Some interesting old transport data and where to find it

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Intent

- Within two research programmes:
  - The role of urban form in sustainability; and
  - Behaviours and motivations that impede reducing household fuel use;

Two underlying questions arise:
- What processes have shaped our cities
- What has shaped current transport networks and behaviours

- To answer these questions, we looked at aspects of New Zealand cities and transport over the last 120 years

- Two purposes of the paper:
  - Highlight some aspects of the old data that help understand the present
  - Outline some of the sources of old data and key reports that helped shape the current transport system
Transport determines city size and activity location

- Each technology has a natural range limit
- City size grows with each new transport technology
- Each technology changes the location of elements of the city
  - For example, the shift from where public transport users converge to where cars converge
- Parts of the city are therefore unavailable for those using the old technology

- **Walk**
  - 2 km radius

- **Horse-drawn (1860)**
  - 4 to 5 km radius

- **Electric tram (1900)**
  - 10 to 12 km radius

- **Rapid transit**
  - 30 to 40 km radius

- **Car (mid-1950s)**
  - About 60 km radius
The transport studies of the late 1950s and 1960s (1)

- The late 1950s and 1960s: where car use becomes dominant
- Traffic in Towns 1959, “Buchanan report”
  - UK study of how to modify towns to accommodate vehicles and new urban forms
- Traffic in a New Zealand City, 1959
  - New Zealand’s first modern transport study using “the American system” of Origin/Destination data and computer analysis to produce desire lines
  - Strategic transport plan as part of forecast growth and change with 1986 as forecast year
- Comprehensive Transport Plans - the De Leuw Cather reports
  Wellington 1963, 1966; Auckland 1965; Dunedin 1963
  - Equivalent reports for these cities using 1986 as forecast year
  - Set out how to tie in motorway systems planned earlier, *Master Transportation Plan for Metropolitan Auckland 1955* and *Wellington to Foxton Highway 1955* into the inner city networks and enhance rail based public transport
The transport studies of the late 1950s and 1960s (2)

- Our current infrastructure plans are very much “finishing the systems” laid out 60 years ago in very different circumstances
  - Pre-peak oil and pre-climate change targets
- But the finishing has been selective:
  - Continuing the Wellington rail system south of the CBD has not occurred
  - Auckland’s rail system is only starting to be developed now
Arrivals at Christchurch CBD: Mode v Distance (1960)

- Walking shifts to bus
  - 1.5 and 3 km
- Cycling shifts to bus
  - 5 and 8 km
- Cars are shared for longer journeys
- Walking plus PT, or Cycling plus PT, are viable alternatives to cars

Traffic in a New Zealand City
Auckland’s Rapid Transit (1960s and 1970s)

- Planning the Auckland Rapid Transit in the 1970s set competitive travel times for bus/train journeys as the lead criterion of success
  - Then selected the electric train type that would be fast enough
  - Then the station spacing that would allow times to be achieved
  - Then considered the governance that would permit the integrated bus train system
  - And accepted that the needed densification around the system may take 20-30 years
Old data: The legacy of Wellington’s tram network

- Current public transport usage is nearly double than other cities
- Car ownership is less
- Most of the tram network was built quickly
  - 1900-1905
- The network led settlement patterns in the new suburbs
- Network extended to geographic limits of city

NZ Railways and Tramways Atlas
Current usage is only about 10% of 1944 peak once population growth is allowed for

NZ Yearbooks, Transport Statistics, De Leuw Cather reports, ARTA, Royal Commission on Harbour Bridge
Old data: Fuel rationing

- In 1942-43 rationing halved transport fuel use
  - because we had to
- Yet society still functioned reasonably because of electrified public transport based on renewable energy
Old data: Royal Commission on Auckland Harbour Bridge need

- Auckland’s bridge was about 20 years behind the international main bridge era
- Car was synonymous with development
  - North shore ‘backward’ with only half the car ownership of south shore
- Car drivers and freight needs ended the ferry era because ferries were poor at moving vehicles
- Bridge tolls acceptable as drivers already paying for ferry
Recent trends: Car ownership and “travel to work” mode

- Only 8% of households do not have a car
- Currently 0.82 cars per person 20 years and older
- We are still “best behaved” going to work

Census questions 1971-2006
Recent trends: Household expenditure on transport

- Household Transport costs have reduced from 18% to approx 13% of income
- Percentage expenditure across income groups similar
- Cars are 30-50% cheaper than 20 years ago
- In 1911 and 1919:
  - Tram fares 3%, food 30-35%, housing 20-25%
Transport energy

Energy used per person per tramcar kilometre (MJ/km)

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<th>1947</th>
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- International data reported 1977
  - Electric PT: 0.6 MJ/person/km
  - Petrol/diesel PT: 0.8 to 1.3 MJ/person /km
- NZ car use:
  - 1977 2.1 MJ/person/km
  - 1997 2.3 MJ/person/km
- The 1920’s society operated on about 20-30% of current transport energy usage
- NZ energy research and development committee reports, NZ Yearbooks
Conclusions (1)

- New Zealand cities follow much the same pattern of development as Australian and North American cities
  - Based around successive transport technologies
- Current transport behaviours are the logical outcomes of the public responding to economics and other real settings of transport
- Often actual settings and economics contradict urgings for different behaviours
- Our current transport settings were laid down in the 1960s
  - They are poorly aligned with achieving a per capita halving of current greenhouse gas emissions from transport by 2040
Conclusions (2) New Research Programme 2009-2012

- Transport will change in response to changes to met GHG targets, and our cities will respond in turn.

- How can we take advantage of this change to enhance economic performance as well as social and environmental objectives.
  - What will be the capabilities of the new systems?
  - Where will people prefer to locate?
  - Where will business and commerce locate and how with parts of cities transition from one land use to another?
  - How can the governance and market sectors be better aligned?