Social and spatial effects of transforming motor vehicle fuel efficiency in Brisbane

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Challenges of transport planning

Policies to improve vehicle fuel efficiency
Current strategies to improve vehicle fleet efficiency (VFE)

- Legislated VFE standard
- Industry voluntary target
- Awareness campaigns
- Financial incentives
- Support for new technologies
- Traffic control measures

(effect)
Without standards in place, Australia will fall further behind other developed economies, at substantial cost to consumers. Introducing standards that adopt international best practice will address this gap.

130 gCO₂/km emissions level

- 2011
- 2020 business-as-usual

(Climate Change Authority, 2014)
HARMONISING MOTOR VEHICLE AND ENVIRONMENTAL EFFICIENCY DATA FOR AUSTRALIAN CITIES

This project provides an e-Data service to establish a national motor vehicle registration dataset for Australian cities. The data collection harmonises the latest motor vehicle registrations available for states and territories containing a comprehensive database of motor vehicle energy and environmental performance. The e-Data service is available through the AURIN Portal to support users wanting to evaluate the social-spatial patterns of urban fleet intensity, environmental impacts and requirements.

PROJECT TEAM

The Urban Research Program at Griffith University is one of the Australia’s leading urban and transport research institute dedicated to improving understanding and answering the most pressing urban questions in Australian cities. Transport research at URP has been delivering quality research on transport systems, services, infrastructure, and their interactions with socio-economic and environmental data-driven research in the URP include the relationship between transport infrastructure and travel behaviour, transport disadvantage, motor vehicle fleet efficiency and urban freight. This research receives funding and support from multiple ARC funded projects, Queensland and industries.

The project leaders, Prof. Neil Sipe and Jago Dodson and Dr Tiebel Li are responsible for project management and direction.

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Research questions:

1) What are spatial patterns of VFE change in the urban fleets?

2) Level of household fuel savings from the VFE improvement? and who get benefit most?

3) Do we need a stronger VFE policy and can it accelerate VFE transition on urban areas?
Change in VFE of private vehicle fleet in Brisbane suburbs 2009 - 2014

VFE_2009: 9.2 (L/100km)
VFE_2014: 8.3 (L/100km)

Change in VFE
-0.42 - 0.16
0.17 - 0.56
0.57 - 0.72
0.73 - 0.87
0.88 - 1.06
1.07 - 1.69

Cluster of VFE change
- High VFE change
- Low VFE change

Chg_VFE (2009 - 2014)
-0.42 - 0.16
0.17 - 0.56
0.57 - 0.72
0.73 - 0.87
0.88 - 1.06
1.07 - 1.69

Kilometers
VFE change in the most oil vulnerable suburbs
Level of household fuel savings from the VFE improvement

Annual fuel saving:
Annual VFE change * average household VKT per year

Total Household VKT:
VKT \( JTW \) * (Total VKT Travel survey / Work VKT Travel survey)

Total fuel saving:
(VFE 2009 – VFE2014) Adjust * Total Household VKT

Assumption: VFE change is linear; and
No change in household VKT over 5 years
Total fuel savings from improved VFE (5 years)
Future fuel saving opportunity and more strict fuel economy targets

Scenario I (current trend)
Annual VFE change = (VFE2009 – VFE2014) / 5 years

Scenario II (imposing a national target)
Annual VFE change = (VFE2014 – 6.5L/100km) / (2030 - 2015) years

Accumulated fuel savings (AU$) in future years vs.
The additional upfront cost of a new fuel efficient vehicle (valued at AU$2,000)

Assumption: * no change in household VKT in the future;
* the fuel price will increase linearly
Current VFE Trend vs. Higher VFE Target
Current works

1. Incorporate motor vehicle fleet data with agent-based transport models to better estimate household VKT and fuel consumption/emission outcomes (partner: Infrastructure Victoria)

2. Predict the future uptake of electric vehicles in Australian cities and the effects of policy interventions (partner: Department of Energy and Environment)
Summary of findings

① VFE change varies between inner and outer urban areas

② One factor impeding the adoption of fuel efficient vehicle is the higher up-front cost for low income households

③ Mid-Outer urban residents benefit most from VFE improvement because they drive more

④ The fuel saving can offset the upfront cost of fuel efficient vehicles if someone drive a lot

⑤ Higher fuel economy targets would generate higher fuel saving opportunities and accelerate the car transition in Australian cities