



26

# BIG IDEAS for 200,000 JOBS

A Clean State plan for WA Jobs



Clean  
State



# Acknowledgements

**Clean State is an independent initiative advocating for action on climate change and jobs in Western Australia. We represent thousands of individuals and hundreds of businesses and other organisations who are dedicated to climate action across the state. We promote solutions that create thousands of jobs supporting businesses, families and communities and make our state a fairer, safer place to live and work.**

The **Conservation Council of WA (CCWA)** is the state's foremost non-profit, non-government conservation organisation, representing almost 150,000 supporters and 105 member groups. CCWA has been an advocate for conservation and a sustainable Western Australia for more than 50 years.

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We acknowledge that we meet, work, and live on the land of the Nyoongar people. We pay respect to their Elders, past and present, and acknowledge the important role all Aboriginal and Torres Strait Islander people continue to play in advancing a more sustainable Western Australia. We acknowledge the Traditional Owners of this country and their continuing connection to land, waters and community. We pay respect to their Elders past and present, and to the vital role Aboriginal and Torres Strait Islander people continue to play in caring for Country across this state.

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# 26 big ideas for 200,000 jobs

Sector			Proposal		Jobs	PG
	Energy	1	Repower WA with Renewables: 90% by 2030	8650	7	
		2	'Bright Sparks' Solar powered schools program	4015	10	
	Buildings	3	Build 15,000 new, low carbon social housing homes in 3 years	59,660	14	
		4	Repower & retrofit WA's 44,000 social housing homes in 3 years	3830	16	
	Transport	5	Ride to Recovery: World's best place to cycle	5220	19	
		6	WA-made electric tram network for Perth	350	22	
		7	WA-made electric bus fleet	120	25	
		8	Powering ahead with electric vehicles	250 – 635	27	
	Conservation economies	9	Partnerships for Conservation – regenerating the wheatbelt and rangelands	200	31	
		10	Urban and Regional Conservation stimulus	2209	34	
		11	Blue Carbon and marine conservation	120 – 270	37	
		12	Unlocking our Carbon Farming potential	6060	41	
	First Nations	13	Closing the Gap: Urgent Infrastructure & services investment	566 – 650	46	
		14	A transformative, state-wide Aboriginal Place Naming Project	251	53	
		15	Expand Aboriginal Rangers & support culture and conservation enterprises	180 – 200	55	
	Industry	16	Zero emissions metals & WA-made wind turbines	91,500	59	
		17	Decarbonise LNG production and transition to renewable hydrogen	4000	63	
	Resilient regions	18	Fund overstretched emergency services in the regions	150 – 200	67	
		19	Improve Digital Connectivity through the SuperNet	320	69	
		20	Forests for life, climate and communities	3490	71	
		21	A bright future for Collie	1550	76	
	Tourism	22	Low carbon, local tourism	3145	79	
		23	Support & expand the development of Aboriginal Tourism	190-1240	84	
	Waste, materials & circular economy	24	Reboot Recycling & Resurrect Repair Labs	1300	89	
	Public sector, care industries & supporting women	25	A Supercharged, Zero carbon public sector	350 – 850	93	
		26	Supporting female participation and leadership in a zero-carbon future	4300	95	
TOTAL				204,215		

## overview

**This report sets out an ambitious program of action on climate change and job creation in Western Australia. The initiatives outlined in this paper have been developed in partnership with some of WA's foremost experts, practitioners and stakeholders across a range of sectors. Together these initiatives can create thousands of new jobs, drive down carbon pollution, and make WA a fairer, safer and cleaner place to live and work.**

Globally we have entered the critical decade for addressing climate change, and Western Australia has a vital role to play. Western Australia can benefit significantly from the transition to a zero-carbon future. The McGowan government's target of net zero emissions by 2050 sets the direction for a comprehensive and ambitious plan of action from government, community and industry working together.

While Western Australia is vulnerable to the impacts of climate change, our state is also one of the best places in the world to contribute to and benefit from the opportunities associated with climate action.

Each proposal contained in this plan provides exciting opportunities for WA businesses, communities, families, and individuals. The plan has been developed to ensure all parts of our community can share in the benefits and opportunities.

The transition to a zero-carbon economy presents the most significant development opportunity in Western Australia's recent history, with transformative potential for businesses and communities in every sector.

This transition will involve rebuilding energy generation to several times the current output. It will include major new infrastructure, transport construction and engineering projects. New sources of clean and affordable energy will unlock significant expansion in minerals processing and drive new and expanded manufacturing industries.

Local government and community groups will be essential partners in delivering local solutions for a zero-carbon future. Land restoration and regeneration will provide new opportunities for regions, farming enterprises, pastoralists and Indigenous land managers. Schools, health workers, Aboriginal enterprises, and volunteer fire brigades are just some of the many groups that will be engaged in ways that will deliver multiple benefits for people and communities.

While the policy recommendations contained in this plan are focussed toward the WA State Government, leadership, investment and support from business, local government, community groups, and individuals is also essential.

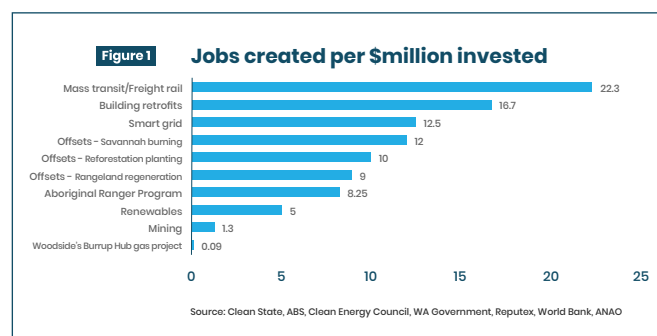
The proposals cover a range of sectors and themes, but they are by no means exhaustive. Instead, they provide a launchpad and a map of opportunities for the first essential steps in Western Australia's journey to a zero-carbon economy. Over time, the ideas and initiatives can be further developed and built upon as momentum builds, new opportunities are developed, and new challenges are addressed.

### Low carbon opportunities for COVID recovery

Many of the initiatives outlined in this report can provide direct and immediate economic stimulus and employment outcomes as part of a COVID-19 recovery that delivers a better future for WA families, communities, and businesses. We can use this opportunity to address the health, social, economic, and climate crises together.

The economic case for a low-carbon stimulus package and 'building back better' is overwhelming. Economists, business leaders and policy experts around the world are making compelling arguments to support low-carbon investments as the best option to help economies recover.<sup>2 3 4</sup>

Research shows that far more jobs are created in low carbon industries than conventional or fossil fuel-based areas for each dollar invested (Figure 1).



This is our opportunity to reboot our economy, accelerate climate action and support families and communities by creating a cleaner, fairer and healthier Western Australia.



## West Australians want to build back better

In June 2020, Clean State commissioned polling by Patterson Research group to understand attitudes of West Australian voters towards COVID-recovery and economic stimulus measures.

The research, which canvassed nearly 1000 people from across the state found that West Australians from all voter groups overwhelmingly support recovery efforts that create a cleaner, fairer economy for WA.

- Action on climate change, conservation, and the 'care economy' are seen as powerful job creators that can grow the economy faster than resource industries or road building.
- Investment in renewable energy and batteries, aged care, social housing, public transport, landcare and conservation all receive a very high level of public support for stimulus investment.
- In contrast, voters are sceptical of recovery efforts that subsidise the gas industry or reduce environmental standards. Cutting red and green tape for mining projects and investments in the oil and gas industry received the lowest levels of support.
- There has been no reduction in the level of concern about climate change despite the COVID-19 emergency.

Overwhelmingly, West Australians (85% of respondents) support stronger action on climate.

## Why this plan now?

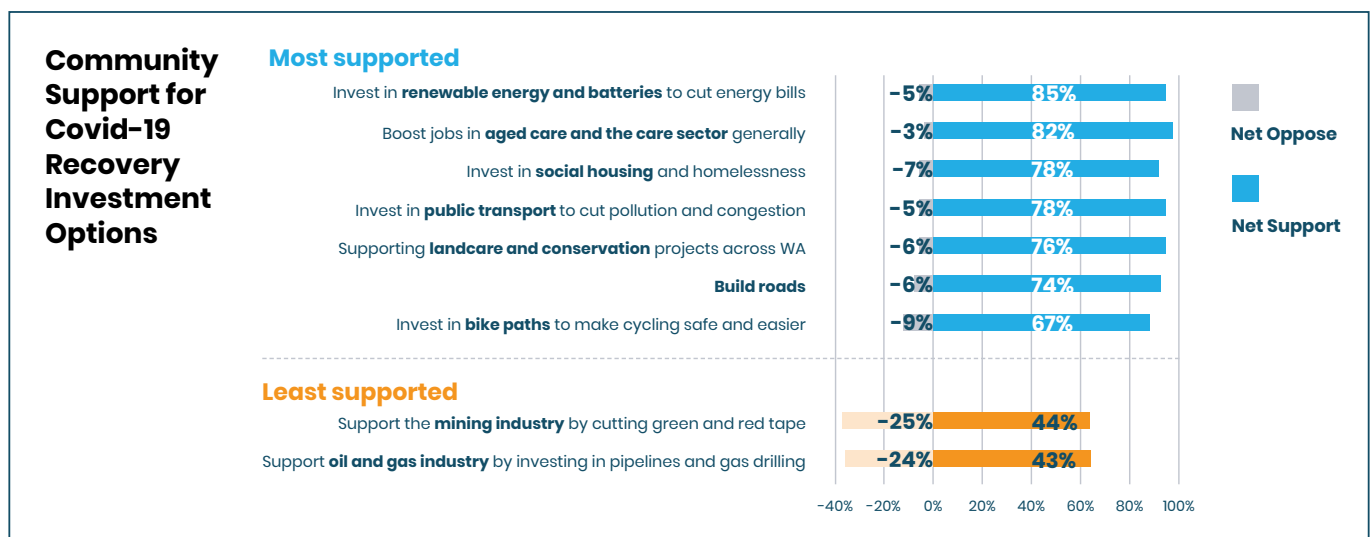
The initiatives contained in this report were selected to provide multiple benefits to our state as part of a program to transition to an economy that is cleaner, safer and fairer for all Western Australians.

The proposals and initiatives which have been selected can:

- Improve energy productivity and reducing energy costs for households, businesses and government agencies.
- Kick-start a boom in a renewable energy powered manufacturing and minerals processing industries.
- Set up WA as a global leader in carbon sequestration, carbon farming and low carbon agriculture.
- Future proof our city by delivering clean and efficient transport infrastructure.
- Support a healthy environment by maintaining WA's unique and threatened biodiversity.
- Invest in our regions to improve the resilience of regional communities.
- Support WA's most vulnerable individuals and communities so that nobody is left behind.
- Engage a diverse mix of organisations to manage risks and share the benefits.
- Reduce overall costs and deliver efficient economic outcomes by transferring costs to those who are in a position to reduce them, including by shifting the costs of carbon pollution to WA's biggest polluters.

Estimates of cost, job creation and carbon pollution savings are provided for each of the initiatives where data is available. Many of the initiatives have the potential to generate carbon credits which could assist with recovering costs from our biggest polluters.

This plan provides a mix of 'quick wins' which can deliver immediate results, as well as opportunities to support and benefit from the long term economic and structural changes required to achieve net-zero emissions by 2050 in Western Australia.



## Three types of proposals

### Quick wins

Includes 'Shovel or Screwdriver Ready' projects. These are opportunities where mature technologies can be deployed through existing or known delivery mechanisms to provide immediate job creation and emissions savings.

### Emerging powerhouse

Chosen to create lift-off in areas where WA has a competitive edge or can take advantage of an emerging opportunity within the next five years. These projects may require assistance with research,

development and commercialisation by local businesses and economies, particularly in new manufacturing & export industries.

### Transition and opportunity

These are areas where immediate opportunities exist on a pathway to significant structural shift over a longer timeframe. For these initiatives, action is required now to unlock the transformative potential that could be realised over the next decade and beyond. Special attention from government is required to support communities in transition, to ensure nobody is left behind, and to put in place a strategic framework to support and drive change so new opportunities can be created and adopted in a managed way.

Summary of proposals by type		
Quick wins		'Bright Sparks' Solar Powered Schools program
		Build 15,000 new, low carbon social housing homes in 3 years
		Repower and retrofit WA's 44,000 social housing homes in 3 years
		Powering ahead with Electric Vehicles
		Ride to Recovery: world's best place to cycle
		Fund overstretched emergency services in the regions
		Improve Digital Connectivity through the SuperNet!
		Partnerships for Conservation - regenerating the wheatbelt and rangelands
		Urban & Regional Conservation Stimulus package
		Closing the Gap: Urgent Infrastructure & services investment
		Low carbon, local tourism
		A Supercharged, Zero carbon public sector
		A Transformative state-wide Place Naming Project
		Expand Aboriginal Rangers & support culture and conservation enterprises
Emerging powerhouse		Unlocking our Carbon Farming potential
		Aboriginal tourism
		WA-made Electric bus fleet
		Blue Carbon and marine conservation
		Decarbonise LNG production & transition to renewable hydrogen
		Reboot Recycling & Resurrect Repair Labs
		Supporting female participation and leadership in a zero-carbon future
		WA-made Electric Tram network for Perth
		Repower WA with Renewables: 90% by 2030
		A bright future for Collie
Transition opportunities		Forests for life, climate and communities
		Green Metals: WA's renewable industrial revolution

## What net-zero emissions mean for Western Australia

The McGowan Government has established Western Australia's long-term carbon reduction goal of net zero emissions by 2050. When combined with immediate peaking and reduction in pollution, this target is consistent with the global temperature goal established under the Paris Agreement, which aims to keep temperature rise to as far below 2 degrees as possible.

To achieve this goal, global emissions must peak and then reduce immediately, and continue to fall to reach net-zero emissions by 2050, followed by a period of negative emissions (also known as net sequestration). The amount of carbon emissions that can be released into the atmosphere before 2050 is referred to as a 'global carbon budget'. If more of the budget is used up early, through delaying action to cut pollution, then the goal of net-zero emissions will have to be brought forward, requiring even steeper cuts to emissions, increasing costs and reducing the opportunity for a smooth transition.

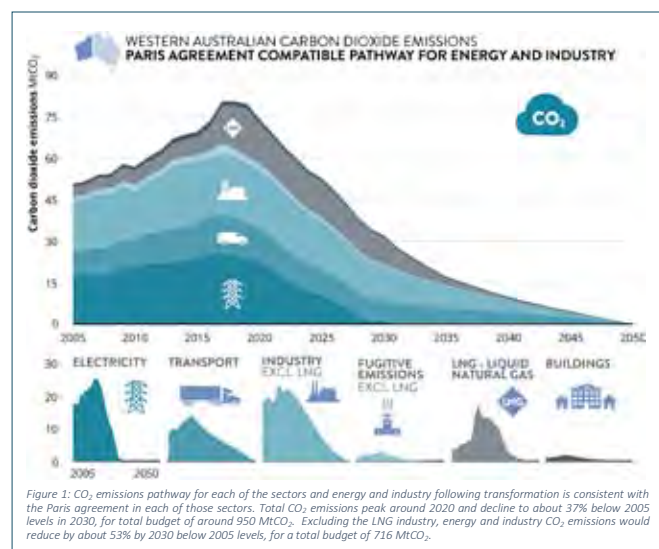
Carbon budgets that are consistent with the global temperature goals under the Paris Agreement are termed 'Paris compliant'. This approach provides guidance on the speed of emissions reduction that will be required and allows shorter-term targets to be established as milestones along the way to the 2050 goal.

## A Paris-compliant carbon budget for Western Australia

In 2019, Clean State and CCWA commissioned the first Paris-compliant carbon budget for Western Australia, developed by globally leading Berlin-based climate and energy research institute Climate Analytics.

The carbon budget shows how Western Australian emissions must peak around 2020 and decline to about 37% below 2005 levels by 2030, establishing a Paris compliant interim target for emissions reduction in WA.

To find out more about what the Western Australian carbon budget means for WA, and each sector of the West Australian economy, the climate Analytics carbon budget report can be downloaded from the Clean State website.



## This Clean State Jobs Plan will deliver:

- Economic benefits worth **\$2.4 billion** per year and another \$2.9 billion in additional export revenue from a Green Metals industry.
- Emissions savings of over **60 million tonnes per year** by 2030 (that's a 66% reduction!).
- Over 200,000 low carbon, high quality jobs including:
  - 98,000 permanent jobs,
  - 6450 manufacturing jobs, and
  - 30,000 'shovel & screwdriver ready' jobs per year in construction, installation, arts and science projects that could be delivered right now.





# energy

Western Australia's energy sector is one of the best places to start to create thousands of jobs and drive down emissions. With the best sun and wind resources in the world, it's time to harness the economic benefits and renewable potential of our state. All Australia's other states & territories are embracing the clean energy transition with renewable energy targets, and WA's lack of such a plan is a failure to grasp an excellent opportunity.





## IDEA 1.

### Repower WA with Renewables: 90% by 2030

REPOWER WA	Jobs
Manufacturing	700
Grid upgrading and fossil decommissioning	700
Construction & Installation	4450
Operations & Maintenance	2800
<b>Total</b>	<b>8650</b>

**8650 JOBS**

### The opportunity

Western Australia's energy sector is one of the best places to start to create thousands of jobs and drive down emissions. With the best sun and wind resources in the world, it's time to harness the economic benefits and renewable potential of our state. All Australia's other states & territories are embracing the clean energy transition with renewable energy targets, and WA's lack of such a plan is a failure to grasp an excellent opportunity.

	ACT	Tas	SA	Vic	Qld	NT
<b>Target</b>	100%	200%	100%	50%	50%	50%
<b>By the year</b>	2020	2040	2030	2030	2030	2030

Repowering WA with renewable energy provides a once in a generation opportunity for infrastructure investment, jobs and value creation that will be a powerful driver for economic activity for decades to come.

### The proposal

Powering WA's Southwest electricity grid with renewable energy by 2030 is both affordable and achievable<sup>1</sup>.

The costs of building and delivering renewable energy solutions are reducing every year, and large scale wind and solar are already able to deliver cheaper electricity than coal and gas<sup>2</sup>. Repowering WA can reduce energy bills for homes and businesses, and support significant growth in manufacturing, minerals processing and other energy-intensive industries that can employ more people here in WA.

A report commissioned by Clean State has found the move to 90% renewable electricity on WA's South West Interconnected System (SWIS) is technologically possible by 2030 and would create over 8600 jobs.

The *90% Renewable Energy Roadmap* created by expert group Sustainable Energy Now provides a transition blueprint for the SWIS – WA's main electricity grid covering most of the population and spanning from Geraldton to Kalgoorlie.



## The proposal continued

For this plan, new renewable energy generation capacity totalling 11.7 GW of will be required by 2030. Optimising the mix of technology to take into consideration electricity demand, weather, cost, technology and the design of the SWIS grid, the SEN model suggests that this should be made up of:

- 5000 MW wind
- 4500 MW rooftop solar
- 2200 MW utility solar<sup>3</sup>

This investment would provide a significant number of jobs to build the infrastructure required. Each year, 800MW of new renewable energy capacity would need to be added, which is, roughly equivalent to the sum of the following:

- **2 windfarms** the size of Merredin's Collgar wind farm, each year (206MW)
- **1.5 solar farms** the size of the Merredin Solar Farm, currently WA's biggest, every year (132MW)
- **1 'big battery'** the size of SA's Tesla giant battery at Hornsdale every two years (100MW)
- **~3500 'prosumer' batteries** the size of the Tesla Powerwall installed each year (13.5kWh/0.135MW)

There would also be additional investment and employment opportunities in providing energy storage and grid services to compliment this generation mix.

Much of the rooftop solar can be delivered by private investment if WA's electricity market is reformed to enable rooftop solar and battery systems to link into the grid productively. Increased battery storage would stabilise the network, and with 78,000 houses in WA coming off a 40c feed-in-tariff this year, there is a prime opportunity to encourage these households to upgrade and install a battery.

Besides the climate benefits and direct employment gains accompanying these investments and reforms, a timetable for the staged and managed closure of WA's coal-fired power stations will avoid energy and business uncertainty, both for the state and for those currently working in the industry.

## How many jobs would this create?

The SEN modelling estimates that transitioning to 90% renewable electricity by 2030 would create 8650 jobs in 2030, with an average of 5500 per year.

This includes:

- **4400** construction and installation jobs
- **2300** permanent jobs in operations and maintenance
- **700** manufacturing jobs
- **700** jobs in upgrading the grid and decommissioning old generators

The above estimates assume 10–33% local manufacturing (depending on the technology); however, WA could capture a greater share of manufacturing with targeted programs and policies to support local manufacturing industries.

## How much carbon pollution would this save?

Climate Analytics modelled a Paris Agreement compatible and cost-optimal emissions pathway for WA's electricity generation to be one-third renewable by 2025, 90% renewable by 2030 and 100% in the early 2030s. This would reduce emissions from the electricity sector by 95% by 2030 and see the sector achieve net zero emissions by 2035<sup>4</sup>.



## What would it cost?

Repowering WA will require a mix of investment by government and the private sector. While some assets such as grid infrastructure should be maintained in public ownership, the need for significant new generation capacity presents opportunities for private investment. In other states, 'reverse auction' processes have been used successfully by government to underwrite investment in new generation at no net cost to government.

## Action required now

The transition to renewable energy for the SWIS grid is already underway, including through:

- The rapid uptake of rooftop solar systems by homes and businesses;
- A 'Powerbank' program to roll out community batteries as part of a 'Distributed Energy Resources' (DER) roadmap;
- The 'Energy Transformation Strategy' currently under development.

While these initiatives are underway, further action is required to unlock the jobs and economic stimulus that would result from repowering WA with renewables. This includes:

1. Setting a WA Renewable Energy Target.
2. Planning the retirement of coal-fired generation with a fair transition for Collie workers (see separate initiative).
3. Fast-tracking approvals for renewable energy projects to connect to the SWIS network.
4. Providing a 'connection guarantee' for renewable energy projects in areas where sufficient grid capacity exists, or where they include integrated supply and demand management such as batteries which can be remotely controlled by the network operator.

5. Accelerating the Distributed Energy Roadmap to complete it before 2023.
6. Reforming market and pricing arrangements to support peer-to-peer trading and a shift to localised energy grids.
7. Using government purchasing power to specify renewable energy for all government electricity contracts.
8. Working with Western Power and Local Government to retrofit all streetlights with LED lighting technology by 2022.
9. Establish a revolving fund to provide low-cost finance for community organisations, churches, sporting clubs, local governments and businesses to invest in rooftop solar solutions.
10. Providing incentives for electric vehicles using network services (such as free EV charging during periods of excess renewable energy generation).
11. Retrofitting all social housing with renewable energy (see separate initiative).
12. Delivering our Bright Sparks' Solar Schools Program (see separate initiative).
13. Working with Collaborative Research Centres like RACE 2030 to identify and deliver other renewable energy and energy storage projects.

## ACKNOWLEDGEMENTS

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Carbon  
saved from  
atmosphere

**22 million  
tonnes**

per year

## IDEA 2.

### ‘Bright Sparks’ Solar-powered sustainable schools’ program

BRIGHT SPARKS SOLAR SCHOOLS	Jobs
Solar installation	3975
Energy Audits	20
Department staff	20
<b>Total</b>	<b>4015</b>

**4015 JOBS**

“Imagine if we covered every WA classroom with solar and turned them into a network of community energy hubs”

– Australian Youth Climate Coalition

#### The opportunity

Schools offer one of the most cost-effective carbon abatement opportunities in the built environment.<sup>5</sup> WA’s 870 public schools have large roof space, high energy usage, and many have huge power bills.

**A large primary school can spend between \$70,000– \$300,000 a year on energy bills, and schools in WA’s hotter regions are known to spend up to \$1 million a year on power bills.**

Schools also provide the ideal location for the addition of batteries to act as distributed community energy hubs to stabilize the grid and store solar electricity, providing power when the community needs it most – on afternoons when the school has closed, night-time and weekends.

Investment in solar schools’ cuts energy bills and provides jobs, with the investment recovered in a short time. This investment also creates more comfortable learning environments for students, making schools cooler in summer and warmer in winter.

Money saved from lower utility bills could go into improving the efficiency of school infrastructure (i.e. buildings and appliances) through better lighting and natural ventilation, greenery and improved air quality. Research has demonstrated that well-designed, sustainable classrooms lead to better student learning outcomes, increase in retention rates and better student and staff morale.<sup>6</sup>

#### The proposal

The *Bright Sparks* Solar powered, Sustainable Schools program across WA’s 870 public schools involves:

1. An energy and resource efficiency program that engages the whole school to audit their energy, water and waste consumption to calculate and track the carbon footprint of their school and implement low or zero cost measures and behaviour change (through for example the WA ClimateClever program).
2. A state-wide rollout to install rooftop solar and batteries to every public school through a ‘revolving energy fund’.
3. Targeting early investment towards schools with the highest energy bills such as those in the north west regions of WA who need to run air conditioning continuously, and where community batteries provide the greatest benefits.

Clean State propose this occur over 5 years.



## The benefits

A 100kw solar system will provide enough power for a school with 1000 students and save between \$15,000–\$30,000 every year on power bills every year.<sup>7</sup>

With an average saving of \$20,000 per school, approximately \$17.4 million could be saved every year across the state, or \$435 million in savings over the lifetime of the panels.

The addition of batteries would help solve the problem of distributed grid stability identified in the state government's DER roadmap and would provide further savings in the form of deferred costs of new grid infrastructure and generation capacity.<sup>8</sup>

## How much carbon pollution would this save?

130,000 tonnes of greenhouse gas emissions could be saved every year if all 870 WA public schools had 100kw solar systems.

## What would it cost?

The average commercial price for installation of a 100kW solar system in Perth 2020 has fallen to around \$100,000<sup>9</sup>; however, bulk-purchasing could reduce this further. The total installation cost across all 870 WA public schools is estimated to be around \$78 million.

**When savings are taken into consideration, this program could be delivered by the Department of Education at no cost – and would generate millions of dollars in future savings in electricity costs.**

Clean State recommends a revolving energy fund that lends money to schools to purchase and install the panels, which is paid back by schools from the savings on their power bills.

With a payback period of five years or less, payments will be less than the savings from energy bills. This means the program can be delivered with no impact to annual school budgets, and schools can create a cash flow positive outcome from inception with no upfront costs<sup>10</sup>.

## How many jobs would this create?

This initiative is estimated to create 4015 jobs in energy and sustainability auditing, efficiency retrofits and solar and battery installation. Further jobs can be created by reinvesting ongoing savings on electricity bills.

## CASE STUDY:

### Savings from solar

Infinite Energy has installed solar PV in hundreds of schools across Australia

- A 40kw system installed at St Emillie's Catholic primary for \$44,520 is saving the school \$10,600 a year in bills and 51 tonnes of emissions.
- A 94kW system installed at Sacred Heart secondary college in Sorrento for \$168,000 (in 2014) is saving the school \$40,000 in bills and 95 tonnes of emissions each year.
- A 100kW system for Carey Baptist College that produces 162,070kWh of clean energy every year and saves the school \$29,000 a year on electricity bills.
- A 512kW system at Scotch College installed in 2018/2019 at a cost of around \$1 million is expected to save the school \$235,000 a year (or 4 million in reduced energy costs over the life of the assets) and saves 649 tonnes of emissions each year.<sup>11</sup>



## CASE STUDY:

### 'ClimateClever' WA Schools Pilot Program

In 2016, a two-year Low Carbon School Pilot Program was launched with 15 schools in metro Perth to assist them in reducing greenhouse gas emissions and costs from energy, water and waste.

During the pilot, the participating schools identified over 600 low carbon actions, the majority of which were low or no cost.<sup>12</sup> The program saw greenhouse gas emission savings of 20% per school, and utility bills being reduced by \$16 per student (e.g. \$4,800 for 300 students).

A tree planting program involving students also offset the entire emissions of all schools, making every school carbon neutral.

After the success of the two-year pilot, an online platform and App was developed to scale the program. The 'ClimateClever Initiative' was launched nationally in 2018. Since then, over 55 schools across Australia have participated in the Program.

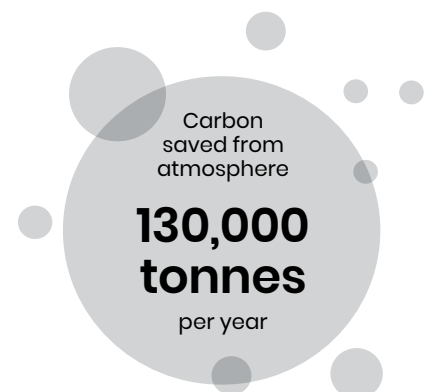


*Dr Vanessa Rauland, ClimateClever*

ClimateClever provides a nationally consistent, data-driven approach to measuring, monitoring and reducing carbon emissions in schools, and is designed to be led by students. The program enables students to use their buildings as a living laboratory by getting them to enter and track data from their school utility bills, audit their rooms and appliances and manage the implementation of sustainability actions across the school.

## ACKNOWLEDGEMENTS

Clean State acknowledges **Infinite Energy**, **Dr Vanessa Rauland** at ClimateClever, **Brian Innes** at Plico Energy, the **Energy Efficiency Council** and **Australian Sustainable Built Environment Council** (ASBEC) in the development of this proposal.





# buildings

WA's construction industry is one of our largest employers, employing 120,000 people. Housing construction is one of the most powerful job keepers and economic multipliers across the economy, and construction will play a huge role in WA's economic recovery.





## IDEA 3.

Build 15,000 new, low carbon social housing homes in 3 years.

SOCIAL HOUSING CONSTRUCTION	Jobs
Construction	58,500
Solar PV installation	1150
Additional department resources	10
<b>Total</b>	<b>59,660</b>

**59,660 JOBS**

### The opportunity

WA's construction industry is one of our largest employers, employing 120,000 people. The industry has been one of the hardest hit by COVID-19, with the rate of new homes being built has falling to 35-year lows.<sup>13</sup>

Housing construction is one of the most powerful job keepers and economic multipliers across the economy, and construction will play a huge role in WA's economic recovery.

Stimulus spending on social housing provides one of the best opportunities to save existing jobs in the housing sector and create new jobs over the longer term but has the obvious additional benefit of providing much needed housing for Western Australia's most vulnerable.

There are currently 14,000 families on WA's social housing waiting list, waiting an average of 94 weeks for a home. Another 9000 Western Australians are experiencing homelessness with 1000 of these sleeping rough each night.<sup>14</sup>

### The proposal

**A Low Carbon Social Housing Construction stimulus package that:**

1. Delivers 15,000 new social housing dwellings built to 7.5-star (NatHERS rating) and the 'Improved Liveability' accessibility standard within three years.
2. Provides each home with 3kw rooftop solar systems (and battery systems to multi-unit dwellings).
3. Leverages support for a local low-emissions building materials sector using sustainable building products.

4. Uses government-owned land and prioritises sites along future transit routes as two opportunities to catalyse urban regeneration and affordable living in these sites.



### What are the benefits?

The ABS has reported that every \$1 of residential construction generates an additional \$3 activity across the broader economy<sup>15</sup>. **This package would, therefore, generate \$4.7 billion in economic activity each year.** Every dollar spent is also estimated to boost GDP by \$1.30<sup>16</sup>.



## What are the benefits? continued

Energy-efficient, solar powered homes are not only healthier to live in, but also reduce energy bills for occupants by \$500-\$800 per year. This proposal would deliver an annual saving of **\$7.5 million** which would be spent in local economies instead.<sup>17</sup>

Providing safe, secure housing to people experiencing homelessness also has significant benefits for our health system. A WA study found demand on health services significantly reduced following entry to a public housing tenancy, estimating direct health care savings of **\$4,846 per person per year**.<sup>18</sup>

This means this initiative could deliver savings worth \$72 million to our health system every year.

## How much carbon pollution would this save?

84,000 tonnes per year.<sup>19</sup>

## How many jobs would this create?

A total of 59,660 jobs including 58,500 total FTE jobs in construction,<sup>20</sup> and 1160 in installing rooftop solar. We also recommend employing ten new staff in the Department of Communities to oversee the program and measure its outcomes.

## What would it cost?

This program would require an investment by government of \$4.7 billion over three years, using an average of between \$240,000 – \$388,000 per dwelling.<sup>21,22</sup> Providing rooftop solar to these dwellings would cost around \$45 million.

Rental income from tenants of \$200/fortnight on average would contribute \$78m per year to offset this cost.

There are many ways to fund the delivery of social housing, including blended finance models with the community housing and private sector, aggregating investment from institutional investors, and issuing affordable housing bonds. The Clean Energy Finance Corporation (CEFC) also provides tailored-long term finance for market-leading energy-efficient community housing and retrofits.

## CASE STUDY:

### Access Housing's Coolbellup 7-star community housing

"All of our developments are designed to provide a high level of solar and ventilation efficiency due to the limited capacity of lower socio-economic tenants to afford ongoing heating and cooling costs. In 2016 we made a decision that all future development energy ratings would increase to 7 stars to provide added benefit to occupants and incorporating at initial design stage provides minimal additional costs."

– Duane Moroney, General Manager, Property Assets, Access Housing



## ACKNOWLEDGEMENTS

This package is endorsed by the **Australian Insulation Foundation, Insulation Australasia, and Kingspan Insulation.**

Clean State is grateful to **Make Renting Fair, WACOSS, the Energy Efficiency Council, ASBEC, Shelter WA, Access Housing, and Renew** who were consulted in the development of this package.

Carbon saved from atmosphere

**84,000 tonnes**

per year

## IDEA 4.

### Repower & retrofit WA's social housing

SOCIAL HOUSING REPOWER & RETROFIT	Jobs
Energy audit & energy coach program	160
Energy efficiency package	600
Solar installation	3050
Department resources	20
<b>Total</b>	<b>3830</b>

**3830 JOBS**

#### The opportunity

Almost 45,000 Western Australian families live in social housing<sup>23</sup>, much of this housing stock is ageing, inefficient and needing upgrades.<sup>24</sup> Social housing is twice as likely to be uninsulated,<sup>25</sup> and less than 4% of all rental housing has solar power or solar hot water systems<sup>26</sup>. The average star rating of pre-2005 homes is 2 stars or less.

#### Living in inefficient homes is expensive.

Homes that are poorly designed are more expensive and less comfortable to live in. A WA study found over 60% of low-income families surveyed had either frequently or occasionally curtailed their use of heating or cooling despite feeling discomfort, in order to pay their power bill.<sup>27</sup>

#### Living in inefficient homes is unhealthy.

A high proportion of public housing tenants are over 65 years old, and almost half report a disability and are more likely to be vulnerable to temperature extremes in summer and winter.

Retrofitting social housing represents a significant opportunity to cut pollution and dramatically improve the health, comfort, quality of life and cost of living for some of the most vulnerable Western Australians.

Insulation not only dramatically improves the comfort of the home but can save as much as 40% on heating and cooling energy bills.<sup>28</sup> A comprehensive retrofit could save up to 80% of energy used for heating and cooling in the oldest and least efficient houses.

WA could be the first state to have all social housing insulated and powered by the sun, with benefits to our most vulnerable people and the climate.<sup>29</sup>

#### The proposal

##### A repower and retrofit program for social housing that provides:

1. An energy audit to all homes in the first year, to collect baseline data on tenants' energy use and carbon emissions and provide advice on zero cost changes to help save energy in the home.
2. A Refurbishment Package tailored to each home, including:
  - Insulation
  - Draught-proofing
  - Upgrading gas heaters, hot water and cookers with efficient electric
  - LED lighting
  - Security screens on doors and windows to allow natural ventilation
3. Rooftop Solar systems or access to community owned renewables and batteries.

#### What are the benefits?

Households would save at least \$120-200 per electricity bill, or up to \$800 - \$1600 each year.<sup>30,31</sup> This translates to \$35-\$70million across all tenants.

## How much carbon pollution would this save?

Energy efficiency is one of the quickest and cheapest ways to reduce emissions while improving productivity and creating jobs.

**This program is estimated to reduce household energy consumption by 80% and will save 277,000 tonnes per year.<sup>32</sup>**

## What would it cost?

The retrofit program would cost approximately \$176m based on refurbishment costs of between \$3800-\$5000 per home. This does not include cost to provide energy audits and ongoing support in the first year. Providing solar would cost an additional \$135 million, based on systems costing \$2000-\$3000.

Clean State advocates for the inclusion of abatement created by this program as an accredited carbon credit.<sup>33</sup> **Emissions abatement under this program could be packaged up as a form of WA carbon offset credit, which could generate \$124.6m over 30 years at \$15/tonne.**

## How many jobs would it create?

A total of 3625 jobs including 160 new jobs in energy auditing and providing ongoing 'energy coaching' to tenants, 605 new full-time jobs in energy efficiency and another 3050 in solar installation.<sup>34</sup>

Specialty construction companies that perform energy retrofits show very high rates of small business participation in the construction.

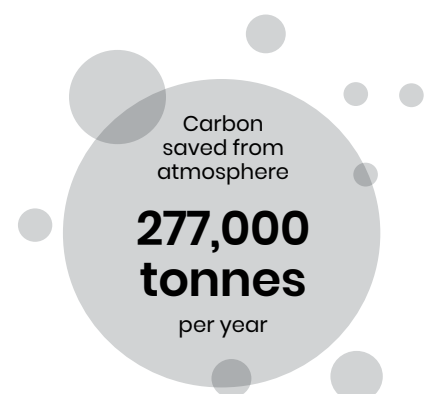
Hundreds of jobs could be created by establishing a facility to recycle old insulation and manufacture new insulation from recycled glass or WA grown wool.



## ACKNOWLEDGEMENTS

This package is endorsed by the **Australian Insulation Foundation, Insulation Australasia, and Kingspan Insulation.**

Clean State is grateful to **Make Renting Fair, WACOSS, Energy Efficiency Council, ASBEC, Shelter WA, Access Housing, ClimateClever** and **Renew** who were consulted in the development of this package.





# transport

Investment in active transport is one of the most jobs-rich, climate-friendly stimulus measures available, and has massive co-benefits to health, air pollution and carbon emissions.







## IDEA 5.

# Riding to Recovery: World's best place to cycle

**5220 JOBS**

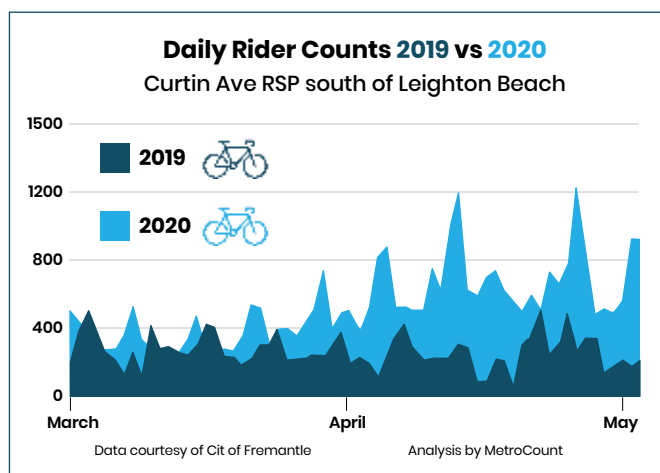
RIDING TO RECOVERY	Jobs
Expand bike parking facilities	100
Deliver 2000km bike paths & trails	5000
Bike Economy: retail, repair & service	100
Additional Active Transport & Travelsmart program staff	20
<b>Total</b>	<b>5220</b>

## The opportunity

**"It is hard to think of an activity with more benefits than cycling, for cyclists and for the wider community." – Colin Murphy, WA Auditor General, October 2015**

Investment in active transport is one of the most jobs-rich, climate-friendly stimulus measures available, and has massive co-benefits to health, air pollution and carbon emissions.

Before COVID-19, around a quarter of Western Australians were already riding a bicycle in a typical week.<sup>35</sup> During the pandemic, Perth witnessed an unprecedented 200-300% increase in bike ridership numbers and local bike retailers are reporting shortages of bicycles and related stock.



Daily rider counts along Leighton Beach Principle Share Path this year compared to 2019 showing an increase of 200% in April and May.

(Source: Data collected using the RidePod BP cycling, pedestrian & scooter monitoring device. @MetroCount)

There is incredible potential to sustain these high numbers of bike ridership in Perth, and encourage even more potential riders, given:

- At least half of all our car trips are less than 5km, a distance that could be comfortably covered in 20 minutes<sup>36</sup>.
- Almost half of Perth's population live within a half hour bike ride to work. 44.5% of workers travel less than 10km to work or study – a distance that could easily be cycled thirty minutes<sup>37</sup>.
- Studies have shown 6 out of every 10 people are interested in riding to work but are held back by concerns about safety and lack of infrastructure.

**"We've got this real moment of opportunity, where there's been an explosion in bike use among people who wanted to keep active during lockdowns, and now as they are starting to return to offices, people want to ride their bikes to work."**

– Bicycle Network Australia CEO Craig Richards.

With leadership and a stimulus-sized investment we could roll out world class infrastructure, facilities and integration with public transport that could completely transform our towns and cities, and make bike trips a safe, dignified and fun way to travel.



## The opportunity continued

We've seen the type of transformations possible in other cities around the world and even here at home in Fremantle, Subiaco and North Perth. Many countries are using their stimulus response to COVID right now to drive investment into active transport. It's time to 'ride to recovery' here in WA.

**"The UK is investing £2 billion in active travel infrastructure. France and Italy are giving up to €500 a person to buy a bike or learn to ride. New South Wales has created a \$15 million fund to pay for pedestrian and cycling projects across the state. Transport professionals everywhere understand that we need to strike while the iron is hot and improve cycling as an experience for everyone to see these trends continue" – Maurice Berger, cycling enthusiast and traffic data expert from MetroCount.<sup>38</sup>**

## The proposal

Clean State propose four transformative steps:

1. Fund 2000km of dedicated bicycle routes and trails across Western Australian towns and cities over the next five years. The new paths would integrate 'recycled road base' and recycled materials (see separate initiative).
2. Dedicate the last carriage of every Transperth Train to bikes and bike riders, on all trains, at all times. This is a zero-cost quick win that would support increased ridership overnight and make the most of decreased train patronage right now.
3. Expand the provision of secure bike parking facilities to every train station and to all major public destinations such as shopping centres, hospitals and schools.
4. Deliver a Travelsmart or similar demand management programs at key trip generating destinations and across suburbs as new cycle infrastructure is rolled out.



Before and after transformation in Amsterdam at Ie van der Helststraat, 1978 & 2005. (Source: @BrentToderian)

## Benefits

**Every time a person commutes by car it costs society \$10, and every time they commute by bike society it saves \$10, according to Bicycle Network Australia.<sup>39</sup>**

Every kilometre walked or cycled has an economic benefit by reducing traffic congestion and vehicle operating costs, reducing air, noise and carbon pollution, improving health and mental health, and creating people-friendly towns and cities.

Specific benefits include:

- Personal savings of \$1900 every year by replacing just one-third of all car trips with a bike;<sup>40</sup>
- The WA Government and RAC have reported every dollar invested in bike infrastructure generates \$5.40 in economic, strategic and environmental benefits<sup>41</sup>.

## How much carbon pollution would this save?

Bikes can dramatically reduce both greenhouse gas and air pollution.

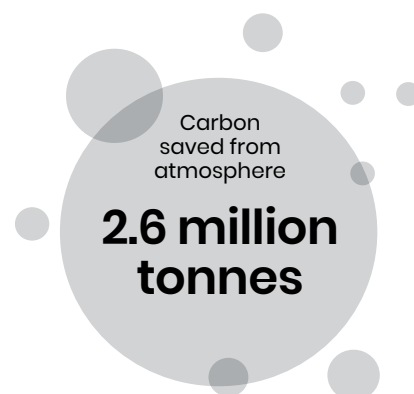
Transport is WA's second-largest source of greenhouse gas emissions, accounting for 17% of our total emissions. Main Roads WA estimate WA road users emitted 8.7 Mt CO<sub>2</sub>-e from use of the road network.<sup>42</sup> Studies have shown about one third of all Perth's car trips could be replaced by bikes, which could save up to 2.6 millions tonnes of pollution.

## What would it cost?

Clean State proposes 5% of the State Transport Budget, or \$210 million over five years be allocated for this package.

On road bike lanes can be delivered for as little as \$35,000 per km, with protected bike paths with kerbing costing around \$100,00 per km. Fully separated 'bike freeways' and off-road cycle paths, such as Perth's Principle share paths, cost up to \$1-\$1.5m per km.<sup>43</sup>

110 kilometres of fully separated bicycle route can be provided for the same cost as one kilometre of freeway.





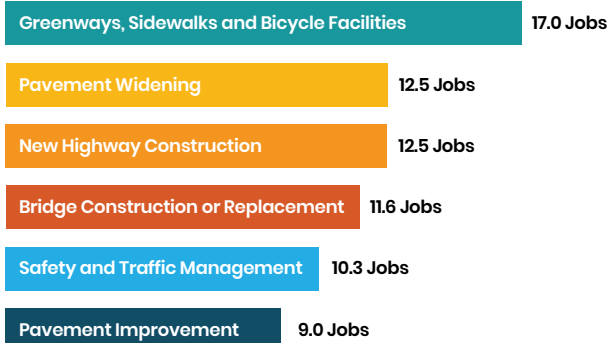
City of Fremantle City of Fremantle has invested in high quality bike lanes. (Source: City of Fremantle.)

## How many jobs would it create?

Investment in trails, walking and biking infrastructure projects create 17 jobs for every million spent.

### Job Creation: Making a Case for Healthy Transportation Investments

Jobs created per million dollars spent



Source: American Association of State Highway and Transportation Officials (AASHTO) Average Direct Jobs by Projected Type (2012); Jobs in terms of full-time equivalents (FTE)

Job creation per million invested in transport infrastructure. (Source: Rails to Trails)

The 2009 federal stimulus package included a \$40m National Bike Path Program, funding 167 projects that created more than 1130 short term jobs and 550 long term jobs, 80 work experience positions, and 90 traineeships.<sup>44</sup> This is equivalent to 46.5 jobs per million invested and is the largest economic multiplier across our entire jobs package.

Compared with spending on road projects, bike projects create almost double the number of jobs. Investment in bike infrastructure also supports jobs in the retail, service and manufacturing side of bicycling. The Australian Bicycle Council call this the 'Cycling Economy' and estimate the Australian bicycle industry employs 10,000 people and generates \$139m in tax revenue.

Clean State estimates 5220 jobs including 5000 in bike path infrastructure, 20 in secure bike facilities, and 100 in the bike economy (retail/sales and repair) would be created by this package.

## CASE STUDY:

### City of Stirling Bike Boulevards



The City of Stirling, through its 2009 Integrated Transport Strategy and its 2015 Integrated Cycle Strategy, has become a true leader in the planning and provision of bike routes.

The City has so far completed two of three phases needed to connect the Scarborough foreshore activity centre, Innaloo and Stirling train station activity centres; and has already planned and costed a cohesive, connective and convenient grid of bicycle routes for its entire local government area.



## IDEA 6. Deliver a WA-made electric tram network for Perth

ELECTRIC TRAM NETWORK		Jobs
Electric Tram network		20
Construction, Roadworks, Recharge points and Land development		230
Local manufacture of tram carriages		100
Total		350

**350 JOBS**

Trackless trams enable the development of new precincts around stations due to their quiet, pollution-free accessibility that is able to replace the equivalent of 6 lanes of traffic. The resulting urban regeneration can help the infrastructure pay for itself.”

– Professor Peter Newman, AO

### The opportunity

Perth is one of the most car-dependent cities on the planet. Providing a world-class electric tram network would dramatically cut emissions and put thousands of West Aussies to work through planning, construction, and ongoing maintenance.

Clean State recognises the state government’s investment in MetroNet, but notes Perth’s train network caters to workers in the city and does not serve cross-city commuters well. Metronet’s contribution to the city is also hamstrung by the lack of mid-tier public transport to heavy rail stations, and it has been acknowledged that ever-crowded ‘park & ride’ facilities cannot expand.

Perth’s next public transport investment must introduce a new ‘intermediate transit system’ – faster and better than buses but cheaper and more integrated than heavy rail.<sup>46</sup>

Fixed route public transport has been shown to provide investment certainty that spurs urban regeneration around their stations, uplifting land-value and enabling the development of high quality residential and commercial buildings along tram routes. This revitalises street life and helps us build more compact, efficient communities.

### What are Trackless Trams?

‘Trackless Trams’ are a new innovation in mass transit technology providing essentially the same service as traditional light rail systems, but for one tenth of the infrastructure cost.

Trackless trams use the same carriages as trams but run on rubber tyres and are guided visually by lines, instead of rails. This avoids the large cost and disruption of major roadworks needed to lay tracks. They run quietly, using electric propulsion (with batteries), and recent advances in stabilization technologies and precision tracking from autonomous optical guidance systems means they have the same high ride quality as traditional light rail.<sup>47</sup>

Like trams, they also harness raised-platform stations that give the fixed route assurance necessary to spur urban regeneration and development.



Trackless Trams in Zhuzhou, China.

(Source: *Why trackless trams are ready to replace light rail. The Conversation*, 2018)<sup>48</sup>



Curtin University has provided a detailed, costed proposal for a city-wide tram network (Fig 1) that services the entire Perth–Peel metropolitan region, starting with a Trial Trackless Tram route that connects Victoria Park, Perth and Morley (Fig 2)

## The proposal

1. Commit to providing a metropolitan Tram Network across the Perth metropolitan area by 2030. (Fig 1)
2. Fund the world first trial of trackless trams in Perth by 2021, starting with a Phase 1 Trial Line running in an East–West route from Burswood station to St Georges Terrace and a major North–South link along Beaufort Street to Morley, as proposed by International transport experts. (Fig 2)
3. Establish a specialist Perth Tram Network Team in the Department of Transport to plan the overall network, deliver the trial, and develop *Transit Activated Corridors* (TAC) Plan for Perth that focuses on transforming main road corridors to a string of urban regeneration in precincts along major roads.

## What are the benefits?

Trackless trams have all the benefits of light rail, but can be delivered faster, at a lower cost, and with significantly less disruption.<sup>49</sup>

Trackless trams increase property values along routes and enable local governments to deliver density targets and provide high-quality urban regeneration and compact communities, bringing more people, more businesses and investment to the area.<sup>50</sup>

The delivery of a tram network would also save billions of dollars in hidden infrastructure costs needed to support greenfield developments, by allowing densification and infill along transit activated corridors. A 2018 study found lifting Perth's infill target to 100% would save \$30 billion by 2050.<sup>51</sup>

## How much carbon pollution would this save?

Improving public transport with trams increases public transport usage at the expense of car traffic. In the first six months of Canberra's light rail operation, Canberrans made 1.3 million more public transport journeys which were estimated to reduce annual emissions by 2,596 tonnes.<sup>52</sup>

The 'Trial Tram Route' proposed by Curtin University would replace 1008 bus trips through the city, saving thousands of tonnes of CO<sub>2</sub> and have a significant impact on both noise and air pollution.

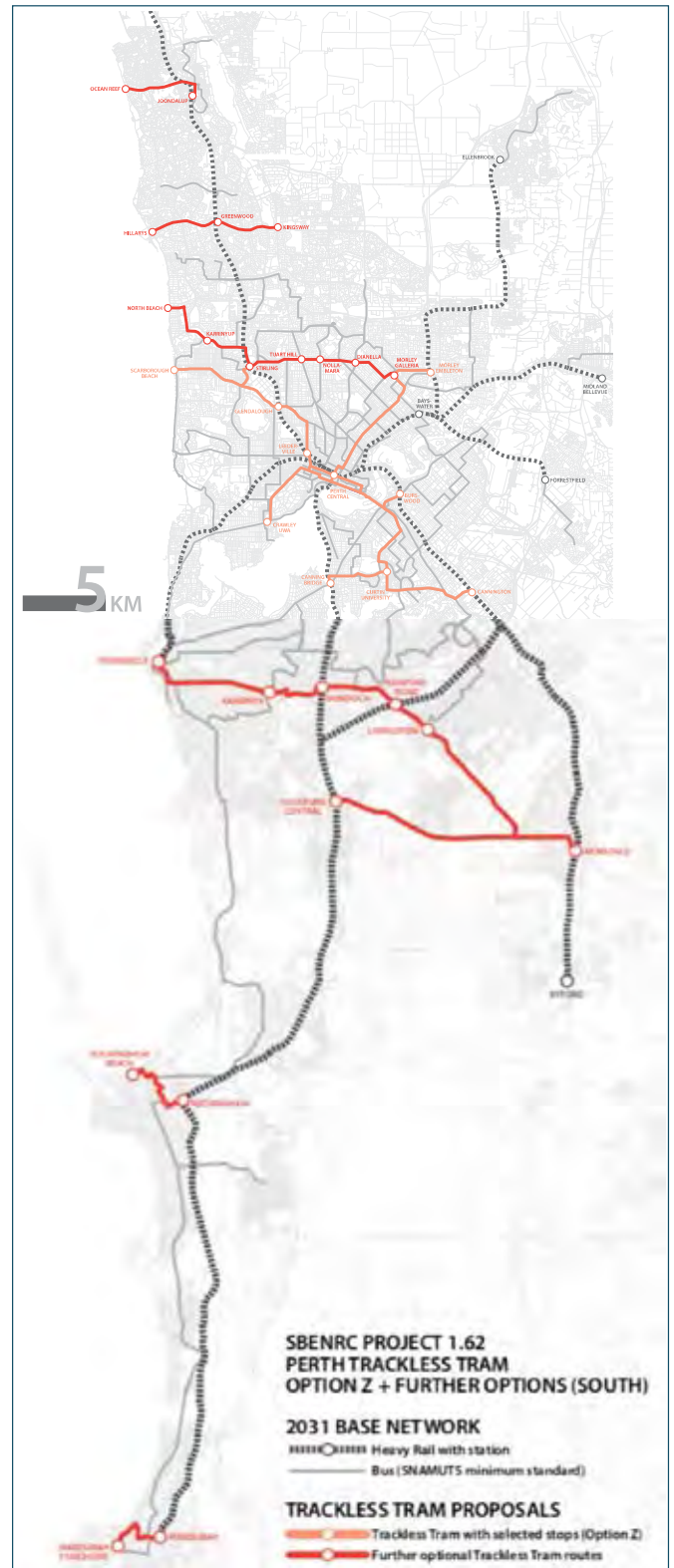


Fig 1: Metro-wide Perth Tram network proposed by Peter Newman, Mike Mouritz, Marie Verschuer (2020)





Fig 2: Phase 1 Perth Trackless Tram Trial line, running from Burswood Station to St Georges Tce, and from the city to Morley along Beaufort Street.

(Source: Trackless Trams and Transit Activated Corridors in Perth Report. By Newman, Mouritz and Verschuer, 2020)



Artists impression of Cecil Street station in Canning City Centre.

(Source: "Trackless Trams and the Perth City Deal", Newman, Scheurer and Verschuer.)

## How many jobs would it create?

Canberra's stage 1 Light Rail, a \$675 million, 12km line to Gungahlin, employed more than 4750 people during construction- totalling over 3.38 million people-hours; equivalent to 2080 full-time job-years.

This kind of investment to jobs ratio would see 330 people employed in delivering the proposed Perth Trackless Tram Trial line.

The indirect jobs generated would also be significant. A report commissioned by the Paramatta Council in Sydney found that a 30km trackless tram line would cost \$300 million and would leverage \$19.8b investment in land development of over ten years, creating an estimated 17,800 direct and 73,260 indirect jobs.

The metro-wide Perth Tram network is estimated to create land-value uplift and urban development that creates 53,400 construction jobs and 219,780 indirect jobs in and around the network's Transit Activated Corridors.<sup>53</sup>

## What would it cost?

The Phase 1 Trial has been calculated as paying for itself in just over 3 years.

The initial outlay for the Phase 1 Tram Line is estimated to be \$110 million, including:

- 25 Trackless Trams (\$75m - \$4.33m per 3 car set).
- Essential stations and four major recharge facilities (\$32m)
- A further \$2m to plan and deliver the trial

It's also estimated Phase 1 service would allow the rationalisation of 28 city buses, saving \$33m per year.<sup>54</sup>

## CASE STUDY:

### Sydney's trackless tram corridor

A 'smart' trackless tram corridor connecting western Sydney's CBD with the new Sydney international airport has been proposed by the Liverpool City Council. Work of the design phase of the Fifteenth Avenue Smart Transit (FAST) Corridor has already begun and construction will be complete by 2026.



(Source: governmentnews.com)

## ACKNOWLEDGEMENTS

Clean State acknowledges **Professor Peter Newman**, **Jan Scheurer** and **Marie Verschuer** from Curtin University in the development of this proposal.



## IDEA 7. Phase in a WA-made electric bus fleet by 2025

ELECTRIC BUS FLEET	Jobs
Department resources	20
New carriage & EB manufacturing at Perth's Volgren factory	100
<b>Total</b>	<b>120</b>

**120 JOBS**

### The opportunity

“We don’t need an electric bus trial, we need an implementation plan.”

– Chantal Caruso, Clean State.

Electric buses represent an enormous potential to reduce the carbon footprint of WA’s transport sector, as well as kickstarting a zero-carbon transport manufacturing sector here in Perth.

Perth’s bus fleet belongs in the last century. Powered by a mix of fossil fuels including diesel, they are heavy emitters of carbon pollution, air pollutants, and noise pollution and actively degrade the amenity of our high streets and quiet neighbourhoods.

Whilst Clean State welcomes the trial of for four all-electric buses from 2022,<sup>55</sup> this initiative is dwarfed by the decision to order 900 new diesel-powered buses last year.<sup>56</sup>

**WA has 1,138 diesel buses and 512 gas buses<sup>57</sup>, running up huge fuel bills worth around \$40 million every year.<sup>58</sup>**

There has been a global push in recent years to ban diesel buses from city centres, with Paris, Madrid, Mexico City and Athens committing to achieve this by 2025. Sydney and Brisbane have committed to all-electric bus fleets.

Most buses on Perth’s metropolitan routes travel 80-90km a day, making them an ideal starting point for conversion to electric.

WA could also support carriage building the new electric fleet right here in Perth, harnessing a manufacturing boom in electric transport.

### The proposal

1. Commit to a WA-made, all-electric Transperth bus and CAT fleet by 2025, and TransWA fleet by 2030. This could be achieved by immediately renegotiating the recent supply contract for 900 new buses.
2. Support Perth’s Volgren factory transitioning to manufacturing and maintaining an all-electric bus fleet.
3. Explore the potential to extend and expand the Volgren factory to convert and retrofit WA’s non-passenger vehicles, including trucks and tractors. Committing to convert the government-owned commercial fleet by 2025 would kickstart this industry.

### How much carbon pollution would this save?

Transperth’s bus fleet travelled 84 million km in 2018/19, emitting an estimated 109,200 tonnes annually.<sup>59</sup>

An all-electric bus fleet powered by renewables could therefore reduce WA’s emissions by over 100,000 tonnes a year.

### What would it cost?

The existing \$549 million order for up to 900 new fossil-fuel powered buses should be renegotiated and could pay for the transition to an all-electric fleet.

Over their lifetime, renewably powered electric buses have up to 12 per cent lower operating costs, according to modelling by Beyond Zero Emissions (BZE). BZE also noted the introduction of an electric bus fleet has the added benefit of accelerating electric vehicle uptake more generally, raising public awareness of the quality performance and



## What would it cost? continued

convenience of electric vehicles, and reducing 'range-anxiety' concerns.<sup>60</sup>

The switch to an all-electric fleet would save \$40 million a year in fuel costs alone.

## How many jobs would it create?

240 existing jobs would be supported and up to another 100 created at the Volgren Bus plant in Malaga, with another 20 positions created in the Public Transport Authority.

## CASE STUDY:

### Brisbane and Sydney power ahead with electric bus fleets



Brisbane City Council has committed to an all-electric 60-strong fleet across two routes. Each will have the capacity to carry 150 passengers along trackless routes. The purpose-built buses and charging stations will be charged at the end of each route using a 'flash' charging system with buses charging in less than six minutes. The 60 electric buses are expected to be operating by 2023, and will be part of the Brisbane Metro project that will create 2600 jobs and supplier opportunities.<sup>61</sup>

Meanwhile in NSW the state government has announced a plan to switch Sydney's 8000 buses to all-electric. NSW will become the first state or territory government to shift its entire fleet to an all-electric, in a tangible policy towards the state's goal of reaching net zero by 2050. It's estimated shifting all of Sydney's buses from diesel to all-electric vehicles would increase NSW's electricity demand by 5-10%, which in turn could drive wind and solar investment, and could be offset by the avoided cost of diesel fuels.<sup>62</sup>

## CASE STUDY:

### Shenzhen's Silent Revolution

More than 30 Chinese cities are now planning to achieve 100% electrified public transit by 2020, including the Shenzhen Bus Company which rolled out a fully electric 16,000-strong bus fleet in 2018. It's now targeting an all-electric 22,000 strong taxi fleet by 2020, saving 440,000 tonnes of CO<sub>2</sub> a year.<sup>63</sup> The bus company has 180 depots with their own charging facilities installed, and a two hour charge will provide a 200km range, enough to cover the day's entire service.



Shenzhen Bus Company's proud deputy general manager, Joseph Ma.

(Source: Guardian/ Matthew Keegan)

Carbon saved from atmosphere

**100,000 tonnes**

per year

## IDEA 8.

### Power ahead with electric vehicles

EV INFRASTRUCTURE ROLLOUT	Jobs
State-wide network of 40 DC electric fast charging stations	35 supported
25,000 charging stations at workplaces by 2030	215-600
<b>Total</b>	<b>250-635</b>

**250-635 JOBS**

#### The opportunity

Despite the significant economic, environmental, and health benefits of electric vehicles (EVs), WA lags behind the rest of Australia in EV uptake. Currently, WA scores zero out of ten adopting policy incentives to increase the uptake of EVs and have just 13 publicly accessible DC charging sites.<sup>65</sup>

With prices continuing to fall, electric vehicles are expected to reach up-front price parity with petrol cars by 2027<sup>66</sup>, and Infrastructure Australia predicts that by 2040 70% of new car sales and 30% of vehicles in Australia will be EVs.<sup>67</sup> This can and should be accelerated. Modelling shows 75% of global new car sales must EVs by 2030 to limit global heating to 1.5 degrees.<sup>68</sup>

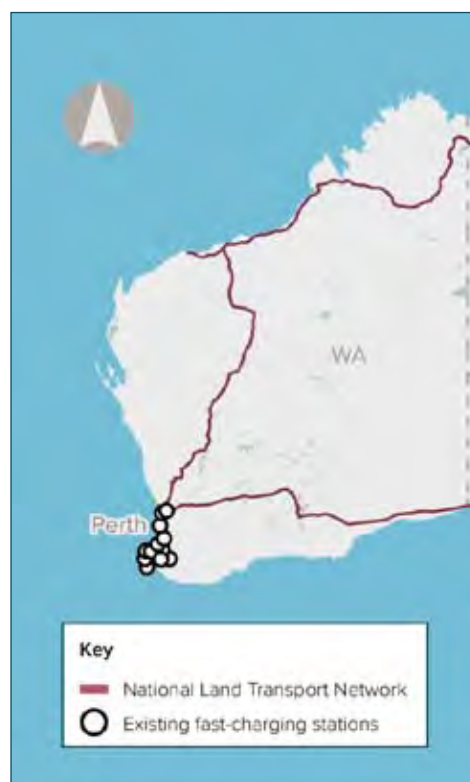
Infrastructure Australia has ranked the creation of a National Electric Vehicle Fast-Charging Network in its top 10 High-Priority Infrastructure Initiatives<sup>69</sup>, noting the poor geographic spread of our existing fast-charging infrastructure and the vast distances where EV's are currently unsupported.

A rollout of charging stations at WA workplaces will provide a massive apprenticeship and employment stimulus for WA's 20,000 electricians and will also stabilise the grid by increasing demand during the daytime off-peak period.

Rolling out state-wide DC fast-charging infrastructure will support EVs to become mainstream and to allow EV owners to travel safely and conveniently around the state.

#### The proposal

1. Deliver a state-wide rollout of a DC Electric Vehicle fast-charging network by 2025.
2. Provide grants for the installation of charging stations at one in ten workplaces around the state by 2030. This would cover about 25,000 WA workplaces.
3. Phase in an all-electric state vehicle fleet.
4. Introduce incentives for EV uptake including removing stamp duty and registration fees and providing fleet incentives (given fleet vehicles account for half of all new car purchases in Australia).



*National EV fast charging network proposed by Infrastructure Australia*





## How much carbon pollution would this save?

The emissions from the Average Australian vehicle is about 200 gCO<sub>2</sub>e/km. For the 2 million passenger vehicles averaging 14,000 km per year here in WA, conversion of the WA passenger car fleet could save 5.6 million tons of CO<sub>2</sub> per year if 100% renewable energy was used.

Even if EVs were charged from the current WA grid (currently over 80% fossil fuels), emissions would still be lower than petrol and diesel, and would make for a saving of about or 2.5 million tons.<sup>70</sup>

## What are the benefits?

PWC have modelled that if Australia increased its EV market share to 57% of new cars sales, and to a proportion of 1/5 vehicles on the road by 2030; the net economic impact would:

- increase real GDP by \$2.9 billion; and
- increase net employment by 13,400 jobs, relative to 2016-17.<sup>71</sup>

Here in WA, these benefits would be realised in a number of areas including:

- **More money being spent in the local economy through fuel savings and reduced maintenance costs.** Currently \$40 billion a year leaves Australian shores to pay for foreign oil products – money we could be keeping onshore in local jobs.
- **A positive impact to local economies** with EV drivers stopping for longer on average than a petrol fuel stop and being more likely to spend money on food, drinks and conveniences.<sup>72</sup>
- **Economic Resilience and energy independence from global supply chains and oil shocks.**<sup>73</sup>
- **Reduced spending on healthcare** due to decreased respiratory illness stemming from vehicle emissions. In WA its estimated 200 people per year die prematurely due to vehicle pollution every year.<sup>74</sup>

## How many jobs would it create?

The installation of 40 fast-chargers would support existing employees including installers, local electricians, excavators and Western Power.<sup>75</sup>

## What would it cost?

A report prepared in December 2018 by UWA for the WA State Government found a state-wide electric vehicle charging grid could be built for about \$30 million<sup>76</sup>.

The grid would cover all major highways across the whole state, provide at least two DC fast chargers at each location, be located not more than 200km apart, and enable EV charging in minutes.

The rollout of 25,000 charging stations at place of employment would cost between \$14m-\$82m per year over ten years (at current prices and depending on the use of single or multiport fast charger stations.)



*Tesla recently revealed that its electric 'Semi' trucks were ready to enter volume production, joining Daimler and Volvo in the growing electric bulk transport market.*

*(Source: Business Insider)*



## Overview of federal, state and territory government policy to support EV uptake

(Source: Climate Works Australia, State of Electric Vehicles 2018)

		WA	QLD	NSW	VIC	SA	TAS	ACT	NT	Cwth
Uptake	EV purchases 2011-2017	375	688	1238	1324	957	61	165	13	4851
	EV sales per 10,000 vehicles	8	6	10	10	22	3	21	1	7
Regulation	Vehicle CO <sub>2</sub> emission standards	✗	✓							
Financial incentives	Stamp duty, registration and tax discounts	✗	✓	✓	✓			✓	✓	✓
	Direct vehicle safety	✗								
	Fleet incentive	✗								✓
	Charging infrastructure incentive	✗	✓		✓		✓	✓		
	Toll and parking discounts	✗	✓							
Non-financial incentives	Vehicle lane and parking privileges	✗						✓		
	EV public transport trials	✗				✓		✓	✓	
	Government fleet policy	✗		✓		✓	✓	✓		
	Information and education programs	✗	✓	✓	✓	✓	✓	✓		✓

Comparison of state policies and incentives enabling EV uptake.

(Source: Adapted from Climate Works Australia, 2018)



denotes policies under investigation

## CASE STUDY:

### Australian Success Story Manufacturing DC Fast Chargers

Tritium, a Brisbane based company, is a great Australian success story, expanding their DC fast-charger manufacturing business enormously in the last few years.

Tritium began in solar car racing at the University of Queensland and is now an international leader in the global EV charging market with their technology now installed in over 20 countries, and headquarters in Holland and California.

Tritium has developed world-leading high-powered DC fast chargers. Their Veefil-RT batteries provide a high power charging system that add 350km of range to an electric vehicle in 10 minutes.<sup>77</sup> In 2018 they developed the world's first high-power chargers (350 kW) that are small footprint charging stations and can add 150km range to an EV in 5 minutes.



(Source: Tritium)

## ACKNOWLEDGEMENTS

Clean State acknowledges the assistance of the **Australian EV Association (AEVA)**, **EVSE**, and **Vantage West** in the development of this proposal.



# conservation economies

A partnership approach to conservation that engages local communities, Traditional Owners, landholders and others in co-management and regeneration programs on farms and pastoral leases can provide substantial social and economic benefits.



## IDEA 9.

### Partnerships for Conservation – Regenerating the wheatbelt and rangelands

PARTNERING WITH LANDHOLDERS	Jobs
Partnering with landholders for conservation, culture and communities	200
<b>Total</b>	<b>200</b>

**200 JOBS**

#### The opportunity

Western Australia's unique wildlife is found nowhere else on Earth, but the future of many species is in question. While the list of endangered species in WA grows, climate change is adding further pressure to already stressed ecosystems. Unlocking the potential of partnerships, community, First Nations ecological knowledge, and cultural land management could hold the key to reversing this trend.

In a changing climate, the future of our wildlife and the health of our communities will increasingly depend on managing biodiversity and restoring ecosystem connectivity at a landscape scale, across different land tenures, and in a way that engages communities and Traditional Owners employing citizen science and Indigenous ecological knowledge.

Much of Western Australia's remaining wildlife habitat exists on private and leasehold land. Large areas of this land are degraded and have declining agricultural productivity due to soil and wind erosion, loss of topsoil and declining rainfall. Weeds and feral animals cause further damage to the natural and cultural values of these areas. Currently, many landholders lack the resources, knowledge or support needed to restore and manage these areas.

First Nations peoples are increasingly being called upon to provide knowledge and expertise for land management, however resources are rarely available to support this. Partnerships and resources to support landholders and communities to work together in partnership will be essential.

Conservation partnerships are not just about nature and wildlife. These programs can play an important role in supporting and revitalising regional communities, generating pride in cultural knowledge, and assisting farmers, landholders and Traditional Owners to adopt sustainable, diversified and regenerative approaches to land management.



When combined with carbon farming and regenerative agricultural practices, conservation partnerships can be transformative for landholders and regional communities by supporting a transition to sustainable agriculture, reconciliation, land restoration, and biodiversity conservation in a changing climate.

**A partnership approach that engages local communities, Traditional Owners, landholders and others in co-management and regeneration programs on farms and pastoral leases can provide substantial social and economic benefits.**

- First Nations people are able to access traditional lands and practice and share cultural knowledge
- Landholders see improvements to soil health and productivity, improved mental health and increased connection with local communities.
- Youth, unemployed people and volunteers in local communities gain transferrable skills, knowledge and connection to country and community.



## The opportunity continued

**This package would deliver significant outcomes for conservation, communities and culture by providing stewardship payments and other incentives and support for landholders and support for Traditional Owners and community organisations to manage and restore conservation values.**

Stewardship payments are proven to be effective in supporting critical management activities like:

- Protecting sensitive natural areas by building stock fences.
- Feral animal tracking, eradication and installing feral-proof fencing.
- Protecting and restoring high conservation value habitats, including creeks, rivers and wetlands.
- Developing and implementing ecologically sustainable property management plans.

**There is great potential, through this package for:**

- Reconnection and restoration across farms
- Repopulation of species
- A transition to regenerative agriculture

Other support and landholders could be provided through reductions in land taxes, rates and other costs associated with land management practises which improve biodiversity.

Landholders in the WA Wheatbelt and southwest also have a critical role to play in wildlife and nature conservation. The Gondwana Link project is an example of connected up land management across different tenures and landholdings in partnership with landholders and communities.

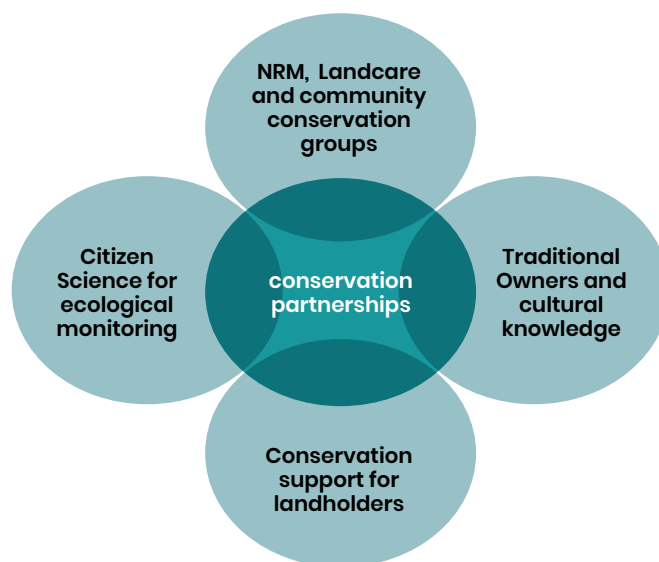
**Many landholders with remnant woodlands and biodiversity on their farms are excited by the prospect of bringing back wildlife species and ensuring the resilience of ecological landscapes in the face of changing climate.**

Measuring and monitoring ecological condition is critical to understanding how ecosystems are changing and essential to the development of adaptive management practices that are responsive to these changes. While gathering this information is of great public value, the limited government-led monitoring programs are unable to fulfill this need. Instead, this proposal engages a community-based Citizen Science network, which builds community connection and understanding of ecological systems and engages volunteers and communities in a crowd-sourced approach to ecological monitoring and knowledge collection.

## The proposal

**A partnership scheme will deliver the best results where a diversity of stakeholders are supported to participate in meaningful ways.**

**This proposal brings together four powerful pillars as part of an integrated model:**



**The key elements of this proposal are:**

1. Introduce a \$15m stewardship and support scheme for landowners to undertake conservation and land management efforts, with payments, support and incentives connected to covenants and monitoring commitments that are secured for the long term.  
  
Private sector investment could be leveraged from mining and other industries to contribute to this scheme, either voluntarily or through enforceable conditions or offsets.
2. Provide \$2m funding and support to Land Councils and Native Title groups to:
  - Facilitate and resource the involvement of Traditional Owners and Aboriginal communities in conservation partnerships by employing Indigenous Conservation Coordinators.
  - Develop and document Indigenous ecological knowledge to assist with planning and delivering conservation and restoration projects and partnerships.
  - Leverage existing programs including Aboriginal Rangers.

## The proposal continued

3. Support the WA Landcare Network, NRM Councils and community conservation groups to employ local Landcare Coordinators, with \$2m to:
  - Engage landholders and facilitate partnerships.
  - Support landholders to access stewardship payments.
  - Assist with the development of conservation management plans.
  - Develop capacity through landcare conservation traineeships.
  - Aboriginal ranger projects and landcare coordinated delivering jobs through traineeships.
4. Support the Conservation Council's Citizen Science for ecological monitoring program to establish a community-based statewide ecological monitoring network to provide baseline and ongoing monitoring for conservation partnership projects, with \$1m funding.
5. Funding for principles of delivery.

## What would it cost?

The total cost of this program is \$20m per year, including:

- \$15m for the stewardship payment scheme.
- \$2m for supporting Land Councils, Native title holders and Traditional Owners.
- \$1m for Citizen Science for Ecological Monitoring.
- \$2m for NRM, Landcare and community conservation groups.

## How many jobs would it create?

This initiative is estimated to create at least 200 jobs by 2025, however with additional resources leveraged from the private sector, landholders and other partners as well as Commonwealth government, carbon farming revenue and other income streams, the employment generation is likely to be far greater.

## ACKNOWLEDGEMENTS

Clean State acknowledges **PEW Charitable Trust, Wheatbelt NRM, WA Landcare Network, Dr Nic Dunlop, Christie Kingston, Richard McClellan and Gondwana Link** in the development of this proposal.

## CASE STUDY:

### Queensland's Nature Reserve Program and North Head Station

Queensland's hugely successful 'Nature Reserve Program' provides a demonstration of the impact that can be achieved through conservation partnerships with landowners. This has been achieved with an investment of just \$4 million, translating to just 25 cents per hectare.



Over the past decade, more than 500 Queensland landholders have chosen to dedicate part of their land for conservation, covering a total area of more than 4.4 million hectares.

Among those are large pastoral stations, which account for more than 70 percent of Queensland's private protected lands. Three of the largest nature refuges are on stations and protect more than 728,000 hectares of tropical savanna, woodlands and native grasslands.<sup>79</sup>

North Head Station is a 75,800-hectare cattle station with a diversity of habitat types that form part of an important wildlife corridor for the area. In 2010 owners Barry and Tammy Hughes entered into a Nature Refuge agreement which gave them access to funding to construct fencing around the ecologically sensitive areas of their property and to install new watering points for better grazing management.

The 19,000-hectare nature refuge features unique spring-fed creeks that provide a crucial water source during dry periods for wildlife including Bandicoots, Rock Wallabies and the Antilopine Wallaroo. The new infrastructure also helped to control feral animals and prevent damage to natural waterholes.<sup>80</sup>





## IDEA 10. Urban & Regional Conservation stimulus

**2209 JOBS**

CONSERVATION STIMULUS	Jobs
Natural Resource Management (NRM) Regions Conservation Stimulus	2000
Perth and Peel Science, Conservation stimulus	189
Two million Trees – Growing Canopy in our Communities	20
<b>Total</b>	<b>2209</b>

### The opportunity

Investing in conservation is one of the most powerful forms of 'shovel ready' – stimulus available, with incredible immediate benefits to local community groups and the environment.

### The proposal

Clean State propose three immediate packages:

1. \$200m Natural Resource Management (NRM) Regions Stimulus.
2. \$25m Perth and Peel Science and conservation Jobs stimulus proposal developed by the Urban Bushland council.
3. 'Two million Trees by 2030' – Growing Canopy in Communities package.

### Natural Resource Management (NRM) Regions Stimulus

More than 70 conservation, land management and farming organisations have come together across Australia to support a Conservation Stimulus proposal that would create thousands of new jobs in delivering practical conservation and land management activities across the country in response to the COVID crisis.

The proposal outlines a \$4 billion national conservation and land management program, to create direct and indirect 53,000 jobs. Clean State is advocating for \$200m to be invested here in WA to generate 2000 direct and indirect full-time jobs. This would create long-term economic benefits worth \$440m.<sup>87</sup>

The NRM Regions Stimulus addresses historic underfunding of NRM projects, where only around 20% of projects put forward have been funded.

WA's 7 NRM Regions and Landcare Networks have put forward detailed, shovel ready priority areas for funding across the whole of WA and can also play a lead role coordination and delivery of on-ground works. The projects have been developed to leverage existing programs and capacity and provide seasonal, scalable and flexible work for all skill levels.

These projects include:

1. **Northern Agricultural region projects** including as seed collection teams with Aboriginal rangers, coast care, community weeding along waterways and regenerative agriculture (50+ jobs).
2. **Rangelands region projects** including sustainable livestock production, native seed collection, landscape – scale that will employ more than 300 indigenous people.
3. **South Coast region projects** including restoring coastal habitats, seed collection and propagation with Aboriginal ranger teams, indigenous cultural site protection and weed and feral animal control (100+ jobs).
4. **South West Catchments projects** including wheatbelt salt remediation and linkage, fire reduction, water quality, eco-tourism trails and bushfire recovery (400+ jobs).
5. **Wheatbelt region projects** such as seed collection, river rat teams, feral animal control ranger teams, intensive weeding along waterways and in listed TECs and knowledge brokers (300+ jobs).
6. **Perth region projects** including bushfire recovery, revegetation, and tree planting, RAMSAR wetland habitat restoration works, dune repair along Perth's coast, and river and creek line restoration (500+ jobs).

## Perth and Peel Science & Conservation Jobs Stimulus

The Urban Bushland Council, representing over 70 local groups has proposed a *Perth & Peel Science and Conservation Stimulus* proposal, to get people back to work here in our global biodiversity hotspot. Clean State strongly advocate for the investment of at least \$20m in new funding to create 189 new jobs in the following priority areas:

1. Bush Forever 'Call to Action 2020' for management and protection of 287 Bush Forever Areas. This would employ five scientists in DBCA and at least 100 on ground bush-carers to help manage each site.
2. A Forrestdale Education/Visitor Centre and DBCA base. This would create 14 jobs.
3. Permanent staff employed at two iconic Regional Parks at Rockingham Lakes and Forrestdale.
4. Employ 50 scientists in the Threatened Species and Communities & Weed Science branches of DBCE and establish an ongoing group for Banksia and Tuart Woodlands.
5. Bushfire rehabilitation and fire risk management, with 20 new jobs in grassy weed control and arson officers especially in the Forrestdale Lake Nature Reserve.
6. Fund the Saving Rare Orchids project proposal to protect and conserve WA's 108 orchids of conservation concern. An independent coordinator and team of 9 new staff is recommended.
7. Create a centre for urban bushland restoration, with at least 10 new staff.

## 2 million trees by 2030 – Growing Canopy in our Communities

The benefits of increasing tree canopy in our cities, towns and suburbs are well documented and include providing habitat for native species, boosting mental health, and reducing the urban heat island effect by as much as 6 degrees. Clean State proposes a package to support local governments and community groups to plant 2 million trees by 2030 in corridors through our local streets and backyards, to increase our tree canopy and make a significant impact on local microclimates and carbon drawdown. New, native tree nurseries could provide a new source of employment for First Nations communities (see separate initiative).

## CASE STUDY:

### 'Green Labs' with Millennium Kids

Over 500 young people surveyed on the issues that they are most concerned about ranked deforestation as one of the top three. Millennium Kids have several ongoing 'Green Lab' projects to increase tree canopy in WA, and they are monitoring, protecting and increasing canopy, and ensuring that it is accessible to the public. In a less than a year the members have planted sedges in South Perth, revegetated areas of bushland in Swan View and started planning to create parks out of sumps in Victoria Park. In these sites, young people have collected samples for science programs, conducted bird and flora surveys and given nature tours to community members. These new and improved green spaces have acted to create shade, increase bird and animal habitat, reduced air pollution and created safe spaces for young people to learn about their natural environment and share their knowledge.



Millennium Kids planting sedges at a Green Lab site in Sir James Mitchell Park. (Source: Millennium Kids)



## CASE STUDY:

### New Zealand's huge environment stimulus

This year, New Zealand went big with a \$1.1 billion 'Environment Jobs' stimulus package to create 11,000 jobs. It was announced in May and funding hit the ground soon after, and in just three weeks projects are up and running.<sup>89</sup>

NZ Conservation Minister Eugenie Sage says, "this investment in nature will not only support thousands of people with jobs but pay dividends for generations to come by giving nature a helping hand."

## How many jobs would it create?

At least 2229 full time jobs would be created.

## Economic benefits

A 2020 report by Ernst and Young found funding geographically targeted Landcare and conservation programs of between \$500m-\$4 billion could raise economic output by up to \$5.7 billion.<sup>88</sup>

## What would it cost?

\$230 million over four years. This cost could be co-funded through seeking commonwealth government contributions. Many of the proposed initiatives are the same or similar to programs that have been full or part-funded by the Commonwealth in other states.

(Note: \$150m of this is allocated to tourism regions hardest hit by the COVID-19 pandemic and is described in the Tourism Package.)

## ACKNOWLEDGEMENTS

Clean State acknowledges **PEW Charitable Trusts**, **NRM Regions WA**, **the WA Landcare Network**, and the **Urban Bushland Council** in the development of this proposal.



## IDEA 11. Blue Carbon & marine conservation

**270 JOBS**

### BLUE CARBON JOBS

	Jobs
Develop a Blue Carbon Strategy, offset standard, and employ new dedicated Department resources.	15
Map WA's Blue Carbon stores	10
Restoration and conservation	245
<b>Total</b>	<b>270</b>

### The opportunity

Blue carbon is the carbon captured and stored in vegetated, coastal ecosystems – primarily mangroves, seagrass meadows, and saltmarshes.

These ecosystems are incredibly effective 'carbon sinks', extracting carbon dioxide from the atmosphere and storing it in the plants themselves and the underlying soils – storing as much as four times more carbon as land-based forests of the same area.<sup>4</sup> The carbon stored in Australian blue carbon ecosystems is globally significant, accounting for about 11% of worldwide blue carbon stocks.

The degradation of Blue Carbon ecosystems will, unless prevented, lead to significant carbon emissions.

Research also shows damage to these ecosystems; through human development, severe weather and the impacts of climate change; is causing losses of about 1% of the total area each year, and causing 2–3 million tonnes of CO<sub>2</sub> emissions to be released back into the atmosphere annually.

### The Sequestration Potential and Carbon Markets

By avoiding further losses or restoring losses there is significant potential to generate revenue through carbon credit markets. Both South Australia and Queensland recognise the mitigation potential of blue carbon, with Queensland investing in proof of concept as part of its Land Restoration Fund, and South Australia developing a Blue Carbon strategy.

#### Mangroves

**~40%**

of carbon captured is retained in the plants



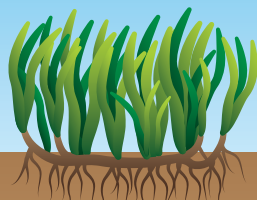
**~60%**

of carbon captured is retained in the soil

#### Seagrass

**~2.5%**

of carbon captured is retained in the plants



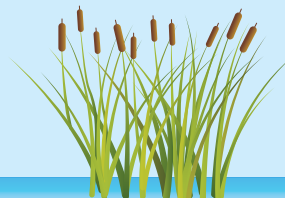
**~95% - 98%**

of carbon captured is retained in the soil

#### Tidal Marsh

**~2.5%**

of carbon captured is retained in the plants



**~95% - 98%**

of carbon captured is retained in the soil

*Carbon storage in Mangroves, Seagrass and Tidal Marshes. (WA Marine Science Institution).*





## CASE STUDY:

### South Australia's Blue Carbon Strategy

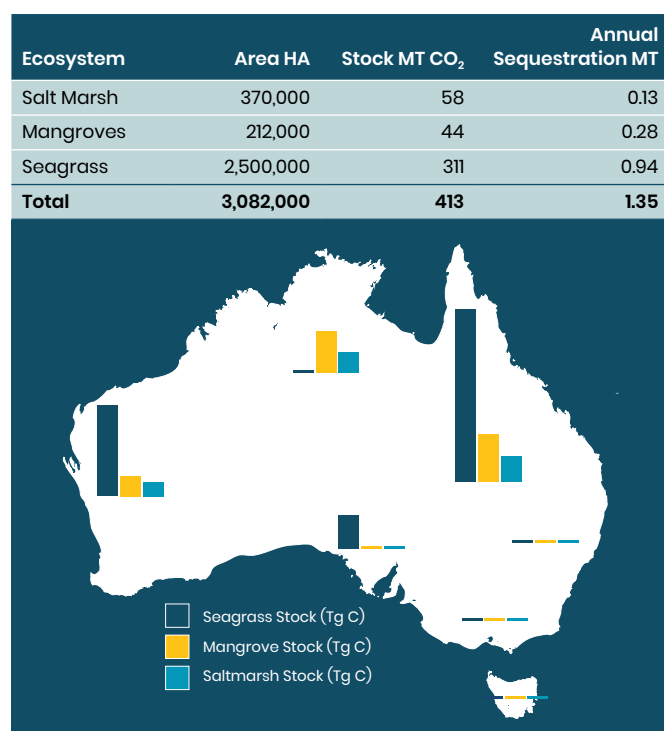
South Australia's Blue Carbon Strategy 2020–2025 establishes a state-wide, evidence-based program of projects and research geared towards blue carbon ecosystem protection and restoration.

#### It prioritises:

- Investigating finance mechanisms including carbon markets for coastal restoration activities, recognising that land-based carbon sequestration projects are eligible under the ERF, with established methods to calculate carbon benefits.
- Funding research to quantify blue carbon projects and co-benefits.
- Funding for blue carbon demonstration projects.
- Providing stronger protection for blue carbon ecosystems in planning frameworks.

Western Australia is well placed with both the expertise and territory to develop a blue-carbon industry. Exciting work is being done out of the UWA Oceans Institute, with a small team collecting and resettling seagrass with potential to restore coastal habitats and sequester drawdown significant amounts of carbon.

Western Australia's coastline extends for over 10,000 km with globally significant Blue Carbon ecosystems covering over three million hectares. It's estimated these WA ecosystems collectively store 412 million tonnes of CO<sub>2</sub> and sequester about 1.3 million tonnes of CO<sub>2</sub> annually.<sup>90</sup>



The area, CO<sub>2</sub> stock and naturally occurring sequestration of WA's Blue Carbon ecosystems.

(Source: WA Marine Science Institution)

### The proposal

1. Develop a WA Blue Carbon Strategy identifying demonstration projects and supporting WA's 2050 net-zero emissions target.
2. Map WA's Blue Carbon ecosystem and mitigation opportunities.
3. Provide funding for 'right-way' science projects partnered with Indigenous communities and leverage this research into long-term Blue Carbon projects that employ Indigenous people through Aboriginal Ranger programs and enterprises.
4. Dedicate a proportion of existing funding for Aboriginal Ranger and other natural resource management programs to coastal and sea country projects that include management and enhancement of blue carbon values.
5. Work with the Australian government to develop a Blue Carbon offset standard under the national Climate Solutions Fund, enabling carbon markets and other robust finance instruments to support Blue Carbon protection and restoration.
6. Investigate and employ effective mechanisms for financing blue carbon projects, including issuing green (or blue) bonds, payments for ecosystem services (PES) and public-private partnerships.
7. Increase funding for marine and coastal habitat restoration and conservation. Scaling up the stewardship of mangrove and seagrass habitats into commercial-scale enterprises has the potential to unlock private investment and create further employment in these areas.
8. Expand Western Australia's marine protected area (MPA) estate to provide protection and management for our most valuable blue carbon sinks.



## The proposal continued

9. Review management plans for activities that have the potential to impact blue carbon stocks, including recreational and commercial fisheries, management plans for existing MPA's, coastal planning policies, and catchment management plans to ensure blue carbon values are recognised and protected.
10. Ensure Environmental Impact Assessment processes and planning decisions consider the impacts on blue carbon for all marine or coastal development proposals.
11. Request the Environmental Protection Authority (EPA) to develop a state-wide Blue Carbon Environmental Protection Policy (EPP) under the Environmental Protection Act.

## Current barriers

The wide range of potential economic value reflects a need for further research and a lack of approved methodologies for blue carbon.<sup>92</sup> This uncertainty makes private investment in this blue carbon market risky. Lowering that risk by developing methods and supporting research will unlock private investment and provide jobs. The Australian Government is currently assessing the feasibility of blue carbon project methods in partnership with other state and territory governments, research providers and industry groups through a national Blue Carbon Roadmap.

Professor Gary Kendrick, Head of UWA Oceans Institute believes there could be huge abatement by protecting and restoring the mangroves in Exmouth Gulf and strong abatement potentials by seagrass restoration in Cockburn Sound and Shark Bay Marine Park. Such blue carbon projects in WA will be vitally dependant on mapping the extent of our vegetated coastal ecosystems, including what has been lost, the cause of decline, and to what extent areas can be restored.

## Benefits of managing Blue Carbon

In addition to carbon drawdown, the benefits of restoration and conservation of blue carbon are immense.

Marine habitat restoration is recognized as a 'jobs intensive' industry and strong driver of economic growth creating immediate employment in transport, construction, marine engineering, project management, science and aquaculture.<sup>93</sup>

Blue Carbon ecosystems provide multiple 'ecosystem services' such as providing habitats and nurseries for fish and other marine life, providing coastal protection, and improving water quality.<sup>94</sup>

Healthy marine systems that support blue carbon stores also underpin very significant economic activities.

- Deloitte estimates the value of healthy blue carbon ecosystems, on which South Australia's marine industries depend, to be worth \$1.3 billion.<sup>95</sup>
- Mangroves contribute US\$40–50 billion per year in non-market benefits associated with fisheries, forestry and restoration and protect 18 million people from coastal flooding, worth \$80 billion per year in mitigation. A study in 2012 found the value of Mangrove ecosystem services to be worth \$28,000 per hectare per year.<sup>96</sup> Benefits from mangrove preservation and restoration are up to 10 times the costs.<sup>97</sup>
- There is a direct correlation between the health of seagrass and fishery habitats and populations. One case study estimated the economic value of seagrass to fisheries at \$35,000–\$65,000 per hectare.<sup>98</sup>

Investment in WA's Blue Carbon also brings a huge opportunity for Indigenous groups to participate and lead collaborative science projects on Sea Country. Partnering with Indigenous communities in collaborative research, monitoring and management offers a range of cultural and economic benefits to partners.<sup>99</sup>

Protecting and restoring Blue Carbon ecosystems builds resilience to climate change by protecting shorelines and enhancing resilience to storm surges and rising sea levels.<sup>100</sup>



*Inland Mangrove community at Lake MacLeod, Gnaraloo.  
(Image: Gnaraloo Wilderness Foundation)*



## The role of marine conservation and protected areas

Blue carbon values are associated with healthy marine ecosystems and the health and viability of seagrass, mangroves and other blue carbon systems relies on a healthy ecosystem. Changing the ecological balance of these systems can have profound impacts on blue carbon storage and sequestration potential. This can occur through:

- Direct clearing or loss of seagrass or mangrove habitat.
- Impacts on water quality as a result of dredging, runoff, spills and contamination, or coastal development.
- Changes to species composition resulting from commercial or recreational fishing which can lead to changes to grazing pressure and loss of ecological connectivity.
- Introduction of marine pests and diseases.

Climate change impacts can exacerbate the above pressures and cause catastrophic loss of blue carbon through direct temperature impacts. Vast areas of seagrass and mangrove ecosystems have been affected already and maintaining the resilience of these systems by managing other pressures is essential.

The establishment of marine protected areas, as well as improved fisheries management, coastal planning, environmental impact assessment, and management of land-based activities that impact water quality are all important tools in supporting the protection and resilience of existing blue carbon stocks. These tools will be essential to ensure the success of efforts to restore or enhance blue carbon.

## What would it cost?

Delivering this plan for blue carbon and marine conservation is estimated to cost \$12.5m, including:

- \$2m to map WA's blue carbon opportunities.
- \$500,000 additional Department Resources to lead the Blue Carbon strategy and new unit.
- \$3m for collaborative science partnerships with Indigenous land managers and Traditional Owners and to support Aboriginal Ranger programs working with blue carbon.
- \$3m as seed capital for the establishment of a WA Blue carbon research institute.

- \$4m to protect and manage blue carbon ecosystems in new and existing marine protected areas, to revise management of activities that impact blue carbon and to establish a Blue carbon Environmental Protection Policy.

## How many jobs would it create?

We estimate this initiative would create 120 jobs immediately and up to 270 jobs in the short to medium term.

## CASE STUDY:

### Malgana Rangers Shark Bay Seagrass Project

In 2011 a devastating marine heatwave resulted in the loss of more than 1000km<sup>2</sup> of seagrass in Shark Bay – ~1/4 Shark Bay's entire seagrass meadows.

In 2018, after a 20-year legal process, Native Title was recognised over large parts of Malgana Country in the Shark Bay Area. The Malgana Rangers are a new group with six trainee rangers and a few full-time rangers.

The Malgana Land and Sea Rangers are working on a co-research project with UWA scientists in Shark Bay, on seeding and planting based restoration of seagrasses. Seagrasses holds incredible importance to traditional cultural practices, by providing habitat to inshore fisheries, dugong and turtles, and cormorants.<sup>[xviii]</sup>

The project is funded through the Marine biodiversity National Environmental Science Program.

## ACKNOWLEDGEMENTS

Clean State kindly acknowledge the assistance and expertise of **Dr Mat Vanderklift**, CSIRO Indian Ocean Blue Carbon Hub; **Professor Gary Kendrick**, Head of School, School of Biological Sciences and UWA Oceans Institute, **Professor Paul Lavery**, Edith Cowan University and **Dr Luke Twomey**, WA Marine Science Institution as experts in the development of this proposal.



## IDEA 12. Unlocking our Carbon Farming potential

**6060 JOBS**

CARBON FARMING	Jobs
Carbon farming activities	6000
Department resources – Land Restoration Fund	20
Forest and Rangelands Carbon Research Centres	40
<b>Total</b>	<b>6060</b>

“We have immense opportunity for capturing and sequestering, at relatively low cost, atmospheric carbon in soils, pastures, woodlands, forests and plantations. Rewarding people and organisations that own and manage land with incentives equal to the true cost of carbon emissions would lead to sequestration in landscapes becoming a major rural industry.”

– Professor Ross Garnaut, Superpower: Australia's Low-Carbon Opportunity

### The opportunity

WA has enormous potential to grow a carbon farming sector that benefits farmers, pastoralists, other landholders and managers including Traditional Owners and Aboriginal enterprises, and regional communities.

Carbon farming can play a key role in supporting landscape restoration and reforestation, protection of WA's unique and endangered wildlife and ecosystems, and improving the resilience of natural areas threatened by climate change.

Through the sale of carbon credits, carbon farming has the potential to significantly improve farm income while at the same time supporting better

land management, conservation of biodiversity and other co-benefit industries.

Despite these opportunities, WA has barely begun to explore the potential of a local carbon farming industry.

**By unlocking the potential of carbon farming, WA could become Australia's biggest source of premium land sector carbon credits over the next two decades.**

Our large and complex environment and vast areas of low productivity land give us an advantage of carbon farming methods that also deliver environmental, social and economic benefits.

### What is carbon farming?

Carbon farming refers to land management activities aimed at storing carbon in woody vegetation and soils or preventing the release of carbon through avoided land clearing or logging, and better management of fire, livestock, and fertiliser use.

Carbon farming activities that comply with specific formulas or 'methods' can generate tradeable carbon credits or offset certificates. These methods include:

- **Agricultural methods** such as dietary supplements to cattle and sheep to reduce emissions, capturing the methane from effluent waste at piggeries, or changing cropping practices to build carbon stores in the soil.
- **Vegetation methods** such as reforestation, revegetation, encouraging native regrowth, protection of standing forests and avoiding the clearing of existing forests and native vegetation.
- **Savanna burning methods** which use fire management practices in northern WA to avoid the release of greenhouse gases through late dry-season wildfires, and to protect the carbon stored in soil and dead vegetation.



A market for carbon credits is already established in Australia and is regulated by the Commonwealth Clean Energy Regulator. Activities that result in verified, additional carbon pollution savings, or directly remove carbon from the atmosphere through carbon sequestration are eligible to be certified by the regulator which issues Australian Carbon Credit Units (ACCU's). ACCU's can be sold to polluters wishing to voluntarily offset emissions or comply with offset requirements.

## WA is missing out on carbon farming jobs

In comparison with other states that have supported carbon farming Western Australia has few carbon farming projects and has attracted only 26 projects out of 486 across Australia funded through the Climate Solutions Fund.

Innovation in agricultural projects that avoid methane production or reduce emissions are also lagging in WA. Nationally there have been 64 agricultural projects funded through the ERF but zero in WA to date (at June 2020).

### Projects funded by the Australian government for abatement and generation

	WA	National
ERF - Agriculture projects	0	6
ERF - All projects	26	486

Sources: ERF Project Register (2019); Emissions Reduction Fund – Opportunities for Australian businesses and farmers (2017)

Within the last 100 years, over 90% of the WA Wheatbelt has been cleared for agriculture, and natural carbon stores across WA's vast pastoral regions have been systematically depleted by unsustainable grazing practices.

There is great potential to rehabilitate and revegetate low productivity farming and grazing lands. Development of a carbon farming industry in WA would provide a win-win by paying farmers and landholders to do this.

Clean State has been a strong advocate for the creation of a WA carbon offset market, and for emissions from WA's largest existing polluters to be offset here in WA.

If the direct emissions from WA's largest existing polluters be offset here in WA, over 4,000 jobs would be created across regional WA.

## Queensland's Land Restoration Fund

Queensland's \$500m Land Restoration Fund was established by the Queensland government to generate a pipeline of Queensland-based carbon offset projects that deliver economic co-benefits.

Clean State propose a WA fund to invest up to \$100 million in carbon farming projects with co-benefits. Investment is directed into premium carbon farming projects that deliver co-benefits including social, cultural and environmental outcomes rather than simply lowest-cost abatement.<sup>83</sup>

The Land Restoration Fund supports three main categories of co-benefits:

- Environmental** – enhancing habitat for threatened species, increasing diverse native forest cover, and by improving the health of wetlands, soils and water systems (which in turn improve water quality flowing into the Great Barrier Reef).
- Social and Economic** – ways that improve the resilience and strength of regional communities by providing jobs and facilitating enterprises.
- First Nations** – supporting connection to Country for First Nations peoples, providing on-country business opportunities as well as new service delivery businesses including carbon farming projects.

Clean State strongly supports the adoption of the Queensland model as a key component in the plan to unlock carbon farming potential in Western Australia

## The proposal

### Unlocking the potential of carbon farming in WA requires a package of initiatives; including:

1. Introduce a \$100m WA Carbon Farming and Land Restoration Fund, in line with the Queensland model, to support a pipeline of carbon farming projects that maximise co-benefits.
2. Establish a Forest Carbon Research Centre in Manjimup and a Rangelands Carbon Research Centre in Geraldton, in partnership with CSIRO, industry and a leading university.
3. Introduce a requirement for offsets to WA's largest polluters as a market signal to promote avoidance and mitigation at source and provide a revenue stream to be invested in carbon farming across the state.

## The proposal continued

4. Work with carbon farming enterprises and the commonwealth to address key gaps in existing carbon farming methodologies relevant to WA.
5. Map the distribution and extent of natural carbon stocks and sequestration potential across Western Australia's land systems. 25 land systems have been surveyed, with more than 200 still to be done.<sup>1</sup>
6. Invest in the training of intermediaries like agronomists, NRM and Landcare groups and land councils who can provide advice to landowners.
7. Adopt the Forests for Life business plan to phase out native logging and increase our plantation estate by 40,000 hectares to support a sustainable timber industry (see separate initiative).
8. Utilise the Forest Products Commission (or other government agency) to provide common-user functions for carbon farmers including carbon and soil mapping and testing, seed collection, propagation and delivery, planting services, land sale database and facilitation, carbon insurance, and aggregation and marketing of carbon products.
9. Work with regional shires to develop a template planning scheme to allow rapid approval for carbon farming projects and standard local government requirements for fire and property management.
10. Develop a special purpose covenant for carbon plantings and natural carbon assets that can be applied where carbon farming is integrated with other farming activities.
11. Assist carbon farming projects and landholders to develop Indigenous Land Use Agreements (ILUA's) which allow carbon farming to occur in a way that maximises benefits to Traditional Owners and Native Title Holders.
12. Reform legislation governing pastoral leases to support diversification and adoption of carbon farming methods by leaseholders.
13. Support Aboriginal Ranger Programs across different land tenures to generate revenue from carbon sequestration or reductions in emissions resulting from cultural land management practices.
14. Reconnect and restore biodiversity in towns and cities.

## How much carbon pollution would this save?

A study by Reputex Energy in 2018 found Western Australia has abatement potential of up to 80 million tonnes of emissions offsets available per year across activities including reforestation plantings, renewable energy, rangeland regeneration, savannah burning, and other land sector projects.

The figure of 80 million tonnes per year is just under Western Australia's total emissions in 2017, of 88.5 Mt CO<sub>2</sub>-e<sup>83</sup> and less than half the total lifecycle emissions generated by the WA LNG sector (Scope 1 and scope 3).

## How many jobs would it create?

The Reputex study<sup>ix</sup> found offsetting 30 million tonnes per year (a 'medium demand scenario') in WA would create 4000 direct jobs. 5 out of 6 jobs were expected to be created in the land sector, with the largest portion of jobs in the South West and Southern Rangelands. (See separate initiative)

Jobs attributed to Reforestation Plantings are expected to be the largest source of new job creation (1,190), followed by Renewable Energy (614), Rangeland Regeneration (249) and Savannah Burning (186); with all remaining jobs attributed to other land-sector projects (1,694).

In Queensland, the Carbon Market Institute's Carbon Farming Industry Roadmap estimated carbon farming could generate 10,500 – 21,000 direct and indirect jobs by 2030.<sup>85</sup> Research by Energetics (2017) conservatively estimated between \$1.4 to \$4.7 billion in value could be generated through carbon farming in the Queensland land and agriculture sector from 2017 to 2030.<sup>86</sup>

We estimate here in WA, direct employment of up to 10,000 working on carbon farming projects, in addition to 20 Department staff and 40 employed in two carbon farming research centres. Significant additional employment created through co-benefits and complimentary industries such as honey production and tourism are not included in these estimates.

Carbon  
saved from  
atmosphere

**30-80 million  
tonnes**  
per year





## CASE STUDY:

### The Yarra Yarra Biodiversity Corridor

The Yarra Yarra Biodiversity Corridor is a multi-species native reforestation project, located about 400km north of Perth and established by Carbon Neutral.

The project aims to reconnect remnant vegetation sites and link 12 nature reserves across a vast tract of land covering about 10,000 square kilometres. Built along the ancient Yarra Yarra drainage line, it's the first Australian sustainability project to achieve the international Gold Standard certification. It has a carbon sequestration potential of 1.25 million tonnes CO<sub>2</sub>-e.



Yarra Yarra Biodiversity Corridor.

(Source: CarbonNeutral.com)



Yarra Yarra Biodiversity Project.

(Source: Gold Standard)

## CASE STUDY:

### The Bulga Downs Rangelands Restoration

The Bulga Downs Rangelands Restoration Project, 340 km north of Kalgoorlie, is expected to sequester 80,000 tonnes of carbon per year over 25 years through low-cost revegetation activities and revised land management practices including livestock management, water point placement and additional fencing to encourage further revegetation.



Image showing the five main paddocks on Bulga Downs are fenced to country type and a minimum of one third of the property is spelled at any given time.

(Image courtesy of David McQuie, Desert Knowledge CRC)

## ACKNOWLEDGEMENTS

Clean State acknowledges the assistance and expertise of **Farmers for Climate Action** and **AgZero** in the development of this proposal:



# first nations

Clean State recognises the value that comes from learning from and working alongside First Nations people. We also recognise that we must do more to support and stand with Western Australia's First People as they determine their future.



## IDEA 13.

# Closing the Gap: Urgent infrastructure & services investment

**566-650 JOBS**

CLOSING THE GAPS	Jobs
Community Infrastructure upgrades	500
Additional department resources in Social Reinvestment	30
First Nations Broadcasting at 6 new remote radio stations	36-120
<b>Total</b>	<b>566-650</b>

### The opportunity

Clean State recognises that to be fully effective in our work on economic transformation compatible with a safe climate we need to learn from and work alongside First Nations people.

This section of our package reflects consultation with First Nations leaders to provide ideas for stimulus measures that would benefit and empower WA's First Nation communities and enterprises.

Clean State also acknowledges and is guided by the work of Lidia Thorpe and Anica Niepraschk 'Respecting Nature Through First Law' in the development of this package.

Clean State also acknowledges the need for meaningful action in Closing the Gap, addressing systemic discrimination and preventing deaths in custody, and the urgency of the Black Lives Matter movement.

We also recognise that we must do more to support and stand with Western Australia's First People as they determine their future and to, together, win cultural, economic and conservation outcomes.

### The proposal

Clean State is advocating for the state government to commit to a process that places First Nation peoples and communities at the heart of WA's stimulus and recovery package, and recommend:

1. Consulting with, empowering, and providing funding for First Nation peoples to establish groups across all communities and regions to identify gaps in infrastructure and services, including clean water, clean energy adequate housing, and climate resilience with the commitment to funding these gaps within three years.

2. Link the program of infrastructure upgrades to Social reinvestment programs. Social reinvestment diverts funding from ineffective and dangerous detention and prison systems to community-led initiatives that provide support, training and employment opportunities.
3. Provide funding to connect remote communities with community-run First Nations media services, which provide culturally and linguistically appropriate access to educational programs, traditional practices, and emergency information.

### Closing the urgent gaps in Infrastructure and Services

**Identifying and fully funding health and community services provided to First Nations communities, and prioritizing clean water, clean energy, and housing must be the first step in any construction-focused stimulus package.**

The Coalition of Peaks, a group of over 50 Aboriginal and Torres Strait Islander community-controlled peak and member groups have worked with the Australian Government in creating the Closing the Gaps framework which identifies four priority areas for reform. These are to reduce inequality in Aboriginal and Torres Strait Islander people's life expectancy, children's mortality, education, and employment. Improving infrastructure and services would directly impact these goals. Establishing community-led training and employment programs for those engaged in the justice system in a state-wide rollout of upgrading energy, water and housing infrastructure would provide a powerful Closing the Gap initiative.

**Any successful project in remote communities must be based on the approval and ownership of those communities, to integrate local context and livelihoods.**

## Closing the urgent gaps in Infrastructure and Services continued

WA's 274 remote communities are home to about 12,000 people. Only 165 of these communities receive some form of direct service provision from government, and many lack basic infrastructure, with a lack of clean water, clean energy, and adequate housing well documented and inadequately addressed to date.

### Clean water

Few remote communities in Western Australia have access to treated drinking water. In 2015 an Auditor General report identified major systemic issues with the delivery of the state-run essential services in WA's remote communities, finding 80% of the 84 surveyed Aboriginal communities failed national water standard safety tests, with the majority failing multiple times. Most remote communities rely on raw groundwater to supply domestic water, often without treatment. A 2018 study found a possible causal relationship between the occurrence of Chronic kidney disease remote in Aboriginal communities and the presence of contaminants in drinking water, particularly uranium and nitrates found in the local groundwater. Access to adequate hygiene facilities is also a major concern.

**Cost-effective water treatment systems are needed to provide communities access to clean and safe potable water at the local scale.**

### Overcrowding

A severe lack of investment in Indigenous housing is a major cause of overcrowding, which affects 13% of Indigenous adults in major cities, 20% in regional areas, and 48% in remote areas<sup>101</sup>. In Mowanjum, in the Kimberly region, about 350 people share 42 houses. Overcrowding has been noted by the UN Special Rapporteur on the rights of indigenous peoples and the UN Special Rapporteur on Adequate Housing in reports from 2017 and 2007.

### Clean energy

Clean State acknowledges the efforts of the McGowan government to aid the transition to clean energy in remote communities with \$11.6 million in funding dedicated to solar installation and storage in six Kimberley communities. However, more must be done to ensure a full transition from fossil fuels across all remote communities. Renewable power through solar PV and batteries on all remote communities should be installed with a staged phase out of costly, noisy and polluting diesel-powered generators.

## CASE STUDY:

### Punmu bed frames assembled for elders

The WA Indigenous Storybook shares an initiative coordinated by the Puntukurnu Aboriginal Medical Service and Punmu Aboriginal Community to address the issue of elders sleeping on mattress on the floor, a prevalent health issue. One volunteer welder taught to weld and assemble bed frames. After two weeks all elders were provided with a bed frame and the remaining frames were available free to anyone who purchased a mattress from the community store. This story shows how addressing community identified issues can be done in a way to instil the necessary skills within a community.

## Combining these efforts with Social Reinvestment programs

Indigenous people are overrepresented in the criminal justice system. WA has the highest rate in all of Australia of First Nations people in detention, the highest rate of Indigenous young people under supervision,<sup>102</sup> and the highest number of deaths in custody of all states. The rate of incarceration has advanced 12 times faster for Aboriginal people than non-Aboriginal people since 1989, yet there's been an almost complete absence of rehabilitation programs for Aboriginal children despite the urgent need for them.<sup>103</sup>

Imprisonment is costly and ineffective. It costs \$100 per day to supervise one juvenile on a community work order, \$356 per day for every adult in detention, and \$1021 per day for every juvenile in detention. The cost to detain WA's 7000-strong prison population is \$1.6 billion and set to increase. WA also has the highest recidivism rates in Australia, with 45% of people returning to prison within two years of release.<sup>105</sup>

20 years ago the Royal Commission into Aboriginal Deaths in Custody identified over-representation of the Aboriginal men, women and juveniles in the justice system was due to Aboriginal disadvantage and underlying issues including unemployment, poverty, unstable accommodation and homelessness, the inability to pay fines, poor health, lack of education, as well as police practices and judicial processes. It recognised that only through addressing these underlying causes would there be any long-term reduction in the levels of over-representation.



## Combining these efforts with Social Reinvestment programs continued

A 2018 review found only 64% of the 339 recommendations of the Royal Commission had been fully implemented, and the rate of imprisonment of Indigenous Australians had almost doubled in the 27 years since 2017. Between 1991 and June 2020 there have been at least 437 Indigenous deaths in custody in Australia, with 164 of these in WA – the highest number of all states and territories.

**In June 2020 Attorney-General for Western Australia, John Quigley, said there was “systematic discrimination” against Indigenous people in the Western Australian justice system, and oversaw long-overdue reforms relating to jail sentences for unpaid fines.<sup>107</sup> The next step is to commit to a state-wide social reinvestment program, and link this to mentoring, training and employment opportunities that would arise from a program rolling out community-identified infrastructure and services across urban, regional and remote communities.**

**Justice Reinvestment** shifts the emphasis and funding of justice from incarceration to less costly early intervention, prevention, and rehabilitation, and targets and responds to the underlying causes of offending rather than reacting to the consequences once damage has been done.

A **Social Reinvestment** approach is a transformative approach to justice issues and focuses on responding to the underlying causes of offending, reducing both crime and costs, and supporting the social and economic development of disadvantaged communities. It is supported by evidence and the collective knowledge and experiences of 25 WA non-government organisations who have formed the Social Reinvestment coalition to support this approach here in WA.

Each of these policies provides for the opportunity to train and employ people and empower communities. During the implementation of the community's recommendations local people could be trained to build, install, and maintain the infrastructure improvements. This would also raise living conditions while simultaneously closing gaps in education and employment, especially in the renewable energy, water sanitation, and health care provision.

In Western Australia, First Nation peoples suffer a mortality rate twice as high as non-Indigenous people, and a drastically higher burden of disease rate, including cardiovascular and respiratory illness, and chronic kidney disease. It is predicted that these inequalities will be intensified by climatic conditions such as heat stress, water and food-borne illnesses, vector-borne infectious diseases and air pollution effects.

## CASE STUDY:

### Smart Justice Projects in WA

**Olabud Doogethu**, an Aboriginal community-designed Justice Reinvestment project in Halls Creek is considered the most advanced Justice Reinvestment project in WA, and provides culturally secure end of end support for at risk individuals and families, guaranteed 12 month paid traineeships for every high school graduate in the Halls Creek region, intensive case management work, establishing a Youth Hub centre open from 3pm-8pm, and free entry into the Halls Creek Swimming pool, has been credited with a 46% reduction in burglary offences and an observable reduction in anti-social behaviour.

The **Fairbridge Bindjareb Project** provides Aboriginal and Torres Strait Islander people in custody with mining industry training and 'real guaranteed jobs'. It also includes an 'intensive lifestyle development program' and focuses on reconnection to and respect of Aboriginal culture. A preliminary review found only 18% of participants returned to prison within two years of being released (compared to 40% for the general prison population recidivism rates), and 73% of participants had successfully gained and retained full time employment 7 months post conclusion of the program. Independent analysis found the cost savings to government for the first five intakes of the project was approximately \$2.9 million.

## Investing in Community run First Nations media services

Digital inclusion and connectivity have been acknowledged by the Australian government as a primary requirement for economic and social participation. It is also essential to meeting the goals laid out in the Closing the Gap framework. Without digital inclusion Aboriginal and Torres Strait Islanders are further disadvantaged in business and access to essential services.

52% of Aboriginal and Torres Strait Islander populations in Australia do not receive appropriate First Nations Media services.

Article 16 of the UN Declaration of the Rights of Indigenous Peoples outlines the right to participate in First Nations-owned and controlled media services and to have access to all forms of non-Indigenous media without discrimination.



## Investing in Community run First Nations media services continued

First Nations media services provide vital services. In remote communities local First Nations radio rates highly as 90 per cent audience share, and in 82 regions across the country First Nations radio is the only radio service available.

Community based media projects can provide work experience and the opportunity to run community workshops teaching aspects of digital literacy.



## CASE STUDY:

### WA's Indigenous Media Landscape

There are 11 First Nations media stations across WA, including:

- Noongar Radio – Perth
- Radio MAMA – Geraldton & Mt Magnet
- Tjuma Pulka FM – Kalgoorlie
- NG Media – Wingellina and the central WA remote communities (14 sites)
- Ngaarda Media – Roebourne
- Goolarri Media – Broome
- Pilbara & Kimberley Aboriginal Media (based in Broome with 12 sites across the Pilbara and Kimberley)
- 6DBY – Derby
- Wangki Radio – Fitzroy Crossing
- PRK Radio – Halls Creek
- Waringarri Media – Kununurra

Each of these stations employs between 2-5 administrative and production staff and a further 4-12 casual or part-time broadcast staff depending on the number of sites they're covering. **NG Media** operates 14 sites across remote communities in Central WA. It is an Independent Yarnangu Corporation employing over 35 Yarnangu workers and growing. The company runs projects in radio, film, TV, media training centres, music, and online content. RadioNGM broadcasts locally and nationally spreading First Nations music and stories.

**Pilbara and Kimberly Aboriginal Media (PAKAM)** located in Broome is an association of organizations that provides 12 remote communities with support and funding for their productions which includes providing them with equipment, helping them with licences, making video content for broadcast, and representing their interests to First Nations Media. They provide Indigenous Community Television and the PAKAM Radio Network via satellite delivery. The broadcasts reach 18 remote communities with an audience of over 5000. Each of the 12 communities has 2 or 3 part time workers, but PAKAM is understaffed and lacks full-time staff devoted to training. Traditionally they've had to hire someone for 6 weeks to travel to all of the communities and provide training.



## Investing in Community run First Nations media services continued

### Addressing broadcasting “White Spots”

In WA, especially south of Perth, there are large gaps in the provision of First Nations media services, and many communities lack access to locally run media outlets, including Albany, Esperance, Denmark, and Bunbury. This has been a growing concern over the past five years as the ABC has scaled back news and weather reporting in remote regions.

**“In terms of infrastructure, there are large pockets of WA without First Nations media services. The south-west corner, south of Perth for example, has a large Aboriginal and Torres Strait Islander population and no dedicated media service. We would like to see these ‘white spots’ addressed to give First Nations communities all over the country access to community-controlled media services.”**

— Claire Stuchbery, First Nations Media

Radio programs can educate listeners on traditional land practices, the effects of climate change, and translate health, public service and emergency information, and news connecting remote communities.

Given the profound and disproportionate impact of climate change on First Nations communities we recommend exploring funding for First Nations media organisations in all locations to produce documentaries, animations, special series, outside broadcasts, language revitalization initiatives, podcasts and multimedia productions across radio and screen content specifically relating to climate change.

Clean State also acknowledge the vital role Indigenous media played during the COVID pandemic and understand that while there was some funding provided to broadcast national level content, none was provided for translating the content into more languages and many communities cut off at the onset of COVID-19 lacked access to health information in the appropriate language. In consultation a greater focus on funding for translating COVID content was identified as a strong, immediate partnership the government could pursue.<sup>111</sup>

As Claire Stuchbery explains, there are a range of job opportunities available within the First Nations media sector in WA. Media organisations create engagement and employment opportunities through school programs, specialised programming on issues such as domestic violence, outside broadcast opportunities for events and meetings and a broad range of skills development opportunities in communications, administrative, digital mentoring and technical roles. We see these activities as aligned with the closing the gap objectives...We would like to see state governments working more directly with local media organisations at a regional level. Our members often talk about wanting to partner with activities and initiatives in their local area, but being directed back to offices in Perth or Canberra and being overlooked due to a lack of local knowledge.

The First Nations media industry provides a range of employment pathways for Aboriginal and Torres Strait Islander people both within the sector and feeding into mainstream media and other industries and offers a culturally safe environment in which to develop ‘work ready’ skills and to continually upgrade those skills to define their own career paths. For this reason, many media workers move into communication roles in other industries, such as the mining and resources industry, politics and the public service and information technology.<sup>112</sup>

However a lack of operational funding has limited opportunities for mentoring and job shadowing to develop management and senior-level expertise, and has constrained the sector’s capacity for business development and increased dependence on government funding, rather than increased financial sustainability.<sup>113</sup>

**“What we don’t have is Government support for these roles. In remote areas some media workers are employed through the CDP, others work on a casual basis on different film and radio projects. What we would like is reliable support for operational expenses that would allow the industry to employ people in a manner that supports career development more strongly, rather than in bits and pieces that provides little job security and continuity.”**

— Claire Stuchbery, First Nations Media

## Investing in Community run First Nations media services continued

The industry has developed 9 Calls for Action which identify minimum requirements from Government to grow the capacity of the sector to deliver employment and economic returns for communities. It proposes \$24 million nationally for items including operational & employment funding, live & local expansion programs, strengthened news services, expanding training & career pathways programs, and infrastructure upgrades.

### What are the benefits?

A cost benefit analysis of just two Justice Reinvestment programs found the potential to reduce spending on primary incarceration, custody and community supervision costs by \$1 billion over the next ten years. This figure doesn't include the broader savings across courts and social welfare systems, or the widespread social and economic benefits former offenders could contribute to society if effectively rehabilitated.<sup>114</sup>

A 2017 Report by PWC Consulting in partnership with Change the Record and Richmond Football Club<sup>42</sup> found that closing the gap on Aboriginal incarceration will save almost \$19 billion dollars nationally by 2040. Under a Social Reinvestment approach, the enormous resources currently wasted on a failing prison system are freed up to be spent on improving the wellbeing of people, families, and communities.

**Investment in First Nations broadcasting generates \$2.87 of cultural, social and economic value for every dollar invested.**

This is according to the Department of Prime Minister & Cabinet who commissioned a Social Return on Investment (SROI).<sup>115</sup> The study looked at three Indigenous Broadcasting Service (IBS) case studies and found "all three IBSs analysed are delivering outcomes consistent with the four themes of communication, strengthening culture, stronger communities and increased employment and participation."

**Local media outlets also ensure the communication of emergency information relating to health and weather conditions in relevant languages.**

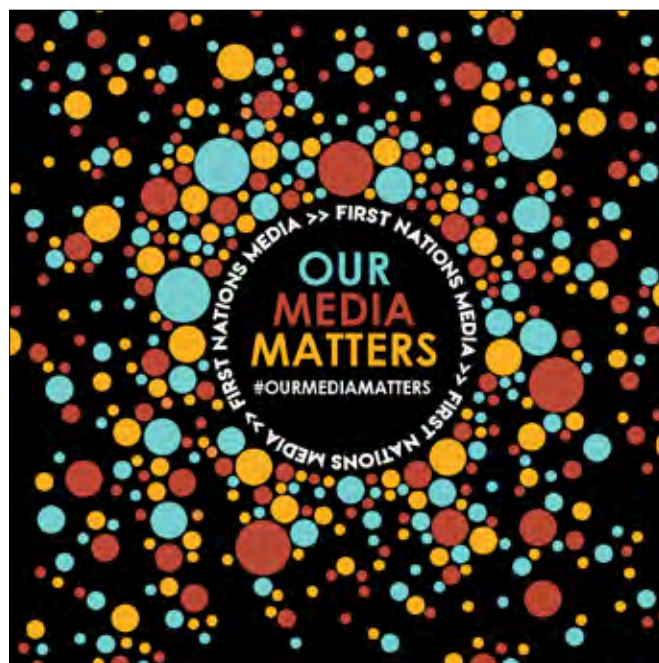
### What would it cost?

At least \$2.4 million to fund the '9 Calls to Action' proposed by peak body First Nations Media in WA.

The investment in infrastructure and services, as well as meaningful engagement and consultation with communities to identify their needs, and linking this to Social Reinvestment programs would be in the vicinity of \$500m.

### How many jobs would it create?

- State-wide consultation and delivery of an emergency infrastructure program would create up to 500 new jobs in community engagement, project management, construction, engineering, operations and maintenance, by 2025.
- Additional Department resources to drive and coordinate Social Reinvestment programs of at least 30 full time staff.
- A new Media service designed to serve the remote areas of South WA, employing up to 6-20 people across 6 new radio stations in Albany, Esperance, Denmark, and Bunbury and in two other south west locations could employ 36 to 120 people, and potentially hundreds of additional traineeships, by 2025.



(Source: First Nations Media)



## CASE STUDY:

### Coolgardie teenager invents a water treatment system



Uriah Daisybell with his deadly metals water filter.  
(Source: Australian Water Association).

18-year old Uriah Daisybell, a student at the Coolgardie Christian Aboriginal Parent-Directed School (CAPS) used mussel shells and sugar to start engineering a solution to contaminated water in his community. He began experimenting with his 'deadly heavy metals' filter while living in the Kimberley, a region that has faced numerous water quality concerns, particularly high levels of nitrates in remote areas.

"In my community the water tastes really bitter. I thought the filter could benefit communities like mine and others further out from major towns."

His award-winning prototype uses charcoal, neodymium magnets and carbon-coated mussel shells – all materials that are easy to obtain locally – to filter contaminants from water.

"Mussel shells are easy to come by ... the real challenge was carbonising the sugar. I had to go outside and make a little fire and cook them ... [In the filter] they're really tightly compacted so they stop dirt and other things in the water from going through."

Daisybell was a finalist for the 2019 Australian Stockholm Junior Water Prize and the 2019 BHP Foundation Science and Engineering Awards.

In his submission, he said the project could benefit communities all over the world, and if water can be cleaned with his filter, it could mean clean water is widely available.<sup>17</sup>

## ACKNOWLEDGEMENTS

Clean State acknowledges members of the **Coalition of Peaks, the National Aboriginal and Torres Strait Islander Health Worker Association, Claire Stutchbery** at First Nations Media, **the Australian peak body for Indigenous media and communications, Neil Turner** at PAKAM, **Perth NRM**, and the **WA Homelessness Task Force** in the development of this package.



## IDEA 14.

# A transformative, state-wide Aboriginal Place Naming Project

**251 JOBS**

WA ABORIGINAL PLACE NAMES PROJECT	Jobs
State-wide Placenames Project 2021-2026:	
• Aboriginal researchers	12
• Aboriginal businesses	20
• Geospatial database & Design specialists	15
• Aboriginal Studies Place Names Scholarships	10
• Aboriginal Community Engagement Trainees	25
• Core Project management, community arts & cultural development practitioners	56
• Local Aboriginal Place Name coordinators	55
• Local Aboriginal Place Name community arts practitioners	28
9 Regional capacity building hubs	30
<b>Total</b>	<b>251</b>

## The opportunity

Aboriginal placenames from more than 66 different languages and dialects covered Western Australia before colonisation.<sup>118</sup> While many continue to be used today, others were replaced by non-Aboriginal placenames.

Aboriginal place naming is a powerful catalyst for reconciliation, provoking a deeper awareness of a location's history and culture.<sup>119</sup> It provides an opportunity to restore Aboriginal names to geographic features, incorporate traditional Aboriginal language, stories and culture into everyday communications, and increase the knowledge and understanding of the whole community about the connection of Aboriginal people with country.<sup>120</sup> These insights help all West Australians collectively recognise who we are as society with thousands of years of history, rather than living through a post-colonial memory. Understanding the history of the land on which we live has the capacity to heal and educate by acknowledging truth and building a shared identity and future.

## The proposal

Clean State strongly supports the proposal by Community Arts Network (CAN) and Professor Len Collard (through Moojar Consultancy) to:

1. Extend the Place Names initiative that combines Aboriginal led research and deep creative community engagement for another five years, scaling it to a state-wide program, that engages all of Western Australia's First Nations' Countries.
2. Develop a geospatial database and website that makes the research, stories and process accessible and transparent.

Clean State also recommend exploring a way to harness the many potential benefits to regional communities this Project could deliver, and suggest:

3. Providing support and funding for regional hubs to develop Aboriginal skills, capacity, training and employment pathways in areas directly related to the Place Names project, including research, the arts, geospatial mapping and information technology, languages, cultural tourism, community engagement and consensus building processes.

**Clean State also proposes:**

4. Funding and department resources for consulting with First Nations people on a process to consider nominations and formal adoption of the original words for places, and the dual or re-naming of signs and maps. (Such as the Northern Territory's Place Naming Enhancement Project).

## Boodjar: Nyungar placenames in the South-West

**"This Boodjar Nyungar Placenames project begins to redress the void in the identification, recording and writing of Australian Indigenous histories."**

**– Professor Len Collard**

The South-West of Western Australia covers the general area south of Geraldton and west of Esperance and Nungarin. To the Nyungar people, the area is known as Nyungar Boodjar. Within this area, 50% of the placenames are of Nyungar origin but, to date, little of their meaning has been widely known<sup>121</sup>.

Professor Len Collard, Chief Investigator at UWA's School of Indigenous Studies and his dedicated research team spent three years investigating the history and meanings of Nyungar placenames in the area prior to colonial settlement.



## Boodjar: Nyungar placenames in the South-West continued

The team produced 'Boodjar' – an interactive website that shares the results of the team's extensive research and provides insight into Nyungar placenames and meanings.



The interactive map on the 'Boodjar' website ([boodjar.org.au](http://boodjar.org.au))

The mapping sheds light on how Nyungar people lived in Boodjar for many thousands of years. It brings to life ceremonies performed in some places and meals shared in others, the ochre trade, wildlife, weather conditions, friendships, magic, spirits and other practices central to Nyungar culture.<sup>122</sup>

## The Noongar Place Names initiative



Albany/  
Kinjarling Place  
Names  
(Source: CAN)

Building on Professor Collard's long-term research, Community Arts Network has developed a powerful model of collaboration drawing on research, community engagement and creative outcomes with Elders and the Noongar communities. CAN and Professor Len Collard have been working on the Noongar Place Names program for nearly five years.

The program engaged communities across Noongar country and beyond in Aboriginal stories, language and culture, collectively uncovering meanings of the names for towns and places; and bringing them to life through film and art.

For an investment of \$1.5 million over five years, CAN has produced Place Names programs in Langford, Albany (Kinjarling), Katanning and Moora, and has involved:

- 599 participants
- 27 partners
- 112 workshops, and
- 253 works created

Independent analysis found programs delivered in Noongar communities over 5 years using similar models delivered an \$18.58 return on every dollar invested.<sup>123</sup>

## An important step in healing

In July the WA government announced the 'King Leopold Ranges' would be renamed Wunaamin-Miliwundi, a combination of the traditional Ngarinyin and Bunuba names.<sup>124</sup> The name given in 1879, after a Belgian tyrant responsible for the death of up to 10 million Congolese, was replaced following consultation with the Wilonggin Aboriginal Corporation and Bunuba Native Title Corporation.<sup>125</sup>

It's time to build on this meaningful step with a transformative project that would inspire reconciliation and healing.

The Northern Territory is the first Australian jurisdiction and a world leader in officially incorporating dual naming in its naming practices and approving dual names for geographic features. The NT Government has developed a Place Naming Enhancement Project and has formal processes for requesting and registering a place name.<sup>126</sup>

## How many jobs would it create?

It's estimated 231 Aboriginal and Torres Strait Islander jobs would be created over five years.

## What would it cost?

The Place Names Project is estimated to cost \$8m, with \$1.5m from the state government, (matched by the Commonwealth) and contributions also expected from local governments and businesses in the nine regional development commission regions.

The Regional Hubs would cost an additional \$3.5m per year, and consultation relating to the introduction of a formal place naming process such as the NT model would cost \$100,000.

## ACKNOWLEDGEMENTS

Clean State acknowledges **Professor Len Collard** and **Community Arts Network** in the development of this proposal.

## IDEA 15.

### Expand Aboriginal Rangers & support culture and conservation enterprises

CULTURE CONSERVATION & SCIENCE	Jobs
Expand Aboriginal Ranger Program	160–180
Support for Aboriginal Enterprises through three regional business hubs	20
<b>Total</b>	<b>180–200</b>

**180–200 JOBS**

#### The opportunity

Clean State acknowledges that Traditional Custodians and First Nations people have said that too often, environmental organisations focus on conservation outcomes and have not taken cultural implications or sustainable economic opportunities into account.<sup>127</sup>

The recognition and protection of the rights of the Traditional Custodians, and sustainable local economies, must be a priority alongside conservation and is a focus of this section.

#### The proposal

Clean State is advocating for the state government to:

1. Develop meaningful, permanent ways to support and empower Aboriginal enterprises in culture, conservation and science.
2. Triple funding to WA's Aboriginal Ranger program and establish this as a permanent program.
3. Increase funding for the WA Indigenous Business and Employment hub and open three new hubs in the regions by 2020 that provide a one-stop-shop for Indigenous businesses, entrepreneurs and job seekers to access advice and support, a place to work, and connect with corporates.
4. Provide funding for operational activities (in addition to capital) in government grants for Aboriginal enterprises to address difficulties in attracting private investment due to lack of land tenure.
5. Permanently protect the Fitzroy River Catchment and empower local custodians to determine its uses for cultural enterprises instead of water mining.

#### Tripling the funding for the Aboriginal Ranger Program

The WA Government provided \$20m over five-years for the Aboriginal Ranger Program in 2017, which funds 42 Aboriginal organisations 85 new jobs and 80 training opportunities from the Kimberley to Esperance.

Land and sea management activities include biodiversity monitoring and research, traditional knowledge transfer, fire management, cultural site management, feral animal and weed management, cultural awareness and immersion experiences for visitors, and guided tours and talks for visitors.

In the Kimberley, women ranger teams have doubled in two years to 2019, with more than fifty trail-blazing women now employed across all parts of the Kimberley. However, women ranger teams face major challenges including funding shortfalls and short-term contracts.<sup>128</sup>

The program has been incredibly successful, and every funding round has been oversubscribed by at least three times.

#### Supporting culture, conservation and science enterprises more broadly

The UN Special Rapporteur on the rights of indigenous peoples also noted equal opportunity employment efforts between indigenous and non-indigenous peoples from 2008–2018 were unsuccessful and indicated negative trends.<sup>129</sup>



## Supporting culture, conservation and science enterprises more broadly

continued

The Noongar Land Enterprise Group identified issues affecting indigenous communities across the State including:

- Many grant opportunities provide funding for capital but not operations. This leads to insufficient management of the capital in land enterprises. Greater funding for operations will create more jobs in the management and operation of land enterprises and provide security for capital investments.
- Lack of land tenure prevents First Nations communities from accessing loans and investment outside government grants to support independent infrastructure development and employment in remote communities.

Clean State consulted with a number of First Nations leaders and practitioners in the development of this Plan who identified a range of ways jobs in Aboriginal enterprises and 'forever industries' could be supported.

Areas for priority investment in First Nations-led enterprises identified include:

1. Nurseries providing seedlings and services for mine site rehabilitation, and linking rehabilitation with aboriginal enterprises more broadly.
2. 'Luxury cultural tourism' infrastructure and services.
3. Bio prospecting and regenerative agriculture.
4. Requiring offsets programs to have cultural and social benefits.
5. 'Luxury cultural tourism' (see Tourism Chapter).
6. Supporting the Fitzroy River Catchment for cultural enterprises instead of water mining.
7. Sustainable aquaculture (such as Marron farming).

## First Nations land tenure

Lack of land tenure prevents First Nations communities from accessing loans and investment outside government grants to support independent infrastructure development and employment in remote communities.

Many grant opportunities provide funding for capital but not operations leading to insufficient management of the capital in land enterprises. Greater funding for operations, from the government or private sources, will create more jobs in the management and operation of land enterprises and provide security for capital investments.

## What would it cost?

A three-fold increase to the existing Aboriginal Ranger program would cost \$12m.

Providing an additional \$2m funding for the WA Indigenous Business and Employment hub and opening three new hubs in the regions by 2020 that provides a one-stop-shop for Indigenous businesses, entrepreneurs and job seekers to access advice and support, a place to work, and connect with corporates would cost \$5m per year.

## How many jobs would it create?

At least 200 new jobs could be created through this proposal.



## CASE STUDY:

### Kimberley Ranger Program – Women rangers protecting country and culture



Kimberley  
Women Rangers  
(Source: Kimberley  
Land Council,  
at [klc.org.au](http://klc.org.au))

In the Kimberley, women ranger teams have doubled in two years to 2019, with more than fifty trail-blazing women now employed across all parts of the Kimberley. However, women ranger teams face major challenges including funding shortfalls and short-term contracts.<sup>130</sup>

Ngurarra Ranger Coordinator Chantelle Murray was the first female ranger coordinator in the Kimberley, and said:

**“When it comes to conversations about land management women play a very important role in looking after country through both cultural and western ways. There are a lot of opportunities arising for women rangers but not as much funding as we have expected. We all need to work together across different levels to tell our stories to accomplish our vision of more women rangers as this is very important to us and our future generations.”**

Corporate Services Manager Sarah Parriman says women rangers are leaders in their community and are inspiring many young women to take up the charge caring for country and culture.

**“For many women living in remote locations in the Kimberley, Indigenous land and sea management is one of their main opportunities to engage in meaningful employment. As a young Aboriginal woman growing up in the Kimberley, being an Indigenous ranger was never an option for me. Now we have women rangers working all over the Kimberley. “Employment as a ranger can empower women and have transformative benefits for families, communities and the women themselves. “Every day women rangers get up, put on their uniform and feel proud that they are contributing to their country, culture and community.”**

## CASE STUDY:

### Collie Marron Farm

The Collie area has an opportunity to restart the Aboriginal-led marron farm in Collie. The farm utilizes wastewater from mining operations, purified and filtered through two dams, to raise the marron. There is presently a huge demand for bush tucker, far outweighing current supply and presenting a great opportunity for the wet and dry market proposed to accompany the farm. The bush tucker sales must be developed in a way that employs and empowers Aboriginal people. This food experience aspect will supplement tourism in the area.

The group proposes a market for the sale of marron, bush tucker and cultural products. The project is primarily focused on the sale of Marron with extra income added by the sale of other items. Recreation facilities in the Collie River area well used, drawing one time and repeat customers to the market.

The facility will provide interpretive displays sharing the story of the Ngalang Boodja and Collie Aquafarm Story with visitors. Further informative displays will provide background on the local artists whose work is featured in the shop. The dry section of the market provides a space for local Aboriginal artists and craftspeople to sell their products.

Marron is sold live to customers for immediate use in the BBQ area or for later consumption. The BBQ area provides coin operated gas BBQ's for use. During aquaculture farm and cultural tours, marron tasting can be available with samples of bush tucker sauce. There is a small bush tucker garden on site to provide for aesthetic and educational value.



# industry

Western Australia is a globally significant resources hub with a wealth of mineral resources and some of the most advanced mining industries in the world. We also have some of the most accessible renewable energy resources, which have the potential to revolutionise the way we power mining and manufacturing.



## IDEA 16.

### Zero emissions metals & WA-made wind turbines

**91,500 JOBS**

ZERO EMISSIONS METALS	Jobs
<i>Permanent jobs:</i>	
Green Steel and Ironmaking	48,700
Green Wind Turbines	5400
Associated renewables	16,000
Green Aluminium smelting	5000
Associated renewables	2200
<b>Total</b>	<b>77,300</b>
<i>Temporary Construction Jobs:</i>	
40 Green steel smelters by 2050	2800 pa
160GW renewables & hydrogen for green steel	6400 pa
5 Green aluminium smelters by 2030	2400 pa
22GW renewables for green aluminium	2600 pa
<b>Total</b>	<b>14,200</b>
<b>GRAND TOTAL</b>	<b>91,500</b>

### The opportunity

“No other place on earth has a comparable opportunity for large-scale, firm, low cost, zero-emissions power to provide energy intensive manufacturing.”

– Professor Ross Garnaut

Western Australia is a globally significant resources hub with a wealth of mineral resources and some of the most advanced mining industries in the world.

The state is also endowed with the world’s best and most accessible renewable energy resources which have the potential to deliver the worlds cleanest and cheapest energy.

Pairing these natural advantages together has the potential to underpin a transformative growth phase for our minerals and mining sector, capturing significantly increased value, jobs and economic opportunity.

This transformation involves:

- Decarbonising existing mining and minerals industries to position them for strategic advantage in global markets.
- Transitioning from the exporting of raw materials to the development of advanced clean minerals processing and manufacturing industries that capture a far greater portion of the value chain here in Western Australia.

Green minerals and metals have been described by prominent economists as our next wave of prosperity’. WA could become a world leader in zero-carbon metals production with the right policy settings, incentives, innovation systems and investment.

This proposal provides an opportunity to address WA’s largest pollution sources and at the same time, produce significant employment growth.

### The proposal

Green metals can become a reality in WA if we start planning and building towards this now. Clean state advocates the adoption of a Green Metals Strategy for WA that will:

1. Establish a green metals and renewable mining research, innovation and industry development hub and seek Commonwealth Government co-investment as a Cooperative Research Centre or CRC.
2. Establish a low carbon jobs Industry Advisory Council reporting to the Premier.
3. Establish incentives and agreements (as part of government approvals and State Agreements) to support and accelerate the uptake of renewable energy in mining and minerals processing.
4. Support the proposal for a quick-start green aluminium smelter in Collie.
5. Invest or partner in the building of a Hydrogen powered steel making plant.
6. Underwrite the renewable energy projects that will be required to power a green metals industry.



## The proposal continued

7. Negotiate with likely steel producers to locate to WA, with an incentive package that includes low cost renewable energy and a guaranteed customer base.
8. Guarantee procurement of green steel, which could be used in WA infrastructure projects, rail and bus fleets, buildings and wind turbine towers.
9. Boost investment and ambition in the WA Green Hydrogen Strategy.
10. Support the establishment of the Asia Renewable Energy Hub in the Pilbara to provide a large-scale renewable energy source for hydrogen production.

## What a green metals industry for WA could look like

Western Australia is one of the world's largest exporters of ores of many metals, including steel, aluminium, and lithium. These products accounted for 85% (\$109.6b) of WA's exports in 2017–18.

The green metals revolution offers WA the opportunity to build on our existing strength by shifting from a 'dig and ship' model to a 'dig – process – manufacture – deliver' model. To complete the value chain, clean minerals processing industries can also recycle used materials such as battery metals, making WA a global hub for clean minerals processing in a circular economy of the future.

**A report by the Energy Transition Hub at the University of Melbourne 'From Mining to Making' released in September 2019 confirms that WA has the opportunity to capitalise as a global leader in green metals. The report, and in direct consultation with author Michael Lord, has provided us with a vision for what a green metals industry for WA could look like.**

### Green Steel

WA has incredible potential to introduce zero emission steel production based on its iron ore and renewable energy resources.<sup>183</sup>

A new zero-emissions method of steelmaking using renewable-derived Hydrogen is showing great potential in other countries (e.g. the 'HYBRIT' project in Sweden). Hydrogen, made by electrolysis using renewable energy, is used to reduce the iron ore, instead of coking coal. By using renewables to power the electric arc process and other small inputs, the only by-product of manufacturing the steel is water.

According to the Energy Transition Hub, every year WA exports 800mt of iron ore. Processing 20% of this here would produce 100mt of steel. This is the same size as Japan's steel industry and would almost double the revenue from iron-based exports by over 90% to \$160 billion.

To achieve this level of output by 2050 would require construction of **40 large integrated steel plants**, which would generate:

- Over **2000 construction jobs per plant**, with each plant taking approximately two years to design and 18mths–2 years to build.<sup>184</sup>
- Over **48,000 permanent jobs** in ironmaking (8700 jobs in direct reduction plants) and steel making (40,000 jobs in semi-finished products).
- **Many thousands more** would be created if government and manufacturers committed further to the steel value-chain, by manufacturing steel products such as wind turbines or finished steel. Clean State are advocating for **at least 5400 jobs** in this chain.<sup>185</sup>

To power a Green Steel industry at this scale would require about 160GW of solar wind and energy, and the annual production of over 5 million tonnes of renewable hydrogen, which would create a further **16,000 permanent jobs, and over 6400 jobs per year in construction and installation.**

### Green Aluminium

According to the Energy Transition Hub, there is growing international demand for more sustainable aluminium with companies including BMW, Toyota and Apple committing to using only low-emissions aluminium.

Converting alumina to aluminium is done through an extremely energy intensive electrical process, however this could be powered with renewable energy.

WA produced 13.6mt of alumina in 2018/19 but there is currently no aluminium production in WA to value add to this product. Processing 75% of WA's alumina output here would produce 5 million tonnes of aluminium, and almost double WA's revenue from aluminium-based exports to around \$16 billion.

Renewably powered aluminium smelters can also operate in the same way as a large battery, by turning down production to accommodate any shortfalls or grid stabilisation needed.



## Green Aluminium continued

Developing an industry this size by 2030 would involve the construction of at least five large aluminium smelters, and would employ:

- **24,000 construction jobs** to build the new smelters, with each taking about 1.5–2 years to build.
- Up to **5000 permanent jobs** in operations and maintenance.

To power a Green aluminium industry would require 22GW of solar and wind energy, creating another **2600 construction/installation jobs** each year and **2200 permanent jobs**.

## Other metals

WA is a significant miner of many other metals including gold, nickel, lithium, cobalt and copper. The processes for making many of these metals largely relies on electricity and can therefore be powered by renewables.

At least one WA company is pursuing this opportunity. Element 25 plans to open a new manganese mine in WA and produce electrolytic manganese metal onsite and is considering up to 90% renewable energy (despite access to a nearby gas pipeline).<sup>186</sup> Other companies are currently constructing or expanding lithium processing facilities in Kwinana and the South West, which could be repowered with renewable energy in the future.

## Renewable hydrogen & ammonia

Western Australia has the potential to maintain and grow its position as an energy superpower in a carbon-constrained world. Instead of exporting high pollution fossil gas, renewable-derived hydrogen or ammonia can be shipped to growing international markets instead.

Hydrogen is a renewable-derived fuel option ideal for high-temperature applications in the industry sector. Hydrogen can also replace gas as a feedstock for ammonia for use in fertilisers and industrial applications, or for converting back to hydrogen fuel. This provides an attractive option for easily transporting and storing hydrogen in ammonia form.

The WA Government's Green Hydrogen strategy recognises our opportunity to develop a clean hydrogen market, and there's increasing interest in large scale projects to generate power from renewable energy and store it in hydrogen to export into neighbouring Asian countries.

Two large scale combined wind and solar projects are already in development in the Pilbara and near Kalbarri to supply production of low-cost green hydrogen, for domestic and export markets, targeting mainly Japan and South Korea (two of our largest LNG customers).

The development of a green hydrogen industry could also underpin Western Australia's development as a natural home for expanded industries in aluminium, steel, silicon and ammonia, which in turn would benefit regional centres including the Pilbara.

## Renewable energy for green metals

The development of a green metals industry in WA has the potential to drive a massive increase in the size of the WA energy market. Just the green steel and aluminium opportunities outlined above would require 180GW of new renewable energy, equivalent to almost five times WA's current energy generation.<sup>134</sup> This alone would create over 18,000 jobs, represents one of the biggest industrial development and job creation opportunities in the history of the state.

## How many jobs would it create?

Using figures from the Energy Transition Hub, in direct consultation with author Michael Lord:

### For Green Steel:

- 69,700 permanent jobs could be created in green steel and iron, WA-made wind turbines, and associated renewable energy at 40 new smelters by 2050.
- 9200 temporary construction jobs per year (or a massive 276,500 jobs-years) would be created, building the smelters and renewable power facilities.

### For Green Aluminium:

- 7200 permanent jobs at 5 green aluminium smelters by 2030.
- 5400 temporary construction jobs per year (50,400 job years).

This is equivalent to around **91,500 jobs** and almost the same size as WA's current mining industry.



## How much carbon pollution would this save?

The transition to a green metals and mining sector in WA has the potential to deliver very significant carbon abatement. It is estimated that up to 25% of total carbon emissions from all Western Australians sources can be reduced and avoided through powering WA's existing mining and minerals industries with renewable energy.

With the opportunity for significant growth in the size and scale of the industry and the export of green metal and hydrogen products, far greater global carbon savings could be delivered. This would allow Western Australia to transition from a major driver of global pollution through fossil fuel exports, to a major driver of global emissions savings and decarbonisation.

## ACKNOWLEDGEMENTS

Clean State acknowledges the **Energy Transition Hub** at the University of Melbourne, **Mr Michael Lord**, and **Beyond Zero Emissions** in the development of this proposal.

## CASE STUDY:

### Sun Metals, Queensland: The 'Perfect case study on Australian Industry Decarbonisation'



*The Sun Metals solar farm (Source: PV magazine, 2020<sup>133</sup>)*

Sun Metals, Queensland is a zinc refinery in Townsville, partly powered by a 125MW solar farm it built in 2018. The solar farm is the largest industrial solar project in Australia and covers one third of the refinery's energy needs. In June 2020 CEO Kiwon Park announced they'd be building a renewable hydrogen plant, as part of the company's long term plans for totally integrated operations, and in what they hope will be the first stage of a renewable export industry based in Townsville.<sup>133</sup> The Queensland government has provided a \$5 million grant towards the hydrogen project, as part of its \$19m hydrogen strategy, which aims to position Queensland as a world leader in renewable hydrogen.

CSIRO recently estimated green hydrogen could be cost-competitive with existing industrial feedstock such as gas in many applications. With adequate policies it is more likely green hydrogen will become the least cost option. Bloomberg recently estimated hydrogen technology can be competitive with coal-based plants for steel production by 2030.<sup>53</sup>

Carbon saved  
from atmosphere

**Over  
20 million  
tonnes**

per year

## IDEA 17.

### Decarbonise LNG production & transition to renewable hydrogen

DECARBONISING LNG PRODUCTION	Jobs
Offsetting pollution from existing LNG facilities	4000
<b>Total</b>	<b>4000</b>

**4000 JOBS**

### The opportunity

The production of Liquefied Natural Gas (LNG) for export is Western Australia's largest source of carbon pollution, eclipsing all other sources in the state. Even more pollution results from burning this fossil fuel overseas.

While further growth in the production of LNG must be prevented to avoid further pollution growth, there is a significant opportunity to decarbonise and transition WA's existing LNG production facilities in a way that can create thousands of jobs across the state.

Decarbonising WA's biggest polluters in the LNG industry presents a huge opportunity for job creation in engineering, renewable energy, energy efficiency, and carbon offsetting industries that can benefit communities across the state.

In 2009, Clean State released the first comprehensive investigation of direct carbon emissions from Western Australia's Liquefied Natural Gas (LNG) industry, revealing alarming growth in pollution that is undermining Australia's national efforts on climate change.

Currently, five operating WA LNG facilities are in the Top 10 list of WA's highest polluters and produce more than double the emissions of WA's three coal-fired power stations. Where conditions to control pollution have been imposed on some LNG projects by the State Government, they are inconsistent, inadequate, unenforceable, and in some cases have been removed altogether.

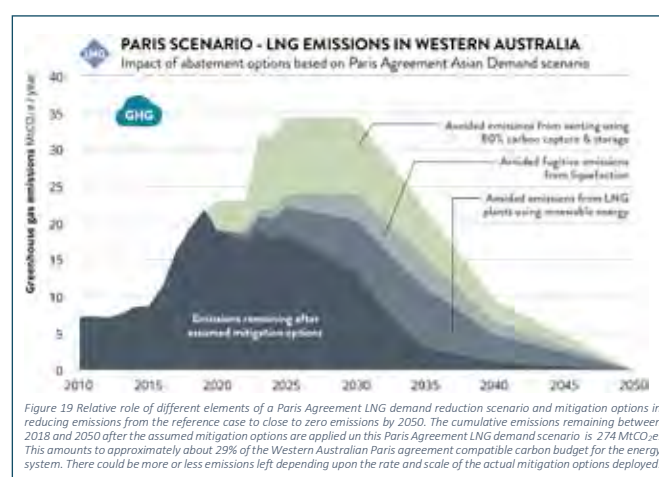
As a result, Clean State estimates that existing WA LNG production facilities will account for over 25% of the state's emissions and 5% of national pollution. If Woodside's proposed Burrup Hub expansion were to proceed, this would further increase, placing our state and national emissions reduction targets out of reach.

### How reducing LNG pollution creates jobs

The best way for the LNG industry to reduce its emissions to reach the goal of net-zero is by applying an emissions abatement hierarchy, focussing first on avoidance, then reduction, then offsetting the remainder of emissions. This would deliver a variety of different measures to control, reduce and offset the different pollution sources from LNG processing in WA.

In 2019, CCWA commissioned independent Berlin-based research institute Climate Analytics to develop a carbon budget for Western Australia, which outlined a plan for the LNG industry to decarbonise and achieve net-zero emissions here in Western Australia.

Climate Analytics found that under a Paris scenario, global demand for LNG will decline by 2030, which would correlate to a reduction in LNG production and emissions in Western Australia.





## How reducing LNG pollution creates jobs continued

Whether LNG production decreases or not, there are technology options available now for the LNG production facilities here in WA to decarbonise. These include:

- Avoided emissions from venting 'reservoir gas' using Carbon Capture and Storage (CCS) in depleted gas fields to capture at least 80% of this pollution stream, which is already occurring at the Chevron Barrow Island LNG facility.
- Avoided fugitive emissions of methane from the gas production and liquefaction process, by containing and fixing leaks of methane from the system and capturing vented gas.
- Avoided emissions from LNG production plants by using renewable energy to power the facilities.

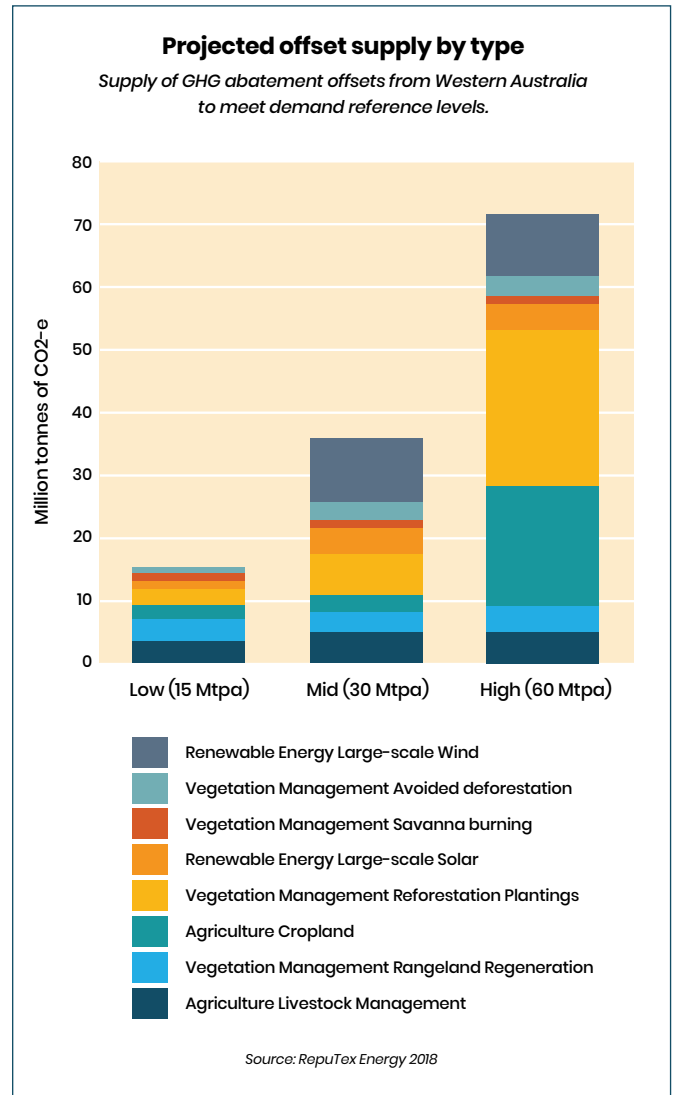
For remaining emissions that cannot be avoided through these methods, local carbon offsetting industries such as carbon farming, waste management, renewable energy installation, energy efficiency, and clean technology can be used.

A study by Reputex energy in 2018 found that Western Australian offset industries could be scaled up to offset all existing LNG production emissions, however this would use up the majority of the state's offset capacity meaning it would no longer be available for other sectors.

Reputex found if the LNG industry were to offset all direct emissions here in WA, without applying other measures to reduce and avoid pollution then the price of offsets would increase to around \$40 per tonne. Offsetting at lower levels would be cheaper – at 15 million tonnes per year the cost would be reduced to less than \$20 per tonne.

The report found that offsetting around 30 million tonnes of carbon pollution per year here in WA (approximately the total emissions from gas production) could be achieved through a combination of carbon farming, renewable energy, and other activities. these include:

- Renewable Energy (Large-scale Wind)
- Renewable Energy (Large-scale Solar)
- Vegetation Management (Avoided deforestation)
- Vegetation Management (Savanna burning)
- Vegetation Management (Reforestation Plantings)
- Vegetation Management (Rangeland Regeneration)
- Agriculture Cropland
- Agriculture Livestock Management



## Carbon price breakthrough

This year, Woodside revealed to investors that it is now applying an internal carbon price of \$80 per tonne of emissions in its WA LNG operation business, and that this does not affect the viability of its operations. This demonstrates that it is economically feasible for the company to reduce and offset 100% of its emissions here in WA, creating jobs and opportunities for thousands of West Australians.

## Beyond fossil gas – the transition to hydrogen

Ultimately the LNG industry will have to transition to the production of gas that does not cause carbon pollution and climate change, and green hydrogen provides a transition pathway for this industry. LNG companies have developed advanced technology for gas production, handling, storage and shipping and this knowledge and technology can provide a strategic advantage in establishing a renewable energy derived hydrogen industry in WA.



## Beyond fossil gas – the transition to hydrogen continued

The WA Renewable Hydrogen Strategy recognises the potential for a new hydrogen industry for WA. In this strategy, the WA government has set a goal that by 2040 Western Australia's market share in global hydrogen exports is similar to its share in LNG today.

### The proposal

Clean State is advocating for Western Australia's LNG production industry to be transitioned to exporting renewable energy derived hydrogen. Until this occurs, existing LNG operations can reduce domestic (Scope 1) emissions to net zero to deliver action on climate change and create thousands of jobs of West Australians.

This can be achieved through:

1. State Government and Environmental Protection Authority (EPA) updating Ministerial Conditions on all existing LNG production facilities to:
  - require emissions avoidance and reduction measures according to the 'abatement hierarchy'.
  - require all remaining emissions to be offset here in Western Australia through carbon farming, renewable energy and other offset industries that create jobs.
2. Support the scaling up of the WA carbon farming industry to supply the demand for offsets (see separate initiative).
3. Accelerate the adoption of the WA Renewable Hydrogen Strategy and prioritise the transition of existing LNG industries to renewable hydrogen production.
4. Update State Agreements, Ministerial Statements, operating licenses and regulations governing LNG operations to provide a regulatory pathway and support for transition to renewable hydrogen production and exports.
5. Support the establishment of the Asia Renewable Energy Hub in the Pilbara to provide a large-scale renewable energy source for hydrogen production, so long as the location is appropriate to all environmental conditions are met.

## How many jobs would this create?

Reducing and offsetting emissions from existing LNG projects would create around 4,000 jobs, mostly located in regional areas.

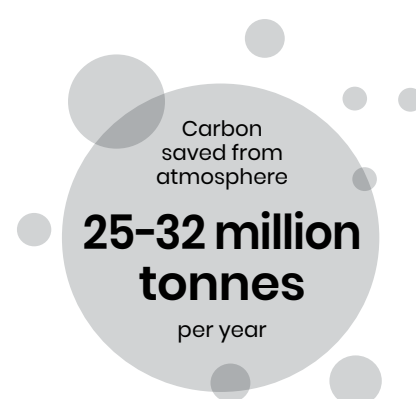
Jobs would be created in undertaking work on LNG facilities as well as offset industries such as carbon farming and renewable energy installation.

This job creation opportunity could be realised at no cost to government, with LNG profits easily accommodating the cost of decarbonisation as demonstrated by Woodside's \$80/t internal carbon price.

The transition to hydrogen production would create even more jobs, and there is the potential for this industry to scale up significantly as the demand for polluting fossil LNG declines.

## How much carbon pollution would this save?

Decarbonising current LNG production would save around 25 million tonnes per year of carbon pollution – around a third of Western Australia's total carbon emissions from all sources.





# resilient regions

Building resilient regions is one of the best things we can do to support jobs, local communities and boost the economy.



## IDEA 18.

### Fund overstretched emergency services in the regions

**150–200 JOBS**

EMERGENCY SERVICES	Jobs
VFES Trainers	10
Fire Brigade cadets training	15
Early detection system	5
Equipment supply and manufacture	20
Indigenous fire management teams	50–100
Professionals and department staff	50
<b>Total</b>	<b>150–200</b>

#### The opportunity

With a warming climate, increased risk of extreme weather events is a reality that Western Australia will have to live with and adapt to. Bushfire, heatwaves, floods, storms and cyclones are increasing in severity and frequency, causing severe impacts for the health of communities and the environment. The cost of natural disasters in Australia is expected to reach an average of \$39billion by 2050.

This calls for a significant increase in the capacity of West Australian emergency services to respond to such events. This must include the development of a world-class rapid response fire suppression capability across regional WA, and improvements to the way that prescribed burning is managed to address fire risk more effectively while maintaining natural carbon stores in the landscape.

Emergency services such as fire, SES and ambulances in our regions are under-resourced and over-relying on volunteers. This puts farmers and regional communities at risk from health emergencies and natural disasters.

Some landholders are being denied insurance for farms and businesses due to the lack of fire services in the region. Many others are concerned about the risk that fire poses to farming businesses, especially long-lived crops such as orchards, plantation forestry, remnant vegetation and carbon farming efforts.

In 2019–2020 the WA Emergency Services Levy (ESL) raised \$405million with only 8% allocated to local governments to fund their Volunteer Bushfire and Emergency Services Brigades. Emergency resources are focused on city-based services leaving just 5% of the ESL to support Bush Fire Volunteers. WA volunteer firefighters struggle to receive funding for operations or capital and have called for greater transparency and accountability in the grant application and

funding process. There are calls for more resources for fuel reduction burning, greater local control, and increased support to attract and retain volunteers.

Volunteer Fire and Emergency Services have identified funding needs to train cadets and provide basics, including uniforms. There is also a need for upgrades to emergency airstrips increasing access to regional areas, and mobile phone towers to allow for communication between regions.

Prescribed burning is currently conducted in ways that are damaging to the environment and wildlife and is reducing the capacity of native vegetation to store carbon over time. Large areas are burned in intense fires allowing no escape for endangered wildlife and often providing little strategic fire risk reduction. Increasing resources for prescribed burning to allow a more strategic approach targeted towards the protection of assets and incorporating indigenous fire management practices is likely to produce better outcomes for biodiversity, carbon stores, and for managing bushfire risk.

Following the success of Indigenous approaches to fire management and controlled burning that were well documented during the recent devastating fires in the Eastern states, there has been an increased demand for these approaches from land managers and Local governments here in Western Australia. Aboriginal people require support and capacity to develop and train others in these skills. At the same time, the provision of Indigenous fire management services has the potential to become a source of employment for Aboriginal people, complementing the activities of existing volunteer fire brigades.

Shifting the focus towards an effective rapid-response bushfire suppression system will also require planning, resources, and ongoing support from all levels of government.



## The proposal

1. Commission an independent review into the capacity of Western Australia's regional fire services to prevent and respond to catastrophic fire events in a climate emergency, as has recently experienced in the Eastern states.
2. Re-balance expenditure under the Emergency Services Levy Fund to increase support for existing regional fire services and volunteers.
3. Establish a program to recruit, train, and provide equipment to double the current capacity of regional volunteer fire brigades and SES, including by recruiting volunteers from within the Perth metro area.
4. Make a significant investment into rapid response fire detection using the best available remote sensing technology.
5. Make a significant one-off investment into establishing a world-class rapid response regional fire suppression capability including infrastructure and equipment such as aircraft, air strips, ground units, and upgraded reliable water access points.
6. Ensure that fire units and other equipment are locally designed and manufactured where possible to support local jobs.
7. Establish a fund for rural equipment which allows for flexibility of choice in the equipment needed, fit for purpose and appropriate for the region it serves. In addition to providing equipment, like radios, that are not currently covered under the ESL.
8. Upgrade mobile phone communications infrastructure to ensure connectivity and communications are maintained during a bushfire and other emergency events.
9. Require industry to contribute to the increased cost of bushfire management and suppression due to climate change through a Climate Emergency Services Levy (CESL) applied to WA's biggest carbon polluters to raise an extra \$50m per year.
10. Transition away from a hectare-target based approach to prescribed burning and towards a strategic, targeted approach incorporating indigenous fire management techniques and focussing on the protection of assets and maintenance of natural carbon stores.

11. Provide a dedicated Indigenous fire management fund to:

- Support training of Aboriginal people by Aboriginal people in Indigenous fire management approaches.
- Establish local Indigenous fire management teams in regional areas, connected with regional volunteer bush fire brigades.
- Provide grants to landholders and local governments to support them to engage the teams in providing Indigenous fire management training and services.

## What would it cost?

Clean State recommends that this initiative is funded through a new Climate Emergency Services Levy (CESL) imposed on WA's largest carbon polluters at a level proportionate to the pollution they release. Applying this at the rate of \$1.50 per tonne of carbon pollution to emitters over 100,000 tonnes per annum would raise around \$50 million per year which would be sufficient to pay for a major overhaul and upgrade of emergency services capacity including the initiatives proposed above, and cover the ongoing costs of maintaining and operating the expanded systems.

## How many jobs would it create?

It is estimated that expenditure of \$50M per annum in emergency services could support 150-200 full time job equivalents, however the number of people with paid employment would likely be considerably higher given the seasonal and part-time nature of the work.

Indigenous Fire Management teams would provide contract work, and other jobs would be created in manufacturing equipment such as mobile fire units. Professional emergency services and firefighting personnel would also be expanded by at least 50 additional positions.

## ACKNOWLEDGEMENTS

Clean State acknowledges the **WA Volunteer Fire and Rescue Services Association** and members of **Volunteer Fire Brigades** in the development of this proposal.





## IDEA 19. Improve Digital Connectivity through the SuperNet

WHEATBELT SUPERNET	Jobs
Construction of the SuperNet	300
Ongoing maintenance	20
<b>Total</b>	<b>320</b>

**320 JOBS**

### The opportunity

The next big leap for infrastructure in agriculture and the regions is better connectivity. Currently, many farmers and regional communities are paying excessive bills and have unreliable service and data limits.

Connectivity and mobile data are essential for the efficiency of farming, land management and regional communities in the technological world. Tackling this issue would be game-changing for regional economies.

### The proposal

WA's grain belt could have enterprise-grade, affordable broadband services to rival the NBN within three years.

The WA SuperNet plan supported by Cooperative Bulk Handling (CBH) Group and rail network operator Arc Infrastructure aims to deliver enterprise-grade affordable broadband services throughout the grain belt. It involves a backhaul network of 4000km of new optic fibre cables dug into the easements of the rail network from Northampton to Esperance, and the construction of 40m radio towers on 100 CBH receival bins.

The SuperNet could be structured as a not-for-profit, non-distributing co-operative, enabling the service to be delivered at competitive rates. WA SuperNet would use the infrastructure to provide a wholesale service, while Telstra or other regional service providers would provide a retail service.

### What would it cost?

This project is estimated to cost \$130 million. A feasibility study is under way and the State Government has invited a business case for formal consideration.<sup>78</sup>

### What are the benefits?

According to KMPG's 2016 report, Infrastructure for Smart Farming, high speed digital connectivity could deliver a \$1.2 billion return to WA industry by helping agribusinesses to be globally competitive.

The project would:

- Deliver substantial savings to customers.
- Deliver more diverse and connected regional economies and businesses.
- Support delivery of online education and health services.
- Save lives by assisting with emergency services and response.
- Support farm enterprises to diversify income.
- Connect WA agricultural producers to supply chain partners and customers.
- Support better land management improved farming efficiency and conservation efforts by enabling the use of robotics and remote sensing technology.



## How many jobs would it create?

It's estimated the SuperNet would create 300 jobs during construction and another 20 ongoing jobs in maintenance.

### CASE STUDY:

**365Farmnet** is an application funded by the European Commission to enable precision farming which makes crop production more sustainable and more competitive. It connects farmers, universities, supply chain partners, and industry partners to provide platforms for industry and exchange of best practices. It allows immediate reporting of management practices, identification of crop diseases, and can pinpoint areas for targeted fertilizer application or pest prevention methods.

## ACKNOWLEDGEMENTS

Clean State acknowledges the work of **Arc Infrastructure, Cooperative Bulk Handling (CBH) Group**, and the **Australian Farm Institute** which articulates the lack of connectivity, in the development of this package.



## IDEA 20. Forests for life, climate & communities

**3490 JOBS**

SOUTH WEST FORESTRY	Jobs
Farm Forestry and Landcare	920
New manufacturing facilities for engineered timber products	50
Supporting nature-based tourism	1000
Supporting the honey industry	600
Forest protection and managing native forest carbon credits	900
Forest Carbon research centre	20
<b>Total</b>	<b>3490</b>

### The opportunity

Western Australians love the south-west forests and want to see them managed for conservation, climate change mitigation and resilience, and complimentary sustainable industries.

Western Australia now has the second-highest rate of primary deforestation in the country,<sup>135</sup> and research compiled by CCWA shows that over 1.1 million hectares of forest was cleared in WA between 1990 and 2017.<sup>136</sup>

Logging in Western Australia's old-growth and high conservation forests continues. As much as 90% of the wood from karri and jarrah forests is turned into low-value products like woodchips, firewood, charcoal and mill waste.

While Clean State acknowledges there was a 12-month hold put on logging of Tier 2 forests in May 2020, this needs to be continued while we explore plantation options for native timber.



*Clearfelling of South West forests (Image: Kim Redman)*

Our current forestry practices are uneconomic, and the native forest timber industry is operating at a financial loss to the state. Between 2013 and 2016 approximately 2 million tonnes of native forest logs were sold for an accumulated post-tax loss of \$34 million.<sup>137</sup>

The native forest timber industry is a small employer. The industry employs just 170 – 330 people in falling and hauling, and another 130 in sawmills processing FPC native timber. Most (82%) employment in the timber industry is in fact in plantations and sandalwood.<sup>138</sup>

The native forestry industry is not only in structural decline, but it is also operating in a way that undermines or harms other industries in the South West, including forest-based tourism, which already supports thousands of local jobs in WA.<sup>139</sup>



*Lewin Karri forest clearfelling (Image: WA Forest Alliance)*

WA's regrowth forests are now worth more standing thanks to WAs growing nature-based tourism industry. In 2016-17 South West tourism accounted for one in five (19.5%) of people employed in the region and contributed \$1.88 billion to the economy.<sup>140</sup>

WA also has the healthiest bee populations and the healthiest honey in the world. Beekeeping is integral to WA's agricultural industry. Pollination that bees provide is estimated to be worth \$800m-\$1.4bn a year to the agricultural sector.





## The opportunity continued

Many existing sustainable and profitable forest-based enterprises, including honey production and nature-based tourism operators, are now calling for forests to be conserved to secure their productivity and allow these enterprises to grow.



*Monastery Landing on the Frankland River near Nornalup.  
(Image: Gary Muir)*

Native forest logging is a significant driver of climate change, but protected forests are a critical ally in our efforts to avert dangerous climate change. Protecting WA's native forests from logging has the potential to prevent 40–60 million tonnes of CO<sub>2</sub> from being emitted over 10-years.

Plantation development has been in decline nationally and in WA since 2007/8. There have been no new softwood plantings over the last decade, and in some areas, mature plantations have been clear-felled with no subsequent replanting<sup>141</sup>. Expanding our plantation resource through farm forestry is one of the best prospects for large scale employment and carbon drawdown.<sup>142</sup>

## The proposal

**Clean State strongly endorses the implementation of the Forests For Life proposal, including:**

1. Establishing a World Class Timber industry through Farm Forestry and Landcare, growing 40,000 hectares of high value, fast growing trees for saw logs within existing farming land.
2. Building two new processing facilities for engineered wood products and prefabricated structural applications in the Great Southern and South West.
3. Supporting local industries in nature-based tourism and honey production.
4. Protecting High Conservation Value forests by securing them as National Parks for water, wildlife, climate and cultural benefits.

**In addition, Clean State proposes the following supporting measures to unlock the potential job creation opportunities associated with a shift to sustainable forest management.**

5. Develop a management plan for WA's native forest estate with a focus around supporting sustainable employment opportunities in carbon credits, sustainable tourism, indigenous fire management, honey production and other sustainable industries.
6. Change the purpose and scope of the Forest Products Commission to focus on supporting sustainable 'forest product' industries such as those mentioned above, rather than a sole focus on the extraction of timber and fibre products.
7. Establish a forest carbon certification method for Southwest native forests and seek certification under the Australian Carbon Credit Unit (ACCU) certification scheme.
8. Establish a forest carbon research centre in Manjimup in partnership with a leading university.
9. Partner with the Forest Products Commission to establish a sustainable timber building materials production, research, training and innovation hub in Collie focussed on production and utilisation of sustainable plantation timber resources and farm forestry products.
10. Provide free retraining for existing native forest timber industry workers in sustainable plantation management and forest carbon management.
11. Invest in joint management of High Conservation Value forests in the Southwest with Traditional Owners.

## Forests for Life and Forests for Jobs

The ground-breaking *Forests for Life plan*<sup>143</sup> provides a detailed and costed transition plan for the forestry sector and for timber workers in our South West and shows how a world-class Farm Forestry timber industry and Landcare initiative can underpin the next century of prosperity for the South West and Great Southern. This includes growing 20,000ha of high value, fast growing trees in the South West zone centring on Greenbushes and 20,000ha in the Great Southern zone centring on Albany. Each year 3,000 – 4,000 hectares would be planted, yielding an estimated 450,000 – 600,000 cubic metres of high-value timber per year once mature and providing a viable quantity of logs to a future processing centre.

**Build two new processing facilities for engineered wood products and prefabricated structural applications in the Great Southern and South West.**



## Forests for Life and Forests for Jobs continued

The increasing demand for timber (through certified sustainable timber demand, growing markets in Asia, and the WA Government's Wood Encouragement policy), as well as increasing awareness of and demand for engineered wood products such as cross-laminated timber are massive drivers that can be harnessed by this proposal.

Engineered wood products and construction timbers offer a vast range of low-carbon products that substitute for more carbon-intensive materials such as steel and concrete. The program would capitalise on excellent new peeling technology which provides for a recovery rate of up to 90% of timber from logs (currently the native forest industry achieves about 30% recovery from sawlogs).

Feasibility studies for two new processing facilities for engineered wood products, and a new partnership with the Forest Products Commission to establish a sustainable timber building materials production, research, training and innovation hub in Collie, focussed on production and utilisation of sustainable plantation timber resources and farm forestry products is recommended.

### Supporting local industries in nature-based tourism and honey production.

“Our industry leaves the forest in a better condition and can operate in harmony with tourism, hospitality and all other industries. And its economic value literally dwarfs that of the forestry industry, from the exact same resource.”

– Mikey Cernotta, Pemberton Honey Co

WA's South West tourist region is the most popular destination outside Perth. Nature-based experiences and forest-based tourism is the biggest drawcard.

WA's Jarrah, Karri and Marri honey are world renowned and highly sought after. However, logging and burning are damaging apiarists' sites, and climate change is disrupting flowering times, making it increasingly difficult for beekeepers to keep up supply.

WA's commercial beekeeping industry is also outperforming the native forestry industry on every measure. It:

- Employs three times as many people than native forestry, with 1500 full time jobs across 500 registered beekeepers.
- Produces a product worth 100x more per tonne, from the same resource, with one tonne of jarrah firewood worth about \$300 on the domestic market, compared to one tonne of jarrah honey worth \$30,000 at wholesale price.
- Provides pollination services worth \$800m-\$1.4 billion to WA's agriculture industry (and \$4-6 bn nationally).
- Produces honey worth \$60m per year.<sup>144</sup>



“Just 500 beekeepers hold a huge responsibility in their hands – the whole agriculture industry in WA depends on our pollinators.”

– Mikey Cernotta, Pemberton Honey Co

The best way to support nature-based tourism and WA's honeybee industry is to conserve WA's remaining native forests.



Jess Beckerling, Convener,  
Western Australian Forest Alliance

## Forests for Life and Forests for Jobs continued

Ongoing logging costs hundreds of millions of dollars in lost honey production and also prevents new sites for existing enterprises from expanding into or allowing new entries into the industry. Karri Forest only flowers heavily enough to produce honey every 7-8 years. Forest with buds due to flower in February in Treen Brook is being logged right now, with massive losses forecast by local honey producers.

### **Protecting High Conservation Value forests by securing them as National Parks for water, wildlife, climate and cultural benefits.**

Old growth forests store and draw down more carbon than regrowth forests, and it takes 150 years for a regrowth forest to recover 90% of the carbon carrying capacity of the original forest. Heavily logged and degraded forests should be allowed to recover their full biological potential for climate and biodiversity, where they can recover their ecological values over time, sequester carbon from the atmosphere, and provide research and education opportunities.

Heavily logged and degraded forests could also be protected where they can recover their ecological values over time, sequester carbon from the atmosphere, and provide research and education opportunities.

## How much carbon pollution would this save?

WA's forests, especially our wet eucalypts store more carbon than the Amazon or Congo.

Research by the Australian National University has found that ending logging and managing existing native forests for carbon sequestration in the state's Southwest has the potential to generate 5 million tonnes per year of sequestration, or 60 million carbon credits over ten years. This has the potential to earn up to \$438 million per annum in carbon credits.

Protecting High Conservation Value forests in the South-West, investing in joint management of these areas with Traditional Owners, and developing a new a management plan for WA's native forest estate that unlocks employment opportunities around carbon credits, sustainable tourism, indigenous fire management, honey production and other sustainable industries is recommended.

## What would it cost?

This plan has the potential to save the state Government millions of dollars, due to the current financial loss to the state the native timber industry is making. Forest Products commission annual reports show a combined loss of \$34 million between 2013-2016.

The Plan would generate millions of dollars in additional product and tax revenue, through the creation of a new timber industry and an expanded honey and tourism industry supported by a healthy forest system.

### **An indicative estimate of \$35.5m including:**

- \$15m as initial start-up funding for 40,000 hectares of new farm forestry
- \$3.5m to establish a certified carbon credit methodology for native forests
- \$5m to establish a forest carbon research centre.
- \$10m to establish a sustainable timber building materials production and innovation hub
- \$2m to develop a forest management plan

## How many jobs would it create?

**This plan is expected to deliver at least 3140 jobs** including 840 in farm forestry timber production; 100 in land care; 1000 supporting nature based tourism; 600 in honey production; 450 in managing native forest for carbon credits, 50 in engineered wood products/ sustainable plantation building materials hubs and 20 in forest carbon research centre.

## CASE STUDY:

### The impact of logging on Pemberton Honey Company

Mikey Cernotta has run a beekeeping business and a bed & breakfast on an 80-acre property in Pemberton for the last five years. The forest around the property is predominantly Karri he describes as 80-90 year old regrowth just reaching the size and maturity where they start producing the most flowers, pollen and honey.

Despite the demonstrable economic and employment value that the forest has through honey sales, agricultural pollination services, tourism, and the flow-on benefits to the region; current state forestry practices are set to have a devastating impact on his business and family.

'We're in a unique position where we've got these eucalypt trees that produce the world's best honey, and are finally getting the recognition they deserve, pricewise.'

"One tonne of jarrah firewood is worth about \$300. One tonne of jarrah honey is \$300,000 at wholesale price. We use the exact same resource as the forestry industry but make a product with 100x more worth".



Stills from a video 'A walk with Mikey Cernotta through Treenbrook Coupe, Pemberton' showing the impact of logging and damage to highly valuable Karri forest flower crops they've been waiting 5 years to flower.

The supply of hives for agricultural pollination services is being outstripped by demand, but with the loss of forest it's impossible to achieve the kind of growth needed. Over 10,000 hives are brought to Pemberton every year to pollinate avocado crops, and beekeepers estimate they'll have to double the number of hives for pollination to accommodate the growth in that crop alone. But since they cannot build and maintain hive numbers without the native forest as a major resource, the beekeeping industry is effectively being hamstrung by ongoing native forest logging.

## ACKNOWLEDGEMENTS

Clean State acknowledges the Forests for Life plan has been developed by the **WA Forest Alliance** with the support of the **Warren Catchment Council**, **Gondwana Link** and the **South West Agroforestry Network** (SWAN) and the **Pemberton and Margaret River Chambers of Commerce and Industry** and many local businesses. We also acknowledge the time and expertise of **Mikey Cernotta**, Pemberton Honey Co. and **Whispering Woods** in the development of this plan.



## IDEA 21.

### A bright future for Collie

A BRIGHT FUTURE FOR COLLIE	Jobs
Renewable energy transition	1245
Sustainable building materials	130
Recycling renewable products	175
<b>Total</b>	<b>1550</b>

**1550 JOBS**

### The opportunity

With the transformation of WA's South West Interconnected electricity system already underway, it is critical that a plan is developed to support a fair and managed transition for the Collie community, where 900 people are employed in coal mining and coal-fired power generation.

With government planning and assistance, it will be possible to create new jobs and economic opportunities while diversifying the local economy.

The ground-breaking 'Collie at the Crossroads' report by Beyond Zero Emissions (BZE) shows how a local workforce geared towards sustainable industry and manufacturing can underpin the next century of prosperity for Collie. This blueprint for the fair transition was developed in close consultation with the Collie community, the coal industry, unions and Traditional Owners, who identified opportunities for transition and economic diversification.

Other proposals for Collie include a quick-start green aluminium smelter in Collie to process Alumina that is currently exported. This project is backed by Ross Garnaut.

The BZE report found transitioning to 100% renewable energy could be a major jobs driver for the region, creating 1550 jobs by 2030, including:

- **1245 jobs in renewable energy transition**, (renewable energy manufacturing, operating a 200MW pumped hydro in retired coal pits, coal plant decommissioning, and hydrogen peaking plant).
- **130 jobs in sustainable building materials** (low carbon cement and wood products, farm forestry).
- **175 jobs in recycling renewable energy products including lithium battery recycling** and commercial scale solar PV recycling processing 200,000 panels every year.

Collie is already being transformed into a world-class adventure trail town through the 'Collie Adventure Trails' initiative, determined to attract cyclists and bushwalkers of all levels to its bush circuits. The project is expected to create 160 jobs, 33 directly in tourism.<sup>45</sup>

### The proposal

Clean State advocates for the adoption of a Collie Transition and Development Plan that includes the following elements:

1. Establish a WA Renewable Energy Target and timeline for the planned retirement of coal fired generation to give certainty to investors and the local workforce.
2. Establish a Collie TAFE campus to provide free re-training for coal workers in renewable energy, sustainable building materials, low-carbon manufacturing and other industries.
3. Work with coal mining companies to develop and deliver progressive mine site rehabilitation plans in consultation with the local community.
4. Where possible, utilise mine site landforms and infrastructure for beneficial local community uses and economic opportunities such as aquaculture, recreation and ecosystem restoration.
5. Examine the potential for coal mining voids to be utilised as a waste management facility to receive lithium processing waste from Kemerton and other minerals processing facilities in the southwest.
6. Work with the Forest Products Commission to establish a second large scale native plant nursery in Collie, to provide seedlings for the carbon farming industry and for Collie mine rehabilitation.
7. Call for expressions of interest for the development of a pumped hydro and storage battery project utilising coal mine voids.



### The proposal continued

8. Partner with the Forest Products Commission to establish a sustainable timber building materials production, research and innovation hub based on plantation timber resources. (See separate proposal).
9. Partner with private industry to build a world class processing facility for engineered wood products and prefabricated structural applications in Collie.
10. Continue to invest in the Collie Adventure Trails initiative and support marketing of Collie as a world-class off road and adventure cycling destination.
11. Develop a WA Renewable Energy Common User Facility in the Southwest to maximise local value capture in manufacturing and installation of renewable energy technology.
12. Commission a feasibility study into low carbon cement manufacturing in the Collie region.
13. Support the proposal for a quick-start green aluminium smelter in Collie.
14. Provide assistance to restart the Aboriginal-led marron farm in Collie.

### How many jobs would this create?

This proposal would assist with the re-deployment of at least 500 Collie coal workers and transition the Collie community to more sustainable and diversified economic base.

The BZE report found transitioning to 100% renewable energy could be a major jobs driver for the region, creating 1550 jobs by 2030.

### How much carbon pollution would this save?

The transition described would save over 14 million tonnes per year by 2030.

### ACKNOWLEDGEMENTS

Clean State acknowledges **Dr Heidi Edmonds, Beyond Zero Emissions, Jaime Yallup Farant, Climate Justice Union, and Brian Innes, Starling Energy and Plico Energy** for the assistance in developing this package.

Carbon  
saved from  
atmosphere

**14 million  
tonnes**  
per year





# tourism

Boosting our local, low-carbon tourism industry is one of the quickest and easiest things we can do to create jobs and boost the economy. Through stimulus measures, infrastructure and transport upgrades, as well as tourism product development, our tourism sector can position itself to continue to showcase the best Western Australia has to offer.



## IDEA 22.

### Low carbon, local tourism

**3145 JOBS**

LOW CARBON LOCAL TOURISM	Jobs
10,000 solar-powered operators	2100
Infrastructure & Interpretive upgrades	500
Build Walkways, bike paths and trails	500
Seed funding for RTOs	10-20
Monitoring GHG at UN Observatory	5
Connecting citizen science with tourism	10
Department resources	10
<b>Total</b>	<b>3145</b>

### The opportunity

WA's tourism industry is one of our biggest employers and has also been one of the hardest hit by the COVID-19 crisis.

Ordinarily, WA's tourism industry contributes \$12.2 billion in revenue yearly and employs 109,000 people across the state<sup>145</sup> – the large majority in micro and small businesses.<sup>146</sup> In regional areas the industry accounts for up to 26% of total employment, often making up the backbone of remote communities' economies.<sup>147</sup> Ordinarily the tourism sector is as large as mining.<sup>148</sup>

Clean State commends the McGowan government's \$14.4 million Tourism Recovery Program that has offered cash payments and grants to help keep tourism businesses afloat.

While immediate stimulus packages urgently need to focus on keeping tourism operators and communities afloat, a longer-term goal of fostering a more sustainable industry can also be achieved.

### The proposal

Clean State propose a range of immediate stimulus measures, infrastructure and transport upgrades, tourism product development, and measures to monitor the sector's carbon emissions, including:

- 1. An urgent stimulus package for tourist regions particularly hard hit by COVID-19 including** Albany (Kinjarling), Denmark, Augusta-Margaret River, Busselton, Wyndham-East Kimberley, Broome, Shark Bay, and Exmouth creating 1500-2000 full time jobs. (\$75m, with matched funding from the Commonwealth)
- 2. A marketing campaign encouraging West Aussies to support local tourism and book a trip in their backyard this year, building on Tourism WA's**

**intrastate campaigns.** (Reallocating existing \$22m marketing and aviation development)

- 3. An Energy Efficiency & Rooftop Solar package to 10,000 tourism businesses to eliminate their power bills overnight and create a local economic stimulus.** (\$50m)
- 4. Infrastructure upgrades in national parks and local reserves, and a funding package for local artists to update and upgrade signage at key tourist and cultural sites.** (\$22m additional funding to \$22m already allocated to Parks)
- 5. Build more walkways, bike paths and touring trail circuits across all five tourist regions** to match the massive increase in hiking and cycle tourism. (\$35m)
- 6. An immediate funding boost to local tourist information centres and visitor facilities for upgrades to facilities, exhibitions, interpretative signage.** (\$5m)
- 7. New, zero carbon transport infrastructure** in and between major destinations, including trackless trams and electric buses. (\$200,000 for Department staff to plan this)
- 8. Supporting and promoting citizen-science travel opportunities that deliver meaningful experiences to guests and leverage volunteers into conservation efforts.** (\$2m)
- 9. Provide additional seed funding of \$300,000 for each of the state's 5 Regional Tourism Organisations (RTOs)** to help identify and implement eco-tourism product development projects. (\$1.5m)
- 10. Funding for permanent monitoring of tourism related GHG emissions** at the UN World Tourism Organisation's 'Sustainable Tourism Observatory' here in WA in order to trace well-informed mitigation strategies.



## Background

### Conservation stimulus package for regions hard hit by COVID

A report by Ernst and Young released on 1 July 2020 identified the eight regional areas in WA that have been hardest hit by COVID-19 as Albany, Denmark, Augusta-Margaret River, Busselton, Wyndham-East Kimberley, Broome, Shark Bay, and Exmouth<sup>149</sup>; all key tourism hotspots.

Clean State is echoing calls of more than 70 conservation, land management and farming organisations for a stimulus investment into conservation and land management programs in these Local Government Areas as targeted economic stimulus to provide to help people get back to work in meaningful roles in their local communities.<sup>150</sup>

“This program would create opportunities for young people, women and unskilled workers, who have been particularly hard hit by the current economic crisis, and can be rolled out fast, to provide work when and where it is needed most.”

– Nerida Bradley, CEO,  
Australian Land Conservation Alliance.

This would create 1500 – 2000 full time jobs in WA immediately, and investment could be targeted to priority conservation areas including restoring rivers and coastal habitats, increasing native seed supply, and delivering strategic threatened species recovery actions.

Each of our five tourism regions feature exceptional natural features found nowhere else in the world, fresh local produce and rich and ancient cultures. As environmental awareness escalates, WA can magnify its tourism appeal by building a strong sustainable reputation for low impact, low carbon tourism experiences. Efforts to promote WA’s natural environment and to protect it will ensure WA stays attractive to visitors in the long run.

This would cost \$150m and would be funded jointly with the federal government.

## CASE STUDY:

### Gondwana Link – Great Southern Biodiversity Link Trail

A range of experiences are being developed with a focus on the landscape scale restoration underway in Gondwana Link ecosystem restoration areas. This digitally based Nature Trail, which will shortly also include ‘Landcare Loop’, provides a cohesive narrative and rich place specific stories on the ecological, social and cultural richness of the Great Southern. The Trail utilizes existing infrastructure, adds to the viability of existing facilities, builds social enterprise opportunities for community-based groups as well as valuable educational resources for visitors. Economic analysis, conducted pre COVID 19, suggests an impressive cost-benefit ratio. Once established, the Trail is easily maintained and is an ideal for visitors as they plan their trip, and for being connected to local efforts during the trip.



## Energy efficiency & Solar package

Tourism is a significant contributor to GHG emissions, accounting for 8% of total global greenhouse gas emissions, mostly through transport, accommodation, shopping and food consumption. The main drivers of our domestic and international visits WA (to experience our expansive coastlines, unique natural sights and ecologically spectacular environments, and local food & wine) are also extremely vulnerable to the impacts of climate change.<sup>151</sup>

Mitigation strategies should therefore consist of two approaches: sufficiency, whereby the focus lies on changing tourists' behaviour towards greater environmental and cultural awareness, and efficiency, in which strategies target ways the industry itself can adopt more sustainable practices.

This is why Clean State is advocating for an Energy Efficiency package that would provide a free refurbishment package to the office (or home office) of operators including insulation, efficient lighting and water fittings, replacing heating and cooling, and installing rooftop solar at up to 10,000 businesses. By virtually eliminating operators' power bills overnight, it will create much needed savings to business' bottom lines of between \$800–\$1600 each year, (or \$16m collectively). It will generate 2100 new jobs, most of these in the regions.

The scheme would cost approximately \$50m.

The scheme would also reduce emissions by 84,000 tonnes, which would be worth \$37.8m over 30 years at a price of \$15/tonne.

## Infrastructure & Interpretive upgrades

Building more walkways, bike paths and touring trail circuits across all five tourist regions are an incredibly effective stimulus measure and match the massive trend uptick in hiking, trek, and cycle tourism. Upgrading infrastructure and signage in national parks and nature reserves by replacing old or hazardous boardwalks with paths made from durable recycled material and installing 'smart' furniture that runs on solar energy to support visitor needs (charging station & WiFi) are also recommended as powerful local stimulus measures.

Providing funding for local artists to enhance interpretation and interactive signage at tourist points and culturally significant sites would also provide meaningful employment to local artists.

\$35m is proposed for these upgrades.

## CASE STUDY:

### Collie Adventure Trail

Collie, known for being a coal mining town, is being transformed into a world-class adventure trail town through the 'Collie Adventure Trails' initiative, determined to attract cyclists and bushwalkers of all levels to its bush circuits. The project is expected to create 160 jobs, 33 directly in tourism<sup>45</sup>.

## Citizen science & Ecotourism

Incorporating citizen science with travel provides a meaningful way for tourism to add value to conservation and a way to market tourism products to new audiences. Environmental charity Earthwatch has observed a 20% participation increase in their citizen science travel offer over the past 5 year, with guests taking part in activities ranging from climate change mitigation to ocean health and wildlife conservation<sup>18</sup>.

\$2m is proposed for marketing and promotion of citizen science operations to potential audiences.



Dunnart



Observing Fairy Terns on Rottnest Island  
(Image: Donna Chapman)





## CASE STUDY

### Houtman Abrolhos Observatory concept



Lesser Noddy (Images: Donna Chapman)

The WA Government recently established the 'Abrolhos Islands National Park' to boost commercial tourism in the mid-west to save a declining regional economy. However, there are very limited resources on the Island to run the Park and no resources proposed for terrestrial ecosystem and wildlife monitoring in the context of increased visitation rates. This is a gap that could be filled with a coordinated citizen-science program (with paying tourists and volunteers) by establishing a 'Houtman Abrolhos Observatory'. This concept was introduced in CCWA's Sentinel Seabirds Guide. It would also add capacity to the way the National park is being managed.

## CASE STUDY

### South West Bush-bird opportunities

South-Western Australia has a high proportion of endemic bush-birds that attract birders from around the world including the eastern States and New Zealand. According to Dr Nic Dunlop, an eminent Western Australian seabirds expert, tours with guides that specialise in finding and interpreting these endemics would service this market.

### Regional Tourism Organisations

Clean State is advocating for additional seed funding (\$300,000) for each of the state's 5 Regional Tourism Organisations (RTOs) with the purpose of identifying and implementing eco-tourism product development projects.

Product diversification and availability is key to ensuring visitor numbers and spending. RTOs are in a favourable position to lead product development projects as they work closely with a broad network of local stakeholders and have a grounded understanding of the complexities facing their particular region. Increased funding would allow organisations to hire more staff to aid members through recovery, improve destination marketing, and provide seed-funding for the development of sustainable tourism products. These aspects combined will enhance the region's attractiveness and boost tourism numbers.

### A big marketing push encouraging West Aussies to support local tourism this year

Clean State acknowledge Tourism WA has launched their biggest intrastate marketing campaign 'Do it in WA' (or 'Wander out Yonder') this year in response to COVID-19, allocating \$4.85 million to get West Aussies into regions.

This campaign should be adjusted according to industry feedback and encouraging West Aussies to explore our back yard and support our regions doing it tough and could be funded by repurposing \$22m allocated for international marketing in the 2019 budget.



## Low carbon tourism & Emissions monitoring

Low-carbon tourism has emerged as an alternative type of travel aiming at delivering high-quality experiences with reduced carbon emissions<sup>14</sup>. The focus of low-carbon tourism is to engage in meaningful localised food, culture, nature and history experiences whilst travelling shorter distances, opting for lower emission transportation options, staying longer in each destination, and using environmentally friendly products and services<sup>15</sup>. The growing appetite for authentic, sustainable, nature-based experiences can be met to a large extent by WA's plural tourism offers and products.

Destination marketing campaigns have been successful in instilling a powerful notion of WA as a haven of nature-based adventures, but this can be further accentuated by leveraging on sustainable practices to form a reputable environmentally conscious destination. Funding and support for WA tourism operators to become ECO certified should be explored. Ecotourism Australia has expanded their ECO Certification program to include Climate Action certification, which is offered to all sectors of the tourism industry and assists in reducing carbon emissions and assuring sustainable practices that address climate change. The program also supplies Respecting our Culture, EcoGuide and ECO Destinations certification.

WA is home to a UN World Tourism Organisation's 'Sustainable Tourism Observatory', the first of its kind in Australia. Led by Curtin University's Tourism Research Cluster it monitors sustainability markers in the South West including tourism visitation, employment, waste and water management. Further funding is required to monitor the tourism industry's carbon emissions as this requires a thorough supply-chain analysis.

This is why Clean State is advocating for funding for the permanent monitoring of tourism-related GHG emissions at this facility, in order to identify well-informed mitigation strategies in the South West, and would also provide a great working example of how mitigation could be identified in the tourism sector.

## What would it cost?

A total of \$190.7 million is proposed in this package, including:

- \$75m for the Conservation Stimulus package (assuming co-funding from the Commonwealth government).
- \$50m for 10,000 Energy Efficiency and Solar power upgrades to operators.

- \$22m for Infrastructure upgrades and artists package for interpretive/signage upgrades in Parks and Reserves.
- \$35m for Trails and Infrastructure and Interpretive/signage upgrades including a local artist package.
- \$5m for Local Tourist Information Centres and Visitor facilities.
- \$1.5m for Regional Tourism Operators.
- \$2m for Citizen Science promotion.
- \$200,000 Department resources to investigate zero carbon transport at and between destinations.

The McGowan Government's 2019 Budget committed \$22m to pre-COVID-19 appropriate areas including international destination marketing and aviation development (\$22 million). This could be reallocated to target intrastate and interstate visitors instead. Funding of \$22m was allocated to the creation and ongoing management of parks and reserves, which should be doubled to \$44m, to fund new and upgraded infrastructure and facilities, particularly in advance of substantially more local tourists while international travel remains closed.<sup>152</sup>

## How many jobs would it create?

This package would create 3145 jobs, including up to 2000 in conservation, 2100 in energy efficiency and solar, and 1000 in infrastructure, arts and design.

## ACKNOWLEDGEMENTS

Clean State acknowledges lead researcher **Sara Cavalcanti Marques, Dr Michael Volgger**, director of the UNWTO Australia's South West Sustainable Tourism Observatory, **Prof Christof Pforr**, sustainable tourism development and tourism governance & policy expert and Discipline Leader of Tourism, **Hospitality and Events** at Curtin University's School of Marketing, **Keith Bradby** at Gondwana Link, **Dr Nic Dunlop** at CCWA and **Destination Perth** in the development of this proposal.

Carbon  
saved from  
atmosphere

**80,000  
tonnes**

per year

## IDEA 23.

# Support & expand the development of Aboriginal Tourism

**190-1240 JOBS**

“Aboriginal tourism is a unique growth industry in Western Australia. As the world’s oldest living culture, Aboriginal culture offers tourism experiences unique to Australia not available anywhere else in the world. A strong, diverse and self-supporting Aboriginal business sector is key to empowering Aboriginal and Torres Strait Islander people, and placing Aboriginal business owners, their families, and communities in the driver’s seat of their economic future.”

– Robert Taylor, CEO WA Indigenous Tourism Operators Council (WAITOC)

Aboriginal tourism employs well over 400 people with full-time jobs and contribute roughly \$44 million in gross state product. The Aboriginal business sector is growing rapidly and faster than the rest of the economy<sup>19</sup>.

Survey results show that 80% of visitors to WA are interested in Aboriginal tourism experiences, but just 20% take part in such activities<sup>6</sup>. There is also an appetite amongst local residents to learn more about First Nations culture and participate in day tours.

Clean State strongly supports programs that work together with indigenous entrepreneurs and

SUPPORTING ABORIGINAL TOURISM	Jobs
First Nations Cultural Centre in Perth	50-500
First Nations Cultural Centres in five regions	50-470
Expand Camping with Custodians program	20
Increase funding to WAITOC	10
Restore funding to WA Aboriginal Tourism Academy	60-240
<b>Total</b>	<b>190-1240</b>

communities to guarantee products are market-ready and that any disadvantage is accounted for and remediated, whilst ensuring self-determination. The 2019 State Budget allocated just \$3.6 million for Aboriginal tourism initiatives.<sup>153</sup>

## The proposal

**Clean State advocate for the state government to support Aboriginal tourism enterprises through a package that includes:**

- A second round of immediate assistance for Indigenous tourism operators**
- An iconic Perth-based Indigenous Cultural Centre.**

A National Indigenous Cultural Centre was proposed at Elizabeth Quay by the Barnett government in 2011 but was later removed from the planning of the precinct. Completing this project would show commitment to being a city that acknowledges, respects and celebrates its Indigenous culture, meaningfully increases the visibility of First Nations people, drives attitudinal shift, and creates a major local and international drawcard.

The Committee for Perth, in consultation with over 150 local Indigenous stakeholders has put forward one idea to build a World centre for Indigenous Culture on a central, prime site on the Derbarl Yerrigan / Swan River in Perth, connected to Indigenous communities; research and learning institutions; and arts and cultural institutions, that seeks to combine a curatorial method of presenting Indigenous art, culture and artefacts and a live interactive approach to represent performance, language, food and tradition. It should also enable Indigenous people to self-represent culture and country, provide a place where Aboriginal and Torres Strait Islanders can find spiritual renewal and be a catalyst for reconciliation.<sup>154</sup>

## The proposal continued

### 2. An iconic Perth-based Indigenous Cultural Centre. continued

The Centre would also function as a first point of contact for visitors in WA to connect with Aboriginal culture and provide information on Indigenous tourism experiences throughout the state. Having a central introductory experience will aid in dispersing travel to different regions and will raise awareness of the exciting indigenous product availability in the state.

### 3. Commit to funding more local Aboriginal Cultural Centres (similar to Bilya Koort Boodja in Northam) in each of the five major tourist regions.

Investment in the planning, design, curation, construction and operation of new, world class Cultural Centres in the regions would celebrate, educate and connect visitors with indigenous culture and history, and also link visitors with cultural tourism opportunities across the state. It would also be a secure source of employment for local artists, historians and guides.

The state government announced \$1.33m towards the Murujuga Living Knowledge Centre and tourism precinct at Conzinc Bay to create a state-of-the-art interpretive centre for the rock art of the Burrup Peninsula – an unparalleled public art gallery of more than a million petroglyphs, and a further \$649,000 to implement the Murujuga Rock Art strategy, which will allow the Murujuga Aboriginal Corporation (MAC) to complete detailed planning and design for the centre.

Clean State proposes funding of at least \$5m for five new Living Knowledge centres, and a further \$2.5m per year to employ 5-10 local First Nations people at each.



*Traditional Custodians of Murujuga leading a 90-minute rock art and cultural experience at Ngajarli (previously known as Deep Gorge).  
(Source: murujuga.org.au)*

### 4. Expand the Camping with Custodian projects and support 'Luxury Cultural Camping' enterprises – in regions not already covered.

Camping with Custodians is an exciting, Australian-first initiative developed by Tourism WA that involves the development of high-quality campgrounds on Aboriginal lands which are open for travellers to stay on and operated by the community.<sup>155</sup>

Camping with Custodians provides employment and enterprise opportunities for local communities and a chance to showcase and share traditional customs, art & culture with visitors<sup>24</sup>. Enterprises include guided tours, cultural awareness and immersion projects, art sales, and traditional cooking demonstrations.<sup>156</sup>

There are currently five campgrounds in the Camping with Custodians network, all in the Kimberly and Pilbara regions.

With more resources and support, the Program could be extended to all five tourist regions, including prospective development sites closer to Perth.

The support and development of tourist stays linked to Aboriginal ranger programs with a focus on environmental & cultural education and nature-based adventures<sup>44</sup> and new 'luxury cultural camping' are also strongly recommended.

Clean State welcomes the announcement of \$3.84m for three Camping with Custodians sites at Dampier Peninsula near Broome in August 2020.

**We propose further funding of at least \$6m to develop 6 new camping enterprises over the next three years in areas yet to feature such initiatives from Gascoyne to the Great Southern.**

WAITOC has suggested two possible sites that could be developed almost immediately: At **Roelands**, a shovel-ready site with land tenure and **Merredin**, with a feasibility study for the Njaki Njaki Aboriginal Cultural Tours and campground already developed. These will be explored in more detail in Clean State's separate initiative.

Clean State also believe this funding could be managed by WAITOC.



## CASE STUDY:

### Award winning Imintji Campground and Art Centre, Gibb River Road: 'A Place to Sit Down'

Once an important rest point for bullock drivers on the Gibb River Road, Imintji Camping with Custodians initiative provides a welcome stop-over for travellers, with newly refurbished campgrounds, a thriving Art Centre. And modern amenities including wifi and even barista-made coffee.

The campground being built provided a turning point for the remote community, turning it into a thriving destination and a reason for locals to stay and work. The Campground provides employment for around 12 local people and the knock-on economic development at the community shop has brought the town back to life. In 2017 the Campground won a national public engagement and community planning award.



*Imintji Community Store*

#### 5. Increase core funding to the WA Indigenous Tourism Operators Council (WAITOC) to \$2m per year.

WAITOC is the peak association representing Aboriginal tourism operators throughout WA. Operating for 20 years. It supports and promotes Aboriginal tourism by providing business support, advice and training to Aboriginal tourist operators and businesses.

**"The vision of WAITOC values culturalization over commercialization. Giving a voice to the oldest living culture on earth, ensuring authenticity and respect to Aboriginal people in Australia."**

– Robert Taylor, CEO WAITOC

According to WAITOC, job creation in Indigenous tourism relies heavily on capacity building, mentorship, building trust over time, and developing market-readiness. The main areas Indigenous business owners have raised consistently as critical for development and growth are:

- Better business support and advice to identify and execute commercial opportunities.
- Improved access to finance.
- Stronger connections and relationships with industry networks.
- Better sharing of information and data about commercial opportunities.

WAITOC currently employs four staff and receives state government funding of just \$900,000 per year to provide these services (\$3.6m over four years).

Clean State strongly advocates for to increase capacity at WAITOC to grow the capacity of the organisation to support business development for emerging, market ready Aboriginal tourism enterprises, and develop new products.

The phenomenal impact WAITOC's support has on Aboriginal tourism businesses speaks for itself.

- From 2015–2019, WAITOC worked with 49 businesses, including 39 new businesses, and created 104 FTE jobs.
- This included supporting 25 businesses in the regions (through the Aboriginal Tourism Development Program, a once off royalties for regions program) – and in just four years helped these businesses:
  - Develop 73 Action Plans
  - Increase full time employees by 307%
  - Increase tours per week by 192%
  - Increase annual customers by 739%
  - Increase interstate and intrastate customers by 45%
  - Increase international customers by 157%
  - Increase annual turnover by 459% and annual profit by 279%; and
  - Purchase 44% more goods and services from local providers



## CASE STUDY:

### Waringarri Aboriginal Arts Centre – An Aboriginal Tourism Development program success story

Waringarri Aboriginal Arts Centre is the first wholly indigenous owned art centre and tour operator established in the Kimberley region and one of the oldest continuously operating art centres in Australia, supporting economic independence for artists and their community.

Through WAITOC's support and working with a Development Manager, the centre received feedback on expanding its business model, secured a loan for a bus, badged with the Arts Centre logos, and began tours showing visitors the artists creating their works and visiting Country where the art has been inspired by. This has completely changed the arts centre model and set it up as a more economically sustainable and independent business. The new model is now an inspiration for other arts centres around WA.



Waringarri Aboriginal Arts centre (Source: WAITOC)

#### 6. Revitalise tourism business development through a new Aboriginal Tourism Academy with funding of \$3m per year.

The Aboriginal Tourism Academy provides support, training, and mentorship for all levels emerging, market ready and export ready businesses. Previously the state government provided \$4.6 million from 2016–2019 for the Aboriginal Tourism Development Program and has since stopped funding to this program. Mentors help businesses develop action plans and then provide funding to implement their Action Plans.

The Academy is currently not funded but the ATDP provides an example of the impact mentoring and business development support can have on Aboriginal enterprises.

With just four mentors, the program created 104 full time equivalent jobs and supported the creation of 39 new tourism businesses throughout WA, over just four years.

The true potential of this program is yet to be realised, because the limited funding also meant only the Kimberley and South West regions of WA were targeted, leaving a gap in products in other areas, such as the Gascoyne, Mid-West, the Pilbara and the Goldfields.

A revitalised program with dedicated funding would allow for a program proportionate to potential and scale of WA's tourism regions. It would allow mentors to work across the entire state to grow product availability and awareness as well as build capacity of operators keen to enter the market. The previous government only wanted to support emerging and market ready businesses, but there is a strong need for support at all levels, including export ready businesses (that is, those working with inbound tourism operators and selling their product to an international market). About 20% of businesses are export ready.

According to WAITOC, funding of \$3m could potentially support 40–50 new businesses every year.

### What would it cost?

Up to \$200–400m for a world class Aboriginal Cultural Centre (assumed leverage of additional contributions from the Commonwealth and private sector).

An additional \$14.6m per year for:

- An additional \$1.1m pa for WAITOC
- \$3m pa for the Aboriginal Tourism Academy
- At least \$7.5m for five new Aboriginal Cultural centres
- \$6m additional funding for six new Camping with Custodians enterprises in regions not currently catered for, from the Gascoyne to Great Southern.

### How many jobs would it create?

190–1240 jobs including up to 1000 construction jobs on cultural centres.

### ACKNOWLEDGEMENTS

Clean State acknowledges **Robert Taylor**, **WA Indigenous Tourism Operators Council** and the **Committee for Perth** in the development of this package.



# waste, materials & circular economy

Closing the loop on our resource use through recycling and reuse is an essential step towards a circular economy. Western Australia currently lacks the recycling infrastructure to process many recyclable waste products including, plastics, glass and other common materials.





## IDEA 24. Reboot Recycling & Resurrect Repair Labs

REBOOT RECYCLING & LOCAL REPAIR LABS	Jobs
E-Waste	900
Building waste diversion for Road base	100
Local Repair Labs: retail, repair, training and workshops	250-300
<b>Total</b>	<b>1300</b>

**1300 JOBS**

### The opportunity

Closing the loop on our resource use through recycling and re-use is an essential step towards a circular economy, and the good news is that these industries are jobs-rich and can be developed right here in WA.

Currently, WA lacks the recycling infrastructure to process many recyclable waste products including, plastics, glass and other common materials. This means our recycling rates remain low and what recycling does take place has to be shipped to other parts of the country or overseas. The carbon footprint of this transport is significant, and we cannot continue to rely on these markets when countries like China are restricting the importation of waste for recycling. By developing our local recycling industries, we can dramatically reduce carbon emissions and at the same time create jobs and business opportunities right here in WA.

Construction and Demolition (C&D) waste account for almost half of WA's total waste stream but has the lowest recovery rate. From a climate perspective, steel and concrete production is a significant contributor to global emissions. Here in WA, quarrying of raw materials such as limestone, sand and rock are causing significant environmental damage; however recycled C&D waste can be substituted for virgin raw materials in many situations.

Outside the Perth metropolitan region, limited access to markets for recycled products and relatively cheap disposal costs continue to restrict opportunities to increase waste recovery. Improving landfill diversion rates and increasing re-use and recycling for this waste stream must be a high priority for the state government.

### The proposal

#### 1. Recycle all our E-waste here in WA

63% of e-waste in Australia is ending up in landfill, losing valuable minerals like steel, plastic, non-ferrous metals and gold & silver.

Australians are amongst the highest users and disposers of technology in the world, generating 465,818 tonnes of e-waste in 2016.<sup>157</sup> In 2016 every Australian generated almost 24kg of e-waste per person.<sup>158</sup>

It's estimated For every 10,000 tonnes of e-waste recycled locally, at least 50 direct jobs are created, compared to only 2.8 jobs per landfill, and almost 5 times as many jobs as other waste streams due to the complex and intricate nature of e-waste recycling.<sup>159</sup>

WA generates about 73kg of e-waste per person, or roughly 198,000 tonnes per year. Recycling this volume of e-waste could create up to 1000 full time jobs, and a number of additional jobs in downstream industries to refine and utilise all of the materials.

#### 2. Recycled roads and infrastructure from construction and demolition waste

Construction and demolition (C&D) waste is our largest single waste stream and accounts for over 4 million tonnes of waste every year. WA's recovery rates in this area have improved over recent years and we now recover about 70% of this amount.<sup>160</sup> This means about 1 million tonnes of materials are still sent to landfill – materials that can be used for roads, footpaths and cycle paths each year.

Using recycled materials for road base will also prevent the need for further limestone quarrying and mining expansions in our South West regions, such as Binningup and Myalup.



## 2. Recycled roads and infrastructure from construction and demolition waste continued

Markets for recycled C&D products need further support to develop. The McGowan Government's Roads to Reuse pilot program commits to using 25,000 tonnes of recycled C&D waste as road base and also includes a target of 30% recycled material in road base<sup>161</sup>. Better handling at tip sites to ensure asbestos is not mixed is vital.

There is the potential to drive even greater recycled content if this program were extended to include soft plastics and glass which cannot be recycled into other higher value products.

Concrete production is a significant contributor to global emissions and resource recovery from the C&D stream to replace the raw materials in concrete use is an important opportunity to reduce this source of pollution.

With the right policies in place, State Government agencies with responsibility for infrastructure development including Main Roads, Water Corporation and Development WA can create a huge market driver to support increased recycling of C&D waste.

## 3. Resurrect Local Repair Labs

A few decades ago, then State Energy Corporation (SEC) resourced 'Safety Watch-it Vans' at metropolitan shopping centres where people could bring electrical appliances to be tested for safety and repaired.

More recently, some local governments and independent collectives have established Repair Labs, which are community initiatives to help people fix their belongings and prevent materials going to landfill. The Wembley Repair Lab, supported by the Town of Cambridge, is a free family friendly community event where skilled volunteers help with repairs to clothing, bikes, furniture, jewellery and battery-run electronics<sup>162</sup>. Some regional local government Authorities have partnered with local community groups to develop 'tip shops' (Such as the highly successful Denmark Tip Shop) where discarded items are salvaged and sold or recycled. These Clean State proposes a program of support to resurrect local repair labs in communities across



(Source: [www.facebook.com/RepairLabPerth/](https://www.facebook.com/RepairLabPerth/))

the state, with a focus on diverting household electrical appliances from landfill, through a widely available, free or low-cost repair service.

The 'local repair labs' would charge a small fee for parts, and be located at accessible locations such as shopping centres or other high-visitation areas. The Repair Labs could be co-located with container deposit collection facilities, utilising existing buildings or constructed from materials diverted from landfill. Clean State proposes a trial of 30 labs located in metropolitan and regional hubs.

## CASE STUDY:

### Repair Cafés springing up across Perth

"When in doubt, don't throw out!"

– Perth Repair Lab

A community-powered series of local "Repair Cafés" have popped up around suburban Perth and regional centres. There are 11 volunteer-powered repair operations currently running in locations spanning from Perth to Albany. Generally opening once a month, people are invited to bring along their broken household items and can learn how to fix the item. If the item can't be fixed the components are salvaged to help with future repairs.<sup>163</sup>

None of WA's repair cafés have permanent homes, and operating only once a month, there is huge potential to provide funding to permanently locate local repair labs in central locations and employ full time staff to run them.



(Source: [www.facebook.com/RepairLabPerth/](https://www.facebook.com/RepairLabPerth/))



## How to make this happen

1. Ban E-waste from landfill and follow the steps South Australia, the ACT and Victoria have taken to establish a dedicated e-waste recycling facility.
2. Ensure government agencies utilise local E-waste recycling options when disposing of E-Waste, creating an instant market demand for local E-waste recycling.
3. Mandate the use of recycled materials in road base by Main Roads Department and Local Government to deliver roads that are stronger, longer lasting and cost competitive with traditional products.
4. Mandate recycled content for infrastructure projects establishing government as major customers to drive demand for this product.
5. Require material collected through the WA Recycling Refund Scheme to be reprocessed here in Western Australia and expand the Recycling Refund scheme to include a broader range of recyclable packaging.
6. Provide tax incentives for WA businesses involved in recycling or reprocessing industries
7. Withhold further approvals for quarry developments or expansions where alternative materials can be sourced from recycled and reprocessed C&D waste products.
8. Develop Extended Producer Responsibility and Product Stewardship schemes under the WA Waste Avoidance and Resource Recovery Act for problem waste products.
9. Provide funding for 30 Local Repair Labs across Perth and in regional areas, and explore linking training and employment opportunities to social reinvestment programs.
10. Provide dedicated funding from the WA Waste Avoidance and Resource Recovery fund for local community groups to clean up litter, illegal dumping, and plastic pollution in rivers, streams, coastlines and bushland areas.
11. Increase the WA Landfill Levy and phase it in to cover regional areas at a lower level.



“We’ve got a big sign in our workshop that says positive vibration. People get a sense of pride and gratitude from knowing their work is contributing to helping the environment. I would love to provide local job opportunities for the Margaret River community, especially for people with a disability and young people starting out.”

– Narelle Koppers, Precious Plastic Margaret River

## How many jobs would it create?

1300 jobs in total

## ACKNOWLEDGEMENTS

Clean State acknowledges the **Enkel collective**, **Hononic**, **Close the Loop**, **Total Green Recycling** and **Belinda Bastow** from EIANZ in the development of this proposal.



# public sector, care industries & supporting women

The Western Australian Government has a unique opportunity to show real leadership in low-carbon job creation. By committing to be a carbon-neutral government, and having an actionable plan, Western Australia could lead the way in what a public service of the future could look like.





## IDEA 25.

### A Supercharged, Zero carbon public sector

**350-850 JOBS**

#### SUPERCHARGED ZERO CARBON PUBLIC SECTOR

	Jobs
Decarbonising government buildings	250-400
Supercharged Climate Unit in the Department of Premier and Cabinet	50
Carbon Farming or other offset measures to offset unavoidable emissions by 2025	50-400
<b>Total</b>	<b>350-850</b>

### The opportunity

Not only do we need to investigate mitigation and adaptation opportunities, but we need to completely decarbonize our economy in less than 30 years. The next ten years are considered the 'critical decade' we need to reduce emissions by 7.6% every year to have any chance of limiting global heating to 1.5 degrees.

Currently less than ten full time staff are employed in a dedicated Climate unit. Clean State proposes a new Minister with responsibility for Climate Change, and a supercharged climate change unit within the Department of Premier and Cabinet, with at least 50 full time staff.

### Decarbonizing government-owned and leased buildings

Government spending now to reduce future expenditure through reduced energy and fuel bills is the perfect stimulus model.

WA's public sector represents one of the lowest hanging fruits for decarbonisation. It's WA's highest employer, with almost 120,000 people working across 19 different departments and entities.

The government currently owns and runs 80 hospitals another 20 buildings and holds 500 private leases covering 560,000 square meters of office space. (Clean State's plan to decarbonize all 870 public schools is covered earlier in this Plan.)

Improving the energy efficiency of all government-owned buildings presents a massive economic stimulus and is one of the best opportunities to reduce carbon emissions in the built environment.

A whole of government approach to procurement and projects funded by government would also be an easy and effective way to show leadership and become carbon neutral in its operations.

### Decarbonising the government fleet: 8000 EVs

The Department of Finance leases and finances 8907 passenger and light commercial vehicles. Of these, just two are electric and 114 are electric/hybrid.<sup>164</sup>

In addition to the fleet, there are another 251 agency-owned vehicles and fleets for government trading enterprises such as the Water Corporation, which includes 92 trucks and vans.<sup>165</sup>

The \$280 million fleet contract is coming up for review in 2021<sup>166</sup> and provides the perfect opportunity to phase in an electric fleet.

This initiative would save up to \$23m per year in fuel costs and the higher price of EVs in the short term would be more than recovered through fuel savings.<sup>167</sup> It would also save thousands of dollars being spent every year to offset emissions from the government fleet.

Committing to phasing in an all-electric fleet would also be the single biggest way government could help drive EV prices down for private owners and spur investment in EV recharging infrastructure.



## The proposal

1. Establish a Minister for Climate Change and employ 50 new staff in a large, cross-government Climate Action and Jobs Unit to coordinate action on climate change across the whole of government and all sectors of the WA economy. (\$5m/yr)
2. Commit to becoming a carbon neutral government by 2025 and develop a plan to achieve this.
3. Launch an ambitious program to audit and retrofit 600 government owned and leased buildings with energy efficiency and solar power by 2025, starting with WA's 80 hospitals. (\$10m/yr)
4. Convert the government's 8000-strong car and commercial vehicle fleet to electric by 2025, starting immediately with the 2021 fleet contract review.
5. Offset unavoidable government emissions (including from Government Trading enterprises) through investment in a Carbon and Land Restoration Fund (see separate initiative).
6. Establish a revolving fund to support Local Government to invest in energy efficiency and renewable energy opportunities with a payback of less than 5 years.

## Benefits

This initiative would save millions of dollars every year in energy bills and provide a massive stimulus to WA's renewable and energy efficiency sectors.

Thousands of tonnes of emissions would be saved each year by electrifying the government fleet and retrofitting all government owned and leased buildings for energy efficiency and solar power.

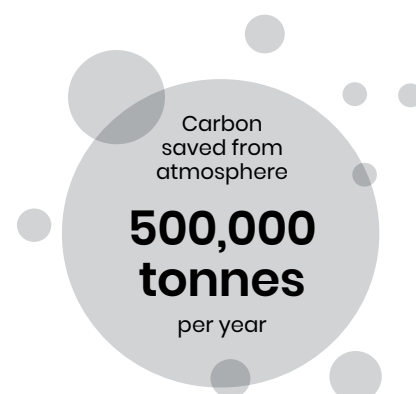
## Jobs created

Clean State estimate:

- At least 250-400 jobs would be created in energy efficiency retrofits and solar installations.
- 50-400 jobs in carbon farming and other offset activities created by offsetting unavoidable government emissions.
- 50 full time jobs in a new Climate Action and Jobs department.

## How much carbon pollution would this save?

The package described would save over 500,000 tonnes per year by 2030.







## IDEA 26.

### Supporting female participation and leadership in a zero-carbon future

**4300 JOBS**

FEMALE FUELLED JOBS	Jobs
Renewing and repowering our Care Industries: Retrofits and solar across 1883 childcare, aged care & disability care facilities.	3165
Early Age School STEM program	30
Free creche and childcare at all tertiary education, government agencies and large businesses by 2022	1000
Department resources and new jobs	105
	<b>4300</b>

#### The opportunity

“Tech is the new frontier of job and wealth creation – the more women we have in STEM fields the lower the risk of economic and social inequality between men and women.”

– Vanessa Doake, co-founder of Code Like A Girl

Bold climate action and low carbon recovery measures will create thousands of jobs and a sustained boom in prosperity. Still, there is a need to ensure all members of our community benefit.

Women have been disproportionately affected by COVID-19 in multiple ways. Women lost more jobs than men during the pandemic<sup>168</sup> and, are being overrepresented in casual and part-time positions, saw higher rates of job losses and reduced hours than men.

Stimulus packages tend to focus on male-dominated industries like construction, infrastructure, and clean energy. Women are also underrepresented in areas of science, technology, engineering and mathematics, all core areas set to boom in a decarbonising economy.

Clean State strongly advocates for everyone to benefit equally from stimulus and recovery packages, and for women and girls are supported and included in the jobs and prosperity boom implicit in the transition to a decarbonised economy.

#### The proposal

Clean State is advocating for the following proposals to ensure women benefit from the low carbon stimulus and decarbonized economy:

1. Introduce an early age school program that engages girls into STEM activities and exposes them to the type of careers and opportunities provided by STEM.
2. Set targets and provide funding for more female-founded low carbon start-ups in WA.
3. Revolutionise childcare in WA by providing funding for free creche and childcare at all WA universities, TAFEs and VET facilities by 2022, all government agencies, and require all large WA businesses to provide childcare or creche on site by 2025, and strongly advocate for the commonwealth government to reintroduce free childcare, permanently.
4. Expand the ‘Onboard WA’ program to the private sector to lift the representation of women on Board positions.
5. Increase funding for start-ups in the New Industries Fund to \$2.4m and create a new program specifically targeted at supporting, mentoring and training women in STEM start-ups to get investment and pitch ready. The program should aim for 100 Female STEM start-ups by 2030.
6. Expand the pilot project on voluntary reporting on workplace gender equality in the public sector to all industry sectors and explore introducing targets and incentives to lift female participation in STEM industries.
7. Retrofit and Repower WA’s 1883 Aged Care and Childcare facilities, to make them more comfortable to work in and cheaper to run, and money saved on energy bills can be reinvested into wages, employee benefits and affordable care.



## Women are underrepresented in STEM

Jobs in STEM (science, technology, engineering, and mathematics) are growing 1.5 times faster than any other industry<sup>169</sup>, but women and girls are vastly underrepresented and underpaid in STEM education and careers.

Women only account for 10% of the global energy workforce, and 15% of the employees in architecture and engineering.<sup>170</sup>

**“There is no fundamental reason whatsoever why there shouldn’t be more women in engineering in Australia; 35% of engineers in Europe are women. Iran has more than 50% women in engineering and 70% of all STEM graduates are women. Similar representation needs to be achieved in Australia if we are to continue our place as global leaders.”**

– Chris Nielson.

Engineers Australia’s Queensland division.

Australian Government figures are sobering, and show:

- Twice as many male students (41%) aspire to a STEM-related career than females (20%).
- Males report far higher confidence in getting good results in STEM subjects than females.
- Far less female year 12 students (27%) are enrolling in Information & Design Technology subjects than males (40%).
- Less than a quarter of STEM university graduates are women (21%).
- Women make up only 17% of Australia’s STEM workforce.
- Just 12% of Australia’s engineers were women in 2016.
- Women earn 14% less than their male counterparts in science, engineering, and IT roles.
- Just 31% of academic and research staff and 15% of professors in STEM are women.
- Visibility of women working in STEM is also poor. Only 28% of STEM academic writers featured in The Conversation in 2017 were women.<sup>171</sup>

Encouraging and supporting women and girls to enter STEM fields would create a seismic shift in our economic structure and technology frontiers.

At current rates of participation, the STEM field will not reach gender parity in key manager positions until the end of the century.<sup>172</sup>

**With STEM and low carbon industries set to be the next boom, its crucial women have the same opportunity to share the benefits.**

Clean State commends the WA government’s ‘Stronger Together’ plan for gender equality in WA<sup>173</sup> and ‘Bright Future’ Plan which aims to increase participation of women and girls in STEM education and careers. However, we share the concerns that the effects of COVID-19 could set back the progress that has been made in gender equity in STEM subjects over the past years.<sup>174</sup>

Engineers Australia believes education, promotion, workplace improvements, work flexibility and addressing overt and unconscious bias are all necessary to improve outcomes in the future.<sup>175</sup> Supporting female researchers move into senior leadership roles will have a long-term effect on the structure of STEM communities by creating female role models and reducing existing issues in STEM professions.

**“Providing learning experiences that are fun and engaging for girls as young as possible is the best way to encourage more girls to consider STEM careers.**

– Vanessa Doake, Code Like A Girl.

## Women are underrepresented in start-ups

The start-up sector in Australia is overwhelmingly male-dominated, particularly in STEM and leadership positions, and women are receiving a tiny proportion of overall funding.

Government support and investment in female-founded start-ups could dramatically accelerate our decarbonisation efforts and gender equity in the field.

The WA government announced \$800,000 to support start-ups and small and medium enterprises impacted by COVID-19 in June 2020.<sup>2</sup> This program could be expanded and should include a stream specifically for women in STEM start-up businesses.

**Free childcare and creche should be a non-negotiable feature of our low carbon recovery and 21st Century economy.**

**“In global terms, before the pandemic, Australia’s childcare was prohibitively expensive for families and particularly punishing in effect to secondary earners, who in Australia are more often women. Given we know women are bearing the brunt of job and income losses post COVID, we know the return of childcare fees will make paid work even more difficult for women to maintain.”**

**– Georgie Dent, acting Campaign Director, The Parenthood**

The single biggest stimulus measure and single biggest enabler for women to thrive in their career is to provide flexible working conditions and access to free childcare.

Since 2012, we’ve been hearing from the Grattan Institute that if we could increase female workforce participation by around 6%, we could increase the size of Australia’s GDP by a staggering \$25 billion a year.

The main reason women’s participation in the workplace falls in women between the ages on 25–45 is caring for a child.<sup>176</sup>

Free childcare not only empowers women to engage in the workforce on their terms but adds billions to the economy through wages and savings otherwise spent on childcare being spent in the local economy instead.

## CASE STUDY:

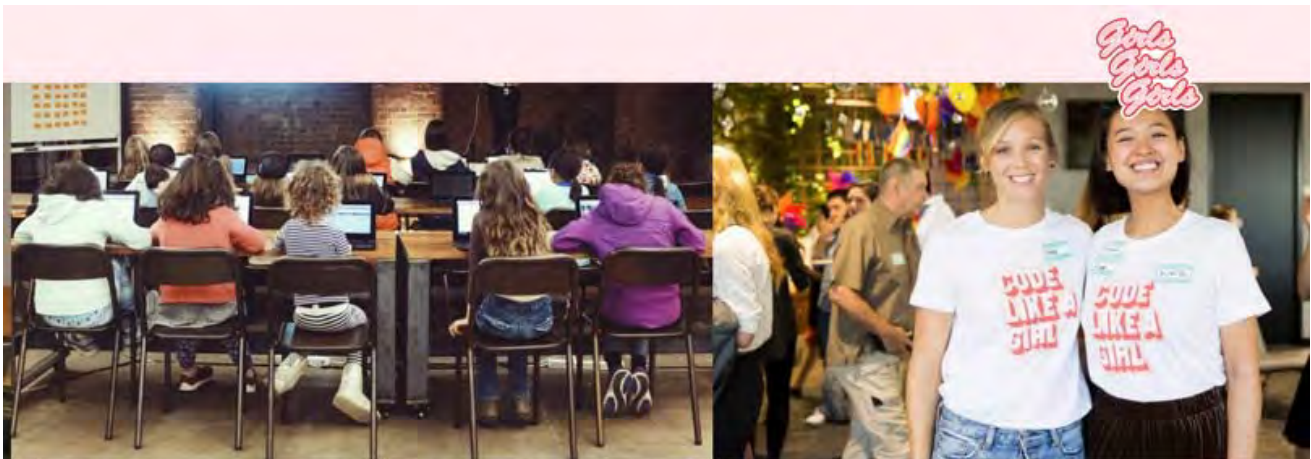
### Code Like a Girl

“We think providing learning experiences that are fun and engaging for girls as young as possible is the best way to encourage more girls to consider STEM careers.”

*Code Like A Girl* is an Australian social enterprise organising providing girls with the tools, knowledge, and support to enter and flourish in the world of

coding by delivering tech-focussed events held across Australia. The team run a junior school holiday code camp for girls aged 8–15, as well as workshops for adults who have an interest in coding. Most recently they launched an internship program and also run a job-sharing service to connect their community of female coders with jobs and employers that are committed to equality in their workplace. *Code Like A Girl* focuses on making tech accessible, inclusive, open and, fun.

Co-founders Ally Watson and Vanessa Doake had experienced first-hand the “isolation associated with being a female developer and decided to host a meetup to bring female coders together to learn, encourage each other and celebrate their achievements”, and are passionate about social justice and “empowering girls and women to be whatever they want and achieve more than what our society tells us we can.” More than 100 people RSVP’d to their first event in 2015.



Girls participating in coding workshops held by *Code Like a Girl*. (Source: [codelikeagirl.com](http://codelikeagirl.com))



Access to childcare could keep 3,756 female managers in the workforce.

Women who continue to participate in the workforce have more in their superannuation fund and overall higher lifetime wages reducing reliance on age pension later in life.

Increased participation in the workforce leads to a more efficient economy.<sup>177</sup> Studies have found in Nordic countries which have free or affordable childcare, have higher rates of participation from women. If Australia had similar rates of participation it would add an estimated \$60billion to the economy.<sup>178</sup> Further just a 6% increase of women in Australia's workforce would add \$25billion to GDP.<sup>179</sup>

### **Repowering WA's care industries would reduce emissions and create savings that could be reinvested into wages and facilities**

Clean State is advocating for the workplaces of WA's 'Care industry' to be retrofitted for rooftop solar PV and energy-efficient water systems.

This would be a powerful way to improve the levels of comfort and contribute to reducing emissions in an industry that is dominated by female workers. Women account for 80% of WA's Health Care and Social Assistance workforce<sup>180</sup> and over 85% of our aged care workers.<sup>181 182</sup>

There are 1,883 childcare, aged care and disability care facilities in WA, including:

- 922 childcare facilities
- 343 aged care facilities (128 of them residential)
- 77 other residential care services
- 413 disability care facilities

Retrofitting these 'care industry' settings would allow what would have been operational costs (high utility bills) to be redirected toward higher wages for employees, lower costs for families, and creating new jobs in paid work experience for aspiring carers.

### **What would it cost?**

This package would cost \$10m per year including:

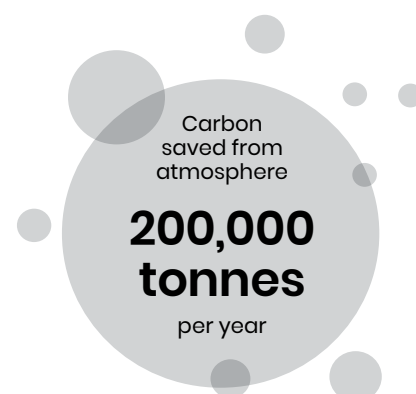
- Renewing and repowering 1883 childcare, aged care & disability care facilities.
- Introducing an Early Age School STEM program.
- Providing funding for free creche and childcare at all tertiary education, government agencies and all large businesses by 2022.
- Supporting 100 Female STEM Start-ups by 2030.

### **How much carbon pollution would this save?**

The transition described would save approximately 200,000 tonnes of carbon per year.

### **ACKNOWLEDGEMENTS**

Thanks to **Dr. Austen** of Curtin University and **Dr Vanessa Rauland** in the development of this package.





## How can we make this a reality?

**The initiatives and case studies contained in this report show how action on climate change can deliver thousands of jobs and exciting opportunities to make Western Australia cleaner, fairer, more liveable, and more prosperous.**

The proposals cover a range of sectors and themes, but they are by no means exhaustive. Instead, they provide a launchpad and a map of opportunities for the first important steps in Western Australia's journey to decarbonisation. Over time, the ideas and initiatives can be further developed and built upon as momentum builds, new opportunities are developed, and new challenges are addressed.

The plan has been developed to ensure that all parts of our community can share in the benefits and opportunities arising from action on climate change. Each proposal provides exciting opportunities for WA businesses, communities, families, and individuals.

The transition to a zero-carbon economy presents the most significant development opportunity in Western Australia's recent history, with transformative potential for businesses and communities in every sector.

While the policy recommendations contained in this plan are focussed toward the WA State Government, leadership, investment and support from business, local government, community groups and individuals essential. This leadership is already happening and must continue to grow.

This transition will involve rebuilding energy generation to several times current capacity, requiring major new infrastructure, construction and engineering. This can underpin significant expansion in mining and minerals processing and drive new and expanded manufacturing industries.

Local government and community groups will be essential partners in delivering local solutions for a zero-carbon future. Land restoration and regeneration will provide new opportunities for regions, farming enterprises, pastoralists and Indigenous land managers. Schools, health workers, Aboriginal enterprises, and volunteer fire brigades are just some of the many groups that will be engaged in ways that will deliver multiple benefits for people and communities.

**To realise these opportunities for Western Australia, Clean State is inviting input and participation from all parts of the community, government, and business in the next steps towards action on climate change in WA.**

We are particularly seeking engagement and input on:

- Refining this plan to further develop the implementation strategies for each initiative.
- Building on this plan by identifying and developing additional initiatives and proposals.
- Building awareness of the opportunities that exist in action on climate change among all sectors.
- Supporting the WA State Government to commit to this plan and provide policy leadership and resources where required.
- Supporting other sectors, communities and organisations to participate in identifying and implementing solutions.
- Ensuring that the opportunities arising from action on climate change are shared and that nobody is left behind in the transition to a zero carbon Western Australia.

### How individuals can participate

Clean State is an organisation built on people power. If you have read this report and are inspired by the ideas and want to help make them a reality, please get in touch with us.

We need individuals from all across the state to help us refine and further develop the ideas contained in this report, as well as to help spread the word.

### How business can get involved

The measures outlined in this document provide a glimpse into the potential business and employment creation opportunities that will flow from a zero-carbon transition for Western Australia; however, the plan only scratches the surface of what is possible.

At times, governments can be slow to act, however with leadership from the business community and non-government organisations action can be taken now.

## How business can get involved continued

Clean State is partnering with WA businesses to identify and unlock action on climate change that creates jobs and economic opportunities. We are developing case studies, proposals, policy recommendations and partnerships between enterprises, governments and community groups.

If your business is ready to embrace a low carbon future and benefit from the opportunities that will flow from action on climate change, we want to hear from you.

## How community organisations can participate

Clean State is committed to supporting action on climate change which helps deliver healthier communities and a fairer society. We understand that healthy, connected communities who are empowered to participate in our economy and decision making are essential for effective action. We are also aware that climate change itself creates new challenges and exacerbates existing issues.

The examples provided in this document show that the transition to a zero-carbon WA can help address existing social and economic challenges. However, if programs and initiatives are not designed with participation and engagement of all sectors and voices, there is a risk that people and communities will be left behind, and solutions will not be enduring.

Clean State is partnering with community organisations, charities, faith groups, and not-for-profit organisations to co-design climate change solutions and build a broad and diverse coalition for action. Please contact us to discuss how your organisation can be involved.

## What State and Local Governments can do

This document contains a wide range of policy recommendations which can be embraced and adopted by State and Local Governments. The transition to a zero-carbon Western Australia is relevant to all agencies, departments and trading enterprises at all levels of government.

Clean State encourages all levels of government to examine the proposals and consider how their adoption and implementation can be supported in their respective areas.

In many cases, there will be more than one way to achieve an outcome and Clean State encourages feedback and dialogue with government agencies and policymakers on how the initiatives and proposals can be further refined and delivered.



**Table 1: WA's top 30 polluters, by facility**

(Source: Adapted from safeguard facility reported emissions 2018-19)

INDUSTRY TYPE	Facility	Operator	Emissions
LNG	Gorgon Operations	CHEVRON	8,970,457
LNG	North West Shelf Project	WOODSIDE	7,387,040
LNG	Wheatstone Operations	CHEVRON	4,056,663
COAL POWER GENERATION	Muja Power station	SYNERGY	3,980,000
ALUMINA	WOR01 Worsley Alumina Refinery/Mine	SOUTH32 WORSLEY ALUMINA	3,613,937
COAL POWER GENERATION	Bluewaters Power 1&2	SYNERGY	2,960,000
LNG	FLNG	SHELL AUSTRALIA	2,317,273
COAL POWER GENERATION	Collie Power Station	SYNERGY	1,850,000
LNG	Pluto LNG	WOODSIDE BURRUP	1,747,412
ALUMINA	Pinjarra Alumina Refinery	ALCOA	1,514,832
ALUMINA	Wagerup Alumina Refinery	ALCOA	1,380,208
ALUMINA	Kwinana Alumina Refinery	ALCOA	1,258,124
IRON ORE	Sino Iron Project – Cape Preston	CITIC PACIFIC MINING	1,256,525
AMMONIA	YPF AMMONIA PLANT	YARA PILBARA FERTILISERS	992,241
CEMENT	Cockburn Cement	ADELAIDE BRIGHTON	947,905
AMMONIA (FERTILIZER)	CSBP Kwinana Facility	CSBP	722,204
OIL	Kwinana Refinery	BP REFINERY (KWINANA)	711,680
IRON ORE	Pilbara Rail Operations	PILBARA IRON	625,143
GOLD	Telfer Gold Mine	NEWCREST MINING	543,934
IRON ORE	Christmas Creek Mine	CHICHESTER METALS	510,900
NICKEL & COBALT	Murrin Murrin Operations	MURRIN MURRIN OPERATIONS	502,006
IRON ORE	PRL03 Rail – IOR Facility	BHP BILLITON IRON ORE	494,600
IRON ORE	Roy Hill Mine	ROY HILL HOLDINGS	412,588
IRON ORE	Cloudbreak Mine	CHICHESTER METALS	401,193
IRON ORE	Solomon Mine	FMG SOLOMON P	392,995
IRON ORE	ARC01 Mining Area C – MNG Facility	BHP BILLITON IRON ORE	370,602
TITANIUM	Kwinana Pigment Plant	TRONOX MANAGEMENT	311,503
IRON ORE	Yarnima Power Station	BHP BILLITON IRON ORE	307,802
DOMESTIC GAS	Ningaloo Vision FPSO	SANTOS	547,856
IRON ORE	Jimblebar Mine	BHP BILLITON IRON ORE	294,288
<b>TOTAL</b>			<b>51,381,911</b>
<b>as proportion of WA total (88.5mt)</b>			<b>60%</b>

<sup>1</sup> Many credible studies have found that the SWIS, WA's main grid, can transition to 100% Renewable sources by 2030. These include:

- 90-100% Renewable Electricity for the South West Interconnected System of WA' (ANU, 2017)<sup>1</sup>
- Energy 2030 (Sustainable Energy Now, 2017)<sup>1</sup>
- Collier at the Crossroads – Planning a future beyond coal (Beyond Zero Emissions, 2019)

<https://bze.org.au/wp-content/uploads/Collier-at-the-Crossroads.pdf> pp13-15

<sup>2</sup> <https://www.csiro.au/en/News/News-releases/2018/Annual-update-finds-renewables-are-cheapest-new-build-power-paper>:<https://publications.csiro.au/rpr/pub?pid=csiro:EP189502>

<sup>3</sup> Ibid p 14 table 2.2

<sup>4</sup> Climate Analytics (2019) A 1.5 °C Compatible Carbon Budget for Western Australia. Published November 2019 at <https://climateanalytics.org/latest/western-australias-paris-agreement-15c-carbon-budget-is-just-12-years-of-present-emissions-report/>

<sup>5</sup> ASBEC ref

<sup>6</sup> Rauland et al (2014), Low Carbon, High Performance Schools – Scoping Study, CRC for Low Carbon Living Ltd. Available - [http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications\\_file\\_attachments/rp3020\\_low\\_carbon\\_high\\_performance\\_schools\\_report.pdf](http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications_file_attachments/rp3020_low_carbon_high_performance_schools_report.pdf); and Rauland, Caruso et al (2019), Low Carbon High Performance Schools: National survey results on attitudes toward the role of the built environment and sustainability on learning outcomes, CRC for Low Carbon Living Ltd. Available: [http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications\\_file\\_attachments/lcl\\_crc\\_report\\_low\\_carbon\\_built\\_environment\\_schools\\_survey\\_2019\\_final\\_1.pdf](http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications_file_attachments/lcl_crc_report_low_carbon_built_environment_schools_survey_2019_final_1.pdf)

<sup>7</sup> Based on SolarChoice figures of a 100kw system generating 124,813kWh in the first year and costing \$107,560; and Infinite Energy's case studies at <https://www.infiniteenergy.com.au/commercial/case-studies/education-medical/>

<sup>8</sup> P 28 DERR because of renewables and battery uptake, operational demand may breach technical limits (around 700 MW) as early as 2022. Per AEMO, Integrating Utility-Scale Renewables and Distributed Energy Resources in the SWIS. p 3, available at [https://www.aemo.com.au/-/media/Files/Electricity/WEM/Security\\_and\\_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf](https://www.aemo.com.au/-/media/Files/Electricity/WEM/Security_and_Reliability/2019/Integrating-Utility-scale-Renewables-and-DER-in-the-SWIS.pdf).

P30. "Soon, growing DER output will reach such a level where... there will be a real risk of a SWIS blackout due to cascading failure or widespread load shedding."

#### Whole of System Plan *eta mid-2020*

Identify the best options for investment in our power system to maintain the security and reliability of electricity supply at the lowest sustainable costs. Assist in the transition to a lower-emissions power system, guiding the efficient integration of renewable generation and energy storage. – DERR p 36

<sup>9</sup> Figures from SolarChoice 100kw system generating 124,813 kWh in its first year and costing \$107,560

<sup>10</sup> <https://www.solarchoice.net.au/commercial-solar-financing-cash-loan-ppa-or-operating-lease/>

<sup>11</sup> <https://www.infiniteenergy.com.au/commercial/case-studies/education-medical/>

<sup>12</sup> 70% of the 625 actions identified across the schools were low (under \$150) or no cost. Source: Climate Clever Initiative / Low Carbon Living CRC Report at <https://bit.ly/2PM9xwb>

Rauland et al (2014), Low Carbon, High Performance Schools – Scoping Study, CRC for Low Carbon Living Ltd. Available - [http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications\\_file\\_attachments/rp3020\\_low\\_carbon\\_high\\_performance\\_schools\\_report.pdf](http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications_file_attachments/rp3020_low_carbon_high_performance_schools_report.pdf)

Rauland et al (2019), Low Carbon High Performance Schools: National survey results on attitudes toward the role of the built environment and sustainability on learning outcomes, CRC for Low Carbon Living Ltd. Available: [http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications\\_file\\_attachments/lcl\\_crc\\_report\\_low\\_carbon\\_built\\_environment\\_schools\\_survey\\_2019\\_final\\_1.pdf](http://www.lowcarbonlivingcrlc.com.au/sites/all/files/publications_file_attachments/lcl_crc_report_low_carbon_built_environment_schools_survey_2019_final_1.pdf)

<sup>13</sup> Almost one quarter of home building projects have been put on hold or cancelled since March, according to the Housing Industry Association <https://www.abc.net.au/news/2020-05-08/coronavirus-downturn-leaves-rate-of-new-wa-homes-at-historic-low/12226192>

<sup>14</sup> This is likely to be an undercount, as another 9000 Western Australians are experiencing homelessness, including 1000 sleeping rough.

<sup>15</sup> [https://www.propertycouncil.com.au/Web/News/Articles/News\\_listing/Web/Content/Media\\_Release/WA/2020/Covid-19\\_new\\_home\\_boost\\_would\\_restart\\_WA\\_s\\_plunging\\_home\\_construction.aspx](https://www.propertycouncil.com.au/Web/News/Articles/News_listing/Web/Content/Media_Release/WA/2020/Covid-19_new_home_boost_would_restart_WA_s_plunging_home_construction.aspx)

<sup>16</sup> See the Social Housing Acceleration and Renovation Program (SHARP) at <https://www.communityhousing.com.au/wp-content/uploads/2020/05/SHARP-Program.pdf?x59559>

<sup>17</sup> Note the average home Solar PV makes a significant difference to the economics of higher efficiency homes, with 7-8 Star, all electric homes found to have energy bills between \$1300-\$1600 per year lower than their 6-star counterparts

<sup>18</sup> Wood, L, Flatau, P., Zaretsky, K., Foster, S., Vallesi, S. and Miscenko, D. (2016) *What are the health, social and economic benefits of providing public housing and support to formerly homeless people?* AHURI Final Report No.265, Australian Housing and Urban Research Institute, Melbourne, <http://www.ahuri.edu.au/research/final-reports/265>, (Accessed 22 June 2020)

<sup>19</sup> Assuming energy costs are eliminated by 80% per home and the average home is responsible for around 7 tonnes of GHG emissions per year. Figure of 7 tonnes per year from Australian Government at <https://www.yourhome.gov.au/energy#:~:text=The%20average%20Australian%20home%20is,greenhouse%20gas%20emissions%20each%20year.>

<sup>20</sup> Using figures from SGS Economics, Community Housing Industry Association (CHIA) and National Shelter which found 3.9 FTE jobs are supported for every home built as part of its 30,000 new social housing dwellings package <https://mailchi.mp/494985c2dbd1/keeping-you-informed-chia-national-enews-october-7879014?e=9b7927b26b>

<sup>21</sup> Figures based on National Shelter and CHIA at <https://mailchi.mp/494985c2dbd1/keeping-you-informed-chia-national-enews-october-7879014?e=9b7927b26b>

<sup>22</sup> Energy Efficiency Council estimate the cost of building 6 star home to be \$1500 extra up front than a 5-star home, and CSR, cited in the BZE million jobs plan cite building a new 7.5 star home costs only 1 to 2% more than a regular home at CSR, Star Ratings and the Cost of Improved Ratings. <https://www.csr.com.au/building-knowledge/research/star-ratings-and-the-cost-of-improved-ratings> and <https://bze.org.au/wp-content/uploads/Million-Jobs-Plan-Buildings-Briefing-Paper-2-Better-Buildings.pdf>

<sup>23</sup> WA has 44,000 social housing dwellings: 33,800 public housing, 7800 community housing, 2600 Indigenous community housing.

<sup>24</sup> A recent study found Western Australia had the worst building shell rating in the country, with WA homes rated little over 1 star out of a possible 5 on the residential scorecard at [www.energy.gov.au/sites/default/files/Residential%20Efficiency%20Scorecard%20Research%20Pilot%20Evaluation%20Report%202019.pdf](http://www.energy.gov.au/sites/default/files/Residential%20Efficiency%20Scorecard%20Research%20Pilot%20Evaluation%20Report%202019.pdf) p16

<sup>25</sup> <https://www.cefc.com.au/media/203027/cefc-market-report-financing-energy-efficient-community-housing.pdf>

<sup>26</sup> <http://businesslaw.curtin.edu.au/wp-content/uploads/sites/5/2016/06/bcec-energy-poverty-in-western-australia.pdf>



- <sup>27</sup> <http://businesslaw.curtin.edu.au/wp-content/uploads/sites/5/2016/06/bcec-energy-poverty-in-western-australia.pdf>
- <sup>28</sup> Knauf Insulation at <https://www.knaufinsulation.com.au/home-owners/upgrading-your-home/ceiling-insulation>
- <sup>29</sup> Beyond Zero Emissions 2019 Collie at the Crossroads report, citing John Shiel, Low-carbon and Affordable Retrofits of Australian Housing for Climate Change and Scarce Resource Scenarios. NSW: University of Newcastle, 2017.
- <sup>30</sup> Infinite Energy Perth Solar System Size Comparison Chart at <https://www.infiniteenergy.com.au/residential/products-2/solar-system-sizes/solar-system-size-comparison-chart/>
- <sup>31</sup> Beyond Zero Emissions 2019 Collie at the Crossroads report; CEFC also estimates annual savings of up to \$1075 per household from deep retrofits.
- <sup>32</sup> Calculations based on average emissions per home of 7 tonnes and assuming 80% of emissions are reduced.
- <sup>33</sup> Clean State acknowledges the work of Stephen King and the Australian Insulation Foundation in this proposal.
- <sup>34</sup> Using figures based on the Energy Efficiency Council's 'Energy Efficiency Employment in Australia' Report and assistance from Rob Murray-Leach, at <https://www.eec.org.au/policy-advocacy/projects/energy-efficiency-employment-in-australia>
- <sup>35</sup> [https://audit.wa.gov.au/wp-content/uploads/2015/10/report2015\\_22-Cycling.pdf](https://audit.wa.gov.au/wp-content/uploads/2015/10/report2015_22-Cycling.pdf)
- <sup>36</sup> [https://www.transport.wa.gov.au/mediaFiles/active-transport/AT\\_CYC\\_P\\_WABN\\_Plan.pdf](https://www.transport.wa.gov.au/mediaFiles/active-transport/AT_CYC_P_WABN_Plan.pdf)
- <sup>37</sup> Government of Western Australia, Department for Planning and Infrastructure. The Truth about Travel in Perth: Facts and Myths. [http://www.transport.wa.gov.au/AT\\_TS\\_P\\_TheTruthaboutTravelinPerth.pdf](http://www.transport.wa.gov.au/AT_TS_P_TheTruthaboutTravelinPerth.pdf)
- <sup>38</sup> <https://metrocount.com/data-reveals-perth-cycling-boom/>
- <sup>39</sup> <https://www.theguardian.com/world/2020/may/26/call-to-fast-track-bike-lanes-to-boost-jobs-and-take-advantage-of-lockdown-induced-bicycle-sales>
- <sup>40</sup> RAC calculations based on one third of 15,000km per year @ .3886cents per kilometre
- <sup>41</sup> According to research commissioned by the RAC, cited in WA Government WA Bicycle Network Plan 2017 Update. [https://www.transport.wa.gov.au/mediaFiles/active-transport/AT\\_CYC\\_P\\_WABN\\_Plan.pdf](https://www.transport.wa.gov.au/mediaFiles/active-transport/AT_CYC_P_WABN_Plan.pdf)
- <sup>42</sup> Main Roads WA estimate WA road users drove that the road network generates carbon emissions of a rate of 295.6 t CO<sub>2</sub>e per million vehicle kilometres travelled (MKVT). In 2016-17 MKVT was 29,434 and thus emissions were approximately 8.7 Mt CO<sub>2</sub>e from use of the road network <https://www.mainroads.wa.gov.au/AboutMainRoads/AboutUs/Sustainability/Pages/footprint.aspx> According to RAC, on average, Western Australians drive around 11,400 kilometres every year, each generating around 3.13 tonnes of carbon dioxide (CO<sub>2</sub>) <https://rac.com.au/about-rac/advocating-change/sustainability/vehicle-emissions>
- <sup>43</sup> Figures from Melbourne Bicycle Network, Transport engineering figures and the WA Department of Transport a Calculations based on Bicycle Network's analysis of a 20% sample of Melbourne's PBN in 1996, and estimated 2,000kms of on-road routes would cost \$70m. [www.bicyclenetwork.com.au/general/bike-futures/11516/](http://www.bicyclenetwork.com.au/general/bike-futures/11516/) ; b figures based on average 23km built in 2 years 2010-2012 with \$1m co-funded grants through the Perth Bike Network Grants. c "\$910,000 allows for the construction of 500m-1km of path per year in environments which do not include grade separation or substantial relocation of services. Department of Transport (2012) WA Bicycle Network Plan 2012.
- <sup>44</sup> Australian National Audit Office (2012) ANAO Audit Report No.27 2011-12 Establishment, Implementation and Administration of the Bike Paths Component of the Local Jobs Stream of the Jobs Fund. 3 Source: page 14 Note 5.25% of program funds or \$2.1m was set aside for departmental administrative costs, leaving \$37.9m available for funding bike path construction projects
- <sup>45</sup> Professor Peter Newman (2020) COVID, CITIES and CLIMATE: Historical Precedents and Expected Transitions for the New Economy. Curtin University, Australia.
- <sup>46</sup> Trackless Trams and the Perth City Deal. 2020. Peter Newman, Jan Scheurer and Marie Verschuer. Curtin University
- <sup>47</sup> Newman, P., Hargroves, K., Davies-Slate, S., Conley, D., Verschuer, M., Mouritz, M. and Yangka, D. (2019) The Trackless Tram: Is It the Transit and City Shaping Catalyst We Have Been Waiting for?. *Journal of Transportation Technologies*, 9, 31-55. doi: 10.4236/jtts.2019.91003.
- <sup>48</sup> <https://theconversation.com/why-trackless-trams-are-ready-to-replace-light-rail-103690>
- <sup>49</sup> Comparing BRT, LRT and ART on Trackless Tram. Source: P.Newman, The Conversation 26 Sept 2018. <https://theconversation.com/why-trackless-trams-are-ready-to-replace-light-rail-103690>
- <sup>50</sup> Newman, Jones, Green and Davies-Slate *Entrepreneur Rail Model Discussion Paper* 2016 at p 14 citing McIntosh (2014)
- <sup>51</sup> Property Council, Curtin University, CODA Architecture and Senator Scott Ludlam (2018) DesignPerth: A joint vision for a connected, liveable and sustainable Perth. [https://www.propertycouncil.com.au/Web/Content/News/WA/2016/Property\\_Council\\_Launches\\_designperth.aspx?WebsiteKey=148a29fb-5ee5-48af-954b-a02c118dc5fd](https://www.propertycouncil.com.au/Web/Content/News/WA/2016/Property_Council_Launches_designperth.aspx?WebsiteKey=148a29fb-5ee5-48af-954b-a02c118dc5fd)
- <sup>52</sup> [www.canberratimes.com.au/story/6772785/light-rail-will-reduce-the-acts-carbon-dioxide-emissions/](http://www.canberratimes.com.au/story/6772785/light-rail-will-reduce-the-acts-carbon-dioxide-emissions/)
- <sup>53</sup> Peter Newman, Mike Mouritz, Marie Verschuer (2020) Trackless Trams and Transit Activated Corridors in Perth Mid-Tier Transit and Urban Regeneration Draft Overview Report page 4.
- <sup>54</sup> Peter Newman, Mike Mouritz, Marie Verschuer (2020) Draft Report: Trackless Trams and Transit Activated Corridors in Perth. Mid-Tier Transit and Urban Regeneration Report.
- <sup>55</sup> <https://thedriven.io/2020/07/02/volvo-to-supply-all-electric-buses-as-w-a-agrees-to-perth-trial-on-short-route/>
- <sup>56</sup> <https://www.volvobuses.com.au/en-au/news/2019/mar/volvo-buses-awarded-contract-for-up-to-900-new-transperth-buses.html>
- <sup>57</sup> Hansard extract Thursday 15 March 2018, The Hon Tim Clifford question to The Hon Stephen Dawson.
- <sup>58</sup> Figures provided by the Public Transport Authority, July 24, 2020. Fuel costs for Financial Year 2019/20 \$38m and for 2018/19 \$42m.
- <sup>59</sup> Using a figure of 1.3kg CO<sub>2</sub> per km travelled by bus (Source: Emissions from bus travel at CarbonIndependent.org)
- <sup>60</sup> Beyond Zero Emission's Electric Vehicles report: <https://bze.org.au/wp-content/uploads/BZE-Electric-Vehicles-Report-Beyond-Zero-Emissions-Australia.pdf>.
- <sup>61</sup> <https://thedriven.io/2020/06/09/contracts-awarded-for-brisbanes-1b-all-electric-metro-bus-project/>
- <sup>62</sup> <https://thedriven.io/2019/10/28/nsw-transport-minister-wants-all-of-sydneys-8000-buses-to-go-all-electric/>
- <sup>63</sup> <https://www.theguardian.com/cities/2018/dec/12/silence-shenzhen-world-first-electric-bus-fleet>
- <sup>64</sup> Western Australian EV sales in 2017 were only 8 in every 10,000, or about 0.08% of the total.
- <sup>65</sup> <https://research-repository.uwa.edu.au/en/publications/electric-vehicle-infrastructure-strategic-planning>

- <sup>66</sup> Nic Thomas, Global Head of Electric Vehicles at Nissan; Nissan Future seminar 09 August 2019 quoted in <https://www.caradvice.com.au/782597/price-parity-electric-vehicle/>;
- see also- UBS Evidence Lab Electric Car Teardown – Disruption Ahead? 18 May 2017 UBS Global Research paper <https://neo.ubs.com/shared/dlZTxnvF2k/>
- <sup>67</sup> [https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/ia18-4005\\_priority\\_list\\_2019\\_acc\\_h.pdf](https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/ia18-4005_priority_list_2019_acc_h.pdf)
- <sup>68</sup> ClimateWorks
- <sup>69</sup> [https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/ia18-4005\\_priority\\_list\\_2019\\_acc\\_h.pdf](https://www.infrastructureaustralia.gov.au/sites/default/files/2019-06/ia18-4005_priority_list_2019_acc_h.pdf) p 51
- <sup>70</sup> Figures provided by the Australian Electric Vehicle Association, 2 July 2020.
- <sup>71</sup> <https://electricvehiclecouncil.com.au/wp-content/uploads/2018/11/Recharging-the-economy.pdf>
- <sup>72</sup> <https://www.energy.gov.au/government-priorities/energy-security/energy-security-assessments/liquid-fuel-security-review>
- <sup>73</sup> According to AEVA it takes two workers about two or three days to do a complete install.
- <sup>74</sup> Braunl, T, Harries, D, McHenry, MP & Wager, G 2020, *Electric Vehicle Infrastructure Strategic Planning*. The University of Western Australia, Perth, Australia. At <https://research-repository.uwa.edu.au/en/publications/electric-vehicle-infrastructure-strategic-planning> Cited by Citizens' Climate Lobby 'EV Charging Infrastructure in WA',
- <sup>75</sup> <https://www.tritium.com.au/news/largest-zero-touch-system-in-usa/>
- <sup>76</sup> <https://www.pressreader.com/australia/countryman/20191107/28206339377772>
- <sup>77</sup> [https://www.outbackqueensland.org.au/nature\\_refuges](https://www.outbackqueensland.org.au/nature_refuges)
- <sup>78</sup> Our Living Outback. Investing in people and nature: Strengthening conservation outcomes on Queensland private land.
- <sup>79</sup> [https://www.outbackqueensland.org.au/nature\\_refuges](https://www.outbackqueensland.org.au/nature_refuges)
- <sup>80</sup> Through carbon farming, land managers can generate Australian Carbon Credit Units (ACCUs), which are equal to one tonne of carbon dioxide equivalent (greenhouse gas) that is either stored or its release is avoided. ACCUs are also tradable financial products, similar to other commodities and Renewable Energy Credits. ACCUs are generally only tradable in Australia, but there is potential that as international markets grow, there will be arrangements for trade in ACCUs to occur on a global scale.
- <sup>81</sup> Acknowledgement of xxxxx Delivering Jobs and Growth in Rural, Regional and Remote Queensland through Carbon Economies – Key Policy Principles, developed by xxxxx and used for the basis of the Queensland Land Restoration Fund.
- <sup>82</sup> RepuTex Energy (2018) Offsetting Emissions from LNG projects in WA available here.
- <sup>83</sup> [www.qld.gov.au/\\_data/assets/pdf\\_file/0026/105749/carbon-farming-industry-roadmap.pdf](http://www.qld.gov.au/_data/assets/pdf_file/0026/105749/carbon-farming-industry-roadmap.pdf)
- <sup>84</sup> [www.qld.gov.au/\\_data/assets/pdf\\_file/0017/67310/unlocking-value-qld-from-offsets.pdf](http://www.qld.gov.au/_data/assets/pdf_file/0017/67310/unlocking-value-qld-from-offsets.pdf)
- <sup>85</sup> Ernst & Young (2020) Delivering economic stimulus through the conservation and land management sector, June 2020.
- <sup>86</sup> Ernst and Young 'Delivering economic stimulus through the conservation and land management sector', at <https://www.abc.net.au/news/2020-07-01/hard-hit-covid-regions-benefit-from-green-stimulus-package/12408282>
- <sup>87</sup> <https://www.doc.govt.nz/news/media-releases/2020-media-releases/investment-to-create-11000-environment-jobs-in-our-regions/>
- <sup>88</sup> Edith Cowan University Marine Ecologist Professor Paul Lavery, WA Marine Science Institution. Toward a Plan for Blue Carbon in WA to Achieve Net Zero Emissions by 2050.
- <sup>89</sup> IUCN (2019) Blue Bonds: Financing Resilience of Coastal Ecosystems: Key Points for Enhancing Finance Action. [https://www.4climate.com/dev/wp-content/uploads/2019/04/Blue-Bonds\\_final.pdf](https://www.4climate.com/dev/wp-content/uploads/2019/04/Blue-Bonds_final.pdf)
- <sup>90</sup> A Marine Science Institution. Toward a Plan for Blue Carbon in WA to Achieve Net Zero Emissions by 2050.
- <sup>91</sup> Drs Andy Steven & Mat Vanderklift 'Key Findings' in Incorporating Blue Carbon Ecosystem Services, into the Blue Economy and National Accounting. Indian Ocean Blue Carbon Hub (IORA) Presentation at <https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2019/11/Steven-Blue-carbon-in-National-Accounting.pdf>
- <sup>92</sup> A Marine Science Institution. Toward a Plan for Blue Carbon in WA to Achieve Net Zero Emissions by 2050.
- <sup>93</sup> Deloitte Access Economics (2017). The economic contribution of South Australia's marine industries
- <sup>94</sup> Salem and Mercer 2012, cited Drs Andy Steven & Mat Vanderklift 'Key Findings' in Incorporating Blue Carbon Ecosystem Services, into the Blue Economy and National Accounting. Indian Ocean Blue Carbon Hub (IORA) Presentation at <https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2019/11/Steven-Blue-carbon-in-National-Accounting.pdf>
- <sup>95</sup> Drs Andy Steven & Mat Vanderklift 'Key Findings' in Incorporating Blue Carbon Ecosystem Services, into the Blue Economy and National Accounting. Indian Ocean Blue Carbon Hub (IORA) Presentation at <https://research.csiro.au/iora-blue-carbon-hub/wp-content/uploads/sites/321/2019/11/Steven-Blue-carbon-in-National-Accounting.pdf>
- <sup>96</sup> [https://www.eurekalert.org/pub\\_releases/2020-06/g-pos060820.php](https://www.eurekalert.org/pub_releases/2020-06/g-pos060820.php)
- <sup>97</sup> WA also has the largest population of youth age 10 – 13 years under supervision on an average day (13%), and they highest proportion of youth ages 10-13 when they entered supervision (38%). First Nations youth are more likely to engage with Youth Justice Supervision at a younger ages, more than once, and make up a higher proportion of those under supervision in outer regional, remote, and very remote areas. First Nations youth are more likely to live in the lowest socio-economic sector before entering supervision, a trend reflecting the geographic distribution of Australia.
- <sup>98</sup> Social Reinvestment WA. Discussion Paper: The case for smart justice alternatives: Responding to justice issues in WA through a Justice Reinvestment approach. Sophie Steward. March 2020 at <https://www.socialreinvestmentwa.org.au/resources>
- <sup>99</sup> Social Reinvestment WA. Discussion Paper: The case for smart justice alternatives: Responding to justice issues in WA through a Justice Reinvestment approach. Sophie Steward. March 2020 at <https://www.socialreinvestmentwa.org.au/resources>
- <sup>100</sup> <https://www.socialreinvestmentwa.org.au/the-issue>
- <sup>101</sup> Lorena Allam & Calla Wahlquist, (24 October 2018). "Indigenous deaths in custody: key recommendations still not fully implemented". the Guardian; and Deloitte Access Economics (August 2018). Review of the implementation of the recommendations of the Royal Commission into Aboriginal deaths in custody: Department of the Prime Minister and Cabinet (PDF). Deloitte Touche Tohmatsu. pp. 1-780.
- <sup>102</sup> Rhiannon Shine (17 June 2020). "Unpaid fines law reforms prompted by death in custody of Ms Dhu pass WA Parliament". ABC news. Australian Broadcasting Corporation.
- <sup>103</sup> Australian Indigenous HealthInfoNet (2019) Overview of Aboriginal and Torres Strait Islander health status in Western Australia, <https://healthinonet.ecu.edu.au/healthinonet/getContent.php?linkid=623640&title=Overview+of+Aboriginal+and+Torres+Strait+Islander+health+status+in+Western+Australia>

- <sup>109</sup> Deloitte Access Economics, 2016 cited in <https://www.socialreinvestmentwa.org.au/prison-and-the-budget-bottom-line>
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- <sup>112</sup> First Nations Media (January 2020) Submission to the House Standing Committee on Indigenous Affairs: Inquiry into Pathways and Participation Opportunities for Indigenous Australians in Employment and Business.
- <sup>113</sup> First Nations Media (January 2020) Submission to the House Standing Committee on Indigenous Affairs: Inquiry into Pathways and Participation Opportunities for Indigenous Australians in Employment and Business.
- <sup>114</sup> Social Reinvestment WA. Discussion Paper: The case for smart justice alternatives: Responding to justice issues in WA through a Justice Reinvestment approach. Sophie Steward. March 2020 at <https://www.socialreinvestmentwa.org.au/resources> <https://www.socialreinvestmentwa.org.au/resources>
- <sup>115</sup> Social Ventures Australia, *More Than Radio – A Community Asset: Social Return on Investment analyses of Indigenous Broadcasting Services*, Department of Prime Minister & Cabinet, Canberra, November 2017
- <sup>116</sup> <https://theconversation.com/getting-clean-drinking-water-into-remote-indigenous-communities-means-overcoming-city-thinking-106701>
- <sup>117</sup> <https://watersource.awa.asn.au/technology/innovation/student-combines-sugar-and-shells-to-filter-contaminated-water/>
- <sup>118</sup> <https://www.waitoc.com/culture-experiences/aboriginal-culture/aboriginal-languages>
- <sup>119</sup> Clark, I. D. (2009). Naming sites: Names as management tools in indigenous tourism sites—An Australian case study. *Tourism Management*, 30(1), 109–111.
- <sup>120</sup> <https://placenames.nt.gov.au/how-places-are-named/aboriginal-or-dual-naming-of-a-geographic-feature>
- <sup>121</sup> <http://www.boodjar.sis.uwa.edu.au/>
- <sup>122</sup> <https://www.sis.uwa.edu.au/research/boodjar>
- <sup>123</sup> Community Arts Network (2020) Place Names Proposal.
- <sup>124</sup> <https://www.abc.net.au/news/2020-07-03/wa-king-leopold-ranges-renamed-wunaamin-miliwundi-ranges/12416254>
- <sup>125</sup> <https://www.theguardian.com/australia-news/2020/jul/03/western-australias-king-leopold-ranges-renamed-to-honour-aboriginal-heritage>
- <sup>126</sup> [https://placenames.nt.gov.au/\\_\\_data/assets/pdf\\_file/0012/795477/aboriginal-place-names-forums-outcome-report-2020.pdf](https://placenames.nt.gov.au/__data/assets/pdf_file/0012/795477/aboriginal-place-names-forums-outcome-report-2020.pdf)
- <sup>127</sup> Australian Conservation Foundation and Lidia Thorpe. 2019. Protecting nature and First Nations culture. Lessons for the environment movement.
- <sup>128</sup> <https://www.klc.org.au/women-rangers-protecting-country-and-culture>
- <sup>129</sup> <http://www.natsils.org.au/portals/natsils/SR%20REPORT.pdf?ver=2017-09-20-162813-897>
- <sup>130</sup> <https://www.klc.org.au/women-rangers-protecting-country-and-culture>
- <sup>131</sup> Using a process called direct reduction. The iron ore would first be converted into iron using renewable hydrogen, and then steel would be produced in an electric arc furnace.
- <sup>132</sup> Table 1, Potential jobs in WA from a large industry making green iron or green steel. Addendum to 'From Mining to Making. Western Australia's economic and employment opportunities from zero-carbon metals production. Energy Transition Hub. Michael Lord. February 2020.
- <sup>133</sup> <https://www.pv-magazine-australia.com/2020/06/26/sun-metals-to-build-nqs-first-renewable-hydrogen-plant/>
- <sup>134</sup> Based on a figure of 37.5GWh generated in 2014/15 reported at [https://rac.com.au/home-life/info/stories\\_renewable-energy-in-wa](https://rac.com.au/home-life/info/stories_renewable-energy-in-wa)
- <sup>135</sup> According to the National Greenhouse Accounts, Commonwealth of Australia (2019) State and Territory Greenhouse Gas Inventories 2017, at <http://www.environment.gov.au/system/files/resources/917a98ab-85cd-45e4-ae7a-bcd1b-914cfb2/files/state-territory-inventories-2017.pdf>
- <sup>136</sup> (Source Table 6.L10 UNFCCC Forest Conversions – WA Annual Areas and related GHG emissions, from the National Inventory Report 2017 Volume 2)
- <sup>137</sup> see FPC Annual Reports 2013 – 2016 and [forestsforlife.org.au/economy](https://forestsforlife.org.au/economy)
- <sup>138</sup> [https://www.parliament.wa.gov.au/publications/tables/papers.nsf/displaypaper/4012041c54ea2f0899a454e548258324000b2774/\\$file/tp-2041.pdf](https://www.parliament.wa.gov.au/publications/tables/papers.nsf/displaypaper/4012041c54ea2f0899a454e548258324000b2774/$file/tp-2041.pdf)
- <sup>139</sup> A local Pemberton 'Forest Getaway' business owner faced the prospect of losing his block, nature-based tourism business and bees if the Helms forest is logged and is now linking up local forest-based businesses to protect the forest and these jobs permanently .
- <sup>140</sup> Economic Contribution of Tourism to Western Australia's Tourism Regions 2016-17. Tourism Western Australia. June 2018.
- <sup>141</sup> Indufor (2017) Forest Products Commission. Growing the Softwood Estate. Mechanisms required for farm forestry to contribute to an expansion of the plantation estate in Western Australia. Final Report.
- <sup>142</sup> At present, the financial return to landowners from growing softwood plantations are 'marginal at best' Essentially, the costs and risks of growing softwood logs and foregoing other land use options for approximately 30 years are seen to outweigh the financial benefits and externalities. There is the opportunity to create a market value specifically for carbon credits, based on CO<sub>2</sub> sequestration, to add a complementary revenue stream to commercial wood production. This is based on the premise that there is apparently a high level of interest among landowners in establishing new plantations; but they require an additional financial incentive to provide the impetus, particularly for long rotation (softwood) plantations. If there was realisable market value for carbon credits, the private sector could be expected to respond and drive the expansion.
- Key mechanisms to expand the plantation estate that were recommended to the Forest Products Commission in 2017 included:
- Establishing a realisable market for carbon credits in new plantations in accordance with ERF methodologies or arranging a direct carbon credits sales arrangement for eligible plantation projects.
  - Introduce an afforestation grant for new plantations within target areas, e.g. the Wellington catchment, based on specified conditions (based on New Zealand models and proposed by the Forest Industries Federation WA, see Case Study)
  - Facilitate the supply of high-quality seedlings to third parties, i.e. farm foresters,
- <sup>143</sup> <https://forestsforlife.org.au/the-plan/>
- <sup>144</sup> Figures provided by Mikey Cernotta, Pemberton Honey Co. 30 June, 2020.



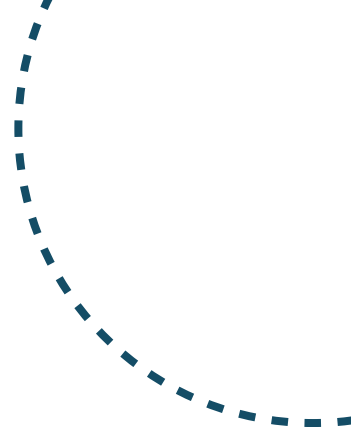
- <sup>145</sup> [https://www.ra.gov.au/economic-analysis/economic-value/state-tourism-satellite-account/state-tourism-satellite-account?utm\\_medium=email&utm\\_source=Tourism+Matters+Newsletter&utm\\_campaign=TOUR-STSA+2018-19](https://www.ra.gov.au/economic-analysis/economic-value/state-tourism-satellite-account/state-tourism-satellite-account?utm_medium=email&utm_source=Tourism+Matters+Newsletter&utm_campaign=TOUR-STSA+2018-19)
- <sup>146</sup> ABS Table A.31 Tourism Businesses by Employment Size in Western Australian Tourism Regions, June 2018.
- <sup>147</sup> <https://www.tourism.wa.gov.au/Publications%20Library/Research%20and%20reports/2019/Ad-hoc/Regional%20Tourism%20Satellite%20Account%202017-18.pdf>
- <sup>148</sup> Government of Western Australia Department of Training and Workforce Development. May 2017 employment levels: Mining 2017 100,800; Accommodation and food services 100,200; ABS 6202.0 Monthly Labour Force Sept 2018: Mining 105,235, Accommodation, food, arts and recreation 117,182. [https://www.jtsi.wa.gov.au/docs/default-source/default-document-library/wa-economic-profile-0918.pdf?sfvrsn=ee0d721c\\_4](https://www.jtsi.wa.gov.au/docs/default-source/default-document-library/wa-economic-profile-0918.pdf?sfvrsn=ee0d721c_4)
- <sup>149</sup> EY (2020) Delivering economic stimulus through the conservation and land management sector. Executive summary report 25 June 2020; and, 'National conservation and land management employment program would deliver thousands of jobs in regional communities hit hard by COVID-19'. Media Release. 29 June 2020. Pew Charitable Trusts.
- <sup>150</sup> Ernst & Young (2020) *Delivering economic stimulus through the conservation and land management sector*, June 2020.
- <sup>151</sup> For example through reduced rainfall in the south west forests, sea level rise, extreme weather events, shoreline erosion, and coral bleaching on the coral coast. Prolonged hot and dry seasons will further impinge on the viability of seasonal tourism enterprises, such as those in the Kimberley where the operating period is already restricted to half of the calendar year.
- <sup>152</sup> [www.mediastatements.wa.gov.au/Pages/McGowan/2019/05/Budget-continues-focus-on-job-creation-and-economic-growth.aspx](http://www.mediastatements.wa.gov.au/Pages/McGowan/2019/05/Budget-continues-focus-on-job-creation-and-economic-growth.aspx)
- <sup>153</sup> <https://www.mediastatements.wa.gov.au/Pages/McGowan/2019/05/Budget-continues-focus-on-job-creation-and-economic-growth.aspx>
- <sup>154</sup> <https://www.committeeforperth.com.au/assets/documents/reconciliation/Committee-for-Perth-Innovate-Reconciliation-Action-Plan-2019-2021.pdf>
- <sup>155</sup> [https://www.tourism.wa.gov.au/About%20Us/Growing\\_tourism/Aboriginal-tourism/Camping\\_with\\_Custodians/Pages/Camping-with-Custodians.aspx#/](https://www.tourism.wa.gov.au/About%20Us/Growing_tourism/Aboriginal-tourism/Camping_with_Custodians/Pages/Camping-with-Custodians.aspx#/)
- <sup>156</sup> <https://swccnrm.org.au/wp-content/uploads/2017/08/FACET-Workshop-Aboriginal-Tourism.pdf>
- <sup>157</sup> <https://www.abs.gov.au/ausstats/abs@.nsf/mf/4602.0.55.005>
- <sup>158</sup> Baldé, C.P. et al. (2017) The Global E-waste Monitor, United Nations University, International Telecommunication Union & International Solid Waste Association, Bonn/Geneva/Vienna.
- <sup>159</sup> Access Economics (2009) Employment in waste management and recycling, commissioned by the Department of Environment, Water, Heritage and the Arts.
- <sup>160</sup> WA Waste Authority Annual Report 2018/2019 at <sup>160</sup> [https://www.wasteauthority.wa.gov.au/images/resources/files/2019/11/Annual\\_Report\\_2018\\_-\\_2019.pdf](https://www.wasteauthority.wa.gov.au/images/resources/files/2019/11/Annual_Report_2018_-_2019.pdf)
- <sup>161</sup> <https://www.wasteauthority.wa.gov.au/programs/view/roads-to-reuse>
- <sup>162</sup> <https://www.cambridge.wa.gov.au/Discover-the-Town/Whats-On/Repair-Lab-Wembley>
- <sup>163</sup> <https://ownyourimpact.com.au/news/repair-cafes--what-are-they-and-where-can-i-find-them>
- <sup>164</sup> Extract from Hansard. Thursday 23 August. The Hon Tim Clifford question to The Hon Stephen Dawson.
- <sup>165</sup> Government Vehicle List 16 November 2017. Provided to The Hon Tim Clifford.
- <sup>166</sup> <https://fleetautonews.com.au/winners-and-loses-in-wa-government-fleet-contract/>
- <sup>167</sup> Using a conservative average weekly fuel cost of \$50
- <sup>168</sup> Women's workforce participation dropped 2.9 percentage points according to May figures, compared with a male participation fall of 1.9 points.
- <sup>169</sup> <https://www.createdigital.org.au/covid-19-threatens-set-back-women-in-stem/>
- <sup>170</sup> <https://www.airswift.com/blog/empowering-women-energy/>
- <sup>171</sup> Australian Government Department of Industry, Science, Energy and Resources. Advancing Women in STEM strategy. At <https://www.industry.gov.au/data-and-publications/advancing-women-in-stem-strategy/snapshot-of-disparity-in-stem/women-in-stem-at-a-glance>
- <sup>172</sup> [https://www.wgea.gov.au/sites/default/files/documents/BCEC-WGEA-Gender-Equity-Insights-2019-Report\\_0.pdf](https://www.wgea.gov.au/sites/default/files/documents/BCEC-WGEA-Gender-Equity-Insights-2019-Report_0.pdf)
- <sup>173</sup> <https://www.communities.wa.gov.au/media/2335/stronger-together-plan.pdf>
- <sup>174</sup> <https://www.science.org.au/covid19/women-stem-workforce>
- <sup>175</sup> <https://www.engineersaustralia.org.au/News/diversity-engineering-12-women-not-enough>
- <sup>176</sup> [https://grattan.edu.au/wp-content/uploads/2014/05/228\\_daley\\_mcgannon\\_submission\\_pc\\_childcare.pdf](https://grattan.edu.au/wp-content/uploads/2014/05/228_daley_mcgannon_submission_pc_childcare.pdf)
- <sup>177</sup> [https://grattan.edu.au/wp-content/uploads/2014/05/228\\_daley\\_mcgannon\\_submission\\_pc\\_childcare.pdf](https://grattan.edu.au/wp-content/uploads/2014/05/228_daley_mcgannon_submission_pc_childcare.pdf)
- <sup>178</sup> [https://grattan.edu.au/wp-content/uploads/2014/05/228\\_daley\\_mcgannon\\_submission\\_pc\\_childcare.pdf](https://grattan.edu.au/wp-content/uploads/2014/05/228_daley_mcgannon_submission_pc_childcare.pdf)
- <sup>179</sup> [https://grattan.edu.au/wp-content/uploads/2014/05/228\\_daley\\_mcgannon\\_submission\\_pc\\_childcare.pdf](https://grattan.edu.au/wp-content/uploads/2014/05/228_daley_mcgannon_submission_pc_childcare.pdf)
- <sup>180</sup> <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6291.0.55.003May%202020?OpenDocument>
- <sup>181</sup> <https://www.aihw.gov.au/reports/australias-welfare/aged-care>
- <sup>182</sup> It's worth noting demand for residential care in WA is rising, between 2012 and 2016 the number of FTE employees in residential aged care increased by roughly 3,000. An increase equal to that was seen between 2002 and 2007. <https://www.gen-agedcaredata.gov.au/www.aihwgen/media/Workforce/The-Aged-Care-Workforce-2016.pdf>
- <sup>183</sup> Pers.Com with Mr Michael Lord, Australian-German Energy Transition Hub, using a process called direct reduction. The iron ore would first be converted into iron using renewable hydrogen, and then steel would be produced in an electric arc furnace. May 2020.
- <sup>184</sup> Calculations based on 470 jobs/MT for DRI plant and 375/MT for EAF, equivalent to about 2000 construction workers per 2.5MT plant. Pers.Com. Michael Lord, Energy Transition Hub at the University of Melbourne, August 6 2020.
- <sup>185</sup> Pers.Com with Mr Michael Lord, Australian-German Energy Transition Hub regarding potential jobs in WA from a large industry making green iron or green steel and WA's economic and employment opportunities from zero-carbon metals production. May 2020.
- <sup>186</sup> Pers.Com with Mr Michael Lord, Australian-German Energy Transition Hub. May 2020.



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