

## **Towards an Energy RD&D Policy for Australia**

Comments on the Discussion Paper prepared by the National Committee on  
Fuels and Energy

National Committee on Transport

April 2004

## 1. Introduction

The National Committee on Transport (NCTR) has a strong interest in energy issues because of the current high degree of dependence of almost all modes of transport on fossil fuels.

In general we feel that rail and sea transport will have least difficulty in coping with a transition to another principal source of fuel, that road transport faces a future where there will be more vehicles (both cars and trucks) operating than today but there will be evolution in vehicle design, and that aviation faces the greatest fuel difficulties.

We raise three main points with the recommendations of the National Committee on Fuels and Energy (NCF&E) for Research, Development and Demonstration.

- They are focussed on supply technology and overlook demand management options.
- There is no quantified background against which to evaluate the recommendations.
- The urgency of the fuel problem facing transport is not recognised.

## 2. NCTR issues

NCTR has recently identified five current issues which it considers to be of paramount importance for the future of Australian transport, and is preparing initial position papers on all of them. The current drafts can be inspected on our web site <http://www.nctr.org.au>.

Energy-related issues raised by the papers include those shown below.

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Road safety               | There are no energy-related issues in the road safety position paper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Changing travel behaviour | <p>The trend in private car use is unsustainable. Seven recommendations are made towards the effective management of demand. They include:</p> <ul style="list-style-type: none"><li>▪ recognising that current activities are not likely to achieve the set objectives;</li><li>▪ education and promotion to broaden understanding of the problem;</li><li>▪ providing a better public transport system;</li><li>▪ providing better cycle and pedestrian facilities; and</li><li>▪ reviewing pricing structures (public and private)</li></ul> |

Infrastructure funding

This paper summarises the Engineers Australia response to the “AusLink” Green Paper on the funding of land transport infrastructure.

Recommendations made include:

- Federal Government should undertake a case study applying its approach to sustainability, because it is far from clear from the Green Paper what it is.
- The energy profile should be adopted as a key tool in assessing options for projects. This should be based on whole-of-life energy consumption for both the infrastructure project and the vehicles using it. There should also be a corresponding statement of the energy "benefits", which would essentially be the mass-distance of payloads moved.
- The Commonwealth Government should assess the skilling needs implicit in the *AusLink* proposals. It should then promote the development of technical courses for professionals to acquire these skills. (This echoes the NCF&E's recommendation for developing greater R&D skills in the energy sector).
- Forecasts of road freight growth should be re-visited with a sustainability orientation, to probe why such high growth rates are expected, what sort of goods are involved and how well demand management alternatives might perform in sustainability terms. In particular, freight pricing policies should reflect the cost of infrastructure provision and externalities. This may result in significant changes to the comparative cost of each transport means.
- The holistic approach envisaged for AusLink assessment methodology should include cross-sectoral costs and benefits, including those between the energy and transport sectors.

Infrastructure condition

More than \$30 billion is needed to make our existing road systems “fit for purpose”, and another \$30 billion for rail. This compares with the \$30 billion investment the electricity industry is said to need for its infrastructure.

Ten recommended policy directions are described. They include:

- Taxation and fiscal policy instruments should encourage sustainable transport.
- There is a strong case for increased investment in transport infrastructure that is more sustainable and less greenhouse gas intensive. Where market

- forces fail, government should intervene.
- More holistic approaches that integrate considerations of impacts on health, sustainability and greenhouse gas emissions into transport decisions are needed.
- There is a need for research to support cleaner transport fuels and technologies along with transport pricing, economics and demand management technologies (including Intelligent Transport Systems).

Environment & public health

Environmental impacts are noted at macro-, meso- and micro scales. Resource depletion is identified as one of the macro scale impacts of transport.

At the macro level, the effects are more an issue of energy efficiency and should be tackled by giving greater emphasis to improving modal energy efficiency and where possible some shifting of demand to the more efficient transport modes of rail and urban public transport.

The concept of “sustainability” is open to many different interpretations.

The ten recommended directions include:

- Vehicles that are bigger than necessary for the task in hand are wasteful of energy.
- Current pricing and charging settings for transport are not immutable.
- Movement of goods and services is an important part of the transport task.
- The community should be aware of environmental and health issues associated with transport and individuals should accept personal responsibility for their actions.
- A holistic systems view when planning would need to consider energy requirements as well as financial requirements.

### **3 A broad approach needed**

During 1999-2002 the Warren Centre for Advanced Engineering at Sydney University conducted a research program called “Sustainable Transport in Sustainable Cities”. This has garnered much acclaim, including the Bradfield Prize from the Sydney Division of Engineers Australia and a National Excellence Award in 2003. The Warren Centre’s work developed six themes, which show that concentration on technology and supply issues alone would

be a limited approach. NCTR believes that a similar broad approach to energy issues is now needed. The six themes were:

- engaging the community;
- monitoring and reporting on transport performance;
- optimising the performance of what we have;
- modifying the shape of the city (with Sydney used as a case study);
- introducing better planning, pricing, funding, new technology and infrastructure; and
- lowering barriers to change.

#### 4. Comments on the text of the draft RD & D Policy

##### 4.1 Setting the Scene

The NCF&E expresses concern about the absence of any documented strategy to “address Australia’s future long-term energy supply and demand” – but it then says a lot itself about supply and nothing significant about demand.

The draft policy lacks any quantitative context, which makes it difficult for the non-specialist to appreciate the relevance of the discussion and the recommendations. A simple table such as the one shown in concept below would be very useful in providing a quantified context. If such a table cannot readily be produced by NCF&E from existing information then the RD&D policy really should recommend its development as a high priority.

**CONCEPT TABLE : SOURCES AND APPLICATIONS OF ENERGY IN AUSTRALIA** (for the most recent year for which data is available)

| ENERGY                                   | UNITS      | FUELS          |                |                |                    |                |
|------------------------------------------|------------|----------------|----------------|----------------|--------------------|----------------|
|                                          |            | Coal           | Oil            | Gas            | Other <sup>1</sup> | Renewables     |
| <b>SOURCES</b>                           |            |                |                |                |                    |                |
| Annual national fuel production          | Gtonnes/yr | P <sub>1</sub> | P <sub>2</sub> | P <sub>3</sub> | P <sub>4</sub>     | n/a            |
| Efficiency of use                        | %          | e <sub>1</sub> | e <sub>2</sub> | e <sub>3</sub> | e <sub>4</sub>     | e <sub>5</sub> |
| Annual usable national energy production | Gjoules/Yr | E <sub>1</sub> | E <sub>2</sub> | E <sub>3</sub> | E <sub>4</sub>     | E <sub>5</sub> |
| Reserves at current production rate      | years      | R <sub>1</sub> | R <sub>2</sub> | R <sub>3</sub> | R <sub>4</sub>     | n/a            |
| <b>APPLICATIONS</b>                      |            |                |                |                |                    |                |
| Industry                                 | %          | ..             | ..             | ..             | ..                 | ..             |
| Buildings (ie domestic, commercial use)  | %          | ..             | ..             | ..             | ..                 | ..             |
| Transport                                | %          | ..             | ..             | ..             | ..                 | ..             |
| Other                                    | %          | ..             | ..             | ..             | ..                 | ..             |
| Imports/Exports <sup>2</sup>             | %          | ..             | ..             | ..             | ..                 | ..             |
| Total                                    | 100%       | 100%           | 100%           | 100%           | 100%               | 100%           |

<sup>1</sup> Specify what they are – eg uranium?

<sup>2</sup> As % of national production – exports +ve, imports –ve

The NCF&E notes a lack of national consensus on what sustainability means – fuel/energy is not the only sector where this applies – but then feels confident enough that it understands sustainability to assert that “sustainability

requires us to expand future energy options". NCTR does not necessarily disagree with this but wonders what the NCF&E think sustainability involves.

Transport is an end user of energy. In 1998 the Chartered Institute of Transport (CIT) held a National Symposium "Beyond Oil", which greatly alarmed all those who attended. The CIT is a very conservative body yet felt impelled to issue a forthright "outcomes statement", which is appended (Appendix A).

Many observers believe that the Age of Hydrogen will succeed the Age of Oil. In May 2003 the Federal Government mounted an international conference on the "Hydrogen Economy". Virtually all the participants were committed to the concept of "the Age of Hydrogen", and may not have been over-concerned about the following observations:

- There are immense technical challenges to be resolved, not least in bringing the cost of hydrogen to the user down to about one tenth of its present level;
- The answer to the two currently competing lobby groups for Australia's hydrogen future (hydrogen from tidal power in NW Australia, versus hydrogen from gasified coal in SE Australia) may well be "neither of you"; and
- Most of the commercial R&D funding comes from energy suppliers and/or the automotive industry, neither of whom have much interest in reducing energy consumption through demand management.

#### **4.2 Setting National Strategic Directions**

NCTR supports the call for scenario planning with a 50-year time horizon, rather than the more conventional 20 or 25. We are concerned that the future availability of appropriate fuel is usually just assumed in all long-term transport scenarios.

However NCTR also agrees with the need for more action by 2020. In fact, in view of the likely timescale for transport difficulties, we feel that transport RD&D is urgent and more should be done by 2010.

#### **4.3. Innovations for the Transitional Period – 2003-2020**

Among the challenges that NCF&E notes are that:

- initiatives to make inroads on demand are failing to have impact
- Australia has a heavy dependence on road transport

NCTR feels that the discussion paper in general, and in particular Section 3.1, "Challenges for 2003 to 2020", needs to give much more attention to liquid fuels. Forecasts of oil at a mere \$US21 per barrel in 2008-2010 (from ABARE and IEA) should be questioned, as well as expectations that hydrogen will be an energy efficient fuel for motor vehicles.

The fuel efficiency of new cars coming to market continues to improve, which would be expected to reduce the fuel consumption of the fleet. However the Bureau of Transport and Regional Economics (BTRE) has found that a 45 percent decrease in average fuel consumption per maximum power output over the past 20 years in Australia has been largely offset by increases in both the average weight and power of new vehicles, “due, in part, to the growing popularity of both 4WD passenger vehicles and heavier vehicles in the light commercial category. The net result, in line with overseas experience, is an improvement in the average fuel efficiency of the new light vehicles over the past 20 years of around 10 percent”. (Greenhouse Policy Options for Transport, BTRE Report 105, 2002). This is a good example of technological improvements on the supply side not having a commensurate end-result on the demand side.

NCF&E recommends developing alternative fuels (CNG, LPG etc) and technologies (hybrid cars, fuel cells etc) for niche transport markets, but does not address the rising demand for fuel from the mainstream transport market, particularly when supply must be sourced from a probably shrinking global market with demand growing fast from large developing countries (eg China).

From a transport perspective, improvements to the mass fleet rather than some niche portion would have a greater impact.

In Table 1 of the draft RD&D policy, Australian R&D which can contribute to major international technology developments is considered to include “advanced transport vehicles”. This perhaps means “advanced conventional transport vehicles”. We find it disappointing that the only new concept for urban transport developed in Australia in the last fifteen years (the Austrans people-mover, designed by Bishop Austrans: we neither endorse nor dismiss this concept) has failed to attract any significant interest either in Australia or overseas. The market seems more interested in the improvement of the familiar than in innovation.

“Advanced transport vehicles” are anyway a niche and there might well be more effective ways of investing in improving the energy efficiency of the transport sector.

The NCTR feels that transport needs more emphasis in the report. The Institution of Engineers Australia has already devoted considerable effort to transport energy issues. In particular, in 1999 the Sustainable Energy Transport Taskforce produced a report “Sustainable Transport: Responding to the Challenge”. NCTR urges NCF&E to give more recognition to this work and in particular to its recommendations, with which the NCTR’s developing positions noted in Section 2 are compatible. In February 2003 the National Council endorsed a transport policy based on the recommendations of this Taskforce, which are appended (Appendix B).

Engineers Australia is also producing “Report Cards” on national and state infrastructure for energy, transport, water, communications and so on.

Some of the 24 areas in Table 1 of the RD&D draft policy are very broad. Does NCF&E think that money should be invested across all areas listed in Table 1, or that some further targeting is worthwhile?

#### **4.4 R & D – Securing Investment**

The statement that ...

*One of the results of the energy industry's deregulation and increased competitiveness has been the loss of experienced industry personnel and a lack of new entrants to the industry. There is an immediate need to train replacements. Some of those displaced continue to provide consultancy services to the industry and research organisations but many are now at or near retirement age.*

... is unfortunately true for the transport industry too.

We note that CSIRO is identified as one of the few groups investing in energy R&D in areas other than coal. CSIRO is actively pursuing ITS ("Intelligent Transport Systems") as a route to greater fuel efficiencies, and CSIRO's actual activity under its "Energy Flagship" program is unrecognisable from NCF&E's potted description of it. We presume CSIRO will itself respond on this point.

NCTR finds it curious that Section 4 does not refer to the good work done by the former Energy Research and Development Corporation (or its predecessor NERDDC), nor offer a view on the desirability of re-establishing ERDC.

Two of the points made at the end of the section are particularly relevant to transport.

*Energy is cheap, there is little incentive to change.* This points to the importance of price as a demand management measure. At the beginning of 2004 a litre of petrol cost, in euros or equivalent in local currency, 1.13 in the Netherlands, 1.09 in the UK, 0.99 in France, 0.80 in Poland, 0.58 in Australia and 0.33 in the US. The main difference is governmental taxation policies.

*There is no co-ordinated industry body to encourage adoption of new transport technologies.* True – federal government tends to rely on the private sector to respond to commercial opportunities and otherwise to repeat regularly that urban transport is a State responsibility, not a federal one. 80% of Australians live in settlements of 25,000 people or more. A greater degree of federal interest in the urban transport sector is required before any progress will be made.

## 4.5 The Recommendations

NCTR feels that there is a lack of basic information about national fuel and energy use in the draft policy document and, if this cannot be remedied from existing sources, then its production should be a recommendation with equal or higher priority to the current draft recommendations. Alternatively this could be included in Recommendation 1b, giving more direction to the modeling, because the development of scenarios should include a “base case”.

NCF&E’s view that it is important to reduce the increased use of energy is supported by NCTR. This warrants a separate recommendation, as does applying a full “polluter pays” principle (as adopted in Europe) to the use of all forms of energy. There is also a need to tie in energy policy with Greenhouse Gas abatement (going beyond the carbon dioxide sinks cited in Section 3.2, page 8).

“The development of energy scenarios” is surely an input to a modelling process, not a product of it. The modelling should be capable of assessing the performance of energy scenarios in terms relevant to the priorities set out in the Innovation Statement, via:

- sustainability measures
- public health measures
- industrial growth potential measures
- security measures

and testing the sensitivity of this performance to interventions of various kinds, including those aimed at demand modification.

The proposed “concept table”, if used to summarise future scenarios, would contain indicators relevant to three of these four issues, and its extension to include a public health indicator would render it comprehensive – something like “volume of waste products” in Gigatonnes per year.

NCTR support recommendations 2 and 3, as more money invested in RD&D should help to inform Energy policy.

## 5. Summary

In general, we feel that the NCF&E paper is not forceful or comprehensive enough to bring about an increase in the current level of energy RD&D investment or to diminish the force of the energy crisis with which the transport sector will have to contend before long.

## **APPENDIX A: MEDIA RELEASE**

### **The Chartered Institute of Transport in Australia Inc**

#### **1998 National Symposium "Beyond Oil: Transport and Fuel for the Future"**

##### **Statement of Outcomes**

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The Chartered Institute of Transport in Australia Inc. has just hosted a highly successful national symposium on the future of fuel in transport. The symposium titled "Beyond Oil: Transport and Fuel for the Future" was held in Launceston, Tasmania and was attended by almost 100 delegates from all states and territories. The following statement of outcomes was drafted at the conclusion of the Symposium.

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We are at the climax of the fossil fuel age. The Chartered Institute of Transport in Australia draws attention to this fact following its 1998 national symposium "Beyond Oil: Transport and Fuel for the Future". Unlimited use of our greatest ever source of cheap energy may soon contract and the "Petroleum Age" in which we live can now be seen to be approaching an eventual end.

The symposium heard that a clear consensus is emerging that cheap oil production outside the Middle East will begin permanent decline around the year 2000, to be followed by permanent world decline within 15 years.

We have reached a crucial stage in the development of our local, national and international transport services. Our present path is leading us into potentially serious economic, social and environmental problems. New directions are needed for our future transport fuels and vehicles. "More of the same" in our current transport plans and ways of thinking is no longer tenable.

The unlimited use of cheap oil that has characterised this century will end and we will be faced with one of the greatest transformations of human affairs. The signs are already there. Risk of chaos, disorder and conflict will arise unless we face up to this great challenge and make the difficult decisions essential to the future well being of us all. These decisions must be based on the care of people and of the environment if we are to proceed down the path of constructive change.

Congestion, pollution and diminishing oil supplies are the central drivers of this change. Communities across the world are increasingly going to be faced with the need to revise their transport systems in response to these drivers. Congestion and pollution are already major factors in some cities - the diminishing fuel supplies will increasingly become apparent as the next century progresses.

Should self interest predominate, we could become locked in conflict, unable to adapt and with the likelihood that we will dissipate unproductively the

scarce high quality petroleum fuels so essential to a safe transformation to a world "beyond oil".

The participants in the symposium workshops identified the following key issues:

- key factors affecting oil based transport are congestion, pollution and oil supply;
- the real cost of transport is going to increase and must be considered as a major factor in setting the economic agenda for the 21<sup>st</sup> century;
- the need for Government to support the introduction of viable alternative fuels, more efficient vehicles and alternative transport systems which are environmentally acceptable and fuel efficient;
- the need for greater transport industry and public awareness of the need to prepare for the decline and end of the "Petroleum Age";
- it is essential that care of people and of the environment be recognised as the principal standards for addressing these issues.

To assist the development of constructive change in response to these issues, the Chartered Institute of Transport, the professional body of transport managers in Australia, calls for the development of greater understanding and awareness of these crucial issues and for their consideration in all policy formulation and decision making relative to the future of transport and fuel in Australia.

The CITIA sees a need to communicate this message particularly within the transport industry, and seeks co-operation from the oil industry and others in its efforts to draw attention to the great challenge which confronts us all.

**ENDS 13/11/98**

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**APPENDIX B: Recommendations in “Sustainable Transport: Responding to the Challenges”, the Sustainable Energy Transport Taskforce Report, IEAust, November 1999.**

1. Taxation and fiscal policy instruments should encourage sustainable transport.

2a. There is a strong case for increased investment in transport infrastructure that offers the opportunity to develop a transport system that is integrated, more sustainable and less greenhouse gas intensive.

2b. The market is the appropriate mechanism to allocate resources between individual transport modes, but where market forces fail to deliver environmental and social objectives governments should intervene.

3. More holistic approaches that integrate environmental considerations into transport policy, planning and investment decisions are needed. They should go beyond current Commonwealth and State and Territory environmental impact evaluations in order to examine wider impacts on health, sustainability and greenhouse gas emissions.

4a. There is a need for industry, innovation and research and development policies and commitments to support the development of cleaner transport fuels and technologies.

4b. Additionally, there is a need for research into transport pricing, economics and demand-management technologies.

(Some 22 sub-recommendations were also made).