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Climate change in Western Australia – Issues Paper by DWER

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1. TRANSFORMING ENERGY GENERATION

What are the main challenges for decarbonising WA's electricity supply while ensuring adequate generation capacity, security and reliability?

Renewable energy sources generate electricity at a cheaper price than burning fossil fuels. The challenge is connecting renewable energy facilities to the grid, considering some locations that are very good for generating renewable energy are not located in the proximity of adequate transmission capacity, or there are other impediments to connection.

There is a need to determine cost effective ways to store a proportion of the renewable energy that is generated so it can be used at times of peak demand, and to get the right mix and spread of locations for renewable energy to keep the network stable.

WA is the only state without a Renewable Energy Target, which if introduced, would drive more investment in renewable energy projects.

Also, WA also lacks an energy efficiency scheme, despite Victoria, NSW, SA and the ACT having schemes in place.

WA also lacks a pricing mechanism on pollution. This would be one of the single most effective instruments to not only drive down pollution by our biggest polluters, but spur investment in our local renewable industry.

A key challenge in WA is the political domination of fossil fuel industries, especially the LNG industry. The LNG sector from 5 facilities is currently the single biggest emitter of greenhouse gas emissions in WA (Ref. CCWA's Key Findings, www.cleanstate.org.au).

What are the most effective ways to overcome these challenges by 2030?

- Legislate a renewable energy target, to be 100% renewable by 2050 with an interim percentage of say 30% for 2030.
- Develop a plan to phase out all coal based generators in WA, with a just transition for workers in that industry. That capacity then needs to be replaced by a substantial state wide program of new renewable energy sources.
- Develop an ambitious energy efficiency program. Substantial gains could be made by cutting energy intensity in homes and businesses. Many have already shown it that is entirely possible, and reduces the need to build renewable generators to fully cover the current projected demand.
- Develop a subsidy scheme to encourage mass battery storage for homes and businesses – that could potentially be a lot cheaper to the government and utilities of building more generators called upon infrequently to meet peak demand.
- A program of energy efficiency and renewable energy and battery installations should be mandated for all state and local government buildings and other facilities, to demonstrate what is possible and to increase the proportion of electricity generated by renewable sources.

Should the electricity sector make a pro-rata (or greater) contribution to Australia's national greenhouse gas emission targets?

Yes, a pro-rata contribution to emission reductions. However, pro-rata may not be sufficient to assist in avoiding dangerous climate change (2 degrees C or above) due to the rapid growth of greenhouse gas emissions from the off-shore LNG industry, coupled with the proposed development of onshore gas reserves, which will over-ride other decarbonisation initiatives in the economy

How fast do you think the transition of the electricity sector should occur?

The south west of WA is already suffering 1.5 degree C increased temperature and greatly decreased rainfall of ~30% both of which are significant threats to agriculture and our unique biodiversity. The likelihood of catastrophic wild fire events has already substantially increased, and is predicted to get worse in future. Agriculture is already been impacted by climate instability, including an increased number of frost events in late winter/ early spring. Therefore, to minimise the likelihood of reaching dangerous levels of climate change, which has been assessed as being an increase of 2 degrees C or above, the transition of the electricity sector should be rapid as possible, driven by renewable energy targets and the program of coal generator closures.

2. INDUSTRY INNOVATION

What measures have been implemented by your business to lower energy use or emissions?

What are the barriers to decoupling energy use and emissions in the resources sector?

Failure by industry to take seriously its responsibility for increased emissions and their contribution to global climate change. Industry needs to be strongly incentivised to innovate to switch to renewable sources of energy.

Have you assessed the implications of the low carbon transition for your business or sector? How are these risks disclosed to stakeholders?

What exemptions should apply to trade-exposed sectors in reducing our emissions?

There should not be any exemptions.

How can the Government of WA foster clean industries and technologies?

- Support with Government funding the development of the renewable hydrogen industry.
- Support the battery industry in WA.
- Require renewable energy supply for mining and energy projects.
- Require phasing out of all new LNG and coal mining and production as soon as possible. Require carbon offsets for all existing LNG and coal mining operations, which will also create thousands of new jobs, especially in regional areas where more jobs are needed.
- Consider the impact of all new LNG projects, whether they be off-shore or onshore, on Australia's international agreements to reduce greenhouse gas emissions.

3. FUTURE MOBILITY

What are the barriers to purchasing a low emissions vehicle for your household or business?

- High cost of purchase.

What can be done to facilitate the uptake of electric and other low emission vehicles in Western Australia?

- Apply licensing concessions for EVs.
- Develop and implement a strategy for more EV fast charging points around the state.
- Introduce hydrogen fuelled buses, trucks in cities and towns in WA.

How can we further encourage use of public transport and active transport, such as walking and cycling?

- Introduce an Urban Growth Boundary for Perth so that there is no further clearing and urban sprawl.
- Limit urban development to infill along current and newly planned public transport corridors.

- Accelerate implementation of the State Government’s ‘Transit Oriented Development’ (TOD) policy, with associated public awareness.
- Accelerate the implementation of the Bike Network in Perth, and fund a bike skills training in primary schools. Ideally 5% of the state transport budget should be allocated to building cycling infrastructure and training.

How can we ensure that Western Australia isn’t left behind in the transition to cleaner transportation?

- Support the introduction of clean hydrogen fuelled buses and trucks.
- Introduce trackless trams (as described by Prof Peter Newman) on major existing roads.
- Continue with the expansion of heavy rail for public transport in Perth.
- Re-open Tier 3 railway lines in the wheatbelt.
- Do more to build safe cycling routes and provide training to encourage greater participation in active transport.

4. REGIONAL PROSPERITY

How will climate change affect your regional community?

- Regional communities are already disproportionately impacted by climate change. More extreme weather events and wildfires if not more action is taken to mitigate climate change.
- Agriculture will be impacted by increasingly unstable weather patterns – droughts, floods, frosts, water supply issues and cyclones.
- Climate change has already affected the south west biodiversity hotspot. Small changes can lead to big impacts especially in bushland plant regeneration. Some species cannot shift.
- Increased extreme hot and cold weather events affect the health of elderly, young, homeless and disadvantaged people, leading to increased illnesses and deaths.

What steps can we take to further enhance the resilience of our regions and our primary industries?

- Increase local native tree planting and carbon farming as below.
- Plant native trees as crops in the south west and Wheatbelt.
- Undertake research to determine the opportunity for carbon offsetting here in WA
- Create Ranger Parks across 5 million hectares of former pastoral leases with management by Indigenous Ranger groups.
- Investment into a State Soil Health Strategy would improve the sustainability and efficiency of WA farmers and could boost wheat production.
- Deliver a Community Power pilot program in three regional areas, which support regional communities to access the skills and expertise required to develop and deliver community-based renewable energy projects, characterized by local ownership, participation and benefit sharing.
- Increase funding to support research and development into the decarbonization of emissions intensive, regional industries such as agriculture and manufacturing.

How can we support the agricultural sector to participate in the low carbon transition?

- Provide State Government landcare grants and expertise to propagate and plant local tree and shrub flora species in tree lots on farms. Establish inter-connecting linkages across the farm landscape. The Gondwana Link (www.gondwanalink.org) is an excellent role model.
- For the leased Rangelands’ properties in the north, remove the requirement for cattle, sheep animal farming and allow carbon farming to replace this, with the possibility of kangaroo or emu or other suitable native species production. Also allow tourism to be the main income earner. Encourage and support traditional Aboriginal landowners on their country to manage these lands.
- Support the State Government’s Outback Ranger Program, working with traditional landholders.
- In low rainfall areas and the south west, on lands already cleared, support carbon farming of local native species as crops. Examples are for sandalwood production, other tree species such as Jarrah, Marri, Karri with wood suitable for building industry, furniture etc.

What opportunities do carbon offset markets present for Western Australian land managers, including Aboriginal groups?

- The opportunities for Aboriginal people in carbon farming in regional and remote areas as described are supported and should be well funded by the State Government and major mining companies.
- For the Collie region, to support regional prosperity, offsets and increased royalties on big mining companies could fund construction of wind farms and/or solar thermal plants to replace power supply to the grid after closing the coal fired power stations at Collie. This would provide jobs for former coal workers and for Aboriginal groups.

What matters should the State Government take into account in developing a strategy for carbon farming in Western Australia?

- Data availability: It is essential for the State Government to monitor and regularly report the density of vegetation cover (NDVI) in each IBRA region of WA from satellite imagery (such as Land Monitor) to ensure it increases each year, thus increasing carbon sequestration. Notably, fires will have an impact on vegetation density which will change from year to year with regrowth after fire. It is essential to achieve increasing vegetation cover in each region. The Government should invest in employing specialists in this data collection, management and reporting in an appropriate State agency. This information should be shared locally, nationally and internationally.
- It is also essential for land clearing to be stopped in the over-cleared wheatbelt and in the south west IBRA region. This is an obvious first step in increasing carbon sequestration as well as biodiversity conservation.
- Avoid large scale prescribed burning as now practised in the south west. It counteracts carbon sequestration achievements from carbon farming and destroys biodiversity in native vegetation. Use other methods for reducing fire risk and to extinguish fires by fast attack. There should not be any prescribed burning permitted on the Swan Coastal Plain especially as grassy weed growth increases and thus worsens fire risk.

5. WASTE REDUCTION

What areas can we target to further reduce greenhouse gas emissions from waste?

- Methane production must be greatly reduced. So the FOGO bin system should be introduced as soon as possible to keep organic waste out of landfill.
- Soft plastics should be banned from sale and use in WA.
- Products which are not re-useable, repairable or recyclable should not be permitted for sale or use in WA as they end up in landfill waste or in the environment including waterways and the oceans and produce emissions and/or plastic waste.

What can households, businesses and government do to reduce their waste and compost more?

- On-site aerobic composting, worm farms and should be encouraged and supported so that organic kitchen waste and garden waste do not go to landfill.
- The FOGO system should be introduced across WA so no organics, from households or businesses, go to landfill.
- Stop using single use plastics such as takeaway cups, straws, soft plastics. This needs to be put into legislation by the State Government so that it is rigorously enforced.

6. SAFE AND HEALTHY COMMUNITIES

What are the main climate risks for your household or your community? What can be done to manage these risks?

- Smoke from wild fires and prescribed burns are a significant human health hazard and cost.
- Extreme weather events, unseasonal and increasing hot weather and decreased rainfall are all significant in our south west hotspot for native flora, fauna and for us humans.
- The heat island effect in newer suburbs is real. These suburbs need excessive areas of concrete and hard surface removed and planted with local native trees and shrubs. This can be achieved on streets and on household blocks. House and building design needs changing to much smaller, solar passive (including orientation on block, materials, veranda, trees) with much less use of concrete.

- The two main issues on the Swan Coastal Plain to be addressed to reduce fire risk and its health impacts are grassy weed control and arson prevention. Prescribed burning on the Swan Coastal Plain is not supported as it actually increases the spread of grassy weeds and may stimulate arson activity. It is also a smoke health hazard and cost.

What are your biggest concerns about Western Australia's future climate?

- An increase in average temperatures, an increase in the number of hot days, damage from increased extreme weather events, and reduced.
- Significant loss of biodiversity and ecosystem stability. Loss of native fauna and flora species.

What could be done to ensure your community is better prepared for possible climate impacts?

- Provide government grants and incentives for solar panels, batteries and solar hot water systems.
- Promote the retrofit of existing housing with insulation, daylighting, energy efficiency, reduce outdoor hard areas of concrete and replace it with planting of trees, shrubs and lawn.
- Promote Urban forest greening using suitable local native species.
- Fire control: Invest in more aircraft water bombers; increase preparedness for very fast attack in the event of fire; invest in arson prevention programs such as the successful JAFFA program by FESA now DFES; educate all primary school aged children about fire, its behaviour and dangers so that they understand and are not tempted to play with it; increase arson watch programs especially for residents adjacent and near bushland areas.

7. WATER SECURITY

What can we do to encourage Western Australians to use water more efficiently and adapt to a drying climate?

- Develop a comprehensive and ambitious water efficiency program which has the potential to save the equivalent of a desalination plant.
- Invest in urban stormwater harvesting opportunities to increase opportunities to harvest and reuse urban stormwater which increases the efficiency of treatment plants and has significant environmental and climate adaptation benefits.
- Update water sensitive urban design guidelines for new communities and provide funding to retrofit existing communities.
- As groundwater levels are declining on the Gnangara and Jandakot Mounds, review the use of groundwater for home gardens and its impact on groundwater levels. As there is no charge and no metering of this domestic use, the current drawdown as a result of domestic and local government use is not well known - or is it known from past groundwater monitoring bore data? The domestic use should probably be stopped as falling groundwater levels are causing native vegetation decline and deaths.
- Immediately make restrictions for domestic home bore water use the same as for potable scheme water – ie twice per week only in summer and once per week as above.
- The volume of groundwater used by LGAs for irrigating sports facilities, public places etc should be reviewed and reduced. Sprinkler systems which deliver large droplet sizes (compared with fine spray and misting) are more efficient and should be mandatory.

Are there policies adopted in other jurisdictions we should consider for Western Australia?

- Require the Water Corporation to recycle all wastewater for re-use rather than pumping secondary treated water out to sea.
- Treated wastewater could be used to grow crops such as tree crops in agricultural and near country town areas.

What are the best management options to deal with the water security implications of climate change for our agricultural sector?

- For the drying wheatbelt region, invest in revegetation with local species on farms and along roadsides. Revegetation will result in increased local and potentially mesoscale rainfall.
- The most efficient irrigation techniques should be mandatory for all licensed horticultural users. A volumetric charge should be introduced for all agricultural and horticultural licensed users with

meters installed and monitored by the Government – as is the case for domestic potable supply in Perth. This would drive much more efficient use.

- New limits in the next Gnangara groundwater allocation plan as described are supported.

8. LIVEABLE TOWNS AND CITIES

What are the key barriers to improved energy efficiency for our built environment?

- Lack of planning laws that require energy efficiency through passive solar design for both residential buildings and commercial developments.
- Lack of solar panels and solar hot water on buildings. They should be mandatory for all new buildings and renovations.
- Excessive use of concrete and paving resulting in far too much hard surface area and lack of vegetation and shade. This includes ‘plastic lawn’ that is laid on a hard base (often crushed granite), stopping water infiltration and also creating a heat sink.
- Planning laws that allow excessively large houses on small-medium blocks where very little room for tree and other vegetation cover.

What information or tools do you require to improve energy efficiency in your household or workplace?

- Support for solar panels and battery energy storage

What energy efficiency standards or disclosure measures do you support for our homes and offices and the appliances we use in them?

- Require rooftop solar panels and solar hot water systems.
- Require north facing orientation for living spaces in all new homes.
- Set a standard for roof colour that reflects heat rather than absorbing it.
- Set standards for cross ventilation of all new homes.
- Develop planning standards for a minimum amount of permeable space for all new homes.
- Encourage the planting of trees and shrubs, particularly local native trees and shrubs to provide shading especially on west side of buildings.

How do you think climate change will affect the liveability of your neighbourhood or region?

How can we improve the retention of vegetation, particularly tree canopy, in our cities and suburbs?

- Provide greatly increased funding for DBCA Swan Region so that all Threatened Ecological Communities (TECs) and habitat of endangered species and all Bush Forever Areas are properly protected and restored. This includes the Banksia Woodlands TEC and Tuart Woodlands CE TEC. and many other TECs. These are fabulous public assets which improve public health and wellbeing.
- Stop all outer urban sprawl with introduction of an ‘Urban Growth Boundary’.
- Develop planning laws that mandate an increase in permeable space in all new developments.
- Develop planning laws that incentivise the retention of mature trees in redevelopments.
- LGAs to introduce **tree protection**. Removal of any tree greater than 3metre high should require explicit approval of the LGA. Such legal tree protection has been in place by the Ku-ring-gai Council in Sydney NSW for many years and the suburb has an excellent and community supported tall tree canopy.
- Plant local native trees and shrubs in suburban street verges and in gardens.
- Supply landholders with information on local native tree and shrub species. Promote these.

9. RESILIENT INFRASTRUCTURE AND BUSINESS

What are the key climate risks for the primary industry or resources sectors?

- Reduced rainfall with reduced pasture production for grazing cattle, sheep. Thus reduced animal carrying capacity of farms.
- Reduced crop yields.

Do you currently assess the impact of physical climate risks on your business, assets or infrastructure?

Is there information which would assist you to do this better?

What are the best ways to enhance the resilience of public and private infrastructure?

- As stated, the integration of large scale renewable energy projects such as solar farms, solar thermal plants and wind farms near country towns and/or near the grid would be beneficial. With battery storage, they could be independent of the main grid and 100% renewable. Thus after initial capital cost, they could provide inexpensive power.
- Such projects could also be smaller scale on individual properties or on small groups of properties. This would be very beneficial in remote Aboriginal communities.

10. PROTECTING BIODIVERSITY

Can existing land use and biodiversity management practices be modified to reduce vulnerability and improve resilience?

- YES! Land clearing has a significant impact with reduced carbon sequestration. The net loss of native vegetation in WA by clearing must be stopped and reversed. In the discussion paper, there is inadequate consideration of land clearing and its contribution to increased carbon dioxide concentrations by loss of the carbon sink.
- Data of vegetation extent: It is essential for the State Government to monitor and regularly report the density of vegetation cover (NDVI) in each IBRA region of WA from satellite imagery (such as Land Monitor) to ensure it increases each year, thus increasing carbon sequestration. This information is needed so that the Government can check and ensure that there is improved resilience to climate change with net increases in vegetation cover in WA each future year. In areas that are burnt, there will be a decrease in vegetation cover expressed as NDVI until regrowth occurs.
- Fire: Prescribed burning produces emissions and air pollution, and it also kills lots of native fauna and reduces biodiversity especially in fragmented areas such as Perth – Peel regions. On the Swan Coastal Plain prescribed burns destroy biodiversity and should not be conducted. It is the long unburnt bushland areas which have the lowest fire risk and lowest ground fire fuel load, and they have the highest populations of fauna and healthy flora. Wild fire risk is not necessarily related to fuel load. Management practices should be modified with increased capacity for fast attack in the event of fire by water bombers; by installation of large edge sprinklers especially in urban areas; by arson watch and JAFFA program; and by removal of dry grassy weeds on road verges adjacent to bushland before the summer ‘fire’ season.
- Complete Bush Forever implementation as planned with all sites fully protected and managed as ‘A’ class reserves. This includes the urgent need for greatly increased funding of DBCA Swan Region to manage Bush Forever Areas as planned. Also sites best located to be managed by LGAs must be transferred and actively managed to retain values.
- Invest in protecting and restoring linkages between existing patches of bushland in the Perth and Peel regions and especially along regionally significant ecological linkages and potential linkages as defined in Bush Forever.
- Complete implementation of all Regional Parks recommendations and greatly increase State Government and Local Government funding for their conservation management.
- Increase collaborative support and funding for community groups to assist in managing bushland reserves especially in the Perth and Peel regions. Note this should not replace the need for increased government funding.
- Stop all further clearing of the south west IBRA region and the wheatbelt. This should include retaining small patches and individual mature remnant trees, and all roadside vegetation especially in the wheatbelt and in the Perth and Peel regions.
- Improve awareness amongst LGAs about the need to retain and manage remnant trees and vegetation on all their lands, especially roadsides.
- Improve management capacity and expertise by LGAs to properly manage and restore their native vegetation remnants and linkages.
- In the Perth and Peel regions especially, increase funding by DBCA and LGAs for grassy weed removal which will help reduce vulnerability to fire and its biodiversity destruction..

Are there opportunities for new collaborations with landholders or communities to address climate risks and improve biodiversity outcomes?

- Yes. As above there is an opportunity for training of teams of hand weeders to be employed by landholders to remove grassy weeds from reserves on the Swan Coastal Plain especially in Banksia

woodlands which are vulnerable to disturbance. Removal of dry smothering veldt grass then allows regrowth of the underlying native shrubs and ground cover species thus improving biodiversity outcomes. There are many examples around Perth where this has been successfully achieved.

- There are many opportunities for landholders to work with local communities to help manage and remove invasive species thus improve biodiversity outcomes.
- There are major knowledge gaps in our biodiversity of the south west biodiversity hotspot (including the Perth region). To improve biodiversity outcomes and address climate risks this must be addressed. There are opportunities for government funding to conduct a range of new citizen science projects in conjunction with government specialist scientists for surveys of flora, vegetation communities, fauna, invertebrates, birds, mammals.

11. STRENGTHENING ADAPTIVE CAPACITY.

Are there gaps in the availability of adaptation knowledge, climate information or skills for your community, organisation or sector?

- Yes. As described above: There are major knowledge gaps in our biodiversity of the south west biodiversity hotspot (including the Perth region). To improve biodiversity outcomes and address climate risks this must be addressed.
- Land clearing: It is not known how much and where land clearing is taking place each year, nor how much is cleared each year (ie the net loss of vegetation cover) on all lands.
- Areas burnt should also be shown for each 6 month period on data maps.
- Information showing local native flora species suitable for revegetation projects for each region and soil type should be available. Landholders and community groups need the help and advice from a contact person such as a botanist with the relevant knowledge of flora species for their area.
- Local Government Authorities especially in rural and remote regions lack knowledge of their local native vegetation, rare flora sites and their protection, especially on roadsides and lands they manage. This needs to be addressed. On roadsides, there are examples of rare flora markers being moved, and the patch cleared thus destroying the rare species and its habitat.
- Farmers and land managers in remote areas need contacts with the relevant local knowledge of flora and fauna species. Aboriginal elder knowledge of country should be shared with community groups and landholders.

How can these be addressed?

- There are opportunities for government funding to conduct a range of new citizen science projects in conjunction with government specialist scientists for surveys of native flora, vegetation communities, fauna, invertebrates, birds, mammals. Substantial government funding is needed for this work.
- Data showing the areas and extent of land clearing and of vegetation cover in each IBRA region needs to be monitored and made publicly available by the State Government. At least 6 monthly and annual data updates need to be available on line, with changes shown. This enables the net changes in vegetation cover and density (NDVI) to be reported.
- LGAs need to be upskilled about their local native vegetation, flora and fauna species. They need to be advised to stop all clearing of their roadsides and to manage them and restore significant sites with replanting of the local species, especially if rare. Increased roadside tree and shrub cover increases tourism values in rural areas, increases wildlife habitat and resilience and has a cooling effect.

What are the main barriers to the adoption of effective climate change adaptation?

- Widespread ignorance of actions that can be taken at the local level and individual landholder level.
- Lack of State Government leadership.
- Lack of State Government funding and incentives for:
 - renewable energy production at the householder and small business level for solar panels and the power generated;
 - installation of solar hot water;
 - biodiversity management especially by DBCA;
 - scientific expertise and capacity in government.

- Lack of government (via DPIRD) support and funding for:
 - carbon farming and growing of WA native tree species for building materials and for furniture manufacture in WA;
 - ecological linkages across rural properties as in the Gondwana Link example.
- Lack of Government action via the Environmental Protection Act to prevent all increases in Greenhouse Gas Emissions from new or extended fossil fuel production (especially LNG, both off-shore and on-shore) whether for use in WA or for export.