# T R A N S C R I P T

# LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

## Inquiry into Recycling and Waste Management

Melbourne—Tuesday, 22 October 2019

**MEMBERS**

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| Mr Cesar Melhem—Chair | Mr David Limbrick |
| Mr Clifford Hayes—Deputy Chair | Mr Andy Meddick |
| Mr Bruce Atkinson | Dr Samantha Ratnam |
| Ms Melina Bath | Ms Nina Taylor |
| Mr Jeff Bourman | Ms Sonja Terpstra |

**PARTICIPATING MEMBERS**

| | |
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| Ms Georgie Crozier | Mr David Davis |
| Dr Catherine Cumming | Mr Tim Quilty |

**WITNESS**

Mr Lee Bell, Senior Researcher, IPEN *(via videoconference).*

**The CHAIR**: I welcome Mr Lee Bell via video link, phone link. Thank you for giving us your time. All evidence taken at this hearing 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 give today is protected by law. However, any comment repeated outside this hearing may not be protected. 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 in the next few days.

Can you tell us a bit more about the subject matter we are going to talk to you about for the next 5 minutes or so, and then there will be a number of questions by various members. Hopefully we will still have a good line of communication.

**Mr BELL**: Thank you, Chair, for the opportunity to address this Committee. In my professional capacity I advise the International POPs Elimination Network on issues related to household and hazardous waste management. I have over 25 years experience in hazardous waste policy and technical analysis, including contaminated sites, landfills, waste incineration, plastic waste management and advanced non-combustion technologies for destroying persistent organic pollutant waste, which are the most toxic chemicals on the planet. I am a member of both the Stockholm and Basel convention expert groups focused on waste management and dioxin management. As this Committee and our community grapples with the issues raised by domestic stockpiling of waste resulting from China's National Sword policy and the follow-on effect that has seen many South-East Asian countries rejecting waste exports from Australia, I would like to warn against poor solutions to the problem.

In the past few weeks the Federal Government has signalled the intention to ban waste exports, particularly plastic scrap, in favour of domestic measures that it has suggested are forms of recycling. Specifically the Federal Government has signalled an intent to support waste to energy in the form of waste incineration. High-level political support for this technology would be unwise and would ignore the experience other countries have had with large-scale waste incineration. Many proponents of incineration labelled as waste to energy point to the European context, where scores of these plants operate, as some sort of endorsement. However, the EU has been withdrawing support for waste incineration on the basis that it actually undermines recycling and generates toxic waste while acting as a massive source of climate change emissions.

Burning plastic waste in incinerators is no different to burning fossil fuels except that incinerating plastic generates larger volumes of more toxic emissions and toxic ash. The combination of these problems has seen the EU drop public subsidies for incineration, end any renewable energy credits and propose taxes on plastic incineration. Denmark and Sweden already tax waste incineration as an acknowledgement of its environmental impact. The waste incineration industry is headed for a phase-out, and Europeans now recognise that you cannot burn your way out of climate change.

Meanwhile, in Victoria there are currently proposals for waste incinerators that in total have a capacity for burning 1.65 million tonnes of waste per annum, with new proposals arising constantly. When you burn that much waste you must have plans for major new hazardous waste dumps to contain the toxic incineration residue, called 'fly ash' and 'bottom ash', which is about 30 per cent by weight of the original waste burned. The fly ash collected in the filters is so toxic that Germany buries it deep in salt mines to prevent it from entering the environment. Sweden dumps it on an island of Langøya just off Oslo, Norway.

On the basis of the planned Victorian incineration throughput, you would need to have capacity to dump between 16 000 and 80 000 tonnes of highly hazardous fly ash every year, but for the hazardous bottom ash you would require capacity for between 500 000 and 2.5 million tonnes each and every year. Environmental issues aside, politically you would need to consider the question: in which electorates will all these new hazardous waste dumps be situated? I have run a hazardous waste treatment siting process for the Western Australian Government, and it is really not an exercise for the faint-hearted—politically or otherwise.

The toxic material in the incinerator ash is a combination of thin metals and dioxins. The dioxins are the most toxic chemicals ever analysed, and they persist in the environment for hundreds of years and are toxic in tiny amounts. They build up in the food chain, contaminate eggs, dairy products and livestock, and despite claims by the industry to the contrary, the problem of dioxins has never really been solved. At best they have been transferred from the air emissions to the bottom ash and fly ash by incredibly expensive filtration and scrubber units. To minimise the risk from the airborne dioxin emissions of incinerators, we also require highly competent regulatory authorities with in-house technical expertise on monitoring and enforcement of POPs emissions. Victoria does not have this, and the recent track record of environmental agency with hazardous waste management underscores this.

Before making any recommendations that might expose the Victorian population and food chain unnecessarily to the large volumes of dioxin-riddled waste and emissions that incineration will create, I would urge Committee members to consider the newly published scientific article by Tait et al of the Australian National University Medical School, who have conducted a global meta analysis of all incinerator health impact studies ever produced. They concluded that waste incineration has significant impacts on the health of incinerator workers and local communities around incinerators, as well as the food chain, and should not be situated near food-producing areas. I seek leave to table the paper as part of my submission.

Finally, Victoria now has an opportunity to lead Australia through waste avoidance and recycling and should avoid locking itself into a trajectory of waste incineration where the burners must be fed for 30 years, stifling innovation, polluting the food chain and externalising costs to the public health budget. It makes far more sense to initiate broadscale anaerobic digestion and composting for organics, and by establishing genuine paper, glass and plastic recycling, supported by government procurement policies and modest subsidies, that would kickstart domestic industries and will generate countless more jobs than waste incineration ever will. So I urge the Committee to recommend employment-building opportunities in genuine recycling and avoid locking Victoria into a dead-end paradigm of burning waste for future decades. Thank you, Chair.

**The CHAIR**: Thank you, just a quick question: the 1.65 million tonnes, where do you get that figure from, because I have not heard that before?

**Mr BELL**: That is a combination of the—

**The CHAIR**: Sorry, about how many that are already applications in the pipeline for waste to energy, is that what you said?

**Mr BELL**: It is a little hard to hear, but what I was suggesting was—

**The CHAIR**: Sorry, I will start again. You mentioned there was an application through the system for approval, or it had been approved, for the equivalent of 1.65 million tonnes of waste. Is that right? Did I hear correctly?

**Mr BELL**: Yes. What that is is the combined total of the current proposals for a range of different incinerators proposed for Victoria.

**The CHAIR**: Who are they? Can you tell us who they are? I am aware of two—maybe one. One is incineration with APM, the other one I think in Laverton for gasification.

**Mr DAVIS**: Ballarat, Latrobe Valley, there was one at Port Phillip. That is three. Where are the other two?

**Mr BELL**: I believe that there have been more applications in recent weeks for another facility. I do not have the names with me at the moment.

**Mr DAVIS**: Could you provide those?

**Mr BELL**: I believe I can, yes.

**Mr DAVIS**: Thank you.

**The CHAIR**: I will go to other members.

**Mr HAYES**: Just one, Mr Bell. Could you tell me: is there any preference, if you are looking at these sort, of facilities, for pyrolysis over burning?

**Mr BELL**: No, I do not believe there is a preference for pyrolysis. In the EU and the US pyrolysis is regarded as a two-step incineration process, so in a technical sense they are no different. I realise pyrolysis operates under a zero-oxygen environment, but because it is a two-stage process of combustion it is still regarded as an incineration technology.

**Mr DAVIS**: The obvious question is this: if you argue there is a problem with burning and the nature of the materials on the top end of the stack, if I can put it that way, and the ash, those chemicals are largely already present and they have to go somewhere.

**Mr BELL**: Actually, that is not correct.

**Mr DAVIS**: It is not quite true? Some of them are present?

**Mr BELL**: No, dioxin is created by burning chlorine and carbon in combination at a certain temperature range. So in common household waste you have a range of chlorinated materials—PVC plastics, and there is a number of them—and when they come into contact with very common forms of carbon and are burnt in a specific temperature range, they form dioxin, and there is a more complex chemistry pathway I will not go into called de novo synthesis that also causes dioxin to form on the ash after the burning stage. This is a part of the problem as to why industry has not been able to overcome the generation of dioxins. They are actually created within the incinerator itself; they are not fed into it.

**Mr DAVIS**: Okay, as well as some pre-existing impurities to begin with?

**Mr BELL**: There are certainly contaminants in household waste that would lead to the generation of dioxins in an incinerator, yes.

**Dr RATNAM**: Thank you so much, Mr Bell, for your submission and the work that you have been doing for a number of years. I had a couple of points of inquiry. One, we are hearing industry make some pretty strong claims that their technology will mean that the $CO_2$ emissions are negligible, and I wanted to know what your thoughts are on that, what have we seen across the world? Secondly, there is an argument that, look, it is better than landfill, so if it is a lesser of two evils, we should choose incineration. I will ask a follow-up question on the industry after that. So I guess the first question is: the claims of clean technology; and, two, landfill/incineration, is that an equivalence?

**Mr BELL**: In terms of talking about $CO_2$, what you will find is that most incinerators compare their emissions to landfill—that is, the methane emissions from landfill. What they do not do is compare their $CO_2$ emissions per unit of energy created to other forms of energy generation. So if you compare incinerator $CO_2$ emissions to solar or wind power, clearly you will have much greater levels of $CO_2$ emissions.

**The CHAIR**: Hang on, with all due respect, we are talking about comparing apples with apples, not apples with oranges. Dr Ratnam was actually quoting me. If we have the least evil, if I have got a landfill—and I agree with you, by the way, about plastics, PVC, all that getting burnt; that is bad, so I am not advocating that—I just want you to maybe follow up on that question. If I have got a choice and I live next to a landfill and I do not want that landfill to continue there anymore, if there is a choice, what would be the best technology to actually use to divert waste from that red bin, as we call it here, or the general waste, from going into landfill to create $CO_2$ and methane and going to waste-to-energy—let me use the word—technology? Is it gasification? Incineration is probably the least preferred option. Is that what you are saying? Are there other technologies currently available today to take that stuff I have talked to you about, which goes to landfill and creates $CO_2$—

**Dr RATNAM**: Without organics, are you talking about? With or without?

**The CHAIR**: Yes, without organics, to create $CO_2$ and methane. Is it the red bin in WA?

**Ms TERPSTRA**: It is the only waste bin.

**Mr BELL**: The green bin.

**The CHAIR**: The general waste bin. What waste-to-energy current technology can you use? Gasification is one; digestion is another one. Sorry to jump in.

**Mr BELL**: Well, it depends which question I am addressing. But in terms of gasification, pyrolysis and incineration, they are all classified as incineration technology by the EU and the US EPA. There is really no difference between them. If you are talking about how to deal with material going to landfill that has the organics removed from that and what the best option is for dealing with that material, well, clearly the best options are higher up the waste hierarchy, which is avoidance and recycling. But given that you would then have some residual material available, there are a couple of options. There is the technology known as gas-phase chemical reduction, which has been used in Australia previously for hazardous waste but is being developed to treat different forms of municipal residual waste in Canada, and there are also technologies that are being developed now that can convert residual waste to hydrogen energy as well. So there are different technologies out there, but the critical issue in some cases, particularly if you are looking to deal with plastics going to landfill, would actually be to have source-segregated landfill cells. It would be preferable to store some of that material until some of the other technologies have reached maturity to actually convert them into something more useful rather than simply burning them in the same way as fossil fuels through an incinerator.

**Dr RATNAM**: I have one more follow-up question. Thank you so much for that. I think it is important to clarify when we talk about these things, when the comparisons are made. Existing landfill has a lot of organics, which is causing a lot of the problems, and we have got to start thinking about comparing landfill that has organics to landfill that does not have organics, and you come up with different comparisons. My second question was around the industry. We had Infrastructure Victoria release a preliminary report yesterday for consultation, which outlined a number of solutions. You might not have seen that yet. It made a comment about waste-to-energy policy. There needs to be actual policy directions. You actually need an overarching policy so that you can guide the industry, because the industry does not have certainty about where to invest. The other side of that I think is that the gap in policy leaves it wide open for the industry. Not to be cynical, but industries can exploit, even in a positive way, for their businesses a gap in policy. So we are getting a whole number of proposals before us. I am just wondering about international examples that you might have seen and what we should be cautious about when we have got industry-led proposals without that policy framework at the moment because claims are coming up in that gap. So have you seen any other examples? Who should be watching out for? What should we be watching out for in terms of making sure that there is some regulation of that industry as well?

**Mr BELL**: I think one of the critical issues around that is to not become locked into a long-term paradigm and back one particular technology. I think it is useful in terms of public policy to keep your options open and flexible. So if you were to generate markets around recycling that allow for public procurement policies, generating domestic markets and allowing a diversity of technologies to enter that space, it provides more opportunities to tweak and adjust public policy settings as you move forward rather than locking into a particular paradigm. If you go ahead with something like incineration, they have a 30-year capital return requirement that they must operate to, which locks in your waste supply contracts for 30 years. So that stifles innovation moving forward if you come up with more practical solutions, more employment-rich solutions or other factors that benefit the environment in a range of different ways. This is the problem that Europe is experiencing. They are trying to move to a circular economy, but they have locked themselves in, particularly in certain countries, to a very intense incineration regime and they are finding it hard to get out of the contractual obligations that that has created.

**Ms TERPSTRA**: Thanks for your submission. It is interesting to hear you talk about some of the other options. You say, for example, with incineration that there are some toxic by-products of dioxins, but you mentioned other options like gas-phase chemical reduction and/or to convert residual waste to hydrogen. With those two options, are there any toxic by-products that come out of those processes that you could tell us about?

**Mr BELL**: Some of the studies have shown that there are some very small trace levels of toxins, but generally no. The gas-phase chemical reduction operated successfully in Western Australia for five years and destroyed the entire PCB stockpile in the state and much of the high-strength persistent organic pollutant stockpiles in other states as well—not all of it; there was still some left. They effectively packed up and left

Western Australia because they ran out of commercial opportunities to process that type of waste and then they went on to operate in Japan and the US and other areas. So they have adapted their technology to treat mixed residual municipal waste and to convert it into a hydrogen stream, and there are new technologies being developed in the UK and the US that also create hydrogen through the treatment of residual waste. But these are mainly around plastics and they are not entirely without drawbacks. If you look at the hydrogen creation, you are still using for the most part plastics to hydrogen, which is a form of frozen fossil fuel, if you will. It is simply that the outcome is better than creating ash and emissions. You actually create a useful, relatively clean fuel that can be used.

**Ms TERPSTRA**: Just one other question. We talked about the gas-phase chemical reduction. How does that work? Just a Cook's tour of what is involved.

**Mr BELL**: Okay. It is a complex facility but essentially what they do is they flood the waste in an enclosed chamber with hydrogen at an elevated temperature and it decomposes the waste material into a hydrogen methane stream. It destroys all of the pollutants and toxins in that waste stream.

**Ms TERPSTRA**: Is the hydrogen that you need to use to break down that waste something that is also harvested from that process or do you have to get an additional supply of hydrogen to do it?

**Mr BELL**: Initially to start the process you need a supply of brought-in hydrogen, but then it becomes a self-sustaining hydrogen generation unit with excess goods to be exported.

**Ms TAYLOR**: If we are looking at overall waste reduction, prospective, what do you think is a realistic time frame, factoring in that industry has to adapt to modify the packaging we are using so we do not continue to create problems for the future?

**Mr BELL**: I think a reasonable time frame is two to four years.

**Dr RATNAM**: Can I ask another question?

**The CHAIR**: One last question.

**Dr RATNAM**: Yes, sure. Have you looked at any of the proposals currently before Victoria in depth? You had a quantum in terms of the volume. Have you looked at any of the specific proposals in depth so far?

**Mr BELL**: I have not conducted an in-depth analysis of the Victorian proposals, but all of them operate on generic incineration technology, whether it be fixed hearth, moving grate or fluidised bed. The technologies are generally speaking—I would not call them off-the-shelf, but they are fairly generic in terms of international incineration technology that is available from major vendors.

**Dr RATNAM**: Thank you. One of the reasons I ask that is that in one of the biggest proposals, the Maryvale Australian Paper proposal, one of their arguments is the need for thermal power, because they do not actually use that power apparently to fire up their paper plant, and they believe that renewables do not give them the type of power they need, the thermal power. So they are basically saying, 'Well, if you're going to be burning coal versus burning waste, it's more efficient'. I think that needs to be interrogated, hence why the question. If you have any further commentary, even outside this hearing, that would be most welcome in terms of those sorts of claims because I suspect it is not the first time the industry has made those types of claims.

**Mr BELL**: Yes, okay. I understand what you are saying, but I do not think it is accurate to say that renewable energy cannot provide the kind of energy needs they would need for a pulp and paper mill.

**The CHAIR**: If you are going to look into this, my understanding is they are looking at, say, if that plant goes ahead, it replaces the use of gas, not electricity. They are not converting to electricity, they are just replacing the gas usage. Is there a difference? Yes, they are not converting. How do you compare that, doing the incineration to replace the gas which they currently use to produce steam, versus, let us say, producing electricity? Is there a difference, or it makes no difference to the emissions overall?

**Mr BELL**: My understanding is that the emissions would be different in terms of their characterisation and profile because of what you are burning to generate the energy. The gas emissions would be relatively clean compared to mixed-waste burning emissions, and the $CO_2$ level emissions would be higher burning mixed waste than they would if you were using gas.

**Dr RATNAM**: Can I ask one more question? As I referred to before, Infrastructure Victoria has also recommended that a waste-to-energy policy needs to be developed in Victoria so we can guide future decision-making around these things. Do you have recommendations? Can you point to any other examples of where these policies have been written? What kinds of things should it contain, so the Committee can be really mindful of that and provide some advice as well to the Government?

**Mr BELL**: Yes. Just a couple of points on that. The first thing I would say is to consider the recently published paper by Pape et al—and I will supply that with my submission—because it includes some of the issues around how you would go about siting facilities and the risks associated with them. The second thing I would say is that we need to also bear in mind the requirements of the Stockholm Convention, to which Australia is a signatory, and what they call BAT/BEP—best available technology, best environmental practice. That would have to be adhered to and the guidelines should reflect that, because of our legal obligations under the Stockholm Convention.

**Dr RATNAM**: And is it your opinion that Victoria should not proceed with waste to energy as part of its solution?

**Mr BELL**: Before I answer that I would just say that there are types of waste to energy that are not incineration.

**Dr RATNAM**: Right, of course; sorry. Apologies. Incineration; yes.

**Mr BELL**: So I would not exclude things like anaerobic digestion, which are very useful. But I think that to lock Victoria into a future of waste incineration would be highly problematic and I would advise against it, particularly with what is happening in the EU at the moment.

**Dr RATNAM**: And so you are classifying incineration as gasification, pyrolysis and straight-out burning, incineration, as well?

**Mr BELL**: Combustion and incineration, yes.

**Dr RATNAM**: Combustion as well. Okay; great. Thank you; that is really helpful.

**The CHAIR**: Thank you, Mr Bell. We appreciate your time.

**Mr BELL**: Thank you very much; I appreciate it.

**The CHAIR**: The Committee is adjourned.

**Committee adjourned.**