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Attention

The Secretary
The Committee for
Inquiry into the Regulatory Arrangements for
Trading in Greenhouse Gas Emissions
Parliament House
Canberra

12th March 1998

Commentary on Reducing and Accounting for Greenhouse Gas Emissions

Attached is a summary of a detailed commentary prepared by Isentropic Systems Ltd for submission to the House of Representatives Standing Committee on Environment Recreation and the Arts "inquiry into the Regulatory arrangements for Trading in Greenhouse Gas Emissions" (The Committee).

The comments represent a summary of Isentropic's views on assessment and control of greenhouse gas emissions and views already expressed by Isentropic in correspondence and discussions with State Government and Federal Government specialists, in published papers and correspondence with various companies and organisations.

The comments show that the largest and most cost effective reduction in Australia's greenhouse gas emissions, for the next decades, will probably lie in Australian-developed and world-leading, commercial systems for the utilisation and elimination of methane emissions from landfill and underground coal mines. This technology, alone, has the potential to enable the Australia's coal and power generation industries' compliance with emissions reductions required under the 1998 Kobe Protocol.

Unfortunately the recording of Australia's current methane emissions, and the methodology currently used to assess the benefits to Australia of reductions in methane emissions, are questionable in that they do not allow Australia to gain the early, major benefits of reducing methane emissions. It is important that The Committee ensure that Federal Government rules on registering and possible trading in emissions and emissions reductions use assessment procedures which accord with IPCC guidelines and favour rather than penalise Australia.

In addition to correctly accounting for and crediting methane emission reductions the attached comments emphasises the need to fully and correctly account for other known greenhouse gas emissions. The full credit for reductions in lesser-known, but very important, emissions will also be of importance to Australia.

The comments also cover-

- Coal waste greenhouse gas emissions
- Problems with use of SO₂ Trading procedures for CO₂
- Federal and NSW Greenhouse Gas Inventory methodology
- Deficiencies in current NEMMCO power trading rules
- The Relevance of NSW SEDA Guidelines
- Rules to Enable Early Reduction of Greenhouse Gas Emissions

If The Committee or its individual members wishes we would be pleased to supply further and more comprehensive detail on specific aspects of our submission and or make a presentation to The Committee and answer any questions raised by The Committee.

Yours sincerely
for Isentropic Systems Ltd

D Ray Cummings
(Director)

Commentary on Reducing and Accounting for
Greenhouse Gas Emissions

prepared for

The Committee for the Inquiry into the Regulatory
Arrangements for Trading in Greenhouse gas Emissions

SUMMARY

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March 1998

Background

Isentropic Systems Ltd's interests and expertise is centred on the development and commercialisation of systems for-

- advanced waste methane utilisation systems
- advanced coal gasification and low emission combustor systems
- high efficiency Integrated Coal Gasification and Solar systems.

In developing these systems Isentropic has rigorously checked emissions reduction benefits of the processes and in doing so has identified significant omissions and inaccuracies in current assessment procedures for greenhouse gas emissions.

Australian Technology

New and Australian-developed technologies will enable Australia to achieve cost-effective reductions in emissions, if accurate inventories, rigorous assessment procedures, waste gas access and trading rules are specified by The Committee.

Is Federal Government Empowered to Control Greenhouse Emission ?

In preparing this report Isentropic has assumed that greenhouse gas production and emissions to the atmosphere could be controlled by the Federal Government by suitable and appropriate legislation. For example, it may be possible for the Federal Government to regard greenhouse gas emissions as an international export operation and therefore subject to the approval and control of Federal Government.

The Current Emphasis on Carbon Dioxide

The greenhouse gas debate and ABARE predictions have concentrated on well publicised carbon dioxide emissions, such as power stations, major industries and transport, and has overlooked some of the best, new and some Australian-developed means to utilise coal with major reductions in greenhouse emissions. There is also a distinct lack of readily available, accurate data on and allocation of emissions of other major sources of carbon dioxide such as natural gas scrubbing and venting, decomposition of coal wastes, biomass and the like.

Methane Emissions

There is a lack of attention to and a poor understanding of the magnitude of methane emissions and an apparent lack of accurate and comprehensive data on methane emissions from landfill and coal mining activities. Current NSW and Federal greenhouse gas inventories for methane emissions appear to be incorrect and whilst ABARE has been informed of Australian technology and existing waste methane-based plant MENSA modelling excludes methane emission assessments.

Methane is a major greenhouse gas, its concentration in the atmosphere [1.5 ppm] is much less than that of carbon dioxide [360 ppm] but its emissivity and Global Warming Potential [GWP] is much higher than that of carbon dioxide.

Methane Emissions continued

Whilst carbon dioxide takes about 100 years to be absorbed from the atmosphere in biomass and ocean reactions, methane oxidises and disappears rapidly and the full benefit of stopping an emission is gained in 12-15 years making the evaluation of stopping methane emissions versus stopping carbon dioxide emissions, more complex than the early approach of taking a simple, universal 100 year evaluation period. It is now known that early International Panel on Climate Control (IPCC) assessment procedures undervalued the benefits of reducing methane emissions.

In 1994 published GWP figures for methane relative to carbon dioxide for 20 and 100 year evaluation horizons. The 1996 review of these figures shows:-

Methane's GWP	20 years	100 years
Evaluation Horizon		
wt CO₂ per wt of CH₄	56	23

- ie. The benefit of stopping the emission of 1 tonne of methane gained within 20 years is equivalent to stopping the emission of 56 tonnes of carbon dioxide

On page-26 Section 9 in the 1994 IPCC report "Radiative Forcing of Climate Change" Para "Global Warming Potential-a tool for policy makers" defines the GWP for gases over different time horizons for gases, and states that ***"the choice of time horizon will depend on policy considerations"***.

Australia has developed world-leading expertise in use and elimination of coal mine and landfill gases and about 150 MW of waste methane-based power is already installed in Australia. Australia can obtain major emissions reduction credits from the use of this technology and the use of a shorter ie. 20 year horizon for assessing the benefits of such emissions reductions.

Increasing the current 150 MW of waste methane-based power generation to 300 MW by the installation of an additional 150 MW of latest Australian-developed waste methane-based generation plant will reduce Australian greenhouse emissions equivalent to eliminating almost 30 million tonnes per year of CO₂ emissions, using permitted 20 year "horizon" for methane emission reductions. This is equivalent to shutting down about 6,000 MW of existing 54% load factor, black coal-fired power plant and will cut Australia's total coal-based power emissions by about 22%.

Isentropic proposes that The Committee recommend the option of using shorter ie. 20 year horizons for assessing the emissions reduction benefits of waste methane-based power plant (as permitted under IPCC assessment procedures).

Whilst ABARE has been briefed on and is aware of existing and newer versions of Australian-developed waste methane-based power generation the ABARE MENSA model, as of late 1997, had not been modified to include waste methane-based technologies or their significant cost-effective emissions reduction potential.

Methane Emissions continued

Waste-methane-based Power is Superior to “Green” and “Sustainable” Systems

It is important to note that whilst most “green power” and “sustainable energy” systems (ie. solar, wind, hydro and biomass- based) power generation systems have, at best, ZERO greenhouse gas emissions, Australian-developed waste methane-based power plants provide EMISSIONS CREDITS. This is confirmed by the following comparison where-

Power generated by Australian-developed waste methane-based power generation systems (when compared with conventional coal-fired power plant) would reduce current greenhouse emissions by

**Eliminating
9.52 million tonnes
per year of CO₂
per 100MW generated**

Power generated by “sustainable” “renewable” or “green” power generation systems (when compared with conventional coal-fired power plant) would reduce current greenhouse emissions by

**Eliminating
0.75 million tonnes
per year of CO₂
per 100MW generated**

Despite emission reductions from waste methane-based power generation being about 12 times greater per unit of power generated than that from the “renewable” power generation systems, mandatory targets are being proposed for “renewable” sources of electricity but no target or goal is being set or support offered for the more effective and significantly more cost-effective waste methane-based power systems. This shows that the fundamental advantages of waste-based power generation are apparently not understood by Federal or State ministries.

Assessment of Emissions from Coal Washery Wastes

As carbon dioxide emissions are assessed over a 100 year horizon it would be advisable for The Committee to insist on assessment and allocation of emissions inventories for coal waste dumps. Allocating emission values for coal wastes would promote the recovery and use of coal wastes.

The avoidance of coal wastage should be a fixed objective of Federal Government as a means of conserving our finite fossil fuel resources. At present 12%(on an ash-free basis) of all coal mined in NSW is dumped. This source of energy, if used, could supply half NSW’s total electricity requirements.

Isentropic would propose that a 50% oxidation of coal waste be assumed until definitive studies indicate that an alternative figure be assumed. For a more rigorously determined emissions inventory figure Isentropic considers the most competent group to quantify the magnitude of coal waste greenhouse gas emissions is the CSIRO, Division of Coal and Energy Technology, North Ryde, NSW

Contact Jim Edwards or John Wright
Tel 02 9490 8950 or 02 9490 8973

Are SO₂ Emission Trading Rules a Sound Basis for Trading Greenhouse Emissions ?

Current US trading procedures for sulphur dioxide emissions within the USA are often cited as a model for trading in greenhouse gas emissions. The report prepared by the **Industry Commission** (Staff Research Paper) "**Framework for Greenhouse Emissions trading in Australia**" outlines the current US sulphur dioxide emission trading procedures and proposes that these procedures be used for trading Australian greenhouse gas emissions.

The Committee should note that there are fundamental differences in the costs and economic impact of SO₂ and CO₂ emissions in that the US had SO₂ emission limits and the cost of SO₂ control systems was known and had set high and low sulphur fuel price differentials before the US trading rules were instituted. Unlike SO₂ emissions, CO₂ emissions directly relate to the core business of most power utilities. It is probable that power utilities could exploit and circumvent SO₂ trading-type regulations if they were applied to CO₂ trading, without suitable modification.

Trading in CO₂ emissions should not be tonnes of CO₂ but MWhrs and tonnes of CO₂ liberated (say MWhrTonne units) to prevent utilities retaining permits by simply reducing power output and force emissions reductions per unit of power distributed.

It should be noted that current NEMMCO procedures for sales of power to and from the East Coast Australian Grid do not enable segregation of power supplies according to emission levels.

The NSW Greenhouse Gas Inventory Report Estimates for 1990 and 2000

This report is based on methods used in the Federal Governments provisional greenhouse emissions inventory. Isentropic considers that these guidelines are deficient for an Australian Greenhouse Gas Inventory in that it-

- Assumes no emissions are associated with coal waste dumps
- Did not institute rigorous accounting for methane emissions even though NSW coal mines are Australia's dominant source of coal mine emissions
- Did not address shorter (ie 20 yr) time horizons for methane even though NSW and Australia would benefit from its use.
- Inventory does not account for Cooper Basin sourced gas (unlike Bass St gas) venting CO₂ in its production and provides no incentive to simply reduce emissions by varying the source of natural gas.

The Relevance of SEDA Guidelines to The Committee's Possible Guidelines

SEDA's rules have been set in accordance with SEDA's interpretation of its own charter. Isentropic considers that these rules are deficient and inappropriate for determining the most suitable and effective Federal Government guidelines. Isentropic could provide a detailed note on the deficiencies it perceives in the SEDA guidelines and why they may not be compatible with Federal Government goals.

Isentropic considers that The Committee should consider

Rules to Enable Early, Low-cost Reduction of Greenhouse Gas Emissions and means for

- **Allocation of**
- **Access to and**
- **Responsibility for Reduction of Emissions**

The classic situation for companies specialising in the recovery and use of industrial wastes is that whilst the company wasting the resource generally has to pay for waste disposal, as soon as a specialist company determines a means whereby the waste can be turned into a useful product, the waste producer wants to charge for the waste and gain as much of the potential profit created by the specialist organisation. There are instances where this form of “commercial stand-off” has delayed beneficial projects by years and in some instances has “killed” what could have been an economically viable and environmentally beneficial project.

As the possible use and elimination of waste greenhouse gas emissions becomes more apparent there will, without doubt, be commercial conflict between emitters of greenhouse gases and the companies with innovative means to utilise these emissions. This conflict of interests, unless controlled, will cause delays and probably increase the cost of reducing greenhouse gas emissions. The Committee should consider formulation of some simple guidelines or rules on ownership, of and access to emissions to facilitate earliest emissions reductions at minimal cost.

Probably one of the most enlightened Federal government policies which radically reduced wastage and emissions was the US Federal prohibition of oil field gas flaring in the early 1940s. This created the new trans American gas pipeline systems and Petrochemicals industries. In that instance Government regulation, which was, to a degree, opposed by The Oil Industry and seen as Federal interference, stopped “waste” gas flaring, enriched those that collaborated and created the new petrochemical and gas-based industries which now form a major part of the US economy. The rules did not disadvantage but took away from oil producers the option to withhold wasted gas from those capable of using it. It remains to be seen whether the US will formulate similar rules for greenhouse gases.

The desirable goal exists for Australia to legislate for access to gas emissions to those with the capability of utilising the emissions. The Committee should consider current procedures for gaining access to emissions and possible regulations which could ensure open and competitive market access to emissions to foster the emergence of commercially-driven solutions to greenhouse gas emission reductions.

Isentropic would be pleased to present its views and proposals for such regulations.