Volume 17(2) October 2013

The TAX SPECIALIST

THE TAX INSTITUTE
THE MARK OF EXPERTISE

GST

"… mere contractual analysis": GST and the Ten Commandments

Gordon Brysland

The role of motor vehicle taxes in shaping Australia's oil policy

by Prafula Pearce, CTA, Senior Lecturer, and Dale Pinto, CTA, Professor of Taxation Law, Curtin Law School

Abstract: Despite Australia being heavily reliant on foreign oil, with some 80% of transport fuel coming from overseas crude oil or imported fuel, it is surprising that it does not currently have a well-developed oil policy. This article makes a case for why Australia should have a well-developed oil policy and argues that the policy should recognise and respond to Australia's high reliance on overseas crude oil or imported fuel. In this context, the article critically examines the role of motor vehicle taxes in shaping Australia's oil policy. It is submitted that the current motor vehicle taxes in Australia are not based on sound environmental tax principles, namely the precautionary principle and the polluter-pays principle, and therefore there is a need to reform motor vehicle taxes in Australia. It is also submitted that existing motor vehicle taxes are not high enough to effect behavioural changes on motorists' choice of motor vehicle and have little impact on the sustainability of oil as these taxes were mainly designed with the specific objective of raising revenue. Consequently, existing motor vehicle taxes have not halted the increase in demand for larger cars, including sports utility vehicles that consume more oil. Against this background, the article proposes a framework for motor vehicle tax reform and then offers some concluding comments.

Introduction

The Australian Government's *Draft Energy White Paper*, released in December 2011, indicated that in 2010 Australia had only 10 years worth of economic demonstrated oil reserves[1] and that it is heavily dependent on imports of both refined petroleum products and crude oil to meet its liquid fuel demand.[2] The subsequent *Energy White Paper*, released in 2012, states that Australia's crude oil reserves are relatively limited and may decline in the long term.[3]

Australia imports about 80% of the crude oil and the oil products it requires[4] and the transport sector accounts for about 70% of the total use of oil.[5] Examination of fuel consumption patterns within the road transport sector reveals that passenger motor vehicles consume the most, representing 60.9% in 2007-08.[6] Moreover, Australians are increasingly using private motor vehicles for personal transportation, and the use of public transportation systems has correspondingly been declining. This creates a tension in that Australians are heavily dependent on oil for their passenger motor vehicles. One may never know for certain how long the existing Australian and global oil reserves will last. However, the well-known precautionary principle[7] points towards an oil policy for Australia based on an awareness of the need to preserve the scarce oil resources, and a necessary starting point is to assess whether a change in Australian Government policy can influence the design, choice and usage of passenger motor vehicles in Australia in order to sustain the limited oil resources and reduce reliance on foreign oil.

This article is divided into six parts. Following this introduction, the second part explores why Australia should have an oil policy, followed by an examination of oil consumption within Australia's road transport sector in the third part. The fourth part examines the growth, characteristics and use of passenger motor vehicles in Australia. The fifth part explores the role of motor vehicle taxation in shaping Australia's oil policy, where environmental tax principles, namely the precautionary principle and the polluter-pays principle, are discussed together with the criteria for shaping the tax reform framework, being vehicle weight, engine capacity, engine power and CO2 emissions. Concluding comments follow in the sixth part.

Why Australia should have an oil policy

Although Australia has abundant and diverse energy resources, it has a limited supply of oil. According to the Department of Resources, Energy and Tourism, Australia is the world's ninth largest energy producer, accounting for around 2.4% of the world's energy production.[8] Australia's economic demonstrated resources[9] at December 2008 were reported as making up 38.2% of the total world uranium resources, 18.5% of the total world coal resources, 1.4% of the total world gas resources and only 0.3% of the total world oil resources.[10] Two years later, as at 31 December 2010, Australia's economic demonstrated resources were reported as making up 33% of the total world uranium resources, 10.3% of the total world coal resources, 1.6% of the total world gas resources and only 0.2% of the total world oil resources.[11] Recent reports indicate that Australia also has vast resources of gas, ie conventional gas, liquefied natural gas, coal-seam gas and shale gas, which can provide export income to Australia.[12] However, gas exploration and production, especially for coal-seam gas, is not easy and requires technology and capital. There are also environmental concerns to be taken into consideration. Many have urged the Australian Government to set sound energy policies for Australia and to also set aside at least 15% of gas production for local industry and household.[13] As part of the energy policy, it is submitted that the Australian Government needs to address whether the available energy resources in Australia are sufficient to satisfy Australia's energy consumption needs.

An examination of Australia's energy consumption shows that in the years 2007-08, Australia's primary energy consumption was 5772 petajoules (PJ),[14]

of which 40% was from coal, 34% was from oil and 22% was from gas.[15] Of the 5772PJ of energy consumed in 2007-08, only 3917PJ was available for disposal as 1856PJ was required for conversion of energy to usable form.[16] Table 1 shows the energy consumption in Australia in the years 2007-08 and 2009-10.

As illustrated in Table 1, the road transport sector is responsible for the largest proportion of Australia's energy consumption, amounting to 26.23% of the total use of energy in 2007-08 and 28.76% in 2009-10.[18]

The energy used in Australian road transport mainly comes from automotive gasoline and automotive diesel oil as demonstrated in Table 2.[19]

The 2011 reported data also shows that in 2009-10 the total Australian consumption of petroleum products amounted to 50 928 million litres, consisting of 18 644 million litres of automotive gasoline and 19 044 million litres of automotive diesel oil.[20] This poses the question as to whether Australia has sufficient oil resources, and if not, whether there are sufficient global reserves of oil that Australia can rely upon.

An examination of Australia's oil resources reveals that they are in decline, with remaining crude oil resources estimated at 1 January 2009 to be 8414PJ, equivalent to 1431 million barrels (Mb). This includes 6950PJ of economic demonstrated resources and 1464PJ of sub-economic demonstrated resources.[21] Australia also has 16 170PJ or 2750Mb of condensate and 6210PJ or 1475Mb of LPG.[22] The economic demonstrated oil resources have further declined to 5685PJ at 31 December 2010.[23] The reason for this is that Australia's crude oil resources are being depleted at a faster rate than they are being replenished by discovery. Crude oil exploration in Australia has not repeated the early success of the 1960s when the first offshore exploration discovered the giant Gippsland Basin.[24] The Australian Government is aware that Australia has less than 10 years of economic demonstrated oil reserves[25] and that it is heavily dependent on imports of both refined petroleum products and crude oil to meet its liquid fuel demand.[26]

Since Australia does not produce enough oil for its own use and has to rely on imported oil from other countries, the government of Australia needs to question Australia's oil security in terms of its reliance on foreign oil. It also should develop policies to reduce reliance on global oil reserves that are constantly being depleted and may ultimately become very expensive as supplies continue to decline. An NRMA-commissioned report[27] released on 28 February 2013 states that Australia has sufficient fuel for about three weeks (23 days) at its disposal and if the liquid fuel supply were to be disrupted, the road transport network would be crippled within weeks. The report further states that without adequate transport, shops will run out of chilled, frozen and dry food within seven to nine days, chemists will run out of medicine within a week, hospitals within three days, and fuel supplies for motorists will be exhausted in three days.[28] The federal government's response to oil security can be gleaned from its 2012 *Energy White Paper* which states that Australia's fuel security is calculated by the National Energy Security Assessment unit and that our well-functioning global markets can provide adequate and reliable supplies.[29] However, the NRMA-commissioned report states that the Australian Government's approach

Table 1: Energy consumption in Australia

	2007-08 PJ	2009-10 PJ
Agriculture	92.6	96.0
Mining	449.7	339.7
Food, beverages, textiles	212.1	111.9
Wood, paper and printing	75.1	76.6
Chemical	202.3	227.7
Iron and steel	117.4	69.9
Non-ferrous metals	461.5	384.6
Other industry	150.4	140.7
Construction	26.4	25.4
Road transport	**1027.5**	**1064.9**
Rail transport	37.5	45.7
Air transport	226.3	245.5
Water transport	70.6	60.1
Commercial services	278.9	309.1
Residential	425.7	440.1
Lubes, bitumen, solvents	62.9	65.8
Total	**3916.9**	**3702.8**

Source: Australian Government Department of Resources, Energy and Tourism, *Energy in Australia* (2010 and 2012).[17]

Table 2: Australian consumption of petroleum products 2008-09

	Million litres
LPG	3996
Automotive gasoline	18 734
Avgas	96
Turbine fuel	6173
Kerosene	25
Heating oil	7
Automotive diesel oil	18 587
Industrial diesel fuel	16
Fuel oil	1423
Lubes and greases	437
Bitumen	809
Other	311
Total	**50 614**

Source: Australian Government Department of Resources, Energy and Tourism, *Energy in Australia* (2010).

is complacent and calls for a mature community debate about Australia's energy policy.[30]

Australia's oil security needs to be assessed in terms of the status of global oil reserves. In order to assess global oil reserves, however, it is first necessary to understand what is meant by "oil reserves". There is no universal definition of oil reserves and the concept is not generally well understood. Broadly speaking, an "oil reserve" can be defined as an estimate of the amount of oil in a reservoir that can be extracted at an assumed cost. There are three categories of reserves: proven, probable and possible reserves.[31]

Proven oil reserves are those which are producible using current technology at current prices and which have a 90% certainty of being produced. Proven reserves are further subdivided into "proven developed" and "proven undeveloped" reserves. Proven developed reserves can be produced from existing wells with minimal additional investment or operating expense, whereas proven undeveloped reserves require additional capital investment to bring the oil to the surface. Probable reserves are those having a 50% certainty of being produced using current and likely technology at current prices. Possible reserves are those having a 10% certainty of being produced. The ultimate recoverable reserve includes a total recoverable reserve and would include proven, probable and possible reserves.

As there is no universal agreement on the definition of an oil reserve or a universally applied method of reserve reporting, there are differences in published reserve data. Reserve estimation consists of gauging how much extractable oil resides in complex rock formations that typically exist one to three miles below the surface of the ground. This has been described as being similar to a blindfolded person trying to judge what a whole elephant looks like from touching it in just a few places.[32] Differences between reserve estimates can arise from the use of different methodologies, or differences in judgement, politics and self-interest considerations. Moreover, reserve estimates are revised periodically as a reservoir is developed and new information is obtained. Reserve estimation is not an exact science, like counting the cars in a parking lot, but an assessment using an array of methodologies and a great deal of judgement.[33] Thus, different estimators may calculate different reserves from the same data, as shown in Table 3.

Table 3: Forecasts of "proved" global oil reserves

Author	Date of forecast	Proved oil reserves (billion barrels)
Oil and Gas Journal (OGJ)	Jan 2009	1342
World Oil (WO)	Year end 2007	1184
International Energy Agency (IEA)	2008	1241
BP Statistical Review	June 2009	1258
Independent authors	Various	903

Source: Low Carbon Mobility Centre, University of Oxford, UK.[34]

The forecasts noted in Table 3 from OGJ, WO and *BP Statistical Review* include tar sands. It has been reported that if the tar sands were removed from the above estimates, the OGJ reserve forecast would be 882Gb, the WO forecast would be 892Gb and the *BP Statistical Review* forecast would be 830Gb.[35]

Other organisations including the Energy Information Administration (EIA) and the Energy Watch Group (EWG) have also reported on the status of the world's oil reserves. The EIA belongs to the US Department of Energy and it publishes many energy statistics, as well as annual reports. In its *International Energy Outlook 2010* annual report, which was released in July 2010, international energy projections through to 2035 were presented. The report stated that as of January 2010, proved world oil reserves including the Canadian oil sands, as reported by the OGJ, were estimated at 1354Gb, of which 56% were located in the Middle East.[36] Peak oil experts have asserted that the Middle East exporting countries artificially raised estimates of their reserves even though there were no new discoveries, on the basis that the reserves were previously underreported for financial and political reasons.[37]

The Energy Watch Group (EWG) is an international network of scientists and parliamentarians, initiated by a member of the German Parliament in collaboration with other parliamentarians from both Germany and abroad. A report entitled *Crude Oil – The Supply Outlook* was released by the EWG in 2008 on the future availability of crude oil up to 2030. The methodology calculated the proved plus probable discoveries and production patterns. The report stated that the peak of discoveries took place in the 1960s,[38] and that current reserves amounted to 854Gb. By comparison, the industry database Information Handling Services (IHS) estimated that the remaining world oil supplies were 1255Gb. Table 4 shows the oil reserves, production and consumption reported by the EWG and IHS.

Table 4 shows that the countries with the most oil reserves are in the Middle East and transitional economies. Although the difference between the EWG and the IHS estimates of oil reserves is 401Gb, this only amounts to 14 more years of supply based on a global demand of 30.3Gb per year. Fourteen years' difference is not much when compared with the millions of years it took for the oil to be formed. Based on the global consumption of 30.3Gb per year in 2005 and without any significant new discoveries and changes in consumption, the current global oil reserves would last somewhere from 28 to 42 years. This time frame indicates that countries should be preserving oil for necessities and developing policies that prepare people to reduce their reliance on oil.

From the above discussion, it can be concluded that although Australia has an abundant and diverse range of energy resources, it does not have sufficient oil to supply the current road transport sector. It also shows that the Australian transport sector will continue to rely on oil as its primary energy source up until the year 2035.[40] This suggests that the transport sector is unlikely to adapt to alternative fuel sources in the next twenty years without sound government policies.

Relying on overseas oil affects Australia's national security and the Australian

Table 4: Oil reserves and annual oil production in different regions and key countries

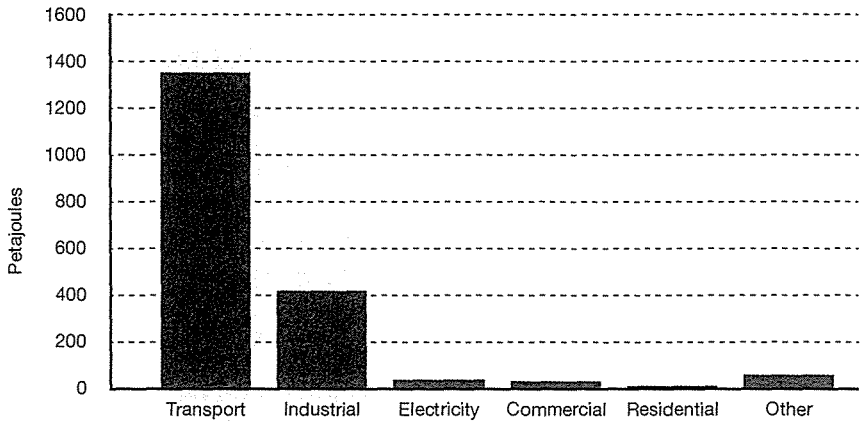
Region	Remaining reserves 2008		Production 2005		Consumption 2005
	EWG [Gb]	IHS [Gb]	Onshore [Gb/yr]	[Gb/yr]	[Gb/yr]
OECD North America	**84**	**67.6**	**3.20**	**1.71**	**9.13**
Canada	17	15.3	0.89	0.12	0.82
USA	41	31.9	1.93	0.59	7.59
Mexico	26	20.4	0.36	1.00	0.72
OECD Europe	**25.5**	**23.5**	**0.1**	**1.94**	**5.72**
Norway	11	11.6	0	1.13	0.08
UK	8	7.8	0.01	0.7	0.65
OECD Pacific	**2.5**	**5.1**	**0.025**	**0.18**	**3.18**
Australia	2.4	4.8	0.02	0.17	0.31
Transition Economies	**154**	**190.6**	**4.1**	**0.18**	**2.02**
Russian Federation	105	128	3.4	0.13	1.00
Azerbaijan	9.2	14	0.01	0.15	0.04
Kazakhstan	33	39	0.47	0	0.08
China	**27**	**25.5**	**1.1**	**0.22**	**2.55**
South Asia	**5.5**	**5.9**	**0.11**	**0.16**	**0.96**
East Asia	**16.5**	**24.1**	**0.3**	**0.65**	**1.75**
Indonesia	6.8	8.6	0.27	0.11	0.43
Latin America	**52.5**	**129**	**2.0**	**0.61**	**1.74**
Brazil	13.2	24	0.075	0.55	0.75
Venezuela	21.9	89	1.17	0	0.20
Middle East	**362**	**678.5**	**6.97**	**1.97**	**2.09**
Kuwait	35	51	0.96	0	0.11
Iran	43.5	134	1.19	0.24	0.59
Iraq	41	99	0.67	0	0.69
Saudi Arabia	181	286	2.85	0.86	0.14
UAE	39	57	0.46	0.45	
Africa	**125**	**104.9**	**2.03**	**1.53**	**1.01**
Algeria	14	13.5	0.72	0	0.09
Angola	19	14.5	0.01	0.45	
Libya	33	27	0.61	0.02	
Nigeria	42	36	0.39	0.52	
World	**854**	**1255**	**19.94**	**9.15**	**30.3**

Source: J Schindler and W Zittel.[39]

Government should take the following sobering observations and conclusions from various government reports, business leaders and industry experts into account when formulating its oil policy:

- the EWG's report, *Crude Oil – The Supply Outlook*, concluded that the world oil production peaked in 2006 and that by 2020 and 2030 the global oil supply will be dramatically lower. This will create a supply gap which will not be satisfied by other forms of energy;[41]
- the US Joint Forces Command's Joint Operating Environment (JOE) states that a severe energy crunch is inevitable without a massive expansion of production and refining capacity. The effect of the supply crunch would result in reduction of growth for both developing and developed countries and could lead to harsh economic adjustments;[42]
- the International Energy Agency's chief economist, Dr Faith Birol, said, "When we look at the oil markets the news is not very bright. We think that the crude oil production has already peaked in 2006";[43]
- the Wicks Report, released in August 2009 by the UK Government Department of Energy and Climate Change, states that there are clear risks that the global oil supply will not be able to satisfy demand and this no doubt will have an impact on the price of oil.[44] The report further states that around three quarters of the projected increase in demand for oil worldwide is expected to come from the transport sector which is least responsive to price changes in the short term, ie the demand is inelastic;[45]
- the UK Industry Taskforce on Peak Oil & Energy Security also released a report in February 2010 entitled *The Oil Crunch: A Wake-Up Call for the UK Economy*, which stated that virtually every sector of the UK economy is still dependent on oil and sent signals to the UK Government to act now and set coherent policies to help the UK adapt;[46]
- in October 2009, Global Witness produced a report entitled *Heads in the Sand? – Governments Ignore the Oil Supply Crunch and Threaten the Climate*, which states that governments and multilateral and international agencies have failed to recognise the scale of the global oil crunch, and most governments are unprepared for

Figure 1: Australian oil and LPG domestic consumption 2007-08



Source: ABARE, Australian energy statistics.

the consequences. The report further claims that it is not possible for the world to spend its way to an oil supply solution and states that individual governments have an overwhelming responsibility to their present and future citizens to take urgent action; and[47]

- Dr Robert Falkner from the London School of Economics has reported that the transport sector in the UK is most exposed to the effects of global oil supply constraints and price shocks, as the transport sector is highly dependent on petrol, diesel and kerosene.[48]

Against the background of the chorus of warnings noted above, countries including the US have implemented policies to curtail oil use. The US Government is conscious of foreign oil dependence and this is reflected in their policies through the *Energy Independence and Security Act* of 2007 which includes increased Corporate Average Fuel Economy (CAFE)[49] and improved vehicle technology.

In a similar vein, it is argued that it is now time for Australia to develop an oil policy that takes into consideration Australia's reliance on foreign oil and to form a plan to reduce this reliance by reducing oil consumption. This calls for an examination of the oil consumption within Australia's road transport sector which is addressed in the next part of the article.

Oil consumption within the Australian road transport sector

The transport sector is the largest consumer of oil products in Australia. In 2007-08, the transport sector accounted for approximately 70% of the total use of oil, compared with 50% in the 1970s as shown in Figure 1.[50]

Road transport is the largest consumer of oil in the transport sector, representing 76% of the total energy consumption in that sector.[51] Further examination reveals that passenger motor vehicles accounted for 60.9% of all Australian road fuel consumption in 2007-08, as demonstrated in Table 5.[52]

This trend has not changed, as 2010 data from the Australian Bureau of Statistics reveals: registered motor vehicles in Australia consumed 31 186 million litres of fuel, of which 18 431 million litres (59.1%) were consumed by passenger motor vehicles, 84.1% of this being petrol.

The fact that passenger vehicles consume the majority of oil used for road transport in Australia means that a well-developed Australian oil policy should address the reduction of oil use in passenger vehicles. This necessitates an investigation of which types of motor vehicles Australians drive, where they drive and the number of vehicle kilometres (VKM) they accumulate in a year. The next part of this article examines the growth of the motor vehicle fleet in Australia, the design and characteristics of the motor vehicles that people choose for personal transportation, and the impact their choices have on the consumption of oil. The article then focuses on motor vehicle taxation as a policy tool to reduce oil consumption in passenger motor vehicles.

Examination of the growth, characteristics and use of passenger motor vehicles in Australia

A plentiful oil supply has been the catalyst for the growth of passenger motor vehicles over the last 100 years, both globally and in Australia. The number of passenger vehicles registered per 1000 population increased in Australia from 250 in 1965 to 465 in 1995.[54] In 2008, there were 555 passenger vehicles per 1000 population compared with 719 total motor vehicles per 1000 population.[55] Thus, in 2008, registered passenger motor vehicles formed 77% of total registered motor vehicles. Of the 11 803 536 registered passenger vehicles in 2008, 6.2 million consisted of three makes: Toyota (19.4%), Holden (17.6%) and Ford (15.2%).[56]

The historical increase in the number of registered cars on Australian roads is shown in Figure 2.

Not only has the number of passenger vehicles increased, but Australians are also increasingly relying on passenger motor vehicles as their main means of personal transportation.

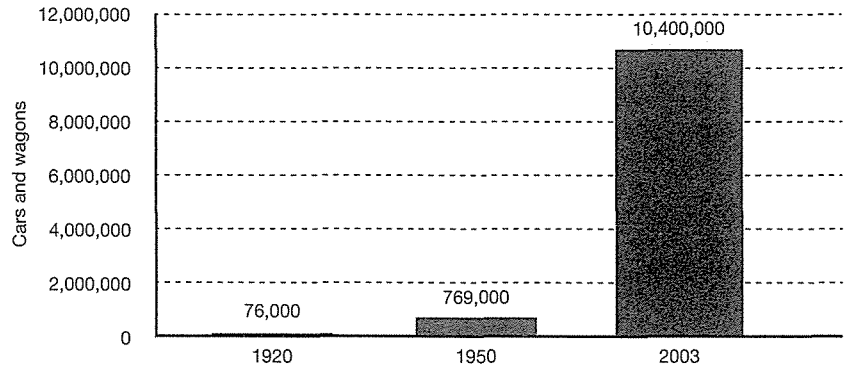
In 1995, private road vehicles represented 93% of city passenger transport.[58] In March 2009, 92% of Australian households kept at least one registered motor vehicle at home. The proportion of households with two or more registered vehicles increased from 51% in 2006 to 56% in 2009.[59] In 2009, 80% of people in Australia used private motor vehicles to travel to work or full-time study, 14% took public transport, 4% walked and 2% cycled. Of

Table 5: Australian road fuel consumption by type of vehicles 2006-07

	Percentage
Passenger vehicles	60.9
Buses	2.3
Motorcycles	0.4
Light commercial vehicles	15.7
Other trucks	0.2
Articulated trucks	12.5
Rigid trucks	7.9
Total	100

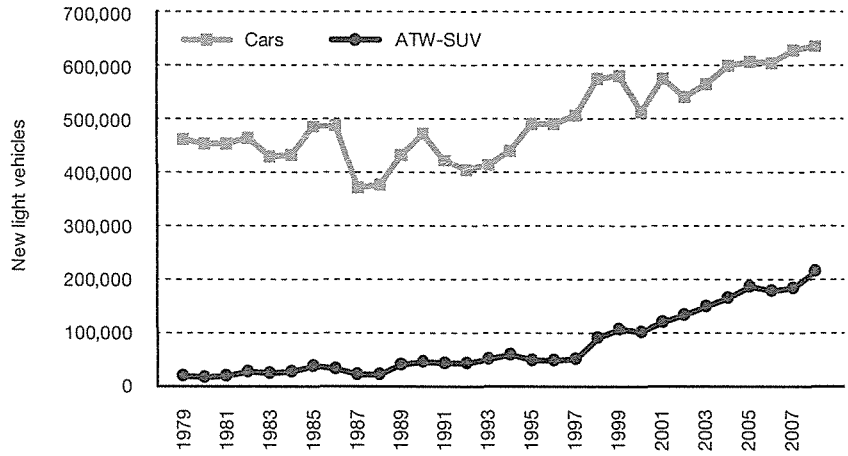
Source: Department of Resources, Energy and Tourism.[53]

Figure 2: Registered cars and station wagons



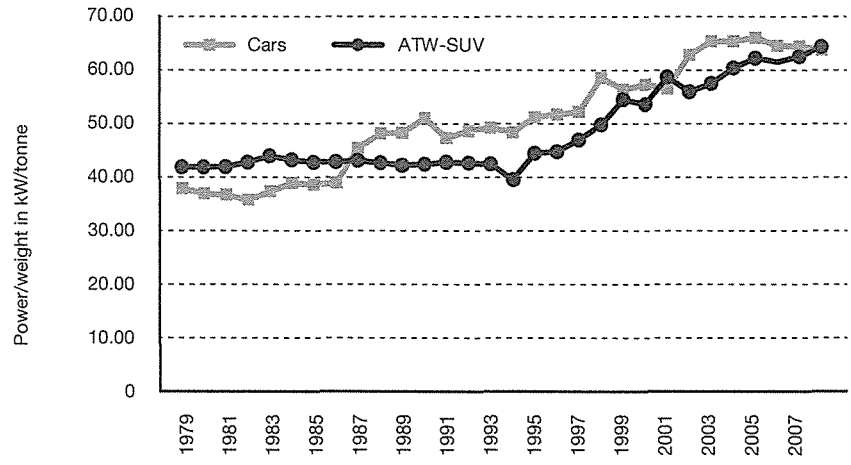
Source: Australian Bureau of Statistics.[57]

Figure 3: New car and ATW-SUV sales in Australia



Source: Bureau of Infrastructure, Transport and Regional Economics.[67]

Figure 4: Power-to-weight ratios for new light vehicles in Australia



Source: Bureau of Infrastructure, Transport and Regional Economics.[69]

those people who used a private motor vehicle to travel to work or full-time study, 94% did so as a driver or rider and only 6% travelled as a passenger. The most common reasons for Australians not using public transport are: lack of service at right or convenient time; convenience, comfort and privacy; travel time too long; and own vehicle needed.[60]

A Senate inquiry on the investment of Commonwealth and state funds in public passenger transport infrastructure and services reported in August 2009 that metropolitan travel passenger-kilometres consist of about 85–90% by car, 10% by public transport and the rest by cycling and walking. The most prominent comment in the submissions was the need for improvements to public transport service and for encouragement of public transport use. A number of recommendations were made, including an investigation into tax incentive options for public transport, and that the government should support behavioural change programs.[61]

Recent reports indicate a peak in motor vehicle use in most developed countries since the early 2000s partly due to increased oil prices.[62] Motor vehicles registered in Australia travelled on average 14 100 km per vehicle in 2010, of which passenger vehicles accounted for 72.1% of the total distance travelled, compared with 74.6% in 2006.[63] The total motor vehicle population in January 2011 was 16 368 383, of which passenger motor vehicle population was 12 474 044,[64] whereas in January 2012 the total motor vehicle population was 16 741 644, with 12 714 235 being passenger motor vehicles.[65] Australians are increasingly purchasing sports utility vehicles (SUVs). According to the official VFACTS data released in February 2013, SUV sales represented 31.2% of the total market in January 2013.[66] Reported data shows that new car sales in Australia increased from 458 131 in 1979 to 631 866 in 2008, an increase of 37.9%, whereas the sale of all terrain wagon-sports utility vehicles (ATW-SUVs) in the same period increased from 15 556 to 210 933, an increase of 1255.9%, as demonstrated in Figure 3.

Bearing in mind Australia's increasing reliance on imported oil, it is worth questioning whether the Australian Government should introduce policy measures to curb the demand for large and powerful passenger cars including SUVs. Figure 4 shows the power-to-weight ratio

of new light vehicles in Australia between 1979 and 2007. In 1979, the average power of new light vehicles was 75.14kW, and the average weight was 1994.01kg. By 2008, the average power of new cars had increased to 118.31kW, while the average weight decreased to 1860.73kg. Thus the power-to-weight ratio of cars increased from 37.68kW/tonne in 1979 to 63.58kW/tonne in 2008, an increase of 68.73%.

Similarly, the average power of ATW-SUVs increased from 105.40kW in 1979 to 157.25kW in 2008, while the average weight of ATW-SUVs was 2528.08kg in 1979 and 2451.00kg in 2008. Accordingly, the power-to-weight ratio of ATW-SUVs increased from 41.69kW/tonne in 1979 to 64.15kW/tonne in 2008, an increase of 53.87%.[68]

The Bureau of Infrastructure, Transport and Regional Economics (BITRE) examined trends in the fuel consumption of new passenger vehicles in Australia from 1979 to 2008 and reported that the preference of Australian consumers for vehicle characteristics that increase fuel consumption, being power, weight, accessories and 4WD capability, has meant that potential reductions in fuel consumption made possible by technological advances have not been fully realised. The report also confirmed that this is a worldwide trend and cautioned against reliance on technology alone to deliver reductions in fuel use.[70] This indicates that appropriate government policies should seek to discourage consumers from choosing extra power and weight when buying new vehicles. Government policies should also encourage the use of alternative fuels in order to reduce the dependence of oil in the transport sector.[71] The next part of this article investigates whether motor vehicle taxation might have an important role in shaping Australia's oil policy.

The role of passenger motor vehicle taxation in shaping Australia's oil policy

Taxation can influence the reduction of oil consumption in passenger motor vehicles in two ways: firstly by influencing the choice of a motor vehicle that has the potential to consume less oil; and secondly by encouraging a reduction in driving.

In Australia, both the Commonwealth and state governments impose a variety of taxes relating to passenger motor vehicles. However, these taxes were not designed with the aim of impacting on reducing energy use, in particular the reduction in the use of oil.

The taxes and duties payable on the purchase of a vehicle in Australia include the goods and services tax (GST), stamp duty and luxury car tax (LCT). Annual motor vehicle licence fees are also payable in order to be able to use the vehicle on the roads.

The GST is a standard 10% payable on the cost of the vehicle and has no bearing on the oil consumption of the vehicle. Stamp duty is imposed by the states and territories where the new vehicles are registered for the first time, or when registration is being transferred to another person. The amount of the duty is based on the dutiable value of the motor vehicles and the rate varies with each state or territory. The stamp duty has an impact on the price of the vehicles but no bearing on the oil consumption of the vehicle.

In Australia, the LCT can impact on the price of the vehicles. The LCT was first introduced in Australia on 1 July 2000 when the GST was introduced and the wholesale sales tax was abolished. The tax applies to vehicles whose GST-inclusive value exceeds the indexed threshold of AUD59 133 for 2012-13 for normal cars and AUD75 375 for fuel-efficient cars that consume less than seven litres of fuel per 100 kilometres. The LCT applies to both domestically produced and imported vehicles.[72] The historical purpose of the LCT was not necessarily to curb excessive oil consumption but to protect the local car industry in Australia.

The price of the vehicle as a basis for the imposition of LCT is not indicative of its fuel efficiency or its emissions. Moreover, the proportion of vehicles subject to the LCT is not more than 11%. Thus, the LCT is not sufficient to encourage the purchase of a fuel-efficient car as it has no impact on about 89% of the motor vehicles purchased.[73]

As regards the annual motor vehicle licence fees in Australia, the six states and two territories apply different methods of calculating vehicle registration charges. South Australian charges depend on the number of cylinders, whereas New South Wales charges are based on weight, as shown in Table 6.

In Western Australia, the vehicle licence fee for light vehicles weighing less than 4500kg is AUD17.02 per 100kg, plus a recording fee and a prescribed flat fee.[74] The Northern Territory and Victorian charges are based on engine size.[75]

The differential vehicle registration charges in Australia have little influence on the purchase and use of motor vehicles as the charges are either not high enough or the basis on which they are imposed has no impact on the use of oil in motor vehicles.

The only tax in Australia that impacts on the use of a motor vehicle is the fuel excise as the carbon tax does not apply to fuel used for passenger motor vehicles. Australia's fuel excise has declined over the last decade as the excise rates are not indexed to the consumer price index and the rate has remained at 38.143 cents per litre. This is demonstrated in Table 7 by comparing the change in excise rates (shown in Euro) on petrol for 10 years from 2000 to 2010 in selected OECD countries.

Table 7 shows that the Australian fuel excise rate has declined over the 10 years to 2010. As part of its *A New Tax System* reforms, the Howard government reduced excise on petrol and diesel by 6.656 cents per litre on 1 July 2000 in

Table 6: Vehicle registration charges in New South Wales

Weight of vehicle		Private use	Business use
Exceeding kg	Not exceeding kg	AUD	AUD
	975	231	341
976	1154	254	375
1155	1504	285	429
1505	2504	406	619

Source: *Motor Vehicle Taxation Act 1988* (NSW), s 5 (as amended).

order to compensate for the introduction of the GST. The Australian Government further reduced the excise by 1.5 cents on 2 March 2001. This brought the total reduction in excise to 8.156 cents. The excise rates in Australia are not indexed to the consumer price index and the excise rate has remained at 38.143 cents per litre, with the result that the real excise rate has decreased over the last 10 years to 2010.

The fuel excise in Australia is only imposed to raise revenue and has no environmental impact. It is contended that it is time to reform Australia's excise rates on fuel used for passenger transportation as part of the overall reform of motor vehicle taxes and Australia's oil policy.

Based on the above discussion, it can be concluded that Australia does not effectively use taxation as a tool to reduce oil consumption in passenger motor vehicles. In light of the declining supplies of oil, it is argued that it is both timely and necessary for the government to initiate a debate on how to reform the federal and state taxes in Australia relating to the purchase, ownership and use of motor vehicles. In order to reduce Australia's reliance on foreign oil, these taxes should be uniform throughout Australia,[77] and based on set principles including environmental tax principles, namely the precautionary principle and the polluter-pays principle which are discussed below.

Table 7: Tax rates on motor fuel in Euro per litre in selected OECD countries

	Petrol 2010	Petrol 2000	Arithmetical % change	Real % change
United States	0.0788	0.067	17.67%	– 8.69%
Canada	0.1524	0.1451	5.05%	– 14.67%
New Zealand	0.1913	0.1453	31.65%	3.7%
Australia	0.2141	0.2595	– 17.48%	– 36.86%
Japan	0.4139	0.4139	0.00%	3.02%
Sweden	0.5173	0.4205	23.04%	5.82%
Ireland	0.5432	0.3739	45.29%	11.3%
Portugal	0.583	0.3706	57.31%	23.46%
Greece	0.61	0.314	94.26%	41.85%
United Kingdom	0.6307	0.5299	19.02%	– 2.47%
Germany	0.6545	0.5624	16.37%	0.07%
Netherlands	0.6681	0.5968	11.96%	– 7.65%
Turkey	0.8802	0.1475	496.88%	9.25%

Source: Organisation for Economic Co-operation and Development, *Taxation, Innovation and the Environment*, 2010.[76]

The precautionary principle

The precautionary principle has its origins in the German concept of "Vorsorgeprinzip", which literally means "foresight principle". The precautionary principle is now widely used in international environmental law and received strong endorsement in the Rio Declaration on Environment and Development, adopted in 1992 by the United Nations Conference on Environment and Development in Rio de Janeiro.[78]

The precautionary principle has been described as a decision-making approach which ensures that, even without conclusive scientific proof, a substance or activity that poses a threat to the environment should be curbed.[79] The principle, both in its conceptual core and its practical implications, is preventative and provides the philosophical authority to make decisions in the face of uncertainty. It is symbolic of the need for change in human behaviour towards sustainability; in this article, behavioural change is required for the sustainable use of oil by using tax measures to reform the choice and usage of motor vehicles for personal transportation. We argue that vehicle taxes in Australia should be reformed by applying the precautionary principle with the aim of reducing Australia's dependence on foreign oil.

The precautionary principle does not provide guidance as to how the government should choose between environmental and economic values when forming its policies, but lack of scientific certainty should not be used as a reason for postponing measures. The precautionary principle requires policies to be considered in the broader context of ecologically sustainable development (ESD). ESD was defined in the 1987 Brundtland Report of the World Commission of Environment and Development as having to "[meet] the needs of the present without compromising the ability of future generations to meet their own needs".[80] The question as to whether the Australian oil position requires any action under the precautionary principle can be answered by examining the Australian Government's statement on the matter in the *Draft Energy White Paper* that was released in December 2011. This paper states that:

- Australia is increasingly dependent on foreign oil and therefore needs to halt the demand for liquid fuel that has steadily risen over the past decade and is projected to grow at a rate of 1.2% a year over the long term;[81]
- Australia's liquid fuel demand will increasingly be met by imports of crude and refined products and Australian refineries will source around 80% of crude oil needs from overseas;[82]
- the transport sector is the largest final consumer of liquid fuels, accounting for around three-quarters of Australia's final use;[83] and
- oil will remain the primary energy source for the transport sector to 2035 and changing policies and technologies could result in a demand-induced peak in global production after 2020. The risk of major supply disruptions remains an unknown but ever-present factor.[84]

The precautionary principle suggests that there is a responsibility on the part of the Australian Government to intervene and protect the public from harm where scientific investigation discovers a plausible risk. As discussed earlier, many organisational and government reports discuss the need to reduce

oil consumption. By applying the precautionary principle, it is the Australian Government that bears the responsibility for reducing oil wastage and educating and preparing the Australian people for life without cheap, abundant oil.

The polluter-pays principle

The polluter-pays principle (PPP) was first advocated by the OECD Council on Guiding Principles Concerning International Economic Aspects of Environmental Policies as: "The principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment." It then went on to elaborate: "This principle means that the polluter should bear the expenses of carrying out the above-mentioned measures decided by public authorities to ensure that the environment is in an acceptable state."[85] The PPP is today one of the fundamental principles of the European community's environmental policy and is in use at an international level.

An environmental tax designed using the PPP allocates the cost to the polluter, and can be set at a level that covers the cost of the defined pollution. However, a higher rate could also be set, not just to cover the cost of the defined pollution, but to achieve a desired behavioural change.[86]

It is proposed that motor vehicle taxes in Australia be reformed by adopting the PPP and imposing taxes on motorists who purchase or use passenger motor vehicles that are high energy consumers, in order to provide an incentive to modify their behaviour.

Based on the precautionary and the polluter-pays principles,[87] the next section explores the criteria for shaping the tax reform framework.

The criteria for shaping the framework for motor vehicle tax reform

It is proposed that the framework for motor vehicle tax reform in Australia should encourage the purchase and use of a passenger vehicle that uses less oil, by imposing a tax on motor vehicle attributes that can cause excessive oil use, which are the vehicle weight, engine capacity and engine power.

Table 8: Specifications of Subaru WRX STI compared with Subaru 2.5i Sports

	Subaru WRX STI	Subaru 2.5i Sports Premium Wagon
Engine Specifications	Turbocharged horizontally-opposed Boxer 4-cylinder, petrol engine	Horizontally-opposed Boxer 4-cylinder, petrol engine
Capacity (cc)	2457	2457
Power	221kW @ 6700rpm	123kW @ 5600rpm
Torque	350Nm @ 2400rpm	229Nm @ 4400rpm
CO2	249g/km	193g/km
Fuel Economy – combined	10.6L/100km	8.3L/100km

Source: Subaru (2012).[93]

Vehicle weight

The weight of a vehicle influences the energy required to move that vehicle. This is because a vehicle's power at the wheels is required to overcome the force of inertia to accelerate from zero to the desired speed or from one speed to a higher one, overcome the forces of air drag and tyre friction, and overcome the force of gravity when climbing a grade. Plotkin notes that motor vehicle weight affects two of the three primary sources of energy use in driving, and weight reduction is therefore an excellent way to reduce the energy needed by a vehicle. He states that the weight of the vehicle affects the inertia required in accelerating the car as well as the rolling resistance from tyre friction.[88] Cheah states that every 100kg of weight reduction will yield a 0.39L/100 kilometre reduction in fuel consumption for the current average gasoline car in the US.[89] As a general rule of thumb, every 10% reduction in vehicle weight leads to a 5–7% reduction in vehicle fuel consumption.[90] Plotkin also states in his discussion paper that if a vehicle designer achieves a weight reduction of 10% and maintains constant performance by using a slightly smaller engine, fuel economy will be improved by about 6–7%.[91]

Engine capacity

Engines with greater capacities are usually more powerful and provide greater torque at lower revolutions per minute (rpm). A bigger engine will also weigh more, creating more rolling resistance. Therefore, an engine that is larger in cubic centimetres has the capacity to increase power and in the process consume more oil.

Motor vehicle manufacturers often use a large engine capacity as a marketing point to sell more vehicles in that a model with a larger engine capacity is more powerful and has the capacity to reduce time at take-off when accelerating from zero to 100km per hour. According to Plotkin, a small engine that uses its substantial power most of the time, with a facility to artificially boost its power when required, is better than a large engine that only uses its substantial power on take-off.[92]

Engine power

The framework for motor vehicle tax reform should also take into consideration the power generated by a motor vehicle. Engine weight, engine capacity and engine power are interrelated, and omission of one of the factors from a tax scheme may encourage policy gaming. A smaller motor vehicle engine can be made to produce more power in a number of ways, such as forced air induction. For example, the Subaru Impreza WRX with its two-litre engine capacity produces more power than a Ford Falcon with a four-litre engine capacity by the addition of a turbocharger. A turbocharger increases the airflow into the engine cylinders, allowing an increased amount of fuel to be burnt, and thereby producing more power. However, this increases the fuel consumption as demonstrated in Table 8 where the Subaru WRX STI is compared with the Subaru 2.5i Sports Premium Wagon.

Both the Subaru WRX STI and the Subaru 2.5i Sports Premium Wagon have the same

engine capacity. However, the turbocharged engine in the Subaru WRX STI produces 221kW of power at 6700 rpm, whereas the naturally aspirated engine in the Subaru 2.5i Sports Premium Wagon produces 123kW of power at 5600rpm. Turbocharging can improve fuel efficiency, however, the fuel consumption also increases in the process, as demonstrated above.

Incorporating the engine power within the tax criteria would encourage consumers to seek motor vehicles with engines that do not produce excessive power, and such motor vehicles may drive a little slower, resulting in reduced air drag. Air drag varies according to the speed of the car; increase the speed, square the amount of air drag and therefore increase the energy required to overcome it. Thus, reducing the speed of the motor vehicle and therefore reducing the drag will lead to a reduction in oil consumption

CO2 emissions

In addition to the three characteristics of vehicle weight, engine capacity and engine power, motor vehicle taxes should also discourage the purchase of passenger motor vehicles with high CO2 emissions. A study undertaken in 2002 by the European Commission's Directorate-General for Environment on fiscal measures to reduce CO2 emissions in new passenger cars concluded that a CO2 component in car taxation systems with significantly progressive tax rates could provide a solid incentive for consumers to choose a car with low CO2 emissions. The report concluded that the more progressive the curve, the larger its effects would be.[94]

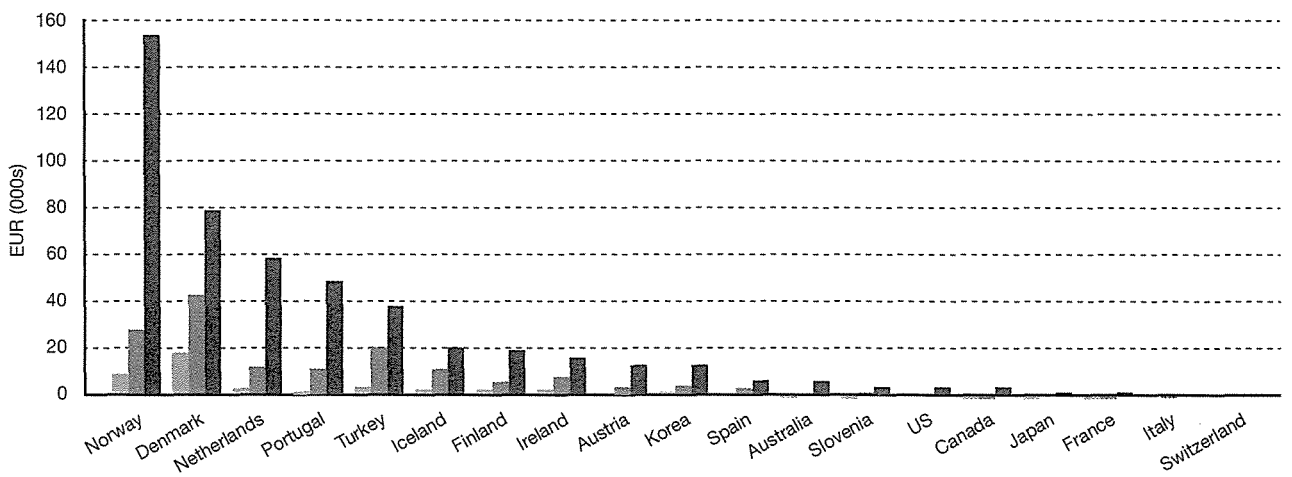
The above criteria could be incorporated in the reform of Australia's taxes that apply in the purchase of a motor vehicle and also the taxes that apply in the use of the motor vehicle. The reform of Australia's motor vehicle taxes will also require consideration of whether the current taxes pertaining to the purchase of a motor vehicle can be made uniform throughout the whole of

Table 9: Taxes on purchase and registration of selected new vehicles

Countries	City car 15 000	Family car 25 000	Hybrid 30 000	4 x 4 50 000	Luxury car 130 000
Australia	17 737	28 957	33 907	57 886	177 227
Denmark	30 512	61 147	71 009	139 686	384 023
Finland	22 750	39 050	43 300	88 100	249 600
Iceland	21825	35 125	40 650	90 250	247 650
Ireland	21 402	35 055	40 566	81 180	217 464
Israel	26 707	47 515	43 590	99 395	258 490
Netherlands	20 850	32 360	35 700	90 230	192 760
Norway	30 082	59 576	43 832	133 330	318 590
Portugal	20 021	31 144	39 016	96 602	201 577
Turkey	23 250	49 500	59 400	124 000	322 400
Germany	0.6545	0.5624	16.37%	0.07%	318 590
Netherlands	0.6681	0.5968	11.96%	-7.65%	201 577
Turkey	0.8802	0.1475	496.88%	9.25%	322 400

Source: Organisation for Economic Co-operation and Development, *Consumption Tax Trends 2012*.[95]

Figure 5: One-off motor vehicle taxes in selected countries as at 9 August 2010



Source: Organisation for Economic Co-operation and Development.[96]

Table 10: Summary of vehicle taxes in Norway

Motor vehicle taxes	Rate in 2010	Rate in 2011
Motor vehicle registration tax passenger cars		
Weight tax, NOK/kg		
Initial 1150kg	35.67	36.31
Next 250kg	77.74	79.14
Next 100kg	155.51	158.31
Remainder	180.85	184.11
Motor effect tax, NOK/kW		
Initial 65kW	55.10	0
Next 25kW	481.00	466.00
Next 40kW	1297.33	1320.68
Remainder	2702.77	2751.42
CO2-emissions, NOK per grams/km		
Initial 115g/km	0	0
Next 20g/km	725.00	738.00
Next 40g/km	731.00	744.00
Next 70g/km	1704.00	1735.00
Remainder	2735.00	2784.00
Annual tax on motor vehicles, NOK/year		
Vehicles with factory-installed particle filter	2790.00	2840.00
Diesel vehicles without factory-installed filter	3245.00	3305.00
Annual weight-based tax, NOK/year	Varies	Varies
Re-registration tax	Varies	Varies

Source: Norway Ministry of Finance 2011 Budget.[97]

Table 11: Registration tax for Holden VE in Norway

	Specifications	NOK	AUD
Tax on unladen weight	**1700kg**	**114 194.50**	**20 762.63**
Tax on engine rating	180kW	202 048.20	36 736.04
Tax on CO2	217g/km	117 390.00	21 343.64
Vehicle scrap deposit		1300.00	236.36
Total motor vehicle tax		**434 933.00**	**79 078.67**

Source: Norway Toll Customs.[98]

Australia and this would require looking into the federal/state relationship.

Reform of Australia's taxes that apply on purchase of a motor vehicle

Australia should also reform its one-off motor vehicle taxes to influence the purchase of a motor vehicle that is light, with smaller engine capacity and power and that has lower CO2 emissions. Lessons can be learnt from countries such as Denmark and Norway that impose higher one-off registration taxes to discourage the purchase of larger motor vehicles. Table 9 compares the one-off registration taxes imposed in Australia on new motor vehicles against selected OECD countries. The final price includes all taxes imposed on the sale price of various cars, ie city cars at USD15 000, family cars at USD25 000, hybrid cars at USD30 000, 4x4 vehicles at USD50 000 and luxury cars at USD130 000.

Table 9 shows that a USD50 000 four-wheel drive in Australia would cost a consumer USD57 886 after tax, whereas in Norway the same car would cost USD133 330 and in Denmark it would cost USD139 686.

A number of European countries have one-off motor vehicle taxes that differ for small, medium and large motor vehicles, as shown in Figure 5.

As shown in Figure 5, Australia's one-off motor vehicle tax does not differentiate between small, medium and large motor vehicles.

A further study of Norway's motor vehicle taxation shows that Norway has a unique motor vehicle tax that penalises heavy, powerful and large CO2-emitting motor vehicles. In Norway, the one-off registration tax is based on a combination of the vehicle's unladen weight (kg), the engine output (kW), and either its CO2 emissions or cylinder volume. From 1 January 2012, there is also a Nitrogen oxides (NOx) component in the one-off registration tax in Norway. The registration tax in Norway is charged on each factor thereby discouraging heavy, powerful, CO2-emitting motor vehicles, as shown in Table 10.

The one-off motor vehicle tax in Norway is quite high and therefore has the potential to influence behaviour. For example, if an Australian passenger motor vehicle, the Holden VE, was purchased in Norway, the registration tax in year 2011 would be NOK434 933 which amounts to AUD79 078.67, as shown in Table 7. This

is based on motor vehicle registration tax rates set in the 2011 Norwegian Budget and a conversion rate of one Australian dollar to NOK5.5.

Norway's policy on purchase and ownership of vehicles is directed towards encouraging the purchase of small, light, compact vehicles as opposed to large-engined SUVs. The purchase tax prompts Norwegians to consider the vehicle weight, engine power and CO2 emissions, as tax rates increase on a sliding scale corresponding to an increase in each of these factors. Moreover, the purchase taxes are quite high, influencing Norwegian motorists in their motor vehicle purchase decisions. These factors have an impact on oil consumption and CO2 emissions as Norwegians are encouraged to choose vehicles that consume less oil and emit less CO2. Norway's annual weight-based tax also discourages ownership of heavy vehicles that consume more fuel. The Australian motor vehicle taxation policy needs to be based on similarly defined principles, rather than just being used for raising revenue.

Reform of Australia's fuel tax

As demonstrated in Table 7, the Australian fuel excise rate has declined over the 10 years to 2010, and as part of Australia's oil policy the excise on fuel used for passenger motor vehicles should be reformed to discourage the use of motor vehicles for personal transportation, especially large and powerful motor vehicles.

The Henry Tax Review suggested that fuel tax as a source of general government revenue should be phased out and transport-specific taxes should be imposed only where they improve social and market outcomes. The Henry Tax Review proposed that fuel excise could serve as a distant second best option to collecting the variable part of the two-part (fixed price component and variable price component) road user charge. The Henry Tax Review further stated that if fuel excise is kept for the variable pricing component of a road user charge, then the anomalies in the fuel excise system need to be remedied and the fuel tax needs to tax all energy sources on an energy-content basis.[99]

A special 2006 research report by the US Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance concluded that fuel taxes may become less reliable revenue sources for transportation programs in the future. The committee concluded that although the present highway finance system can remain viable for some time, travellers and the public would benefit greatly from a transition to a fee structure that more directly charges vehicle operators for their actual use of the roads.[100]

The reason why many countries are considering replacing fuel taxation with a kilometre-based user fee structure is that the kilometre fee addresses the three main criticisms of the fuel tax: that the kilometre-based user fees are based on distance driven and not the amount of fuel purchased and consumed; that the revenue base is not diminished by increased fuel efficiency of the motor vehicle fleet; and that they capture miles driven by vehicles that do not use traditional fuel.[101]

Similar alternative thinking could be applied in the reform of fuel excise pertaining to passenger motor vehicles in Australia. Differential fuel excise rates could be imposed based on the criteria of a motor vehicle's weight, power, engine capacity and CO2 emissions. Australia could reform its fuel excise rates in conjunction with the one-off motor vehicle registration tax to influence the types of motor vehicles driven on Australian roads and the distance driven in order reduce the consumption of oil.

Detailed analysis undertaken by the co-author of this article (Pearce) in her PhD thesis, *Using Tax and Regulatory Measures to Reform Choice and Usage of Motor Vehicles for Personal Transportation in Australia for the Sustainability of Oil*,[102] could enhance the debate in this much-needed area of reform where Pearce proposed a single Luxury Energy Tax that could replace all motor vehicle taxes and excise relating to passenger motor vehicles.

Conclusion

In its *Consumption Tax Trends 2012*, the Organisation for Economic Co-operation and Development (OECD) describes the main features of vehicle taxes and the ways they can be used to influence customer behaviour within the context of environmental policies. These include taxes on the sale and registration of vehicles and recurrent taxes on the use of motor vehicles and components.[103] The OECD report states that taxation is increasingly considered an efficient tool to influence customer behaviour and encourage the purchase of fuel-efficient and low-polluting vehicles. Although more than two-thirds of OECD member countries apply rate differentiation and rebates for one-off motor vehicle registration taxes and annual/recurrent taxes based on environmental criteria,[104] this is currently not the case for Australia.

The OECD in its recent 2013 report on *Taxing Energy Use* confirmed its view that taxation is one of the most important government policies affecting energy use.[105] The reason for this is that energy use is a critical component of modern economies, and taxation affects the price and therefore the use of various forms of energy.[106] It provides a signal aimed at changing behaviour.[107] The report states that in most OECD countries, energy products used in transport are taxed significantly more than energy products used for heating or process use, and oil products, in particular gasoline and diesel, are taxed more heavily and more frequently than other energy products.[108] The report illustrates effective tax rates for OECD countries based on energy consumption, with a special category on oil products used for road transport. The tax on energy consumption pertaining to oil products used in road transport is about less than half of the OECD average. When compared with the OECD average, the Australian simple average effective tax rate on energy in transport fuels is 7.7% compared with an OECD average of 15.5%.[109]

It is submitted that the current motor vehicle taxes in Australia, including the fuel excise, are not sufficiently high to effectively impact on motorists' choice of motor vehicle and have little impact on the sustainability of oil as they were mainly designed with the specific objective of raising revenue. The existing motor vehicle taxes have not slowed the increase in demand for larger cars including SUVs, as discussed above. The problem with existing motor vehicle taxes and excise is that they do not discourage the common attributes that cause excessive oil usage in a passenger motor vehicle. These attributes include vehicle weight, engine capacity and engine power which should all be taken into consideration in a comprehensive reform of Australia's motor vehicle taxes.

The proposal to reform Australia's motor vehicle taxes is in line with recommendations made by the Henry Tax Review, which noted that the existing road transport taxes in Australia are not appropriate to meet Australia's future

transport challenges, and that transport taxes should be designed to correct market failures in the transport sector.[110] In formulating Australia's oil policy, priority should be given to the reduction of oil usage in passenger motor vehicles, and this could be best achieved if there was a harmonious relationship between the Australian energy, transportation and tax policies in order to promote the choice of passenger vehicles that consume less fuel or use cleaner fuels, encourage a reduction in the use of vehicles, and lead to a reduction in congestion. Instead of having a variety of taxes with no specific objectives other than raising revenue, a comprehensive tax on motor vehicles should be introduced that targets the attributes of a motor vehicle that cause excessive oil use.

By carrying out a comprehensive reform of passenger motor vehicle taxes, the government of Australia can promote its oil policy and educate its people to seek motor vehicles that consume less oil. It is argued that this can be effectively achieved by reforming the current motor vehicle taxes in Australia and introducing a more targeted tax. The extra revenues collected as a result of this tax reform can be utilised in building sufficient infrastructure for public transport.

Dr Prafula Pearce, CTA
Senior Lecturer
Curtin Law School

Dale Pinto, CTA
Professor of Taxation Law, Curtin Law School and Fellow, Tax Law and Policy Research Institute, Monash University

This article is based on the published thesis of Prafula Pearce, *Using tax and regulatory measures to reform choice and usage of motor vehicles for personal transportation in Australia for the sustainability of oil*, Australian Tax Research Foundation, 2013 (Research Study 48). The full text of the thesis is also available at http://espace.library.curtin.edu.au/R?func=dbin-jump-full&local_base=gen01-era02&object_id=188723.

References

1 Department of Resources, Energy and Tourism, *Draft Energy White Paper: Strengthening the Foundations for Australia's Energy Future,* Commonwealth of Australia, December 2011, p 14.

2 Ibid p xxvi.

3 Department of Resources, Energy and Tourism, *Energy White Paper 2012: Australia's Energy Transformation*, Commonwealth of Australia, October 2012, p 15.

4 Department of Resources, Energy and Tourism, above n 1, p 114.

5 Geoscience Australia and Australian Bureau of Agricultural and Resource Economics (ABARE), *Australian Energy Resource Assessment*, Assessment and Report, Australian Government Department of Resources, Energy and Tourism, 2010, p 63.

6 Department of Resources, Energy and Tourism, *Energy in Australia 2011*, ABARE, Canberra, 2011, p 68.

7 See a discussion on the precautionary principle later in this article.

8 Department of Resources, Energy and Tourism, *Energy in Australia 2012*, ABARE, Canberra, 2012, p xiv.

9 "Economic demonstrated resources" are defined as the quantity of resources that is judged to be economically extractable under current market conditions and technologies. See ibid p xii.

10 Department of Resources, Energy and Tourism, *Energy in Australia 2010*, ABARE, Canberra, 2010, p 4.

11 Department of Resources, Energy and Tourism, above n 8, p 11.

12 Department of Resources, Energy and Tourism, *Australian Gas Resource Assessment 2012*, ABARE, Canberra, 2012, p 1.

13 See, for example, The DomGas Alliance which has stated: "Australia should implement a national reservation policy that would require LNG projects to set aside 15% of gas production for local industry and household". See D Byers, "Free market the best policy", *The Australian* (Sydney), 25 March 2013, p 9.

14 One joule is defined as the amount of work done by a force of one newton moving an object through a distance of one metre. One joule is the equivalent of one watt of power dissipated for one second. One petajoule is the heat energy content of about 43 000 tonnes of coal or 29 million litres of petrol.

15 Department of Resources, Energy and Tourism, above n 10, p 13.

16 Ibid p 17.

17 Department of Resources, Energy and Tourism, above n 8, p 27.

18 Ibid.

19 Department of Resources, Energy and Tourism, above n 10, p 18.

20 Department of Resources, Energy and Tourism, above n 6, p 18.

21 Geoscience Australia and ABARE, above n 5, p 51.

22 Ibid p 4.

23 Department of Resources, Energy and Tourism, above n 8, p 11.

24 Geoscience Australia and ABARE, above n 5, p 41.

25 Department of Resources, Energy and Tourism, above n 1, p 14.

26 Ibid p xxvi.

27 J Blackburn, *Australia's Liquid Fuel Security. A Report for NRMA Motoring and Services*, 28 February 2013, pp 7, 10. See also C Stewart, "Doomsday warning on fuel stock", *The Australian* (Sydney), 28 February 2013.

28 Ibid.

29 Department of Resources, Energy and Tourism, above n 3, p 126.

30 Blackburn, above n 27, p 5.

31 J Schindler and W Zittel, *Crude Oil – The Supply Outlook*, Report, Energy Watch Group, 2008. Available at www.energywatchgroup.org/fileadmin/global/pdf/2008-02_EWG_Oil_Report_updated.pdf, p 25.

32 R Hirsch, R Bezdek and R Wendling, *Peaking of World Oil Production: Impacts, Mitigation, & Risk Management*, 2005. Available at www.netl.doe.gov/publications/others/pdf/oil_peaking_netl.pdf, p 12.

33 Ibid p 11-12.

34 N Owen, O Inderwildi and D King, "The Status of Conventional World Oil Reserves — Hype or Cause for Concern?", 2010, 38 *Energy Policy*, pp 4743, 4744.

35 Ibid pp 4743, 4747.

36 Energy Information Administration, *International Energy Outlook*, Report No DOE/EIA-0484(2010), Energy Information Administration, 27 July 2010. Available at www.eia.gov/forecasts/archive/ieo10/index.html, p 37.

37 Schindler and Zittel, above n 31, p 30.

38 Ibid p 7.

39 Ibid, p 8.

40 Department of Resources, Energy and Tourism, above n 1, p 31.

41 Schindler and Zittel, above n 31, p 16.

42 US Joint Forces Command, *The Joint Operating Environment (JOE)*, Distribution Statement, 18 February 2010, p 28.

43 F Birol, Chief Economist of the IEA, said in an interview that the global oil peak occurred in 2006. See ABC, "Oil Crunch", *Catalyst*, 28 April 2011 (J Newby, interview with F Birol).

44 M Wicks, *Energy Security: A National Challenge in a Changing World* (Wicks Report), Report for the Department of Energy and Climate Change, 2009, pp 3-4.

45 Ibid p 27.

46 Industry Taskforce on Peak Oil & Energy Security, *The Oil Crunch: A Wake-Up Call for the UK Economy*, Second report of the UK Industry Taskforce on Peak Oil & Energy Security, 10 February 2010, p 4.

47 Global Witness, *Heads in the Sand? – Governments Ignore the Oil Supply Crunch and Threaten the Climate*, Report, Global Witness, 20 October 2009, p 5.

48 Industry Taskforce on Peak Oil & Energy Security, above n 46, p 27.

49 American CAFE standards were first introduced in 1975 through the *Energy Policy and Conservation Act 1975* in the wake of the oil embargo.

50 Geoscience Australia and ABARE, above n 5, p 63.

51 Department of Resources, Energy and Tourism, above n 10, p 49.

52 Department of Resources, Energy and Tourism, above n 6, p 68.

53 Ibid.

54 Australian Bureau of Statistics, *Australian Social Trends, 1996*, Catalogue No 4102.0, 24 June 1996, pp 159-170.

55 Australian Bureau of Statistics, *Motor Vehicle Census*, 2009. Available at www.abs.gov.au, p 10.

56 Ibid p 14.

57 Australian Bureau of Statistics, "Use of Urban Public Transport in Australia", *Year Book Australia, 2005*, Catalogue No 1301.0, 21 January 2005.

58 Ibid.

59 Australian Bureau of Statistics, *Year Book Australia, 2009-10*, Catalogue No 1301.0, 4 June 2010, p 84.

60 Ibid p 85.

61 Senate Rural and Regional Affairs and Transport Committee, Parliament of Australia, "Executive Summary and Recommendations", *Investment of Commonwealth and State Funds in Public Passenger Transport Infrastructure and Services*, 2009. Available at www.aph.gov.au/Parliamentary_Business/Committees/Custom_Contents/SenateCommittees/rratctte/publictransport/report.

62 T Litman, *The Future Isn't What it Used to Be*, 2012, Victoria Transport Policy Institute. Available at www.vtpi.org/future.pdf, p 6.

63 Australian Bureau of Statistics, *Survey of Motor Vehicle Use, Australia, 12 Months Ended 31 October 2010*, Catalogue No 9208.0, 23 August 2011.

64 Australian Bureau of Statistics, *Motor Vehicle Census, Australia, 31 January 2011*, Catalogue No 9309.0, 28 July 2011.

65 Australian Bureau of Statistics, *Motor Vehicle Census, Australia, 31 January 2012,* Catalogue No 9309.0, 22 August 2012.

66 Federal Chamber of Automotive Industries, "Strong Vehicle Sales Continue in 2013", media release, 5 February 2013. Available at www.fcai.com.au/news/news/all/all/323/strong-vehicle-sales-continue-in-2013.

67 Bureau of Infrastructure, Transport and Regional Economics, *Fuel Consumption by New Passenger Vehicles in Australia 1979–2008*, Information Sheet No 30, August 2009.

68 Ibid.

69 Ibid.

70 Ibid p 10.

71 See M Diesendorf, D Lamb, J Matthews and G Pearman, *A Roadmap for Alternative Fuels in Australia: Ending our Dependence on Oil*, Report, Jamison Group, July 2008. Available at www.mynrma.com.au/media/Jamison_Group_Alternative_Fuels_report_July_2008.pdf.

72 *Tax Laws Amendment (Luxury Car Tax) Act 2008* (Cth).

73 Australian National Audit Office, *Administration of the Luxury Car Tax*, 2012, Commonwealth of Australia. Available at www.anao.gov.au/Publications/Audit-Reports/2010-2011/Administration-of-the-Luxury-Car-Tax/Audit-brochure.

74 Department of Transport, *Schedule of Licensing Fees and Charges*, July 2010, Government of Western Australia. Available at www.transport.wa.gov.au/licensing/566.asp, p 5.

75 Northern Territory Transport Group, *Vehicle Registration*, March 2012, Northern Territory Government. Available at www.transport.nt.gov.au/mvr/registration; VicRoads, *Registration*, 18 May 2012, State Government Victoria. Available at www.vicroads.vic.gov.au/Home/Registration/.

76 Organisation for Economic Co-operation and Development, *Taxation, Innovation and the Environment*, OECD, 2010.

77 The Commonwealth Government should deal with motor vehicle taxes under the environmental tax umbrella and make them uniform throughout Australia. This should be part of the federal-state relations debate over which the Queensland Premier has recently called for a review and possible referendum. See M McKenna, "Federal Bullying Must End: Campbell Newman", *The Australian*, Sydney, 13 April 2013.

78 PL Stein, "Are Decision-Makers Too Cautious With The Precautionary Principle?", paper presented at the Land and Environment Court of New South Wales Annual Conference, Blue Mountains, 14-15 October 1999, p 3.

79 Ibid p 5.

80 GH Brundtland, *Our Common Future* (The Brundtland Report), World Commission on Environment and Development, 1987. Available at www.earthsummit2012.org/about-us/historical-documents/92-our-common-future. See also J Drexhage and D Murphy, "Sustainable Development: From Brundtland to Rio 2012", background paper prepared for consideration by the High Level Panel on Global Sustainability at its first meeting, United Nations Headquarters, 19 September 2010.

81 Department of Resources, Energy and Tourism, above n 1, p 113.

82 Ibid p 111.

83 Ibid p 113.

84 Ibid p 31.

85 Organisation for Economic Co-operation and Development, *Recommendation of the Council on Guiding Principles Concerning International Economic Aspects of Environmental Policies*, C(72)128, 26 May 1972.

86 See JE Milne, "Environmental Taxation: Why Theory Matters – Critical Issues in Environmental Taxation", in JE Milne et al (eds), *Critical Issues in Environmental Taxation: International and Comparative Perspectives*, Richmond Law & Tax, 2003, vol 1, at pp 2-3. See also A Bakker, *Tax and the Environment: A World of Possibilities*, IBFD, 2009, at pp 7-10.

87 There are many prestigious books and refereed articles published on the precautionary principle and the polluter-pays principle, for example, see: S Beder, *Environmental Principles and Policies*, University of New South Wales Press, 2006; N de Sadeleer, *Environmental Principles From Political Slogans to Legal Rules*, Oxford University Press, 2005; R Moules, *Environmental Judicial Review*, Hart Publishing, 2011; JF de Carvalho, S Seger, P Mercedes and IL Sauer, "Precautionary Principle, Economic and Energy Systems and Social Equity", (2010) 38(10) *Energy Policy* at 5399; P Dorman, "Evolving Knowledge and the Precautionary Principle", (2005) 53(2) *Ecological Economics* 169; K Steele, "The Precautionary Principle: A New Approach to Public Decision-Making", (2006) 5(1) *Law, Probability and Risk* 19.

88 SE Plotkin, "Examining Fuel Economy and Carbon Standards for Light Vehicles", in International Transport Forum Round Tables, *The Cost and Effectiveness of Policies to Reduce Vehicle Emissions*, OECD Publishing, 1st ed, 2009, at p 38.

89 LW Cheah, *Cars on a Diet: The Material and Energy Impacts of Passenger Vehicle Weight Reduction in the US*, Thesis, Doctor of Philosophy in Engineering Systems, Massachusetts Institute of Technology, September 2010, at p 32.

90 Ibid p 13.

91 Plotkin, above n 88, p 38.

92 Ibid.

93 Subaru (2012). Available at http://subaru.com.au.

94 European Commission's Directorate-General for Environment, *Fiscal Measures to Reduce CO2 Emissions from New Passenger Cars: Main Report*, Final Report, January 2002, p 114.

95 Organisation for Economics Corporation and Development, *Consumption Tax Trends 2012 VAT/GST and Excise Rates, Trends and Administration Issues*, OECD Publishing, 2012, pp 156-159.

96 Organisation for Economic Co-operation and Development, above n 76, p 41.

97 Norway Ministry of Finance, *Budget 2011*, 12 January 2011, Ministry of Finance. Available at www.statsbudsjettet.no/english, pp 17-18.

98 Toll Customs, *Calculator: Importation of Motor Vehicles*. Available at www.toll.no/templates_TAD/RegistrationTax.aspx?id=79&epslanguage=en&step=3#anchorResult.

99 A Tasman, *Henry Tax Review: An Overview of Issues for Motorists*, Report, Australian Automobile Association, May 2010, p 9.

100 Committee for the Study of the Long-Term Viability of Fuel Taxes for Transportation Finance, Transportation Research Board of the National Academies, *The Fuel Tax and Alternatives for Transportation Funding*, Special Report 285, Transportation Research Board, 2006, p 3.

101 RT Baker, G Goodin and L Taylor, *Mileage-Based User Fees – Defining a Path toward Implementation (Phase 2): An Assessment of Institutional Issues*, Final Report, University Transportation Center for Mobility, November 2009, p 12.

102 See P Pearce, *Using Tax and Regulatory Measures to Reform Choice and Usage of Motor Vehicles for Personal Transportation in Australia for the Sustainability of Oil*, PhD Thesis, Curtin University, 2013. Available at http://espace.library.curtin.edu.au/R?func=dbin-jump-full&local_base=gen01-era02&object_id=188723, Tax Research Foundation, 2013 (Research Study 48).

103 Organisation for Economic Co-operation and Development, above n 95, Ch 6, pp 137-162.

104 Ibid p 139.

105 Organisation for Economic Co-operation and Development, *Taxing Energy Use*, OECD, 2013, p 3.

106 Ibid p 18.

107 Ibid p 21.

108 Ibid pp 13-14.

109 Ibid, pp 38, 249.

110 Commonwealth of Australia, *Australia's Future Tax System: Final Report*, 2 May 2010. Available at http://taxreview.treasury.gov.au/content/Content.aspx?doc=html/pubs_reports.htm.