



Building new markets, new industries, new jobs

This Environment Business Australia submission is directed to:

The Prime Minister and Members of Cabinet and their advisors; The Department of Prime Minister and Cabinet; State Premiers, Territory Chief Ministers and Cabinet Ministers; The Senate Fuel and Energy Committee; The Renewable Energy Target Inquiry; Treasury pre-Budget submission; Henry Taxation Review; Departments of Treasury and Finance; The Department of Climate Change and Water; The Department of Environment; The Department of Energy and Resources; The Department of Innovation and Industry; The Department of Infrastructure and Infrastructure Australia; The Department of Health; The Future Fund; The Productivity Commission; The Australian Energy Market Regulator; IPART

We request the reader to consider this EBA paper 'Foresight, strategy and architecture for action' in conjunction with some of our previous recommendations outlined in 'Targets for our future' and 'Wedges, levers and a zig zag' these can be accessed at www.environmentbusiness.com.au

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Core recommendations

- *Ensure an adequate governance structure for markets overseen by a national 'War Council' with a vision and a strategy to roll out 'mega solutions' capable of tackling climate change, while building new wealth, new markets, new industries and new jobs*
- *Make action to tackle and adapt to climate change the first order of Government. End government 'stove pipe' approach by putting in place an over-arching super-department reporting directly to Prime Minister and Cabinet*
- *Complement the proposed emissions trading scheme with a strong transitional framework based on regulation, standards, fiscal incentives and financial investment. In this way a 'major polluters' CPRS' can be combined with energy efficiency upgrades across the economy, renewable energy substitution for fossil fuels, and carbon biosequestration offsets. This could result in a scheme capable of delivering a minimum of 25% cuts in GHG emissions by 2020 against a 2000 baseline and preferably 40%. Recognise the current mandate from the electorate for this deeper and meaningful action – if necessary call a national referendum*
- *Use government policy levers to optimum effect - regulation, standards (e.g. for appliances, vehicles, buildings), fiscal measures, market measures such as trading schemes, governments' own procurement and investment, education. Make sure that government tenders focus on quality outcomes not lowest cost bids*
- *Properly value the services that the ecosystem services provide and invest in the upgrade and maintenance of environmental infrastructure and support systems. Internalise all externality costs in pricing so that new 'clean' approaches have easier access to market and do not have unfair competition from polluters/free-riders. Design financial and fiscal stimulus packages to achieve lasting outcomes without perverse impacts*
- *Incentivise and fast-track investment into 'clean' technologies, energy efficiency systems and retrofits, green infrastructure, carbon biosequestration, sustainable cities and mobility systems*
- *Create a 'Climate Bond' to harness public, private, institutional funding*
- *Set a target for the cleantech and environment industry to be contributing at least \$60 billion to the Australian economy by 2012 and in the process make cities, communities, the environment and the economy more secure and resilient. Development target of 2030 for 'mega clean energy parks'*
- *Support biosequestration and soil carbon measures in Australia and developing countries to remove legacy carbon from the atmosphere*
- *Auction all emissions trading permits and hypothecate revenue to structural adjustment at industry, household and commercial levels (e.g. accelerated depreciation support for companies seeking to retrofit/retire polluting plant or diversify their portfolios and switch to setting up full scale demonstration plants for renewable energy generation of electricity; re-investment tax concessions for new technology R&D and successful commercialisation and deployment; preferential corporate tax rates for companies investing in upgrading grid access and efficiency; gross feed-in tariff for renewable energy; complete energy efficiency retrofits at household and commercial levels.*
- *Champion high level global negotiations (G20, UN, IMF, World Bank, OECD) that put environmental criteria at the top of the agenda for developed and developing countries and link this to the WTO trade agenda.*

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EXECUTIVE SUMMARY

Recent months have clearly shown the extent to which greed, short-termism and unheeded collateral damage wreak havoc on the common good, major economies, companies, and individual shareholders. But today's horrible market could pale into insignificance next to the 'full awful' impacts of climate change.

Prevention is key. There are no technological fixes available, and no amount of money will buy a solution if the planet is tipped into runaway climate change. We are moving, by dire necessity, into an ecological protection era where we need to urgently invest time, policies, creativity and money into 'mega solutions'.

Decisions and interventions made now will affect our immediate, mid, and long-term future and this is at the forefront of discussions at the UN, OECD, IMF, World Bank and WTO. How this dialogue advances is crucial to the future of civilisation.

Environment Business Australia (EBA) believes that Australia should play a key role in global efforts to tackle the joint challenges of climate change and financial/economic turmoil. One of the first steps is to create a bold new governance structure for markets based on recognising and building on *fundamental value*. Australia can build its next competitive edge by creating a 'mega masterplan' approach to build **new markets, new industries and new jobs** which are *not* based on short-termism, collateral damage and excessive greed at the expense of the common good.

At EBA we believe that the environment industry has an important role to play in developing commercially viable solutions, but we need governments and international organisations to understand that not all benefits will materialise instantly - some will accrue over the longer-term. Notwithstanding this, the next great technological era requires immediate action and investment.

EBA reiterates its recommendation that a 'War Council' approach is needed to tackle the biggest emergency of all time unfolding in front of us. Only significant international action will put in place 'forever' technology, infrastructure, finance, aid, trade and diplomacy changes into play.

Climate change is not the only negative 'mega trend' it is compounded by the convergence of peak oil and energy security, peak fish, peak food¹, peak rare metals, peak forests, peak soil, declining sources of quantity and quality drinking and irrigation water and ocean acidification is increasing.

Energy security is certainly important, but on a scale of urgency food production capacity could be the next global catastrophe². While this may not carry the broad eco-system and biodiversity threats of climate change, it should be recognised as a first-order issue of concern for humanity. We mention this early in this paper because part of the solution to the climate change challenge can also help to replenish soil carbon and rebuild productivity levels.

The current financial and economic crisis would have some stall action on climate change. This would be entirely the wrong approach and would exacerbate the exponential growth curve of cost and non-cost impacts from environmental degradation.

Decisions going forward cannot be based on history lessons or historical imperatives. Our challenges are unprecedented. Commonsense and foresight must guide us so that our thinking and our actions are based on long planning vistas and horizons that are supported by meaningful and timely targets and milestones.

¹ Global food production peaked in 1990

² Especially in countries with already weakened security such as Pakistan, Afghanistan

Commercially ready and internationally competitive mega solutions

In spite of all this bad news we at least armed with foresight. This foresight dictates that the solutions we know to be available today should be implemented with urgency. This necessitates far greater support for R&D, demonstration and trialling of new and emerging solutions must become a core priority of Government policy.

Each country can help to harness innovation and capital flows as well as taxpayer, voter and consumer community support.

Australia is well-placed to be a leader, and, as an energy intensive nation, has an important role to demonstrate that an energy intensive country can retain its prosperity by being smarter, 'cleaner and greener', and more efficient.

To achieve this new 'global green new deal' different economic, resource and industry approaches are needed. The good news is that many of the technological solutions are readily available. The not so impressive news is that there are many barriers to their entry to market, including a protectionist approach from incumbent companies and industry sectors. Many of the barriers to action are propped up by outdated regulations and guidelines that were designed for a previous era.

A new architecture for action is needed – the problems need to be tackled at their root - the traditional approach to environmental problems of end-of-pipe-fixes, mitigation and repair is too little too late to tackle the ecological resource challenges. The fixer-upperers are not equipped to reverse the damage.

One of the strongest recommendations of this paper therefore is for Government to harness its key policy levers to fast-track the deployment of innovation especially where wealth generation can be decarbonised. Regulation, taxation and standards in particular can help restructure and reposition the market to do what it should be doing – providing opportunity to commercial enterprise to develop new markets, new industries and new jobs. However, signals no matter how strong will be inadequate without direct investments to roll out major infrastructure solutions and to aggregate smaller low cost solutions into projects of scale.

If these new markets and new industries are based on 'green' and 'clean' technology and infrastructure there may be, as Professor Ross Garnaut said "a slender chance that humanity can get its act together."

Some of the technology solutions we suggest in this paper will be early movers in a developing market, others will take time to reach their longer-term potential. We recognise that, as a market with relatively small scope and scale, Australia is unlikely to be a commercial home to all of them. However, our proximity to, and our excellent relationship with energy-hungry countries in the region puts us in an excellent position to provide technology/infrastructure 'demonstrators' to trial and refine, at commercial scale, a variety of 'clean' energy projects. Australia's expertise and export potential is enhanced, developing countries benefit from technology transfer and capacity building.

Australia is not 'going alone' - California's carbon response is built on the vision of building the future wealth of the State on its green technology leadership. President Obama's stimulus package to rebuild the USA economy includes a major green technology and infrastructure package. Many EU countries are targeting new export markets in Asia for their environment industries. These are signals that the world's approach to the environment and economies is changing.

Emissions trading needs complementary measures and they require investment

There are also very strong signals that we should not be investing all our hope in emissions trading solving the climate change problem.

EBA is a strong supporter of carbon emissions trading but in light of the failed governance of financial markets we most strongly recommend that the CPRS be complemented by a strong and effective transitional framework that harnesses regulatory approaches, standards, fiscal incentives and penalties, governments' own procurement and investment spend.

The CPRS as outlined in the White Paper is weak in the face of the task ahead. The main message from the environment industry is that the proposed targets in the CPRS, as outlined in the White Paper, are too low to provide a credible signal to investors who have identified 'clean' energy as a key element in the next technological era.

Compounding the problem is these low targets being locked in until 2020 and the proposed price cap for the first five years.

Investors are effectively being asked to absorb the risk of committing investment funds to infrastructure development with long amortisation periods and this in a very uncertain market. They are seeing the risk exposure but not the commercial upside.

This does not make Australia an attractive investment proposition, especially in light of changes in the USA, much closer government/industry linkages in Europe, and significant shifts in institutional investment to China already underway.

Regulate for competitiveness

Regulation and standards can help avoid some of the risk while shaping new markets for 'clean' energy services, manufacturing processes, and transportation. Regulations make companies more innovative and 'fit for the future'³. As an example of a highly successful regulated market - Germany has a vastly superior reputation and sales of automobiles (domestically and to other countries) than the USA which has a largely unregulated auto market. German auto manufacturers are not asking for multi-billion bail-outs and are instead revisiting their customers to make sure they are delivering the 'next thing' the market wants.

However, innovation needs investment as well as political will - revenue from the CPRS should be directed in this direction.

WHAT AND HOW - AND NOW

There is no one tool that will deliver a safe solution and EBA has consistently recommended a 'toolbox' approach⁴. The recommendations we put forward in this paper follow this theme and are intended to work together to generate and protect wealth. By helping to build *prosperity* rather than a one-dimensional view of *growth*, these recommendations are also consistent with the Millennium Development Goals.

Speed is of the essence if technology solutions are to have optimal impact on limiting the damage of GHGs and if they are to contribute to Australia's next era of wealth generation.

It is not sufficient to say "our long-term target for GHG reductions should aim to reduce atmospheric concentrations below 450 or 350 ppm CO₂-e". The current concentrations

³ Sigmar Gabriel, German Secretary of State for the Environment, Executive summary report on the environmental economy 2009

⁴ This term has been used consistently by EBA in international climate change meetings of the UNFCCC

are over 455 ppm and we are in the danger zone. That is why the recommendations of curtailing future emissions must be considered in tandem with drawdown of 'legacy' carbon in the atmosphere. This point may end up being overly repeated in this paper but we simply cannot overstate the importance of a dual approach.

One thing is certain, neither Australia, nor any other country, can afford to wait for some 'preferred' technology such as carbon capture and geological storage (CCS) to emerge so that our energy status quo can continue.

Existing and near horizon technologies need to be evaluated on the following:

- Can the technology be brought to commercial scale quickly enough to make a material difference?
- Is the technology cost competitive when full cost price recovery of externalities is included?
- Is it likely that the technology will reduce significantly in price once demonstrated and refined at scale?
- Is the technology safe, or could it cause unwanted side effects?
- Will the private sector be able to financially carry any long-term risks associated with the technology?

Energy efficiency and the major renewable energy technologies proposed later in this paper offer affirmative answers to these questions.

There is a long lead-time required for planning and designing the integration of new technology approaches for energy plant. This, combined with the lengthy amortisation periods for the considerable investments required, means that industry is dependent on government putting the right policy settings in place to accelerate clean energy technology deployment into a market of sufficient scale. This has become even more important, not less, with the global financial and economic crisis.

Five big steps

We suggest that policies and stimuli be focused on five over-arching objectives:

- Build new efficiencies, opportunities and options into the national economy
- Decarbonise energy services and the production and consumption supply chain
- Internalise all externality costs in pricing
- Draw down 'legacy' carbon from the atmosphere
- Help create and then access a fair share of new "Global Green New Deal" markets

Five key priorities

The key priorities that are put forward in this paper involve:

- Market reform to get rid of short-termism and the perverse subsidies that prop up negative externalities
- Regulation, financial and fiscal incentives that bring forward new standards and innovation deployment
- Government matching its policy 'levers' to the innovation available from the private sector
- New energy efficiency and low/zero carbon standards for all goods and services particularly appliances, automobiles and buildings
- A whole of life-cycle analysis approach to define and reward 'positive GDP' (e.g. waste, pollution, GHG emissions and car crashes are not counted)

Ten key solutions

The key solutions put forward in this paper focus on commercial activity with short to mid-term payback and no collateral damage:

- A price on carbon through an emissions trading scheme where the price of carbon is not capped, targets and timelines are sufficiently robust to instigate meaningful action

- Complementary measures and offsets to speed up emissions reductions and to begin significantly drawing down existing 'legacy' atmospheric carbon; for example:
 - National energy efficiency target with systemic implementation across the household, commercial and industrial sectors
 - Renewable energy target and speeded access to the grid
 - Soil carbon replenishment – biosequestration of carbon using a variety of methods to store carbon while rebuilding soils
- Helping to enhance the WTO global trading system by encouraging a global regulatory system for financial markets and environmental outcomes
- Standards and trade-in schemes
- Creating a 'Climate Bond' linked to the Future Fund, Build Australia Fund and other Government financing initiatives; enhancing capital flows from Australian and international bankers and investors (particularly superannuation funds) and providing low interest/Government guaranteed loans for energy efficiency and renewable energy projects
- Linking this investment strategy to a revised taxation approach with green depreciation, investment credits and re-investment tax concessions, performance based tax-rebates (including for individuals), and white certificates (for example to fast-track energy efficiency in the built environment)
- Government using its own investment and procurement funds to drive change – for example all levels of government mandating standards for fuel efficient and low emission vehicles for their own fleets (criteria being locally manufactured or imported vehicles/mobility systems meeting top 5 percentile performance standards on a global basis).

Mega and aggregated mega

Some of the approaches proposed – such as speeded up deployment of solar or geothermal energy – have the potential to be 'mega' in their own right; others such as energy efficiency require an aggregated approach to build scale from demand side management; retrofits; materials and resource selection; systems and infrastructure design.

COMMERCIALY ACHIEVABLE ECONOMY-BUILDING TARGETS FOR GHG EMISSIONS REDUCTION AND RENEWABLE ENERGY GENERATION

Australia could achieve 40%+ cuts in GHG emissions by 2020 against a 2000 baseline with improvements in energy and systems efficiency, materials and resource selection, advanced waste treatment and recycling, and major renewable energy deployment at commercial infrastructure scale. All recommendations below meet the criteria for the development of new markets, new industries and new jobs.

These significant cuts could be achieved by 2020 from the following areas:

20% - energy efficiency

10% - fuel switching

10% - advanced waste treatment - recycling materials, embodied energy, soil carbon

10% - solar thermal

5% - wind

2% - geothermal

2% - marine

2% - solar PV

With smarter materials and resource selection; systemic sector-wide efficiency programs; full life cycle risk and cost analysis; 'clean' and renewable energy; increased grid efficiency and distributed generation from local energy sources; fast rail for freight and transport; public transport and fuel efficient cars; Australia can achieve a decarbonised economy with a strong return on investment.

Australia can become a demonstration site for technology, infrastructure, and economic reform. The technology approaches outlined briefly below and submitted to Government in detail by a number of companies and organisations, show how these proposed cuts in GHG emissions can be achieved without negative economic impacts by using existing and near-horizon technologies.

The list below is not exhaustive, nor is it intended to dictate which technologies should be selected, but it provides an indication of the extent to which Australia can become a showcase for solutions that help strengthen economies while avoiding further environmental degradation.

Energy efficiency - *potential for a minimum 20% GHG cuts through improving the energy efficiency of the economy by a minimum 20% by 2020.* This can be achieved through a 2% compound improvement per annum in systemic energy efficiency after a 3-year period to implement programs and get savings up to the 2% p.a. level. These savings can all be achieved through measures that have a positive NPV for the economy, and with consumers gaining direct savings. Europe has recently set a 20% energy efficiency by 2020 target. A national strategy for all buildings (household, commercial, industrial, cities, public sector) and all industry sectors to become energy neutral; national energy efficiency standards for appliances and vehicles. The McKinsey cost curve demonstrated the significant GHG reductions to be made with energy efficiency – there are further considerable gains to be made by addressing materials and resources inputs and the energy consumed by large-scale urban, industrial and transportation systems.

Renewable energy - achieving diversification of energy sources, with a greater percentage of renewable energy included in the mix, is likely to remain stalled until there is clarity surrounding the CPRS and until the committed extension to the Renewable Energy Target has been fully implemented. EBA recommends that the RET should be extended to a more commercially realistic timeframe to allow for the longer amortisation periods associated with large-scale infrastructure. Also recommended is a gross feed-in tariff to encourage early stage uptake of household, commercial and industry energy self-reliance and export of excess energy to the grid. This is an industry development not a household assistance measure although there are clearly double benefits.

Renewables, perhaps more than any other emerging technology sector, require fresh policies to remove existing market barriers to their commercialisation and deployment.

It is anticipated that early baseload (2010-2012) supply from solar thermal energy in particular, could be ramped up extensively and be cost effective with the right policy settings. Over the longer-term deep geothermal is showing considerable potential to be a baseload supplier for electricity generation. It is worth noting that Germany recently stated their intent to achieve 45% of energy delivery via renewable energy sources by 2030. The UK's Centre for Alternative Technology has released a report saying that Britain could be carbon neutral by 2020 using existing technologies:

Hot rock geothermal – The emerging geothermal energy industry in Australia can be expected to provide at least 1,000 MW and potentially up to 2,200 MW of base-load capacity by 2020 into the national electricity market. With early action, 25% of new generation capacity could be met with this technology by 2030, this would equate to 10% of Australia's total generation capacity. Two companies are confident of being able to supply 500 MWe installed capacity by 2015 (with potential for initial generation being as early as 2010) and this could be significantly accelerated from 2015, reaching 2000 MWe by 2020 and 4500 MWe by

2030⁵. Australia benefits from the best known resource for deep hot rock geothermal energy and has a global leadership position. *Conservative estimate of 2% GHG reductions in Australia by 2020 increasing significantly thereafter as new plants come on line.*

Solar thermal - (with chemical energy storage and/or combined with geothermal or clean coal). A 138 km by 138 km site with 20% land coverage by solar collectors working at 20% overall efficiency, would theoretically have the capacity to provide all of Australia's primary energy – that is the analysis of one solar thermal company. At least 25% of new generation capacity could easily be provided by solar thermal energy by 2020. In an important breakthrough Australia has developed a cutting edge chemical process energy-storage technology. These generation and storage technologies now need to be moved to full scale operational deployment and refinement. Solar thermal technology has the potential to provide 300 MWe installed capacity of electricity by 2012. As examples of other countries seizing a competitive edge over the world's sunniest continent - Spain has stated its intent to roll out 100 plants; there is consideration of major solar parks in the Sahara to provide EU electricity requirements; the US State of Nevada recently completed a 64 MWe plant that was built in under 15 months. Australia has the technical capacity, the available land and the available financing to develop plants of similar (and increasing) capacity at the same speed, in other words, five plants could be operating by 2012 if the right policy indicators were put in place. A potential additional benefit of solar thermal energy is the capacity to value-add to Australia's coal exports. This would include the gasification of coal and export of liquid methanol and could deliver 30% extra energy to the end consumer while more than doubling exports, even while the world moves to a carbon constrained marketplace. *Conservative estimate of 10% GHG reductions in Australia by 2020.*

Solar photovoltaic - Investment to regain Australia's competitive advantage is considered worthwhile as there is potential for household and commercial buildings to become close to energy self-sufficient. That would lead to a lowering of demand side electricity requirements. The current constraints on solar photovoltaic deployment centre on the rate that factories can be built to manufacture solar panels. A gross feed-in tariff is required at national level to unleash the full potential of this technology. *Conservative estimate of 1-2% (above energy efficiency/solar hot water) GHG reductions in Australia by 2020.*

Marine - potential for 2,000 MWe installed capacity by 2020 reducing annual GHG emissions by approximately 1,000,000 tonnes of CO₂ and 30,000 tonnes of SO₂. This represents some 1400+ wave energy modules which have the specific additional benefit of being able to produce desalinated seawater with near zero GHG emissions. The desalination component is of considerable importance when considering the number of countries likely to face water security issues. The Carnegie technology is being demonstrated off the Western Australia coastline; the Oceanlinx⁶ technology, as demonstrated at their Port Kembla site, has been named one of the world's top ten technologies by the International Academy of Science⁷. Oceanlinx is also one of four marine energy technologies selected by the UK for demonstration at the

⁵ Australian geothermal industry association

⁶ Formerly named Energetech

⁷ This award covers all forms of technology, it is not limited to energy supply

Wave Hub⁸. *Conservative estimate of 2-5% GHG reductions in Australia by 2020*

Wind - is the lowest cost zero emissions technology currently available at scale, providing electricity at 7 cents per kilowatt hour in Australia. Wind has the potential to supply 15% of the world's global electricity demand by 2030 (1.12 million MWe installed) and to reduce global greenhouse gas emissions by 1.66 billion tonnes (3 times Australia's current emissions level). Wind energy is currently growing at 30% per annum. *Conservative estimate of 5% GHG reductions in Australia by 2020.*

Advanced waste treatment and recycling - *potential of 10% GHG cuts by 2020.*

This requires 70%+ diversion from landfill and recycling of the materials, embodied energy, greenhouse gases (specifically methane), and soil carbon in the waste stream - the high levels of nutrients and carbon in the food chain should be recycled and diverted from deep ocean outfalls and landfills. A side benefit is production of natural fertiliser (including a biochar approach) to help farmers boost soil carbon and food productivity levels while moving away from superphosphate fertilisers (this is covered further in the offsets and biosequestration section of this paper). The emissions benefits of gas capture from landfill, keeping organics from landfill and an 80% recycling target (current national average is 48%) would be a 35 million tonne reduction in emissions which could occur at low marginal cost.

Fuel switching - potential for gas (including coal seam methane) to replace coal-fired electricity generation⁹ and liquid petroleum gas (LPG) to replace stationary and transport energy especially in rural areas. Cogeneration needs to be increased, currently only 5% of total energy (about 2700 MWe installed capacity) is cogenerated. This is extremely low compared to other developed countries. There is the opportunity to increase this to 7-8% in the next decade. Gas fired cogeneration plants are typically about 75%+ thermally efficient compared to coal-fired plants which only deliver about 25-30% of energy used to the end user. At the domestic level, switching electric hot water systems to gas-fired or solar with gas-boosting water heating would significantly cut household emissions. With 50% less emissions than coal-fired electricity plants we give fuel-switching a *conservative estimate of 10% reduction in GHG emissions in Australia by 2020*

SOME SPECIFIC ACTION PROPOSALS

Highlighted in this section are some proposals for immediate action that Government and business can jointly deliver quickly to offer quality job creation and a net return on investment.

HOUSEHOLD ENERGY EFFICIENCY

There are significant reductions in GHG emissions available from making the household sector as energy efficient as possible, this has been recognised by the Government's stimulus package. A strong national energy efficiency target is an important tool to support emissions trading.

The stimulus package can be enhanced if modified to take better advantage of the expertise and time of contractors installing insulation and solar hot water systems.

A more complete household retrofit would include:

- Extend roof insulation to include cavity insulation

⁸ British Government is positioning the South West of England as a world leader in the development of wave energy technology

⁹ APPEA statement says gas industry believes it could reach 70% of Australia's electricity production by 2015

- Double-glazing
- Draught proofing
- Ventilation
- Solar hot water as well as insulation not either/or
- Solar PV panels for electricity demand, heating and cooling
- Water efficient taps, showers, and installation of water tanks (especially designs that incorporate hot water storage)
- Reflective roofs (decrease building heat, replace lost albedo reflection of sunlight)
- 'Carbon sink gardens' – bring landscape gardeners and nurseries into urban carbon footprint reduction (e.g. heat shielding); encourage 'potager' gardening where food is grown alongside decorative plants

Energy efficiency retrofits rolled-out on a suburb by suburb basis would help increase the scale of projects with the double benefit of reducing costs per household and creating projects of sufficient scale to interest to superannuation fund investors.

As with the commercial sector energy efficiency recommendations we suggest a lease-financing program or a mortgage extension¹⁰ to make it easier for householders to access energy and cost saving solutions that are not covered by the stimulus package.

New appliance standards and a trade-in program

In addition to the retrofit program we recommend an immediate update of energy efficiency standards for all appliances and electrical goods (manufactured in Australia or imported) and a national appliance trade-in program. This has the additional benefit of providing a boost to the manufacturing sector.

Reward ongoing energy saving performance with tax incentives

To further encourage households to maintain low energy consumption patterns we suggest the Tax Office provide annual tax deductions equal to the value (on a KWh basis) of energy saved, i.e. the year before retrofit is a baseline and any savings in subsequent quarters are submitted with the end of year tax return for a rebate. As energy retailers already provide comparisons there is minimal red tape involved in the process.

COMMERCIAL AND PUBLIC SECTOR ENERGY EFFICIENCY RETROFITS

Improvements in heating, cooling, lighting, refrigeration, insulation, double glazing, transport, warehousing, etc.

- At the same time as a national program to retrofit energy efficiency into the commercial sector, the public sector's own buildings and operations should be fully retrofitted. The benefits include lower energy costs to the public purse; projects of sufficient scale to warrant manufacture in Australia with increased attractiveness for superannuation fund investors; training and skilling of workforce; job creation; financial stimulus as goods and services are deployed across schools, hospitals, public housing and government buildings
- Sectoral approach (e.g. restaurants, drycleaners, supermarkets, crash repairers, etc.) to harness opportunities of scale and innovation – aggregation approach is likely to attract greater investment
- Opportunity to trial and refine innovation at commercial scale
- Lease-financing approach to bring forward action not affordable on an individual or franchisee basis – bills can be repaid on a quarterly basis as part of the energy bill

1. Energy retailers, banks, and all levels of government work together

MEGA CLEAN ENERGY PARKS BY 2030

A big vision and the right policy frameworks Australia could see Australia fuelled by renewable energy for baseload and peak electricity supply by 2030.

In addition, with sufficient support to scale up the major sources of renewable energy - solar thermal, wind, marine, geothermal – Australia could develop a series of regional hubs that provide:

- Minerals processing and value adding
- Manufacturing
- Desalination
- Biofuels production

OFFSETS – BIOSEQUESTRATION AND TERRESTRIAL SEQUESTRATION OF CARBON

A number of carbon offsets to help draw down legacy carbon in the atmosphere are available at comparatively low cost. Many of these offsets are already commercially viable and others could be revenue-generators in their own right as well as providing credits to the carbon market. Terrestrial and biosequestration carbon offsets have the potential to help farmers and agricultural communities access the commercial upside of the carbon market.

Since European settlement, the historical emissions of carbon from land management practices we now know to be unsuitable and unsustainable for Australian soils (slash/burn/deep plough/heavy use of synthetic chemical fertilisers) have resulted in millions of acres of degraded agricultural land – and some calculations suggest that these historic land-based emissions are equivalent to the past 100 years of fossil fuel burning in Australia.

Soil carbon replenishment offers a way to redress this balance and at the same time improve drought resistance and food productivity from what are currently very carbon impoverished soils (while Australian soils have a range of carbon content there are significant tracts of cropping and rangeland with soil carbon levels below 2% - 6% is generally considered a minimum necessary level).

Carbon is a key ingredient in soil organic matter. The photosynthesis process takes CO₂ from the atmosphere sequestering it, via plants, into soil. A soil with high carbon and organic content is much more productive and stable than soils whose organic matter has been depleted through poor soil management practices - excessive tillage, over-use of synthetic chemical super-phosphate fertilisers and rapid crop rotation or over-grazing. Carbon rich soils are therefore more conducive to healthy plant growth and a virtuous circle of carbon sequestration is created.

It is apparent, on the basis of compelling science, that if additional carbon and nutrients from bio-organic sources are added to Australia's depleted agricultural and pastoral soils, large amounts of legacy CO₂ can be taken from the atmosphere and sequestered.

Proponents of soil carbon sequestration emphasise that a slight increase in soil carbon across a fraction of Australia's agricultural and pastoral regions (around 500 million hectares) could sequester more than half of Australia's greenhouse gas emissions (i.e. 0.25% soil carbon increase over 2% of Australia's farmlands each year could sequester around 300 million tonnes of CO₂ per annum).

Arid and semi arid land makes up 70% of Australia's land mass. The Garnaut Report quotes estimates that these lands alone could absorb at least half of Australia's present annual emissions.

Estimates as low as \$5 dollars per tonne of CO₂ have been calculated (and arguably GDP positive due to other benefits), compared to estimates of \$80 to \$140 per tonne for CO₂ capture and geo-sequestration from coal-fired power stations (Cambridge Energy Research Associates).

These offsets are potentially very low cost and abundant, estimates as low as \$5 per tonne of CO₂ sequestered have been calculated and would facilitate Australia being capable of meeting targets in excess of 40% CO₂ reduction by 2020.

Recent research is showing that 'grass' crops in particular store carbon in a way that locks it up for hundreds of years. These plants store carbon in silica phytoliths or 'plant stones' in leaves, stems and roots. These 'plant stones' do not break down as plants decompose and they are impervious to fire.

Plant stone carbon storage helps improve the overall structure of the soil making it better able to transfer other sources of carbon to improve plant growth.

The importance of these potential biosequestration approaches merit immediate:

- Government/business/science/agriculture establishment of a series of pilot projects in different regions and with different soil and climate profiles to accurately measure the levels of soil carbon prior to enhancement; to measure increases in soil carbon following enhancement; and to calculate on a scientifically rigorous basis, the amount of increased CO₂ uptake resulting from added sequestration resulting from heightened photosynthesis
- Commission CSIRO to provide the scientific oversight and monitoring of the pilot projects and to report to the collaborators on the findings
- Following the trials, seek the inclusion of soil carbon sequestration as a valid offset under the CPRS and in the accounting rules
- Seek to have soil carbon sequestration benefits included in international schemes. There are multiplier benefits to many developing countries - Africa (Niger already provides a case study on the edge of the Sahara) and China are two countries that would benefit immediately from soil carbon replenishment
- Support the rapid uptake of the soil carbon strategy through the provision of national enabling policy and infrastructure support

Perhaps the greatest benefit of carbon biosequestration is in offset provision that helps with the timetable for economies to make the transition to a low carbon future.

Offsets where EBA member companies have direct expertise, or are linked to major research efforts include:

- Reforestation/sustainable forestry and land asset value-adding
- Surface and groundwater management
- Ecosystem financing to provide alternative sources of income to developing country communities to assist with avoiding deforestation and land-clearing and developing reforestation/native vegetation planting programs
- Replenishing soil carbon levels to productive use by recycling food, crop and forestry 'wastes', this may also include biochar processing (pyrolysis) of these organic waste streams. Charcoal is recognised long-lasting store of carbon with soil rehabilitation properties
- Potential use of algae for carbon biosequestration and to produce biofuels that do not compete with food crops or further deplete soil carbon levels
- 'Plant stone' technology
- Auditing and verification

It is important that Australia engage international bodies such as the UN (UNFCCC, UNEP and UNDP in particular) and the WTO so that they have an in-depth understanding of the immediate and long-term value offered by terrestrial and biosequestration of carbon –

Australia should be championing this carbon drawn-down approach at all levels of international negotiations starting with the next meeting of the G20.

EFFICIENT MOBILITY

Public transport

Reprioritise public transport (and weave in cycling and pedestrian friendly paths). Not only does public transport reduce the number of cars on the road it greatly increases the efficiency of cities and the accessibility of urban corridors. This efficiency gain should be recognised for its enhancement of the profitability of private business and other public sector enterprises that can legitimately be considered as 'profit centres'¹¹.

Public transport will greatly increase in appeal if as well as having a low carbon footprint it has:

- Frequent, clean, efficient, friendly services to and from the places of mass movement
- Satellite services radiating from central hubs
- Commercial centres located around hubs
- Each validated public transport ticket/season pass doubles as a lottery ticket
- Parking for individual cars is limited in urban centres

Electric vehicle

Due to the technology and infrastructure developments in electric vehicle technology this low carbon mobility approach is now being developed in a number of countries. With renewable energy off-takes from the grid the electric vehicle can begin the process of taking all 'tailpipes' off the road and at the same time the vehicles can be accessed during peak load requirements – effectively the vehicles act as mobile renewable energy storage units¹² and rolled out quickly enough there is the additional short-term benefit of negating the need for new peak power plants to be built. Further information on the technology, infrastructure and financing can be obtained from Better Place Australia¹³

Government spend can clean up the car market

If all three levels of government (including all government trading enterprises) mandated fuel efficiency and emissions reductions standards for their fleets (either direct procurement or leasing) the signal to the automotive companies would be unequivocal – the largest market in Australia is moving to world's best standard. This move would have the potential to reduce the unit cost of low emission vehicles for the consumer. As amply highlighted by the low performance standards in the USA versus the higher standards in Germany, regulation and standards can create new and viable markets.

AVOID RISK

Leading climate scientists are telling us that the next 3 to 4 years are critical to avoid overloading the atmosphere with greenhouse gases. That gives us little time to plan and take steps that will be big enough to make the necessary transition to a low carbon economy.

Society willingly accepts that we cannot compromise or trade-off on public safety when it comes to bridges, roads, buildings, planes, or large machines – it is time to demand equally rigorous application of high standards to avoid degradation of ecosystem support systems that provide essential 'eco-infrastructure' services to communities and economies (e.g. quality and quantity of waterways and groundwater; functioning atmosphere; clean air; fertile soils; amenities, etc.)

¹¹ EBA submission to Government on Sustainable Cities can be seen at www.environmentbusiness.com.au

¹² Better Place, electric vehicle technology, infrastructure and financing

¹³ www.betterplace.com

Each dollar of the Government's stimulus spend is available once only

In coming weeks and months further decisions will be made on financial and fiscal stimulus packages. It is important that this money be invested in ways that assist with the economic restructure and not wasted on encouraging short-term consumption or on buffering the community against behavioural changes that are needed.

Once this stimulus money is committed it is no longer available to other areas – it is important therefore that this public investment does not lock us for many more decades into a costly and unsustainable high carbon economy.¹⁴

Win or lose in Asia

It is largely agreed that the battle against climate change will be won or lost in Asia - if we do not help countries in our region with technology transfer, expertise capacity building and capital flows, we may well have left it too late. That is a risk that no Government should take.

The other side of the coin is that Asia is a very large potential market that Australia is not yet accessing fully and we are – compared to Europe, Canada and the USA – doing little to develop the market for our 'clean' goods and services

VISION AND LEADERSHIP IS NEEDED

Policy framework for change is urgently needed

All of the above recommendations could and should happen, but without a reinvigorated and cohesive policy framework innovation will continue to be undermined by free-riders and will not attract sufficient investment.

Australia's vulnerability in the face of climate change is one reason to lead. What Australia has had to bear from drought, floods and tragic bush-fires will only increase in severity and frequency. Large scale solutions need to be deployed, the community needs to be better informed and empowered. Government now needs to be brutally frank about the scale of the catastrophe that could emerge if urgent steps are not taken to reduce GHG emissions and to reduce atmospheric concentrations of carbon.

Vision, back-casting, timetables, targets and stepping stones

The vision must be big, bold and based on what needs to be achieved. Back-casting from the vision will help put in place the timelines, targets and stepping stones – and it will show that even in a 20 year architecture there are a great many steps which need to be taken immediately if we are to seize new opportunities and act in sufficient time and with enough impact to avoid catastrophe.

Government intervention and enabling framework needed to support private sector innovation

The private sector has innovation in technology, infrastructure and finance and the necessary expertise to deliver on an assertive carbon reduction trajectory. But the 'technology wedges' will only materialise if governments - of all levels - use policy levers to create the enabling framework for the deployment of innovation and investment in nation-building infrastructure. EBA's previous papers deal extensively with this aspect of developing markets for environmentally efficient solutions.¹⁵

Government, not the market, is the driver to long-term infrastructure. It is worth noting that no electricity market anywhere in the world has emerged without government intervention. The 'clean' energy era requires similar and urgent intervention.

¹⁴ Lord Nicholas Stern

¹⁵ 'See www.environmentbusiness.com.au – Wedges, levers and a zig zag; Targets for our future

The 'hands-off' government approach of recent years is a dismal failure.

VALUE OF THE PROPOSITION

Creating and then sharing in the new trillion dollar 'clean' technology and 'green' energy market

While the transition to a 'clean' energy future will entail costs, there is ample opportunity to buffer those costs and create millions of new jobs. The development of the international environment industry sector is expected to double its global turnover within a decade. In 2000 this marketplace was suggested to be in the order of \$750 billion, earlier this year the German Government¹⁶ released research that estimated the green markets of the future to be worth 2,200 billion Euros per annum by 2020 (their 2005 figures placed market value at 1,000 billion Euros). The International Energy Agency has released a report suggesting that the energy efficiency, clean energy and climate change technology sector will be worth in excess of \$1.3 trillion by 2012¹⁷. The Australian environment industry is estimated to be worth well over \$20 billion per annum¹⁸ it is estimated that this could increase to over \$60 billion by 2012 with assertive commercial deployment of cleantech and green energy.

Need a level playing field for new market entrants

New approaches bear all their R&D, early demonstration, trialling, refining, and market penetration costs and at the same time they are competing against old high-pollution investments that have been amortised many times over and which do not have to include their negative externalities of waste, pollution, greenhouse gas emissions in their pricing structures.

This is a free-rider problem in Australia and other developing countries, it is amplified in developing countries where supply chain demand from the West provides insufficient margin for occupational health and safety or pollution avoidance.

HOW TO IMPROVE THE WHITE PAPER

Robust targets are needed

The White Paper was foreshadowed as the blueprint to one of Australia's most significant economic reforms since the deregulation of the Australian financial markets in the 1980s. It has failed to unlock support and enthusiasm because the very conservative targets proposed are highly unlikely to encourage the investments needed to make the transition to a low-carbon economy.

The 5% basic, or 15% if the majority of the world acts, is reinforcing a deeply held international suspicion that Australia is not interested in, nor is it up to the task of participating in humanity's future.

¹⁶ In a summary of this report Germany has 1.8 million people working in this sector currently with the majority employed by SMEs employing less than 250 people

¹⁷ Improvements in energy efficiency over the past three decades have played a key role in limiting global increases in energy use and CO2 emissions. For IEA countries, energy efficiency gains since 1990 have led to annual energy savings of more than 16 EJ in 2005 and 1.3 Gt of avoided CO2 emissions. However, the recent rate of efficiency improvement has been much lower than in the past. The good news is that a large potential remains for further energy and CO2 savings across all sectors. In industry alone, the application of proven technologies and best practices on a global scale could save between 1.9 Gt and 3.2 Gt of CO2 emissions per year. In public power generation, if all countries produced electricity at current best practice levels, CO2 savings would be between 1.8 Gt and 2.5 Gt.

¹⁸ The previous Government removed the environment industry sector from ABS analysis. These figures are extrapolated from a 'National Capability Statement on Australia's Environment Industry' study undertaken by Federal Department Environment Australia in 2001. UK Trade and Investment valued the market in Australia at \$25 billion late in 2008

As the world gears up to the Copenhagen negotiations on targets, Australia should be seen to commit to carbon emissions reductions targets that have meaning and that act as real milestones for action.

A bare minimum of 25% by 2020 against a 2000 baseline is needed and as the scientific data on climate change grows bleaker on almost a daily basis, Australia's responsible role would be to opt for a 40% reduction by 2020 (this then keeps alive the option for Australia to achieve 80-90% cuts by 2050). An outline for achieving the 40% target appears above.

It is misleading to suggest that a 5% target equates to over 20% on a per capita basis. Australia's per capita emissions are at least 2.5 times higher than those of Europeans; 6 times higher than a Chinese person's emissions and 13 times higher than those of each Indian.

The CPRS targets, as outlined in the White Paper, will not deliver on either 'mega' or 'urgent'.

Let a market be a market

The White Paper has effectively taken the word 'market' out of a market mechanism and it has reinforced the failed notion that markets do not need good governance and strong regulatory framework. A strong governance framework is required for the general market and the carbon market - the CPRS does not provide this.

The low target, the low fixed price, and the fixed term to 2020 all effectively tell the market that Australia is being protectionist about its fossil fuel interests.

Even without these fundamental weaknesses in the CPRS, there is no tangible recognition of the critically important five year period at the beginning of the emissions trading scheme. This is the period when emissions trading needs to be supported by a transitional framework of complementary measures – many of which can help the drive for new markets, new industries and new jobs.

If the CPRS is redrafted and given a strong rather than a weak start, emissions trading can become a driver to ensure that innovation, infrastructure and investment are each heading in a low-carbon direction.

Cap on prices turns investors away

The problem of low targets is compounded by the cap on prices effectively disallowing the market to take advantage of commercial upside while mandating that the market carries the majority of risk.

Perhaps the worst element of the White Paper is that the low and soft targets are locked into the scheme until 2020. By this time the carbon poker game will have been decided, unfortunately it will be far too late to ask for a re-dealt hand.

Need to bolt-on complementary measures

The White Paper has reduced the effectiveness of a national emissions trading scheme to such an extent that it will have little if any meaningful impact unless a portfolio of other measures (outlined above¹⁹) are bolted-on. However, these other measures should be in use anyway to complement the CPRS, now they will be required to salvage any hope of the emissions trading scheme delivering GHG cuts of any real scope.

¹⁹ for example - soil carbon offsets to provide incentives to changes in farm practices; a very strong (and extended) Renewable Energy Target; an immediate nation-wide energy efficiency scheme; and a strong stimulus package for commercial scale deployment of 'clean' innovation including a gross feed-in tariff across household, commercial and industrial sectors

The White Paper does little to address the need for urgent upgrades of standards across the entire production-to-consumption supply chain including the built environment, transportation, technologies and appliances, and agricultural production.

As highlighted in the core recommendations at the beginning of this paper:

Complement the proposed emissions trading scheme with a strong transitional framework based on regulation, standards, fiscal incentives and financial investment. In this way a 'major polluters' CPRS' can be combined with energy efficiency upgrades across the economy, renewable energy substitution for fossil fuels, and carbon biosequestration offsets. This could result in a scheme capable of delivering a minimum of 25% cuts in GHG emissions by 2020 against a 2000 baseline and preferably 40%. Recognise the current mandate from the electorate for this deeper and meaningful action – if necessary call a national referendum asking the electorate for support for deep cuts and a big strategy to build new markets, new industries and new jobs.

Auction all permits in the CPRS and hypothecate funds

In 'Wedges, levers and a zig zag' and our submissions to the Garnaut Review and regarding the CPRS, EBA recommended that all emissions trading permits be auctioned and all revenue be hypothecated to galvanise innovation and drive structural adjustment and achieve the outcomes broadly demanded by society. We maintain that our recommendation is the correct path as it would provide financing for accelerated depreciation and ensuing plant retrofit/retirement and companies investing in 'clean' and renewable sources of energy.

FINANCING IS AVAILABLE WITH THE RIGHT SIGNALS

Achieving all the right outcomes will require major investment. The International Energy Agency and other international bodies have suggested that over 60% of financing for future climate action and clean/renewable energy supply will need to come from the private sector.

An in-depth paper is being prepared and will be provided at a later date, this section is intended as an initial overview of where financing could be drawn from to invest in Australia's economic revitalisation as part of the '*Global Green New Deal*'.

- Incentives to superannuation/institutional investor financing to invest in Australian 'clean' infrastructure projects
- Harnessing governments' spend (invest, procure, lease) with a carbon clearance certificate accompanying every dollar of public money so that government spend is reassigned to its most beneficial and least harmful outcome.
- A portion of Defence spend should be focused on basic security – bolstering provision of food, water and shelter; building new infrastructure; strengthening ageing infrastructure such as transportation and communications corridors.
- Create a 'Climate Bond' (similar concept to the Future Fund) with Government underwriting guaranteed returns for environmental infrastructure investments. Contributions to the Climate Bond to be given similar tax status as superannuation investments. Funds provided to Federal, State and local government for long-term infrastructure borrowings at 50% of the reserve cash rate. Link to Australia's Future Fund; Infrastructure Australia Building Australia Fund; Renewable Energy Fund; Climate Action Fund; and Coal Fund to catalyse investment into iconic nation-building infrastructure and provide funding to spread the risk in bringing new technologies to commercial scale operation
- Pooled index fund to harness individual investments facilitating investments in 'clean' energy and technology with a lower risk profile than normally associated new technology investment.

- Lease-financing for household and commercial sector retrofits
- Fiscal incentives – accelerated depreciation for plant retrofit, energy efficiency upgrades or retirement and replacement where necessary; reinvestment tax concessions for new technology development and deployment; double/triple dividend tax incentives
- R&D and innovation commercialisation funding extending to technology deployment
- Harnessing and re-allocating Governments' (all levels current and proposed spend – procurement, investment, infrastructure, defence)
- Re-allocation of existing perverse subsidies to sustainable outcomes
- Auction all permits in the CPRS and hypothecate revenue which should be well in excess of \$12 billion a year (funds used to finance outcomes not as handouts)
- 2009-2012 Budgets - divert proposed tax cuts to give individuals investments of an equivalent amount in national infrastructure projects. This could raise investment revenue while adding to individual savings accounts.
- Make Australia more attractive for inward bound investment and provide additional incentives to attract major international pension funds and institutional investors who are looking for long-term environmental infrastructure investments.
- Provide incentives to insurers to offer lower premiums for companies verified as taking meaningful measures in energy efficiency, pollution and waste abatement.

Full cost recovery pricing is key to financing solutions

Markets in Western countries in particular have become dominated by artificially deflated prices for fundamental goods (e.g. energy and water) and artificially inflated prices for those that are less important.

Pricing structures take little or no account of the life-cycle of costs or of negative externalities (e.g. waste, pollution, loss of soil fertility and greenhouse gas emissions). And worse, perverse subsidies have entrenched sub-optimal performance as the status quo making it even more difficult for new 'clean' technologies and infrastructure to compete.

Overcome the "coal is cheap myth"

Coal is still referred to as cheap or least cost fuel for electricity generation. The collateral damage associated with burning fossil fuels means this is not the least expensive option when negative externalities are included in full life cycle cost benefit assessments. In addition to GHG emissions other high cost externality impacts of fossil fuels include ocean acidification and mercury contamination.

Time to abandon low capex high opex

For the majority of major infrastructure contracts tender selection criteria still focus largely on low capex and fast returns. This is often made worse with demand for specific technologies or processes rather than putting the emphasis on desired outcomes.

This means that potential gains from lower operating costs and decreased externalities are bypassed along with opportunities to weave in, scale up, reduce costs and widely deploy cleaner technologies and infrastructure.

With governments as lead procurers for and investors in public good infrastructure there is a significant opportunity to fast-track the deployment of innovation by providing a 'friendly market'.

CONCLUSION

Ecology will be the economy of the 21st century

"Environmental issues can no longer be separated from economic concerns. Traditional environmental policy which deals with problems after they occur cannot overcome today's challenges. Nor is it sufficient to rely solely on market mechanisms. Governments have an important task: to ensure that prices reflect the ecological truth and to create, with a mix of supply and demand policies, framework conditions which foster the development and dissemination of environmental innovations."²⁰

EBA recommendations are to focus climate change action on building new cleantech and 'clean' energy markets, new industries and new jobs. Australia, perhaps more than any other country is well-placed to harness investment, technologies and infrastructure into a nation-building package which can in turn assist developing countries in our region – and it is worth reiterating that Asia is where the battle against climate change will be won or lost.

New low-emission technologies for electricity generation must be deployed on a massive scale to achieve the proposed reductions in greenhouse gas emissions. There is sufficient technology 'waiting in the wings' to take the immediate and major steps that are needed, but, they need to be scaled up very speedily.

The biggest challenge is monetarising tomorrow's value to galvanise action today. This requires a new policy framework from Government and financing directed towards the outcomes that society wants. We have suggested in this paper ways to use Government's existing spend on procurement, leasing, investment to overcome barriers to change.

The enabling framework approach outlined in this paper does not 'pick winners' per se, but it does create better opportunities for winners to emerge by providing the marketplace with radically improved governance structures and allowing the market to recognise and reward high performance in any sector.

Today we are trying to come to grips with the inevitable results of a market that is driven by greed, is bereft of vision for the common-good, has no comprehension of the meaning of the world "value", and has an inadequate governance structure.

Our value system has somehow been replaced with a vicious circle revolving around short-term returns. And this, in spite of knowing that our goods and services are delivered on the back of collateral damage that is destroying the context for our common good, wealth and prosperity.

"How was this allowed to happen? What ideology, what policy, what abuses made this possible? Were there any warnings? And if so, why were they ignored?" Prime Minister Kevin Rudd, The Monthly, February 2009

The next question would be – "Are we up to the task of restructuring the market, rebuilding our values, and re-engaging with innovation and its deployment?"

At the time of writing, the perverse subsidies and belief systems that supported historical imperatives still operate. While these may have been beneficial last century, now they are detrimental, systematically overriding today's cultural change and population growth, and taking no notice of the weakening ecosystem resource base.

A regulatory framework to suit our era is required to put the market back to work.

²⁰ German Government, executive summary report on the environmental economy, 2009

The current and intensifying weakening of eco-system services is a threat of far greater significance than the current financial and economic crisis. If just one of the major elements collapse – atmosphere, water supply, soil fertility, food supply - there are unprecedented economic and security implications for civilisation.

Should the rate of melt of Himalayan Plateau glaciers continue at the current rate then one third of the world's population will run out of drinking and irrigation water as the important rivers of the region run dry.

Climate change poses unprecedented economic and security threats – Australia should do more to help drive global efforts to avoid or circumvent the worst impacts of climate change because civilisation will be unable to adapt.

So, while some may continue to cite the complexity and difficulty of internalising externalities, or of changing to an economy fuelled by renewable energy, it is important to consider just how complex and difficult our world will become if we allow runaway climate change to occur.

Environment Business Australia

Environment Business Australia is a business think tank and advocacy group promoting commercial solutions to environmental challenges. As the peak organisation for the environment industry and cleantech sector we push for far-reaching policies to help shape the marketplace for clean and efficient technologies, next generation infrastructure, and smart systems and ideas.

This submission

This Environment Business Australia paper began as separate responses to the White Paper and the CPRS, submissions to Treasury regarding the Budget and the Henry Tax Review, recommendations regarding the Renewable Energy Target (RET), and recommendations for a national energy efficiency scheme.

However, because of the multiple overlaps in these papers and the need to overcome the 'stove pipe' treatment of various aspects of climate change, financial turmoil and looming economic recession, we have merged these papers together.