Submission No. 25
8.11.05

Parliament Of Queensland

Petrol Pricing Select Committee

a submission 7th November 2005 from

B A Clark

As suggested I have responded using the questions suggested in the committee's invitation.
I am willing to appear before the committee if requested.

- **The extent to which current prices increase the competitiveness of alternate fuels such as E10.**

Examination of the production and introduction of alternate biofuels elsewhere in countries similar to Australia (Ref 1) indicates that the alternate fuels require considerable price support. In Germany there is no tax on biofuel and its use is now optimal but very low, whilst in the UK the 20 pence per litre tax differential has proved somewhat inadequate.
Whether you actually achieve any real increase in the overall sustainable transport fuel supply has yet to be answered by the development of biofuels. Both financial and energetic networks illustrating the actual cost in energetic (finite resource) terms of alternate bio-fuels exist in plethora for evaluating this question. Briefly, a reasonable consensus suggests that in terms of existing finite mineral petroleum resources, the production of part or full substitute biofuels has but a marginal effect on the rate of increase of mineral crude oil depletion.

- **The economic and financial consequences of current fuel prices, with a particular emphasis on regional Queensland and outer metropolitan areas.**

This question needs to be split into two areas.

Regional Queensland

With regard to regional Queensland, much of the agricultural and mining business interests will be able to pass on the increase in costs with only minor changes in production intensity. Current excise subsidies render the price of the primary diesel fuel to approximately equivalent to the US price and the international competitive situation generally remains unchanged. Tourism will be different.
Serious financial disadvantages do occur within that section of regional populations without the ability to charge these extra costs against income tax, or who have to bear those transport costs passed on to consumer goods. These add-on transport costs are disproportionate to those on charged to metropolitan populations. It needs to be also recognised that much of regional Queensland does not have the benefit of a highly cross subsidised public transit system. Current direct operational annual cross subsidy in SEQ is now in excess of several hundred millions of dollars per year. It is expected that Tourism will take a hit as it is the most energy intensive mineral crude oil user and I expect the Queensland Treasury models will outline the size and likely areas where some dislocation will occur.

Outer Metropolitan Areas

As mentioned above, annual operational subsidies from the Queensland Government for these areas, especially SEQ, are very high as a percentage of the journey ticket prices of public transit. It is also estimated that some 80% of the current Queensland Government subsidy of 8+cents per litre applies to fuel sold in SEQ giving a further subsidy of several hundred of millions of dollars to these populations. Such subsidies also promote increased rates of depletion for mineral crude oil resources.

Research has also indicated that some 80% of single vehicle occupant journeys (this sector is approx 60% of all journeys) is for private discretionary travel. This type of travel is defined as the length of journey continued after passing the first point of entry to the public transit system. Overall, some 80% of all journey distance travelled in the SEQ is of the private discretionary travel type. Estimates of the value of private discretionary travel in dollars (at $15 /hr for journey time saved over subsidised public transit journey times) far outweighs the cost of congestion, promoted and used as an argument for increased road investment. It suggests that, at the very least, the Queensland State fuel subsidy for metropolitan areas should be cancelled and used to develop public transit in regional Queensland.

- **Practical ways that consumers can reduce their petrol bills and whether existing information on the fuel efficiency of different makes of vehicles is sufficient.**

There are two basic ways to tackle the above. The first is to operate the vehicle within its optimal use envelope by education (correct tyre pressures and improved driving techniques, etc), the second is in more accurate investment decision-making by the vehicle purchasing public when purchasing a vehicle. The Queensland Government should consider including in the road fund charges levied some incentives for purchasers to make choices that will reduce depletion rates.

Investment Decision Making

It can be demonstrated that with regard to energy from a finite source, the time developed marginal costs (TD MC) Ref 2, of the energy consumed over the economic life of a vehicle should always be used in investment decision making such as purchasing a vehicle. This type of cost signals ahead the costs of depletion and exhaustion of the current finite fuel resource, including its replacement with a higher cost resource, as distinct from the average costs of extraction and use, normally used. Significantly, the TD MC, can also be used to compare the effect of various present technologies on their financial costs but also their effect on physical resource life. Usually in the present energy supply industry, this type of cost information although available is considered fully commercial in confidence and is therefore difficult to obtain in fine detail.
Nonetheless these values should be pursued and freely made available to the public as a major project in the national interest by the Queensland Government. With regard to any financial appraisal advice offered, especially by the motoring organizations per se, it should be a requirement for them to use TD MC costs in any appraisal without exception.

The use of TD MC in any investment appraisal involving energy costs should also be an essential part of the core purchasing policy of Queensland Government.

It is accepted that the bringing into line of the fuel prices charged at the point of consumption and the TD MC will be always advantageous to the optimisation of investment at all levels of activity. It is, however, recognised that organization of price levels can depend upon other types of judgements.

- **How the Australian Competition Commission Powers could be strengthened to deliver enhanced competition.**

It has been clear for some years that returns on investment by the Australian petroleum refining and distribution industry, as in so many western industrialised countries, has not generally been sufficient to meet desired market criteria and it is now clear that shortages in this area has been a driver in price hikes. What investment has occurred has been to satisfy increased Government environmental regulation or to extend profit into non- core business such as general retailing at petrol stations. There has been a small investment to drive some distribution costs lower.

Much has been made of opportunistic behaviour by refiners to increase refining margins. Whilst there have been gains in this area, I would re-iterate the main driver has been due to the flow-on of increased global demand combined with a world-wide shortage in refining capacity (ref 1). In this case it is difficult to see how the ACCC can or should alter the situation at the Australian refineries.

- **Whether Queensland receives its fair share of road funding?**

There is no evidence that Queensland does not get an adequate share of the present Commonwealth tax revenue for this purpose. It has been said of politicians that they are the only people who build bridges where there are no rivers. Much of the current road investment underway and planned in Queensland, especially in the SEQ, can be said to be of this type.

- **The capacity and benefits of the Federal Government reducing fuel excise to ameliorate the impact of high fuel prices on families and business.**

That the overall taxes on fuel should be much higher and in line with our western world level of consumption, will be seen to be essential in the near future necessitating at least a doubling in Australian pump prices. For instance Australia, US and Canada have by far the highest wasteful consumption in the world, have significant lower fuel prices due to low tax regimes, and continually exhibit the worst efficiency performance in all facets of mineral petroleum-based energy use whether by industry, commerce, government business or private and public transportation of passengers and goods. Significantly these countries have been hardest hit by the increase in crude oil prices.
It is unlikely, however, that this tax situation will change significantly quickly and in a planned manner to avoid the fore-coming worldwide instabilities in physical supply due to the accelerating crude oil depletion. The adaptation required by us all will cause a new set of values to emerge. The old set would be of little guide to predicting the new. In the complex societies of the real world, time lags to-date have been, and are, such as to delay perception of

impending problems, and thus the development of new values. It is the job of politics to achieve this change.

- **Whether Queensland motorists are receiving the full benefit of the 8.534 cents per litre subsidy; the efficiency of administration for the bulk end users scheme.**

I have not seen any evidence that the subsidy is not available at the pump. The efficiency of any administration dispensing cash is normally dependent upon the level of corruption allowed to be practised in the process.

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Future Fuels 2005 Published by the Energy Institute UK
D J Fisk: The economic value of conserving energy J Inst F. Dec 1978 pages 187-190

Appendix

I have below made a few comments regarding ways we might use in understanding the changes happening.

Risk Assessment of the economic effects of rapid changes in Petrol and Diesel pricing and those changes associated with Peak Oil effects on supply stability.

Financial systems models, through network analysis of inputs and expenditures, exist in the Qld Treasury to indicate the expected changes in Queensland's economic activity that rapid cost increases in any of the critical network elements bring about. Physical energy input and associated financial data also exists in great detail and thus changes to the state's economy due to rapidly rising fuel prices, would have already indicated some economic and energetic functional sectors as being at higher risk than others. Transport, especially air transport which involves a particularly high-energy subsidy, is of interest here.

Whilst the Queensland Treasury level of interest would automatically be more with the effects upon Government revenue than with other issues such as social dislocation, political disharmony etc, others within Government and the community believe that these issues are as important and should be explored.

A further, most important point about Peak Oil effects; is that, for the first time, the question of continuing long-term reductions in the physical supply of natural Petroleum derived products needs to be considered. The timescale of current economic decision-making is now much longer than the timescales over which substantial supply constraints are expected to develop.

It has been argued elsewhere, a useful tool for initially predicting these effects is for the re-casting of the economic (financial) networks in terms of energy equivalence. These can give indications of the effects of supply constraints. Again, much of the data is available to give valuable insights into the relationships between production intensity and energy intensity of various Queensland economic activities.

Risk management of the above situations.

Whilst the State Government has the ability to legislate or re-activate previous legislation in the controlling and directing the physical use of critical resources for the benefit of Queenslanders as a whole, it is unlikely this will be seen to be necessary in the near term for mined petroleum-based fuels. As a matter of policy, however, it is likely that the State Government will require that these fuels be used always in a way that gives maximum long-term benefit to all Queenslanders. This has as its main aim, the endeavour to prolong the life of this existing high-intensity energy resource base. Such prolongation, allowing much higher cost substitutes to be developed carefully together with their use values, and thus avoiding crash programs, will be necessary as well as prudent in the near future.

I have included comments upon the existing fuel subsidy.

Existing Petrol and Diesel Fuel Subsidy Queensland State Government.

The average result of this scheme is that the price charged to consumers at the pump is a reduction of 8+cents per litre. The cost to the Queensland State budget is believed to be several hundred million dollars per annum. As the result of the subsidy is seen at the pump, it is sometimes difficult to see the subsidy's effect, as the pump price varies considerably dependent upon the distance of the pump from the refinery gate (i.e. where the Commonwealth levies its Excise Duty.)

The subsidy is iniquitous for a number of reasons:
One is that people who never buy fuel in their lives contribute to the subsidy through Queensland State Taxes, presumably on the basis because they live in Queensland they benefit in some way. These benefits have never been spelt out. This is very applicable to people in regional Queensland.

Again, the subsidy has less of a benefit in much of regional Queensland, outside of the SEQ metropolitan region, especially for those who can't pass these costs on as Commonwealth tax deductions, and who in general have much larger individual consumptions due to distance constraints and lack of public transport infrastructure.

Then again, it skews investment decisions regarding fuel-using appliances in favour of low capital and high operational costs (leading to rapid resource depletion)

On the basis of equity, the subsidy could be removed from the metropolitan areas, such as SEQ, without any economic effect, the revenue saved being used for the development of Regional Queensland public transport services. Much of the SEQ has been provided with public transport at a great and continuing level of subsidy, many hundreds of millions of dollars per year. This public transport infrastructure makes untenable the social behaviour of many of those living in SEQ who continue their private discretionary travel past the point of their first access to the public transport network and who demand further expensive road infrastructure development to cater for this behaviour.

D J FISK MA PhD*

The economic value of conserving energy†

The true economic value of conserving a unit of energy from a finite reserve is normally greater than the cost of extraction and delivery to consumers. Where a difference occurs the appropriate marginal costs of fuels should be used in preference to average costs or consumer fuel prices in cost-effectiveness calculations from a national resource point of view. A simple example is examined to show how the numerical difference between marginal cost and average cost arises when considering the exhaustion of a finite resource. The marginal cost is shown to exceed the average cost, demonstrating that use of the average cost tends to undervalue energy conservation

1. List of symbols

- Q total fossil fuel reserve at time $t = 0$, measured in units of energy
- C_1 cost of extraction and delivery of fossil fuel per unit of energy
- C_2 cost of production and delivery of substitute fuel per unit of energy
- $\dot{q}$ rate of consumption of fossil fuel reserve in units of power
- T time remaining until exhaustion of fossil fuel reserve
- i discount rate (as a fraction)
- ρ natural logarithm of $(1 + i)$
- μ marginal cost of consuming energy at time t, per unit of energy
- $\bar{\mu}$ average cost of consuming energy at time t, per unit of energy
- M lifetime of project
- K initial cost of project
- $\dot{s}$ rate of fuel savings arising from project

2. Introduction

When analysing the cost-effectiveness of energy conservation measures from a national point of view it is customary to use the unit price of fuel to represent the economic value of the energy saved. This is more often done because it is the only hard figure generally available for calculation, than because it is thought convincingly representative of the true value of conserving a unit of energy.

Investment theory states that for the optimal investment, the cost of the last conservation measure undertaken should equal the cost which would otherwise have been incurred in providing the units of fuel saved. The cost of these units of fuel is the cost of the last units produced—the so-called marginal cost—which will not necessarily equal the average unit cost of the total fuel production. It is thus vital to use the marginal resource cost of energy when it differs from price in an appraisal of an energy conservation measure made from the national point of view. Unfortunately, the marginal costs of fuels are not generally available to those who require them for the calculation of the cost-effectiveness of energy conservation measures. The detailed calculation of the marginal costs of particular fuels is a matter of considerable complexity requiring data and insight normally only in the possession of the individual fuel industries concerned. However, much insight into the importance of marginal costs can be obtained from a simple example. This is largely an extension of the case discussed by Posner.[1] A general review of the valuation of finite energy reserves is given by Solow.[2]

3. Analysis

Consider a fossil fuel reserve containing Q units of energy at $t = 0$. This reserve is assumed to cost C_1 per unit of energy for extraction and delivery to the final user. When this resource is exhausted a 'backstop' technology will have to be brought on-line. This is assumed to cost C_2 per unit of energy for extraction and delivery. Since it is a 'backstop', C_2 is greater than C_1. Fuel 1 might be natural gas, for example, and fuel 2 might be synthetic gas. The rate of consumption of gas is $\dot{q}$ units of power. In this simple example, $\dot{q}$ is assumed price inelastic, and C_1 and C_2 independent of the rate of gas consumption. The present value of the cash stream is (written in continuous notation[3] for convenience)

$$PV = \int_0^T C_1\dot{q}(1+i)^{-t}\mathrm{d}t + \int_T^\infty C_2\dot{q}(1+i)^{-t}\mathrm{d}t \quad (1)$$

$$= \int_0^T C_1\dot{q}e^{-\rho t}\mathrm{d}t + \int_T^\infty C_2\dot{q}e^{-\rho t}\mathrm{d}t$$

where $T \equiv Q/\dot{q}$ and $e^\rho = (1 + i)$ where i is the discount rate. This simplifies to the sum of two terms, one arising from fuel 1

$$PV_1 = \dot{q}C_1(1 - e^{-\rho T})/\rho \quad (2)$$

and the other from fuel 2

$$PV_2 = \dot{q}C_2 e^{-\rho T}/\rho \quad (3)$$

Suppose now that $(\dot{q}\mathrm{d}t)$ extra units of energy are taken at time $t = 0$. This incurs an immediate extraction and delivery cost of $C_1(\dot{q}\mathrm{d}t)$. However, there is an additional cost incurred. The reserve will now last $(\mathrm{d}t)$ units of time less and fuel 2 will have to be brought 'on stream' $(\mathrm{d}t)$ units of time earlier. This increases the PV of the stream of costs. From (2) and (3), the cost of decreasing T by $(\mathrm{d}t)$ is

$$-\frac{\partial PV_1}{\partial T}\mathrm{d}t - \frac{\partial PV_2}{\partial T}\mathrm{d}t$$

$$= \dot{q}(C_2 - C_1)e^{-\rho T}\,\mathrm{d}t$$

The full marginal cost per unit of energy when there are T years of reserve remaining is then

$$\mu = C_1 + (C_2 - C_1)e^{-\rho T}$$

This marginal cost thus rises from C_1, when the fuel reserves are very large compared with consumption, to C_2 when the reserve is fully exhausted. The transition is exponential and smooth, and is a function of the discount rate. After exhaustion the marginal cost remains at C_2. This behaviour clearly signals ahead the impending cost of exhaustion of the reserve.

This is in contrast to the average cost $\bar{\mu}$ as normally defined. The average unit cost of energy after $t = T$ in

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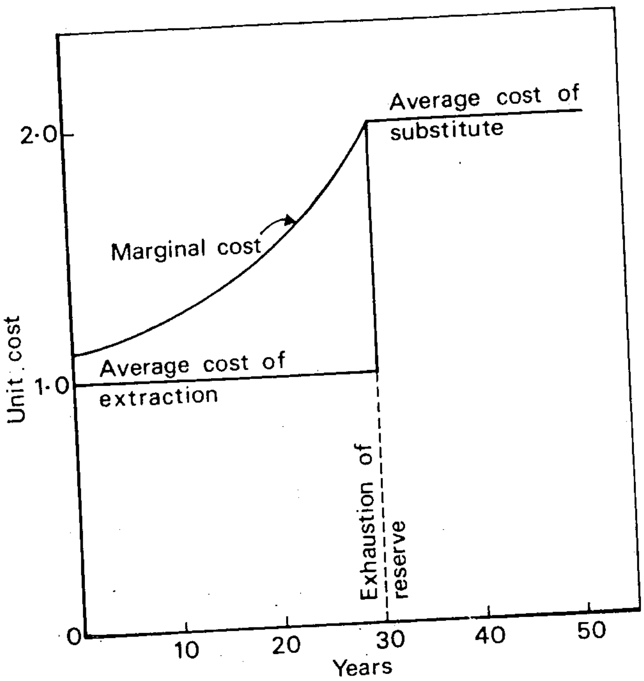

FIG. 1 Time variation of marginal unit cost and average unit cost for a fossil fuel reserve of 30 years with a substitute at twice its unit extraction cost. Discount rate 7%. Note that the marginal cost always exceeds the average cost

TABLE 1 Comparison of average and marginal unit costs

Time interval	$0 < t < Q/\dot{q}$	$t > Q/\dot{q}$
Marginal cost	$C_1 + [C_2 - C_1] \exp [- \rho((Q/\dot{q}) - t)]$	C_2
Average cost	C_1	C_2
$\frac{\text{Marg} - \text{Av}}{\text{Av}}$	$\left[\frac{C_2}{C_1} - 1\right] \exp \left[- \rho((Q/\dot{q}) - t)\right]$	0

the example is C_2, and since by definition of average cost

$$PV = \int_0^\infty \dot{q}\bar{\mu}(t)\mathrm{e}^{-\rho t}\mathrm{d}t$$

the average unit cost for $t < T$ is C_1. The average and marginal unit costs are compared in Table 1.

For a discount rate of 10% and a reserve of 30 years the excess of marginal over average cost represents only 6% of the cost difference $(C_2 - C_1)$. However ten years from the date of depletion, the marginal and average cost differ by 39% of the cost difference. The rate of discount employed has a very important bearing on this cost difference. For example, using a 7% discount rate gives 'surcharges' of 13% and 51% respectively. A graphical representation of these functions is given in Fig. 1 for $C_2/C_1 = 2$.

4. Short-run and long-run marginal cost

Whether the unit of energy costed is viewed as a single, isolated unit of extra consumption to which only 'unavoidable' costs are attributed (short-run marginal cost) as one extreme, or part of a marginal permanent change in demand (long-run marginal cost) as another, makes no difference in this particular example. In general when the demand at $t = 0$ has fulfilled the planning expectations of earlier periods so that the plant size and mix is still optimal, no difference is to be expected.[4] The subtleties of costing with a non-optimal mix are masked in this example by the use of single production costs C_1, C_2, which are assumed to have no fixed component.

When marginal cost pricing is being discussed the use of either long or short run (or any other 'run'[5]) can represent a vexed question, when non-optimal capital is employed. In terms of national resource appraisal of energy conservation, however, the issue of 'run' is somewhat academic because once the perturbation in demand associated with the conservation measure is determined, there is a unique incremental change in energy resources which can be associated with it. The longevity of many of the measures employed in buildings, does, of course, argue an incremental change of a long-run character.

The marginal savings in resources from a saving of a unit of energy per unit time (ie per unit of power) in this example is

$$\Delta PV = \int_0^\infty \mu(t)\mathrm{e}^{-\rho t}\,\mathrm{d}t$$

$$= \int_0^T C_1\,\mathrm{e}^{-\rho t}\,\mathrm{d}t + \int_T^\infty C_2\,\mathrm{e}^{-\rho t}\,\mathrm{d}t + T(C_2 - C_1)\mathrm{e}^{-\rho T}$$

$$= \int_0^\infty \bar{\mu}(t)\mathrm{e}^{-\rho t}\,\mathrm{d}t \qquad + T(C_2 - C_1)\mathrm{e}^{-\rho T}$$

The first term is the present value as calculated with the average cost and the second term is positive definite. As to be expected the present value of the energy savings is greater when the marginal cost in resources is taken into account than when an average cost formalism is used.

Although excess of marginal over average unit cost of energy increases as exhaustion is approached, the duration of that excess necessarily decreases. Thus the 'excess' in the marginal present value does not monotonically increase as exhaustion is reached but has a maximum somewhat earlier. By simple calculus it is easy to show that

$$\max\,[T(C_2 - C_1)\mathrm{e}^{-\rho T}] = \exp(-1)\,(C_2 - C_1)/\rho$$
$$0.368\,(C_2 - C_1)/\rho$$

which occurs when $T = 1/\rho$.

For a 10% discount rate the maximum error is about four times the cost difference $(C_2 - C_1)$ and occurs in the tenth year before reserve exhaustion. For a 7% discount rate the maximum error is five and a half times the cost difference $(C_2 - C_1)$ and occurs in the fourteenth year before reserve exhaustion. Table 2 gives as a numerical example the 7% discount rate case, with C_1 set at unity, and C_2 (which might, for example, be the cost of a technology to produce a synthetic substitute for the fossil fuel 1) set at 1.40.

The use of costs A to C rather than D would represent significant errors in the allocation of resources to energy

TABLE 2 Variation of present value of saving with different choices for cost

Cost used	Present value of unit saving ($T = 14$ years)
A Current average cost	14.78
B Average cost time profile	17.07
C Current marginal cost	17.07
D Marginal cost time profile	19.24

conservation. Even in the most favourable case C the failure to use marginal costs has resulted in a 13% bias against the acceptable net costs of an energy conservation measure. The variation of ΔPV over a range of values of T is given for this example in Fig. 2.

5. Cost-effectiveness calculations

Whether these changes are significant or not in a particular cost-effectiveness calculation will depend on circumstances. It will make the most difference to a project on the margin of acceptance, particularly to projects for which there is a high rate of increase of savings per unit of extra capital investment.

It would be a mistake to suppose that the principal changes would occur for projects of long life. To see this, consider the present value of fuel consumption for a project lasting M years

$$\sum_{n=1}^{n=M} (\text{cost of fuel in year } n)/(1+i)^n$$

$$= \int_0^M \dot{q}\mu e^{-\rho t}\, dt$$

$$= \int_0^M \dot{q}\mu e^{-\rho t}\, dt + M(C_2 - C_1)e^{-\rho T} \quad M \leqslant T$$

$$= \int_0^M \dot{q}\bar{\mu} e^{-\rho t}\, dt + T\ (C_2 - C_1)e^{-\rho T} \quad M > T$$

For a given T, the largest percentage change on using marginal rather than average costs occurs for projects for which $M \approx T$.

A second interesting issue arises if the internal rate of return (IRR) of a conservation measure is to be computed. The IRR is defined as that value of i for which the net present value of the measure is zero. For a measure with an initial cost K and a rate of fuel savings $\dot{s}$, this means in the present nomenclature that the IRR is given by

$$IRR \equiv (e^{-\rho'} - 1)$$

where ρ' is such that

$$-K + \int_0^M \dot{s}\mu e^{-\rho' t}\, dt = 0$$

In solving this latter equation, circumstances will decide whether μ is taken as a function of ρ' or not. If the IRR of undertaking a package of energy conservation measures as opposed to an investment in supply is required, μ can be viewed as a function of ρ'. More frequently, however, it will be the IRR of alternative energy conservation measures that are of interest. Here it would be more appropriate to view μ as a function of a given 'background' discount rate and not a function of ρ'.

6. Costs and prices

It is to be emphasized that these cost schedules are illustrative and drawn from an example which does not represent all the complexities of either resource extraction economics (eg reference 6) or option appraisal under uncertainty (see reference 7). Nevertheless, there seems little reason to suppose that adding these complexities

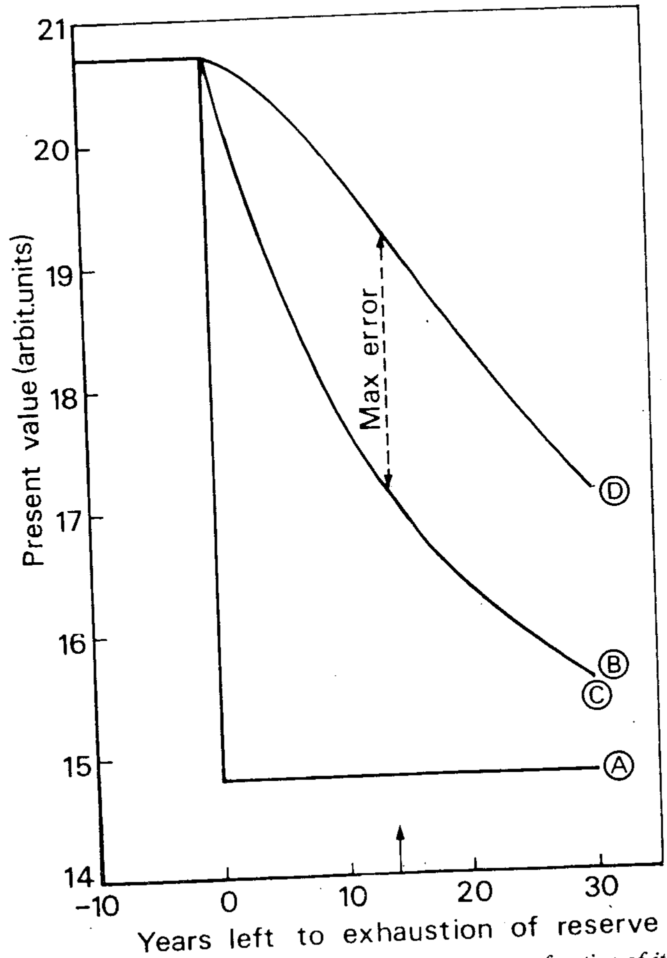

FIG. 2 Present value of a long lifetime project as a function of its starting date in relation to exhaustion date of fossil fuel reserve.
A using only the current average cost
B using the time dependent average cost
C using only the current marginal cost
D using the time dependent marginal cost
(C_2/C_1 = 1.40, discount rate 7%)

would change in any way the qualitative conclusion on the importance of using marginal rather than average resource costs in the analysis of the allocation of national resources.

It is also emphasized that resource costs, as such, have no direct relevance to the individual energy consumer for whom it is the prices charged that represent the basis for decisions. There is obviously a case based on the efficient allocation of resources for bringing prices and marginal costs into line throughout the economy, but it must be acknowledged that pricing policy involves more issues than just the efficient allocation of resources. The literature on this subject is extensive and it would be inappropriate to pursue the matter here, except to say that in a policy of energy conservation in buildings which relies on action by individual building owners, energy pricing and related fiscal matters represent very important components.

7. Conclusions

The resource costs of a fuel extracted from a finite source are of central importance to the discussion of the energy future. This applies particularly to the allocation of the correct resources to energy conservation. It has been shown by the use of a simple example, that the average cost of extraction and delivery of that fuel differs from the true marginal resource cost. The marginal resource cost was shown always to exceed this average cost, so that the use of the average cost in the economic appraisal of energy conservation always undervalues the savings and in general fails to allocate sufficient resources to conservation measures. It was also shown that this undervaluation occurs even for measures whose lifetime was shorter than the expected life of the finite energy source, and that the most significant changes in resource allocation, on changing to marginal costs, appear for measures in this category. The example serves to emphasize the importance of having estimates of the marginal resource cost of fuels for energy conservation appraisal from the national point of view, rather than using average costs or consumer prices.

8. Acknowledgments

The simple model of resource depletion on which this paper was based was originally suggested to the author by P Bakke. The work described forms part of t[h]e research programme of the Building Research Establis[h]ment and the paper is published by permission of t[h]e director.

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(*Paper received 6 January 1978*)

Addendum to Submission No 25
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November 29th 2005

Security of Supply

It would appear that not a great deal has been said of the fact there is now a significant excess of worldwide demand for crude oil over available supplies. Scenarios and prognosis of this situation, that is credibly irreversible, indicate rapidly increasing prices for the end user together with supply volume instability.
Recent analysis (March 2005) by BP Oil principals, indicates that worldwide investment in the exploration and production of crude oil, has since the year 2000 been increasing by 12% per year. (2004 was $ US 170 Billion). Other analysts suggest that there has been no appreciable increase in supply capability due to this increased investment.
There is increasing support for the view that beginning in 2008, world production will decrease by some 3% per year from approximately 84 million barrels per day, and this is likely to continue for a decade and a half at least. This decline is due to actual physical constraints on the extraction from known and predicted in ground reserves. Even if worldwide investment levels could be increased significantly, it is unlikely that production will be able to be improved.
World production in 2020 will be probably in the order of 54 Million Barrels per day. Inequities currently applicable in the distribution of crude oil will be therefore severely exacerbated. Voluntary substantial reductions in use by the developed world economies have to date attracted little attention Imposed solutions must be seen to be seen to be possible by diplomacy (sanctions), economics (price fixing) or aggressions. Currently the world’s two largest nation states, both equipped with powerful military capabilities and having 44% of the world’s population, have access to some 10% of the current world’s production of crude oil. It is difficult to see how this state of affairs will be allowed to continue in an era of reducing supply.

Australia and the concept of voluntary reduction in the use of petroleum fuels.

Whilst it may be thought that action at a Federal level should be the preferred response can a State Government possibly initiate such a concept and form an action plan?
Currently the Queensland Government has control over vehicle registration fees and the rates are presently structured to reflect power consumption only. A restructuring of these rates with zero registration fees being levied for vehicles equipped with low fuel use hybrid engines together with additional charges for the remainder of vehicles above a base km travelled per annum would provide a platform for attempting to reduce transport petroleum based fuel use to approximately a third of present consumption within the next 15 years. This will give a defensible morality to Australians as serious world citizens. The revenue raised should be used to expedite the changes and mitigate job mobility and training needs.
This 60% reduction can be achieved if hybrid technology especially is comprehensively introduced across the whole transport mix over the next decade and a half. Second stage hybrid technology now in production has reduced fuel use to 25% of the current Australian litres per 100 km figure.
The Queensland Government could also initiate the siting of a major hybrid vehicle manufacturing facility in Queensland with the correct blend of incentives to the current leaders in this technology. It has been estimated that at least 100 major new hybrid technology plants will be required worldwide within the next decade.
Ref Energy World Pages 16/17 August 2005.