

Inquiry Into the Regulatory Arrangements For
Trading In Greenhouse Gas Emissions

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On the Environment, Recreation
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Opening Remarks

“Most climate scientist see global warning as the inevitable thermodynamic and hydrodynamic consequence of a continuing build-up of greenhouse gases in the atmosphere. These gases absorb heat that otherwise radiate into space and re-emit the trapped energy back to the Earth’s surface. While large uncertainties remain about the rate and extent of climatic response by the oceans and the atmosphere (and the rate of accumulation of greenhouse gases from human activities), almost all scientists agree that significant global warming will occur in the next 50 to 200 years”¹

Energy Options

The Australian Energy market and its subsequent “Greenhouse Gas” emissions are categorised by many variations of services and subsets of demand such as transportation, manufacturing, residential, agriculture etc. For the purpose of this submission I have focussed my attention on the electricity and gas markets, not the transportation market.

The terms of reference of this inquiry appear to focus on the measurement of greenhouse gas and the abatement of it by the use of traditional carbon sinks such as plantations etc. I have approached this submission from an alternative supply side view. I have formed the opinion of recent government policy that Australia has no choice but to pollute and therefore the question is, “how do we attempt to reduce the impact of the communities pollution on all society after it’s done”?

I believe there is an alternative method of delivering energy services without creating the by-products that this inquiry is attempting to cure.

Energy as a Service

Energy is typically regarded as a commodity when economic and planning studies are undertaken. Its value as a commodity is, however, limited. A cubic meter of gas or kilowatt-hour of electricity is only of value if it is used in a way that results in some useful function or service being derived, such as a warm room, a cold drink or a cooked meal or immediate good being produced. For this reason energy, or the supply of it appears to be an all enduring fixation in the Australian economic planning cycle. As one of the largest suppliers of primary energy sources (coal) in the world, Australia has matched its economic fortunes on the rate it can be dug out of the ground and sold.

¹ Wright,B., “Unravelling the Climate-Change Conundrum” in “ECOS”, CSIRO’s Science-and the- Environment Magazine, N^o 74, Summer 1992/93, page 13.

Over the past decade an awareness on value adding has changed the mind set of a commodity based economy only. Our primary energy sources are more value if we adopt a value added approach to goods in the manufactured sector which enables Australia to capitalise on the use of low cost energy to ensure cost competitiveness in manufacturing in an aggressive global economy.

Energy Options

During the early 1970s the first of the OPEC oil shocks hit the previously stable global energy market, this was followed again in the late 1970s. Oil prices escalated over night to record levels and for the first time the world was aware of the addiction we had on energy and problems which we had if it wasn't available. For the first time major industrial economies undertook structural changes to shift the focus of their energy use to alternative energy sources and to demand side management. The principal driver however was security of supply and the control of escalating costs.

Energy and the Environment

During the 1980s supply of non renewable energy supplies stabilised and due to vastly improved exploration technics many new oil, gas and coal resources came on stream. The improvement in technology also helped to reduce the general level of consumption. Demand continued and as third world economies emerged with industrial expectations of keeping up with the OECD group of countries, another blight created by excess usage emerged. "Greenhouse Gas " global warming and environmental impact created a new and challenging problem, but one without the same sense of urgency for the global decision makers. This is due largely to the impact of the problem resting with voters who will not yet have been born.

The use of energy always seemed to provide a barometer for growth. The two were assumed to be natural partners and without more energy how could you create more goods for more consumption and employment.

The focus of many Australian economic planners has always been on the normal supply and demand equation. That is "the more you have then the cheaper it must be". Very little attention has been placed on the equation of the, "the less you use the less it costs"

Pricing Strategies

Pricing policies directly influence decision-makers by changing the price relativities between energy alternatives. For example, increasing the cost of one energy form may encourage use of another or the adoption of equipment with reduced energy demands. Prices of goods and services are accepted as influencing the manner and extent to which they are used. Pricing strategies which may have application in energy markets include:

- Levies, resources rents and royalties;
- Financial incentives including taxes and charges;
- Enforcement incentives (eg performance bonds);
- Subsidies; and
- Marketable emission or pollution rights.

The later of these bullet points can be addressed by using solar water heaters.

Water Heating

An arbitrary line must be drawn to distinguish water heating from process heating services in the industrial sector. The line becomes blurred when it is appreciated that many of the applications normally considered to be those of process heating may be better met by appliances traditionally used for water heating. For example, many boilers are used to raise steam which is then used for producing hot water in calorifiers.

Appliance Design

In Australia in the residential sector, the dominate water heater type and size varies from state to state. Over the past eighteen years the market has been largely divided into gas or off-peak storage water heaters. These fall into the major sizes of 135 litre for gas and 250 or 315 litre for electric. There are however large quantities of small 50 and 125 litre electric's still in use and being offered in the market place. All Australian houses without exception have one form of hot water system or another and this energy demand constitutes the largest energy cost for the domestic dwellings with possible exception of space heating for houses in the south eastern states of Australia. So dominate is the water heating load that competing utilities gas and electric respectively openly transcend into aggressive marketing and promotion by providing their preferred water heater to developers, builders and retail consumer free of charge just to ensure that they are then able to supply the energy that is used by these appliances over many years. Thus ensuring strong cash flow to the utilities. Good for Australian consumer you might say, but short sighted and not providing the same advantages to smaller renewable supply companies and consumers who inevitably still subsidise the promotional activity of the utilities through charges but derive non of the benefits that should come through their considered reduction in energy use.

Solar/electric units and solar/gas systems in total account for about 5% of the Australian hot water market, adoption in NSW and Victoria is below 1%.

Water heater appliance efficiency varies as the implementation of new energy efficiency guidelines will not be enforced until 1999. Water heater appliance efficiency can be improved through both a reduction in heat losses (standing losses) to the environment and improvement in conversion efficiency.

Poorly designed gas and electric water heaters remain of minimal concern to consumers as the total cost of the extra energy used represents very little expense compared with the resultant benefit when more expensive and better designed hot water systems are used.

Solar Water Heating

Solar water heating is one of the most successful applications of renewable energy technology in Australia. The success of solar water heaters in Australia can be partially attributed to high energy tariffs in some Australian states during the early 70s which enabled consumers to participate in the use of solar water heaters and discover the effectiveness of the technology. Solahart consumer research ascertained that 86% of consumers who purchase its product have either used a solar water heater by directly owning it or have lived in a house as a child which had a solar water heater installed. It can also be due to the abundance of solar radiation and the natural perception of consumers wishing to utilise this energy source. Australia has one of the highest levels per square metre of solar radiation in the world.

In conjunction with the above factors, the aggressive and sustained marketing by several manufactures a natural development of the industry has occurred. The industry is a highly elaborate value added manufacturing sector, represented by four major companies; Beasley, Edwards, Southcorp (Rheem) and Solahart Industries.

To sustain the viability of dedicated solar water heater companies such as Solahart, export marketing has ensured growth and liquidity. Currently Solahart exports 55% of its companies production to approximately seventy countries.

Solar water heater manufacturing commenced in Australia over fifty years ago and went through a rapid expansion during the 1970s as the first and second of the OPEC oil shocks gave rise to the adoption and development of renewable energy. Domestic solar water heaters were the first of the renewable energy products adopted and created early acceptance by consumers, as no variation to the service of supply was evident by the installation and use of a solar water heater. By comparison to a standard electric or gas hot water system, a solar water heater ensured the same service and at a much lower running cost. The only inhibiting factor was the initial "up front" capital cost which currently is in the order of three to four times the cost of comparable conventional energy hot water systems.

Solar water heaters may be considered to be either energy efficient water heaters, in which case they are a demand-side technology or energy conversion devices, in which case they rate as a supply-side technology. This submission categories solar water heating as a supply-side technology. In this respect I make the representation that we are an energy service industry which by its nature will radically minimise the use of carbon sinks by reducing green house gas emissions at the source.

Supporting the Risk

Solar water heating is a mature technology with a world wide adoption rate greater than any other renewable energy source with the possible exception of solar clothes drying. "Yes the

Hills Hoist is another great Australian solar invention". In this respect solar water heating is really about that simple also.

Much has been said about the disappointment of the evolution of the solar energy industry and detractors generally place the industry in a patronising "it might happen one day" product range. The fact is that had solar water heating and renewables in general been given the same support as conventional non renewable energy sources, the development of the industry could be argued to be many more times advanced than it is today.

Risk is an important barrier both to the process of innovation and market acceptance. Government, through energy supply utilities or other agencies plays an important role in spreading risk across the community. The risk associated with projects considered to be for the broad benefit of the community is not required to be borne by the individuals. At present energy efficiency and renewable energy strategies require individuals to bear the risk. If risk is not spread innovators suffer higher cost associated with the "risk premium" they attract.

Underwriting of risk can be achieved by:

- Establishing and support insurance schemes;
- Establish service infrastructure;
- Extending guarantee periods;
- Guaranteeing future markets;
- Implementing regulations and standards;
- Introducing subsidies or incentives which reduce the extent of risk;
- Providing incentives or subsidies; and
- Providing a source of low cost investment finance.

Marketable Rights

Marketable (or tradeable) emission rights have been widely proposed as a means by which greenhouse gas reduction targets may be met. A system of marketable rights may be designed to promote reduced energy usage.

Marketable rights typically work within a framework on agreed standards. In the case of emission rights, once overall limits on the emission of a specific pollutant have been agreed, marketable rights provide a mechanism by which emission rights may be traded between those that seek to increase their allocation and those that have surplus rights under their allocation. Marketable emission rights may be allocated at a national, state, regional and /or local level.

Rights trading creates a market in which value is placed on the right, say, to emit. In this way, financial incentive is created for those who can devise the means of reducing emissions below their rights allocation.

Marketable emission rights provide a market-based means by which the external cost associated with atmospheric emission may be partially internalised within the economy. The effectiveness of marketable emission rights program is dependent on the establishment of overall emission limits which are sufficiently stringent to create pressure for reductions in emissions. Process are required to maintain this pressure over time. This could occur by withdrawing emission rights or increasing the costs of these rights, which would attract investors who inturn have options for reductions in emissions to enter the tradeable market.

The Use Of Solar Water Heaters to Reduce Emissions

An alternative to a direct licence and trade of emissions could be the use of off setting benefits in the community. There are over six million domestic dwellings in Australia and thousands of industrial buildings using medium and low temperature water heaters. Argument on the exact CO₂ savings for the average solar water heater(4m² flat plate collector) varies but on average a reduction 4 to 5 tonnes per annum can be expected.

Currently, 300,000 solar water heaters are installed and used in Australia providing an annual benefit of 1.2 million tonnes saving of greenhouse gases per annum.

The benefit on installation directly offsets the use of conventional water heaters and in particular electric water heaters which are the worst of this group. The gas industry have been arguing for some time that use of gas water heating is equivalent to the use of a solar electric water heaters when it comes to greenhouse gas reductions, debate on this topic is still to be verified. If this position was supported then the logical step would be to install solar/gas water heaters. The subsequent savings would increase to approximately 7 tonnes per system.

Licensed emission holders could either buy the licence and the funds are pooled to identify projects such as housing refurbishments in intercity areas. The funds could be used to upgrade houses to a more modern and efficient energy level. For example ceiling and wall insulation minor amendments to the design to improve passive use of solar energy for a reduction in the heating and cooling loads, in addition the installation of a solar water heaters could be included. Historically the public housing sector has not enjoyed the best or efficient housing designs and appliances. It is ironic that through bad design and installation of high energy usage appliances that the people who can least afford high running cost items are saddled with inefficient designs and products by their benefactors, thus keeping them in their poverty cycle and inevitably on the public purse.

Structural Change

Increased competition in the deregulated energy sector is not delivering the benefits to consumers it initially anticipated. When the fully contestable market comes on line in 1999 more innovative methods of marketing may occur but presently the policy of the utilities appear to be more of the same. That is lower costs and effective marketing of more use of energy.

Where else but Australia would you be told to be more energy efficient by slick utility fliers in the consumer billing accounts and then be rewarded by tariffs that actually reduce in price with the greater amount of energy consumption.

Or, utilities drop tariff charges only to put up fixed supply charges which are not related to any quantifiable measure of energy use. This penalises any consumer who takes the initiative to attempt to conserve energy and makes them pay for poor pricing policy of utilities regardless of the consumers community spirit.

The benefits of competition may be achieved when the market opens up totally but the creation of separate distribution units for which successful performance is dependent on the sale of a single energy form is not conducive to the pursuit of energy conservation or fuel switching strategies. This is particularly apparent in the eastern states where electricity and gas supply utilities actively compete. Builders and developers are offered "all gas" or "all electric" packages by the respective supply utilities with no consideration of the concept of the best fuel for a given end-use. Home buyers and tenants are nearly always totally disenfranchised from this process.

Due to the single energy focus shown by utilities consideration for the reduction in energy is the least of their concern.

As an example of this corporate mind set, the author of this paper has been involved for the past six years in providing information on the design and use of solar water heaters for the Sydney Olympic Village. During the course of my time in this task I have met with utilities and builders to provide assistance for the use and installation of solar/gas water heaters. The outcome is that solar/gas is now being installed in the athletes village. The use of this type of product has not come without considerable effort on our behalf, as the utilities and some developers have attempted to water down the spirit of the solar water component and the environmental impact on the project due to short term economic considerations.

At a meeting with Australian Gas Light Company (AGL) representatives, I was outlining the technical specifications for our recommended product and gave details on the amount of gas savings which would be provided. 65% solar contribution was and still is the effective savings. Naively I pronounced this number with an expectation that I and the AGL officials were all in the meeting for a common purpose and to ensure a minimum use of energy. This I believed to be the mandate of and strategy adopted by SOCOG. I was quickly admonished by my hosts and told in no uncertain terms that "this was not good enough". My immediate perception was that they wanted more solar input, to which I replied if "I can put more collectors on the system to

give a higher solar fraction”. “No !! Was the response. “We mean that we want more gas used, and if there isn’t then we won’t provide gas to the site”!

I was with two other Solahart staff and my response was stunned silence. As can be seen from this example and it is only one of many, the industry is still in a mind set of gas or electricity supply and not energy services.

The Future

Australia has over 200 years of known reserves of coal and gas, more than enough for this current generations needs and several more to come as well. Inevitability whilst the demand for Australian energy may not diminish our customer base will change. Already a stronger push in Europe towards energy efficiency has lead to the greater adoption of all types of renewables. In particular solar water heating is growing at a rate of 15%² per annum. Whilst at the same time Australian domestic installations have actually gone backwards. Typically Western Australia with adoption rates of 26% prior to the advent of the Karratha to Bunbury gas pipe line(1984) has now seen market penetration drop to 15%.

Europe in particular is seeing wider acceptance through initiatives provided by Governments and the strong demand by the public. The concern for Australian companies exporting to Europe that local demand has created stronger competition from the likes of Daimler-Benz Aerospace and companies with much bigger capital backing than the current Australian industry participants. This doesn’t only mean bad news for the Australian solar water heating companies but also sends a message to Australian exporters of coal and gas that Europe is doing their best to ensure that Australia keeps our non renewable energy in the ground. In reality Europe is an unwilling customer. This is not an attribute one should generally feel too comfortable about.

Public Sector Example

The International Energy Agency³ has argued that there is an important role for the public sector in setting examples for the industry or individuals to follow. It is claimed that public sector example helps to motivate and, where consistent, lends credibility to the Government policy. The converse is also the case, failure to take a lead undermines the effectiveness of a policy strategy. In the IEA’s view, Government energy conservation programs should be both effective and well publicised

² CADDET, IEA Solar Heating and Cooling Committee 1997, Large Scale Solar Purchasing. “A business opportunity”

³ International Energy Agency “Energy Conservation in IEA Countries” OECD, Paris 1987.

The Discount Rate and Future Climate Changes⁴

How should the cost of future climate change be discounted in making current decisions? This issue is particularly thorny because of the long lags in the carbon cycle. Carbon dioxide emissions have an extremely long atmospheric residence time, in the range of 200 to 500 years, so actions today can effect economic welfare in the distant future. How should we balance CO₂ reduction costs in 1990 against benefits in lower costs of climate change in 2040 or 2090?

In part, the issue is an ethical question, reflecting the relative valuation of well-being of current and future generations. The revealed social discount rate is embedded in numerous policy and private decisions, such as government fiscal and monetary policy and the rate of public investment, so the discount rate on climate change should not be chosen arbitrary and without regard to other decisions. A real discount rate on goods and services close to the return on capital and typically used in most countries - say 8 percent per year or more- would imply that we should invest little today to slow the projected climate changes and concentrate instead on more immediate problems. The decision to make is not if action should be taken on greenhouse gas reduction but how soon and how much.

Summary

The use of solar water heaters as a tool for energy supply would directly benefit the reduction of greenhouse gas emissions. A secondary benefit would see the direct savings for every user in the immediate reduction in energy cost which if used discreetly could directly benefit low income users. As a third and final matter which I am sure will not be missed by this committee, the increase in direct employment opportunities by strengthening the already strong manufacturing base in the Australian solar water heater companies would ensure even the driest of economist would see a direct and immediate benefit by comparison to large scale and long term forestry programs. In addition export income growth through more efficient production, as larger economies of scale assist with capital returns and increased buying power of raw materials for the solar water heater manufactures.

Reduction in greenhouse emissions at the source rather than mitigation after the event would provide far greater advantage in the Australian community

I trust that this submission will assist the committee in its deliberations and should you require further information or assistance please do not hesitate to contact me

⁴ Nordhause, WD, Economic Approaches to greenhouse Warming in Global Warming: Economic Policy Responses, Dombush and Poterba (eds) Massachusetts Institute of technology, 1991, pages 57 and 58
Extensive use of "Scenarios For Alternative Energy In Western Australia" was also used.
The authors Peter Versluis and Alan Pears