T R A N S C R I P T

LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

Inquiry into Climate Resilience

Melbourne – Wednesday 6 November 2024

MEMBERS

Ryan Batchelor – Chair
David Ettershank – Deputy Chair
Melina Bath
Gaelle Broad
Jacinta Ermacora
Wendy Lovell
Sarah Mansfield
Rikkie-Lee Tyrrell
Sheena Watt

PARTICIPATING MEMBERS

John Berger
Ann-Marie Hermans
Evan Mulholland
Rachel Payne
Aiv Puglielli
Richard Welch

WITNESS *(via videoconference)*

Jeremy Spencer, Director, Sustainable Builders Alliance.

The CHAIR: Welcome back to the Legislative Council Environment and Planning Committee's Inquiry into Climate Resilience in Victoria. We are joined in this session by the Sustainable Builders Alliance. Welcome, Jeremy. I will just read out this short statement about the hearing.

All the evidence that we take is protected by parliamentary privilege as provided by the *Constitution Act 1975* and the provisions of the Legislative Council standing orders. Therefore the information that you provide during the hearing is protected by law. You are protected against any action for what you say during the hearing, but if you go elsewhere and repeat the same things, 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.

My name is Ryan Batchelor. I am the Chair of the committee and a Member for Southern Metropolitan Region. I will just ask the committee to introduce themselves to you.

David ETTERSHANK: David Ettershank, Western Metropolitan Region.

Sarah MANSFIELD: Sarah Mansfield, Western Victoria Region.

Gaelle BROAD: Hi, I am Gaelle Broad, Member for Northern Victoria.

The CHAIR: And joining you online is –

John BERGER: John Berger from Southern Metro.

Jacinta ERMACORA: Jacinta Ermacora from Western Victoria.

Jeremy SPENCER: Hello, all.

The CHAIR: Jeremy, if you could state your full name and the organisation you are appearing on behalf of for the Hansard record, please.

Jeremy SPENCER: Yes. My full name is Jeremy Spencer. I am here on behalf of the Sustainable Builders Alliance for the inquiry.

The CHAIR: Thank you. The format for today is we invite you now to make a short opening statement and then we will head over for about half an hour's worth of questions.

Jeremy SPENCER: Okay. Is it possible to do a presentation at all or not?

The CHAIR: Of course it is. I am sure that can be facilitated.

Jeremy SPENCER: I can share screen if that is okay. It might help just so that I can explain I guess our opinion on things.

Visual presentation.

Jeremy SPENCER: I have not heard any of the other submissions, and we did not actually make a submission; I was not aware of the inquiry, though we were asked to come. I have got some thoughts just on general resilience and how it relates to net zero homes, which is what the Sustainable Builders Alliance is about.

Now, the Sustainable Builders Alliance is an organisation of seven sustainable builders. Just for a bit of background, I have been a builder for over 20 years as well as a thermal performance assessor. I run a

sustainable building company called Positive Footprints where we build sustainable homes, typically homes that produce more power than they use, which I think makes them very resilient, combined with batteries, which I want to show you today. The Sustainable Builders Alliance is trying to spread information to the industry at the moment of how to actually achieve very low energy or carbon-positive homes, how to do it cost effectively and how to leverage the new NatHERS whole-of-home software that is in the building code and to spread the information that designers and assessors and builders need to know to pull off these homes in practice and make it a commonplace thing rather than something one only sees every now and again.

What I think of when I am talking about resilience, I am thinking when it is a cold snap and the home stays warm – our focus is residential construction – when it is a hot period then the house stays cool and when it is a blackout and the house continues to run and provide services and comfort and hot water and cooking and also potentially during the blackout provide power to power a car, an electric car or vehicle, over a period of weeks, potentially months, until whatever that crisis was ends, assuming the house itself did not burn down or something. Then that house would be able to almost be a standalone house providing safety during that period. And I guess more broadly it is also constructing homes in a way that is healthy and that allows the occupants to thrive and that are very cheap to run – because money in the back pocket is also a form of resilience, if you like, if you are not having to spend a lot to run your home – and more broadly producing homes that do not themselves create a lot of carbon dioxide and that make people coming after them add to climate change, if you like.

Now, to that end we have created a website for the industry, a free resource, and on that there is something called the road map to net zero homes, which is not just a road map; it is actually almost a design guide, a process to be followed that almost ensures a net zero outcome. I want to show you why I think a net zero outcome is also a resilient outcome with a case study I will just flick to. It is actually good timing – I was putting together a presentation on this case study. Maybe I should just tell you what you are looking at here.

The five steps to a net zero home: one is good design – so design a home so it needs little mechanical heating and cooling in the first place. That is designing for climate. Mostly that is talking to designers. What are the rules that they need to know so that the climate does the heavy lifting and even in the absence of power the house maintains a reasonably comfortable temperature vis-a-vis any other standard home and even vis-a-vis temperature change. If the climate changes over time, a well-designed home will perform better over time compared to contemporaries.

The second step is to choose low-impact material specification to keep embodied carbon down. I will not go into that today, but that is something that we look at.

The third step is about performance construction. While the first step talked to designers, the third step is really talking to builders who put these homes together, and if the home is not built to perform thermally to the assumptions under NatHERS and the code, then it will not perform on the ground as it does on paper. So step 3 is all about where buildings fail and how to make sure that yours does not fail – and this is with standard construction as well. It can be done on any construction, but standard construction works just fine.

Step 4 is about appliance selection. Heating and cooling is only part of running a home. It is the appliances that actually use the energy. Under the code now NatHERS has been expanded to NatHERS whole of home. It is one of the compliance pathways that you need to get through, and the code. Some of you may know that; I am saying it just in case others do not. That includes heating, cooling, hot water, lighting, cooking and general plug-in appliances – or an amount is put in for plug-in appliances.

Another group that the Sustainable Builders Alliance talks to and wants to get involved in conversation is assessors. I am a long-term assessor, as I said, and that software has a lot of ability as far as resilience goes that is not being brought out at the moment. At the moment the NatHERS system is an accreditation system – a compliance system at the end of the building process. But it has great design power. If an assessor comes in early and works with a designer at design concept stage, you can get energy-efficient outcomes. In fact, one thing that has changed with 7 stars is that now the most cost-effective way to achieve 7 stars is through good design. The most expensive way to achieve 7 stars is to think of it as a material substitution and take an old 6-star design and just put in more insulation or triple-glazed windows. That is the expensive way to achieve 7 stars. So this is also the cost-effective way to get these outcomes.

With the software these days assessors can do the house in free-running mode, so they can see what happens if the power goes off – what temperatures would one expect in the home? They can also look at future climate predictions, the different RCP scenarios, and they can run that through the software to see how the house will perform in the future. Also, under free-running mode, if you want to do that, they can try different appliance selections to choose more efficient appliances and get the most efficient mix for your budget. Lastly and possibly most importantly, they can answer the question: how many photovoltaics would you need to put on the roof for your house to produce as much power over the year as it uses? Step 5 is everything to do with putting on photovoltaics and what builders and designers need to know about that, which ends up with a net zero home. And if you also took into account the embodied carbon in the house and calculated that, you could potentially produce a house that produces enough excess power to also pay down its embodied carbon debt by putting that renewable power out into the grid.

Let me give you an example to maybe bring it home a little bit. Sorry, guys, I will try and not be too long. What you are looking at here is a net zero home. This is one of the Positive Footprints homes, but really it is just following that same methodology. What you are seeing is above the line you have got the energy drawn from the grid – you have got blue and you have got red; that is peak and off-peak – and then underneath you have got the excess power beyond what the house needs, which is being sent back to the grid. This is for a house that is an 8.6-star home. It has a 13.1-kilowatt PV – a reasonably big PV – and a battery, but it also charges an electric car.

You can see up in that top corner that this house, by the way, is $500 in credit over the year, so instead of an average bill of, say, $2000 – $2500 maybe if you combine gas and electric together for a combined electricity bill – this house is all electric and it is still $500 in credit. And each month as it puts out those kilowatt hours of renewable power into the grid, that goes to neighbours. Neighbours then use that energy, and fossil fuels do not need to be burnt to supply that energy. And in this case, every year this home offsets through that mechanism 10 tonnes of carbon dioxide.

If you just look at this graph a little bit – the parts of this graph that I want to point out that are important. Because this house has a battery and because it has a very low demand, there are a couple of things. If the power went out on this house, this house could survive for months basically on its own merit, without interaction with the grid. Only in June, July and August is it drawing more power from the grid than it is sending out to the grid, and that is in the order of a few kilowatt hours a day, when you work out the difference there. So with a bit of managing of maybe not turning on all the heaters but just turning on the main heater in the house and being a little bit more wise, I am sure this house could quite easily go through that middle part of the year, no problem. And remember this is while charging an electric car.

From a social point of view, if we are trying as a society to get to an outcome where we have a green grid and we have all homes on that using electricity and we have got industry on it, we have got business on it and we have got transport on it, the only way that that can be done in a cost-effective manner – minimising the transmission lines, the battery hubs, the wind farms – is to try and minimise the demand of the things that are going on that grid. So you can see that this house has very little demand from a social point of view. It means that when the sun goes down and solar stops working, all the other homes who have not minimised their demand through good design and efficient appliance selection, and a battery in this case, will be starting to have demand at that time when there is no extra solar to help out, if you like.

What this shows too is this huge amount of power that is being produced is enough to run a similar house or to run two more similar homes, it works out, or just a standard existing home – this would be enough to supply that other house as well. But what it points out is we are already in a situation where there is a lot of solar on roofs, and when it is a sunny day we are producing a lot of power through solar. I think it was 75 per cent or something last month – they achieved a 75 per cent rooftop solar contribution to the grid. So what I suggest from a government point of view is: I think this is great and we should be getting homes to produce power, but one thing that you might want to consider is rebates or incentives that will drive demand for using that power during the day to what they call load shifting – things like hot water. A quarter of a house's power goes to hot water, so if you have got a timer on your hot-water system – so you have got a heat pump that operates during the day – you can make use of that solar. Car charging can make use of that solar. We could potentially have, you know, council car charging that is cheaper in the middle of the day, say, or even free at certain times. That is just from a society point of view.

The CHAIR: Jeremy, if you could just wrap up the presentation that would be great.

Jeremy SPENCER: Yes, okay. I am hoping that you get the idea. I guess to wrap up the presentation, I think to continue to promote net zero homes and to get this working to get it mainstream, there are a couple of things. We need to roll out the education, and designers, builders and assessors need to know how to pull it off in a cost-effective manner. We have already got the NatHERS whole-of-home scheme in the code, but at the moment people just do not realise that it can be leveraged for these really high performance, highly resilient outcomes.

I think there is a huge place for batteries. I will show you one last picture here. This is two homes that are very similar houses – very similar floorplans and very similar performers. The one on the left is the one you were just looking at; the one on the right does not have the battery and you can see the difference in the demand draw on the grid. It still only uses about a third of the energy of an average home, but of course it is using that at night-time, when the sun is not shining. So there is a big social case I think for governments to put rebates onto batteries to drive behind-the-meter self-consumption. I know that my own clients, if there was a rebate on batteries, many, many more of them would go for it. It is just not cost-effective for them at the moment in the same way that the panels are. But batteries behind the meter do not take the same infrastructure resources as other infrastructure on the other side of the meter supplying renewable power from wind farms and those things. They take more transmission lines and community battery hubs and so forth. There is a lot more infrastructure there, but you could have this public–private partnership that gives homes a lot of resilience themselves if you have a blackout and the shit hits the fan. Assuming your home does not burn to the ground, you can be safe and you can potentially help other homes that are in crisis. That is it. I hope that made sense.

The CHAIR: It did. Important assumptions built into that. Thanks very much. I just wanted to ask: we have heard from a variety of witnesses over the course of the inquiry about a range of things in the lived environment – the homes we live in, the homes we spend most of our time in – and what features of a changing climate we need to take account of. From your point of view as a building practitioner, what are you seeing as being the key climate change risks that the people you work with are needing to take account of when they are building or renovating the homes that they live in? What are they most concerned about? What are people that you work with most concerned about in terms of climate risk?

Jeremy SPENCER: To tell you the truth, I do not think many of my clients think about climate risk when they are building or designing or thinking about their home. I think about it a bit. When you run the simulations, our climate in Victoria is what they call a heating climate at the moment. It is a cold climate, so most of the time you are heating. As the climate in general warms over time, it will mean that there will be less energy actually needed to heat the home. There will be a bit more cooling but a lot less heating, so on balance there will be less energy use, so that is a good news story for us. Now, there may be higher peak periods of need – say a real hot spell comes through. But that is where the technologies that we have – solar power combines so well with efficient reverse-cycle air conditioning, and assuming those things are working, you have heaps of power even on a small solar system to provide cooling in those really hot periods. Even in winter you will still get enough on the efficiency of those systems and a solar panel to heat a home during the day. Assuming you have then insulated it well, it will retain much of that heat that it got during the day, even in the absence of being able to turn on power at night.

At the moment most people's solar systems, if there is a blackout, will just turn off completely, and the house will not have access to those solar systems the way that they are constructed. It needs to be put in so that when the blackout happens your house can still make use of the system but the power does not go out into the street. You will need to have a battery on board in that system for this to work and to be a resilience thing, because what they do not want is total grid connect, no battery and solar power going out to the street when someone is trying to fix the powerlines. They do not want that, but if you have got a battery on board the house, you can be totally islanded off with the right set up.

The only other thing that I will add is rainfall – we do not quite know how it will change, but I believe we are going to have bigger downfalls and maybe more sporadic ones. At the moment in the building code to collect the whole roof for a water tank for flushing toilets and so forth it is actually a performance solution to do that. There is no deemed-to-satisfy way of achieving that under the building code, because under the building code all water needs to flow downhill on the deemed-to-satisfy plumbing code. To collect a whole roof, you have to have a charge system where water falls into the downpipes, goes down, then comes up and drops into the water

tank just by the differential in heights between the top of the tank and the higher gutter. That puts quite a big cost on creating a system where you can collect all of the water from your roof, which may be a pressing need as we move forward. It is a simple system to set up, but the code is stopping it and making it too expensive for clients to go ahead in a legal way.

The CHAIR: Thanks. Mr Ettershank.

David ETTERSHANK: Thanks, Chair. Thank you for your presentation, Jeremy. It was really good, and I absolutely endorse your comments around a battery. We have just gone down that path, and the savings are remarkable, but it was a logistical nightmare to get through the vendors and the regulators, so perhaps something needs to be done.

The question I wanted to ask is: in the context of that vision of the sustainable net zero home are there particular impediments in the building code or are there particular things that could be changed about the building code to make that transition or that achievement easier?

Jeremy SPENCER: To achieve this outcome – first of all there is history. In the past, if you go back 10 years, it would have been expensive to do this because the technology was not quite there and the prices were higher. So there is just a lag in people's understanding that this is now a cost-effective option. The other thing that has changed for the better, like I said, is that 7 stars is now a requirement, and the cheapest way to achieve that is to build using passive solar design to achieve 7 stars, if you want to go for minimums, or beyond. But people do not realise this, so there is an amount of education that needs to get out to designers, which is what the Sustainable Builders Alliance is trying to do. Then we need to get assessors in from just being accreditors to seeing themselves as consultants – to get in early and to use the power of the software to advise, like I said, on appliances and also net zero outcomes as far as how big the solar system should be. That is key. Lastly, the builders need to understand what the assumptions that are built into the NatHERS are about how the house is built and how to build to meet those assumptions so the house performs on the ground. Once again, the website has all that, but it is a matter of trying to get that information widely to the community. I see that really as the biggest impediment at the moment.

David ETTERSHANK: Thanks, Chair.

The CHAIR: Mrs Broad.

Gaelle BROAD: Thank you very much, Jeremy. I guess there is a bit of an assumption that building a sustainable home will always cost more. Is that a myth you would like to crack, or what are your thoughts?

Jeremy SPENCER: Yes, I would like to bust that myth. I am not talking about a passive house. I am not talking about anything other than standard construction to get these outcomes. Standard construction done well and just built to actual code – literally you could make huge impacts if the code had some sort of insulation check or tightness check at the end. You have probably heard people talk about the blower door test. Yes, it is a good idea. It works just as well on standard construction. I have lost my train of thought there.

Gaelle BROAD: You were just talking about priorities – what you prioritise in building and what is affordable – so insulation that you are recommending.

Jeremy SPENCER: Yes. Look, like I said, now the equation has changed, and people just do not realise a 7-star house, which is code minimum, is enough to get a net zero outcome if you combine it with efficient appliance selection and the appropriate-sized PV and good construction. So yes, that is a myth that needs to be busted. It needs to be busted with more case studies and more people just doing it. I think it must be a little bit like once enough homes are out there, just like you used to drive through suburbs and you would see one solar panel there and one solar in the next suburb over; now you see them all over the place. It will take a little while, but I think it will be something that will come on quickly.

Gaelle BROAD: You mentioned solar panels and the need for batteries too. I know, having done that type of thing as well, there is a cost because they only last a certain amount of time. Is that something that is factored in?

Jeremy SPENCER: Replacement, no, is not factored in. It is probably a little bit above my pay grade to do the economic analysis from the government point of view. I do know that it works, and obviously someone is going to need to choose batteries that can be recycled and repurposed, all that sort of stuff.

One thing I did not say is the huge benefit that vehicle-to-house technology could provide if the government could work out protocols so that an electric vehicle could become the battery for the house. In this emergency resilience scenario a battery vehicle is about two to three times the size of your standard Tesla Powerwall, so it has a lot more capacity in it. If you have a house that does not have much demand and is recharging, putting more power in every day, a car could keep the house going forever.

Gaelle BROAD: I am interested in regional areas. Can you speak to some of the challenges in building in a regional area as opposed to the city?

Jeremy SPENCER: Yes. This is not quite a challenge, but if you want to do a completely net zero in a regional area – typically I find in the city that if you design the house to 7 stars or above and you build it well, you stock it with efficient appliances, most homes, most families will start breaking even at about 6 kilowatts of panel. But I always suggest putting on one more kilowatt if you are after net zero outcomes in the real world, because things fluctuate; circumstances change, weather patterns change. Then if you are wanting to run a city car with an average of 50 kilometres driving a day, another 2 kilowatts of panel would be enough to charge a car for 50 days of daily travel on average. Now, if you are in the country, that might be significantly more if you want to be net zero, including the charging of the car. In the city probably from 8 kilowatts onwards you could be completely net zero, including the car. In the country maybe it is 10 kilowatts or something like that.

Gaelle BROAD: Thanks, Jeremy.

The CHAIR: Dr Mansfield.

Sarah MANSFIELD: Thank you. Thank you for appearing today. One of the issues I think you have highlighted is that a lot of the practices you are describing are in some ways, some of them, relatively simple, but they are not widely adopted across the building industry. They are not standard practice or the default option for many builders. I am wondering what you think needs to change at a systems level to help to make this less of a niche type of building and make it more the standard.

Jeremy SPENCER: On the Sustainable Builders Alliance website we have a builders thermal performance checklist. It simply goes through each stage of construction: footing stage, framing stage, lock-up stage, insulation stage. It just has a number of little things for builders or someone on site to check off that they have done before the next stage happens. You can appreciate if a pipe is put through a wall and it is not caulked and you get an air pathway and then you put some cabinetry behind the back of it, well, you cannot then seal that and now you have got a leak in the house. So it is a lot of little things. I have taught teams. My own team knows this off the top of their heads. Other teams can learn these things very quickly, and builders are pretty good at working with QA tick sheets, so I think that is not particularly hard to introduce from an education and systems-wide point of view.

The other thing that I have found really effective at changing overnight the way that teams work is getting a thermal camera – you can get little ones that attach to your phone these days – and having a blower door test. Simply give the thermal camera to your project manager, get your project manager when he inducts everyone to show them this thermal camera and how it can take photos through walls and see what is there and explain to them that this is going to be a sustainable house and you are doing a blower door test at the end. Without even saying any more than that, that sends the signal to the trades that come on site that, one, this builder is not only interested in how good the benchtops look and how good the finish is, but they are also interested in the performance of the structure and they can see what is underneath. And they will put two and two together and they will think, 'Well, okay, now I've got to just make sure that I do things with a little bit more care than before.' That combined with a checklist – I think it is just a matter of getting that out into the community.

They are not operating sloppily because people just want to make our homes fail thermally, they are doing it because we come out of a history of cheap energy, not caring about performance too much and nobody checking and that is just the way it worked. If you wanted to go to the next step, I think just like the VBA has been doing some random inspections on plumbing and just building code compliance staff, some random inspections at insulation stage and some random blower door tests at the end would also send a huge signal to

the industry. It would not cost much. We have already got the workforce for smaller random inspections, so I think that would be a great way of starting the movement to higher performance and just getting the culture changed.

Sarah MANSFIELD: Okay. Thank you.

The CHAIR: Mr Berger.

John BERGER: Thank you, Chair. Thank you, Jeremy, for your presentation today. I listened intently to some of the things you were just saying about the compliance part of the 7-star ratings, given that a lot of new houses are being built and you sort of wonder whether or not they have actually achieved it. It looks good on paper, but it is whether it actually achieves it once people move in – whether it has achieved that rating that is specified on the documents for building. I just wonder, when you spoke about compliance, how you might set that up and have a regulatory group oversee that.

Jeremy SPENCER: There are a couple of things that can already help. At the moment on the new NatHERS certificate, on the back of the certificate there is something called an energy passport. That energy passport is not compulsory at the moment, but it has a tick box on all the things that the assessor assumed and entered from the working drawings for the builder to tick, for the building surveyor to tick, for the home owner potentially to tick and for the designer to potentially tick as well. That is one compliance mechanism. Another one: like I said, I would love to have an insulation stage inspection. I think that would be great. It is something that could go under the building surveyors' mandate if they were just given a bit of education on how to do it and we changed something in the code so that it was done.

Look, in the end I think that there is another part to this equation. We are telling the industry they need to build a bit tighter than they are at the moment. That is because the NatHERS software assumes at least 10 air changes per hour or under. That is not quite a hard rule – it does depend on what the assessor enters – but it is a good rule of thumb. Back in 2016 that was 15.4 air changes on average that we were achieving on new homes Australia-wide. That has now come down to eight or so air changes per hour in the latest testing, so that message has been getting through, of starting to build our homes tighter. That is a good thing. The problem now is from an air quality point of view if we go too tight – if we get under five air changes and definitely under three air changes per hour – then there can be some potential health implications of not getting enough changeover. I have got some suggestions on how to deal with that, but that is why the blower door test would be a good thing to introduce, even as a CPD item potentially for builders, or something that they need to not do all the time, but just to get an idea of how tight they are building, and if they are building very tight then they should be putting in the appropriate ventilation strategies that go along with that.

John BERGER: Thank you. Thanks, Chair.

The CHAIR: Thank you. Thanks, Jeremy. That is the time allotted for the session concluded. We really appreciate the time you have taken to join us today and provide us with this evidence. If you want to provide a copy of that slide presentation to the committee secretariat, that would be really helpful for the committee as well. We will provide you with a copy of the transcript for review before it is published on our website.

With that, the committee will take a short break.

Witness withdrew.