

# Environmental Audit Committee

## Oral evidence: Heat Resilience and Sustainable Cooling, HC 1671

Wednesday 25 October 2023

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Members present: Philip Dunne (Chair); James Gray; Ian Levy; Caroline Lucas; Cherilyn Mackrory; Dr Matthew Offord; Claudia Webbe.

Questions 71 - 136

### Witnesses

**I:** Councillor Linda Taylor, Vice-Chair, Local Infrastructure and Net Zero Board, Local Government Association, and Leader at Cornwall Council; Francis Heil, Chartered Engineer and Principal Consultant, AtkinsRéalis, and Member at the London Climate Change Partnership; and Adrian Dobson, Executive Director, Professional Knowledge and Standards, Royal Institute of British Architects.

**II:** Professor Elizabeth Robinson, Director, Grantham Research Institute, London School of Economics; Omar Abdelaziz, Assistant Professor, Department of Mechanical Engineering, The American University in Cairo, and Lead Author, “Global Cooling Stocktake” report, UN Environment Programme; and Eleni Myrivili, Global Chief Heat Officer, UN-Habitat.

Written evidence from witnesses:

[Local Government Association](#)

[London Climate Change Partnership](#)

[Royal Institute of British Architects](#)

[Professor Elizabeth Robinson \(Director, Grantham Research Institute on Climate Change and the Environment, London School of Economics\) et al.](#)



## Examination of witnesses

Witnesses: Councillor Linda Taylor, Francis Heil and Adrian Dobson.

Q71 **Chair:** Good afternoon and welcome to the Environmental Audit Committee for the second oral evidence session in our inquiry into heat resilience and sustainable cooling. We have two panels this afternoon, and I am very pleased to welcome to our first panel Councillor Linda Taylor from Cornwall. It would be helpful if you briefly said a few words about what you do in this area that is relevant to our inquiry.

**Councillor Taylor:** I am here representing the LGA, where I am the vice-chair of the Local Infrastructure and Net Zero Board. I also have the very welcome privilege of being the leader of Cornwall Council.

**Chair:** We are also joined by Adrian Dobson from RIBA. Welcome, Adrian.

**Adrian Dobson:** Good afternoon. I am the Executive Director for Professional Knowledge and Standards at RIBA. My team develops policy and services for architects, particularly in areas like sustainability, building safety, and so on.

**Chair:** And Francis Heil from the London Climate Change Partnership. That is a part-time role, I assume.

**Francis Heil:** Good afternoon, everybody. I am from AtkinsRéalis, which is a global engineering consulting firm. We advise on and design buildings and infrastructure, and we advise local authorities. As part of my role with AtkinsRéalis in the climate resilience team, I am a member of the London Climate Change Partnership, which is a partnership of public and private sector, academia and not-for-profits across London, working to advance climate adaptation and resilience.

Q72 **Chair:** I am going to kick off with some fairly broad questions about the Government's approach to this issue, which is, I think it is fair to say, in the fairly early stages because we have not, as a nation, suffered significant problems until recently from excessive heat affecting the built environment. In July this year, the Government published their third national adaptation programme in relation to how we manage heat. I would like to ask each of you for your impressions on whether or not that is a suitable and adequate response to this growing crisis. Perhaps we might start with Francis. I think you have been most critical of it.

**Francis Heil:** I can share the view that the London Climate Change Partnership has submitted to the Committee, which also echoes the views of many of my peers working in climate resilience and adaptation that the Government's national adaptation programme 3 does not deliver the step change in action and ambition on climate resilience that the country needs. It underplays the significance and the urgency of heat-related issues.



We already know that heat stress and heatwaves are possibly the most significant climate risk being faced in the country. We have had more than 3,000 excess deaths when there have been heatwaves in the past, but this level of urgency and this level of impact are not being reflected and have not been reflected in the Government's national adaptation programme 3. The NAP3 sets out actions that are mostly around research and actions that could have been undertaken in the past or should be undertaken in parallel with action that delivers on the ground and addresses the risks that are being faced by the most vulnerable people. That is echoed by many people in the climate change and adaptation space.

**Chair:** Adrian, do you agree with that assessment?

**Adrian Dobson:** To some degree. From the built environment point of view, the adaptation programme is quite light in what it says about the built environment. I think in the built environment we have made a lot more progress on climate mitigation than adaptation. The fact that there is recognition that adaptation is important is good, but it is very much at the level of policy and strategy rather than action at the moment, so I think we probably do echo those views.

It may come across as slightly platitudinous and stating the obvious, but one of the challenges is that this requires action across a whole range of Government Departments. We particularly work with DLUHC, but many of the Departments are involved and that is all part of the challenge. It is a step in the right direction but probably needs to say more about the built environment and needs to move to action rather than strategy, would be our summary.

Q73 **Chair:** Do you see evidence of cross-Government working in this area? If the programme was signed off by DEFRA—and we are talking about the built environment over which DEFRA has limited responsibility—are Government approaching this from the right starting point?

**Adrian Dobson:** One of the things we have been calling for, along with a number of parties, is a more integrated national retrofit strategy. I am sure we will talk in a few minutes about what is happening with approved document O and new build, but the biggest challenge in the built environment is that about 80% of the buildings we are going to occupy in 50 or 60 years' time are already here, and it is the retrofit of those that is necessary. We need something that ties together what at the moment is quite a lot of piecemeal action—boiler replacement schemes, Great British insulation project programme—in a more integrated programme.

Q74 **Chair:** On the subject of integration, Linda, does the LGA have a role to play in this area from a governance point of view? Were you consulted on this programme?

**Councillor Taylor:** Thank you for pointing out that it is in its early stages. Having the opportunity to listen to people is the right thing to do, if I may say so, so that you can hear our views.



The LGA has done an accelerating adaptation action plan. One of the things specifically about this NAP is that there is no clarity on support and funding for councils. That is incredibly important. The point that you will probably hear from local authorities is we know our areas, we know what needs to be done, but we need that clarity on funding and on support.

**Q75 Chair:** I am sorry, I am being distracted by a member of the public who is taking photographs, which we do not do in the Chamber. We are being broadcast anyway, so you can pick it up from there.

The NAP3 set out a research programme of £15 million to support research into this area, funded by DEFRA and UKRI. This is recognising that we are at a research stage at this point rather than implementing policy. We are trying to decide what might be appropriate. Does RIBA recognise that that is correct, or have you come up with solutions within your profession—maybe Atkins has as well from an engineering perspective—which means we are beyond the research stage?

**Adrian Dobson:** I do not suggest that the research is not worthwhile, because I am sure it would be a very worthwhile programme, but you are right to identify there is an issue of analysis paralysis. The action now is needed quite urgently. In our own guidance, because obviously as a professional body we can only do the push rather than the pull for regulation, we have developed, for example, a thing called the 2030 Climate Challenge, which is very much about energy and embodied carbon in buildings. It was felt that 2030 was the period where we needed to get significant action. The research is welcome but probably we need to move to action in parallel with rather than waiting for research.

**Q76 Chair:** Is Atkins putting this into practice in other countries around the world, where you operate adaptation schemes around the existing built estate that are just not happening here?

**Francis Heil:** I have a few points on that. Around the world we recognise that urban heat and overheating is a multifaceted problem. Urban environments need to be adapted, not just buildings. We very much push a nature-based solutions focus of urban greening and thinking about access to water, thinking about cooling and shading in the built environment and public realm spaces, not just in buildings. In buildings we are implementing solutions that seek to meet the net zero challenge, while also looking to avoid increasing energy consumption and carbon emissions. Looking at more passive solutions is certainly the focus.

On your point about the research versus action, we work with many local authorities, helping them to undertake climate risk mapping and looking at heat risk, identifying vulnerable areas of cities or vulnerable communities. It is well established which building types and which people are most vulnerable to heat. I think we are beyond the research stages of that. The research needed now is into the benefits of different solutions, the benefits of green infrastructure, the benefits of other solutions that



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are passive—ventilation but also shutters, awnings, things that can be temporarily used to avoid heat—and the benefits of behavioural change campaigns and awareness-raising campaigns.

We need more evidence on those things, but there is no doubt that the key risks are largely in cities where there is the urban heat island effect, and in multi-storey buildings and flats that have single aspect. The time has come to move towards action and monitoring of solutions, not just spending time looking at who is at risk. I think we have established who is at risk.

**Q77 Chair:** Linda, picking up your point on the joined-upness or otherwise between central Government and local government where, as you rightly say, people have a better handle on what is happening within their area, do you feel that the NAP3 addresses those issues? The Climate Resilience Board has been set up, I think, to help local government to engage. Are there any signs that that is effective?

**Councillor Taylor:** To endorse what has just been said, we have a lot of information already and we have a lot of data, but the engagement between national Government and the local authorities needs to improve. We would want direction and clarity, especially in relation to planning. If as much emphasis as is put on net zero is given to adaptation, then we are on the right path trying to sort out the issues in front of us.

**Q78 James Gray:** Francis, you touched on it, but in our written evidence we have received all kinds of suggestions about things that could be done, particularly with regard to the urban environment, from green homes, green roofs and tree planting and green open spaces, and a variety of other things. Which of these things is effective, which of them is likely to be achieved and which is cost effective? Do you have any ideas on what things we should be doing in action terms with regard to the urban environment?

**Francis Heil:** They are very good questions. On the point of cost effectiveness, there is an element of bespoke analysis for that. In different places—

**James Gray:** Analysis what?

**Francis Heil:** Bespoke analysis would be required to say what is most cost effective in what situation.

**James Gray:** What is bespoke analysis?

**Francis Heil:** In terms of looking at different communities, different streets, for example, will have different issues. If a street or a neighbourhood is facing surface water flooding issues as well as overheating issues, then green infrastructure seems an obvious win, because it can provide benefits for both. It can help to reduce surface water run-off, reduce overheating and provide other benefits as well, like air quality improvements and biodiversity enhancements.



That is not the case in all neighbourhoods. There could be some neighbourhoods where it is not as cost effective, so it is hard to say how to give you a straight answer on what the most cost-effective solutions are. Certainly, in urban greening, there are win-wins there, as I have just mentioned. That stacks up in many cases.

Other measures that reduce energy use or do not add energy load make good sense because they do not lock people into high energy bills, and they do not continue to overload our energy supply. I would be approaching it in terms of what are the win-win solutions and what are the lower regret solutions as well. That is often how we approach adaptation planning. Take the actions that are low regret and continue to monitor and make decisions as time goes on.

In urban environments, other measures could include things like increasing access to public water points. That is a very useful and important service for vulnerable people. I also mentioned before behaviour change.

**Q79 James Gray:** Forgive me for interrupting, but all you are doing is repeating a long list of things that might be appropriate in certain places—I think you described it as bespoke. However, if we were to produce a report that suggests things to the Government, if we just say, “There are loads of different things you could do in different places and, yes, it might do,” you get nowhere. My question, therefore, is: which of these is best? Which should we be focusing on? Which would you like to see our report proposing? What should we battle for? Just saying it is bespoke does not help. Adrian or Linda, do you have views on this?

**Adrian Dobson:** I take the question, and I am also conscious these are quite complex issues in some ways. If I was asked to give a simple answer, I think increasing the amount of urban green space does not just have a benefit in terms of urban heat islands, but it has a wellbeing impact as well. There is quite a lot of evidence that there is a lot of inequity in access to urban green space. There is not enough of it.

There is the green infrastructure framework, a publication that Natural England has produced, which I think is very good. It has some excellent guidance, but again it is just guidance. It needs to be brought into the planning system so that it can have more teeth.

**Q80 James Gray:** We will go on to new build in a minute. I am talking about what exists now. What do you say about green space? It brings us on perhaps to Linda. That strikes me as being achievable because it is local government that does it. It will almost certainly be a planning matter and local government provision matter. Linda, is it feasible to see significant increase in green space in our urban areas?

**Councillor Taylor:** I think there can be, but I would like to make a point that I have been trying to emphasise, which is that local authorities need more robust planning powers to make sure that development meets the



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environmental standards. I would also highlight the fact that viability on a planning application is considered a material planning consideration. I would like consideration given to getting rid of that fall-out clause of viability.

Yesterday I was at Duchy College and there is a lot of research going on there with the Plymouth University. It is interesting how with robotics and the information we already have with satellite technology, local authorities working in partnership can at a glance see where there is potential for green areas and unlocking those spaces.

On the point that has been made about planting, planting is going to be incredibly important in the future because it is going to have the benefits of helping to reduce heat, but it is also going to capture carbon. These are the things that we definitely need to be looking at as we move towards the future.

**Q81 James Gray:** Leaving aside the changes that you suggest to the planning system, which are—I was going to say the “short grasp” but that was perhaps not the right expression, our detail, to what degree would your colleagues in local government be ready to accept a Government proposal that they should increase urban green space by a figure? Let’s imagine the Government said, “I want every single local authority in Britain to give us 10% more green space”. To what degree would that be doable?

**Councillor Taylor:** To a certain extent, that could be within the remit of local authorities because usually local authorities do have a lot of green space. There are also locked planning applications as well. Going back to planning again, if there was some potential for planning applications that have been stalling around for six, seven, eight years, if the local authority had the ability to unlock some of those stalled sites, that would give you what you need for your community. There is a lot that can be done and working with the local authority would be incredibly beneficial to delivering what we need for our communities.

**Q82 James Gray:** Coming back to the green infrastructure framework—I think it was you who mentioned it—is that working? Is it a good proposal and is it being implemented? Does it stack up?

**Adrian Dobson:** The proposal makes a lot of sense in the guidance it contains, but the national planning policy framework is due for review. It needs to be reflected in that. One note of caution I would add is that the planning system is already under a lot of strain. I am going slightly off subject but a big problem for many of my members is the delay within the planning system. Of course, it does require boosting the capacity and the skills of the planning system as well, in order to be responsive. I think that is where the action is going to be, within the planning system, but it must have the skills and resources.

**Q83 James Gray:** We cannot solve that problem this afternoon, but how





many local authorities have adopted the national green infrastructure framework? Is that something that has been widely adopted by local authorities?

**Councillor Taylor:** I know Cornwall has, but I cannot give—

**Adrian Dobson:** We could not give you a figure.

Q84 **James Gray:** I wonder if you could get the LGA to look into that and let us know. It would be quite interesting for us to know whether or not this is something about which most local authorities around Britain are saying, "Great, let's do it," or it is something that has been proposed by Natural England but has been left on the shelf to gather dust.

**Councillor Taylor:** I am sure that the LGA can provide that information.

Q85 **James Gray:** That would be very helpful. Perhaps we will come back to you, Francis: with regard to changes to the existing built infrastructure, that presumably is going to be much more difficult. As you mentioned, it was bespoke; much of it is privately owned anyhow, so you cannot make owners do things unless they want to; and the cost would presumably be gigantic. How do we move? Is it by means of changing public opinion that we move towards a better, less overheated urban environment by persuading people to do awnings or green roofs or things? That is a public information campaign rather than a funded campaign; is that a reasonable guess?

**Francis Heil:** Yes, I think we do need public awareness and a public information campaign, but we need incentives as well. We need to have, for example, the supply of things like awnings or shutters that can be fitted to homes. We need to see a cheap supply of those or a very accessible supply of those. We need to see people with skills to be able to fit those on at the rate that we need them fitted. We would also need to see things like landlords being incentivised to retrofit their properties because renters are not going to be able to do this.

There are examples of landlords being incentivised for programmes like this. There could be tax concessions, for example. There could be green mortgages as an approach where banks will reduce mortgage interest rates if you meet certain sustainability criteria. It could be things like meeting overheating criteria as well as meeting net zero criteria. There are a range of things that can stimulate action. It is not just public awareness.

Q86 **James Gray:** Mortgages are a commercial matter. Maybe you could persuade the banks to do that. In terms of coming up with subsidised shutters, people to fit them, training to do it, in the current and any foreseeable fiscal situation you are not going to get that, are you? That is going to be an enormous amount of money. To all of us in this room, it is a very important matter, but if you went on to the streets and said, "We are going to spend £1 billion on reducing heat in our urban environment," people would just say, "Hang on, what about education and health?"





While it might be nice to think of that, is it likely?

**Francis Heil:** I think the costs of not acting to enhance climate resilience are well established. The Climate Change Committee has put forward huge figures in the costs of the impact on the economy. We cannot just look at the costs of installing these measures. We need to think about the costs of inaction, which we have already seen in heatwaves and excess deaths of 3,000 people. That will continue. We have seen impacts on transport infrastructure in heatwaves and impacts on health systems. I think it is not just the question of costs.

Q87 **James Gray:** We all know that, but in 30 years of knocking on doors not one single person I ever heard has raised the question of urban heating. It is not a political issue. Nobody is interested. We are. Therefore, persuading HMG and the Treasury to stump up £1 billion to subsidise the shutters strikes me as being a bit unlikely, isn't it?

**Francis Heil:** I do not think it is a question of—

**Chair:** We might not have been canvassing in the middle of a heatwave, James, because we were taking shelter.

Q88 **James Gray:** You are probably right. We will move on to a different thing then: future homes, new builds. That might be rather different. Is there a way that we can use the new build standards to ensure that new builds achieve the things that you describe?

**Adrian Dobson:** I will have a first go at answering that. To take the point about new build, I think new build is where we are making the most progress in the overheating agenda because we do have this approved document O. We have a form of regulation. There are some aspects of it that perhaps could be improved and it maybe does not go far enough, but it is a step in the right direction.

The key point I want to make about new build is that in the new build arena you are generally going for something a bit like the so-called passive house approach, where you are going for a fairly airtight structure and you are super-insulating it and controlling the ventilation. That only works if you have high-quality design and high-quality construction because you need to achieve that air tightness. We know that as an industry the construction industry is quite challenged in this quality arena. For example, a solution we posited is we are very keen on the notion of post-occupancy occupation because, for example, on energy efficiency—

**James Gray:** Post-occupancy occupation?

**Adrian Dobson:** Post-occupancy evaluation, sorry, POE, as we call it. We know there is a big performance gap between the way new buildings are designed to perform, particularly in energy where we have a lot of data and it is easy to measure, and the actual performance because we do not achieve the levels of air tightness that we should.



On the new build, it is very much about getting the regulations right. I think we are going in the right direction, but it is getting the quality right. One mechanism may be POE; there may be others.

Q89 **James Gray:** I have two quick questions. First, is the story of O as good as it can be? Is it right? Is it world leading? Secondly, should the POE be mandatory?

**Adrian Dobson:** What RIBA has asked for on POE is that we think, for example, for publicly funded buildings there should be a mandatory requirement for POE because it is setting the agenda; it is achieving that culture change. That would be the answer on that one.

Whether approved document O is of world-leading standard, I am not sure we would be qualified to say that for certain. I note that in another session today you are looking at international comparisons, which I think is very good. Certainly, in our work generally on building regulations, particularly on fire safety, we have been surprised how reluctant the UK is to look at international. We tend to assume we know best and we do not always.

I will go slightly off track. Going back to the original question, the bigger challenge, though, is in the retrofit arena where, as you say, it is quite complicated. I think there is a risk that we put in energy efficiency measures that then exacerbate overheating in buildings where we do not have overheating at the moment. It has to be a whole building approach. Leaving aside the argument of incentives, finance and so on, there is a lack of information. I think most building owners are somewhat befuddled by what they are being asked to do because they get these piecemeal interventions.

Where financial incentives are offered there has been very low take-up, so we are not using the finance that has been made available. Sorry, I rambled slightly but I hope I have covered some of the points.

**Councillor Taylor:** Thank you for your question. This is coming back to the LGA where what we are saying is that local authorities need to secure funding pots as opposed to bidding in. When you have a financial pot that you know you are going to be working with, that is when you can start to work with private investors, because no local authority and no Government is going to be able to deliver what we need to do without that private investment.

We do need to have incentives, but having a solid funding pot will allow a local authority to go in and plan economies of scale. I would also like to throw into the mix the apprenticeship levy. My understanding is that that is not always spent to its full capacity. If the apprenticeship levy was devolved to the local authority, they would then have a sum of money where they could start to upskill and skill the operatives that we need to deliver on the green credentials that we need to put things right. Things like screening, airbricks in roofs, creating green spaces on council land,



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these are things that can be achieved. They can be achieved through the apprenticeship levy, which is not going to be any additional extra cost to the Government. That is something I would like you to think about, please.

It is making the point that local authorities need secure funding and knowing that they have that funding for two or three years so they can start delivering on what needs to be done, and working with partners to make sure that it happens.

**Chair:** On the subject of retrofitting, Ian Levy.

**Q90 Ian Levy:** I am the Member of Parliament for Blyth Valley, and we have quite a large stock of houses that will need to be retrofitted. I often look at retrofitting in houses and I think, "Why don't we do it right the first time round?" Obviously, quite a lot of our stock, as it will be across the rest of the country, is a fair age. The question is: how do we best retrofit existing properties to cope better with heat and what measures should we prioritise when retrofitting?

The other part of my question is: what is the right balance that we get—this might be for Adrian—between insulation, air tightness and ventilation? I know in my inbox I have had quite a few instances where people have felt the cold over the winter. They have had the tumble dryer on and the house is just riddled with damp. If we make an airtight property, if we retrofit a property and make it more or less airtight but we have that ventilation as well, like you have said, it is not that good to do that when you retrofit but it is if you are doing new. I do not know if you want to pick that one up, Adrian, and then I will leave it open to the panel.

**Adrian Dobson:** I will do my best. I think we are reiterating the point that with new build it is easier to get that balance between air tightness and ventilation because you can use a much more controlled thing. We have this quite complex housing stock, reportedly the oldest housing stock in Europe. Lots of solid brick wall construction, this kind of thing.

Our view would be that we would go for a fabric-first approach, that the best thing is to get the insulation levels right, get double glazing in, get the insulation levels correct. However, you do need to be aware of the need to have controlled ventilation measures. Your windows have to have ventilation provision.

**Q91 Ian Levy:** Would cavity wall insulation be included in that?

**Adrian Dobson:** That is possible with some of the more modern stock. With older stock you are then into all the complexities of whether you put insulation on the inside or the outside.

**Ian Levy:** It is solid.



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**Adrian Dobson:** Yes. This takes me back to my point that for the tenant, the home owner, the home occupier, it can be quite difficult to navigate all this. I think we tend to reduce it—we are always in danger of reducing things to a quick technological fix. For example, air-source heat pumps probably have an important role to play, particularly for new build, in future energy consumption, but if you are going to do that in an older property, that is quite a complex measure where you have to get the whole product right.

In terms of the skills gap we have, it exists in the professional sector as well as the construction sector. We probably have sufficient people but we have not all yet skilled up to meet that challenge. I am trying to be honest in saying that I do not think it is something with a simple answer. Francis may say there is something more straightforward, but I think it needs people to look at each individual property.

What the Government could perhaps look to the construction sector to do is to say there are certain typologies. Not every house in the UK is different. We have terraced houses of solid brick construction pre-1919. We have semi-detached houses built. We have cavity-wall houses from the 1960s and 1970s. Perhaps the construction industry should be more proactive in coming forward with the typological solutions that we need. The point we have to get across today is the scale of this challenge is enormous. It is a huge challenge.

**Francis Heil:** I am not an architect or a building designer, but I did contribute to a magazine article in *Building* last year. I can provide this to the Committee. There were many others who contributed as well. There was some research from Loughborough University quoted in that article. It has two identical test facilities of flats—one fully insulated and one not insulated—and it could test how those two performed in heatwaves. The fully insulated flat did get a little bit hotter in a heatwave, 1° or 2° hotter, but during the night, by opening the windows and ventilating the flat, the temperature dropped down.

A key point that I want to get across is that behaviour change and behavioural interventions are important here, too. It is not just the built solutions, but the built solutions are certainly important. Insulation makes sense, in general. There was some other research in this article that mentioned loft insulation decreased overheating in flats as well. There are good reasons that insulation can be a good thing to decrease overheating, not just to cause overheating. Again, going back to some of those simpler measures for people to be able to manage, like shutters, like being able to open windows and have cross-flow ventilation, those are important.

For retrofitting—I am not an expert on retrofitting—there is clearly a huge programme of retrofit that is going to be happening and needs to happen to reach net zero. What we need is join-up and understanding the benefits of join-up, not just for overheating but also for flood prevention,



which is another key issue that homes can be addressing. If we are getting in and doing work once, we should be thinking about—I think it has been said—climate change mitigation and adaptation together, so that we do it cost effectively and with the least impact on people’s homes and livelihoods.

**Q92 Ian Levy:** Councillor Taylor, could I ask you to put a slight twist on that? When it comes to local authority buildings—libraries, schools, this sort of thing—where are we at with that? Is there a hunger to put shutters on buildings like that?

**Councillor Taylor:** It is an interesting question because you probably know that local authorities have what I would sometimes describe as grey, old, brown buildings that unfortunately are not fit for purpose but they are valuable to the community. You have to keep those places open, especially as a lot of them have been adapted to become hubs and places for vulnerable people. Things like shutters and sometimes something obvious like an air brick keep that ventilation open.

The point I was hoping to make is that I believe that the majority of the social housing decarbonisation fund should go to the local authorities because I am coming back to economies of scale. If we have that funding, we know that we can get a programme going as opposed to stop, start, stop, start. Grey, old, brown buildings are important and they are just as important to the community wellbeing. We do need to look at preserving those as well, but there are huge costs. That is why it is important to get those incentives so we can get private investors involved in local authorities and preserving buildings with potential tax breaks or incentives.

**Ian Levy:** Did you want to come in, Adrian?

**Adrian Dobson:** Just to reiterate three points that my colleagues have made. On the existing buildings, as well as being intrinsic to community identity, there is a huge amount of embodied carbon in existing buildings. That is another factor that mitigates further retrofit. To make the point about behavioural change, which is obviously a slightly odd expression, it is not that people are badly behaved but there is this business about how people have to be brought up to speed with the way systems work in buildings when they are introduced.

To go back to my post-occupancy evaluation point, there was a piece of work done with a new arts centre in Nottingham where they were having problems with some of the energy performance, and so on. That was to do with this very point of the staff not understanding that there was an opportunity in the summer to purge cool the building by using the ventilation system. It is not necessarily intuitive to people because it is not the way we have all been brought up to, as you say, adapt and cope to the houses we have.

**Q93 Dr Matthew Offord:** I wanted to ask Councillor Taylor about the LGA’s



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written evidence to this Committee. It stated that local authorities receive no core funding for climate action. What is the implication of that, particularly on your local authority, and the delivery of councils across the country and their delivery of adaptation strategies?

**Councillor Taylor:** It is coming back to the point that local authorities are best placed to understand their community. They have a lot of information; they have a lot of data. With secure funding, they are able to deliver the programmes that we need. I would suggest as well that local authorities with local knowledge, using local contractors and economies of scale, could, in my opinion, deliver the programmes out cheaper than if it was a national programme coming from Government. That is why I think it is important that local authorities are actively engaged. They have those secure funding pots and they can start to make a difference.

Q94 **Dr Matthew Offord:** What current mechanisms are available to finance heat adaptation measures?

**Councillor Taylor:** Local authorities get grants. We get grants that are available to all local authorities. Local authorities start bidding and it is unhelpful. It is not just for the subject we are talking about today. You are putting so much time and resource in and these are important discussions today, heat resilience. That is why I keep coming back and you feel I am on a record. Local authorities, if they had that certainty and that funding, would be able to deliver. This is a big project for the whole of the UK. Having local authorities bidding in is not helpful, and I do think that we need to secure funding.

Q95 **Dr Matthew Offord:** You mentioned bidding. Can you confirm for the benefit of us that you are not guaranteed of your bid being accepted?

**Councillor Taylor:** No. Yet you still have to deliver what is needed. This is a subject that needs to be addressed now. That is why I am making a plea on behalf of the LGA and local government, our local authorities, that we get secure funding because that is going to make the difference and secure what we need to do.

If I may say so, going back to my suggestion about having the apprenticeship levy, that will give the local authority the ability to start training people up because that will be the next hurdle, not having the availability of skills.

Q96 **Dr Matthew Offord:** One of the difficulties with the Government providing money is that it is paid for by the taxpayer, and not everyone who would be a beneficiary of that money could be a home owner. How would you like to see a balance of public-private money being provided to address this issue?

**Councillor Taylor:** The Government have the money, and it is not just home owners that will get the benefit because most local authorities have very aged housing stock. To some extent, this is where our most





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vulnerable residents are living. It is incredibly important. I believe most local authorities would look at the most vulnerable sector and want to start to retrofit that particular housing.

Local authorities do not have to have the money all in one go, but if they had the certainty of a three-year programme, they would know to get their programmes on a row ladder. It is going back: we know our areas. We know what can be done and it is providing that certainty.

**Q97 Dr Matthew Offord:** Would you support other initiatives, such as increasing the council tax, if you made it very clear to your residents that this is what the money would be almost hypothecated towards?

**Councillor Taylor:** With respect, we are at our limits in Cornwall, as a lot of local authorities are, so Government would need to do something in relation to that cap on council tax. This is so important that if there was an ability to look at council tax income within the cap, then I do believe that the majority of residents get it.

I would prefer that the funding pots that are available are made available to local authorities, especially in relation to housing decarbonisation, because that is a 10-year plan. We do not know what we are going to get, but if we had that certainty then we can start to make a real difference.

**Q98 Cherilyn Mackrory:** I want to ask a little bit about prioritising the most vulnerable to the effects of heat and when it comes to adaptation measures. Linda, you and I both know that in Cornwall there are some parishes that were outstanding at knowing where their vulnerable people lived. We were able to, in some parts of Cornwall, identify them and start to help them straightaway. However, it was not the case everywhere, and it certainly was not the case all over the country. Do local authorities know enough about their communities and the individuals who are particularly vulnerable? Are we mapping that in a formal way? How are we doing that, either in our example in Cornwall or nationwide?

**Councillor Taylor:** Local authorities should be ideally placed to know where our vulnerable people are, especially if they are working in partnership with DWP because they are going to have that source about where pensions are going. One of the things that came out from Covid was that community spirit and building up that knowledge of where vulnerable people are.

To a certain extent, that has slightly disappeared. I think it is incredibly important that there is a collaboration with local authorities, with the voluntary sector, to map it out. The most vulnerable will be known to the local authorities, especially through council tax collection and with DWP.

**Q99 Cherilyn Mackrory:** That is already on a formal way. We have talked about urban environments versus rural environments. Are we then trying to do some analysis on where our most heat vulnerable people live in the country?



**Councillor Taylor:** Yes. We can track that through the household support scheme that has been allocated out to local authorities. We can map with our collaboration with the voluntary sector and with Cornwall Energy Plus. We can map out where those grants were going and where there is a need. You will always get people fall through the gap because people will not make a claim. Local authorities are best placed and it is more about collaborative working, especially with the voluntary sector, to find those people who could and should but do not.

Q100 **Cherilyn Mackrory:** Are there initiatives in all local authorities to do that work?

**Councillor Taylor:** I think it was something that came together in Covid. It has probably dropped a bit but, as a model, this could be rolled out across the country. It is incredibly important, as we go into heat resilience, to know where our most vulnerable people are. As I said before, some of them, a large majority, will be in our social housing so local authorities will know where they are.

Q101 **Cherilyn Mackrory:** The hottest temperature I think I have ever experienced was in Melbourne. It was about 48°. I noticed that in Geelong, which is in Victoria, they have gone as far as working out where those people live and then retrofitting a single room in each of the homes of those people to—I think they have put in draft excluders and all sorts of different things, each low-level things but that is what they are trying to do. It is a cost because it is a lot of houses but the actual work does not cost that much. Could the panel comment on things like that and whether that is something that we can start with in this country or whether we are already starting that, formally rather than voluntarily?

**Adrian Dobson:** A straightforward answer: I do not know the answer to the question about how much of that is happening. I do not know if we are blessed or cursed to live in a mild, temperate climate. That creates some of our inertia, I think, but it seems without doubt that we are going to experience some periods of perhaps quite short but acute heat and flood issues, too. We have all been saying today that these are long-term measures to try to build heat resilience in the built environment. There probably will have to be some short-term emergency provision around vulnerable people, maybe single-room air-conditioning. There is the possibility of using air-source heat pumps as a cooling mechanism.

Q102 **Cherilyn Mackrory:** I guess I might bring my question back a step. In this country, as you say, we occasionally get acute heat events but they are not predictable, they are not every year, but we are told they are going to become more common. Would something such as cooling centres be more applicable? If that is the case, what work is already being done to try to formalise them? Is that happening everywhere yet?

**Francis Heil:** The London Climate Change Partnership, of which I am a member, is calling for a national heat resilience strategy to address exactly what you are talking about, to think about how we prioritise and make plans for actions. Much of the Government's focus, certainly in the



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national adaptation programme, has been more about preparing the health and social care systems for once people have already been overheated or impacted rather than preventing that from happening.

In London, for example, in the work that I do at AtkinsRéalis, we work with local authorities to map climate risks, look at heat stress and heat risk and overlay that with vulnerable population mapping. The Greater London Authority has made its climate risk map publicly available so that the boroughs around London can use it, and other authorities have done similarly. However, there is a need to develop a strategy, looking at the typology of different buildings and interventions that could work to address cost-effectively on a mass scale how we prioritise different buildings and where in the country we prioritise, doing things such as you mentioned in Geelong.

This also has to involve what I said earlier about behaviour change, the human elements. Even the idea of moving out of hot rooms into a room that is cooler to work in or sleep in, such as moving from a higher storey to a lower storey for sleeping, for example, is a useful adaptation that can occur before retrofits fully take place. In some cases, the retrofits will never fully take place because they will not be cost effective. There are some solutions that we do need to think about sooner.

Another one is just having fewer people in some of our buildings. That is not a simple solution, but in some cases it might be that we have to accept that some older buildings can no longer house as many people as they used to, some factories, for example, or some office buildings.

**Q103 Cherilyn Mackrory:** Can you talk to me about active cooling and passive cooling? If active cooling is something like reversible heat pumps where you are actively making a room cooler, what is passive cooling? I do not know what that would be. Is that taking people to a cooling centre or under a tree? How does that work? I am reading the brief. What I am saying is that there are lots of different stages and I guess we have to take it in stages in this country in particular. What can we learn from other countries going through this path and probably a little bit further down the road than us? We are not going to be straightaway at a point where we need to map everybody and immediately take them out of their homes and into other places. I guess I am asking you about summer 2024. If we are in for a hot July, we can see the weather coming down the road. What plans have we got that soon and then what are we aiming for in the medium and longer term?

**Francis Heil:** In London, the Mayor of London has stepped in. The London Climate Change Partnership's view is that there has been an absence of leadership at the national level so the Mayor of London has put in place a few strategies. You have mentioned one of them, cooling centres. The Greater London Authority has mapped and made available areas that vulnerable people can use during heat waves.



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A very vulnerable population is rough sleepers and there has been good evidence to show major effects on them and probably less done during heat waves compared with when there are cold spells. There are some populations and groups that we are not getting to early enough.

Yes, in the short term, in the near future, we should be using things such as cooling centres, and cool areas, whether they be churches or theatres or large public spaces that are better ventilated. We need to recognise that that has implications for people's privacy and their productivity. We cannot expect that the heat issue will not perpetuate inequality. People in larger houses, who can potentially afford cooling or air-conditioning, will continue to live more comfortably and work from home comfortably. That is not the case for others.

**Cherilyn Mackrory:** Those people are not vulnerable.

**Francis Heil:** Exactly.

**Councillor Taylor:** I think there are some practical ideas. I am thinking about Cornwall. Where we have vulnerable people we can use canopies but we do need to start planting.

Another upside to being able to afford to keep cool is the impact or drain on the national grid. That has to be another serious consideration in how we move forward.

**Cherilyn Mackrory:** Do you have anything to add, Adrian?

**Adrian Dobson:** On passive versus active cooling, just to make the point that an over-reliance on active measures to cool is incredibly energy intensive.

**Cherilyn Mackrory:** What about passive?

**Adrian Dobson:** A couple of things struck me during the conversation. In heatwave conditions, there are some quite counterintuitive things that I think we all learned about over the last few years. Self-raising windows: you want those shut and the curtains drawn when the natural thing is to ventilate, you would think. It is partly about looking at how buildings are built in hotter climates. You do not have to go very far south in Europe to see buildings with external shutters, particularly on south-facing facades, and that kind of thing. Those measures could be put in place. That is not to say there is no role for air-conditioning but we must be aware that puts a huge requirement on the grid for energy.

**Chair:** That concludes our first panel. Thank you all very much for joining us, Councillor Linda Taylor from Cornwall, Francis Heil from AtkinsRéalis and Adrian Dobson from RIBA. Thank you very much indeed.

Examination of witnesses

Witnesses: Professor Elizabeth Robinson, Omar Abdelaziz and Eleni Myrivili.

Q104 **Chair:** Welcome back to the Environmental Audit Committee for our second panel where we are covering some of the international experiences of heat resilience and best practice, which we were being led towards by the questioning at the end of the last panel.

I would like to start by welcoming in the room Professor Elizabeth Robinson from the Grantham Research Institute at the London School of Economics. Welcome, Elizabeth.

**Professor Robinson:** Thank you.

**Chair:** Could you tell us what you do at the LSE?

**Professor Robinson:** I am an environmental economist. I work a lot on the links between climate change and health. Part of that is that I am Working Group 1 lead for the Lancet Countdown on Health and Climate Change that tracks the links between climate change and health. One of the particular areas we are interested in is the health co-benefits of tackling climate change, both adaptation and mitigation. I am representing quite a broad body of knowledge at Grantham, including the leadership by Dr Candice Howarth of our local adaptation group.

Q105 **Chair:** Thank you. We are particularly pleased that Eleni Myrivili has been able to join us from the UN-Habitat office in Athens. I think you are midway between Washington and going home so thank you for stopping off in London to join us today. Could you explain what your role as the Global Chief Heat Officer means?

**Eleni Myrivili:** My background is that I was elected to the city government in Athens and then worked in building resilience, and eventually specifically heat resilience, in the city of Athens. I participate in different networks, city networks, lately focusing more and more on heat and recently, very recently, since last February-March, I joined UN-Habitat, trying to raise the agenda of heat resilience within UN-Habitat. Through UN-Habitat, because it is mostly an urban issue, I raised the issue within the UN system in general, both on an advocacy level and an advisory level. That is my mandate.

Q106 **Chair:** Thank you. You have a lot of directly relevant experience for this inquiry so thank you again for joining us.

We are joined online by Omar Abdelaziz, Assistant Professor in the Department of Mechanical Engineering at the American University in Cairo, who I believe is joining us today from Nairobi. Thank you for spending time with us today. Could you explain what you do about heat resilience and cooling sustainability?

**Omar Abdelaziz:** I am also the co-chair for the Refrigeration, Air Conditioning and Heat Pump Technical Options Committee for the UN Ozone Secretariat and I am a lead author for the "Global Cooling Stocktake" report, which is part of the global Cool Coalition from the UNF.



Through this report, we are trying to have a stocktake for cooling, the status quo, and what policies are available. We are modelling the current status, what will happen in 2050 if we continue with the status quo, continue with business as usual, and also looking at different scenarios to envision what actions would be needed to achieve a near zero potentially.

Q107 **Chair:** Thank you. Your volume is full as far as we are concerned here but you are a little faint to hear, so as you are doing, if you can sit a bit closer to the screen, that might help us. Thank you very much for being with us.

This inquiry was prompted by some research done by some learned academics at the Oxford Martin School, who I am pleased to say are with us in the room. Professor Radhika Khosla and Dr Nicole Miranda, thank you for joining us. The research that you undertook indicated that the UK, in an international context, appeared to be one of the least prepared of developed countries for coping with increased heat waves as we have now evidenced recently in the UK as well, obviously, and in many other countries, including Greece, particularly this summer.

We received quite a significant amount of written evidence in relation to this inquiry, I would say more than we might have expected, which suggests that it is a topic of great and growing interest, which is perhaps not surprising as the world heats up and we all become more aware of the implications.

One of the questions that we are trying to address is whether or not the UK needs a dedicated heat strategy or whether heat resilience could be built into existing strategies. It would perhaps be easiest if I start by asking Elizabeth Robinson for her views on this because she will be closer to the UK's circumstances than our other guests.

**Professor Robinson:** I think the short answer is yes, we do need a particular heat resilience plan and strategy. What we have seen from the earlier evidence as well is that the impact of heat on health, productivity and vulnerable people is widespread and we cannot isolate and try to solve this one department by one department, one sector by one sector.

As we have seen, there is already a lot of evidence that dealing with heat, tackling heat, is insufficient. If we just consider that for the next 27 years we are going to be trying hard to reduce our emissions and at the same time temperatures will be going up, we need to think about a co-ordinated, 27-year trajectory in the way in which we look at the links between adaptation, mitigation impacts and health.

We have talked a lot about the built environment. We have talked a lot about vulnerable people. When it comes to deaths, those vulnerable people are the elderly, but what we have not talked about are vulnerable workers. As we start to look at who is vulnerable and why and the economic impacts, we know that productivity goes down in heat, and labour supply goes down in heat in all but the cooler countries around the globe. Where we can see the evidence it suggests that joined-up thinking





is needed and joined-up thinking is going to lead us to much more efficient and much more effective outcomes, much more cost effective and have much more impact in terms of reducing the negative impacts of heat.

**Q108 Chair:** In addition to encouraging Departments to work together, to have more coherent policies, what other aspects do you think a heat resilience strategy should contain?

**Professor Robinson:** The specific elements? I suppose we need to look at building resilience and prevention and then we need to have the early warning systems for reaching people. It is about preparedness, trying to be less reactive and looking at where the funding comes from. We have had a lot of discussions about where we make the investment. There are lots of areas and we can even look at food supply.

On the one hand, vulnerable people tend to have vulnerabilities in many different areas, but with heat, for example, we know that it is poor people who suffer food poverty and cannot afford a healthy diet during hot periods because healthy food is more expensive. We look at workers, for example, those in the gig economy, and we look at elderly people. I think these are just more reasons why we need to have a joined-up approach.

To some extent, it is mainstreaming. Any time we are looking at policies—most policies but especially those linking to adaptation and mitigation—we should think about the implications in the context of heat. We know that it is not just heat that we are looking at. That is another reason. It is heat plus all the other impacts we might see from climate change.

**Q109 Chair:** Eleni, could you come in with some experiences from around the world? We might start with Greece and whether you have a resilience strategy.

**Eleni Myrivili:** No. We have in some cities but we do not have one on a national level. Very few countries have heat resilience strategies. The US is trying to put one together as we speak. In India, there has been some resilience strategy for heat, but it is more guidelines to lower levels of government. Some countries around Europe do have strategies; it is still sparse, but it is also extremely important. I would suggest that you have the incredible luxury of not having to deal with extreme heat very intensely right now and you have the time, first, as you said, to fold it into other policies and strategies that you are already doing. It is silly to come later. It is much more cost effective to fold it into your energy strategies and your mitigation strategies.

The main thing is that nobody really has the ownership of heat so often what happens is it gets bumped around and nobody gets to own it and to co-ordinate and create the collaboration that is needed. As my colleague said, so many different aspects of our systems in cities and our national systems are affected by heat, from infrastructure to health to labour to



different types of building codes and so on. So many aspects need to be co-ordinated in order to make sure that when the heat waves happen, we can save lives. That is really important: having some centralised co-ordination and strategies can help with that and can also streamline theoretically. The best thing, as you were saying before, which is also not the case in most countries, would be to create a streamline between different levels of government so that mandates, and also the funding, can go all the way down to cities, which is where most of this stuff has to happen.

However, because you asked before and I was thinking about what things you can do, you can do naming and categorising, which should be at a local level, naming heatwaves and categorising heat waves, but it could be on a national mandate and overseen by your national meteorological agency.

Q110 **Chair:** Do you mean naming like we name storms, naming heatwaves?

**Eleni Myrivili:** Exactly. We are starting to see this. This has just started happening in different countries. We are just starting to see evidence that shows that there are fewer calls to hospitals when we have applied better information systems.

Q111 **Chair:** This is to inform the population that there is a problem coming and to start to take steps to keep out the sun, or whatever?

**Eleni Myrivili:** Yes. It is important because it changes perceptions. Heat is like something that is vague. We call it the silent killer because most people do not understand how dangerous it is and what a high risk it poses.

On things such as having categories, people think of risk when they hear category 1, category 2, category 3, and the naming also allows people to respond to it as an entity. By now we do have some evidence. This is a very conflicted field but we do have evidence that shows behavioural change. This is important.

Another thing that is important is to—

Q112 **Chair:** Sorry. I think this is very interesting but can I just stop you for a second? Is this something that the UN is promoting?

**Eleni Myrivili:** No.

**Chair:** No? Not yet?

**Eleni Myrivili:** No, not yet. There is a lot of resistance to it. There are a lot of issues. One is the type of categorisation that is a heat-health categorisation, which we have started implementing in different cities. Because heat is so idiosyncratic, the best place to act on it is in cities. For example, London could have a totally different heatwave from what Manchester might have. We do have to look at how heat affects urban environments and one of the best ways to do that is to look, as we say,



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back-cast, and see what effects we have had in the past for London, or for Manchester, and then correlate the effects for mortality and morbidity with heat levels and create correlations between heat and health that are depicted in these categories of heat waves so it would have the impact in the categorisation, because that is easier for decision makers and policymakers to take into account.

Q113 **Chair:** This happens with storms, which are by definition localised. They move around geographies. We all are familiar with the way hurricanes move up the east coast of America out of the Caribbean. Are there places around the world where this is happening? Have any cities started to do it? Did Greece name anything this time?

Q114 **Eleni Myrivili:** In Athens, in Thessaloniki, in Seville, in Spain in a couple of cities, in Paris they have been doing it, and in the United States and India as well. We do have cities starting to apply this, yes. We are starting because it is very recent; it is the last couple of years that we are piloting it. Miami, for example, created this long heat season with early warning systems and constant attention, and we are starting to get measurements of the lessening of calls to hospitals and fewer deaths.

Q115 **Chair:** Excellent. We will pick this up in further questioning but I am very keen to let Omar come in now, particularly on this point of best practice and whether, Omar, you agree with what Eleni said, that naming as a means of raising information and awareness might be a good thing.

**Omar Abdelaziz:** Of course. Raising awareness is very important. I completely agree with Eleni. Raising awareness helps a lot because people can be more prepared. I am not sure if naming the heat waves is the best approach because, as was mentioned, different cultures react differently to heat. Building construction is different from one culture to another and urban heat is also a contributing factor. That is why the national adaptation plan is of major importance.

Right now, in our "Global Cooling Stocktake", we were able to count 87 countries that have national adaptation plans. I think this is the first step, to have a national adaptation plan. How do you want to adapt to heat or cool waves? Once you have this adaptation plan accounting for all your cultural background, for your buildings or your urban heat effects, urban heat island effects, then you look for what is the best path forward. Maybe in cities where they are used to the idea of hurricanes being named is the best path forward. Yes, naming the heat wave would be good there, but in a culture where they have never named a hurricane before or have never seen a hurricane, having a heat wave named would be too strange. They might need a different way of understanding the danger of the heat wave.

**Chair:** Okay. I think we should move on but, Ian, do you want to come in on that?

Q116 **Ian Levy:** Yes, thank you, Chair. When you watch the weather forecast on the TV, you get a weather warning—it could be a yellow warning or a



red warning—and that is usually for storms, but we do not get that for heat. Could that be a way of implementing it? If people knew—the country is already used to a yellow warning for weather, whether it be yellow or red. Could that be a similar thing?

**Chair:** It does apply in some countries. Eleni?

**Eleni Myrivili:** Yes, absolutely. Usually, the categories have a colour to them, you are right, for quick recognition. Naming is just a part of it but the categorisation is important.

If I can continue with a few things that could be mandated, another mandate could be for the energy sector, beyond a specific temperature, to divert energy from industry to residential so we do not have blackouts and we do not lose people; easy.

Building codes for passive and active cooling: I can quickly explain. Active cooling is when we use energy. When we use energy, we call it active cooling whether it is by heat pumps or air-conditioning or whatever. It is active. Passive cooling is whenever there are passive means such as if you design a building with windows or you have shading or if you have a public space, which is 70% of our space in our cities, to use it for cooling, as with nature-based solutions and so on. These are all passive ways of cooling. If you use materials or different colours, these are all passive cooling ways. If you use energy, those are active cooling ways.

You can do a lot in building, in the building sector, and you talked about this already. Another thing is labour laws, which is also starting to happen in some countries. In Greece we have it and in Qatar and in the US they are starting to put in labour laws when beyond certain temperatures you stop people from working. You send them home or they have to take breaks and so on.

These are easy things to do and they can be mandated. Also, of course, there are nature-based solutions. We know that there has been research that shows that if we have a 30% canopy in a neighbourhood, we start to lower the number of deaths from heat, deaths that are linked to heat, by one third, or one fourth, I am not sure which. It recently came out from *The Lancet*. It was very recent research, in 94 cities in Europe, that proves that we have a lowering number of dead people when we have 30% or more of tree canopy. These are things that we can take into consideration but they need to be mandated, so cities can be helped to do that.

**Chair:** Could we get access to that research? I am looking at our specialist advisers. I think they are nodding, so that is great. Practical suggestions are helpful, and if you can weave those into your answers to the other questions that we have that would be much appreciated.

Q117 **Dr Matthew Offord:** I understood that some members of the British press described our heatwave as Cerberus. There is a fashion for doing



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this. Mr Abdelaziz, I wanted to ask if you could briefly tell us about your Cool Coalition and “Global Cooling Stocktake”.

**Omar Abdelaziz:** The “Global Cooling Stocktake” is a report that was developed to shine a spotlight on cooling policy trends, technology and investment opportunities in collaboration with key global stakeholders to help close the gaps in access, affordability and information. It not only focuses on space cooling but also cold chain for food.

It is prepared as a collaborative output of the Cool Coalition, providing a status check and an overview of national policy and regulatory actions across all cooling sectors in 192 countries. We could not find information from the Democratic People’s Republic of Korea.

It provides modelling for direct and indirect emissions from all cooling sectors globally. By “direct”, we mean the emissions of refrigerant directly into the atmosphere, whereas indirect emissions are the emissions related to the consumption of energy and the CO<sub>2</sub> associated with that.

We use the year 2022 as our baseline, with the projection all the way to 2050, along with interventions and different scenarios to reduce the emissions while improving access to the vulnerable. The modelling that we used evaluated different measures and pathways by which near zero emissions from cooling can be achieved, alongside development priorities, such as access to cooling for those who need it.

In some very emerging findings, we found out that near zero emissions from the cooling, with improved cooling access, can be accomplished through the implementation of synergistic policies. I can describe that. Synergistic policies are basically looking at—we have three main things: the building energy codes, the minimum energy performance standards, and the refrigerant global warming potential. We try to look at these synergistically. Of course, there is a very important aspect, which is the financing and how you can market these technologies together.

These also need to work together to create a strong and sustainable cooling ecosystem. It requires mainstreaming cooling within a national-level regulatory and legal framework in alignment with broader net zero targets, developing national cooling action plans and streamlining financing.

We found that the G20 countries currently represent about 73% of the emissions, and roughly this value will continue all the way to 2050. If we look at the G7, this value shrinks down to only 11%. That means that we need the G20 to provide the leadership when they look at what needs to be done to achieve the near zero emissions from cooling.

If we fully implement the measures outlined in the report, we can reduce the 2050 greenhouse gas emissions from cooling by at least 60%, which is around 3.8 billion tonnes of CO<sub>2</sub> equivalent emissions, which could be



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increased up to 96% if we can also account for decarbonisation of the grid.

The cumulative savings in social cost of carbon using \$185 per tonne would be \$16.5 trillion. Looking at the energy savings for the consumer, this would be about \$1 trillion per year in the year 2050, and the cumulative would be also in the order of \$17 trillion between now and the year 2050. Now I am at your hand.

**Q118 Dr Matthew Offord:** Thank you. That is very useful. It will be interesting to see when the report is published at COP28. You mentioned just one country in there but explain some statistics about others. What do you think that the UK should focus on in regards to transitioning to a cooling?

**Omar Abdelaziz:** When we look at the UK and what needs to be done when transitioning to cooling, the focus should be how we do the synergistic activity. How can we look at buildings minimum energy performance standards and the F-gas regulations? Luckily, the UK is well ahead of the world when it comes to F-gas regulations and the transition to lower GWP refrigerants. Now our focus should be how we can have efficient buildings and maybe urban environments as well as how we can facilitate that with higher efficiency equipment.

When the UK was part of Europe, there was this ecodesign process for improving energy efficiency and having stringent equipment efficiency. With time it was updated regularly. That needs to continue. Now, on the market, you can go and buy room air-conditioners that are two to three times more efficient than an average unit in the UK.

Another issue is that the buildings, what I call a stock building in the UK, are not designed to be air-conditioned; they are designed to be heated but not necessarily air-conditioned. If we were to say, "Okay, I want to cool this because now the climate is different," there is a significant cost of retrofitting this building and we need to redesign the building—the retrofit goes in to create the required changes and modification to fit the cooling equipment. Or should we think about how can we reduce the cooling load so that we do not need as big cooling equipment?

Finding this balance between how much of this up-front cost goes into improving the building envelope versus just buying bigger cooling equipment is something that needs to be done, especially with the large building stock that we have in the UK.

**Q119 Dr Matthew Offord:** Thank you very much. Moving on, I wanted to ask you what the reaction has been to the Nature for Cool Cities Challenge. For example, was there any interest from the United Kingdom?

**Omar Abdelaziz:** Unfortunately, I was surprised when I dug into the statistics and I found that no city from the United Kingdom has submitted an intention to participate so far. Twofold to that, I do not think we have done enough in promoting the Nature for Cool Cities Challenge. Maybe cities are not aware of this and have not had enough time or awareness





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to say, "Yes, this is something that we would like to participate in." We have not had serious interest from other cities as well like the serious discussions that we have with a handful, not as many as I was hoping to hear right now.

Of course, the funding that we have is about \$1.5 million. It is secured now and we hope to be able to fund five cities and to provide capacity building for 15 other cities, and replicate that information all the way to 200 cities afterwards.

When I look outside this challenge, there are UK cities that are doing activities related to nature-based solutions and trying to have activities in sustainable climate and trying to have something similar to an adaptation plan. There are about three cities that are trying to do so, but not enough. Not enough is being done, to be completely honest.

**Dr Matthew Offord:** That is very interesting for us to learn that and we certainly will bear that in mind when our report is produced. Did you have something to add?

**Eleni Myrivili:** Yes, could I add a couple of things? The UK is the founding member of the Cool Coalition and it has been participating in the steering committee. I have also been part of this effort. Right now it is proposing a global cooling pledge that is coming up, as you know, at COP28. It has been championed by about 10 countries by now, and the UK Government are currently considering that they are probably going to support the commitments. It is about 13 commitments on a national level and three commitments on a subnational level.

Another side of this is the nature-based solutions challenge for cities, which is separate. We tried to put them together but it ended up being quite separate. As Omar said, it has not yet attracted attention, but it was not supposed to yet attract attention because we just managed to get UNEP, to get the \$1.5 million secured. Now it is going to start engaging cities and trying to get cities' attention.

Again, there are some cities preparing and part of the discussions of these two things in England. Greater Manchester is more engaged and more involved in these discussions with the UK Mission Innovation and the Department for Energy. These discussions are going on. That is it. If you want any more I would be very glad to give you more information for both these initiatives.

Q120 **Chair:** We have the Minister responsible for preparing the UK approach to COP28 before our Committee very shortly, and we can ask him very specifically what his plan is.

**Eleni Myrivili:** This global cooling pledge is mostly mitigation. It is mostly about active cooling, a little bit of passive but mostly active cooling.

**Chair:** I think we should raise both of those strategies with him.



**Q121 Cherilyn Mackrory:** Eleni, I want to ask you a little bit about your role. We will come to your role as Global Chief Heat Officer shortly, but I wonder if you could talk to the Committee a bit about your time as the Athens chief heat officer, what that role involved, what lessons you have learned, what worked well in Athens and what was not working so well. Then we can take it to a global level.

**Eleni Myrivili:** I talk about three different pillars of actions in relation to heat resilience. First is awareness raising because, as we said, nobody understands how dangerous heat is, then three months later we start figuring out that we have lost thousands of people. The data that is related to the impact on human lives is also difficult to get. Maybe my colleague can speak about that, too. Awareness raising, preparedness and redesign are the three pillars that I have been working on.

On awareness raising, as I said before, I think the most game-changing activity has been the categorisation and naming of heatwaves. Greece did not want to do naming; Athens did not want to do naming. Eventually, the National Meteorological Agency did naming last summer. For the first time we had a named heatwave. There are a lot of different things that we can do for awareness raising, but that is one pillar.

Then this links to preparedness, the early warning systems, which I know is part of what the UK is already implementing and has designed for. The early warning systems often is the first thing that we do. How do we make sure that we get to the most vulnerable populations? This has been the challenge in Athens as well. I tried to design the early warning systems by having workshops with the vulnerable communities, talking to them and trying to see where they get their information from. What are the best channels to try to reach them? What solutions would they like? How would they like to hear what risks they are—

**Q122 Cherilyn Mackrory:** What surprised you in those conversations?

**Eleni Myrivili:** First of all, like in England, most people do not get that heat is an issue. They think, "We have heat all the time, what is the big deal?" which is funny because here you say, "We do not have to deal with heat. What is the big deal?" This is funny because both the hot countries and the cold countries do not realise yet. Most people are resistant to dealing with it as an important issue, which is understandable. People want to deal with their economic problems or with this and that.

What surprised me was the number of older people we lose alone in their apartments during heat waves. That was shocking. From the Red Cross, we got that 83% of the people who died in Athens from heat are older people who lived alone. This is a very sad statistic. What surprised me was that we also had to understand, for example, the daily lives of homeless people in order to understand how we could help them get to the information.

What else? Children, caregivers, and people who come in contact. What surprised me is that we have to think about, for example, the neonatal



units or the children's units in hospitals and bring them from the top floors to the lower floors because otherwise we lose children. These things, little details that we have to start thinking about because we will be dealing with heat increasingly, are things that surprised me.

**Q123 Cherilyn Mackrory:** I can imagine certain communities who suddenly realise they are vulnerable might be receptive to changes in behaviour eventually. How receptive were institutions such as hospitals? How receptive were schools and businesses? In particular, if you are going to shut off productivity, how receptive were your businesses to doing that?

**Eleni Myrivili:** Not very. Last year, in 2022, we had a ministerial decree that went out for the first time—it is not the law yet—that created very specific guidelines, after a big piece of research that took place in different industries all around Greece. They had to measure core temperatures of workers during their labour, figure out what they were and when they get dangerous, and start creating legal measures based on very specific research taken on by universities.

For example, last year they had an extra decree that stopped people doing deliveries during the heatwave. All the deliveries and all the platforms were stopped. The Minister who imposed this called to get some pizza delivery and they actually did it, and he fined them. He wanted to check.

There is resistance and it will not be that easy to do it, but we have to start taking these measures. Thank god, for you, it will take a while and you do not have to take them very often yet. They are measures that will save lives and they are very important.

**Q124 Cherilyn Mackrory:** When my nieces were small they went to school in Cyprus, and it was quite normal during a heatwave that they would shut the school at 1 o'clock and everybody would go to the beach or they would go home. There was always a bit of notice, you knew it was coming, it might have been a few days, and they said that they would close. How much notice do you find that businesses, delivery companies and so on need? If you are going to shut a factory down, you cannot just open a factory again. It often takes a long time to do that.

**Eleni Myrivili:** Usually, we have forecasts. That is why it is good to have the categorisation. For now we just use temperatures. We know that if it goes from that temperature up, then this is what has to take place, and usually the ministry comes and says a day before that tomorrow we are not going to do it, or two days in advance. Usually, there is an anticipation because there is a forecast. There is everybody's own expectation that this is going to happen at least five days in advance.

**Q125 Cherilyn Mackrory:** I will take the example of a factory because I am thinking of a difficult operation to shut off and restart. In Athens, for example, your heatwaves can go on for weeks, potentially months.

**Eleni Myrivili:** Yes, increasingly.

**Cherilyn Mackrory:** How much productivity do they lose on average?



**Eleni Myrivili:** We have started counting productivity losses and we have seen that globally, in different cities, they can be immense. Again, my colleague can probably speak to that. There are immense productivity losses, and we also have losses in commercial activity in cities. Cities empty out, which is something that especially affects small and medium businesses.

The last thing I would like to add is that we have incredible numbers of work-related injuries during heat. When heat goes up we have people who lose concentration, who get fatigued, who do not sleep well, and that is another consideration that we have to take into account.

Q126 **Cherilyn Mackrory:** Before I bring this back to the UK, I wonder if you could explain a little bit about how you tie all these threads together with your Global Chief Officer role.

**Eleni Myrivili:** Before I go there, can I just say something?

**Cherilyn Mackrory:** Sure.

**Eleni Myrivili:** The third pillar is redesign and it is the most important thing, which has to do with the discussion you had before, but the most important aspect that we did not talk about is public space. As I said, 70% of our cities is public space. We can do a lot to lower temperatures and to prepare our cities for heat. Right now, we do not even think about that. We create public spaces and we never think of heat in public spaces. This is almost like special machinery that we could use to make sure that our cities can lower their temperatures. Nature is an important part in that, designing with nature and taking cars out of the streets.

Q127 **Cherilyn Mackrory:** In your global role, do you advise localised chief officers? What does that role entail?

**Eleni Myrivili:** My global role is, first of all, in cities where UN-Habitat is working right now, several dozen cities around the world, and trying to fold heat guidelines into the normative tools that they already have. Whether they are talking about assessing public spaces and the right way to redesign public spaces, transportation or accessibility, how can we fold heat into all these things on the normative side?

The second thing is advocacy. With a cohort of mayors who are championing heat actions within the UN, together with the leadership of UN-Habitat, we are trying to advocate, "Let's do more about heat," because heat is going to be, in a way, a long-term pandemic that we will be dealing with for the next few decades and on the global level we have to figure out how to do that.

Finally, I am trying to create a multi-partner trust fund with global governance that will create a collaboration between existing agencies within the UN system, and if I do that then I can leave and let people do that.

Q128 **Cherilyn Mackrory:** Given the UK's structure of government, would you advise us to recommend that we have a national chief heat officer at this



stage, given that our heat events are sporadic? Do you think that cities like London, Manchester and Birmingham should be looking at a city heat officer, or both? What would you advise at this stage?

**Eleni Myrivili:** On a national level it would be wonderful to have somebody who co-ordinates different ministries in relation to heat resilience. You have this great resilience plan that you have created, and in the resilience plan you suggested—I do not know if it is mandated or not—the existence of chief resilience officers on a local level, which is fantastic. That could and should include heat. Heat should go in resilience, not in environment but in the resilience efforts that are happening on local level. However, I think there should be co-ordination and a strategic plan that comes from top down. That would be very effective.

Q129 **Cherilyn Mackrory:** Elizabeth, did you want to add any more to that?

**Professor Robinson:** It is quite interesting because Eleni has brought the conversation around to heat rather than heatwaves. A lot of the conversation at the beginning was about heatwaves and these extremes, but we know that from 17° and 18° onwards, older people are more at risk.

On the economics, there is an estimate that productivity losses already could be costing London alone about £500 million a year. Your point was good because you asked, “What are the productivity losses if we shut a factory down?”, but by not doing anything at the moment we are already having productivity losses.

We need to think where best to invest. To some extent, we can start thinking about, for example, different times of when one works; 9.00 am to 5.00 pm might not be the norm anymore. It might be that there is more work in the mornings and the evenings when it is cooler.

I was interested when you talked about delivery people. There is a lot of asymmetry of information and a lot of lack of information. On the one hand, we know what works: give people breaks, give people cooling and ensure people are rehydrated. However, we do not know what the best schedule for that is.

Another thing we do not know is if employers may see a loss of productivity or not, because workers might be working harder to keep their income up and putting pressure on their health. That is an area where we do not have enough information. You talked about measuring core temperatures. We need to measure much more pressure on workers.

There are the classic high-exposure sectors that we talk about—we tend to talk about construction, outdoor workers, farms and agriculture—but I wonder to what extent we are not thinking hard enough about the gig economy. We have a growing population of individuals who, when it is hot, have to make a choice between protecting their health or protecting their income, and they may not be able to protect either. There are no



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obvious win solutions here because those people are self-employed, as it were, so they are making those choices, but they are going to be harmed one way or the other.

I do think we need a lot more information. Take healthcare workers. When we think of pressure on the health services, on the one hand it is more people sick, and I totally agree with you about workplace injuries. That is where we need to have joined-up thinking. If you are hot at work, then go home to a hot building and do not cool down at night, are you going to be more at risk of workplace injuries? I do not think we know well enough about that.

**Eleni Myrivili:** We actually do.

**Professor Robinson:** We do? Maybe you could share that information.

**Eleni Myrivili:** I can send the report. In the US they did it for 11 million people. They know. They figured it out. Go ahead.

**Professor Robinson:** With healthcare workers, there is going to be more pressure on health services, but healthcare workers are also often outdoors going from place to place. If we think of people in the fire service, they are wearing very warm clothing. We even have to think about literally clothing that cools you while you wear it. We have to start rethinking fundamentally, because if we think of risk, it is the hazard of the heat, the exposure and the vulnerability, and there are entry points for policymakers in each of these.

The other thing I wanted to add was from something earlier. We talked about—and I totally agree with you—this bluing and greening of cities, but in the longer term we are also seeing adverse consequences. Infectious diseases are changing. Their spread is changing. If we change the environment to something that we all think makes a lot of sense, more blue and more green, we might be exposing people to more infectious diseases, not maybe in the next 10 years but over time. We can see what is happening in Greece and the Mediterranean, moving up towards the UK. To some extent, we have an early warning from seeing what is happening in France and the Mediterranean.

**Cherilyn Mackrory:** That is another inquiry in itself, I think. Back to you, Chair.

**Chair:** Omar put his hand up and wanted to come in.

**Omar Abdelaziz:** I just wanted to add a quick comment. Heat is not only temperature; heat is temperature and humidity. When we talk about vulnerability from heat we need to be very careful because in some areas, especially around the coastal areas in the UK, humidity can get really high. When you have high temperature and high humidity, the heat stress can be even more dangerous to people and to the elderly.

**Cherilyn Mackrory:** Thank you. That is all very helpful.

Q130 **Ian Levy:** I would like to talk about working together and different skills.





What are the best ways of facilitating a collaborative governance approach to heat resilience? What are the best ways we can work together? I am thinking of things like the Government and local government.

**Eleni Myrivili:** That is one of the most important things. We see all over the world that we do not have enough, first of all, intergovernmental—

**Ian Levy:** Joined-up approach?

**Eleni Myrivili:** Yes, this joint approach, which makes a very big difference in effectiveness and capacity to deal with problems. That is both vertically, from central Government to regional and local government, where we need to make sure that we can streamline priorities and organise things, but also within government horizontally. We have siloed work, usually, and often there are weird mandates. I have found that to be true, for example, in city governments here in England, where you have different authorities and mandates overlapping and it ends up being an issue because there is nobody who owns the issue to push things forward. This is another very important aspect. Things like heat need this dedication. That is why it is great to have somebody who wakes up every morning—

Q131 **Ian Levy:** Having that one person who is dedicated to it?

**Eleni Myrivili:** It would be nice because it facilitates this co-ordination and collaboration. They have it as a mandate, to figure out how to get everybody in the same room.

**Ian Levy:** At a time of crisis as well you have someone to go to.

**Eleni Myrivili:** What you are saying is very much recognised. In times of crisis we do need that, and we usually have that in times of crisis and we are usually better equipped to deal with crisis. I am talking about the long-term design, which is the hardest, which needs effort, money and all that stuff to push it through.

Finally, in Greece there is this position that I think is interesting, a “minister of ministers”, it is called, who lives in the office of the Prime Minister. His work is to figure out which topics need co-ordination from different ministries. I just found out recently that that is his job, but this is a very interesting position that I do not think we often have in government.

Q132 **Ian Levy:** Lovely. Elizabeth, you might be able to answer this one. Is there a sufficient skills pipeline to address heat-related issues such as home refitting?

**Professor Robinson:** It is not my area of expertise but it is certainly an area where there seems not to be, as far as we can see. On upskilling, we heard in the earlier evidence session that there are budgets—the apprenticeship budget and so on. This is an exciting opportunity where



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we are looking for those green skills, jobs that are fit for purpose for the 21st century and the next 27 years of skillsets we need. I do not believe there are, and there are a lot of opportunities for this being part of addressing green growth.

**Q133 Ian Levy:** The last one is for Omar, if you do not mind. How is heat adaptation resourced in other countries and cities, and are there any creative approaches that you have come across that you think we could use when it comes to financing for skills and building capacity?

**Omar Abdelaziz:** I am not sure about the first part of the question, how heat is resourced. I am not sure how to answer that. Maybe I can return to you.

In terms of the second part of the question, looking at financial approaches and financing, something like ESCO models would probably be a good fit in the UK because you have a very good and well-established model for verification and you have a very well-established credit system. As such, you can get someone to pay the up-front costs and finance the difference between what the utility would have charged and the energy efficiency savings, and use that towards financing the equipment or the energy-efficient product.

I am not sure if you are familiar with the ESCO model, the energy service contracting company. This is one of the most established approaches for financing energy efficiency and energy services. Once you have a well-established credit system in a country and you have a good way of doing measurement and verification, it looks like this is probably the best path forward.

**Ian Levy:** Lovely. Eleni, did you want to come in?

**Eleni Myrivili:** This financing works, as Omar said, mostly for mitigation and for active cooling solutions, because when we are talking about passive cooling solutions it is very difficult to figure out a return on investment. ESCOs and these models are based on the thing paying off the investment that the private sector has made in the beginning. It is paid off in the next 10 years from the economies—whatever, you know what I mean.

**Ian Levy:** Yes.

**Eleni Myrivili:** In heat adaptation, a lot of the passive solutions do not have an easy return on investment. With nature-based solutions it is difficult to calculate what, economically, somebody who makes this investment can get back, so it is harder to finance.

That is why we need the public sector, especially at city level, to help to finance the solutions that we need. The public sector is a very important sector here, as well as the humanitarian sector, foundations and so on. That could de-risk and attract some private sector support as well, which can be added to the mix. That is the financing that we have seen



happening, especially in solutions that bring together mitigation and adaptation so that we do have some return on investment, such as from the energy savings that we get, but we can also fold in other solutions that are more passive.

An example of that is solar panels and green roofs. This is mitigation. You have the solar panels, you have renewables and all that stuff, but you also have a green roof that cools the building, or at least the top part of the building. With this combination, the nature side and the plants help to cool the solar panels so that they are productive during extreme heat, and the solar panels shade the green areas so that they are more lively, can survive more easily in hot temperatures, and you have more biodiversity because you have shaded and not shaded areas. This clever thinking, putting mitigation and adaptation together, can help us finance these solutions better.

**Q134 Ian Levy:** You said earlier that heat is dangerous. It is a horrible statistic that elderly people are vulnerable and often die alone in their apartments, which is an awful thought. Could I ask everyone on the panel: what ideas do you have about how we change the perception of what heat is? Certainly, in the UK, if we have a bad storm, floods or heavy snowfall, people realise that it is bad. When it is sunny, people tend to head to the beach. They get their swimming trunks on. People are now starting to say, "We need to wear sun cream," which was not the case in the 1970s and 1980s, when people did not bother much with sun cream. What are your opinions and any ideas that you might have on how we can change the public perception of what heat is and the dangers related to it?

**Eleni Myrivili:** This is an important question. This is the \$1 million question for us all. How do we change behaviour? This is not an easy thing but we do have campaigns that we can do. We need to do things like the categorisation. That is why I think it is important, because you have categories and so you think of risk. It is a risk thing.

We have to make more data available more readily and try to figure out how to link data to the heat event instead of coming out much later. There is the media. Community work is also important, as I was saying before. We have to get engagement with the specific communities. That is why the role of cities is so important here, because they have access to the communities and they are the ones that are responsible for the survival of those communities—the wellbeing, at least—on a very local level. Getting engaged with them is important and making them engaged in finding solutions is crucial.

I want to finish with this. Social cohesion is the best way of responding to crisis, including heat. We have the Chicago report that came from a heatwave at the end of the 1990s, which showed that the communities that were close-knit and could help each other lost fewer people to heat. That was a devastating heatwave. Thousands of people were lost in Chicago. It does not necessarily have to do with rich or poor communities



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or resilient infrastructure; more than anything else, it has to do with social cohesion. Any work that helps community cohesion would be important.

**Professor Robinson:** There are quite a few lessons from France, where they lost 15,000 people in a 2003 heatwave but only—I say “only” but every death is a tragedy—1,500 people in 2019. Some of the learning was that messaging needs to focus on solutions and actions that people can take and that there are benefits to people taking the actions; for example, quite simple messaging like, “Don’t forget to rehydrate when it’s hot,” and not, “Don’t go running,” but, “Think about running at safer times.”

You are also trying to change social norms. If we looked at the social norms in, say, a Mediterranean country where people are more used to the heat, we might look at their behaviours and ask ourselves, “Why don’t we behave like that when it is hot?” We just have different social norms. Like you say, our social norm is that if it is hot, we celebrate and go to the beach. Changing those social norms is quite difficult but it does seem to be some of these practical measures. Then focus on what the risky behaviour is and what the change is that needs to happen to make that behaviour less risky. There is some messaging about, “Don’t leave your children or pets in vehicles, especially when it’s hot,” because that is particularly risky behaviour.

Another thing we have not mentioned, or perhaps right at the beginning, is that heat and air pollution are particularly damaging. There is also important messaging if it is very hot and there is air pollution. Ideally, we would get rid of the air pollution, but if we cannot then we would ask people to avoid the air pollution. For example, people understand that running when it is hot is risky. Hot and humid is riskier. Hot, humid and polluted is particularly risky.

Then offer alternatives, because we need to be very careful about messaging that says, “Heat is bad.” Those of us who remember the 1970s, 1980s and 1990s are used to miserable weather. That was the English weather. There is still that feeling that heat is novel and exciting, but increasingly it is not. It is pervasive and it is affecting us much more. We can change the social norms through messaging, we can focus on what is really risky, and we can avoid extreme messaging that makes people possibly oppositional to it and react against it. Behavioural economists and psychologists do a lot of interesting research to look at what messaging works.

**Omar Abdelaziz:** I would like to demonstrate something here. I am in Nairobi in a conference room. Here in Nairobi they do not have air-conditioning. The campus is passively cooled and all the rooms have very nice windows. I was advised to dress smart so that is why I wore a jacket and a tie, but I have been warm. This is the first thing. Do I need to wear a tie and a jacket when it is 30° or 32°? This is a very important



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message, trying to adjust behaviour. What is the right clothing for the event? We know that these are the events and these are the typical clothes that you have to wear to these events, but sometimes we have to adjust this.

I remember when I was young my dad owned a car that did not have air-conditioning, and in the scorching summer in Cairo, Egypt, we used to drive from Cairo to the north coast, two hours in the baking sun, and we did not complain. Now, if I drive my car without running the air-conditioning for 15 minutes, I complain. People got used to the comfort of air-conditioning too much. Again, this is part of the adaptation strategy: what is the right adaptation strategy? Do we say no air-conditioning at all or do we adjust, as was mentioned earlier, the behavioural psychology? What is the right set-point temperature? Is it 25°C, 26°C or, as my teenage daughter would put it, 20°C? That is 20°C in the summer; in the winter she puts it at 28°C because she always wants to wear the most comfortable pyjamas.

These are things that we need to think about. How can we adjust the behaviour? Do you think the behaviour will be adjusted by a campaign, going and talking to people? It is more than just a campaign. We need this information to be embedded in movies, in series, and in how we charge taxes. It is more than just an awareness campaign. It will be a norm of living.

However, before we do anything we need to look at, as I said earlier as I started this national adaptation plan, our buildings. Are our buildings ready for this? Is our culture ready for this or not; for example, sub-Saharan Africa, where men and women are okay wearing short sleeves, versus GCC countries, where women are still wearing hijab and long sleeves. These are different countries with different CLO and when you put them on the comfort chart for the ISO or the ASHRAE you have to account for their clothing, you have to then account for capitalism, and all these things. That is why the cultural and local aspects are very important.

**Ian Levy:** OK. Eleni, did you want to come in on something?

**Eleni Myrivili:** I have a quick addition. Policy makes behaviour change. What policies have other countries adopted? France, for example, recently adopted a policy where shops cannot have open doors when they have air-conditioning, and they have very high fines.

There is policy on levels of temperature. In Japan they did that years ago, starting with the public sector. They had to keep the air-conditioning high, I think 28°. That was the mandate. That became fashionable and people started doing it in their homes and businesses as well.

There is policy on albedo, the reflectivity of surfaces. Countries have said that it should be at this measure at least, so that all the colours that we use for our buildings reflect heat and do not absorb heat. For example,



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coming on the train from Gatwick to the centre of London, most of the roofs that I saw, because I was thinking about it, were black. This is also true in Sydney. We should not allow this. We should make sure, and that is easy and cheap. It is so cheap to make a different colour the colour that we use. There are things like that, or shading. Make sure that historical building regulations allow people to put—what are they called?

**Chair:** Shutters.

**Eleni Myrivili:** Shutters, yes, because some regulations probably prohibit it. We need to make sure that we allow things to happen that will help people lower the temperature in their homes.

**Ian Levy:** Chair, it is a known fact, is it not, that in the UK people love to talk about the weather? Maybe we should be talking about it and saying, "It's hot today. Let's take care, let's be sensible about this". Thank you very much.

Q135 **Chair:** Thank you, Ian. You have taken the words out of my mouth. I was going to make that same point, that we have a national obsession about the weather that should mean that we are able to educate the public readily. We have an authoritative voice in the form of the Met Office, which gives good information.

It has been a very interesting discussion. I would like to close with one final question about behaviour change and whether you have witnessed around the Mediterranean, for example, a reversion to working practices that are more reflective of the external conditions in which people are working.

When I was growing up it was traditional, if you went to some countries, that there would be a siesta period. Businesses and shops would all close during the heat of the day and then they would open in the evening, and people would not go to bed until much later. That was attractive when I was a young boy, to go to bed after midnight, because it did not normally happen. Then, of course, when we went for industrialisation everybody standardised the working hours of the day and the week. Are we seeing differentiation happening in areas where there is greater heat, in places like Greece or Egypt, for example?

**Eleni Myrivili:** Yes, indeed. We see it very clearly in the agricultural sector all over the place. People start working in the fields in the middle of the night these days. We see it in the construction sector also, where people start working in the night as much as possible because it is unbearable. We see that also in the Gulf area and in the eastern Mediterranean. What you said before about an authoritative voice for information is so important for behavioural modification. It is really important these days.

Q136 **Chair:** Thank you. Omar, would you like to give us a reflection from your part of the world on working practices?





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**Omar Abdelaziz:** Yes. I agree that industrialisation has reverted some of these cultural norms. Now that air-conditioners are prevailing in some of these hot countries, we do not see these things. It is eroding. People continue to work from 8.00 am to 6.00 pm, or 9.00 am to 7.00 pm or whatnot, and we do not have these siestas anymore.

It is not easy to go back to the way things were. My dad used to work from roughly 8.00 am to 2.00 pm, come have his siesta, and then go back to work in the afternoon, but that would not work these days because everyone works so much more than we used to in the past. Taking two hours off work to take a siesta is simply not possible, plus going back and forth is going to add traffic issues. I think Eleni mentioned taking all the cars away from the city. Having a siesta, adding this additional trip back and forth to work, is going to create a huge issue. Before we go back and reminisce on something that was once thought of as a good thing, we need to understand all the implications.

**Chair:** Thank you. You are living evidence that we live in a globalised world now, giving us evidence from a country on a different continent, and we are very grateful to you for giving up your time and getting dressed so appropriately for London weather and not so appropriately for Nairobi weather. Thank you very much, Omar Abdelaziz. Thank you, Eleni Myrivili, for joining us and making the effort to do so, and Professor Elizabeth Robinson. Thank you to our specialist advisors, Radhika Khosla and Nicole Miranda, for joining us again for this session, and Gary O'Key for preparing our brief.