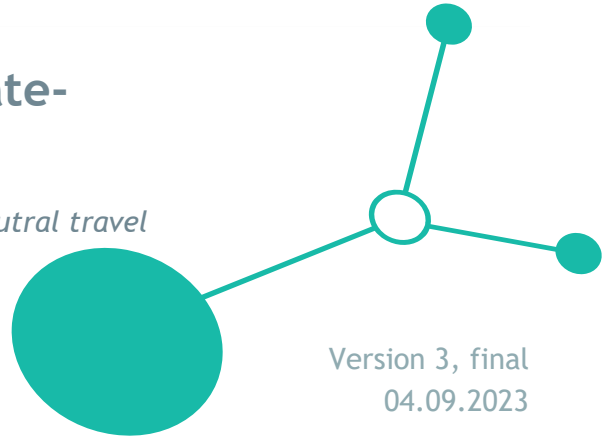


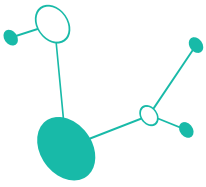
Innovative participatory sustainable business model for cycling along the Iron Curtain Trail - Innovative ICTr Cycling

Report: Analysis of the existing climate-neutral travel solutions (D 2.1.1)

WP 2: Creating an impact measurement system for climate-neutral travel

ICTr-CE





ANALYSIS OF THE EXISTING CLIMATE-NEUTRAL TRAVEL SOLUTIONS

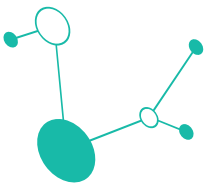
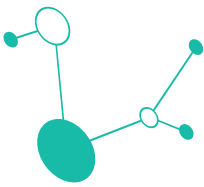


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FOREWORD

About the ICTr-CE project (Interreg Central Europe)

The potential of transnational cycling routes for tourism is still underdeveloped in central Europe. This includes the EuroVelo 13 Iron Curtain Trail, which connects regions across the whole Europe from the Barents Sea to the Black Sea along the European Green Belt. The ICTr-CE project improves the business case for this route by developing new tourism products. These result from a newly developed participatory business model, which strengthens the innovation capacities of local businesses.

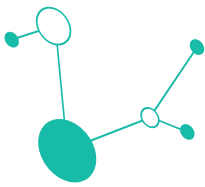
D 2.1.1: Analysis of the existing climate-neutral travel solutions

The aim of this activity is to study the existing carbon and climate-neutral travel solutions. The progress of interest in tourism sustainability brought a vast body of knowledge and best practice examples when it comes to environmentally friendly ways of travel. The knowledge provider, UP FTS, in close cooperation with ETE and Ecopolis, researched the topic to come up with a classification of the existing climate-neutral travel best practices and tools. This will be used to inspire the solution developed specifically for ICTr. This will be achieved with the consultation process among all project partners (PP) relevant NGOs who, based on their experience and the involvement of their target groups, will bring in the national/regional best practices that will be used as input to develop an innovative ICTr solution through the collaborative co-design process.

Activity lead: UP FTS, all PPS contribute.

This deliverable presents a report in which the knowledge provider, UP FTS, reviewed and classified the existing climate-neutral travel solutions with the help of inputs from all PP and the best practices from their countries. The list of existing climate-neutral travel solutions identified by PP can be found at the end of the Report in the Appendix 2 (Table 1).

The report consists of an Introduction where United Nation's World Tourism Organisation climate action is presented. The chapter is followed by "Cycling in the context of sustainable tourism", in which connections between sustainable tourism practise and cycling (tourism) are discussed. Next are the "Practices in decarbonisation", where we talk about the role of cycling as a method of transportation in the efforts to reduce the emissions of carbon dioxide. Definitions of decarbonisation are included to avoid any misunderstanding. Further on, the Report provides the analysis of existing climate-neutral travel solutions identified by the project partners: a thematic analysis of the solutions' (product) marketing and a basic descriptive analysis of the identified solutions. The final part of the Report is dedicated to a more detailed presentation of published papers dealing with calculators accounting for emissions from personal travel. The Report concludes with "Key findings" with recommendations to be used in the following project activities.



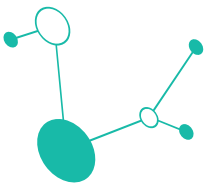
1. INTRODUCTION

In 2021, United Nation’s World Tourism Organisation (UNTWO) declared a climate action in tourism alongside a global fight for climate justice signed under the Glasgow Declaration (Launch of the Glasgow Declaration, 2021; The Glasgow Declaration, 2021). The primary objective of the Glasgow Declaration is to provide a coherent climate action narrative, delineate viable strategies for the tourism industry to attain carbon neutrality, and foster public endorsement for the expansion of the sector’s efforts in addressing climate change (Launch of the Glasgow Declaration, 2021).

UNWTO’s Baseline Report on Climate Action in Tourism (2022) finds that:

- A mere 20.7% of tourism organisations engage in measurement practices, exhibiting limited standardisation and consensus among them.
- Many existing techniques do not adequately address the specific demands of small and medium-sized enterprises (SMEs), and there is limited availability of freely accessible tools.
- Certain participants utilise calculators provided by offset firms for measurement purposes, but others seek more comprehensive assistance from experts and certification agencies.

Additionally, in the “Climate Action in the Tourism Sector: An Overview of Methodologies and Tools to Measure Greenhouse Gas Emissions” (2023), UNTWO emphasises the significance of target formulation and decarbonisation through measurement in the Glasgow Declaration on Climate Action in Tourism. They stress establishing a consensus about measurement methodology and tools as of utmost importance to expedite involvement and effectively monitor the progress made towards achieving commitments set for the year 2030. Warning of greenwashing practices, the document explains the reliance on measurement as insufficient as it ought to serve as a mechanism for achieving emission reduction and decarbonisation objectives. Finally, it concludes that the upcoming decade is the period to prioritise establishing effective measurement mechanisms and implementing immediate climate action.



2. CYCLING IN THE CONTEXT OF SUSTAINABLE TOURISM

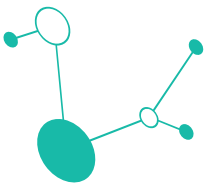
The European Cyclists' Federation (ECF) and the World Cycling Alliance (WCA) point out that cycling is directly linked to achieving 11 out of 17 global goals of the UN Sustainable Development Goals (European Cyclists' Federation, 2021).

In the context of sustainable tourism, Ciascai et al. (2022) find cycle tourism a prominent and essential component, as it establishes connections between sustainable tourism practices and communities of cycle tourists that prefer exploring lesser-known or secluded areas. Moreover, as bicycles serve as an essential means of transportation for tourists, facilitating their connection to both the natural environment and social aspects, cycling as an activity plays a pivotal role in promoting sustainable transportation and yields favourable outcomes in terms of public health, climate change mitigation, economic prosperity, environmental preservation, and air quality enhancement.

Furthermore, as indicated in the Charter for Sustainable and responsible cycling tourism in the Mediterranean area (project MEDCYCLETOUR, Interreg MED programme), cycling is an environmentally sustainable means of transport and tourism. It contributes to the reduction of air and noise pollution, greenhouse gas emissions and congestion. Cycling helps fight climate change and provides a healthier environment for the local population and visitors. Cycling infrastructure needs less space than infrastructure for cars. This means less sealed soils, less soil pollution and less water pollution, especially in remote areas and natural parks. Moreover, it can replace motorised trips both for locals in their everyday journeys and for tourists visiting several sites. Cycle tourists tend to use public transport more than planes to reach their holiday destinations, which also contributes to the environmental sustainability of cycling tourism (EuroVelo, 2023)

Han et al. (2020) expect cycle tourism to experience substantial transformations in the next 75 years, potentially becoming an emerging trend in the forthcoming years as it embraces the utilisation of electric bicycles and implements sustainable practices to address environmental and societal concerns. Likewise, metropolitan areas are expected to enhance their infrastructure and amenities, whilst sustainable tourism endeavours aim to foster ecologically mindful cycling practices.

As cycle tourism projects sustainable practices, case studies, such as Gazzola et al. (2018) study in Northern Italy, exemplify an opportunity for sustainable tourism development in rural regions through cycle tourism. They argue the potential of cycling through the enhancement of sustainable mobility alternatives, with the encouragement of utilising train connections, while noting that cycle visitors may opt for alternative modes of transportation, such as planes or cars, based on their geographic location. Nevertheless, they stress that the growth of cycle tourism can stimulate broader tourism development that adheres to the principles of slow tourism, emphasising sustainable long-term outcomes.



3. PRACTICES IN DECARBONISATION

Road transport alone contributes about one-fifth of the EU's total emissions of carbon dioxide (CO₂), the main greenhouse gas (GHG). Between 1990 and 2007, transport-related GHG emissions increased by 36%. Cycling or the bicycle is a method of transportation that provides significant greenhouse gas reductions when compared to other modes. The GHG emissions from cycling are more than ten times fewer than those from individual motorised transportation, even though it is not a carbon-free form of transportation. Research conducted in 2011 based on the data Eurostat's data from the year 2000 (collected in the EU-15), estimates that cycling's contribution represents a 3 to 6% share of EU-15 Kyoto Protocol commitments to reduce greenhouse gas emissions, entered into force in 2005 (Blondel et al., 2011).

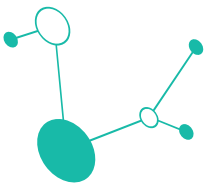
To ease the above limitation in reaching net zero in carbon footprint and ensuring carbon neutrality, we analysed key solutions worldwide, which will be defined further in the analysis and considered for their inclusion in the project outcomes. A good indication of a carbon-neutral solution in cycle tourism is solar charging stations, as demonstrated by Wamburu et al. (2020) in their design of a zero-carbon electric bike share system, focusing on solar charging stations, which demonstrated the feasibility of fulfilling the annual energy requirements of each station by the installation of a solitary solar panel, while simultaneously attaining net-zero operation through the utilisation of net-metering.

However, to avoid any misconception, as a significant portion of the vocabulary employed in discussions about carbon neutrality and net zero lacks precision (Rayer et al., 2022), the below definitions are to be employed throughout the text:

1. **Carbon neutrality** refers to a method of production in which the entire amount of carbon dioxide emitted is equal to zero, ensuring that businesses offset their carbon emissions (Becker et al., 2020).
2. **Carbon offset and carbon offset credit** are interchangeable terms for reducing greenhouse gas emissions through land restoration or tree planting. Offset credits are transferable instruments, allowing individuals to "retire" emissions for personal goals (Broekhoff et al., 2019, p. 6).
3. **Net zero** is a scientific concept aiming to limit global average temperature rise by limiting the amount of carbon dioxide and other greenhouse gases in the atmosphere (Fankhauser et al., 2022).

The accuracy of the terminology employed by the solutions providers is subject to speculation, given the possibility of greenwashing and irresponsible marketing.

As found by Polonsky et al. (2020), the regulatory studies of carbon offsets as a 'green' marketing strategy have identified various difficulties that could mislead customers. As scientific perspectives vary, the lack of a standard for carbon offsets or claims is the biggest concern. The offset may not include airline carbon or plane manufacturing environmental impacts. Additionally, corporations may misrepresent their carbon offsets relative to their carbon output, complicating matters. The offset must also include internal carbon-reduction actions like updating equipment to greener infrastructure.



4. ANALYSIS OF EXISTING SOLUTIONS

4. 1 Thematic analysis of identified solutions

An inductive thematic analysis was conducted using qualitative data analysis software. Such inquiry aims to systematically identify and organise information into patterns of meaning across a large data set. This method allows us to discover a common theme and how it is communicated and used in, for example, a marketing campaign.

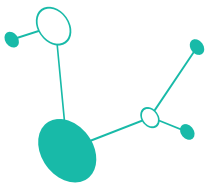
In this case, we analysed 36 short pitches, as promoted on the selected solutions' websites. The analysis detected 13 repetitive themes alphabetically: calculator, carbon, climate, cycling, cycling tourism, emissions, footprint, hotel, industry, products, sustainable, tourism, and travel. Moreover, as some themes can be clustered together - such as hotel, industry, travel and cycling tourism- into tourism, we narrowed the results to nine overall themes.

The “calculator” alongside “footprint” proves to be a vital code, indicating the aim of these campaigns by employing interest via an interactive approach for the user. “Carbon”, “climate,” and “emission” point out the main issues the solutions address, while “tourism” gives us a perspective of when they apply.

Given the obvious highlight on the first code, we will look into a more comprehensive analysis of carbon footprint calculators specifically designed for travel-related applications in a separate chapter.

“Cycling” is merely connected to tourism, holidays and the sustainable tourism industry in these pitches. This finding, however, may be useful in the ICTr-CE project to improve marketing communication of the relevant project's outputs, addressing cycling as a method of transportation that provides greenhouse gas reductions compared to other modes and has positive effects on other sustainable development goals.

Additionally, a word cloud, as a graphical representation of word frequency analysed within these pitches, demonstrates the most emphasised words in these solutions, namely: “emissions”, “travel”, “carbon”, and “footprint”. The word cloud was generated using the top 1000 most used words, portraying the frequency of each word by its size in the image (see Appendix 1, Figure 6).



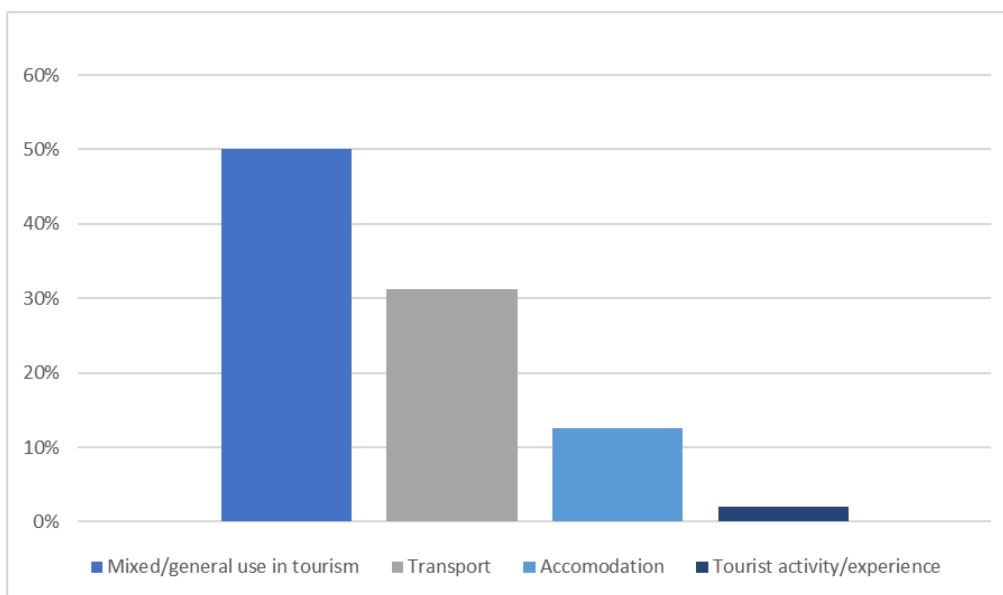
4.2 Descriptive analysis of identified solutions

In the following chapter, a classification of 36 existing climate-neutral travel solutions identified by the project partners will be provided. To avoid the use of information which might be potentially misleading, the analysis considers the descriptions offered by these providers as anticipated results, rather than definitive outcomes. All chosen cases are not conceptual or in a state of development, but products already available on the market; either commercially, promoted by NGOs or applied in a funded (regional/national/EU) project.

Almost half (48,1%) of the identified climate-neutral travel solutions have been launched in recent years, from 2019 to this date. Moreover, if we extend this period to the last decade (2013-2023), we find that two-thirds of the identified solutions were launched.

Half of the identified solutions have general use in tourism, whereas almost a third deal with transportation and route planning (31,3%). Significantly fewer solutions refer to accommodation (12,5%) and only 6,3% directly aim at tourist activity and experience (Figure 1).

Figure 1: Where are the identified climate-neutral travel solutions applied? (N=32)



As seen in Figure 2, more than half of detected climate travel solutions seek carbon offsets (51,9%), followed by carbon neutrality with 29,6%. Less than a fifth of solutions found are mixed in nature, combining offsetting and carbon emissions neutrality.

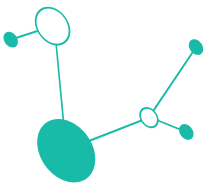
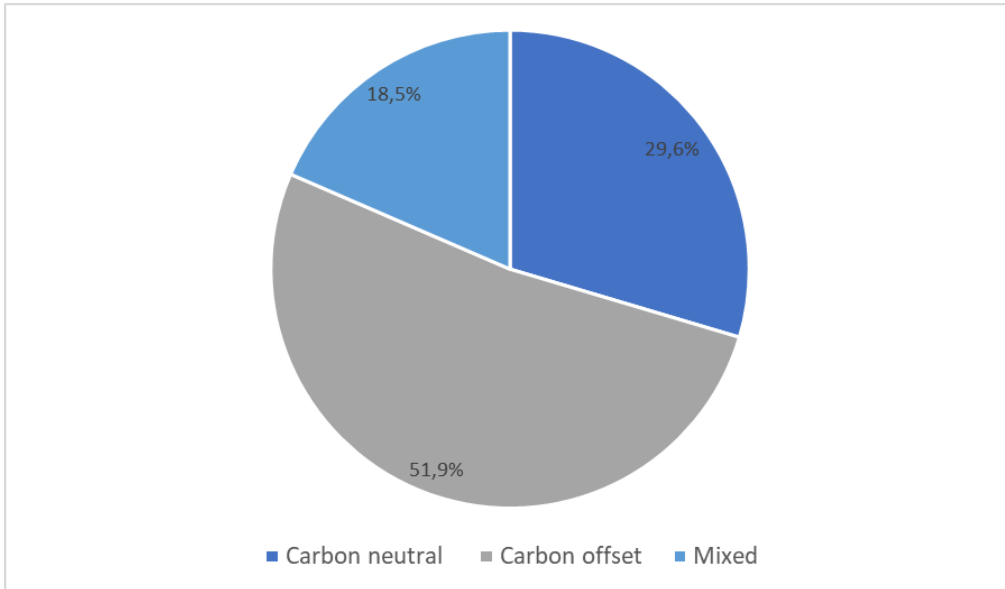
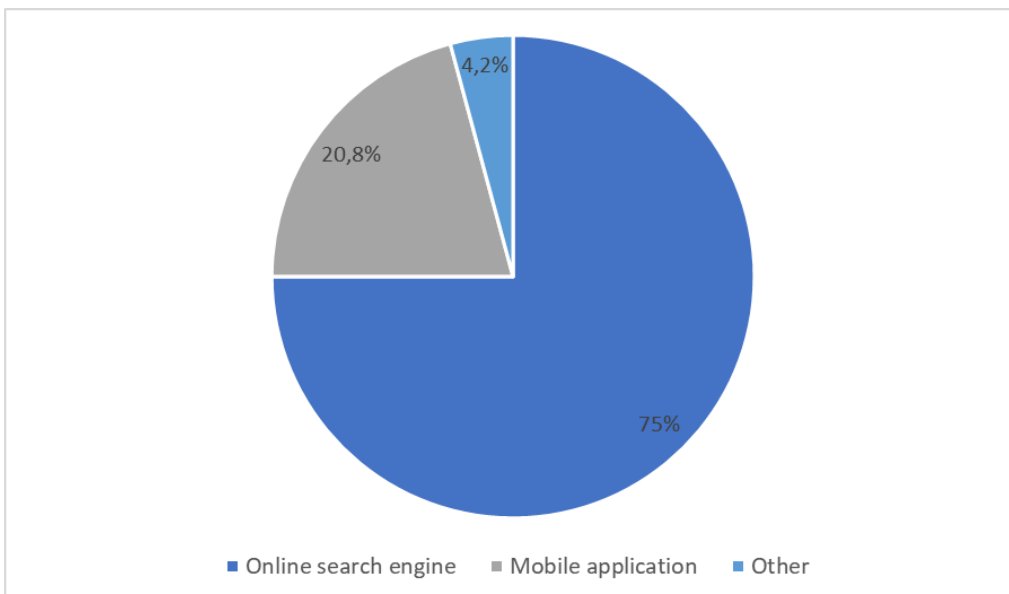


Figure 2: Type of solution for carbon reduction in the identified climate-neutral travel solutions? N= 27



Regarding the type of technology used, most of the identified solutions adopt online search engines or web-based software (75%), followed by mobile applications with 20,8% (Figure 3).

Figure 3: Technologies used in the identified climate-neutral travel solutions? N= 24



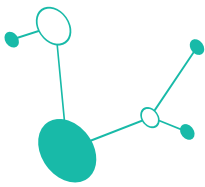
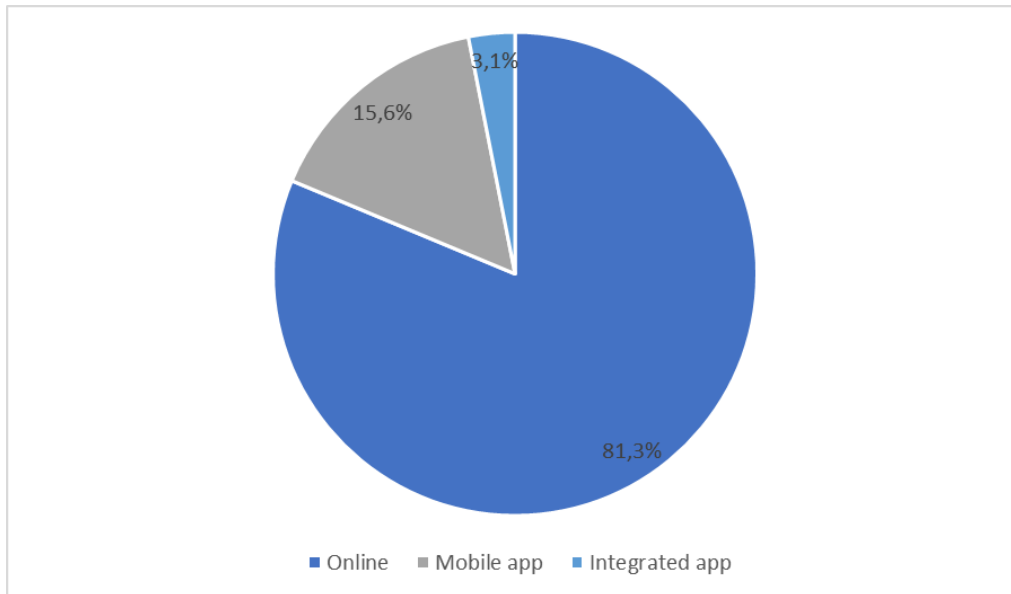
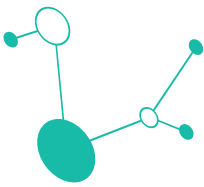


Figure 4 shows that carbon footprint calculators are mostly used online on the web (81,3%), much less via mobile applications (15,6%). Remarkably, we have identified only one case of a calculator using an integrated application (3,1%).

Figure 4: Type of calculator (where applicable) in the identified climate-neutral travel solutions? N= 32





4.3 Footprint calculators

Considering other more in-depth and systematic research has already been conducted in the field of footprint calculators, main outcomes of recent scientific papers dealing with carbon emissions calculators will be presented in the next chapter, instead of the analysis of cases found by the project partners.

General public frequently does not have enough knowledge on their carbon footprint or, more particularly, the effects of certain forms of consumption. However, in the light of global warming a growing number of citizens are prepared to change their patterns in the everyday life to ones that are more sustainable. Lately, the phrase "personal carbon footprint" has grown in use to describe how much carbon dioxide an individual emits on a daily basis. Such calculators have been demonstrated to improve knowledge and comprehension of environmental sustainability-related topics as well as the effects of unsustainable resource usage. Moreover, this tool can evaluate or better say "calculate" carbon emissions from personal travelling and other personal transport-related activities. There are various calculators in detail and scope, the most basic calculate carbon emissions based only on energy-related activities in the household, while the more detailed are able to estimate travel-related consumption.

Mulrow et al. (2019) assessed 31 carbon footprint calculators, which were chosen based on popularity within three categories: Government, Non-profit, and private (please see Table 1 in Mulrow et al., 2019, for their inventory of chosen online carbon footprint calculators). Using the data from their poll, they came to the conclusion that, a majority (53%) of all survey respondents have previously used a carbon footprint calculator, however, only 8.9% could recall their calculated footprint measure. In addition, merely 15.9% of the participants said using a carbon footprint calculator had a positive impact on their daily energy usage. Furthermore, approximately 75% of participants reported knowing »Little«, »Very little«, or »Nothing at all« about their home energy use.

Bekaroo et al. (2020) explored how key transport-based calculators account for emissions from personal transport-related activities by methodically analysing 10 calculators, out of the initial 136¹ identified cases. Besides enhancing knowledge and understanding of environmental sustainability-related aspects and impacts of unsustainable resource utilization, these tools shift focus from government obligations to reduce the rise in GHG emissions and place greater focus on the responsibility of individuals. Surprisingly, none of the calculators included maritime transport in their list of calculation categories, which is a significant drawback.

The authors point out, that up to this point, there hasn't been an agreement on how carbon footprints should be estimated, furthermore, different calculators have different structures and input requirements, and even the same data might provide different answers. For this reason, a taxonomy was designed as a guide of three essential building blocks (Figure 5), where enhancements on existing transport-based carbon calculators are needed, and these are: standardization, technology and user focus (Bekaroo et al, 2020). Their findings are further presented as follows.

¹ Out of these 136 initially identified cases of transport-based calculators, there were 108 calculators that estimate the effects of calculating water, land usage, and GHG footprints; some additionally needed technical expertise in life cycle assessment modelling. Furthermore, there were also calculators that were country-specific, commercial, involved principally diet-related processes and downstream of product purchase, which were disregarded due to their irrelevance for this study. Additionally, the carbon footprints of all the profiles established in the preceding section could not be calculated using the country-specific calculators, therefore they were not taken into account. 15 calculators were found to directly or indirectly calculate carbon emissions connected to personal transportation after the screening procedure. In the end, 10 of the 15 calculators were chosen for this study since they could be used in different countries.

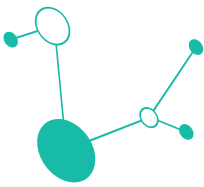
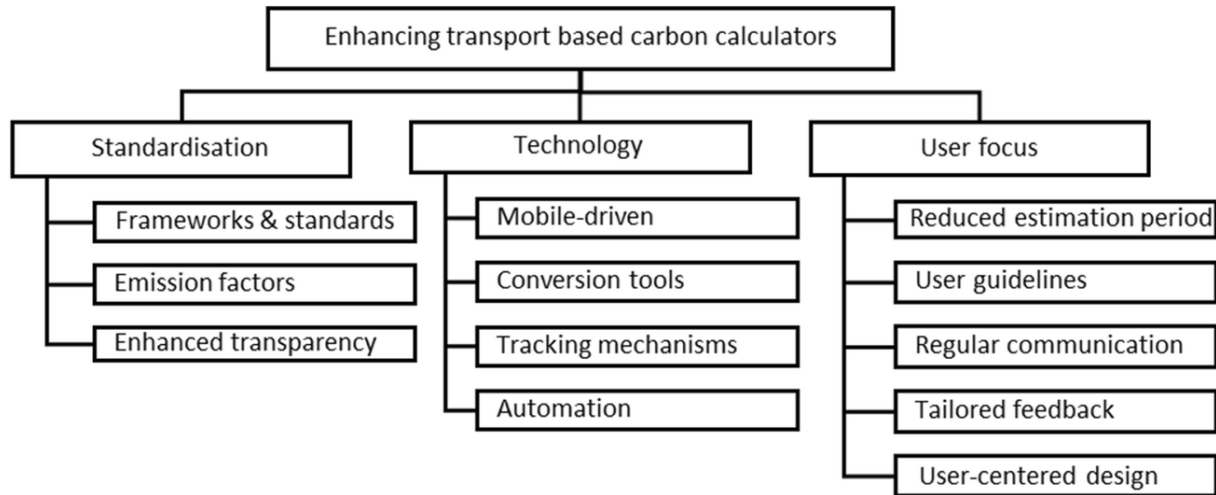


Figure 5: Proposed taxonomy for enhancing transport-based carbon calculators



Source: Bekaroo et al, 2020.

Standardization

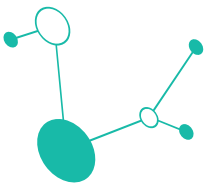
Frameworks & standards

The research shows there is no mention of the current calculators' compliance with international regulatory frameworks and standards. This is also due to a lack of governing structures and regulations for such instruments. As a result, regulatory bodies and research are required to investigate the creation of such frameworks and standards. These could regulate the scope, parameters and factors utilized by such calculators.

The framework and the scope of the categories that are taken into account in regard to emissions from transportation needs a sufficient number of categories because calculators with less of these categories result in an inadequate division of emission-related elements. However, a lot of the categories are difficult for end users to operate and can lengthen the calculating process. This criterion is crucial to the analysis process because it might provide important details about restrictions and inconsistencies in the way various calculators classify emissions from travel on top of emissions variables. Also, standardized categories, parameters and approaches could improve consistency of results among calculators, and most of all, reduce confusion among users.

Furthermore, calculators lack transparency of approach, which relates to whether the methodologies and emission-related parameters utilized by the calculators are available for end users to consult. Transparency aids calculator users in comprehending the emission-related parameters and the applied formulae, much like the calculating approach.

In addition, current calculations do not take emissions from the phases of vehicle production and delivery into account. Even though there is a lot of attention on lowering GHG emissions from the shipping industry, the majority of the calculators we tested did not take maritime transport into account throughout the calculation process.



As a result, the existence of such frameworks and standards could assist govern the publication of transport-based calculators, allowing regulatory organizations to take action to block public access to any published tool that does not comply with established standards. Regulating organizations could periodically evaluate published calculators to check for compliance with established standards if relevant standards, frameworks, and policies have been developed.

Emission factors

There are limited insights into the emission variables that are used by several calculators, which has caused a discrepancy in the estimates of carbon footprint supplied by different tools. Additionally, the use of global averages reduces the accuracy of calculated carbon footprints because there is a lack of emission factors for different countries. Therefore, countries could publish such data to increase the accuracy of estimated carbon emissions, which would be then used by the calculator developers and designers.

Enhanced transparency

Carbon footprint calculators are frequently criticized for their lack of transparency. In order to address this issue, such tools should give clear, precise, explicit, and transparent information about the calculation process, including the GHG being reported, the technique used, the emission factors employed, the conversion factors involved, and the equations used.

Technology

Mobile-driven

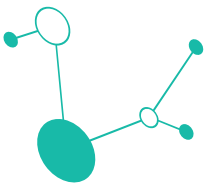
This platform offers a lot of potential for encouraging a low-carbon way of life, since the smartphone has already surpassed the computers as a means of accessing the internet. However, the study shows that the mobile-based platform had more restrictions than the current web-based calculators. As such, carbon calculator designers should better capitalize on the potential of the mobile-based platform for the accessibility reasons.

Conversion tools

The reviewed transport-related carbon calculators utilize varying metrics for key parameters needed in the calculation process, some use miles others utilize kilometres. Similar to that, some use gallons while others ask for input in litres. As a result, conversion tools should be added to the calculators to make them easier to use.

Tracking mechanisms

Only a few calculators come with built-in carbon emission tracking capabilities in terms of saving and monitoring their carbon emissions within the system through an integrated database. End users could use reduction techniques in the future by tracking their prior emissions by turning on this functionality. Additionally, based on past data, users may receive more individualized and insightful carbon reduction advice that would help them do a better job of lowering their transportation-related emissions. Moreover, this would improve the potential for the creation of carbon forecasting algorithms for activities connected with personal travel.



Automation

None of the calculators made any attempt to automate some steps in the data collecting or computation process, according to the comparison analysis. Some of the processes might be automated to streamline user input and speed up computation. For instance, utilizing the Global Positioning System (GPS) on mobile phones, the calculator may automatically record changes in positions and distance.

User focus

Reduced estimated period

Analysis showed that eight of the ten tools calculate carbon emissions on a yearly basis, not monthly or for a specific period of time. Adding the ability to calculate carbon emissions for certain dates would provide users with more necessary flexibility.

User guidelines

Closely related to the need for standardization, lack of transparency and relatively high granularity of input parameters, which implies guidelines that are not clear enough and user-friendly. There are also limited possibilities during the calculation process when using shared transportation options and there are more people in the vehicle or when using shared transportation modes (e.g. car-pooling).

Regular communication

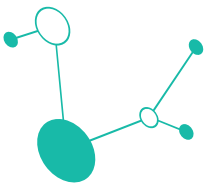
Use of newsletters, regular emails, live chat, and notifications, among other things, should be made in order to improve communication, which is necessary to reduce scepticism in the field of carbon management and control, and to better engage end users by giving them current information on personal carbon-related aspects.

Tailored feedback

Results indicate that the calculators only provide generic information on carbon emission reduction techniques. Instead, end users might receive more useful and personalized input on how to lower their own carbon footprint based on pre-established baselines, averages, or historical emissions calculated by users of such programs. Information technology-related ideas like artificial intelligence, data mining, and machine learning may be used to do this.

User-centred design

Some calculators displayed information in a variety of ways, some of which were even challenging to read and notice. User-centred design (UCD) methodologies might be used by the creators of such tools to enhance end users' experiences.

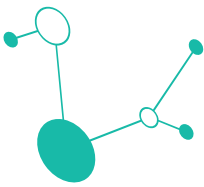


5. CONCLUSION

Key takeaways

The aim of activity was to study the existing carbon and climate-neutral travel solutions, to come up with classification of the existing climate neutral travel best practices and tools, that will stimulate the development of solutions specific for ICTr. Key takeaways from the Report are listed below:

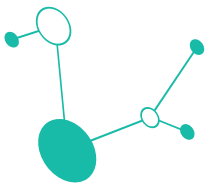
- UNWTO's Baseline Report on Climate Action in Tourism (2022) finds that:
 - A mere 20.7% of tourism organisations engage in measurement practices, exhibiting limited standardisation and consensus among them.
 - Many existing techniques do not adequately address the specific demands of small and medium-sized enterprises (SMEs), and there is limited availability of freely accessible tools.
 - Certain participants utilise calculators provided by offset firms for measurement purposes, but others seek more comprehensive assistance from experts and certification agencies.
- UNWTO in the "Climate Action in the Tourism Sector: An Overview of Methodologies and Tools to Measure Greenhouse Gas Emissions" (2023), stress the need to establish a consensus about measurement methodology and tools as of utmost importance to expedite involvement and effectively monitor the progress.
- The European Cyclists' Federation and the World Cycling Alliance point out that cycling is directly linked to achieving 11 out of 17 global goals of the UN Sustainable Development Goals.
- Cycling as an activity, plays a pivotal role in promoting sustainable transportation and yields favourable outcomes in terms of public health, climate change mitigation, economic prosperity, environmental preservation, and air quality enhancement.
- The accuracy of the terminology employed by the solutions providers is subject to speculation, given the possibility of greenwashing and irresponsible marketing. To avoid any misconception, as a significant portion of the vocabulary employed in discussions about carbon neutrality, the following definitions are suggested:
 - Carbon neutrality refers to a method of production in which the entire amount of carbon dioxide emitted is equal to zero, ensuring that businesses offset their carbon emissions (Becker et al., 2020).
 - Carbon offset and carbon offset credit are interchangeable terms for reducing greenhouse gas emissions through land restoration or tree planting. Offset credits are transferable instruments, allowing individuals to "retire" emissions for personal goals (Broekhoff et al., 2019, p. 6).



- Net zero is a scientific concept aiming to limit global average temperature rise by limiting the amount of carbon dioxide and other greenhouse gases in the atmosphere (Fankhauser et al., 2022).

- Almost half (48,1%) of the identified climate-neutral travel solutions by project partners, have been launched in recent years, from 2019 to this date.
- Half of the identified solutions have general use in tourism, whereas almost a third deal with transportation and route planning (31,3%) and 12,5% solutions refer to accommodation.
- More than half of detected climate travel solutions seek carbon offsets (51,9%), followed by carbon neutrality with 29,6%.
- Regarding the type of technology used, most of the identified solutions adopt online search engines or web-based software (75%), followed by mobile applications with 20,8%.
- Carbon footprint calculators are mostly used online on the web (81,3%), much less via mobile applications (15,6%).

- A recent study (Mulrow et al., 2019), shows that a majority (53%) of all survey respondents have previously used a carbon footprint calculator, however, only 8.9% could recall their calculated footprint measure.
- Carbon footprint calculators which estimate travel-related consumption, have to include all types of transportation, including maritime transport.
- Bekaroo et al. (2020) designed a guide to enhance transport-based carbon calculators and organized them into three essential blocks: standardization, technology and user focus.



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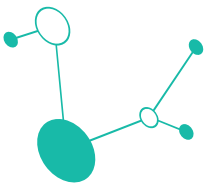
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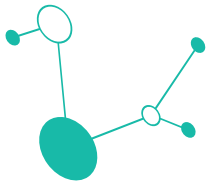
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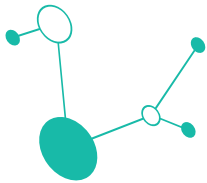
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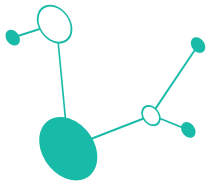
Appendix 2

Table 1: A list of the climate neutral travel solutions identified by the project partners

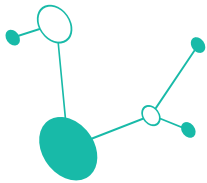
N o.	Travel solution	Organisation / Company	Year launched	Country of origin	What it promises, how it promotes itself (2-3 sentences pitch)	Target focus: 1. transport; 2. accommodation; 3. tourist activity/experience; 4. mixed/general use in tourism	Type /Nature of solution? 1. carbon neutral; 2. carbon offset; 3. Mixed (provide the source of offset)	Technology used (if mentioned)	Type of calculator (if applicable): (1) Online; (2) Separate APP; (3) Integrated APP - provide link/source	State of development: 1. available in theory; 2. promoted by NGOs; 3. Applied in a funded (regional/national/EU) project ; 4. Product available on the market	Comments	Website
1	tuCO2	innoveco	2023	Greece	"tuCO2 provides an easy to use yet sophisticated and scientifically proven tool, that helps to calculate and offset your travel carbon footprint, achieving Carbon Neutral travel! tuCO2 calculator can be used for flights, trains, cruises, hotels and more. Furthermore, on our website you can find tips on how to reduce the carbon emissions produced by your trip, and suggestions for low carbon or even carbon neutral hotels, transportation, and other activities."	4. mixed/general use in tourism	2. carbon offset	mobile application	2	4. Product available on the market	The app has been launched in April 2023 - as a new app it has a few glitches	tuCO2
2	GreenPerk	TravelPerk	2020	Spain	"GreenPerk is the new way for sustainable business travel: Transparent. Affordable. Impactful." "Our tool makes carbon-neutral business travel easy, allowing you to compensate CO2 emissions not just from air travel but also train travel, hotels, and any other service you book on TravelPerk's platform."	4. mixed/general use in tourism	2. carbon offset	only available to TravelPerk clients	1	4. Product available on the market		https://www.travelperk.com/travel-solutions/sustainability/greenperk/
3	Staze	Staze Ltd	2019	United Kingdom	"You can now make net zero hotel bookings in every city on the planet at no extra cost. Compare carbon like you compare price and we'll offset your bookings for free."	2. accommodation	2. carbon offset	online search engine	?	4. Product available on the market		https://staze.com/
4	EcoSphere+	Abatable	2016	United Kingdom	"Ecosphere+ delivers positive impact for climate, nature and people by harnessing the power of the carbon market"	4. mixed/general use in tourism	2. carbon offset	several - carbon calculator..	1	4. Product available on the market	Acquired by Adatable in April 2023	https://ecosphere.plus/
5	Travel Carbon Footprint	Sustainable Travel International	2020	International	Use our carbon footprint calculator to calculate your travel emissions and purchase carbon offsets.	Travel	carbon offsets	online search engine	1	4. Product available on the market		https://sustainabletravel.org/our-work/carbon-offsets/calculate-footprint/?utm_source=...
6	Travel & Climate	The Region of West Sweden via Klimat 2030, Centre for Tourism at the University of Gothenburg, Chalmers...	2022	United Kingdom	"The aim of Travel and Climate initiative is to contribute to a more sustainable tourism industry by providing a digital platform with tools and content that educate consumers about the climate footprint of tourism. The platform makes it easier for consumers who want to make low carbon choices, and it has the potential to contribute to the sustainability efforts of the tourism industry – through spreading knowledge and offering opportunities for industry actors to showcase low carbon options for travel and accommodation."	4. mixed/general use in tourism	1. carbon neutral	online search engine	(1) online	4. Product available on the market		https://travelandclimate.org/
7	Carbon Footprint Calculator For Individuals And	Carbon Footprint Ltd	?	United Kingdom	Carbon Footprint software is an ideal tool to help raise awareness, measure emissions, reduce costs and engage staff in your carbon management programme. Our Carbon Footprint software is the leading & authoritative calculation package that is also one of easiest to use – so much so that it has well over 1,000,000 users worldwide.	1. Transport	3. Mixed (provide the source of offset)	online search engine The online calculators	(1) online + WEB APPs	4. Product available on the market	Emissions per person is based upon data readily available from The World Bank. This is illustrated as tCO2e	https://www.carbonfootprint.com/calculator.aspx



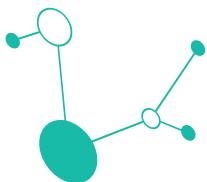
	Households			Checked regularly as part of the Quality Assurance Scheme, so you can be assured that our software is always up to date and accurate (unlike stand-alone off-line systems).			on this web site follow the methodology outlined by the UK Government ...			per person and is available for most countries across the globe. The most recent data release for emissions per person was 2018. As mentioned, this data is country specific, and is controlled by the input country selected on the 'Welcome' tab...	
8	World Land Trust's Carbon Balanced programme	World Land Trust	2005	United Kingdom	Established in 2005, World Land Trust's Carbon Balanced programme provides both individuals and organisations with the most effective method of fighting climate change. After first measuring your carbon footprint and taking steps to reduce it, you'll "offset" your unavoidable emissions with us, funding the protection of forests that store harmful carbon dioxide (CO2)	1. Transport	3. Mixed (provide the source of offset)	online search engine	(1) online	4. Product available on the market	https://www.worldlandtrust.org/carbon-calculator/
9	Zero Carbon & Climate Positive Certification	EKOS		New Zealand	The EKOS company offers services in carbon neutral theme for enterprising and individuals (advice, measurement, offset, certification...). The Certification requires meeting of all criteria, including calculating of applicant's carbon footprint (they use several calculators) and offsetting them through EKOS (by establishing new forests and protecting old ones).	4. mixed/general use in tourism	3. Mixed (provide the source of offset)	several carbon footprint calculators available	(1) Online? See https://ekos.co.nz/calculator-home-page	4. Product available on the market	https://ekos.co.nz/
10	Tampere - Carbon Neutral Tourism Destination 2030	VisitTampere Ltd.	2022?	Finland	Good roadmap to carbon neutral destination of Tampere in 2030. Involving tourism companies and mobility providers, applying various tools to monitor and manage impacts, looking for financial and social sustainability.	4. mixed/general use in tourism	1. carbon neutral	Comprehensive destination management.	Calculators mentioned, but no specific one listed.	3. Applied in a funded (regional/national/EU) project	May be an inspiration for our mission in the pilot areas. https://visittampere.fi/wp-content/uploads/2022/06/tre-region_stf2030_tiekartta_web_en-1.pdf
11	Visit Finland CO2 calculator	Visit Finland	2022	Finland	The calculator is part of the Sustainable Travel Finland programme. "The CO2 calculator for the tourism industry is intended - as the name implies - for all actors in the tourism industry in Finland. The usage is not limited to a specific company size or type of organization - All companies, associations and municipal tourism organisations in and start using it. The needs of small and medium-sized enterprises have been prioritized in the design of the calculator, so that as many companies as possible in the tourism sector can receive support and tools for their climate work, with a low threshold and costs..."	4. mixed/general use in tourism	?	?	1	3. Applied in a funded (regional/national/EU) project	https://co2calc.visitfinland.fi/en
12	EXOTravel Climate Action Plan	EXO Travel	2013	Vietnam	"... we are working towards developing a methodology to measure emissions from our own operations and generated by travelers while they set foot in Asia. Working with specialist organizations, we have created tools and calculated emissions for scope 1 (direct emissions), 2 (emissions from heat & electricity) and 3 (value chain emissions). Even though we still face limitations in our measurement, due to the complex nature of our business, we are committed to improve it year-on-year and to work with accredited organizations to verify our calculations."	4. mixed/general use in tourism	3. Mixed (provide the source of offset)	?	They declare the use of calculators but no reference.	4. Product available on the market	We should be careful - isn't a greenwashing? https://www.exotravel.com/responsible/carbon-neutral
13	Green Initiative	Greeninitiative.eco			Program offers to travel industry companies globally 3 certifications (1. Climate positive, 2. Carbon neutral and 3. Carbon measured). Certification is realized in three steps: 1. Calculate 2. Mitigate 3. Certify.	4. mixed/general use in tourism	3. Mixed (provide the source of offset) ?	?	1. Online (probably)	4. Product available on the market	They declare to be endorsed by the UN Climate Change Agency to provide https://greeninitiative.eco/get-certified-climate-positive-carbon-neutral-and-



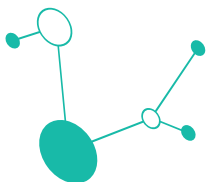
											advisory services and support to organizations willing to engage in climate action via UN formal processes and technical standards	carbon-measured-certifications/
14	NativeEnergy	Native	2003	USA	NativeEnergy, our best overall pick, is a public benefit corporation that offers carbon offset programs for individuals and businesses. The platform lets you easily calculate the carbon footprint of your home, travel, business, and events. You can then buy offsets as a one-time purchase or as a monthly, quarterly, or annual offset; if multiple projects are in progress, you can choose—otherwise, you'll be able to select the project that is currently underway. Projects vary but generally cover emissions reduction and reforestation—you'll see exactly which project your money will support when you pay for your offset.	4. mixed/general use in tourism	carbon offsets		Online	4. Product available on the market		Travel, Household & Events Carbon Offset Calculator NativeEnergy
15	Natural Habitat Adventures		1985	USA	Since 1985, Nat Hab has delivered life-enhancing nature and wildlife experiences to small groups of passionate explorers while protecting it in the process. We combine an innovative approach to travel, personal attention to detail, and industry-leading sustainability practices to provide intimate encounters with Earth's wildest places. Our mission is conservation through exploration—protecting our planet by inspiring travellers, supporting local communities and boldly influencing the entire travel industry.	3. tourist activity/experience;	Carbon neutral			4. Product available on the market		About Us Natural Habitat Adventures (nathab.com)
16	Fahrtziel Natur	Deutsche Bahn	2015	Germany	Initiative of German Railways for travelling to and within destinations without car and promoting protected areas. The rail travel in Germany is carbon neutral using green electricity.	Transport	Carbon neutral	no calculator	Online platform	4. Product available on the market		https://www.fahrtziel-natur.de/
17	Ecological Footprint Calculator	Global Footprint Network	1992	Switzerland	On the demand side, the Ecological Footprint© adds up all the biologically productive areas for which a population, a person or a product competes. It measures the ecological assets that a given population or product requires to produce the natural resources it consumes (including plant-based food and fibre products, livestock and fish products, timber and other forest products, space for urban infrastructure) and to absorb its waste, especially carbon emissions.	Mixed use	None: Own responsibility	Online calculator	Online platform and APP	4. Product available on the market	A tool for individuals and households	https://www.footprintcalculator.org/home/en
18	2030Calculator	UNFCCC	2022	Germany / Sweden	The 2030 Calculator uses a database of CO ₂ e emissions data for the cradle-to-gate emissions generated by materials used in all parts and packaging of products, average energy consumed during processing and manufacturing and transportation. The methodology of the 2030 Calculator is based on ISO 14040 on life cycle analysis and ISO 14067 on carbon footprint of products. The modelling of resources and energy in the tool is done with characterized LCIA data using the IPCC 2021 GWP 100 impact model. This means that greenhouse gas emissions are measured as the global warming potential over a 100-year period relative to carbon dioxide. The indicator, for which the carbon footprint is expressed, is carbon dioxide equivalents (CO ₂ e)...	Mixed use		Online engine	Online Platform	4. Product available on the market	A tool for individuals and households	https://www.2030calculator.com/
19	greenTripper	Greentripper, CO2logic	2008? (CO2logic - sister company has more than 15 years of	Belgium	We want to give back travel its place in nature by going beyond carbon contribution and co-creating extra-ordinary solutions with travellers and travel professionals to generate social & environmental benefits. Together we can start the travel transition!	1	2		1	2, 4		https://greentripper.org/en?CalculatorOnly=1



			experien e)																	
20	Ecotourism Footprint calculator developed by the DestiMED project		developed by FreeRange, under the supervision of Global Footprint Network, IUCN, and WWF Adria		Albania, Croatia, France, Greece, Italy, Spain			4		2					1		3		https://d22soebhfw4sgw.cloudfront.net/assets/files/DestiMED_Footprint_Calculator_Guidelines_Version_1_0_October_2019_final.pdf	https://www.meetnetwork.org/ecological-footprint-calculator
21	EKOS					We all want to help reduce the impacts of climate change. Understanding the carbon footprint of your business, school, event or household is an important place to start!		1		2					1					https://ekos.co.nz/individual-offsetting-options
22	Consciousourism		Wanderlust with a Purpose			Sustainable Travel International has recently launched a carbon footprint calculator to help travellers plan and reduce emissions. As a more responsible traveller, start by calculating your travel footprint. This travel carbon calculator is quick, easy to use and completely free.		1		2					1					https://consciousourism.com.au/calculate-your-carbon-emissions/
23	Pomorze Zachodnie (The West Pomerania) mobile app	Amistad Mobile for West Pomerania Region	2022	Poland		CO2 calculator as a part of the mobile app for cycling tourist. The mobile app is perfect tool for everyone planning a cycling trip in the region and looking for a convenient and reliable guide. The app provides the current routes of West Pomeranian cycling trails, including Euro Velo 13. The app has a simple CO2 calculator that shows how much emissions is saved due to traveling by bike instead of car.		1			mobile app		https://rowery.wzp.pl/en		3		4		The new calculator from the ICT-r project can be probably implemented in our app.	https://rowery.wzp.pl/en
24	Carbon neutral accommodation (with live track of CO2 emission)	Irota EcoLodge	2016(?)	Hungary		It is a climate neutral luxury accommodation with net zero carbon (all CO2 emission is compensated). Regarding the accommodation (and the whole company), the carbon footprint reports are available and downloadable on their website. Furthermore, guests can also track operational emissions live on the carbon dashboard. The software background behind it called One Click LCA which is a one-stop carbon & life cycle metrics software.		2		2		software	https://www.oneclicklca.com/				4			https://www.irotaecolodge.com/en/index.html
25	Hotel Carbon Measurement Initiative (HCMI)					It is a methodology and free tool for hotels to calculate the carbon footprint of hotel stays and meetings in their properties. HCMI enables a hotel property to calculate (1) total carbon footprint; (2) carbon footprint per occupied room on a daily basis; (3) carbon footprint per area of meeting space on an hourly basis; (4) renewable energy and electricity as a portion of total consumption. It includes all energy used 'on site', such as natural gas, oil and other fuels, purchased electricity, and mobile fuels from vehicles and other equipment) and emissions from refrigerants. It also includes, if applicable, carbon emissions from outsourced operations.		2					Hotel Carbon Measurement Initiative (HCMI) – Sustainable Hospitality Alliance				4			Hotel Carbon Measurement Initiative (HCMI) – Sustainable Hospitality Alliance
26	EuroVelo Route Planner	ECF	2023	Belgium		ECF developed a EuroVelo Route Planner in the frame of the AtlanticOnBike project, co-funded by the EU Atlantic Area program. This tool helps to plan cycling itineraries along EuroVelo routes across Europe, aiming to provide inspiration without being a navigation tool. It includes a carbon footprint calculator demonstrating the amount of carbon saved by making this itinerary on a bike rather than with a car. This is an additional incentive for users to choose cycling holidays.		4. mixed/general use in tourism		carbon neutral	Online interactive map and itinerary calculator		Online: https://en.eurovelo.com/route-planner				2 and 4			https://en.eurovelo.com/route-planner
27	Cycling-friendly services schemes	ECF	Depends on the country	ibid		By offering cycle-friendly services, businesses encourage the development of cycling tourism at the very heart of carbon-neutral travel. There are 28 cycling-friendly service schemes spread across more than 17 European countries. Developing your business to be certified as cycling-friendly is a sign of strong support for cycling		4. mixed/general use in tourism		carbon neutral			Online list and maps				4. Product available on the market			https://en.eurovelo.com/cycling-friendly-schemes



				tourism, essential to reduce the carbon footprint of tourism and more generally transport.							
28	Platform facilitating low-carbon travel (by train with destination suggestions)	Mollow (association)	2023	France	This young initiative aims at facilitating train travelling across Europe, with destination suggestions and already made-up rail itineraries. Multimodality is a key topic for cycling tourism and helps reduce the carbon footprint of travelling. There are mentions on the Mollow website of the objectives of "emitting less" and "low-carbon travel". In calculating the carbon footprint of a cycling product, you can take into account the way you reach the starting point of your cycling itinerary but also how to come back.	1; transport	carbon neutral	Online search engine	(1) online https://www.mollow.eu/	4. Product available on the market	https://www.mollow.eu/
29	e-bike solar recharging stations	eBIKE PORT solar (Econec) / e-bike port (there are several companies)	2019	France and other countries (American university study)	This recent technology allows to recharge e-bikes thanks to solar energy. There are already a few companies on the market. As the use of e-bikes has been increasing these last years, setting those along long-distance cycling routes like the ICT can be an alternative to classic recharging stations when needed. This infrastructure could maybe be integrated in a footprint calculator of a cycling product if this technology is present along the itinerary. However, it would have to differentiate the use of a classic bike and of an e-bike.	3. tourist activity / experience	carbon neutral	Solar-powered bike charging stations can have four key hardware components : solar panels, charge controller, batteries and converter and a configurable bike charger.		4. Product available on the market	This academic paper presents the benefits of solar ebike recharging stations: https://none.cs.umas.edu/papers/pdf/paper_greening.pdf "Specifically we study the challenges in designing solar charging stations for electric bike systems(...)" Econec proposes the eBIKE PORT solar https://marketplace.eitubanmobility.eu/products/ebike-port-solar-rest-and-charging-station-for-e-bikes/ Another company is EBike Port, in France, https://solarimpulse.com/entreprises/e-bike-port
30	Further information from German Publications:				https://www.ifeu.de/methoden-tools/berechnungstools/ https://www.wissensportal-nachhaltige-reiseziele.de/post/pilotprozess-thg-bilanzierung https://www.umweltbundesamt.de/sites/default/files/medien/5750/publikationen/2019-12-05_dokumentationen_05-2019_reisemobilitaet.pdf https://www.umweltbundesamt.de/publikationen/klimawirksame-emissionen-des-deutschen https://www.umweltbundesamt.de/themen/verkehr-laerm/nachhaltige-mobilitaet/radverkehr#gtgt-stark-im-verbund						
31	Appstore Applications				Emyze Future Planet (Personal Carbon Footprint) Pawprint Yayzy						



				Carbon Footprint Calculator - Footprint CO2HERO Plinkn Carbon Donut Giki Zero NMF.earth Earth Rewards Carbon Tracker Warmd - Fight climate change Earth Project Cilo - Carbon Counter Carbon Neutral & CO2 Meter Cool The Globe Carbon Manager Change Carbon MyFootprint: Carbon Assessment								
32	Cyclists Welcome services	Partnerství, o.p.s.	2005	Czechia	The nation wide certification promises to cyclists safe storage for bikes, accommodation for 1 nite only, information on cycle routes and cycle related services in 4 categories: accommodation, camp sites, gastronomy and tourist attractions.	Accommodation	carbon neutral				Product available in the market	www.cyklistevitani.cz
33	Carbon Foot Print	C12, o.p.s.	2013	Czechia	Carbon foot print calculator with an implementation plan how to decrease your carbon foot print. It offers domestic and international off set programs.	carbon offset	carbon offset	web page	https://www.uhlikovasto.pa.cz	2 Promoted by NGO	the web was launched 2021	https://www.uhlikovastopa.cz
34	Carbon foot print and offset programs	C12, o.p.s.	2021	Czechia	The web portal enables people to offset human activity and to invest into concrete projects.	carbon offset	carbon offset	web portal/mobile app	https://www.offsetujieme.co2.cz/	2 Promoted by NGO		https://www.offsetujieme.co2.cz/
35	Ride with GPS	Ride with GPS	2007	United States	Simple, Easy and Fast Planning Simply tap the map to plan custom routes Search for locations to route to or add as waypoints Real-time elevation profile + estimated time	route planning		web portal	Mobile Bike Route Planner - Ride with GPS	available		
36	LocusMap	?	2012	?		route planning		web portal/app	Locus Map - mobile outdoor navigation app			