New Zealand vehicle travel – Data issues and trends

Prepared by Haobo Wang and Stuart Badger
Transport Knowledge Hub seminar, November 2017
Contents

► Background
► Data issues with VKT estimation
► Our proposed approach
► Trends in VKT
► Summary
Background
Road transport – the largest liquid fuel user

Road transport used nearly 75% of liquid fuel in 2016
- Fuel security
- Household spending on transport

Road transport contributed nearly 17% of national GHG emissions in 2015
- Significant environmental implications

Source: MBIE & MfE
Vehicle fleet size/mix and travel

- Both fleet size/mix and VKT are important for travel demand and road safety.
- VKT are especially important for estimating fuel use and GHG emissions.

Total number of vehicles = 3.94 million
Vehicle kilometres travelled = 45.6 billion
Data issues with VKT estimation
Two approaches for VKT estimation

- **Odometer reading based by MoT**
  - largely based on actual odo readings, but also using estimation algorithm/assumptions for VKT (when the most recent WOF/COF reading is unavailable) and scrappage

- **RAMM (Road Assessment and Maintenance Management) based by NZTA**
  - based on traffic counts and estimates on every section of road between intersections, and sometimes finer
The national VKT estimates are reasonably close (divergence <5%)
Comparison of national VKT estimates – A closer look

They show different change patterns over time
Trends in VKT and economic indicators

- National VKT, billion
- Real regular petrol price, cents/litre
- Real GDP, $million

- Odo-based (MoT)
- RAMM-based (NZTA)
### Comparison of VKT estimates at the regional level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>1.03</td>
<td>1.03</td>
<td>1.02</td>
<td>1.01</td>
<td>1.00</td>
<td>0.97</td>
<td>0.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Bay of Plenty Region</td>
<td>1.21</td>
<td>1.19</td>
<td>1.19</td>
<td>1.15</td>
<td>1.15</td>
<td>1.12</td>
<td>1.13</td>
<td>1.12</td>
</tr>
<tr>
<td>Canterbury Region</td>
<td>1.09</td>
<td>1.14</td>
<td>1.10</td>
<td>1.12</td>
<td>1.07</td>
<td>1.05</td>
<td>1.05</td>
<td>1.05</td>
</tr>
<tr>
<td>Gisborne Region</td>
<td>1.04</td>
<td>1.02</td>
<td>0.88</td>
<td>0.98</td>
<td>0.98</td>
<td>0.96</td>
<td>0.93</td>
<td>0.94</td>
</tr>
<tr>
<td>Hawkes Bay Region</td>
<td>0.97</td>
<td>0.98</td>
<td>0.98</td>
<td>0.96</td>
<td>0.96</td>
<td>0.95</td>
<td>0.94</td>
<td>0.96</td>
</tr>
<tr>
<td>Manawatu-Wanganui Region</td>
<td>0.91</td>
<td>0.92</td>
<td>0.89</td>
<td>0.86</td>
<td>0.89</td>
<td>0.88</td>
<td>0.87</td>
<td>0.87</td>
</tr>
<tr>
<td>Tasman-Marlborough Region</td>
<td>0.99</td>
<td>1.05</td>
<td>1.01</td>
<td>1.01</td>
<td>0.97</td>
<td>1.00</td>
<td>1.00</td>
<td>1.01</td>
</tr>
<tr>
<td>Northland Region</td>
<td>1.01</td>
<td>0.97</td>
<td>0.93</td>
<td>0.92</td>
<td>0.90</td>
<td>0.89</td>
<td>0.90</td>
<td>0.87</td>
</tr>
<tr>
<td>Otago Region</td>
<td>0.79</td>
<td>0.82</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.79</td>
<td>0.80</td>
<td>0.79</td>
</tr>
<tr>
<td>Southland Region</td>
<td>0.99</td>
<td>1.02</td>
<td>0.96</td>
<td>0.96</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
<td>0.91</td>
</tr>
<tr>
<td>Taranaki Region</td>
<td>1.06</td>
<td>1.05</td>
<td>1.05</td>
<td>1.03</td>
<td>1.03</td>
<td>1.01</td>
<td>1.01</td>
<td>1.01</td>
</tr>
<tr>
<td>Waikato Region</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.84</td>
<td>0.81</td>
<td>0.80</td>
<td>0.77</td>
<td>0.81</td>
</tr>
<tr>
<td>Wellington Region</td>
<td>1.07</td>
<td>1.07</td>
<td>1.05</td>
<td>1.02</td>
<td>1.06</td>
<td>1.06</td>
<td>1.04</td>
<td>1.05</td>
</tr>
<tr>
<td>West Coast Region</td>
<td>0.64</td>
<td>0.72</td>
<td>0.65</td>
<td>0.71</td>
<td>0.65</td>
<td>0.65</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>NZ total</td>
<td>1.01</td>
<td>1.01</td>
<td>0.99</td>
<td>0.98</td>
<td>0.97</td>
<td>0.96</td>
<td>0.96</td>
<td>0.97</td>
</tr>
</tbody>
</table>
## Each approach has strength and weakness

<table>
<thead>
<tr>
<th></th>
<th>Strength</th>
<th>Weakness/Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odo-based VKT (MoT)</td>
<td>• Good estimation at the national level</td>
<td>• Poor estimation for another seven regions</td>
</tr>
<tr>
<td></td>
<td>• Quick response to major events</td>
<td>✓ Drive through traffic in a region,</td>
</tr>
<tr>
<td></td>
<td>• Good estimation for seven regions</td>
<td>✓ WOF/COF and actual driving are inconsistent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unable to split into local road and state highway VKT</td>
</tr>
<tr>
<td>RAMM-based VKT (NZTA)</td>
<td>• Able to split into local road and state highway VKT</td>
<td>• Slow response to major events (eg oil price shock)</td>
</tr>
<tr>
<td></td>
<td>• Reasonably good estimation of regional share in total VKT or in total</td>
<td>• Its annual growth rate may not be reliable</td>
</tr>
<tr>
<td></td>
<td>local road VKT or in total state highway VKT</td>
<td></td>
</tr>
</tbody>
</table>

13
Our proposed way for VKT reporting
Our proposed way for VKT reporting (TV001)

- Using the odo-based VKT estimation for
  - National total road VKT
  - Regional road VKT for the Auckland, Canterbury, Gisborne, Kawkes Bay, Tasman/Nelson/Marlborough, Taranaki, Wellington regions; group all other regions together (Other) – so they will sum up to the national total (also regional/national VKT share for these regions)

- Using the RAMM-based VKT estimation for relative shares
  - Regional local road/SH traffic share (%), eg region x 62% local road, 38 % SH in 2015
  - Regional local road share (%), eg region y 9.5% of national local road VKT in 2015
  - Regional state highway share (%), eg region z 11% of national SH VKT in 2015
  - Regional/national VKT share (%), eg region k 7.4% of national VKT in 2015
VKT trends
National VKT

About half/half in local roads and state highways
Light travel per vehicle has decreased and levelled off in recent years
Regional VKT (billion)
Regional shares in national total VKT
Regional state highway VKT in national state highway VKT
Regional local road VKT in national local road VKT

- Northland Region
- Auckland Region
- Waikato Region
- Bay of Plenty Region
- Gisborne Region
- Hawkes Bay Region
- Taranaki Region
- Manawatu-Wanganui Region
- Wellington Region
- Tasman-Marlborough Region
- Canterbury Region
- West Coast Region
- Otago Region
- Southland Region
Key points

► There are two ways for VKT estimations: odo-based, and RAMM-based

► The odo-based approach produces reliable national VKT and regional VKT for seven regions, but it cannot split into state highway and local road VKT

► The RAMM-based approach produces both state highway and local road VKT at regional level, but its VKT estimates seem to respond to major events (e.g., oil price shock) slowly

► We propose to use the odo-based approach to estimate national VKT and regional KT for the seven regions; the RAMM-based approach can be used to work out regional shares for state highway and local road VKT

► National total VKT and VKT per capita have increased since 2013, but light VKT per vehicle has generally decreased and levelled off in recent years
Contact:
Haobo Wang
Ministry of Transport

h.wang@transport.govt.nz

Thank you