

Climate Change in Western Australia - Issues Paper

Various comments and recommendations submitted for consideration

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Transforming Energy Generation

The WA government's recent activity. Very encouraging progress is being made in the uptake of solar energy and the harnessing of other of alternative energy sources. This trend must increase substantially in the next decade. Unfortunately the Australian Government is currently out of tune with the rapidly changing mood of the WA community and is out of step with the WA Government.

Despite the progress, the pace of activity needs to increase markedly in the next decade. Professor Garnaut and Sir David Attenborough have forthrightly said that the heavy lifting must be ramped up now to minimise the effect and cost of mitigating climate change. Unfortunately a significant proportion of the WA community do not see that taking action to reduce the carbon gases in the atmosphere is an imperative that they should worry about. So a key challenge is to have almost all people choosing lifestyles that will help ensure an environmentally sustainable future.

Expectations of all WA politicians. Children are demanding that all politicians must work together in a concerted, sustained manner to achieve reductions in carbon emissions, and they are right! WA should be able to achieve more than 50% carbon emissions reduction well **before** the 2050 target, if an action plan is cooperatively conceived and collectively implemented with the full participation of all sectors within the next 5-10 years. Legislation directing implementation of the plan must be durable and flexible to provide assurance while promoting intelligent exploration, broad-scale learning, diverse and inspirational innovation. Key leaders in the mining industry are already committed to this target. Broad cultural change must be engendered across Australia however.

WA's situation is very different to that of the Eastern seaboard, so WA can legitimately take the lead in policy development and action on introducing alternative energy initiatives if it chooses to do so. WA should be prepared to bypass issues that are not relevant to the WA situation. On the other hand, cooperation with other states could produce efficiencies, improved the quality and rate of action, and expand opportunities. Therefore WA must closely monitor, and engage, where promising action is being taken elsewhere.

WA's level of government ownership of Synergy is strategic and highly valued by most Western Australians. Expectations and agreed standards of carbon emissions need to be understood by all sectors of the community. The Government's current direct involvement should ensure that a strong level of responsible management occurs during the long renewal process. The participation of private energy providers will be integral. The energy production change process will need comprehensive monitoring and transparent public reporting of progress will be essential at predetermined, "mile-post", times.

Effective environmental education. Improving understanding of the key issues and possible actions needs to be a high priority for the whole community including business, industries and all areas of government. It is not just the domain of schools, local government, select services and vested companies/interest groups. This education must be founded on scientific advice and promoted by credible, trusted, authentic communicators in all sectors and in the media. Companies like BHP and Rio Tinto are making commendable changes, but based on media reports, some companies, including foreign-owned companies, are side-stepping this issue. It has to become an obligation on all.

Indeed every person should know what they can and should contribute. The benefits and opportunities of switching to strategic use of alternative energy and reduction of waste need to be made clear and compelling for everyone.

Economics and finance reform. Economic adjustment and financial redirection will be needed. “Carbon taxes” and offsets, etc, will need to be reviewed and implemented in the near future in collaboration with the Australian Government. Canada has taken the lead with this and their experience should be drawn upon. Enduring tax-break schemes, fuel rebates and other concessions to the private sector should be reviewed if they encourage excessive use of fossil fuels, eg rebates for farmer and miner’s consumption of diesel, the requirements of vehicle salary sacrificing. Tax-payer concessions being claimed by foreign-owned companies under anachronistic laws should be reviewed with the Australian Government

Financial incentives have been driving the installation of household and business solar for a decade. The incentives have worked. Similar, end-dated, stimulus as well as supported research could drive the development of a new energy storage industry. The WA Government’s lithium batteries industry initiative is a very positive step, but other creative ideas should be considered in the near future, e.g. pumped solar using existing dams, decommissioned deep mines (goldfields) and pits (Collie?). Country towns might change to operating on their own independent energy collection systems involving solar and wind energy systems and lithium or other battery storage.

Technical assistance could be provided to local government and the private sector to help them identify ways to reduce their emissions, e.g. encouraging widespread use of mini “smart” cars in the city, using more electric/hybrid vehicles in say the courier and rental industries, local governments switching to battery driven machinery/tools and using more solar-powered lighting. Recharging could be provided in carparks from independent providers with their own energy collection and lithium battery storage systems.

The size and complexity of WA. The WA Government is in a unique position because of the state’s huge size, climate extremes and hence complex challenges of electricity provision. WA greatly varying regions and localities may be best served by customised solutions for different regions, centres and environments. Use of a suite of energy provision options would seem a very suitable approach. Combinations of sources would give flexibility, potentially accrue long-term savings, while still assuring certainty of supply.

WA interests will be vulnerable if the WA Government does not have sound information to support its policies and plans when negotiating funding with the Australian Government. WA will need to monitor other state’s planning and programs, as well as international developments and have compelling arguments based around the forward thinking of the mining and education sectors if it is to get much better financial support from the National purse.

The City of Perth should be the vanguard organisation lead action to decarbonising the metropolitan area. It should declare a target of zero carbon emissions by 2040 and reset the standards for urban planning. It would provide direction to regional centres and other cities. Action to passively cool and heat the city and implementing the use of electric and hydrogen powered vehicles would be essential job creating strategies.

Perth should be working in unison with the big companies that occupy its heart, the big miners. These companies have a joint mission to create a world leading technology hub in WA centred on Perth. The City of Perth must respond by exemplifying the use of their cutting-edge innovation, especially their highly responsible action to decarbonise the mining industry through automation and adoption of hydrogen as a base fuel. Perth has a successful history of use of hydrogen as a fuel in its buses (2004-7 trial), so hydrogen will not be unexpected by many WA commuters. On 19 November, 2019 Tasmania released information about its renewable hydrogen action plan. Germany already produces considerable commercial hydrogen that they will soon be using across most areas of society.

The Perth metropolitan area presents a particular challenge because most people are comfortable heavy energy consumers. If Perth is to substantially reduce its emissions in the next decade with clever cooperative planning, will need to be implemented in a phased manner. However from the good work by educators and administrators the people of Perth are mostly receptive to sensible change. Good examples are available to encourage the transition, e.g. the taxi industry is already using by using hybrid vehicles. A transport emissions strategy for the city of Perth should be a priority.

The business, industry and mining sector will need to be helped to take on more responsibility for innovation and leadership. They will need to provide resources for achieving a carbon neutral position sooner rather than later. Their contribution will need to be more than a pro-rata contribution. One way would be for the low level of WA gold royalties being raised incrementally to a level closer to most other countries. Foreign-owned companies should be expected to make additional contributions, e.g. through restructured lease arrangements or by sharing highly creative ideas and ground-breaking technological advances. An “environmental cost” factor will need to be included in all significant decision making process as a matter of course. What constitutes the “bottom-line” may need to be redefined.

Decarbonising mining. A focus of the Resources Technology Showcase 2019 was the growing commitment to decarbonising mining operations. Companies such as BHP, Fortescue and Rio Tinto have research teams investigating strategies that might enable alternative and distributed energy generation technologies to power mining and better still down-stream processing instead of fossil fuels. There is a special opportunity here as WA is ready-made for the development new alternative power systems in remote locations that have abundant levels of solar and other alternative sources. WA will benefit if these advances come through in the near future, because a range of secondary level opportunities that will arise from the creative actions of the big miners. New industry and jobs with a low carbon footprint that can be offset. The WA government is positioning itself to support for such activity, for which it must be commended.

Professor Garnaut. The widely-supported proposals by Professor Ross Garnaut relate directly to WA. His work could underpin the refocusing and development of important new alternative powered manufacturing industries in WA. His thinking is futuristic and resonates with the “renewed” WA multi-faceted energy generation and supply system that WA needs.

A 20-year phased transition will be necessary. However, the community seems to be ready for further expansion of alternative energy provision and battery storage, so the WA government should be confident to expand its current activities in this area without the broad plan. Also of immediate importance is the need for better strategic education of the community about the greenhouse effect and its consequences. An audit of school environmental teaching is also recommended. STEM should become STEM(E) where the bracketed “E” refers to environmental impact.

WA needs to be ahead “of the game” because the effects of climate change are happening earlier here than in most other places. WA needs to start its long term planning now. It could be a great opportunity because the problems that present will need clever solutions, and free open-minded problem solving has always been a strong attribute of the WA workforce. WA needs to set its own ambitious targets for 2030 to help bring on a concerted focus for change.

The task is complex, but a simple “conception” is needed that can be understood and embraced by all stakeholders, the public, business, schools etc. There will need to be a synergy and concerted, aligned across the State ,and eventually the nation.

A new vision for energy provision is needed that involves micro to mega solutions/components that complement and support each other. The state government will need to prioritise a set of alternative power generation and new storage methods that can be coupled together in different configurations and proportions depending on the consumer needs and locality constraints. WA’s off-grid and mini-grid actions should continue to be improved and expanded as they will provide transferable solutions and trigger

alternative thinking. The Government's lithium battery industry fund and also the alternative energy innovation fund are very helpful initiatives, as is its support of the big miners in their promise to develop of hydrogen gas as a baseline fuel, e.g. to replace diesel in mining, manufacturing and transport here and in northern Asia.

Building additional support. Formal think-tanks, conferencing and professional organisations etc, could help initiate new power generations projects, consolidate policy, build concerted commitment, and devolve leadership that will be needed.

However, some valuable, novel ideas could also come from informal, independent sources, eg knowledgeable individual inventors, enthusiasts, researchers, relevant networks, interest groups, philanthropists and "Go Fund Me" seekers. The government should also take steps to encourage ongoing informal input and give support to mobilise suitable innovation. Small to grand ideas should be encouraged. Ultimately most actions must not be reliant on government participation, but should be directly connectable to the strategic framework of policy and critical target outcomes that underpin the long-term direction of the concerted "climate change plan".

Strategic, collaborative planning. I recommend that an exceptional group of scientific research, business, industry, economic, planning and communication experts be formed as a project team to undertake the necessary analysis and present options for action and make recommendations to the WA Government to underpin its critical decision making about the long-term, phased transition that is needed.

Protecting Biodiversity

Our fragile ecology. The traditional farming, mining, forestry, gardening and land development practices are antagonistic to the WA natural environment and unfortunately are necessarily destructive of the natural environment. Although modified over the generations some destructive practices are entrenched and still degrading the ecology systems across WA. It is clear the “carbon bank” or biomass in the native terrestrial and marine environments is still declining rapidly despite changes in practice by many.

The damage must stop and our ecological systems greatly improved for there to be an improvement in carbon storage levels in our plants, soils and oceans. Nearly every person and industry will need to make a positive contribution for this to happen. Further building of community understanding and care for our diverse environment in all settings will need to be an enduring priority if future generations are to enjoy their world. Current land development practices need systematic review.

Because of our dry climate and poor soils, our fragile, vulnerable, highly-adapted natural ecosystems are easily destroyed. They are almost impossible to regenerate. In other parts of the world, eg the forests of Canada the recovery is much easier and more complete. In south-west WA, the wheatbelt (mallee) forest is almost gone and the remnant jarrah/marri/karri/banksia reserves which remain, are heavily stressed. Coastal and shoreline ecosystems are also heavily degraded despite the efforts of many dedicated people. These issues are due to excessive clearing, poor land management decision making and issues such as introduced animals, weeds and pathogens.

Many more plant and animal extinctions are likely and the very diverse gene pool that existed two centuries ago are still declining. Just to sustain the existing natural biomass stored in our natural assets at current levels will require major changes in activity and improved implementation of laws and regulations. Land clearing by farmers needs to be changed to stop unnecessary clearing. An annual clearing entitlement of 10% per annum appears derelict from a sustainability perspective.

The activity will need to include making old-growth areas untouchable, better implementation of protection legislation and management of people’s understanding and respect for our unique biology. I expect that some action will be in conflict with the free-wheeling, righteous attitude of some groups in our society because we have had so much exploitative freedom in the past. Canada is struggling with similar issues.

Forestry. Expanding our plantation timber industry in a variety of ways should occur as a matter of urgency because it takes at least 10 years for them to lock away significant amounts of carbon. Alternative tree species should be investigated for planting for different purposes other than saw logs, e.g. the humble, but highly resilient, fast growing, WA peppermint tree (*agonis flexuosa*) is rich in oil and exceptionally flammable and so might make it useful as renewable fuel in certain locations. It was a favourite tree of the SW indigenous peoples and European settlers. Review of the use of exotics should be part of this process, e.g. bamboo has a multitude of uses and could become the basis of a new materials industry. *Pinus radiata* has long been a valuable forest crop for timber and but has other uses including preservation of the black cockatoos in urban areas.

Forestry in the SW will become more difficult to sustain as the climate becomes drier. It is obvious that the remnant jarrah forest is stressed from heavy logging, drying soil and regular burning. The northern forest appears to have been decimated by clearing. Very careful management is needed to keep the southern forest healthy. Logging of jarrah should only be undertaken for local furniture manufacturers and crafts-people. Tourism, conservation of species, biomass storage and potential medicinal research are sufficient reason to halt all but boutique logging.

Forest fires. As we are regularly told forest fires are now the major threat and cause of huge losses of biomass, native animals, and private and community assets. The new fire control centre in the SW appears to be making a difference to existing fire-fighting practice. Rapid fire detection and response is the vital for early fire elimination. A system based on: excellent detection of risk; weather and topographical analysis; and strategic, rapid response, especially from the air, appears to be slowly evolving. However, WA should consider moving to more high-tech solutions. Right now there is a rare opportunity for the WA fire-fighting industry develop to the point that it leads

world in best practice in bush fire mitigation. This can be achieved if a futuristic redevelopment approach is taken in unison with the surge of automation innovation being undertaken by the WA mining giants.

The recent push for intelligent, phased but rapid rollout of automated mining and processing by FMG, BHP and Rio Tinto is bringing about incredible, improved ways of working and gains in efficiency. There is a great deal that our fire-fighting industry can emulate from the incredible changes that are rapidly being developed by the mining industry. The strategies include: use of real-time sensors that continuously feed critical data that is used for risk identification, rapid intervention and event prediction; satellites and robots that can scan or undertake very difficult tasks; drones that can observe and take action from the air; and machines and equipment designed to support/undertake very specialised tasks.

I believe that mining's innovation approach is the way to retrain the fire-fighting community to deal with and prevent catastrophic fire situations. There is potential for the WA fire industry to lead the world in innovative fire-fighting technology and machinery working in partnerships with key areas of the mining sector. Heavy-load drone tankers might be developed and placed on standby in strategic locations all summer. The traditional methods will always be needed, but the integration of safer, more strategic air support should give the fire-fighters more options. An innovation approach will ensure savings to the community. Innovations in the industry could be exported so that ongoing innovation can be funded and environmental damage is minimised.

More protective behaviour from residents and councils in high-risk areas should be considered. In addition, the ways of undertaking control burning of the forest should be continuously scrutinised and gradually modified to reduce their ecological impact and give more strategic protection of towns and properties. High tech innovations are needed to increase precision and efficiency, while reducing the frequency of fires.

Urban forestry. In some countries "urban forestry" in parklands is an historical but useful practice. WA local governments have turned to planting small stands of native trees on large parklands, but these don't even replace the trees that are being lost to infill housing. There is enormous scope to expand this practice and the consequence should be a cooler city, better air quality and improved aesthetics.

Quarantining the most fertile land. It is important that the most productive farmland, of which we have little, is not taken for forestry or housing developments, because it should be reserved for food production. Our most productive land is usually close to our rivers and old-established towns in the SW, but a lot of it is being developed for housing or industrial uses, e.g. the Bunbury hinterland. Where possible it should be permanently zoned for specialised farming, i.e. because of it is within close proximity to its market, which means minimal transport emissions.

Changing regional rainfall and natural biomass. Climate change models indicate that some inland regions of WA will receive much less rain. Other remote areas are likely to get more rain than at present. If so the biomass stored in the natural vegetation in these regions will probably increase in the future. Planning to secure such a potentially massive increase should be set in place.

Modelling of changes in rainfall across Australia has already been done by CSIRO. BOM data could be further researched to specifically predict where in undeveloped WA there is the most potential for the development of new highly productive farmlands. WA will need new farmlands to replace the marginal farms in the SW. New farms could be offered to young aspiring farmers with supportive government loans.

The PRC apparently has hacked the BOM database and hence no longer has to rely on Australian cooperation to explore Australia's weather history. Analysis of this data could help identify areas that are not that viable now, but could become productive farming areas in the distant future. The PRC could easily develop sophisticated business plans for clearing and developing new WA farm land without the knowledge of their long-term intention of the State or Australian Governments. The likelihood of future foreign interest in our land for agriculture etc, is high, so the WA government should develop policies soon for the management of surprising requests, especially in regard to land care and sustained health. Leasehold of land with tight environmental management rules and financial obligations should be explored.

The expansion of development opportunities, due to rapidly improving analytical and communications technologies that provide vast amounts of detailed information about WA, will be increasingly difficult for the WA government to manage.

School Environmental Education P-10. School environmental education for pre-primary to Year 10 will need to incorporate significant milestones as this area will need more specific guidance in the future. School community environmental projects help build deep understanding and care for the natural world. Students living in the inner city should have first-hand experience in the WA bush, but could also undertake projects in the built environment of the city or their suburb. For example, local government environmental projects could be strategically incorporated into school STEM programs, e.g. park plantings, wall gardens, air quality or bird population monitoring. The cross-over to healthy living is obvious. Students participating in school/community revegetation projects is common.

Recognition of competence. Children should be able to gain a government developed and authorised **Certificate of Environmental Competence** at Year 8 that formally recognises that the child has reached a suitable standard of knowledge of ecology and ways to contribute to environmental sustainability. The certificate would be issued by teachers when students have demonstrated the relevant understandings and made positive participation in environmental projects etc.

Senior Secondary School. Almost two decades ago a major review of senior secondary courses allowed the introduction of a suite of new courses to be undertaken for the ATAR. This was well received but one outcome was that the enrolments in Year 11 and 12 Geography and Biology plummeted such that many schools could not offer these courses any more. Human-focused courses, such as Psychology and Human Biology, have become very popular and religion became a requirement in many private schools. I believed this has reduced the perceived importance of the natural environment for many people. With so much our WA's income coming from the exploitation of our natural resources you might expect that studying Geography, Chemistry, Physics, Earth Science and Biology would be most popular but this is not the case. I believe this is an important issue needing review.

The Reduce, Reuse and Recycle and anti-littering campaigns have been effective and indicate that the public will respond if they understand and believe the evidence. The work that has been done on educating the public through the media is likely to engender more interest in all age groups in new initiatives and group conservation activities.

Many "baby boomers" have latent ability that could be harnessed. Many have spare time and deep knowledge of the Australian ecology from their empathy with the bush in their childhood. Many young people and recent immigrants have been raised elsewhere will not have their deep experience to draw upon. So I recommend involving more seniors as significant volunteers, wardens, field/research assistants, etc, to assist with the land conservation, management and research programs. Efforts to preserve the native vegetation and undertake planting of trees on private land were foregrounded by Landcare and in schooling in the 1990s. However since then some excellent programs have been neutered.

Decisions to open up old growth areas to logging, allow farmers to clear up to 10% vegetation on their properties, and give land developers access to fill many of the coastal plain wetlands, are wealth driven activities that have resulted in loss of important diverse and remnant habitats. Loss of habitat results in loss of species from whole districts which then to extinction. The impacts of development activity is clear when you look closely at the death rate of trees along the Forrest Highway. The clearing rules should be placed under review immediately. Land-care, tree planting and school environmental programs need to be reinvigorated.

Extinction of Species. The SW of WA is meant to be a world class diversity hotspot, but in reality much more than half of the natural vegetation has been removed so many unknown species have already become extinct. This a huge loss of the gene pool and chemical extracts, with potentially exceptional applications (e.g. in medicine), that have been lost. The remaining native vegetation needs to be regarded as a resource essential to sustaining life and so proposals for removal should be strongly resisted. Gene pool/seed pool banking should be expanded by locking up certain reserves and changing access so that human contact and use is carefully managed to still be enjoyable but protective of native species.

There is plenty of cleared land in the SW that no more clearing should be needed. The high likelihood of coastal and other low areas being inundated means that land developments in high risk areas should be banned and the vegetation left to help mitigate the problem. Tree planting should be stepped up as soon as possible. Plantation timber production needs to be ramped up and volunteer tree planting should be encouraged and even facilitated in cooperation with land holders. "Urban forestry" should be considered on large reserves and spacious unused parklands, e.g. on the old rubbish dump site next to Centennial Drive in Wilson, Perth.

The mining industry has a lot of expertise to share in this area.

Local Government. Local government's work is focussed squarely on land development, maintenance and improvement. Its workers drive the mowers, spray the glyphosate, approve sub-divisions, control waste management, assess building applications and enact important laws and regulations that impact directly on the environmental and general health of the environment.

Unfortunately I regularly observe council workers carrying out required work which is destructive to the environment. An obvious example is the excessive spraying of glyphosate in parklands, native reserves, waterways and gardens. The impact of glyphosate on human health is a contentious issue but often ignored is the impact on animals, including fish and pets. Parts of the Canning River have been very badly effected by effluent run-off. Environmental health indicators, frogs and molluscs, are absent from many foreshore areas of the Canning River where spraying is injudicious. My opinion is that there is a problem with over-servicing of glyphosate which exacerbates the problem.

Local councils need to do much more to educate their workforce and their residents and businesses about best practice of environmental. The councils are the vanguard of land management so a review of local government responsibilities and degree of control is recommended as their role in taking action on climate change is not defined and appears to be a low priority for many elected councillors.

Exemplary practice. The WA Government has been helping the WA community to identify ways to take action on climate change, such as installing solar panels and recycling. However the real task is only just beginning and best contemporary practice needs to be regularly showcased by key leading groups across all sectors of the community. For example, the Kings Park and Botanic Garden is a world class conservation and tourist gem. The KPBG Board could be assisted to take new innovative action to raise its profile as a world class organisation leading conservation and environmental education as well as showcasing WA's beautiful, extremely diverse flora and fauna.

A second way might be to facilitate a city or shire council becoming a carbon neutral, highly trained organisation that could showcase its methods and help lead training of workers/staff from other councils.

The mining and gas and oil companies and farmers are already well down this path with their pilot plants and community showcases. Other industries such as cleaning, transport and robotics could also exemplify best practice in environmentally responsible, efficient methods in a variety of ways.