Net Zero Review: Call for Evidence (October 2022)

For more information about the enquiry please visit: https://www.gov.uk/government/consultations/review-of-net-zero-call-for-evidence/net-zero-review-call-for-evidence

Background:

The Physiological Society (The Society) is Europe's largest network of physiologists, at the forefront of science for 146 years. Physiology is the science of life, and research in physiology helps us to understand how the body works in health, what goes wrong in disease, and how it responds and adapts to the challenges of everyday life. The Society's membership is made up of researchers in all of these areas, from neuroscience through to endocrinology, nutrition and sport and exercise science with the science ranging from the mechanistic to the applied, from molecular to whole body.

The Department of Business, Energy & Industrial Strategy conducted an inquiry into the government's approach to delivering its net zero targets. Since climate change impacts consumers, employees and businesses alike, and affects cities, agricultural economy and natural environment, this call for evidence aims to provide open channel for organisations and the general public to provide their views on the transition net zero.

Physiology is an essential part of the scientific response to the climate crisis as it helps us understand the consequences of climate change for humans and other animals. As the science of how the body works, physiology explains the impact of climate change on our health and productivity, as well as the scope we have for mitigation and adaptation. In so doing, physiology is integral to the future of life. The Society's response to the inquiry is based on our reports *Physiology and Climate Change and The Climate Emergency: Research Gaps and Policy Priorities* published in this area.

Consultation response:

How does net zero enable us to meet our economic growth target of 2.5% a year?

Newer technologies and innovation are required to achieve net zero and reduce our reliance on greenhouse gas-intensive products and services. The transition to net zero can boost the economy by opening up new markets and increasing demand for green goods and technologies. For example, physiological research into evaporative cooling techniques, through which evaporated water is used to cool hot air, can be used to develop newer and greener technologies to keep people cool despite rising temperatures. Further, an understanding of how humans thermoregulate enables smart heating and clothing that reduces energy consumption but maintains thermal balance and comfort.

What opportunities are there for new/amended measures to stimulate or facilitate the transition to net zero in a way that is pro-growth and/or pro-business?

Methane accounts for about 25% of global emissions and has 80 times the warming power of CO_2 over the first 20 years. The annual global methane emissions from animal agriculture are over 145 million tonnes. Reducing

methane emissions from livestock is an importance step in achieving net zero; according to UNEP, we need to "rethink our approaches to agricultural cultivation and livestock production."[1]

The Physiological Society's report *The Climate Emergency: Research Gaps and Policy Priorities* notes how developing alternative sustainable proteins and switching to plant-based diets can help mitigate the climate crisis by reducing these methane emissions.[2] By leveraging newer innovations to create sustainable proteins, we hope to see a rapid growth in the technology and food industry as we switch to create climate-friendly food. For instance, according to the International Panel of Experts on Sustainable Food Systems, the alternative meat industry is predicted to grow rapidly, from $4.2bn in sales in 2020 to $28bn in 2025.[3]

Climate change has resulted in an increase in average air temperatures and warmer heatwaves of longer durations are predicted to become more frequent. Extreme heat is not only damaging to health, but also impacts the ability to work and reduces worker productivity leading to economic damage. This presents an excellent opportunity to develop and invest in newer technologies that keep people cool despite rising temperatures without relying on energy-consuming mechanical cooling techniques such as air conditioners.

By using the principles of thermal physiology, we can understand what drives the perception of human thermal comfort, what makes humans feel comfortable at warmer temperatures and how to keep people cool using sustainable technologies. Our report includes a case study on the Heat and Health Research Incubator at the University of Sydney which used thermal physiology principles to substitute air conditioning with more energy efficient indoor fans. The researchers observed that if everyone in Australia adopted this strategy, a 70-75% reduction in greenhouse gas emissions from air conditioning use would be achieved.[4] Such techniques will allow people to work despite rising temperatures, thereby promoting worker productivity and boosting economic growth.

Have you or are you planning to take personal action to reduce your carbon emissions (for example through how you travel, what you buy, how you heat your home)? If so, how?

The Physiological Society encourages staff to take personal action to reduce carbon emissions in our new sustainability policy.[5] We try to ensure the sustainability of our working practices either directly as part of our charitable objects, or indirectly through the way that we run our organisation. All Society governance meetings for example will now be held online. Where possible, conferences and events will also take place online. Our staff are encouraged to think about whether an in-person meeting is required.

The Society's current energy supply comes from 100% renewable sources. We also ensure that we meet all building performance and energy efficiency standards. Further steps taken by us to reduce our carbon footprint

[1] UN Environment Programme. *Methane emissions are driving climate change. Here's how to reduce them*. Available from: https://www.unep.org/news-and-stories/story/methane-emissions-are-driving-climate-change-heres-how-reduce-them

[2] The Physiological Society. *The Climate Emergency: Research Gaps and Policy Priorities*. Available from: https://static.physoc.org/app/uploads/2022/07/12080835/Climate-Emergency-Research-Gaps-and-Policy-Priorities-Report.pdf

[3] The Guardian. *Big meat is gobbling up fake meat companies*. Available from: https://www.theguardian.com/environment/2022/may/10/meat-alternatives-industry-threat-monopoly

[4] Malik A, et al. The potential for indoor fans to change air conditioning use while maintaining human thermal comfort during hot weather: an analysis of energy demand and associated greenhouse gas emissions. *Lancet Planetary Health*. 2022; 6(4): E301-309 Available from: https://www.thelancet.com/journals/lanplh/article/PIIS25425196(22)00042-0/fulltext

[5] The Physiological Society. *The Physiological Society's Sustainability Policy*. Available from: https://www.physoc.org/about-us/board-of-trustees/governance-reference/the-physiological-societys-sustainability-policy/

include: only serving vegetarian meals at onsite meetings; replacing most light bulbs with low energy light bulbs; having automatic lights that turn off when the room is not used; reduced printing where possible; and ensuring we purchase paper products made from recycled materials.

The Society also has a sustainable travel policy in place. Our hybrid working model means that staff are in the office for fewer days a week which has reduced the carbon footprint from daily commuting. We also encourage staff to use public transport and opt for trains/ other public transport over air travel whenever possible.

In our report, *The Climate Emergency: Research Gaps and Policy Priorities* we recommend people to consider active travel, by highlighting the benefits of physical activity such as cycling or walking on people's health and wellbeing. We also advice people to minimise the number of indoor pollutants such as candles and stoves within their homes. These pollutants are responsible for worsening air quality within homes and can exacerbate deaths due to respiratory and cardiovascular disease. Indoor heating too can be a source of pollution; further, every degree reduction in heating saves up to 13% of emissions and also costs. These measures are particularly important for older and vulnerable populations who may spend more time indoors; further, in most developed and industrialised countries, including the UK, people spend around 90% of their time indoors.[6]

Our *Physiology and Climate Change* report encourages people to buy less meat and dairy, as they are the largest contributors to diet-related greenhouse gas emissions.[7] We recommend that people eat a diet based on local, seasonal vegetables, reducing air miles and the massive cost of refrigeration. Furthermore, buying less processed food, which use large quantities of land, water, energy, is also beneficial for health. High quantities of processed food can cause obesity, heart disease, high blood pressure and diabetes. Lastly, we advise people to measure their carbon footprint so they are more aware of their contribution to climate change and can take the required steps to reduce the same.

Do you face any barriers to doing this? What are they?

One of the barriers to individuals reducing carbon emissions is the lack of infrastructure for environment-friendly travel. For instance, areas outside of major cities lack separate cycle lanes making it harder for individuals to cycle to work. Smaller cities and towns also lack proper public transport facilities, leaving many people to use their own private modes of transport.

Another barrier is that climate-friendly food products are often more expensive than traditional items. For people whose diets is currently heavily reliant on meat, vegan meat options are currently more costly than regular meat.[8] Thus, even though alternative meat is healthier than traditional options, many people cannot afford to switch to greener options. Moreover, most supermarkets do not clearly identify which products are seasonal and local, therefore people are unable to opt for the products having a lower carbon footprint.

What would help you to make greener choices?

Greener choices must be made cheaper than traditional options for people to choose them. In his speech at the *UK Pathway to Net Zero* conference, Sir Patrick Vallance recognised the importance of this – the greener choice

[6] Klepeis N., et al. The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants. *J Expo Anal Environ Epidemiol*. 2001. 11(3): p. 231-52

[7] The Physiological Society. *Physiology and climate change*. Available from: https://static.physoc.org/app/uploads/2021/11/01082431/Physiology-and-Climate-Change-October-2021_WEB.pdf

[8] Vegan Foundry. *Why Is Vegan Food So Expensive?.* Available from: https://veganfoundry.com/why-is-vegan-food-so-expensive/

should be the cheaper choice. Many coffee shops across the UK continue to charge an additional fee for non-dairy milk which use less land, less water and generate lower amounts of greenhouse gases. For example, the retail price of oat milk is approximately twice that of dairy milk.

The lack of evidence and public health messaging about the impact of climate change on the health of individuals is also a major barrier to the adoption of greener choices. People are more likely to opt for sustainable choices, such as active travel and eating planet-friendly foods, if they are able to see the health benefits for themselves.

Is there a policy idea that will help us reach Net Zero you think we should consider as part of the review?

A policy idea that should be considered as a part of the review is the public health messaging around climate change. Public health guidance should emphasize the link between personal health and planetary health. For example, reducing the amount of heavily processed meat in our diet we can not only reduce emissions but also decrease our risk of disease. This, in turn, will encourage healthy ageing and reduce the demand on the NHS.

The review should also consider a broader range of research, with a particular focus on interdisciplinary research funding, in order to address a complex, 'wicked problem' such as climate change. In The Physiological Society's report *The Future of Interdisciplinary Research Beyond REF 2021,* we noted that 'Achieving these [net zero] targets will require creative and innovative solutions that draw on all the physical, life and social sciences'. In order to achieve this, we argued that greater recognition of the impact and value of interdisciplinary research should be embedded throughout the UK's R&D system from academic progression to greater funding for research targeted at the ambition of reaching net zero as quickly and sustainably as possible. Thus, a collaborative and integrated research supporting mitigation, adaptation and sustainable technological development is required to achieve Net Zero.

Related reading

Physiology and Climate Change

The Climate Emergency: Research Gaps and Policy Priorities