

The ETS Inquiry
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Australia

ETS Inquiry

Dear senators,

Australian "carbon trading" will be about as relevant to addressing the problem of climate change as selling indulgences was to solving the problem of small pox for the same reasons. It will however destroy what little is left of the information which is a pre-requisite for sensible and necessary large-scale energy industry investment and indeed a solution to the problem.

Put simply what Australia needs is a coherent, technically credible national energy policy, which makes large scale investment in zero CO2 to the atmosphere solutions possible.

It is not going to get one of course. In places like NSW it will be prohibited on ideological grounds. Successive governments, since WW2 have done the most to destroy technologically based industry in this country. The energy and resources industries have until now escaped this "assistance" because they operate in global markets with global investors or are simply operating on infrastructure constructed decades before it was asserted that economics replaced the laws of physics.

The ETS will correct this oversight.

The attached subtle rant is for the benefit of those who think this is a moral, social, political, legal and theological problem.

The core message is that without addressing the real problem of CO2 emissions and planning for the design, installation and funding of something like a 100 GW of generating capacity to cover both stationary power generation and surface transport, the ETS is a counter productive measure.

Yours Sincerely,



The ETS no worries solution to planetary salvation

Executive summary

Australian "carbon trading" will be about as relevant to addressing the problem of climate change as selling indulgences was to solving the problem of small pox for the same reasons. It will however destroy what little is left of the information which is a pre-requisite for sensible and necessary energy industry investment and indeed a solution to the problem.

Some Economic (theology) issues

The fundamental problem is that there is no market for atmospheric CO₂. Tulips are a far firmer base for a market, since at least you can put them in your flower box. Economic theology, to the extent that its useful, applies to goods and services for which there is a real demand.

The first and most obvious question is where has such an indulgence scheme worked in the past? It may have done a lot for church construction in the dark ages, but the proponents had god on their side and as a public health measure it was less effective than hanging garlic above the door, which presumably deterred social intercourse.

Betting the Australian economy on such a theory is bad enough, but the future of most of the world's large cities, which are typically below 7m AMSL is going a bit far, even for the people who gave us Wall St.

This is an attempt to apply simplistic economic theology that might work with pork belly futures, but has clearly failed with more complex environments, such as network-based business. Economists refer to this as "Market Failure". Anything that does not behave on the basis of market theology is a "market failure"; since it could not possibly be that anything should not follow the rules of "the market". Compounding this "Market Failure", as acknowledged by Sir Nicholas Stern, with a funny money scheme is obviously a dysfunctional response because the problem has a fundamentally different character to those problems, which are amenable to the simplistic theology of "the market". One only has to look at the shambles of Australia's telecommunications policy to realise that applying such simplistic theories produces no solution of relevance. (In the case of mobile telephony the economic theory of beach based ice cream sellers, was cited to select a mobile phone system with a cell size suitable for Liechtenstein! To hell with the Physics, we should make multi-billion dollar national infrastructure investments on the basis of a theory, which applies to ice cream sellers on the beach.)

While the universe consistently obeys the laws of Physics, the laws of Physics are not contingent upon artificial constructs, such as the near baseless assertions of economists.

The ETS is an attempt at establishing a market for airline tickets before anyone has invented aircraft.

One could postulate the following WW2 dialogue.

If the Germans build an atomic bomb first we are finished, but we are all economists and lawyers so we cannot pick winners. (We don't understand any of this stuff, so we always pick losers. Being the self-chosen elite we must however stay in control.) It is therefore proposed that we establish a trading system for radioactive particles, since that way the best and cheapest atomic bomb will be produced by the market. Just go ask those folks down in Wall St. they are already designing planet destruction default swaps to ensure there is a derivative market, with maximum leverage. (Thereby ensuring that it is inevitable that something will go bang.)

The European implementation of this scheme has established its farcical nature. As a collection of post industrial societies, which rely on material mined in places like Australia and processed –

fabricated in China, the Europeans can afford to adopt such schemes, thus leaving the real problem to others. Most Australia's employment may be in the service sector, but it's the energy intensive resource extraction that pays the bills.

Shifting relatively efficient extraction and industrial processes from places like Australia to third world countries as promoted by such schemes makes the global problem worse.

Simply put any remotely realistic carbon price is insufficient to make renewable energy price competitive or make it viable as the dominant source of energy supply. All a carbon-trading scheme is going to do is allow the issue to be moved from one country to another. The problem of course does not move, as there is only one relevant planet.

The variability and unpredictability of such a mechanism however precludes the required substantial investment to produce a solution on a relevant scale.

It should be noted that instantaneous cost of power from wind (the most "viable") and other renewable sources couldn't be compared with sources such as coal unless variability, energy storage and long haul transmission costs are included. Wind power is a function of the cube of the wind velocity. Depending on something as variable as the wind to support a societies infrastructure is simply impractical. Depending on the cube of something as variable as the wind..... Recent experience in the UK identifies the problem. When there was peak power demand, less than 1% of it was available from renewable generation because there was no wind.

Energy unlike most commodities has storage, transmission and availability costs, which are totally different to most commodities to which simple economic theory is applied.

Any sensible arithmetic analysis forces the conclusion that fooling around on the margins with the power that is capable of being delivered from current "renewable" energy sources (about 2% of Australian energy use) is an exercise in futility.

People attack the level of problem they are capable of solving. Thus if this problem were given to a pack of lawyers we would get back legalisation with the odd Latin incantation. Economists would and have returned with a funny money scheme. Christians would doubtless deliver some moral analysis based on the conclusion that the cause was the failure to believe in interstellar intercourse and its derivative beliefs.

The universe has consistently demonstrated behaviour, which ignores all such assertions.

The ETS approach has no sensible historic precedent. Indeed human innovation has always proceeded on the basis of solution invention and implementation followed ultimately by accounting in a mature environment.

Economics 2.001&1/2 - the final insult

Scholes and Merton won the Nobel Prize for Economics. Eager to further make a name for themselves, they did something no economist should ever do: they went into business (with Other People's Money of course). Notwithstanding the edict that "in the long term we are all dead" the entity was christened "Long Term Capital Management". The definition of "Long Term" appears a little rubbery in the context of LTCM. In 1998 it lost US \$4.6 Billion of OPM in less than four months.

We are being asked to bet the future of the planet's major coastal cities on the success of a theology whose most honoured practitioners deliver successes such as LTCM.

Climate science may have some serious defects when it comes to complex predicative models, (Given the number of positive feedback processes involved the predictions may be far too optimistic.) but at least the basic Physics is irrefutable. Anyone who asserts that this is true of Economics is either a idiot or a

Some comment on the real problem

It may be worth stating some of the basics.

Is greenhouse gas, principally CO₂, induced atmospheric warming a serious and imminent problem? Yes.

The problem was first predicted in the late 19th century by a Swede on the basis of relatively straightforward Physics, which at least used to be taught in high schools. The level and spectral distribution of radiation is a function (fourth power) of the radiating body's absolute temperature. Since the earth is not as hot as the sun (whose radiation peaks in the visible light band), the earth's re-radiation is shifted to longer wave radiation. At specific frequencies, this infrared radiation is absorbed by CO₂. The thermal mass for want of a better term of the atmosphere is very small compared with say the earth. Thus a very small increase in CO₂ in the atmosphere leads to more drastic atmospheric warming. Of obvious concern is the fact that there are all manner of positive feed backs, such as the removal of white reflecting ice increases the amount of radiation absorbed by the earth's oceans which increases the ice melt.

While the increased radiation absorbed is relatively easy to calculate and can indeed be measured, the complexity of the secondary effects makes accurate predictions as dangerous as using tea leaves or a Wall St., economist as a basis of decision making. Herbert Grosh's second law: It can get worse without limit.

A very relevant issue is that the problem is **NOT energy usage**. Total human energy usage is about 1/8,000 of the inbound solar radiation and on the basis of Stefan-Boltzmann would increase the earth's temperature by something like 0.009 C on a black body radiation basis.

In Summary

It's a physical problem, governed by the laws of physics.

The solution is to simply stop dumping CO₂ into the atmosphere. The obvious battle order is stationary power generation, surface transport and aviation. (The latter is the more significant challenge because of the power to weight requirements). If this problem had been attacked in the same manner as say the Manhattan project western society would be seeking another crisis by now.

Regrettably, Western society has been taken over by a cabal of socio-political-legal-accounting-eco (self perceived) 'elites' whose interests, expertise and motivations are irrelevant to both the problem and the solution. One only has to compare the speed with which trillions of dollars were provided to "save" the banking industry to identify the centre of interest of those who govern western society.

Some consequences of the ETS

NSW coal produces about 850,000 tons of CO₂ per TWH. Victorian brown coal produces about 1.4 million tons per TWH. Electricity and money has been known to flow across the Murray (Something in the constitution about that.), what has not be presumably thought of in the design of this accounting séance is the drastic compounding effect of the energy required to compress, pump and liquefy the CO₂ in any CCS scheme.

In a "market" this would led to shutting down all the brown coal power stations in favour of NSW ones, except of course that there is no money available to even replace the obsolete power stations in NSW which are too old, too dirty and in the wrong place.

Lets for the sake of argument assert that it takes a TWH to compress – dispose of a million tons of CO₂. This would increase the marginal cost of NSW electricity by a factor of at least 7. (More

capital equipment is required too.) It increases the cost of Victorian brown coal derived electricity by an infinite margin. There is nothing left over for light bulbs, even green ones. The obvious should be noted. The physics of the problem makes the setting of a carbon price an irrelevant exercise in regulatory masturbation. It's not that bad of course. (One estimate puts the efficiency loss of generation with CCS as low as 33% but there are still other compounding factors in the energy budget such as the transport of material such as overburden and the CO₂.) At 200 KWH / ton for a complete CO₂ compression liquefaction and transport cycle that is 200 GWH / million tons of CO₂, the net NSW power per MT CO₂ is 0.97 TWH whereas for Victoria would be 0.51 TWH per MT CO₂.

Thus we have a 2:1 carbon cost differential across the Murray. Of course the magnitude of this "cost" is unknown. We are assured that it will continue to rise on some basis or that it will be fixed for "five years". Some times these assurances are proclaimed on the same day. The problem is of course that NSW should invest something like \$25 billion dollars in power generation to supply replace at least 10 GW of generating capacity. Power stations are typically 20-50 year investments. How could any responsible entity invest \$25 billion dollars in a 20-50 year life asset when the fundamental economics of the business is unknown and the "tax" while unknown is projected to exceed the price of the resource (coal) used to produce the product (electricity). In the case of NSW this question is academic since private investment in power generation is prohibited on ideological grounds (by a one time garbage man and the state government does not have the money to do it.) Where does that leave Victorian power generators in an environment where the only certainty is a 2:1 cost disadvantage in the most significant cost variable which is beyond their control? Investing somewhere, anywhere, but Australia of course.

Where do they find the people who devise these schemes? Certainly not from the ranks of anyone who has managed a successful business.

Accounting

Coal based power generation can cost as little as \$11 / MWH which compares rather favourably with the \$500 / MWH of most viable "renewable" power source which incorporates energy storage. (Molten salt solar thermal.) Even this 50:1 ration ignores the fact that such renewable generation would typically be more distant from energy consumers and hence incur greater transmission losses.

The idea that this problem can be addressed by inventing some kind of funny money like carbon credits is ludicrous, notwithstanding the fact that \$500 / MWH is approximately the German solar farming bounty. (The term price seems inappropriate.)

Since there is only one atmosphere, the problem and therefore the solution must be global. If every car, fridge and house owning Australian were executed and the remainder followed Bob Brown out the back to live in harmony with the "environment" by watching the grass grow and the sun set, it would have less effect than not allowing a billion Chinese a fridge. (Refrigeration is a prerequisite for most of the planet's humans feeding themselves.)

Any money (universal token of exchange) like scheme presupposes an issuer of tokens and since the Chinese have a far greater grip on reality than say Alan Greenspan, it is difficult to see why they or their government would settle for a carbon credit certificate in lieu of a fridge, TV, car, heat light and power. An equitable "entitlement" with Americans would lead to a fourfold and catastrophic increase in carbon emissions.

A common misconception is that the country's energy consumption is a life style choice. (An idea promoted by the new religion of environmentalism. Like all religions it is based on guilt, fear, power over adherents and superstition. In Europe energy usage is indeed more lifestyle related. You can heat your home or freeze.) If the imputed energy of coal exports is included then Australia's energy consumption is something like 20,000 peta joules pa, which is the equivalent of about 30 KW pp on a 24/7 basis. (The ABS doubtless has more accurate numbers.) The energy contained in coal exports is returned in fabricated goods. Indeed the cost of most mass manufactured goods is

typically a function of the cost of the energy to fabricate them and their manufacturing plant with an ever-smaller labour component. This "cost" propagates all the way to mining which is an energy intensive process. The rocks don't get paid for being mined.

Fortunately, resolution of the accounting issue is at hand. Some of us accept the A.C.Clark view that the inevitable unit of global currency will be the KWH.

Alternative energy

While a complete consideration of "alternative energy" is beyond the scope of this missive, some proposed options are worthy of cursory consideration.

Conservation

The effect of "energy saving" light bulbs is a good example. One could develop an argument for concluding that at peak saving of 80 Watts per household (no self respecting sentimentalist would leave on a unnecessary light) the power consumption reduction would be 4 watts per person on a 24/7 basis: 4 watts in 30,000. The total energy cost of the bulb's life cycle including safe disposal should be considered, which further exacerbates the measure's token irrelevance.

There are of course some obvious and effective conservation measures. Contraception has by far the best business case. We simply don't need 9 billion people. Even when the greenhouse energy problem is solved by technical innovation, unless the objective is to maximise the number of people living in total Politically Correct boredom (in harmony with the environment) there is no rational need for 9 billion humans. This observation would of course offend various religious who seem to regard the end game as out breeding each other.

Wind

Wind power is a function of the cube of the wind speed ($1/2M*V^{**2}$ and the M is a function of V too.)

A MW generator at 20kts = a KW at 2 kts and of course in reality zip.

Without the development of efficient energy storage and low loss long haul transmission wind is effectively relegated to optional power usage unless it is backed up by near abstemiously available alternative power sources of the same capacity.

Solar

Solar thermal is an excellent form of heating, (What a revelation.) particularly water heating. It is worth noting that if all the off-peak domestic hot water heaters were eliminated rather than eliminating the need for more power stations, the power grid would in some cases have serious off-peak problems due to a lack of load.

Guilt free solar powered hot tubs will doubtless become de regur in California and solar power for Nevada air conditioners doubtless has a good demand supply fit, but little of this is relevant to industrial scale power generation.

Solar thermal with molten salt heat storage offers some prospect of "clean" energy with a base load capability on an industrial scale with a well defends, if expensive, cost paradigm. There are some significant issues such as large-scale access to cooling water. (Like much of this issue the laws of thermodynamics govern its important aspects. In this case the pronouncements of Mr Carnot are relevant.) The location of such a large-scale facility raises issues such as transmission infrastructure.

Fortunately the technology involved in solar thermal is well understood, so the taxpayer's money can be directly spent on massive subsidies rather than token research, which might otherwise be used as an appropriate excuse for the lack of a coherent energy policy.

Photo-voltaic

An expensive form of domestic roofing, but an excellent PC fashion statement.

Nuclear (Fission) Power

Without fast breeder reactor technology this is really no basis for a global solution. There is simply not enough fissile uranium. It is arguably the basis of an Australian ability to proclaim that it has addressed its (near irrelevant) carbon emissions. In this context it should be noted that burning Australian coal to provide cheap power to mine uranium so it can be shipped to France so the French can claim to be clean and green has the smell of hypocrisy about it. Clearly nuclear power should be considered in the context of a total fuel cycle budget including extraction, enrichment, and waste disposal. In the case of Olympic Dam one can add the provision of cooling water. (Unlike economics, thermodynamics is unfudge-able.)

It is self evident that an economy the size of Australia's lacks the sensible ability to support a fossils fuel and nuclear power industry. Yes it's a case of picking winners and doing something about it.

Australia's technology policy track record

Anything remotely connected to technology in Australia is a policy shambles. For example while South Korea was establishing its eminence in mobile telephony with a set of coherent simple policies which encouraged both innovation and efficient network operation, Australia telecommunications policy was based on a simplistic ideological battle between those who wanted to preserve Telstra's inefficient monopoly over all forms of telecommunications industry related innovation to acquire a monopoly sales premium vs. those who want to preserve the monopoly to secure the continued employment of their industrial union benefactors. The result was Telstra continued domination of all manner of business, which it never had the skill set to manage and outrageously inefficient destructive competition, such as up to 11 sets of transmission equipment servicing small areas of Australia and nothing in other areas.

It could be argued that since telecommunications largely supports the domestic service economy in the overall scheme of things it is largely irrelevant, since the country has no telecommunications equipment industry of significance.

It is Australia's resources and energy industries, which pay the bills and along with the farmers earn the money to fund Australia's life style.

Given their access to foreign markets and foreign capital the resource industries have been immune until now from the effects of Canberra's expertise. The domestic power industry has been kept alive on the basis of investments made in the 1950s and 60s.

Australians may deserve the results of this wacky political – religious exercise, but they need a coherent energy policy.

Any coherent energy policy has to be based on the selection of demonstrable working viable technology, not on the arbitrary assertions of people who don't understand the real problem and are irrelevant to a solution.

A realistic response

Since 98% of Australia's and most of the civilised world's energy is generated from burning coal, clearly defining a solution suitable for the Australian environment, implementing it on a relevant

scale and setting a baseline cost for base load power generation with zero CO2 to the atmosphere is the first imperative.

There are very significant consequences from the results of such an exercise. Given the age and location of existing NSW power stations an investment of at least \$25 billion would be required, simply to satisfy current demand in a carbon-constrained environment. The nature of the solution selected will determine the location of this infrastructure.

The claim that such investment should be made on the basis of something as ethereal as a projected CO2 "price" as defined by the operation of some artificial market based on an unproven economic theology is nothing short of fraud.

In the case of NSW such investment is currently deemed ideologically unacceptable and in the case of Victoria the required CCS energy load of brown coal is probably enough to put its whole power generation industry out of business.

The fantasy response of abandoning coal based power generation for nuclear-based generation would doubtless do for the exchange rate what similar talent did for the Telstra share price. As invasion prevention measure exporting coal might still be considered, thus making the adoption of nuclear power even more pointless.

As for solar, a cost estimate for "going solar" would have more zeros than Pearl Harbour.

If we are prepared to shut the place down at night and when it rains, we could go with the German tariff and lets include surface transport too.

$20,000 \text{ PJ} = 2 \times 10^{19} \text{ Watt seconds} = 5.5 \times 10^{12} \text{ KWH @ 50 cents}$

$\$2.25 \times 10^{12}$ Well what's a Terra dollar anyway?

Of course that assumes we have spare generating capacity from some presumably unPC source hanging around to supply all the nation's power when approved PC power is not available. (A KW available in Perth is not much use in Cairns.)

So since the marginal cost of solar is claimed to be free we will assume a useful generating period of say 8 hours in three days in winter and we will assume that we have constructed sufficient energy storage so we only need solar generating capacity 9 times the average consumption.

So after we have converted Lake Eyre into molten salt heat storage, dug a canal to it to provide cooling water and built a nation wide power network radiating from SA, we should be home free. It all about faith and commitment for the environmentally friendly way of doing things.

Cost? Oh that's irrelevant, the ETS will solve that problem. Its market economics. No worries.