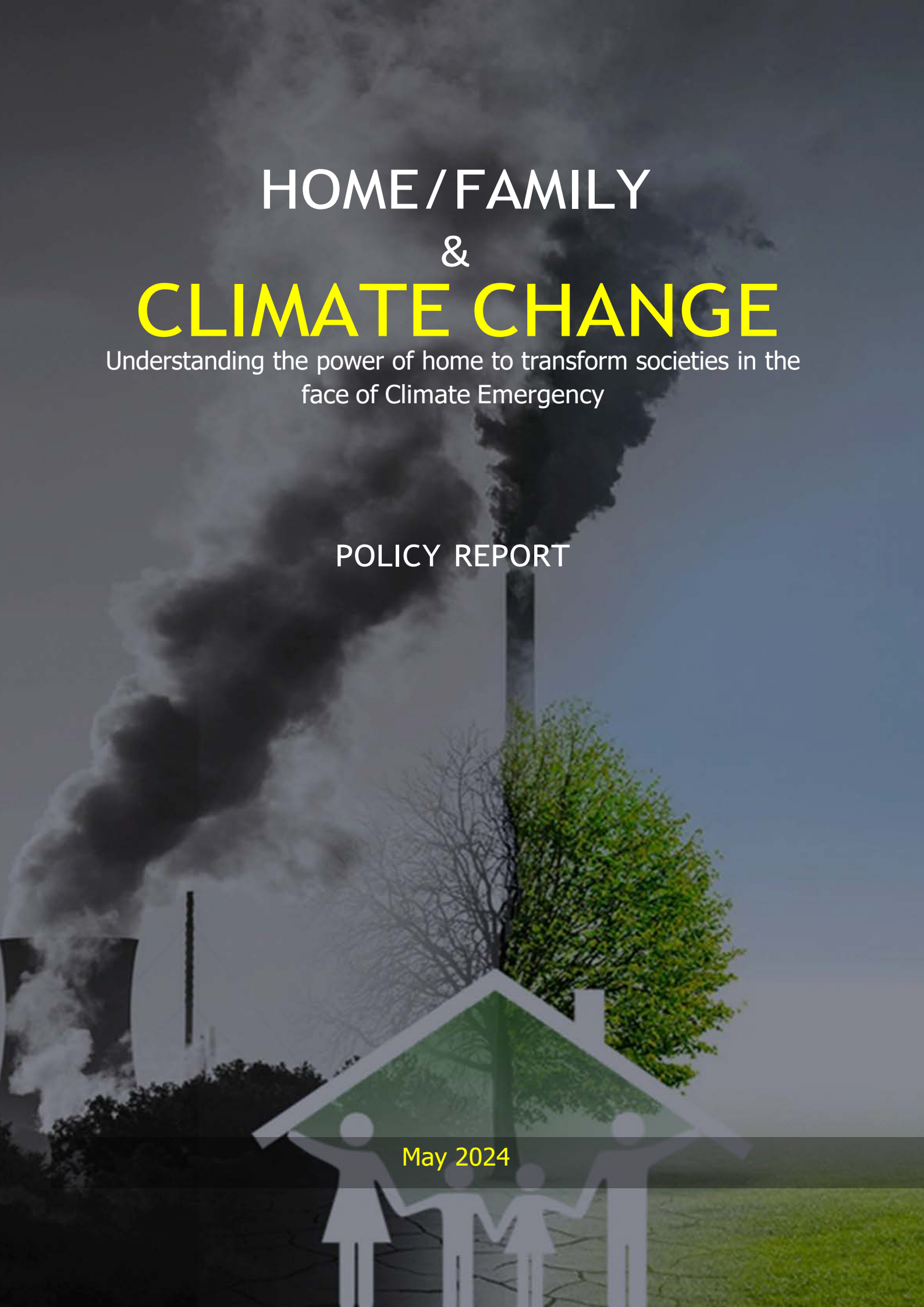

HOME / FAMILY
&
CLIMATE CHANGE

Understanding the power of home to transform societies in the face of Climate Emergency

POLICY REPORT

May 2024

Acknowledgement:
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Home Renaissance Foundation, Nottingham Trent University, and The University of York.
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Home Renaissance Foundation,
Nottingham Trent University, and **The University of York**
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Home, Family and Climate Change

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Policy Report

May 2024

CONTENT

WELCOME LETTERS

From Home Renaissance Foundation

It is a privilege to have been a partner with UN, Nottingham Trent University and University of York in the process which has resulted in this work on Home/Family and Climate Change. I must also emphasize the sense of urgency and priority which prompted this response; no current concern has both such a global reach and so many individual impacts. These challenges are the focus of our daily news *and* the daily reality for countless individuals and their families across the world.

Home Renaissance Foundation (HRF) has a distinguished record in championing the value of home to individuals and society, through academic research and publications on wide range of issues affecting the home. It is key to recognize that attitudes and actions in the face of climate emergency– and any shift in these – begins at home. Identifying the ways in which homes already have the social infrastructure and skills to face the demands of climate change is an important strand to set alongside global, national and local initiatives to combat its effects. Asking what the home and families can already contribute moves the response of external agencies from seeking compliance to active cooperation and shared innovation.

The input of the international experts whose views and research are represented here shows what can be learnt from how families and households already cope with the impact of global climate change, and how they can be better equipped to deal with future demands on their daily domestic lives. The balance of the theoretical and practical represented in these multi-disciplinary contributions offers broad and deep insights into the issues at stake on our planet and in our homes.

The varying perspectives included here: individual home experience, connected and resilient neighbourhoods, sustainable housing choices, and the home-based economy, when added to the specific implications for education and public health, also demonstrate this breadth and depth of focus. The policy recommendations (attached) reflect this approach and attention. On behalf of HRF, I endorse all that has been presented and would like to echo the recognition stated here that the relational structures of the home make it the primary and priority setting for learning attitudes and behaviours towards combating and preventing climate change, specifically in caregiving and receiving. Hence the priority for governments to understand homes and households as fundamental units and critical agents in learning, education and shared concerns about climate change.

I would like to take this opportunity on behalf of HRF, to thank Professor Gamal Abdelmonem for this very timely policy resource for the United Nations International Year of the Family +30 and contribution to the wider vital field of study.

Bryan K. Sanderson CBE
Chairman at Home Renaissance Foundation

From United Nations - Department of Economic and Social Affairs

It is a distinct honour to welcome you to be part of the preparations for the thirtieth anniversary of the International Year of the Family, 2024 conducted by the United Nations Department of Economic and Social Affairs. This Expert Group Meeting is focusing on the megatrend of climate change, an issue of existential proportions and global consequences. I am truly grateful for the fruitful cooperation with the Nottingham Trent University and Home Renaissance Foundation which led to this meeting.

The United Nations has taken the lead in advocating for action on climate change starting with the 1987 Bruntland Report, which came up with the definition of sustainable development "that meets the needs of the present without compromising the ability of future generations to meet their own needs." The UN Framework Convention on Climate Change and the 2015 Paris Agreement were followed by the Sustainable Development Goals (SDGs), the blueprint for development with SDG13 focusing on climate action.

Besides its intergovernmental work, the UN supports efforts to help communities to adapt to the changing climate which includes projects related to disaster risk reduction, sustainable agriculture, water management and more. The UN raises awareness of the need for action and encourages governments, private sector and individuals to take steps to mitigate climate change and environmentally friendly practices that can positively impact communities and families.

As an intergovernmental organization, UN efforts aim to harness political will to take action on climate change. Those efforts are of paramount importance; however, we need to think of innovative ways to approach the issue of climate change. There is not enough attention paid to the home and the role of families in climate change action, despite the fact that two thirds of global emissions come from our lifestyles. Clearly, a lot can be done at home to mitigate climate change and the potential of families and family-oriented policies to achieve SDGs, including SDG 13 remains to be fully addressed in overall socio-economic policy making.

The Summit for the Future is to take place in 2024. It will be a once-in-a generation chance to reaffirm existing commitments including those on climate change. We owe it to future generations. Never before have we had such an abundance of knowledge, technology and resources to succeed in saving the planet. This abundance has to be matched by action at all levels, including at home.

We need evidence-based research and advocate for a family focus in socio-economic policies. The SDGs include targets to ensure that, by 2030 people everywhere have the relevant information, education and awareness for sustainable development and lifestyles in harmony with nature.

This meeting has contributed to achieve this important commitment. We learnt about the net zero homes as localities for households, neighborhoods, and natural environments. We went beyond mitigation and adaptation strategies to include psychological theory and resilience structures to manage the impacts of climate change. We focused on positive environmental aspects of working from home and sustainable architectural designs for homes and communities.

We are proud to transmit this knowledge through our work on at the United Nations and hope to inspire all stakeholders committed to sustainable development.

Renata Kaczmarska
UNDESA, United Nations

From the Expert Meeting Chair

This Home/Family and Climate Change Report represents a critical transformation in our intellectual and cultural understanding of the central role of the home and family as a critical institution in our combat against Climate Change. This Experts Meeting focused on their role in addressing the risks of climate change and as a starting point for novel and effective responses to this global and existential challenge. The line-up of the international experts offers wonderful mix of perspectives, disciplines, professional backgrounds, and research cultures. They addressed such a collective challenge form varying angles, methods, and creative solutions.

The papers presented in this report are diverse, inclusive and offer very interesting takes and distinctive challenges and contexts that challenge of conventional perception of the role of the family in combating climate change. They have the capacity to inform policy, guide international agreements on shared objectives, and offer evidence on how sustainable homes, families and communities need to be. The findings of the papers contributed substantially to the development of the report Executive Summary and Policy Recommendations, to provide important and practical steps to alter the current course of events and policy making towards a more inclusive and collaborative approach towards climate change. This report offers a set of findings and recommendations that consider the family and home as central players in the active and societal response to Climate Emergency.

Following two days of extensive meetings, discussions, and collective debate, we co-produced a series of principles and measures that governments and intergovernmental organisations can consult and take as reference while shaping their nation's response and actions to combat climate change. We do not assume those steps as inclusive or universal in their implementations. Rather, actions and solutions need to be community and context based where communities and local stakeholders must take a central role in shaping meaningful and effective action plan.

I wish to thank all experts, authors and contributors for their extensive efforts, critical studies, papers and contributions to the panel discussions and the write up of the policy recommendations. Without their insights and evidence-based studies, this report or its recommendations would not be possible. We are also grateful to all partner organisations and institutions who contributed through various means of support or sponsorships to enable and facilitate our experts research and work on this project.

We are particularly grateful to the Experts Meeting key organisers, led by The Home Renaissance Foundation, its Chairman, Bryan Sanderson CBE, and the United Nations' Department of Economic and Social Affairs, Focal Point on the Family, Renata Kaczmarska. Finally, we are very grateful to the generous support and sponsorship of meeting by Nottingham Trent University and its Pro-Vice Chancellor (International), Professor Cillian Ryan, under the University's UN-SDG Initiative.

Professor Mohamed Gamal Abdelmonem
Report Editor and Experts Meeting Chair, University of York

HOME, FAMILY & CLIMATE CHANGE

Home, Family and Climate Change

Understanding the power of home to transform societies in the face of Climate Emergency

Introduction

The United Nations Framework Convention on Climate Change was established on 21 March 1994 with two prime objectives; to reduce greenhouse gas emissions including carbon dioxide, and to commit financial support to developing countries that require assistance to adapt to the impact of climate change. Almost 30 years later, little has been achieved on both fronts, whilst the concerns are growing of the impact of Climate Change that showed extreme weather conditions almost everywhere on the planet. On 27th October 2022, The United Nations Environment programme released a report ahead of COP27, confirming there is "*no credible pathway to 1.5C in place limit*" today, whilst UN Secretary General, Antonio Guterres, further commented: "*we are headed for economy-destroying levels of global heating. We need #ClimateAction on all fronts – and we need it now. We must close the emissions gap before catastrophe closes in on us all."*

Climate Change has a drastic impact across the globe that reach each one of us. Whilst rising average temperatures, rising sea levels, and melting Arctic ice are experienced first-hand by limited number of world populations, their long-term impact is far more devastating. We all experience, lengthy and extreme summer temperatures, decrease in average river flows, in some cases by more than 20%, extreme frequent, longer, and more intense heat waves and wildfires. Global warming is also associated natural disasters and increasing waves of displacement and desertification, food shortages, draughts and decline in crops production across the globe. With the Climate Clock set by researchers for 9 years (2031) it is when we will reach the 1.5C rise that is mark of no-return, there is no escaping that Climate Change is reaching each household, at varying degrees.

Many studies associate critical approaches to limit Carbon Dioxide and limit the rise of global warming sits on two key pillars; concentrate many activities within homes and limit the use of any carbon emitting machines. In a drastic vision by researchers at Lawrence Berkeley National Laboratory in the journal Science, they citied that for California to cut greenhouse gas emissions to 80 percent below 1990 levels, by 2050, workers need to lock the door to their net-zero homes, hopping in battery-powered cars, then heading to uber-efficient offices powered by solar panels. Such technology led solutions are largely technical processes that overlook the other factors and opportunities surrounding the home, family, and community. Simple analysis of the family homes, planning and urban/sub-urban patterns of life and consumption seem to have larger impact on both the family and its carbon footprint.

The proximity of single-family home, to local stores, places of work, job centre, healthcare facilities or the shopping district seem to have significant impact. Economic and job patterns including working from home have provided clues on both the efficiency of an economy working on minimum energy consumption in city centres, whilst activating the economic values and credentials for the home. Equally, the footprint to a multi-family home in a walkable urban neighbourhood seem to offer a serious place to start thinking about effective methods to combat climate change. Yet, most approaches and investment into climate change focus to large extend on advanced technology of electrical and carbon neutral cars and devices, but little focus is made on community power and the centrality of home to societal shifts in economy, mobility, infrastructure and livelihoods.

Vision

One PLANET, One HOME: Reversing the Clock of Climate Change

"The strength of a nation derives from the integrity of the home".

Confucius

Central to the collective response to Climate Change is the individual sense of insecurity, and the risks that comes with global warming and face families and homes. The missing link is the global action or political vision is the sense of love and care of the planet as our shared and universal home, on whose ground, all our homes and safe havens do exist. Research and studies largely focused on the technical and economic side of climate change, whilst rarely touched on the philosophy of care of the planet as one's home; the simple message that grasp's public attention and concern. We will protect the planet when we truly understand it is our home. As much as we take care of our intimate homes, it is equally important to take care of our collective home that houses and shelters humanity.

Most studies of specific climate change effects focused on certain sectors, economies, consumption patterns, technologies, transportation, or natural environments. However, rarely were critical multi-disciplinary studies of how the home and family as social unit are impacted directly by Climate Change nor how it can help us change course or reverse it. As much global the Challenge is, the impact and potential response needs to be centred around the home and family capability of transformation and change. This is the key lesson we got from the global and effective response to the drastic impact and risks of COVID-19. When COVID-19 led to lockdowns across the planet and social and economic systems came to a holt, our societies withdrew to the safe territory of the home and sought social support of the family. As the economy, healthcare and social care moved from public systems to the local and community support system, the family became the centre of resilience and rebuilding. In parallel, mobility and travel were curtailed, our carbon footprint were substantially reduced, our cities became greener, we became reliant on local supplies, produce and social support.

In the face of a global emergency, the home and family instantly and instinctively emerged as the resilient unit on which our society can rely and through which we can adapt and reset our systems and global operations; lessons learned, adaptably and flexibility were tested, and it worked. Why, therefore, we look elsewhere to build resilience and response mechanism to combat Climate Change. This report explores the role home and family play in the transition towards a sustainable and carbon-neutral planet, where our Carbon footprint is neutralised by offsetting our consumption with the production of clean energy and a sustainable lifestyle. Building on the lessons learnt during COVID-19 Pandemic, this report brings together collective effort of experts, scholars and scientists from diverse disciplines, professions, and research backgrounds to debate the challenges and opportunities facing the home as societal institutions to achieve that goal. It tries to respond to a key question, *'how can we engage more effectively with the home and family as a resilient unit to help societies and economies combat Climate Change?'*

As part of the Home Renaissance Foundation's mission to tackle global challenges facing the home, this report makes an important contribution to building a home-centred framework that enables the family to play a central and effective role in the global response and action plan to combat Climate Change. EM23 investigated the Home and Climate Change under five themes such as: *Health and wellbeing*, *home ecologies and carbon footprint*, *micro-economics of the home*, *Net-Zero home and 20-minute neighbourhood*, *culture and education*, *mobility, and infrastructure*. In coordination with the United Nations' Department of Economic and Social Affairs and several international partners, this report documents expert papers, panel discussions and policy recommendations, and action plan. It aims to raise global awareness and set key principles of the possible routes towards home-centred response on the Micro and Marco levels. Papers presented in this report covers multi-disciplinary expertise in economy, social science, healthcare, architecture, urban culture, environmental sciences,

psychology, and policy to collect evidence on both the impact of Climate Change and global warming on the families, and how the home can become effective domain of combating it.

Project Description

With the challenges facing global economy and the ever-changing political priorities, we need to take a slow, in-depth look at how Climate Change affects households, how we can curb its impact, and what household-related policies can be implemented. In this context, our project attempts to reposition the home and family at the centre of climate change debate and action plan. It studies the impact, analyse the struggles and offer insights into effective approaches to home-based solutions. It enables us to understand the way families could engage with the challenges of global warming and how policy, planning, architecture and economy can be re-envisioned to support the home within the framework of national and international policy circles.

Our goal is to highlight the role of the home and family in society and explore ways to improve our understanding of the impact of Climate Change on the Home and family as the building block of society and its key social and economic unit. At the heart of HRF vision is the value of what is offered by the home fundamentally is cultural and social for each family member, encouraging independent of income and resilience to external circumstances.

Under the title, 'Home, Family and Climate Change, our Experts Meeting 23 was an opportunity for conversation and reflection on how people and institutions can generate a sustainable home within an ecosystem of net-zero homes and neighbourhoods. Papers discussed the direct impact of Climate Change on the home and how homes can be better prepared adapted and be more resilient and responsive to societal and climatic changes. However, this response is not limited to one sector or aspects of family livelihoods or lifestyle. It filters through several sectors, policies, opportunities to implement fundamental change to our perceptions and way of life and enable new innovations and propositions. To reach material evidence on this debate, we set some key questions in this intellectual and empirical project.

Key Questions

1. How far do we understand the impact and consequences of climate change and global warming on the health and wellbeing home and families at home?
2. How far is the home, as central social unit, is considered in the current policies, plans and international response to Climate Change?
3. What are current conceptual, theoretical knowledge gap about the potential role and value of the home in achieving net-zero cities' targets?
4. What scientific evidence do we have on the obstacles and challenges facing households and the opportunities they offer in responding to extreme weather conditions and situations?
5. What are the frameworks that enable the home and family to become effective plays in productive and carbon-neutral economy and trade? What policy approaches we can adopt in response.
6. To what extent our neighbourhood planning, land use, digital infrastructure enables the home to play a key role in re-distributing our Carbon emission and
7. How can the results of this work be incorporated into new policy and actions?

Key Goals and Objectives

The key goal of this report is to raise the awareness of the critical role of the home on human and societal response to challenges and impact of global warming and climate change, shedding new light

on the home position as the missing link in international initiatives and national policy about practical approaches towards sustainable societies.

Objectives:

(i) Initiate an intellectual and policy debate on the theme of home response to climate change that covers diverse approaches and contextual differences.
(ii) Enable experts to deepen our understanding of the importance of the home in the context of climate change and repositioning the home as a critical institution in building resilience and adaptive mechanism.
(iii) Identify policy gaps in international and governmental frameworks that overlook the role of the home and family in combating the effects of climate change.

Key themes/ strands

1. The Care of the Planet: Love and care at the heart of Climate Response

Our planet is our shared home. It is key to our survival and our perception of living. On the personal and cultural levels, we care for our planet because we truly understand that the planet is our home. As we ought to take care of our individual and most intimate homes, it is also imperative to take care of the all-encompassing home, on which we live and the one that houses and shelters our nations. This strand focuses on the philosophical meaning of love and care within the context of care for the home and family. It connects the universal home, the planet and its wellbeing, to the very personal and intimate home of the family.

2. Climate Change & Public Health: The health and social care of the home

This strand discusses current and projected impact of global warming on family members and potential risks to essential support systems in healthcare, social care and wellbeing of individuals and vulnerable groups. Many studies reported the effects of extreme weather and heatwave on the health of older and more vulnerable people who need care. This covers variable factors that influence our health, from direct impact through excessive heatwave, torrential rains, wildfires, poor air quality, and enduring dry seasons to indirect ones that result from the limitation to our healthcare systems and their capacity to increasing demands. This strand distils the multiple studies and evidence on such change on households and potential risks.

3. Consumption & ecological footprint: *Energy, Food and Transportation*

This strand focuses on everyday lifestyle and consumption, through multiple examples of household consumptions in both developed and developing world. It puts into perspective the disparities of CO2 emissions and consumption of energy though work, food supply chain and transportation (essential and luxury). Whilst studying current patterns of societies, it summarises best practice in active reduction of carbon emission in progressive states and cities to recommend practical steps in achieving sustainable lifestyle and consumption patterns.

4. Remote economy and home-based work: *digital homes changing economic and Work/Life balance*

This strand debates the critical role the redistribution of economy, job markets and trade in offsetting the carbon consumption through remote patterns of work and trade from home. It looks at recent change in economic operations, and digital infrastructure that are needed to support families working from home and connect them to wider network of trade and markets. It maps effective economy and corporations that relied managed to remain active during the Pandemic, those new economies that emerged to compete with traditional sectors.

5. Connected Locality*: Net-Zero Homes & Neighbourhoods*
Under this strand, we discuss the design of carbon neutral housing and the development of net-zero cities through multiple models around proximity of the family to essential services, markets, local supplies. It investigates architecture, innovation and artificial Intelligence in the make-up of greener homes and developing new forms of construction to cope with periods of torrential rains and extreme temperatures.

6. Building Climate Resilience: *Raising awareness through culture and education*
This strand explores what means of education can help young individuals for developing awareness of the role of their homes and families in responding to climate emergencies and its consequences, like increased deprivation, displacement, and health risks. It investigates our learning institutions consideration of the home, family practices and power of education to change societal attitudes towards the environment.

EXECUTIVE SUMMARY

***Venue**: Nottingham Conference Centre, Nottingham Trent University, Nottingham, UK*
***Date**: 28-29 Sep 2023*

Executive Summary

The Fifth HRF International Experts Meeting (EM2023) 28-29th September 2023, at Nottingham Conference Centre, Nottingham Trent University, addressed the growing impact of climate change on families and domestic lives around the globe. Participants explored innovative and creative approaches to understanding the impact of climate change on daily behaviour and attitudes of families in their home's daily lives. More importantly, new methods were highlighted, alongside policy guidance, to engage households, families, and communities more effectively in combating the adverse impact of the global warming. The meeting brought together 17 experts from multiple disciplines, professions, countries, and cultures to discuss policy and research papers designed to show new evidence of the potential contribution homes and families can make in the face of climate change. From this discussion, which is detailed below, a series of policy recommendations for international governments and intergovernmental organisations has been prepared (refer to end of the Report).

Key discussion points and challenges addressed:

Panel 1 The Care of the Planet

Professor Antonio Argandoña and Dr Ilaria Malagrino debated the nature of the home and its philosophical connotation to the planet: '*We do not inherit it from our predecessors, we borrow it from our children*', and hence emphasis the individual and collective responsibilities to future generations. Human beings inhabit a planet, but we are not free to consume it. Progress has accustomed us to take the planet for granted and its availability for our patterns of consumption and to use as we wish. Both authors emphasized the moral and ethical responsibility towards the planet's natural resources as a fundamental aspect of everyday life that must be embedded in education, starting at home and coordinated with schools. The younger generation as much as adults need to learn the importance of the common home, so that people value it as their own. Preserving the planet and combating climate change should be a shared effort between home and school-based integrated learning and appreciation of the planet's limited resources.

In the discussions, experts noted political reluctance to see the centrality of home/family in social and public policy or through central funding models and taxation. This raises the questions: How do we support families if we accept their primary role in combating climate change? Why are we willing to fund companies to do specific technical work, but not families to help transform their living patterns into more sustainable lifestyles.

Key discussion points:

- Relational structures of the home make it the primary and priority setting for learning attitudes and behaviours towards combating climate change, specifically care-giving and receiving.
- The concept of the planet as "a common home" is derived and lived out in individual homes; hence, it must share everyday values of collective protection and survival.
- Justice is a key virtue in the ethics of care in the broader understanding of needs, responsibilities towards others and the consequences of our own actions. Climate Justiceneeds to follow similar connotations to rights and duties.
- There is a need to reconsider and reinvent social practices within the home and schools to instil a sense of collective and global responsibility towards our shared planet.

Panel 2 Climate Change and Public Health

Professor Jigna Desai and Professor Rowena Hill addressed Climate Change and Public Health, from two distinctive but mutually enlightening perspectives. Professor Desai offered research from lived- experience of climate challenge in Ahmedabad, India, while Professor Hill outlined the psychological challenges and barriers to effective mitigation/adaptation strategies. For both, resilience was not just a keyword but a vital characteristic of successful engagement with current and future emergencies. Both also addressed the challenges facing both top-down policy makers and bottom-up community leadership in their preparedness for risks and adverse impact of climate change. Professor Rowena Hill discussed psychological distance where local households and families think of climate change as a distant and future event, rather than as a daily reality; '*what is further away matters less to us, we are only impacted by what happens nearby, because geographical distance or more distant circles prevent us from empathising with the suffering of others*.' Professor Hill discussed the challenges facing policy makers and local authorities in the UK to cross this psychological distance, in their attempts to develop effective communications with communities to change their attitude towards climate changes.

By contrast, the bottom-up approach was best presented by the case of Ahmedabad, an Indian city where climatic emergencies are a fact of life, and where the lack of water and extreme weather result in loss of human lives, resulting in frequent waves of internal migration. Professor Desai outlined how with limited government support, the municipal corporation has implemented strategic solutions that expect society to self-organise and transform to face the challenges facing the city. Traditional housing choices in Ahmedabad, India prove resilient to rising temperatures: flexible room use, shade use, shared/threshold space. In this context, connected living and wider familial neighbourhood networks impact behaviours under local advocacy and cultural support systems. In the face of those challenges, the role of women and their mutual support and knowledge exchange proved more effective at times of crises maintaining both inward and outward-looking care.

Discussions in this panel, stressed that whilst the reliance on this spontaneous bottom-up approach was effective in the emergency of COVID, it is not sustainable or enduring with the almost permanent impact of climate change and adverse weather conditions. Experts indicate that there has to be a strategic and coordinated change of cultural and social norms through well-funded public training, education and development plans supported by governments and administrations. Our daily behaviour has a great impact on the planet, and our attitude towards it will need to be more proactive.

Key discussion points:

- *There is a substantial challenge in communicating national targets, goals and risks to local communities and individual households. There is a problem with language and approach when trying to prepare people for risk.*
- *Adaptation and changing lifestyles in preparation for risks and scarcity will continue to prove unpopular to individuals and the government at times of economic and social stability.*
- *The hierarchical structure of climate action does disconnect a family's daily objectives and challenges from those of the governments and their agencies. National targets must be effectively translated into vital and measurable actions to understand local impact. This is a gap at the regional level that connects locality to national goals.*

Panel 3: Consumption and Ecological Footprint

Professor Amin Al-Habaibeh reported his research into home energy economies in the UK, and the behavioural household variables which affect their success. Enrico Marzano described the ambitious project of Campus Bio-Medico (hospital and university) in Rome, to create a series of green spaces to capture both the imagination and intentions of patients, students, and the wider neighbourhood. The complementarity of small actions and bigger visions was an important strand of the meeting. These two papers covered collective attitudes of families and households toward climate actions in both the UK and Italy, and highlighted the critical importance of how practical and small steps of change in daily behaviour of families can have a large impact of our consumptions.

Professor Al-Habiabeh studied the impact that our behaviour in the home has on the planet. Energy consumption and carbon emission at home represents 50% of total energy consumption in the UK-based on statistics from COVID-19 period. Studying building performance indicates that the behaviour of people in their homes, in terms of opening windows is critical for building insulation to achieve its objectives and targets. Similarly, attitudes to cooking indicate that different habits have a significant effect on energy savings. Collectively, the general change of attitude and

behaviour in either cooking and use of windows, or cooking devices could make substantial change in our patterns of energy consumption and CO2 emissions.

Enrico Marzano presented a co-authored study on a community-centered approach to sustainable living and decision making, the Social Green Master Plan at the Campus Bio-Medico in Rome. The authors reminded us of the importance of modifying these habits and suggested doing so not as an imposition but as an empathetic acceptance of the planet. The theoretical and empirical scientific research programmes of the Campus Bio-medico developed an innovative approach towards educating the university community on the social and environmental principals of sustainable living. It made the case for a new model of innovation around thematic parks (Spirituality, Thinking, Sociality, Listening, Harvesting and Care, amongst others). The authors advocate an integrated approach towards sharing net-zero and environmental goals amongst all university community members.

Discussions in this panel highlighted the critical role for knowledge exchange with local people. The Campus Bio-Medico fosters an ambitious model of societal transformation towards benefits, whilst households need to advocate upgrading their environmental performance and change family attitudes and consumptions in everyday lives.

Key discussion points:

- *Due to their sheer volume of consumption and impact of basic and common daily behaviourand attitudes, homes are key to implementing incremental and measurable small actions to build climate resilience confidence.*
- *Whilst governmental policies focus on major strategies like transportation, infrastructure and green technology, small actions like installing smart meters, altering domestic devices,or becoming energy-aware will inform and impact energy choices with tangible rewards.*
- *Grand policies about managing the energy market and prices are not flexible enough to support the household transition towards greener choices, nor do they provide equal investments for scaling up community energy plans such as -in the UK- District Heating.*

Panel 4: Connected Locality: NetZero Homes & Neighbourhoods

Studying two types of localities, socially inclusive development from one side and connected homes of older people from another, this panel made the case for novel approaches to combating climate change through revising principles of community-based design and participation. Professor Bridgette Wessels and Jennifer Challinor examined how households and families can be more effectively engaged as resilient units to help societies and economies combat climate change in Scotland. Their study focused on 'connected locality' - how people, place and planet come together to shape households that then become 'net zero by default'. For homes to be net zero by default, it is necessary to integrate designs and retrofits that not only respond to net zero targets and climate ambitions, but also to the needs of households to live well.

Along similar lines and putting the elderly at the centre of climate action research, Professor Gamal Abdelmonem proposed a novel approach to seeing connected homes as growing forms of smart home design that aim to improve the quality of life for the elderly, their families and wider households. Such models foster better management of household activities, connectivity with family, caregiving and services. With the growing proportion of people ageing at home connected to a large infrastructure of services and technology, smart home connectivity and management will enable safer homes.

More importantly it will enable households to be more efficient in managing resources and consumption as people age at home. In our collective effort to reduce carbon emissions and combat climate change we need to revisit some of our behavioural attitudes and develop new habits and lifestyles, which make use of advanced and increasingly accessible and affordable technology in response to more frequent challenges of climate impact.

Owing to the magnitude of the challenge, small unitary efforts at institutional or policy change may have only a limited effect. By contrast, with millions of older households, families and homes around the world, adopting environmentally conscious attitudes to sustainable living and efficient lifestyles will enable a widespread outcome and have a substantial impact on reducing our carbon emissions. The homes of older people and their families are at the centre of this effort.

Key discussion points:

- *There are limited, if any, measures to ensure equity in any energy scheme (to avoid disparity of benefits versus wealth) and work with housing developers to build in climate and "whole life" adaptations as standards rather than extras.*
- *Older people are growing in representation within modern society. With the emergence ofclimate change as a major external force that impacts older people more than other age groups, the quality-of-life indicators and attitudes must be shifted to link their living and consumption patterns to the impact on the environment.*

Panel 5: Building Climate Resilience

This panel focused on educational models for young people and professionals for more integration with the natural environment at times of climate emergencies. Architect and educator Professor Pablo Campos addressed Building Climate Resilience through the lens of school and university design and construction. During the discussion of this presentation led by Professor Abdelmonem, Chair of Architecture at NTU, the relevance of this “learning by living” approach was seen to have much to add to the home agenda as well as educational settings.

Professor Pablo Campos studied schools through the influence of home environments on spaces of learning and education. He stressed the importance of designing schools with appropriate criteria that include affective, collaborative and integrative environments that respond effectively to climate change and shape the future mindset of young people. School design projects that aspire to be exemplary for promoting and educating for climate change must be designed with due intentionality and commitment to comprehensive quality, and integration in actual context and increasingly challenging environments for a sustainable future.

Acting with sensitivity to local circumstances helps considerably in terms of vulnerability. For Campos, the adaptation to the social environment adds an 'educational' role to the architecture and ensures that the spatial design is linked to building traditions and local culture, affirming thesense of identity in the community. In his commentary Professor Abdelmonem, emphasized twocritical points: the consideration of classroom as a three-dimensional textbook, as a real learning environment, and the radical shift in teaching models for architects; moving from ‘learning by doing’ to ‘learning by living’ in real context where climate change impact is real and experienced. Professor Abdelmonem stressed that critical importance of integrative approach to design, rather than the professional and elitist creative design approach.

Key discussion points:

- *Family spaces of living at home are the first learning spaces where an intimate approach to learning, affection, collaborative education, integration and compassion is practised.*
- *There is a need to change our perception of educational spaces from physical spaces to athree-dimensional textbook, learning in context.*

Panel 6: Remote economy and home-based work

This panel tackled aspects of telework as a sustainable solution that has a positive impact on work-life balance, carbon emission reduction and family dynamics. Both Professor Maria Jesus Alvarez and Maria Jose Monferrer brought their research and experience of the Remote Economy and Home-Based Work to their presentations. While Professor Alvarez evaluated the benefits and costs (personal and environmental) of teleworking, Maria Jose Monferrer widened the focus to recommend universal services to allow an equitable new world of work.

The panellists under this strand advocated that adopting telework as a viable work model can lead to happier and more satisfied employees, more flexibility and autonomy for workers, a greener environment and strengthened family ties. As we navigate the complexities of the modern world, telework presents itself as a promising tool for achieving a more sustainable and balanced future for people and planet. Beyond its impact on work and the environment, telework has demonstrated its potential to bring families closer together.

Professor Maria Jesús Álvarez argued that with the flexibility of working from home, employees can spend more quality time with their families, especially their children. Telework encourages shared care and domestic responsibilities, fostering stronger family ties and promoting a supportive partnership within households. The new generations value autonomy and flexibility as important values. They see it as enabling them to have other life projects, such as a family project among others. Addressing factors such as productivity, well-being and energy consumption will help policy makers and organisations to develop evidence-based strategies to optimise the benefits of telework.

Finally, and as a result of Prof. María José Monferrer's research, a series of recommendations are offered with regard to urban planning, promoting teleworking and creating sustainable living environments. These are suggestions in response to the current change in commuting patterns and work dynamics. She suggests balancing the needs of different demographic groups and adopting innovative solutions that can contribute to a more equitable, efficient and environmentally friendly future.

Lessons from the impact of telecommuting on work-life balance and family well-being underline the need for well-thought-out policies and considerations. Balancing technology, workspace design, "right to disconnect" policies and prioritising family well-being in future work analyses are crucial steps. In addition, addressing the challenges and opportunities related to migration from urban to rural areas due to remote working requires integrated policies and infrastructure development. In this way, societies can reap the benefits of remote work while ensuring the well-being of households and families.

This panel highlighted the role of the household and family as critical in harnessing the current shift in commuting and work dynamics to reshape urban planning, promote telecommuting and foster sustainable living environments. They enable adopting equitable policies, incentives and the active participation of citizens to facilitate a transition to clean energy consumption and generation. They also ensure family well-being, address the challenges of urban-rural migration and achieve comprehensive sustainable development.

Key discussion points:

- *With the growing influence of technology and internet access to knowledge, information,and news updates, we must recognise the critical importance of equal access to basic technology as a source of information and collective safety and security in the face of climate change challenges and impact.*
- *Access to the internet became a critical source of not only knowledge but also work, income and information at times of crises and emergencies. However, the locality lacks the necessary social and cultural infrastructure to support this reversing of living patterns.*
- *There is a need to be alert to the potential risks and harms involved in empowering total predominance and freedom of online communications and uninterrupted and equal accessto the internet, especially for young people's protection.*
- *The remote economy has repositioned the home and locality as a central hub for livelihoods within the over-reliance on major transportation links or carbon-heavy daily mobility towards city centres. It enables multi-tasking at home and strong family connections. Yet, italso distributes work and family pressures and increased levels of domestic consumption*.

Roundtable Panel

Addressing UN policy priorities and climate emergencies and the role of the family

The meeting has developed conversations leading to key themes and streams of debate. There is a clear need to revisit some of the principles of current policies and strategies that ignore the role of the home as the centre of power and influence on actions to combat climate change. The home and household need to be reactivated as agents of change, where behavior, knowledge and change need to be empowered.

There is a recognition that climate change has already developed major risks and hazards around the globe that require multiple levels of interventions and policy changes to inform collective and effective models of integration with nature, realizing individual responsibility towards the planet and toward future generations. In this discourse, despite its centrality, the family and the home remained on the margin of government policies and action plans. Instead, there is a reliance on national agencies, industry, and technology to act as key enablers for carbon neutral world. This approach overlooks the agency of the family and household relationship with nature, community, and its role as an economic unit. This round table discussed the key questions and policy recommendations for governmental and intergovernmental agencies to reposition the family at the centre for our adaptation to deal with the increasing challenges of climate change.

Empowering families to be in control of their lives and have the agency to make decisions on their strategies and actions is key to counter climate change. This comes through small actions, changed behaviors and attitudes on daily basis. Working from home and access to online could exacerbate inequalities and social divisions between those who can afford to work from home and those who cannot. This could result into disparity of resources, access and even wealth. In light of these discussions, the meeting developed a series of policy recommendations as detailed in the separate Policy Recommendations Report.

Acknowledgement:

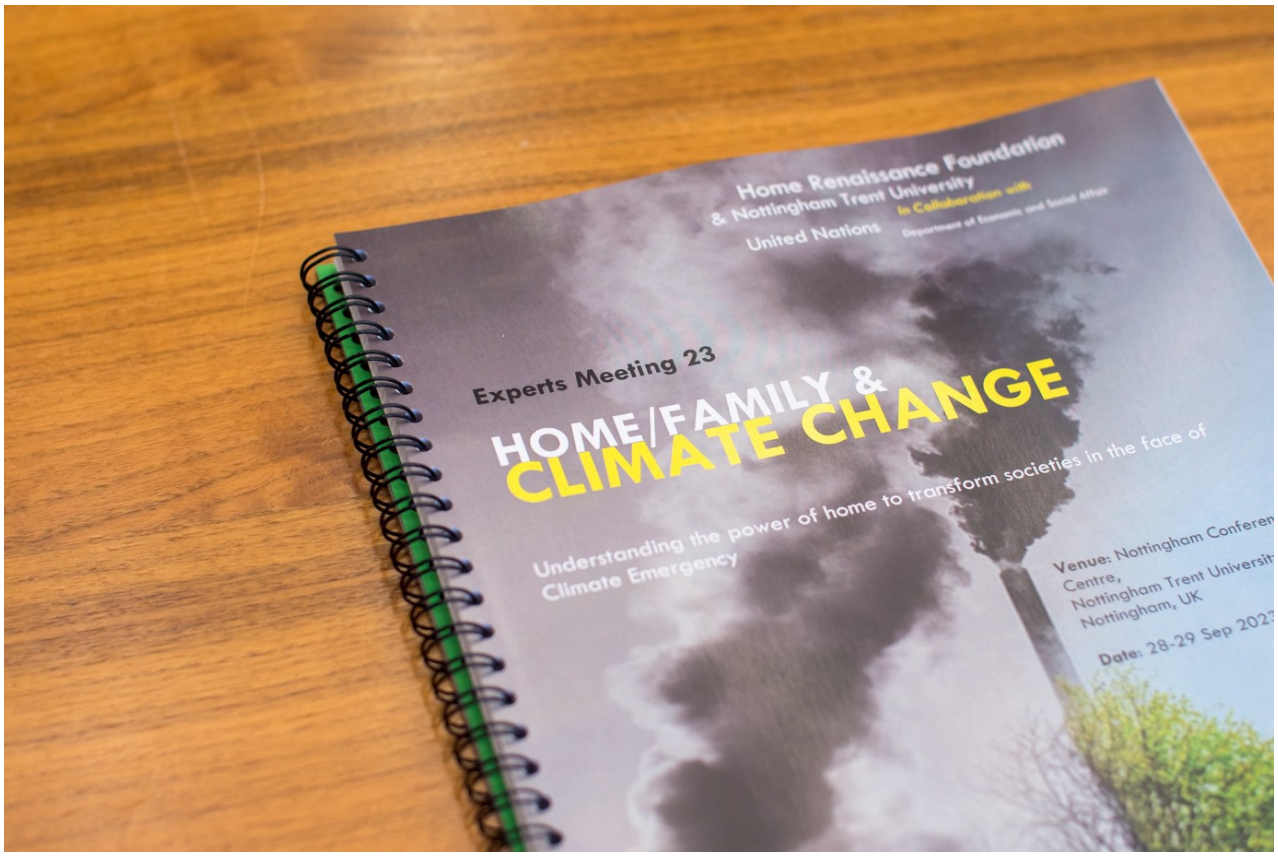
The United Nations' Department of Economic and Social Affair was represented by Ms. Renata Kaczmarska, Social Affairs Officer & UN Focal Point on the Family, whilst the Home Renaissance Foundation was represented by its Chairman, Mr. Bryan Sanderson, CBE. The meeting was chairedby Professor Mohamed Gamal Abdelmonem, Chair of Architecture and the Founding Director of the Centre for Architecture, Urbanism and Global Heritage (CAUGH) at the University of York (then at Nottingham Trent University).

Experts and panellists represented The University of Glasgow, Universidad de Navarra, Campus Bio-Medico De Roma, Queen Mary University of London, Universidad Carlos III de Madrid, CEPT University in India amongst others.

For further information about the Experts Meeting and its participants, you can visit the event Webpage and short documentary: https://www.youtube.com/watch?v=ITgu6qnverw

https://homerenaissancefoundation.org/article/hrf-ntu-un-experts-meeting-in-nottingham/

https://caugh.org/home-and-climate-change




Good Neighbours
Care Group

AUTHORS BIOGRAPHIES

AUTHOR BIOGRAPHIES

Mohamed Gamal Abdelmonem is Professor and Chair of Architecture and Founding Director of Research at the University of York. Gamal is also the Founding Director of the Centre for Architecture, Urbanism and Global Heritage. Fellow of the Royal Society of Arts and Patron of the Home Renaissance Foundation, Gamal is multiple award-winning scholars and the recipient of The Queen's Anniversary Prize (2021), UK's highest national research honours, NTU's Research Excellence Award (2020), UC Berkeley's Jeffrey Cook Award (2014), and runner up for the prestigious Newton Prize (2020). Professor Abdelmonem research focuses on architectural history, architectural and urban heritage, architecture of home, socio-spatial practices of urban communities, and sustainable living for ageing population. Gamal's research has informed governments, international organisations, and featured in leading academic journals and government policies. His books include 'Peripheries: Edge Conditions in Architecture' (2012), 'The Architecture of Home in Cairo' (2016), and "Architecture, Space and Memory of Resurrection in Northern Ireland" (2019); and 'People, Care and Work in the Home' (2020).

Professor Amin Al-Habaibeh is Professor of Intelligent Engineering Systems within the Product Design team at Nottingham Trent University. Amin's research helps reshaping futures by creating a positive impact on individuals and society. He is the Director of the national DTA-Energy (Doctoral Training Alliance) and also the Director of Product Innovation Centre. His research and teaching activities focus on several multi-disciplinary topics in the broad area of product design and innovation, automation, energy, condition monitoring and artificial intelligence. His international research profile and academic activities cover a wide range of countries. Amin has strong links with industry including eight years as the industrial placement adviser and over 25 years of industrial collaboration.

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to the improvement of the productivity of the systems. She has been involved in research projects related to logistics and transport supported by public institutions. Lately she has been involved in projects related to business sustainability and Circular Economy. As results of them there are papers published in scientific journals such as Transportation Research, Journal of Quality Technology, and European Journal of Operational Research, Journal of Cleaning Production among others. She has worked also with companies getting improvement in its production and logistics processes. She has been Head of the Industrial Management Department (1996-2003) and Dean of ISSA-School of Management Assistants (2011-2016) of the University of Navarra.

Antonio Argandoña holds a PhD in Economics from the University of Barcelona. He is Emeritus Professor of Economics and of Business Ethics and holds the "la Caixa" Chair of Corporate Social Responsibility and Corporate Governance at IESE Business School, University of Navarra. He is a member of the Royal Academy of Economics and Finance of Spain, President of the Standing Committee on Professional Ethics of the Economists' Association of Catalonia and a member of the Commission on Anti-Corruption of the International Chamber of Commerce (Paris). He has published numerous books, book chapters and articles in prestigious journals on economics and business ethics. He has been editor of books and journals, member of ethics committees of business associations and financial institutions and has held government positions at IESE Business School and with numerous scientific and professional bodies.

Saverio Berghi is currently responsible for the development of new strategic initiatives coordinating and overseeing their realization. He has a strong background in the development of green and innovative solutions thanks to his degree in construction Engineering and his PhD in which he had the opportunity to investigate the main aspects connected to energy saving and distributed micro generation.

Marta Bertolaso is Full Professor of Philosophy of Science and Human Development at the University Campus Bio-Medico of Rome (Italy) and within the CCBIO project (https://www.uib.no/en/ccbio/137960/marta-bertolaso) at the University of Bergen, Norway. Her expertise in philosophy of science, scientific practice and in philosophy of life sciences with a strong scientific background has allowed her to promote and collaborate in

interdisciplinary research and educational projects on complex organized systems and human wellbeing more in general. She is currently focusing her work on the integral development of complex adaptive systems, also mediated by digital technologies. The social impact and the emerging educational challenges for inclusion and sustainable innovation are the main focus of her contribution in institutional and international programs. She currently also collaborates in the Ministry of Health and of the Ecologic Transition in Italy and in the department for Work and Integral Wellbeing of the Vatican. Since 2017 Marta Bertolaso is Editor in Chief of Springer Series on "Human Perspectives in Health Sciences and Technology" (HPHS&T) starting in 2018. https://www.springer.com/series/16128.

Pablo Campos Calvo-Sotelo, PhD in Architecture, PhD in Education and Full Professor of Architectural Composition, San Pablo-CEU University, is an Academician of the Spanish Royal Academy of Doctors and member of the Scientific Advisory Board Gadea Ciencia Foundation. He has recognized 4 Research Six-Year Periods. He has directed or co-directed 9 national and international Doctoral Theses and 5 more in process. Pablo Campos has been speaker for 30 years at numerous international centers: Stanford University, UCLA, Columbia, Virginia, Pittsburgh, UIC-Chicago, NYU, Royal College-Harvard, NYCCT, McGill (Montreal), ITESM (Mexico), Sapienza, Naples, Cagliari (Italy), Porto, Lisbon (Portugal), TU-Delft (Netherlands), Ministry of Education (Bhutan), Athens (Greece), Aalto University (Finland), AAB (Kosovo), UCAM (Colombia), or the American Institute of Architects. Since 1989 he designs and researches about the Architecture of Education. He has written 17 books and more than 90 articles on the subject and lectured at prestigious international institutions. Author of the concept of "Educational Campus", Professor Campos has designed numerous Master Plans for universities and their relationship with the city, both in Spain and abroad. Among others: the Campus of the University of Salamanca, Sustainable Campus (competition, Madrid), Campus UNAE (Ecuador) and Campus UAN (Angola). In 2012, he received the Education Leadership Award-World Education (India) for his contribution to education on an international scale.

Jennifer Challinor is the Head of Research and Development at The Crichton. She has been with the Trust since January 2018. She leads on embedding age-friendly, zero carbon and technology-driven innovation into both the work of the organisation and local communities. She is passionate about testing the next generation of innovations and understanding the challenges and opportunities of adapting to technology a climate emergency and an ageing society in rural communities. She coordinated the 'Building the Case for a Care Campus' Project for the Trust. This was a 3-year community-led project that ended in December 2020. During this project she worked to explore the opportunities of an ageing rural population and how rural places can innovate and be empowered to find solutions that work for them. In her rare moments of spare time, she enjoys being a PhD student at the University of Glasgow.

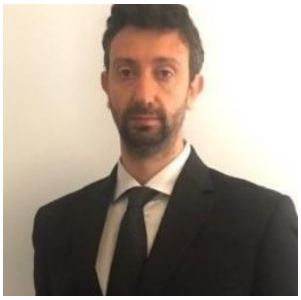
Stephen Davies was the Head of Education at the Institute of Economic Affairs (IEA). Previously he was program officer at the Institute for Humane Studies (IHS) at George Mason University in Virginia. He joined IHS from the UK where he was Senior Lecturer in the Department of History and Economic History at Manchester Metropolitan University. He has also been a Visiting Scholar at the Social Philosophy and Policy Center at Bowling Green State University, Ohio. A historian, he graduated from St Andrews University in Scotland in 1976 and gained his PhD from the same institution in 1984. He has authored several books, including Empiricism and History (Palgrave Macmillan, 2003) and was co-editor with Nigel Ashford of The Dictionary of Conservative and Libertarian Thought (Routledge, 1991).

Jigna Desai is founder and head of the Center for Heritage Conservation at CEPT University. In this role, she collaborates on pioneering international research projects, engages with government, city administration, industries, and communities to inform best practices and policies for heritage conservation. Her overseas work includes heritage monitoring missions, evaluations and advice for the International Council for Monuments and Sites (ICOMOS), World Heritage Committee and World Monuments Fund. She is also a Visiting Professor at Nottingham Trent University, and has written extensively on architecture, heritage conservation and world heritage issues in India. Her most notable book is, Equity in Heritage Conservation, The Case of Ahmedabad (Routledge, 2019). Jigna is also a co-founder of a small, award-winning architecture practice, JMA Design Co. where she brings resource conservation perspective to architectural design processes at all scales.

Rowena Hill is a Professor of Psychology in the School of Social Sciences at Nottingham Trent University. Her work builds opportunities to translate evidence and research into policy and increase knowledge exchange between academics, communities, and organisations. As an active researcher, Rowena's research areas focus on emergency responders and emergency and disaster management. Her interests can be clustered around the facets of collective action, communication of risk, and humanitarian assistance in relation to psychological health. She is currently the embedded scientist supporting the Climate Change (Civil Contingencies) and Adverse Weather portfolio for the National Police Chiefs Council. She is an ESRC Policy Fellow to the Department of Levelling Up, Housing and Communities on Climate Change, is the Honorary Research Lead for the Fire Fighters Charity and is the Chair of the national Academic Collaboration, Evaluation and Research Group for the National Fire Chiefs Council.

Renata Kaczmarska is a Social Affairs Officer and a Focal Point on the Family located in the Division for Inclusive Social Development in the Department of Economic and Social Affairs (DESA) at the United Nations Secretariat in New York. She has served as the Focal Point on the Family in the Social Integration Branch of the Division since 2009. In this capacity, she acts as a spokesperson on family issues for the United Nations Secretariat. The major duties of the Focal Point on the Family include providing substantive support to intergovernmental bodies of the United Nations, including the General Assembly, the Economic and Social Council and the Commission for Social Development; drafting of reports on family issues; organization of expert group meetings related to family and family policy issues; coordination of technical cooperation activities; managing of the Trust Fund on Family Activities and organizing of awareness raising events, including the annual observances of the International Day of Families, 15 May. Currently, Mrs. Kaczmarska works on family policy development in the context of the 2030 Agenda for Sustainable Development. She conducts research on how family policies contribute to the achievement of Sustainable Development Goals and targets relating to poverty, health, education, gender equality and social integration.

Rosa Lastra is the Sir John Lubbock Chair in Banking Law at the Centre for Commercial Law Studies (CCLS), Queen Mary University of London. She is a member of Monetary Committee of the International Law Association, a founding member of the European Shadow Financial Regulatory Committee, an associate of the Financial Markets Group of the London School of Economics and Political Science, and an affiliated scholar of the Centre for the Study of Central Banks at New York University School of Law. From 2008 to 2010 she was a Visiting Professor of the University of Stockholm. She has served as a consultant to the International Monetary Fund, the European Central Bank, the World Bank, the Asian Development Bank and the Federal Reserve Bank of New York.



Enrico Marzano is currently responsible for the evaluation of new initiatives with a strong social impact and venture capital investments in the health sector. He has an international academic background in economics and finance, during his career he has acquired strong expertise in implementing innovative solutions in the

agricultural field as well as in the circular economy. During the years Enrico Marzano has delivered support to a wide array of private and public entities helping them in elaborating and submitting research projects facilitating them in obtaining grants and other fiscal incentives.

María José Monferrer Freire is an accomplished professional with extensive experience in the telecommunications and technology sectors. With a Master of Science's degree in Telecommunications Engineering from UPV (Valencia Polytechnic University), María José has a strong business acumen and is proficient in multiple languages. She has gained international experience throughout her career. Additionally, she is an alumna of renowned Spanish Business Schools, including Instituto de Empresa for the International MBA, IESE Business School for the Advance Management Program (PDD) and ESADE for the Women Leadership Promociona program. María José is president and co-founder of AIverse, promoting Artificial Intelligence. Associate professor at UC3M Universidad Carlos III de Madrid. She is part of the Scientific Advisory Board of Fundación Gadea. Board of AEITM Madrid branch of the Spanish professional association of Telecom Engineers. She is the co-founder and former Vice-president of EJE&CON (Association for Executive and Board Members), where she leads the ForoTech. She also has served as the Chair for the BT Spain Gender Equality Network. With over 25 years of international professional experience, María José has worked in various roles within the sales and procurement departments at BT Group. Her key areas of expertise include leading change through commitment, transforming business models to enhance customer experience, and recognizing innovation as a crucial factor for success. María José Monferrer Freire is an occasional speaker and a lifelong learner. She is passionate about promoting STEM talent, driving digital transformation, fostering entrepreneurship, and championing innovation. As a change agent, she actively contributes to these areas.

Ilaria Malagrinò is a Researcher in Moral Philosophy and Bioethics at Roma Tre University. Ilaria completed her Ph.D. at University Campus Bio-Medico of Rome working on the relationship between mother and foetus. Her research interests lie in the area of pregnancy, motherhood, corporeality, intimacy, home and care. She has collaborated actively with researchers in several other disciplines particularly sociology, psychology, engineering and biology.

Bryan Sanderson is the Chairman and Founding Director of Home Renaissance Foundation and Chairman of the Low Pay Commission. Before that, Sanderson was Managing Director of BP, Chairman of BUPA and Standard Chartered Bank. He also helped establish the Learning and Skills Council as its first Chairman. He served as Vice Chairman of the Court of Governors at LSE and is a Trustee of the Economist Group. After gaining a BSc in Economics at LSE and furthering his education in the IMEDE Business School Lausanne, the majority of Sanderson's business life has been in the management of advances made in areas ranging from technology to corporate law, from financial regulation to societal and cultural behaviours.

Marcella Trombetta is Dean and founder of the Department of "Science and Technology for Sustainable Development and One Health" of the Università Campus Bio-Medico di Roma (UCBM). Since 2006 she is Full Professor of Principles of Chemistry for Applied Technologies. Since 2023 she is member of the scientific technical committee of the "One Health" parliamentary intergroup of the Chember of Deputies of the Italian parliament. In 2017-2023 she was constituent of the "National Commission for the prediction and prevention of major risks" of the Presidency of the Council of Ministers for the sector of the chemical, nuclear, industrial and transports risks (GURI n. 284 of the 05/12/2017). In 2018-2021 she was member of the Technical Health Committee, "section for the evaluation of biotechnologies" of the Ministry of Health as expert in Biotechnology of the Department of Civil Protection (DPR 28 March 2013, n. 44). In 2014-2018 she was constituent of the "Consiglio Superiore di Sanità" (National Health Council) of the Ministry of Health. In 2014-2020 she was President of the Master's Degree in Chemical Engineering for a Sustainable Development at UCBM. In 2013-2016 she was Vice-Dean of the Department of Engineering at UCBM. Publications at https://www.scopus.com/authid/detail.uri?authorId=7003928503.

Bridgette Wessels studied Sociology and the Sociology of culture at the Universities of Durham and York. She then went to the University of Sussex to undertake doctoral research in the innovation and use of telematics – one of the early community-based developments of the Internet and WWW. The sociological study of the Internet and WWW was in its infancy and she was part of an innovative research environment that fostered interdisciplinary research into the WWW in social contexts. After undertaking two post-doc research projects

at the Universities of Durham and Newcastle, she took up her first lecturing post at the University of Sheffield becoming Reader in Digital Sociology in 2014. She founded and ran the Centre for Interdisciplinary Research in Socio-Digital Research at Sheffield (IRiS). She was Professor of Sociology at Newcastle University before becoming Professor of Social Inequality at the University of Glasgow. At Glasgow, she founded the Glasgow Social and Digital Change Group – with Professor Andy Hoskins – and they work with Dr Catherine Happer and Dr Justine Gangneux in co-ordinating that Group.

Expert Meeting Coordinators:

Ángela De Miguel, Home Renaissance Foundation

Maryam Pourzakarya, Nottingham Trent University

EXPERTS PAPERS

INDEX of PAPERS

1. Ethics of Care, Care in the Home, Care of the Common Home

Antonio Argandoña, IESE Business School, University of Navarra

Abstract

Human beings live in a home, a community of people (a family) who live together in a place (a house), with a shared common project, in a particular setting (a village, town or city open to the world). This home is part of another home in a broad sense - the earth, the universe, nature...- that welcomes us all and offers us the conditions for a dignified life. This broad home presents problems that affect us all because it is our 'common home'. Experts, governments, businesses, and many other organizations study, report, and propose solutions to these problems, but it is often forgotten that the family home is the first agent affected by the causes and effects of these environmental problems. This article deals with the role of the home as the most significant experienced site of embodied, inhabited, and place-based environmental education. We use the ethics of care as a tool to understand these problems, become aware of them, motivate ourselves, and guide the processes of analysis, decision, and implementation of appropriate solutions in the home, which is the experiential and educational site where the eco-citizens of today have the chance to contribute to the moulding of the responsible pro-environmental citizens of tomorrow.

Introduction

Our life begins in the 'home': a community of people (the family) who live together in a place (the house) with a more or less explicitly shared common project, in a particular setting (a village, town or city open to the world) (Argandoña 2018, 9). 'Home' is also the first place where a person encounters his environment, not only immediate (house, parents and siblings, furniture, neighbours), but the environment in a broader sense. "Environment means what surrounds us. It may be living or non-living things (...) Living things live in their environment. They constantly interact with it and adapt themselves to conditions in their environment."[1] We humans live in a natural environment, which we have received, adapted, and changed over the centuries: it is our 'home' in a broad sense.

The actual state of that natural environment, its short- and long-term expectations, and its effects on present living beings and future generations is a cause of concern. Experts and politicians, international bodies, governments, companies, and many other organizations propose solutions to the environmental problems. Here we are primarily interested in the role of the home in this collective task of taking care of the environment. Guided by the ethics of care, we will deal successively with care in the home, the ethics of care, the ethics of the environment and its practice in the home.

Home and Care

Human beings are *vulnerable* and *dependent*. We are born in a state of total helplessness, in need of physical and spiritual protection. Our first 'home' is our mother's womb, where we receive everything, we need to begin our career in life. At birth, we find ourselves in a *home*, a safe and pleasant place, and a community of people on whom we depend for everything. In that home, we grow and mature as

[1] *https://simple.wikipedia.org/wiki/Environment (accessed August 15, 2023).*

people and acquire *autonomy*. But our vulnerable condition never disappears we all suffer more or less frequent and long periods of fatigue, illness, or physical, moral, or spiritual deterioration, and the home is again the place where we find protection and help. And, although it is not the only one to which we can turn, it is usually the most accessible.

Home is our place for intimacy, to which the person withdraws to keep his or her life in order and regain control over it. "*It is the place for the free and peaceful actualization of what is human*" (Marcos and Bertolaso 2018, 53); "*that most recondite, private, secure and comfortable place for the self, where it takes shelter from the natural world, to where it belongs as its innermost shelter, and from where it addresses the world and the other, opening itself to transcendence*" (Patrão Neves 2018, 73).

The home is a space in which a community of people, often united by ties of kinship or affinity, live their private lives. It is the place where people learn to live with others, to share resources and capabilities, to be served and to place themselves at the service of those who are vulnerable and dependent. We call this exchange of services and help 'care', and it is characterized by openness to the 'other' and to his or her needs as a person, not just as a sick or weak body. Although care is lavished in other environments, such as the extended family, the workplace, the neighbourhood, the school, the hospital, a group of friends or many others, the home is the paradigm of care, which occurs spontaneously and where everyone exercises it, each in his or her way, sometimes as caregivers and sometimes as cared-for persons.[2]

"When Hamington (2004, 3) says that '*care is committed to flourishing and growth of individuals*' he seems to be thinking of the home's social function, particularly concerning children" (Abdelmonem and Argandoña 2020, 8). "*Only a civilization focused on care can promote human flourishing and, consequently, happiness and care should be the most significant things learnt at home*" (Chirinos 2023, 7). '*We start our life as dependent (…), and the role of early care is to foster our autonomy*' (Tronto 1993, 162-163). "*Sickness also makes us dependent, and the care received during illness aims to restore our autonomy. In that perspective, care is a response to dependence, in a way that does not abuse it, but instead uses it to promote autonomy*" (Giraud 2021, 6).

The ethics of care

The origins of the *ethics of care* are often traced to feminist philosophy and political movements of the 1980s and 1990s (Gilligan 1982; Noddings 1984), as a response to what was interpreted as a dominant gender bias in some moral theories, such as those of Kant and utilitarianism, which were based on a concept of the self as disembodied and detached (Held 2006). The ethics of care "calls attention to *relationships*, *responsibility* and *experience* and their cultural, historical and psychological contexts" (Borgerson 2007, 479, emphasis ours). "It is an ethics that values interdependencies and caring relations that connect persons, rather than privilege independence and individualization. It emphasizes ethics as a process of making judgments based on real, lived experiences and in the constellation of relationships and institutions in which caring is positioned" (Phillips 2019, 1157).

How are decisions made in the ethics of care? *Traditional decision theory* usually starts from a problem faced by the agent, a problem (it may be an opportunity) with several dimensions, including moral ones. The agent studies the nature, origin, and possible consequences of the problem; seeks alternative solutions; establishes the technical (cost, feasibility, effectiveness, collateral consequences, etc.), human, social and moral criteria that the most appropriate solution must meet; analyses the various options by these criteria; makes the decision, executes it and, finally, evaluates the consequences.

[2] *External caregivers also often provide their services in the protective and friendly environment of the home.*

The ethics of care follows a similar scheme but becomes a personalization of the moral disposition of the person in a relational environment. The *problem* is always the need for particular care that another person has. "*In contrast to ethical theories that assume the paradigm of moral reasoning to be an isolated agent making impersonal, abstract calculations -a dominant view in Western philosophy-, ethics of care highlight the affective dimensions of morality, the inevitability of dependence and interdependence, the importance of caretaking and healthy attachments in the fabric of human well-being, and the relational and contextual nature of any ethical question or problem*" (Gilligan 1982; Whyte and Cuomo 2016, emphasis ours).

Caring is essentially *relational*, "*it happens in the relation between the one caring and the one cared for* ." (Noddings 1984; Giraud 2021, 5). The agent knows the needs of others precisely through his or her relationships with them, relationships that are *reciprocal*, but not necessarily equivalent. "Ethics of care understand moral agents as deeply and inextricably embedded in networks of ethically meaningful connections and conceive of care as the exercise of responsibilities and virtues that maintain and positively influence relationships and overall flourishing within those overlapping networks" (Whyte and Cuomo 2016). The ethics of care is about not only solving a particular problem but doing so in the best way to ensure the flourishing of all, primarily the agent.

Because of the need for care that he or she perceives in another person, the agent feels challenged and enters "*a process of making judgments based on real, lived experiences and in the constellation of relationships and institutions in which care is positioned*" (Phillips 2019, 1157, emphasis ours). It is thus not cold, abstract reasoning, typical of 'third person ethics,' but something personal, which accepts the *moral validity of emotions* in ethical decision-making and focuses less on individual moral reasoning (Giraud 2021, 5).

Emotions were already present in the traditional decision-making process, at least as a wake-up call about the problems affecting people. Now, in the ethics of care, affects and emotions play a more relevant role, from the very identification of the problem[3]; through the recognition of the responsibility that the agent has in solving it - a committed, not abstract responsibility; the search for alternative solutions and the elaboration of their validation criteria, to the implementation of the preferred solution, which is enriched by the relationships between the caregiver and the person cared for: "*in order to really 'help', the helper needs to humble herself and be ready to apprehend the other's reality*" (Giraud 2021, 5). [4] The ethics of care is thus a "*social practice as much as individual disposition, as something larger than the province of the individual, and as a collective responsibility*" (Tronto 1993; Phillips 2019, 1158).

All of this is evident in the four phases that Tronto identifies in the process of the ethics of care: caring about, taking care of, caregiving, and care-receiving. '*Caring about involves the recognition in the first place that care is necessary. It involves noting the existence of a need and making an assessment that this need should be met (...) Taking care of involves assuming some responsibility for the identified need and determining how to respond to it*' (Tronto 1993, 106). '*Care-giving involves the direct meeting of the needs for care (...) Care-receiving recognizes that the object of care will respond to the care it receives*' (Ibid., 107)" (Giraud 2021, 6).

Environmental ethics and the home

Every human being needs a home, but we also have another 'home' that welcomes us all and offers us the conditions for a dignified life: the earth, the universe, nature, our *'common home'* as Holy Father

[3] *The identification of the problem goes back to the field of research, which gives rise to what Haverkamp (2021) calls the "participatory and engaged action research".*

[4] *This implies a closeness of the caregiver with respect to the cared-for person, a closeness that is always present in the home, but not in public policies.*

Francis calls it in his Encyclical *Laudato Si'* (2015), recalling the duty we all have to take care of it. That care is a call to the responsibility of rulers and experts, but also of all citizens. How do the problems of that 'common home' impact our family home?

Research, analysis and debate on problems related to the environment have experienced considerable growth in recent decades: *climate change* and the part that human activity can play in it, the preservation of fauna and flora species, alterations in biodiversity, the deterioration of ecosystems and many other problems, which have multiple impacts on human living conditions, such as short and long-term risks for many communities, uncertainty about the conclusions of climate science and, therefore, about the measures that need to be taken or should be taken (Gardiner 2004), the costs of prevention, correction or adaptation, etc (Lomborg 2007).

These are global problems in terms of their causes and consequences, with very long-term and persistent impacts, but uneven across regions (Dietz et al 2008).[5] Those problems affect us all, not only because of their consequences, but also because of their causes, given that many of our daily decisions on food, water and energy consumption, waste management, means of transportation, or what we wear and use, have had or will have an impact on the environment. These are therefore problems with a clear ethical dimension because we are all active or passive agents of these actions, starting with researchers and those who must propose and implement the measures to be taken by nations, but also reaching down to smaller communities, homes, and individuals[6]. We are all affected by questions about the quality of the decisions we make, the rights and duties we have towards others, the costs of a decision versus the benefits it brings, or the rights of future generations versus the current ones.

At home, we are interested in environmental and ethical issues because "the home is the first site where our values and beliefs are moulded. As Payne (2010, p. 213) depicts it, '*the home is probably the most significant experimented site of an embodied, inhabited and place-based environmental education (or not) -well before and beyond the classroom, the playground and the school*" (Brizi 2020, p.91).

The home and environmental problems

The ethics of care presents itself as a useful instrument for dealing with the moral dimension of caring for the environment. "*Ethical paradigms centred around caring can acknowledge the significance of caring for all kinds of others, as well as the complex value of ecological interdependencies and the limitations of worldviews that deny reliance on nature*" (Whyte and Cuomo 2016). What does the ethics of care offer to those who have to make decisions concerning the environment at home? First, a broad concept of who the 'others' are that our actions may affect, from the people closest to us to others very remote, who made, perhaps long ago, decisions that affect us now, or who will suffer the consequences of our actions in time and space. "*This starts from the premise that humans are ultrasocial and display an enhanced capacity for care and sensitivity to the needs of others as opposed to the conception of homo oeconomicus*" (Phillips 2019, 1158).

Secondly, a broad concept of what actions with environmental implications we conduct in the home. The focus is often on the impact of consumption (of food, water, energy, transport, leisure), but the household is much more than a consumption unit, because, for example, it is part of a neighbourhood, in whose culture and problems it participates, often in a very active way. "Urging households to behave responsibly has its limits, and what constitutes 'responsible' behaviour is developed within social practice, rather than abstractly distanced from it (...). [Households] are 'enrolled' in networks (social,

[5] *All this justifies the responsibility of the international organizations and national, regional and local governments in regulating and promoting private behaviours on the environment, although there is a wide margin for companies and households to make decisions in this area (Brizi 2020, 84-87).*

[6] *On the responsibilities and duties of individuals in environmental ethics, cf. Cripps (2013), Nanda (2011).*

industrial, governmental), with consequences for behaviour and resource use and for the extent to which households can change (...) [They are also] sites of production with their divisions of labour, internal economies of lending and sharing goods (e.g., clothing), amidst neighbourly gift economies (of fruits and vegetables, plant cuttings, child care, etc.), and cultures of re-use" (Gibson et al. 2010, 4-5). [7]

In the ethics of care, emotions are not only calls for attention before the identification of the moral problem, but also guides for the search and reception of information, for the analysis of the problem and possible solutions, for the informed response to those problems, and for the execution of the most appropriate solution. "Care and compassion together with imagination mean that the suffering caused by injustice can be visualized, and this motivates and inspires political action" (Phillips 2019, 1158), and private action, referring to other people and, where appropriate, to the natural world.

The relevance of emotions and effects in the ethics of care applied to the environment does not contradict the importance of virtues (Connelly 2006), good operational habits that are acquired by the voluntary, deliberate, and effortful repetition of increasingly better acts. The first of them, in this field, is justice, "as it makes us accept that every human being is or should be entitled to an equal share of the natural resources as any other human being[8]. As we inhabit the world and make use of its natural endowment, we inevitably affect the entitlement of others of their share of natural resources, the other being not only currently living creatures, but also those who are not yet borne" (Brizi 2020, 83). There are also other virtues and values in the field of environmental ethics, such as perseverance and patience (because these processes take a long time), frugality (because the volume and composition of household spending affect the use of resources and the volume of waste), compassion (for the consequences of our decisions on other people, present or future), solidarity (to extend help to many in need, including the future generations), participation (giving input to those affected to participate in decisions that are taken), prudence (willingness to discern what is the true good in each case and choose the means to achieve it), empathy, etc.

The formation of values, beliefs and practices begins with information and communication. News about theories, facts, data and experiences about the environment reach the household members: what is said in the media about climate change, its causes and consequences; what laws and regulations say about these issues[9]; what relevant events take place in that environment; what are the experiences of the people who suffer its consequences (also those in the household members' histories); what responsibility the household may have for those events, etc.

In this way, information can give way to awareness and acceptance. The people who make up the household can gradually understand their role as mere spectators or as active subjects of these changes, through their knowledge and experiences on, for example, the use of water and electricity, the food they consume, the means of transportation they use, the use of reusable bags and recycled materials, and other initiatives. "Through open and continuous communication, parents have the chance to raise the level of awareness and pass down to their children a concern for the environment that helps generate both motivation and commitment to act responsibly" (Brizi 2020, 89).

From awareness will derive the substantive and procedural responsibilities, duties and rights of citizens, to the extent that they have the capacity - and interest - to assume them, and, consequently, the motivations that will move agents to take and implement the consequent decisions on prevention, mitigation, adaptation and compensation, even when there is no immediate gain to be had. "The level

[7] *Of course, households can also act on problems for which they are not directly responsible, such as inequalities caused by political and economic decisions.*

[8] *This is related to the principle of universal destination of goods of the Social Doctrine of the Catholic Church. Cf. Pontifical Council for Justice and Peace (2004), nn. 171ff.*

[9] *From this follows the right of citizens to be informed by political authorities and companies on environmental issues that may affect them, including variables such as resource consumption levels in order to make decisions about their savings.*

of motivation (...) makes the difference. By internalizing motivation, we become eco-virtuous" (Brizi 2020, 89). [10]

We have presented some arguments that justify the use of the ethics of care as an instrument for the study of environmental problems at home, as well as for the development of the knowledge, attitudes, values, and virtues necessary for the home to be an active agent in solving these problems. Such ethical theory cannot have the last word because it will not always provide adequate solutions to the problems posed by the environment. But can be useful to guide the processes of analysis, decision and implementation of appropriate solutions in the home, which is "an incubator of good environmental practices (...) being the experiential and educational site where the eco-citizens of today have the chance to contribute to the moulding of the responsible pro-environmental citizens of tomorrow (...) Preserving the natural environment is a huge challenge that has to be understood more as a process than an outcome. Besides, it is to be pursued both at a local and a global level. The local challenge has to be started and pursued in the home (...). In this respect, the home, as local as it is, can have a global environmental impact" (Brizi 2020, 82).

In any case, the consequences of the use of the ethics of care will be a slow process, because adapting behaviours in the home requires time, and this adaptation will depend on factors such as the age, gender, education, and income level of the people involved, home conditions, work habits and many other variables. Its implementation will often take the form of small details and daily routines, such as turning off the water tap while brushing one's teeth, turning off lights that are not necessary, unplugging electrical appliances at night, recycling leftover food, etc., all of which coincide with the educational function of the home.

Conclusions

Education in care for the 'common home' begins at home, where we learn to live, to be aware of the consequences of our actions on others and the natural environment, and to act accordingly. The ethics of care guides us in this task, paying special attention to the relationships we establish, the responsibilities we must assume, the experiences, and the context in which we act. Applied to the problems created by climate change, pollution, resource depletion and other environmental events, the ethics of care provides us with more information about who are the people on whom we project the consequences of our actions, what are those actions, what role emotions and affections play in identifying the moral problems that arise, what virtues are developed, and how we can carry out our ethically correct decisions until we end up acquiring the daily routines that shape our behaviour as eco-citizens.

In any case, taking care of the environment does not only consist of throwing waste in the appropriate bin, avoiding wasting water or insulating doors, windows and walls to save energy but also requires a change in values that leads families to live more frugally, make better use of the assets they have and reduce the environmental impact of their daily activities. This extends through the members of the household, who transmit those values to future generations and spread them among their relatives, neighbours and relationships.

[10] *Obviously, the process by which the agent is moved to act is not free of difficulties. Heald (2017) points out the importance of two factors: self-efficacy, whereby "unless they are externally coerced, [people] avoid transactions with those aspects of their environment that they perceive exceed their coping abilities" (Bandura 1997, 14) and moral disengagement, which "provides the means for those who morally disengage to circumvent moral standards in ways that strip the morality from harmful behaviour and their responsibility for it" (Bandura 2016, 3).*

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2. Home, care and love: the possible starting point to overcome the climate crisis

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Introduction

Climate change is one of the most compelling challenges for society today. States are articulating climate action plans to cut emissions and adapt to climate impacts through nationally determined contributions. Unfortunately, many people still struggle to recognize climate change as a serious issue[11]. The accumulation of scientific data has failed to compel the general public on the urgent need for pro-environmental policy action. Why? Scruton (2012) argues that this probably happens because the most unfortunate aspect of the centralized approach to environmental problems is that, while advancing a non-compromising agenda, it ignores the need to provide ordinary people with motives for adopting it[12].We can correct ourselves only if we have motives to do so; motives strong enough to restrain our appetites. The author claims these motives ultimately should be grounded in 'oikophilia', the love and feeling for home. Human beings, in their settled condition, are animated by an attitude of 'oikophilia': the love of the *oikos*, which means not only the home but the people contained in it, and the surrounding settlements that endow that home with lasting contours.

In this reading, care for home, and grief over its violation, are recognized human universals. But why? Scruton's perspective is surely interesting, suggesting that restoring effectiveness and meaningfulness to environmental ethics, requires understanding that the source of the problems we face lies in how our ontological and metaphysical assumptions have informed and shaped our behaviour. As Guattari[13] argues, we are in need reinvent reinventing social practices that would give back to humanity a sense of responsibility. This reorientation could be achieved by emphasising more centrally a deeper, interconnected sense of the earth as a 'home', in which all features are intimately interdependent.

But why, using an expression of Nel Noddings', can we say that starting from and at home is so important for the life of the planet and of people? My aim in this paper is to outline an "ecosophy", a wisdom about home, with embedded ethics, and to clarify why it is a key point and what this perspective suggests to the debate on the current ecological crisis that we are experiencing. Knowledge, and care for, the home is required to have knowledge and care for both ourselves and our environment.

To address this topic, in the first part I will start "From Home" by clarifying that human being inhabits the world by making a home and that the distinct aspect of dwelling is care. In the second part, I will analyze the importance of "Starting at Home", highlighting that education to be at home and, ultimately, our way of being in the world begins in the childhood home. In the third section, I will go on to point out what it means to love home. Finally, in the last part, I will conclude by emphasizing that the perspective of oikophilia forces the ecological debate to think about what human being means in the world, since this reflection is recognized as the only and essential starting point to create a sustainable future.

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[11] P. H.Thibodeau, C.M. Frantz, M. Berretta, The earth is our home: systemic metaphors to redefine our relationship with nature, «Climatic Change», 142 (2017), pp. 287–300. https://doi.org/10.1007/s10584-017-1926-z.

[12] R. Scruton, How To Think Seriously About The Planet. The Case for an Environmental Conservatism, Oxford University Press, Oxford 2012, p. 101.

[13] F. Guattari, Chaosmosis:An Ethico-Aesthetic Paradigm, Powet, Sydney1995, p. 120.

Starting "From Home"

Home is a place of a particular kind[14]. Human persons make places through their activities, we might say, and so the places take on the shapes of the activities themselves. The place thus "belongs to the very concept of existence" rather than "being merely locatory or situational." [15] According to Bollnow[16], a human being realizes its existence by inhabiting: dwelling and finding a home is the very "essence" of human existence. Bollnow, like Heidegger, describes dwelling as a central notion. Dwelling is not an activity like any other, but a determination of human beings that allows them to become aware of their true existence. Thus, speaking about home does not imply a reference to a house, or a building, at least not primarily[17]. Home shows a particular action, a relationship with the surrounding environment. Human beings inhabit the world by making a home.

The way in which we humans are on the earth is dwelling, as Heidegger argued. To be a human being means to be on the earth as a mortal and it means to dwell[18]. Heidegger explicitly makes a connection between ethics and dwelling. Dwelling, then, is not something we do within buildings specifically constructed for that purpose[19]. Dwelling as ethical comportment pervades our lives in their entirety: far from being a mere residing at some particular location, one's dwelling is reflected in all of one's engagements in the world. But in what does the nature of dwelling consist?[20] The fundamental trait of dwelling is caring, a concern for things, and their presence. Caring is an attitude toward other entities, that discloses our original condition. According to Heidegger, human' being is care, stressing that humans are not disembodied intellects, but instead radically finite, embodied, the beings-in-the-world for whom beings' matter[21]. Humans care when they let other beings be, in the sense of allowing them to manifest themselves in terms of their inherent possibilities[22].The virtue of care enables a person properly to pursue the flourishing of those things capable of flourishing. When things are properly cared for, they are spared and cherished. We let things ripen of their own accord in this way when we resist forcing a conceptual interpretation onto them.

Swanton describes this disposition and practice toward things as having a sense of the world as holy, which is to see it as mysterious, radiant, awesome, and not something to be totally 'ordered about,' calculated, manipulated for our ends[23]. It inspires a paradoxical desire to both embrace things and to keep a respectful distance from them. Learning to live both desires allow one to dwell in a loving way. Dwelling love is a deeply comforting coming close, allowing for a nearness of being.

Therefore, the ethics of care is an ethics of alliance, understood as a respectful union; it signals the subtle tension between attraction and distance necessary to savor the invigorating benefits of the bond.

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[18] M. Heidegger, Building Dwelling Thinking, In Poetry, Language, Thought, transl. by A. Hofstadter, Harper and Row, New York 1971, pp. 141-159.

[19] Ivi, p. 144

[20] Ivi, p. 147.

[21] M. Zimmerman, Heidegger's Phenomenology and Contemporary Environmentalism, In Eco-Phenomenology: Back to the Earth Itself, C. S. Brown, T. Toadvine (eds), State University of New York Press, New York 2003, p. 79.

[22] Ibid.

[23] C. Swanton, Heideggerian Environmental Virtue Ethics, «Journal of Agricultural and Environmental Ethics», 23 (2010), p. 160.

[24] In this reading, caring does not mean aiming one goal for the other. Caring means having the other as a goal[25]. Caring is looking for the other[26]. In this sense, caring means supporting the other in the development and in the process of becoming what it is[27].

Taking care does not mean opposing an active subject to a passive object. Caring is not just about giving; it seeks participation, and ultimately action from others. It speaks about a "relational ontology", a mutual interdependence, relocating and giving importance to the concepts of reciprocity, dependency, and connectedness[28]. The ethical goal of care can thus encompass the subjects' autonomy: not an abstract autonomy, a hypostasis of autonomy, but a process of liberation and individuation.

Staying with the things of man transforms the world into a home, because of its care: thus, the originally ethical dimension of living is rediscovered. If the fundamental trait of living is care and the way of being in the world is ethics, then care is the first ethical approach to the world, its most characterizing dimension, starting “At Home"

As Scruton states quoting Aristotle, success in action requires virtuous habits, and virtuous habits must be acquired early if they are to be acquired[29]. Education to be at home and, ultimately, to our way of being in the world begins in the childhood home. We learn to care at home[30]. Chronologically, we first learn what it means to be cared for by experiencing it. Then, gradually, we learn to take care of ourselves and, by extension, of things and others. Only those who are cared for from birth will do the same[31].

From this perspective, experiencing being cared for and learning its meaning is the first step in moral education[32]. But how can we describe what we learn when we are cared for and how could we define what we learn when we care for others?

To address this topic, as Noddings suggests, we must start with the analysis of the ordinary way that individuals have to relate and which we could define as a “natural cure”[33]. A home is not always a happy place and, indeed, sometimes it is a place of misery and fear, but, happy or unhappy, it is the initial dwelling of the new being, where one takes care of or, on the contrary, ignores its body. In this sense, the body becomes the organ of encounter that allows the self to develop. Through the bodily response, a relationship of care and trust is established which is marked by both sides under the banner of "I am here". The "I am here" is nothing but an offering of love.

One of the lessons learned at home, then, is that in any encounter between actual incarnate beings matters[34]. Home is the place where the fragility of bodies is encountered and experienced: living ones can be injured, and inanimate ones can be broken. Therefore, they must be treated with care.

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[24] M. de Hennezel, La distance intime, « European journal of palliative care », 5, No 2 (1998), pp. 56-59.
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[29] R. Scruton, How To Think Seriously About The Planet, p. 121.
[30] N. Noddings, Starting at Home, p. 1.
[31] W.T. Reich, N. Jecker, Contemporary Ethics of Care, in Encyclopedia of bioethics, Simon & Schuster Macmillan, New York 1995, pp. 367–374.; R. May, Love and Will, W.W. Norton & Company, New York 1969, p. 290; Reich, Warren T., History of the notion of care, Encyclopedia of Bioethics 5(1995), pp. 319-331.
[32] N. Noddings, Starting at Home, p. 25.
[33] According to Noddings, “Natural” care means a form of care that arises more or less spontaneously out of affection or inclination.
[34] Ivi, p. 133.

Bodies are precious. At home you learn to manage your bodies and how to respond to the other bodies you meet. You learn to love by being loved. But, to love you learn by example. The way of relating characterized by attentive love is educational. It is at home that we learn, or we don't learn, to take care of people, animals, plants, and objects. And, while we take care of things, we also take care of ourselves, shaping our responsiveness.

The disposition to respond is learned at home and is directed toward the animals, plants and objects encountered there. As the capacity to respond develops, a moral need, the need to care, is revealed and, with it, the movement that goes beyond the duty towards something deeper and that leads us towards the great joy of reciprocity.

Education to our incarnation and to be at home and, ultimately, to our way of being in the world is inaugurated in the childhood home. In this regard, Bachelard argues that home, especially the one we were in when we were little, is what allows us to form our first sense of the world: it is the first world of the human being[35]. It is through the experiences we have of and in this first home that we begin to be ourselves. At the same time, our first home is also the place where we learn to put things in the right place and take care of them.

This also means, therefore, that our home is not a separate part of our experience, but is rather a pervasive structure, providing the fulcrum for all our actions. Whether we decide to continue the traditions of our first home or decide to step away sharply from them, we are shaped by what we have experienced in our first home[36]. Steinbock argues that our perceptive powers are also shaped by our domestic experience[37]. The scholar says that a natal planet is privileged because it is one through which our experiences are grounded as our own and in such a way that our world structures our experience. This constitutional privilege is indifferent to whether we like it or not, or whether it makes us happy or unhappy. The point is that the norms that guide the home planet are our norms, the way of life that we have matured. Our home, to use Bachelard's words, engraves in us the hierarchy of the various functions of dwelling[38].

Thus, the dichotomy between passivity and activity allows us better to articulate the educational responsibility of the first home. In and through our homes, especially our childhood homes, we develop certain ways of doing and perceiving things, and we carry these tendencies with us into our future homes as well as into the world, and these tendencies in effect tie us to a particular home. Learning to stay at home is learning something that allows us to belong somewhere so that we can establish a way of being in the world. This is what allows us to feel at home.

Love Home

According to Scruton,[39] oikophilia is an appeal to responsibility, and a criticism of calculation. It tells us to love, and not to use; to respect, and not to exploit. It invites us to view things in our home environment not as means only, but as ends in themselves. A loving inhabitant of a place, especially in concert with other loving inhabitants of the place, can take actions that contribute to the well-being of the place.[40] We can categorize these actions in terms of trusteeship rather than enterprise, of conversation rather than command, of friendship rather than the pursuit of some common cause.[41]

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[35] G. Bachelard, The Poetics of Space (1961), transl. by M. Jolas, Beacon Press, Boston 1964, p. 7.
[36] C. C. Marcus, House as a mirror of self: Exploring the deeper meaning of home, Conari Press, Berkeley, CA 1995; C. Bollas, The shadow of the object: Psychoanalysis of the unthought known, Columbia University Press, New York 1987.
[37] A. J. Steinbock, Home and beyond: Generative phenomenology after Husserl, Northwestern University Press, Evanston, IL 1995, pp. 232-233.
[38] G. Bachelard, The Poetics of Space, p. 15.
[39] R. Scruton, How To Think Seriously About The Planet, p. 253.
[40] Ivi, p. 85.
[41] Ivi, p. 13.

But, according to Heidegger, the true problem with dwelling is that humans are constantly searching for their true nature and always have to learn how to dwell.[42] This constitutes a plight in that our nature, our home, is not simply handed down to us, but rather requires work and commitment. Thus, there are a range of virtues required by a comportment of dwelling, that are acquired by cultivating a capacity for meditative thinking allowing things to come into being with an acute sensitivity to the ontological possibilities inherent within them. We do so with humility, recognizing that humans are not the masters and commanders of the world. Rather, as Heidegger said, man is a loving shepherd. If he cares properly, he will dwell in peace, gratitude, and humility.

We nourish our meditative natures by maintaining a sense of wonder and awe when faced with the presence of things while being grateful for the gift of such thought. We both love and respect things enough to be with them in the world without trying to consume them. Today, in the ecological debate, the word management is frequently used to refer to order, control, and having the power to enforce them.[43] The danger of the managerial approach lies in its failure to consider alternative perspectives and acknowledge the existence of other truths. We can never have, or know, it all; we can never manage everything.[44]

As a loving shepherd, a man watches over a charge that is never itself present, prompting Heidegger to add heedfulness and commitment to the list of phenomenological virtues. Guardianship is vigilance, watchfulness for the has-been and coming destiny of being, a vigilance that issues from a long and ever-renewed thoughtful deliberateness, which heeds the directive that lies in the manner in which being makes its appeal. A skilled cultivator allows something to naturally mature into its fruit. This does not call for an indifferent and non-participatory relationship to the thing, but rather the fostering of ontological disclosure. Being aware of the past and anticipating the future of existence means never being able to find comfort and rest in the certainty of knowledge. To facilitate growth, the cultivator cannot control the cultivation process. He has to remain open to the shifting opportunities and calamities intrinsic to generative beings. An ethos of receptivity and readiness governs his actions in his constant regard for the others.[45]

Therefore, by its nature, ethical is not something to be achieved, but rather it involves a continuous commitment to behaving well and being mindful of all that exists, remaining attentive to everything without fixation on any particular thing. To be loving and protective of the earth means to be humble in the face of modernity's achievements, sparing in the age of the disposable, patient in the age of now, heedful in the age of diversion and distraction, and remain committed when technology is seductively whispering that there is an easy way out.

To be loving and protective of the earth means first recovering the proper balance between humanity and nature. The point is that human beings, no more than any other beings, are not the masters of nature. There can be no such mastery. Instead, all beings should be free to display themselves and reach their flourishing within nature.

That is not to argue that human beings have no creative role to play on earth. They are a natural part of the world and, as conscious beings with the ability to shape their future, they have a significant role in preserving and safeguarding the earth. But, saving the earth does not mean mastering or

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[42] *M. Heidegger, Building Dwelling Thinking, p. 159.*

[43] *L. McWhorter, Guilt as Management Technology: A Call to Heideggerian Reflection, In Heidegger and the Earth: Essays in Environmental Philosophy, L. McWhorter, G. Stenstad (eds), University of Toronto Press, Toronto 2009, p. 11. https://doi.org/10.3138/9781442697720-003.*

[44] *McWhorter, Guilt as Management Technology, p. 12*

[45] *C. Bigwood, Logos of Our Eco in the Feminine: An Approach Through Heidegger, Irigaray, and Merleau-Ponty, In Merleau-Ponty and Environmental Philosophy: Dwelling on the Landscapes of Thought, S. L. Cataldi, W. S. Hamrick (eds), State University of New York Press, Albany 2007, p. 97.*

subjugating it, which is merely one step away from boundless spoilation.[46] The earth is not an inanimate mass of matter. Dwelling on the earth, human beings should make themselves open to the soundless voice of being. Such dwelling is reverential and primordial and asks no questions. "The meditative man is to experience the un-trembling heart of un-concealment' in 'the place of stillness".[47]

Oikophilia in the current climate crisis

As Scruton acknowledges, adopting the perspective of oikophilia is not only important but also urgent if we are to address the current climate crisis. Indeed, when we pose the question of what it means to be at home in nature, our environmental actions and policies reflect how we conceive of being at home.[48] But first, the perspective of oikophilia compels us to consider what it truly means to be human in the world, which in turn informs the ecological debate. It encourages us to locate the real centre of gravity of our identity in places beyond technical and institutional power. Instead, we should focus on the harmony between our inner selves and the natural world, rather than seeking to dominate nature as an external resource. This is to reaffirm the unified self and the unified world as mutually dependent. One cannot exist without the other. That is finally recognizing that humility, derived from the world 'humus', which means 'earthy' and is also the root of 'human', is our dominant experience. Human beings are not autonomous, separate from nature, but are a part of nature.

Our existence is one of embodiment and participation in an inhabited and relational world. It follows that human self-realisation involves understanding and embracing both the internal and external aspects of our existence. This process is a continuous journey of discovery and personal development. Earth is not something we own. Earth does not belong to us; rather, we belong to it. We belong on it. So, the main question is not of property, but of community.

From this point of view, the ideal vision for human life is not focused on exploiting Earth as a mere resource, but rather on recognizing it as a cherished home in a created community of life.[49] Earth is a planet full of potential, a planet that holds promise for us all. As humans, we have both the right to be a part of this planet and the responsibility to protect and preserve its potential. This opens the way for ethics built upon *poiêtic* dwelling, as Heidegger suggested, which encourages us to be attentive to the way in which the things we encounter not only inform but also resist our attempts to conceptually define them using epistemological categories. A *poiêtic* dwelling cultivates the ability to appreciate, serve, and foster the inexhaustible blossoming forth of the earth into the world, the ability to listen to the essence of existence itself. This homemaking is achievable only by continuously practising ethical behaviour. We are called upon to embody this behaviour by the earth and all beings. As vulnerable and subjective beings in a world with other vulnerable and subjective beings. This allows us to be connected to the place where we live and to other beings. It rejects the notion that we can fulfill our moral responsibility by simply calculating the outcomes of our actions or by applying abstract rules, insensitive to context and embodiment.

From this perspective, the earth itself can serve as the foundation for a more hopeful ethic of the environment. This new approach to environmentalism avoids the metaphysical paradigms causing and perpetuating ecological destruction and devastation. Our responsibility is to define our role in both benefiting from and conserving this community of life in which we reside. That is finally a greater

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[46] M. Heidegger, Building Dwelling Thinking.

[47] M. Heidegger, The End of Philosophy and the Task of Thinking (1977), transl. by D. F. Krell, In Basic Writings, M. Heidegger, Harper-Collins, San Francisco, CA 1993, p. 444.

[48] D. H. Davis, Umwelt and Nature in Merleau-Ponty's Ontology, In Merleau-Ponty and Environmental Philosophy: Dwelling on the Landscapes of Thought, S. L. Cataldi, W. S. Hamrick (eds), State University of New York Press, Albany 2007, p. 119.

[49] H. Rolston, Rights and Responsibilities on the Home Planet, «Yale Journal of International Law» 18(1993), p. 278.

acknowledgement of the worth and magnificence of our home planet, and our responsibility to take care of it.

The crisis of dwelling is a crisis of thinking about the way of living and therefore of the way of relating to oneself and the other. The crisis of dwelling is reflected in the current ecological crisis. It is a crisis of how we think about humanity, both in general and in our specific contexts. Only by starting from an adequate anthropology can we properly address the question of dwelling. This includes being aware of the need to rethink ecology and propose new sustainable and suitable solutions to address the current climate crisis. If we are interested in resolving the issues we face in this area, it would be beneficial to heed Heidegger's call to reclaim our diminishing essences as the meditative thinker whose comportment is a manner of respectful and grateful conversance with the earth and the things of the world. Because returning to classical wisdom, rather than journeying back to the past, is the only way to create a sustainable future.

3. Thresholds of connected living; understanding spatial affordances of Ahmedabad homes in response to climate change

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Abstract

The inner city of Ahmedabad, while revered for its historicity, is also one of the denser localities of the world. One may argue that while the inner city, like many medieval cities, was designed as a relatively high density, walled settlement that can be defended against attacks. Unlike many other cities of the time, however, the inner city of Ahmedabad has continued as a liveable city, of course not without its challenges. The city is located in the sub-tropical climatic zone which is characterised as hot and dry. It is prone to heat waves and water scarcity, and occasionally has heavy winds with sporadic heavy rains. The city is characterised by linear 'pol houses' with multiple threshold spaces connected to gated neighbourhoods with their own sense of 'inside and outside'. The paper makes an argument that this continuous inhabitation, even in the context of harsh climate is owed to the affordances that are provided by the threshold spaces of the houses and neighbourhoods. These spaces are often overlayed with water structures, and they provide social as well as physical buffers that allow individuals and communities to expand and shrink during extreme events and difficult weather conditions. Threshold spaces also lend themselves to be subverted by the marginalized in the often conservative social fabric of families and communities. The recent Intergovernmental Panel on Climate Change (IPCC) Report has identified the key risk for the city of Ahmedabad as loss of life and out-migration due to urban heat island and water scarcity. In response to which the Ahmedabad Municipal Corporation has also prepared a Heat Action Plan. In the context of this specific situation, this paper will explain the affordances of threshold spaces and their connections to cultural institutions through examples and then go about laying out possibilities of how these lessons can inform climate policies for the future, especially for historic urban areas in South Asia.

Setting the Context

Gujarat is situated on the western coast of India and is the ninth most populous state of the country with a population of 60.4 million. It has the longest coastline in the country, 1,600 kms, approximately one-third of the coastline of England. The general climate of Gujarat is sub-tropical and has three main seasons, Summer, Monsoon and Winter. Most of the region is also considered to be hot and dry. However, geographically and climatically the state can be understood to be further divided into four parts (Figure 1: Climatic Zones of Gujarat):

Fig 1. Agro-climatic zones of Gujarat. Map Source: https://www.mapsofindia.com/maps/gujarat/gujarat-agro-climate-zone-map.html. Retrieved on 26th October 2023.

- Rann (Desert) of Kutch, a seasonally marshy saline clay desert and a part of the Thar Desert. The climate of this region is categorized as subtropical with temperatures averaging 44 Degrees Celsius in summer and can reach up to 50 degrees. Winters are cold and nights can reach below freezing. The region is dry for most part of the year and sees moderate rain during the monsoon season, which is from June to September. The region is prone to cyclones and has seen severe droughts in recorded history.
- The Kathiawar Peninsula, also known as Saurashtra, has a range of low hills with tropical dry forests and houses the last remaining population of Asiatic lions. Saurashtra has a hot semi-arid climate with summer temperatures averaging 40 degrees Celsius and occasionally reaching as high as 47. Winters are moderate with 13 – 14 degrees Celsius. The region sees moderate rains in monsoon. Like Kutch, Saurashtra sees frequent cyclones and droughts.
- North Gujarat sits as a plane receiving the Western Ghats from the South, Vidhya Mountain Range from the East and Aravalli Mountains from the North. While its climate is similar to Saurashtra, the region is known for frequent dust storms, heat waves in summer, and occasional torrential rain in winter and it gets affected by the North Indian cold waves as well.
- South Gujarat sits on the wind-ward side of the Western Ghats and is categorized as a tropical savanna climate, which is warm and humid. Average summer temperatures are 32 –

35 DEGREES CELSIUS, THOUGH OCCASIONALLY REACHING ABOVE 40 AND THE WINTER AVERAGE TEMPERATURES ARE 15-16 DEGREES. SOUTH GUJARAT RECEIVES HEAVY RAINS IN MONSOON AND THE SETTLEMENTS EXPERIENCE FREQUENT FLOODS.

As per a 2019 report by the Gujarat Institute of Disaster Management (GIDM), the coastal region of Kutch and Saurashtra have not only seen an increase in the frequency of cyclonic activities, but the intensity of cyclones has also increased in the last two decades. Settlements of South Gujarat now get flooded more often and have heavy wind conditions during monsoon. North Gujarat on the other hand has an increased instance of heatwaves, higher summer temperatures, heavy wind conditions due to its proximity to cyclonic conditions, and bursts of rain due to its proximity to the monsoon conditions of South Gujarat. House forms of Gujarat and outlining the rationale of the paper

Houses and settlements of each of these regions have responded to these climatic differences, extreme water conditions as well as the reality that Kutch and North Gujarat are also earthquake prone regions. For example, the traditional houses of Kutch region are typically of circular units made of thick rammed earth walls that can withstand cyclones, earthquakes, and extreme temperatures (Figure 2). Traditionally Kutch also had a well thought out water system for settlements and for farming. Traditional timber houses in North Gujarat respond to extreme heat, earthquakes, and water scarcity through their architecture (Figure 3). In both these cases, the settlements and the way these houses relate to the settlement extends the ability of these houses to address the weather conditions, water scarcity and extreme events. While the *Bhungas* of Kutch are now few and far between the new developments, and often retained only for tourism purposes, some settlements in various parts of Gujarat have survived and continue to be inhabited, albeit with its own social and economic challenges. This paper investigates one such settlement that has endured to look into the lessons that can not only help adaptation for climate change concerns, but also can shed light on the future designs of houses, neighborhoods and settlements.

Fig 2. Bhunga of Kutch. Photo Source, https://www.kutchtourguide.com/blog/traditional-bhunga-huts-of-kutch/. Retrieved on 26th October 2023.

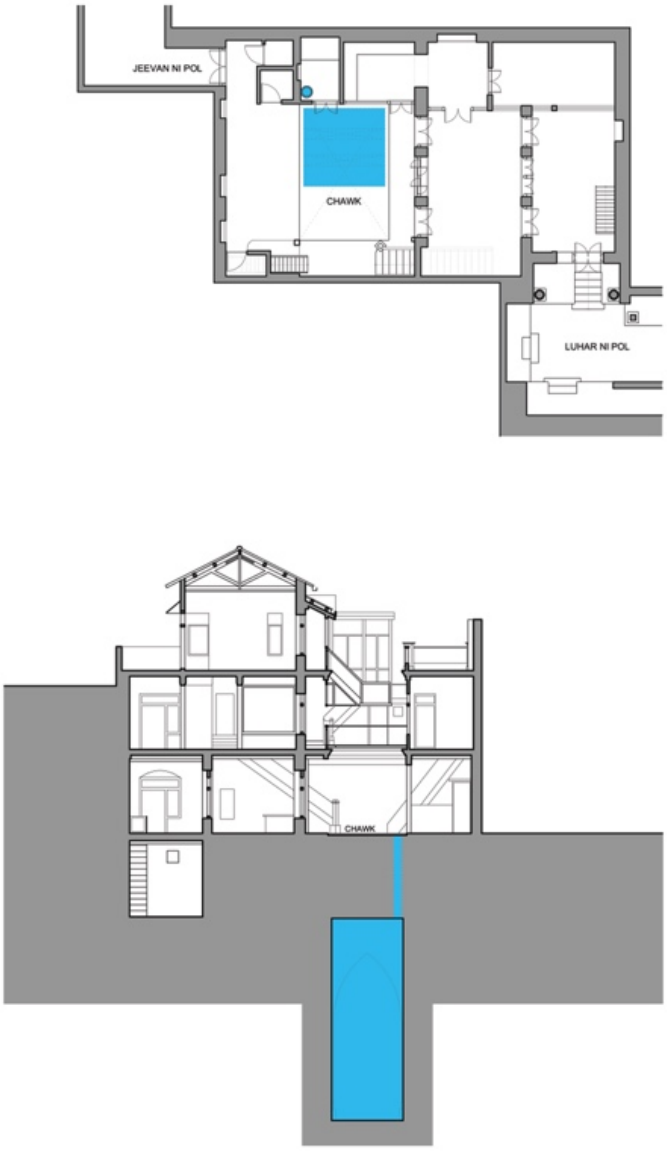

Fig 3. Plan and Section of the Pol House of Ahmedabad. Documented by Priyank Thakershy, 2005. Source: CEPT Archives, Ahmedabad.

The paper takes the inner city of Ahmedabad, also a world heritage site, one of the denser localities in the world that accommodates more than 600 people per hectare and studies its house form and urban structure for its response to the climatic conditions as identified before. The paper makes an argument that this continuous inhabitation, even in the context of harsh climate is owed to the affordances that are provided by the threshold spaces of the houses, neighbourhoods and blocks. These spaces are often overlayed with water structures, and they provide social as well as physical buffers that allow individuals and communities to expand and shrink during extreme events and difficult weather conditions. Threshold spaces also lend themselves to be subverted by the marginalized in the often-conservative social fabric of families and communities. This paper will explain these affordances through examples and then go about laying out possibilities of how these lessons can inform climate policies for the future, especially for historic urban areas in South Asia.

House and Neighbourhood of Inner City of Ahmedabad

The inner city of Ahmedabad, developed between the 16th and 17th Century CE and most of the urban structure that can be seen today has emerged during this period. Most of the houses seen today are said to have a footprint from the same time but could have been repaired, restored, or rebuilt over the years. The houses, however, have a consistent plan type and bear some variations due to orientation and size. They follow a linear organization with a verandah opening to a street, and a multifunctional space next to it, followed by an open to sky courtyard that would connect to upper rooms and inner rooms with other semi-open spaces. The inner rooms are not designated to have specific functions but are flexible and allow easy movability of functions. These houses are organized as a densely packed neighbourhood known as *Pol,* and are thus termed as Pol Houses. The longer side of these linear houses are shared walls with other houses making the shorter part open to the street, which itself is very narrow. *Pol* House is constructed of wooden post and beams with infilled brick walls. The organization ensures that the brick walls are not exposed to weather, while the narrow street façade and the faces of the courtyard, the only surfaces exposed to weather, are treated with wooden elements that create shadows on the surface and shaded spaces below them (Figure 4: pol house).

Fig 4. Facade of a Pol House in Ahmedabad. Photo Credit, Khushi Shah, 2016.

A collective of such houses, a *Pol* constitutes a neighbourhood, typically of a group of people connected either through familial ties or through occupation and usually has one or two gates connecting it to the main street or in some cases to other neighbourhoods. Since groups from very diverse backgrounds came and stayed in the city, and at various times were also in conflict with one another, each of these neighbourhoodsneighbourhoods was structured to function as fortifications at such times. The back gates to other neighbourhoods acted as the only connections. These densely packed neighbourhoods were organized to have their streets and community spaces shaded during most parts of the day (Figure 5 – shading study). Located within these neighbourhoods are cultural

institutions, usually linked to a larger religious organization, that also have a role to play in extreme situations.

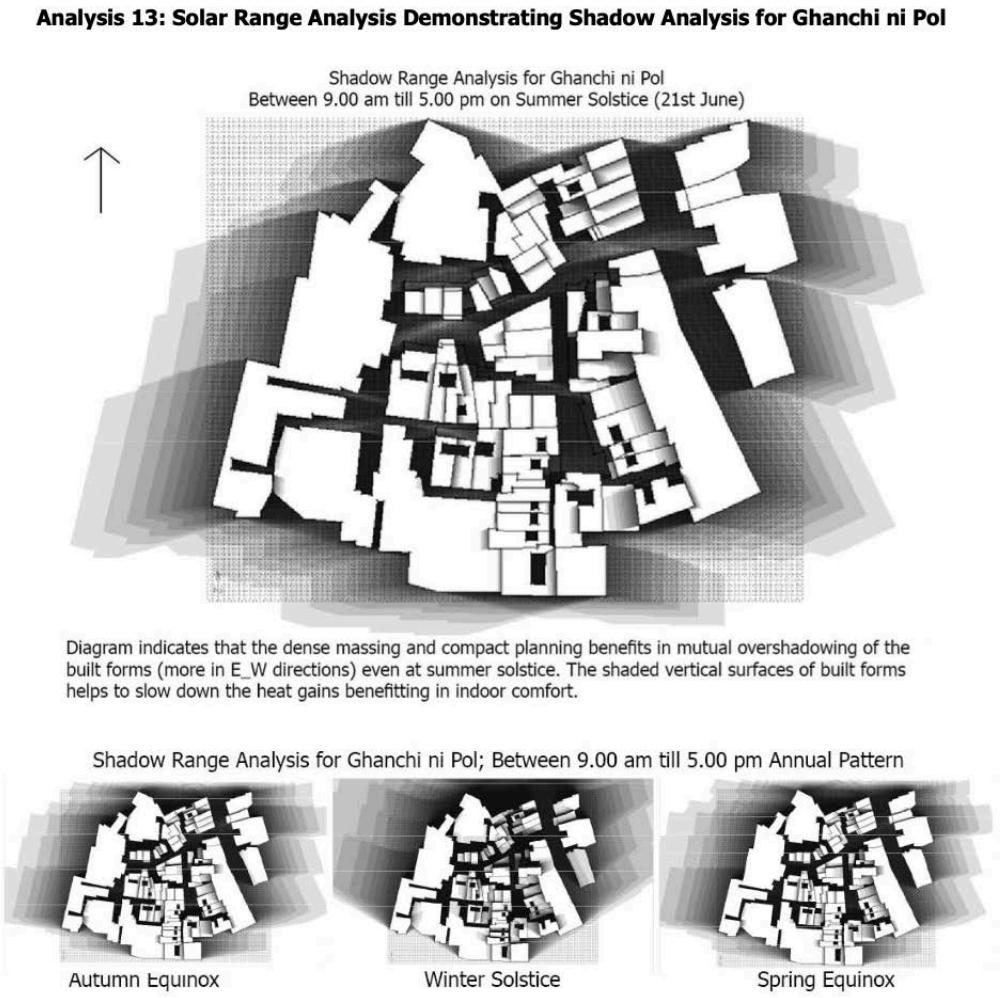

Fig 5. Shadow Studies by Ninad Koranne, 2006. Student Thesis at Welsh School of Architecture, Cardiff University.

The thermal behaviour of the houses in the inner city of Ahmedabad has been studied multiple times and it has been found that the simple strategies of shading and ensuring low exposure to external radiation, provide a shield between the solar radiation and the thermal mass. The construction system of these houses had also ensured reasonably good structural behaviour in the event of an earthquake. Most studies, however, find that the inhabitants to adapt to extreme conditions due to their ability to change functions of spaces, location of activities and most importantly territorial boundaries of their homes during extreme circumstances.

Home and thresholds

A household in the inner city of Ahmedabad continues to be characterized as 'joint family living' headed by a patriarch. These two conditions create a unique situation where 'home' and the territory of it would mean different for different individuals in the family. Up until very recently, the ownership

of all the houses in one Pol was held jointly by a group of five men. Pol *Panch*, who were considered to be the heads of the largest families in the neighbourhood. As mentioned before, the Pol is a gated community with clear boundaries and a clear entrance. In the given context, the gate to a Pol is the first threshold that opens into a street lined with houses culminating into a larger space - 'chowks'. The chowk serves as a place for the social engagement for the people living in the *Pol*. It usually houses an office for the Pol *Panch*, a well or a water tank and in some cases a *chabutara* (bird feeder) (Figure 6 - image of a chowk). In most cases a small cultural institution, a praying space or a community space, is also located here. The patriarchs of the neighbourhood spend most of their days in the chowks and so do the young boys. Women get access to these places during early mornings (mostly for cleaning), afternoons, when men are out to work, or when they have to use these open spaces to dry their pickles. Neighbourhood festivals and life events are celebrated here. The water structure in the chowk, usually a well, and in some cases a large tank associated with the cultural institution, becomes a physical marker around which many activities take place and is a source to access the groundwater for community purposes.

Fig 6. Chowk within a pol. Photo Credit, Mrinal Bhatt, 2015.

The next layer of the threshold is the verandah space, locally known as *otlo*, which becomes an extension of the chowk activities. It opens in the next enclosed space called *baithak*, translated as seating space. Both these places can be seen as an extension of the activities of the chowk but as a defined domain of the men of the family. Like in the chowks, women use these spaces to socialize, or to carry out their daily activities during the afternoons, when men are at work. Beyond the *baithak*, is the internal house courtyard. As per one study (Ubbelohde, S., & Loisos, and Vekharia, 2017), the courtyard of the house acts as a less straightforward thermal amenity. The tall and narrow proportions of the courtyard, usually 6 to 10 square meters in plan and around 8 to 12 meters in height, minimizes the incoming radiation with self-shading. In most houses, the courtyard has an underground water tank that harvests the rainwater from the roof. This courtyard is connected to the kitchen and other rooms

and generally, this is where the domestic place starts. Usually, all activities that are done by the women of the family, such as cooking and washing, take place here. The verandah space around the court, called *parasal*, is the most utilized space of the house. This space, the court and the *parasal*, serves as a transition space between the public and the private (Figure 7 - image of the court). The court acts as the symbolic center of the house and all spiritual activities of the house start from here. All spaces beyond this are called ordo, literally translating as rooms, without any designated functions, indicating that they can be used in multiple ways, as needed, based on need and comfort.

Fig 7. Court inside the house. Photo Credit: Arpan Shah. Retrieved from: https://www.mododesigns.co.in/blog-detail/pol-of-ahmedabad/ on 26th October 2023

For an inhabitant living in the inner city, the idea of home includes the pol as well as the house they live in. This is evident, not only by the way in which the activities take place, but also by how people dress and move around each other's houses and all of this is an important part of their sense of place. A few of the definitive indicators of this sense are women of the pol do not change their 'home clothes' unless they are walking outside the *Pol*'s gate, children only have to get permission from their family if they are going out of the pol, it is common to enter into anyone's house within the pol and go up to the *baithak* without worrying about breach of privacy. At the neighbourhood level, as well as within the house, the two threshold spaces mentioned above are the chowk of the pol and the court of the house, both surrounded by semi-open spaces namely the *otla* and the *parssal*. In the local language, the inner court of the house is also called a '*chauk'*. The similar names of these open places have an origin in Sankrit word '*chatuska'*, meaning a crossway, or where pathways meet.

Responses to extreme situations

With the currents of reform and modernity, and the new developmental paradigm, the neighbourhood structures and the house occupation pattern have changed over time. Many neighbourhoods are not homogenous communities anymore and are not defined by the social norms of the past, and many households are adapted to include sewage systems and air conditioners, changing the way places get

occupied. In some cases, these adaptations have resulted in blocking off the *parasals* at ground level as well as sealing off the windows at the upper level. The physical structure of the settlement, however, endures and has found renewed value and academic interest owing to the world heritage nomination. The threshold spaces, however, continue to have the conceptual role of the chowk, where inhabitants come together. They also provide the affordances needed for the sense of belonging and sense of comfort.

At the time of collective festivities, the chowks expand to include within the activity domain, on one hand, the *otlas* and the *baithaks* of the houses and on the other the streets, the gates of the pol, and a bit of the main street, its shops and its community spaces. During the instances of communal violence, the gates of the pols shut creating a safe space for inhabitants to interact and providing a possibility of defending the neighbourhood. During this time, the back alleys that are otherwise used only by the women, become connections with other pols and are useful in creating communication channels for reconciliation, or sometimes just escape (Figure 8: plan of the pol with the gates and the alleys).

Fig 8. Kadva Patel ni Pol. Credit, Desai 2019, p. 180.

The court within the house is crucial for the families to combat extreme heat events. Occupants use patterns that distinctly change during the summer months and in order to combat the heat waves, the doors and windows of the narrow front façade get shut during the daytime. The court then starts getting treated as the shaded 'outdoor space' where the floor is cooler due to the water tank below. During the daytime the family occupies the ground floor moving around the house through the verandah space. The upper floors of the house and on some days when the court also gets direct noon sun, receive heat radiation and are too hot to be occupied. The night, however, is cooler. The roofs, court and terraces

are washed down and beds are brought out. While inhabitants of the inner city who can afford it now have air conditioning to manage comfort, many still follow this pattern. This daily shift of function once again is centered around the court which gets used as a sleeping space on summer nights and extended kitchen spaces to avoid the indoor heating due to cooking during the day. Many studies have also identified that access to comfortable spaces is gendered. In most families, men get access to the coolest rooms of the house and women often end up occupying the *parasal* spaces on the ground floor.

Climate Change and Response

The recent Intergovernmental Panel on Climate Change (IPCC) Report has identified the key risk for the city of Ahmedabad as loss of life and outmigration due to urban heat islands and water scarcity (IPCC, 2022, p.1501). The report and other studies also identify that the impact of this will be seen more on women and poorer families as there will be greater workloads and stress during drought events and lesser accessibility to comfortable spaces during the heat waves. The report also mentions increased occurrences of tropical cyclones on the western coast of India which will result in sporadic heavy rain and short-term flooding. Ahmedabad Municipal Corporation has been one of the first municipalities in the country to respond to this and has prepared a Heat Action Plan that gets updated annually and has advisories for building regulations to minimize trapping of heat, managing heat stress and institute cool roof policy.

Fig 9. Collective action by the community at the time of crisis. Photo Credit, Juhi Bafna, 2020.

The *Ahmedabad Heat Action Plan* (2019), while has a clear action and protocol in place for heat emergencies and has a clear policy to combat radiation through adding a cool roof policy, is not cognizant of the existing – on the ground condition of the inner city which spatially and socially functions differently than the its modern counterpart. The inner city currently has a complex objective of conservation, owing to its world heritage status, and of sensitive development owing to the need for a better quality of life and climate change mitigation. While a separate policy for the inner city is needed, the lessons on how threshold spaces are important for addressing extreme events and emergencies. The importance of recognizing these spaces and the cultural networks for which they become a platform was recently demonstrated during the COVID-19 pandemic. The chowks during this time became sites of community kitchens and neighbourhood clinics that took care of everyone,

including the homeless and the out-of-work migrant workers when the regular supply networks were snapped (Figure 9 - the image of a community kitchen at the time of covid).

Further Actions needed

Responses to extreme events, especially in the inner cities of South Asia are heavily dependent on the social networks and related spatial hierarchies of homes and neighbourhoods. Climate change mitigation and adaptation measures would work much better if these situations and the situated knowledge of these places are considered as a part of it. For example, the Ahmedabad Heat Action Plan could consider the house type and the inner thresholds into consideration while suggesting measures to combat radiation and cooling policies. The action plan could also consider the chowks and the cultural institutions connected to them as the first respondents to emergencies. Going further with this network, the author hopes to connect to various communities and the Ahmedabad Municipal Corporation to prepare a model action plan for the inner city of Ahmedabad. An understanding of the threshold spaces, considering their affordances during extreme situations, would also affect and influence the conservation policies that are currently being prepared for some historic cities in India.

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4. Reaching Beyond Mitigation and Adaptation: Using Resilience Structures and Psychological Theory to Plan and Manage the Impacts of a Changing Climate in our Homes and Communities

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Introduction

This paper will seek to use learning from the Covid-19 pandemic and disaster preparedness literature on community resilience, collective action and resilience structures to inform how we can support local communities and households to prepare and plan for the impacts and adaptation required to respond to the changing climate. Across the World Health Organisation (2020), the UN Office for Disaster Risk Reduction (2023), and the UK Government Resilience Framework (2022), they align in support of a 'whole of society' approach to understanding the changing climate across the globe as well as at national, regional and local level. This argues that the vulnerabilities and risks within communities should be understood in the local context, also referred to as a whole-of-society preparedness approach. Within the context of the wider risks landscape, these include risks associated with two main foci of clusters.

Risks associated with interests can be understood through an event such as the Manchester Arena attack where there is a national and international geographical distribution of both victims and survivors, but they share an interest in common and therefore can be considered a community of interest. The other way in which risks can be considered within a community are those based on shared geographies or weather patterns, these include systemic-wide flooding or storms that cross administrative governance boundaries, and so can be considered a community based on geographical location. The challenges of changes or extremes in large adverse weather systems necessitate cross-border and cross-regional support at all levels. Levels of membership, this refer to the memberships of groups that members of a community hold and participate in. We hold multiple identities at family, household, community, interests, sub-national, national and global levels. We hold those identities together and one might be more in focus depending on how we see ourselves compared to others, or we may see ourselves as one against a common aggressor or threat, such as a disaster or emergency (Drury, 2018). As part of a membership of a group (family, household, community, region, species) we see the threat to the members of the group facilitates coordination and organised collective behaviour when no common group membership existed prior to the event.

The successful whole of society and household approach to responding to and managing the changes in our climate relies on the identification of local needs and likely impacts (Stewart et al., 2020). To date most of the impacts have been worked at a national or global level, and the focus should now start to shift to what the local impacts are likely to be this will do two things. Firstly, the existing geology influences the environmental science of how the changing climate impacts each localised area. In the UK for example the ice age geology underneath the sea means rising sea levels will be greater in the South than they will in the North. Secondly, it has been widely accepted as good practice in risk and emergency work that community vulnerabilities are identified before disasters occur (Whitehouse et al., 2015).

This requires two big demands for a governance structure trying to support communities to prepare adequately; they need to invest significant time, energy and structures to understand and identify existing vulnerabilities and social characteristics and norms and secondly, this needs to be co-ordinated in boundaries that are meaningful to the local people, rather than administrative governance boundaries (Genik and Godsoe, 2015). This means empowering local residents within communities to define their own boundaries and making the governance boundaries work to the community identified boundaries. The complexity within communities made by governance jurisdiction and administrative boundaries is not reflected in the types of activities that public policy and climate preparedness have typically acknowledged to date. Communities include multiple, different social clusters with very uneven capabilities and assets. Most initiatives that come from the governmental leadership cannot accommodate this diversity and complexity.

The work of Drury et al. (2022), Genik and Godsoe (2015) and Andrews, Pickford, Hill, and Guest (2021; 2022) suggest that the creation of a collective, highly networked, flat management structure works for community led projects such as mutual aid in the pandemic and projects to address complex community challenges. These do not work as effectively if there is institutional membership, but instead a community led and defined flexible membership that recruits based on shared interests and objectives is the most effective and reported as supportive by those involved. Networks based on shared interests, mutual benefits and collective ideas support the development of new capabilities and new civic leaders. Centralized programs typically exclude important impacts and partners from the activities as they do not have an in-depth understanding of the communities and miss the significance of local complexities.

One central learning across the globe from the pandemic, which is the other recent global existential threat alongside our changing climate, is the use of data to inform and create knowledge to aid in decision-making and develop meaningful approaches. The use of data synthesis and creation of intelligence by central governments to inform the local-level community civic leaders were the most successful approach to reducing transmissions and ensuring communities were making decisions based on the most recent and accurate knowledge at the time. This saved time, public trust, and community activity (Hill, Stewart, Potter, Pickford, and Smith, 2021; Hill, Guest, Pickford, Hopkinson, Daszkiewicz, Whitton, Reed, Thomas, and Crego, 2020; Hill, Guest, Pickford, Hopkinson, Daszkiewicz, Whitton, Reed, Towler, and Crego, 2020; Hill, Guest, Hopkinson, Towler, and Pickford, 2020). It was also clear from these same sources that the differential impacts across societies had cascade impacts and interconnecting effects. This is shared by the differential impacts of the changing climate. This further highlights the need for data to inform where and how these differential impacts will play a part.

There is also much to be learnt from the COVID-19 pandemic that we can apply to the way we approach our public narrative to the changing climate. Our learning from Covid suggests we should not use threatening, hyperbolic or war-themed language (Hill, Potter and Pickford, 2020). Climate change is no different. The public narrative around mitigation is one of hope and empowerment as it is based on collective targets to achieve. However, the public narratives around adaptation and the response to already baked-in impacts that we feel more acutely over the coming years and decades is a harder public narrative to hold as it can quickly feel hopeless and become directionless. Enabling civic leaders and governments to have a narrative of hope of how to successfully respond, prepare and flourish, alongside the narrative of mitigation, is essential to enable our communities and households to respond fully to our changing climate. Enacting contributions to Net Zero and mitigation is no longer enough.

Our communities will need to know how to live through significant change and acute climate shocks and events. This paper sets out some of the important aspects to consider in supporting communities to successfully engage across the suite of activities. Policies which set out to influence individual and

community behaviours concerning both mitigation and adaptation are therefore essential. This includes individual and collective understandings of behaviour change, and the application of behavioural science to direct societal action through policy, especially policy that enables community-led action and self-designing and designating community groups.

The potential opportunity to strengthen the bidirectional relationship between the national and local structures to support behaviours that respond to the changing climate is essential. This includes enhancing public communication strategies to understand and connect communities with their nuanced local risks of climate change to influence behaviour change and enhancing relationships between the local and national decision-making structures which are managing the impacts of climate change. The opportunity to benefit from psychology to facilitate behavioural science across communities and society should be actioned by societies and leaders.

One challenge to communication with the public is that they perceive a low level of risk associated with climate change as it might be based at a global level. This means it would be based on comparative optimism, where individuals compare the chances of something negative happening to them with their perceived chances of that happening compared to other people. Climate change is a whole society event, disrupting the ability to make this comparison, however, it also has differential impacts where changes are felt at a different pace across the globe at different times. In turn, this makes the messaging about reducing risk (already a complex communication) through mitigation (taking actions to achieve net zero) or managing the impacts that will arrive to live and thrive (adaptation) more challenging. That includes messaging to individuals, families, organisations, occupational sectors, communities, and geographical regions.

The complex human judgements to alter behaviours in response to an appraised risk are informed by not only the assessment of risk but also coping behaviours, which form the motivation to act against the risk. The evidence throughout the Covid-19 pandemic highlights the importance of evidence-informed national-level messaging and communication strategies. Clear actions set within the context of why, what and how rationales, clarity over strategic objectives, transparency of the data and intelligence used to inform the position and an evidence base informing policy and practice advocated, alongside examples of role modelling desired behaviours, positive messaging generating empowerment rather than negatives would all facilitate mutual and collective responses through identification with the broader experiences, accountability and responsibilities. In turn, this would support collective action and mutual aid.

One reason why collective action and individual or household action is not achieved at a higher rate has been identified as psychological distance. This is the notion that it feels far removed with impacts happening further away in geography or time to make an urgent impact on an individual. Keller et al. (2022) suggest that this explanation does not robustly describe all facets of the limitations of pro-environmental behaviour, but it does align with the challenge in the recognition of impacts and risks. Finding non-threatening ways to close this gap that is nonconfrontational, would enhance the uptake of pro-environmental behaviours. This could be linked to the family or those close. For example, for those who know a family who has had a child in 2022, that child will be of projected pensionable age in 2100, a year that a lot of future scenarios use as a projected anchor point for description.

If we are to be resilient and achieve a climate change engagement through every household and family, then we cannot simply set the expectations of and ask families to look after one another. A strategic, coordinated cultural and social norm shift has to occur through a well-funded public training, education and development plan that is supported by governments and administrations. It is about robust facilitation and empowerment with shared data and intelligence, preparedness, planning, access to resources and aid, understanding of risk, understanding of response, understanding of adaptation, clear communication in a measured way of long-term risks and the modelling of how to keep spaces,

places, and people we love and care for safe. We cannot just leave community response or nature to coordinate, and problem-solve on their own.

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5. The effect of people's behaviour on home energy consumption and carbon emission- case studies of home cooking and space heating

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Abstract

People's lifestyle and behaviour can significantly influence their energy consumption and carbon emission. This paper highlights two case studies of how people's behaviour at home and in their lifestyle could significantly influence their energy consumption and therefore carbon emission and the climate change. The paper shows that people's behaviour at home is a key factor that has a serious impact on carbon emission and energy consumption. A food technology case study is presented to highlight the importance of people's behaviour in selecting suitable kitchen technologies for food cooking. A second case study is presented to highlight the change in heating demand in buildings as a result of people's behaviour. Window opening in cold weather is presented as a behavioural issue that influences energy consumption, which could reduce the benefits of insulated homes in many situations. Both case studies are extrapolated to quantity carbon savings when more sensible behaviour is presented. The paper concludes with recommendations towards a more sustainable future.

Keywords: energy; cost of living; people's behaviour; carbon emission; climate change.

Introduction

The increase in market economy activities, particularly during the post-COVID-19 era, has resulted in a surge in energy demand in 2021, which is still growing but at a slower rate (Ritchie, Roser and Rosado, 2022). Despite the growth of renewable energy, fossil fuels still dominate energy production (BP PLC, 2021). Buildings contribute significantly to greenhouse gas emissions (UN Environment Programme, 2020), with space heating and food cooking being the largest source of domestic energy demand in the UK (Government Property Agency, 2022). To achieve the UK Government's goal of net-zero emissions by 2050; strategies to reduce energy consumption in buildings, such as improving insulation and energy efficiency, are necessary. Wall insulation plays a crucial role in improving energy efficiency, but its effectiveness depends on various factors, such as local weather, insulation materials, level of insulation (U-value), and occupants' behaviour, such as working from home (Sen and Al-Habaibeh, 2020) or opening of windows (Salim and Al-Habaibeh, 2023).

Newly built homes are designed to be energy efficient and case studies have proven that newly built houses in England and Wales have lower energy demand (The National Energy Efficiency Network, 2019). However, a significant number of English dwellings fall into the category of poor energy efficiency in existing housing stock, and attention is needed to improve that (BRE, 2016). Retrofitting with enhanced insulation can improve the energy efficiency of existing buildings (Al-Habaibeh *et al.*, 2022), but estimating energy savings prior to the retrofitting process and its payback period on investment is a challenging task. Artificial Intelligence and infrared thermography are found able to predict future heat losses through buildings' walls from several years (around 8 years) of historical climate data with reasonable accuracy (Al-Habaibeh, Sen and Chilton, 2021). The payback period

estimation using such predicted heat losses is accurate for up to a quarter of a year (Sen, 2021). An accurate assessment of pre- and post-retrofit U-values is necessary to realise the impact of retrofitting. However, existing in-situ U-value estimation methods have limitations, such as being applicable only during winter and requiring night-time infrared thermography to counteract the influence of solar irradiation. Past research shows that a novel U-value estimation kit designed by combining artificial intelligence and infrared thermography with the application of a point heat source can predict the in-situ U-values of multi-layered walls within 85% accuracy and could be used in summer conditions (Sen and Al-Habaibeh, 2021; Sen and Al-Habaibeh, 2019).

The above studies do not consider the impact of occupants' behaviour on predicting future energy consumption. People's behaviour is very complex in nature and often driven by the present situation. For example, during the COVID-19 pandemic's lockdown, people were required to work from home, leading to changes in occupants' behaviour and a new work pattern. Hence it was expected that the domestic energy consumption would rise (Sen and Al-Habaibeh, 2020). The post-pandemic work pattern is a hybrid one, with a higher number of people working from home than in the pre-pandemic situation (Haan, 2023). Moreover, the effect of inflation also motivates people to travel less to work, especially in the UK (Office for National Statisitcs, 2023). Occupants' behaviour concerning window opening has a significant impact on household energy consumption, and a study shows that a highly insulated house could use as much energy as a poorly insulated house due to occupants' choice of leaving the windows open during winter (Salim, 2022).

According to the Energy Saving Trust, cooking and storing foods are responsible for 20% of household energy consumption in the UK (Quinn, 2022). Working from home could change people's dietary habits (Mekanna, Panchal and Li, 2023) as well as their cooking patterns. Al-Habaibeh (2022) has shown that the cost of cooking is related to the technology used. Therefore, it is necessary to understand the impact of cooking's energy consumption, especially for people working from home. This paper includes two case studies to reflect the importance of people's behaviour at home on energy consumption and carbon emission. People's behaviour in the kitchen in selecting their preferred cooking technology. Another case study related to a comparison between four households' energy consumption and carbon emission based on the type of house and occupants' behaviour. Case study 1: The effect of people's behaviour in using kitchen's technology on energy consumption.

Design and technology are changing individuals' life and contributing to reducing carbon emissions. As technology advances, clean energy, such as electricity from renewable sources, is adopted more frequently in daily life. Electricity has replaced solid fuels in the modern kitchen on a global level. Moreover, cooking appliances are designed to be more efficient and provide better control and safety features. Modern cooking appliances provide consumers with an enhanced user experience, in this way promoting individuals to choose a more efficient cooking method. The cooking process, which is a user-centred behavioural process, contains the choice of cooking methods, cooking technologies, and the use of appliances. Cooking includes normally six forms of heating processes, such as baking, broiling, roasting, boiling, frying and stewing (Karel, Fennema and Lund, 1975). As a result of increasing energy costs and climate change, kitchen equipment manufacturers claim in many cases that their products are energy efficient to attract consumers (Karunanithy and Shafer, 2016). The selection of a specific technology for cooking could influence energy consumption, and this in most cases is based on people's behaviour.

The jacket potatoes experiment

For this case study cooking of jacket potatoes is selected as a case study. Three technologies, namely microwave, air fryer and electric oven are tested to examine the most efficient method. This work investigates if changing the technology of cooking as a result of people's behaviour would result in

energy and carbon savings. The jacket potatoes cooking experiment is repeated three times. In each experiment, the weight of the potatoes is carefully selected. The quality difference between the same group of experimental potatoes is not more than 20 g. The main characteristics and key results are summarised in Table 1.

Table 1: The conducted experimental work.

Test number	Technology	Weight of potato (g)	Temperature Setting/ ^{o}C	Time (minutes)	Energy (kWh)
1	Microwave	450	88% power	16	0.27
	Air Fryer	420	200 ^{o}C	40	0.48
	Oven	420	200 ^{o}C	80	0.72
2	Microwave	183	88% power	12	0.1
	Air Fryer	187	200 ^{o}C	35	0.48
	Oven	184	200 ^{o}C	60	0.86
3	Microwave	307	88% power	13	0.15
	Air Fryer	305	200 ^{o}C	40	0.31
	Oven	310	200 ^{o}C	53	0.89

Test 2 will be described as an example of the experimental work. After washing, three potatoes of roughly the same quality and weight (i.e. from the same batch), are put into the microwave, air frying and electric oven respectively. A fork was used to pierce the surface of the potatoes. The power output of the microwave was 88%, which is described as MID HIGH, the cooking time lasted for 12 minutes. The temperature of the air fryer and oven was set at 200°C, and the cooking time lasted for 40 and 53 minutes respectively. Figure 1 presents the results of the three tests of Table 1. The results show that the selected technology could have a significant effect on energy consumption. The results indicate that the microwave is the most efficient way of cooking jacket potatoes. And using the air fryer instead of the oven saves about 50% of electricity consumption. It can be inferred that if one person eats a jacket potato twice a week, cooking with an air fryer can save approximately 38.4 kWh of energy than using an oven for one year. This savings will be 62.4 kWh when using the microwave in comparison to the oven, an energy saving of about 80%.

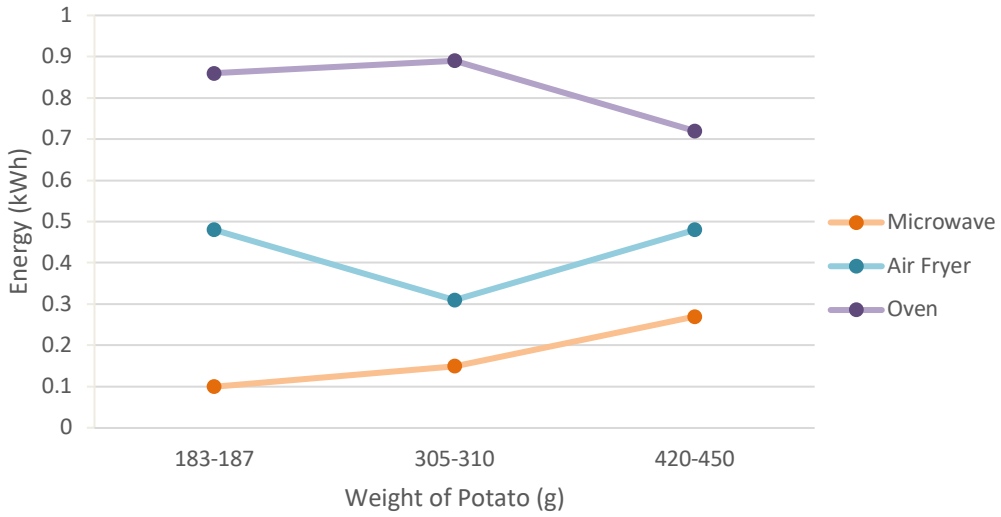

Fig 1. The results of the three tests indicating the microwave is the winner in this case.

In the UK, for example, there are circa 28.2 million households. If the energy savings of using the microwave to replace the electric oven is extrapolated from the above data, this will include savings of 1.7 GWh of electricity. Since the carbon intensity of electricity (CIE) of the UK in 2021 was about 265 grams of CO2 per kWh (Aquaswitch.co.uk, 2023), this will reduce carbon emission by 450,500 kg of CO2, or simply 450.50 tonnes of CO2 per annum.

Case study 2: Opening of windows in cold weather when heating is on

The authors have done fieldwork to examine the behaviour of people at home in relation to the opening of windows.

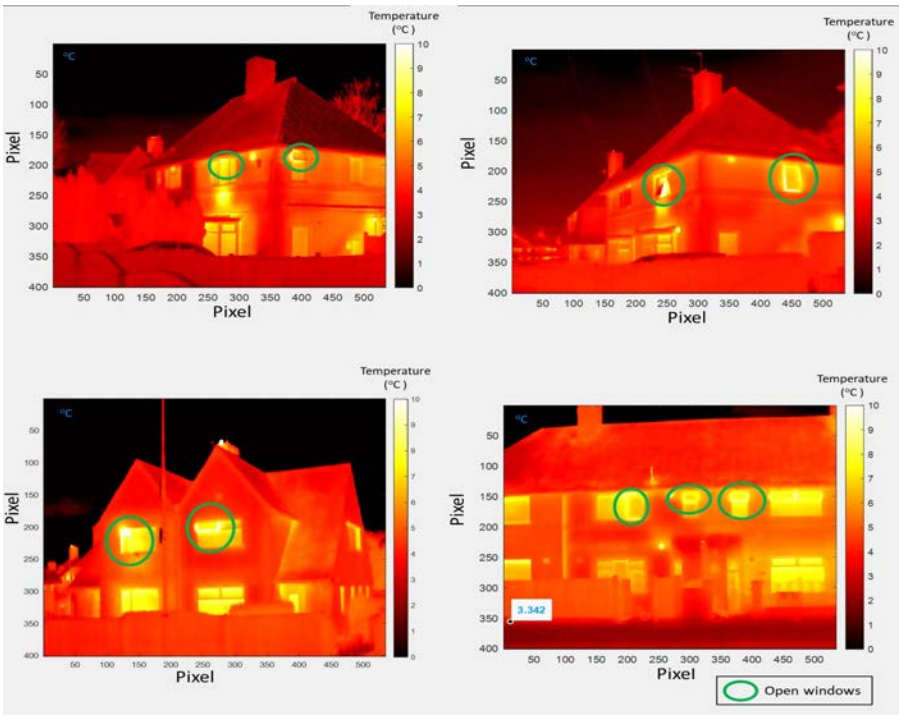

Fig 2. Infrared images of houses with windows open during cold weather.

The findings indicate that many people keep their windows open during the cold season while heating is on, see Figure 2, which presents using infrared thermography to examine the opened windows during nighttime in winter. In an online survey that included 300 participants, they were asked how often they open windows of their house, in winter. The results are shown in Figure 3.

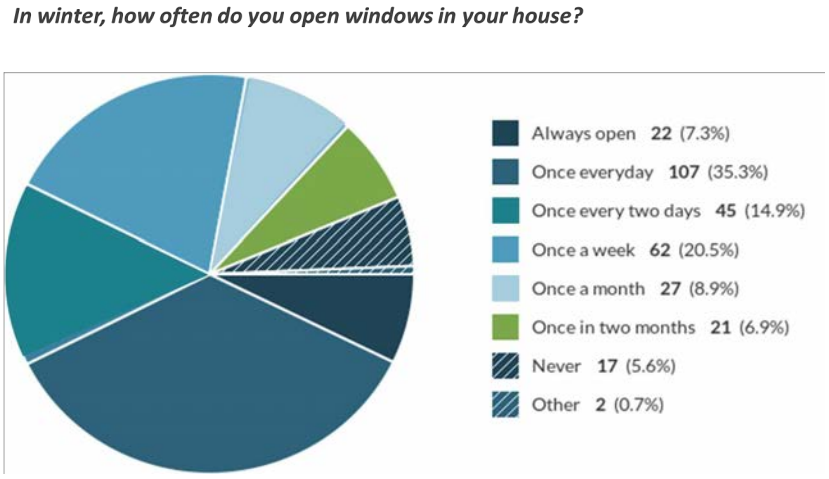

Fig 3. Frequency of window opening

93.7% of participants opened their home windows in winter, in a frequency ranging from as frequent as always open to least frequent of once in two months. Figure 3 shows the frequency of window opening in winter. 35.3% of participants open their home windows once every day. Only 5.6% of the participants never open windows. One out of the 300 respondents answered, *'[I open windows] whenever central heating isn't on and feel the need to do so (usually in the afternoons)'.*

The energy efficiency factor of making sure the heating is off before opening windows was considered mandatory by only one participant. It is to be noted that of the 22 participants who left their windows always open, 18 were adults and 2 were senior citizens; 3 of the households had adults and children in them; none of them had babies in their household. Further studies need to be done to understand whether the age of household occupants is a relevant factor that leads to window opening behaviour. One participant stated:

> '*I open some windows more than others. The window in the kitchen gets open all the time as the cat goes in and out and I need to let out the smoke as I burn the food a lot (I am quite a distracted person). The bedroom gets the window open as my husband does not feel cold and that window stays open sometimes a day or two. The windows in the children's rooms are opened hardly ever. Maybe once a week a bit. The living room....not often as it is noisy and quite a bit of pollution*

Another person stated: '*Windows are open for a few hours to all day in the bedroom to air out the bed. Rest of the house we tend to open windows in the bathroom for an hour or so after getting ready. Open windows in all other rooms when needs, e.g. when airing out laundry, get rid of smells, while cooking etc.'* Another participant stated: '*I'm opening my windows everyday, few times a day for 10 min.*'. To quantify how behaviour would influence energy consumption, four houses were tested as shown in Figure 4, where homes are given A to D letters. Table 2 presents the characteristics of each house.

Fig 4. the four houses covered in this study.

Table 2: The four homes investigated in this case study.

House	Type	No. of Bedrooms	Boiler Type	Property Type and People's Behaviour	Symbol
House A	Semi detached	3	Combi	High Insulation; Window Open	HI-WO
House B	Semi detached	3	Combi	High Insulation; Window Closed	HI-WC
House C	Mid terrace	3	Combi	Low Insulation Window Open	LI-WO
House D	Semi detached	3	Combi	Low Insulation Window Closed	LI-WC

The four houses are seen to have combination (Combi) boilers for heating space and water. About 75% of the UK housing stock uses combination boilers (English Housing Survey, 2020). Energy

consumption due to heating depends on the heating cycle of boilers. A diagnostics study of 221 boilers revealed that 50% of them had an average of 50 starts per day (Bennett, Elwell and Oreszczyn, 2019). The efficiency standards are not met due to this detrimental performance. Thermal cycling contradicts assumptions in efficiency testing standards, which assume steady state operation, weighted by full and part power measurements.

Window opening behaviour in buildings is best studied with field measurements due to its stochastic nature. Previous research results show that there are large discrepancies in household energy consumption even of similar layout (Ouyang, Hokao 2009; Bahaj, James 2007). The radiator heating times (in minutes) for the four houses for the considered case study are shown in Figure 5.

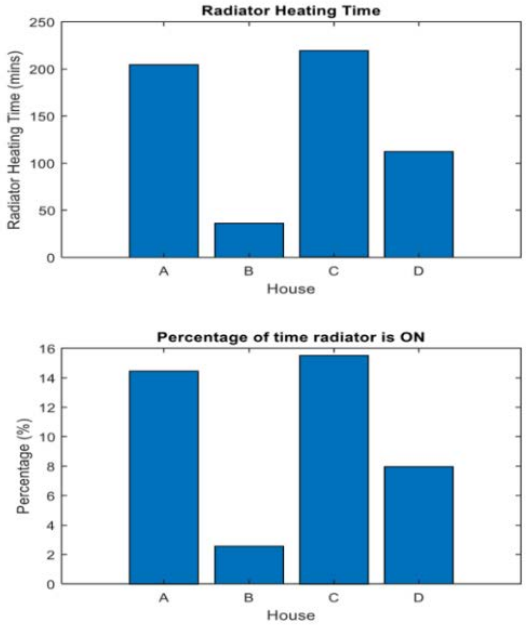

Fig 5. Comparison of the houses based on radiator heating time

(during 24 hours in winter)

House A, which is a high-insulation with windows always open house (HI-WO) has a radiator heating time of 200 minutes which is double that of House B, which is a high-insulation windows often closed (HI-WC). Based on the energy consumption of the gas boiler, Figure 6 indicates the energy demand related to Figure 5 periods. When extrapolated to one month in the cold season, Figure 7 presents the energy demand for one month in kWh.

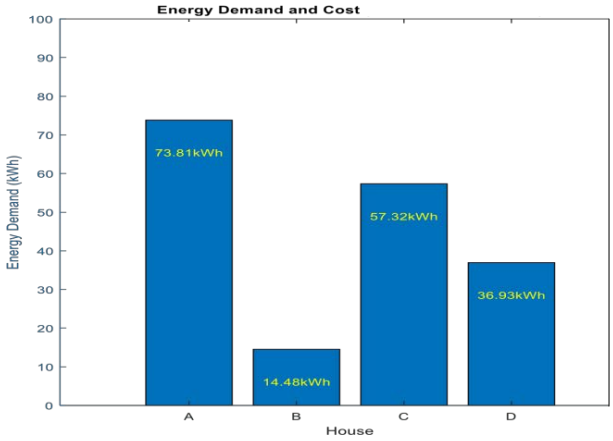

Fig 6. Energy Demand during 24 hours use.

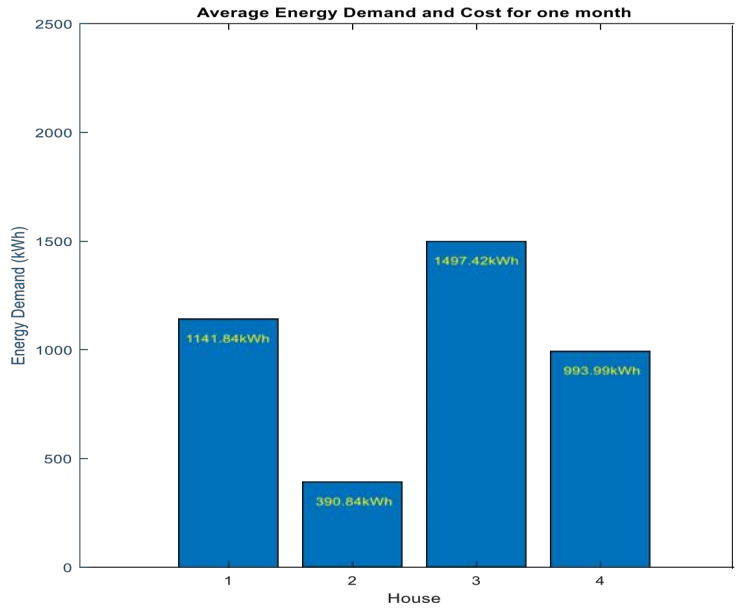

Fig 7. Average energy demand for one month extrapolated from Figure 6.

Figure 7 presents the energy demand of high-insulation with window-open house (HI-WO, House A), high-insulation window-closed house (HI-WC, House B), low-insulation window-open house (LI-WO, House C) and low-insulation window-closed house (LI-WC, House D). In high-insulation houses, the energy demand increases by a factor of 2.9, when comparing a window-open and window-closed house. There is a percentage difference of 97% between the energy demands of high insulation window-open house and a high-insulation window-closed house, while the percentage difference in energy demands is only 13% between a high-insulation window-open house and a low-insulation window-closed house. Figure 7 shows that insulation can save significant energy, but the behaviour of window openings will significantly influence that. Given that the carbon emission of A-rated gas boiler emits 215g of CO2 per kWh (Heatable, 2023), this means the insulation of the building could be responsible for 76.4 kg of CO2 during one winter month while the behaviour could be responsible for 238.8 kg CO2 per winter month for the insulated house. Hence

the behaviour seems to be critical to meet emission targets.

Discussion and Conclusion

The presented case studies show the impact of people's behaviour on energy consumption and carbon emissions. The cooking case study indicates that different cooking methods or cooking habits have a significant effect on energy conservation and hence carbon emission. The second building insulation case study has indicated that people's behaviour in their homes, in terms of opening windows, is critical for the building insulation to achieve its objectives and targets of energy and carbon savings. Improving efficiency and reducing heat losses is not the only issue that needs to be addressed, consumers themselves will need to contribute daily through their behavioural change to achieve energy conservation by paying attention to their daily activities.

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6. A community-centred approach to sustainable living and decision making: Campus Bio-Medico' Social Green Master Plan as a case study

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Introduction

Somewhere else we have stated that a better account of human beings than a reductionist and individualistic one might be important in developing innovative and sustainable social scenarios (Marcos and Bertolaso, 2017). It should integrate the psychobiological, social, and spiritual dimensions into a single picture for a new paradigm of civil society and therefore of cities and community living places. We have identified such a new anthropological paradigm as a relational one, i.e. human beings have to be understood in relational terms and not merely in selfish and individualistic terms. Beyond the human tendency to search and defend the conditions for survival, there is also a deep desire for community, family, and integral well-being that is characterized by gratitude, generosity, and sacrifice for a common good. Many examples during the pandemic also show that, for example, solidarity has even become an organizational principle.

More in concrete, *the home* - understood in the first place as a "place in which a human being habitually lives as a member of a family" (*ibidem*) - is the paradigm of enabling places where human beings flourish, and a relational framework is generative of new dynamics. Following the abovementioned emerging paradigm, three dimensions are entangled and coupled in *the home*: (1) vulnerability, which demands home protection; (2) dependency, because we depend on mutual domestic care, even to become autonomous; and (3) autonomy, thanks to which we can determine our criteria for ourselves and set ourselves to care for others within the frame of a home.

Consistently, human work should be newly understood in terms of *care*: caring for others and the environment emerges, in fact, as what specifically characterizes human work (Rocchi and Bertolaso 2020). These dimensions become particularly important and interesting when the territorial challenge is related to a hospital and a university that is growing around it. *The home*, as the paradigm of the human dwelling and behaving in the world, can thus help in understanding the potential intrinsic to a context of *care*, like a hospital is. In this context, the Campus Bio-Medico SpA (CBM) of which both Università Campus Bio-Medico di Roma (UCBM) and the hospital Fondazione Policlinico Universitario Campus Bio-Medico (FPUCBM) belong, developed the Social Green Master Plan (SGM) with the partnership of the United Nations.

The focus of SGM is not merely educational, but social and cultural in very practical ways and a very first place. The central goal of the CBM's project is not the university as such but developing a science and healthcare processes in service of the patients, of the personnel that work in the hospital, their families, and the territory as a whole. The most interesting educational dimension is not, therefore, the specialistic one (that we actually teach in the university in any case) but is existential, i.e., it is related to and focused on one of the most paradigmatic and deep experiences of human beings: suffering and the search for an integral wellbeing.

These pillars (relational understanding of human beings, human experience of care, the home and the cities for a renewed dwelling of local communities) therefore shape this contribution, which aims at showing how -in particular- this specific understanding of human beings and their life is informing community and societal attitudes for the climate change too. As far as making a home starts from

taking care of the house, contributing to the integral well-being of us all passes through the possibility of taking care of the natural environment for the common good and human flourishing.

Moreover, there is reciprocity in these relationships: as far as we care for others and for the environment we contribute to structures and infrastructures that enable and enhance our relationships and common challenges and goals. Nobody should feel homeless in an environment like this. As Heidegger said: 'Only if we are capable of dwelling, only then can we build' (Heidegger, 1993). As the promoter Blessed Alvaro Del Portillo said: "*This University was born small, but it is already big because you want to build it with a big heart [...] the graduates who will come out of these classrooms will be able to promote the integral good of the sick, in soul and the body*".

In the following, we now focus on how the interest of others, in the light of the current climate changes, has been shaping a whole environment, practices, and collective behaviors. Some data are work in progress, while others belong to the history of the 30-year-old institution.

The Social Green Masterplan

CBM owns and manages a real estate complex whose buildings currently amount to an overall surface area of 90,000 sqm and 90 hectares of land. The area of intervention of the SGM is a peripheral area located in the South-Eastern quadrant outside Rome, within a territory characterized by intensely built areas located in an intensive agricultural landscape and by large parts of Agro Romano of huge environmental and naturalistic value. SGM arises from the outcome of the international architecture competition «UCBM Masterplan International Design Competition», dedicated to the memory of Dr. Piero Lucchini - one of the founders of CBM - was won in 2019 by the Labics + Topotek1 team with the urban masterplan entitled « Horti academics".

The objective of the SGM is to create seven multifunctional experimental parks in the context of the Decima Malafede Nature Reserve in Rome, to turn it from a non-enjoyable area to an accessible, safe, and inclusive green space, destined for all the population in the area, open to people of any sex, age, and persons with disabilities within the One Health approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. These parks are an ecologically integrated green space of public utility, which constitutes an avant-garde experimental center for the conservation of biodiversity, in which protected green systems, usable, experimental agricultural systems at the service of the person in terms of intergenerational inclusion through a system of beneficial relationships throughout the life span:

- *Social: social inclusion processes for the elderly, fragile subjects, families, and children; development of services and employment impact on the territory.*
- *Green: connection, reinvention, and regeneration of biodiversity; experimental technologies and applied research for sustainability and the circular economy.*
- *Masterplan: cultural vision and regeneration project of a part of the city with new services, infrastructure, and equipment for the local community.*

SGM is the result of the union between local authorities and institutions - public and private - maximizing the impact of both policies by exploiting their complementarities. Promoting integrated approaches and strengthening synergies between them is offering the opportunity to develop sustainable and smart economic improvements in service of the whole Italian innovation ecosystem and making it better at responding to key EU and global societal challenges.

The path taken allows combining tradition and innovation, memory, and future, to confirm the mission and the founding purposes by updating them in new paths of assistance, research, and training at the service of the needs of people and society.

The territorial and educational challenge

CBM was designed, from the very beginning, to develop a new way of building the collective response to the present, for the patients and communities of people dedicated to caring for others. The very logic of living together with "common logos", whether they are those of culture, work, education, health, or more generally of living as citizens. The pandemic, energy, and geopolitical crises have led to exponential change on a global scale. For the first time, all institutions and organizations have shown the precariousness of proposing plans, forecasts, and control structures in dealing with what was happening. This "new present" has profoundly questioned the paradigms on which we have founded our work, leadership, and organizations: from the illusion of planning and control, of the centralization of decision-making systems and the separation of these from operations, from the emphasis on standards and numerical indicators to caring of processes and contextual factors for sustainable development of the civic society and human relationships. New lenses are needed to read the context, inhabit it, and transform it. This is a challenge that crosses roles and generations. It is an "adaptive" challenge; the answer must emerge from the "community". What is the kind of relationship we need to establish with the context we inhabit?

In this logic, two levels of analysis may be of interest. The first is related to the academic development of the UCBM's training and research programs over its 30 years and the evolution of the related objectives of the agenda 2030 SDGs: UCBM started in 1993 with a bachelor's degree in Nursing and a Master's Degree in Medicine and Surgery (SDGs n. 3 and 4). Then, in 1999 the bachelor's degrees in biomedical engineering and in Dietetics were delivered (SDGs n. 2, 3, and 4). In 2007 bachelor's degrees in Dietetics were implemented in Food Science and Human Nutrition. In 2010, the bachelor's degree in biomedical engineering was implemented in Industrial Engineering, and Master's Degrees in Biomedical Engineering, Chemical Engineering for Sustainability, and Food Science and Human Nutrition were delivered (SDGs n. 2, 3, 4, 11, 12, and 13). In 2019 the Department in Science and Technology for Human and Environment was founded, then transformed on the 28th of February 2023 into the Department of Science and Technology for Sustainable Development and One Health (SDGs n. 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 15 and 17). The second is related to the social and territorial impact of the work done by UCBM in these 30 years:

- *Alumni and Families: a network with 2,730 Alumni and 1,275 Parents;*
- *Campus Life: since January 2023, 23 events organised;*
- *Inclusiveness: 2.7% of Students with disabilities;*
- *Over 550 people engaged in sports activities carried out in UCBM;*
- *Internationalisation and International cooperation: 5 works camps in 2023, and application submitted to THE – World University Rankings*

The second is also related to the social and territorial impact of the work done by the FPUCBM and the UCBM in these 30 years: (i) Local training to 80 Students between 10-14 years old about alcohol and liver, microbiome, motorbike, and drugs, smoke; (ii) UCBM Academy: 41 Masters, 278 courses.

We, therefore, regenerate our individual and collective living, as leaders and citizens, in terms of: i) identity and adaptation; ii) integration and differentiation; iii) vital relationships and care. This new living must start by regenerating the gaze with which we observe reality and the mindset with which we live it.

Coordination and governance

The whole project is conducted by CBM which is the entity responsible for the selection of the suppliers that will directly implement the project from the initial design stage to its complete execution. CBM is the organization set up to promote the UCBM and ensure the pursuit of the University's institutional objectives. Company shareholders comprise non-profit organizations, businesspeople, and private or institutional investors.

Effective action in the management of complex processes increasingly requires a new way of inhabiting places and times of an organization, gradually identifying the levels of intervention while being aware of their constant and dynamic inter-relationship. It is a question of bringing into play an (eco)systemic understanding of specific diversities (of people, circumstances, places, objectives, etc.) by managing not so much information flows and the imposition of operating models (practices), but rather creating circumstances so that information and models are assumed and implemented locally in a generative, responsible, and pro-active way.

To overcome the lack of a deep awareness of the "complexity" theme and suitable methodologies to measure it, we have thus developed training courses that can also make the methodological approach a tangible experience. That is, the UCBM project is deeply committed and related to the management of protected areas, to the improvement of the energetic strategies for the sustainability of the new processes and local dynamics and to the dialogue between rural and urban areas. This changes behaviours and implements skills in our daily life and for everybody.

Also following the European orientations on Circular Economy that encompass a whole range of activities ranging from domestic and industrial processes of consumption and production to their processing towards food, transports, services, and energy distribution, we have developed tools for an effective accelerator for sustainable innovation, local regeneration of natural resources as well as of communities, if properly understood.

We are doing so, also in collaboration with other players on the territory, promoting sustainable economies which are a priority for the PNRR and in the EU in general. In Italy, various projects have been developed accordingly. In this sense, UCBM is not an exception, but an interesting example given its peculiar position and strategic developmental opportunities. It gathers more than 2,500 students with a hospital with more than 300 beds and a whole ecosystem taking over the need of the caring processes for patients, and their families, and training programs for students and researchers. Needs are not democratic: community-based solutions.

The current challenges require *knowledge driven solution* for a real impact and sustainable solutions. As many studies show in economics and life sciences, this asks for a new kind of informed decision grounded on the awareness and capability to design and develop processes in which communities are involved and engaged. This becomes crucial when the target of progress is a territory with its specificity and characterization. Families and their dynamics related to daily life may play a role in this scenario.

SGM aims to model the landscape, reshaping it in a new form, through actions of conservation and enhancement of the existing and the introduction of new elements, functions, and services. The keywords to build a naturalistic and equipped green space are connection, re-invention and regeneration. With a specific focus on the 3rd SDGs (health and wellbeing), the SGM aims at the realization of an aggregation of multiple parks with different vocations:

- "*Park of Spirituality": a Naturalistic, geologic park, where Nature reconciles and nourishes the spirit. A park dedicated to the search for contact with oneself through contact with nature, in which interactive educational paths of an ecological-environmental nature are developed.*

- *"Park of Movement": spaces where it's possible to practice outdoor sports, rehabilitation, and services for the disabled.*
- *"Park of Thinking": land art, amphitheater, artistic and poetic itineraries.*
- *"Sociality Park": where spend your free time immersed in a natural context, respectful of the environment and sustainable, equipped with games for children, picnic areas, BBQ areas, where you can also buy excellent zero miles products.*
- *"Park of Listening": acoustic pathways, open-air theatre, meditation areas, relaxation, and recreational areas.*
- *"Park of Harvesting": agrotourism trails, butterfly garden, garden of pollinating insects and birds, beehives.*
- *"Park of Care and Reception": FPUCBM*
- *"Park of Didactic and Research": UCBM buildings are designed as open and bright devices. The large windows allow you to view the surrounding landscape from inside, emphasizing the natural character of the intervention.*

This effort of developing an integrated approach for the well-being of Students and Patients and scholars or employees and families in general in and throughout Campus Bio-Medico, has been shaping the architectural structure of the buildings that are well connected by a bridge that connects all the Parks, opened to the natural and green environment (cfr Fig. 1, 2 and 3) and designed in order to have more engaging workplaces where relationships are at the center of the daily and academic life. Beauty and details care -as in the domestic environment have an important role in shaping relationships and community dynamics. In particular, we have team leaders in services that take care of all these aspects having the people in mind: an example is the birthday celebration of hospitalized patients with a lunch and a special dessert.

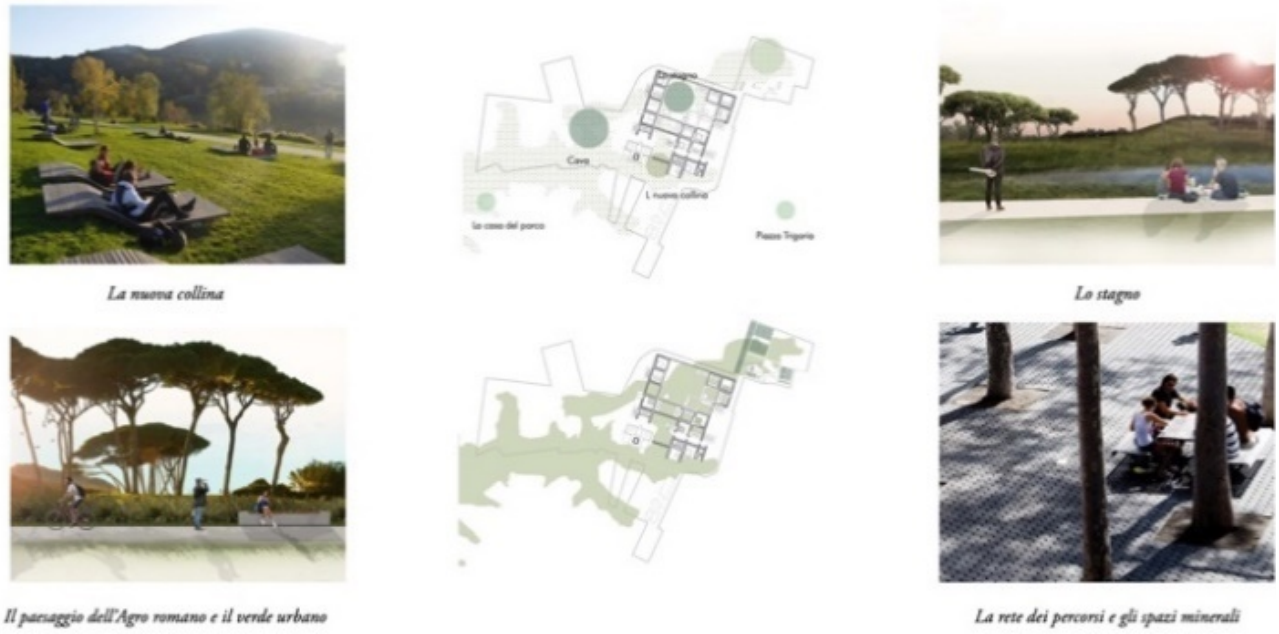

Fig 1-3. Natural and green environment and natural engaging workspaces on campus

Conclusions: on the importance of the theoretical framework, of a unity of knowledge and education

In conclusion, we think that sustainable challenges have to do with values and sharing of common goals in service of people and communities. Such values have to take into account the local characteristics as has been also stated at the European level, i.e. European challenges have been more and more interpreted as an opportunity for innovation that moves from the local and the not-homogeneous needs of the territory.

Campus Bio-Medico's theoretical and empirical scientific research programs, therefore, are allowing the development of a new model for innovation and generating a new awareness about the potentiality of the Master Plan Project for the sustainable development of the territory and the flourishing of the communities around it. Similarly, scientific evidence beyond common narratives about sustainability and circular economy has allowed us to implement:

- *Integrated structures*
- *Dissemination of culture at the service of society*
- *Innovative solutions for problems of social relevance*
- *Solidarity, which commits prestige and authority to the service of the common good*
- *Cultural and social initiatives in favour of the common good*
- *Interdisciplinarity and consolidation of networks*
- *The University is committed to ensuring that solidarity translates into works*

Finally, at the crossroad of individual and collective innovations, there are theoretical and empirical basis for how contemporary societies conceive their need to re-organize production and consumption and explore the messy assemblage of institutions and actors. A new combination of social practices emerges.

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7. Net-Zero Homes as localities of households, neighbourhoods, and natural environments

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Introduction

This paper considers the question of how to engage more effectively with home and family as a resilient unit to help societies and economies combat climate change. It focuses on 'connected locality', which is how people, place, and planet come together in shaping homes that then become 'net-zero by default'. According to the UN's Climate Action Net-Zero Coalition (n.d.), 'net-zero' is a state of net-zero carbon dioxide emissions, achieved by cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere by oceans and forests. Shaping homes to be net-zero by default requires embedding designs and adaptations in homes that not only meet the needs of net-zero targets and climate ambitions but also the needs of households to live well. The focus of this paper is on home as dwelling through the relationship between types of shelter and the environment, based on research and developments in Scotland, we argue it can be adapted to other contexts in the Global North and beyond.

The first section covers some of the key challenges facing homes during climate change and relevant UK and international policies. It then addresses some of the underpinning arguments for taking a neighbourhood and home-centred approach to address climate change. It then discusses a real-world example of the development of sustainable connectivity that addresses global climate change through its local contextual rootedness, the Ladyfield development. Ladyfield is framed through a 'people, place, planet' approach in developing homes of the future. It concludes that homes can become net-zero by default if we think about home as a dwelling, which draws out ways of living through the home and its environment. When a dwelling is operationalized in home and neighbourhood-centric development approaches, it can act as a central pivot in developing sustainable communities that support environmental and household well-being and resilience. This requires working with a deep understanding of the natural environment, with technological and material innovations responsibly, and with households to create their homes.

Key challenges facing homes during climate change

Households face challenges in adapting to and mitigating climate change which need to be addressed in ways that work with diverse communities and dwellings, through policies that can be adapted to people and places. The intersection of homes and climate change features in global policies on adequate housing, urban housing, and climate change goals. The UN Human Rights Council Resolution 43/14, backed by the New Urban Agenda and 2030 Agenda for Sustainable Development, emphasises the importance of the right to adequate housing as part of strategies to adapt to and mitigate climate change, as well as the role of communities in designing homes to address the effects of climate change (UNHRC, 2020).

The Scottish Government Climate Change Plan exemplifies how policy can be adapted as a place-based approach to support Scotland's green recovery. It seeks to work closely with communities and organisations that are undergoing or affected by the change. The planning process is focused on places, people, and evolving concepts such as '20-minute neighbourhoods' which priorities quality of life, health, and net-zero ambitions. Several grant schemes to fund household-based changes have been made

available over the last few years in the UK that support households with home upgrades, green home innovations, and social housing decarbonisation, alongside other sustainability approaches, such as the Green Homes Grant, Sustainable Warmth Strategy, and Boiler Upgrade Scheme. For example, the 2020-21 Green Homes Grant voucher scheme provided grants for households to make energy-efficient home improvements such as insulation, low-carbon heating, and draught proofing (BEIS, 2022).

In terms of infrastructure, other policy changes include the increased social and environmental importance of neighbourhood greenspace not just for outdoor gatherings, but cooling effects to reduce home overheating and natural drainage for flooding (Defra, 2017; ARUP, 2022). Digital connectivity is also increasingly recognised as an essential utility for homes by housing providers, developers, planners, and architects (Samuel, 2022; Hyperoptic, 2021). It is not enough to provide access to 4, 5, or 6G, but also the quality of the relationship with digital services for supporting the use of resources in the home (e.g., smart apps) and feelings of autonomy and dignity.

The focus on climate resilience and the impact of homes, althoughimportant, decenters the importance of what home means and its role in supporting wellbeing as well as net-zero goals. Home is a complex cultural phenomenon involving dwelling spaces, relations amongst household members, artefacts, technologies, and economic, social, and environmental hubs and networks where people want to feel safe, comfortable, and at ease. This is not always the case, but the idea of home remains strong and has social and cultural value. This understanding of home is neededto address sustainability from a home-focused perspective and how it relates to well-being. In this sense, sustainability is about meeting people's present needs without compromising the ability of future generations to do the same, which includes not just natural, but also social and economic resources (WCED, 1987).

Neighbourhood and home-centred approaches to addressing climate change

Neighbourhood approaches are well-established in addressing social aspects of housing such as accessing services, fostering community, and addressing environmental issues (Kearns and Whitley, 2019). These approaches inform models around the proximity of households to essential services, markets, and local supplies, including the '20-minute neighbourhood model' where services exist within a short walking distance to reduce reliance on transport and support the development of resilient communities (O'Gorman and Dillon-Robinson, 2021). Although convenience is part of supporting households in making and sustaining homes, it does not support a relational approach to home and environment, in both addressing net-zero and in developing resilient homes.

There is an increase in single-person, intergenerational and multi-occupancy households that cover a range of ages, genders, sexualities, and disabilities (ONS, 2019; Eurostat, 2019; Eurofound, 2020; Owen and Barrett, 2020). Living arrangements have also diversified, including families of choice, friends as families, blended families, and LGBTQ+ families and households (Chambers and Gracia, 2022). New kinds of commitments have developed, including home healthcare, ageing in place, living sustainably, hybrid working, and online learning. Given these demands on homes, they will vary in environmental impact and capacity to support sustainable practices (Ivanova and Wood, 2020).

Beyond convenience, homes must be adaptable, working with human, digital and natural environments. Homes should be flexible as household compositions and household members' needs change across the life course. If housing quality is good, it contributes to the feeling of an area and enhances the home as a dwelling – linking together housing and environment in how we dwell on the planet. However, as a recent UK large-scale public consultation shows, households feel their homes are not readily adaptable and connections to services and natural spaces are poor (Design Council, 2021).

As part of the relationship between house and environment, housing types should complement each other and sit as part of the landscape. The material and spatial footprint of housing should be as light

as possible, utilising technologies and the natural environment to make homes energy efficient and as part of the framework of how households' dwell throughout the year. This brings to the fore how natural spaces are part of our home and how we dwell. In the Global North, access to natural spaces enables people to experience and have contact with nature, which is good for physical and mental health and seems to need to be open to everyone, whatever their age, mobility, disability, sex, ethnic group, religious belief or sexuality. Policy guidelines fornatural space state that it should be attractive, well-maintained, relatively quiet, provide seating, and have good air quality (O'Gorman and Dillon-Robinson, 2021).

Policies such as those noted in the above section and the guidelines about 20-minute neighbourhoods are important. However, they essentially frame people as 'users' of spaces and services within neighbourhoods, which limits how they can develop a deep understanding of how their footprint affects net-zero and how they can become resilient through their practices of dwelling. Current approaches underemphasise the role of resilient households and homes in climate change and attention is needed on the agency of households in making homes with the structural and material aspects of housing and neighbourhood in developing resilient homes as actors in addressing climate change. There needs to be a balanced approach between the agency of households to wider structural factors at neighbourhood level.

Home and its relationship with its environmentThere is a lack of focus on homes and their relationship with neighbourhoods as spaces of services, sociality, and the environment. Working towards homes that are net-zero by default requires approaches that work from a natural habitat or in rewilding where homes and households become active partners in a process of dwelling rather than passive users of natural spaces and local services. This means asking how natural environments of all types interact in the shaping of homes and neighbourhoods. It also means considering how household well-being can be embedded into meaningful connected localities that are net-zero. This requires research in developing a new conceptual and analytical framework, such as theoretical development based on secondary analysis and case studies that are then tested and developed further through applied research in different contexts.

The first step in developing such a framework is conceptualising of home as relational (see Blunt and Dowling, 2006) and how homes may become embedded within net-zero, underpinning the resilience of home and environment. This involves internal household relations and practices of working, relations of home with services, and built and natural environments. Using home as a relational concept, dwelling is comprised of households, accommodation, neighbourhoods, nature, and utilities that can start to inform how to develop homes and neighbourhoods that are net-zero by default.

Home is crafted through the activities of households, otherwise known as 'doing home' (Morgan, 2011). Households are actively involved in domestication; however, this process goes beyond that of animals and crops to new technologies, artifacts and practices and how they are enculturated into belonging to the house. Silverstone et al. (1992) use this concept of domestication to understand the take-up and use of technology in the home concerning household agency (and its limitations). They argue there are four stages in the process of technological domestication: technological integration, user and environmental adaptation, innovation, and conversion.

This paper argues Silverstone et al.'s (1992) framework can be adapted further to address how homes can be socially and environmentally shaped to dwelling that is net-zero by default. The *first part of the process* involves attention to what households need and how they can develop sustainable practices through a household-centric approach. This means addressing how household practices and values feed into new ideas and practices. Household practices highlightwhat material and structural factors enable households to dwell in sustainable ways and what challenges and barriers they pose to households realising their ambitions. Attention has been narrowly focused on sustainability and not on how households' dwell, which is needed to inform the role of households in achieving environmental and

social sustainability (Collins, 2015; UKGBC, 2016). If the focus is instead on how households' dwell, relate to their environments and find new ways to meet their needs and desires, it can reveal how households find novel ways to do so (Hobson, 2006; Gibson et al., 2011; Casey et al. 2022).

This change should be aligned with the *second part of the process, t*he relationship between home and environment which can support households to live sustainably. This aspect involves leadership and policy at the environmental level and finding ways to incorporate household studies into neighbourhood studies, architecture, and landscape design. Each of these disciplines takes a different approach to the environment. Neighbourhood studies highlight the importance of local services in sustaining vibrant neighbourhoods in terms of their social environment, with attention to meeting spaces and community support. Architecture and landscape design have long histories in understanding how building design and the local environment can shape homes and communities through dwelling, c, and create spaces for gathering (Dekkers, 2011, Bell et al., 2020). These disciplines still frame people as passive users of natural and greenspaces and not as active participants in shaping social and natural environments. Participatory design can contribute to residents being active in designing spaces, this however is not yet mainstream (Edgerton et al., 2014; Felstead et al., 2019). Household involvement is usually via consultation which limits the amount of expertise that canbe gathered from them. More work is needed to understand how households and the environment adapt.

In the *third part of the process, innovation*, and knowledge gained from household and environment adaptations in supporting sustainability need to be captured, conceptualised, andmodelled to support innovation in the industry to shape the development of net-zero homes and neighbourhoods. By focusing on dwelling, development can then be based on how households reimagine their relation to their natural environment and how they form an active relationship with nature in developing sustainable dwelling spaces and relationships. This relationship may well sustain homes and underpin their resilience and the resilience of their environment. Making a home needs to be understood as active, through the practices households adapt to accommodation and the relations forged with neighbourhoods, nature, and utilities (Morgan, 2011). This requires a collaborative approach between households, designers, and developers in the *fourth part of the process*, *the conversion* aspect of the move to a sustainable dwelling that has the potential for homes to become net-zero by default. One early example of this is the development of the Ladyfield site, which takes the notion of domestication, environmental impact, and sustainability into a planning process that has at its centre a people, place, and planet approach.

Ladyfield: Homes and neighbourhoods of the future The Ladyfield site (see Fig. 1 below) is c.22 hectares of undeveloped land approximately 2.5km south of Dumfries next to The Crichton, which is an internationally significant estate owned by Dumfries and Galloway Council on a long-term lease to The Crichton Trust. The Crichton Trust set out to create a sustainable housing model that can be adapted all over the world, one that isinformed by three integrated themes: developing housing from the wisdom of residents (*people*); working for the wellbeing of people through the preservation of nature, connection to others, and using new technologies to support wellbeing and enable people to live in their community for longer (*place*); and developing energy efficient homes and self-sufficient community that works with and for the protection and recovery of the natural world (*planet*).

Fig1. The Ladyfield site

The Ladyfield development is an early exemplar of how homes can be socially and environmentally shaped to dwellings that are net-zero by default. This development can be analytically examined through an adaptation of Silverstone's framework, as outlined in the above section.

The *first part of the process* involves identifying household needs and sustainable practices, to develop a household-centric approach. The development of Ladyfield involved a community engagement process aligned with the National Standards for Community Engagement (SCDC, n.d.). The process involved workshops and community events for the local community tocontribute to the development of Ladyfield collaboratively and positively. From this, developers learned that residents wanted more biodiversity, traffic calming measures, and water management controls in place, to preserve the historical character of the estate, and for Ladyfield to support the long-term viability of local schools. The Crichton Trust also collaborated on a pilot project with researchers from the University of Glasgow on co-creating connected homes with households to support wellbeing in a rural location, which explored how digital connectivity, data-driven services, and home life are interconnected in shaping sustainable living (Casey et al., 2022). This household-centric approach demonstrates the internal complexity of households and how the development of Ladyfield has approached the role of households in addressing sustainability practices.

The *second part of the process* is embedding relations between home, neighbourhood and environment so household-centric approaches are supported in the context of wider structural change.

Much of the consultation feedback in the Ladyfield development is reflected in the Ladyfield Principles, which have been established to guide its future development. These include five themes: biodiverse, heritage, connected, intergenerational, home, and enterprising.

Digital and green infrastructure are both embedded in this step of the process, by including smart technologies in the home (e.g., smart walls), smart street lighting across the neighbourhood, and strategies for preserving and adding to the natural and landscaped environment (see Fig. 2).

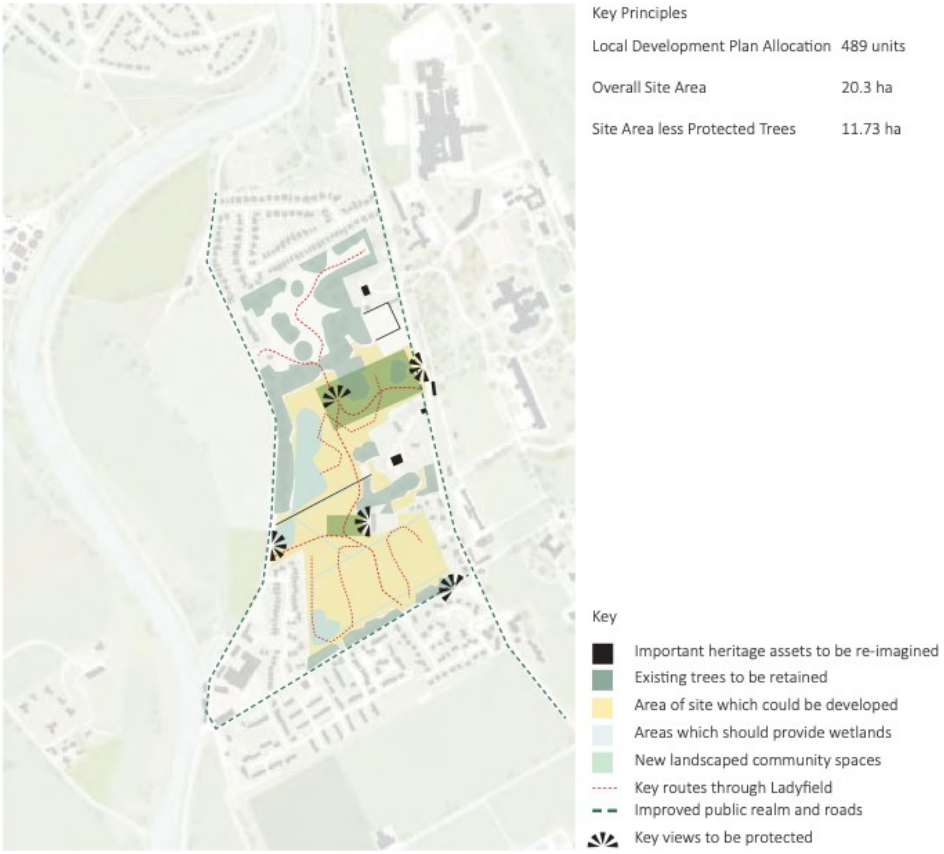

Fig 2. Strategy for a future liveable place

These relational principles are embedded in the plans for Ladyfield, as evident in Figure 2, and demonstrate how relations between home and environment can support households to live sustainably. The Ladyfield Masterplan is landscape-led, involving light-touch interventions with the natural environment, protection of mature trees, creation of new wild public spaces and community growing spaces and sustainable water management including water recirculation flows from wetlands to homes (see Fig. 3).

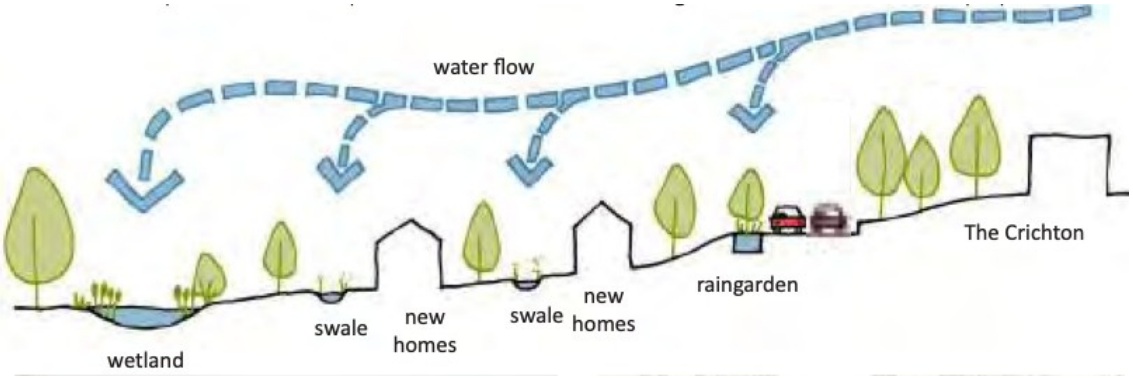

Fig 3. Water flow concept

Placemaking principles are also embedded in the design of streets, greenspaces, community gardens, travel connections, and heritage preservation. These principles build on existing and establish new positive relations between homes, neighbourhoods, and the environment at Ladyfield (see Fig. 4). They include spaces for playing, meeting, growing, and for the natural environment and wildlife to flourish.

Fig 4. Networked external green spaces.

The *third part of the process* is innovation, with Ladyfield bringing together an interdisciplinary development group to address how homes and neighbourhoods can be net-zero by default. The Ladyfield development is funded by the UK Government through the UK Community Renewal Fund, which supports people and communities most in need across the UKto pilot programmes and new approaches to prepare for the UK Shared Prosperity Fund. The project is commissioned by The Crichton Trust and Dumfries and Galloway Council and the projectteam includes Collective

Architecture (lead consultant/architect), RaeburnFarquharBowen (landscape architect), nbm Construction Consultants (cost consultants), and Buro Happold (environmental/ transport/infrastructure/utilities consultant). Bringing together this group of households, designers, and developers provide a strong foundation for the Ladyfield development.

The *fourth part of the process* is about converting the potential for homes to be net-zero by default elsewhere that can be adapted to people and place. Although Ladyfield is too early in its own development to fully demonstrate this step, updates are continually shared online and the Ladyfield site has been shortlisted in the Scottish Design Awards 2023 for the Masterplan of the Year Award which helps to raise awareness and recognition even at this early stage.

Relationality is embedded into the Ladyfield development's architecture, smart technologies, circular economies of neighbourhood and networks, its pathways and hubs, and in how people connect and nature. It works with the flows and spaces of its natural landscape, including water and light, and how households and neighbourhoods live. It does so concern Dumfries' local climate, which includes flooding issues as well as increasing hot spells. Ladyfield also uses new forms of construction and design in shaping greener connected localities. Examples include housing that is adaptable on the one hand to changes in household requirements and on the other, adapting to climate and environmental issues through household practices and smart accountable technologies. Another example is embedding circular economies of consumption and production into how neighbourhoods can share resources in sociable ways through the design of new social hubs. It fosters community engagement in the natural world by embedding interaction with nature into everyday activities through designing house-nature relationships.

Conclusion: Thinking and designing with the idea of net zero by default

The Ladyfield model (see Fig. 5) provides a radical new vision in its holistic and relational approach. It takes mechanistic approaches to housing types, neighbourhood proximity, and access to work, education, and health into a relational paradigm of lived neighbourhoods – natural and social. It moves climate change approaches beyond narrowly understood electrical and carbon neutral technologies into working with communities, neighbourhoods, and the home in creating meaningful, connected, and sustainable living.

In terms of how we can domesticate our approaches to climate change, Ladyfield is at the second stage of the domestication process, looking at how homes and neighbourhoods can be developed to address net zero through deepening household relations with the natural environment. The development works with how households live and provides the resources and design of homes and neighbourhood that build resilience, and importantly, home and environment well-being to support new ways of dwelling. Therefore, taking a framework that has people, place and planet understood through a relational lens of dwelling means that there is a potential for creating net-zero by default ways of living. This concept is aspirational and not fully worked-up but if we can learn from early case studies such as Ladyfield, we can build a knowledge base to underpin future innovation and practice. Areas of further research therefore include:

- Testing and adapting this new framework in different places and ongoing developments, including in the Global South.
- Exploring how this new framework could be adapted for social housing developments, particularly for vulnerable and/or marginalised households in the cost-of-living crisis.
- In the context of UK 'right to regenerate' policies, exploring how this framework could inform net-zero developments of derelict buildings and vacant plots in urban areas.

Fig 5. Ladyfield Masterplan

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8. Connected homes for older people: Role of family and locality in combating Climate Change

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Abstract

The adverse impact of climate change on older people has become well documented and studied over the past decade with the increasing realisation that people of vulnerable conditions and situations are more likely to struggle with their physical and mental health issues in the face of climate emergency than others (OHCHR 2021). Over the past two decades two fundamental changes have occurred, affecting the practice and experience of the family and homes of older people: the substantial increase of the ageing population and the encroachment of technologies in the way the home functions daily. Both challenged conventional operations in the home and are enabling new modes of communication and support that can be mobilised at times of need, as we saw during the global pandemic. Homes of Older people made use of mobile technology, eShopping and medical support, facilitating an instant transformation of the city from carbon-heavy to become carbon-neutral. This living pattern and technology-supported lifestyle can enable further development of best practices and as a guide for sustainable living, this paper argues. Driven by the global pandemic, nevertheless, Climate Change and its impact on the health and wellbeing of older adults are to be considered as a more existential threat. This paper studies the notion and best practice of connected homes in the United Kingdom, using the period of the pandemic lockdown as a test bed to recalibrate the mission, function, and lifestyle of older adults in their homes towards the permanent and sustainable way of life that contributes to the Zero-Carbon cities. It analyses the useful role of technology-assisted operations in the care of old people and its impact on energy consumption and climate change. It offers good insights into the readiness of global societies to help and support older people living independently at home.

Introduction: Between Care and Climate Change- Challenges facing Older People

Modern British society has elevated family and household matters from their formerly private position to that of concerns of the political institutions. The emergence of society, seen by Hanna Arendt in the rise of housekeeping, its activities, problems, and organisational devices, has moved the home from the shadowy interior of the household into the light of the public sphere. Housing policies, management of households, and professional rules of home workers are a few discrete examples of how the institution of society interferes in the home, linking social and economic policies to support the family. Those expanded and overlayed domains have seen the impact of Climate change impacting the family and the home in multiple ways.

A quick look at the housing layout of British cities shows clear signs of accelerating displacement of the family from their urban centres towards the peripheries. There is increasing segregation and distance between places of work and living spaces, and there are lengthier daily journeys between work and home. Families have to live at greater distances from work and provide alternative means of caring for their house, children, and elderly, generating high levels of energy consumption and lifestyle that have a negative impact on the environment. Such spatial segregation between where people work and live has resulted in a decline of support from within the family and has increased the demand for outside care services, be it domestic workers, childminders, or care for elderly people. Hence, other forms of professional relationships were brought into the home at a time when there was a clear divide between people's needs and the practicality of living. Places of work are disconnected from places of

care for older people, leaving them in a far more vulnerable position where institutional care is the only alternative.

With public spending on health and social care in growing decline, the culture of care is shifting towards providing care at home and wherever possible by the family with local community support. The relationship between the home and care is becoming very crucial in the make-up of twenty-first-century homes. The home exists because it satisfies needs, and care appears to be one of the home's critical functions that require a safe, suitable physical environment and a community of people who perform that care for older people, being the family, neighbours, and community of social care. While the specific needs related to care change over time, the need for care persists. We are vulnerable and interdependent as a species, even when we are at the peak of our strength and physical and mental capacities. A home is a place where we can take shelter from inclement weather, an opportunity to enter and retire into our private space, a place for mental repose, and a means for recouping strength. This is obvious at times of illness or disability or in the infirmity of old age ... but a home is always a place where everyone can find care. Family, by default, is the primary and sustainable care provider in most nations and societies, regardless of age or social status. The association of the family as a unit and home as a place is unavoidable. Hence, the practices and attitudes of both do have a substantial influence on climate change.

The literature on the ethics of care has grown considerably, particularly since the works of Carol Gilligan (1982) and Nel Noddings (1984). Care is a unique relationship that involves two parties, the 'one caring' and the 'cared-for', both with obligations (Noddings 1984). In the home, this relationship is always personal and direct (Bubeck 1995), not a commercial exchange (Bahr and Bahr, 2001) or delivered through a contract (Held, 1993). Neither can care relationships in the home be reduced to the mere performance of deontological duties. On the contrary, they will include other qualities such as gentleness, agreeability, compassion, sympathy, and good-temperedness (Baier 1987), which align with virtue ethics (Halwani 2003, McLaren 2001). These reflections on the nature of care, although they are usually directed toward other activities, are particularly important for the home. When Hamington (2004, 3) affirms that "care is committed to flourishing and growth of individuals", he adds that care "acknowledges our interconnectedness and interdependence" (Ibid., 3; Mayeroff 1971). Home care for older people is always connected to family, locality, or social care providers.

We are living in an ever more dynamic and mobile environment where our activities overlap, and the traditional boundaries of privacy have become blurred regarding where a certain activity stops and another starts. In our contemporary society, we have a multiplicity of homes, some of which are not such private domains as they used to be. Homes could host professional and work activities and medical, health and social care. However the home is a contested environment where several processes, interactions, and engagements are at work constantly, resulting in a lifestyle that has either a positive or negative impact on the environment. Over time, the challenges to home as an institution emerged from changing socioeconomic and cultural landscapes. Most of the current research on the impact of climate emergency on the family, however, is quite limited and much more focused on the scientific measurements of energy consumption. Little is done to understand how lifestyles and daily attitudes of family, especially those with older people, can be part of the solution, not the problem.

This paper looks at the practical trends and attitudes through which families and homes with older people, a substantial and increasing proportion of current households, although there are also a limited number of studies that deal with such topics in a more interdisciplinary way. It aims to develop an enquiry on the function and practices of the contemporary home of older people regarding their contribution to combating climate change as a holistic approach. It asks the question of to what extent current attitudes toward homes and care for older people contribute to climate change in Britain and how practical changes can lead to inventive solutions.

Connected Homes of Older People: Technology and Care

Recent demographic analysis of Western societies shows that the profile of older people is changing. In the UK, there are 11 million people over the age of 65 in 2023, and projected to increase by 10% in the next five years and 32% by the year 2043 (AgeUK 2023). A Man aged 65 expects to live 18.5 more years, while a Woman of the same age expects to live 21 more years. Population ageing brings with it a number of challenges to aspects of life in the home and the way the home is connected to society, most notably a rise in the demand for care and social support. By 2010, 36 million people globally were recognised as having dementia, and by 2050, this number is expected to rise to 115 million (Mihailidis et al, 2012). The proportion of that population living alone at home is also increasing, and approximately one-third of older people living at home also live alone (Wild & Boise, 2012). Such predictions highlight the importance of pursuing research on the housing of older people and its contribution and response to climate change due to its substantial housing sector and the substantial supportive services, infrastructure, and digital technology (Mieczakowski & Clarkson 2012).

Technology has largely developed new modes of connectivity through the home-work interface, erasing the "socially constructed" boundary between the life domains of work and home. The development of Skype, Zoom virtual meeting rooms and workspaces, and e-shopping made it much easier to overlap private and public domains, compared to the time, cost and health risks of commuting on busy transport, as we learned during the pandemic. This also contributed to a substantial reduction in energy consumption and Carbon emissions through vehicle usage and public transportation for daily journeys. According to Nature's study, daily global CO2 emissions had decreased by –17% (–11 to –25% for ±1σ) in early April 2020 compared with the mean 2019 levels, with half of this change being due to changes in public and vehicle transportation. In individual countries, the total reduction reached –26% on average (Le Quere et al 2020). Further reductions in Carbon emissions at home were recorded in the UK during 2020 at 10% (ONS 2021) as a result of people staying and working at home.

The home holds more significance for older people. Recent data suggests that elders spend on average 80% of their daytime at home (Rowles and Chadhury 2005, p.25), and 89% of older people live in a mainstream family home (Hanson 2001, p.14). Within the Futurage Road Map, the home's centrality to everyday life is important with increasing age, and particularly in very old age, people spend most of their time in the home with the incremental need for monitoring, support, and care (Futurage Road map 2007). For older people, the reduction of individual visits and reliance on virtual social engagement helped reduce unnecessary daily journeys and subsequently a reduction in carbon emissions. The local neighbourhoods and communities, by contrast, compensated for it.

As we learned during COVID-19, Older People were especially vulnerable, with over 80% of fatalities occurring above the age of 75, enabling technology to play a critical part in safeguarding them against risks of infection or isolation. *(Ferguson et al. 2020; Long 2020)*. The growing influence of technology on domestic environments, mixing work, life, care, and well-being, marked a new beginning of a new pattern of living that not only helps older people be safe but, more critically, keeps them connected to family, health care and other services like e-shopping and groceries. More important, though, is the impact of using this technology to reduce Carbon emissions and cut energy consumption at home. The effectiveness of e-shopping and e-medicine was critical to millions of older people over the pandemic years (2020-23), allowing them to receive care and medication via eMedicine and eCare support without any physical contact or frequent journeys to medical appointments.

Most arguments against ICT within the home are concerned with the acceptability of technology, ethics, and the negative connotations of "substituting 'warm' hands with 'cold' technology" (Aanesen et al. 2011). The aim of Smart home technologies is 'to enable non-obtrusive monitoring of residents and involves different levels of technological sophistication, ranging from stand-alone intelligent devices to homes that continuously monitor residents' activities and physical status and adapt to

residents' needs, often providing proactive measures. (Demiris et al 2004) A major influence in the use of technology is the motivation of the older person, desire for control, sense of privacy and understanding of its potential connectivity. But, as our lives increasingly depend on connectivity and technology, especially over the past five years, this barrier has largely disappeared, with most older people becoming technology-adept and able to engage with more sophisticated applications and processes. As a result, once the Coronavirus lockdown was enacted, older people across have swiftly used the existing technologies and infrastructures to maintain their daily needs and activities as efficiently as possible, helping millions of families across the globe to stay safe at home whilst e-care and work from home continued at large.

Smart Homes and solutions for combating climate change in Older People's homes.

The prevalence of technology has not started recently, but the concept of *smart homes* has existed for decades at different levels and for varying purposes. Referred to as intelligent homes or home networking, it involves the introduction of networked devices and services at home for a better quality of living (Bierhoff et al, 2005). The capabilities of the technology are always expanding through the introduction of entirely new devices and networks that reflect new capabilities, opportunities, and challenges. As illustrated by Aldrich (2003), Connected, learning, and attentive homes are the most advanced models of the smart home that facilitate a) connectivity with the outside world and service providers, b) learning patterns of activities through accumulated recording and analysis of user behaviours; and c) the ones where there is a registered dataset for each person, their attitudes, behaviours, and activity operate to attend to those needs.

Those models are critical in supporting and managing old people's living independently at home and have the potential to actively contribute to cutting carbon emissions and contributing to combating climate change. This means more efficient control of home services (electricity, gas, social services, domestic supplies and medical attention). To this end, Smart homes can enable learning older residents' behavioural patterns and needs, such as regular shopping orders, medical appointments, communications with family, meal preparation, and regular events of social engagements. With regular applications and development of smart home technologies and using Covid-response as a point of reference, this has the capability of reducing excessive and unnecessary energy consumption and carbon emission by up to 20% across older people's homes. This reduction can be even more, where local groups of homes can operate collectively in response to those shared needs and living patterns. Coordinated timing for social and healthcare attention, shared schedules of grocery supplies, and social engagement.

To be truly effective, smart homes must be responsive to the daily needs of older people, increasing their comfort, independence, security, and quality of life. Smart homes are designed to address needs based on three main areas: comfort, leisure, and healthcare. (Chan, 2008) But, they all have carbon emission implications and can have a positive or negative contribution to our fight against climate change. The smart home itself is not a technology per se, but rather a concept incorporating many different devices and services, many of them focusing on home energy consumption and environmental performance, local district services (heating/cooling) as well as medical and social care. Whilst some of those aspects are digital and virtual, critical elements of the smart home design remain physical and spatial (Value Ageing, 2010-2014). Beyond a network connection through which technology can communicate both to each other and to the outside world, there is no rigid formula for making a home smart. Hence, they need to be curated and designed for the use of specific individual needs and can be calibrated for the use to reduce and neutralise energy consumption within local old people's homes. This will involve revised protocols for architecture and construction, ICT, hardware design, psychology, healthcare, medicine, and robotics.

Impact of smart technologies in improving the environmental performance of their homes.

User motivation towards technology and its impact on well-being has two phases: *'felt-need'* and *'perceived benefits'* (Mahmood et al 2008, p.108). According to McCreadie and Tinker (2005), the degree to which an individual feels they need technology will affect their acceptability of it. Living independently and connected to family and friends is for example a key motivation, for using technology to live independently despite their physical or mobility limitations (Mahmood ibid).

While considering the impact of ICT on an older person's living conditions and surrounding environment, it is necessary to consider the person's lifestyles and modes of consumption that take place in these conditions. Different ICT solutions will vary in terms of their impact, benefits, and risks, usually influencing more than one sphere. Most technological solutions in this respect will have mutual influences on both the older person's cognitive, and emotional conditions, whilst having an impact on the environment as well, whether directly or indirectly. This impact can also play different roles in various phases of the aging process: they can help to delay the effects of aging, such as cognitive decline, assist in managing specific conditions, such as physical disability or dementia, or open up social, cultural and economic opportunities for older adults. The basic cognitive functions that are most affected by ageing are attention and memory. Amongst other cognitive functions that may decline with age is perception, mainly due to deteriorating sensory capacities, language processing and decision-making. Maintaining cognitive health allows older people to live independently longer, postponing or in some cases reducing the need for carers or being moved to residential care.

Simultaneously, technological solutions play a key part in keeping ageing people in touch with their daily habits and support actions to protect the environment, whilst managing low energy consumption and efficient operations of their households. To this end, if and when cognitive and sensory capacities struggle or deteriorate, technology can help maintain systematic operations and functions of standard and environmentally friendly practices at home. It can prepare reminders of certain activities, diaries, connections with family members, but also can self-manage the domestic operations and functions of the household, from managing heating, cooling, and electricity, and at times responding to changing daytime/night-time conditions.

Acknowledging the adverse health risks and deterioration to older people as a result of climate emergencies (extreme weather, hotter summers, flooding, wildfires), many ageing charities and supporting organisations urged older people communities to manage their domestic activities in an environmentally responsible manner. In their effort to support Older People to contribute positively to combating Climate Change at home, AgeUK gave 8 practical steps and action plans (AgeUK 2021). In collaboration with Friends of the Earth, they suggested 8 practical aspects, amongst them, managing attitudes like the insulation of the home, Installation of low-carbon heating; and more importantly, Developing energy- and water-saving habits is the most effective. The latter has become increasingly reliant on technology, with the use of Smart energy meters with live information on energy usage. Conclusions: Implications of Older People Homes on Combating Climate Change

Connected homes are emerging modalities of smart home designs aiming to improve the quality of life of older people, families, or households through better managing of domestic activities, and connectivity to family, care providers, and services. In our universal effort to cut our carbon emissions and combat climate change, we are developing new habits, living patterns, and lifestyles in response to the growing and frequent challenges of extreme weather conditions. Due to the scale of the challenge, small unitary efforts of institutional change or policy may bear limited effect. By contrast, with millions of homes, families, and households around the globe, adopting environmentally conscious attitudes to sustainable living and efficient lifestyle will enable widespread outcomes and have a substantial impact on cutting our carbon emissions. Homes and households of older people and their families are the epicenter of peace in this effort.

Improving attitudes toward consumption and climate emergency of older people is an everyday practice that could be facilitated by technology that does exist and we use it frequently. Traditionally, assessing older people's quality of life has focused on diminishing capabilities and the subsequent loss of independence. Functional capacity, care, health status, psychological well-being, social support, morale, dependence, coping and adjustment are all examples of indicators used as "proxies" for quality of life at home (Walker, 2005; Fernandez-Ballesteros 2010). However, these are all related to individual cases and older people's conditions. With the emergence of Climate Change as a major external force that impacts older people more than other age groups, the quality-of-life indicators and attitudes must be shifted to link their living and consumption patterns to the impact on the environment.

To this end, the definitions and concepts of ageing well at home for older people have to be rewritten to link the ability of older people to live independently and actively contribute to society to their contribution to combating climate change through their home, family, and locality. This is the only route possible if we are to provide conditions to reduce health risks and consequently lead to lower costs of healthcare for elderly (Abdelmonem & Krawczyk 2013; p1).Most of these actions and attitudes could facilitated by transformative technology using mobile technologies, online applications, and e-services from all types of trades: banking, grocery, care, and shopping. The proportion of time spent in the home also increases as a person ages, reinforcing its importance as a place of comfort and security, but also a central avenue to combating climate change through managing one's attitude and behaviour. The links between the home and smart technologies are well established in contemporary everyday life. However, using that technology to transform our attitudes toward energy consumption and carbon emission is still emerging. The role of the family and locality of older people, in this context, can provide a novel and universal approach towards practical contribution to a neutral carbon-neutral city. Whilst each house's contribution is limited, the collective and shared practices amongst the ageing population have the power to make major inroads towards cutting our carbon emissions and realising zero-carbon city targets.

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9. Educational schools as homes: educational mission, Climate Change awareness and Architecture

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Introduction: Education and Architecture in Schools

Education is transcendental for societies. As a first statement, it must be remarked that "*Quality Education*" is one of the United Nations "*Sustainable Development Goals*". As part of its targets for 2030: "*4.A. Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments for all*." In this context, it is worthy to mention the Research Project that is being developed for the Ministry of Science and Innovation of Spain, entitled: "*Inclusive Campus and Architecture. Criteria to promote welcoming university environments and generators of cognitive accessibility in people with intellectual disabilities* (CAMPUS-INCLUAQ - PID2020-114373RB-I00)"

From a conceptual approach, Education constitutes an event characterized by four basic features: affective, collective, sustainable, and spatial. The emotional component is essentially generated by the relationship between teachers and students, as an outstanding way of transmitting values and fostering resilience: "*It seems impossible to overcome difficulties and grow as a human without the nourishment of affection*" (Uriarte, 2006, p. 14). Learning in a group way enriches the process as a whole, as has been shown by neuroscience (Willis, 2010). The sustainable profile of the educational fact refers to the fact that the human being can continue to grow in culture and knowledge whenever he wishes: a facet that is intensively promoted by the European Higher Education Area, with the notion of "Lifelong Learning" (Laal, and Salamati, 2012).

Through a committed design, Architecture can foster innovative teaching and learning modalities, as has been proved since decades ago (Escolano, 2003); and it must also contribute to the transcendental mission of configuring friendly environments that increase psychological well-being. If the physical space is designed to meet this objective, it will collaborate in the transformation of mere spaces into real places, adding the human dimension as an enriching quality of the built areas. Schools are an extraordinary field of study in this regard since they are erected as institutional extensions of the family environment. Their design can be inspired, precisely, by the notion of home. Thus, architectural composition must be carefully elaborated, as it motivates learning. Therefore, schools constitute an extraordinary framework to promote attitudes that increase awareness of Climate Change (Gelfand, 2010), (Jabłońska, and Ceylan, 2021). School environments, Climate Change, sustainability, and attitudes to building awareness.

Climate Change is an issue that must be addressed with priority by international strategies, generating criteria and actions (World Health Organization. Regional Office for Europe, 2015). This is a critical challenge in research and praxis, affecting all social spheres (Keim, 2008), (Schneider, 2011), (Chatham-Stephens, Mann, Schwartz, and Landrigan, 2012). Its impact on the planning and design of all types of cities and buildings is unequivocal (Kennedey and Basu, 2014), (Roaf, Crichton, and Nicol, 2009). Sustainability forms a *theoretical*-practical corpus linked to Climate Change, as it explores solutions. It has a multiple set of dimensions, linked to the Sustainable Development Goals SDG (United Nations General Assembly, 2015): institutional, social, environmental, energy, economic, educational and cultural, and health and well-being (Giovannoni, and Fabietti, 2013). In this global context, Architecture has to play a sound role, in facing current societal challenges, such as climate

emergency and promote sustainable solutions. As an extension of the family formation received at home, schools build very propitious scenarios to build awareness on this topic (Karpudewan, Roth, and Abdullah, 2015), (Hoody, 1995). Consequently, an important strategy to consolidate this formation in their daily experience within the school is to base it on curricular aspects of the subjects to be taught, as well as on the transmission of human virtues by academic managers. But in parallel, urban and architectural solutions can provide transferable values to the social context, incorporating them into the school curriculum (GADRRES, 2015).

If carried out with the necessary sensitiveness, the design of physical environments (open spaces and buildings in schools) can carry in itself values that demonstrate to all users' solutions as effective as aesthetically attractive. Proceeding with this purpose, positive responses are activated in students, increasing their motivation for learning (Maxwell, and Chmielewski, 2008). School architecture can enrich the training given by teachers, also reinforcing awareness of Climate Change. All the built complexes must meet regulations in terms of safe locations and constructive solutions, but they can also become "*three-dimensional textbooks*", exercising an added formative dimension. Thus, school environments can acquire a sort of formative facet in themselves, a concept that is directly associated with the paradigm of the "*Educational Campus*" and "*Educational Schools*" (Campos, 2018).

"Educational schools": their design and construction as a potential contribution to training in awareness about Climate Change

Some conceptual foundations

The basic mission of any school complex is to host academics and their associated functions. But if it is designed to transmit the values mentioned above, then it acquires an effective "educational" quality, thus enriching the teaching processes. Adaptation to Climate Change affects the built body, but it becomes critical to consider the human component of the users (Dear, 2006). Training any type of student on the issues that currently threaten the planet must be channelled essentially through a *curricular corpus*, expressly aimed at acquiring knowledge and skills that they can put into practice tomorrow in their different professional tasks (Fortner, 2001). But it must be remarked that the architectural body of a school has a sound influence on the whole educational process, as it can create an atmosphere of attractive learning (Sammons, *et.al*., 1995). One of the challenges facing society today, on a universal scale, is awareness of Climate Change and its effects. In this mission, the Architecture of the schools can function as a "three-dimensional textbook" (Kong, Yaacob, and Ariffin, 2015).

Potential contribution to training in awareness about Climate Change: background and references in the matter

Planning schools under comprehensive quality guidelines have generated numerous investigations, regulations and design guidelines, starting with those with a more technical profile, focused on security and resilience concerning Climate Change and its effects: "Towards safer school construction: A community-based approach" (GADRRRES, 2015), "Guidance notes on safer school construction" (INEE-GFDRR, 2009), and "Comprehensive school safety" (UNISDR-GADRRRES, 2017). Regarding the design criteria that can generate evidence of awareness regarding Climate Change, numerous international case studies illustrate the basic theme of this text, focused on the quality and innovation of school architecture as a scenario that promotes training in this matter. A prominent European example is the Feldballe School, designed by Larsen (Rønde, Denmark). Among many others selected in Dudek's research, the following may be cited: Speech and Learning Center (London, UK); Anne Grank School (Papendrecht, Netherlands); Odenwaldschule (Frankfort, Germany); or the Strawberry Vale School (Victoria, BC, USA) (Dudek, 2000).

In Africa, adaptation to geographical singularities is a matter of considerable importance, in terms of Climate Change. Among other criteria, it is plausible to investigate vernacular solutions that today continue to provide particularly useful lessons (Daoudi, Mestoul, Lamraoui, Boussoualim, Adolphe, and Bensalem, 2019). Examples can be found on this continent of schools which, despite budgetary constraints, have opted for a commitment to Climate Change. This is the case of Horton Street Primary School (Freetown, Sierra Leone), as an example of a carbon smart school designed and built by members of the local community (family, builders and managers). It is worth mentioning the Digalama Primary School (Morogoro, Tanzania), which stands out for its awareness of the role of forests in providing essential ecosystem services.

In India, the climate efficiency achieved at the Rajkumari Ratnavati Girls' School in the city of Jaisalmer should be highlighted.Within the Spanish panorama, there have been notable theoretical contributions (Batista, Torre, Fermoso, Morais, Avila, Pinto-Gomes, Castanho, and Cabezas, 2022), (Pérez, and Boscolo, 2010), (Varela-Losada, Arias-Correa, Pérez-Rodríguez, and Vega-Marcot, P. (2019), (Punter, Ochando-Pardo &, and Garcia, 2011). As a school project of interest, it can be highlighted the Nursery El Petit Compte (Besalú, Spain), designed by the Spanish architectural firm RCR (Pritzker Award 2017). Certain policy strategies aimed at promoting awareness of Climate Change are noteworthy. Among others, the case of the CEIP Peñalba (Ponferrada, Spain) can be mentioned; together with other 46 educational centres in Spain, it will participate in a Climate Change adaptation project organized by the Ministry for the Ecological Transition and Demographic Challenge. As a complementary aspect to what has been described, it should be added that in recent decades, progress has been made in the ideation of school complexes that play a role as testimonies of functional exemplarity and educational-spatial innovation (Nair, and Fielding, 2005), (Lippman, 2010), (Hudson, and White, 2019).

Criteria for “Educational Schools” Design Related to Climate Change

Construction strategies: Climate Change and sustainable solutions

The contents that will be expressed in this section are linked to certain aspects of sustainability. This affects technical solutions that adequately respond to the universal challenge of Climate Change, as well as the SDGs. The constructive regulations on disaster risk reduction that already exist must be accomplished. But they must be coordinated with other strategies, the benefits of which translate into inducing psychological well-being. Among those, the adequate air ventilation to ensure homoeostatic balance, acoustic comfort and natural illumination. Regarding constructive consistency and durability, some architectural typologies are recommendable, such as orthogonal plants, symmetrical patterns, and morphological order, as well as the use of simple volumetric prisms covered by gable roofs with a moderate slope and without projecting eaves. One of the most useful construction strategies regarding certain consequences of Climate Change is that in school ensembles adequate distances are available between the various architectural pieces that compose it. With this, its resistance is optimized in case of natural hazards such as earthquakes or strong winds, while these separations help the evacuation of water in case of floods (GADRRRES, 2015) (INEE-GFDRR, 2009).

Participation: Climate Change and Social Engagement

An important aspect called to collaborate in the formation of students in the field of Climate Change and the various dimensions of sustainability will be participation. Involving family and social contexts, this operating principle has been growing in recognition and usefulness in recent times (Chrispeels, 1996), (Magoni, 2020). Indeed, there is a growing tendency to involve the community in the planning work of educational institutions, which results in the reinforcement of their security, as well as the increase of the sense of identity. This community-based planning process ends at the construction

stage, through a consensual action (UNISDR-GADRRRES, 2017). As a result of this participatory trend, the school increases its sustainable dimension, as it activates synergies with the context. In this sense, the physical proximity between the school and the urban centre is an advantage to value. There are notable examples of building structures that have strived to reinforce this collective sense of education; among others, the case of Lupani Primary School (Livingstone, Zambia) is noteworthy. It is also worth mentioning international examples where social engagement has prevailed as support for the formative facet in the field of Climate Change; such is the case of the Shree Niketan Patasala School (Tambaram, India) where a Design for Environmental Change initiative was launched. Among many other dynamics of participation, we can mention the campaign developed in Boston "Schools of Thought on Climate Change: Stories from Land and Sea", in which disciplines such as Public Art were integrated to show creative visions on Climate Change.

Human scale: spatial sensitive experience and Climate Change

As a basic family environment, the home hosts attitudes full of affection, formation in values and welcoming, in its various meanings. One of them has to do with architecture. Homes are usually conceived as environments of human scale, called to build places in which vivid experiences crystallize and promote sustainable living (Åhlberg., Äänismaa, and Dillon, 2005). If it is possible to extrapolate part of this domestic and intimate atmosphere to schools, friendly environments will be created, where students will be more receptive to all kinds of training processes, such as those related to Climate Change. It should be added that these atmospheres are linked to certain dimensions of sustainability, such as social, educational, cultural, and health and well-being. In addition, they will configure environments that will help learning (Cheryan, *et al*., 2014). From a generic perspective, architectural design can contribute to the physical and mental well-being of every user (Schweitzer, Gilpin, and Frampton, 2004).

One of the procedures to encourage schools to educate on a way of living more sensitive to the planet and, therefore, more aware of the issue of Climate Change, is walking. Schools should opt for dimensions of human scale, encouraging the leisurely experience, to enjoy the environment. Walking is also an extraordinary procedure of learning: as opposed to frenetic daily stress, it implies enjoying moments and places. Pedestrianism is a key experiential strategy for crystallising the human scale of the school. This philosophy of life experience "in slow motion" is shared by other types of current initiatives in terms of enjoyment of urbanism and heritage, such as the "*Cittá Slow*" movement, of international scope and presence in countries such as Spain (Servon, and Pink, 2015). One of the components that hold great potential for the consolidation of school communities more sensitive to the environment is the presence of Nature. To this must be added Art, in its various manifestations, since it refers to a cultural dimension of sustainability (Moraza, and Cuesta, 2010).

In conclusion, it can be stated that, in addition to a close personal attitude of teachers, the design of a school must foster interpersonal relationships and human scale. This aspect is linked to sustainability and Climate Change, as it ensures the construction of domestic "places" (prioritizing the sensitiveness towards the human being) rather than mere "spaces" (referring to strict physical dimensions). Schools that incorporate qualified architecture achieve safety, becoming friendly and human-scaled environments.

Architectural Design Methodologies and Climate Change

Composition

To achieve functional and aesthetic excellence, architectural composition has used throughout history a repertoire of theoretical and practical strategies. As a holistic process, it guarantees integral quality,

including the incorporation of artistic expressions into schools (painting, mural, sculpture). Composition unfolds a dialogue between three factors, which are present in any urban or architectural project: functional programme, style, and the characteristics of the social, cultural, and physical "place". Sensitiveness to the "place" is essential in terms of resilience and sustainability, as a project attitude that contributes to overcoming situations of vulnerability; furthermore, synergies between school premises and their social and geographical context are critical, especially in high-risk locations.

An intelligent architectural composition implies the existence of a spatial order. This is a key factor for the configuration of another parallel order, concerning how human beings are organized for the development of school activities (Arnheim, 1977). And that order, as an aesthetic value, can be transmitted with an "educational" character. Its introduction in schools contributes to reducing the negative impacts of Climate Change, as it incorporates structural systems and construction solutions that are more resistant, and more efficient in terms of energy sustainability (INEE-GFDRR, 2009). A compositional pattern that is proliferating internationally is flexibility, specifically applied to the dissolution of the architectural limits of schools (with special emphasis on classrooms) (Hertzberger, 2009). The "Corona School", designed by Neutra, shows the suggestive consequences of the dissolution of classroom boundaries. By expanding spaces through innovative compositions, new modalities of teaching and learning are encouraged, and this is positive to reinforce the "educational" profile in terms of sustainability and Climate Change.

Poetics of space

Schools can enrich their educational potential if they introduce the artistic component derived from the poetics of space in their architectural dimension. As an artistic discipline, architecture must contribute to well-being and mental health. Schools can generate psychological comfort in students, opening their minds to the poetic evocation of home as an experiential paradigm. As an inexhaustible source of inspiration, poetry fosters architectural creativity, as it translates feelings into shapes. Using this energy of ideation, schools can incorporate elements of the phenomenological universe: gardens, courtyards, stairs, thresholds, nests, fireplaces, niches or corners (Bachelard, 1957). Besides, some other spatial elements connected to the poetics of space have been added as "learning metaphors", such as caves, campfires, or watering holes (Thornburg, 2013). All of them play a role as constructed metaphors of the intimate atmosphere of homes; in that sense, schools work as coherent portions of society.

Geographically, these metaphors support architectural design for schools, focusing on the dualities of "floor-earth" or "ceiling-sky". The building floor becomes somehow a "rationalisation" of the terrain, establishing a rootedness in the "mother earth". The ceiling represents the sky, artificially replacing the vast celestial vault; concave sections evoke feelings of welcoming and embracement. This architectural simile can be extrapolated to the plane of safety. In case of natural hazards, schools serve as emergency shelters, where people can remain until their houses can be rebuilt after the damage. In architecture, protection has psychological connotations. Students enjoy more in a safe and relaxed "place", generating feelings of security and mental well-being, such as visual mastery and the feeling of "spatial embracement".

Final reflections: "Educational Schools" and Climate Change

Designing schools with adequate criteria, so that they respond effectively to Climate Change is an issue that can continue to be investigated at various levels (Roggema, 2010), (Engle, 2011). Undoubtedly, any school project that aspires to be exemplary in the work of promoting and formation in the field of Climate Change, must be designed with due intentionality and commitment to integral quality. The contribution of architecture, assumed under an "educational" profile, increases its positive

impact if planned through interdisciplinary action involving different professionals: administrators, architects, urban planners, sociologists, professors, families and experts in sustainability and Climate Change. Part of this commitment to quality involves considering the specific circumstances of the place where it is located. Acting with sensitivity to local circumstances helps considerably in terms of vulnerability (Masten, 2001). First, the geographical location, choosing a safe enclave for a school; secondly, adaptation to the social environment adds an "educational" role to architecture; thirdly, if spatial design is linked to constructive traditions (rejecting solutions alien to the local culture), the feeling of identity in the community is reinforced. Concerning materials, it is advisable to use nearby resources, for their economic advantages and for serving as a tool for conceptual affirmation of the project in the face of the Climate Change challenge.

Incorporating this "educational" facet into school architecture brings direct benefits of a holistic nature. Schools that, in addition to responding adequately to this transcendental social challenge and achieving safety, acquire a certain homely character, as an extension of the family environment, increase student motivation towards learning, foster social engagements with the community through participation, and support them in their emotional growth.

As a final reflection, it should be emphasized that spatial quality in a school can be achieved through a holistic philosophy, full of innovation, that understands it as an architectural metaphor for the home. Assuming the power of families and homes to transform societies in the face of Climate Emergency, schools can carry out a formative work of great importance, in a double sense: as a place to provide training that sensitizes students to such an important subject, and also providing exemplary architectural solutions that, by themselves, transmit values associated with this universal theme. In this singular facet but of great potential in the sphere of Architecture is where the notion of “Educational Schools is based.

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10. Remote economy and home-based work: digital homes changing economic and Work/Life Balance

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Abstract

The primary objective of this study is to explore the relationship between family, teleworking, and climate change. Specifically, the research seeks to determine how teleworking can contribute to reducing the negative impact of climate change while improving work-family balance. This study provides a systematic review of the current state of knowledge about the impacts of teleworking on work-life balance, family households and climate change. We have used both academic sources (Web of Science) and grey literature. The majority of the studies indicate that teleworking has a positive impact on work-life balance, emissions reduction, and home dynamics. However, not all authors agree, so more research is needed; especially, in normal conditions as many of the studies have been carried out in the pandemic situation.

Introduction

Throughout history, both our homes and the planet we share have encountered numerous threats. In the present day, one of the most significant challenges arises from polluting industries, which adversely affect the environment. These industries contribute to the release of harmful gasses, leading to air and water pollution. Moreover, they contribute to deforestation, deplete natural resources, and pose various other threats that impact the functioning of households.

In light of these challenges, it becomes crucial to emphasize the importance of adaptability in confronting them, embracing sustainable lifestyles, making conscious choices about resource consumption, and supporting initiatives that promote environmental conservation. New technologies play a crucial role in adapting to challenges and bringing about significant changes on a large scale. However, the impact of these technologies depends on how they are utilized. Similar to any tool, their effectiveness relies on the knowledge of their users. Therefore, it is important to promote research in this field to gain a deeper understanding of these technologies and learn how to maximize their benefits and minimize any potential drawbacks, ensuring that they are used in the most efficient and impactful manner.

In recent years, teleworking has emerged as a tool to combat climate change. As this tool is primarily implemented in households, it is important to understand its impact on families to help them implement it in a way that does not affect them negatively. Therefore, this study aims to evaluate if teleworking is a potential tool in the fight against climate change and how it impacts homes. If teleworking is to become a prevalent practice in families, it should serve as a means to raise environmental awareness within households, ensuring it doesn't disrupt the delicate balance between family and work life.

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Work-life balance

According to the International Labour Organization (2014), the concept of work-life balance can be defined as the state of achieving harmony between one's work responsibilities and family commitments. Expanding upon this definition, it is important to also consider the personal responsibilities of individuals. Karatepe & Aleshinloye (2009) further contribute to this understanding by emphasizing that work-life balance encompasses the ability of individuals to effectively and harmoniously manage and integrate their work, family, and personal obligations.

Teleworking

According to the European Foundation for the Improvement of Living and Working Conditions (2020), the concept of telework can be defined as the form of organizing and/or performing work, using information technology, in the context of an employment contract/relationship, where work that could be performed at the employer's premises is carried out away from those premises regularly.Teleworking seems to be increasing with time, after the pandemic COVID-19, this type of work is growing in a variety of industries, for example, according to Bureau of Labor Statistics data analyzed by Matthews and Williams (2005), up to 45% of all jobs in the United States are compatible with at least part-time telework. Increasing rates and high potential levels of telework adoption portend major changes to household and firm-level bargaining and workplace location decisions, thus warranting attention from researchers and policymakers on how best to harness the potential efficiency gains of a mobile workforce. The objective of the research is to explore the relationship between family, teleworking, and climate change. To achieve this objective, we propose two research questions:

- Has teleworking had a positive impact on work-family life balance?
- Can teleworking contribute to reducing climate change?

Research methodology

This study provides a systematic review of the current state of knowledge about the impacts of teleworking on work-life balance, family households and climate change. The literature search encompassed academic sources and other forms of grey literature (mainly studies and reports from organizations and large consultancies). The academic search utilized the Web of Science (WoS) database. The search was carried out in May 2023. We made the following searches in the WoS:

- (telework* or telecommuting or outworking or homeworking) and (home balance or family or life-work balance). Initially, 703 articles were retrieved.
- (telework* or telecommuting or outworking or homeworking) and (home balance or family) and (climate change or global warming or heating) Only 4 results were obtained, but none of them covered all three topics simultaneously.
- (telework* or emissions or climate change or pollution or contamination). 137 results were discovered.

To relate the three aspects, we decided to take, as a starting point, the first search. Then, as inclusion criteria, we consider studies on teleworking and climate change from the grey literature and the WoS, especially if they provide quantitative information on emission reductions and energy savings. Therefore, we started with 703 papers and after a screening based on titles and abstracts, we reduced the number to 237 relevant papers. After reading the complete text, the number was down to 49 as relevant to the objective of our research. Then 18 studies related to teleworking and climate change were included. It can be seen that the pandemic significantly accelerated the number of studies. Many organizations had to quickly implement remote work policies to ensure business continuity. This unprecedented context generated even greater interest in studying the effects of telecommuting in terms of impacts on climate change, employee well-being, and households.

Discussion

Teleworking as a tool against climate change

In recent years, teleworking has gained significant traction on a global scale, drawing considerable attention and discussions. It has emerged as an intriguing subject due to its dual perception as both a

potential threat and a promising opportunity to bring about positive changes in our homes and our planet.

Following the outbreak of the COVID-19 pandemic, many people embraced remote work as a regular form of employment due to the shutdown of physical office spaces. Several real-time surveys were conducted to determine the number of individuals who started working from home immediately after the implementation of lockdown measures. According to a survey called *Living, Working, and COVID-19* (2020) conducted by Eurofound, approximately 39% of employees in the European Union member states were working from home in April 2020, and this figure increased to 48% in July 2020. Similarly, a cross-national real-time survey conducted in China, Japan, South Korea, the United States, and the United Kingdom found that around 40% of employees began teleworking when the pandemic started (Belot et al., 2020).

Negative and positive impacts of teleworking on households

Numerous studies affirm that telecommuting provides (or improves) a balance between work and family (Wapshott & Mallett, 2012; Gajendran & Harrison, 2007; Hornung & Glaser, 2009). One of the reasons for this is the flexibility it offers (Dockery & Bawa, 2018; Hill et al., 2003; Golden et al., 2006). Flexibility allows individuals to effectively manage their work and family responsibilities by integrating and overlapping them in terms of both time and space (Hill et al., 2003b).

Studies, such as one made by Chung and Van Der Horst (2018) have found that telecommuting options can contribute to women's employment retention and career advancement opportunities post-childbirth. By allowing women to have more control over their work schedules and reducing the need for physical presence in the office, telecommuting enables them to better balance their professional and caregiving responsibilities. This can lead to increased workforce participation and career continuity for women, providing them with valuable options for maintaining their employment while fulfilling their parental duties (Lyttelton et al., 2021).

Another reason why telecommuting affects the balance between family and work is the potential to achieve a more equitable division of household responsibilities for couples with children (Dockery & Bawa, 2018b; Giovanis, 2015). Several studies have identified this impact, and during the pandemic, multiple studies have also confirmed it (Carlson & Petts, 2022). Telecommuting allows parents to have greater flexibility in managing their work and family responsibilities, creating opportunities for shared caregiving and household tasks. With both partners having the ability to work from home, they can collaborate more effectively in managing their household duties, leading to a more balanced distribution of responsibilities. This can contribute to reducing the burden on one partner and fostering a more equal and supportive partnership within the family unit.

Not only does telecommuting help with the division of tasks, but studies also affirm that an advantage of implementing a hybrid work arrangement is that employees have the opportunity to spend more time with their family (Peprah, 2023), especially with their children (da Costa Lemos et al., 2018). The complexity of the study arises from the fact that not only there are studies that affirm these positive aspects, but there are also studies (although fewer) (Sarbu, 2018; Stankevičiūtė & Kunskaja, 2021b; Palumbo, 2020) that claim that working from home generates conflict between family and work due to the blurred boundaries between these two realms (Eddleston & Mulki, 2015; Varotsis, 2022). While this is indeed a reality, many studies that draw these conclusions were conducted during the COVID-19 pandemic when parents with children were forced to work in an environment where their children had to stay at home (Aleem et al., 2023; Redaelli et al., 2022). It is important to note that the context within each household has a different impact, and this can make telecommuting effective (Pantoja et al., 2020; Blahopoulou et al., 2022). Factors such as the availability of workspace, support systems, and the age of the children can significantly influence the work-family balance and the overall

success of remote work arrangements. Therefore, it is crucial to consider the specific circumstances and individual experiences when analyzing the effects of telecommuting on the balance between family and work.

Negative and positive impacts of teleworking at work

Numerous studies worldwide support that teleworking can increase workers' productivity. Research consistently shows that remote workers can achieve comparable or higher productivity levels than those in traditional office settings (Vayre et al., 2022; Beckel & Fisher, 2022). This is attributed to reduced distractions, greater autonomy, and improved time management. Additionally, teleworking fosters positive relationships among employees through virtual collaboration tools (Kohont & Ignjatović, 2022; Alshibly & Alzubi, 2022).

However, other studies suggest that teleworking can lead to stress and difficulties in work-life balance (Tejero et al., 2021). Implementation plays a crucial role in teleworking success. Supervised teleworking with clear policies and training tends to yield better results (Vrchota et al., 2020; Lautsch et al., 2009). Jobs requiring physical interaction may face challenges in remote environments (Sostero et al., 2020). Overall, individual circumstances and job nature influence teleworking experiences (Ikenouchi et al., 2023; Šmite et al., 2023).

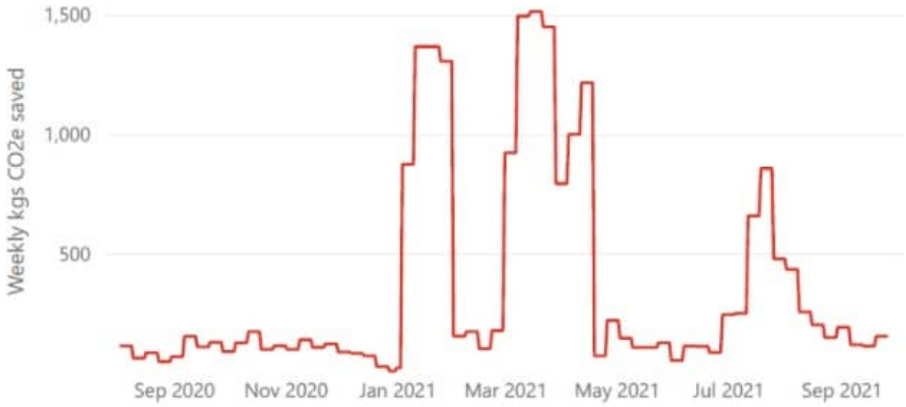
Negative and positive impacts of teleworking on emissions

Numerous studies conducted in countries around the world (UK, Spain, etc.) have shown that teleworking can reduce emissions (Yao Shi, et al, 2023; Alonso A. et al. 2917). Teleworking, which can be implemented immediately and at a fraction of the cost with both immediate and long-term benefits for society, can be an effective strategy to reduce traffic and improve air quality. The amount of distance travelled for business can also be decreased by using teleconferencing and video conferencing more regularly. The reduction of traffic and air pollution may also be advantageous for the environment and general health. Additionally, improved health status reduces hospital admissions and related inpatient and outpatient costs, which is another benefit of higher air quality (Giovanis, E., 2018).

Reduction of emissions

Numerous studies have identified a positive impact of teleworking, specifically in terms of reducing emissions resulting from a decrease in commuting to office spaces (Fu et al., 2012). However, there are conflicting opinions regarding this matter. For example, some studies argue that household emissions may increase due to teleworking. Nevertheless, recent research suggests that this claim is not entirely accurate since commuting is often replaced by non-polluting activities (Bieser et al., 2022). The debate surrounding this topic is extensive, and the studies do not seem to provide a clear and unbiased perspective.

Teleworking has been recognized for its potential environmental benefits by some consulting companies, but their analysis and studies on the subject have often been limited (Deloitte, 2021), (Pinner, D., Rogers, M., & Samandari, H., 2020). However, PwC stands out for taking a more comprehensive approach to exploring the environmental impact of teleworking. According to PwC, flexible work positively impacts the environment, and they have updated their internal policy to incorporate a hybrid working model, which supports their goal of achieving net-zero greenhouse gas emissions by 2030. They claim to have saved almost 20 tons of CO2e emissions from August 2020 through reduced commuting, equivalent to the absorption capacity of 600 trees.



Weekly Co2 saved from teleworking by PwC staff. Source: PricewaterhouseCoopers. (2021).

In a study conducted by Hook, Court, Sovacool, and Sorrell in 2020, it was found that the transport industry was responsible for a significant portion of national greenhouse gas emissions (25.2%), with road transportation being the major contributor (92.6%). The study emphasizes the importance of considering both commuting and non-work travel to accurately assess the energy savings achieved through telecommuting. Additionally, it highlights the need to measure distance travelled and differentiate between person distance and vehicle distance to understand energy savings accurately.

The study reveals that teleworking's impact on energy consumption and carbon emissions reduction varies depending on the extent of teleworking adoption, with potential reductions ranging from 0.01% to 14% for energy consumption and from 0.1% to 80% for carbon emissions.

Reduction of office energy

While some sources suggest that increased remote working could lead to higher energy consumption at home, numerous studies provide evidence supporting overall energy savings resulting from teleworking. These savings are achieved through reductions in per capita office space, often facilitated by practices like hot-desking, and the potential elimination of the need to heat or cool offices to the same extent and duration as before.

For instance, Williams (2003) conducted research that estimates a reduction of national energy consumption by 1.0% in Japan through adopting a four-day-per-week teleworking schedule for the specialist/technical workforce, which comprises approximately 14% of the total workforce. The study attributes these savings to the elimination of office heating and cooling on non-working days. Similarly, another study by Matthews and Williams (2005) finds that the potential energy savings from reducing office space are comparable to those achieved by reducing commuting distances. However, the magnitude of these gains may vary based on factors such as the level of office space per worker in different countries and regions.

The extent of energy-saving gains also depends on how companies respond to an increase in teleworkers. If firms proportionally downsize or close their offices in response to teleworking, significant energy reductions may be achieved. Shimoda et al. (2007) estimate that full-time teleworking by 60% of workers in Osaka City, Japan, would lead to a 0.6% reduction in total energy consumption for residential and non-residential buildings. Conversely, if teleworkers only work part-time, the potential gains in reduced office energy consumption may not be fully realized, as companies may maintain the same office size for non-teleworking days.

Despite the potential energy savings, it's worth noting that very high levels of teleworking may only result in modest reductions in aggregate energy consumption. Matthews and Williams (2005) estimate that if all US 'information workers' teleworked four days a week, the overall energy consumption in the US would only decrease by approximately 2%. This limitation is attributed to teleworking's suitability for less than half of the US workforce.

Even though most researchers have shown that telecommuting does assist cut emissions and save energy, other studies have come to different conclusions. *A systematic review of the energy and climate impacts of teleworking*, (Hook, 2020) is one study that reflects on the drawbacks of teleworking and other issues that other articles on the topic frequently overlook. They also state that whether teleworking-related economic and behavioural changes lead to an overall decrease in energy consumption depends on the sign and magnitude of these various categories of impact, whose relative importance is likely to change over time and vary depending on context (De Graff 2004, Horner et al 2016). Since physical transportation consumes far more energy than ICT (Information and Communications Technology) services, most studies of teleworking completely ignore the direct effects and instead focus on the indirect effects, particularly those from reduced commute (Horner et al. 2016).

Lastly, the usage of energy in the home and workplace could also work against the benefits of teleworking (Perez et al. 2004). For instance, teleworking could lead to higher energy use at home (such as for heating, cooking, and lighting) without any corresponding decrease in energy use at work (such as keeping workplace heating and lights at the same level). There may be an "additive" effect of teleworking if companies do not close their offices in response to increased teleworking or move to smaller buildings with a reduced energy footprint. More teleworkers could have a negative overall influence on energy usage, possibly increasing it across the board (Kitou and Horvath 2008).

Conclusions

In conclusion, teleworking represents a sustainable solution that positively impacts work-life balance, emissions reduction, and family dynamics. Embracing telecommuting as a viable work model can lead to happier and more fulfilled employees, more flexibility and autonomy for workers, a greener environment, and strengthened family bonds. As we navigate the complexities of the modern world, teleworking stands as a promising tool in achieving a more sustainable and balanced future for individuals and the planet.Another compelling aspect of teleworking is its potential contribution to emissions reduction. The review of various global studies consistently indicates that teleworking can significantly decrease emissions, primarily by reducing the need for daily commutes. This reduction in traffic not only improves air quality but also aligns with broader climate change mitigation goals. By embracing telecommuting options, individuals and organizations can play a proactive role in fostering a more environmentally sustainable work culture.

Beyond its impact on work and the environment, teleworking has demonstrated its potential to bring families closer together. With the flexibility to work from home, employees can spend more quality time with their families, particularly with their children. Telecommuting encourages shared caregiving and household responsibilities, fostering stronger family bonds and promoting a supportive partnership within households. As a result, teleworking has the potential to create a more harmonious and fulfilling family life. New generations value autonomy and flexibility as important values. They consider that it enables them to have other vital projects, such as a family project among others. Teleworking can be a help in this respect. However, more research is necessary.

The findings present a compelling case for the benefits of teleworking, in both home welfare and climate change mitigation. However, some authors disagree. It is essential to acknowledge the need for further research. Concerning homes, the hybrid form can be a solution to solve some of the negative points of teleworking, however, it is necessary to go deeper. Structural factors such as the quality of

roads and the size and type of city have a great influence. The impact on a more compact European city type is different than in more spread-out cities such as the American ones, for example.

Studies conducted during the COVID-19 pandemic may provide valuable insights into short-term impacts, but a more nuanced understanding of teleworking's long-term effects requires continued investigation. Addressing factors such as productivity, well-being, and energy consumption will help policymakers and organizations develop evidence-based strategies to optimize the benefits of telecommuting.

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11. Towards a sustainable and home-based economy: The changing landscape of work-life balance and the societal and environmental impact of working from home as a business model

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Abstract

The ongoing Covid-19 pandemic has brought about significant shifts in the way economic operations are conducted. One prominent change has been the widespread adoption of remote work, where individuals perform their salaried tasks from the comfort of their own homes or alternative locations. However, the impact of these changes extends beyond remote work alone, as new business models have emerged in response to the evolving circumstances. The research, it will analyse the recent changes in economic operations, giving particular attention to the transformations in remote work and the resulting business model adaptations. Furthermore, we will explore the broader societal impacts stemming from these changes, including reduced commuting, the growing energy consumption and the home/family role in the energy transition, the equilibrium between work and personal life, and the consequences for economic activity and wealth distribution. Finally, we will delve into the crucial digital infrastructure necessary for the expansion of remote work, while considering potential incentives that can be legally or economically provided by appropriate policies if a positive correlation with climate change mitigation is demonstrated. By delving into these areas, we aim to shed light on the evolving economic landscape and its ramifications on society.

Introduction

Digitalization, Climate Change and Demographics are among main concerns of the Economy. The families/household play a key role, it is not only designing human-centric operations, but reaching the utmost trade-off for equilibrium via a home-centric economy. Recently occurred changes in the way businesses conduct economic operations (due to Covid) are analysed, encompassing both remote salaried work (where the only change is the location from which it is performed) and other business models that have emerged precisely because of these changes.

Concepts interconnected are reviewed to underline the role of home and families in the climate change combat. The phenomenon of globalization was not prepared for risks such as a global pandemic, which leads to a disruption in the supply chain and triggers local production for essential supplies. On the other hand, the pandemic accelerates remote work, especially in the service sector, speeding up digitization and benefiting from the deployment of communications. This unique situation has allowed us to study not only the acceptance of remote work by individuals and their companies but also its impact on commuting and the environment. Circular and sharing economy becomes also relevant and the role of home and families as key player is relevant, especially when relocating from urban areas.

Arguments and findings

Homes and families have a multifaceted role in combating climate change through various interconnected aspects:

***Energy Transition*:** Families and households emerge as pivotal players in the ongoing energy transition. They are both consumers and potential generators of clean energy. Investment in this transition comes from global corporations, governments, and private households. Policies promoting renewable energy adoption and equitable distribution, along with subsidies for low-income households, can accelerate the shift. Citizen participation in renewable energy systems and energy communities is crucial, necessitating supportive policies and regulations.

Work-Life Balance and Remote Work: The concept of remote work, exemplified by telework, has gained prominence, with the COVID-19 pandemic acting as a catalyst. This trend reduces commuting, thus lowering carbon emissions. However, it also raises questions about work-life balance and the adaptability of homes for both work and well-being. The integration of work and personal life calls for flexible home designs, affecting remote work and family welfare. Such adaptations could lead to families moving to rural areas, which, if supported by appropriate policies, could have positive environmental impacts.

Demographic Shifts and Sustainable Development: The shift from urban to less populated areas present opportunities for investment and societal changes. Families and homes are essential components of this transition. As populations migrate to rural areas driven by factors such as digital transformation and ageing demographics, adaptable homes become critical. Smart homes and collaborative spaces, regardless of urban or rural settings, are key for sustainable development. Homes and families as key parts of society, along with universities, and government form the Triple Helix model that drives innovation, education, and adaptation to future needs.

***Digital Infrastructure and Climate Impact*:** The need for high-quality digital infrastructure is a need as remote work and its positive climate impact incentives are discussed. Also, balancing access to modern services and fast internet between rural and urban areas. This balance not only addresses climate change but also tackles issues of inequality.

Homes and families play a crucial role in combatting climate change through their involvement in the energy transition, remote work practices, demographic shifts, and the development of sustainable, adaptable living spaces. Collaborative efforts involving families, governments, corporations, and institutions are vital for shaping a more climate-resilient future.

Decreased commuting

The use of transportation for commuting has decreased because of these changes. Highlighting the reduction in travel and commuting as more people work remotely, leading to a decrease in the use of transportation for commuting purposes. In 2020, due to the pandemic, the acceptance of remote work has shifted. However, this adaptation could have expedited an essential trend. The preference for 100% WFH[50] (Work from Home) had an acceptance rate of around 14% before the pandemic, which increased to 45% after the second wave. Projections show that approximately 29% in the future. On the other hand, having no WFH (Working from home) days acceptance was at 71%, and it will eventually decrease to 38% in the future (Chen , et al., 2023). WFH has more acceptance in future and is a trend in certain sectors, but not for everyone "Working from home is more possible for those in urban areas and households with higher incomes, likely because of the nature of employment among these groups of individuals. Perhaps understanding potential barriers that can be overcome is more urgent for those outside these groups" (Beck, Hensher, & Wei, 2020).

Concerning the reduction of commuting time, additional studies evaluated skills mismatch based on salary and education disparities. These studies revealed that achieving a balance between job availability and housing primarily reduces commuting times for high-skilled individuals. Furthermore,

[50] *Hereinafter WFH stands for Working from Home*

the analysis showed that skills alignment had a more significant impact on home-to-work commutes than the reverse. Therefore, prioritizing skills matching between workplaces and residential areas is crucial, especially in self-contained urban centres (Xiao, Wei, & Chen, 2023). Therefore, it is necessary to implement different policy measures.

Approximately 325 million individuals, which accounts for about three-quarters of the EU[51] population, are inhabitants of urban areas including cities, towns, and suburbs. Of this urban population, approximately 40% are concentrated within cities exclusively[52]. As Europe's urban population is expected to rise slightly over 80% by 2050, it is imperative to establish sustainable cities, towns, and suburbs to enhance the well-being and quality of life of its residents. Besides, the World Health Organization recommends that all people reside within 300m of green space[53]. There is a concern in European cities about having green areas within reach, in such a way that they provide well-being and improve the environmental impact. Green urban areas possess significant potential to enhance human health and overall well-being. They assume a vital role, particularly benefiting children, the elderly, and individuals with lower incomes who might otherwise encounter constraints in accessing natural environments. It is imperative to ensure that these green spaces are universally accessible, offering safety, inclusivity, and openness, thereby emphasizing their indispensable role. In the EU, 66.7 % of the urban centre population had access to green urban areas within four hundred metres walk in 2018. This share has remained stable since 2012. (Sustainable Development Goals 11)

The debate arising here is about the measures in urban areas versus the policy measures to let the population dwell in nonurban areas with the necessary and sustainable basic services. Moreover, there is not the same concern about having worked at the same distance, or at least at a reasonable distance. Urban areas are evolving into smart cities (SC)[54], and efforts have focused on innovation and technology to transform cities into resource-efficient, liveable, and inclusive places. "*Many children and young people perceive crises with the same urgency as smart city programmes and are equally interested in technological innovation, environmental protection, and social inclusion*" (Ghafoor-Zadeh, 2023). This cultural aspect is positive and shows how families are concerned about it. Smart cities should also cover the needs of aged people living alone, especially in countries where life expectancy is high and fertility rates are low, by ensuring that their homes are adapted to their need .

Impact on energy consumption

We briefly review the household economy concept and data, as it plays a key role in the energy transition. The household economy concerns the combined economic actions conducted by households. Often governmental departments refer to the household economy as the household sector as distinct from the business, government, and foreign sectors. The total economic value added by households in household production has been aptly named Gross Household Product (GHP) (Ironmonger, 2001) Government gathers household Finances Survey's (HFS's) helping analysts and policymakers to understand how different sections of society are managing. The survey's data are used to monitor and inform policies aimed at combating poverty and social exclusion. The data enables a more comprehensive understanding of our economy and an effective formulation of public policies[55].

The energy consumption trend, the need for green energy and the disrupting technologies that enable this evolution to set the families/home as a key player in the energy transition. The World Investment Report 2023 mentions that three primary actors drive investment activity in the energy transition:

[51] *EU: European Union*
[52] *SDG 11 - Sustainable cities and communities - Statistics Explained (europa.eu)*
[53] *who-benefits-from-nature-in.pdf (europa.eu)*
[54] *SC Smart Cities*
[55] *Survey of Household Finances - Surveys of households and individuals - Statistics by topic - Statistics - Banco de España (bde.es)*

global MNE´s, governments, private households and domestic companies (UNCTAD, 2023). Estimates by the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) put the total global capital expenditures associated with the Paris climate goals at more than $125 trillion, and annual investment needs until 2030 at $5.7 trillion. Renewable power generation capacity has shown significant progress over the past decade, reaching 3,372 GW in 2022; however, it will need to triple to 10,772 GW by 2030 to keep the world on track to achieve the energy transition in line with IRENA's 1.5°C scenario (IRENA, 2022).

Households play a pivotal role in the energy transition as they are both consumers and potential generators of clean energy. Though policies should encompass energy transition not to exacerbate the differences, subsidies can help make energy more affordable for low-income households. Removing them could lead to an increase in energy poverty. According to DENA German Energy Agency, the active participation of citizens is vital for a sustainable energy transition. This could be in the form of households adopting renewable energy Systems or participation in local energy communities, for example. Communities in their various constellations will progress towards a decentralized energy transition in the future. Digital technologies can help economically enable energy trading among peers, collective self-consumption, and other decentralized business models (DENA, 2022).

In addition to climate protection citizen participation in the energy transition might also have a positive effect on the economy, the analysis in Germany (Vögele, Broska, Ross, & Rübbelke, 2023) demonstrates that "presuming" (producing and consuming) and energy communities might create jobs and could provide value-added, although the extent of these positive effects depends strongly on the spatial distribution of heterogeneous households and the underlying economic structure as well as the predominant housing types and ownership structures of housing in regions.

The economic assessment (Kozlovas, et al., 2023) for using rooftop solar photovoltaic (PV) systems in Lithuanian urban areas to support energy and climate policy formation and its implementation in the country, shows that the cost of energy produced by solar PV systems was estimated at 2.34–5.25 EURct/kWh, which is significantly lower than the prices of market and retail electricity, standing at 23 EURct/kWh and 24 EURct/kWh (with support from the government) in 2022, respectively. The effort of the government supporting the cost of utility companies should be shifted to policies that facilitate home/community investment in green energy. The prior analysis shows that retail prices are not adjusted, and energy regulators and policymakers should review existing policies, either regulating or investing in home/family premises. Policies and regulations have a key role to play in de-risking as well as incentivizing investment of families in the clean energy transition.

Impact on the balance between work and personal life

As the line between work and personal life becomes blurred, there is an impact on the equilibrium between these two aspects. The importance of adapting and differentiating the uses of the home to increase the work experience and overall well-being, achieving a healthy balance between the two spheres.

Globalization and technological progress have made telework arrangements such as telework from home (TWFH[56]) well-established in modern economies. TWFH was rapidly and widely implemented to reduce virus spread during the Coronavirus disease (COVID-19) pandemic and will be widespread also post-pandemic. According to (Lunde, Fløvik, Christensen, Johannessen, & Finne, 2022). The consisting evidence on the relationship between TWFH and employee health is scarce. The absence of

[56] *TWFH Telework from home, also mentioned as remote work*

research on significant health indicators underscores a substantial knowledge deficit that is vital to address when strategizing the future integration of TWFH in the workplace.[57]

Remote and hybrid work opportunities are a common business practice to improve talent availability. (WEF, 2023) This trend is evident in certain sectors and among specific age groups. It requires not only proper spaces in the household but also proper work-family life balance. Disruptive technologies, to this end, will facilitate and lead WFH in years to come.

Reaching an appropriate equilibrium between professional responsibilities and daily life is a challenge for all employees, with families being notably impacted. The capacity to effectively harmonize work, family obligations, and personal life is crucial for the overall well-being of every household member. Male employees working extraordinarily long hours, more than 50 hours a week, in paid work across OECD countries is almost 14%, compared with about 6% for women. (OCDE, 2023) The fact of WFH may help the gender differences regarding work at home, but the fact of "always on" may impact negatively on the family. Always on' culture leads to increased risk of depression, anxiety, and burnout. The concept of the "right to disconnect" refers to an employee's right to disconnect from work and avoid participating in work-related electronic communications, including emails and other messages, outside of their work hours. Recent research results, indicate that while there have been some advancements in addressing work-life balance concerns, there has been a significant decrease in family time for workers in 2022 (Eurofound, 2022). Almost 30% of workers reported that their employment is now hindering them from spending time with their families, a notable increase from the much lower 19% reported in 2020[58].

Despite the trend of WFH, work-life balance is not improving. Future analysis of work should include family wellbeing as a key driver to staff wellbeing for every type of family and household. WFH may eventually facilitate the movement of families out of urban areas, but there should be combined policies that support business WFH policies and economic measures to businesses and families that facilitate the decision of the families to move to rural areas.

Impact on economic activity, wealth, and demographic redistribution

Focusing on how not populated areas become attractive not only to investors but to society. The effects of the changes on economic activity and the redistribution of wealth within society suggest that further analysis is required to fully understand these impacts.

From urban to rural areas: Demographic trends are accelerating digital transformation due to a lack of human capital and the need to adapt homes for the ageing population. With a shrinking population and the demand for a workforce, there is a pressing need to embrace digital transformation wherever possible and make homes suitable for the care of the growing elderly population. In the coming years, the ageing population will represent a significant percentage, requiring a larger active population to sustain the economic system. To address this population shortfall, process automation is being implemented when feasible, directly impacting our daily lives. The analysis will gather the necessary home adaptation to prepare for future needs, especially the digital infrastructure needed to cover these basic needs. The concept of "Universal service" will be reviewed in the next section, encompassing the status quo coming in the next decades.

Recently released U.S. Census Bureau population estimates emphasise that it was domestic out-migration that exerted an outsized demographic impact on large metropolitan areas during the prime 12 months of the COVID-19 pandemic. These estimations— period July 1, 2020, to July 1, 2021— reveal a huge decline in the combined size of the nation's fifty-six major metropolitan areas (those

[57] *The relationship between telework from home and employee health: a systematic review - PubMed (nih.gov)*

with populations exceeding one million). At the same time, smaller metro areas, as a group, experienced higher population growth than in each of the previous two years, while non-metropolitan America showed the greatest annual population gain in more than a decade (Frey, 2022).

The rural areas study (Serrano & Fajardo, 2023) highlights a change in population behaviour in Spain as a whole, especially between 2020 and 2022, where there was a loss or stagnation of population in urban areas and a gain in rural areas. However, this study highlights that this process is beginning to show signs of exhaustion and a return to pre-pandemic population trends is in sight, albeit in a more attenuated form. One significant factor causing these variations is the mobility of the younger population, primarily driven by their pursuit of educational and employment prospects. The increased mobility of younger generations can lead to substantial alterations in demographic profiles in specific geographic regions, with certain areas experiencing growth due to an influx of highly educated, younger generations, while others face stagnation or lag (Eurostat, Population statistic at regional level, 2022) .

Aged population: In 2021, the share of the population aged 65 and over is already increasing in every EU member state (Eurostat, 2021) and is well ahead of China, where it stands at around 13 per cent. The countries with the biggest share of the population aged 65 years and over are Italy (22.5 per cent), followed by Finland (22.7 per cent), Greece (22.5 per cent), Portugal (22.4 per cent) and Germany (22 per cent). According to the baseline projection of (EUROPOP2019), the EU's population will fall by 6.0 million persons during the next three decades, equivalent to an overall fall of 1.3 % (or thirteen per 1 000). And According to the latest population projections issued by Eurostat, the EU's population will decrease by 6% between 1 January 2022 and 1 January 2100, equivalent to 27.3 million fewer people.

Seniors living alone: On the other hand, the growing trend is more of seniors living alone. Since the onset of the COVID-19 pandemic, many community-based mental health and social care providers have increased their capacity for technology-enabled outreach and service. Homes should be connected, letting the families or single families a sense of company and care. When transitioning to a care house, the study highlights the importance of "home" for older individuals, emphasizing its role as a place of belonging and support (O'Neill, Ryan, Tracey, & Laird, 2022).

Needs*:* Smart Homes are needed to cover the future needs of families in smart cities and in rural areas, where families/homes care for climate change and empower themselves to lead the transition to a sustainable model. Also, private/public premises gather collaborative sharing spaces with the required sustainable infrastructure, such as knowledge hubs or business footprints in rural areas. New challenges are also emerging as regards working conditions. The growing number of online platforms has created new opportunities for people to earn income, and enter or remain in the labour market, provided WFH have the necessary infrastructure. Allowing the workforce of certain industries to move to rural areas. This expansion to rural areas needs green energy and corresponding policy measures. This represents an innovative approach that following at least the Triple Helix model studied by Etzkowitz, requires collaboration of universities, government, and society, where home and families play a key role in civil society. The support of corresponding policies is essential to drive investments and the corresponding local sustainable development.

In recent years, we have observed a trend where business/scientific and technological centres are concentrated outside the city centres. The proposed model goes further in the atomization of production with a collaborative approach that shifts the focus away from individual business production, instead emphasizing the family/home, its impact on the economy (as a provider and primary customer), and its well-being (health impact).

At least half of the European population lives in large cities, which are being re-designed for future needs. Given the low demographic growth, adapting cities to future operations will require significant

robotization. Digital transformation is imperative, leading to new business models and new production strategies to achieve economies of scale and attain the objectives. But it is not only adapting cities for the future but evolving homes to future needs. A culture of innovation and continuous education is necessary.

Digital Infrastructure

There is a need to evaluate the digital infrastructure required for the expansion of remote work and to expand this model. It could be secured legally or economically via appropriate policies as it has a positive impact on climate change. "The high-quality digital infrastructure is an increasingly significant cornerstone of the whole economy, taking its place alongside electricity, gas, water, and transport networks. Excellent and secure connectivity is a prerequisite to deliver sustainable economic and social benefits based on modern online services and fast internet connections." (Euro-Lex 2023)[59]

The rapid evolution of technologies, the exponential growth in broadband traffic and the increasing demand for advanced very high-capacity connectivity have further accelerated during the COVID-19 pandemic. The share of households having access to 30 Mbps internet speeds has increased in Europe from 58.1% in 2013 to 90% in 2022. Availability of only 30 Mbps is no longer future-proof for ensuring connectivity and widespread availability of very high-capacity networks. Aligned with the technological neutrality principle these elements include those capable of delivering broadband access services at speeds of at least 100 Mbps(EuropeanCommission, 2023)).

Universal service: The objective of universal service (US) is to make basic communication services (including fixed and mobile voice services and sometimes high-speed broadband access) available to all end-users at affordable prices by imposing an obligation on one or more entities to provide such services. A country may also choose to set a policy goal to achieve universal availability of certain basic telecommunications services at affordable prices, and to support this with public money. In this case, there would be no formal obligation on an operator to provide basic services at a subsidised price, but if an operator freely decides to provide the services, it could benefit from public funds reserved for this goal. Most countries that defined a minimum broadband speed set a 10 Mbps download speed (Cullen-International).

Plans in Europe are under review and broadband investments regulation as well, eventually, it will enable the homes to evolve thus enabling new form of work through exponential technologies. As mentioned, the Universal service obligation is a policy that lets citizen across a territory to have basic communication service. These types of policies are essential to prevent inequalities from growing. Access to utilities such as electricity, gas, water, and transportation networks is crucial. Since households contribute to wealth and employment, a better balance between rural and urban areas can help combat climate change.

Lessons and recommendations

The current shift in commuting patterns and work dynamics provides an opportunity to reshape urban planning, promote remote work, and create sustainable living environments. Balancing the needs of different demographics and embracing innovative solutions can contribute to a more equitable, efficient, and environmentally conscious future.

Clear and attractive incentives should be put in place via policies to motivate families to invest in clean energy, further accelerating the energy transition. In summary, the lessons drawn from the role of the household economy and families in the energy transition underscore the need for equitable policies, active citizen participation, and well-designed incentives to facilitate a sustainable shift

[59] *EUR-Lex - 52023PC0094 - EN - EUR-Lex (europa.eu) ; Directive 2014/61/EU (Gigabit Infrastructure Act)*

towards clean energy consumption and generation. Policymakers should work towards fostering a supportive environment that empowers households to actively engage in and benefit from the ongoing energy transition.

The lessons drawn from the impact of remote work on work-life balance and family well-being underscore the need for thoughtful policies and considerations. Balancing technology, workspace design, "right to disconnect" policies, and prioritizing family well-being in future work analyses are all crucial steps. Moreover, addressing the challenges and opportunities related to urban-rural migration due to remote work requires integrated policies and infrastructure development. By doing so, societies can harness the benefits of remote work while ensuring the well-being of homes and families. Throughout the paper, it is highlighted the need to focus on less populated areas, adapt homes for an ageing population, address demographic shifts, enhance care for seniors, implement smart homes, and foster innovation. To achieve sustainable development, it is vital to prioritize collaboration, technology adoption, and education while promoting a comprehensive approach that balances economic growth, well-being, and environmental responsibility.

The study advocates for strategic investments in digital infrastructure, the establishment of incentives to promote climate-friendly remote work practices, and the implementation of policies ensuring universal access to essential communication services. By achieving a harmonious equilibrium between rural and urban areas, societies can contribute to both economic prosperity and environmental sustainability in the face of climate challenges.

The role of home and families is pivotal in leveraging the current shift in commuting and work dynamics to reshape urban planning, promote remote work, and foster sustainable living environments, while also embracing equitable policies, incentives, and active citizen participation to facilitate a transition towards clean energy consumption and generation, ensuring family well-being, addressing urban-rural migration challenges, and achieving holistic sustainable development.

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POLICY RECOMMENDATIONS

POLICY RECOMMEDATIONS

Policy context and recommendations for climate response.

In our recognition of the centrality of the home and family in our collective battle against the devastating impact of Climate Change and its accelerating and destructive speed, The Expert Meeting 2023, "*The Home/family and Climate Change*", met on 28-29th September in Nottingham, UK, recognize the critical need for radical change in the international community, organisations and individual governments' approach towards climate action. The singular effort, top-down policies, and investments have persistently returned limited rewards.

We, the participants, and signatories of this document, strongly support a change in policy perception from an enforcer of change to an enabler and agent that encourages families and households to change their daily routine, consumption patterns and ecological footprint. This could be achieved under the following six strands of action. Under each strand, we highlight the current policy context and challenges, followed by policy recommendations and change.

Panel 1: The Care of the Planet

Policy context

- Relational structures of the home make it the primary and priority setting for learning attitudes and behaviours towards combating climate change, specifically care-giving and receiving.
- The Concept of the planet as "a common home" is derived and lived out in individual homes; hence, it must share everyday values of collective protection and survival.
- Justice is a key virtue in the ethics of care in the broader understanding of needs, responsibilities towards others and the consequences of our own actions. Climate Justice needs to follow similar connotations to rights and duties.
- There is a need to reconsider and reinvent social practices within the home and schools to instil a sense of collective and global responsibility towards our shared planet.

Policy recommendations

- *Public institutions and national governments must prioritise families, homes and households as fundamental units and critical agents in learning, education and shared concerns about climate change. They must inform life-long climate choices as a collective social unit rather than the current focus on individual attitudes.*
- *There is a need for policy innovation and resource opportunity, whether funding schemes or tax reliefs, to gauge the impact/benefit on households to influence changing attitudes directly or indirectly towards more sustainable living.*

Panel 2: Climate Change and Public Health

Policy context

- There is a substantial challenge in communicating national targets, goals and risks to local communities and individual households. There is a problem with language and approach when trying to prepare people for risk.
- Adaptation and changing lifestyles in preparation for risks and scarcity will continue to prove unpopular to individuals and the government at times of economic and social stability.
- The hierarchical structure of climate action does disconnect a family's daily objectives and challenges from those of the governments and their agencies. National targets must be effectively translated into vital and measurable actions to understand local impact. This is a gap at the regional level that connects locality to national goals.

Policy recommendations

- *National governments must prioritise modelling and reinforce positive behaviours by supporting local practical projects and initiatives supported by simple, accessible training and resources.*
- *Governments need to revisit their top-down instructional approach and work within regional/ community "real" boundaries and ecosystems for change rather than the current focus on political messaging and national targets that have limited meaning on the family and community level.*
- *Empower community-level and local responsibility for delivering adaptations and achieving realistic self-sufficiency and carbon neutrality through reinforcing subsidiarity on the level of the home and locality, Enabling the lowest level of decision-making and the highest level of response.*

Panel 3: Consumption & Ecological Footprint

Policy context

- Due to their sheer volume of consumption and impact of basic and common daily behaviour and attitudes, homes are key to implementing incremental and measurable small actions to build climate resilience confidence.
- Whilst governmental policies focus on major strategies like transportation, infrastructure and green technology, small actions like Installing smart meters, altering domestic devices, or becoming energy-aware will inform and impact energy choices with tangible rewards.
- Grand policies about managing the energy market and prices are not flexible enough to support the household transition towards greener choices, nor do they provide equal investments for scaling up community energy plans such as -in the UK- District Heating.

Policy recommendations

- *Governments must seek to develop and inform place-based and context-aware inspirational models of sustainable living through investing in good practice local educational model,*

where communities and workplaces must act as agencies for change, education, and integration with nature.

- *Governments must focus their policies on key investment programmes for behavioural change in domestic attitudes to living with clear and tangible rewards. Major policies, such as transportation, infrastructure, and green technology, must be integrative and complementary to household-based action and support programmes.*

Panel 4: Connected Locality: Net-Zero Homes & Neighbourhoods

Policy context

- There are limited, if any, measures to ensure equity in any energy scheme (to avoid disparity of benefits versus wealth) and work with housing developers to build in climate and "whole life" adaptations as standards rather than extras.
- Older People are growing in representation within modern society. With the emergence of Climate Change as a major external force that impacts older people more than other age groups, the quality-of-life indicators and attitudes must be shifted to link their living and consumption patterns to the impact on the environment.

Policy recommendations

- *Governments need to reposition the climate emergency as a key driver for housing schemes, and the participatory design process needs to be normalised as a standard process for adaptive place-based schemes.*
- *Governments need to force a radical approach towards a holistic approach to housing within a relational model of lived neighbourhoods where natural and social interests are integrated and complementary within a meaningful, connected and sustainable living.*
- *Due to their growing representations, influence and impact, the definitions, and models of ageing well at home for older people have to link the ability of older people to live independently and actively contribute to combating climate change through connected homes, families and locality.*

Panel 5: Building Climate Resilience

Policy context

- Family spaces of living at home are the first learning spaces where an intimate approach to learning, affection, collaborative education, integration and compassion is practised. We need to change our perception of educational spaces from physical spaces to a three-dimensional textbook, learning in context.

Policy recommendations

- *Governments and professional bodies need to revisit their regulatory formworks and design principles to enable the spaces of education and training to become laboratories for ecological living, where professionals and designers live a carbon-neutral ecological and socially active life that helps them enhance their professional attitudes towards architecture and nature.*

- *There is a need for a radical shift from the educational model of 'learning by doing', that is, to become 'learning by living', where integration in natural environments is a key driver for sustainable and future design.*

Panel 6: Remote Economy and Home-based Work

Policy context

- With the growing influence of technology and internet access to knowledge, information, and news updates, we must recognise the critical importance of equal access to basic technology as a source of information and collective safety and security in the face of climate change challenges and impact.
- Access to the internet became a critical source of not only knowledge but also work, income and information at times of crises and emergencies. However, the locality lacks the necessary social and cultural infrastructure to support this reversing living pattern.
- There is a need to be alert to the potential risks and harms involved in empowering total predominance and freedom of online communications and uninterrupted and equal access to the internet, especially for young people's protection.
- The remote economy has repositioned the home and locality as a central hub for livelihoods within the over-reliance on major transportation links or carbon-heavy daily mobility towards city centres. It enables multi-tasking at home and strong family connections. Yet, it also distributed work and family pressures and increased levels of domestic consumption.

Policy recommendations

- *International organisations must recognise access to the internet as a human right as it enables families to be connected with access to essential communications and information. This is key for families at risk of climate impact, emergencies or disasters.*
- *Governments must consider access to online educational and knowledge resources at home for early-age children as critical infrastructure. This will ensure that access to knowledge is a global right regardless of ethnicity, religion or social status.*
- *Policy about home-based work must consider access to associated activities and infrastructure such as education, access to technology and resources to support our combating climate change.*

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ORGANISERS & PARTNERS

Partner organisations

Supporting partners