Veterinarians for Climate Action
A Voice for all Animals

vfca.org.au
info@vfca.org.au
ABN: 636 944 191

Contact:
Janet Berry PhD BVMS
janetberryisnow@gmail.com
Volunteer
Veterinarians for Climate Action

Australian Government
Department of Agriculture, Water and the Environment

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National Climate Resilience and Adaptation Strategy 2021

Veterinarians for Climate Action appreciates the opportunity to contribute to a revised National Climate Resilience and Adaptation Strategy.

Revision is essential because climate change has become a climate emergency in the six years since the Strategy was first developed in 2015.

The risks presented by the global climate emergency and the consequences for the health of the environment, humans and animals are immense and we respect and value all genuine measures to address those risks.

Our paper covers the following topics:

1 Climate predictions
2 The risk to all humanity from increasing greenhouse gas emissions
3 Renewable energy
4 Veterinary science and animal health
5 Ecosystems and biodiversity
6 Agriculture

1 Climate emergency

The National Climate Resilience and Adaptation Strategy 2015 [1] states up front that ‘climate change poses significant risks to our economies, communities and the natural environment’ and that ‘Australia is one of the developed countries most vulnerable to climate change’. It would now appear that this is a significant understatement.

In 2015, the Strategy reported that Australia had warmed by 0.9°C, mostly from 1950. In 2020, only five years later, the CSIRO State of the Climate report [2] stated that Australia's climate had warmed on average by 1.44°C since national records began in 1910. That's a rise of about half a degree in only five years.

The most recent Sixth Assessment report from the Intergovernmental Panel on Climate Change (IPCC) [3] concludes unequivocally that there is a narrow path to avoiding climate catastrophe, but only through immediate, deep and sustained emissions reductions. Climate change and its effects are accelerating, and more serious consequences are on the way.

As global temperatures rise from 1.5°C to 2°C and beyond, the IPCC reports that heatwaves, droughts, floods and other impacts will become more serious in Australia. Sandstorms and dust storms will increase across the continent. The sea level will continue to rise significantly as melting ice sheets and glaciers enter the oceans. And there is high confidence that the intensity, frequency and duration of fire weather events will increase, resulting in more and more deadly bush fires.

Recommendation: That the revised National Climate Resilience and Adaptation Strategy acknowledges the climate emergency, and provides a summary of future climate predictions for Australia according to the IPCC Sixth Assessment report.

2 The risk to all humanity from increasing greenhouse gas emissions

The Department of Agriculture, Water and Environment states on its website that the revised National Resilience and Climate Adaptation Strategy will focus on climate adaptation and resilience only [1].

We consider that unless greenhouse gas emissions are reduced immediately, the effort to adapt to the climate crisis will ultimately become meaningless. Our adaptation and resilience will become overwhelmed by deteriorating weather systems.

Emissions from fossil fuels are the dominant cause of global warming. In 2018, 89% of global CO2 emissions came from fossil fuels and industry [4].

Australia is the fourth greatest producer of coal in the world [5]. About 70% of the coal mined is exported, mostly to eastern Asia, making Australia one of the largest exporters of coal in the world during 2020 and thus a very significant contributor to global emissions. The Australian Government has no plan to close mines or limit production. The Adani mine in central Queensland was allowed to go ahead in 2019 and planning proposals for new coal mines continue unabated in this country [6]. As well as the impact these mines will have on the environment, water sources and the future climate, they also present a significant economic risk to the country and are likely to become 'stranded assets' as market forces globally reduce the demand for coal.

The only effort shown by the government in controlling emissions from fossil fuels has been to spend billions of taxpayers' dollars on developing a process known as carbon capture and

storage (CCS). CCS has not been successful and the only consequence has been to delay any real climate action.

The International Energy Association has said: 'If governments are serious about the climate crisis, there can be no new investments in oil, gas and coal, from now – from this year' [7]. In contradiction to that recommendation, the Federal Government has developed a *Gas Fired Recovery Plan* [8]. A plan to use natural gas to support the transition to renewable energy – even when the greenhouse gas methane leaks at every stage of the gas industry.

The Government is providing taxpayers' money to support companies exploring for natural gas in the Beetaloo Sub-basin south-east of Darwin [9] and has approved exploration for gas in the Bass Strait [10].

Recommendation: The updated Strategy for 2021 must acknowledge the huge risk that continuing fossil fuel production in Australia is to the safety and wellbeing of the environment, people and animals.

3 Renewable energy

Australia has an abundance of renewable energy that could replace fossil fuels. The adaptation to an electricity grid powered entirely from renewable energy by 2030 is possible [11].

Australia has the highest solar radiation per square metre of any continent and consequently some of the best solar energy resource in the world [12]. In the last couple of years there has been a surge in roof and ground mounted photo voltaics and Australia now leads the world in solar per capita, at 600W/person with Germany a close second at 580W/person [13].

Onslow in Western Australia's Pilbara region has become the largest town in Australia to be powered by 100% renewable energy, achieving the landmark moment during a successful demonstration of the Onslow Distributed Energy Resource (DER) Project [14].

Wind power is currently the cheapest form of large-scale renewable energy. For the first time, wind overtook hydro as Australia's leading source of clean energy in 2019 supplying 35.4 per cent of the country's clean energy and 9.5 per cent of Australia's overall electricity [15]. The proposed 'Star of the South' offshore wind farm in Victoria could supply 20% of that States electricity needs if supported by government to proceed.

There are over 100 operating hydroelectric power stations in Australia [16]. And now the power of the sea is being explored as an energy source, with CSIRO reporting that wave energy could contribute up to 11 per cent of Australia's energy (enough to power a city the size of Melbourne) by 2050, making it a strong contender in Australia's renewable energy mix [17].

One of the biggest criticisms of renewable energy has been that the output of wind and solar farms is variable depending on the weather and time of day. Energy storage technology and digital intelligence to improve grid stability is rapidly evolving. The Hornsdale Power Reserve in South Australia is the largest lithium-ion battery in the world, and is providing

essential grid-support services [18]. A factory under construction north of Newcastle will soon be manufacturing batteries for electric vehicles [19].

Pumped hydro energy storage can utilise surplus energy to pump water from a lower dam to a higher one, essentially converting the upper reservoir into a giant battery. Lakes in Tasmania are being explored as pumped hydro development sites [20].

State and Territory governments are leading the transition to renewable energy. Tasmania has become one hundred per cent self-sufficient in electricity generated from renewable sources, largely wind and hydro. South Australia and the ACT are close behind that achievement [21].

Private investment is showing considerable interest in green hydrogen production in Australia [22] for use as an alternative fuel to power larger transports, such as haulage trucks, farm vehicles and ships.

Recommendation: The government should support more aggressive adaptation to renewable energy in all States and Territories, thus encouraging the considerable interest and investment from private businesses. Leadership and support from the National Government should aim to power the national grid entirely from renewable sources of energy by 2030.

4 Veterinary science and animal health

Veterinary scientists have long recognised that climate change will affect the future of Australian agriculture, animal production and animal health, particularly when associated with other evolving factors such as environmental degradation, intensive animal production, an increasing human population, and expanding urbanisation [23].

One Health is an approach that recognises that human and animal health are interdependent and bound to the health of the ecosystems in which they live [24]. There is a strong affiliation between people and animals, whether pets, livestock or wild animals.

Veterinary Services are adapting their work to take into account the increasing effect of climate change on all animals, in the paddocks, in the forests, in the waterways and in the home.

— Heat

The increasing global temperature will affect animals in many different ways.

Direct heat stress can negatively affect livestock health by causing metabolic alterations and oxidative stress, and by suppressing the immune and endocrine system [25]. Multiple consequences include reduced liveweights, lowered fertility and calf production and increased disease susceptibility.

The dairy industry is well aware that heat stress substantially reduces overall milk production, with lowered milk protein and fat content. Dairy Australia recognises the financial loss to dairy farmers and provides effective adaptation advice in their ‘Cool Cows’ publication [26].

Indirect effects will be those linked to quantity and quality of feedstuffs and water. As the temperatures of surface water increases, water quality declines, harmful algae blooms become more frequent, water oxygen levels decrease, and reduced feeding and growth rates occur, all of which can increase the incidence of diseases.

The increasing temperature of the oceans has caused several mass bleaching events on The Great Barrier Reef. This brings long term risks not only to the reef itself but to the diversity of marine fauna living within the reef, including dugong and marine turtles. The Australian Government recognises that climate change is the greatest long-term threat to the reef [27].

Heatwaves will also put pet animals at risk. City temperatures in particular could warm by more than 4°C by the end of the century [28]. Heatstroke will be seen in dogs and cats left alone in houses or cars, leading to multiple organ failure and death. Taking dogs for a walk will risk burning their feet from overheated pavements.

— Severe weather events.

Australia has already experienced severe weather events associated with climate change that have resulted in livestock and wild animals suffering pain, distress and death.

In February 2019 an estimated 625,000 cattle were wiped out by widespread flooding in northern Queensland [29].

An extreme heatwave in far north Queensland during 2018, when temperatures were over 42°C, killed more than 23,000 spectacled flying foxes, equating to almost one third of the species in Australia [30].

Nearly three billion animals – mammals, reptiles, birds, and frogs – were killed or displaced by the 2019-20 bushfires in Australia [31]. At least thirty-four people lost their lives and many more were displaced from their homes.

Severe and more-prolonged droughts can be expected as a consequence of climate change, resulting in further animal welfare catastrophes.

— Disease spread

Climate has influenced, and will continue to influence, the occurrence and severity of infectious diseases in natural and agricultural systems. While most attention has focused on vector-borne diseases, waterborne, windborne, and enteric infections can also be expected to increase [[32].

In Australia, diseases will spread further south due to increasing average temperature and more prolonged heat waves, especially those carried by vectors such as mosquitoes, midges and ticks. The distribution of cattle tick, bovine ephemeral fever and arboviruses will extend resulting in more livestock susceptible to outbreaks of disease.

Climate change will alter the density and movement of both wild animals and livestock in Australia and affect human–animal contact patterns. This could promote transmission of existing zoonotic disease or increase the risk of novel diseases emerging [32].

Recommendation: The updated strategy should recognise that if greenhouse gas emissions are not reduced, the direct and indirect impacts of the climate emergency on health, human and animal will intensify greatly. Adaptation to reduce the vulnerability of animal populations has barely begun and needs to be supported through scientific research, veterinary education and awareness strategies for all those who own and care for animals.

5 Ecosystems and biodiversity

Australia is one of the most biologically diverse countries in the world. Many plant and animal species are endemic to Australia and found nowhere else on earth [33]. There is also much diversity in Australia's biogeography, extending from deserts to tropical monsoon areas, temperate, Antarctic and sub-Antarctic regions.

Climate change is already damaging Australia's ecosystems. Other human activity contributes to habitat alteration and loss as well as the competition and predation from introduced species such as foxes, cats and weeds.

Nowadays it is recognised that not only are ecosystems seriously affected by climate change, but they also have a significant role in climate mitigation and resilience.

— Forests

Australia has 147 million hectares of native forest [34], containing thousands of animal and plant species, fungi, lichens and invertebrate species.

Tropical and subtropical rainforests are vulnerable to the warming temperature and rainfall alterations of climate change. Devastating bushfires in Australia have further damaged large areas of native forests.

Human activity such as the clearing areas of bushland or forest for development causes further destruction. For example, the Minerals and Metals Group (MMG) are proposing to build a new tailings dam facility in the takayna/Tarkine, in Tasmania's north-west, involving the clearance of 285 hectares [35].

Forests are one of the most important solutions to addressing the effects of climate change. Approximately 2.6 billion tonnes of carbon dioxide, one-third of the CO2 released from burning fossil fuels, is absorbed by forests every year [36].

Deforestation is a human activity that has impacts on biodiversity and also contributes to the climate emergency. The logging of native forests is no longer acceptable and should cease.

— Water systems

The Murray-Darling Basin (Australia's largest water catchment) and southwest Western Australia are already threatened by salinity and other environmental problems. Predicted decreased rainfall from climate change and consequent lower river flows in both regions would have a major impact.

Freshwater wetlands such as the Macquarie Marshes in the central west of New South Wales are also at risk because of a change in water quality and quantity. Waterbirds, frogs, turtles and other aquatic life depend on these systems.

— Marine ecosystems

The rising global temperature has resulted in increased ocean temperatures and acidification, with resulting effects on marine ecosystems.

As mentioned before, the Great Barrier Reef is deteriorating and could be lost forever. This is largely due to rising ocean temperatures, but the run off from agriculture, resulting in pesticides, fertilisers and animal waste entering the ocean, also contributes.

More than 95% of the giant kelp in the seas off the east coast of Tasmania has been killed [37]. Temperatures there are about 2C hotter than a little over a century ago. Warm water pushed down the coast by the east Australian current has stripped the area of nutrients and brought new invasive marine species.

— Alpine regions

The alpine regions of Australia are home to unique fauna and flora. Changes in snow fall predicted under future climate change are likely to have a significant impact on the animals and plants whose ecology is intrinsically linked to snow conditions.

Recommendation: The revised strategy should recognise that elimination of greenhouse gas emissions from fossil fuel production is damaging Australia's unique ecosystems, and that the environment, with its capacity to capture and store carbon, can provide resilience against human caused climate change. Strategic planning and support, supported by legislation in all jurisdictions must safeguard the environment and biodiversity of fauna and flora.

6 Agriculture

Australian farmers produce high quality meat, wool, cotton, grain, dairy and more. Around 70% of agricultural produce is exported [38].

The industry will be affected in many different ways by the climate emergency. Heatwaves, droughts and floods will put livestock, pastures and grain and vegetable production at risk. The distribution of some diseases will change according to temperature and rainfall.

Agriculture also contributes to the production of greenhouse gas emissions, accounting for 12.9 per cent of Australia's national emissions in the year to March 2020 [39].

Many initiatives are underway to reduce gas emissions and encourage carbon capture within the agricultural sector. The Australian Government has funded and must continue to fund targeted adaptation projects to equip primary producers with the knowledge, tools and strategies to meet the challenges of the climate emergency.

Meat and Livestock Australia are aiming for the red meat industry to achieve carbon neutrality by 2030. The CN30 target will be achieved through focusing on creating opportunities to promote the care of natural resources, people and the community, the health and welfare of animals, and the drive for continuous improvement [40].

Agricultural production already captures and controls its own emissions. The carbon dioxide produced by agriculture is known as a 'short-term carbon cycle'. Carbon dioxide from the animals or from tilling the ground to grow vegetables has always been re-captured naturally by grass, shrubs and trees; they need it for photosynthesis and growth. The development of improved farm regeneration practices – low-tillage of soil, better pasture care, increased biodiversity and natural composting – will encourage more carbon-dioxide sequestration.

Another greenhouse gas, methane, that is more than twenty-five times as potent as carbon-dioxide at trapping heat in the atmosphere is produced from the digestive system of ruminants, cattle, sheep and goats. Australian scientists are up to that challenge, developing food supplements to reduce the methane production, training calves' stomachs to produce less methane and selecting for faster growth rates. Science and innovation that can be fed to the world.

Many agricultural vehicle makers are going electric because the charging capability, affordability and other factors are rapidly falling into place just as they are for road vehicles. The production of green hydrogen produced from waste water on farms may also power farm vehicles in the future. Many other farm processes, such as pumping of irrigation water can also be powered from renewable sources and progressive farmers are making these changes. This should be encouraged.

Despite the climate action by Australian farmers, it is likely that their exported produce will be taxed by other countries. Countries that have pledged to be more ambitious in combating the climate crisis are looking at a carbon tax on some products coming in from countries that are not taking similar steps to deal with climate change.

Recommendation: The revised strategy should recognise that the agricultural industry in Australia is developing a range of climate mitigation and adaptation initiatives and should include mechanisms to further encourage uptake. It should also recognise that without the National Government having an aggressive strategy to reduce greenhouse gas emissions in this country, Australian produce will be tainted, regarded worldwide as carbon dirty.

CONCLUSION

The plan to update the National Climate Resilience and Adaptation Strategy highlights the will of the National Government to protect the population from the ever-growing climate emergency.

However, it is incomprehensible that the National Government, despite being highly aware of the climate emergency and the cause of the problem – fossil fuels – is exacerbating that problem rather than addressing it.

The Strategy must include the intention to adapt from supporting the fossil fuel industry to supporting renewable energy, putting every bit of effort and funding into achieving net zero emissions as fast as possible.

About Veterinarians for Climate Action

Veterinarians for Climate Action is a national, not-for-profit, registered charity that aims to advocate for and achieve climate action within and beyond our profession.

Our members include veterinarians, vet nurses and animal carers who campaign for climate action out of concern for all the animals that are being hurt or killed by climate change. Our patron is Professor Peter Doherty, veterinary surgeon, Nobel Laureate and Australian of the Year in 1997. Twenty-eight former Chief Veterinary Officers also publicly work alongside us.

We are evidence-based and informed by published scientific findings. Limiting the global temperature increase to 1.5C will reduce the challenging impacts of climate change on ecosystems, human (and animal) health and welfare, and all aspects of society. For that reason, Veterinarians for Climate Action support the science backed target of reducing emissions by 75% below 2005 levels by 2030 and reaching net zero emissions by 2035 [41].

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