Public subsidies and incentives to fossil fuel production and consumption in Australia

A Draft Discussion Paper

by

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1 Introduction

1.1 Background

The Institute for Sustainable Futures (ISF) defines a sustainable future as one that protects and enhances the environment, human well-being and social equity indefinitely. Sustainable development is then the type of economic and social development that leads to a sustainable future.

Australia's energy system is not sustainable. About 94% of Australia's energy is derived from combustion of fossil fuels – coal, oil and natural gas. Combustion of fossil fuels generates carbon dioxide, a major greenhouse gas. A majority of scientists believe that rising concentrations of greenhouse gases in the Earth's atmosphere will result in global climate change. In Australia, the energy sector contributes 79.6% of all anthropogenic greenhouse gas emissions (AGO, 2001b). This makes the energy system the major contributor to global climate change.

The most recent report on the impacts of climate change by the IPCC finds that some human and natural systems have already been adversely affected by climate change and future impacts have the potential to be severe. In Australia, rainfall is likely to decrease, although the intensity of heavy rains and tropical cyclones is likely to increase. Crop yield will be reduced in the long term and particular Australian ecosystems may become endangered or extinct, with coral reefs, arid and semi-arid habitats in southwest and inland Australia, and alpine systems being the most vulnerable to climate change (IPCC Working Group II, 2001). To avoid these impacts, drastic cuts in greenhouse gas emissions are required.

As well as being a major contributor to climate change, a fossil fuel energy system has local environmental impacts, such as urban air pollution and ecosystem damage resulting from mining. There are also concerns over the economic sustainability of Australia's energy system. Australia's reliance on oil imports is set to increase in the future, and in a politically unstable world where much of the global oil reserve is concentrated in the Persian Gulf, the risk of price rises is very real. Australia needs to consider alternatives to fossil fuels, particularly oil, if it is to maintain energy security into the future.

A sustainable energy system could be based on renewable energy technologies, such as wind power, photovoltaics and biomass, as well as radical improvements in the efficiency of energy use in buildings, vehicles and industry. Current research at the Institute for Sustainable Futures is using a systems analysis approach to develop scenarios for the transition to a sustainable Australian energy system in the future. Within the systems analysis framework, a range of methods are being used to develop scenarios and to explore the pathways between the existing energy system and the system represented by the scenarios.

One of the early findings of the research is that public subsidies to the production and consumption of fossil fuels are a substantial barrier to the development of a sustainable energy system. These subsidies distort the market in such a way that it is difficult for sustainable energy technologies to compete. Removal of these subsidies could significantly reduce greenhouse gas emissions while also improving economic efficiency.

The objective of this discussion paper is therefore to examine the magnitude of the public subsidy to fossil fuels in Australia and improve understanding of the types of subsidies that exist. It is hoped that a better understanding of the subsidies will assist with the development of policies for subsidy removal in the future. Public funds currently used to subsidise fossil fuel production and consumption could instead be used to subsidise sustainable energy initiatives to reduce greenhouse gas emissions. Sustainable energy initiatives include energy conservation and energy efficiency improvements (demand side management) and promotion of

renewable energy sources. It is recognised that fossil fuels, especially natural gas, will still be an important energy source for some time during the transition to sustainable energy. Some support for reducing greenhouse gas emissions from combustion of fossil fuels should therefore be retained.

1.2 International Context

In July 2001, the parties to the United Nations Framework Convention on Climate Change (UNFCCC) reached a political agreement on the rules for implementation of the Kyoto Protocol. The 'Bonn Agreement for the Implementation of the Buenos Aires Plan of Action' has been hailed as a significant political achievement and a key step on the path to ratification of the Kyoto Protocol. While the political significance of the Bonn Agreement is undeniable it represents a compromise that has considerably reduced the effectiveness of the Kyoto Protocol as a means of reducing global greenhouse gas emissions (Ott, 2001).

Under the Bonn Agreement carbon absorbing activities may be used to a large extent to reach international commitments to limit or reduce greenhouse gas emissions. This is expected to reduce real reductions in emissions from the five per cent originally mandated by the Kyoto Protocol to about two per cent (Ott, 2001). It should be noted that these emission reductions are far less than those required to stabilise the concentrations of greenhouse gases in the atmosphere.

The Bonn Agreement also allows unlimited use of economic instruments to achieve emission reduction targets, which will reduce the need for Parties to achieve domestic emission reductions (Ott, 2001). The effectiveness of the Kyoto Protocol has been further reduced by the decision of the United States to abandon the Protocol entirely.

The compromises in the Bonn Agreement are largely the result of exploitation of loopholes in the original text of the Kyoto Protocol by particular countries, including Canada, Australia, Japan and Russia. These countries (and the United States) have argued for increased flexibility in achieving emission reductions. These arguments have been supported by claims that domestic emissions cuts will harm national economies.

The argument that domestic emission cuts will harm the economy fails to consider the distorting effect of existing financial subsidies and associated incentives to fossil fuel production and consumption provided by governments in most developed countries. In a recent paper, de Moor (2001) estimated that the global energy sector receives over $US240 billion per annum in public subsidies. Considering that fossil fuels supply almost 80% of global primary energy (IEA, 2000), most of these subsidies presumably support fossil fuel production and consumption. Modelling of the global economy by (for example) Anderson and McKibbin (1997) has demonstrated that international reform of these types of subsidies has the potential to provide substantial gains in economic efficiency and reductions in carbon dioxide emissions – a 'no regrets' outcome for the economy and the environment.

This paper examines financial subsidies to fossil fuel production and consumption in Australia. On a per capita basis, Australia is the third highest emitter of carbon dioxide from fossil fuels in the world, surpassed only by the United States and Luxembourg (OECD, 1999), and the highest emitter per capita if all sources and sinks are taken into account (Turton and Hamilton, 2001). Australia has been a strong supporter of the United States in international climate negotiations and has received a lenient 2010 emissions target under the Kyoto Protocol (108% of 1990 emissions). Per capita subsidies and associated incentives to fossil fuel production and consumption in Australia are likely to be similar in magnitude to those in the United States and the other countries that have pushed for increased 'flexibility' during international negotiations.

1.3 Relationship to Previous Research

The National Institute of Economic and Industry Research (NIEIR) previously examined subsidies to the use of natural resources in Australia (NIEIR, 1996), but encountered:

> *"conceptual as well as practical difficulties in getting the data…(which meant that the study)…developed as more of a discussion document and less as a catalogue of hard figures (p iii)".*

NIEIR estimated subsidies to energy production and consumption although it did not completely distinguish between subsidies to fossil fuels and subsidies to other forms of energy.

The energy sector in Australia has undergone significant change since 1996 and it is now appropriate to reassess the magnitude and type of subsidies to fossil fuel production and consumption in Australia using the most recent available data. Additional subsidies have been identified or implemented since NIEIR released its report. This paper builds on and extends the earlier work by NIEIR to provide a more complete and up to date description of the key financial subsidies to fossil fuel production and consumption in Australia and a new estimate of their magnitude.

2 Definition of subsidies

There has been extensive debate over how to define a subsidy. In this paper we have followed the definition provided by de Moor and Calamai (1997) and restated by de Moor (2001) as:

> *"Subsidies comprise all measures that keep prices for consumers below market level or keep prices for producers above market level or that reduce costs for consumers and producers by giving direct or indirect support (p 168)".*

This is similar to the definition previously used by NIEIR (1996) in assessing subsidies to natural resources in Australia, which states that public subsidies arise:

> *"... when a government deliberately adds to the revenue or relaxes the financial performance criteria of a productive entity to enable it to sell its outputs at less than the real costs incurred in producing those outputs (p 14)".*

Typical types of financial subsidies provided by governments include (NIEIR, 1996, de Moor, 2001):

- Direct subsidies and rebates;
- Favourable tax treatment;
- Provision of infrastructure and public agency services below cost;
- Public contributions for research and development (R&D);
- Provision of capital at less than market rates;
- Failure of government-owned entities to achieve normal rates of return; and
- Trade policies, such as import and export tariffs and non-tariff barriers.

Financial subsidies tend to decrease the cost of production and increase the activity level of entities involved in the activities that are subsidised. When the activity that is subsidised is an environmentally disruptive one, such as fossil fuel production and consumption, financial subsidies will tend to increase the degree of environmental disruption. Specifically, subsidies to fossil fuel production and consumption will increase greenhouse gas emissions, as greater quantities of fossil fuel will be burnt and associated emissions of carbon dioxide will increase.

Financial subsidies and incentives occur within the existing economic framework. They can be distinguished from subsidies associated with the failure to incorporate environmental and social externalities into existing economic frameworks. Externalities are costs that are not fully paid by the entities responsible for incurring the costs, creating an implicit incentive to continue or increase the activity that creates the cost. For example, the full environmental and social cost of climate change is not paid by the entities that emit the greenhouse gases responsible for climate change. Sorensen (2000) estimates that the externality associated with greenhouse warming between 1990 and 2060 is between 0.23 and 0.47 US$ per kilogram of CO_2 emitted, depending on the assumptions made.

This paper will concentrate solely on financial subsidies while noting that where financial subsidies are associated with environmental and social externalities, environmental and social disruption will tend to be magnified (NIEIR, 1996).

Although public funds are used to provide subsidies, the public is often unaware of the existence and magnitude of the subsidies. This paper aims to describe and quantify public subsidies to fossil fuel use and production in Australia to improve the transparency of government funding allocation.

3 Australian fossil fuel subsidies

The list of subsidies discussed in this paper is not intended to be exhaustive as subsidy identification is an ongoing process. This paper discusses some of the largest subsidies in detail while summarising some of the minor ones (see Table 8).

3.1 Greenhouse Gas Abatement Program

The National Greenhouse Strategy (NGS) is the primary mechanism through which Australia intends to meet its international commitments to limit greenhouse gas emissions. The Commonwealth Government has provided approximately $1 billion in funding over five years to implement the NGS. Many of the measures detailed in the NGS are appropriate responses to climate change, providing support for development of renewable energy sources and improved energy efficiency.

The major competitive funding mechanism under the NGS is the Greenhouse Gas Abatement Program (GGAP). GGAP provides funding of $400 million over 4 years for projects that will provide quantifiable additional abatement of greenhouse gas emissions in Australia. The program guidelines state that funds are allocated based on project merit to projects that provide cost-effective, large-scale greenhouse gas abatement.

A total of $93 million was allocated to a range of projects in the first round of GGAP funding, announced in 2001. Table 1 shows how the funding was allocated by industry and project. The coal industry received a total of $29 million, which is effectively a direct subsidy to fossil fuel production. The aluminium industry received $11 million to assist with energy efficiency improvements. The aluminium industry in Australia already receives substantial subsidies in the form of reduced electricity prices (see Section 3.11) and should be capable of improving energy efficiency without the need for public funding.

The aluminium industry received a further $7 million for a natural gas fuel substitution project, while the cogeneration industry received $26 million for natural gas fired cogeneration plants. This funding effectively subsidises the natural gas industry.

The ethanol industry also received $16.2 million, of which $8.8 million was allocated to a petroleum company for assistance with blending of petrol and ethanol. There is no guarantee that the ethanol will be produced from renewable sources. The remaining funding was for a training program to assist in HCFC recovery.

Table 1: Allocation of funding in first round of GGAP showing industry beneficiary.

Industry	***Projects***	***Funding***
Coal	Capture and use of waste coalmine gas (methane) to generate electricity	$24 million
	Improve thermal efficiency at a coal-fired power station	$5 million
	Sub-total	*$29 million*
Aluminium	Increase energy efficiency of an alumina refining plant	$11 million
	Replace oil with natural gas at an alumina refinery	$7 million
	Sub-total	*$18 million*
Cogeneration	Establishment of natural gas fired cogeneration (combined heat and power) plants	$26 million
Ethanol	Production of ethanol from sugar mill byproducts	$7.35 million
	Replacement of petrol with an ethanol/petrol blend	$8.8 million
	Sub-total	*$16.2 million*
HCFC	Training program for HCFC recovery	$3.56 million
Total		$93 million

In total, $81.8 million has been allocated to projects that at least partially support the fossil fuel industry. While these projects are expected to achieve some short-term greenhouse gas abatement they help to entrench the use of coal, natural gas and petroleum products. In the long-term, use of these fuels will need to be phased out. It is recognised that there is an important role for natural gas as a transitional fuel due to its relatively low greenhouse gas intensity. Short and medium term subsidies to natural gas may therefore be appropriate where there is a long-term commitment to move to renewable energy sources. However, in general, the provision of short-term support for industries that will not be viable in the long-term is a perverse way to allocate public funds. Funds would be better allocated to technologies that do not use fossil fuels, such as renewable energy sources.

Under Round 1 of GGAP, the following applications were received (Oquist, 2001):

- 13 applications totalling $224 million to improve energy efficiency in commercial and residential buildings and appliances;
- 9 applications totalling $117 million for renewable electricity projects;
- 13 applications for cutting greenhouse gas emissions from transport; and
- 6 applications for waste minimisation projects.

None of these projects were funded despite their potential to provide long term reductions in greenhouse gas emissions while assisting in the establishment of a sustainable energy industry. It can only be concluded that there is an implicit government policy to avoid spending GGAP funds on long-term greenhouse solutions.

3.2 Tax benefits for cars provided by employers

3.2.1 Background

Motor vehicles provided to employees by companies and government departments comprise about 16.5% of vehicle sales in Australia but cause about 40% of peak hour traffic and 20% of all traffic (Hill, 1999). These vehicles are responsible for a disproportionate fraction of the greenhouse gas emissions from the transport sector. Employers that provide vehicles or other benefits for use by employees in Australia are liable for a fringe benefits tax (FBT) of 48.5%.

Two methods may be used to calculate liability for FBT: the operating cost method and the statutory formula method. The operating cost method accounted for only 7% of total motor vehicle FBT in 1998/99 (Australian Taxation Office, 2001). It requires a logbook to be kept to determine actual operating costs and the actual proportion of the time that the car is in private use. The benefit to which FBT applies (the taxable value) is then equal to the private fraction of the actual vehicle operating costs as determined from the logbook.

The statutory formula method determines the taxable value to which FBT applies by multiplying the purchase value of the vehicle by a specified percentage that varies with total distance travelled by the car during the year. The greater the distance travelled, the lower is the taxable value. This method accounted for 93% of total FBT paid on motor vehicles in 1998/99 (Australian Taxation Office, 2001). The method assumes that the greater the distance travelled by the vehicle, the lower the proportion of private use and hence the lower the fringe benefit to the employee. This is a clear incentive to drive further.

With both methods the employee has the option of making contributions towards the operating costs of the car. These contributions are subtracted from the taxable value, so it is possible for employees to reduce their FBT liability to zero by paying the appropriate amount. Once the taxable value is determined it is multiplied by a gross up rate of 2.13 and the FBT rate of 48.5% to determine the FBT liability.

Although the FBT was originally introduced to remove the incentive to provide fringe benefits instead of salary, definite incentives still remain with respect to motor vehicles. These incentives arise partly due to the use of novated leases to provide motor vehicles to employees as part of a remuneration package.

A novated lease is an agreement between a financier, an employer and their employee, where the employee has effective control, and ultimate responsibility for the vehicle leased. The employee arranges a lease with the financier for the vehicle of their choice, and then sub-leases the car to their employer. FBT is determined using the statutory formula method. The employer makes the lease payments and deducts lease payments, FBT and

other operating costs from the employee's gross remuneration package. The employee's total taxable income is therefore decreased and the employee pays less tax. The employee can also retain the car if they change jobs.

3.2.2 Impact of different methods

Approximate costs and benefits of different methods of vehicle provision are shown in Table 2 for four different scenarios and two different assumptions for the total distance driven each year. All assumptions are outlined in the table. In Scenario 1, the employee purchases and finances the vehicle and does not incorporate it into a salary package. This is the reference scenario, which is compared to three scenarios where the employee receives a vehicle through a lease as part of a salary package. In Scenarios 2 and 3 the vehicle is provided through a novated lease and FBT is calculated using the statutory formula method. In Scenario 4 the vehicle is provided through a standard lease and FBT is calculated using the operating cost method. In all scenarios, the vehicle is financed over four years and the final value (the residual value) at the end of the four-year period is the same. This allows direct comparison of the scenarios.

One of the key figures in Table 2 is the annual cash benefit to the employee, which is the extra amount per year that the employee receives compared to Scenario 1. This is effectively the size of the incentive to obtain a car through salary packaging. It is clear from Table 2 that the incentive only exists (under these scenarios) when the employee receives the vehicle through a novated lease and makes a contribution towards operating costs of the car. Most employees who obtain salary packages seek financial advice and would act to maximise the annual benefit, so it is likely that in most cases the employee will make a contribution towards operating costs. Most organisations that provide novated leases require that the contribution made is sufficient to reduce FBT liability to zero. This is the situation represented by Scenario 3.

It is reasonable to conclude that in most cases there will be a real financial incentive to obtain a car through a novated lease as part of a salary package, rather than by direct purchase. As shown in Table 2 the size of the benefit increases as the distance travelled each year increases. In the scenarios considered, the incentive ranges from $550 for an employee driving 15,000 km per year to $1,245 for an employee driving 25,000 km per year. This incentive may be sufficient to encourage an employee to obtain a car when they might otherwise have used public transport or other forms of transport.

Table 2: Costs and benefits of different methods of vehicle provision.

Scenarios

Scenario 1 (reference scenario):

- Employee purchases and finances the vehicle and does not incorporate it into a salary package.
- Tax deductions for work-related motor vehicle expenses are claimed to the value of $1,540, which is equal to the average claim by each individual claiming this type of expense in 1998-99 (Australian Taxation Office, 2001).
- To purchase the vehicle, a $30,000 loan is taken at a fixed interest rate of 9% per annum. After four years the amount owed has been reduced to $8,181 (the same amount as the residual value in Scenarios 2 and 3).

Scenario 2:

- Vehicle is provided through a novated lease as part of a salary package and FBT is calculated using the statutory formula method.
- The finance company claims input tax credits for GST, which reduces the nominal value of the vehicle to $27,270, compared to $30,000 for a vehicle purchased directly.
- The novated lease is for a four-year period at a fixed interest rate of 8% and a residual value of 30% ($8,181) and lease payments include all fuel, maintenance, insurance and registration costs.
- No employee contribution are made.

Scenario 3:

- As for Scenario 2, but an employee contribution is made, sufficient to reduce FBT liability to zero.

Scenario 4:

- Vehicle is provided through a standard lease as part of a salary package and FBT liability is calculated using the operating cost method.
- Assumes that the vehicle is used 50% for private use and 50% for business use.

Two variants for each scenario:

a. Vehicle is driven 15,000 km per year (primarily for private use)
b. Vehicle is driven 25,000 km per year (significant proportion of business use)

Baseline Data and Assumptions

Total number of vehicles on which FBT was paid in 1998-99 (Australian Taxation Office, 2001)	657,300
Assumed annual remuneration package	$50,000
Purchase cost of vehicle (equivalent to a Holden Commodore Executive model sedan - the highest selling car in Australia in 2000 and a typical government or company car) including 10% GST	$30,000
Fuel efficiency – city cycle (AGO, 2001a)	10L/100km
Fuel efficiency – highway cycle (AGO, 2001a)	6.6L/100 km
Fuel cost per litre	$1
Annual fuel costs (assuming half city driving and half highway driving)	a. $1,245 b. $2,075
Annual insurance and registration costs (NRMA, 2001)	$450
Annual maintenance costs (NRMA, 2001)	a. $225 b. $375

Scenario Cost-Benefit Calculations

	Scenario 1a	Scenario 1b	Scenario 2a	Scenario 2b	Scenario 3a	Scenario 3b	Scenario 4a	Scenario 4b
Gross annual remuneration	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Employee contribution to operating costs	n.a.	n.a.	-	-	$6,000	$6,000	-	-
FBT due	n.a.	n.a.	$6,200	$3,410	-	-	$4,670	$5,530
Annual lease payments	n.a.	n.a.	$9,045	$10,700	$9,045	$10,700	$9,045	$10,700
Gross annual cash salary	$50,000	$50,000	$34,755	$35,890	$46,955	$45,300	$36,285	$33,770
Income tax deductions	$1,540	$1,540	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Taxable income	$48,460	$48,460	$34,755	$35,890	$46,955	$45,300	$36,285	$33,770
Income tax and Medicare levy	$11,645	$11,645	$7,330	$7,685	$11,170	$9,800	$7,810	$7,015
Annual cost of own vehicle	$9,120	$10,100	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Net cash salary	$29,235	$28,255	$27,425	$28,205	$29,785	$29,500	$28,475	$26,750
Annual cash benefit compared to Scenario 1	-	-	-$1,810	-$50	$550	$1,245	-$760	-$1,500
Total government tax revenue (FBT, income tax and medicare levy)	$11,645	$11,645	$13,530	$11,095	$11,170	$9,800	$12,480	$12,545
Reduction in government revenue compared to Scenario 1	-	-	-$1,885	$550	$475	$1,845	-$835	-$900

It is also a real financial incentive to drive further and increase the cash benefit once a car is obtained. The statutory percentage applied reduces step-wise as the kilometres driven increase. Under novated leases the employee must estimate their annual kilometres before entering into the lease and may have to pay extra at the end of the tax year if they do not meet this target. As a result, there is evidence that employees increase their driving or loan their cars to friends towards the end of the tax year to ensure that the total kilometres exceed the statutory threshold required to reduce the applicable percentage (UNSW Transport Program, 1999).

The operating cost method (Scenario 4) does not usually provide the same benefit to an employee as the statutory formula method (Scenario 3). As shown in Table 2, if the vehicle is used for business purposes 50% of the time and private purposes 50% of the time, the employee will be between $760 and $1,500 worse off each year than an employee who purchases his or her own car, depending on the distance driven. This disincentive increases with the proportion of private use and the total distance driven.

However, in situations where business use is dominant the operating cost method can provide a benefit to employees. If the employee drives 15,000 km per year there is a net benefit to the employee when business use is greater than about 62%. If the employee drives 25,000 km per year there is a net benefit to the employee when business use is greater than about 70%. These proportions of business use are unusually high, which helps to explain why the operating cost method is only used 7% of the time. The operating cost method does not provide an incentive to drive further as this would increase the FBT liability.

As shown in Table 2 government tax revenue is reduced when an employee elects to receive a car as part of their salary package and makes an employee contribution to maximise their net cash benefit (Scenario 3). The reduction in annual government revenue ranges from $475 for a vehicle driven 15,000 km to $1,845 for a vehicle driven 25,000 km. As Scenario 3 is the most likely scenario (since employees will try to maximise their benefit), this reduction in revenue is effectively the size of the subsidy to each person who obtains a motor vehicle as part of a salary package. Multiplying these figures by the total number of vehicles paying FBT in 1998-99 (657,300) gives a rough estimate for the total subsidy of between $311 million and $1.21 billion depending on the assumptions made.

The average distance driven by all passenger motor vehicles in 1999 was about 14,500 km (ABS, 2000b). This would support an estimate towards the low end of the range. However, vehicles used for business purposes generally travel a greater distance than the average vehicle, which supports a higher estimate. By way of comparison, a 1999 newspaper article estimated that the cost to taxation revenue of the FBT arrangements for company cars was $740 million in 1996-97, although no information is available on how this estimate was derived (Cumming, 1999). Based on the available evidence, an estimate of $750 million has been adopted for the size of the subsidy, which is in the middle of the range calculated above and similar to the estimate reported by Cumming (1999).

3.2.3 FBT on public transport

The benefit obtained by receiving a motor vehicle as part of a salary package is reversed if an employee wishes to receive a public transport ticket as part of a salary package. An employee on a total remuneration package of $50,000 who receives a $1,400 annual public transport pass is between zero and $990 worse off per year than an employee who buys the public transport ticket himself or herself. The employees are only treated equivalently when the employee with the salary package makes a full employee contribution of $1,400 and the other employee does not claim any income tax deductions. In most cases, at least some of the travel will be for business purposes so the employee without the salary package will be able to claim income tax deductions. This means that there is a disincentive to provide public transport passes as part of a salary package. When combined with the incentives for providing motor vehicles it is not possible for public transport to successfully compete for a role in salary packaging.

3.2.4 GST on public transport

The implementation of the 10% Goods and Services Tax (GST) on 1 July 2000 has provided further price incentives for motor vehicles over public transport. Before the implementation of the GST, new motor vehicles were subject to wholesale taxes of 22 per cent. These taxes were removed and replaced by the GST, leading to a

reduction in the price of new cars of about 6%. In contrast, the implementation of the GST has increased public transport fares by between 5% and 9%. While not strictly a subsidy, the effect of these price changes is to encourage the use of motor vehicles over public transport.

From 1 July 2001, businesses have also been able to claim input tax credits for GST on new cars, further reducing the effective price of company and government cars. The ability to claim back input tax credits will save businesses about $3,200 on a $35,000 car and government taxation revenue will be reduced by $650 million over two years (Commonwealth Government, 2001). Input tax credits also save businesses about 7 cents per litre on fuel used for business purposes. These measures are not subsidies but they send the wrong pricing signal and further encourage vehicle use over public transport use.

3.3 Tax deductions for vehicle use

The value of work-related motor vehicle expenses claimed by individuals in 1998/99 was $2.4 billion, or about $1,540 for every taxpayer that claimed expenses of this type (Australian Taxation Office, 2001). There are four methods used to calculate allowable deductions for work-related motor vehicle expenses:

- Cents per kilometre method, where a set rate is claimed for each business kilometre (up to 5,000 kilometres). Rates are based on engine capacity and are higher for larger engines;
- 12 per cent of original value method (must travel more than 5,000 kilometres);
- One third of actual expenses method (must travel more than 5,000 kilometres); and
- Logbook method.

Without further study it is difficult to determine whether these methods provide appropriate compensation for actual expenses incurred through driving. Assuming that they do, there appears to be little incentive to drive further as expenses incurred will increase at the same or a greater rate than allowable deductions increase. However, the existing methods do not provide any incentive to drive a more fuel-efficient car. There is an opportunity to use the tax regime to provide such incentives.

Businesses may also deduct the cost of owning and operating motor vehicles when determining tax liability. In 1998-99 a total of $12.2 billion in motor vehicle expenses were claimed by businesses in Australia (Australian Taxation Office, 2001). This equates to $3,440 per business taxpayer. Again, there is no evidence that the deductibility of motor vehicle expenses provides any financial incentive to purchase a motor vehicle or drive it further, however an opportunity exists to use the tax regime to encourage the purchase of vehicles with greater fuel efficiency.

3.4 Import duty inequities for four wheel drive vehicles

The duty for new passenger vehicles imported into Australia is currently set at 15 per cent of the customs value. Vehicles defined in the customs tariff as “off road four wheel drive vehicles” have an import tariff set at 5 per cent of the customs value, even though most of those sold are used as passenger vehicles. As there are currently no Australian manufacturers of four-wheel drive (4WD) vehicles there has historically been no need for tariff protection, hence the lower import duty for these vehicles. The lower import duty acts as an incentive to import 4WD vehicles, which generally have higher fuel consumption rates than other passenger vehicles. This is effectively a subsidy for the importation of 4WD vehicles.

The total customs value of passenger motor vehicles (PMVs) imported into Australia in 1999 was $6.79 billion (ABS, 2001b). The total number of PMVs imported into Australia in 1999 was 286,723 (DISR, 2000a). Therefore the average customs value of a passenger motor vehicle (PMV) imported into Australia in 1999 was $23,670 (ABS, 2001b); (DISR, 2000a). It is conservative to assume that 4WD vehicles imported into Australia during 1999 have at least the same average customs value as PMVs, as 4WD prices are generally towards the higher end of the market. In fact, a review of typical prices for the most popular 4WD models indicates that an average customs value of $35,000 to $40,000 would be more appropriate for 4WDs. An average customs value of $35,000 is assumed.

A total of 146,625 4WD vehicles were imported into Australia into 1999 (DISR, 2000a). Assuming an average customs value of $35,000, the total customs value of these vehicles was $5.13 billion. Total import duty on

these vehicles (at 5% of customs value) was $257 million. If the rate of import duty were equal to that for other PMVs (15%) then total import duty in 1999 would have been $770 million and the approximate subsidy for importation of 4WDs is $513 million.

3.5 Automotive industry support

The Commonwealth Government provides direct support to the automotive industry in Australia through the Automotive Competitiveness & Investment Scheme (ACIS). This scheme will provide up to $2 billion between 1 January 2001 and 31 December 2005 to encourage investment and innovation in the Australian automotive industry. This direct support for the automotive industry ensures that vehicle prices remain competitive and encourages consumers to continue to purchase motor vehicles. It is in addition to the industry protection already provided in the form of import tariffs for motor vehicles.

While some of this funding may in theory be used to improve the fuel efficiency of vehicles manufactured in Australia, it is likely that most will be used to subsidise production of existing models with little attention to fuel efficiency. Australia's niche market in automobile manufacture is not fuel efficiency.

3.6 Non-recovery of public agency costs

Public agencies in Australia provide basic geological information, databases and other information and management services to fossil fuel exploration and production companies at nominal costs. This is effectively a subsidy to the coal, oil and gas industries in Australia (NIEIR, 1996). The main public agencies involved in the provision of information and support to the fossil fuel industry are:

- The Australian Geological Survey Organisation (AGSO);
- The Federal Department of Industry, Science and Resources (DISR); and
- Public energy departments in each Australian state.

The value of public energy agency costs not recovered in Australia has previously been estimated by NIEIR at $267 million per year. This estimate comprised $68 million per year for AGSO, $30 million for DISR (then the Department of Primary Industries and Energy) and a total of $169 million from the various state departments (NIEIR, 1996). This estimate does not distinguish between costs incurred in supporting the fossil fuel industry and costs incurred on behalf of renewable energy sources. A reasonable assumption would be that the proportion of costs incurred is the same as the relative contribution of each energy source to the primary energy mix in Australia. Fossil fuels provided 94% of Australia's primary energy in 1997-98, so it is reasonable to assume that 94% of the above estimate, or $251 million per year, supports fossil fuels.

As a check on this estimate, which is based on figures that are now somewhat dated, the subsidies provided by each public agency are examined in more detail below.

3.6.1 AGSO

The Australian Geological Survey Organisation is the federal agency that provides geoscientific advice, information, databases and mapping services. The total appropriation for the AGSO in the 2000-01 federal budget is $62.4 million (Commonwealth Government, 2000). In the absence of a detailed breakdown of this budget, it is necessary to estimate the proportion of the budget allocated to fossil fuel projects. NIEIR (1996) estimated that about 50 per cent of the AGSO budget was allocated to petroleum projects, mainly offshore, in 1994/95. Assuming the proportion of the budget allocated to petroleum projects is the same in 2000/01, the total allocation to petroleum projects would be about $31 million.

The AGSO Work Program for 2000-2001 lists 45 projects, of which 13 provide direct support for petroleum exploration (AGSO, 2000). Assuming an equal budget allocation for each project, the total allocation to petroleum projects would be about $18 million. However, many of the remaining projects support mineral exploration in general and would therefore provide some support for coal exploration. Coal comprises about 35% of the total mass of minerals produced in Australia in 1998-99 (ABS, 2000a). Assuming 35% of the

remaining AGSO budget supports coal exploration and production gives an allocation to coal projects of about $16 million and total fossil fuel support of about $34 million.

An alternative estimate may be obtained by examining the value of mineral production in Australia and assuming that the value of support by AGSO is allocated in the same proportions. In 1998-99, the value of total mineral production in Australia was $34.6 billion, including $10.5 billion for coal and $8.4 billion for oil and gas (ABS, 2000a). Assuming the AGSO budget is allocated in the same proportions gives an allocation of $34 million for fossil fuel support.

The best available estimate for the size of the subsidy to fossil fuel exploration and production as a result of non-recovery of costs by AGSO is therefore about $34 million. This is somewhat less than the NIEIR estimate, which did not attempt to distinguish between support for fossil fuels and support for other minerals.

3.6.2 DISR

The Commonwealth Department of Industry, Science and Resources, provides support to fossil fuel production and consumption in Australia. The magnitude of this support is very difficult to estimate as budget papers rarely itemise the specific functions that assist the fossil fuel industry. DISR administers the release of offshore petroleum exploration areas, promotes Australia as an ideal location for investment in fossil fuel exploration and assists with industry development plans, most recently for the Downstream Petroleum Products Industry and the Australian Liquefied Natural Gas (LNG) Industry.

DISR also provides financial and facilitation assistance to companies wishing to invest in petroleum exploration and production, through Invest Australia. Invest Australia is the Commonwealth Government agency responsible for promoting Australia as an investment location (DISR, 2000b). While assistance is available to all types of projects, there is a bias towards major projects with capital expenditure greater than $50 million. This favours large, centralised, fossil fuel developments over smaller, distributed sustainable energy developments.

NIEIR (1996) estimated that the Department of Primary Industries and Energy (the predecessor to the DISR) provided advice and administration support worth $30 million to the energy sector in 1994-95. This figure does not include funding for R&D. As 94% of Australia's primary energy is derived from fossil fuels it is reasonable to assume that 94% of the DISR support went to fossil fuels. This gives a subsidy of about $28 million per year. In the absence of better data, it will be assumed that this subsidy still applies.

3.6.3 State Departments

NIEIR (1996) has previously estimated the magnitude of state energy department costs not recovered, as shown in Table 3. Assuming, as above, that 94% of these unrecovered costs provide support to the fossil fuel industry gives an adjusted estimate of $158.9 million.

As these estimates are somewhat dated, an attempt has been made to derive a new estimate from budget statements for 2000-01. In general, state budget papers do not provide sufficient detail to identify funding for specific programs that provide support for the fossil fuel industry. In the absence of this information it has been assumed that half of the funding for state mineral resource agencies supports fossil fuels, with the remainder supporting other minerals. It has also been assumed that 94% of funding for state energy departments supports fossil fuels, in line with the proportion of fossil fuels in the primary fuel mix. Applying these assumptions gives an estimate of $196.5 million in unrecovered public energy department costs that support fossil fuel exploration, production and consumption at the state level.

Table 3: Estimates of state and territory energy department costs not recovered.

State/Territory	*Agencies*	*NIEIR Estimate[1] ($ million)*	*Adjusted Estimate[2] ($ million)*	*2000-01 Estimate[3] ($ million)*
New South Wales	Ministry for Energy and Utilities	30	28.2	4.7
	Department of Mineral Resources			14.4
Victoria	Department of Natural Resources and Environment	30	28.2	33
Queensland	Department of Mines and Energy	75.8	71.3	38.8
Western Australia	Office of Energy	15	14.1	13.1
	Department of Minerals and Energy			28.3
	Department of Resources Development			13.7
South Australia	Office of Minerals and Energy Resources	10	9.4	12.9
	Office of Energy Policy			24.2
Tasmania	Department of Infrastructure, Energy and Resources	5	4.7	2.5
Northern Territory	Department of Mines and Energy	3.2	3	11.2
TOTAL		169	158.9	196.5

Notes:

1. From NIEIR (1996).
2. Assuming 94% of the unrecovered energy department costs support fossil fuels, consistent with the proportion of fossil fuels in the primary energy mix.
3. Best estimate from state budget papers for 2000-01. Generally, it has been assumed that 94% of the budget for energy departments and half the budget for geological and mineral resource agencies supports fossil fuels.

3.7 Fossil fuel industry taxation

Companies involved in fossil fuel exploration and production in Australia are subject to two types of taxation: company taxation and secondary resource taxation. All companies operating in Australia are subject to company tax. The company tax rate is 30% of taxable income for 2001/02.

Secondary resource taxation only applies to companies that are involved in depleting publicly owned resources, such as fossil fuels. It is essentially a way of charging for access to these resources and compensating the community for the decline in the resource base. There is a strong argument for using revenue from secondary resource taxation to develop alternative technologies that may be implemented when the existing resource is no longer available.

Secondary taxes may be assessed as a fixed percentage of the value of production (ad valorem royalties), on profits (resource rent taxes) or as a fixed rate per tonne (specific rate royalties). In Australia, the Commonwealth and the states share resource taxation revenues from minerals (including coal) and petroleum.

State and Territory Resource Taxes

The states and the Northern Territory collect direct royalties on coal production. Royalty systems and levels vary across Australia. Typical royalty rates for coal are 2.5 per cent to 7 per cent of the value of the coal on an ad valorem basis, or a fixed royalty varying from $0.04 to $1.77 per tonne (DISR, 2000b). When royalties are calculated on an ad-valorem basis, a range of deductions are usually allowed before calculation of the royalty payments. Royalty payments themselves can be deducted from company income when determining liability for

company tax. Anderson and McKibbin (1997) did not find any subsidies to coal production or consumption in Australia, in contrast with the situation in a number of European countries where coal production subsidies exist and developing countries where coal consumption subsidies exist.

The states and the Northern Territory also levy royalties and excise on petroleum resources onshore and in coastal waters, mainly on an ad valorem basis. The rate of excise varies depending on the annual rate of production of crude oil, the date of discovery of the petroleum reservoir and the date on which production commenced. The rate of royalty varies between 10 per cent and 12.5 per cent of the net wellhead value of the petroleum produced (DISR, 2000b). State royalties and excise also apply to Australia's North West Shelf petroleum resources.

Commonwealth Resource Taxes

Commonwealth royalties and oil production excises mainly apply to fields in inshore and coastal waters, such as Barrow Island, some other Western Australian fields and the North West Shelf. The first 30 million barrels of oil produced from any one field (inshore and coastal waters, including the North West Shelf) are free of Commonwealth excise (NIEIR, 1996).

The Commonwealth applies a Petroleum Resource Rent Tax (PRRT) of 40% to profits from all offshore fields with the exception of the North West Shelf production and exploration areas. The tax is assessed on a project basis. Exploration expenditure is deductible against PRRT and deductibility is assessed on a company wide basis. Project and exploration expenditures can be transferred from other projects or other years to minimise the total PRRT burden. Deductions are allowable for all project closing-down costs, including environmental restoration costs. PRRT payments are themselves deductible from company income when determining company tax liability (DISR, 2000b).

In 1999/2000 the PRRT totalled $1.2 billion (Australian Taxation Office, 2001). The PRRT has averaged $1.06 billion per year between 1991/92 and 2000/01. Only about 8 or 9 companies in Australia pay PRRT, although these are large companies with high incomes such as Woodside, Shell, ExxonMobil, BHP, Santos and Apache (Layer, 2000).

Appropriateness of the taxation regime

Secondary taxation is intended to strike a balance between providing the community with a return for exploitation of a public resource and providing the private sector with a return for risks and an incentive for exploration (NIEIR, 1996). Despite the strong argument that a substantial amount of the revenue from resource taxation should be directed towards eventual replacements for that resource, only a small proportion of total revenue from fossil fuel taxation is directed towards sustainable energy.

It is difficult to determine the appropriateness of the tax regime for fossil fuels. By comparing to tax regimes in other countries it is possible to determine whether Australian taxation rates are high or low on an international basis. However, this does not address the question of whether the revenue obtained from the fossil fuel industry is appropriate compensation for depletion of a finite resource, the consumption of which causes environmental disruption. Another possibility is to compare the taxation regime for fossil fuel industries with that for sustainable energy industries and determine whether there is any comparative advantage. However, due to the complexity of taxation law and the differing scale of fossil fuel and sustainable energy projects, this is a difficult task that is beyond the scope of this paper.

What is certain is that existing tax concessions to the fossil fuel industry act as an incentive for fossil fuel exploration and production companies. The following special deductions (from company tax) are available for companies involved in petroleum exploration and development activities (DISR, 2000c):

- all petroleum exploration and prospecting expenditures;
- all operating costs;
- capital expenditure on certain petroleum transport facilities;
- costs of export market development and defending native title claims and closures;
- capital and current environment protection expenditures (except plant) on pollution control or waste management;
- Environment Impact Statement capital costs;
- certain minesite rehabilitation costs including expenditure associated with the removal of offshore platforms; and
- taxes and charges (such as royalties and resource rent tax) associated with income producing activities.

While some of these deductions may be appropriate, the deductions available for environment protection and rehabilitation expenditures and native title claims seem particularly inappropriate. Costs of protecting the environment should be treated as part of the normal cost of doing business.

The impact of the deductibility of exploration costs for minerals and petroleum was $360 million in 1994/95. That is, an additional $360 million in company tax would have been earned if exploration costs were not deductible (Layer, 2000). In 1999/2000 total mineral and petroleum exploration expenditure in Australia was $1.4 billion, comprising $680 million for minerals and $720 million for petroleum (ABS, 2001c). Assuming the impact on company tax is split in the same proportion, additional company tax revenue of $186 million could be earned if petroleum exploration costs were not deductible. This provides a lower bound estimate of the lost revenue due to the existence of the inappropriate tax concessions listed above. Data was not available to estimate the full subsidy associated with the listed tax concessions.

3.8 Research and development

In 1994 an estimated $180 million was provided for energy R&D, of which only $27 million (15 per cent of the total) was provided to renewable energy and energy efficiency applications (NIEIR, 1996). These figures include not just direct expenditure on energy R&D but also the value of tax deductions in 1994. Expenditure by private companies on R&D can be claimed as a deduction against company tax at a concessional rate of 125% of expenditure.

While the Commonwealth and State Governments have increased funding for sustainable energy R&D in recent years, it appears that fossil fuel R&D continues to receive the major proportion of government funding support. To check whether the situation has changed significantly since NIEIR released its report in 1996, reviews of current funding for the Australian Cooperative Research Centre (CRC) program and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) are provided below.

CRCs bring together researchers from universities, government and the private sector to research specified topics over a period of years. CRCs involved in R&D that wholly or partially benefits the fossil fuel industry are listed in Table 4. The CRC for Greenhouse Accounting is also listed, as this CRC is specifically focused on strengthening Australia's argument that terrestrial carbon sinks should be allowed as a means of reducing greenhouse gas emissions under international treaties. This approach is unlikely to achieve the long-term emissions reductions that are required.

Table 4: CRCs involved in research and development that wholly or partially benefits the fossil fuel industry or the use of greenhouse sinks.

CRC	***Average Annual Commonwealth Funding***	***Proportion Supporting Fossil Fuels or Sinks***
Coal in Sustainable Development	$2.1 million	100%
Mining Technology and Equipment	$1.4 million	50%
Petroleum	$2.6 million	100%
Clean Power from Lignite	$2.0 million	100%
Greenhouse Accounting	$2.3 million	100%
WEIGHTED TOTAL		$9.7 million

As shown in Table 4, five CRCs with government funding of about $9.7 million per year are involved in research and development that supports fossil fuels or terrestrial carbon sinks. In contrast, a single CRC (the Australian CRC for Renewable Energy) with annual government funding of $1.6 million is dedicated to sustainable energy R&D. Sustainable energy R&D funding through CRCs is about 14% of total CRC funding for energy and greenhouse response.

While the research conducted by the CRCs listed in Table 4 may have some additional benefits to Australia, it is more appropriate that Commonwealth funding focuses on sustainable energy and transport and long-term solutions to climate change.

Another example of the imbalance in R&D funding is provided by an examination of Commonwealth Government funding allocated to the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's flagship research organisation. Funding allocations that support fossil fuels are summarised by business unit in Table 5. An estimated $17.4 million in Commonwealth Government funding is allocated to business units within the CSIRO annually for research that directly supports fossil fuels.

Table 5: Summary of CSIRO funding for energy R&D by business unit (CSIRO, 2001).

Business Unit	***Program***	***Estimated Annual Funding ($ million)***
Energy Technology	Coal Preparation	2.5
	Coal Utilisation	2.5
	Gas Utilisation	2.5
Exploration and Mining	Coal Mine Geology	1
Petroleum Resources	All	6.9
Marine Research	Petroleum	0.9
Mathematical and Information Sciences	Petroleum	0.7
Molecular Science	Petroleum	0.4
TOTAL FOSSIL FUEL RESEARCH		17.4

Table 6 summarises CSIRO funding for sustainable energy R&D. An estimated $2.8 million in Commonwealth funding was provided during 2000-01. Again, about 14% of total energy R&D funding provided to the CSIRO supports sustainable energy. This brief review of CRC and CSIRO funding supports the figures provided by NIEIR (1996). Energy R&D funding clearly demonstrates a significant bias towards fossil fuels and against renewable energy and energy efficiency. This is effectively a subsidy to the fossil fuel industry amounting to about $153 million per annum, and exceeding the subsidy to the sustainable energy industry by $126 million.

Table 6: Summary of CSIRO funding for sustainable energy R&D (Environment Australia, 2001).

Area of Research	***Estimated Annual Funding ($ million)***
Energy End Use Efficiency in Industry, Transport and Buildings	0.1
Renewable Energy Technologies	2.7
TOTAL SUSTAINABLE ENERGY RESEARCH	2.8

3.9 Commonwealth fuel subsidies

The Commonwealth Government has implemented a range of fuel subsidy schemes as described below.

3.9.1 Diesel Fuel Rebate Scheme

The Diesel Fuel Rebate Scheme (DFRS) provides a rebate for customs or excise duty paid on diesel or 'like fuels' used in specified off-road activities. Excise duty is collected for fuels produced in Australia and customs duty is collected for fuels imported into Australia. The activities for which a rebate can be claimed are:

- mining;
- agriculture;
- forestry;
- fishing;
- rail transport;
- marine transport;
- electricity generation for residential premises; and
- the operation of hospitals, nursing and aged care homes and other medical institutions.

'Like fuels' include heavy fuel oil, light fuel oil and all fuels that attract the same rate of duty as diesel (except for gasoline, coal tar and coke oven distillates). As of June 2001, the customs and excise duty rate for diesel is

about 38 cents per litre. The Commonwealth Government has budgeted $1.98 billion for the DFRS in 2001-02 (Commonwealth Government, 2001).

The rationale for the DFRS is that off-road use of diesel fuel should be exempt from duty as the revenue collected through duty is used to fund roads, which are not used by off-road users. In addition, competing end-use energy sources such as natural gas and electricity are not subject to excise duty, so the rebate is a way of avoiding subsidisation of these other sources (NIEIR, 1996). NIEIR concludes that the DFRS should not be seen as a financial subsidy (NIEIR, 1996).

In 1999-2000 the total rebates paid under the DFRS amounted to just over $1.5 billion (Australian Taxation Office, 2001). At that time the rate of rebate varied across the eligible activities, only diesel was included and rail and marine transport were not included. In 2001, all of the eligible activities qualify for the full rebate and like fuels are included so the cost of the scheme is likely to be higher. The Commonwealth Government has budgeted $1.98 billion for the DFRS in 2001-02 (Commonwealth Government, 2001). The mining industry received about half of the total rebates in 1999-2000 (Australian Taxation Office, 2001). NIEIR estimated that rebates to the coal mining industry alone amounted to $300 million in 1994/95 (NIEIR, 1996).

While the DFRS does not meet the strict definition of a financial subsidy it certainly provides a financial incentive for the use of fossil fuels. The environmental externalities of fuel combustion are not adequately included in fuel prices in Australia and removal of the DFRS would be an important step towards more appropriate fuel pricing.

3.9.2 Diesel and Alternative Fuels Grants Scheme

The Diesel and Alternative Fuels Grants Scheme (DAFGS) provides grants for use of diesel, compressed natural gas, liquefied petroleum gas, recycled waste oil, ethanol, canola oil and other fuels for long-distance road freight. The scheme provides particular support for use of these fuels by primary producers. Generally a grant of about 17 cents per litre is available for the on-road use of diesel and alternative fuels in vehicles with a gross vehicle mass of 4.5 tonnes or more that are registered for use on public roads. To receive the grant businesses need to be registered and must use the fuel for carrying on the enterprise. Primary producers are eligible for all trips on public roads. Other enterprises using a vehicle with a gross vehicle mass between 4.5 and 20 tonnes are eligible only for trips outside metropolitan areas.

The Commonwealth Government has budgeted $665 million for the DAFGS in 2001-02 (Commonwealth Government, 2001). This is essentially a direct financial subsidy to the use of diesel and alternative fuels for road transport in Australia.

The proportion of this subsidy that supports fossil fuels is uncertain. Some proportion of the subsidy supports renewable fuels such as ethanol, however the volume of diesel, LNG and CNG consumed in Australia is much higher than the renewable fuels. In 1997-98, consumption of diesel was roughly three times the consumption of LNG/CNG, with other alternative fuels having much smaller consumption rates (ABS, 2001a). It is fair to assume that the bulk of the subsidy currently supports fossil fuel use.

3.9.3 Energy Grants (Credits) Scheme

From 1 July 2002, both the off-road and on-road schemes described above will be replaced by the Energy Grants (Credits) Scheme, the stated aims of which are to encourage the use of 'cleaner' fuels, 'maintain entitlements' under the DFRS and DAFGS and, in the case of diesel, to restrict entitlements to ultra low sulphur fuel from 1 January 2006. Details of this scheme have not been released however one of the stated aims is to retain the existing level of subsidies.

3.9.4 Fuel Sales Grants Scheme

The Fuel Sales Grants Scheme pays grants to fuel retailers and distributors of petrol and diesel in regional and remote areas of Australia in order to prevent rises in fuel prices as a result of the implementation of a Goods and

Services Tax (GST) in Australia. A budget of $210 million has been provided for this scheme in 2001-02 (Commonwealth Government, 2001).

3.9.5 Fuel Excise Reduction

High fuel prices (in relative terms) in Australia during early 2001 resulted in public pressure on the Commonwealth Government to reduce fuel taxes. Despite the fact that the increased fuel prices were a response to market conditions that are likely to prevail more and more often in the future, the government decreased the rate of fuel excise by 1.5 cents per litre and abolished indexation of fuel excise. In 2001-02 the estimated cost of these actions in terms of lost tax revenue is $635 million, projected to rise to $1.7 billion by 2004-05 (Commonwealth Government, 2001).

3.9.6 Petroleum Products Freight Subsidy Scheme

The Petroleum Products Freight Subsidy Scheme (PPFSS) is a national subsidy scheme providing assistance to offset the cost of freighting eligible petroleum products to remote Australian places. The Scheme acts to benefit purchasers in those places by reducing the freight component of the purchase price of fuel. The PPFSS covers automotive distillate, motor spirit, aviation gasoline and aviation turbine fuel. The Commonwealth Government has budgeted $17 million over 6 years, or about $3 million per year for this scheme (Commonwealth Government, 2000).

3.10 Subsidies for road use and car parking

As pointed out by NIEIR (1996) roads are a capital asset, which should be required to earn a rate of return. Taking that cost into account, as well as the costs of road infrastructure and maintenance, NIEIR estimated very roughly that the total publicly paid cost of motor vehicles in Australia was $14.5 billion in 1994. Subtracting road user charges paid to government of about $13.3 billion, gave a net public subsidy to the users of all motor vehicles of $1.2 billion or about $2 billion in 2001 (assuming an 8% discount rate).

Banfield, et al. (1999) estimated the direct economic costs of cars, buses and trains in Sydney in 1996, taking into account the value of land, infrastructure, rolling stock, and operating costs. Road infrastructure costs were allocated between cars and heavy vehicles according to the paper's "Flow & Force" scenario, in which the construction and maintenance costs of major roads are determined by heavy vehicles and those of local roads are determined by cars. Total costs for cars, buses and trains were found to be 60, 28 and 40 cents per passenger-km, respectively, and the corresponding user charges were 5[1], 12 and 9 cents per passenger-km, respectively. To estimate the subsidies, we draw upon the raw data from this research to compare the public components of the total cost of each mode with the user charge. Assuming a 10% real discount rate, the annual public subsidies in Sydney in 1996 were approximately: cars $5.9 billion; buses $0.14 billion; and trains $1.4 billion.

It is likely that the subsidy in Sydney is much higher than the average across Australia, however a subsidy is likely to exist in most Australian cities. Some attempts have been made to reduce the extent of this subsidy in Sydney by introducing car parking levies of $400 to $800 per space in particular suburbs with good access to public transport (White, et al., 2001). Since it is impossible to extrapolate from the cost of cars and buses in Sydney to the cost of all motor vehicles in Australia, the NIEIR estimate is used here. However, the more detailed calculation by Banfield, et al. (1999) for Sydney suggests that the NIEIR result is an underestimate.

3.11 Subsidies for supply of electricity to the aluminium industry

The aluminium smelting industry is an electricity-intensive industry that accounts for 16% of Australia's greenhouse gas emissions from the electricity sector and 6.5% of Australia's total greenhouse gas emissions (Australia Institute, 1999). This proportion is set to increase with the construction of the new Aldoga Aluminium Smelter and the proposed construction of a new Comalco alumina refinery at Gladstone in

[1] This corrects an error in the original calculation that gave a user charge 10 cents per passenger-km for cars.

Queensland. Aluminium production in Australia predominantly uses electricity from coal-fired power stations, whereas aluminium production outside Australia usually uses hydro-electricity, resulting in much lower greenhouse gas emissions.

The aluminium smelting industry in Australia is widely believed to receive electricity at prices well below the standard industry rates for electricity users of a similar size. Electricity supply contracts are commercial in confidence so it is difficult to confirm the size of the subsidy to the aluminium smelting industry. The subsidy has been estimated as at least $410 million annually based on the limited available information (Victorian Auditor-General's Office, 1998, Australia Institute, 1999).

The proposed $3 billion Aldoga Aluminium Smelter to be built in Gladstone, Queensland, also appears to have been offered substantial subsidies and concessions of about $100 million by the state government, the bulk of which comprised heavily discounted electricity supplies (Sydney Morning Herald, 2001). The proposed $1.4 billion alumina refinery to be built by Comalco in Gladstone has also reportedly been offered subsidies of about $100 million (Davidson, 2000). These subsidies are not included in the previous $410 million estimate.

In addition, the Queensland Government sold the coal-fired Gladstone Power Station to a consortium of parties with interests in the Gladstone alumina refinery and aluminium smelter for $753 million in 1994. This price was determined on the basis of overall state development benefits rather than the actual value of the power station. It has been estimated that the price was between half and two-thirds of the net value of the power station (Joint Standing Committee on Treaties, 2000). This is a permanent subsidy to the aluminium industry of between $377 million and $753 million that cannot be recovered. It supports the use of coal to provide electricity.

3.12 State energy supply subsidies for particular groups

State subsidies are provided in NSW, Victoria, Queensland and South Australia, mainly to assist pensioners, people in country areas and financially disadvantaged groups with electricity payments (see Table 7). While these subsidies may be appropriate from a social justice perspective it would be better to provide the subsidies as direct payments, such as tax rebates, rather than tying them to energy consumption. The existing subsidies may encourage greater energy consumption and greater greenhouse gas emissions.

Table 7: Estimate of state energy supply subsidies for pensioners, financially disadvantaged users and users in remote areas.

State/Territory	***Subsidy***	***Annual Value ($ million)***	***Source***
New South Wales	Concessions for pensioners and financially disadvantaged in 2001-02	90	(NSW Treasury, 2001)
Victoria	Energy concessions in 1998-99	76	(Department of Human Services, 2000)
Queensland	Electricity rebates for pensioners	59	(Queensland Treasury, 2001)
South Australia	Remote Areas Energy Supplies subsidy scheme	3	(SA Auditor General, 2000)
TOTAL		228	

3.13 Direct subsidies to fossil fuel development projects

The Stuart Oil Shale Project in Queensland has received a series of direct subsidies from the Commonwealth and Queensland Governments. The project aims to process a major oil shale deposit located near Gladstone to produce medium shale oil and naptha in approximately equal fractions. The project has been granted an exemption from excise tax for up to 600,000 barrels per year of gasoline produced from oil shale until 2005 (Greenpeace Australia, 2001, SPP/CPM, 2001). At an excise rate of 37.5 cents per litre this exemption could potentially be worth $35.8 million per year. Actual production as of July 2001 has failed to reach these levels however may do so in the future. At full capacity and operating continuously, Stage 1 of the project could potentially produce 1.6 million barrels per year.

Stage 1 of the Stuart Project also received a grant of $7 million from the Commonwealth Government for research and development (SPP/CPM, 2001). It has been reported that the Queensland Government provided $11 million to construct a dedicated wharf facility for the project (Queensland Greens, 2001).

The ready availability of coal from state mines for use in generating electricity may also have contributed to the construction of coal-fired power stations when other options would have been more economic. In Western Australia, the State Government supported the construction of the Collie coal fired power station although the official (Harman) committee recommended that a gas-fired power station would have been cheaper. The total additional discounted (8 per cent discount rate) cost in 1990 dollars is estimated at $170 million and would be even greater if additional costs of greenhouse gas emissions were considered (OECD, 1997).

Australia is giving $8 million a year to East Timor for petroleum-related industry projects under the Timor Sea Agreement, signed in July 2001. More than $6 billion in infrastructure is also planned in the form of pipelines and gas processing facilities in the Northern Territory to take advantage of oil and gas resources in the Timor Sea (Dodd, 2001). The public contribution to development of this infrastructure is still uncertain.

These subsidies to the development of a shale oil plant, coal-fired power station and oil and gas field in Australia are an example of the types of subsidies available to new fossil fuel projects. While they may not be typical of the subsidies provided for development of fossil fuel projects they provide an indication of the types of subsidisation that may be occurring.

In addition to these types of subsidies, there are subsidies associated with the tax deduction of interest paid during construction of power stations. The companies that construct large, centralised coal-fired power stations are usually large companies while the companies that install sustainable energy technologies are often small to medium-sized. Large companies are able to make profits in other areas while investing funds in power station construction. This means that they pay tax and are therefore able to claim tax concessions for interest paid on loans for power station construction. In contrast, the smaller sustainable energy companies often run at a loss while investing in sustainable energy technologies and do not pay tax, so they cannot take advantage of available tax concessions. This effectively subsidises the development of fossil fuel projects. No attempt has been made to estimate the magnitude of this subsidy.

3.14 Electricity transmission pricing arrangements

Existing electricity transmission pricing regimes in Australia are biased against distributed generation (including many renewable energy sources) and cogeneration. Under the current pricing system, the costs of providing the transmission network are paid by customers, rather than the centralised coal-fired power stations that are the main beneficiaries of the network (Australian Cogeneration Association, 2000). Distributed generation sources and demand side management options are not appropriately rewarded for not using the transmission network. A recent Senate Inquiry into global warming found that (ECITA References Committee, 2000, p170):

> *"Current arrangements, which restrict transmission charging to generators to shallow entry costs, while leaving the bulk of costs to be recovered from customers, provide a substantial subsidy to remote, usually coal-fired generation to the competitive disadvantage of more greenhouse friendly natural gas and renewable generation typically located closer to loads. Pursuit of demand management options is also acutely disadvantaged."*

The size of this subsidy has not been estimated but it provides a definite financial incentive to centralised fossil fuel power stations.

3.15 Summary of financial subsidies and incentives

Table 8 summarises the annual financial subsidies and incentives to fossil fuel production and consumption in Australia, which amount to about $6.5 billion, even though there are indications that many of the subsidies are underestimated. This figure is much higher than the $1.995 billion annual subsidy to the energy sector estimated by NIEIR for 1994 (NIEIR, 1996). If subsidies associated with environmental and social externalities were considered this figure would be higher still. However, it appears to compare well with other international estimates of energy subsidies.

De Moor (2001) estimates that the world energy sector receives public subsidies of over $US240 billion (or about $464 billion) per annum. Australian primary energy consumption in 1998 was 1.58% of global primary energy consumption (IEA, 2000). If we assume that Australia's proportion of the global subsidies is the same as its proportion of energy consumption, the total annual subsidy would be $7.3 billion. This figure is of similar magnitude to the estimate presented in this paper.

Table 8: Summary of annual ongoing financial subsidies and incentives to fossil fuel production and consumption.

Subsidy or Incentive	***Annual Value ($ million)***	***Comments***
Greenhouse Gas Abatement Program (GGAP)	81.8	GGAP is a competitive funding mechanism that provides $400 million over 4 years for greenhouse gas abatement. The subsidy estimate comprises Round 1 funding to projects that support coal, natural gas or petroleum use.
Tax benefits for salary packaging motor vehicles	750	Subsidy could be as high as $1.2 billion depending on the assumptions made.
Reduced import duty for 4WDs	513	
Automotive industry support	400	
Non-recovery of agency costs	258	
• AGSO	34	Alternative estimates using differing assumptions arrive at a similar figure.
• DISR		
• State departments	28	
	196	
Inappropriate company tax concessions	186	Actual subsidy is probably higher due to implementation of new tax concessions since the estimate was made and lack of data for many of the concessions.
R&D support for fossil fuels	153	
Diesel Fuel Rebate Scheme	-	The scheme is worth $1.98 billion per year but does not meet the definition of a subsidy.
Diesel and Alternative Fuels Grants Scheme	665	
Fuel Sales Grants Scheme	210	
Fuel excise reduction	635	Lost tax revenue in 2001-02.
Road and car parking subsidies	2,000	This is likely to under-estimate the real subsidy.
Electricity supply subsidies to aluminium industry	410	This does not include one-off subsidies of between $577 million and $953 million provided to the aluminium industry.
State energy supply subsidies	228	
Direct subsidies to Stuart Oil Shale Project	Up to 36	This does not include one-off subsidies of about $18 million.
Timor Sea Arrangement	8	
Transmission pricing arrangements	Not assessed	
TOTAL	$6.54 billion	

Note: The table does not include one-off payments to specific fossil fuel development projects, although a number of these subsidies have been discussed in the text.

4 Conclusion

This study has found an estimated $6.54 billion per annum in financial subsidies to fossil fuel production and consumption in Australia, despite the fact that many subsidies cannot be calculated. This confirms and extends the subsidy estimates developed by NIEIR (1996). While Australia is a high per-capita user of energy and a net energy exporter, there is evidence from global studies (de Moor, 2001) that similar levels of subsidy are present in other countries.

These subsidies support a fossil fuel energy sector that is the major contributor to global greenhouse gas emissions and conflict with attempts to expand the role of sustainable energy technologies. At present, a perverse situation exists where society pays the fossil fuel industry to pollute, pays the environmental cost of that pollution and pays the cost of attempting to establish new technologies in a market with substantial financial barriers. If Australia and other countries are serious about reducing greenhouse gas emissions then there is a clear need to reduce the magnitude of fossil fuel subsidies.

As noted by de Moor (2001), the ideal approach to removal of energy subsidies is a global one, as few countries will be willing to act unilaterally to remove subsidies. De Moor proposes that a Grand Deal for removal of subsidies to energy use be pursued within the United Nations Framework Convention on Climate Change (UNFCCC). This Grand Deal would involve a gradual phase out of energy subsidies by OECD countries and financial and technology transfer to non-OECD countries. Such a deal has the potential to encourage action by non-OECD countries to reduce greenhouse gas emissions within the UNFCCC, addressing current objections by the United States and others (de Moor, 2001).

In Australia, the Australian Conservation Foundation (ACF) has proposed an inquiry into environmentally damaging government programs and subsidies and environmental tax reform. ACF estimates that a broad-reaching inquiry would cost about $10 million over a year to 18 months. Fossil fuel subsidies would only be one of the areas examined (Krockenberger, et al., 2000). Government commitment to such an inquiry would be essential if its recommendations were to be successfully implemented.

An inquiry of this sort could greatly improve the subsidy estimates and range of subsidies contained in this paper by incorporating additional information that could not be readily accessed by the authors. It would also help to make the existing subsidisation of the fossil fuel industry more transparent to the public and make funding available to develop sustainable alternatives. In many cases it may be appropriate to retain funding for specific subsidies while modifying the rules of the funding program to benefit sustainable energy and transport rather than fossil fuel production and consumption. In other cases subsidy removal will require more substantial structural change.

Subsidy removal and redirection should be an effective way to achieve a substantial reduction in greenhouse gas emissions, although the potential reductions have not been estimated. Subsidy removal should also have positive effects throughout the whole economy by removing some of the market distortions and failures that currently exist.

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