

Working From Home: The Sustainability Question.

Designing the Future of Work with
Applied Behavioural Science.



 Morethannow



PHOENIX GROUP

“We’ve been thinking creatively about how we will work differently in the future, in light of everything we have learnt from this terrible pandemic. To deliver on our purpose of helping people secure a life of possibilities we’re putting sustainability at the heart of Phoenix and this includes working in ways that make us healthier and happier, striking the right balance around where we work, when we work, and how often we travel. We were keen to learn more, and this research outlines the real potential of flexible working lives for people and our planet. We’re excited as a business to be using these behavioural insights to shape how we create our truly flexible and sustainable business.”

Sara Thompson, Group HR Director, Phoenix Group

“We have a unique opportunity to rethink the ways in which we work as we emerge blinking from this pandemic. We’ve learned a lot about human adaptivity and resilience. We’ve also learned that a lot of work can be productively done outside the four walls of an office. That doesn’t mean that we will all be working from home permanently, and neither will we be in offices all the time. It’s much more likely to be a hybrid workplace as we open up more choices for employees. If we are going to seize this opportunity fully, we need to think what is good for organisations and the wellbeing and productivity of the people in them, but we also need to make sure that it works for the environment as well. This research helps us to develop a rigorous, data-led view that will help our business customers keep the climate challenge in mind as they shape their future workplace strategies. There is no vaccine for climate change, so we must change our behaviours.”

Dr Nicola J. Millard, Principal Innovation Partner, BT

Foreword.

How to Build a More Sustainable Future of Work

The shift to Hybrid Working is happening in the middle of a climate emergency. That context matters, because WFH will influence how we travel, the technology we use, the waste we generate, and the energy, food and water we consume.

Organisations should not claim a commitment to the environment without designing sustainability into their vision for the future of work. This report offers an action roadmap for responsible employers.



James Elfer,
Founder of MoreThanNow

As behavioural scientists, we can make a big difference by focusing on changing one behaviour at a time. *Millions of people are estimated to adopt more flexible working practices in the future, and we are captivated by the scale and variability of their environmental footprint.* This report reveals the global opportunities and climate risks that are hidden behind every-day behaviours.

As a next step, we're asking leaders to meaningfully engage with emerging insights and the academic community. MoreThanNow will continue to lead the way with Phase 2 of our sustainability programme, which will see a consortium of employers experimenting with innovative ideas and sharing what they find. We are delighted that BT and Phoenix Group will be joined by Nationwide Building Society on this journey and invite other organisations to help us build a more sustainable future of work.

Thank you to all who helped us make it this far.

This research is shared for public-use thanks to the commitment of our friends at BT and Phoenix Group, who role-model the leadership we want to see from influential organisations. The end product is the result of the hard work of our team at MoreThanNow, Zoe Featherstone Smith and Ruby Koppenhagen, and our brilliant lead researchers, Dr Laura Giurge, Dr Ganga Shreedhar, and Dr Kate Laffan, as well as the collaboration of LSE Consulting.

The Researchers.



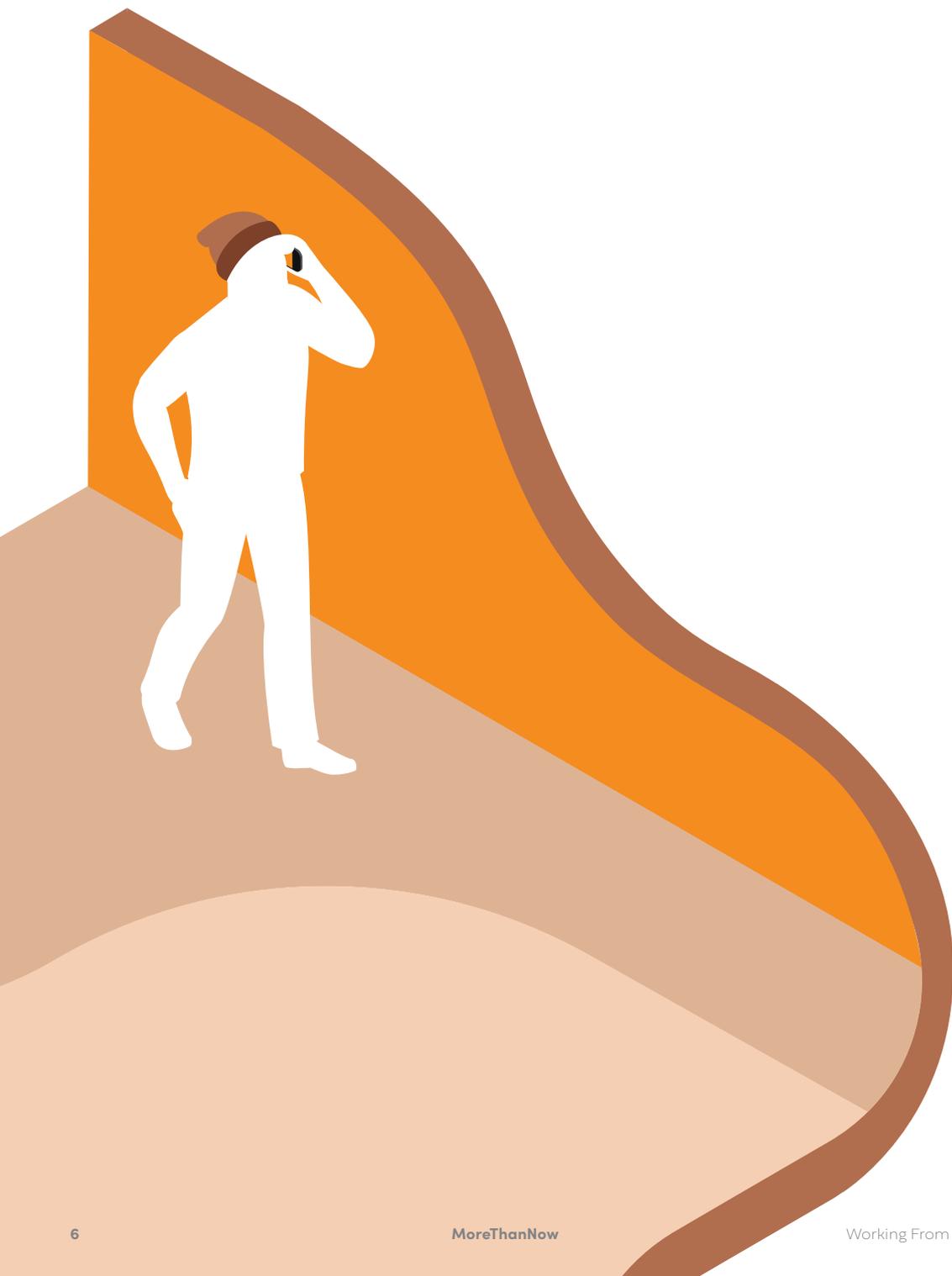
Dr Ganga Shreedhar is an Assistant Professor in the Department of Psychological and Behavioural Science at the London School of Economics and Political Science and an Affiliate of the Department of Geography and Environment.
G.S.Shreedhar@lse.ac.uk



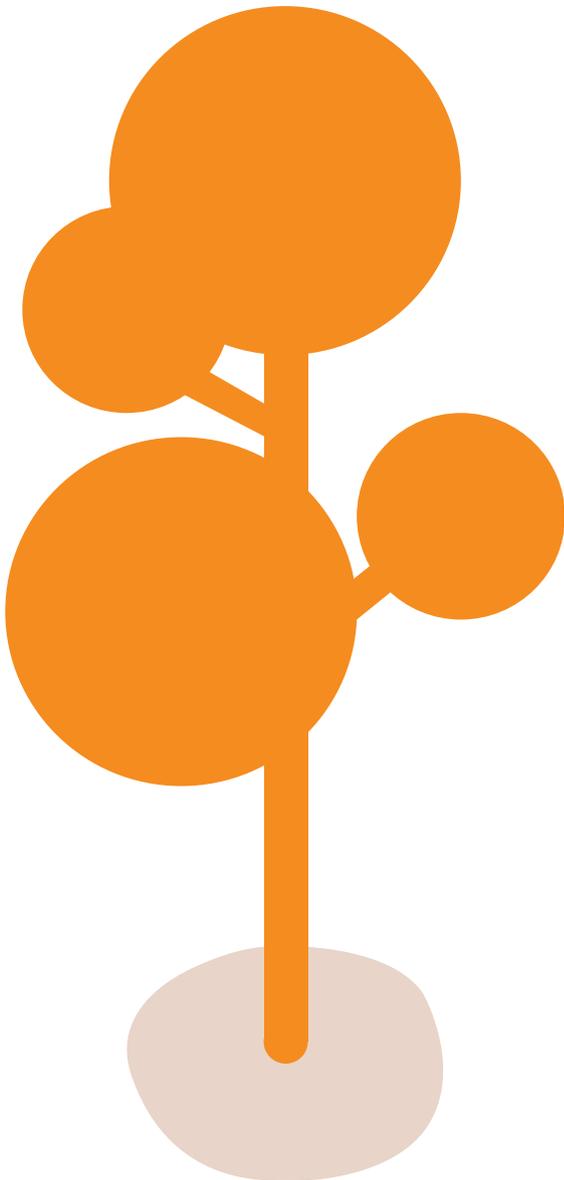
Dr Kate Laffan is a Marie-Skłodowska-Curie Fellow at the Geary Institute for Public Policy at University College Dublin and a Visiting Fellow in the Department of Psychological and Behavioural Science at the London School of Economics and Political Science.
kate.laffan@ucd.ie



Dr Laura M. Giurge is a Postdoctoral Research Fellow in the Organisational Behaviour Department at London Business School, Research Affiliate at the Wellbeing Research Center at the University of Oxford, and a Research Lead at MoreThanNow.
lgiurge@london.edu



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Sustainable Working From Home.

In response to the COVID-19 pandemic, many organisations asked their employees to make a transition to working outside the office, often at home, wherever possible. This is undoubtedly the largest work-from-home (WFH) ‘experiment’ in history, accelerating trends towards flexible and remote work, digitalisation, and home-working that began decades ago^{1,2}.

Workforce surveys reflect the WFH trend: under half of the British workforce worked from home for at least part, if not all, of the working week in Summer 2020³. In March, the Financial Times reported that UK businesses aim to implement hybrid work models⁴, signalling that WFH is likely here to stay even after the pandemic is under control⁵. The reality of a hybrid workforce raises important debate about how to manage employee productivity, collaboration, and well-being when they work from home.

WFH is likely here to stay even after the pandemic is under control.

Increasingly stringent government regulations, mounting pressure on Economic Social Governance (ESG) performance from employees and investors alike and risks to global supply chains all contribute to the immediate need for organisations to address sustainability issues⁶. Despite this, the question of how to make home working sustainable has received little attention. Employee behaviour – both in relation to work and lifestyles – can have major environmental impacts, especially when aggregated across organisations, cities, and nations.

It remains largely unclear how WFH arrangements impact upon employees’ environmental footprint. On the one hand, organisations can help employees reduce the environmental impact of WFH by reducing the need for high-carbon activities, like business travel by air and commuting to work by car. At the same time, these benefits may be offset by other behaviours, such as increased use of consumer electronics (e.g., laptops), higher home energy consumption, and even increased non-work travel⁷. The few efforts to empirically estimate the environmental consequences of WFH and flexible working arrangements offer mixed results, with the overall calculus depending on several key factors, including the time of year, available home technologies, work vs. non-work travel habits, and the type of office space⁷⁻¹³. Contrary to some recent arguments^{9,14}, WFH might not be a clear win from an environmental perspective.

WFH might not be a clear win from an environmental perspective.

Large-scale disruptions to daily life, such as the current COVID-19 pandemic, represent unique ‘moments of change’¹⁵ when organisations can act to create meaningful and long-lasting behavioural shifts. Now that conventional ways of working have been upended, organisations can redefine old, unsustainable habits by adopting an experimental approach to make the future of work, in general, and home working, in particular, more environmentally friendly.

We argue that organisations can adopt behavioural interventions as a promising tool for addressing these new challenges at work. A behavioural approach pays close attention to understanding how people’s individual and contextual

circumstances – in this case working from home – can be leveraged in intervention design. It pays attention to understanding how to improve the design of the “choice architecture”, i.e., organising the context in which people make decisions.

This understanding can improve the design and implementation of several types of behavioural change interventions, such as awareness campaigns, nudges and incentives. Importantly, experimenting with and evaluating different behavioural strategies will be crucial to effectively manage the new world of work. Experimentation is a safe pathone of the best ways to scale up the most successful strategies while accounting for possible costs. and the ThinkSmall process is designed to break down an important issue –such as sustainability of employees’ behaviours when WFH –into incremental steps and thereby aiding the discovery of candidate behaviours to change. So where should organisations start?

Experimentation can help scale up the most successful strategies in the long run.

When looking to make WFH sustainable, there are a range of key behaviours that employers could understand and influence, from one-off choices (e.g., switching energy providers) to, habitual behaviours (e.g., diets, driving to work, heat and temperature settings at home, or showering). To be clear: there is no silver bullet to ensure people WFH sustainably. Yet, when employers acknowledge the diversity and range of employee behaviours the opportunities to meet pro-environmental goals

become clear. Indeed, evidence from behavioural science can provide insights into how interventions have been designed and implemented to change behaviour.

This report is structured as follows. First, we introduce a new approach – Think Small— to how organisations can think about the evaluation of behaviours that matter for making WFH sustainable. To that end, we identified five behavioural domains that hold relevant sustainability impacts in the context of shifting to WFH: consumer electronics, information, and communication technology (electronic devices and internet use), utilities (water and energy), food (consumption), waste (food waste and recycling), and travel (for commute and business). For each, we highlight insights from the latest behavioural science evidence in terms of successful interventions and generate ideas on how these insights could be adapted to a WFH setting. Finally, we highlight the need for experimentation and evaluation, and show how organisations can achieve robust results within the “Think Small” framework. We also outline important knowledge gaps, foreseeable challenges, and caveats relevant to this moment that organisations can and should meet head on.

Ultimately, we address two important questions facing organisations: what behaviours matter from a sustainability perspective when employees work from home, and what can organisations do to address the environmental impacts that arise from home working?

ThinkSmall.

A Framework for Scaling Action.

Although, under WFH arrangements, fewer of employees' sustainability impacts are likely to take place under employers' roofs, they are still occurring on their watch. Employers, therefore, need to take actions to promote sustainable behaviours among their employees when WFH. This is especially relevant in the contemporary workplace where WFH is on the rise.

Naturally, some employee behaviours will be more impactful than others, so it is important to think about where the biggest sustainability gains can be from changing behaviour. Employees can take many small actions across a range of behavioural domains, and all these actions have sustainability implications. Thus, tackling the sustainability of WFH arrangements requires employers to consider each domain. Even then, to gauge whether changing behaviour is beneficial from a sustainability perspective, evaluation is necessary. Evaluation can shed light on several issues: whether a

change in the behaviour actually occurred, what the impact could be on the environment, and whether there were any unintended consequences. This is because the impact of changing a particular choice or set of behaviours is often context and person specific. What is clear, however, is the opportunity for employers to take action and address sustainability issues around WFH.

The ThinkSmall Approach helps to break down sustainable WFH in small actionable steps with a clear and systematic process that organisations can consider. We shall apply this process to each domain, uncovering clear opportunities for interventions.

The design of behavioural interventions begins with defining the domain of interest (e.g., food) and mapping relevant behavioural changes (e.g., eating less meat or more seasonal produce). Once a target behaviour has been identified, organisations can decide on the appropriate

behavioural intervention that would lead to the desired change in behaviour (e.g., an immersive cook along). Where appropriate and possible, interventions should be evaluated using a randomised controlled trial (RCT) and then further adapted and/or scaled in an iterative process to fine-tune them and maximise their impact^{ii.1}.

Why evaluate?

Rigorous evaluation can shed light on the interventions that actually work to change the identified behaviour. While one intervention could work in one context it may not in another. This may be because there may be some unintended consequences which arise from a particular feature of the new context, or because there are subgroups for whom the intervention is particularly or not at all effective. Such insights can identify where interventions need to be further adapted to the specific context or tailored to suit specific populations.

Producing robust evidence of the impacts of sustainability interventions on employee behaviour while WFH is not straightforward. Under WFH, employers have less control over the physical contexts where people spend their work hours. Similarly, collecting environmentally significant consumption data such as energy usage and waste will be a challenge. However, organisations can develop creative evaluation strategies for every context if they are working together with employees, and respecting important ethical principles such as transparency, privacy, and autonomy.

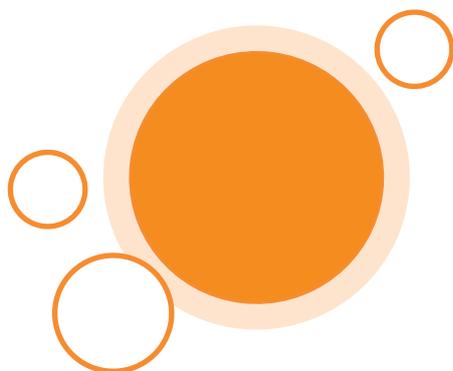


Employers with the intent to action interventions that are of the greatest relevance for their own workforce should consider closely the outlined domains and evaluate the impact with the most robust approach possible.

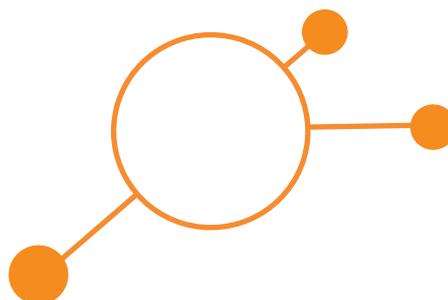
ThinkSmall.

A Framework for Scaling Action.

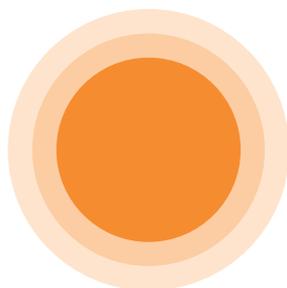
1. Define the domains and sub-domains



2. Explore and Map the behaviours



3. Target a behaviour and Design an Intervention.

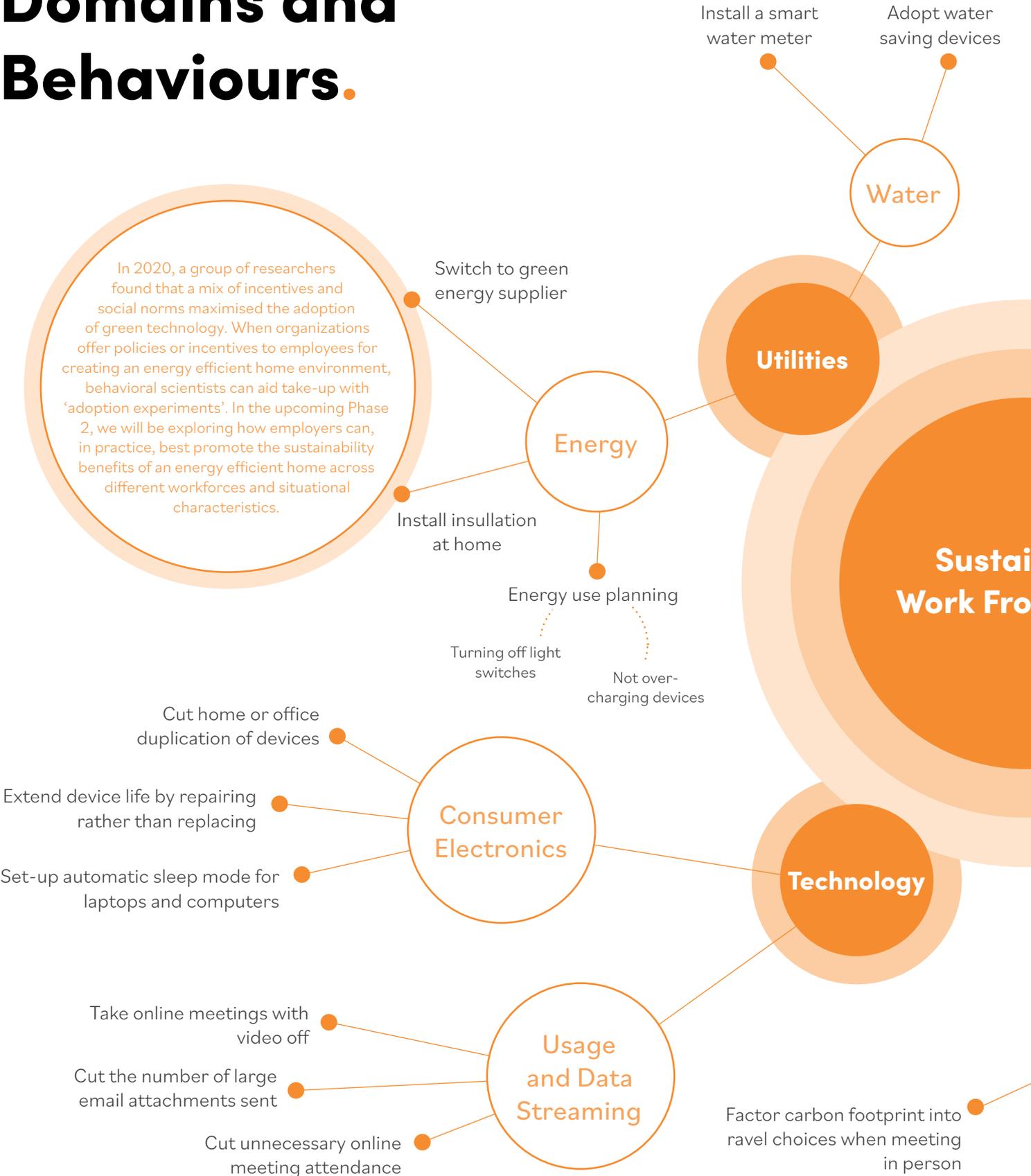


4. Evaluate and Scale the interventions



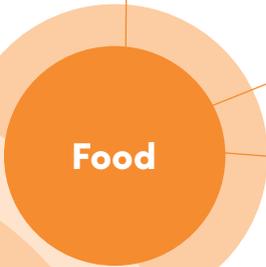


Domains and Behaviours.



Sustainable Home

Conserve water for teas and coffees



Increase plant based breakfast and lunch



Eating together can positively influence wellbeing and productivity and organisations like Google are taking advantage. WFH presents an important opportunity for employers to use meal-based interventions to benefit staff as well as the environment. Encourage your teams to share virtual lunches and commit to meat-free meals or eating leftovers.

Eat leftovers for lunch



Purchase of separate bins

Adoption of visual cues on bins



Walk or cycle to run errands

An active commute has both environmental, physical and time-use benefits. Walking, running, or cycling to the office reduces our emissions, while being cheaper and healthier than other forms of commuting. It is also efficient time-use, it means you don't have to find time to hit the gym or go for a run later in the day. Employers should encourage active commuting and support their staff to do so, and individuals can reap all the benefits.

Adopt active commute, walk or cycle where possible

External Meetings

Reduce business class flights

Technology.

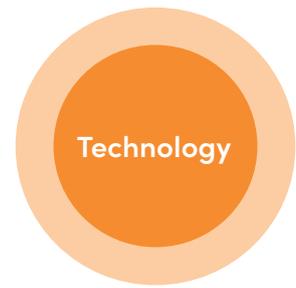
As a primary short-term strategy to enable WFH, many organisations provided employees with digital devices like laptops and phones¹⁶. Going forward, organisations will need to consider the environmental impact of digital devices and platforms, as well as employees' work habits, to ensure that WFH, and more broadly the shift to digitalisation, is sustainable.

Consumer Electronics

Smartphones, personal computers, laptops, and other computing devices have changed how we work and our day-to-day lives. Yet, according to recent estimates¹⁷, the carbon footprint of our gadgets, our use of the internet, and the systems supporting them account for about 3.7% of global greenhouse emissions¹⁸. And this figure is projected to double by 2025¹⁹. Given that many of these products typically have low life span, the amount of electronic or e-waste generated is high. For instance, in 2017, e-waste volumes were predicted to reach 65.4 million metric tons or enough e-waste to almost match the weight of the moon (which is 73.5 million metric tons).

WFH restricts access to consumer electronics provided in the office (in addition to work-related infrastructure, such as a desk, chair, printers, stationery), leading many consumers and companies to procure more consumer electronics. Indeed, market reports suggest that the COVID-19 pandemic pushed sales of laptops and desktops in 2020 and 2021²⁰. According to new estimates from Gartner, global PC shipments grew 10.7% in the fourth quarter of 2020, reversing consumer trends to a phone-first focus²¹. The net and long-term impacts of such changes on the environment are still unclear, but they are unlikely to be positive, given that these technologies currently rely on global supply chains of rare metals, minerals and labour. Planned obsolescence is often designed to accelerate the replacement cycle of products.

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Communications Technologies

The emissions of the Information and Communication Technologies (ICT) industry will vary depending on what is included in the estimates. Looking at the ICT ecosystem as – which delivers internet, video, voice, and other cloud services encompassing television, personal digital devices, and mobile-phone networks, it accounts for – is estimated to produce over 830 million tons of CO₂ annually, which is more than 2% of global CO₂ emissions²². From an individual footprint perspective, it can be difficult to estimate the time spent on offline tasks (e.g., creating documents in Microsoft Office) versus online tasks (e.g., emailing those documents to a friend or colleague) and between work and personal activities when online and offline – boundaries that are already increasingly porous^{2,23}. However, several insights emerge when looking at specific behaviours. For example, one study estimates the footprint of an email can vary dramatically, from 0.3g CO₂e for a spam email, to 50g (1.7oz) CO₂e for one with a photo or hefty attachment²⁴. Similarly, one Google search can account for around 0.2 to 7 grams of CO₂e emissions, where 7 grams is equivalent to driving a car for 52 feet²². The same report suggests that a “typical business” user—albeit in the pre-COVID-19 period—creates 135kg (298lbs) CO₂e from sending emails every year, which is the equivalent of driving 200 miles in a family car, just under the distance from Brussels to London.

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WFH often necessitates employees to work alone or in teams using digital platforms and devices. Research by telecom industry watchdog Ofcom found a surge in screen time of over 40% of the waking day during the first lockdown amongst adults living in the UK²⁵. If we keep streaming and videoconferencing at current rates, our carbon footprint of streaming and video chatting alone could grow by as much as 34.3 million tons of CO₂e by the end of 2021. To put this in perspective, it would take a 71,600-square-mile (185,443-square-kilometer) swath of forest—an area about 75% of the UK’s landmass—to sequester all that out of the atmosphere. The additional water—



- Cut home or office duplication of devices
- Extend device life by repairing rather than replacing
- Set-up automatic sleep mode for laptops and computers



- Take online meetings with video off
- Cut the number of large email attachments sent
- Cut unnecessary online meeting attendance

commonly used for cooling data centres—needed to process and transmit all that data could fill more than 300,000 Olympic-size swimming pools and would need as much land as the entire city of Los Angeles²⁶. Excessive screen-time can further undermine employee mental and physical well-being, which, over time is not only problematic for the environment but can also cut unnecessary online meeting attendance²⁷.

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Technology Interventions

Emerging evidence suggests several low-cost ways to increase sustainable practices related to consumer electronics, such as more efficient product use and balancing time spent engaging with the products.

Defaults (i.e., a pre-selected choice option) have been shown to positively influence behaviours because people tend to stick with the status quo option. For example, a Swedish study²⁸ estimated that 30% of paper consumption is determined by the default option. By switching the default to the double-sided option, paper consumption could be reduced by 15%, compared to a single-sided print option which consumes more paper and more energy. Pre-programming electronic devices to eco-mode or switching them to standby, “sleep mode”, or “hibernate” at a pre-specified time (e.g., 2 hours), can also help save energy and cut costs on utility bills, alongside lower emissions²¹.

To get people to monitor their screen time and device use, organisations could adopt cost-effective and easily available tools and cues like reminders and screen time-use feedback nudges. However, just more information about screen time-use is often not enough. One study²⁹ tested the impact of a passive digital nudge (i.e., grayscale mode) against an active digital nudge (i.e., time limits) amongst university students. While the passive nudge led to an immediate, significant reduction of objectively measured screen time-use, compared to a control condition (tracking only of digital time-use), the active nudge led to a smaller and gradual screen time reduction. Notably, there was no change in screen time in the control condition. Thus, apart from making it easy to act sustainably, interventions that make it harder and less attractive to not act sustainably can be equally beneficial.

“Although technology facilitates WFH, its impact on emissions is massive and projected to rise. Careful testing and evaluation of interventions to reduce screen time and device time-use could reduce emissions while also benefiting employee well-being.”

Utilities.

Energy and water usage are among the most environmentally impactful forms of consumption. As an indication, in 2016 energy use in industry and in buildings (both residential and commercial) accounted for 41.7% of the global greenhouse gas emissions³⁰. The shift to WFH has implications for residential energy and water usage³¹ – both in terms of which activities are resource-intensive, as well as seasonal and daily variation in demand – which is unsurprising, given that there has been reduced consumption in office buildings.

Energy

Estimates from 2016 suggest that residential energy-related emissions (e.g., offices, shops) account for 10.9% of total emissions and emerge from the generation of electricity for behaviours such as lighting, appliance use, cooking and heating³⁰. Important individual sustainability behaviours related to energy include: choosing between a “green” vs. “grey” (e.g., renewables versus fossil fuel) energy provider; purchasing and using energy efficient products (e.g., smart meters, appliances and lighting with A-star energy ratings); having homes with higher Energy Performance Certificates or EPC; and modifying habitual behaviours (e.g., turning lights and heating off).

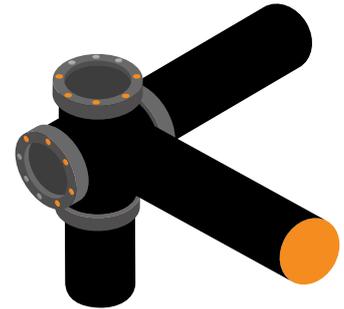
Changes to residential energy consumption during the pandemic can inform our understanding of the implications of WFH. Despite a 15-20% reduction in total electricity demand during the initial months of the pandemic (from shrinking industrial economic activity), Ofgem finds that 55% of people surveyed felt their domestic energy consumption had increased compared to last year. USwitch estimates that households where people are WFH will use 25% more electricity and 17% more gas per day³². Assuming an average employee heats just their home office for an extra 4 hours a day, their estimated costs will be 180 kg CO₂e and £60 per year³³. Season variations is crucial with higher emissions being predicted during winter, when demand for heating is generally higher than the rest of the year.

Despite a 15-20% reduction in total electricity demand during the initial months of the pandemic (from shrinking industrial economic activity), domestic energy consumption has increased.

Water

A growing global population and the economic shift towards more resource-intensive consumption has placed much stress on global freshwater use. According to some estimates, withdrawals for agriculture, industry and municipal uses increased nearly six-fold since 1900³⁴. Together, agriculture, forestry, and land use are estimated to directly account for 18.4% of greenhouse gas emissions, while water waste accounts for 1.3%³⁰. The UK's Environment Agency projects that England could run short of water by 2040 due to climate change and unsustainable levels of consumption. Currently, daily household water usage on a per person basis is 143 litres up from 85 litres in the 1960s. The largest share of water-use in the home, and thereby the range of related water consumption behaviours, comes mostly from the bathroom and kitchen³⁵.

WFH can entail an increased demand for water from a range of behaviours relating to changes in personal routines and schedules, ways of spending free time, hygiene, cooking and cleaning (e.g., washing of clothes and groceries, gardening etc.). The increase in water consumption is perhaps warranted given that the pandemic demonstrated the critical importance of sanitation, hygiene, and adequate access to clean water for preventing and containing diseases. However, aside from these necessary water consumption behaviours, the current pandemic has made additional WFH changes salient, least of which is the dispersal of peak times of water-use with water being consumed throughout the day instead of first thing in the morning before commuting to the office and at the end of the workday.

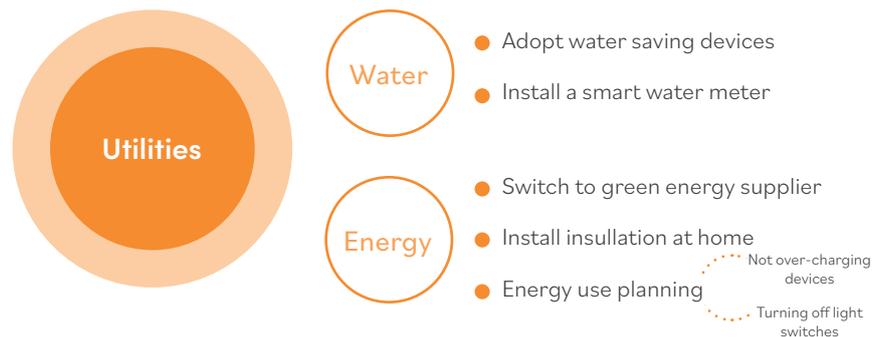




Utilities Interventions

One of the most impactful ways to reduce one’s energy emissions is to introduce green defaults (i.e., a pre-selected choice option for “green” electricity). This way consumer choice is preserved such that consumers can still choose the non-renewable or less energy efficient option by opting out of the green default. Defaults are known to be impactful ways to change behaviours as they hinge on making the change easy and thereby lead to endorsing the greener option (even if implicitly). Several studies have demonstrated, albeit pre-pandemic and not in a WFH-first context, that using green defaults increase sustainable energy behaviours, such as setting room temperature, switching to a green energy provider, using more efficient electric appliances, and even switching to cost-savings and emissions-reducing tariff schemes³⁷. For instance, Chassot et al.³⁸, found that an opt-out scheme increased the number of green electricity: only 10% opted-out, 72% stayed with the default, and 18% chose a different (qualitatively better) green electricity tariff. Similarly, Toft et al.³⁹ found the installation rate of a Smart Grid increased by 18% in the default treatment. Thus, employers could provide opportunities for employees to consider switching their energy provider – for example through collaborations with online platforms like USwitch – where the default option is set to a green energy provider.

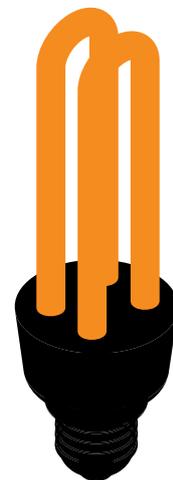
Defaults have proven to be impactful as they hinge on making the change easy and thereby lead to endorsing the greener option.



Another robust finding in behavioural science is the capacity for leveraging social norms and peer comparison in reducing both energy and water-use. Since people care about how they behave in relation to others, often preferring to conform to the social norm, utility companies like Opower have worked with behavioural scientists to incorporate social influence messaging in consumers' utility bills. Informing people about how much energy they used compared to their average neighbourhood usage (descriptive norms) reduced energy consumption for those above the norm. Perhaps even more importantly, adding an injunctive message (e.g., conveying social approval or disapproval through, for example, a smiley) removed undesirable boomerang effects for those already consuming less^{40,41}.

Such messaging can have a lasting impact. For example, Bernedo et al.⁴² studied the long-term impact of a one-time behavioural nudge that combined technical information on water-use, moral appeal to save water, and social comparisons to induce voluntary reductions in water-use during a drought with 100,000 households. The nudge had a surprisingly persistent effect: although its effect size declined by almost 50% after one year, it remained detectable and policy-relevant six years later. Why do they work? Apart from shifting perceived social norms, another psychological mechanism is second-order normative beliefs (i.e., the belief that community members think saving energy helps the environment)⁴³. Employers can use these insights to create energy saving norms and a sense of community amongst employees in a WFH context.

“Water and energy use are daily habits both at the office and at home. The gains that can be made from simply switching to a renewable energy supplier or installing energy efficient appliances and lighting are astounding. Although individuals undoubtedly face barriers to doing so, sustainable WFH can help make such changes happen.”



Food.

Food production and consumption, especially of meat, is another major source of greenhouse gas emissions⁴⁴. According to recent estimates, the global food system is responsible for 26% of global greenhouse gas emissions^{45,46}. WFH will likely impact what people consume, how they consume it, and what they fail to consume.

In many Western countries, the overconsumption of meat represents a key facet of food consumption that contributes to environmental issues. Typically, meat is significantly more resource intensive and environmentally impactful as compared to plant-based foods, such as fruits and vegetables, whole grains, nuts, and legumes^{46,47}. It is estimated that a global transition towards low-meat diets would halve the costs of climate change mitigation by 2050⁴⁸. Importantly, this implies that people follow health guidelines and balance their diet composition, while cutting down the proportion of carbon-intensive meat in their diets⁴⁹.

It is estimated that a global transition towards low-meat diets would halve the costs of climate change mitigation by 2050⁴⁸.

It is unclear whether the disruption to eating patterns arising from a shift to WFH is likely to promote or impede meat consumption. To the extent that some subgroups are already looking for ways to reduce their meat consumption, having greater control over their consumption as a result of WFH, might help them better fulfil their intentions. Indeed, past epidemics affecting livestock, such as SARS and swine flu, have led to a reduction in meat consumption, at least in the short run. Yet, because meat is associated with comfort eating, there may be an increase in demand for meat when employees are stressed and/or overworked (such as at the end of a long week of high screen time)³⁷. Additionally, the inability of employers to raise awareness of the multiple benefits of limiting meat consumption through on-site initiatives such as meatless Mondays will undermine the salience of these benefits in people's minds and a shift to more sustainable eating habits^{50,51}.

Food Interventions

Apart from more light-touch nudges such as defaults and leveraging social comparisons, organizations can take advantage of interventions that employ both goal setting and planning prompts. In research on meat consumption, Loy et al.⁵² found that coupling goals around

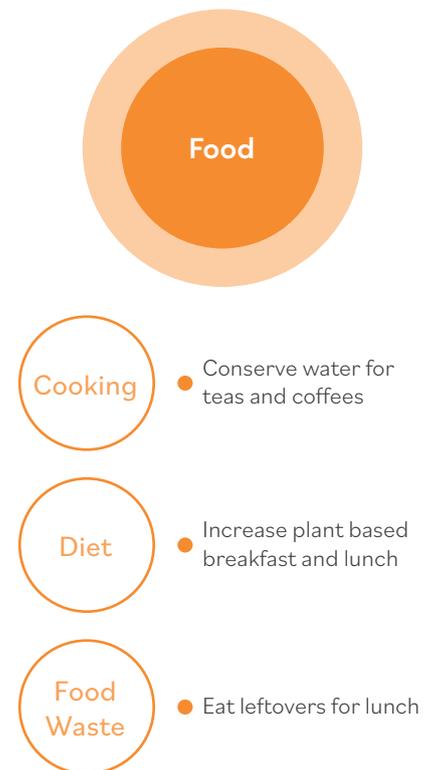


reduced meat consumption with an exercise that encouraged people to recognise obstacles standing in their way and making plans for when, where, and how to eat less meat led to significant reductions in their meat consumption. Such goal setting with implementation intentions exercises could be carried out as part of cook along activities or in follow up communications where people could be encouraged to go meatless one day a week, during the work week or at lunchtime. One advantage of such interventions is that they can be digitally implemented: Shreedhar and Galizzi (under review) found that digital planning prompts, which frame the benefits of vegetarian diets in terms of personal and planetary health, could nudge people to choose more vegetarian food, but also generate positive spill-over effects by encouraging people to make more donations to environmental causes.

... digital planning prompts, which frame the benefits of vegetarian diets in terms of personal and planetary health, could nudge people to choose more vegetarian food...

Employers could also combine sustainability behaviour change strategies with a few exercises to build team spirit and enhance collaboration in a WFH context. For instance, there is evidence in support of the positive impact of culinary interventions - cooking classes - on dietary health. This literature suggests that such interventions can be effective at reducing participants' consumption of meat and increasing their consumption of vegetables⁵³. It also indicates that interactive cooking classes are more effective than cooking demonstrations⁵⁴. Employers looking to encourage their employees to rescue their food waste could host an online cook-along involving vegetarian or dishes with low meat content (e.g., a blended burger made from a mix of beef and mushrooms). In fact, there is scope to combine multiple interventions, as planning exercises have been shown to complement cooking classes, thus enhancing their effectiveness⁵⁵.

“There is no denying that eating at home is different from eating at the office. There is significantly more burden on employees to cook for themselves, and potentially their family, and this additional burden makes dietary change hard to implement. Employers can and should do more to support their employees to make local and seasonal dietary choices.”



Waste.

Waste is another major notable driver of carbon emissions. Based on emissions from wastewater and landfills, in 2016 waste accounted for roughly 3.2% of the global greenhouse emissions³⁰. The UK alone produces over 200 million tonnes of waste each year⁵⁶. There are many sources of waste to take into consideration. Here we focus on food waste and recycling as these two sources of waste are most salient and likely to change when WFH.



Food Waste

Roughly half of the amount of food waste in the UK originates in households⁵⁶. The environmental benefits of eliminating household food waste have been compared to taking one in every four cars in the UK off the roads⁵⁷.

Roughly half of the amount of food waste in the UK originates in households⁵⁷.

Eating patterns at home are likely more stable than those around eating out or at the office⁵⁸. More predictable patterns of consumption may allow for more accurate provision of food. As a result, the shift towards WFH could help motivate and facilitate an overall reduction in food waste just by virtue of people spending more time at home. These insights are an important initial step, yet not sufficient towards understanding food waste at home.

Recycling

Household consumption represents a significant proportion of global CO2 emissions⁵⁹ and some of that can be offset by recycling rather than disposing of waste. Recycling at the household level reduces the amount of landfill waste. It also reduces the number of raw materials that need to be sourced for new production. Household waste is often broken down into non-recyclable waste, and various categories of recyclables (e.g., glass, paper, card, metal). There is significant variation in the net CO2 emission reductions associated with recycling different materials, with aluminium tins, foil, aerosols, cans, and textiles yielding the greatest reductions⁶⁰.

During the national lockdown that started in March 2020, household recycling and waste volumes both increased significantly in the UK – an unsurprising finding given the increased time spent at home, including the increase in consumption⁶¹. It is unclear whether these positive trends will continue or what is the impact on the environment, collectively.

Waste Interventions

While there are several different entry points at which to target food waste, food planning behaviours have been identified as particularly impactful^{62,63}. These behaviours include everything from writing a shopping list, compiling meal-plans in advance^{64,65}, to checking inventories before shopping⁵⁰. For example, Cadario and Chandon⁶² conducted a meta-analysis of the existing evidence on food nudges and found that sharing an educational article on food planning behaviours was the most beneficial nudge in leading to significant reductions in domestic food waste. Additionally, and of particular relevance to WFH, managing leftovers can play an important role in food waste prevention^{50,66}. Indeed, employers could encourage a reduction in food waste while WFH by encouraging employees to use leftovers and unused food rather than throwing it away. This could be done through communications that highlight dinner recipes with suggestions for how to repurpose leftovers for lunch or make dishes from unused items. Such communication prompts could be particularly effective if they come from appropriate messengers, such as food bloggers, dieticians, and chefs⁶⁴.

... sharing an educational article on food planning behaviours led to significant reductions in domestic food waste.

In terms of recycling, social role models have been shown to be especially beneficial. Studies have shown that recruiting community members who were already part of recycling programs (e.g., “Zero Waste Agents”) convinced the non-recycling members to also participate⁶⁷. For example, Maddox, Doran, Williams, and Kus⁶⁸ found that working parents’ recycling behaviour was significantly improved when they children acted as social models. However, the biggest gains for household recycling results from significant structural interventions, most notably increasing access to kerbside recycling collection (i.e., people no longer had to drive to a recycling collection centre themselves). Providing bins⁶⁹ or recycling bags⁷⁰ have also been shown to significantly improve recycling behaviour, with some evidence suggesting that visual prompts can be equally effective⁷¹.

Other interventions, such as providing financial incentives (to overcome motivational barriers) and providing feedback (to overcome informational barriers), have yielded promising results in reducing contamination of recycled waste⁷².

“It is exciting to think of all the possibilities for changing waste related behaviour. These could be tested in the home environment and potentially help individuals better align their behaviours to their personal sustainability goals.”



- Purchase of separate bins
- Adoption of visual cues on bins

Work Travel.

The report would not be complete without account for the transportation industry, which in 2016 accounted for 16.2% of the global greenhouse gas. Globally, transport accounts for one-fifth of CO2 emissions in the transportation industry ³⁰.

Within the transportation sector, 11.9% of the global greenhouse gas emissions come from road transport, followed by 1.9% from the aviation sector³⁰. One of the main threats to sustainability are modes of transport that use fossil fuels. For instance, road, rail, air and marine transportation accounted for over 24% of global CO2 emissions in 2016⁷³. Commuting by car and business travel are two of the key employee travel behaviours that will likely change under WFH.

Car Journeys

One of the largest contributors to a household's carbon footprint is the use of private car⁷³. In the UK alone, commuting by car has been estimated to account for 25% of carbon emissions⁷⁴. Organisations might unintentionally contribute to these numbers as one study found that offering a company car can increase the average household vehicle volume by 25%⁷⁵.

Although by some estimates WFH can lead to a reduction in automobile use^{76,77}, the net environmental effects of WFH are not necessarily positive due to rebound effects, including increased non-work travel, more short trips, or higher home-energy use that would offset the positive benefits of fewer commutes^{78,79}. For example, Riggs⁸⁰ found that although travel to and from work has decreased during the lockdown months of the coronavirus pandemic, people continued to engage in other types of trips and not necessarily via carbonless transportation means. Moreover, while the rate of driving declined from 31% to 27%, the total number of trips people did when WFH increased from 3.97 to 4.45 total trips. This evidence points towards a potential substitution effect whereby people might be driving less for work but, at the same time, they might be driving more often for other purposes such as shopping, socializing, or recreation. This is important because prior research has shown that 80% of emissions are related to engine start-ups, rather than the duration of trips people make⁸¹.



Business Travel

Although air travel often receives great attention when it comes to sustainability issues, it accounts for only 11.6% of transport emissions. Each year, air travel emits under one billion tonnes of CO₂ or around 2.5% of the total global emissions⁸². This is not to say that air travel does not matter—it does. In fact, these numbers reflect important inequalities in the world given that majority (80%) of the global population have never flown. This means that carbon footprint from air travel will and should matter more for employees who travel often because it will make up a much larger share of their personal carbon footprint and therefore of the organisations' collective carbon footprint. For example, according to a 2018 report — all of which could offset the corporate travel accounted for about half of a typical company's carbon footprint.

...carbon footprint from air travel will and should matter more for employees who travel often because it will make up a much larger share of their personal carbon footprint and therefore of the organisations' collective carbon footprint.

Air travel—for business and pleasure—has been severely impacted by the extreme situation of international travel restrictions and WFH created by COVID-19. Given that many international borders were closed and most if not all non-essential travel was banned, the aviation sector yielded the largest relative anomaly of any sector with a decrease in daily activity of 75% during the confinement period. Interestingly, the decline of air travel contributed only 10% of the decrease in global CO₂ emissions⁸⁴. Relatedly, survey findings⁸⁵ based on 3,000 office employees around the world (88% of which were regularly WFH during the pandemic) suggest that for every 100 employees who worked remotely twice a week, a company would eliminate 70 tons of CO₂ or the equivalents of 154,000 miles travelled by car, each year. Given these potential massive benefits for sustainability, it is imperative to develop and test interventions that would reduce corporate travel, before it returns to pre-pandemic rates (or worse).

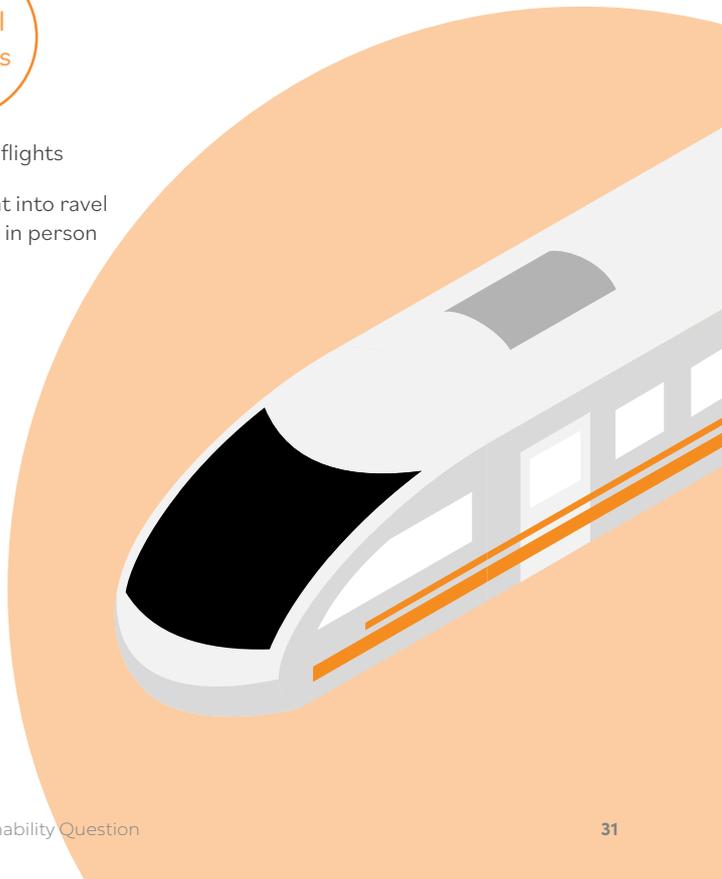
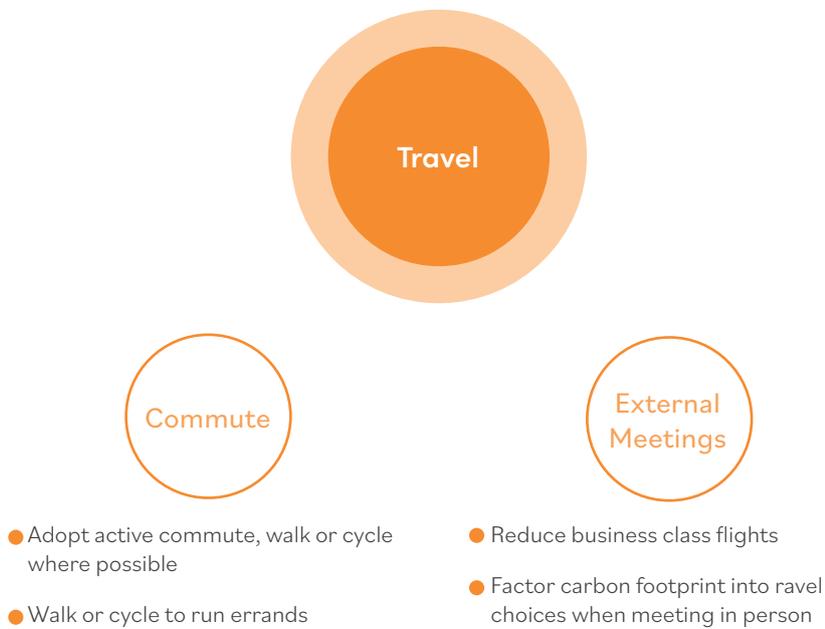
Work Travel Interventions

While it can be harder to nudge food and waste behaviours, there is much more that employers can do to influence work-related travel behaviours. Converting one-off in-person meetings to virtual meetings is one of the easiest and most effective means to reduce emissions arising from business related international air travel. When these trips are unavoidable, several studies have demonstrated that an opt-out default can aid carbon off-setting^{86,87}. However, travel and commuting behaviours are habitual, so they may be hard to change, and more deliberative interventions may be necessary. Indeed, key behavioural change techniques (e.g., providing information, encouraging intention formation, identifying barriers and solutions, goal setting etc.) failed to change commuting pre-pandemic behaviour⁸⁸. This suggests that focusing primarily on individual behaviour change might be insufficient to change travel behaviour.

... focusing primarily on individual behaviour change might be insufficient to change travel behaviour.

As with utilities and food choices, leveraging social norms in behavioural interventions can be effective to transform behaviours in the real-world context. Kormos et al.⁸⁹ found that employees exposed to messages that highlighted descriptive social norms increased sustainable transportation behaviour relative to private vehicle use for commuting (i.e., school or work) but not non-commuting travel (i.e., appointments, shopping, and leisure). This study suggests that social norms can help shape travel behaviour but that different factors (e.g., the goals that underlie employee behaviours: travel for work vs. nonwork activities) might affect related behaviours and would require different solutions. Organisations could introduce social norms around desired levels of carbon footprint and make employees aware before booking a business trip of what that trip means in terms of their carbon footprint and where it would place them in comparison to their colleagues. Organisations could further encourage or reward employees who keep track of their carbon footprint or even aim to offset as much as possible.

“We cannot deny that how we work and by extension travel for work has changed. We now face cross-roads; do we guide work travel towards new, more sustainable habits or not? The former can be achieved, but only with targeted, scientifically robust efforts.”



Taking Effective Action.

Thoughtful design and robust evaluation of any intervention are key for organisations' ability to address sustainability issues and maximise the benefits to their ESG performance.

Importantly, randomised controlled trials (RCTs) are considered the gold standard in determining whether and why a particular behavioural intervention has been effective (e.g., had a causal impact on the outcomes of interest). In RCTs, a subset of the target and representative sample is randomly assigned to the treatment group (i.e., those who are exposed to an intervention) while others are assigned to the control group (i.e., those who are not exposed to an intervention; 'business as usual' group). After a pre-defined period of time, comparing the outcome of interest (for example meat consumption) in the treatment group to those in the control group provides evidence of whether the intervention has had the desired impact^{iv}.

There are two main reasons why robust evaluation is important. First, it provides evidence of the effectiveness, or not, of intervention strategies at producing the desired behavioural outcomes in the company's own workforce. Second, it allows monitoring of indirect behavioural and well-being consequences, as well as any positive or negative spill-over effects of the intervention.

Of course, all workforces are distinct and the key contributors to employees' footprints will vary substantially across companies. For example, one company's workforce might fly regularly for business travel while another's might rely heavily on ICT. Some workforces might predominantly

live in high-efficiency buildings which they own, whereas others might live in homes with low energy ratings which they rent. Finally, some employees might be more capable or motivated to take pro-environmental actions while others may be systematically constrained. Employers looking to enhance the sustainability of their workforces while WFH need to identify the most relevant key employer actions for them based on knowledge of their own business operations and the distinct characteristics of their workforce. Following this, rigorous evaluation can shed light on whether interventions that worked in other contexts are equally or more effective for the workforce in question and whether there are subgroups for whom the intervention is particularly, or not at all, effective. Such insights can identify where interventions need to be further adapted for the context or tailored to suit specific populations.

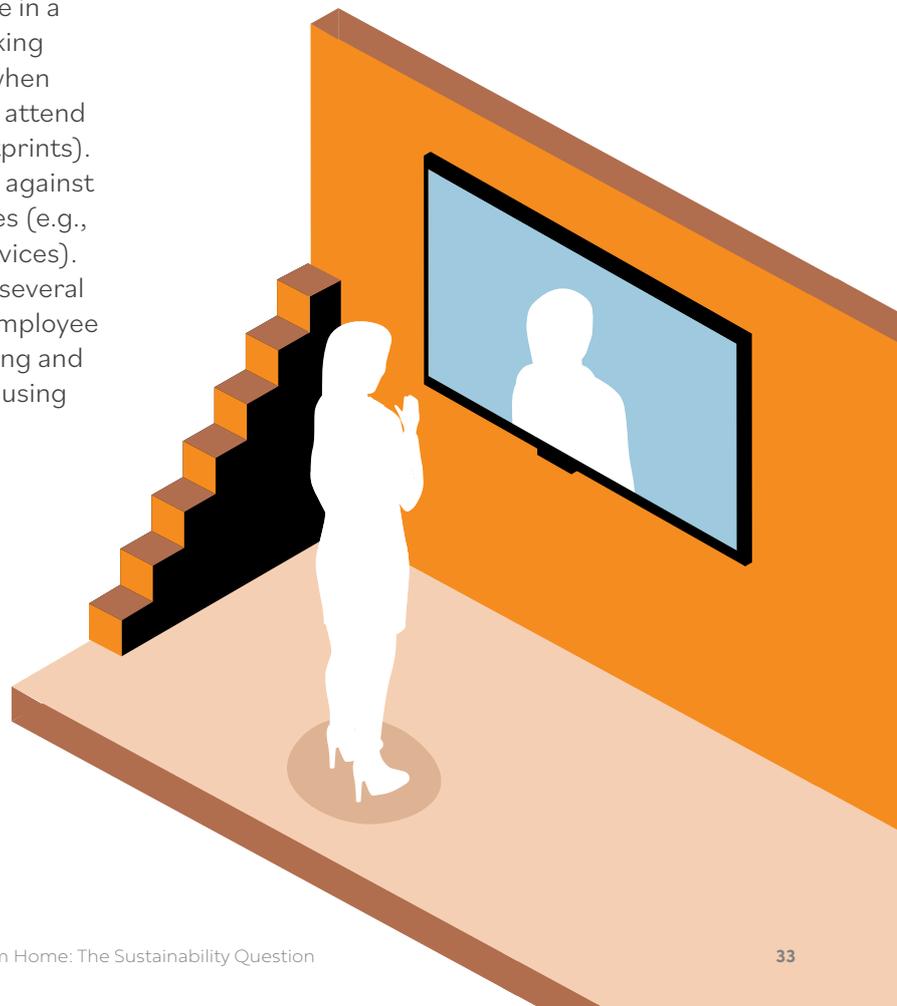
... all workforces are distinct and the key contributors to employees' footprints will vary substantially across companies.

Any intervention that targets a specific behaviour is likely to have indirect consequences. These 'spill-overs' can result in changes to related behaviours and/or the targeted population's physical and mental well-being⁹⁰. Importantly, from an employer's point of view such spill-overs can act to promote or impede an organisation's ESG performance. For example, a commonly cited issue highlighted in the energy literature is the rebound effect, i.e., when an investment in an energy-efficient technology leads to greater usage and reverses some, or all, of the efficiency gains that technology offers. Equally relevant, is research that highlights that employers' actions to promote sustainability goals can positively impact upon

employee outcomes including their engagement in pro-environmental actions in their personal life, productivity, quality of collaboration, and job satisfaction. Thoughtful evaluation designs can capture these indirect consequences and provide a comprehensive picture of the overall costs and benefits of interventions.

Lastly, while all behavioural interventions and nudges have the capacity to make cost-effective changes, they do not always work. There may be some good reasons for this, including strong antecedent constraints (e.g., inability to move to an energy efficient house) and “counter-nudges,” which persuade or confuse people to choose in a way that confounds the efforts of those seeking to make behaviour more sustainable (e.g., when people are nudged to work longer hours, or attend more meetings and reduce their digital footprints). Interventions may also fail when they are up against structural constraints imposed on employees (e.g., high-carbon internet infrastructure and services). In such cases, employers can still engage in several initiatives, such as a review of the types of employee processes and services currently used, testing and evaluating more effective nudges, and even using incentives and regulations⁹².

“Taking effective action requires that employers think about the interventions that will work for their employees, in the context that they are working in, and carefully evaluate the impacts such that their learning can be shared with other employers too.”

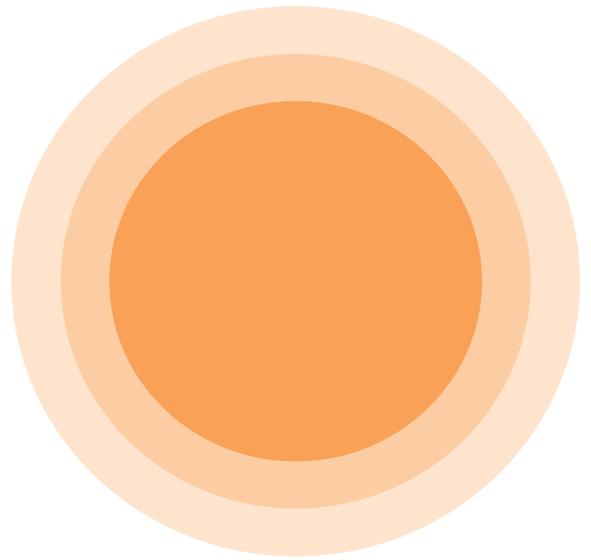
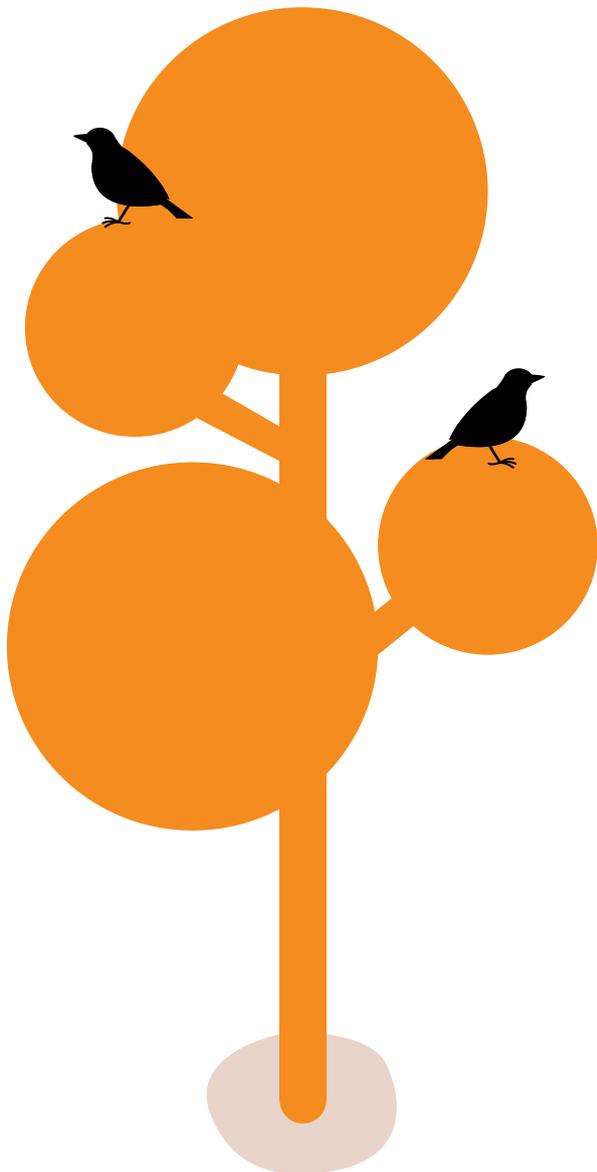


Concluding Remarks.

Sustainability is a pressing business challenge that organisations need to tackle head on right now. If organisations still expect employees to work and advance their mission when they work at home, then they should still be concerned with and aim to mitigate employees' environmental footprints. Organisations will face difficult ethical dilemmas between employee autonomy and the need to address sustainable issues.

One way to address the impacts of WHF is by leveraging the Think Small Approach whereby sustainable employee behaviours at home are addressed not as one challenge but as multiple small and impactful opportunities for change. For the highest impact and meaningful policies, organisations should embrace experimentation and evaluate existing or new intervention strategies that would make WFH sustainable.

It is our hope that this report will enable organisations to turn the current moment of change created by COVID-19 into an opportunity to tackle sustainability in the WFH context one behaviour at a time.



Get in touch.

futureofwork@morethannow.co.uk

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Endnotes.

1. Although the report focuses primarily on the impact of WFH, we sometimes use the word 'teleworking' which captures the broader concept of working outside the office (thus at home but also at other location like a café or library that is neither the office nor the home) because there is a lack of evidence on the impact of WFH.
2. Importantly, randomised controlled trials (RCTs) are considered the gold standard in determining whether and why a particular behavioural intervention has been effective (e.g., had a causal impact on the outcomes of interest). In an RCTs a subset of the target sample is randomly assigned to the treatment group (i.e., those who are encouraged to engage in the chosen intervention) while others are assigned to the control group (i.e., those who are not yet encouraged to engage in the chosen intervention; 'business as usual' group). Comparing the outcome of interest (for example meat consumption) in the treatment group to those in the control group provides evidence of whether the intervention has the desired impact.
3. The report aimed to include estimates primarily from Our World in Data. However, because of the specific behavioural domains and the context of the report (WFH), specific statistics were often not available. The report therefore includes data from other sources where estimates where are not available from Our World in Data.
4. Such evidence can be complemented by qualitative inquiry that provides insights into the target sample's perceptions of the behaviours in question and the interventions aimed at influencing them.

