T R A N S C R I P T

LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

Inquiry into the Health Impacts of Air Pollution in Victoria

Melbourne—Monday, 28 June 2021

(via videoconference)

MEMBERS

Ms Sonja Terpstra—Chair
Mr Clifford Hayes—Deputy Chair
Dr Matthew Bach
Ms Melina Bath
Dr Catherine Cumming
Mr Stuart Grimley
Mr Andy Meddick
Mr Cesar Melhem
Dr Samantha Ratnam
Ms Nina Taylor

PARTICIPATING MEMBERS

Ms Georgie Crozier
Mr David Davis
Dr Tien Kieu
Mrs Beverley McArthur
Mr Tim Quilty

WITNESSES

Professor Michael Abramson, Chief Investigator, and

Associate Professor Fay Johnston, Chief Investigator, Centre for Air Pollution, Energy and Health Research.

The CHAIR: I declare open the Legislative Council Environment and Planning Committee's public hearing for the Inquiry into the Health Impacts of Air Pollution in Victoria. Please ensure that mobile phones have been switched to silent and that background noise is minimised.

I would like to begin this hearing by respectfully acknowledging the Aboriginal peoples, the traditional custodians of the various lands we are gathered on today, and I pay my respects to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings. I would also like to welcome any members of the public who may be watching these proceedings via the live broadcast as well.

At this juncture I will take the opportunity to introduce committee members to you. My name is Sonja Terpstra. I am the Chair of the Environment and Planning Committee. Also with us via Zoom today we have Ms Nina Taylor, Dr Catherine Cumming, Dr Samantha Ratnam and Mr Cesar Melhem.

All evidence that is taken today is protected by parliamentary privilege as provided by the *Constitution Act 1975* and further subject to the provisions of the Legislative Council standing orders; therefore, the information you provide during the hearing is protected by law. You are protected against any action for what you say during this hearing, but if you go elsewhere and repeat the same thing, those comments may not be protected by this privilege. Any deliberately false evidence or misleading of the committee may be considered a contempt of Parliament.

All evidence is being recorded and you will be provided with a proof version of the transcript following the hearing. Transcripts will ultimately be made public and posted on the committee's website.

Now, for the Hansard record if I could get you first, Professor Abramson, and then Associate Professor Johnston to both state your names and the organisation you are appearing on behalf of.

Prof. ABRAMSON: Thank you, Chair. I am Professor Michael Abramson from Monash University and I am representing the Centre for Air Pollution, Energy and Health Research.

The CHAIR: Great. Thank you.

Assoc. Prof. JOHNSTON: And I am Associate Professor Fay Johnston from the Menzies Institute for Medical Research at the University of Tasmania, and I am also representing the Centre for Air Pollution, Energy and Health Research.

The CHAIR: Okay, great. Thank you. What I will do is I will hand over to you both now and if both of you could give opening statements. I am not sure whether you are both going to speak or one is speaking and one is supporting the other or whatever, but there is enough time for you both to make opening statements. Perhaps, Professor Abramson, we might start with you and then hand over to you, Associate Professor Johnston. I will give you a bit of an indication as we get close to the 10 minutes. Over to you. Thanks.

Prof. ABRAMSON: Thank you, Chair. Could I have permission to share my screen?

The CHAIR: Yes, you should be able to do that.

Visual presentation.

Prof. ABRAMSON: So hopefully you can all see that?

The CHAIR: Yes, we can. Thank you.

Prof. ABRAMSON: Excellent. Well, Fay and I very much welcome the opportunity to speak with the committee today in support of our submission to the inquiry into air pollution in Victoria. The main points that we wish to make are, firstly, that there is no safe level of air pollution and, secondly, that electric vehicles present an opportunity to reduce traffic-related air pollution—however, they need to be recharged from low-polluting or renewable power sources. Reduced vehicle volumes on the road produce lower levels of air pollution, and active transport, such as walking and cycling, has substantial additional health benefits. On the other hand, wood heaters contribute significantly to air pollution in both urban and rural areas, and rapid gains in air quality could be achieved through regulation of real-world emissions and financial incentives to adopt less-polluting methods of home heating. And finally, given that the health sector has a substantial carbon footprint it could contribute more to reducing both greenhouse gases and air pollution.

Now, I am not sure what other presenters have discussed with you today, but I just thought it might be helpful to show you this schematic. I am proposing to talk about particulate matter. We talk about PM_{10}—these are respirable particles less than 0.01 millimetres in diameter, and you can comfortably fit five of these across a human hair shaft. And I am also going to talk about fine particles—these are less than 0.0025 millimetres in diameter, and you could fit 20 of these across a human hair. We did include in our submission a little information about the gaseous pollutants, and we are happy to answer questions that you might have on those.

Why do we say there is no safe level of air pollution? I have taken this figure from a paper co-authored by my colleague and fellow CAR investigator Yuming Guo which was published in the *New England Journal of Medicine* a couple of years ago. What we have in these figures are the dose-response curves, the concentrations of PM_{10} and $PM_{2.5}$, against the effect on all-causes mortality. Here we have the various regulatory standards around the world, and the Australian standards are actually quite well aligned with those of the WHO and EU. So for PM_{10} we are talking about concentrations below 50 micrograms per cubic metre, which I worked out earlier today is 0.05 grams per litre, for those who might think in those terms. And you can see that the effects are detectable at very low levels, well below these so-called acceptable thresholds. Interestingly the slope of the response curve is even a little bit steeper at the lower concentrations. Now, you cannot reduce concentrations indefinitely because eventually you get back to background levels—things like sea salt and windblown sand and so on. It is a very similar curve for $PM_{2.5}$. Again, the standard here is 25 micrograms per cubic metre. During the bushfires that occurred over the Black Summer, we had concentrations of thousands of micrograms per cubic metre in our major cities. I think it is unquestioned that there are health effects from particulate air pollution in Australia, and we could do much better by controlling these levels more stringently.

The only other point that I wanted to make is that we consider that the use of electric vehicles should be encouraged rather than taxed. As you would be aware, electric vehicles basically do not have any tailpipe emissions. There is still a little bit of particulate generated from road dust and brake wear, and then there is the pollution which is caused by the electricity source that is used to recharge them, which is why we are advocating for renewable sources of energy. I note that there was a recent piece in the *Guardian* which basically said that Victoria now has the worst electric vehicle policy in the world and that user charges start in a couple of days. On that note, I will hand over to Fay to talk about wood heating.

Assoc. Prof. JOHNSTON: Thank you, Michael. I was going to make some comments about a particular source of air pollution, which is important throughout Australia, including Victoria, and it is one where there is huge opportunity for gains in air quality and in health. So just a few points about wood heaters—that is, burning wood usually in slow combustion burners inside a home to heat the home: domestic wood heaters. The main point is that they are a major contributor to air pollution, particularly in rural communities but also in large cities, with a disproportionate, I guess, amount of pollution for the benefit they give us.

This was illustrated in a study done in Sydney where they looked at all the sources of particulate matter, you know, from power generation or from the motor vehicle fleets in Sydney and from wood heaters in Sydney—and these are fairly essential things, power and road transport. Firstly, a key finding from that was that the single-most important source of particulate matter from poor air quality was wood heaters, over and above, and this is coming from around 5 per cent of homes that use wood heating. So although it is not used by a majority of people in Sydney, whereas nearly everybody or the vast majority would have a car or two, and everybody uses power from power stations, the biggest single source was wood heaters from a minority of households. That is really to illustrate just how much pollution can come out of a single chimney from a single wood heater, and it can contribute to the overall load of pollution in big cities.

The rate of wood heater ownership is similar across mainland Australia. It is much higher in Tasmania but around 10 per cent of the population—higher in country areas, lower in big cities, but even in big cities it is

important. And given what Michael was saying about 'no safe lower threshold', any rapid change we can have in reducing particulate matter in a city will have a definite effect on people's health and reduce community-wide death rates and rates of going to hospital.

This was demonstrated in a study in Launceston—and that is where these photos are from—which did have a serious air pollution problem from wood heaters. Through a buyback scheme the number of wood heaters was halved in this town in and around the year 2000, and death rates fell. I was a part of the team that did that study, and we looked at death rates for seven years before and seven years after the buyback and saw that death rates fell approximately 10 per cent. It was quite a significant amount statistically and significant in terms of the health improvement in the community. So fewer heaters led to less deaths, less disruption to lives, less hospital admissions for asthma and less heart disease, and that is something that is possible to achieve throughout Australia.

The other key point is that removing heaters does improve air quality. It costs a lot—heaters are $3000 to $4000 each—but the health impacts cost so much. More than one study has done this estimate: if you take the health costs, the costs of earlier-than-expected death, the hospital costs, and divide them by the number of wood heaters, it is approximately—this is an estimate for Tasmania—$3500 in health costs per wood heater per year from the particulate air pollution associated with heaters. When you take that into account, incentive schemes for reducing the number of heaters are very cost effective.

Next slide, Michael, and this is my final slide. A lot of questions come up. What about alternatives? What about tightening emissions standards? What about educating people in how to have a less polluting fire? Just a couple of brief comments about that. Australia has tightened standards considerably recently—there is no doubt about that—but there is no evidence anywhere that air pollution in any town has actually improved as a consequence, and that is the key point. There are a number of reasons for that. One is the standards—the way they are tested is not a way that reflects real-world operation. The dirty startup phase is not included in Australian standards. Even with the best of best heaters, it still requires skilled and motivated operation. You can educate individuals—there is evidence people can learn and reduce—but in doing that at scale across an entire community, again, there is no evidence it has worked to change air quality in the community.

And just to finish, just to note, there is a method, the Canterbury method from New Zealand, that is worthy of investigating. That is a different set of standards with very stringent—more stringent, almost an order of magnitude more stringent than our current ones—and tested under real-world operating conditions. That was introduced in a region of New Zealand five or six years ago. It drove a lot of innovation in new heater design, and there is some emerging evidence that this did contribute to improved air quality in that region. So I am not saying it is the answer for Australia, but it is worthy of investigation. I will leave it there. They were the points I was going to make. Thank you.

The CHAIR: Great. Thanks so much for that presentation, to both of you. All right, we will hand over to the committee for questions now. I will start with Dr Ratnam.

Dr RATNAM: Thank you, Chair. Thank you so much, Professor Abramson and Professor Johnston, for your presentation today and your excellent submission. It had a really nice framework, which is particularly helpful as this is the first day of our inquiry hearings. So I am going to ask a couple of rudimentary questions, if I may, because we are setting the context, and all of us are learning. We are not medical doctors, we are learning, so it is good to be informed as we investigate these things in more detail.

You talked in your submission and your presentation today about transport emissions—and thank you for that slide, Professor Abramson; that was really helpful in terms of the particulate matter and the different types. We are trying to put it together. There is different particulate matter, kind of. We have heard from the previous presenters on the four main contributors to air pollution, and we are hearing about transport emissions being one of the main issues. Could you talk us through transport emissions? So what are the mechanisms? It is the particulate matter, it is the CO_2, and then you have got the broader impacts on climate change that are worrying. We often hear about CO_2 emissions kind of framed in terms of climate change but not as much for the air pollution impacts, so if you could expand on why transport emissions are a significant issue, that would be really helpful.

Prof. ABRAMSON: Thank you for that question. I have to admit that I am not actually the expert on this, but I will do my best, and maybe Fay would like to add some additional comments. So we have a somewhat fragmented transport sector in this country. We rely very heavily on heavy diesel vehicles to transport goods, and they often travel quite long distances. They also tend to be somewhat undermaintained, so they can produce very large quantities of soot when the engines are started. Beyond that of course we also have some diesel light vehicles, and then we have petrol vehicles. As I understand it, we have a fleet which is turning over very slowly in Australia. So that is one of the concerns about having less stringent vehicle emission standards than many other countries in the world. It is a concern that Australia could become a dumping ground for vehicles that are too polluting to be operated elsewhere. And because the uptake of electric vehicles has been so slow, there really is not much of a second-hand market at this stage.

So those are the factors that occur to me in relation to transport emissions. The other contributors of course would be public transport, and although I have focused very much on electric cars, I think there is a very good argument for electric buses, which typically are travelling much shorter distances. Generally we would want to encourage better use of public transport but unfortunately, as you all know, Melbourne is too sprawling and has to some extent outgrown its public transport network. So the sort of developments that are occurring at the moment are very welcome. The Metro Tunnel construction is occurring just down St Kilda Road from me, but it will be a while until that is operational. Fay, were there other points that I should have made or you would like to add?

Assoc. Prof. JOHNSTON: No, that was a good summary. I just want to clarify the question: were you also asking us about the mechanisms by which traffic emissions cause ill health?

Dr RATNAM: Yes, that would be helpful, thank you.

Assoc. Prof. JOHNSTON: I can make some comments there if you would like me to, Michael, and you could jump in.

Prof. ABRAMSON: Please.

Assoc. Prof. JOHNSTON: So traffic emissions that come out of the exhaust pipe are the product of combustion of fossil fuels, right? So when the hydrocarbon gets combusted it gets converted to energy, and if it is 100 per cent efficient combustion, then 100 per cent of the carbon in the petrol will be turned into carbon dioxide, which is important for greenhouse gas emissions. But the reality is of course that combustion is never complete, so what comes out of the tailpipe is a lot of carbon dioxide but also a lot of other things as well, and these other things as well get divided into two groups. One is the particulate matter, which is the suspended, often, bits of carbon. Tiny, weeny fragments of carbon can be suspended vapours as well. And then there is a suite of gases that are the result of incomplete combustion, and these gases include many of our other well-known pollutants, such as carbon monoxide, oxides of nitrogen, nitrogen dioxide, oxides of sulphur—a whole suite of things. These other things are also all known to have health effects; they are very irritating and they can stir up the lungs.

Particulate matter is really important for health. It works in a variety of ways. It sets off the body's defence systems and sets off our immune responses, so it makes inflammation. If you have already got a lung problem, then it irritates and makes your lungs more inflamed. It will make a condition like chronic bronchitis or asthma worse. But it does not stop there. It also sets off inflammation throughout the body, and that has effects like raising the stress hormones, making your blood more likely to clot. So if you are at high risk of a heart attack, for example, it can precipitate a heart attack. It can affect the developing lungs and hearts in young people. It can make conditions worse in older people. It can affect the development of unborn babies. So, particulate matter has a whole range of effects through these body-wide inflammatory, irritating responses. That is probably enough of a summary. One could go on. Michael might want to add something.

Prof. ABRAMSON: The only other thing I would add, Fay, is that the large molecules, the polycyclic aromatic hydrocarbons, which are in the soot that comes out of diesel and other vehicles, cause cancer.

Assoc. Prof. JOHNSTON: Yes, sorry. That is an important point.

Dr RATNAM: Thank you. That is really, really helpful, particularly at this stage. I have got some more questions that I might come back to if we have more time. Thank you.

The CHAIR: Yes. There are a few of us to get through. Hopefully if we have got more time, we will come back. All right. Dr Cumming.

Dr CUMMING: Thank you, Chair, and thank you for your presentation, Associate Professor and Professor. Just going down a different line of questioning, I have had many people over my time email me about aeroplane emissions and talk about aeroplanes and their concerns around air pollution that aeroplanes might be emitting. As well I have had numerous constituents contact me around asthma in children and their concerns around planting the right trees. My mother is not a fan of plane trees and different grasses and pollens and how all of this in our air goes towards issues. I guess also you could talk about mould and other things. So air quality is not just obviously wood fires and diesel cars and those kinds of things, but there are a lot of other things that contribute to our air and the pollution that is in our air.

I guess another concern of my residents is around the stockpiling of recycling and the fires that we have had from that, and then we can talk about waste and methane and emissions from tip sites and their concerns around the factories that they see around them and the possible chemicals that come out of those factories. I guess my question is this: could you add anything to this inquiry that might help all of these different concerns my constituents have about what might be contributing to the air around us as well as any knowledge that you have around filters and mitigation that we could actually use on factories or air stacks when it comes to the West Gate Tunnel Project or world-best practices in any which way or form? Thank you.

Prof. ABRAMSON: Okay. Well, there are multiple questions there, and unfortunately I have now reached an age where I cannot hold all of them in my head at once. I will try and address the question you asked about asthma. Asthma is a complex, multifactorial disease. We do know that the sort of gaseous pollutants that are referred to in our submission can cause asthma in some children, and, as Fay said, there is good evidence that particulate air pollution makes it worse. But you are quite correct, there are many other factors in the environment that contribute to asthma.

I think the leading theory these days is what is called the microbiome theory, and that relates to the microorganisms that live in the lungs and bronchial tree and in the gut and all over us in fact. There are more bacterial cells in an average human then there are human cells, and we believe that things disturb the balance of these microorganisms very early in life so that in Australia we have quite a high prevalence of allergies. About one in nine people has asthma, so it is much more common in Australia than in many European or American countries.

As I say, the predominant explanation now is in terms of the microbiome, but undoubtably allergens present in the air do play a role. We have created the house dust mite friendly home, so people get exposed to a lot of these little critters from an early age, and then there are the outdoor allergens. So I would not want the inquiry to think that all of the sources of air pollution are human made. Certainly pollen is a major allergen. It causes a lot of hay fever and perennial or chronic rhinitis. Mould, as you referred to, is another important allergy source. I would refer the inquiry to the Melbourne Pollen Count. They do a very good job of keeping track of the pollen season, which patients can use to provide guidance. Fay, that might be a good segue for you.

Assoc. Prof. JOHNSTON: Yes. You raised a lot of potential airborne hazards, and my overarching comment is that they are all important, they are all perfectly valid concerns and they do all affect health. I guess the issue is prioritising and what is practical and reasonable in how we protect the overall health of the population. They also interact with each other. You know, you can get increased allergic responses to pollens in settings with higher pollution. I am not sure exactly what I can say more specifically than that. There is a lot of research done on all these things and there is data there that can help guide you, and certainly our centre would be happy to assist with that kind of reviewing of what the evidence shows.

Dr CUMMING: I guess, Professor, something I have learned from the Chair is that you can take these questions on notice. You can both provide further information, if you want, to the inquiry to actually help us along. Yes, I know that it was a very broad question, but seeing that the submission that you have given us was fairly specific, I am hoping from your organisation that you might have other research or that you can point us in the right direction in some way. But yes, take this question on notice if you need to, and provide the committee with more information further down the track.

Prof. ABRAMSON: We would be happy to do that.

The CHAIR: Great. Thank you. I might ask a question at this juncture if I can. Professor Abramson, you sort of made some comments around the zero-emission vehicles and the like, and you may not be aware that the government has already committed to rolling out or having incentives for people to take up zero-emission vehicles. I do not know that I necessarily agree with your comments around a charge. In fact the charge that has been proposed for zero-emission vehicles is actually cheaper than for combustion vehicles because people are still paying the tax on fuel. So you may not be aware of the recent policy developments in that [inaudible]. That is okay.

But nevertheless what I wanted to get you to focus on for me, if you could please, is the comments you made in your submission around the health sector. You say the health sector and hospitals have a substantial carbon footprint, and also you point to them as they commit hazardous air pollutants like mercury and dioxins and medical waste and those sorts of things. So in your opinion, what is your suggestion perhaps for the health sector? If you had to say, 'Look, there are three key things that they could do to help reduce their footprint and reduce their emissions', what could they do?

Prof. ABRAMSON: Thanks for that question. We did cite a reference in our submission which deals with carbon emissions from the health sector as a whole. It is around things like construction methods—and I am aware that there is considerable hospital construction going on in Victoria at the moment—and it is particularly around transport. So if we had electric ambulances and electric vehicles involved in shuffling specimens around between hospitals and labs and so on, that would obviously reduce the footprint a bit. Again, it is not really my area of expertise, but historically hospitals have had waste disposal issues and they have even had incinerators. I do not know what sort of standards are applied to the operation of those these days. I do note that the government has committed some funding to improving the management of waste by hospitals, but obviously we feel fairly strongly about the health sector because that is the sector that we work in.

The CHAIR: Sure. Associate Professor Johnston, is there anything you want to add there?

Assoc. Prof. JOHNSTON: No, I do not think so. It is not my area of expertise quite so much. I do not think I can add more.

The CHAIR: Okay. Thanks. I guess what you are saying is you would like to see hospitals be further incentivised to make greater changes, or do you think they should as good citizens of the world be leading the charge in their industry? What would you say about that?

Prof. ABRAMSON: Look, I think both of those would be a good idea. There are some incentives but they could be strengthened, and there is certainly a workforce in our health system that is very favourably disposed to these sorts of challenges. I know that you are listening to a colleague of mine later this afternoon who probably feels even more strongly about it than I do.

The CHAIR: Sure. You will be pleased to know that we are also looking at—I am just reading your submission where you talked about your transport sector, and you have talked about that before. I mean, part of the reason for a charge on an electric vehicle is also to encourage people not to drive it, to actually do the things that you mentioned, which are to take public transport or to ride their bike or to walk; obviously if you want to pay less, then you can do all those active transport things perhaps and you do not have to pay. But buses are certainly something that government is looking at as well, so there are a range of things. I think for individuals the cost of electric vehicles is quite expensive. If you are asking an average worker to look at shelling out $70 000, $80 000, $100 000, that is out of an ordinary person's reach really, so the government is looking at purchasing electric vehicles to help create that second-hand market because there currently is not one at the moment. So they are all the things that we are doing there.

Just one last question: is there another industry particularly? I know you are both from the health industry, that is where you are from, and I know we have heard from other witnesses today about the Latrobe Valley and others, but is there any other particular industry that you think could look at improvements as well?

Prof. ABRAMSON: Well, I suppose there could be progress in the power sector. To be honest that is not really my area of expertise, but we do have an aging fleet of coal-fired generators which are going offline. I am really very encouraged by the uptake of renewable energy in this state, and I think the state is doing a much better job than many other jurisdictions around the country.

The CHAIR: Yes, there is lots of change happening in lots of different ways. It is a challenge to try and do things all at once, but we will get there eventually.

All right. Thank you very much for those answers. I appreciate that. And I think you are right that the workforce in the health sector, and I know nurses in particular—it is an area that I worked in as well—are very conscious of minimising waste and how they manage waste in the hospital sector, so it would be good to further explore that a bit later on. Thank you for those answers.

Ms Taylor, over to you for a question. Dr Cumming, you have had a question so let me just go around and I will come back if we have time.

Ms TAYLOR: Thank you very much for attending and for your contributions. I just had a couple more points pursuant to what Ms Terpstra was saying. We have got $46 million for Australia's first public zero-emissions vehicle subsidy program, providing individual subsidies at the point of purchase for more than 20 000 ZEVs, and $19 million to accelerate the rollout of electric vehicle charging infrastructure across regional Victoria to support the charging of EV fleets. I can go on, but there is also $20 million for a ZEV public transport bus trial and $10 million to replace 400 vehicles in the Victorian government fleet with ZEVs. So would you say those investments are not helpful—

Prof. ABRAMSON: No.

Ms TAYLOR: or can you see merit in them?

Prof. ABRAMSON: Look, thank you for raising those, and clearly I was not on top of all those details, but—

Ms TAYLOR: And there is more. I just do not want to list it all out.

Prof. ABRAMSON: I agree that these are very helpful initiatives. It is just that I do not think the user charge is a helpful initiative.

Ms TAYLOR: You do not? Fair enough—not fair enough, actually. What I was going to say is we could argue more on that point, and perhaps we can give you some more links and information on that too, because there is a lot more to that facet as well, particularly when the cost of electric vehicles at this point is actually extremely expensive, and in part—

Prof. ABRAMSON: I agree.

Ms TAYLOR: But we will get there. We are very determined, just so you know. As a government we are very determined, because we know how important it is. Well, I am glad you find those policies helpful, and actually it is all part of our $100 million zero emissions vehicle road map. So that is perhaps a helpful link for the inquiry as well, just so the inquiry is aware that we actually do support electric vehicles in Victoria. That is all. Anyway.

Prof. ABRAMSON: Thank you.

The CHAIR: Great. Thanks, Ms Taylor. Dr Cumming, another question from you?

Dr CUMMING: Thank you, Chair. Professors, I was just wanting to have a question around ozone and smog and air quality again. Do you believe that it would benefit Victoria to improve, say, the EPA standards or even that the Australian standards could be improved to be more like or more around our world standards of air quality? And we could even touch on the World Health Organization guidelines. If you would like to expand on how Victoria and Australia could actually improve their standards to be more like the world's, that would be great.

Prof. ABRAMSON: I must confess as a public health researcher I find the whole business of setting standards rather complex. I mean, my understanding is that we have these national environment protection measures, and then it is up to individual state jurisdictions to implement them. So there is not total uniformity around Australia. I note in fact the EPA's standard for, I think it was, $PM_{2.5}$ is slightly better than the national recommendation. But you can have the best standards in the world and they will not adequately protect the health of the public unless they are actually enforced.

Unfortunately in Australia we have major events, like the Black Summer in 2019–20, which are not really the responsibility of any jurisdiction. It is not, in a sense, human-made particulate pollution, but it results in very high levels, clearly breaching whatever standards are implemented, and I think without more investment in tackling climate change and reducing the risk of such events, the population is going to continue to be exposed to unacceptably high levels of particulate air pollution. Now, Fay, I have probably glossed over something there. Maybe you are a bit more in touch with this than I am.

Dr CUMMING: I am not quite sure, Professor, if I am more in touch, but I know that now that we have gone through a pandemic and we have all learned how to use a mask, maybe educating the community when the air pollution is very high of the need to actually put on a mask, the need to stay indoors—that kind of public information might be beneficial to the health of our community. I guess also too, Professor, I totally understand your answer in the way of measurements and standards, but when I understand that the Australian standards are like this and the world standard is like that, I would hope that we could even just increase our standards so that the quality of all the air for everyone in Australia would be better.

Prof. ABRAMSON: Fay, can I handball that other part of the question to you?

Assoc. Prof. JOHNSTON: Yes. So I agree: there is always room to improve, and one of the problems with having a standard is it sort of leads to the belief that if you are within a standard, you are safe, and with air pollution you are not. Australia needs to move to a framework actually away from standards and towards continuous percentage reduction. Other jurisdictions in the world are doing that, and we would benefit from doing that because there is always room for improvement. Until we get down to a level of 3 or 4, there is always room for improvement, and that is what we should aspire to.

I also 100 per cent agree with your remarks about educating our population about air quality and how to protect their health. I would also like to make the point that because the relationship to ill health is so steep at modest concentrations, more people die in Australia and get sick at modest fluctuations that are around quite low levels than from really extreme events. Extreme events are important—we need to know what to do with them—but we need to work right across the board, right down to the lowest levels, and people need to know how to protect their health, even with those minor day-to-day fluctuations.

The CHAIR: I want to just follow on from that line of questioning, and I will throw to you, Dr Ratnam, in a second as well for another question. We are in Victoria, and of course Victoria can control what we do. But is there a role for the commonwealth government here as well in influencing air quality? Because obviously in what we do in a particular area here in Victoria, we have only got so many government levers available to us. For example, we were talking about vehicles before. I think federal government policy still allows combustion vehicle manufacturers to dump cheap vehicles in Australia, right? That is something that is outside of the control of the Victorian government. So there are things that impact us that are outside of our control. Do you think that the federal government should take more responsibility for some of these things as well?

Prof. ABRAMSON: To be honest, I can only agree. I work in the health sector. We have been talking about environment policy. These are both areas where the responsibility is split between the commonwealth and the other jurisdictions, and there are many examples where it really does not function all that well, unfortunately. As I understood it, these national environment protection measures were developed by the environment protection and heritage council, on which all the state and territory ministers sat, which was chaired by the commonwealth minister. I do not actually know whether that mechanism still operates or indeed when it last met.

The CHAIR: Thank you. Dr Ratnam.

Dr RATNAM: Thanks very much. You had another point around wood-smoke pollution. I am just asking for an explanation on the statistic in your submission. You talked about approximately 4 per cent, which you think is probably a Victorian average for wood-smoke heater use, which is useful to know because we do not have other data. But you talked about 25 per cent exposure. Do you remember that data or quote in your submission? I was just wondering if you could explain what that meant. Did that mean there is 4 per cent of heaters that are wood-smoke heaters but 25 per cent of people get exposed to that pollution? Am I reading that correctly?

Assoc. Prof. JOHNSTON: I do not have it in front of me.

Dr RATNAM: That is fine.

Assoc. Prof. JOHNSTON: It might have been a 25 per cent contribution to the air pollution concentrations. I think that is probably what it was, but I have not quite got it. I can get back to you.

Dr RATNAM: Okay. Great. Thank you very much.

Dr CUMMING: Would you be able to provide the slides?

Prof. ABRAMSON: Yes, we would be happy to do that.

The CHAIR: Sorry, Dr Ratnam, did you have any other further questions?

Dr RATNAM: Just one more question. In terms of the examples you provided, the Tasmanian examples, for the government programs to get people to replace their heaters, we had a previous witness talk about the ACT buyback scheme as well. Do you know of any other schemes? They all sound quite successful in getting people to replace their wood-smoke heaters.

Assoc. Prof. JOHNSTON: The New Zealand example I gave. There are also some North American examples in both the USA and Canada that I would need to look up the details of.

Dr RATNAM: No problem.

Assoc. Prof. JOHNSTON: Yes. That is all I know.

Dr RATNAM: No worries. If you have more information you want to provide at a later date, that would be fantastic. Also on your point about other gaseous pollutants, could you elaborate on what contributes to those other gaseous pollutants in the air? We have got the chemical compounds, but what is the thing that we have to stop to stop that level of gaseous pollution?

Prof. ABRAMSON: I can respond to that, Fay. Fay did give you a general comment about combustion sources, but the other major mechanism is what is called photochemical smog. We do have an ozone season in Australian cities, particularly around Melbourne. There is a clockwise circulation of air around Melbourne and the ozone precursors, which include oxides of nitrogen predominantly from transport but also some heavy industry and volatile organic compounds, bake under the influence of sunlight as the air travels out across Port Phillip Bay, and then they usually land in the western suburbs in the afternoon, by which time there is considerable formulation of ozone. We know that ozone is a very irritant oxidising gas, and it does have many of the adverse health effects that we were discussing earlier.

The other gaseous pollutants are mostly combustion products, and as I understand it we do not have major issues with sulphur dioxide in Victoria because there are sources elsewhere, like Broken Hill and Mount Isa, and most of our fuels have a relatively low sulphur content. There is one exception that our colleagues from the Centre for Air Pollution, Energy and Health Research have been looking at, and that is bunker oil, which is the sludge burnt by shipping freight. There are regulations about how much of that high-sulphur fuel they are allowed to burn, particularly in port. Again, I do not know what the precise regulations are in Victoria.

Dr RATNAM: Okay. Thanks very much. In terms of prevention, once again it is transport emissions, industry and some of those by-products of some of those industries that would be the main kind of preventative tools for those gaseous pollutants.

Prof. ABRAMSON: Yes. Well, certainly we need stricter fuel regulation, and that goes back to a point I think the Chair made earlier. That is a commonwealth responsibility. I was asked a question about some other aspect of this. Sorry, I will have to respond to it later.

Dr RATNAM: No problem at all. And just as a final comment, I want to thank you for your presentation and argument around EV policy. I agree with you, and I argued very strongly in the chamber when that Bill came before us. Yes, there might be incentives on one hand, but then you put a big barrier to uptake on the other hand and you are undermining it. You are supported by many, many environmental experts, transport advocates and industry advocates right across the world, so thank you for your presentation of that argument.

Prof. ABRAMSON: You are welcome. Look, the other point that I forgot to make relates to heavy industry. I think the EPA has actually done quite a good job in controlling emissions from industry, and it is not that

difficult—it costs money of course—to fit emission-controlling technology to smokestacks, whereas it is a lot more difficult to control the emissions from thousands if not millions of mobile sources like vehicles.

The CHAIR: Okay. Thank you. I know we will have to agree to disagree, Dr Ratnam, on the whole electric vehicle thing. I think Ms Taylor very eloquently laid out all of our investment in those things, and the government very carefully listened to industry experts to come up with our policies as well. Dr Cumming, a question from you?

Dr CUMMING: Yes, just a last question. Professors, do you feel that maybe the EPA could do with more resources, seeing that, from what I understand, a lot of people obviously call the pollution hotline and find wait times and are not quite sure about them getting back to them. Is that your experience, Professor? Do you also feel that we should spend some more money on research to find out more about the things that we do not know, such as industry pollution and such as what you have just raised in the way of pollutants from container ships or even aeroplanes and what they emit?

Prof. ABRAMSON: Yes. That is the question that I had to take on notice. Look, I am a researcher, so of course I think there should be a bigger investment in research. I would say that I think the EPA are doing a pretty good job with the resources that they have available, but I am sure they could do a better job with additional resources.

The CHAIR: All right. Thank you. You may not be aware, but just post those factory fires in the west there was a significant injection of funds to the EPA, so it will be good to see going forward what they are able to do with that. Just going on from your comments earlier, we are hearing from other witnesses as well that community education around accessing information to let people know what the air quality is like and how to reduce their own impacts on air quality—things like what you have mentioned, wood-fired heaters and how we get can people off those and those sorts of things—are all useful and helpful things. But as you also noted, sometimes air pollutants are not just about fumes. It can be other irritants like pollen or like other things, so there is a range of things that can impact air quality.

I just wanted to ask—and it may be difficult because I know you are a medical researcher in that field—if you had a magic wand and could wave it and say what would be the top thing that government could do in terms of improving the regulatory framework, for example, what do you think would be a priority for government to do to improve the regulatory framework?

Prof. ABRAMSON: Well, yes, that is a difficult question for me. Fay, I do not know whether you want to tackle that.

Assoc. Prof. JOHNSTON: There is huge scope to improve the regulatory framework around wood heaters, there is no doubt about that, and how they are produced and how they are sold, how people use them and use them safely, and places where they are safe to have and places where they are not safe to have. That is a very fragmented system currently, so national leadership there would be really helpful.

Another big gap—and this is less about regulation—is in having pollen networks and data available Australia-wide. Victoria has led the country since thunderstorm asthma, but that is another insecure, fragmented service run through universities that would benefit. The whole motor vehicle fleet and encouraging active transport and encouraging public transport, whether that is regulatory or through incentives, there is huge scope there. I guess that would be my comment.

The CHAIR: Yes, and that sort of flows into education as well, doesn't it, really, which is for people to be encouraged rather than driving to get out of their cars, use public transport or walk or cycle or whatever, but just to encourage people to do that.

Assoc. Prof. JOHNSTON: Yes, making it easy and having the infrastructure.

The CHAIR: Sure.

Prof. ABRAMSON: I absolutely agree.

The CHAIR: Okay, fabulous. Ms Taylor, a final question from you? We have got about 8 minutes left to go. Nothing?

Ms TAYLOR: No. I will have a little more of a think. If someone else wants to ask one, I might come back at the end.

The CHAIR: Sure. Dr Ratnam, anything further from you? Dr Cumming, anything further? Looks like that is all good to go there, too.

All right. I would like to thank you both very much for your evidence and your contribution today. It is a really interesting topic and interesting presentation, and I am sure the committee will have a lot to learn and take away from your presentation today, so thank you both very much for your attendance.

Prof. ABRAMSON: You are very welcome. When do you expect to hand down your report?

The CHAIR: It will be later in the year. We are actually conducting two inquiries at the moment at the one time, so we have got to get the biodiversity one out of the way and then this one, but I think it will be probably sometime after August—but do not hold me to that. I have not looked at when the dates might be, but it will be in the second half of the year.

Prof. ABRAMSON: That is fine. We look forward to it.

The CHAIR: Great. Thank you very much.

Witnesses withdrew.