CLIMATE CAMPAIGNERS

Scope of actions to reduce GHG intensity of daily life in Lighthouse Cities

This project has received funding from the European Union's Horizon research 2020 and innovation programme under grant agreement ID 101003815.

Date of Delivery: 12/2021

Document Information

This report is Deliverable 1.2 of the H2020 project CAMPAIGNers - Citizens Acting on Mitigation Pathways through Active Implementation of a Goal-setting Network, grant agreement ID 101003815.

Disclaimer

Please cite this report as:

Biresselioglu et al. (2021). Scope of actions to reduce GHG intensity of daily life in Lighthouse Cities. Deliverable 1.2 of the CAMPAIGNers project funded under the European Union's Horizon 2020 research and innovation programme GA No: 101003815.

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Citizens Acting on Mitigation Pathways through Active Implementation of a Goalsetting Network

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1. Executive Summary

This deliverable report provides a comprehensive analysis of Greenhouse Gas Emissions (GHG) habits in the Lighthouse Cities through the use of two main tools: (1) State-of-the-art literature review on the perspectives, methods, and concepts relevant to climate lifestyles and behaviour change, and (2) CAMPAIGNers Expert Survey that captures the lifestyle-related environmental opportunities and feasible policy actions debated in the Lighthouse Cities.

The literature review provides an overview of the existing evidence on the climate-friendly lifestyles and behaviour change, classified according to the geographical coverage, discipline and research methodology. In addition, the literature review identifies the frameworks for understanding how lifestyles influence climate action and individual and social factors that affect climate lifestyles along with a list of takeaway points for CAMPAIGNers.

The second main component of the deliverable, the CAMPAIGNers Expert Survey, was conducted among local experts from the Lighthouse Cities who have in-depth knowledge regarding the formulation and implementation of climate mitigation and adaptation policies in their cities. Results of the CAMPAIGNers Expert Survey reveal that the lifestyle-related environmental opportunities and feasible policy actions debated in the Lighthouse cities have gone through an evolution, as the paradigms in these cities change. For instance, the most debated lifestyle choices in the past including waste and recycling, using low-consumption led lighting have transformed into the current debates reflecting the more contemporary perspectives of low and zero carbon themes including e-mobility, renewables and teleworking. There is a focus on public transportation both in the past and current debates. When the next 5-10 years are considered, although the themes related with e-mobility persist, effects of sustainability as a driver become more evident, via the most debated lifestyle choices such as reclaiming and reusing building materials, recycling water, eco-driving, and renovating to low-energy and smart houses.

Concerning policy actions, the past debates are concentrated on more general themes of reducing pollution, improving air quality, reducing waste, and provisions pertaining to awareness and policy update. Although the awareness issue is still in the current debates regarding policy actions, the significance of energy savings, recycling, and stakeholder involvement are highlighted as target policy actions. The future debates on policy actions are centred around the more contemporary low and zero carbon technologies. Moreover, the need for formulating new policies for supporting climate action are emphasized. Finally, the future debates on policy actions also reflect the more visible effects of climate change. That is, increasing preparedness for extreme weather events appears as one of the most-supported policy actions for the next 5-10 years as more cities are affected by such events (including floods, hurricanes, and extreme temperatures) as a result of climate change.

The results of the state-of-the-art literature review and the CAMPAIGNers Expert Survey are evaluated and integrated in order to identify a catalogue of habits of high GHG intensity to be considered within the scope of policy action. The analysis shows that the significant factors affecting lifestyle choices include awareness, sustainable mobility, and energy efficiency. Policies addressing these factors can induce behaviour change and adoption of climate-friendly lifestyles. The results also revealed that the most significant lifestyle change motivators are information and education, encouragement, incentives, modelling, exemplifying, engagement, goal-setting, feedback, restriction, enablement, and persuasion. Finally, the following prominent barriers are identified: difficulty with changing existing habits, unwillingness to give up personal car, cost of required investments for energy efficiency upgrades, time needed to adapt to a change, personal unwillingness to change, high perceived cost of climate beneficial actions, insufficient knowledge to overcome mitigation inaction, perceived cost of carbon-intensive actions, and pessimism about the future. These results contribute to the creation of policy levers that can be utilized to influence daily lifestyles in efforts to meet the Paris Agreement goals of the Lighthouse Cities.

2. Introduction and Overview

Work Package 1 one of the CAMPAIGNers project has two main aims. The first is to assess the relationship between the conditions and characteristics of citizens in the Lighthouse Cities (LCs), including their social, cultural, and gender aspects, with their energy behaviours. In doing so, Work Package 1 also serves the second aim, identification of the barriers to carbon-neutral lifestyles. These two aims enable the definition of the scope of policy action to prepare the ground for lifestyle-related interventions on the local scale.

To this end, Task 1.1 utilizes the existing data on lifestyles and pinpoints the drivers to the citizens' carbon emitting behaviours. Establishing these drivers provides significant insights for identifying potential co-benefits of climate-friendly lifestyles, formulating targeted and impactful policies with higher chances of social acceptance, as well as avoiding adverse effects on vulnerable groups through unintended consequences. The output from Task 1.1 of CAMPAIGNers is reported through Deliverable 1.1, Comprehensive mapping of individual behaviour to anthropogenic GHG emissions.

On the other hand, within the scope of Task 1.2, Deliverable 1.2 of CAMPAIGNers, Scope of actions to reduce GHG intensity of daily life in Lighthouse Cities, aims at providing a comprehensive analysis of Greenhouse Gas Emission (GHG) habits in the Lighthouse Cities. D1.2 also utilizes input from the Lighthouse Cities in terms of policy levers that can be used to influence daily lifestyles to help meet the Paris Agreement goals of the LCs.

This input from the Lighthouse Cities is obtained through the CAMPAIGNers Expert Survey, developed by the scientific partners in Work Package 1, and completed by experts from the Lighthouse Cities. The aim of the CAMPAIGNers Expert Survey is to collect, from the perspectives of the experts, the lifestyle-related environmental opportunities currently debated in the LCs and feasible policy actions

Respondents for the CAMPAIGNers Expert Survey are selected from policymakers, executives and officers in the municipal or mayoral offices, and members of professional chambers, academicians, representatives of utility companies or other private companies. These are drawn from 11 Lighthouse Cities, and are experts and have participated in, or have in-depth knowledge regarding the formulation and implementation of climate mitigation and adaptation policies in their cities. Themes of the CAMPAIGNers Expert Survey include the following: climate change mitigation policies/tools and how the city prioritizes these, past, current and potential local policy actions towards climate change mitigation, lifestyle changes addressed by current climate policies, past, current and potential policy debates concerning individual lifestyle choices, motivators targeting lifestyle changes, individual barriers to lifestyle changes that have adversely impacted policy making for climate action, climate

change adaptation initiatives and how these are prioritized by the city, past, current and potential policy actions towards climate change adaptation, and key barriers for climate change adaptation experienced at the local government level.

The information captured from the experts through the CAMPAIGNers Expert Survey also includes reflections of city Climate Action Plans, or similar initiatives. A significant output of the CAMPAIGNers Expert Survey is the understanding of how Lighthouse Cities have tailored their related policy priorities and approaches concerning lifestyle-related environmental opportunities. This knowledge, based on local mitigation and adaptation policy portfolios, provides pointers to the process of local climate policy making, including strategies in different contexts, preferences regarding adaptation and mitigation frameworks, and the local policy response to lifestyle changes. Moreover, results of the CAMPAIGNers Expert Survey will also serve as inputs for the policy formulation regarding behaviour change towards carbon-neutral lifestyles.

Another significant input exploited in D1.2 is the results of the targeted state-of-the-art literature review, conducted in the context of Work Package 1. The literature review focuses on the perspectives, methods, and concepts relevant to climate lifestyles and behaviour change, and analyses the existing body of relevant work. Evidence from the literature review is utilized to provide an overview of the relevant research including information on the range of contexts and scales of intervention regarding climate-friendly lifestyles and behaviour change, the geographical coverage that the research on climate lifestyles and behaviour change focuses, the disciplines that the relevant literature belongs to, and the range of methodologies utilized. Concerning the content of the literature on climate lifestyles and behaviour change, the frameworks and parameters are identified, including the frameworks for understanding how lifestyles impact climate action, and key parameters, dynamics affecting climate lifestyles including factors related to individuals, factors related to community/society, and external factors, and gaps pointed out by the literature. Finally, a list of takeaway points for CAMPAIGNers are determined.

Results from the state-of-the-art literature review and the CAMPAIGNers Expert Survey are evaluated to enhance the identification of a catalogue of high GHG intensity habits, for consideration within the scope of policy action.

3. Methodology

The methodology of D1.2 of CAMPAIGNers, Scope of Actions to Reduce GHG Intensity of Daily Life in Lighthouse Cities follows a multi-layered approach. There are two components of this methodology; first a comprehensive state-of-the-art literature review, and second, the CAMPAIGNers Expert Survey.

Results drawn from the two main components of the methodological framework, the state-of-the-art literature review and the CAMPAIGNers Expert Survey, are then utilized in D1.2, Scope of Actions to Reduce GHG Intensity of Daily Life in Lighthouse Cities. This document aims to list the available policy levers available for influencing daily lifestyles to help meet the Paris Agreement goals of the LCs, focusing on habits of GHG intensity, areas with available policy actions and related knowledge gaps.

The use of literature review in the methodology of D1.2 is twofold: First, the comprehensive state-of-the-art literature review is utilized to design the CAMPAIGNers Expert Survey. Second, output from this survey is synthesized with evidence from the literature review to validate and align the results obtained from the CAMPAIGNers Expert Survey. The literature review methodology is utilized as a systematic way to perform a comprehensive analysis on a particular topic. To this end, the literature review is conducted by the contribution of partners of Work Package 1, following the guidelines and a template prepared by the Work Package Leader (IUE).

The guidelines and the literature review template is utilized to facilitate the coherence of the efforts by various partners, and to ensure the collection of the targeted information. For this purpose, the guidelines for the literature review included the background information on the work to be conducted and its relevance to the overarching objectives of CAMPAIGNers, the targeted output from the literature review, and how the results of the literature review will be utilized. Accordingly, the literature review template and guidelines include a specification of the scope for keywords, and the information to be extracted and reported from each manuscript analysed.

Accordingly, the literature review template design involves two main parts. The first part, State-of-the-art intends to capture overall information on the manuscript, along with its relevance to the key concepts of climate change, climate-harming lifestyles, climate-friendly lifestyles, and energy behaviours.

This part includes;

- the fields of full citation (authors, journal, publication year, etc.),
- selection criteria (the motive for including the manuscript in the repository such as matching keywords, relevance to climate change, climate-harming lifestyles, climate-friendly lifestyles, energy behaviours, addressing significant topics, providing a comprehensive perspective, introducing new concepts),

- keywords (as stated in the manuscript and/or keywords relevant in terms of climate change, climate-harming lifestyles, climate-friendly lifestyles, energy behaviours),
- type (article, review article, case study, project report, policy document, etc.),
- context (individual, household/community, local/regional, national/supranational, etc.),
- geographical coverage,
- discipline/domain (the scientific discipline/domain to which the analysis in the manuscript belongs),
- focus (economic, environmental, socio-cultural, demographic, vulnerable groups, etc.),
- key definitions/terms/terminology pertaining to lifestyles and climate change that relate to CAMPAIGNers,
- key definitions/terms/terminology in the manuscript which will benefit discussion and common understanding within CAMPAIGNers,
- objective(s)/aim(s),
- research question(s),
- theory(ies) used (if applicable),
- methodology(ies) used,
- main Indicators, dimensions or variables used or identified,
- core themes, (especially those pertinent to climate change, climate-harming lifestyles, climate-friendly lifestyles, energy behaviours),
- identified gaps, results/conclusions,
- link to datasets where applicable.

The second part of the literature review template is focused on Conceptualization of climate change, climate action, and lifestyles. This part is designed to collect more in-depth information concerning how climate change, climate action, lifestyles, and related phenomena are conceptualized by the manuscript, to create more structured analysis, and identify takeaways for CAMPAIGNers. Thus, this part of the literature review template involves the fields for framework including how lifestyles impact climate action and key variables (Important factors, motivators, barriers, drivers, etc.), dynamics affecting climate-harming and climate-friendly lifestyles, including factors related to individuals, factors related to community/society, and external factors, and takeaway for CAMPAIGNers including co-benefits of climate-friendly actions that can be utilized and targeted policy suggestions. Following the contributions of partners, results from the state-of-the-art literature review are analysed, highlighting the key points defined in the literature review template.

Results of the literature review are also utilized to design the CAMPAIGNers Expert Survey. CAMPAIGNers Expert Survey is utilized to obtain information from the Lighthouse Cities in terms of the lifestyle-related environmental opportunities currently debated in the 11 LCs and feasible policy actions, from the perspectives of the experts. For the CAMPAIGNers Expert Survey, the respondents in each city are selected from experts who have participated in, or have in-depth knowledge of the formulation and implementation of climate mitigation and adaptation policies in their cities. These experts are policymakers, executives or officers in the municipal or mayoral offices,

or members of professional chambers, academicians, representatives of utility companies or other private companies.

The selection of Themes for the CAMPAIGNers Expert Survey aims to obtain past, current, and potential local policy outlook on lifestyle-related environmental opportunities in Lighthouse Cities as discussed above.

The CAMPAIGNers Expert Survey was implemented through Google Forms, over a timespan of one month (1st October 2012 to 31st October 2021). Expert survey methodology was selected to enable the collection aimed at accessing hard-to-obtain information regarding how the LCs designed and implemented policies and actions concerning adoption of lifestyles and behaviour that that support climate change.

Following the design of the survey utilizing the results of the literature review, the initial design was reviewed and fine-tuned by the partners of Work Package 1. Moreover, the survey was pretested and piloted with a group of five executives from Istanbul, Turkey, in order to assess survey design and clarity of the questions, and identify the time required for completion prior to being distributed.

The respondents for the CAMPAIGNers Expert Survey were selected through purposeful sampling from among experts with knowledge of climate change politics from 11 Lighthouse Cities. For purposeful sampling, the partners exploited their professional networks. This strategy was designed to ensure that selected respondents are knowledgeable about climate change strategies and planning, and who are either directly or indirectly involved in decision making processes at the local level. Among 97 experts contacted for the CAMPAIGNers Expert Survey, completed the survey, a response rate of 93%, when the final sample of valid responses involved 90 respondents. The resulting sample of respondents involved 15 experts from Baku (Azerbaijan), 12 from Vilnius (Lithuania), 11 from Lahti (Finland), 10 each from Izmir (Turkey) and Trujillo (Peru), 9 from Athens[1] (Greece), 8 from Linz (Austria), 5 from Milan (Italy), 3 each from Cape Town (South Africa), Dublin (Ireland), and Skopelos (Greece), and 1 from Malmö (Sweden).

The methodological framework of D1.2, Scope of actions to reduce GHG intensity of daily life in Lighthouse Cities is summarized below:

Step 1. Preparation of the template and guidelines for state-of-the-art literature review

Step 2. Conducting the state-of-the-art literature review

Step 3. Analysis of the results of the literature review

Step 4. Design of the CAMPAIGNers Expert Survey

Step 5. Fine-tuning, pre-test, and pilot of the CAMPAIGNers Expert Survey

[1] Athens is representing the DAFNI Network.

Step 6. Selecting the sample for CAMPAIGNers Expert Survey using purposive sampling

Step 7. Conducting the CAMPAIGNers Expert Survey

Step 8. Analysis of the results of CAMPAIGNers Expert Survey

Step 9. Synthesis of the results of the state-of-the-art literature review and CAMPAIGNers Expert Survey

This methodological framework for D1.1 is also depicted in Figure 1.

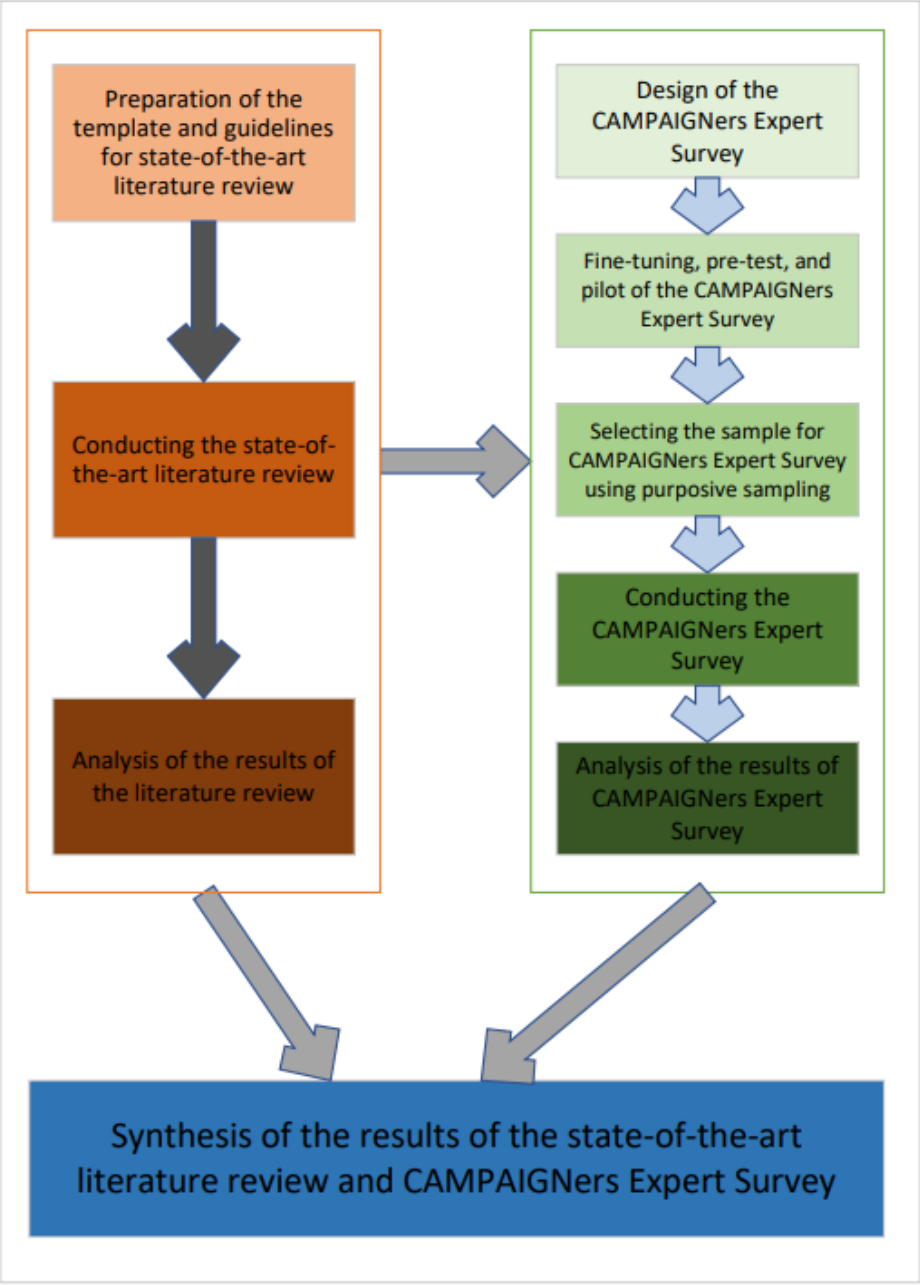

Figure 3. 1: Methodological Framework

4. Evidence from the Literature Review

This section presents analyses of the state-of-the-art and comprehensive literature review conducted for Work Package 1, highlighting perspectives, methods, and concepts relevant to climate lifestyles and behaviour change. It is based on 88 articles, reports, and other written materials reviewed by project partners for the CAMPAIGNers project.

4.1. Overview of literature review

Most manuscripts (86 of 88) specified the content type, of which the majority (65) were academic journal articles. The remaining content included policy documents (8), assessment and project reports (7), books (4), a study guide (1), and a PhD thesis (1). As such, reported cases are largely drawn from academic sources, with a minority from other sources. Table 1 shows a detailed list of academic studies reviewed in CAMPAIGNers project.

Table 4. 1: List of manuscripts reviewed in CAMPAIGNers project

#	Manuscript
1	Tvinnereim, E., Fløttum, K., Gjerstad, O., Johannesson, M.P. and Nordø, A.D. 2017. Citizens'preferences for tackling climate change. Quantitative andqualitative analyses of their freely formulated solutions, Global Environmental Change, 46, 34-41.
2	Moberg, K.R., Sovacool, B.K., Goritz, A., Hinojosa, G.M., Aall, C. and Nilsson, M. 2021. Barriers, emotions, and motivational levers for lifestyle transformation in Norwegian household decarbonization pathways. Climatic Change, 165(3), https://doi.org/10.1007/s10584-021-03018-y.
3	Gjerstad, O. and Flottum, K. 2021. Climate change lifestyle narratives among Norwegian citizens: A linguistic analysis of survey discourse. European Policy Analysis, 7(2), 386-404.
4	Mcguire, L. and Beattie, G. 2018. Talking green and acting green are two different things: An experimental investigation of the relationship between implicit and explicit attitudes and low carbon consumer choice. Semiotica, 227, DOI: 10.1515/sem-2017-0138.
5	Rice, J.L., Cohen, D.A., Long, J. and Jurjevich, J.R. 2019. Contradictions of the Climate-Friendly City: New Perspectives on Eco-Gentrification and Housing Justice. International Journal of Urban and Regional Research, 44(1), 145-165.
6	Nikas, A., Lieu, J., Sorman, A., Gambhir, A., Turhan, E., Baptista, B.V. and Doukas, H. 2020. The desirability of transitions in demand: Incorporating behavioural and societal transformations into energy modelling. Energy Research & Social Science, 70, 101780.
7	Institute for Global Environmental Strategies, Aalto University, and D-mat ltd. 2019. 1.5-Degree Lifestyles: Targets and Options for Reducing Lifestyle Carbon Footprints. Technical Report. Institute for Global Environmental Strategies, Hayama, Japan.
8	Niamir, L., Ivanova, O., Filatova, T., Voinov, A. and Bressers, H., 2020. Demand-side solutions for climate mitigation: Bottom-up drivers of household energy behavior change in the Netherlands and Spain. Energy Research & Social Science, 62, p.101356.
9	Sparkman, G., Attari, S. and Weber, E., 2021. Moderating spillover: Focusing on personal sustainable behavior rarely hinders and can boost climate policy support. Energy Research & Social Science, 78, p.102150.
10	von Borgstede, C., Andersson, M. and Johnsson, F., 2021. Public attitudes to climate change and carbon

	mitigation—Implications for energy-associated behaviours.
11	Marshall, N., Park, S., Howden, S., Dowd, A. and Jakku, E., 2021. Climate change awareness is associated with enhanced adaptive capacity.
12	Chen, M., 2021. Extending the theory of planned behavior model to explain people's energy savings and carbon reduction behavioral intentions to mitigate climate change in Taiwan–moral obligation matters.
13	Elgaaied-Gambier, L. and Mandler, T., 2021. Me trying to talk about sustainability: Exploring the psychological and social implications of environmental threats through user-generated content. Ecological Economics, 187, p.107089.
14	Belaïd, F. and Joumni, H., 2020. Behavioral attitudes towards energy saving: Empirical evidence from France. Energy Policy, 140, p.111406.
15	Csutora, M., Zsoka, A. and Harangozo, G., 2021. The Grounded Survey – An integrative mixed method for scrutinizing household energy behavior. Ecological Economics, 182, p.106907.
16	Cohen, B., Cowie, A., Babiker, M., Leip, A. and Smith, P., 2021. Co-benefits and trade-offs of climate change mitigation actions and the Sustainable Development Goals. Sustainable Production and Consumption, 26, pp.805-813.
17	Welsch, H., 2021. How climate-friendly behavior relates to moral identity and identity-protective cognition: Evidence from the European social surveys. Ecological Economics, 185, p.107026.
18	Soutter, A. and Mõttus, R., 2020. "Global warming" versus "climate change": A replication on the association between political self-identification, question wording, and environmental beliefs. Journal of Environmental Psychology, 69, p.101413.
19	Boto-García, D. and Bucciol, A., 2020. Climate change: Personal responsibility and energy saving. Ecological Economics, 169, p.106530.
20	Nelson, S. and Allwood, J., 2021. Technology or behaviour? Balanced disruption in the race to net zero emissions. Energy Research & Social Science, 78, p.102124.
21	Somerville, P., 2019. A critique of climate change mitigation policy. Policy & Politics, 1-23.
22	Balogun, A., Marks, D., Sharma, R., Shekhar, H., Balmes, C., Maheng, D., Arshad, A. and Salehi, P., 2020. Assessing the Potentials of Digitalization as a Tool for Climate Change Adaptation and Sustainable Development in Urban Centres. Sustainable Cities and Society, 53, p.101888.
23	Xu, Q., Hwang, B. and Lu, Y., 2021. Influencing Paths of the Behavior-Driven Household Energy-Saving Exploring the influencing paths of the behavior-driven household energy-saving intervention—Household Energy-Saving Option. Sustainable Cities and Society, 71, p.102951.
24	Alt, E. and Spitzeck, H., 2021. Improving environmental performance through unit-level organizational citizenship behaviors for the environment: A capability perspective.
25	Lu, S., Bai, X., Zhang, X., Li, W. and Tang, Y., 2019. The impact of climate change on the sustainable development of regional economy. Journal of Cleaner Production, 233, pp.1387-1395.
26	Arslan, A., Haapanen, L., Hurmelinna-Laukkanen, P., Tarba, S. and Alon, I., 2021. Climate change, consumer lifestyles and legitimation strategies of sustainability-oriented firms. European Management Journal,.
27	Kaiser, F., Henn, L. and Marschke, B., 2020. Financial rewards for long-term environmental protection. Journal of Environmental Psychology, 68, p.101411.
28	Barr, S. and Gilg, A., 2006. Sustainable lifestyles: Framing environmental action in and around the home. Geoforum, 37(6), pp.906-920.
29	Asilsoy, B. and Oktay, D., 2018. Exploring environmental behaviour as the major determinant of ecological citizenship. Sustainable Cities and Society, 39, pp.765-771.
30	Xu, X., Xiao, B. and Li, C., 2021. Analysis of critical factors and their interactions influencing individual's energy

	conservation behavior in the workplace: A case study in China. Journal of Cleaner Production, 286, p.124955.
31	Sparkman, G. and Attari, S., 2020. Credibility, communication, and climate change: How lifestyle inconsistency and do-gooder derogation impact decarbonization advocacy. Energy Research & Social Science, 59, p.101290.
32	Adua, L., 2010. To cool a sweltering earth: Does energy efficiency improvement offset the climate impacts of lifestyle?. Energy Policy, 38(10), pp.5719-5732.
33	Jakučionytė-Skodienė, M., Dagiliūtė, R. and Liobikienė, G., 2020. Do general pro-environmental behaviour, attitude, and knowledge contribute to energy savings and climate change mitigation in the residential sector?. Energy, 193, p.116784.
34	Urban, J. and Ščasný, M., 2021. Exploring domestic energy-saving: The role of environmental concern and background variables.
35	Carman, J. and Zint, M., 2020. Defining and classifying personal and household climate change adaptation behaviors. Global Environmental Change, 61, p.102062.
36	Niamir, L., Ivanova, O. and Filatova, T., 2020. Economy-wide impacts of behavioral climate change mitigation: Linking agent-based and computable general equilibrium models. Environmental Modelling & Software, 134, p.104839.
37	Chuvieco, E., Burgui-Burgui, M., Orellano, A., Oton, G. and Ruiz-Benito, P. 2021. Links between Climate Change Knowledge, Perception and Action: Impacts on Personal Carbon Footprint. Sustainability, 13, 8088.
38	Whitmarsh, L., Seyfang, G. and O'Neill, S. 2011.Public engagement with carbon and climate change: To what extent is thepublic 'carbon capable'?. Global Environmental Change, 21, 56-65.
39	Fudge, S. and Peters, M. 2011. Behaviour Change in the UK Climate Debate: An Assessment of Responsibility, Agency and Political Dimensions. Sustainability, 3, 789-808.
40	Wang, X. 2018. The role of attitudinal motivations and collective efficacy on Chinese consumers' intentions to engage in personal behaviors to mitigate climate change. The Journal of Social Psychology, 158(1), 51-63.
41	Nash, S. L. and Steurer, R. 2021. Climate Change Acts in Scotland, Austria, Denmark and Sweden: the role of discourse and deliberation. Climate Policy, 1-12.
42	Muhammad Mehedi Masud, Abul Quasem Al-Amin, Ha Junsheng, Ferdous Ahmed, Siti Rohani Yahaya, Rulia Akhtar, Hasanul Banna, Climate change issue and theory of planned behaviour: relationship by empirical evidence, Journal of Cleaner Production, Volume 113, 2016, Pages 613-623, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2015.11.080.
43	Rachel A. Howell, It's not (just) "the environment, stupid!" Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles, Global Environmental Change, Volume 23, Issue 1, 2013, Pages 281-290, ISSN 0959-3780, https://doi.org/10.1016/j.gloenvcha.2012.10.015.
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46	Simon Gilby, Caixia Mao, Ryu Koide, Atsushi Watabe, Lewis Akenji, Vanessa Timmer. 2019. Sustainable Lifestyles Policy and Practice: Challenges and Way Forward. Institute for Global Environmental Strategies, Hayama, Japan.
47	Parodi, O. and Tamm, K. eds., 2018. Personal sustainability: exploring the far side of sustainable development. Routledge. See Chapter 3 Psychology of sustainability by Marcel Hunecke
48	Sharpe, S., Lenton, T.M., 2021. Upward-scaling tipping cascades to meet climate goals: plausible grounds for

	hope. Climate Policy 21, 421–433. https://doi.org/10.1080/14693062.2020.1870097
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52	Bhowmik, A.K., McCaffrey, M.S., Ruskey, A.M., Frischmann, C., Gaffney, O., 2020. Powers of 10: seeking "sweet spots" for rapid climate and sustainability actions between individual and global scales. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ab9ed0
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4.1.1 Context/scale of intervention

The scale of intervention was reported for almost all manuscripts (86 of 88). However, the open-ended nature of reporting made for some variation in responses. For instance, over 30 cases reported two or more scales of intervention.

Based on a counted frequency of key terms, 33 cases reported an individual scale of intervention, along with the local (19), household (15), national (12), regional (12), community (9), municipal (5), supranational (4), and collective (3) scales. Outlying scales of intervention also referred to organizations, global, social, supranational, Australian adult citizens, theoretical, and research & intervention.

Overall, the range of scales suggests that many manuscripts target or impact the individual or household scale but are also frequently connected to broader or multiple scales, from community to region to international.

Figure 4.1 demonstrates the context/scale of intervention of the studies reviewed in CAMPAIGNers project.

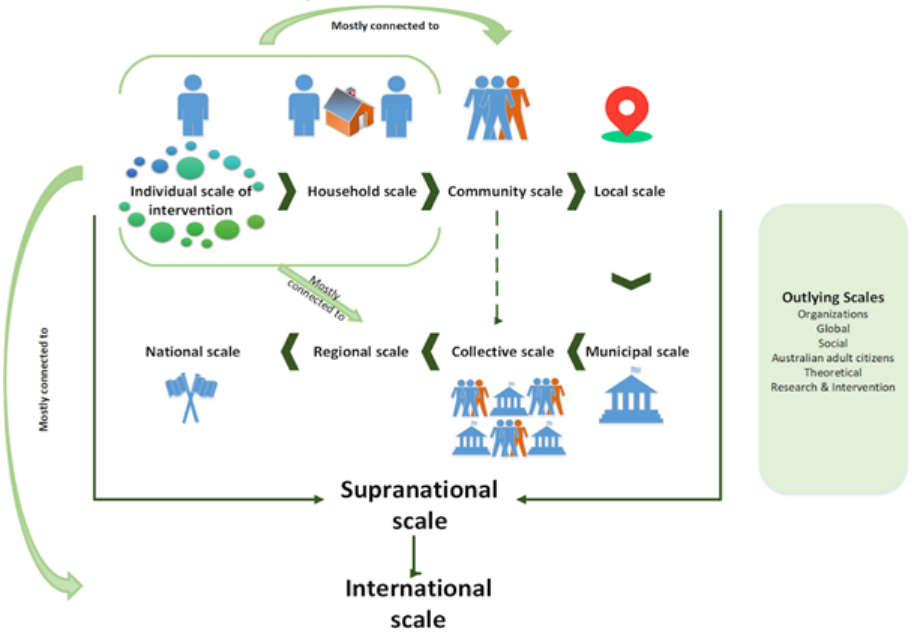


Figure 4. 1: Context / Scale of Intervention

4.1.2. Geographical coverage

76 of 88 manuscripts reported a geographical scale or location. In total over 89 geographical locations were discussed, as some manuscripts reported multiple locations. A minority of manuscripts reported the location as general (16 of 76) and a further case reported itself as international (1).

The vast majority of analysed cases fell within Europe (42), with cases 6 reported as Europe along with cases emanating from the Great Britain (13), Italy (7, of which 5 were in Milan), Norway (4), Finland (4), Lithuania (3, of which one in Vilnius), Austria (3), Spain (3),

Sweden (3), Switzerland (2), Germany (2), France (1), and Romania (1). Figure 4. 2 illustrates the geographical coverage of the case studies pertaining to climate-friendly lifestyles and behaviour change within Europe.

Figure 4. 2: Geographical coverage of the case studies pertaining to climate lifestyles and behaviour change within Europe

There was a smaller selection of country-specific cases from outside Europe (17), including manuscripts from China (5), Australia (3), North America (4), (including 2 from the United States), Singapore (1), Malaysia (1), Taiwan (1), Brazil (1), and India (1) (See Figure 4.3).

Figure 4. 3: Geographical coverage of the case studies pertaining to climate lifestyles and behaviour change across the world (excluding Europe)

On a continental scale, 55 cases were from Europe, 9 from Asia, 4 from North America, 3 from Australia, and 1 from South America. No cases were reported from Africa (See Figure 4.4). Given the geographic focus of CAMPAIGNers, it is perhaps unsurprising that the cases primarily emanated from European countries, or were general in scope. Furthermore, this distribution may also reflect a wider bias within English language documentation.

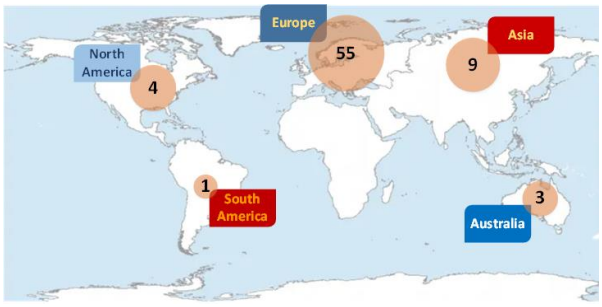


Figure 4. 4: Geographical coverage of the case studies pertaining to climate lifestyles and behaviour change on a continental scale

To improve CAMPAIGNers' international scope, it may be worthwhile seeking additional cases from outside Europe and North America and in languages other than English.

4.1.3. Discipline

83 of 88 manuscripts reported a discipline or domain. As there was no guidance or preselected categories, responses ranged considerably.

The vast majority of responses recorded the manuscript as belonging to explicitly (57) or implicitly (13) to the social sciences, with many manuscripts specifying specific social science discipline or sub-discipline, including social and environmental psychology (6), sociology (4), economy and

ecological economics (4), and political science (2), amongst others. Additionally, the specified domains referred to were sustainability (4), urban research (2), and climate science (1). Figure 4.5 conceptualizes the discipline wise approaches to climate lifestyles and behaviour change.

Beyond academic disciplines, several manuscripts also reported their domain as policy document (3) or referred to an associated sector, such as energy (4), mobility (1), design engineering (1).

The prevalence of social science and associated sub-disciplinary and topical references suggests that this review draws predominantly from social science perspectives, yet is interdisciplinary within these parameters.

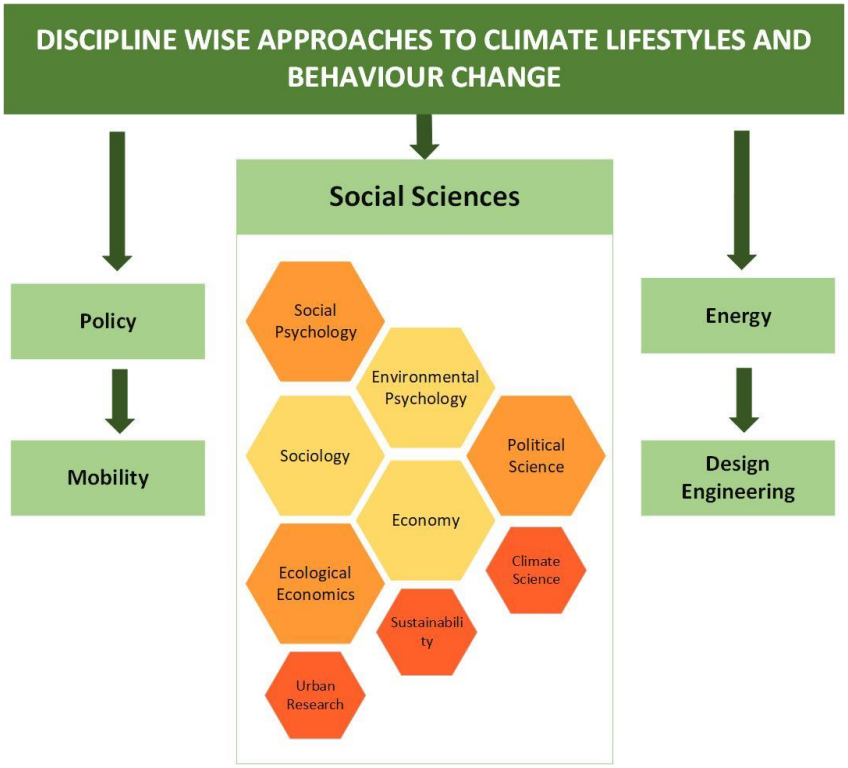


Figure 4. 5: Discipline / Domain of studies reviewed relevant to climate lifestyles and behaviour change

4.1.4. Focal themes

Manuscripts could also specify their focus. While the responses were open-ended, suggested responses included: economic, environmental, socio-cultural, demographic, and vulnerable groups.

76 of 88 manuscripts specified a focus, of which over half (39) reported multiple areas of focus, along with a small number of manuscripts referring to their focus as general (2) or multi-sectoral (1). The majority of manuscripts reported an environmental focus (43), other focuses were socio-cultural (18), economic (14), social (9), political (6), policy (5), behaviour (4), institutional (3), organisational (3), individual (3), demographic (3), and vulnerable groups (2).

Climate was referenced 5 times overall, including climate change mitigation or narratives (2), climate knowledge (2), and climate awareness (1). Reviewed manuscripts were generally more specific in nature, including energy, moral discourses, CO2 emissions, technical.

Overall, these cases predominantly have a partial or total environmental focus, but also report a complementary focus or perspective, whether socio-cultural, social, or economic. Understanding this focus suggests it might be useful to set an environmental focus as a requirement for further literature and proposed cases, and then examine which supplementary perspective or focus is applied to each case.

Figure 4.6 summarizes the key focal themes of the studies covered in the state-of-the-art literature review of CAMPAIGNers.

Figure 4. 6: Focal themes of the literature

4.2. Methods

Overall, 77 of 88 manuscripts specified a method, but the range of responses varied considerably and was not universal. For instance, in addition to the 11 manuscripts with no specified method, a further 3 listed methods not considered applicable. Given the diversity of literature and cases analysed, the proposed studies were based on or assessed by a range of methods. Four manuscripts were reportedly based on mixed or multi-method research, while a further 8 appear to incorporate mixed methods without labelling their approach as such. Furthermore, 6 studies specified a comparative or comparison element in their method.

The most popular method was the survey (29), including 4 specified as online surveys, along with a further 10 studies based on questionnaires. Some use existing surveys for analysis (e.g., Swiss household energy demand survey), while others analysed their own questionnaires and surveys, or did not specify. In terms of analysis, 4 studies were reported using regression analysis (including one study using 'multivariate regression, elastic net selection'). Alongside survey methods, 3 manuscripts were reported as drawing upon quantitative methods generally (of which one also listed surveys) and a further 4 manuscripts were based on carbon footprint assessments (4). In terms of qualitative methods, 7 studies were based on some form of literature or document analysis, including content analysis (2, including 1 descriptive analysis), literature analysis (2, both comparative), document analysis (1), desk research methods (1), and inductive thematic analysis (1). Slightly less popular were talk-based methods such as interviews (5), case studies (2), physical observations (1) and focus groups (1). Figure

4.7 shows different methods utilized in the reviewed studies.

The reported methods also included a broad range of descriptions. Some included additional methods, including dynamic thermal simulations of building model, co-impacts framing, digital social market approach, co-designed research, and methods for early warning of environmental tipping points. Meanwhile, other manuscripts described an analytic framework or method, such as: computable general equilibrium models, agent-based models, statistical and geographical data analysis, six-step models to create an assessment framework for analysing regions adaptive capacity, transport volumes modelling, structural equation modelling, confirmatory factor analysis, and analysing escalation of consumption and identification of several points. Finally, several manuscripts provide more general statements, including extensive research on degrowth developments recruitment methods, and open documents to cities' contributions.

The review suggests that the methods of the analysed literature are somewhat diverse, yet approximately half of the responses were based on a survey method or questionnaire. With this in mind, there is considerable scope to broaden the type of studies and methods reviewed, such as around experimental studies (e.g. randomised controlled trials) and qualitative methods, including those outlined above.

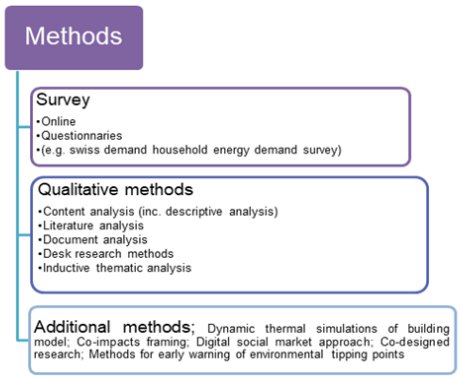


Figure 4. 7: The methods utilized in the reviewed studies

4.3. Frameworks and parameters

The reviewed literature also provided pointers to the study's framework, in particular reporting of how the study perceived lifestyles impact climate action (60 of 88) and key parameters associated with this perspective (68 of 88). Over two-thirds of the reviewed manuscripts in the literature provoked responses, which means a substantial minority did not outline the framework underpinning the study.

Thus, despite limitations, this sample does provide some useful insights into the prevailing perspectives which have been incorporated into the literature thus far, and what parameters might be relevant to the CAMPAIGNers project.

4.3.1. Frameworks for understanding how lifestyles impact climate action

The frameworks call attention to aspects of the relationship between individual lifestyles and their impact on climate action. Overall, there is an awareness that lifestyles have an impact on climate action, and that lifestyle changes are necessary to counteract climate changes. However, each framework

offered slightly different insights. For the purposes of analysis, this section synthesizes the frameworks into a loose narrative (or 'meta-framework) for CAMPAIGNers, as illustrated in Figure 4.8.

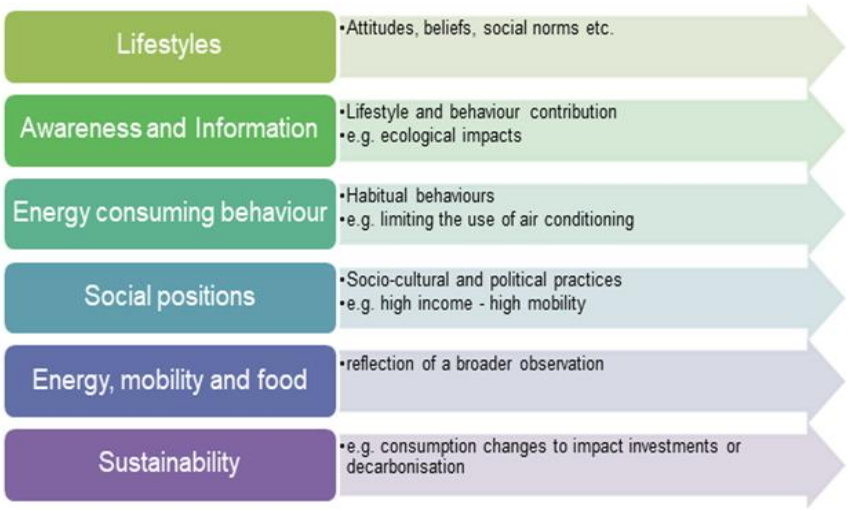


Figure 4. 8: Frameworks for individual lifestyles on climate action

Accordingly, within this meta-framework, lifestyles are perceived as the culmination of practices based on satisfying and meeting the individual's needs and desires. Satisfiers are shaped at different levels (orders) of intervention, including behaviours, attitudes, beliefs, personal and social norms, along with wider socio-demographic, environmental, cultural, political, economic, spatial, and material dynamics. Together, these factors inform how people move, work, live, and consume, which are impacted by, and have an impact on, the environment and climate action across several sectors. Changes to existing habits, behaviours and consumption patterns can reduce environmental impact and emissions across a variety of sectors and lifestyle dimensions.

At this point, multiple frameworks focused on the importance of raising awareness and informing people of how their lifestyles and behaviours contribute to emissions and wider ecological impacts. It was suggested that changing knowledge, awareness, and perceptions around lifestyles can impact climate action. Furthermore, sharing best practices within different sectors (e.g., housing sector) can also affect the environmental impact of individual lifestyles and behaviours. In this respect, encouraging pro-environmental lifestyle and behaviour change might need to be prefaced by a broader education surrounding the importance of climate action. For instance, one framework suggested that public greater awareness of global warming via the media (TV, radio) and social media will encourage people to save energy.

Energy-consuming behaviour is often routinized and shaped through individual and structural factors, resulting in more habitual behaviours. As such, lifestyle changes must attend to or fit within daily actions (e.g., lowering the heating thermostat; choosing energy-efficient models when replacing household

appliances, using less water, limiting the use of air conditioning, shopping locally, using greener transport, reducing energy use, local sustainable good and services, increasing a home's energy efficiency, using renewable energy, reducing meat consumption, and limiting flight frequency). In particular, getting residents to explicitly consider the climate risks of their lifestyle activities can necessitate a degree of flexibility and interest in potential changes. One manuscript suggested framing lifestyle as the choice between "bad" and "good" alternatives that determine climate action and addressing the benefits or perceived detriments of choosing "good" alternatives - such as costs or added burdens.

A number of dimensions may act towards encouraging lifestyles changes: highlighting increased efficiency in existing practices and behaviours, promoting options that minimise disruption by relying on existing technology or accepted behaviours, offering individuals a selection of options so they feel they can make an informed choice, suggesting ways of adapting habits or patterns, compensation mechanisms, and, suggestions of voluntary simplicity advocating for a "double dividend" of simultaneously reducing consumption while enhancing well-being. Several frameworks recalled how social position fosters certain dispositions toward socio-cultural and political practices that suit this social position and befit their occupants. In turn, certain factors might impact or predict certain lifestyle habits and, consequently, environmental impacts - e.g., higher income seems to lead to higher mobility emissions on average. Furthermore, changes to more sustainable lifestyles can also be encouraged by being framed in terms of gains or benefits, such as framing behaviours as a form of environmental protection or promoting individuals as problem solvers to climate and social challenges whose choices support multiple-benefit solutions for climate-change-related effects on health, wellbeing and citizens' sense of ownership.

On the other hand, the systematic dimensions informing lifestyles and climate action have also been pointed out within a number of frameworks. These frameworks suggest that changes to more environmentally and climate-friendly lifestyles could be facilitated through new technologies and supportive policies, along with changes to surrounding markets and economies. As such, many frameworks suggested that focus needs to be put on how practices are produced and reproduced, socially and culturally, not simply on individual values/attitudes, behaviours, or choices. Accordingly, structural and system influences for lifestyle changes might take the form of climate programs, infrastructure investments, public education campaigns, population growth, land use, cultural consumption patterns, mobility options, or supply chains and production networks.

In considering climate action, several frameworks suggested that increased attention to the environmental impacts of personal lifestyles can also have broader impacts on individual environmental and social lifestyle awareness, while also leading to more ambitious, motivated, and engaged citizenry and participation in public climate

discourses. For example, energy citizenship offers a background to approach different ways in which citizens are becoming actively involved in the energy transition, and engaging politically, either as consumers and users, by participating in protests and support movements and, most relevant to this paper, as prosumers.

Finally, one framework emphasized how unsustainable lifestyles are driven by capitalist norms and systems pushing towards continued growth and capitalist accumulation, which is damaging the environment. This was complemented by other frameworks suggesting that lifestyle behaviour change could involve anti-consumption, consumption changes to impact investments or decarbonisation.

4.3.2. Key Parameters

Manuscripts also specified key parameters associated with the summarised frameworks. Given the diversity of the frameworks, analysis for this section is structured around the following perspectives: individual-focus, structural/systemic-focus, behaviour change strategies-focus, and sector-specific focus. Figure 4.9 is an illustration of the key parameters derived from CAMPAIGNers' state-of-the-art literature review.

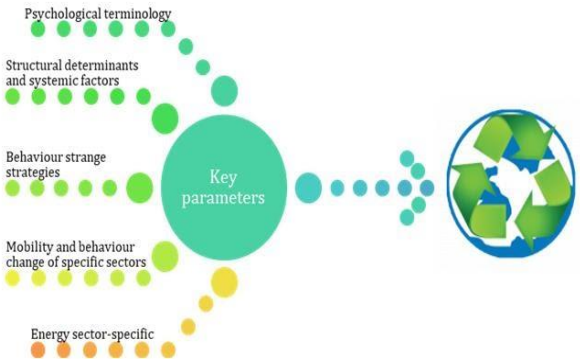


Figure 4. 9: Key parameters

First, however, several responses outlined general parameters related to lifestyles changes and decision-making: Starting broadly, lifestyles are based around needs, and around satisfiers shaped by socio-technical provisioning systems, activities, services, and technologies.

Climate-based changes relied on three factors: individual decision making and awareness, individual behaviours and practices, and engagement with systems of provision and governance. Similarly, three types of consumption decisions and resulting emissions can be determined: direct emissions related to personal activity, indirect emissions from consumption of purchases, and indirect emissions related to public infrastructures and production chains. As such, promoting lifestyle changes should not just focus on direct emissions, but also account for wider changes and indirect impacts.

Many parameters focused on factors impacting livelihoods and behaviour

change. Individually centred parameters were largely grounded in psychological terminology and studies, and were classed either as parameters that both inform behaviours, or those which are more directly useful for actively encouraging behaviour change. Internal factors informing behaviour change included: self-esteem maintenance, attitudes, collective efficacy, intentions, future orientation, values, self-efficacy, practice-specific wants, sense of ownership, subjective norms, knowledge, perceived commitment, perceived intractability, and frequency of action. On the other hand, external parameters informing individual behaviour included materials, social norms, costs, health, and wellbeing. Echoing some of the above parameters, individual moral identity and cognitive legitimacy were separately highlighted as impacting climate-friendly behaviour.

When actively encouraging lifestyle changes, motivators included: influencing agents and networks, inspirational examples, emotions, convenience, awareness of the meaning of living environmentally friendly, positive emotions, positive actions. Furthermore, adaptive capacity was highlighted as an important parameter. Adaptive capacity involves an integration of management of risk and uncertainty, skills in planning, learning, and reorganising, financial and emotional flexibility, and interest in adapting.

A number of researchers also outline parameters related to individual adaptation behaviours, which included: civic engagement, consumption, coping, household protection, learning, lifestyle changes, migration, self-protection, and informal information. Conversely, barriers to lifestyle change consisted of emotional barriers (hopelessness, fear, anxiety, pessimism), insufficient knowledge, too much knowledge for making meaningful decisions; confusion, problem denial, and busy life (bad habits and routine). Finally, it was noted that individual behaviour change is necessary, but not sufficient, for reaching an overall solution, which must include consciousness to reflect on one's values and identity with a view to connecting them to political action and policy goals. Indeed, value expressive functions, such as caring about the environment and future generations, were reiterated as important parameters for predicting and encouraging environmentally responsible behaviour.

Alongside individually focused parameters, several manuscripts highlighted parameters related to structural determinants and systemic factors informing lifestyles and behaviour change. These overlap somewhat with the external individual parameters but tended to focus more on the societal and systemic influencers of behaviours. These include aspects of social-demographic parameters, such as socioeconomic position, age, gender, household size, sex, age, education, work, income, population, and political identification. These determinants can reflect differences in everyday actions and practices across different segments of the population or specific lifestyle groups.

Environmental attitudes and concerns were reiterated as a key parameter, particularly when reviewed in relation to perceived

control and resulting social impact. For example, one set of parameters outlined how citizens with common pro-environmental aims engage in fluid 'rhizomatic' networks on social media sites continually emerge and fuse together.

Systemic perspectives to sustainable lifestyles and behaviours furthermore advocated for understanding the processes and the systems in which practices are embedded. For example, encouraging behaviour change without addressing technical or infrastructural barriers can limit the potential of changing existing behaviours or habits. Furthermore, reflecting on systemic factors means recognising perceived costs and benefits based on wider changes, insufficient, ill-equipped or inappropriate infrastructures or service delivery, limited preparation or capacity for changes or hazards, and unwillingness to take up available alternatives due to disruption or lack of appeal.

Several manuscripts outlined political parameters impacting behaviour change including, international collaboration and responsibilities, governmental measures and instruments, taxes and other economic incentives, regulation and wider regulatory frameworks, environmental and climate policy, and public awareness and pressure towards implementing pro-environmental policies. Improved dialogue between local authorities, local businesses, and citizens around decision making can also promote collectively agreed-upon behaviours and encourage collective review and change.

Economic parameters reported include economic and cultural capital, emissions prices and allowance allocation methods, and carbon emissions prices and personal allowances.

Contextual and spatial parameters were also identified and included residence type, tenure status, energy label, the age of residence, availability and proximity of public services, geographical representation, variation of organisational forms, territorial scope, and renewable energy sources. Parameters related to ongoing calls for 15-minute cities – a residential urban concept are identified as people's location, and how this relates to service and infrastructural access, environmental factors, and the structural conditions of their environments.

Consequently, adopting multiple perspectives (such as physical-technical-economic models a lifestyle and social–behavioural approach) can improve strategies for encouraging more pro-environmental consumption approaches. Furthermore, recognising the appropriate scale was also inferred by one manuscript. For instance, encouraging changes to heating behaviour is more appropriately assessed and adapted at the level of household or dwelling, than at the level of the individual.

A further selection of manuscripts provided parameters related to behaviour strange strategies. While these manuscripts overlap somewhat with the factors informing behaviours and lifestyles, those were more focused on particular strategies and processes of behaviour change. Reported strategies for changing behaviours include information dissemination and education, goal setting and feedback, persuasion, role-

playing, incentives, modelling, coercion, restriction, enablement, sharing best practice within and between different actors, conscious use of resources, and accurate analysis. One framework outlined four strategies for behaviour change strategies for governmental actors. These four strategies are "enable" (e.g., providing information), "engage" (e.g., encouraging individuals to make more informed choices) "encourage" (e.g., appropriate regulation to encourage market changes to support behaviour change objectives), and "exemplify" (e.g., government actors exemplify aims in relation to the strategic project and own operations). Furthermore, the need to reframe problems was reiterated. For instance, reframing could be done to recognise diversity/complex influences or distinguish between needs and wants/luxury. Similarly, addressing any threats to one's self-image could be important for encouraging wider participation beyond exemplars.

Finally, many reported parameters corresponded to specific sectors – including transport, energy, water, and waste, amongst others. Transport was the most commonly referred-to sector, with parameters addressing several different aspects of mobility and behaviour change. When looking to encourage transitions towards more sustainable transport habits and behaviours, proposed behaviours include implementation of a unified vehicle and passenger flow monitoring and modelling system, incentives and obligations to encourage public entities to choose clean vehicles, reducing consumption of polluting fossil fuels through fiscal measures, education of city governors, designers, planners, and society, pilot projects, and cost savings. Planning, infrastructural, and spatial parameters were considered particularly important for influencing more sustainable transport lifestyles. In addition to those outlined above, additional parameters include integrating urban transport infrastructure into the EU and national transport network, urban auto transport infrastructure for quick and transit traffic, formation of clean cargo logistics zones, improvement of sustainable urban streets infrastructure in accordance with the principles of sustainable mobility, parking control, promotion of electric cars and low polluting transport, and Low Emission Zones. Parameters for addressing higher emission transport, such as cars and planes, were informed by several parameters, including frequency of use (e.g. reducing car and plane journeys, replacing shorter journeys with more sustainable transport options), overall mobility practices, urban living configurations, time and space organisation, technologic advances to increase fuel efficiency such as vehicle light-weighting, accessory load management, powertrain systems optimizations, and aerodynamics. Public transport (PT) parameters include expanded PT service accessibility, increased reliability, and increased frequency of departures, consistent and effective PT network, increased safety, and universal design in PT and accessibility to all groups. Cycling and non-motorised transport parameters included a consistent and qualitative network of cycling routes, integration of cycling infrastructure to the multimodal services, additional storage lots, racks, sheds near living quarters, educational

facilities, workplaces, and other target points, and additional traffic safety measures. Walking parameters were related to a more humanised environment and including universal design and accessibility to all groups, adaptation of spaces for safe and healthy mobility, expansion of pedestrian infrastructure, ensuring access to educational facilities by foot or on micro-mobility modes, creation of socially secure spaces, and traffic safety measures.

Energy sector-specific parameters were also frequently reported. Overall, these parameters could be classified as individual-related and industry-related and largely recommended revision of existing habits, reduced use of energy and transitions towards more efficient technologies and renewable resources. In this respect, individual-level parameters included consumer education and awareness-raising, driving less, investment in smart energy systems, food consumption and mobility habits, wearing warmer clothing and reducing heating use, using high-efficiency lightbulbs, double glazed windows, energy-efficient appliances reducing hot water temperature, turning off unused lights, heating, and appliances, improved housing construction, layout, and insulation, and take-up of more efficient motors and pumps. Industry-level parameters related to lifestyles and behaviours, on the other hand, included cost of energy and import/export balance of resources and technologies, long term development and functioning of the industry based on sustainable development, widespread deployment of small-scale renewable energy installations owned by private energy consumers and communities, cessation of unrenewable resource extraction (e.g., oil), transitioning to renewable energy sources, investing in R&D for environmentally-friendly technology, availability of take-up of more efficient motors and pumps and thermal insulation. Among water conservation parameters were reducing the number of baths/showers taken, replacing baths with showers, minimising water consumption when showering, washing dishes, and brushing teeth, using plants that need less water, and reducing toilet flushes. Waste management parameters included reusing paper reducing battery usage, composting garden waste, recycling plastic bottles, cans, glass, and newspapers, reusing glass, and donating furniture and clothes to charity. Green consumption included using own bag for shopping, buying locally produced foods, buying recycled toilet paper, buying less packaged products, buying organic products, avoiding the use of aerosols and toxic detergents, buying recycled writing paper, and buying from a locally. Finally, broader urban parameters included housing prices, urban planning for energy efficiency, advanced traffic management, urban hub development, ecosystem services implementation, new environmental standards, access to green public spaces, a sense of community, and access to services.

A number of manuscripts also highlighted limitations to understanding or informing lifestyles and behaviour changes, for instance through questioning the accuracy and bias of parameters based on self-assessments, which might diverge from actual behaviours and habits. Specifically, socially desirable habits are likely to be over-

reported and, thus, limitations could be useful to focus on when considering the applicability of parameters to different contexts. Secondly, it is important to recognise the contextual particularities of any study, as certain location-specific dynamics could impact the relevance or impact of parameters across different cities and countries. For example, pre-existing infrastructural or economic development could impact an intervention's feasibility (e.g., existing public transport infrastructures, national renewable resource options, urban spatial fabric). It could be argued that parameters and challenges should be matched and recommended for consideration to urban contexts with similar profiles – or at least not universalised. Moreover, recognising lock-in effects was mentioned as a key parameter for reconceptualising lifestyles and encouraging changes, such as in the example of many people's well-being and health expectations being based on assumptions of infinite economic growth. In response, accepting the idea of a maximum need satisfaction might be required to allow all current and future generations to fulfil their basic needs.

Reviewing frameworks within this literature review draws certain parallels to T3.1, which consists of an interdisciplinary review of pro-climate behaviour change research, including summaries of prevailing theoretical frameworks from relevant scientific disciplines and relevant empirical studies. The findings of that review are separately compiled and summarised in a forthcoming report (D3.1), but these also complement and build on the frameworks outlined above.

4.4. Dynamics affecting climate lifestyles

The reviewed literature also outlined the specific dynamics affecting the choice of a climate-harming or climate-friendly lifestyle. Out of the 88 manuscripts, 66 mentioned a specific dynamic. The manuscript described 3 different types of factor, related to individuals (mentioned in 55 manuscripts), to community/society (43) and to external influences (32). Figure 4.10 categorizes the dynamics affecting climate lifestyles.

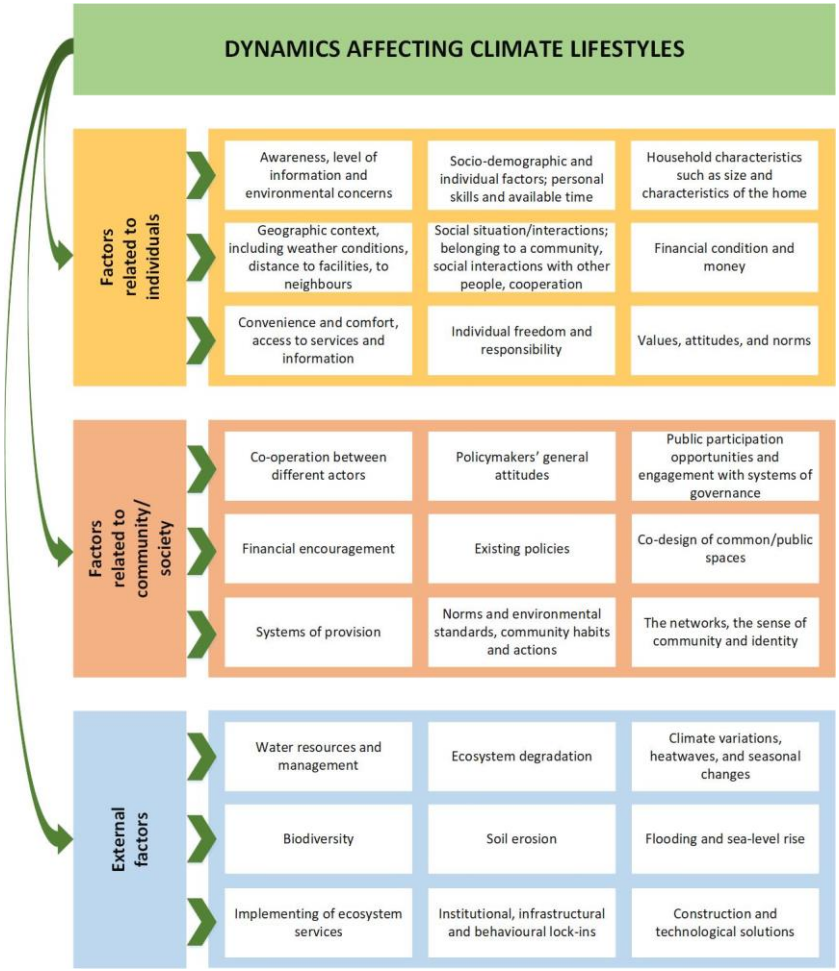


Figure 4. 10: Dynamics affecting climate lifestyles

As the numbers show, some manuscripts mentioned one dynamic, and others, dynamics in two or three categories. This overview highlights that a single dynamic often cannot be isolated and that the choice of climate-harming or climate-friendly lifestyles are embedded in complex dynamics that need to be considered at and across different levels. Each category of dynamics presented in the literature review is developed below.

4.4.1. Factors related to individuals

The first type of dynamics affecting climate-harming and/or climate-friendly lifestyles mentioned in the literature review are factors related to individuals. The described factors are very diverse and broad. The elements that stand out are identified as;

- awareness,
- level of information and environmental concerns,
- socio-demographic and individual factors (age, gender, level of education, physical and mental health, income) as well as personal skills and available time,
- household characteristics such as size and characteristics of the home (e.g., square footages, number of

bedrooms, type of home, heating system, appliances),
- geographic context, including weather conditions,
- distance to facilities, to neighbours, social situation and interactions,
- a sense of belonging to a community, social interactions, cooperation opportunities,
- financial condition and money (household income, personal savings, personal costs),
- availability of carbon tax support,
- convenience and comfort,
- access to services and information,
- individual freedom and responsibility,
- and values, attitudes, and norms.

4.4.2. Factors related to community/society

Factors related to community and/or society are also emphasised through the literature review. Although presented separately, some factors could be considered as relating both individuals and community/society, depending on the point of view, and some factors listed in this second category echo the above factors. At a community/society level, the main factors affecting climate-harming and/or climate-friendly lifestyles can be summarised through these different foci, including co-operation between different actors – policymakers, industries, communities – to define and pursue shared goals as well as take collective responsibility, policymakers' general attitudes, public participation opportunities in, and engagement with systems of governance, financial encouragement such as tax savings schemes and subsidies, both for households and industries, existing policies such as work policies, property/housing policies as well as business models, co-design of common/public spaces, systems of provision, norms and environmental standards, trends for expanding community behaviours and actions, and networks, sense of community and identity.

4.4.3. External factors

Interestingly, many factors mentioned as relating to the individual and/or to the community/society are also mentioned as external factors. This again shows that, depending on the point of view, factors can be seen both as relating to individual and external. Socio-demographic variables, such as age, gender, education or income, are related to individuals but also mentioned as external, societal, or systemic. This dual framing highlights how these individual variables can predict the likelihood of certain climate-harming or climate-friendly lifestyles, while also reiterating that these variables should not be considered an individual choice. Some factors also appear as related to the community/society as well as external, this is the case for example of climate policies, political and community awareness, social norms, consumption costs and incentives.

Amongst the external factors that do not appear in the other above-mentioned categories, the main elements related to the environment included water resources and management, ecosystem degradation, climate variations, heatwaves, and seasonal changes, biodiversity, soil erosion, flooding and sea-level rise. A number of other external factors affecting climate-harming

and/or climate-friendly lifestyles are also identified, such as implementing of ecosystem services, institutional, infrastructural and behavioural lock-ins, and construction and technological solutions.

4.5. Gaps

Gaps were also identified by 53 out of 88 manuscripts. While some gaps only referred to a specific research project, other identified gaps were broader or more recurrent in nature and/or shed light on an element relevant to CAMPAIGNers.

On a methodological level, one of the recurring gaps highlighted is the scarcity of qualitative methodologies, data, and in-depth analysis. Many of the above findings are based on quantitative data and the link between different findings (for example cause-effect relationship) is often difficult to establish. Moreover, manuscripts on climate-friendly behaviour use self-reporting measures of behaviour which may lead to an overly optimistic view on the readiness for actual behaviour change. In the same trend, the overall willingness or awareness is often considered, but there seems to be a gap in the understanding of how this awareness can lead to concrete actions.

A line of research also highlights the attention to technological approaches (and techno centric solutions) and economic feasibility, at the expense of more social and psychological approaches to change.

The problem of "the right level to act" is also raised. Much research tends to focus on incremental savings that are at risk of disappearing in larger trends, and the understanding of the opportunities for change on larger scales (industries, policies, etc.) is still scarce.

It is also highlighted that social justice, racial, class, and gender inequalities, emotions and moral conceptions are often under-considered in research on climate-harming and/or climate-friendly lifestyles.

4.6. Takeaway points for CAMPAIGNers

In order to be able to draw on this literature to elaborate the project, the manuscripts also included a specific section focusing on the takeaway points for CAMPAIGNers. Of the 88 manuscripts, 53 identify a specific takeaway for this project. As each manuscript offers a very broad overview of the topic, the main takeaways are very diverse and show the complexity of the topic. Figure 4.11 demonstrates the takeaway points for CAMPAIGNers.

Some key takeaway messages have been identified:

Regarding political role and action, political participation should be encouraged, local governments should take an active role and be transparent (i.e., publish their data), and collaborative efforts are needed (between existing ministries, with local businesses, with communities, etc.).

Concerning the importance of the local community, more power needs to be transferred, citizens need to be engaged in taking an active role in their community, and support is needed for local co-operatives, charities, mutual-aid/social enterprises.

In terms of social and environmental justice, basic needs have to be protected for everyone, such as ensuring healthy food and water for all citizens, and decent housing, high consuming lifestyles and behaviours need to be targeted for change, socio-geographical inequalities (i.e., gentrification and its impacts) need to be addressed, socio-demographic factors (e.g., gender, age, income, ethnicity) need to be prioritized.

Therefore, effective measures regarding reducing the availability of 'bad' options (choice editing), investments in infrastructure and available low-carbon options, action plans to make climate-friendly solutions and economically-friendly solutions need to be implemented. This should involve considering the long-term efficacy and impact of measures, rebound effects, and target residential CO2 footprints.

It is also worthwhile to acknowledge that individual and collective practices are socially, institutionally and infrastructurally configured, and therefore activities cannot be considered isolated because they are bundled with others and framed through social arrangements. To this end, the different behavioural settings and material arrangements at home, on holiday, at work, etc. need to be addressed, socio-technical provisioning systems (i.e., how consumption is shaped through collective temporal, spatial and material organisation need to be employed, and time-use and time-allocation should be planned.

Awareness is important, but lifestyles are strongly embedded into moral and social norms. At this point, rather than defining right and wrong behaviours and providing ready-made answers, it may be more effective to get people to observe their own lifestyles, carbon impact, potential financial savings, and health benefits, in addition to many other aspects.

Figure 4. 11: Takeaway points for CAMPAIGNers

5.Evidence from the CAMPAIGNers Expert Survey

In this section, results of the CAMPAIGNers Expert Survey are utilized in order to provide an assessment of lifestyle-related environmental opportunities currently debated in the Lighthouse Cities (LCs) and feasible policy actions.

5.1. Overview of the CAMPAIGNers Expert Survey

The CAMPAIGNers project aims to build a goal-setting network that will encourage lifestyle transformations important in tackling climate change. In Work Package 1, the project, first, explores how Lighthouse Cities have tailored their related policy priorities and approaches. To that end, the project uses an expert survey to obtain information from local experts on climate mitigation and adaptation policies that address lifestyle transformation in their cities. More specifically, the survey questionnaire was designed to collect data across 11 countries on: (1) climate change mitigation policies/tools in order of priority for the city (2) past, current and potential local policy actions towards climate change mitigation, (3) lifestyle changes addressed by current climate policies, (4) past, current and potential policy debates regarding individual lifestyle choices, (5) motivators targeting lifestyle changes, (6) individual barriers to lifestyle changes that have hindered policy making for climate action, (7) climate change adaptation initiatives in order of priority for the city, (8) past, current and potential policy actions towards climate change adaptation, and (9) key barriers for climate change adaptation experienced at the local government level.

The expert survey is designed to elicit less accessible authoritative knowledge on local policymaking from practitioners, academics, and other stakeholders. Mitigation and adaptation are two key policy responses to climate change as recognized in the Paris Agreement. However, the existing scholarly and political debates on the subject have been largely restricted to mitigation efforts (Javeli, 2014). This is mainly because local administrations and international bodies have initially incorporated climate mitigation in their policy agenda and have become ready to include adaptation issues only recently (Grafakos et al., 2020). In addition, mitigation policies promote a more efficient use of energy resources, including renewable energy, and create more attractive investment opportunities for stakeholders (Hoppe et al., 2014). The results of this survey contribute to the debate on climate change by collecting cross-country comparable data on local mitigation and adaptation policy portfolios. Studies show that municipalities are more effective in taking action and brings change in response to climate change than other actors, including higher education institutions, military, and insurance companies (Holland, 2015). This dataset set will enable us to evaluate how local policy strategies work in different contexts, whether local administrations prefer adaptation or mitigation frameworks, and how they respond to lifestyle changes,

and how we can develop solution-focused and forward-looking actions that can translate into lifestyle change.

5.2. Survey Sample Characteristics

CAMPAIGNers Expert Survey was conducted online, using Google Forms, between 1st October and 31st October 2021 and distributed to local executives, faculty members, energy sector representatives, and other experts with knowledge of climate change politics from 11 countries. The expert survey technique was considered more appropriate than a public opinion poll for gathering sophisticated information on how Lighthouse Cities administrations formed their policies and actions regarding lifestyle transformations that support climate change. The participants were identified by the project team members from their professional networks through purposeful sampling. With this sampling strategy, our goal was to target respondents who are knowledgeable about climate change strategies and planning, and who are either directly or indirectly involved in decision making processes at the local level. The central goal of inquiry was to generate "insights and in-depth understanding rather than empirical generalizations" (Patton, 2002: 273). A total of 97 experts received invitations to take part in the survey. The response rate was 93%, with 90 experts completing the questionnaire.

Table 1. Participants in terms of location

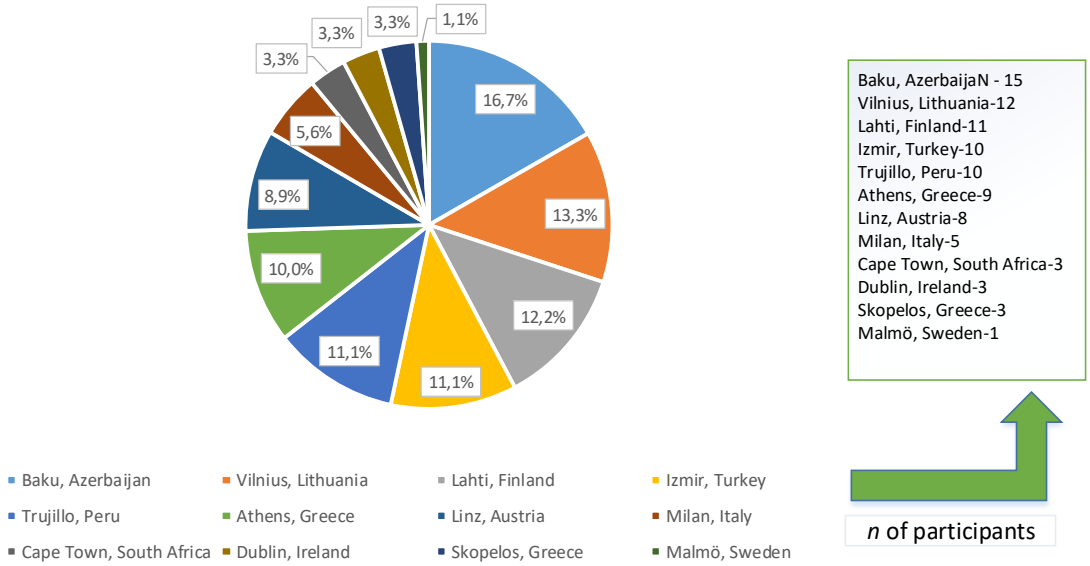


Figure 5. 1: Number of respondents and their location

The final sample included 90 respondents as demonstrated in Figure 5.1 and discussed above. Figure 5.2 shows the number of respondents by job functions. The largest group in the sample is mid-level officers. This groups includes those serving as officers in environmental/sustainability, transportation, urban/construction and other (such as procurement and finance) services of the city. The second largest group consists of faculty members and researchers such as H2020 project managers and consulting company's independent researchers. In total, there are 100 occupational activities reported in the questionnaire. The number of job titles exceeds the number of respondents (N=90) as some reported more than one occupation. The range of job functions indicate that respondents have the necessary skills, knowledge, and experience to provide reliable and valid responses.

The survey questionnaire was developed after reviewing the relevant literature and validated by project team's members. The questionnaire is also piloted with a group of five experts from Turkey to assess survey design and clarity of the questions, and identify the time required for completion prior to being distributed.

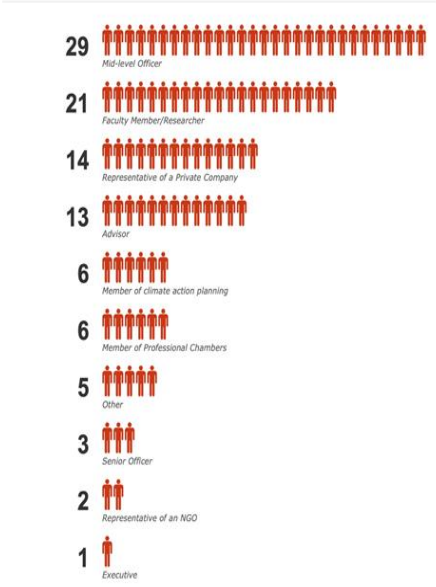


Figure 5. 2: Number of participants in terms of job title

5.3. Climate change mitigation

This part of the survey focus on the efforts of Lighthouse Cities in reducing greenhouse gas emissions. First, the questionnaire asked experts to list the three key climate change mitigation policies/tools in order of priority for their city from six options. The results are shown in Figure 5.3. 'Regulation' was the most common first option. Of the 70 respondents, 20 (which corresponds almost 29% of study subjects) considered regulation as their top climate change mitigation tool. Overall, the data indicate that regulation was not the most popular option. Figure 5.3 also reveals that as many as 50 respondents (71.4%) considered 'education and enabling' as one of the top three climate change mitigation policies.

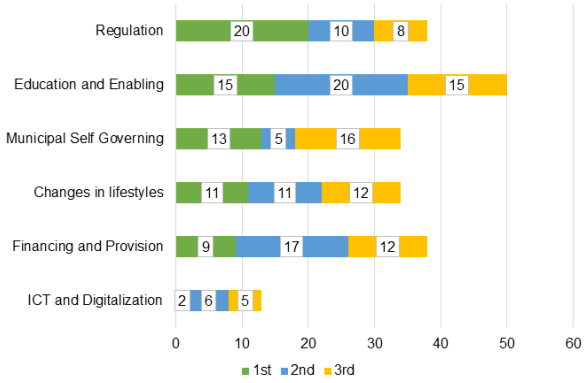


Figure 5. 3: Frequencies of responses to the question "Please rank the top three climate change mitigation policies/tools in order of priority for your city."

Figure 5.4 further shows that, 15 of these were from EU member states, in other words, almost 29 percent of EU experts stated that their local governments rely on mitigation regulations.

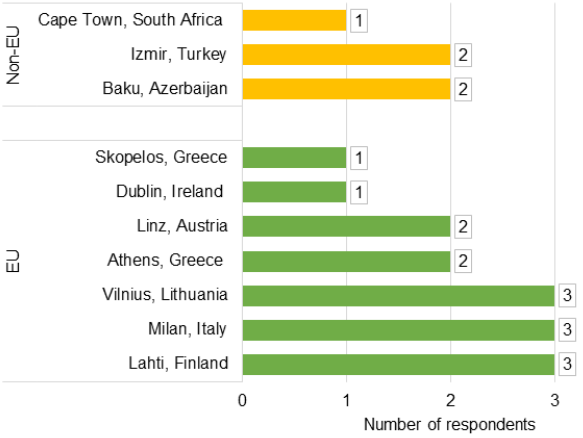


Figure 5. 4: Distribution of 'regulation' responses by city

The distribution of these respondents according to the geographical location is available in Figure 5.5. At least 1 expert from each EU member state in our sample claimed that education and enabling is an important mitigation tool in their city. Of 10 respondents from Izmir, 8 cited educations and enabling as a mitigation policy. These results are consistent with other studies on the EU member states and suggest that public education and outreach is an important policy objective of climate change action plans of European countries (Grafakos et al., 2020).

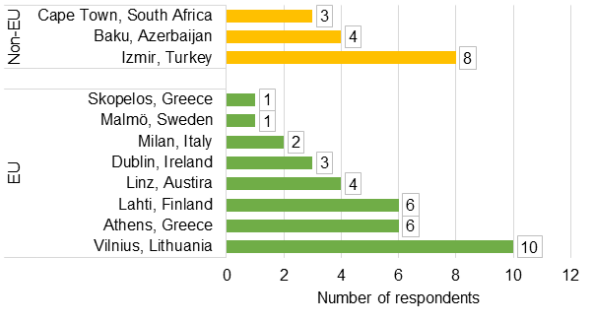


Figure 5. 5: Distribution of 'education and enabling' responses by city

'Information and communication technologies (ICT) and digitalization' was the least preferred answer. Only 2 respondents (both from Vilnius, Lithuania) indicated digital strategy as a top preference and only 11 other experts mentioned this option in their first two policy choices. Experts from Turkey, Ireland, and Sweden did not consider it as an option at all. This is surprising, since previous research suggests that the adaptation of innovative and green technologies in different domains of urban life such as media, housing, and transport is crucial in mitigating climate change. It is also known that digitalization can facilitate, especially, risk management, climate forecasts, and information transformation (Balogun et al., 2020). Overall, the survey results show that five of the possible climate mitigation policies are highly valued in Lighthouse Cities, i.e., there is no single way to promoting sustainable behaviour.

The questionnaire asked experts about the main policy actions that have been implemented in the last 5-10 years, are currently being implemented and/or need to be implemented in the next 5-10 years to address climate change mitigation in their city. There were 20 policy actions to consider. This question examined the commonality of

mitigation strategies. Figure 5.6 shows the top five policy implications of the past, present or future. The results suggest that 'reducing pollution' was the most popular policy across Lighthouse Cities in the last five years. Of 90 responses 38 (42%) indicated that reducing pollution was implemented in the past. The other notable past policies include 'raising public awareness', 'facilitating more sustainable waste management', 'improving air quality', and 'reviewing and updating of existing local policies, regulations and guidelines', selected by almost 40%, 34%,33%, and 32% of respondents respectively. This finding is not surprising since improving waste management performance and air quality are related to pollution control policies. Our results also indicate that public awareness of climate mitigation is the most significant issue (selected by 58 respondents or 63%) for Lighthouse Cities today. In 2015, the World Health Assembly, the decision-making body of the World Health Organization (WHO), similarly recommended that its member states developed measures to increase public awareness regarding health risks of air pollution (Amegah and Agyei-Mensah, 2017). The mitigation policy of the future will however be different; almost 61 percent of respondents indicated that 'installing low and zero carbon and energy efficient technologies' need to be implemented in the next 5-10 years to address climate change mitigation in their city. However, the existing literature shows that realizing this policy goal requires behavioural awareness (Asilsoy and Oktay, 2018). The Lighthouse Cities' current investment in raising public awareness might help achieving energy low-carbon growth and efficient technology transformation in the future.

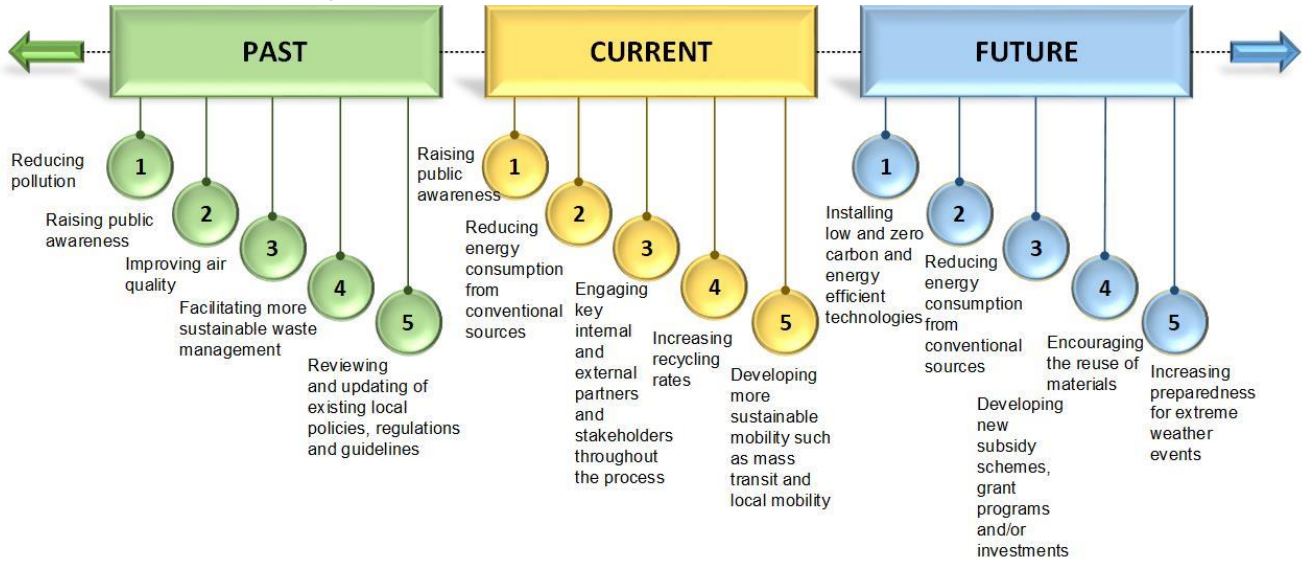


Figure 5. 6: The most supported policy actions addressing climate mitigation

Figure 5.7 reveals the five least common policy implications of the past, present and future. The results show that the attributed importance to reducing pollution will

decrease in the next five to ten years. Around 60% of respondents failed to select it as a future policy. This might be because air pollution has already created an active global movement over the last three decades. The Convention on Long-Range Transboundary Air Pollution of the United Nations Economic Commission for Europe, which was adopted in 1979 "is one of the oldest and most successful multilateral international treaties protecting the environment" (Hordijk, 2007: 336). The United Nations Conference of the Parties, similarly, identified air pollution as a worldwide environmental threat and called for international and national monitoring of pollution targets in 2015 (Climate Council, 2015). Even though air pollution is more of a local issue, it has been becoming an issue that transcends boundaries, and it has required robust strategies developed and executed at national and international levels (Amann et al., 2020).

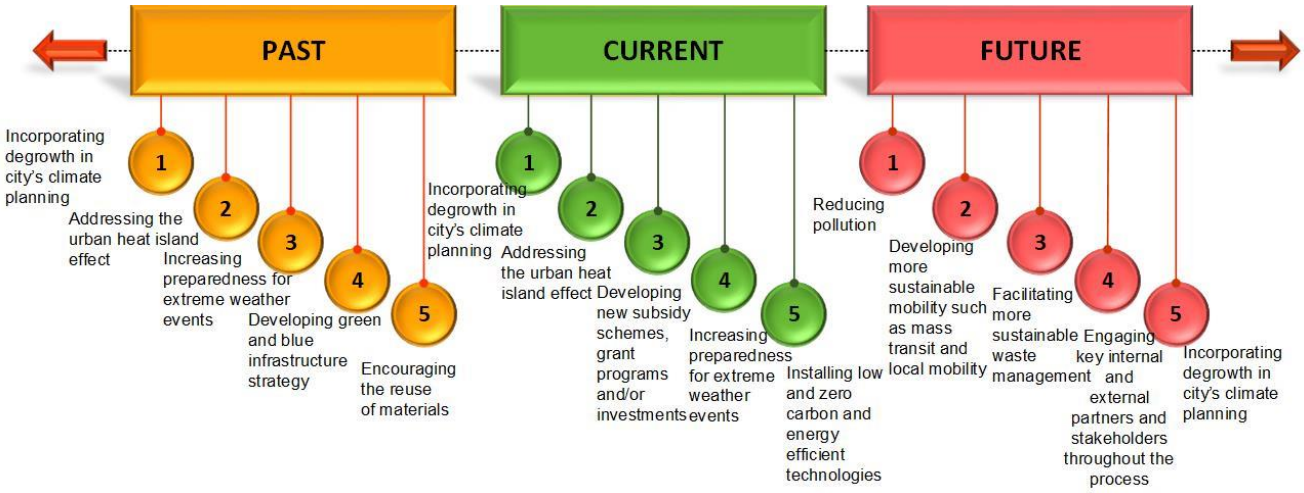


Figure 5. 7: The least supported policy actions addressing climate mitigation

The results also reveal that the least popular climate mitigation policy in the past and present were 'incorporating degrowth in city's climate planning' and this was also among the five least preferred policies for the next five years. These results are consistent with the findings of earlier research. Scholars define degrowth as "voluntary, democratically negotiated, equitable downscaling of societies' physical throughput until it reaches a sustainable steady-state" (Büchs and Koch, 2019: 155). Studies argue that degrowth strategy is very difficult to achieve in the macro level, since it requires broad public and industrial support, lifestyle minimalism, and a fundamental socio-economic and institutional transformation (Deriu 2012, Büchs and Koch, 2019; Alexander and Yacoumis, 2018).

Table 5.1 shows the number and percentage of respondents who indicated a mitigation policy if only implemented in the last 5-10 years. Of 90 respondents, almost one quarter

selected reducing pollution as only implemented in the past. These respondents are from Baku, Athens, Lahti, Linz, Trujillo, Cape Town and Milan. The least preferred policies of the past were increasing preparedness for extreme weather events and incorporating degrowth in city's climate planning. The former was identified by four respondents from Baku and Cape Town, and the latter by four all from Trujillo, Peru.

Table 5. 1: Climate mitigation policies only implemented in the last 5-10 years[2]

Policy Action Addressing Climate Mitigation	*n*	%
Reducing pollution	21	22.8
Facilitating more sustainable waste management		19.6
Improving air quality	18	19.6
Raising public awareness	17	18.5
Developing more sustainable mobility such as mass transit and local mobility	14	15.2
Reviewing and updating of existing local policies, regulations and guidelines	13	14.1
Developing administrative organizational structure for the implementation and monitoring of climate action plans	13	14.1
Increasing recycling rates	13	14.1
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	11	12.0
Enhancing water management strategies	11	12.0
Accelerating transition to low emission vehicles	10	10.9
Engaging key internal and external partners and stakeholders throughout the process	10	10.9
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	10	10.9
Installing low and zero carbon and energy efficient technologies	9	9.8
Developing new subsidy schemes, grant programmes and/or investments	9	9.8
Developing green and blue infrastructure strategy	8	8.7
Addressing the urban heat island effect	6	6.5
Encouraging the reuse of materials	5	5.4
Incorporating degrowth in city's climate planning	4	4.3
Increasing preparedness for extreme weather events	4	4.3
Average	**11.2**	**12.2**

[2] The survey question asked the experts to select all applicable response options, thus the frequency percentages are greater than 100% in the tables.

Table 5.2 shows policy actions implemented both in the past and present. Results reveal that a small minority of respondents identified climate mitigation policies that have been implemented for the last ten years. Of these, only 'increasing recycling rates', 'reducing pollution', and 'enhancing water management strategies' were reported by 5 or more respondents. 'Addressing the urban heat island effect' is only reported by one expert from Athens. Similarly, 'reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources' was only indicated by one respondent from Lahti, Finland, while none selected 'Increasing preparedness for extreme weather events' and 'developing new subsidy schemes, grant programmes and/or investments'. The tracking and anticipation of extreme heat, cold, floods, and droughts require digitalization and early warning mechanisms (Balogun et al., 2020). However, the previous survey question also shows that ICT and digitalization were not among the top priorities of local administrations in Lighthouse Cities.

Table 5. 2: Climate mitigation policies implemented in the last 5-10 years and currently being implemented

Policy Action Addressing Climate Mitigation	*n*	%
Increasing recycling rates	7	7.6
Reducing pollution	6	6.5
Enhancing water management strategies	5	5.4
Accelerating transition to low emission vehicles	4	4.3
Facilitating more sustainable waste management	4	4.3
Engaging key internal and external partners and stakeholders throughout the process	4	4.3
Developing administrative organizational structure for the implementation and monitoring of climate action plans	4	4.3
Installing low and zero carbon and energy efficient technologies	3	3.3
Reviewing and updating of existing local policies, regulations and guidelines	3	3.3
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	3	3.3
Raising public awareness	3	3.3
Encouraging the reuse of materials	3	3.3
Improving air quality	3	3.3
Developing more sustainable mobility such as mass transit and local mobility	2	2.2
Developing green and blue infrastructure strategy	2	2.2
Incorporating degrowth in city's climate planning	2	2.2
Addressing the urban heat island effect	1	1.1
Reducing energy consumption from conventional sources	1	1.1

by improving energy efficiency and sustainable use of renewable sources		
Developing new subsidy schemes, grant programmes and/or investments	0	0.0
Increasing preparedness for extreme weather events	0	0.0
Average	**3**	**3.3**

Table 5.3 shows mitigation policies of the past, present and future. 'Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources' was selected by around 16 percent of respondents, from Baku, Lahti, Izmir, Vilnius, Skopelos, Athens, Malmö, and Cape Town. The second most common identified policy was increasing the level of protection, restoration and regulation of the natural environment and ecosystems. The respondents from Baku, Lahti, Izmir, Skopelos, Athens, Vilnius, Malmö, and Dublin indicated implementation of this in the past, present and future.

Table 5. 3: Climate mitigation policies implemented in the last 5-10 years, currently being implemented, and need to be implemented in the next 5-10 years.

Policy Action Addressing Climate Mitigation	*n*	%
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	15	16.3
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	13	14.1
Raising public awareness	13	14.1
Reviewing and updating of existing local policies, regulations and guidelines	12	13.0
Engaging key internal and external partners and stakeholders throughout the process	10	10.9
Reducing pollution	10	10.9
Improving air quality	10	10.9
Developing more sustainable mobility such as mass transit and local mobility	9	9.8
Facilitating more sustainable waste management	8	8.7
Increasing recycling rates	8	8.7
Enhancing water management strategies	8	8.7
Encouraging the reuse of materials	7	7.6
Installing low and zero carbon and energy efficient technologies	6	6.5
Developing new subsidy schemes, grant programmes and/or investments	5	5.4
Accelerating transition to low emission vehicles	4	4.3

Developing administrative organizational structure for the implementation and monitoring of climate action plans	4	4.3
Increasing preparedness for extreme weather events	4	4.3
Developing green and blue infrastructure strategy	2	2.2
Addressing the urban heat island effect	1	1.1
Incorporating degrowth in city's climate planning	1	1.1
Average	**7.5**	**8.2**

Table 5.4 presents the number and percentage of participants that identified mitigation policies that are implemented only currently. An average of 24 respondents identified at least one mitigation policy as currently being implemented, but not in the past or in the future. The most identified current policy is 'developing more sustainable mobility such as mass transit and local mobility.'

Table 5. 4: Climate mitigation policies only currently implemented

Policy Action Addressing Climate Mitigation	*n*	%
Developing more sustainable mobility such as mass transit and local mobility	34	37.0
Accelerating transition to low emission vehicles	30	32.6
Engaging key internal and external partners and stakeholders throughout the process	30	32.6
Facilitating more sustainable waste management	29	31.5
Reviewing and updating of existing local policies, regulations and guidelines	28	30.4
Developing green and blue infrastructure strategy	28	30.4
Encouraging the reuse of materials	28	30.4
Developing administrative organizational structure for the implementation and monitoring of climate action plans	27	29.3
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	27	29.3
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	26	28.3
Raising public awareness	26	28.3
Increasing recycling rates	26	28.3
Reducing pollution	25	27.2
Enhancing water management strategies	23	25.0
Installing low and zero carbon and energy efficient technologies	18	19.6
Improving air quality	18	19.6
Increasing preparedness for extreme weather events	17	18.5

Addressing the urban heat island effect	16	17.4
Developing new subsidy schemes, grant programmes and/or investments	15	16.3
Incorporating degrowth in city's climate planning	9	9.8
Average	**24.0**	**26.1**

Table 5.5 reveals the mitigation policies that are implemented in the present and need to be implemented in the future. Only one policy, raising public awareness, was selected by more than 15 respondents, from Baku, Lahti, Izmir, Vilnius, Cape Town, Linz, Milan, and Dublin.

Table 5. 5: Climate mitigation policies currently implemented and need to be implemented in the next 5-10 years.

Policy Action Addressing Climate Mitigation	*n*	%
Raising public awareness	16	17.4
Developing administrative organizational structure for the implementation and monitoring of climate action plans	13	14.1
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	13	14.1
Accelerating transition to low emission vehicles	11	12.0
Engaging key internal and external partners and stakeholders throughout the process	11	12.0
Installing low and zero carbon and energy efficient technologies	10	10.9
Developing green and blue infrastructure strategy	9	9.8
Increasing recycling rates	9	9.8
Developing new subsidy schemes, grant programmes and/or investments	8	8.7
Encouraging the reuse of materials	8	8.7
Increasing preparedness for extreme weather events	8	8.7
Addressing the urban heat island effect	7	7.6
Reducing pollution	7	7.6
Improving air quality	7	7.6
Facilitating more sustainable waste management	6	6.5
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	6	6.5
Developing more sustainable mobility such as mass transit and local mobility	5	5.4
Reviewing and updating of existing local policies, regulations and guidelines	5	5.4
Enhancing water management strategies	5	5.4
Incorporating degrowth in city's climate planning	2	2.2

Average	**8.3**	**9.0**

Table 5.6 is about the mitigation policies not yet formulated that need to be implemented in the future. Of 90 respondents, 40 reported 'installing low and zero carbon and energy efficient technologies' as the policy of the future. Incorporating degrowth in city's climate planning found little support in the past and current policy agenda but were indicated as a future policy by 37 respondents. Only representatives of Malmö and Skopelos did not mention degrowth.

Table 5. 6: Climate mitigation policies only need to be implemented in the next 5-10 years

Policy Action Addressing Climate Mitigation	*n*	%
Installing low and zero carbon and energy efficient technologies	40	43.5
Incorporating degrowth in city's climate planning	37	40.2
Increasing preparedness for extreme weather events	36	39.1
Developing new subsidy schemes, grant programmes and/or investments	35	38.0
Encouraging the reuse of materials	35	38.0
Addressing the urban heat island effect	32	34.8
Developing green and blue infrastructure strategy	30	32.6
Enhancing water management strategies	27	29.3
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	26	28.3
Accelerating transition to low emission vehicles	25	27.2
Improving air quality	25	27.2
Facilitating more sustainable waste management	24	26.1
Developing more sustainable mobility such as mass transit and local mobility	23	25.0
Reviewing and updating of existing local policies, regulations and guidelines	23	25.0
Developing administrative organizational structure for the implementation and monitoring of climate action plans	23	25.0
Increasing recycling rates	23	25.0
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	22	23.9
Reducing pollution	19	20.7
Engaging key internal and external partners and stakeholders throughout the process	18	19.6
Raising public awareness	11	12.0
Average	**26.7**	**29.0**

5.4. Lifestyle Changes and Lifestyle Choices

Another set of questions in the survey focuses on the policies that may promote change from high-consumption and energy-intensive lifestyles. Scholars suggest that "rising conspicuous consumption in the post-industrial revolution era cannot be sustained" and there is a need for a shift towards energy-sufficient and low-carbon consumer behaviour (Roy and Pal, 2009: 192, Samadi et al., 2017). However, lifestyle change is difficult to achieve as it depends on cultural, political, socio-economic and demographic factors such as age, income, occupation, social status, gender and marital status, size of household, religion, ethnicity and ideological position (Asilsoy and Oktay, 2018; Roy and Pal, 2009). Lighthouse Cities should therefore utilize policy tools to remove barriers to pro-environmental lifestyle choices. The elite survey asked respondents to rank the top five domains of lifestyle change in order of priority for their city's current climate policies. Figure 5.8 shows the percentage of respondents ranking the fourteen domains.

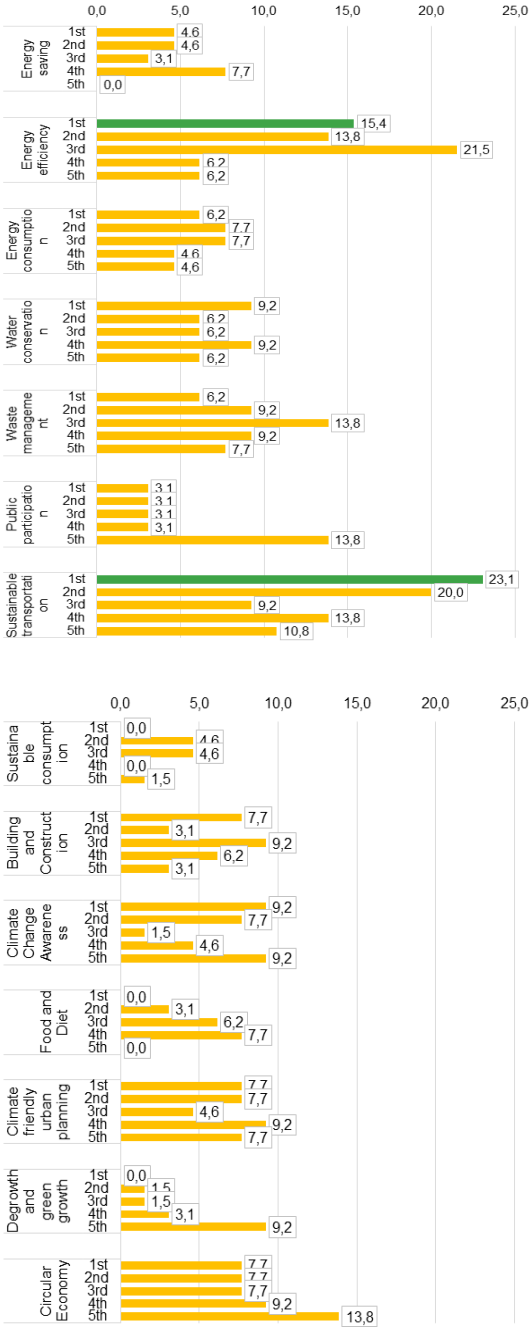


Figure 5. 8: Top five lifestyle changes for city's current climate policies

It is indicated that the lifestyle domain targeted by the majority of Lighthouse Cities is sustainable transportation. Of the 44 responses to this question, 15 (23%) ranked sustainable transportation as first choice.

The sustainable transport system includes reduced car use, and energy efficient vehicles and commuting (Steg and Gifford, 2005). These 15 respondents are from Izmir, Lahti, Milan, Vilnius, Baku, Malmö, and Dublin. A total of 10 respondents (15%) from Izmir, Baku, Athens, Linz, Vilnius, Lahti, and Milan ranked energy efficiency as the most important lifestyle domain to be changed. Energy efficiency policies address lifestyle choices regarding housing, space and water heating/cooling and home appliances (Moriarty and Wang, 2014). All other lifestyle domains are ranked as first choice by less than 10% of respondents. None ranked as first choice sustainable consumption, food and diet, and degrowth and green growth. This result is consistent with the finding that the least popular climate mitigation policy has been 'incorporating degrowth in Lighthouse Cities' climate planning.

The next question asked respondents which lifestyle choices were debated in the last 5-10 years, and are currently being debated and/or need to be debated in the next 5-10 years in the development of city's climate policies. There were 35 lifestyle options, and Figure 5.9 presents the most and least frequently discussed lifestyle preferences across Lighthouse Cities. In each category, the top five lifestyle choices are marked orange, and the bottom five, in grey. The results show that 'paper waste' was the most discussed issue in the development of climate policies in the last five years, identified by almost 59% of the 82 respondents, the highest proportion. Forty-five respondents (54%) reported that plastic, metal and glass waste recycling had been debated in the past.

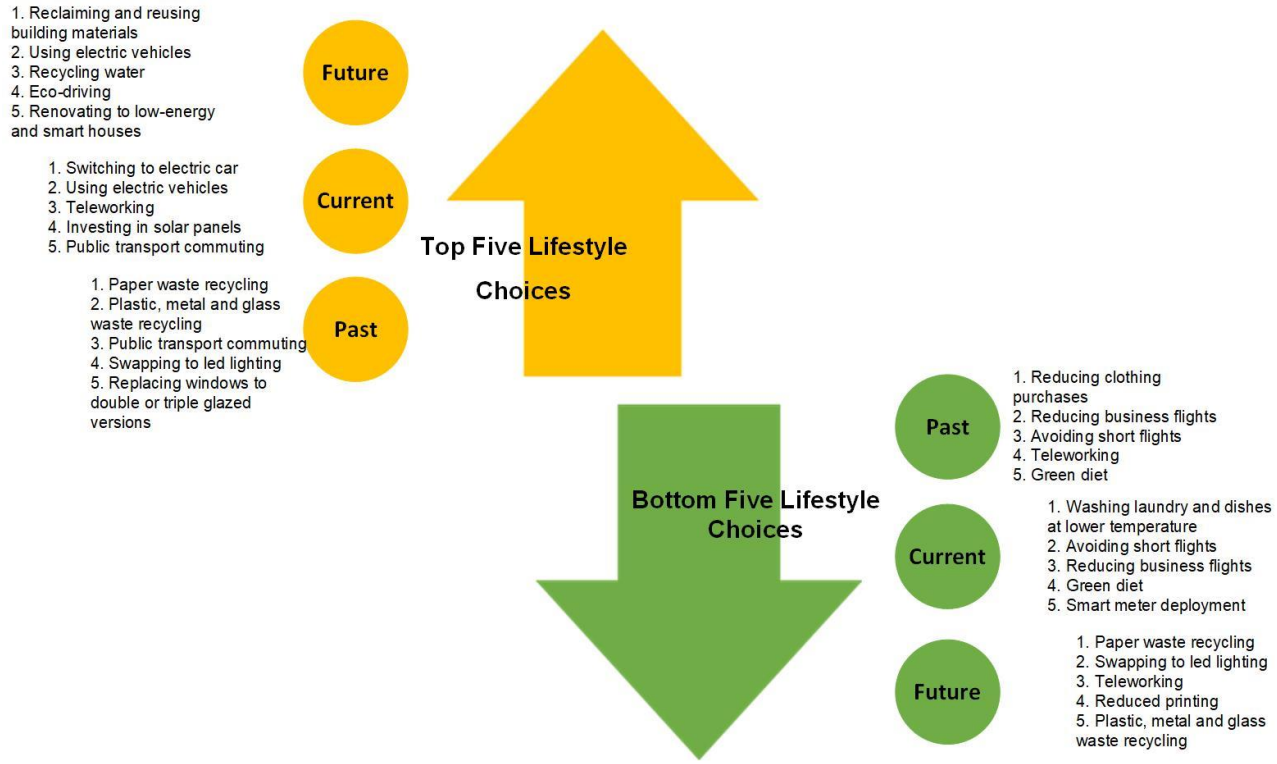


Figure 5. 9: The most and the least debated lifestyle choices

This finding is in agreement with the existing literature. The increase in the quantity of waste produced per household has imposed remarkable threats to environmental sustainability across the world. Recycling has become an efficient and accepted tool for minimizing waste especially in Europe where it is promoted through a combination of "EU directives, fiscal measures […], pricing structures, and local authority provisions" over the last three decades (Thomas and Sharp, 2013: 12; Yu et al., 2019). Our results reveal that paper recycling was also selected more frequently by European Union-based experts.

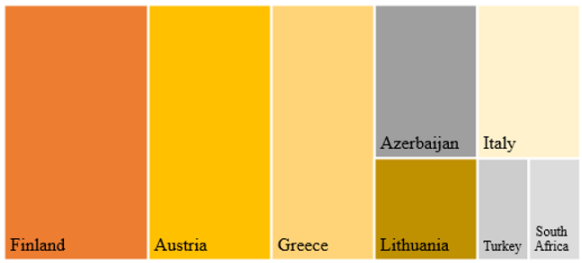


Figure 5. 10: Past debates on recycling by city

However, Figure 5.9 further reveals that, today, switching to electric car and vehicles rather than recycling is the most topical policy debate, and is likely to remain so in the future. Of the 82 respondents, 61, around 75%, stated that switching to electric car is currently being debated in the development of city's climate policies; 34 or around 41%, that it will be debated in the next 5 to 10 years. Car is still the most attractive mode of travel worldwide yet there is a need to switch from internal combustion engines to electric vehicles due to the challenges inherent in reliance on fossil fuels. Electric cars "have the potential to improve the efficiency, affordability, and sustainability of the transport system" (Ortar and Ryghaug, 2019: 1). Policymakers, hence, are promoting the development and use of electric vehicles since the prior barriers such as limited vehicle range, high vehicle cost, and long recharging times (Biresselioglu et al. 2018) are currently being reduced. Figure 5.11 shows the countries in which the switching to electric car is currently debated. Two respondents who did not report their location are not included in the figure. The data indicate that the EU member states display great interest in electrification of mobility.

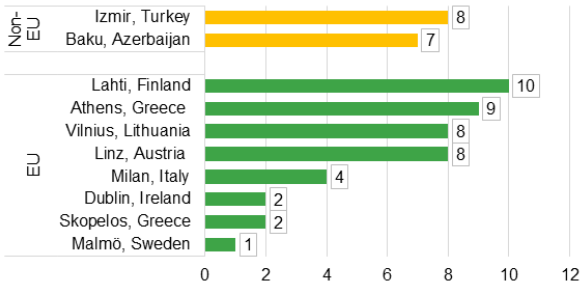


Figure 5. 11: Present debates on switching to electric car by city

This is understandable since the European Commission has set targets for the transport sector to reduce CO2 emissions by 2050 (Statharas et al., 2019). Studies also show that "in 2020 the global stock of electric vehicles exceeded the 10 million limit and global sales increased by 41 %" and "145 million vehicles" are expected by 2030 (IEA, 2021). Moreover, as seen in Figure 5.12, the debate on switching to electric cars are likely to continue in the non-EU countries in the future. Both Turkey and Azerbaijan have

reduced the tax on electric cars over the last decade.

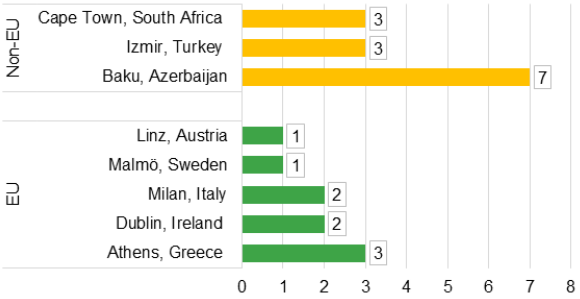


Figure 5. 12: Future debates on switching to electric car by city

As expected, our results show that teleworking, which is "work carried out in a location where, remote from central offices or production facilities, the worker has no personal contact with co-workers there, but is able to communicate with them using new technology", is a popular discussion area today. (Di Martino and Wirth, 1990: 530). The Covid-19 pandemic has encouraged working from home, which resulted in reduced energy demand from industry and increased energy saving in transportation (Rouleau and Gosselin, 2021). The survey results also reveal that the discussion around teleworking will become less important as the global pandemic is contained. The least debated lifestyle choice today is energy saving in washing laundry and dishes.

The experts in our survey see future lifestyle choices to be related to building sector and housing. Among 82 respondents, 42 (51%) indicated that 'reclaiming and reusing building materials' need to be debated in the next 5-10 years in the development of their city's climate policies. Figure 5.13 presents in which countries the future debates on housing will take place. A possible explanation of why the majority of experts from Izmir suggested rebuilding sector as a future lifestyle choice might be the recent earthquake that struck the Aegean Sea in October 2020. It reportedly killed 115 people, injured more than 1000, and damaged 635 buildings to varying extents (Sahin et al., 2020). As an earthquake zone, Izmir needs to focus on comprehensive rehabilitation, risk planning and reproduction of urban spaces.

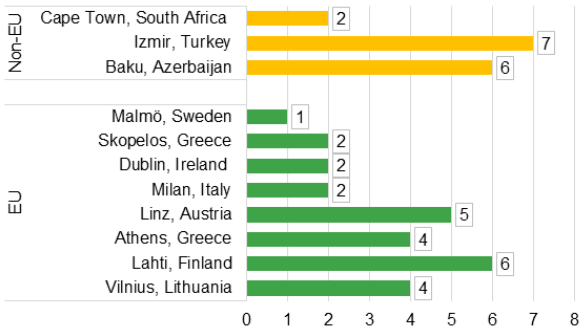


Figure 5. 13: Future debates on reclaiming and reusing building materials by city

Table 5.7 shows the number and percentage of respondents who reported a lifestyle choice discussed only in the past 5-10 years. Of 82 survey respondents, almost 38 percent identified that paper waste recycling was only discussed in the past. These respondents are from Baku, Athens, Lahti, Linz, Milan, Izmir, and Vilnius. The least debated lifestyle choice of the past that has now disappeared from the policy landscape is reducing clothing purchases, selected only by one expert from Athens.

Table 5. 7: Lifestyle choice debated in the past

Lifestyle Choices	*n*	%

Paper waste recycling	31	37.8
Plastic, metal and glass waste recycling	28	34.1
Replacing windows to double or triple glazed versions	26	31.7
Reduced printing	25	30.5
Swapping to led lighting	25	30.5
Preferring to purchase energy-efficient appliances and whitegoods	20	24.4
Using less water in daily life	19	23.2
Carsharing	18	22.0
Walking/cycling rather than personal driving	18	22.0
Public transport commuting	17	20.7
Carpool commuting	17	20.7
Organic waste recycling and composting	16	19.5
Urban cycling	15	18.3
Washing laundry and dishes at lower temperature	15	18.3
Investing in solar panels	15	18.3
Efficient use of home appliances and whitegoods	15	18.3
Upgrading insulation	13	15.9
Reducing heating and cooling	11	13.4
Food waste reduction	10	12.2
Disposing less and recycling more	10	12.2
Switching to an heat supplier offering larger share of heat from renewable sources	10	12.2
Eco-driving	9	11.0
Smart meter deployment	9	11.0
Switching to an energy supplier offering larger share of electricity from renewable sources	9	11.0
Reclaiming and reusing building materials	9	11.0
Renovating to low-energy and smart houses	8	9.8
Recycling water	7	8.5
Disposing less and reuse more	5	6.1
Green diet	4	4.9
Switching to electric car	4	4.9
Using electric vehicles	4	4.9
Avoiding short flights	3	3.7
Reducing business flights	3	3.7
Teleworking	2	2.4
Reducing clothing purchases	1	1.2
Average	**12.9**	**15.7**

Table 5.8 presents the lifestyle choices discussed both in the past and today. The three key lifestyle choices in this regard are public transport, commuting, and paper waste recycling. Of the 82 experts, 2 from Baku, 2 from Izmir, and one respondent each

from Finland, Lithuania, Austria, Greece, South Africa, and another undisclosed location. Similarly, 10 respondents (3 from Izmir, 2 from Baku, 2 from Lahti, one respondent each from Vilnius, Milan, and Dublin) stated that paper waste recycling has been discussed both in the past and present. None of the respondents selected green diet, reducing business flights, washing laundry or washing dishes at lower temperatures, disposing less and reuse more, or reducing clothing purchases. This result implies that the public is not yet ready to give up hygienic concerns or comfort zones for climate purposes.

Table 5. 8: Lifestyle choice debated in the past and today

Lifestyle Choices	*n*	%
Public transport commuting	10	12.2
Paper waste recycling	10	12.2
Investing in solar panels	9	11.0
Urban cycling	8	9.8
Plastic, metal and glass waste recycling	8	9.8
Swapping to led lighting	8	9.8
Organic waste recycling and composting	6	7.3
Upgrading insulation	6	7.3
Renovating to low-energy and smart houses	6	7.3
Replacing windows to double or triple glazed versions	6	7.3
Switching to an energy supplier offering larger share of electricity from renewable sources	5	6.1
Preferring to purchase energy-efficient appliances and whitegoods	5	6.1
Using less water in daily life	5	6.1
Food waste reduction	4	4.9
Switching to electric car	4	4.9
Reclaiming and reusing building materials	4	4.9
Recycling water	4	4.9
Walking/cycling rather than personal driving	4	4.9
Reducing heating and cooling	3	3.7
Disposing less and recycling more	3	3.7
Switching to an heat supplier offering larger share of heat from renewable sources	3	3.7
Using electric vehicles	3	3.7
Carsharing	2	2.4
Reduced printing	2	2.4
Efficient use of home appliances and whitegoods	2	2.4
Carpool commuting	1	1.2
Teleworking	1	1.2
Avoiding short flights	1	1.2
Eco-driving	1	1.2
Smart meter deployment	1	1.2
Green diet	0	0
Reducing business flights	0	0

Washing laundry and dishes at lower temperature	0	0
Disposing less and reuse more	0	0
Reducing clothing purchases	0	0
Average	**3.9**	**4.7**

Figure 5.14 presents the lifestyle choices which were debated only in the past, and also need to be brought to attention in the future. Respondents identified nine lifestyle choices discussions that fall into this category. Among these, carpool was identified by 2 of 82 respondents, the other eight lifestyles, by one each.

Figure 5. 14: Lifestyle Choices: Debated in the last 5-10 years and also need to be debated in the next 5-10 years

Table 5.9 shows the lifestyle choices which were debated in the last 5-10 years, are currently being debated, and need to be debated in the next 5-10 years. Public transport commuting, urban cycling, and walking/cycling rather than personal driving were the most selected, by 11 respondents from Lahti, Linz, Izmir, Vilnius, Malmö, Dublin, and Milan. No other lifestyle choices reached as much as 10 percent.

Table 5. 9: Lifestyle Choices: Debated in the last 5-10 years, currently being debated, and need to be debated in the next 5-10 years

Lifestyle Choices	*n*	%
Public transport commuting	11	13.4
Urban cycling	11	13.4
Walking/cycling rather than personal driving	11	13.4
Organic waste recycling and composting	8	9.8
Plastic, metal and glass waste recycling	8	9.8
Investing in solar panels	8	9.8
Recycling water	8	9.8
Replacing windows to double or triple glazed versions	7	8.5
Paper waste recycling	6	7.3
Upgrading insulation	6	7.3
Renovating to low-energy and smart houses	6	7.3
Swapping to led lighting	6	7.3
Food waste reduction	5	6.1
Disposing less and reuse more	5	6.1
Disposing less and recycling more	5	6.1
Efficient use of home appliances and whitegoods	5	6.1
Carpool commuting	4	4.9
Eco-driving	4	4.9
Reduced printing	4	4.9
Switching to a heat supplier offering larger share of heat from renewable sources	4	4.9

Preferring to purchase energy-efficient appliances and whitegoods	4	4.9
Using electric vehicles	4	4.9
Green diet	3	3.7
Teleworking	3	3.7
Carsharing	3	3.7
Reducing heating and cooling	3	3.7
Switching to electric car	3	3.7
Smart Meter Deployment	3	3.7
Switching to an energy supplier offering larger share of electricity from renewable sources	3	3.7
Washing laundry and dishes at lower temperature	2	2.4
Reclaiming and reusing building materials	2	2.4
Using less water in daily life	2	2.4
Avoiding short flights	1	1.2
Reducing business flights	1	1.2
Reducing clothing purchases	1	1.2
Average	**4.9**	**5.9**

Table 5.10 shows the current popularity of lifestyle choice debates. The most popular debate is about teleworking, which is being discussed in 43 respondents' country, in terms of the development of city's climate policies. The distribution of these respondents by city is shown in Figure 5.15.

Table 5. 10: Lifestyle Choices: Currently being debated

Lifestyle Choices	*n*	%
Teleworking	43	52.4
Switching to electric car	37	45.1
Using electric vehicles	28	34.1
Disposing less and reuse more	27	32.9
Disposing less and recycling more	27	32.9
Urban cycling	26	31.7
Swapping to led lighting	24	29.3
Switching to an energy supplier offering larger share of electricity from renewable sources	24	29.3
Public transport commuting	22	26.8
Organic waste recycling and composting	22	26.8
Renovating to low-energy and smart houses	22	26.8
Food waste reduction	21	25.6
Reducing heating and cooling	21	25.6
Carpool commuting	21	25.6
Plastic, metal and glass waste recycling	20	24.4
Reducing clothing purchases	19	23.2
Reduced printing	19	23.2
Walking/cycling rather than personal driving	19	23.2
Car sharing	19	23.2
Investing in solar panels	19	23.2
Upgrading insulation	17	20.7

Eco-driving	17	20.7
Preferring to purchase energy-efficient appliances and whitegoods	17	20.7
Using less water in daily life	17	20.7
Paper waste recycling	16	19.5
Efficient use of home appliances and whitegoods	16	19.5
Smart Meter Deployment	15	18.3
Green diet	13	15.9
Reducing business flights	13	15.9
Reclaiming and reusing building materials	13	15.9
Recycling water	12	14.6
Switching to a heat supplier offering larger share of heat from renewable sources	12	14.6
Avoiding short flights	8	9.8
Washing laundry and dishes at lower temperature	7	8.5
Replacing windows to double or triple glazed versions	7	8.5
Average	**25.7**	**31.3**

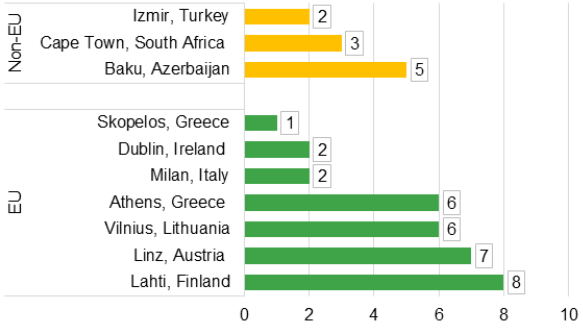


Figure 5. 15: Current debates on teleworking by city

Table 5.11 shows that a total of 34 respondents, from Athens, Izmir, Baku, Lahti, Skopelos, Vilnius, Milan, and Dublin, reported that switching to electric cars and other electric vehicles is currently being debated and need to be debated in the future in their city.

Table 5. 11: Lifestyle Choices: Currently being debated and need to be debated in the next 5-10 years

Lifestyle Choices	*n*	%
Switching to electric car	17	20.7
Using electric vehicles	17	20.7
Investing in solar panels	14	17.1
Reclaiming and reusing building materials	11	13.4
Switching to an energy supplier offering larger share of electricity from renewable sources	9	11.0
Switching to a heat supplier offering larger share of heat from renewable sources	9	11.0
Renovating to low-energy and smart houses	9	11.0
Preferring to purchase energy-efficient appliances and whitegoods	9	11.0

Walking/cycling rather than personal driving	8	9.8
Swapping to led lighting	8	9.8
Efficient use of home appliances and whitegoods	7	8.5
Reducing heating and cooling	7	8.5
Paper waste recycling	7	8.5
Plastic, metal and glass waste recycling	7	8.5
Disposing less and recycling more	7	8.5
Reducing clothing purchases	6	7.3
Using less water in daily life	6	7.3
Public transport commuting	6	7.3
Carsharing	6	7.3
Avoiding short flights	6	7.3
Reducing business flights	6	7.3
Organic waste recycling and composting	5	6.1
Smart Meter Deployment	5	6.1
Upgrading insulation	5	6.1
Recycling water	5	6.1
Green diet	5	6.1
Carpool commuting	5	6.1
Teleworking	4	4.9
Eco-driving	4	4.9
Disposing less and reuse more	4	4.9
Reduced printing	4	4.9
Replacing windows to double or triple glazed versions	4	4.9
Food waste reduction	4	4.9
Urban cycling	3	3.7
Washing laundry and dishes at lower temperature	0	0.0
Average	**9.7**	**11.9**

Table 5.12 reveals that, for the never-debated lifestyle choices that need to be discussed in the future, the majority of experts in our survey chose eco-driving. Figure 5.16 presents those respondents by country.

Table 5. 12: Lifestyle Choices: Need to be debated in the next 5-10 years

Lifestyle Choices	*n*	%
Eco-driving	31	37.8
Reclaiming and reusing building materials	29	35.4
Food waste reduction	27	32.9
Disposing less and reuse more	27	32.9
Reducing heating and cooling	26	31.7
Reducing business flights	25	30.5
Recycling water	25	30.5
Carpool commuting	24	29.3
Carsharing	24	29.3
Green diet	23	28.0
Washing laundry and dishes at lower temperature	23	28.0
Reducing clothing purchases	23	28.0

Renovating to low-energy and smart houses	23	28.0
Avoiding short flights	22	26.8
Switching to an heat supplier offering larger share of heat from renewable sources	22	26.8
Disposing less and recycling more	21	25.6
Smart Meter Deployment	19	23.2
Switching to an energy supplier offering larger share of electricity from renewable sources	19	23.2
Using less water in daily life	19	23.2
Urban cycling	18	22.0
Using electric vehicles	18	22.0
Replacing windows to double or triple glazed versions	16	19.5
Walking/cycling rather than personal driving	16	19.5
Organic waste recycling and composting	15	18.3
Upgrading insulation	15	18.3
Switching to electric car	14	17.1
Efficient use of home appliances and whitegoods	14	17.1
Preferring to purchase energy-efficient appliances and whitegoods	14	17.1
Teleworking	12	14.6
Reduced printing	12	14.6
Investing in solar panels	11	13.4
Public transport commuting	10	12.2
Plastic, metal and glass waste recycling	7	8.5
Paper waste recycling	5	6.1
Swapping to led lighting	5	6.1
Average	**23.8**	**29.0**

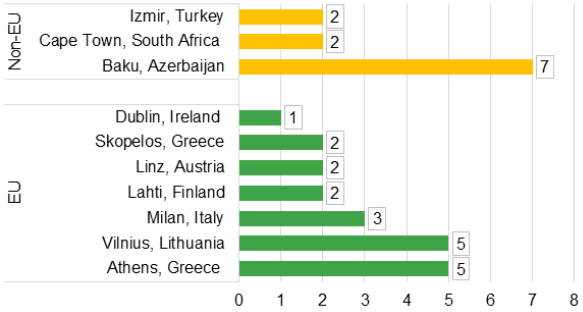


Figure 5. 16: Future debates on eco-driving by city

Table 5.13 shows the frequency lifestyle choices being reported as "not applicable". As many as 38 respondents (46.3%) identified debates over avoiding short flights as not applicable in the city. 33 of 82 respondents, failed to identify reducing business flights as ever been debated, or likely to be debated in the future in their city. Figure 5.17 presents the geographical distribution of these two sets of respondents.

Table 5. 13: Lifestyle Choices: NA

Lifestyle Choices	*n*	%
Avoiding short flights	38	46.3
Reducing business flights	33	40.2
Washing laundry and dishes at lower temperature	30	36.6
Green diet	27	32.9
Reducing clothing purchases	25	30.5

Smart Meter Deployment	22	26.8
Switching to an heat supplier offering larger share of heat from renewable sources	18	22.0
Efficient use of home appliances and whitegoods	18	22.0
Teleworking	15	18.3
Upgrading insulation	15	18.3
Reduced printing	14	17.1
Recycling water	14	17.1
Eco-driving	13	15.9
Car sharing	12	14.6
Replacing windows to double or triple glazed versions	12	14.6
Switching to an energy supplier offering larger share of electricity from renewable sources	11	13.4
Reclaiming and reusing building materials	11	13.4
Disposing less and reuse more	10	12.2
Preferring to purchase energy-efficient appliances and whitegoods	10	12.2
Carpool commuting	9	11.0
Using less water in daily life	9	11.0
Reducing heating and cooling	8	9.8
Disposing less and recycling more	7	8.5
Renovating to low-energy and smart houses	7	8.5
Using electric vehicles	7	8.5
Food waste reduction	6	7.3
Public transport commuting	5	6.1
Walking/cycling rather than personal driving	5	6.1
Organic waste recycling and composting	4	4.9
Paper waste recycling	4	4.9
Plastic, metal and glass waste recycling	4	4.9
Switching to electric car	3	3.7
Swapping to led lighting	3	3.7
Urban cycling	2	2.4
Investing in solar panels	2	2.4
Mean	**21.7**	**26.5**

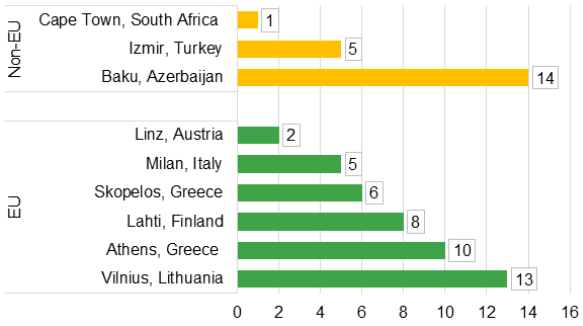


Figure 5. 17: Distribution of respondents who reported 'avoiding short flights and reducing business flights' debates as NA by city

The next question focused on which lifestyle change motivators are considered in policy making. Figure 5.18 shows the preferences of a total of 90 respondents over 10 possible options. The most often cited motivator was information and education (82 respondents, 89 %), followed by encouragement (47, 51%), and incentives (44, almost 48%). All other

motivators received less than 40%. One expert each from Baku, Vilnius, and Linz indicated no motivators used as a policy tool in their city. The expert from Vilnius specifically stated that "there are no real measures taken (except renovation of buildings)" regarding climate change and "the rest is happening on incremental pace or actually moving to the opposite direction."

The existing literature points out that governments' reluctance to promote environmentally friendly behaviour might be due to "fear of electoral protest, close relationship with industry, a focus on economic growth, and the short-term priorities of government which are linked to its limited period in office" (Lorenzoni et al., 2007: 446).

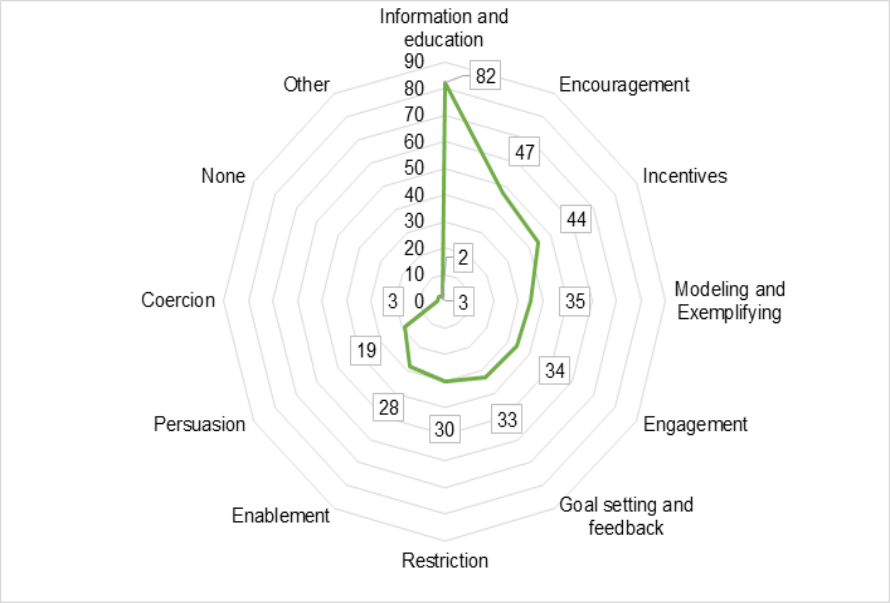


Figure 5. 18: Lifestyle motivators

Figure 5.19 shows the number of experts not choosing information and education as a lifestyle motivator considered in policy making in their city. Of 10 respondents from Peru, only 6 identified information and education.

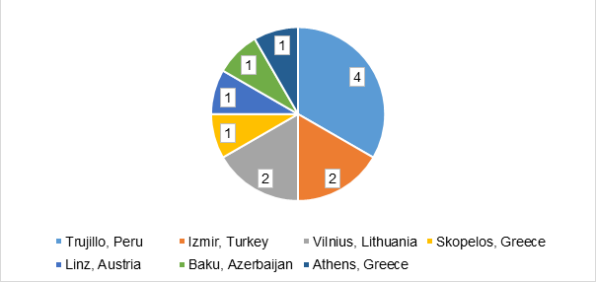


Figure 5. 19: Respondents who did not identify information and education as a lifestyle motivator

Figure 5.20 shows the number of experts who reported encouragement as a lifestyle motivator in their city. 8 of 10 respondents from Izmir, identified encouragement as a lifestyle change motivator considered in

policy making as did 8 of 11 experts from Lahti, all 3 experts from Dublin, all five experts from Milan, and the one expert from Malmö. Two respondents did not identify their location hence they are not included in the figure below.

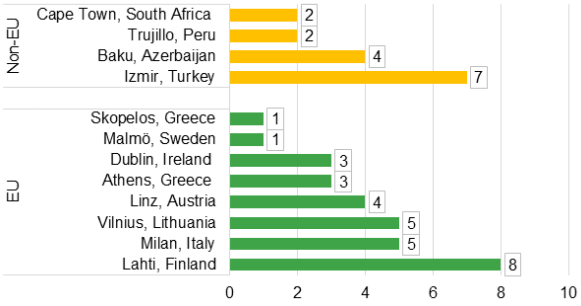


Figure 5. 20: Encouragement as a lifestyle motivator by city

Figure 5.21 reveals the number of experts who reported incentives as a lifestyle motivator in their city. No experts from Cape Town or Trujillo mentioned incentives. Eight out of 12 from Vilnius, the one expert from Malmö, 2 out of 3 experts from Skopelos, and 2 out of 3 experts from Dublin identified incentive as a lifestyle change motivator considered in policy making.

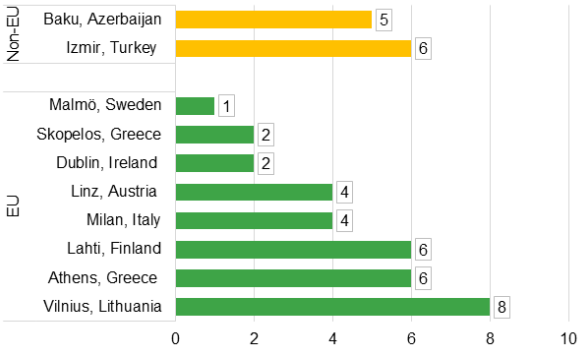


Figure 5. 21: Incentives as a lifestyle motivator by city

The survey, next, asked respondents about individual barriers to lifestyle changes that have hindered climate action policy-making in their city. Over the past decade, most research has shown that the level of public awareness of climate change is on the rise. However, increased awareness of the effects of climate change does not necessarily equate to adopting climate-friendly lifestyles (Kollmuss and Agyeman, 2002; Wibeck, 2014; Lorenzoni et al., 2007). Our results show that the successful development of climate policies depends on changing public's perception of difficulties associated with forming new habits.

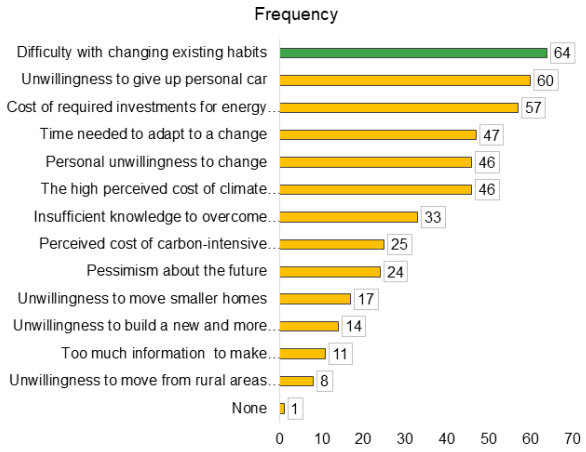


Figure 5. 22: Barriers to lifestyle changes

Figure 5.22 shows barriers for lifestyle change were cited by a high proportion of respondents: almost 70% cited difficulty with changing existing habits, followed by unwillingness to give up personal cars (65%), and cost energy efficiency upgrades (62%). The perceived cost of change seems to be playing a major role as expected. Individuals do not want to invest in new homes, cars, and appliances, most probably due to the free rider effect. This finding implies that people might not be viewing themselves as the responsible agents, and expect climate friendly action and motivation from

governments. Studies suggest that policymakers should encourage citizens to initially adopt 'simple and painless' steps to overcome their concerns over lifestyle change (Kent, 2009).

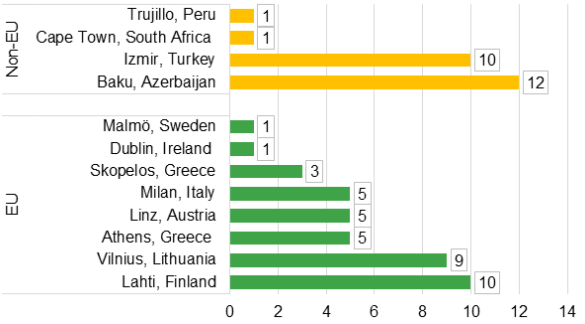


Figure 5. 23: Difficulty with changing existing habits by country

Figure 5.23 presents the distribution of responses for difficulty with changing existing habits by country. Of 11 respondents from Lahti, 10 reported that habits can act as a barrier to lifestyle transitions. The one expert from Malmö and all five from Dublin agreed.

Figure 5.24 shows the distribution of respondents who chose unwillingness to give up personal car by country. No respondents from Peru mentioned this barrier, but all 11 respondents from Lahti did.

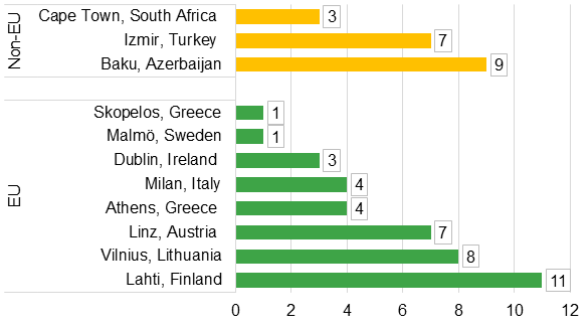


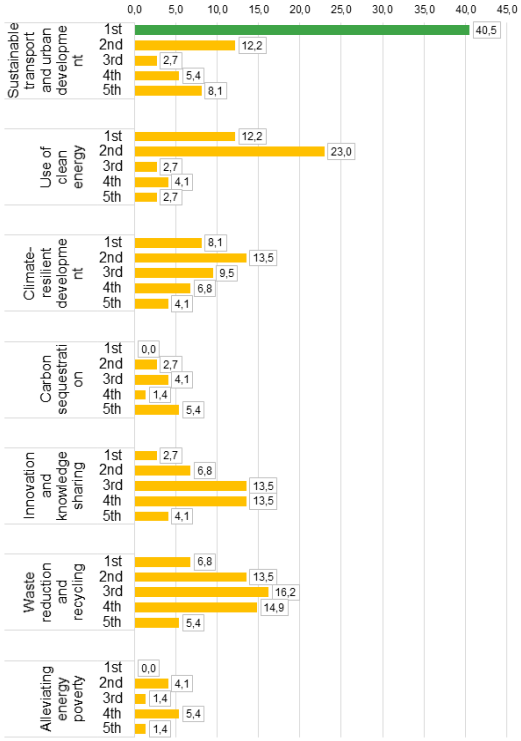
Figure 5. 24: Unwillingness to give up personal car by country

5.5. Lifestyle Climate Change Adaptation

The last section of the survey focuses on climate change adaptation policies. Adaptation refers to policies, regulations and programs "based on an awareness that conditions have changed or are about to change, and that action is required to return to, maintain, or achieve a desired state" (Dupuis and Biesbroek, 2013: 1479). Although adaptation is important for minimizing the risks of climate change, it has received less political and scholarly attention than mitigation. This is mostly because the possible impact of adaptation is limited and uncertain. For example, "it is difficult to conceive how Pacific coral atolls could successfully adapt to a substantial rise in sea-level" (Füssel, 2007: 265). This part of the survey takes a closer look at which adaptation initiatives policies Lighthouse Cities implement and the key barriers for climate change adaptation experienced at the local level.

The survey asked respondents to rank the top five climate change adaptation initiatives in order of priority for their city. Figure 5.25 presents the percentage of respondents ranking the fourteen initiatives. The results reveal that the most important initiative for the majority of Lighthouse Cities is encouraging sustainable transport and urban development. Of the 73 responses, 41% ranked encouraging sustainable transport first. Around 12% ranked expanding the use of

clean energy as their leading climate change adaptation initiatives. Other adaptation initiatives, however, are all ranked as first choice by less than 10% of respondents. None of the participants ranked as first choice carbon sequestration, alleviating energy poverty, or strengthening the existing air quality monitoring.



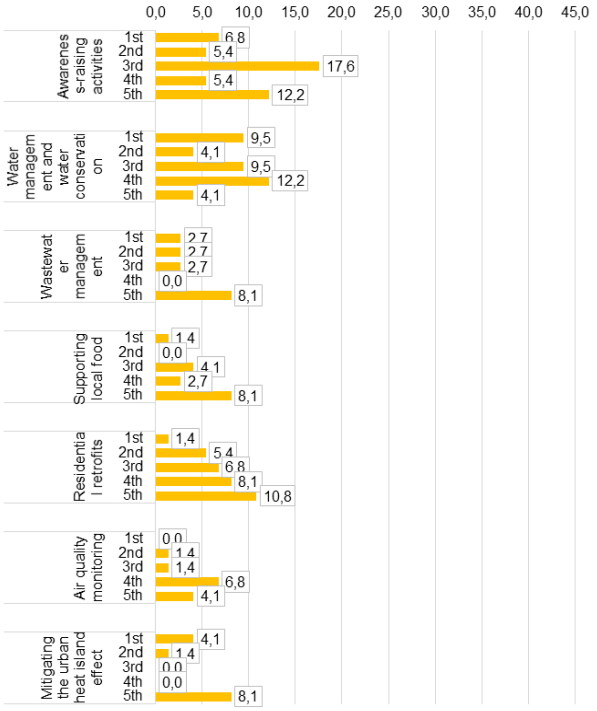


Figure 5. 25: Climate change adaptation initiatives in order of priority for the city

Figure 5.26 presents the distribution of those who chose sustainable transport as their first choice. No experts from Austria, Greece, Sweden, or South Africa ranked the transport system as the leading climate change adaptation initiative of their city.

Figure 5. 26: Distribution of respondents who chose sustainable transport as their first choice

The distribution of those who chose clean energy second is shown in Figure 5.27. No experts from Finland, Sweden, or South Africa ranked this option as their second most important climate change adaptation initiative of their city.

Figure 5. 27: Distribution of respondents who chose clean energy as their second choice

As a follow up, the questionnaire asked participants about the main policy actions that have been implemented in the last 5-10 years, are currently being implemented and/or need to be implemented in the next 5-10 years to address climate change adaptation in their city. Respondents evaluated 10 policy actions in Figure 5.28.

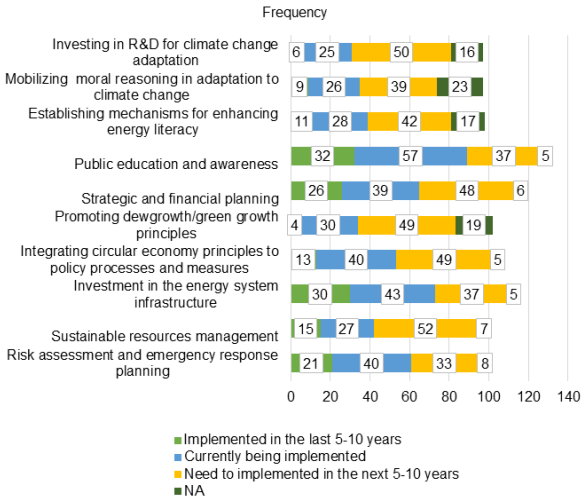


Figure 5. 28: Policy actions addressing climate change adaptation over the years

Scholars suggest that evidence-based policy-making and technical expertise increase government's likelihood of planning adaptation actions (Füssel, 2007). Our results imply that the Lighthouse Cities did not have the relative capacity to make adaptation policies in the past. Of the 90 responders, the largest group (32 respondents) stated that their cities invested in public education and awareness. As shown in Figure 5.10, as many as 30 experts reported that their cities invested in the energy system infrastructure to adapt to climate change, whereas only 26 claimed that their local authorities conducted strategic and financial adaptation planning. All other past adaptation policies are mentioned by at most 21 experts. Figure 5.29 shows the distribution of experts who reported the past investment in public education and awareness by country.

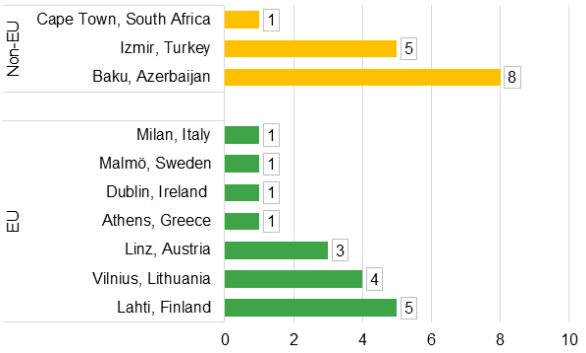


Figure 5. 29: Respondents who reported the past investment in public education and awareness by city

Figure 5.28 further shows that in the last 5 to 10 years, the least attention was given to promoting degrowth/green growth principles. Only one expert each from Lahti, Izmir, Vilnius and Malmö stated that their cities explored degrowth as a policy option in the past. These findings are similar to our earlier findings on the popular climate mitigation policies in the past and present. Despite growing scholarly interest in the discussions of degrowth in high consumption communities, the political will and action are lacking.

It is also shown in Figure 5.28 that of the 90 respondents, 57 identified public education and awareness among the current adaptation policies. Increased knowledge and awareness will enhance individuals' ability to adapt to climate changes and to evaluate possible options suitable for their needs. Figure 5.30 shows the distribution of public education responses by city. 9 of 10 experts from Peru, and 10 of 11 from Lahti, emphasized adaptation education. Scholars hold the view that the traditional environmental education focuses on issues mostly related to climate mitigation, such as reduction in consumption. They suggest that there is a universal need to teach climate adaptation topics including responding safely to natural hazards such as rising sea levels and drought (Krasny and DuBois, 2019; Stevenson et al., 2017). Figure 5.28 also further that public education is followed by investment in the energy system infrastructure, risk assessment and emergency response planning and integrating circular economy principles to policy processes and measures. Investment in R&D for climate change adaptation is the most popular policy tool for the future.

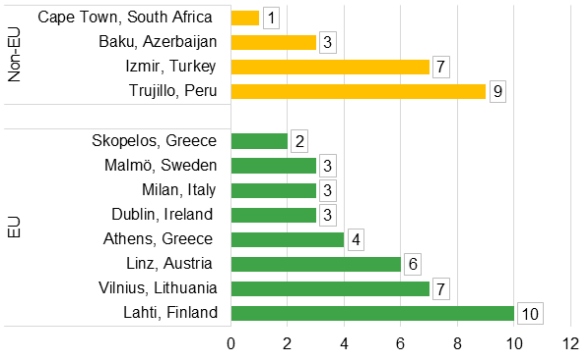


Figure 5. 30: Respondents who reported public education and awareness as a current adaptation policy

The United Nations Development Programme's (UNDP) Climate Change Adaptation Toolkit suggests that the planning and implementation of adaptation initiatives require identifying key barriers including insufficient economic, technical and political resources. The UNDP's Toolkit further recommends engaging with stakeholders and local expertise to systematically identify barriers to climate change adaptation.

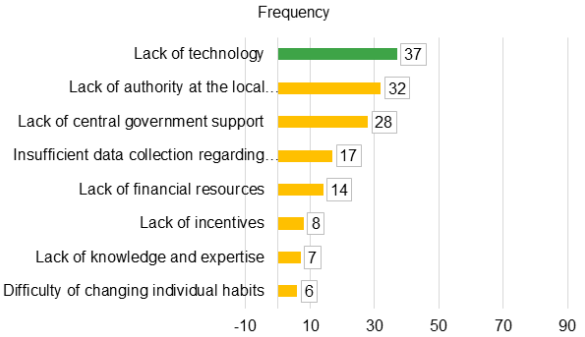


Figure 5. 31: Barriers for climate change adaptation

This survey asked the 90 experts across Lighthouse Cities about the key barriers for climate change adaptation experienced at the local level in their city. Figure 5.31 presents the results. No option was identified by more than 40 percent of the respondents. The most frequently identified barrier was lack of technology (40%).

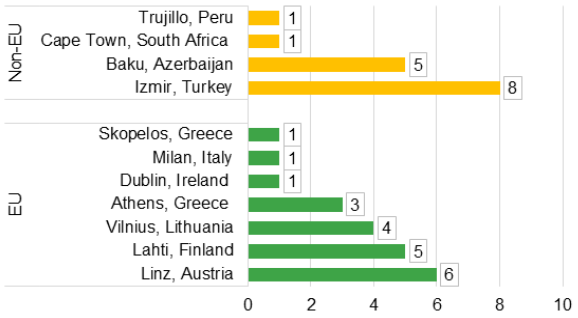


Figure 5. 32: Lack of technology by city

Figure 5.32 shows the experts choosing this option. This barrier is followed by lack of authority at the local government level (almost 35%), and lack of central government support (30.4%). Traditionally, central governments were argued to be in charge of designing and implementing adaptation policies (Biesbroek et al., 2010) but this claim has been strongly contested in recent years. Our findings also imply that adaptation initiatives will be implemented effectively if different levels of governance are involved in the decision making.

6. Aligning the Results of Literature Review and CAMPAIGNers Expert Survey

The sixth assessment report of the Intergovernmental Panel on Climate Change stated in 2021 that "global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO2) and other greenhouse gas emissions occur in the coming decades." Questions have been raised about whether it is possible to meet the targets when the only incentives are increasing carbon taxes and subsidies for renewables, and developing technical innovations (Sharpe and Lenton, 2021). Changes in consumer behaviour and lifestyle choices are also crucial to achieve sustainable emission reductions (Capstick et. al, 2014; Roy and Pal, 2009; Samadi et. al, 2017; Schanes et. al, 2016; Grubb et al., 2020).

Accordingly, the Step 5. Analysis of the results of CAMPAIGNers Expert Survey analyses a current debate in the climate change literature concerning how individuals can contribute to stabilizing carbon emissions by changing their lifestyle choices and consumption patterns (Tvinnereim et al., 2017). Findings of the CAMPAIGNers elite survey highlights the implications of the related literature, and provides a comparison of the policy needs and priorities of Lighthouse cities.

CAMPAIGNers Expert Survey is designed to generate original data to understand climate mitigation and adaptation policies and lifestyle choices in Lighthouse Cities. The central message emphasizes a strong need and demand for increasing public awareness of climate issues through education and information sharing. Also, there are concerns regarding public resistance to change, and the lack of necessary political authority. The results of this survey will assist policymakers to take design effective measures against climate change. These findings from the results of CAMPAIGNers Expert Survey are in line with the evidence from the literature review that highlight the significance of behavioural and social traits (e.g., awareness and personal norms), and social interactions, as well as the identification of education as a determining individual socio-demographic characteristic.

The literature involves a number of studies that emphasize the significance of increasing awareness and information provision in order to demonstrate means of and trigger climate-friendly behaviour and lifestyle changes. This also extends to utilizing the effect of increasing awareness through providing instances of best practices. The literature review also highlights the significance of more structured and more widespread education activities, along with awareness increasing campaigns. One example would be utilizing mainstream media (TV channels, radio) and social media

as tools for mass public awareness campaigns on energy savings and the impacts of global warming.

6.1. Lifestyle Choices

To date, various lifestyle strategies have been introduced to reduce green gas emissions, such as walking/cycling instead of driving, avoiding long and frequent flights, recycling, reducing clothing purchases, washing laundry and dishes at lower temperatures, lowering the heating thermostat, and teleworking. However, it is not reasonable to expect people to enforce all these strategies automatically and at once. Green lifestyle adoption is related to individual factors such as age, gender, education, income, religion, norms, and values, and contextual factors such as economic, institutional and socio-cultural dynamics.

CAMPAIGNers Expert Survey emphasizes sustainable transportation as the most important lifestyle domain targeted by the majority of Lighthouse Cities. At this point, one interesting conclusion drawn from the literature review is that the literature on climate-friendly lifestyles demonstrates a bias towards the analysis of urban middle-class lifestyles, rather than the variety of conditions and situations within urban contexts. This conclusion is further reflected in the results of CAMPAIGNers Expert Survey, where sustainable transportation, a theme associated with the urban middle-class, is highlighted as the most prominent policy

The following discussion examines evidence from the CAMPAIGNers Expert Survey, based on main themes, and traces the relationship between the survey and the literature review.

priority for the Lighthouse Cities. Among the 44 respondents who participated in the CAMPAIGNers elite survey, sustainable transportation was ranked first by 15 (23%) respondents, from Izmir, Lahti, Milan, Vilnius, Baku, Malmö, and Dublin. This result also aligns with the findings of the literature review, which indicated that lifestyle changes mainly involve transportation preferences (Gjerstad and Flottum, 2021). Greener transport habits include reduced car use, energy efficient vehicles, using public transportation and carpooling (Asilsoy and Oktay, 2018; Gjerstad and Flottum, 2021). Previous studies demonstrated that the lower emissions in London and New York compared to those in Barcelona and Toronto are “a result of high levels of public transport usage, strong investment in infrastructure and policies to promote alternatives to private motor vehicle use” and low “car ownership and usage levels” (Dodman, 2009: 194).

The elite survey also revealed energy consuming behaviour as another key lifestyle domain needing change. This finding supports the literature review which revealed that the promotion of energy-saving behaviour in residential buildings is necessary with the increase in population and personal comfort and hygiene options

(Adua 2010, Hess et al. 2018; Xu et al., 2021). Examples for household energy-saving behaviour include reducing space and water heating/cooling, wash cycles, and use of tumble dryer. In the CAMPAIGNers elite survey, 10 respondents (15% of the sample) from Izmir, Baku, Athens, Linz, Vilnius, Lahti, and Milan ranked energy efficiency as the key lifestyle domain. Findings from the literature review also points to a field of priority in terms of energy-savings behaviour in residential buildings. This is due to energy consumption and potential energy savings' association with daily activities, generally taking place within households. Examples analysed include using energy-efficient appliances, adapting comfort temperatures with less need for heating and cooling, and decreasing water consumption.

The CAMPAIGNers elite survey also asked respondents which lifestyle choices have been debated in the development of their city's climate policies. The results revealed that the most commonly debated issues in the past were paper waste recycling, plastic, metal, and glass waste recycling. This finding compliments the literature review which demonstrated that recycling is a "conventional environmental action" that is "highly structured and regulated […] in contrast both to purchasing and habitual activities" (Barr and Gilg, 2006: 911). Recycling is a low-cost and convenient pro-environmental behaviour for individuals compared to other activities such as flying long distance. It has become an efficient and accepted tool for minimizing waste, especially in Europe, where it is promoted through a combination of "EU directives, fiscal measures […], pricing structures, and local authority provisions" over the last three decades (Thomas and Sharp, 2013: 12; Yu et al., 2019). The results reveal that paper recycling is also selected more frequently by experts from the European Union member states. Lahti, Linz, Athens, Milan, and Vilnius reported waste management as an important area of past debate in their city.

A number of studies in the literature also refer to the framing of energy-savings behaviour in households by focusing on the costs and benefits associated with them. That is, households associate lifestyle choices with the immediate and future benefits or costs/burdens to themselves, as well as to their environments. This is an important perspective for utilization in formulating policies that target climate-friendly lifestyles. Another point to consider, as evidenced from the literature review emphasizes that higher-income earners generally have larger households, hence larger carbon footprints, i.e., eco-gentrification is likely to increase rather than lower overall emissions.

However, the CAMPAIGNers elite survey further revealed that, today, switching to electric car and vehicles rather than recycling is a hot policy issue and is likely to remain so in the future. Our literature review indicated that "sustainable mobility approach requires actions to reduce the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system" (Grigonis et al., 2014: 334). Therefore,

the promotion of electric cars and vehicles could also contribute the greener transportation efforts if powered from green energy as well as. The CAMPAIGNers elite survey data revealed that the EU member states (Austria, Greece, Ireland, Italy, and Sweden) display greater interest in electrification of mobility. This is findings is not surprising after the European Commission targets for the transport sector to reduce CO2 emissions by 2050 (Statharas et al., 2019). Moreover, the elite survey showed that the debate on switching to electric cars is likely to continue in the non-EU countries (e.g. Azerbaijan and Turkey) in the future. This finding is also expected, since both Turkey and Azerbaijan have reduced the tax on electric cars over the last decade.

The literature review also provides results in line with the findings from the CAMPAIGNers Expert Survey in terms of the prioritization of mobility in the context of behaviour change. The phenomena of sustainable mobility and sustainable transport are often cited. In this respect, the literature refers to incentives, regulations for low-carbon transportation, use of electric vehicles in the public transportation fleet, taxes and other restrictions on vehicles with high carbon emissions. It also highlights the need to increase the skills and education levels of city planners, designers, and local policy makers in terms of sustainable mobility. As compared to the CAMPAIGNers Expert Survey findings, the research in the literature focuses more on the processes of planning, infrastructure building and considering spatial parameters of the cities in terms of adopting sustainable transportation lifestyles.

Another important survey finding that aligns with the literature review is the burgeoning importance of reclaiming and reusing building materials across Lighthouse Cities. Population growth has stimulated the construction sector. However, the production and use of building materials such as wood, plaster, steel and cement promote wasteful consumption and depletion of natural resources (Gorgolewski 2008). Scholars have suggested that "static and aging housing should be replaced by scenarios of structural and technological progress in new urban development (e.g., zero-carbon footprint buildings) and refurbishing old housing stock in cities" (Niamir et al. 2020: 12). The survey shows that the more intense future debates on housing will take place in Izmir, Baku, Linz, and Lahti. In particular, after the recent Aegean earthquake in October 2020, Izmir needs to focus on comprehensive rehabilitation, risk planning and reproduction of urban spaces.

The survey also revealed that the current least debated lifestyle choices are washing laundry and dishes at lower temperature, avoiding short flights, reducing business flights, green diet, and smart meter deployment. The literature review shows similar results concerning the lifestyle choices on the on the individual level including daily habits, food consumption and mobility habits. These include, reducing water consumption, using energy-efficient appliances reducing hot water temperature,

wearing warmer clothing, and reducing flights. Hygiene dominates the current battle against COVID-19; hence reduced consumption of hot water is not discussed in the Lighthouse Cities. Flights can be avoided by using "a mix of coach, train, high-speed-rail and carpool transport" and green diet can be achieved by consuming locally produced, chemical free and plant-based diet (van de Ven 2018: 862). The literature review shows that campaigns of change can be successful in encouraging greener lifestyle choices (Sparkman et al. 2021).

6.2. Lifestyle Change Motivators

In connection to the lifestyle choices, the CAMPAIGNers Expert Survey also asked experts which lifestyle change motivators are considered in policy making in their city. The available literature suggests that "various intervention strategies should be explored to encourage energy-saving behaviours among occupants, including: (i) information and education (e.g., workshops to increase knowledge or understanding); (ii) goal setting and feedback (e.g., assigning an energy reduction target, and giving feedback for households to measure the progress); (iii) persuasion (e.g., using communication to induce positive or negative feelings or stimulate action); (iv) incentives (e.g., creating expectation of reward such as monetary rewards); (v) modelling (e.g., providing example for occupants to aspire or to imitate; (vi) coercion (e.g., creating expectation of punishment or cost) (vii) restriction (e.g., using rules to reduce the opportunity to engage in competing behaviours or to increase the opportunity to engage in the target behaviour); (viii) and enablement (e.g., increasing means and reducing barriers to increase capability or opportunity)" (Belaïd and Joumni, 2020: 8)

In the survey, the respondents were asked to state which of these strategies have been considered in policy making for climate actions in their city. Based on past literature, we expected environmental awareness and information to be a priority in achieving climate-friendly lifestyles. Past research shows that the factors with the potential to shape action are direct experience (e.g. breathing polluted air), factual knowledge on the impact of climate friendly practices, and ecosystem information.The findings of the elite survey support our expectations. All Lighthouse cities identified information and education as a lifestyle motivator in local policymaking. Encouragement also seems to play an important role in Baku, Dublin, Izmir, Lahti, Milan, and Malmö, while the least reported policy tool is coercion.

Results from the CAMPAIGNers Expert Survey regarding the prioritization of lifestyle change motivators are in line with the findings of the literature review in the sense that the literature also identifies awareness level and information level as the most prominent factors affecting individuals'

behaviours and can stimulate behaviour change for climate-friendly lifestyles.

As with the CAMPAIGNers Expert Survey, encouragement or persuasion is also extensively discussed in the literature review. This is closely related with the second most important lifestyle change motivator, incentives, as evidenced from the survey. The literature also places a similar emphasis on incentives, also referring to the cost/benefit paradigm. That is, the literature also recommends considering of how lifestyle choices and climate-friendly behaviour are perceived by the individuals, according to immediate and future benefits or costs/burdens. At this point, it is worthwhile noting that both the literature review and the CAMPAIGNers Expert Survey places negative impacts/costs to a lower priority as compared to incentives and benefits. That is, according to both, utilizing rules and restrictions to reduce the opportunity to engage in competing behaviours has lower likelihood of effectiveness as compared to actions or initiatives to increase the opportunity to engage in the target behaviour.

According to the information received from the experts, CAMPAIGNers Expert Survey places modelling and exemplifying as the fourth significant motivator for lifestyle changes. Similar evidence can be derived from the literature review, where providing example for citizens to aspire or to imitate is proposed as an efficient trigger for behaviour change towards climate-friendly lifestyles.

6.3. Barriers to Lifestyle Change

As with the lifestyle change motivators, barriers to lifestyle change need also be considered in terms of their impacts on adopting climate-friendly lifestyles.

In this respect, the literature review identifies a number of barriers on different contexts. For instance, infrastructural and technical barriers, economic barriers, and social barriers are listed as external barriers.

According to the literature review, the catalogue of individual-related barriers makes up a much longer list of factors. That is, the literature review identifies emotions such as hopelessness, fear, anxiety, and pessimism, insufficient or excessive knowledge, confusion, problem denial, entrenched habits, and busy routine as individual barriers against climate-friendly lifestyles, or environmental action (Moberg et al., 2021). Results from the CAMPAIGNers Expert Survey also provide evidence in the same direction, highlighting that Lighthouse Cities consider difficulties associated with forming new habits as the most significant impediment to green behaviour, especially in Lahti, Malmö and Dublin. Unwillingness to give up personal cars and the cost of required investments for energy efficiency upgrades are also important barriers for lifestyle change particularly in Lahti, Vilnius, Linz, Malmö, Izmir, and Baku.

Individuals are reluctant to invest in new homes, cars, and appliances most probably due to the free rider effect. This finding implies that people who might not view themselves as responsible agents would expect climate friendly action and motivation from governments. Studies suggest that policymakers should encourage citizens to initially adopt 'simple and painless' steps to overcome their concerns over lifestyle change (Kent, 2009).

A similar conclusion holds for the external barriers. In line with the evidence from the literature review, the significance of the economic barriers is also reflected by the results of CAMPAIGNers Expert Survey, where the high cost energy efficiency upgrades are identified as a significant barrier for lifestyle change. According to the results from the CAMPAIGNers Expert Survey, the significance of this barrier increases even more when the actual high cost of climate beneficial energy efficiency actions is coupled with the perceived high cost of such actions. Overall, both the literature review and the survey indicate that the cost of change seems to be playing a major role as a barrier –both internal as a perception, and external as the actual economic barrier- as expected.

Personal unwillingness to change, whether stemming from lack of awareness, lack of information, economic, or infrastructural factors, is another important barrier against climate-friendly behaviour and lifestyles. CAMPAIGNers Expert Survey identifies this phenomenon as a significant barrier. However, in the literature, personal unwillingness to change is typically not directly cited as a barrier directly hindering climate-friendly behaviour and lifestyles, but rather as a consequence of other barriers, such as lack of information or perceived high cost of pro-environmental actions.

7. Identification of available policy levers that the Lighthouse Cities use to influence daily lifestyles

Human activities have resulted in excessive carbon emissions and hence, climate change., and an urgent and ambitious response is needed. The scope of such response should include policy making, as well as initiatives by the actions by the individuals, society, and actions by the NGOs. This underlines the significance of policy making. Climate policies should be formulated to address both central and local government-led strategy formulations, action plans, initiatives, and implementations as well as measures to foster and facilitate, and trigger the efforts of individuals, community, NGOs, and other stakeholders. Hence, the policy formulation needs to consider multiple perspectives, as well as motivators and barriers pertaining to the different facets of the policy making paradigm.

Evidence from the literature review and CAMPAIGNers Expert Survey can be utilized to highlight the policy making areas that need to be prioritized for Lighthouse Cities in terms of fostering climate-friendly lifestyles. According to both sources, the most important domains of lifestyle change for Lighthouse Cities are identified as awareness, information provision, sustainable mobility, and energy efficiency.

Policies concerning increasing awareness and information provision have been long debated in the literature, and in policy making in the Lighthouse Cities, and the topic persists as the most prominent factor in behaviour change and climate-friendly lifestyles. Therefore, targeted and more efficient policies need to be customized and implemented for Lighthouse Cities. Regarding policy making for increasing awareness and information provision, two significant points can be drawn from literature review and CAMPAIGNers Expert Survey. First, as the topic has long been in the agendas of Lighthouse Cities, it may result in the efforts, policy formulation, and implementation becoming a routine and expected practice, not frequently reviewed or revised. However, the era of information with abundant means of communication options including social media, opens the way for a more dynamic approach to the process and communication for increasing awareness and information provision, considering the contemporary opportunities and threats. The second factor revealed by the literature review and CAMPAIGNers Expert Survey concerning policies for increasing awareness and information provision is that, to increase the impact of policies, there is a need for a longer-term and more structured

approach, geared towards education rather than delivering stand-alone, one-time messages.

The second policy area for Lighthouse Cities that is highlighted by the literature review and CAMPAIGNers Expert Survey is sustainable mobility. Among the policy domains concerning sustainable mobility, one important area, public transportation, is typically managed by local governments. In this respect, policymakers in Lighthouse Cities have the advantage of formulating and implementing policies in this area. Such policies include the extension of the public transportation network, improving its infrastructure to increase its utilization, investing in low-emission or zero-emission public transportation vehicles and infrastructure, and implementing relevant incentives. In addition to the policies directly related to the public transportation service, the Lighthouse Cities can use various levers to influence daily lifestyles, such as policies that facilitate its integration of public and personal transportation in the last-km, enhancing pedestrian and bicycle routes, investing in electric vehicle charging infrastructure, and encouraging car sharing.

The third area that can be utilized as a policy lever is energy efficiency. As with awareness, despite the long-term efforts in this area, there is still room for implementing policies in this area in the Lighthouse Cities. Another significance of energy efficiency policies is their direct relevance to other climate policies, for example, concerning education, awareness, incentives, and regulations. Hence, although not necessarily central to policy making for the Lighthouse Cities, energy efficiency polices are practically well-suited as an overarching principle lever in the policy formulations concerning climate-friendly lifestyles. However, one critical challenge is for policies targeting behaviour change through energy efficiency is the difficulty of changing daily lifestyles and behaviours beyond the habits of the individuals. That is, most individuals are aware of the narratives of energy efficiency, and have adopted behaviours accordingly, but generally consider these narratives to a limited degree. Hence, prospective policies targeting energy efficiency in the Lighthouse Cities need to be reformulated to achieve the targeted impact.

Evidence from the results of CAMPAIGNers Expert Survey reveals that, in the past, policies concerning waste management and recycling were the most debated lifestyle domains across Lighthouse Cities. However, such policies are less debated currently and are foreseen by experts to be debated even less in the future. Considering the contemporary dimensions of waste management and recycling, including reusing building materials, waste water management, waste heat management, a reiteration of such policies may also be a valuable policy lever in the Lighthouse Cities. Such reformulation needs also to acknowledge the strategies and policies regarding the European Green Deal, as well as the accompanying economic transformation. Redesigning waste management and recycling policies as part

of Green Deal strategy can also enhance the utilization of the opportunities that the Deal provides.

Another set of significant outputs from the literature review and CAMPAIGNers Expert Survey are the motivators and barriers for climate-friendly lifestyles. Although these parameters may not directly point to policy areas, their consideration in policy making will prove to be important for the acceptability and implementability of the resulting policies. Hence, climate policymaking should target utilizing motivators in the policy formulations, while alleviating the effects of or removing barriers.

Concerning the motivators for lifestyle changes in the Lighthouse Cities, information and education is determined to be the most significant motivator, hence the need to prioritise policies that explicitly target information campaigns or education programmes on climate-friendly lifestyles. In addition to these policies that directly target information and education, there is also a need for policies in other domains such as public transportation or recycling, which may have complementary counterparts that target information provision and education regarding these areas.

The next most prominent motivator is identified through the literature review and CAMPAIGNers Expert Survey is encouragement. Similar to education, encouragement can also be utilized as a policy lever, as an ingredient in policy formulations in many areas. Encouragement takes the form of, for example, energy/fuel price instruments combined with appliance standards, rebates, tax breaks, or taxes, education programs, media campaigns and advertisements to promote green lifestyles, rewarding low-carbon behaviour of employees, CO2 labelling of consumer goods, stamps of approval labels, energy metering, decreasing public transportation costs, promoting social cohesion, and supporting local food habits and tourist facilities. It is worthwhile to note that, both the survey and the literature review indicate the lower effectiveness of utilizing rules and restrictions to reduce the opportunity to engage in competing behaviours as compared to actions or initiatives to increase the opportunity to engage in the target behaviour. Another possible means of encouragement is through political participation, political role and action. In this respect, local governments in the Lighthouse Cities should take an active role and emphasize transparency. Collaborative efforts with local businesses and with communities may also prove to be effective.

Another motivator that can be utilized as a policy lever is the concept of modelling and exemplifying for lifestyle changes. Policies or initiatives that enhance the local governments in Lighthouse Cities, as an inspiration and example to citizens can become an efficient trigger for behaviour change towards climate-friendly lifestyles. Such policies would relate to the municipalities using electric vehicles, increasing the energy efficiency in public buildings, and decreasing carbon emissions

resulting from the activities of the municipality. In addition to providing such examples, these type of policies also serve to overcome the hesitancy in citizen's views of their own capacities to undertake initiatives towards climate-friendly lifestyles.

There are significant individual and external barriers to lifestyle changes that have hindered policy making in the Lighthouse Cities. The most significant external barriers are identified as infrastructural, technical, and economic barriers. Policy formulations concerning climate-friendly behaviours need to acknowledge that overcoming these usually requires long-term efforts and resources, and that one-shot policies should be avoided. Instead, the message delivered to the public through policies needs to demonstrate the strategic and persistent efforts. Concerning internal barriers, the most significant impediment to green behaviour are difficulties associated with forming new habits, unwillingness to give up personal car and cost of required investments for energy efficiency upgrades. Policy formulations in all areas concerning climate-friendly lifestyles need to consider these barriers and seek to include tools to prevent them significantly decreasing the acceptability and implementability of the policies.

Also, concerning the importance of the communities, empowering local communities, local co-operatives, charities, mutual-aid/social enterprises may act as a policy lever to enhance the engagement of citizens for taking an active role in terms of adopting climate-friendly lifestyles.

In terms of social and environmental justice, everyone's basic needs should be protected such as ensuring healthy food and water for all citizens, other issues that need to be addressed are decent housing, questioning the need for high consuming lifestyles and behaviours, and socio-geographical inequalities (i.e., gentrification and its impacts). In particular, socio-demographic factors (e.g., gender, age, income, ethnicity) need to be prioritized.

Therefore, there is a need for considering the following: effective measures regarding reducing the availability of 'bad' options (choice editing), investments in infrastructure and available low-carbon options, action plans to make climate-friendly solutions economically-friendly solutions need to be implemented. In doing so, the long-term efficacy and impact of measures, rebound effects, and target residential CO2 footprints.

It is also worthwhile to acknowledge that individual and collective practices are socially, institutionally and infrastructurally configured, and therefore activities cannot be considered isolated because they are bundled with others and framed through social arrangements. To this end, the following should be taken into account: the different behavioural settings and material arrangements at home, on holiday, at work, etc. and it is important to employ socio-technical provisioning systems (i.e., considering how consumption is shaped through collective temporal, spatial and

material organisation), and use these to plan time-use and time-allocation.

8. Conclusion and Final Remarks

Deliverable 1.2 of CAMPAIGNers, Scope of actions to reduce GHG intensity of daily life in Lighthouse Cities, provides a comprehensive analysis of Greenhouse Gas Emissions (GHG) habits in the Lighthouse Cities. In order to achieve this aim, two main methodological tools are utilized. The first is the comprehensive state-of-the-art literature review, which analysed the perspectives, methods, and concepts relevant to climate lifestyles and behaviour change, based on the existing body of work. The literature reviews captured information on the range of contexts and scales of intervention regarding climate-friendly lifestyles and behaviour change, the geographical coverage that the research on climate lifestyles and behaviour change focuses, the disciplines that constitute the relevant literature, and the range of methodologies utilized. Also identified are the frameworks and parameters, frameworks for understanding how lifestyles impact climate action, and key parameters, dynamics affecting climate lifestyles including factors related to individuals, factors related to community/society, and external factors, and gaps pointed out by the literature concerning the climate lifestyles and behaviour change. The state-of-the-art literature review also provided a list of takeaway points for CAMPAIGNers.

Analysis of the literature review has outlined key findings from the literature review conducted by project partners for WP1 of the CAMPAIGNers project. This review has provided an abundance of insights regarding existing literature addressing sustainable lifestyles, including research methodologies, frameworks for understanding how lifestyles impact climate action and associated parameters, dynamics affecting behaviour change, and key insights from research. In contrast, the current literature review summarises and synthesizes insights from all reviewed literature, and reiterates several key ways of framing and understanding the relationship between lifestyles and climate. Three overarching insights are identified as provisional conclusion:

Many factors, dynamics, and parameters can influence and support more environmentally friendly lifestyles and behaviours. However, these are often context and sector-specific and require an understanding of systems of provision, political economies and ecologies, and urban lifestyles, and the variated and uneven experiences of residents within cities.

Reviewed literature is diverse, but primarily centred on survey-based research focused

on individual behaviours and techno centric approaches. Further research could focus on broadening the reviewed methods, geographic contexts, and disciplines involved.

Lifestyles are not simply a matter of individual choice, but must be understood and addressed across multiple scales (e.g., individual, household, community, city, region), sectors (e.g. transport, energy, waste, food, housing, and water, amongst other), and spheres of influence (e.g. psychological, cultural, political, social, material, economic).

D1.2 also utilizes input from the Lighthouse Cities in terms of policy levers employed to influence daily lifestyles to help meet the Paris Agreement goals of the LCs, obtained through the CAMPAIGNers Expert Survey. The survey is implemented with experts from the Lighthouse Cities who have participated in, or have in-depth knowledge of, the formulation and implementation of climate mitigation and adaptation policies in their cities. The Survey resulted in information on a wide range of issues as discussed.

Results from the state-of-the-art literature review and the CAMPAIGNers Expert Survey are evaluated, enhancing the identification of a catalogue habits of high GHG intensity to be addressed within policy activities.

The analysis demonstrates that results of the CAMPAIGNers Expert Survey and the literature review are highly consistent. Both analyses found that significant factors affecting lifestyle choices are awareness, sustainable mobility, and energy efficiency. Hence, policy formulations in these areas can be utilized as levers to induce behaviour change and adoption of climate-friendly lifestyles.

Similarly, there is also an agreement in the results of CAMPAIGNers Expert Survey and the literature review in terms of the lifestyle change motivators. In this respect, the major lifestyle change motivators according to the CAMPAIGNers Expert Survey are information and education, encouragement, incentives, modelling and exemplifying, engagement, goal-setting and feedback, restriction, enablement, and persuasion. These results are also supported by evidence from the literature review.

Concerning the barriers against lifestyle changes, a number of internal and external factors emerged, the most prominent being: difficulty in changing existing habits, unwillingness to give up personal car, cost of required investments for energy efficiency upgrades, time needed to adapt to a change, personal unwillingness to change, high perceived cost of climate beneficial actions, insufficient knowledge to overcome mitigation inaction, perceived cost of carbon-intensive actions, and pessimism about the future. Evidence from the literature review also points to these barriers.

These results provide valuable inputs for policy formulations. The motivators can be exploited to utilize in policies, whereas barriers need to be alleviated or overcome.

However, the interactions between these parameters also need to be considered.

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9 Appendix

INTRODUCTION

Thank you for taking part in this survey on lifestyle-related environmental opportunities currently debated in the Lighthouse Cities and feasible policy actions. The survey should take no longer than 15 minutes to complete. The results will allow us to identify the available policy levers that the Lighthouse Cities use to influence daily lifestyles in order to meet the Paris Agreement goals.

This study is being carried out on behalf of CAMPAIGNers Project supported by H2020, involving 28 partners in 16 major cities, 15 countries and 5 continents. CAMPAIGNers is a multidisciplinary project that aims to provide the most profound and policy-ready knowledge on decarbonisation of citizens' lifestyles.

TERMS, CONDITIONS & CONSENT

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. There will be no direct benefit to you, but your participation is likely to help us find out more on our research subject.

We will not be sharing any information about you to anyone outside of the research team. The information that we collect from this research project will be kept private.

Please answer the questions as fully and honestly as you can. If you are experiencing any issues with this survey please email to: senlab@senlab.ieu.edu.tr.

Thank you for taking the time to complete this important questionnaire.

SECTION 1: EXPERT/STAKEHOLDER INFORMATION

1) Selecting the "Yes" button below indicates that you understand the above terms and conditions of participation in this study.

   - Yes (I consent to the aforementioned terms of the survey)
   - No (I do not consent to the terms of the survey)

2) Please indicate your country and city:
   .....

3) Please specify your role(s) as an expert or a stakeholder:

   - Executive (Municipality or Mayor's Office)
   - Senior Officer (Municipality or Mayor's Office)
   - Officer in environmental/sustainability services of the city
   - Officer in transportation services of the city
   - Officer in urban/construction services of the city
   - Officer in other functions of the city (e.g., procurement, finance, social services)
   - Advisor (Municipality or Mayor's Office)
   - Member of Technical Committee for local climate action planning

- Member of Steering Committee for local climate action planning
- Member of Professional Chambers
- Faculty Member/Researcher
- Representative of a Private Company
- Representative of a Utility Company
- Other (please specify) .....

SECTION 2: CLIMATE CHANGE MITIGATION - efforts to reduce greenhouse gas emissions in your entire community.

4) Please rank the following top three climate change mitigation policies/tools in order of priority for your city.
   - Municipal Self Governing
   - Education and Enabling
   - Financing and Provision
   - Regulation
   - Changes in lifestyles
   - ICT and Digitalization

5) Please indicate the main policy actions that have been implemented in the last 5-10 years/are currently being implemented/need to be implemented in the next 5-10 years to address climate change mitigation in your city.

   (Please check all that apply. If an action has never been considered to be implemented, please check NA)

Policy Action	Implemented in the last 5-10 years	Currently being implemented	Need to be implemented in the next 5-10 years	NA
Accelerating transition to low emission vehicles	○	○	○	○
Developing more sustainable urban mobility such as mass transit and local mobility	○	○	○	○
Installing low and zero carbon and energy efficient technologies	○	○	○	○
Facilitating more sustainable waste management	○	○	○	○
Developing new subsidy schemes, grant programmes and/or investments	○	○	○	○
Reviewing and updating of existing local policies, regulations	○	○	○	○

and guidelines				
Engaging key internal and external partners and stakeholders throughout the process	○	○	○	○
Addressing the urban heat island effect	○	○	○	○
Developing green and blue infrastructure strategy	○	○	○	○
Increasing the level of protection, restoration and regulation of the natural environment and ecosystems	○	○	○	○
Reducing pollution	○	○	○	○
Developing administrative organisational structure for the implementation and monitoring of climate action plans	○	○	○	○
Raising public awareness	○	○	○	○
Reducing energy consumption from conventional sources by improving energy efficiency and sustainable use of renewable sources	○	○	○	○
Increasing recycling rates	○	○	○	○
Encouraging the reuse of materials	○	○	○	○
Improving air quality	○	○	○	○
Incorporating degrowth in city's climate planning	○	○	○	○
Increasing preparedness for extreme weather events	○	○	○	○

SECTION 3: LIFESTYLE CHANGES AND LIFESTYLE CHOICES

6) Please rank the top five domains of lifestyle change in order of priority for your city's current climate policies.

- Energy saving
- Energy efficiency
- Energy consumption
- Water conservation and water management
- Waste management
- Public participation
- Sustainable transportation
- Sustainable consumption
- Building and Construction
- Climate Change Awareness
- Food and Diet
- Climate friendly urban planning
- Degrowth and green growth
- Circular Economy

7) Which individual lifestyle choices have been debated in the last 5-10 years/are currently being debated/need to be debated in the next 5-10 years in the development of city's climate policies?

(Please check all that apply. If an individual lifestyle choice has never been considered to be debated, please check NA)

Individual Lifestyle Choice	Debated in the last 5-10 years	Currently being debated	Need to be debated in the next 5-10 years	NA
Green diet	○	○	○	○
Food waste reduction	○	○	○	○
Public transport commuting	○	○	○	○
Carpool commuting	○	○	○	○
Teleworking	○	○	○	○
Urban cycling	○	○	○	○
Car sharing	○	○	○	○
Avoiding short flights	○	○	○	○

Reducing business flights	○	○	○	○
Eco-driving	○	○	○	○
Reducing heating and cooling	○	○	○	○
Organic waste recycling and composting	○	○	○	○
Paper waste recycling	○	○	○	○
Plastic, metal and glass waste recycling	○	○	○	○
Switching to electric car	○	○	○	○
Washing laundry and dishes at lower temperature	○	○	○	○
Disposing less and reuse more	○	○	○	○
Disposing less and recycling more	○	○	○	○
Reducing clothing purchases	○	○	○	○
Reduced printing	○	○	○	○
Smart Meter Deployment	○	○	○	○
Investing in solar panels	○	○	○	○
Switching to an energy supplier offering larger share of electricity from renewable sources	○	○	○	○
Switching to an heat supplier offering larger share of heat from renewable sources	○	○	○	○
Upgrading insulation	○	○	○	○
Renovating to low-energy and smart houses	○	○	○	○

Swapping to led lighting	○	○	○	○
Replacing windows to double or triple glazed versions	○	○	○	○
Reclaiming and reusing building materials	○	○	○	○
Recycling water	○	○	○	○
Efficient use of home appliances and whitegoods	○	○	○	○
Preferring to purchase energy-efficient appliances and whitegoods	○	○	○	○
Using less water in daily life	○	○	○	○
Walking/cycling rather than personal driving	○	○	○	○
Using electric vehicles	○	○	○	○

8) Which of the following motivators for lifestyle changes are considered in policy making for climate actions in your city?
(Please check all that apply)

- ○ Information and education
- ○ Goal setting and feedback
- ○ Persuasion
- ○ Incentives
- ○ Modelling and Exemplifying
- ○ Coercion
- ○ Restriction
- ○ Enablement
- ○ Encourage
- ○ Engage
- ○ Other (Please specify) .....
- ○ None

9) Which of the following individual barriers to lifestyle changes have hindered policy making for climate action in your city?

(Please check all that apply)

- Difficulty with changing existing habits
- The high perceived cost of climate beneficial actions
- Perceived cost of carbon-intensive actions
- Personal unwillingness to change
- Time needed to adapt to a change
- Unwillingness to move from rural areas to urban ones
- Unwillingness to move smaller homes
- Unwillingness to build a new and more sustainable home
- Cost of required investments for energy efficiency upgrades
- Unwillingness to give up personal car
- Pessimism about the future
- Insufficient knowledge to overcome mitigation inaction
- Too much information to make meaningful decisions
- Other (Please specify) .....
- None

Section 4: CLIMATE CHANGE ADAPTATION - efforts to adapt to existing and expected impacts of climate change.

10) Please rank the top five climate change adaptation initiatives in order of priority for your city.
    - Encouraging sustainable transport and urban development
    - Expanding the use of clean energy
    - Promoting climate-resilient development
    - Carbon sequestration
    - Supporting innovation and knowledge sharing
    - Promoting waste reduction and recycling
    - Alleviating energy poverty
    - Awareness-raising activities on the effects of climate change on human health
    - Water management and water conservation
    - Wastewater management
    - Supporting local food supply chains and farm biodiversity
    - Supporting residential retrofits
    - Strengthening the existing air quality monitoring
    - Mitigating the urban heat island effect
    - None

11) Please indicate the main policy actions that have been implemented in the last 5-10 years/are currently being implemented/need to be implemented in the next 5-10 years to address climate change adaptation in your city.
    (Please check all that apply. If an action has never been considered to be implemented, please check NA)

	Implemented in the last 5-10 years	Currently being implemented	Need to be implemented in the next 5-10 years	NA
Risk assessment and emergency response planning	○	○	○	○
Sustainable resources management	○	○	○	○
Investment in the energy system infrastructure	○	○	○	○
Integrating circular economy principles to policy processes and measures	○	○	○	○
Promoting degrowth/green growth principles	○	○	○	○
Strategic and financial planning	○	○	○	○
Public education and awareness	○	○	○	○
Establishing mechanisms for enhancing energy literacy	○	○	○	○
Mobilizing moral reasoning in adaptation to climate change	○	○	○	○
Investing in R&D for climate change adaptation	○	○	○	○
None	○	○	○	○

12) What are the key barriers for climate change adaptation experienced at the local government level in your city?
(Please check all that apply)

- ○ Difficulty of changing individual habits
- ○ Lack of knowledge and expertise
- ○ Lack of technology
- ○ Lack of financial resources
- ○ Lack of incentives

- Insufficient data collection regarding climate change
- Lack of authority at the local government level
- Lack of central government support
- Other (please specify) .....
- None

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This project has received funding from the European Union's Horizon research 2020 and innovation programme under grant agreement No. 101003815.