CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

REPORT TO: **CITY MANAGER**
TO BE REFERRED BY THE OFFICIAL TO MAYCO VIA THE RELEVANT *ENERGY & FUTURE PLANNING AND RESILIENCE* SECTION 79 COMMITTEE [AFTER CONSIDERATION BY CITY MANAGER]

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1. ITEM NUMBER

2. SUBJECT

FEEDBACK ON THE INTERNATIONAL/OUTSIDE THE BORDERS OF THE RSA TRIP UNDERTAKEN FROM 12-13 March 2024 TO ATTEND THE CLIMATE CAMPAIGNERS GENERAL ASSEMBLY IN BELGIUM

ONDERWERP

TERUGVOERING OOR DIE INTERNASIONALE REIS (BUITE DIE GRENSE VAN DIE RSA) VAN 12 TOT 13 MAART 2024 VIR DIE BYWONING VAN DIE ALGEMENE BYEENKOMS VAN KLIMAATSKAMPVEGTERS ("CLIMATE CAMPAIGNERS GENERAL ASSEMBLY") IN BELGIë

ISIHLOKO

INGXELO EMALUNGA NASEMVA KOHAMBO KUMAZWE APHESHEYA/ANGAPHANDLE KWEMIDA YASEMZANTSI AFRIKA EQHUTYWE UKUSUSELA NGOWE12 UKUYA KOWE 13 NGEYOKWINDLA 2024 UKUZIMASA INDIBANO JIKELELE YABAKHANKASI KWEZESIMO SEZULU, EBISE BELGIUM

Q3336

John Laing Smale
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3. EVENT SUMMARY

EVENT DETAILS	
CONFERENCE/SEMINAR	Climate Campaigners General Assembly
OTHER	To gain insight into the results of data analysis and the resulting implications for climate policy and behavioural change, based on the implementation of the Climate Campaigners Project that was rolled out in various cities across the world including Cape Town.
DATE	12-13 March 2024
VENUE	Mundo Madou, Av.des Arts 7/8 1210
TOTAL COST TO THE CITY	R0
CITY	Brussels
COUNTRY	**BELGIUM**

ATTENDEE DETAILS	
NAME AND SURNAME	DESIGNATION
Caitlin Gifford Sole	**ASSISTANT PROFESSIONAL OFFICER**
Candes Lee Arendse	**PROFESSIONAL OFFICER**

PROVIDE SUMMARY OF HOST ORGANISATION / CITY
The final Genearal Assembly of the Climate Campaigners project was hosted by the Energieinstitut an der Johannes Kepler Universität Linz. The Energieinstitut an der Johannes Kepler Universität Linz is a not for profit research organisation located in Austria. The institute consist of 35 researchers currently work at the institute in a multidisciplinary structure of three departments (Energy Economics, Energy Law, and Energy Technology) aiming to gain holistic insights into the issues under investigation. The organisation was the project lead for Climate Campaigners, and was responsible for the organisation of the final General Assembly.

4. OBJECTIVE

Climate Campaigners is a multi-city project funded by the European Union to bring together science institutes, cities and municipalities, civil society organizations and digital entrepreneurs. The aim of the project is to drive active citizenship for climate change mitigation by changing behaviour through a social media application (app) that integrates social science research insights and policy support with grassroots action. It further aims to provide participating cities with ananonymised data collected from the app to inform policy and strategic direction across multiple sectors.

Cape Town participated in the project and the roll out of the App in collaboration with 13 other cities around the world, including cities in France, Peru, Ireland, Italy, Switzerland, and Turkey. Ultimately, the outcomes of the project aims to contribute to the promotion of a

transition to sustainable lifestyles by encouraging citizen-driven behavior change as well as help cities better understanding the underlying processes, motivators, and barriers to change.

Through the attendance of the Assembly, the officials attending were able to gain insights and learnings from the project, including the final project outcomes and key findings, and insight into climate change policy recommendations based on the findings of the data analysis done as part of the Campaigners Project. In addition, the results from the data analysis and experiences from other cities that participated in the roll out of the project - will inform how the City can improve on communicating climate change including climate risk, adaptation, mitigation and sustainability topics.

The Assembly was also attended by representatives from other cities, who leads the implementation Climate Change Strategies and Action Plans in the respective cities. This provided an opportunity to engage with these cities on general climate change response topics including successes and challenges, with specific interest in how Cape Town is currently addressing water management.

5. OUTCOMES

- Various content changes were suggested and explained by the participating cities for the Climate Campaigners Mobile Application, in order to improve the application to be specific to local context in order for local audiences to be able to relate to the information and participate more actively. These suggestions will be considered by the project managers for future implementation as the app will continue to be available for use for the next two years.
- The App provided a good basis to inform and guide local climate change and sustainable development related communication and engagement in Cape Town.
- While the app was able to monitor and track behavioural change, more data and lifestyle parameters are needed to quantify the overall impact of behavioural change on emission reductions. However insights gleaned from the app confirmed that behaviour changes are able to produce the highest impact on carbon mitigation over the short to medium term, while policy implementation has the biggest impact in the mid to long term.
- The app also highlighted how lifestyle changes can rapidly help alleviate pressure on electricity demand. This is useful insight for the City of Cape Town's load-shedding mitigation plan.
- The cities attending provided useful lessons learned and innovative solutions to addressing challenges in communicating climate change and motivating action amongst the public.

6. ACTIONS REQUIRED

There is no follow up action required by the City of Cape Town. The project coordinators of the Climate Campaigners Project will be in contact with Sustainable Energy Markets as the project lead for the City and UCT as the Research Partner, to communicate and engage with any actions required for future interactions.

7. IMPLICATIONS

7.1 Constitutional and Policy Implications No ☒ Yes ☐

7.2	**Environmental implications**	No ☒	Yes ☐
7.3	**Financial Implications**	No ☒	Yes ☐
7.4	**Legal Implications**	No ☒	Yes ☐
7.5	**Staff Implications**	No ☒	Yes ☐
7.6	**Risk Implications**	No ☒	Yes ☐

7.7 POPIA Compliance

☒ It is confirmed that this report has been checked and considered for POPIA Compliance.

NOTE: POPIA Section MUST be completed otherwise the report will be returned to the author for revision.

Contact your Directorate POPIA Stewards should you require assistance.

The City has a contract in place with XL Embassy Travel for the safe-keeping of Traveller's personal information as required by the POPI Act.

8. RECOMMENDATIONS

It is recommended that the feedback report on the trip Climate Campaigners General Assembly in Brussels, Belgium undertaken by Caitlin Gifford Sole and Candes Lee Arendse on 12-13th March 2024 **be considered and noted**.

AANBEVELINGS

Daar word aanbeveel dat die terugvoeringsverslag oor Caitlin Gifford Sole en Candes Lee Arendse se reis vir die algemene byeenkoms van klimaatskampvegters in Brussel, België van 12 tot 13 Maart 2023 **oorweeg word, en dat daarvan kennis geneem word.**

IZINDULULO

Kundululwe ukuba **makuthathelwe ingqalelo kwaye kuqwalaselwe** ingxelo engasemva kohambo ebelumalunga neNdibano Jikelele engaBakhankasi kwiSimo seZulu, eseBrussels, eBelgium, oluqhutywe nguCaitlin Gifford Sole noCandes Lee Arendse ukususela ngowe12 ukuya kowe13 kweyoKwindla 2024.

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9. GENERAL DISCUSSION

Overall, the Campaigners General Assembly offered valuable insights for the City of Cape Town on the role that behavior change among residents can have towards achieving the City's climate change goals, and how these can be implemented through effective policies and communications campaigns. These are particularly relevant to the City's Climate Change and Energy Strategies, both of which include active citizenship and engagement. In addition, some useful policy recommendations were provided which were drawn from discussions with Lighthouse Cities (including Cape Town) held over the duration of the project.

These include:

- Utilise behaviour mapping to design targeted engagement strategies for shifting mobility trends, while also providing accessible and safe sustainable transport alternatives and highlighting the co-benefits of transitioning towards more sustainable transportation options.
- Prioritise environmentally-friendly renovations and alleviate energy poverty, supporting households with information, technical assistance, and financial aid throughout the renovation process, while also enforcing stricter standards for building renovations and engaging in multi-sector efforts to establish local energy communities.
- Facilitate affordability of sustainable food products by providing financial support for local sustainable food production and consumption, while also supporting initiatives to minimise food waste through targeted communication campaigns, ideally at least in-part framed within the context of local food culture and heritage.
- Provide financial support for circular activities and services while enhancing accessibility to lower-carbon products through initiatives such as mapping climate-friendly stores and promoting them digitally.
- Investment in diverse communication methods, including digital and in-person engagement, must prioritise equity and meaningful, locally framed messaging to effectively promote sustainable behaviours and ensure inclusivity, considering potential technology-related barriers.

The above are reflected in the City's Climate Change and Energy Strategies, confirming that the City's policies and goals are relevant to and in line with international policies, whilst reflecting our own local context.

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10. ANNEXURES

Annexure A: Final Agenda: Climate Campaigners General Assembly
Annexure B: CAMPAIGNers Guidebook: incorporating lifestyle-related pathways and actions into NDCs and long term strategies [DRAFT FOR CONSULTATION]

FOR FURTHER DETAILS, CONTACT:

DATE	09 APRIL 2024		
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DIRECTORATE	ENERGY	FILE REF NO	
SIGNATURE :	CSole		

EXECUTIVE DIRECTOR

KADRI NASSIEP

The ED's signature represents support for report content and confirms POPIA compliance.

COMMENT:

SIGNATURE:

NAME Kadri Nassiep

DATE 16/04/24

EXECUTIVE DIRECTOR

GARETH MORGAN

The ED's signature represents support for report content and confirms POPIA compliance.

COMMENT:

SIGNATURE: Gareth Morgan Digitally signed by Gareth Morgan Date: 2024.04.10 15:26:44 +02'00'

NAME

DATE

MANAGER: INTERNATIONAL RELATIONS

COMMENT:

DR. DENVER VAN SCHALKWYK

SIGNATURE: Dr Denver van Schalkwyk Digitally signed by Dr Denver van Schalkwyk Date: 2024.04.17 11:18:48 +02'00'

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☐ REPORT COMPLIANT WITH THE PROVISIONS OF COUNCIL'S DELEGATIONS, POLICIES, BY-LAWS AND ALL LEGISLATION RELATING TO THE MATTER UNDER CONSIDERATION.

LEGAL COMPLIANCE

☐ NON-COMPLIANT

NAME John Laing Smale

TEL

DATE Digitally signed by John Laing Smale Date: 2024.04.21 21:08:38 +02'00'

COMMENT:

Certified as legally compliant based on the contents of the report.

Note: The Afrikaans translation of the Recommendations erroneously refers to 12 to 13 March 2023.

CITY MANAGER

☒ NOTED

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☒ REFER TO THE MAYORAL COMMITTEE VIA THE RELEVANT SECTION 79 COMMITTEE

DATE

COMMENT:

Annexure A: Final Agenda

CLIMATE CAMPAIGNERS

General Assembly

Brussels, Belgium

12th – 13th March, 2024

Venue:
Mundo Madou
Av. des Arts 7/8, 1210
Bruxelles, Belgien

climate-campaigners.com

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

Agenda

Tuesday, 12th March 2024	
at Mundo Madou – conference room: Artemisia	
Time	
09:00 - 09:30	**Arrival / Registration**
09:30 - 09:45	**Welcome / Intro** EI-JKU & CANE
09:45 – 11:15	**Project Chronicle: milestones, takeaways and lessons learnt** Lead: IUE Participants: all
11:15 – 11:30	**Coffee break**
11:30 – 12:30	**Project Chronicle: milestones, takeaways and lessons learnt** Focus: policy findings Lead: HEAS Participants: all
12:30 – 13:30	**Lunch**
13:30 – 15:00	**Experience sharing from Lighthouse Cities** Lead: ICLEI Participants: all
15:00 – 15:30	**Coffee break**
15:30 – 17:00	**Beyond CAMPAIGNers: amplifying sustainable lifestyles** Lead: UCT Participants: all
17:00 – 17:15	**Wrap up, end of first meeting day**
19:00 – 22:00	**Social dinner - tbc**

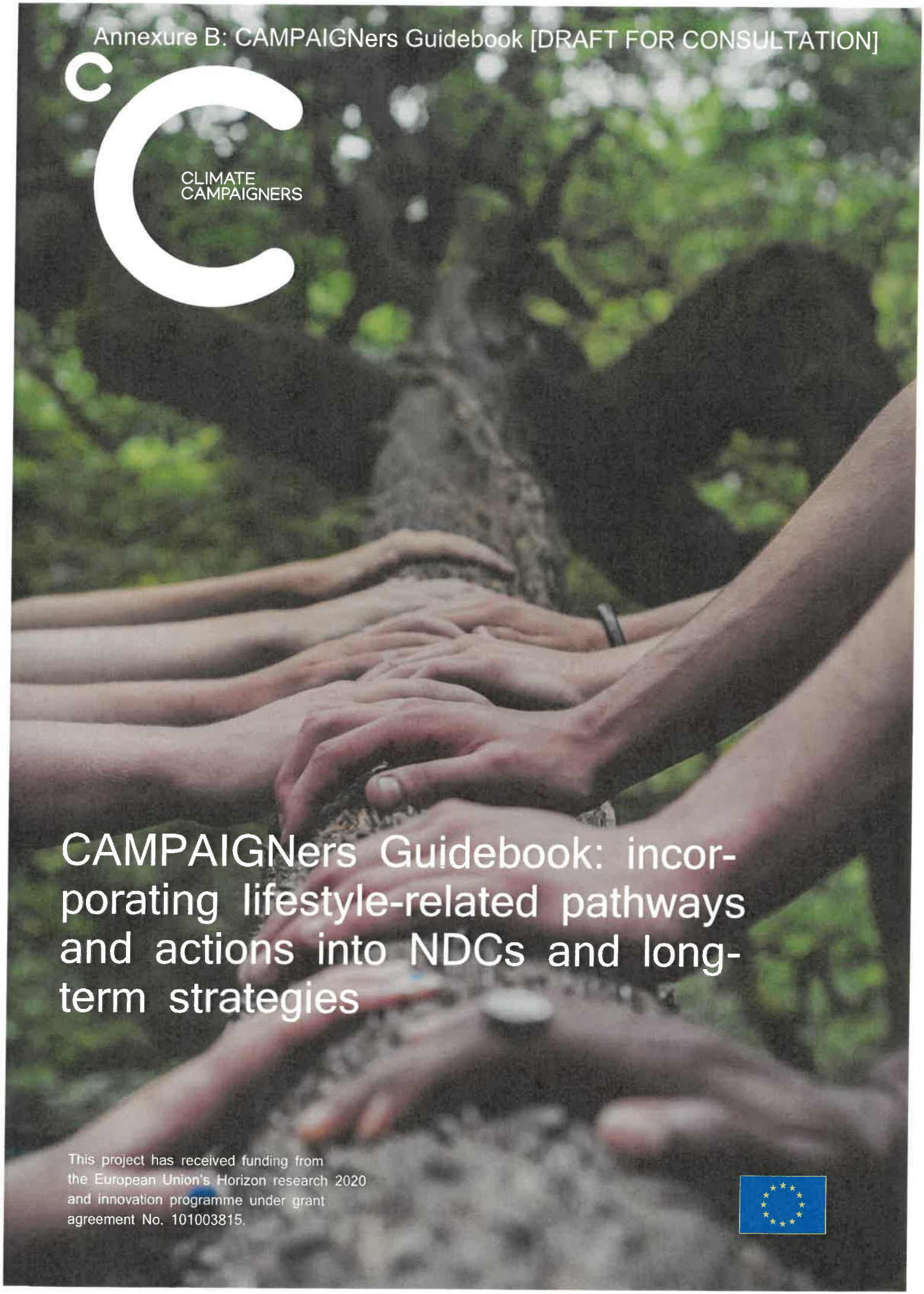
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement No. 101003815.

Wednesday, 13th March 2024 **WP-leader Meeting** Participation of WP-leaders is required. All other partners are welcome to join – if so, please inform EI-JKU about your planned participation.	
at Mundo Madou – conference room: Artemisia	
Time	
09:00 - 09:30	**Arrival / Registration**
09:30 - 09:45	**Opening / Agenda** Johannes Reichl / EI-JKU
09:45 – 11:00	**Work Package Leader meeting** Focus: Rehearsal Final Conference Lead: EI-JKU
11:00 – 11:15	**Coffee break**
11:15 – 12:30	**Work Package Leader meeting** Focus: Review meeting & Final report Lead: EI-JKU Participants: WP-leader
12:30 – 13:30	**Lunch for the whole consortia**
CLIMATE CAMPAIGNERS – Final Conference (public event) Gamifying Sustainable Lifestyles: Missing ingredient or lost endeavour? **conference room:** Artemisia	
Time	
13:30 - 14:00	**Registration & Coffee**
14:00 – 18:00	**Sessions with keynote speaker, panel discussions and exchange upon the experiences from the CAMPAIGNers research project** Detailed Agenda can be found here!
18:00 – 20:00	**Networking** drinks & bites

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

Annexure B: CAMPAIGNers Guidebook [DRAFT FOR CONSULTATION]

CLIMATE CAMPAIGNERS



CAMPAIGNers Guidebook: incorporating lifestyle-related pathways and actions into NDCs and long-term strategies

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

Date of Delivery: draft 12/2023

Disclaimer

Document Information

This report is part 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:

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Authors

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

Laura Cavalli
Fondazione Eni Enrico Mattei, Italy

Caterina Ottobrini
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Summary

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1. Introduction

Climate change is one of the most currently and globally discussed issues by the whole society, from governments to citizens, from universities to students, from companies to individual consumers, and it is important that all actors are aligned and cooperate, being effectively informed and aware of what it means and what it can entail.

In order to achieve the main goal of mitigation pathways of the Paris Agreement (PA) - the intention to hold the increase in global average temperature to below 2 °C above pre-industrial level and to pursue efforts to limit it to 1.5 °C - it is necessary to consider on the one hand the production system and a promotion of energy, economic and land system (Rogelj et al., 2018), on the other hand to intervene on the demand side, addressing citizens directly in environmental policies, empowering them with the education, knowledge and tools they need to reduce their emission effectively. Accordingly, the PA highlighted the importance of sustainable lifestyles and sustainable patterns of consumption and production with an emphasis on the responsibility of the developed country Parties (PA, 2015).

Current emission reduction policies and related Nationally Determined Contributions (NDCs) are predominantly supply-side focused and target production entities by applying rules and limitations, with the objective of reducing greenhouse gases (GHGs) emissions and adapting to the impacts of climate change. However, since they do not adequately address citizens' measures and perspectives, it is essential to develop more general guidelines that also consider behavioural and lifestyle changes of consumers and citizens to reduce emissions in different sectors; this includes, in particular, transport, diet, housing, and other consumption. The document presented here is inserted within the Horizon 2020 Project CAMPAIGNers - *Citizens Acting on Mitigation Pathways through Active Implementation of a Goal-setting Network*[1], which involves national authorities, local governments, agencies, companies and individuals from multiple countries[2], through full partnerships or Letters of Intent.

Within the Project, the Work Package 7, with the specific Task 7.2, aims to understand the potential consequences deriving from the inclusion of carbon-neutral lifestyle advices in NDCs and national climate strategies and to operationally implement practical examples to include behavioural aspects of the carbon-neutral lifestyle in the sectors investigated, based on national data and statistics from the participating countries.

Accordingly, the present document specifically intends to address the following specific research questions: (RQ1) *Why are lifestyle changes essential to achieving emission reduction targets?* (RQ2) *How is this aspect currently integrated into NDCs? How can policy makers improve their integration?* As a result, a manual for policymakers is here proposed. The main objective of this policy guidebook - generated by the collaboration between partners and stakeholders - is summarized in the willingness to elaborate and incorporate lifestyle-related pathways and actions into forthcoming Nationally Determined Contributions (NDCs) and long-term strategies of the countries adhering to the Project, in order to redirect strategies and international agendas and effectively support national policymakers and governments and to inform society, which constitutes the final stakeholder of the implemented policies.

The guidebook is structured as follows: the first section considers the state of the art regarding the integration of carbon-neutral lifestyle into national policies through reference literature and some

[1] CAMPAIGNers Grant agreement ID: 101003815, https://cordis.europa.eu/project/id/101003815

[2] Project's countries: Austria, Azerbaijan, Belgium, Canada, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Norway, Peru, South Africa, Sweden, Switzerland, Turkey

models, to better understand the areas of intervention in which it is most urgent to act at the policy level; this is followed by an analysis of the importance of a collective education of citizens and the whole community in the fight against climate change, through an active participation in the decision-making process; and the following section, finally, formulates and proposes the potential general policies to incorporate behavioural advice in the NDCs within each sector considered (namely transport, diet, housing, and other consumption), mapping carbon-neutral lifestyle-related measures, to be evaluated and reviewed in collaboration with the respective policy makers.

2. Theoretical overview

The carbon-zero lifestyle and its integration into policies aimed at reducing emissions are becoming more relevant in scientific research, policymaking and model design, both considering the impact that a change of behaviour can have on emissions, and to underline the importance of issues such as awareness and education of citizens to sensitize them to pursue a responsible lifestyle.

Considering the current panorama of emissions-reduction policies, a considerable focus on production-oriented and supply-side measures is evident. First of all, the European Union has played a key role in implementing these policies.

Some key examples of policies that address these topics are the Kyoto Protocol (1997), the Emission Trading System (ETS) (2005), the Paris Agreement (2015). These, however, focus mainly on the reduction aspects of GHGs emissions through market-based mechanisms and solutions oriented to companies and their productive and supply sides.

The Paris Agreement, specifically, represents a crucial global commitment to reduce emissions and adapt to the consequences of climate change. It is an international treaty stipulated by 196 parties that has allowed to conceive, for each country involved, the Nationally Determined Contributions (NDCs), which outline individual reduction targets and potential actions to be taken to achieve overall goals. A similar pattern, aimed at achieving energy and climate goals by 2030, can be seen in the National Energy and Climate Plans designed for each Member State.

Despite most directives that consider consumption and energy efficiency in the view of achieving ambitious decarbonization targets and limiting climate change depend mainly on supply-side technological solutions (Keppo et al., 2021), it seems that individuals also play a central role in the transition to a low-carbon society. However, the few models that evaluate these aspects have been developed in recent years, with the emergence of new scientific evidence and related research on the contribution of lifestyle transformations towards achieving challenging climate goals.

Among these, an experimental model that embeds behavioural advice within policies is represented by the Personal Carbon Allowances (PCAs), proposed in England. Used as a policy tool for long-term emission mitigation, PCAs are designed to offer individual quotas on how much carbon people are allowed to emit over a specific period of time and encourage them to negotiate for particular activities (Seyfang et al., 2007). The Personal Carbon Trading (PCT) system aims to develop a sustainable attitude in financial and resource terms among consumers, focusing on increasing the conscious use of materials.

Furthermore, in recent years it has been adopted in the literature the use and application of Integrated Assessment Models (IAMs) to shape lifestyle changes in global scenarios (Van den Berg et al., 2019; Saujot et al., 2020) and to assess potential trajectories towards the achievement of long-term decarbonization goals and broad SDGs (Levesque et al., 2021): it is thus possible to better understand the impact on emissions of the transition to a more environmentally friendly behavioural attitude, which leads to lower emissions (Van Vuuren et al., 2018).

Specifically, Van den Berg et al. (2019) have studied how to describe and classify different mitigation measures in the demand sectors through the application of the Avoid-Shift-Improve (ASI) framework (Creutzig et al., 2018) and have attempt to define what are the determinants of behavioural change and impact-oriented perspectives, which focus on the environmental effects on lifestyle changes. Otherwise, Sajout et al. (2021) have analysed the incorporation of complex social phenomena through the integration of lifestyle changes in IAM-based mitigation pathways, emphasising the importance of improving the political relevance of lifestyle-driven mitigation pathways.

In the same perspective, also Energy System Models (ESMs) have been adopted and largely used by researchers to develop quantitative scenarios

regarding the future evolution of the energy sector, as well as its interactions with the economy side, aiming to inform policymakers about the required measures to be adopted in order to achieve energy and climate policy objectives.

Similarly, other scholars have used the IMAGE integrated assessment model (Van Vuuren et al., 2015; Van Sluisveld et al., 2016) to demonstrate how the adoption of lifestyle change measures for residential energy consumption, mobility and waste management would allow a variable emission reduction depending on the reference sector and related to a price change. What has emerged is tangible evidence of the importance of including these aspects in emission-reduction policies.

Nonetheless, although IAMs and energy-system models adequately capture supply-side emission-reduction options (Iyer et al., 2015), they are often criticized for the limited insights they provide about consumer-side transitions (van den Berg et al., 2019) and lifestyle changes. This in effect prohibits a comprehensive analysis of the specific drivers and effects of behavioural change, as well as of the associated implementation barriers for policy.

It is thus clear that these policies and models, although fundamental, are limited because they mainly concern the supply and production side, while few aspects are addressed to the sphere of demand, which remains almost unexplored and hardly represented (Creutzig et al., 2016; Grubler et al., 2018). This leads to a major imbalance in industrial and production-oriented policies with respect to demand and individual citizens, who are equally emission-producing but relatively less aware.

The lack or reduced awareness in consumers, as well as the few and confused food for thought to change their behaviour with a view to reducing emissions are certainly a limit and a potential cause of the still inadequate inclusion of aspects behavioural in NDCs and in long-term strategies.

It then emerges a growing need to balance supply-side policies with the demand-side ones, especially in view of the drafting of the forthcoming NDCs, in which it will be necessary to address consumers directly, to make them aware, participatory and active in actions and policies, and to propose suggestions and changes concerning their behaviour, promoting more sustainable lifestyles, in achieving decarbonization targets and wider SDGs.

3. NDCs: what is missing?

The Nationally Determined Contributions (NDCs) are a government obligation, presented by the member countries of the UNFCCC (United Nations Framework Convention on Climate Change) and are updated before the annual Conference of Parties (COP). NDCs represent the commitment that individual countries intend to adopt to reduce climate altering emissions, as required by the Paris Agreement, and outline the individual objectives and actions needed to accomplish broader objectives.

Prior to 2015, the UNFCCC required that each state specify what would be their contribution in terms of reducing climate-altering emissions, respecting the request to limit the temperature rise to 2 °C, perpetuated in the Paris Agreement. However, from the analysis of the documents submitted, the United Nations Environment Programme (UNEP) assessed that the estimated temperature increase would be 3.2 °C in 2100; consequently, member states were required to re-draft NDCs by 2020. But in 2022, only 28 countries submitted the periodic update of the measures and targets proposed in their NDCs, contrary to the Glasgow Climate Pact, in which all countries should have reviewed and strengthened the goals, instead of waiting, as agreed, five years for their renewal.

However, it should be noted that in many cases the updated NDCs do not represent a real improvement and do not outline a progress towards reducing GHG emissions. Only in a few updated documents it appears an interest in lifestyle mitigation pathways, even if not adequately integrated into the national climate policies, and this represents an important limit and an aspect on which to focus for the drafting of the next ones.

According to the definition of climate change provided by the UNFCCC, the emissions of climate-altering gases appear to be strongly connected with social and demographic aspects, indeed it means "*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods*" (United Nations Framework Convention on Climate Change).

Human activities appear to be significant and ever-increasing impactful on climate. Human behaviours and lifestyles come into play in this vicious cycle because of various factors, such as eating habits, transportation routines, housing energy demand and other consumptions' tendencies. However, the inclusion of these behavioural aspects in emission reduction policies seems to be inadequate, albeit necessary. In order to pursue the energy transitions and meet the objectives outlined in the Paris Agreement, it is essential to reduce both energy production and, consequently, energy demand by citizens, seen as actually responsible for most of the emissions, since they often opt for comfort and trivially for cheaper options, without considering the environmental consequences of their choices.

There are some reasons to investigate what stands behind this occurring phenomenon, primarily related to the default metric adopted for the advice included in the Nationally Determined Contributions, namely the Global Warming Potentials (GWPs), based on the physical impact of a certain gas in terms of emissions. This metric has been questioned and contested by some scholars because it gives equal weight to emissions regardless of target and proximity (Shine et al., 2007). In this sense, if a policy aims to promote carbon-neutral lifestyles, the metric used to measure its success should be different from the one used for a policy that aims to reduce industrial emissions: the selection of appropriate metrics is crucial for the success of climate policies, in order to ensure policymakers that their efforts to reduce emissions are effective and impactful.

Moreover, it seems that using targeted policies on the production side is more immediate to evaluate and monitor the reduction in emissions pursued, since most models and metrics are concerned with the supply-side; however, although more complex and energy and resource-intensive, targeting policies also to the behaviour of citizens and consumers would give more accurate and less approximate results on the actual level of emission-reduction. It

therefore seems necessary that the change of the decision-makers perspective acts and develops simultaneously with the technological one, additionally considering the behavioural sphere of the individuals.

The metric approaches, with bureaucratic hurdles, operational and technical complexities are only some examples of the obstacles to embed behavioural aspects into emission reduction policies. In addition, it is essential to reflect about changes in the behavioural aspects of citizens, not only imagining them addressed to individual entities, but also to an entire community, in order to define real actions to undertake a participatory and collective path.

4. Collective education and participation in policymaking process

Addressing individual citizens to raise their awareness of gas emission reduction policies seems necessary, but not sufficient. It is therefore essential that policy-makers address a whole community of multiple citizens, with their own needs and interests, in a more coherent and consistent way, and involve them at several levels, so as to make society a pro-active player in the transformation process. It thus becomes necessary to address the issue of the transition towards sustainability using a collective approach that presupposes the concept of "citizen engagement".

In many national situations, participatory scenarios that define citizens actual and active part of the process and not only followers of local government decisions are increasingly frequent (Michels and De Graaf, 2010). What underlies this trend is the need to empower and make aware and committed citizens in decision-making process, as subjects with tangible responsibilities towards the planet. In this way, effective dialogue between governments and citizens can be established through the implementation of policies aimed at them.

This co-production process and an active collaboration represent the basis of the CAMPAIGNers Project, which aims to develop a Goal Setting Network directly from citizens and involving multiple associated heterogeneous actors, in order to create a common vision and shared goals and empirically define carbon-neutral lifestyles to be promoted in emission reduction strategies at local and supranational level. The objective of the project and of Task 7.2 is aligned with the Sustainable Development Goals (SDGs) 17 - *Partnership for the Goals*, which proposes to enhance the means of implementation and renew the global partnership for sustainable development.

To attain the SDGs, a citizen-oriented approach is crucial: it is imperative to recognize the significant role of individuals in achieving SDGs and encourage them to contribute towards creating a more sustainable future.

The structural setting of the CAMPAIGNers Project allows to pursue broader tasks that go beyond the simultaneous actions of single independently operating actors, but visualizing them as a community (Hall, 2009). This "collective approach" is both generated by citizens, who, as part of a community that acts to mitigate climate change, feel more committed to pursuing sustainability and adopting eco-friendly lifestyles and by policymakers, who are able to better frame their national policies in the wider international framework, through an accurate and strategic gaze on a complex system of governance.

Thanks to this approach, it is possible to achieve a polycentric transformation, originated simultaneously in multiple countries by several stakeholders and this allows to modulate the scope according to specific conditions of the unit of analysis considered, thus increasing the effectiveness of the policies. Indeed, Zhang et al. (2018) demonstrate how a bottom-up approach focused on the will of the individual can lead to a holistic implementation of green policies, in order to achieve energy efficiency goals

and, by offering citizens a platform of dialogue, they show the possibility to increase interactive learning and change the behaviour of target groups. In this way, greater responsibility regarding their consumption and lifestyle choices is entrusted to the community and individuals, which must be increasingly clear, defined and widespread.

Therefore, aligned with the objective of WP 7 - *Multi-Level Policy Advice and EU Strategy Support*, pursuing active engagement together with education by providing proper and shared tools, it is essential for spreading good consumers practices and raising people's awareness of how they can contribute to sustainability, and generating collaboration and participation among all citizens and stakeholders, thanks to echo and network effects.

Overall, the educational aspect hereby discussed concerns not only citizens, but also policymakers, who can encourage a shift in the current political paradigm by adopting new metrics that can effectively lead to a positive assessment of behavioural aspects, aiming for a more holistic and inclusive approach. Responsible consumption and education should involve policymaking, where there is an ever increasing need to disseminate accurate and realistic information to key stakeholders, namely citizens, primarily affected by all the negative effects of climate change. To achieve this, it is crucial to educate and empower individuals to make informed choices. This can be pursued additionally through awareness-raising campaigns, incentives for environmentally friendly behaviour, educational programs that promote sustainable lifestyles.

This is crucial in the fight against the climate crisis, as many citizens would want to reduce and limit their environmental impact, but they do not have the right tools to make a meaningful difference and to pursue more sustainable actions and lifestyles (Bonini and Oppenheim, 2008). It is undeniable the urgency to inform consumers about the potential to take actions to limit the emissions of GHGs and educate them to a healthier and sustainable lifestyle, in order to allow them to fully understand how to make a difference in various aspects related to consumptions, from clothing to electronic tools, from transport to diet and eating habits.

This can be done, on the one hand, through the dissemination of circular economy practices (in accordance with the SDG 12 - *Ensure sustainable consumption and production patterns* of the 2030 United Nations Agenda for Sustainable Development), which allows an increase in the efficiency of resources without compromising the level and quality of services provided (Andreou, 2022); on the other, by promoting "pro-environmental" mindset for the purpose of resource conservations and waste recycling, fundamental pillars of circular economy (Capstick et al., 2014).

Moreover, by taking into consideration the fact that in many of the countries adhering to the CAMPAIGNers Project the culture towards the circular economy and recycling is not particularly rooted, it is even more important to spread this attitude. The transition towards the circular economy should therefore be the focal point of policy objectives pursued at the national and local levels, but, so far, the regulatory frameworks do not yet seem to have adequately incorporated this aspect.

In fact, in their NDCs this concept appears addressed and still focused solely on the production-related side, highlighting the importance of recycling in production processes in order to reduce the use of raw materials and reuse them as a primary energy source. But even in these strategies there are several gaps to fill. Accordingly, an integration of behavioural advice aspects targeting lifestyle changes towards sustainability that can be implemented by individual citizens and communities could constitute a turning point in these policies. It is therefore urgent and necessary to update and study the integration of aspects related to the behaviour and lifestyles in the NDCs of individual countries and in long-term strategies at the national and supra-national levels (such as the National Climate

and Energy Plans, which represent a synthesis of climate objectives and targets for each country).

5. Purpose of the work and methodology

The objective of Horizon 2020 Project CAMPAIGNers is to create a "*Goal-setting Network*" between the various adhering actors, which aims to generate participation and collaboration among all stakeholders and citizens.

With the Work Package 7 - *Multi-Level Policy Advice and EU Strategy Support* the goal is precisely to build and improve structured interactions with the relevant policymakers, jointly assessing the information gaps related to lifestyle pathways integration into their policies, in order to cooperatively decide how to best provide and disseminate solutions to the entities involved in the preparation of the forthcoming NDCs.

Accordingly, the objective of analysing and redefining these fundamental aspects is structured on the answers to the following research questions: (RQ1) *Why are lifestyle changes essential to achieving emission reduction targets?* (RQ2) *How is this aspect currently integrated into NDCs? How can policy makers improve their integration?*

The present document, deliverable of Task 7.2 - *Operationalizing scientific support for addressing lifestyles in NDC*, indeed proposes to better investigate the areas of intervention in which it appears most urgent to act concretely at the policy level, in the perspective of reducing carbon emissions and incorporating behavioural aspects of carbon neutral lifestyles, based on the potential effort level required by individuals in implementing these policies.

In this sense, the added value of the project consists precisely in the interactions and co-design of trajectories that may lead countries to include lifestyle-related reflections in their emission reduction policies, both with specific regard to NDCs and to other long-term strategies, such as Low Emissions Development Strategies (LEDS).

Accordingly, a precise methodology has been developed. First, it has been assessed the economic and social conditions of the selected countries, evaluating their major differences: the countries adhering to the Project have, in fact, been divided according to the NDCs presented - the European Union was considered as a whole since it has adopted a common NDC, while other countries in a separate and independent way. Secondly, for each sector covered in Deliverable 1.3 - *Report on Target Lifestyles* of CAMPAIGNers Project (Copinschi et al., 2022) - namely transport, diet, housing, and other consumption - the behavioural measures on carbon-neutral lifestyles that are most recommended to be included in each of the NDCs have been analysed and highlighted, on the basis of both their effectiveness in mitigating emissions and in terms of consistency with the policies currently included in the NDCs and long-term climate strategies. The final step consisted in understanding whether adhering countries already included some behavioural policy advice in their NDCs, and eventually including new directives, concrete proposals and potential policies, tailored on the basis of specific economic and social parameters - potentially feasible for most of the adhering countries - to support and enlarge the existing ones.

From this detailed analysis and methodology, it has been possible to produce a guidebook for policymakers, with the aim of embedding lifestyle-related pathways and actions in the next NDCs and long-term strategies of the countries adhering to the Project, with a view to reorienting strategies and international agendas and supporting national

policymakers and governments and raising society's awareness, as the ultimate stakeholder of the policies implemented.

6. Advice for embedding behavioural pathways in NDCs

The analysed NDCs of the countries participating in the CAMPAIGNers Project - namely Azerbaijan, Canada, Peru, South Africa, Turkey and EU (Austria, Finland, France, Greece, Ireland, Italy, Lithuania, Sweden) - do not present a homogeneous structure and each nation declines the principles in various ways, with different thematic extensions and focuses some, for instance, show both GHG mitigation measures and adaptation to climate change, while others only mitigation measures.

The countries' NDCs were drafted according to specific rules proposed by 2006 IPCC guidelines (Herold et al., 2006), which identify the key categories to focus on and the mitigation policies of each GHG emitted by the detected ones. However, the categories identified concern the industrial sector and mainly employ quantitative criteria; the qualitative criteria (generally based on surveys[3]), instead, fits into the analysis only if the quantitative data are not sufficient to identify all the categories to be prioritized, as in the case of the inclusion of behavioural advice on carbon neutral lifestyles in the NDCs.

Therefore, the policy proposals presented in the following paragraphs assume that policymakers responsible for drafting the NDCs of the countries belonging to the CAMPAIGNers network are committed in reviewing the current criteria for the inclusion of behavioural advice, to be addressed to individual citizens and not to the industrial sectors of reference. Accordingly, the reference sectors on which the research is built were those identified in the Report on Target Lifestyles (deliverable of WP 1.3), which for four reference sectors (transport, diet, housing, other consumption), had highlighted the alternatives with the greatest potential for decarbonisation that do not require the adoption of new technologies.

The following paragraphs hence provide policy guidance based on scientific evidence from the data collection phase, through the adoption of an equal weighting for each field of intervention. These policy proposals have been designed on the basis of quantitative considerations from official statistical data on socio-economic conditions, i.e., the percentage of the population living in urban areas, access to clean fuels and technologies for cooking and the GDP per capita, as well as the carbon footprint of the various sectors of interests. Since the adhering countries are quite unequal in economic and environmental terms, summary grids for each sector of interest are also presented, which list the recommended interventions for each country, providing evidence of the operational aspect of the proposed policies.

6.1 Transport

The topic of transport represents a crucial issue in reducing climate-altering gas emissions. In line with the findings of Deliverable 7.5 - *Advice for a citizen-centred and climate-supportive utilisation of the COVID-19 Recovery Fund* (Copinschi et al., 2022), with regard to the transport sector, it is necessary to highlight its high potential for reducing emissions

[3] https://it.surveymonkey.com/r/HNKHYRT

through major changes in lifestyle (Ivanova et al., 2020). This practice is essential since potentially viable behavioural measures have a high capacity and effectiveness in reducing sectoral transport and energy demand and related GHG emissions compared, for example, to those adopted in the residential and housing sector.

To analyse emissions in the transport sector, it is useful to make a distinction between countries based on their membership of the Organisation for Economic Co-operation and Development (OECD): the CO2 emissions' growth curve for OECD members is not particularly steep, thanks to laws imposing emission restrictions for circulating vehicles; while for non-OECD members, i.e. Azerbaijan, Peru and South Africa, the curve is proportionally steeper, suggesting the urgency of mitigating emissions at industrial and individual levels.

This discrepancy is additionally linked to aspects of infrastructure development and urbanization: in Baku, capital of Azerbaijan, lives more than 20% of the national population and the same phenomenon also occurs in Lima, Peru. The high concentration of population in key cities leads to high urban traffic, often unsustainable given the constant increase in use of private vehicles, rarely electric or hybrid. Therefore, together with a need for the development of public and private infrastructure, in these countries, given the low number of passengers per vehicle and the high propensity to use private transport compared to public transport, the priority is to encourage the adoption of public transport or shared mobility practices so as to reduce the use of private cars, or at least increase the number of passengers per vehicle, ultimately reducing per capita emissions from road transport.

However, for OECD members such as Canada and EU countries, the policy orientation is different, since the public infrastructure is broadly already well developed. In these territories, despite the increasing popularity of high-speed trains, there is a high propensity to use air transport instead of land transport. This is responsible for a very high level of emissions and passenger aviation in some cases, for example for distances of less than 1000 km, the airplane could be successfully replaced by rail solutions and, moreover, if properly developed and disseminated, virtual connection systems could be more and globally exploited to avoid some unnecessary travels.

In general, in both the private and commercial transportation sectors, viable alternative solutions for moving towards carbon-free transportation are becoming increasingly widespread, even if not properly adopted, such as electric mobility and micro-mobility (e.g., electric scooters, bicycles, microcars), and biofuel-based mobility (for cars, ships, and planes). Potentially, another alternative that could be implemented, once there will be a real development of the market, is the use of hydrogen or ammonia-based mobility (for ships and planes).

Furthermore, at a transversal level and particularly in Europe, where the distances to be covered by urban transport are narrow, a possible change in mobility habits to decongest urban traffic, reduce emissions and stay healthy concerns the active mobility, in the form of walking, biking or other eco-friendly modes of commuting. To change these habits and be able to move around feeling safe, however, it is necessary that public authorities plan and invest in no-car zones, walking and cycling lanes and paths, promoting the active transport. Moreover, a multi-modal integration could also be seen as a practicable option: the development of seamless connections between different modes of transport (e.g., combining cycling with public transport) offers more sustainable travel options.

Accordingly, in order to incentivise the adoption of more sustainable mobility habits, public authorities and policymakers can enhance public transport and infrastructures overall at national level. For example, national governments could incentivise the spread and use of shared mobility (preferably using electric vehicles), which leads to the optimisation of vehicle

occupancy and the reduction of the number of cars on the roads. National governments could also promote the employ of national public transport for short distance travel, such as using trains instead airplanes to reduce traffic congestions and GHG emissions.

It is therefore essential to deeply understand which suggested policies are most suitable for each specific country adhering to the CAMPAIGNers Project, since each of them, beyond the formal criteria of being part of a specific geographical economic reality, has unique characteristics that make the tailoring of policies fundamental. To date, according to a study (Kustar et al., 2022) only 13% of NDCs include targets to shift travel to more sustainable modes, such as choosing public transportation over private one.

Additionally, concerning the minority of countries that have already included behavioural advice in their NDCs - such as Azerbaijan that fosters "environmentally friendly" forms of transport - the suggested policies would offer a more integrated solution and allow to reach an improved operational declination, which would ultimately lead to an effective reduction of emissions. Accordingly, to address this problem, each country should compulsory initiate or accelerate (for those who have already planned) the adoption and implementation of a Sustainable Urban Mobility Plan (SUMP), in an adaptive and inclusive way.

Furthermore, another viable solution could be seen in the "Avoid-Shift-Improve" approach. The ASI model aims to reduce environmental impact and improve the quality of life in cities, by avoiding unnecessary travel, shifting transport demand towards more sustainable modes and improving the efficiency and sustainability of existing modes of transport. By promoting and adopting the "Avoid-Shift-Improve" approach also in NDCs, it would be possible to reduce the dependence on vehicle trips, significantly reducing emissions from the referring sector and increasing resource efficiency of the services offered. The implementation of this approach in order to effectively pursue behavioural shifts needs supporting measures to be adopted at the public and private levels, such as financial and non-financial measures (e.g., subsides, tax credits, rebates, reduced fees, special transport permits, battery recycling spurs) to incentivize the switch to more sustainable means of transport, as well as a more widespread education for citizens to become aware and responsible for the benefits for themselves and for the environment.

The following table displays and summarizes the suggestions for behavioural pathways that should be included in the upcoming NDCs and long-term strategies, specifically regarding the transport sector.

OECD/ non-OECD	Country name	Transport Policy 1	Transport Policy 2	Transport Policy 3	Transport Policy 4
Non-OECD	Azerbaijan	Encourage public transport	Increase sharing solutions for road transport	Increase the number of passengers per vehicle	Increase average transportation distance for railway passengers
OECD	Canada	Encourage electric mobility	Increase metro lines	Increase sharing mobility	Discourage short-haul flights
OECD	EU	Reduce private cars usage	Enhance active mobility	Increase sharing mobility	Discourage short-haul flights by reviewing taxation on air tickets
Non-OECD	Peru	Increase railway density	Reduce train ticket prices- incentivize train-line	Increase electric or hybrid buses	Discourage short-haul flights
Non-OECD	South Africa	Increase the number of passengers per vehicle	Incentivize bus over taxis	Implement railway infrastructures to encourage train usage	Increase sharing solutions for road transport
OECD	Turkey	Reduce private cars usage	Increase railway density	Enhance high-speed trains usage	Discourage short-haul flights

Table 1 - Proposed policies for the transport sector, authors' elaboration

The discriminating factor in the implementation of the proposed policies is represented by the existing transport infrastructure of the countries considered: without a robust infrastructure network through which to develop and improve transport, the work of policymakers would be useless. Indeed, for a proper and successful implementation, an expansion and modernization of the transportation system, pursued by national governments, is essential: an enlargement of the railways routes an increasing of routes and number of buses, light rails or trains serving them; a robust network of electric vehicle charging station; the creation of multimodal hubs to transfer between public transport and micro-mobility, with bikes and scooter-sharing docks next to transit stations should be some of the solutions that can be adopted. In this sector, moreover, it is crucial that the behavioural advice that can be promoted in NDCs and long-term strategies go in parallel with centralized and structural interventions.

6.2 Diet

The IPCC reiterated in the Assessment Report (AR6) that the adoption of a balanced and sustainable diet is the measure with a higher potential for reducing and mitigating the carbon footprint of each individual (IPCC, 2021), since diet is responsible for a significant level of emissions, especially in high-income countries.

In Europe, in particular, food accounts for about 30% of households' carbon footprint (Ranganathan et al., 2016). This factor arises largely from the consumption of red and processed meat, of which the major European producers and consumers are the Germans and the French (Ritchie et al., 2017): it would be sufficient to reduce the consumption of red meat per capita to significantly lower emissions in the sector.

Red meat and dairy products, in addition, are linked to cardiovascular problems and obesity and, therefore, the promotion and spread of low-meat diets could also have a significant positive impact on health: a shift in this attitude could offer significant benefits in improving citizens' health and reducing emissions, in particular in OECD countries, such as Europe and Canada, where the average daily consumption of animal-based protein is noticeable (75.7 g/capita/day and 58.7 g/capita/day respectively).

Accordingly, FAO (Food and Agriculture Organization of the United Nations) data support the evident need to include measures about sustainable eating habits in the NDCs of the countries adhering to the Project. FAO, analysing the nutritional composition of the diet for the reference countries, shows that their consumption of proteins of animal origin is on average 68.75 g/capita/day while, for example, that of the Gulf countries[4] is 26.75 g/capita/day; moreover, the share of dietary energy supply derived from cereals, roots, and tubers (kcal/cap/day) for the countries participating in the Project is half compared to the Gulf ones. Nonetheless, diet-related policies are not currently included in the Project's countries NDCs, although they could prove to be empirically effective and beneficial not only for the environment, but also for individuals' health.

In order to improve the current situation regarding NDCs of the Project members, it is further important that policymakers address citizens. Specifically, it is necessary to promote and implement the so-called "sustainable consumption patterns", namely, all those daily practices that if consistently integrated into every day's lifestyle can lead to a reduction in emissions. These include reducing food waste, especially for those nations that discard tons of food every day, and favouring a more sustainable production chain, prioritizing the implementation in countries where the level of malnutrition is highest (e.g., Azerbaijan) or with a high level of excessive food purchase (e.g., Canada).

In addition, citizens need to change their eating habits by pursuing a more balanced diet, on the one hand, by increasing the consumption of plant-based foods (such as those based on coarse grains, legumes, fruits and vegetables, nuts and seeds) or animal-sourced food produced in resilient, sustainable and low-GHG emission systems, for adaptation and mitigation while generating significant co-benefits in terms of human health; on the other hand, strengthening the purchase of seasonal and local products, which would entail a reduction in CO_2

[4] Bahrein, Kuwait, Iran, Oman, Qatar, Saudi Arabia and United Arab Emirates

emissions from the transport of products and refrigeration systems used for their storage.

From the policymakers' perspective, in order to ensure that these changes are properly implemented, it is necessary to effectively combine guidance and intervention. From the implementation point of view, it is important that they establish and improve the nutrition monitoring system through specific interventions in key areas and groups, and popularize knowledge regarding nutrition and health. Moreover, to foster the dissemination of the proposed policies, it is possible to adopt various system of incentives and taxes.

Specifically, with regard to the food monitoring system, it is important to mainly considers countries and areas with scarce resources and communities most at risk of instability and food poverty. Governments, for example, could propose the introduction of financial incentives or economic support for poorer communities to increase the purchase of food whose consumption is recommended at the national level, or introduce subsidies for such foods.

With regard to the educational aspects addressed to citizens, it is functional that governments and national policymakers develop and disseminate specific nutritional campaigns that incorporate information on the impact of food choices in terms of both the environment and health, such as the extensive spread of nutrition labels common to several countries, in which, in addition to indicating the nutrition score, could include the indicative level of emissions due to the production and consumption of products purchased.

Furthermore, they could also promote the construction and opening (for example through subsidized financing or national incentives) of healthy canteens and restaurants.

The table below shows policy proposals related to diet specifically designed to address the priorities of each of the countries adhering to the Project.

OECD/ non-OECD	Country name	Diet Policy 1	Diet Policy 2	Diet Policy 3	Diet Policy 4
Non-OECD	Azerbaijan	Reduce processed meat consumption	Reduce food waste	Enhance consumption of organic food	Enhance consumption of local food
OECD	Canada	Reduce red meat consumption and food waste	Increase plant-based protein consumption (69% obesity rate)	Implement the spread of healthy restaurants	Enhance consumption of local food (2/3 is imported)
OECD	EU	Reduce red meat consumption	Reduce non-seasonal food consumption	Increase consumption of local and organic foods	Promote the use of multinational common nutritional score
Non-OECD	Peru	Adopt a balanced and varied diet with plant-based foods	Enhance consumption of organic food	Rescue discarded food from markets	Enhance consumption of local food (14% is imported)
Non-OECD	South Africa	Avoid food waste	Eat from top to tail (avoid packaged food)	Enhance sustainable local production	Reduce red meat consumption
OECD	Turkey	Shift to sustainable consumption patterns	Reduce food waste	Increase plant-based protein consumption	Enhance consumption of organic food

Table 2 - Proposed policies related to diet, authors' elaboration

The idea of including in the NDCs food-related measures is essential and functional in the first place because the effort of individual citizens to change eating habits making them more attentive and sustainable is definitely lower than that of other behavioural changes. This, on the one hand, may be due to the fact that eating habits consist of particularly personal and not difficult to manage actions, especially since they are often related to one's health and have obvious and immediate impacts. On the other hand, if transport-related switches (such as living without cars or reducing the number of flights) have a reduction potential of 1.7 tco2eq/cap, but longer and more complex timeframes, those related to diet are more immediate to adopt and implement and therefore, overall, currently responsible for the highest level of CO_2 avoided (equal to 11 034, 174kg) (Ivanova, 2020; Climate Campaigners, n.d.).

It becomes therefore necessary that the trajectory of the "Business-As-Usual" in nutrition is abandoned, and that instead everyone opts for technological progress, for the reduction in food waste and for

more flexible and balanced diets that favour plant-based foods. Only in this way the interventions proposed in the NDCs of the countries adhering to Campaigners Project will be aligned with the wider objectives of the Paris Agreement.

6.3 Housing

Additionally, housing has a significant impact on a country's carbon footprint: specifically, CO_2 emissions are largely caused by space heating or cooling, as well as water heating, cooking and lightning, but their order of importance varies widely across regions. In Europe, for example, space and water heating dominate the energy use in buildings, while in countries like South Africa cooling is also relevant; cooking use, instead, is quite stable across countries and not associated with health.

A further distinction regarding the household consumption must be made between the member countries inside and outside the OECD. In the last ten years in the OECD countries the energy requirement for space heating is slightly decreased; for non-members, however, the trend is increasing as a result of the rapidly growing building stock, which is negatively influencing future energy demand but enhancing people's well-being: in both scenarios, however, an additional effort to reduce emissions from the building sector is necessary through mitigation policies.

Analyzing GHG emissions per capita of countries participating in CAMPAIGNers Project, it emerges that these have a decreasing trend, but still a higher amount of emissions than the average of European countries. It is therefore clear the urge to incorporate in the NDCs of these countries further lifestyle-related recommendations to reduce emissions from the residential sector.

The literature suggests that, when it comes to Europe, warming for space heating and cooking accounts for around half of carbon emissions on average (Ivanova, 2020). Moreover, for the European countries adhering to the Project, the level of Heating Degree Days (HHDs) - an indicator of the severity and duration of cold weather and climatic driver of space heating demand in a certain country on a given day or during a period of days - is high. According to the International Energy Agency (IEA), the average heating temperature of residential buildings in Europe is over 22 °C; there is therefore a great potential to lower the setpoint without losing comfort: assume a 1°C/2°C reduction in thermostat setting, for example, on one side would save about 7% of the space heating energy and reduce emissions, and on the other would improve citizens' health, since temperatures of around 20 °C (heating) and 25 °C (cooling) are totally in line with medical recommendations. A further suggestion concerns electric heat pumps and electric-based heating systems that can replace traditional fossil fuel-based heating methods, allowing to efficiently convert renewable electricity into heating or cooling energy.

These factors, indeed, suggest the importance of spreading practices towards a more conscious consumption of resources and raising awareness about emissions deriving from heating and avoiding heating domestic environments when not at home.

Furthermore, a solution must be found to the problem underlying the high level of emissions of households, concerning technologies adopted and the poor thermal insulation of most buildings. According to an elaboration of FAO data, the countries adhering to CAMPAIGNers Project adopt less clean fuels than the European average for cooking foods. Therefore, an increase in the renovation and integration rate through a switch to renewable fuels and electrification could contribute to the reduction of emissions deriving from households: the transition from traditional gas-based cooking methods to

electric stoves would not only reduce CO_2 emissions, but also indoor air pollution and related health risks in households.

Nonetheless, in Europe only 22% of the energy used for heating comes from renewable resources (Eurostat, 2022) and in the other countries participating in the Project there is also a great potential to expand the use of renewable energy (e.g., geothermal in Turkey, hydroelectric in Canada and Peru, solar and wind in Azerbaijan and South Africa): addressing the technological issue would bring significant environmental and economic benefits. It would also be useful to suggest incentives for the adoption of renewable energies or energy-efficient and low-carbon technologies in residential buildings in the NDCs, which would enable greater energy independence to be achieved and local resources to be exploited. Accordingly, it is also possible to introduce or spread the creation of the so-called "renewable energy community", association that produces and shares renewable energy between citizens, SMEs and governments, to generate and manage green energy independently at advantageous costs, significantly reducing CO_2 emissions and energy waste. The synergies so created between and within end-uses and supply-side sectors optimize the use of energy resources, enhance the overall system resilience, and facilitate and foster the decarbonization process.

Another category of policies aimed at promoting the adoption of sustainable lifestyles among citizens consists in encouraging responsible housing practices, such as to conserve hot water or decrease shower, as well as to use blackout curtains to keep the heat out of the house and reduce the need for air conditioning systems during hot periods. Another suggestion regards the provisions of incentives to thermally insulate buildings, especially in colder countries (e.g., Canada and northern European countries adhering to the Project), producing a significant reduction in space heating demand and in the associated emissions.

One of the most viable measures that requires the lowest effort to citizens and could lead to tangible results in emission reduction concerns the use of eco-mode for clothes and dish washing programmes: indeed, despite the longer time required, this practice could reduce energy consumption (about 523 kWh over a year).

Regarding buildings, another transversal policy to be adopted in all the adhering countries concerns the construction of private buildings with local resources, minimizing the emissions related to the transport of imported materials, as well as enhancing the development of the local economies and the adoption of eco-sustainable materials. Additionally, it can be implemented the flexible use of buildings through the higher employ of shared building spaces (e.g., co-housing and working) and related policies that limit floorspace used per capita in the residential sector or promote a size reduction of dwellings after children have moved out: for the effectiveness of these measures, however, a mental and cultural change is also needed.

In the following table there are presented policy proposal related to housing for each country participating in the Project: given that some countries make extensive use of renewable energy, while others cannot exploit it and need other policies, such as recycling waste or the use of local building materials, here the declination of priorities and recommended policies is influenced by the energy mix of the countries themselves.

OECD/ non-OECD	Country name	Housing Policy 1	Housing Policy 2	Housing Policy 3	Housing Policy 4
Non-OECD	Azerbaijan	Replace carbon-intensive heating technologies	Reduce natural gas for cooking (now >90%)	Switch to renewable fuels where possible	Incentivize sustainable buildings with heat resistant materials
OECD	Canada	Incentivise thermal insulated buildings	Adopt locally sourced materials for buildings	Replace carbon-intensive heating technologies	Set eco-mode when using washing machines/ dishwasher
OECD	EU	Reduce domestic heating where possible	Enhance renewables and biofuels for space heating	Promote co-housing and renewable energy community	Incentivise thermal insulated buildings
Non-OECD	Peru	Replace carbon-intensive heating technologies	Increase renewables for housing purposes	Waste management and recycling	Adopt locally sourced materials for buildings
Non-OECD	South Africa	Reduce coal for housing	Prefer houses built with local resources (steel, glass panels and other materials such as eucalyptus poles)	Close blinds and curtains during the day to reduce air conditioning	Fabricate building with local efficient resources
OECD	Turkey	Promote flexible and shared use of buildings	Enhance renewables and biofuels for space heating/ cooling	Set eco-mode when using washing machines/ dishwasher	Incentivize sustainable buildings

Table 3 - Proposed policies in the housing sector, authors' elaboration

The current policies concerning behavioural habits in the housing sector included in NDCs are not sufficiently covered - only Azerbaijan has actually included some aspects concerning "*awareness activities on energy efficiency, application of energy-efficient bulbs and modern energy-saving technologies in heating systems*"; therefore, there is ample room for improvement to include behavioural aspects related to carbon neutral lifestyles and move towards a more holistic approach.

6.4 Other consumption

In addition to the sectors previously analysed, there are further directives that can be considered and implemented with a view to reducing emissions, concerning the huge spectrum of "responsible consumption practices", particularly addressed to citizens.

This shift in attitudes could be empirically supported by the diffusion of the principles of sharing economy, as well as by increasing the average life of products. Related policies could give advice to opt for second-hand clothes, furniture and household appliances, or spread awareness to consumers that eco-sustainable fabrics or materials are preferable to non-renewable ones (such as nylon, polyester and acrylic), can lead to significant reductions of emissions in the sector. Similarly, creating greater awareness of the benefits of recycled packaging such as "greener" oxo-degradable plastics or moulded pulp - that comes from wood, bamboo, bagasse, or wheat straw - is an effective way to reduce landfill accumulation and pollution (Semple et al., 2022).

The use of electronic devices also falls into this category. Generally, these are thrown away rather than being repaired, but extending their duration of use via the "repair instead of replace" approach could contribute to reduce the environmental impact.

Additional sustainable behaviours can be implemented in relation to the individual as well. It is possible, for example, to invest in the creation of orchards and gardens common to several inhabitants to procure vegetables and fruits independently, reducing emissions related to the transport of imported products and reducing packaging; or give incentives for those who procure bulk food and detergents or products for cosmetics and personal care from suppliers who avoid polluting packaging. In general, policies should insist on a decrease in intensive purchases, trying to buy only the necessary products and, preferably, from local and certifiably sustainable brands.

Below are recommended some policies referred to each country adhering to the Project regarding consumption practices, i.e., those actions that citizens can adopt, and which cannot be included in the previous sections addressed.

The behavioural advice presented here are not strictly related to the characteristics that determine individual countries' emissions, but have a more transversal nature that can certainly be declined in all countries participating in the Project and, in some cases, can promote the development of the local economy. These measures concern various sectors of individual consumption and, although the extent of individual emissions is lower than that of transport or housing measures, they still need to be considered, included, and widely disseminated.

OECD/ non-OECD	Country name	Other consumption Policy 1	Other consumption Policy 2	Other consumption Policy 3	Other consumption Policy 4
Non-OECD	Azerbaijan	Promote sustainable consumption	Increase teleworking (especially in Baku- where 85% of GDP is produced)	Extend product lifetime	Opt for recycled materials over primary raw materials
OECD	Canada	Extend product lifetime	Timber construction for buildings	Compost food leftovers	Promote sustainable consumption
OECD	EU	Enhance second-hand clothing	Prefer natural over synthetic fibres for clothing	Increase waste management and recycling	Repair broken electronic appliances
Non-OECD	Peru	Compost food leftovers	Prefer recycled materials over primary raw materials	Promote sustainable consumption	Prefer local materials for clothing
Non-OECD	South Africa	Compost food leftovers	Promote sustainable consumption	Prefer local materials for clothing	Opt for recycled materials over primary raw materials
OECD	Turkey	Promote sustainable consumption	Compost food leftovers	Prefer natural over synthetic fibres for clothing	Increase waste management and recycling

Table 4 - Proposed policies for sustainable consumption, authors' elaboration

Essentially, the real revolution of changes related to consumption practices for the reduction of GHG emissions cannot be separated from the dissemination of knowledge and awareness among citizens, as a set of actors that consume and pollute ever more and more intensively.

7. Conclusions

The results that emerged from this detailed analysis allow to better understand the potential deriving from the incorporation of behavioural advice into reduction-emission policies and, specifically, in the NDCs of the countries participating in the CAMPAIGNers Project, highlighting the pivotal role of individual actions in reducing GHG emissions.

Furthermore, this guidebook could represent a useful and valuable support to direct the development and drafting of the forthcoming NDCs. The suggested policies, in fact, are powered by scientific evidence, derived from a data collection phase, extended over three years and based on both quantitative and qualitative considerations.

Through research, it is possible to assess the state of the art of current policies regarding the reduction of emissions and identify gaps, then redefine them, with the help of policymakers, in a more structured and all-encompassing way, in order to make the transformation feasible and effective.

Research, in this sense, is proposed as a valuable "handmaid" to the work of governments that, through policies built *ad hoc*, are effectively able to promote and encourage a certain type of change in behaviour and lifestyles; in doing so, policymakers are the only ones capable to properly spread these carbon neutral practices and to make the subjects to which they direct their policies more aware and responsible.

Addressing policies directly to citizens and consumers would, in fact, generate a deeper sense of responsibility and awareness among individuals, as well as a sense of "collective commitment" towards the carbon neutrality goals, which would be advantageous both for the environment itself and for the citizens, who would benefit from the health and social point of views.

Accordingly, the effectiveness of the changes related to the reduction of climate-altering emissions is precisely built on citizens, the heart of the policies here suggested. Consulting and addressing individual citizens, leveraging on the change in habits and on their belonging to a community, is the key to achieve a successful and widespread transformation: CAMPAIGNers Project, which strongly pursues these ideals, is indeed a turning point in the current environmental policy landscape.

Nonetheless, it is crucial to pursue this transformation in a more holistic way by leveraging also on a sense of community and network: to feel part of something greater, which aims at the same objectives of mitigating climate change and reducing emissions, allows citizens to act for a common good, namely a future more sustainable; it is therefore necessary that everyone participate actively and simultaneously cooperate with each other and with partners, at several levels, in a multi-level governance perspective.

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