RESEARCH ARTICLE

Air Pollution Issues in Australia.

Author

Janet Roden

Email: jroden@nswnma.asn.au

Abstract

This researcher examined air quality in Australia and, compared to other countries, found that there were considerable gaps in Australian's actions and legislation towards air pollution.
Firstly Australia has a Neoliberal Federal Government who are committed to continuing with fossil fuel development. As well as a preference for coal, gas is regarded as being a big contender in the Australian economy. The Federal Government is now keen to undertake CSG mining to extract gas which produces methane which is approximately 30 times more dangerous to the climate in greenhouse gas emissions than carbon dioxide.
Further concerns have arisen in regard to lack of fuel standards which mean that car owners can use whatever types of petrol they wish. Diesel is also another option. Both these fuel sources are creating toxic, uncontrolled pollution.
Another worrying consideration is the 40 year old Australian coal-fired power stations. The author was affronted at the terrible toxins being emitted from the Liddell coal-fired power station, well above the international standards, and there only being dated control in place, unlike the reduction of emissions in other countries.
The research project the author undertook on: "Supporting the Upper Hunter valley community in the transition from coal power to renewable energy with the closure of the Liddell power station in 2022," showed that individual and family health results were concerning as there was confusion about whether respondents considered their health was impacted. Interestingly focus groups highlighted that many people did understand that once the power station closed their health would definitely improve.
NSW and Australia need policy development and action in air quality. The evidence of bad pollution – no fuel standards; dated controls on emissions for 40 year old coal-fired power stations; and probable continued greenhouse gas emissions increasing through continued coal use and gas mining – show that Australia is at the crossroads in regard to air quality and climate change. Zali Steggall, an Independent Member of Parliament, is proposing a Climate Change Bill by November 2020. Her supporters are arguing for a conscience vote. If enacted, the Bill would address the issue of climate change in a scientific and systematic way and, in so doing, tackle the multi-faceted problem of Australia's poor air quality.

Introduction

Global Air Pollution

Air pollution is recognised by governments, institutions and communities as a major global public health risk. In fact, it can cut the average life span of a person from all around the world by almost two years, making it the single greatest threat to human health[1]. Greenstone and Qing Fan[2] note that particulate air pollution is even a greater risk to human health before Covid-19. It has caused damage to heart and lungs and has cut global life expectancy by two years on average over the last twenty years.

Particulate air pollution is anything solid or liquid that is suspended in the air and includes a mixture of contaminants from a range of sources. This includes smoke, fumes, soot, other combustion by products but also natural particles such as dust, sea salt, pollen and spores. In addition, it includes primary particles coming from exhaust stacks and tail pipes as well as secondary particles like sulphates and nitrates which form from the by-products of oxidation of atmospheric gases. It was not until the late 1980s that a clear association between illnesses such as asthma, respiratory symptoms and lower lung function and exposure to particulate pollution was recognized in internationally epidemiologic studies[3]. This culminated in 1994 in time-series particulate air pollution research allowing the analysis of differences between US cities and suggesting a specific association with the fine particle PM 2.5[4]. Fine particulate matter 2.5 is described as being 30 times smaller than a hair and being able to travel deeply into the respiratory tract, reaching the lungs and the blood stream and causing respiratory, heart and stroke disease[5,6]. Air pollution research focuses on measuring particulate matter resulting from the burning of fossil fuels from vehicles and industry. It found that in India and China lifespans were being shortened by six years[1]. China used to be one of the top five most polluting countries before 2014 but now India, Pakistan, Bangladesh and Central and West Africa are leading the pack. Some countries have followed the lead of the USA in their Clean Air Act such as India who in 2019 launched its National Clean Air Programme (NCAP)[2]. The WHO report states that air pollution is now the biggest single environmental health risk and the cause of one in eight deaths worldwide[7].

In 2005 the World Health Organization developed the most current assessment of air pollution health effects, for exposure levels of particulate matter (PM 10 and PM 2.5) based on scientific evidence[8]. Since the advent of the Air Quality Life Index (AQLI) people can find out how much longer they would live if they were breathing air which met the WHO guidelines, compared to where they live. The AQLI takes particulate pollution concentrations and converts them into the metric of life expectancy[9].

A new global study has associated depression and suicide with poor air quality[10]. Although the research is not conclusive the evidence is highly suggestive that air pollution increases the risk of adverse mental health events. Another worrying possibility is the link to children developing stunted lungs and also another link to children developing childhood obesity. A UK cohort research study

associating commuting with cardiovascular disease, cancer and mortality has been presented linking census data over 25 years. Results revealed that more physically active forms of travel from cycling and train use were certainly preferable to private car usage which needs to be reduced to achieve future health and environmental goals[11].

In Australia there are unsafe levels of particulate matter. Muswellbrook, NSW, close to the Liddell power station has a consistently higher level for fine particles and their SO2 pollution level is ten times higher than the World Health Organisation's standards[12]. This pollution mainly comes from coal-fired power station emissions as well as fossil fuel diesel vehicle emissions. In addition, NSW, Victoria, ACT and Queensland, in Australia experienced very severe and extreme bushfires from October 1st 2019 through to February 10, 2020. Toxic Bushfire smoke containing particulate matter 2.5 blanketed the east coast around Sydney and surrounds, and the South Coast of NSW on and off for 19 weeks. Air quality monitoring data was obtained for bushfire smoke. The highest reading of 98.5 microns was obtained on January 14, 2020 and quadrupled the national standard, being 14 times more than the historical average. Bushfire smoke was estimated to have caused: 417 excess deaths, 1124 hospitalisations for cardiovascular problems, 2027 for respiratory problems, and 1305 presentations to emergency for asthma[13]. An international study on cardiac arrest even for short -term exposure to low concentrations of particulate matter 2.5, notes an association with gaseous pollutants like bushfire smoke[14]. Australia has now officially entered the new bushfire season on 1st August 2020.

Aims:

1. **To demonstrate why Australia has a need for better controls over its air pollution**
2. **To determine what Australia should do to move forward in this matter**

Australia's Current Situation: Focus on Fossil Fuels

Australia has a Neoliberal Federal Coalition Government that is pushing for continued use of fossil fuels. Although coal is now regarded as a 'stranded asset,'[15] and companies and investors may lose money investing in coal, the Federal government is keen to continue the production of coal and gas. This is in direct contrast to industries and companies committed to renewable energy, who can see the benefits of low carbon renewable energy use in Australia. In regard to the Paris Agreement Australia promised to reduce its emissions by 26 to 28 per cent from 2005 levels by 2030. Instead, since 2015 our emissions have been going up year on year[16]. Australia is a rich country and should be doing a lot in terms of climate action. If Australia takes into account the amount of coal being mined to be burned in another country then our individual global emissions are high at 4%, instead of the 1.3% per capita, often cited as infinitesimal[17]. Right now the NSW Independent Planning Commission is evaluating the Santos Narrabri Coal Seam Gas Project (proposed 850 wells). Nearly 23,000 submissions were made to the Commission, including one from the New

South Wales Nurses and Midwives' Association. Nighty-eight percent of submissions were against the proposed project.[18]. The Federal Government however, is very keen for this CSG mining project to go ahead. Gudasz and colleagues have alerted us to the rapid increase of methane with rising temperatures. Methane produced by gas is roughly 30 times more dangerous to the climate than carbon dioxide[19].

Study Example Provided to Emphasise Air Pollution Problem

This researcher undertook a study to support the community of the Upper Hunter Valley (UHV), NSW Australia. They were transitioning to renewable energy with the closure of the Liddell coal-fired power plant in 2022, and some focus groups, interviews and a survey using a mixed methods approach was adopted [20]. The 98 response survey, consisting of community residents (including nurses) and power workers, examined the health and well-being of respondents and their families; asked about the assistance they would need in the transition; about whether they were interested in renewable energy; what support the community would need; whether people were interested in working with renewables; and basic demographic details were provided. It should be noted that AGL, who owned the Liddell power station, were supportive of the transition from coal to renewables and had a plan in place which they had shared with the community.

Results showed that there were four groups of respondents who perceived the changes to energy production. There was a small group who were very positive. They were confident that social life would improve, and that life and health would improve through better air quality, less traffic and the development of renewable industries and jobs. On the other hand, there was also the bigger negative group of respondents who focused strongly on the loss of jobs, and associated closure of businesses and falling house prices. This group did not talk about health or the environment and were mistrustful and fearing about the announced closure. The other two groups (neutral and ambivalent) were not clear in their views. Denial that this would impact them was a possibility, as well as also having conflicting ideas and uncertainties about agreeing with the changes.

Although the significant finding was that 71% of respondents agreed that such a transition would have an important impact on the life of the community, the health results were concerning. Interestingly confusion seemed to occur for respondents when they were asked about their health and that of their families. The majority (46%) of respondents in the survey were undecided about the question: "My health will not improve when the Liddell power station closes," whilst the remainder (54%) were equally divided between those disagreeing and those agreeing that their health would not improve. One survey comment suggested, for example: "as far as I am aware only steam is emitted from the Liddell power station…" It could have been that the questions were in the negative confusing some respondents but the following open-ended question indicated that some people were aware of the negative effects of power station emissions particularly on respiratory health. A further

comment referred to the focus groups who were surprised that many respondents were in the "neither agree or disagree" category and that they did not see the health benefits associated with the Liddell power station closure.

Toxic Legacy of Pollution from Liddell Coal-fired Power Station

The estimated local health costs of coal, from mining and power generation, in the Hunter Valley NSW are in the order of $700million per annum[21]. It is noted there that every time a coal-fired power station closed down and is replaced by renewable energy, the health benefits to communities within a 100 km radius of the power plant are immediate[22]. AGL's self-reported pollution data states that for 2016-2017, the Liddell power station emitted 8,855,569 tonnes of carbon dioxide[23] and 28 different types of pollutants including: carbon monoxide 1,146 tonnes; sulphur dioxide 33,490 tonnes; oxides of nitrogen 18,627 tonnes; hydrochloric acid 623 tonnes; particulate matter 10.0 um 48.5 tonnes; and particulate matter 2.5 um 18.3 tonnes[24]. The Liddell power station is very close to Muswellbrook and the Muswellbrook Shire Council's then, acting general manager Fiona Plesman commented that levels of NOx emissions would be a real concern for both the council and the community although the residents were more worried about fine particle dust from the nearby coal mines spoiling the air quality[25].

Arguments for A Plan of Action:

The United States Environmental Protection Agency (EPA) established National Ambient Air Quality Standards for PM 2.5 in 1997[26]. It wasn't until 15th December 2015 that Australia's Environment Ministers established the National Clean Air Agreement[27]. They also have the Product Emissions Standards Act 2017 and Product Emissions Standards Rules 2017 to manage noxious emissions from outdoor powered equipment and propulsion marine engines. However although the NSW Environment Protection Authority (EPA) state they are reducing air pollution and working with Government, industry, communities and the environment to improve air quality there are concerns that this is not happening.

In December 2018 submissions were made on the Coal-fired Power Stations about whether their licences would be reviewed. A 2014 report by the ABC News, based on source data from the Australian Energy Market Operator, indicated that by 2030, 65% of Australia's coal-fired power stations will be over 40 years old[28]. This was an opportunity for the EPA to review power stations and order them to provide pollution controls. Power stations in China and the US, for example, are required to install pollution controls such as Flue Gas Desulphurisation (FGD) which can remove up to 99% of sulphur pollution[29]; Selective Catalytic Reduction (SCR) which can remove high levels of NOx pollutant[30]; and activated carbon injection now considered the most robust technology of mercury control[31]. Together these can reduce emissions of sulphur dioxide, oxides of nitrogen and mercury respectively by 85% or more[32]. If Australia were to install the best available emission control technologies (ECTs), power

generators could reduce NOx and SO2 emissions by 85% or even more. They are Australia's single largest source of fine particle pollution, sulphur dioxide (SO2) and oxides of nitrogen (NOx) that contribute to illness and premature death[33]. None of Australia's coal-fired power stations are fitted with either Flue Gas Desulphurisation (FGD) or Selective Catalytic Reduction (SCR) as these pollution controls are not currently required by our environmental regulators[34].

The New South Wales Nurses & Midwives' Association made a submission on the review of coal-fired power station licences, and were informed by the EPA that they were happy with the way the power stations were operating and they provided a 'no action needed' response. The EPA showed no concern about examining the amount of toxic gas like particulate matter 2.5 that was escaping from these power plants.

The next opportunity was to make a submission to the National Environment Council Review on air quality. Our Association, along with many other health organisations and individuals, made this submission in August 2019 in regard to proposing to vary the National Environment Protection (Ambient Air Quality) measure standards for NO2, SO2 and O3. Our recommendations focused on lowering the NO2, SO2 and O3 standards and the way they are measured to reflect international best practice; enforcing them through legislation and making their monitoring more transparent[35].The former Australian Minister for the Environment, Melissa Price, decided to postpone any decision on Australia's adopting Euro 6 fuel standards until July 2027[36]. Australia does not have a fuel efficiency standard like the US and NZ and other countries. Countries like UK and France have announced plans to ban the sale of new petrol and diesel cars in 2040[37].

Further evidence supporting toxic air pollution comes from Ewald, 2018, a population researcher who undertook air quality research around five coal-fired NSW power stations and found that every year in NSW there will be 279 premature deaths, 361 people who develop diabetes type 2, and 233 underweight babies. Among other things, this research makes one aware of toxic air pollution that is transmitted from the Central Coast of NSW to Sydney communities. Sydney, the largest Australian city, is within a 200 km radius of these 'old' coal-fired power stations in NSW which means that it is not exempt from the toxic output[38]. This toxic air pollution from coal-fired power stations; diesel and petrol air pollution from cars as well as bad bushfire smoke pollution in major cities and surrounding towns of Sydney, Victoria, ACT and Queensland may occur again. This makes Australia a country with considerable problems involving air quality.

Conclusion

Although this research showed that it was vital to improve the UHV communities' understanding about toxic emissions and health, what is paramount is that NSW and Australia, unlike many other countries, need policy development and action on air quality. The evidence of bad pollution – no fuel standards, dated controls on emissions from

soon to be 40 year old coal-fired power stations, the likelihood of recurring bushfires, and increased greenhouse gas emissions through continued coal use and gas mining – show that Australia is at the crossroads with air quality and climate change. In spite of all these circumstances, there is the possibility of a break though in November of this year. A newly elected, non-aligned Member of Parliament has introduced the Climate Change (National Framework for Adaptation and Mitigation) Bill 2020[39]. She, along with a handful of crossbench members, are arguing for a conscience vote on the Bill[40], to allow more progressive government MPs to support it. If enacted, the Bill would address the issue of climate change in a scientific and systematic way and, in so doing, tackle the multi-faceted problem of Australia's poor air quality.

References

1. Carrington DP. Air pollution cuts two years off global average lifespan, says study. *The Guardian*. Environment Editor. 21 Nov 2018. https://www.theguardian.com/environment/2018/nov/20/air-pollution-cuts-global-average-lifespan-by-nearly-two-years-study Accessed on 6th August, 2020.

2. Greenstone M, Qing Fan C. *Air Quality Life Index*. Annual Update. July 2020. https://aqli.epic.uchicago.edu/report. Accessed on 6th August, 2020.

3. Dockerty DW. Health Effects of Particulate Air Pollution. *Ann Epidemiol*. 2009;19(4):257-263. DOI:10.1016/j.annepidem.2009.01.018

4. Levy JI, Hammitt SK, Spengler JD. Estimating the mortality impacts of particulate matter: what can be learned from between-study variability? *Environ Health Perspect*. 2000;108:109-117.

5. Xing YF, Xu YH, Shi MH, Lian YX. The impact of PM 2.5 on the human respiratory system. *J Thorac Dis.* Jan, 2016;8(1): E69-E74. DOI: 10.3978/j.issn.2072-1439.2016.01.19.

6. Hamanaka RB, Mutla GM. Particulate Matter Air Pollution: Effects on the Cardiovascular System. *Front Endocrinol*. Nov16, 2018;9:680. DOI:10.3389/fendo.2018.00680

7. World Health Organization. News Release:7 million premature deaths annually linked to air pollution. 2014, March 24. https://www.who.int/mediacentre/news/releases/2014/air-pollution/en/. Accessed on 29th August, 2020.

8. Krzyzanowski M, Cohen A. Update of WHO air quality guidelines. *Air Qual Atmos Health.* 2008;1**:**7–13. https://doi.org/10.1007/s11869-008-0008-9

9. Air Quality Life Index (AQLI) How much longer would you live if you breathed clean air? July, 2020. https://aqli.epic.uchicago.edu/?mc_cid=2b8c4bde96&mc_eid=75501c839. Accessed on 29 August, 2020.

10. Carrington DP. Depression and suicide linked to air pollution in new global study. *The Guardian*. Environment Editor. 19th December. 2019. https://www.theguardian.com/environment/2019/dec/18/depression-and-suicide-linked-Accessed on 6th August, 2020.

11. Patterson R, Panter J, Vamos EP, Cummins S. Associations between commute mode and cardiovascular disease, cancer, and all-cause mortality, and cancer incidence, using linked Census data over 25 years in England and Wales: a cohort study. *Lancet Planet Health.* May, 2020;4(5): E186-E194. DOI: https://doi.org/10.1016/S2542-5196(20)30079-6

12. NSW power stations licence review. Briefing note. Environmental Justice Australia. October, 2018. http://www.epa.nsw.gov.au/-/media/epe/corporate-site/resources/air/18p0700-review-of-coal-fired-power-stations.pdf. Accessed on 9th December, 2018.

13. Arriagada NB, Palmer AJ, Bowman D, Morgan GG. Unprecedented smoke-related health burden associated with the 2019-20 bushfires in eastern Australia. *Med J Aust*. 23rd March, 2020. Published online. DOI: 10.5694/mja2.50545. https://www.mja.com.au/journal/2020/213/6/unprecedented-smoke-related-health-burden-associated-2019-20-bushfires-eastern. Accessed on 29th August, 2020.

14. News Release. Air pollution impacts can be heart-stopping: Lancet Planetary Health paper. Biggest study of dangerously small particulate matter and cardiac arrest. University of Sydney. 27th January, 2020. https://www.eurekalert.org/pub_releases/2020-01/uos-api012420.php. Accessed on 3rd September, 2020.

15. Bos K, Gupta J. Stranded assets and stranded resources: Implications for climate change mitigation and global sustainable development. *Energy Research & Social Science*. October, 2019;56:101215.

16. March, S. Will we make it? Are Australia's efforts to curb global warming enough to meet the Paris target? 2nd April, 2019. https://www.abc.net.au/news/2019-04-01/is-australia-on-track-to-meet-its-paris-emissions-targets/10920500?nw=0. Accessed on 29th August, 2020.

17. McDonald, M. How to answer the argument that Australia's emissions are too small to make a difference. *The Conversation*. June 18, 2019.

18 DPIE Narrabri Gas Project. State Significant Development SSD 6367. June 2020. https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2020/04/narrabri-gas-project/referral-from-the department-of-planning-industry-and-environment/dpie-final-assessment-report.pdf Accessed on July 1st 2020.

19. Foley, JA. Methane emissions to Increase with Global Warming. 27th March, 2014. from https://www.natureworldnews.com/articles/6457/20140327/methane-emissions-to-increase-with-global-warming.htm. Accessed on 29th August 2020.

20. Roden J. *Muswellbrook: between eight coal mines and two power stations. Preparing for the Closure of The Liddell Power Station and the Transition Beyond*. Research Report. July, 2018. ISBN: 978-1-921326-20-2.

21. Climate and Health Alliance, *Coal and health in the Hunter: Lessons from one valley for the world*, February 2015, page 1 at http://d3n8a8pro7vhmx.cloudfront.net/caha/legacy_url/53/CLimate-and-Health-Alliance_Reprot_Layout_PRINTv2.pdf/1439938112. Accessed on 25th June, 2018.

22. James Whelan, cited in *the Singleton Argus*, "The decision by AGL to close their Liddell power station as planned 2022 welcomed," 22 May 2018. https://ww.singletonargus.com.au/story/5419770/agis-decision-welcomed-by-environmental-group-and-union/. Accessed on 28th June, 2018.

23. Australian Government Clean Energy Regulator, National Greenhouse and Energy Reporting data http://www.cleanenergyregulator.gov.au/NGER/Pages/Published%20information/Electricity%20sector%20emissions%20and%20generation%20data/2016-17-greenhouse-and-energy-information-for-designated-generation-facilities---Facility-details-aspx?Listld={A2B1407E-4473-45C6-A98B-4DC7AA1CC16}&itemlD=510. Accessed on 30th June, 2017.

24. Australian Government, Department of Environment and Energy, National Pollutant Inventory http://www.npi.gov.au/npidata/action/load/individaul-facility-detail/criteria/year/2017/browse-type/company/reg-business-name/AGL%2BMACQUARIE%2BPTY%2BLIMITED/jurisdiction-facility/151. Accessed on 28th June, 2018.

25. Ben Millington, Liddell coal plant emitting nitrogen oxide at three times rate of global standard, *ABC News* 22 May, 2018. http://www.abc.net.au/news/2018-05-22/liddell-toxic-gas-emissions/9785688.Accessed on 29th June, 2018.

26. Department of Health. New York State. Fine Particles (PM 2.5) Questions and Answers. https://www.health.ny.gov/environmental/indoors/air/pmq_a.htm. Accessed on August, 23rd 2020.

27. National Clean Air Agreement. Towards a clean air future for all Australians. December 2015. https://www.environment.gov.au/system/files/resources/188756ab-ed94-4a3c-9552-62763ca86a7f/files/national-clean-air-agreement.pdf. Accessed 2nd September, 2020.

28. FactCheck, Coal-fired power stations in Australia, *ABC News*, 12 November, 2014 http://www.abc.net.au/news/2014-11-12/coal-fired-power-station/5880356. Accessed on 26th October, 2016.

29. Leon Walker, Wet Scrubbing 'Most Versatile, Cost Effective Air Pollution Control. Environmental Leader. 21 January, 2014. https://www.environmentalleader.com/2014/01/wet-scrubbing-most-versatile-cost-effective-air-pollution-control/. Accessed on 9th December, 2018.

30. Clean Air Technology Center, Technical Bulletin: Nitrogen Oxides (NOx), Why and How They are Controlled. United States Environmental Protection Agency (1999). https://www3.epa.gov/ttncatc1/dir1/fnoxdoc.pdf. Accessed on 9th December, 2018.

31. Sjostrom S, Durham M, Bustard CJ. Martin C. Activated carbon injection for mercury control: Overview. *Fuel*. June, 2010;89(6):1320-1322. https://doi.org/10.1016/j.fuel-2009.11.016 at: https://www.sciencedirect.com/science/article/pii/S0016236109005250. Accessed on 9th December, 2018.

32. Baig K, Shahzad YM. Coal Fired Power Plants: Emission Problems and Controlling Techniques. *J Earth Science Climate Change*. 2017;8:404. DOI:10.4172/2157-7617.1000404 https://www.omicsonline.org/open-access/coal-fired-power-plants-emission-problems-and-controlling-techniques-2157-7617-1000404.php?aid=92025. Accessed on 9th December, 2018.

33. Broome RA, Fann N, Navin Cristina TJ, Fulcher C. The health benefits of reducing air pollution in Sydney, Australia, *Environ Res.* 2015;143:19-25

34. Lipski B, Rivers N, Whelan J. Toxic and terminal: How the regulation of coal-fired power stations fails Australian communities. Environmental Justice Australia. 7 August, 2017. https://www.envirojustice.org.au/powerstations/. Accessed on 19th May, 2018.

35. New South Wales Nurses & Midwives' Association. Submission to the National Environment Protection Council on the proposal to vary the National Environment Protection (Ambient Air Quality) Measure standards for NO2, SO2 and O3. August, 2019.

36. Gazette Government Notices, C29019G00039. Notice of Intention to Vary the National Environment Protection (Ambient Air Quality) Measure. January 18, 2019. Commonwealth of Australia.

37. March S. Will we make it? Are Australia's efforts to curb global warming enough to meet the Paris target? 2nd April, 2019. https://www.abc.net.au/news/2019-04-01/is-australia-on-track-to-meet-its-paris-emissions-targets/10920500?nw=0 Accessed on 29th August, 2020.

38 Ewald B. *The health burden of fine particle pollution from electricity generation in NSW.* November, 2018. https://www.envirojustice.org.au/wp-content/uploads/2018/11/Ewald_B_2018_The_health_burden_of_fine_particle_pollution_from_electricity_generation_in_NSW.pdf Accessed on 19th March, 2020.

39. #ClimateActNow. How does the Australian Climate Act work? https://climateactnow.com.au/wp-content/uploads/2020/08/CAN-CC-Bill-Overview.pdf Accessed on 21st September 2020

40. Remeikis A. *Zali Steggall to unveil climate change bill and push for a conscience vote for MPs. The Guardian*. 10th February 2020. https://www.theguardian.com/australia-news/2020/feb/10/zali-steggall-to-unveil-climate-change-bill-and-push-for-a-conscience-vote-for-mps Accessed on 21st September 2020

