurring. When seen in aggregate, however, a different picture begins to emerge. The transition agents are not competitors trying to outperform one another; rather they are responding in different ways to a largely shared set of perceived problems, concerns and opportunities. At this point in time they appear to mainly be acting individually, so their combined impact is perhaps not as effective as if they were better networked. Nevertheless, collectively they hold the potential to “provide the seeds for systemic change” (Geels, 2012).

5.1 INNOVATIONS AND INITIATIVES

Each case study was coded according to a list of niche-innovations identified in the literature (Phase 1 of the research, as outlined in Table 1). We found that the case studies covered most of the innovations identified (see Figure 9), though the 7 innovations that were not evident in our Internet search were: (1) programs implementing low rolling resistance tyres; (2) the use of virtual travel (i.e. organisations heavily promoting the use of programs like Skype or GoToMeeting); (3) alternative travel modes such as the use of rail or sea over road and air; (4) changes to urban form resulting in shifting transportation patterns; (5) the development of a charging infrastructure for electric vehicles; (6) organisations promoting flexible work hours to reduce traffic loading; and (7) organisations implementing alternative transport options for employees or members. That is not to say that these innovations are not underway within organisations, but that none were identified during our scoping study. This may have been because these were not promoted heavily online; organisations implementing flexible work hours, virtual travel, or putting on alternative travel arrangements may not have a virtual presence in this space or be promoting this as a transport transition. It may also be because these innovations are in very early stages and not particularly evident (or their follow on effects not particularly evident), e.g. urban planning and electric charging infrastructure.
Alternative fuel initiatives included the uptake or development of biofuels (n=12) and electric vehicles (n=8), with some uptake of CNG/LPG (n=2), plug-in hybrids (n=1), and elevated fuels (n=1).

The innovation uptake corresponding to more efficient engines was due to the uptake of hybrid vehicles as individual consumer purchases; we did not identify any cases where more efficient internal combustion engines were being promoted, although it is likely that there are examples within New Zealand.

In relation to the energy cultures framework, the innovations and initiatives described here are spread fairly evenly across material changes (n=20), practice changes (n=23), norm changes (n=16) and modal shifts (n=19); however fewer case studies of infrastructure changes were found (n=7), although infrastructure investments by central and local governments (e.g. in public transport, cycleways or walkways) were not always particularly evident on websites and thus were not captured.

The distribution of transition types varies according to the particular organisation initiating them: individual consumer purchases tend to be mainly based around material changes (e.g. purchase/ conversion to electric vehicle, purchase of a hybrid vehicle or CNG vehicle); we did not identify any initiatives at the individual scale relating to practice changes or modal shifts. Community and NGO initiatives focused on shifting public norms and expectations, whilst public agency efforts mainly honed in on modal shifts, mostly attempting to improve the accessibility of public and active transport more accessible to people. Private enterprise initiatives tended to focus in material changes (e.g. replacing petrol with biodiesel, or a fossil fuel powered vehicles with electric) and practice changes (e.g. encouraging freight drivers to drive more efficiently). Additionally, this sector was involved in some infrastructure changes, such as increasing the prevalence of EV charging stations or making biofuels more easily available to potential customers. This variability across organisations is shown in Figure 10.
To further explore these differences we ran a 2-step cluster analysis that revealed 4 clusters (see Figure 11) within our data set. We used a silhouette measure of cohesion and separation\(^2\) to give an indication of how well each case study belongs to cluster to which it has been assigned. Our findings indicated that the clustering solution obtained is a good fit for the data (average silhouette = 0.6), which is separated into four clusters according to three inputs: (1) transition type in terms of the contribution to a transport transition (importance = 1.0); (2) organisational structure (importance = 0.86); and (3) sector focus (importance = 0.82).

\(^2\) The silhouette measure of cohesion and separation returns a value between 0 and 1 that indicates how closely related the objects in a single cluster are, and how distinct or well separated each cluster is from the others. When clusters are clearly distinct this measure is close to 1, and when the clusters are not particularly apparent this measure returns a value close to 0.
The first cluster (n=21) is dominated by of transition agents involved in supporting practice changes. These include initiatives designed to encourage people to carpool (n=10), to change driver behaviour (n=8), and to promote vehicle maintenance (n=5). Most of these initiatives are driven by private enterprise (n=19), almost all of which are businesses directly involved in the transport industry (n=18). Examples of these types of initiatives include Alexander Petroleum Services Ltd. (case #3) who introduced driver best practice systems to reduce the high levels of fuel consumption in their fuel tanker fleet, and Jayride (case #36), New Zealand’s largest public ride-sharing service.

The second cluster (n=24) is entirely made up of organisations engaged in the development or uptake of technologies, fuels and infrastructure, and accounts for 90% of all the material culture changes (n=18), and 86% of the infrastructure changes (n=6) identified in this report. The majority of the cases are initiated by private enterprises (n=21), and the remaining three represent individual choices to purchase a hybrid, EV, or CNG/LPG powered vehicle. This cluster includes initiatives around biofuels, EVs, and other alternative fuels, as well as improvements to vehicle design or appropriate vehicle selection. The organisations that fall into this cluster come from the tourism industry, the new-fuel industry (including EV and biofuel companies), and from the transport industry. Examples include Kea Campers (case #40) who have the most environmentally friendly vehicles of any campervan rental company across Australia, New Zealand and Southern Africa; and Zero Emissions Vehicles (case #85) who design and build electrically powered heavy commercial vehicles.

The third cluster (n=25) is characterised by transition agents that are attempting to shift norms (expectations and aspirations) (n=16) as well as encourage modal shifts (n=5). This cluster comprises community groups (n=15) and NGOs (n=10) using various forms of advocacy to raise awareness of local, regional, and national transport options, and to encourage both public and active forms of transportation. Examples include GreenFleet (case #25), an initiative of the Sustainable Business Network designed to help and encourage businesses to actively reduce the costs and associated harmful impacts of transportation throughout New Zealand; and the Transition Town: New Zealand-Aotearoa movement (case #73), which works at the community level to proactively design a future which involves less use of fossil energy and lower emissions.

The fourth and final cluster (n=15) comprises agents involved in transportation modal shifts at the local government level, at times supported by national government initiatives. Most of the initiatives focus on active transport (n=14) and public transport (n=8), with one case study also promoting carpooling, and one encouraging the uptake of EVs. Examples include New Plymouth District Council’s Let’s Go plan (case #51), which is a model community package of works designed to ‘fast track’ behaviour change through enabling, educating and encouraging people to make the shift from cars to walking and cycling; and Wellington City Council’s Spring to the Street program (case #63), designed to educate the public on the benefits on active transport and the options currently available to them and encourage people try these different travel modes in order to promote greater uptake.

Accordingly the clusters of main transition agents and their primary areas of activity are named: (1) Business/behaviours; (2) Business/technologies; (3) Community & NGO/advocacy; and (4) Local government/modal shifts.

5.2 DRIVERS FOR CHANGE

Transition agents’ motivations were identified, where available, from their online sites. A thematic analysis of this data revealed 10 different sources of motivation, as outlined in Table 4.
Table 4: Motivations identified from the case study analysis

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Description</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Economic gain or cost benefits from transition, including commercial interest, financial incentives, and funding opportunities. Often discussed in relation to the increasing costs of crude oil, the impact on company profits, or the sustainability of petrol and diesel powered transport for wider cross-section of the public.</td>
<td>36</td>
</tr>
<tr>
<td>Performance</td>
<td>Improvement due to an increase in efficiency. Discussed in terms of system operation (e.g. resource and cost efficiency), technology (e.g. vehicle fleet efficiency), or behaviour (e.g. driver efficiency).</td>
<td>11</td>
</tr>
<tr>
<td>Security</td>
<td>Benefits due to increased security of fuel supply. Often mentioned with regards to potentially volatile prices of oil based fuels, as well as concerns over peak oil globally.</td>
<td>16</td>
</tr>
<tr>
<td>Regulatory</td>
<td>Desire to align to external regulatory environment, such as regional land transport strategies or internationally established technology emissions standards.</td>
<td>17</td>
</tr>
<tr>
<td>Policy</td>
<td>Desire to align to internal corporate sustainability policies or voluntary agreements, such as Air New Zealand’s policy driven goal “to be the world’s most environmentally sustainable airline”.</td>
<td>5</td>
</tr>
<tr>
<td>Environmental</td>
<td>Environmental and energy sustainability benefits from transition, with motivations including reducing greenhouse gas emissions, clean fuel, environmental health, and adaption to climate change.</td>
<td>54</td>
</tr>
<tr>
<td>Community</td>
<td>Strengthening of community relationships, networks or businesses. Community resilience is frequently mentioned, with aims such as “creating stronger bonds” and “supporting the community in becoming vibrant, resilient and sustainable”.</td>
<td>28</td>
</tr>
<tr>
<td>Social</td>
<td>Improvements in social indicators such as health and quality of life, such as becoming fitter, arriving at work more alert, a more relaxed pace of life, and improved social interaction within the community.</td>
<td>13</td>
</tr>
<tr>
<td>Opportunity</td>
<td>Identification of a niche business opportunity, often due to a unique feature of NZ’s physical or societal infrastructure.</td>
<td>17</td>
</tr>
<tr>
<td>Image</td>
<td>Desire to be seen to be ‘green’, often in order to retain customers or promote business development, predominantly mentioned in relation to tourism ventures.</td>
<td>6</td>
</tr>
</tbody>
</table>

Across all of the case studies, concern for the environment, financial drivers and strengthening communities were the most frequently appearing motivations. However the motivations are not spread evenly across the different clusters. **Business behaviour** initiatives (Cluster 1) are mainly driven by financial and environmental motivations. Whilst these are also important to the **business technologies** cluster (Cluster 2), this group is also keen to explore niche market opportunities and maintain a green image. The main motivators for **community and NGO advocacy** (Cluster 3) are around environmental issues, benefits to the local community, and ensuring security of energy supply, whereas **local government initiatives** (Cluster 4) tend to be driven by regulatory motives, as well as the triple bottom line of financial benefits, environmental benefits and social benefits. This can be seen in Figure 12.
Figure 12: Distribution of motivations across the clusters

5.3 ACTIONS AND AGENTS

The types of initiatives undertaken by transition agents are spread across actions to change material culture, practices, norms, modal shifts (involving material and practice changes) and infrastructure (Figure 13). Importantly, different agents are involving themselves in different aspects of the framework, with community and advocacy groups, for example, being the main agents that are focusing on changing expectations and aspirations, and businesses focusing on adoption of new technologies and practices. These observations reinforce that the field is highly fragmented, with each agent offering a distinctive product or service to a relatively limited audience.
5.4 SUMMARY OF TRANSITION AGENTS

- The 85 case studies spanned most of the innovations identified, though the distribution of innovation type is influenced by the organisational structure of the transition agent.

- Transitional change in parts of the transport system is mainly occurring in niche situations with agents mainly acting individually, so their combined impact is perhaps not as effective as if they were better networked.

- A cluster analysis revealed 4 clusters in the case studies, split according to three inputs: (1) transition type in terms of the contribution to a transport transition; (2) organisational structure; and (3) sector focus. The resulting clusters of main transition agents and their primary areas of activity are named: (1) Business/behaviours; (2) Business/technologies; (3) Community & NGO/advocacy; and (4) Local government/modal shifts.

- Transition agents’ motivations were identified, and a thematic analysis revealed 10 different sources of motivation, which are not spread evenly across the different clusters.

- Different agents are involving themselves in different aspects of the energy cultures framework; the transport transition field is highly fragmented, with each agent offering a distinctive product or service to a relatively limited audience.
6. PATTERNS, PROBLEMS AND LESSONS LEARNED

This scoping project set out to identify which organisations or other agents in New Zealand were taking action in order to reduce carbon emissions and/or improve efficiency of New Zealand’s transport system, and the range of actions being undertaken.

Across the 85 case studies, around half were private enterprises, with the rest spread across government (mainly councils), community groups, and non-government and not-for-profit organisations. Individuals also play a role, although individual purchases of vehicles powered by fuels other than petrol and diesel are still in the niche category.

The case studies highlight the diverse transition agents, their activities and motivations that are contributing to New Zealand’s transition towards a less fossil-fuel dependent transport system. However it is not evident that they are harnessing real traction in transforming the transportation system.

Many of the initiatives identified struggle to find the funding and levels of interest needed to continue. Take for instance the University of Canterbury Rideshare scheme (case #76) that was absorbed in 2011 by the national ridesharing programme, Jayride (case #36); a move that ultimately led to the decreased used of ridesharing at the university and the removal of prioritised parking spaces for rideshare users around the university (Morris, 2012).

Or the Transition Town movements who also struggle to hold the public’s interest long enough to attract the kind of numbers and attention required to affect the kind of changes needed for a sustainable transport system to be developed. This can be seen in the examples of the ‘Get the Train’ movements in Port Chalmers (case #58) and Waitati (case #80) or in Kaiwaka (case #70) where the initiatives have been determined to see the return of the commuter train system to urban fringe areas. The stocktake identified 85 early adopters of transportation initiatives, but as innovators these initiatives are also the most vulnerable; identifying the initiatives and identifying some of the lessons learned is only the first step.

Moving forward means thinking of ways to help support and expand these initiatives with the aim to first and foremost challenge the business-as-usual transport system that remains so dominant. The patterns, problems and potentials drawn from the stocktake offer a good starting point for where to begin looking to more effectively coordinate the efforts of industry, government, community groups and individuals. However, the case studies also highlight two areas of concern that are a critical part of the energy transition in transport in New Zealand; vision and connectivity. In short, further reflection is needed on how to bring together the different clusters of transport innovation and the kind of vision for the future of transport might this inspire.

6.1 SUSTAINABLE TRANSPORT: FROM IDEAS TOWARDS REALITY

Examples of more holistic approaches to transition can be seen in some of the world’s mega-cities like Beijing, Shanghai, Los Angeles, and London, which are most frequently cited as leading examples of transport transition. For example, London’s congestion charging scheme, which was put in place by the Greater London Council in 2003, led to a substantial and immediate reduction of personal vehicle transportation. During the first year of the scheme a 33% reduction in cars and minicabs, and 11% in trucks and vans, was achieved (Transport for London,
2007). These reductions have been sustained over time, with modal shifts to public transportation continuing to accommodate many of those who no longer drive. Others turn to carpooling or active transport, with the number of pedal cycles entering the city centre raised by 49% just 4 years after the scheme’s introduction (Transport for London, 2007). This innovation cut 40-50 million litres of fuel consumption and 100,000 tonnes of carbon dioxide emission annually, as well as generate annual net revenues of around £123 million, which is used improve public transport, road safety, and implement additional energy efficiency measures.

Through the energy cultures lens, we see here how a contextual change in transportation policy at the city level, implemented via financial measures, resulted in substantial material culture and energy practice changes. These were observed though reductions in private vehicle transportation, with users either taking active or public transport (i.e. shifting their material culture and energy practices simultaneously) or by carpooling (i.e. changing energy practices). These changes preceded the shift in social norms (as opposed to being driven by them), and created an imperative narrative that ultimately led to shift in infrastructure funding and eventually a social normative shift in the way transportation is perceived in London. This can be seen through London’s cycling revolution, which continues to be supported by the Mayor through his public speeches as well as the plethora of photos illustrating his 2-wheeled journey to work.

In the New Zealand context there is no such material imperative to change, yet. As a result, there is a gap between the rhetoric and reality of transport transitions. Perhaps nowhere is the gap most evident than in the discrepancy between policy, regulatory and funding mechanisms, and the way transportation is currently being talked about and expressed in the everyday reality at the level of innovations. At the policy level there is a lot of discussion around having resilient and diverse transport systems, however many of the community group and NGO cases indicate that the funding remains heavily in favour of the road transport fuelled by oil.

What this demonstrates is that, in the New Zealand context, the rhetoric of innovative transition may be present, but a commitment to integrated multi-level action has yet to materialise on a widespread scale. The transitions that are occurring do so within silos, and tend to focus on the low hanging fruit while doing little to disrupt business-as-usual. We propose that a solution may be to reframe our vision of the transportation space, and combine this with appropriate action plans for achieving change.

6.2 SILOS OF TRANSPORT INNOVATION

The failure of transport innovations to materialise on a broad scale could be in part attributed to the fact that the innovations in transport are very much siloed. By siloed we are referring to the fact that where initiatives and innovations are occurring they are often on a relatively small scale, function independently of one another, and have limited links between and amongst the different clusters identified earlier.

Innovations in the private sector tend to focus on either behavioural shifts or material culture changes. Companies whose businesses are heavily reliant on having vehicles on the road, such as Alexander Petroleum Services Ltd. (case # 3) tend to either engage with driver behaviour programs to increase the efficiency with which they can carry out their business. Other companies look to gain these efficiencies by switching out their fleet for a more fuel-efficient fleet, or switching fuels to more fuel-efficient fuels, but rarely do we see companies engaging in both. In fact, in some instances this may not be appropriate, for example Kea Campers (case # 40) have engaged in efforts to make their vehicles more environmentally friendly, but it may not be appropriate to target driver behaviour programs toward their customers (though nudging customers in the right direction may be an option).

In addition to the lack of overlap between different initiatives, we also see very little overlap between organisational sectors; while private enterprises are engaging with either material culture or energy practice innovations, NGOs and community groups tend to focus on advocacy measures, and municipal governments focus on strategies to promote active and public forms of transport. In other words, the current transition environment in New Zealand is siloed in the sense that for the most part there are groups who represent different elements of freight (trains, trucks, and ships), business leaders who represent innovative car manufacturers and electric vehicle initiatives, people representing frustrated NGOs and community groups, and municipal governments each working in relative isolation to one another.
This is not to distract from the innovative work done through the collaborations identified in the case studies, for example the NZTA “Model Communities” programme (Case #51 New Plymouth & Case #32, Hastings) which involved a broad mix of community, business, and governmental stakeholders. However, despite the diversity of stakeholders, the context and focus of ‘innovation’ of the programme remained situated within the local government attentiveness to modal shifts and behaviour change (cluster 2). So although such programmes may initially appear to be addressing complex transport issues in an innovative, multi-layered way, the possibility of ‘innovation’ is limited and defined to a concept of modal shifts.

While modal shifts are both necessary and innovative, there are dangers and unintended consequences of this siloed approach to sustainable action and policy making, particularly when thinking about the resilience of our transportation system in years to come. The transportation system is complex, containing multi-level, multi-loop, and multi-agent feedback systems, which means that the actions of any one organisation do not operate in isolation. However, reading the case studies as a collective does not give us any indication of what the future of transport in New Zealand may look like. Each company, government initiative, NGO and community group identified had their own vision of what a future sustainable transport system should look like and all too often these visions are vague, function in artificial isolation from others, and only exist within their own field of interest and power, i.e. their clusters. A vision for a sustainable future freight system that focuses on driver education and behaviour produces a starkly different future than say what is being proposed by the NZ 100% Possible (Case #52) campaign dedicated to “moving beyond fossil fuels.” Both are promoting a less unsustainable future, but are doing so with little engagement with one another.

A forum whereby interested agents can contribute to a shared vision and action plan may help various organisation situate their own experience within a wider context. It may enable cross fertilisation of ideas, as well as allowing members to develop action plans for their own organisation that are better supported by and offer support to the wider transition. That is not to say that all organisations will follow the same path of innovation, but rather they will all be moving in the same direction. It is highly unlikely that there will be a single sustainable system (the elusive silver bullet), but to fail to acknowledge the feedback loops inherent in the transportation space will result in lack of integrated momentum. For a more widespread and significant transition to be achieved it is important to acknowledge this inherent interconnectivity between the various transition agents, the actions they undertake, their motivations, and the innovations they produce, by changing the way in which we think about, talk about, and model the transport space.

6.3 PICKING LOW HANGING FRUIT CAN SUPPORT BUSINESS-AS-USUAL

Reflecting on the case studies emphasises a general trend across each of the four clusters; that transition agents are mostly acting when the initiative does not require a significant change in the underlying structure. For instance many of the private enterprise transition initiatives are dominated by smarter vehicle choice (Air New Zealand, case #2; Galantai Plastics, case #21; SeaLink, case #60), driver education (Alexander Petroleum Services, case #3; Downer, case #15) and alternative fuel choices that require little to no capital expenditures (Explore NZ, case #19; Hassel Free Tours, case #31; Leopard Coaches, case #42). Likewise, municipal government modal shift policies promote alternative travel modes but are not necessarily able to address the infrastructure imbalances between modes. The case studies illustrate that on the whole, more fundamental investments in widespread contextual change are rare, so that ‘innovation’ is largely an extension of standard practices. Where more challenging innovative infrastructure or contextual developments do occur, for example in biofuels (Mobile, case #47; Gull, case #28) or EV charging points (JuicePoint, case #38; ZED Energy, case #84), it is still on an extremely small ‘test’ scale, with most of the financial risk being assumed by private investment (and in the instances above, often under the banner of demonstrating corporate social responsibility).

Although we acknowledge that each organisation can only take action within their own field of influence, and this is the space in which the change is occurring, there seems to be little thought to big-picture changes and how these might be facilitated, with a far greater focus on implementing small and low cost changes. Many of the innovations in transport appear to be like picking the low hanging fruit, and whilst these types of changes may put organisations along the path to a transition, they may also serve to strengthen the current system. For instance, adding biofuel to
an internal combustion engine or investing in more efficient internal combustion engines without making any other changes, while certainly more sustainable in the short term may also inadvertently help prolong the unsustainability of the transport system as a whole.

The metaphor of picking the low hanging fruit is commonly associated with being the initial easy step towards a more sustainable path. Conversely, however, we may also consider many of these easy to implement innovations to be the product of the business-as-usual system itself, merely prolonging an unsustainable system rather than reworking it. Perhaps Yanarella, Levine and Lancaster (2009) put it best when they write:

*Picking the low-hanging fruit in the name of sustainability is often merely postponing the larger and more formidable task of confronting and revolutionizing the controlling systems of energy, food production, water, transportation, and construction.*

One key element that New Zealand’s current transportation transition is missing out on is a stronger vision of what a reworked transportation system might look like and what actions are required to take us there. A shared dialogue between the different organisations and groups motivated to act in this space could enable more collaborative efforts and start to break down the silos we currently observe. It could also situate the transitions already occurring within a bigger picture, and support and cultivate growing (and potentially risky) innovations, allowing them to create traction toward a reworked transportation system for New Zealand.

### 6.4 SUMMARY OF PATTERNS, PROBLEMS AND LESSONS LEARNT

- Agents are currently not harnessing real traction in transforming the transportation system and many of the initiatives struggle to find the funding and levels of interest needed to continue.
- In the New Zealand context, the rhetoric of innovative transition appears to be present, but a commitment to integrated multi-level action has yet to materialise on a widespread scale.
- The transitions that are occurring do so within silos, with a lack of overlap between different initiatives and between organisational sectors.
- Transition agents are mostly acting when the initiative does not require a significant change in the underlying structure, and there tends to be little thought to big-picture changes and how these might be facilitated, with a far greater focus on implementing small and low cost changes.
- New Zealand’s current transportation transition is missing out on is a stronger vision of what a reworked transportation system might look like and what actions are required to take us there.
- A forum whereby interested agents can contribute to a shared vision and action plan may help various organisation situate their own experience within a wider context.
- The transportation system is complex, containing multi-level, multi-loop, and multi-agent feedback systems. For a more widespread and significant transition to be achieved it is important to acknowledge the inherent interconnectivity between the various transition agents in the transport space, the actions they undertake, their motivations, and the innovations they produce, by changing the way in which we think about, talk about, and model the transport space.
7. CONCLUSION

The findings of this report are based on a scoping exercise that recorded a sub-section of agents involved in initiatives supporting low-carbon and/or energy-efficient transport. It is important to emphasise that this sample does not include all agents, or all types of activities undertaken, and is not representative of all activity in New Zealand. Nevertheless it does reveal the range of type of agents and activities, and is a useful starting point in attempting to characterise the early stages of New Zealand’s transport transition.

The theory of socio-technical transitions suggests that change starts with small, niche areas of activity, which gradually become linked, and finally stabilise into new socio-technical configurations. Over time, and with appropriate support and windows of opportunity, these sub-dominant regimes may expand to become the new dominant socio-technical regime. This scoping project suggests that agents and activities that would support a transition to a low-carbon energy-efficient transport system are still very much at the ‘niche’ stage – largely small, disconnected agents and actions, with two-thirds localised to a specific town or region. Most have arisen in the past 8 years, suggesting a relatively recent interest in transitional activities, with insufficient time yet for linkages and stabilisation.

Using the energy cultures framework, our analysis showed that initiatives are spread across material culture changes, practice changes, norm changes, modal shifts and infrastructure. Different clusters of agents are involved in each of these areas, with relatively little overlap, and few evidently engaged across all areas. The current transition environment is siloed in the sense that transition agents are working in relative isolation to one another, as well as on different aspects of transition. There is a lack of overarching vision for the transition as a whole.

In terms of the energy cultures framework, transitional change occurs when norms, practices and material culture, as well as the wider contextual influences, are aligned with a new set of imperatives (in this case, low carbon and energy efficient transport). Change in any single element of the framework may have consequential changes on other elements (for example, changed infrastructure (external influence) might lead to different practices; or changed aspirations might lead to purchase of a more efficient car) but depending on these influences to occur in an ad hoc fashion is unlikely to bring about change in a coherent and timely manner. We suggest that, in order to achieve transitional change in transport, what is required is a shift in all of the elements of the framework, and for these shifts to be aligned and consistent. For this to occur, a much higher level of communication, networking and collaboration between transition agents is needed.

The range of transition agents scoped in this report demonstrates that a desire to change business-as-usual can be seen within all sectors, but it is not evident that this represents a fundamental interested in systemic change; for many agents it may simply be a pragmatic business or personal decision. This is not its own problem, except to the extent that each of these agents is largely ‘fighting against the grain’ to achieve change within a transport system that is largely aligned to the status quo. This reinforces the question raised earlier of whether a focus on ‘low-hanging fruit’ will actually achieve transitional change, if there is not also a commitment to fundamental changes to the system.

A further observation is that the various analyses, while seeking to establish common factors across the case studies, mainly show the huge diversity across them. They are all working on different aspects of what it might take to change a transport system, but largely working with specific audiences, specific ‘culture’ elements, a particular set of
motivations, and within a specific context. Each has their own approach to actuating a desire for a different style of transport system. To grow from niche to more widespread engagement means that this diversity of interests must be recognised and supported.

For widespread systemic change to the transport system to occur, *every* business or individual, not just niche transition agents, should be in a position to make a pragmatic decision in the direction of transition. The leadership challenge is to create a context that supports greater connectivity between niche leaders, enables the alignment of transitional norms, practices and material culture, and creates a context within which low-carbon energy-efficient transport becomes a straightforward and pragmatic choice for businesses and households.

Further in-depth research is needed to understand the roles and experiences of transition agents in greater depth, and to gain a better understanding of how to support the growth of such initiatives from niche to mainstream.
REFERENCES


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</tr>
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<td>83</td>
<td>Winstone Aggregates</td>
<td>Energy Practice Innovations</td>
<td>Driver behaviour &amp; education Engine tune ups/vehicle maintenance</td>
<td>Transport</td>
</tr>
<tr>
<td>84</td>
<td>Z Energy Recharge Point</td>
<td>Material Culture Innovations</td>
<td>Battery Electric Vehicles (BEVs)</td>
<td>BEV Industry</td>
</tr>
<tr>
<td>85</td>
<td>Zero Emissions Vehicles (ZEV)</td>
<td>Material Culture Innovations</td>
<td>Battery Electric Vehicles (BEVs)</td>
<td>BEV Industry</td>
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</tbody>
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APPENDIX B: THE CASE STUDIES

AOne Movers Ltd.
Two trucks were trialled for six months on canola-based biodiesel – one on a biodiesel blend of 20% biodiesel with 80% ordinary diesel (B20), the other on 100% biodiesel (B100). No modifications or set-up changes were required, just a fuel filter change 5,000 km after switching to biodiesel. In the future AOne Movers will soon be joining Enviro-Mark NZ certification programme with the plan of converting the entire fleet to B100.

Air New Zealand
Air NZ’s public website pays more attention to their carbon offsetting initiatives, which is a carbon offsetting not a carbon reducing practice. However, Air New Zealand’s investment in Boeing 777s, and the newest Boeing 787s, has been described as a concerted effort to establish a more efficient aircraft fleet. Since 2004, Air New Zealand has also saved $18 in fuel burn through implementing new operating procedures (corresponding to a 58,000 tonne reduction in greenhouse gas emissions). And according to the Air New Zealand has also committed $2 billion to fleet changes and by October 2013, the average age of the fleet is expected to be 6.5 years, which is one of the youngest fleets in the world.

Alexander Petroleum Services Ltd.
The driver best practice systems designed to improve the performance of the company has four components comprising; (1) Management leadership – aimed to establish a safe and fuel efficient culture, (2) Driver management – aimed to reduce excessive speed and increase fuel efficiency, (3) Journey management – aimed at improving route management, (4) Vehicle management – aimed to purchase the right vehicle for the right job. The programme resulted in 17.8 percent reduction in fuel consumption and a 99 percent reduction in the occurrence of speeding over 90km/h (from 4734 in January 2006 to 44 in January 2008).

Association for the Promotion of Electric Vehicles NZ (APEV NZ)
APEV’s mission is to create financial, environmental and social benefits for all New Zealanders through the promotion and commercialization of electric vehicle technology innovation, and through building awareness of the energy efficiency and operating cost advantages of electric vehicles. Their goal is foster the largest annual % reduction in transport fossil fuel use of any OECD country by 2023.

Battery Electric Vehicles (BEV) registered in NZ (2012)
At the year-end of 2012, electricity fuelled 85 cars, 9 trucks, 15 motorcycles and 81 buses and coaches; a negligible percentage of the 2,915,115 vehicles currently registered in 2012.

Cabchooze
Termed by Cabchooze as a form of “mobile intelligence”, this is a type of ICT part of the dematerialisation and demand-driven movement of transport. A physical phone number is no longer required and everything revolves around the mobile customer. When a customer uses Cabchooze to request a cab, they enter their pick up and destination address details on their Uzer version of the app. Cabchooze drivers nearest to the pick-up location each receive an invitation to bid for the customer’s business. Once the drivers have submitted a bid for the work, the customer can then choose the best offer (price vs. proximity). As soon as the customer makes their selection, the driver who submitted the winning bid is notified and asked to collect the passenger. At the completion of the journey users can rate the cab and driver. This kind of “app” may find itself filtering into a variety of transport related innovations in the future.

Carpool King
Carpool King is part of an international organisation dedicated to promoting the multiple benefits of carpooling. Carpool is a web-based forum used to connect people and share the use of a car often by people who each have a car but travel together to save cost and to promote other socio-environmental benefits. According to their site, Carpool King NZ currently has 14,321 people registered, 14,575 messages exchanged, 8,778 rides listed, and 592,033 kilometres shared.
Carpool NZ

This web site is available nation-wide and is designed to simply help people share rides around New Zealand. It is basic; there is a list of people who can offer rides and there is a list of people who are looking for rides. Listings can be one-offs or recurring. No further details are offered on the website: simple and functional is the general theme.

Carpool World

Carpool World is part of an international ride-sharing programme that is in its infancy in New Zealand. There have been a total of 773 carpool rides across New Zealand, mostly located in the North Island: Auckland 278 carpool rides, Wellington 113 carpool rides, Onehunga Auckland 276 carpool rides, Porirua 106 carpool rides. Carpoolworld.com is essentially a web site that matches commuters or other travellers based on their transportation needs. Users enter their origin (home) and destination (place of work) street addresses, and the system automatically shows them a list of similar trips from other users. The users contact each other by phone, email, or SMS to make ridesharing arrangements. Carpoolworld.com is free for individual public use.

Christchurch City Council

The Christchurch Transport Strategic Plan is a 30-year vision that has been developed by the Christchurch City Council to keep the city moving forward by providing its residents and visitors with transport choices that connect people and places. This Plan places an emphasis on offering travel choice throughout the city. The need to encourage more effective use of the road network has been recognised in the Christchurch Transport Strategic Plan and aims to promote greater use of public transport and more walking and cycling for shorter distance trips (less than two km). New road designs would recognise that roads and streets have a wider function than simply moving vehicles.

Cityhop

Cityhop is New Zealand’s first car share company. It is based on the same concept as a car hire company however the major differences are that the cars parked in public areas. The cars are located all over Auckland’s CBD, Wellington and Christchurch. It is a self-service car share company with cars for rent by the hour, day, or the week, and can even be booked for as long as 6 months. The cars are reserved online or by phone (with a $5 surcharge), and can be collected and returned 24/7 using one of our high-tech smartcards. Once joined members are free to use the cars as often as you like for $15.00 an hour or for a special daily or overnight rate.

Compressed Natural Gas (CNG) Vehicles in NZ (2012)

At the year-end of 2012, CNG fuelled 18 cars, 64 trucks, 1 motorcycle and 41 buses and coaches. Of the 41 buses and coaches category, Go Bus in Hamilton has more than half with its 24 CNG buses as part of its public transportation fleet.

CourierPost

Courier Post has been using B100 (Biodiesel - 100% blend) on three Wellington based vans as part of a 6-month trial. Initial results were that the fuel works well with no issues in terms of performance or maintenance of the vehicles.

Cycling Advocates Network (CAN)

CAN is New Zealand’s national network of cycling advocates who work with government, local authorities and the community on behalf of cyclists, for a better cycling environment. Their aims are to promote the benefits of cycling, improve safety for cyclists, encourage the creation of a good cycling environment, promote cycle tourism, advocate for integrated cycle planning, and increase the number of cyclists on our roads.

Downer

In terms of transport, Downer’s efficiency comprised of partnering with the SEED (Safe and Energy Efficient Driving) driver-training programme and installing new GPS tracking technology to make routes more efficient.

Dunedin City Council

Building on the “Dunedin Cycle Strategy” (2004), in August 2011, the Council adopted the Strategic Cycle Network (SCN) as the vision for cycling in Dunedin. The intention is to provide safe and convenient cycling facilities throughout the city, linking residential areas with key destinations, such as the city centre, local centres, schools and recreation centres. The SCN exists as a separate entity from the transportation plan. In February 2013, Council endorsed the South Dunedin Cycle Network plan for community consultation. This included the broader network, as well as concept plans for other projects. Developments of the plan are currently underway.

eCars (Clarksun Enterprises Ltd.)

eCars is a New Zealand based importer and distributor formed for the sole purpose of importing zero emissions vehicles from China (YangZhou Dawn Electric Vehicle Co., Ltd). Future plans include looking at building an infrastructure network of fast charge stations in strategic areas around the country, or at businesses or shopping centres, thereby increasing the distance you can travel.
EcoMatters Environment Trust

EcoMatters Trust is a charitable trust that works to deliver a diverse range of sustainability initiatives. These include the Sustainable Living Centre, Sustainable Homes, community gardens, stream restorations and education for sustainability. An individual Fleet Check was conducted that determined opportunities to: (1) reduce the amount of fuel used in the fleet, and (2) reduce CO2 emissions related to the fleet. Key features of the programme include: closer monitoring of fuel use, driver training with the help of EECA and other measures dedicated to improving maintenance like regular tyre pressure checks.

Explore NZ.

After a short trial of B20 on some of their yachts, the entire Explore NZ fleet switched to B20 biodiesel. No modifications were required to shift to biodiesel, and the only set up requirements were to install an additional fuel filter. In the future, Explore NZ sees switching to B100 as the next step in their sustainability plan and is also advocating increasing biodiesel use for Bay of Islands tourism and marine industries.

Fullers Group Ltd.

Fullers has been the leading ferry operator in Auckland for over 20 years and offers a range of ferry trips, tours and charters around Auckland Harbour and the islands of the Hauraki Gulf. A TEEP energy audit helped Fullers Group Ltd introduce simple energy savings initiatives including operating vehicles in a more sustainable manner (slow and controlled speeds), using more efficient lighting, and applying a foul release coating to the propellers.

Galantai Plastics Ltd.

Galantai Plastics is an award winning plastics manufacturer. With the demands of both servicing clients’ needs and running a leading edge manufacturing plant, Galantai Plastics needs a mix of vehicles to keep the business operating. Galantai’s fleet consists of 2 commercial vehicles to support operational requirements and a further 6 management and sales vehicles. Key features of the energy audit included: Actions to monitor fuel economy and bring fuel economy of lesser performing vehicles in to line with benchmark standards; disposal of low mileage vehicles; provide training for sustainable driving; regular checks on tyre pressure.

Generation Zero

The 50/50 campaign is a two-fold programme of awareness building of the issues and the value of “Smart Transport Systems”, and petitioning. First, the group acts as an advocate for a smart transport system for New Zealand that would be designed to integrate roads, rail, buses, cycling and walking to provide a more efficient and sustainable network. Secondly a petition is in circulation to protest the Roads of National Significance policy that favours roads over a smart transport system.

Golden Bay Carpool

This web-site is based out of Golden Bay but rides all over the South island are listed. It is very simple design where potential carpoolers fill out one of two ride forms: A “One-off Ride” form for a one-off trip to town, to the beach, over the hill, or a “Carpool Form” for the trips you do regularly e.g. every Monday (to work, etc.). In each case you can either OFFER a Ride/ Carpool, or REQUEST a ride. Details of the Ride/Carpool will list automatically on the website where others can share/view the ride offers.

Green Cabs

The Green Cabs fleet is all ‘Toyota Prius’. They were selected over other vehicles for a number of reasons but on the ‘Green’ front because they were one of the few vehicles to have achieved Euro 4+ rating. Green Cabs is New Zealand’s first taxi company claiming to be environmentally friendly. They currently run a fleet of HEV cabs in Auckland, Wellington, Christchurch and Queenstown. Green Cabs also plant trees to offset the emissions.

GreenFleet

GreenFleet was developed by the Sustainable Business Network to help, and encourage, businesses to actively reduce both the costs, and associated harmful impacts, of transportation throughout New Zealand. With the help of partners such as EECA, Trees For Survival, First Direct and Catalyst R&D, GreenFleet provides a set of tools to help businesses to reduce emissions, improve transport efficiency, reduce transport costs, and offset emissions through tree planting. GreenFleet operates in alignment with EECA’s fleet management guidelines “EconoDrive”.

GreenFuels

Greenfuels produces Biogold™, which is a renewable fuel that can directly replace conventional petroleum diesel, resulting in a reduction in tailpipe emissions, carbon footprint and greenhouse gases. Green Fuels NZ Ltd was established when it purchased the biodiesel manufacturing assets from Biodiesel New Zealand Ltd on 3 February 2013. Green Fuels purchased the production rights to manufacture its Biogold branded biodiesel in Christchurch. Biogold is made from 100% recycled vegetable oil and is sold throughout New Zealand.
Grey Lynn 2030 - Transition Community

Grey Lynn 2030 is part of the international, grassroots Transition Towns movement. The goal of Transition Towns is to bring people together to explore how communities can respond to the challenges and opportunities of climate change and peak oil. Transition Towns works on the belief that communities have within themselves the innovation and ingenuity to create positive solutions to the converging crises of our time. Grey Lynn 2030 Transition Community’s main transport initiative is called the “Traffic Calming Group”. It is largely community education project that encourages modal shifts away from vehicles in an effort to “reclaim the community space from traffic”.

Gull New Zealand

The first major distributor to bring a biofuel to market in New Zealand, Gull Force 10 and Gull Regular Plus are bioethanol blends (New Zealand whey) and Brazil sugarcane that can be used in almost all later model petrol vehicles in New Zealand making it one of the easiest ways to use good quality biofuels for petrol engines from by-product feedstock. This service is available to the public at Gull outlets in the North Island. In 2011, Gull New Zealand also announced the launch of Gull Force Pro, a new high octane biofuel with 85 percent bioethanol content.

Hachette NZ Ltd.

A publishing company relies on its ability to visit clients face to face across New Zealand, so managing the mobile sales force is critical. Hachette’s fleet consists of 13 sedan vehicles to support sales operations with 2 further management vehicles. Sales representatives visit retailers in urban locations with book samples. The fleet check audit resulted in two key features: (1) the transition of 3 V6 vehicles to smaller capacity engines (Honda Accord Euros), and (2) other measures including keeping luggage compartments clear to reduce weight, driver training and fuel reporting.

Hamilton City Council

The strategic approach for Access Hamilton is to use an integrated and coordinated combination of transport interventions to provide transport choices for everyone. The Integrated Transport Plan ensures this future will be achieved by working with Hamilton’s transport partners and implementation through a series of Action Plans, including the following modal shift strategies: (1) Active Travel Action Plan; (2) Passenger Transport Action Plan; (3) Sustainable Transport Programme initiatives around school and workplace travel.

Hassel Free Tours

In November 2007 Hassle-free Tours’ conservation efforts were recognised by the New Zealand government when it received a Parliamentary Congratulations for being the first tour company in New Zealand to convert its entire fleet to Biodiesel. They began to run their fleet on biodiesel blends in late 2007, and for over a year the vehicles ran on B60 (a 60% blend of biodiesel with 40% ordinary diesel). Although that fuel worked very well, changes in the pricing structure of biodiesel meant it became more cost effective to run on B20 (a 20% biodiesel blend), which they switched to in 2009.

Hastings District Council

The strategy’s community vision is “Making walking and cycling irresistible”. The package of activities in the Hastings District Council proposal includes: A focus on four key arterial routes into the city centre, completing routes and linking communities and modes; complimentary on-road cycle improvements on key collector routes; shared pathway projects; footpath renewal, connectivity and lighting; and a network of information signs, bike stands and seats. A complimentary education programme including cyclist skills training, Share the road campaigns, promotional campaigns for walking and cycling to school.

Hikurangi Foundation

The Hikurangi Foundation supports and grows social enterprises and ambitious communities to deliver solutions to climate change, resource limits and environmental degradation. The Foundation focuses on entrepreneurship and innovation emerging in the social and community sector. They believe that change comes through people - their courage, leadership and ingenuity. The three transport initiatives mentioned: (1) Bikes in Schools - working to provide safe cycling environments for primary school children throughout New Zealand. (2) Kowhai Connection - The Kowhai Connection is an on-demand public transport service in the Matakanaka / Warkworth, a small rural area north of Auckland. (3) The SkyPath project - aims to build a walking and cycling pathway across the Auckland Harbour Bridge.

Hutt City

The strategy is an integrated transport plan and includes the following four transport objectives and actions: (1) increase the number of walking and cycling trips; (2) increase patronage on public transport; (3) reduce harmful emissions from motorised transport; and (4) reduce single occupancy car use.

James Blond Ltd.

The vehicle rental firm currently has 190 vehicles. The commercial fleet switched fuels in September 2009 when Environ Fuels approached them about switching to biofuels; a blend of 20% biodiesel with ordinary diesel (B20). No modifications to the engines or fuel systems were required, other than having to change the fuel filter at each vehicle’s next service – standard practice when switching over to biodiesel.
Jayride

Jayride is New Zealand's largest public ride-sharing service, with over 1,000 members sharing over 20,000 rides around New Zealand. Jayride's founders are Rod Bishop and Ross Lin, young New Zealand entrepreneurs. The New Zealand start-up has gained international attention, opening site in Australia and the UK. The site is simple and easy to use. Sign up for free, then browse rides or share yours, make contact and share the ride. Of the several carpooling sites in NZ, Jayride would be amongst the most active.

JPM Holdings

JPM Holdings is a South Island line-haul operator that employs 32 drivers and 16 trucks on behalf of PBT Transport. The driver education programme worked closely with drivers and used fuel monitoring, analysis and driver mentoring to achieve fuel savings of 15%.

JuicePoint NZ Ltd.

JuicePoint is the largest supplier of electric vehicle (EV) charging systems throughout NZ. They currently offer 6 models of their recharging points. The company is responding to climate change concerns and argues that New Zealand’s renewable electricity comprised 74% of the total electricity generation in 2010, make the reason for New Zealand to move into EV’s very compelling.

Kapiti Coast District Council

The first electric rubbish truck in the southern hemisphere made by Zero Emissions Vehicles Ltd. The operational cost savings on fuel and maintenance outweigh the additional cost of purchasing the vehicle. Vehicles are manufactured in China and assembled by ZEV incorporating components from other countries such as USA, Canada, Switzerland.

Kea Campers NZ

KEA has the most environmentally-friendly vehicles of any campervan rental company across Australia, New Zealand and Southern Africa. Entire fleet is manufactured with Euro 4 turbo-diesel vehicles, which are claimed to be more efficient than petrol, with a maximum age of 30 months. Kea has also committed to wind tunnel testing – on vehicle designs to reduce aerodynamic drag.

Kiwifuels

Kiwifuels was established in 2006 after a group of local Rangiora businessmen found they could successfully produce and sell locally made Biodiesel that could compete with fuel prices at the service pump. They produce and distribute ZeroB100 BioDiesel, which is 100% canola biodiesel (B100) and is used in automotive (both on and off-road) and industrial applications. Both supply and demand for the canola needed to produce this form of biodiesel at an economically viable scale appears to be an issue.

Leopard Coaches

Leopard Coaches was the first bus company in New Zealand to run an entire fleet on bio-fuel during a 12-month trial, which ended in May 2008. As of February 2010, Leopard Coaches now uses Bio-Diesel in all of its fleet (over 100 vehicles). The bio-diesel for the Leopard fleet is manufactured by Bio Diesel NZ made from used cooking oil and oilseed rape. It is blended with standard diesel to form the B5 mix, which is called ‘Bio-Gold’.

Let’s Carpool

Let’s Carpool is set up so you can share rides with co-workers to and from home, a transit location, day care, or school. It involves three steps: (1) Join-Add your origin, destination and login information, (2) Find-Find people who share similar journeys and match your criteria, (3) Connect-Contact people who match your journey and get started. Depending on your schedule, you can carpool once a week or every day and share the car round-trip or just one way. Currently more than 7000 New Zealanders are signed up to Let’s Carpool.

Living Streets Aotearoa

Living Streets Aotearoa is a nationwide organisation with local branches and affiliates throughout New Zealand. The main objective of the organisation is to get more people “walking and enjoying public spaces, whether walking, sitting, commuting, shopping, between appointments, or out on the streets for exercise, for leisure or for pleasure”. Living Streets Aotearoa is New Zealand’s primary advocacy organisation for people on foot. Living Streets undertakes a number of activities and services: Community street reviews and audits; Submissions; Walk 2 Work; Walking Awards; Walking Conferences; Walking Microfund; and Walking Maps.

LPG Vehicles in NZ (2012)

At the year end of 2012, there were 1,098 cars, 379 trucks, 57 buses/coaches, and 92 motor caravans registered as being fuelled by LPG.
Mapua Transition Town

MAPUA TT Transport Group – The transport group is a public education initiative that takes advantage of already existing rideshare/carpooling programs and initiatives that promote alternative modes of transport and higher use of public transportation. The website highlights coming events, featured initiatives, provides an information sharing portal and asks for the Mapua community’s input on what you would like to see happening in your community.

Mobil (New Zealand)

Mobil Oil New Zealand Limited has been selling ethanol-blended petrol at selected service stations in the greater Wellington region since 2008. At specific Wellington Region trial sites, Mobil sells ethanol-blended petrol E3(Mobil S1000) and E10 (Mobil S8000) blends. E10 – contains up to 10% ethanol blended with Premium grade petrol. E3 – contains up to 3% ethanol blended with regular grade petrol. Mobil is now distributing reportedly sourced from Chile, but is also sourcing tallow-based biodiesel domestically.

Napier City Council

Although cycling and walking are mentioned in the Heretaunga Plains Transportation Study (2005), Napier City Council does not have an integrated transportation action plan. Road and Transportation is filed under the section entitled “Essential Services Development” whereas the Cycleway Strategy is a standalone policy alongside the city’s Retail Strategy and Joint Alcohol Strategy. The Bike it! - Cycleway Strategy provides a framework and direction for Council to recognise the needs of cyclists and to integrate their needs into transport planning and design. It is a commitment to various objectives and methods that will achieve Council’s policy of encouraging a decrease in the reliance on motor vehicles through the establishment of cycleways.

Nelson City Council - Carpool

The Council offers carpool car parks and recommends the use of the NZTA’s lets carpool.com to meet fellow carpoolers. Their offer works like this: The Council has a great carpool system that rewards you with free parking in prime city locations. All you need to do is register your carpool with Nelson City Council. It is easy to sign up. You can do it via the Council website or just call in to the office to do it. Each person registered gets a permit that must be displayed on the dash board of the car you carpool in that day.

Nelson City Council

Nelson City Council and the New Zealand Transport Agency are working together develop several integrated projects to make it easier to walk and cycle in Nelson. Two main projects already in the progress include: the St Vincent and Vanguard Street cycle lanes and Brook St cycling improvements and Tasman St upgrade. Additional projects will be varied but will all contribute to the same set of goals of: extending, developing and linking Nelson’s existing walking and cycling networks; working with schools to make walking and cycling for students easier and safer; providing more transport choices, particularly for those with limited access to a car; reducing the adverse environmental effects from land transport; and contributing to making communities healthier.

New Plymouth District Council

Model community vision: For residents to choose walking and cycling on spectacular shared pathways and streetscapes. The “Let’s Go” package of works designed to ‘fast track’ a community that can change travel behaviour through improved transport choices. The programme takes a three pronged approach focused on enabling, educating and encouraging people to make the shift from cars to walking and cycling. It began in June 2010 when New Plymouth District Council was one of two Councils (the other was Hastings) awarded a combined $7 million over two years to develop walking and cycling initiatives to encourage people out of their cars and onto our shared pathways and streetscapes.

NZ 100% Possible Campaign

100% Possible is a collaborative campaign between Generation Zero, 350 Aotearoa and WWF to catalyse action to create a safer, healthier and thriving Aotearoa that moves beyond fossil fuels. They argue that New Zealand needs smarter transport if they are going to move beyond fossil fuels. The campaign involves an educational, informational and promotional campaign that states there are two basic steps to get moving beyond fossil fuels: (1) reducing our energy needs, and (2) shifting the power we do use to clean renewable energy sources.

NZ Clean Energy Centre & ChargePoint

ChargePoint has partnered with the New Zealand Clean Energy Centre (NZCEC) to establish the country’s first networked electric vehicle (EV) charging station. Located on the new State Highway 1 Taupo bypass (at the intersection of Napier Highway), the unveiling of the ChargePoint station occurred in 2011. NZCEC’s mission is to accelerate the adoption of clean energy solutions by industry, communities, businesses, households & motorists, including fleet operators. They cluster clean energy companies in a collaborative office environment; demonstrate clean energy solutions (solar, wind, hydro, biomass, geothermal, electric vehicles); host clean energy events; conceive of and facilitate the development of projects; host relevant Associations (e.g. Assoc. For Promotion of Electric Vehicles); and facilitate global technology transfer into the NZ market.

Ocean Fisheries

Ocean Fisheries was approached in 2006 by Biodiesel New Zealand, suggesting they trial one of their trawlers on biodiesel. Their contact at Biodiesel New Zealand was a former Lyttelton mechanic, well known to the firm’s managers and trusted by
them. Two trawlers running on B20, one trawler running on B100 which is believed to be the first commercial fishing vessel in New Zealand to run on B100, and possibly the first new commercial engine on land or sea to do so. Additionally, the firm’s 12 trucks, which haul fishing gear and other cargo, and deliver the Lyttelton fishing fleet’s catch, also use B20.

**Palmerston North – Manawatu Councils**

A joint venture between the Palmerston North City Council and Manawatu District Council, the Manawatu Active Transport Strategy’s vision is to encourage more people in the region to use “active transport modes” (foot or cycle) for travel, health and enjoyment. The Manawatu Active Transport Strategy 2007 supersedes the 1998 Bike Plan. Strategy objectives are structured under the four E’s - Engineering, Encouragement, Enforcement and Education.

**Palms Direct Ltd.**

Palms Direct is a plant hire, sales and landscaping business that delivers fresh and innovative plant solutions for office, hotel, restaurant and retail environments. The Palms Direct fleet consists of 2 delivery vans and a light vehicle to support sales and service operations. The energy audit resulted in closer monitoring of fuel use, sustainable driving training and other measures including improving line maintenance like regular tyre pressure checks.

**Porirua City Council**

The vision for the cycling & walking strategy is: ‘A district where cycling and walking are enjoyable, safe, convenient modes of travel and regarded as a realistic transport choice, especially for shorter journeys’. The primary aim is to Increase the uptake of cycling & walking within Porirua. This will be achieved through four policies: (1) Improve the Safety, Convenience and Extent of the Cycling & Walking Networks in Porirua; (2) Improve the environment in which cycling and walking take place by consideration of the needs of cyclists and pedestrians in all transportation projects; (3) Promote Cycling & Walking Through Initiatives, Advocacy and Provision of Information; (4) Focus Planning Controls Upon Provision of Good Cycling & Walking Facilities.

**Port Chalmers Transition Town**

The 50 member Port Chalmers seeks to promote ways of combating climate change and peak oil. The Port Chalmers Transition Group and the “Get the Train” campaigners have worked together to reopen Port Chalmers Upper Train Station. And although there is no specific transport sub-group they are actively involved in many transport issues and frequently write articles to newspapers and council members promoting sustainable transport initiatives.

**Queenstown Lakes Biodiesel Consortium**

The Consortium brought biodiesel to more than 20 companies by securing a supply of B20 blended biodiesel to run the pilot with commercial business vehicles in 2010. As a result of the subsidy coming to an end the consortium dropped the blend from 20% to 5% biofuel in July 2012 to remain open. Domestically grown virgin rapeseed oil and used cooking oil form the basis of the biodiesel.

**SeaLink Travel Group**

SeaLink Travel Group operates car, passenger and freight ferries between Auckland. SeaLink completed one of New Zealand’s first marine tourism energy audits as part of the Tourism Energy Efficiency Programme (TEEP) in December 2008. The project resulted in simple energy efficiency measures including, reducing time that ships idle at ramps, small modifications to pilot/driver practices, reducing base loads when vessels are not in use, alterations to the setup of the ship propellers, use of a new, improved anti-fouling system to reduce resistance through the water and also expressed an interest in investigating new technologies for improving the fuel efficiency of their vessels.

**Snowpool**

Snowpool.org is an international site started in 2005 to allow people with spare spaces in their cars to find others to share the travel with. The site is simple, where drivers and passengers post rides, organise a meeting point and travel to the ski field together. The idea is to share the costs travelling while meeting other likeminded skiers along the way, and there is also a passing mention of “the sustainability climate change angle, but if you’re motivated purely by keeping costs down, well, that’s cool too!”

**Southpack Trucks Ltd.**

Southpack took an industry leading position in 2007 to launch Euro 4 compliant trucks, two years ahead of legislative requirements effective January 2009. Euro 4 engines require Selective Catalytic Reduction (SCR) technology and the support structure of AdBlue now widely available in New Zealand. SCR technology has been identified by the majority of truck and engine manufacturers as the solution in producing emission levels so low that they become almost impossible to measure.

**Spring to the Street**

Active transport fluctuates with the seasons. As the weather starts to warm up and the days get longer more people become open to the idea of walking, cycling, taking the train, hoping on the ferry, riding the bus, or experimenting with carpooling. Spring to the Street is an online sustainable transport challenge that runs three weeks during mid-September to early October. Participants enter as an individual or as part of a team and once registered all they have to do is log the kilometres made each day and the mode of transport taken. Participants earn points according to the mode of transport and the distance travelled.
Teams, individuals and workplaces with the most points have the potential to win prizes such as an overnight stay for two on Kapiti Island or lunch for your team at Logan Brown. 2011 saw about 1700 people take part in the event and the 2013 event already has around 487 participants, 58 teams, and 21 workplaces registered.

**Tauranga City Council**

The main goal of the programme is create a governance strategy where transport and land use are planned together and has been ordered into six areas: Integrated Planning, Demand Management, Transportation Network, Walking & Cycling, Passenger Transport, and Parking.

**Transition Nelson**

The vision for Nelson is a sustainable transport future for Nelson. The mission for Nelson is to have a land transport system which is safe, efficient, integrated and responsive, and that meets the needs of current and future generations in ways that are environmentally, socially, and economically sustainable. Transition Nelson acts as an advocate for sustainable transport in the area and in council. The focus of this Strategy is on providing a quality bus service; travel demand management; cycling and walking; Traffic management. However, the website contains fairly out-dated information and it is difficult to determine the current status of the group.

**Transition Town Brooklyn**

Transition Town Brooklyn is a network for local people and community groups who want to take practical action to turn the challenges of climate change and the decline of cheap oil into an opportunity for a sustainable and a higher quality way of life. Brooklyn Transition Town has a Transport Sub-group. The main areas of engagement include promoting already existing global events such as “World Car Free Day” and “International Walk to school month”, and promoting involvement at the municipal government planning level including petitions.

**Transition Town Christchurch**

There has been a sustained interest in public education initiatives in the form of invited guests about sustainable transport behaviours and practices. However, no sub-group or working group on transport could be located at this time.

**Transition Town Kapiti**

Transition Town Kapiti strives to greater local resilience by (1) raising awareness of the need to transition, (2) networking so that skills and resources are shared, (3) hosting workshops which ways to live with reduced energy and consumption. The focus on the website is largely centred on sustainable education and awareness but actionable items in terms of transportation are limited. The group actively opposes the construction of new expressways, such as the Kapiti Expressway Proposal, as it is believed the price of oil is going to be on an upward trend. They promote the idea that money available for roads is better spent on improving existing state highways and local roads.

**Transition Town Kaitaia**

Transition Town Kaitaia has an Energy Group looking into implementing alternative energy projects. Their specific interest is with investigating the viability of making ethanol from raupo for running vehicles. The information provided did not outline any activities currently underway other than offering a wealth of information and educational events such as movie nights and various workshops.

**Transition Town Kaiwaka**

The Transition Town Kaiwaka group is a loose organisation with approximately 40 members. The “Transport Group” is dedicated to looking at opportunities around the local railway, which they suggested are currently an under-utilised resource with only a couple of goods trains through per day. An opportunity exists in expanding the use of rail.

**Transition Town Motueka**

Our main methods of transportation are affected by growing oil scarcity and affect the climate with their carbon emissions. There are alternatives, and we are looking for ways to encourage them within and between our local communities. The Transport sub-group work with City Councils to promote carpooling, ridesharing, cycling and public transport initiatives. The Energy Working Group is exploring how we will reduce our dependence on oil and replace oil with other forms of energy.

**Transition Town Whangarei**

Several transport initiatives were mentioned on the website: (1) the local campaign called Save Our Rail (SOR) striving to save the rail line North that Kiwi Rail is saying is too inefficient to operate. This also involves protest to “support freight on rail not roads: transport change, not climate change!” (2) An independent carpool website that appears to be active and (3) the promotion of active transport by organising critical mass bike ride.

**Transition Towns: New Zealand-Aotearoa**

Transition Town initiatives are part of an international grassroots movement that brings people together to explore how we - as communities - can respond to the environmental, economic and social challenges arising from climate change, resource
depletion and an economy based on growth. The purpose of Local Transition Initiatives is to drive forward the “energy descent” process in their region. This may be achieved through formal “Energy Descent Action Plan”, through hands-on projects (like the establishment of community gardens or transport schemes), through increasing awareness (film screenings, lectures, workshops etc.) or the establishment of partnerships with existing community groups to help disperse and implement the transition message. Refer to the 12-steps to transitioning at http://www.transitiontowns.org.nz/#12steps. Reducing the need for oil by shifting transportation practices and norms is a significant part of the work for Transition Towns.

**Transition Valley – North East Valley (TV473)**

TV473 has an active Transport subgroup. As part of the vision for sustainable transport, TV473 is investigating ways to make the valley safer and more pleasant for walkers and cyclists. They host practical events as well as visioning a better future transport system. The Transport Sub-group is actively involved in local politics, including slowing traffic speeds on North Road. Another initiative is the “Bike Library”. The Bike library is a non-profit organization that will allow members of the community to loan or hire recycled bikes, which have been donated and done up within the community. The main idea of the bike library is increase accessibility and usage of bicycles.

**Transition Waiheke**

Transport sub-group is involved in the “Betta Buses Campaign”. A committee coordinated by the Waiheke Green party has created a “betta buses” campaign, launched on global climate change day. Goals include: (1) to increase public awareness of how using the bus can cut down on greenhouse emissions and therefore combat climate change; (2) Education - to inform the Waiheke bus company and regional transport agencies, such as ARTA, of needed improvements in the bus service that would increase bus patronage. We are also researching the possibilities of alternative fuels and services; (3) Cycle Action Waiheke is meeting with supportive council personnel to plan first cycle path; (4) Transport initiatives being developed Smart Transport - still in concept stage, but essentially a cooperative taxi-like service using a variety of small and medium sized vehicles that roam the island in response to individual requests, all managed by a central software system.

**University of Canterbury: Carpool/Rideshare**

UC Rideshare is the carpooling scheme for University of Canterbury staff and students that used to reward carpoolers with priority parking around campus. In 2011, the Jayride.co.nz site replaced the rideshare scheme that the University of Canterbury used to run independently. This led to the loss of the ‘Rideshare’ priority parks. The UC Jayride works the same as the other Jayride sites (see Case Study # 36).

**University of Waikato: Ridelink**

The University created the Ridelink programme to encourage car sharing. This service can be used by anyone at the University to get a ride to and from anywhere in New Zealand. Subscribers can offer a commute to University or ask for a ride, both long and short distances are welcomed. If you are interested in someone’s ride or request, simply click on the “Contact Driver about Ride” link (“Contact requestor to offer ride” for wanted ads) and write a small message. The ads poster will then review the request and can accept it for further communication. There are currently 35 RideLink car parks (approximately 1% of total spaces available) on offer and the use of them is policed to ensure compliant usage.

**Upper Hutt City Council**

Upper Hutt City Council’s Sustainability Strategy is a standalone document that is not embedded within the Land Transport section of the Long-Term Plan 2012-2022. In addition to the Sustainability Strategy is the Walking and Cycling Strategy, which will provide the basis for sustainable transport improvements and uptake in Upper Hutt. The vision of sustainable transport will be achieved through (1) ensuring vehicle and pedestrian traffic in Main Street flows freely; (2) promoting the city centre to State Highway 2 motorists; (3) encouraging and promoting sustainable commuter and recreational transport, including walking, cycling, trains, and buses.

**Wairarapa Transition Town**

The extent of involvement with sustainable transitions in transport is to encourage political engagement concerning the City Council’s efforts to promote its draft entitled the “Walking and Cycling Strategy”.

**Waitati Transition Town**

Waitati is a small community 20 km north of Dunedin. Waitati is located alongside several other small coastal communities, and functions as a ‘hub’ for the broader Blueskin Bay community. The Waitati Transition Town is an active site and has recently developed the Blueskin Energy Project - aiming to achieve New Zealand’s first community owned and developed wind cluster. There are three transport initiatives have been developed: (1) the W3 Rideshare scheme operates between Waitati and Dunedin with $2 pick-up and drop-offs (2) the East Otago Walking-Cycling Network that aims to promote the establishment and use of safe, attractive walking tracks and cycleways in East Otago, and (3) the “Get the Train” initiative which aims to re-establish a commuter rail service.
Wellington City Council

The Walking and Cycling Policy seeks to promote ‘walking for a purpose’, either as a method of commuting or as a substitute for short trips taken by car. The intent of the Cycling Policy is to provide a safer environment for cyclists and to reduce the perception of road danger. The adoption of the Walking and Cycling Policies will allow the Council to seek supportive financing from funding agencies, such as Land Transport New Zealand. The Walking and Cycling Policies will inform the infrastructure investment programme and other specific projects and initiatives.

Westland Milk Products

Westland Milk Products collects and transports milk from all dairy farms along the West Coast of the South Island. It operates 20 truck and trailer milk tanker combinations. Using GPS data and working with drivers, the company succeeded in improving both road safety and fuel use. According to the EECA report, the programme comprised four areas: speeding, cornering forces, idling and other down time. However, on the website there is no mention of fuel efficiency or the education programme on the company’s environmental statement. The environmental concerns are directed towards the negative images associated with dairy farming and associated pollution concerns. Fuel savings were associated with costs reductions.

Winstone Aggregates

With diesel being more than 8% of total company expenditure, finding ways to make efficiency gains is critical. All but five of vehicles have been replaced by the engines that meet the new Euro4 (emission) standards for diesel engines. Additional energy efficiency measures included, limiting and monitoring speed, cover trucks and trailers, reducing idling, maintaining optimal tyre pressure, and planning trips and optimise vehicle use. To achieve this Winstone Aggregates employs one of only nine trainers in New Zealand qualified for training and verifying drivers in the SAFED NZ (Safe and Fuel Efficient Driving New Zealand) training programme.

Z Energy

Z Energy, previously called Greenstone Energy, runs Shell branded services in New Zealand. Z has installed a free 15-amp charging post for electric passenger vehicles at its Harbour City service station in Wellington as part of the trial supported by the Wellington Council. This is the first electric vehicle charging station in a New Zealand service station, positioning Z as being interested in supporting the inevitable arrival of more electric vehicles in New Zealand.

Zero Emissions Vehicles (ZEV)

Zero Emission Vehicles Limited (ZEV) designs and builds electric power solutions, particularly around heavy commercial vehicles. Formed in New Zealand in 2001, the company has developed a variety of innovative technologies around batteries, battery management and electric drive. ZEV was the supplier for the Kapiti Coast District Council’s BEV waste management fleet. The “ZEV Enviro 9000” truck, built by Zero Emission Vehicles, uses lithium-ion phosphate batteries and will travel a daily route of up to 100 kilometres on an overnight charge at the vehicles depot.