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MEASURES TO REDUCE THE TRANSPORT-RELATED CARBON FOOTPRINT OF THE ERASMUS+ PROGRAMME

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1. Introduction

1.1 Background

Over the past decades, more and more higher education institutions (HEIs) have integrated internationalisation into their purpose, functions, and activities (Knight, 2008).

Internationalisation has progressed from a marginal activity, now deeply embedded into higher education at institutional and national levels, within Europe and beyond, driven by trends such as the rise of the global knowledge economy and the growing competition of academia (Kreil & Stauffacher, 2021; Musselin, 2018; Wit & Altbach, 2020). While internationalisation can be home-based, utilising strategies such as curriculum development or recruitment of international staff and students, it most dominantly takes the form of international mobility (Knight, 2008; Wit & Altbach, 2020). Within international mobility are mobility programs, perhaps the most well-renowned being the Learning Mobility program of Erasmus+ which gives students and staff the opportunity to study, teach, or train at a higher education institution abroad (Erasmus+, n.d.a; Nada & Legutko, 2022; Zotti, 2021).

Engaging in mobility programs, specifically that of Erasmus+, is widely regarded as a positive experience with an array of benefits for participants, their institutions, and society. On the individual level, mobility has been linked to positive outcomes of personal development, such as increased self-confidence and independence (Asoodar *et al.*, 2017), improvements in skills and competences and thus employability (Engel, 2010), as well as a higher degree of intercultural understanding and interest (Amendola & Restaino, 2017; Nada & Legutko, 2022). Mobility can take on another meaning for staff members on teaching or training assignments, enabling them to not only exchange field-specific knowledge, but build their networks which, especially in research where international collaboration is more important than ever before, opens doors to new opportunities and career advancement (Souto-Otero *et al.*, 2019; Lassen, 2022). For higher education institutions, participation in mobility has been shown to improve the quality of teaching and administrative systems, and to support cross-organisational cooperation, making way for opportunities for collaboration around research projects and academic publications, as well as producing longer term partnerships like joint degrees (Souto-Otero *et al.*, 2019). These benefits add to the prestige and competitiveness of higher education institutions, especially when considering that international rankings are based on indicators like the number of international students and co-authors of publications (Jack & Glover, 2021; Wit & Altbach, 2020). Finally, in a broader sense, mobility programs are considered an indispensable policy instrument for improving European integration, with policymakers of the European Union setting out to build a sense of identity and improve labour market conditions through Erasmus+ (Engel, 2010; Jacobone & Moro, 2014; Nada & Legutko, 2022).



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1.2 Problem definition

While mobility is beneficial for a variety of reasons, the reality is that along with mobility comes travel and its associated environmental impact. With almost 1.9 million mobilities conducted within the scope of the Erasmus+ mobility program between 2014 and 2020, attributing to a total distance travelled of approximately 2.7 trillion kilometres, the travel-related carbon footprint of the program is considerable, with one estimate suggesting more than 195,000 tonnes of CO₂-eq was emitted. **98% of the travel-related carbon footprint of the program has been attributed to air travel, which made up most trips between sending and receiving higher education institutions, at 83%** (Gabrielczak & Sokołowicz, 2021). As seen in Figure 1, air travel is widely considered to be the least energy-efficient mode of transport¹.

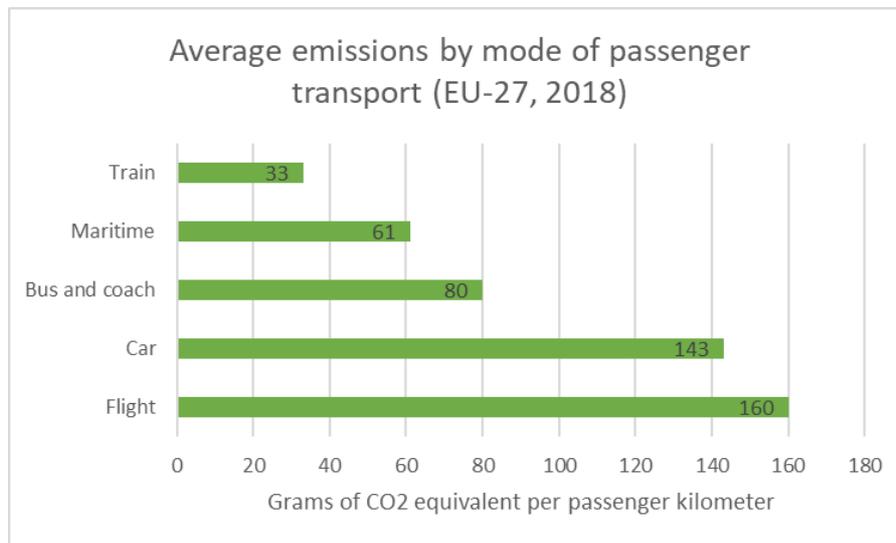


Figure 1: Average greenhouse gas emissions by mode of passenger transport, adapted from European Environment Agency (n.d.).

Tensions appear to exist between internationalisation and sustainability, and this becomes clearer when we narrow the scope down to the level of the higher education institution. A vast majority of higher education institutions are increasingly getting involved in sustainability discourse and practice, whether that be through research, teaching, social engagement, or on-campus initiatives. Yet, contradictions arise with the environmental impact of international mobility going neglected for the most part (Glover *et al.*, 2017; Jack & Glover, 2021). Air travel from mobility makes up a significant portion of higher education institutions' carbon footprint, with one estimate from Utrecht University suggesting that the air travel of employees and exchange students made up 16% of the university's carbon footprint in 2019. That is 6% more than the emissions produced by day-to-day commuting (Utrecht University, 2020).

¹ It is necessary to note that the energy efficiency of transport modes will vary according to distance travelled and local factors like the electricity mix (Arsenault *et al.*, 2019; European Environment Agency, n.d.).



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Urgent action is needed to reduce the carbon footprint of the Erasmus+ mobility program in the face of climate change. Although strides are being made in the decarbonization of air travel, through for example the development of sustainable aviation fuel, they are not expected to lead to significant carbon reduction in the near future. Furthermore, the relevance of addressing the ubiquity of air travel goes beyond its immediate impact on the environment. Relocating for study, teaching, or training purposes can be considered a major life event, especially when dealing with longer durations of stay. Such events often trigger a reassessment of habits in the lead up and the follow up and can accordingly act as a suitable leverage point or window of opportunity that, if utilised well, can address not only the trip-related travel behaviour but the person's travel behaviour as a whole, whether that be for business or leisure trips or for day-to-day commuting, within and beyond exchange (Müggenburg *et al.*, 2015). This is especially relevant since students and staff of higher education institutions tend to be a hypermobile group in general, usually embark on a number of leisure trips during their time abroad, and often have a larger appetite for new international experiences after a successful exchange (Arsenault *et al.*, 2019; ESN & Eurail, 2020; Nada & Legutko, 2022). Therefore, behavioural change around travel within the Erasmus+ mobility program will be necessary, and alternatives such as offsetting will need to be explored as a last resort.

1.3 Aim

This research report aims to review and assess measures that can be used to reduce the travel-related carbon footprint of the Erasmus+ mobility program for higher education students and staff, with a focus on behavioural change measures, mainly ones that instigate a shift from air travel onto more sustainable modes. It will also explore the potential for carbon offsetting schemes. The target audience includes higher education institutions and management bodies of Erasmus+, such as the European Commission, the European Education and Culture Executive Agency, National Agencies, for which recommendations for design and implementation will additionally be provided (European Commission, n.d.).

The research questions that will be addressed in this report are as follows:

What measures can be used to reduce the travel-related carbon footprint of the Erasmus+ mobility program for students and staff of higher education institutions?

- A. What are the characteristics and drivers of program participants' travel behaviour?**
- B. What measures can be used to instigate sustainable travel behaviour among program participants, and what are their potentials and challenges?**
- C. What measures can be used to offset the travel-related emissions of program participants, and what are their potentials and challenges?**
- D. Which measures are recommended to reduce the travel-related carbon footprint of the program, and how can they be embedded within the program's management?**



1.4 Scope

There are several boundaries to the scope of this research. First, there are multiple key actions within the Erasmus+ program, and our study is limited to Key Action 1: Learning Mobility of Individuals, within which the mobility project for higher education students and staff, which we will simply refer to as the “Erasmus+ mobility program”, is our focus. Students include bachelor’s, master’s and doctoral students, whereas staff includes both academic and administrative staff. We consider mobility periods between higher education institutions only, and thus capture all study, doctoral, teaching, and training periods and exclude traineeships (European Commission, 2022). Higher education institutions participating in the Erasmus+ mobility program are not only in Europe, but also the Western Balkans, the Eastern and Southern Neighbourhoods and Central Asia (Erasmus+, n.d.b).

Table 1 provides an overview of Erasmus+ mobility periods taken into account with some of their characteristics. It is worthy to note that these can occur in blended form, integrating a virtual component, although it is unclear to what extent this is utilised. Furthermore, since 2021, a distinct, blended intensive program has come to fruition which allows higher education institutions to jointly organise challenge-based assignments that students and staff can work on (European Commission, 2022).

| Target group | Student mobility | | | Staff mobility | | |
|--------------------------------------|------------------|--------------------------|------------------|-------------------|-------------------|------------------|
| Type of mobility period | Study period | Doctoral mobility | Blended mobility | Teaching period | Training period | Blended mobility |
| Duration of physical mobility | 2-12 months | 5-30 days or 2-12 months | 5-30 days | 2 days - 2 months | 2 days - 2 months | 5 - 30 days |

Table 1: Types and characteristics of Erasmus+ mobility periods considered within the scope of this report, adapted from Erasmus+ (2022)

Another boundary that has been set for this research is the scope of measures considered to reduce the travel-related carbon footprint of the program. Generally, measures can be employed to target one or several of the following outcomes; the avoidance of travel in and of itself, the shifting of travel modes, or the improvement of chosen travel mode’s carbon efficiency (Fulton *et al.*, 2013; Fletcher *et al.*, 2019). However, we focus mainly on reviewing and assessing measures that aim to shift travel away from air travel, in addition to carbon offsetting as a last-resort measure that aims to improve carbon efficiency. Other types of measures are selectively discussed.

The last point to mention is that we only consider trips to and from higher education institutions. While leisure trips, study trips, business trips, and day-to-day commute trips conducted during mobility can be considered a part of the travel-related carbon footprint of the Erasmus+ mobility program, we choose not to focus on them because they are usually shorter distance travels with less environmental impact and because they are more locally determined.



1.5 Methods

Both primary and secondary research methods have been employed in this research. First, a literature review of theoretical and applied academic literature is conducted, in addition to supplementary reports from grey literature, in order to set the foundation for analysis. Second, a web search of higher education institutions is carried out to get insight into behavioural change and carbon offsetting measures that have been applied in practice. Following the desk research, primary research was carried out. Three focus groups at Erasmus University Rotterdam, Lapland University of Applied Sciences, and Lodz University were held with past and potential participants of the Erasmus+ mobility program in order to understand the subjective barriers that stand in the way of sustainable travel, develop potential measures for carbon footprint reduction, and explore their strengths and weaknesses. Furthermore, six interviews were conducted to gain insight into the effectiveness of measures and the success factors and challenges associated with their implementation at higher education institutions. More details on specific methods can be found in the annex of this report.

1.6 Structure

The structure of this research is as follows. First, we focus on the behavioural change aspect of this research, outlining the current travel characteristics of the Erasmus+ mobility program, providing a review of the literature surrounding drivers of travel mode choice, and finally delving into what measures could be used to influence it in the context of higher education. Afterwards, a review of emission offsetting is made which includes considerations around offsetting, their different types, and their implementation within higher education. Finally, we provide recommendations for implementation, specific to the Erasmus+ mobility program, and conclude with a discussion to position the research within wider discourses, as well as a conclusion. A bibliography and annex can be referred to.



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2. The characteristics and drivers of travel behaviour

2.1 Introduction

The first questions that need to be addressed before considering travel behaviour and how it can be changed are - who is travelling, where are they travelling, how far are they travelling, and how long are they staying at their destination? Answering such descriptives help centre the discussion in the reality of the target group, and is accordingly what we begin with. Afterwards, we take a look at the reasons why people - and specifically students and staff members - choose one travel mode over another, utilising insights from focus groups, academic literature, and research reports. This basis helps form an understanding of what factors and principles measures should try to target to effectively shift travel from air travel to alternative, less carbon intensive forms of travel.

It is worthwhile to note why a limited definition of travel behaviour is taken. While reducing carbon emissions can additionally be done through behavioural change measures that aim to 'avoid' travel in and of itself, or aim to 'improve' its carbon efficiency and reduce the cost-to-benefit ratio of travel (e.g., by encouraging or stipulating avoiding stopovers, using light luggage, combining multiple travel purposes into one trip, extending trip duration, or carbon offsetting), 'shifting' modes is the strategy where we believe most potential lies for the Erasmus+ mobility program (Fulton *et al.*, 2013; Fletcher *et al.*, 2019; Kreil & Stauffacher, 2021). **Focusing on incurring a modal shift provides the opportunity to directly reduce carbon emissions while preserving goals of internationalisation and integration which is especially suitable in the short- to medium- term.** 'Avoid' measures will need careful deliberation of the program, and while all Erasmus+ mobility programs incorporate an element of physical mobility, the penetration of digital tools seems to currently be at its infancy, whereas 'improve' measures are not stringent enough.

2.2 Travel characteristics

In the period between 2014 and 2020, the majority of mobility periods in Erasmus+ were conducted by students, followed by staff (Gabrielczak & Sokołowicz, 2021). For what is known about the composition, please refer to Figure 2 below. Furthermore, the majority of mobility periods are conducted by women, at approximately 60%. This is not necessarily a trend specific to Erasmus+, as, globally, women have been found to enrol in higher education more frequently than men, in both developing and developed countries (Gabrielczak & Sokołowicz, 2021). The statistic is nevertheless interesting to note given that along with gender differences come differences in travel behaviour and attitudes.

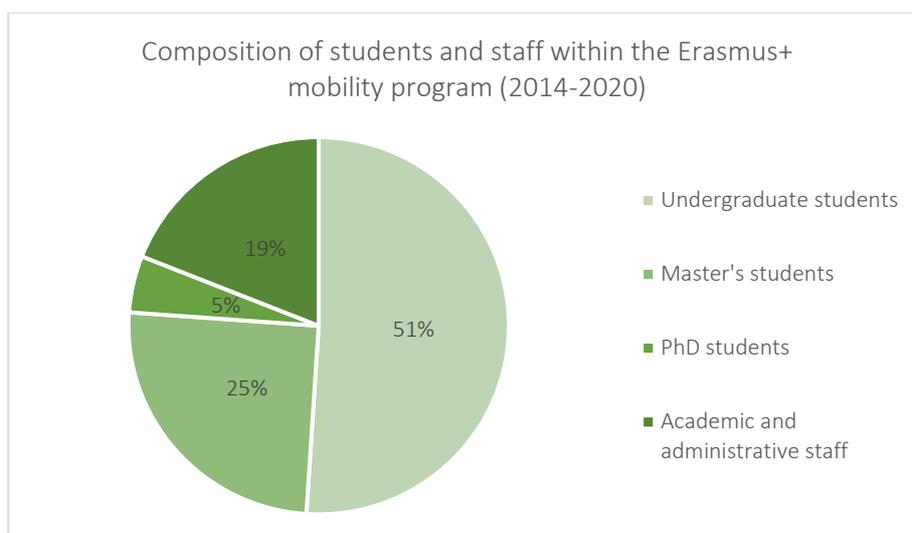


Figure 2: Composition of Erasmus+ mobility, adapted from Gabrielczak & Sokołowicz (2021)

The distances travelled by Erasmus+ students and staff have been found to be highly variable. Sometimes, mobilities occur within cross-border cities and, other times, they reach overseas territories. That being said, Spain, France, and Italy are consistently ranked as the countries that send the most outgoing students and are considered the main hubs of the Erasmus+ network, whereas the most popular hosting region is the south of Spain. **The average distance travelled by students has been calculated to be 1,374 km round trip, while the average distance travelled by academic staff is approximately 28% higher** (Gabrielczak & Sokołowicz, 2021). **It is unclear whether the distances incurred differ with the categorization of students, but in the case of staff, a study examining the air travel of researchers in Switzerland found that it is usually more senior academic staff that travel longer distances** (Ciers *et al.*, 2019). This finding has been confirmed by other studies in Canada (Arsenault *et al.*, 2019) and Austria (Thaller *et al.*, 2021), and is interesting given that senior academic staff are likely to be the least dependent on travel for their career progression, while on the other hand have more experience to relay.

When it comes to the length of mobility, Gabrielczak & Sokołowicz (2021) found that it varied from as little as one day to almost two years. On average, staff went on exchanges for just one working week, despite the fact that they are allowed to take up to two months (Erasmus+, n.d.a). On the other hand, students spent an average of 155 days at their destination, which translates to around one semester, coinciding with how Erasmus+ mobilities are planned. **This statistic, combined with the fact that the distances travelled by staff are on average longer, may point towards the relevance of putting more effort into incentivizing students to reduce the carbon footprint associated with their travels, more so than staff.** Replacing air travel with more sustainable transport modes would likely increase the duration of travel, which is not only unfavourable given that employees have a higher value of time for their institution than students, but also because incurring longer times in transport would disrupt and inconvenience a short term stay more than a longer one. In addition, one can argue that staff can be encouraged to make more of their stay - if



they will be travelling and adding to a higher education institution's carbon footprint, they might as well make it more worthwhile by staying for longer and reaping more of the benefits that mobilities have to offer.

The overwhelming majority of travel between sending and receiving higher education institutions under Erasmus+ is conducted by plane. This finding has been corroborated by several studies (ESN & Eurail, 2020; Green Erasmus, 2022), the most recent being Gabrielczak & Sokołowicz's (2021). The authors estimated that, between 2014 and 2020, 83% of Erasmus+ trips to and from the destination were conducted by plane. The popularity of air travel seems to be consistent across students and staff members of higher education institutions (Thaller *et al.*, 2021). To what extent air travel could have been substituted by other modes will depend on a number of factors such as travel distance.

2.3 Drivers of travel mode choice

2.3.1 Duration and cost of travel

From a classical economic point of view, travel mode choice can be explained by considering a rational, self-interested individual. They weigh the benefits of travel against the objective costs, which encompasses time and money spent on the trip, and choose the option that maximises the net value (McNally & Rindt, 2007).

One of the most crucial reasons explaining why people tend to prefer air travel over other modes is travel time. This has been highlighted by several studies (Behrens & Pels, 2012; Dällenbach, 2020; European Commission, 2010; Sun *et al.*, 2017), and has been confirmed in the case of higher education institution students and staff. A 2020 study examining the international travel behaviour of students travelling between universities for a study trip showed that air travellers' main reason for choosing their mode was travel time. In addition, a survey conducted by ESN & Eurail (2020) confirmed duration of travel as a key consideration among factors such as cost. When it comes to staff members of higher education institutions, travel time has, too, been shown to be a significant factor. In the case of scientists in Germany, duration was the most important factor determining the mode of transport taken to an international conference (Haage, 2020). Research by Thaller *et al.* (2021), too, suggests travel time being a significant determinant among business travellers at the University of Graz, Austria, with not only work implications but personal ones too given existing university policies. One respondent stated, *"Long train journeys take up several working days, which may not be counted as working time. I do not want to give up my free time to travel for the university."* (Thaller *et al.*, 2021, 6).

Another rather rational reason pointing towards a choice of air travel over other modes is ticket costs, for which air travel is widely considered to be cheaper at longer distances.

Approximately 90% of Erasmus+ students surveyed by ESN & Eurail (2020) reported choosing their transport mode based on price. Such a finding, confirmed by Dällenbach (2020), is not a surprise considering that students usually have a low budget, making them an especially cost-sensitive group of travellers. In the case of staff members, cost comes up



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as a determining factor of mode choice in a number of studies as well as focus groups one, two and three (Haage, 2020; Thaller *et al.*, 2021). It has been shared that their concerns of increased costs stem from the fact that their university does not usually cover the full travel costs incurred by academic staff and rather provides partial subsidies, disincentivizing them to switch to, for example, rail (Thaller *et al.*, 2021).

2.3.2 Attitudes, subjective norms, and perceived behavioural control

While we see that hard, situational factors such as duration and cost of travel influence behavioural decisions greatly, what we see in reality is that behavioural decisions are much more complex. There are a variety of theories that attempt to explain why, despite there being a change in hard factors such as duration or cost conditions, behaviour may remain static. Perhaps the most frequent theory applied to the context of transport is the theory of planned behaviour. It states that three variables predict behavioural intentions: attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991).

Attitudes are evaluative judgments about the behaviour which can be influenced by a person's past experiences with the behaviour or, according to other models, broader conceptions of what is desirable i.e., values such as privacy, status, flexibility or comfort (Busch-Geertsema & Lanzendorf, 2015; Harvey *et al.*, 2014; Scheiner, 2018; Thaller *et al.*, 2021). **A common example of attitudes that may favour air travel over other modes is attitudes around trip safety; staff members of higher education institutions, most frequently women, have reported apprehension while travelling by train, especially overnight. Another attitude staff members have been found to hold is that train coaches are uncomfortable, perhaps due to crowding** (Harvey *et al.*, 2014; Thaller *et al.*, 2021).

On the other hand, people may have positive attitudes towards train travel for a variety of reasons. For example, train travel has been suggested to be more conducive to activities such as working, more so than air travel (Wardman & Lyons, 2016), and has been shown to be evaluated as more worthwhile (Malichova, Cornet & Hudak, 2022). Another driver of positive attitudes that is interesting to explore is environmental considerations. Recent research has found concerns around environmental friendliness to be prioritised among staff members and students of higher education institutions as a driver of modal choice (Dällenbach, 2020; Haage, 2020; Thaller *et al.*, 2021), although other reports show that environmental impact is rarely considered (ESN & Eurail, 2020; Green Erasmus, 2022). A report from Green Erasmus (2022), for example, shows that only 6% of Erasmus+ students considered the ecological footprint of their chosen travel mode. **It is also interesting to note however that, even though people may be aware of the negative effects of air travel, think reducing air travel is important, and/or believe that individuals are responsible for taking action, these attitudes do not necessarily translate into behavioural intentions or behaviour change; some degree of cognitive dissonance exists, as has been also highlighted by focus group 1** (Árnadóttir *et al.*, 2021; Green Erasmus, 2022; Schrems & Upham, 2020).



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Students and staff members have also been suggested to have subjective norms around sustainable travel, let alone travel in and of itself which will be discussed in further sections of this report. **A perception of social pressure may stem from peers or organisational culture.** Subjective norms that students and staff members experience could be derived from debates around flight shame or views on accountability (Gössling *et al.*, 2019). The opposite may also be true; for example, in focus group 1, an administrative staff member said that they felt pressure and a sense of responsibility to book air travel to save costs for their department, despite the fact that the cost addition from train travel would have been covered in accordance with a formal policy. This suggests that organisational culture may have inhibited sustainable travel mode choice, and that building social norms could be an area of relevance.

Perceived behavioural control has also been hypothesised to affect behavioural intentions, and is applicable in the case of students and staff members of higher education institutions. **The more people are convinced of the availability and feasibility of alternatives, the more likely air travel will be substituted** (Dütschke, 2022). **During focus group 1 and 3, it was found that both students and staff members had low levels of perceived behavioural control, having little awareness of what alternatives to air travel they could have used successfully in the case of long distances or low-accessibility destinations.** They often questioned if travel to their destination was possible by sustainable transport modes and how they would go about it. This highlights the need for greater awareness, guidance, and support around decision-making.

2.3.3 Other socio-psychological factors

Other individual obstacles may also be present when it comes to behavioural change. Behavioural change may not occur because of personality traits - some people are risk averse, whereas others seek new and different experiences, which is more likely to be the case among students (Hsiao & Yang, 2010; Scheiner, 2018). In addition, habits allow people to produce a behaviour automatically without the effort of re-considering decisions and weighing arguments again and again. They reduce complexity and uncertainty and are often heavily relied upon, making it less likely for people to seek information to re-evaluate their behaviour (Busch-Geertsema & Lanzendorf, 2015; Dällenbach, 2020; Scheiner, 2018). That being said, habits can be interrupted in the face of key life events in a person's personal or professional life, such as exchange periods, providing a window of opportunity to leverage (Müggenburg *et al.*, 2015). There are various ways to address resistance to change stemming from habits, personality traits, or other sources, whether that be presenting choices as defaults to restructure the context of decision-making and establish a new way of doing things, or encouraging trial experiences (Avineri, 2012).

The effect of biases is also interesting to note, and can be demonstrated by highlighting biases in the perception of travel time durations. While travelling by train can indeed be more time-consuming, especially at distances above 700km, and where high-speed rail connections are not available, the perception of travel time, which forms the basis for decision-making, is often biased (Bieger & Laesser, 2004; Transport & Environment, 2020).



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Research has suggested that people do not usually consider door-to-door travel time, as evidenced by Dällenbach (2020) in the case of students. This stresses the importance of awareness-raising through practical, informational communication.

2.3.4 The role of context and socialisation

Whether behavioural change occurs or does not occur may also go beyond individual-level habits, heuristics, personality traits, or preferences and be attributed to an individual's embedding in the broader context of the current political, economic, and sociotechnical systems (Geels, 2012; Marsden *et al.*, 2014; Scheiner, 2018). **Behavioural change is strongly limited by the context in which an individual makes their choice, so the discussion around influencing behavioural change becomes quite limited without calling into question the status quo.** Context plays a significant role in sustaining existing standards and conventions, and in locking people into certain behaviours. Some examples include institutional factors, monetary costs, and constraints by the built environment, not to mention customs that are held by the collective. For example, cars hold cultural meanings and affective atmospheres; they are associated with notions of freedom and power (Schwanen *et al.*, 2012; Shove, 2010), and an argument along the same lines could be made for flying; flying has been shown to be associated with cosmopolitan orientations and can be considered an accessory that reinforces identity (Grinstein & Riefler, 2015; Lassen, 2015). Within the scope of this study, socialisation can be argued to be a relevant mechanism through which such norms are learned and can thus be addressed.

Individuals can adopt knowledge, pre-dispositions, and attitudes from influential socialisation agents around them, whether that be significant others who are in their social networks or are in geographical or social proximity to them, such as family members or colleagues, or groups such as peer groups, or organisations (Shields, 2019). Channels of socialisation can include observation e.g., a direct comparison of behaviour to other individuals, as has been stimulated in studies encouraging lower use of energy by providing direct comparisons to neighbours' energy use (Abou-Zeid & Ben-Akiva, 2011), or communication via media or personal interactions. Usually, socialisation is a barrier to voluntary change in the aggregate - people may question why they should adopt a new behaviour if people around them do otherwise, favouring conformity, or why they should not adapt to the norm when they notice their behaviour represents a small minority (Scheiner, 2018). **Higher education institutions can be regarded as socialisation agents, often labelled as change agents or catalysts.** Not only do they produce and disseminate knowledge, but they influence their students and staff in the day-to-day through their visions and strategies. More recently, they have been incorporating sustainability agendas into their priorities, helping increase awareness, albeit usually in a top-down manner (Gabrielczak & Sokołowicz, 2021). Bottom-up approaches and social nudges from peer groups or individuals are interesting to explore too; they are commonly utilised in the promotion of sustainable commuting within the context of workplaces or schools, and have been found to reinforce positive views and encourage those new to the activity. Examples include buddy systems or other trusting relationships that support behaviour change (Avineri, 2012; Howell, 2014).



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3. Review of measures to influence travel behaviour

3.1 Introduction

Despite the fact that many higher education institutions are aware of their impact on climate change and the portion of greenhouse gas emissions that are produced by air travel, policies within this area seem to be lagging behind (Kreil & Stauffacher, 2021, Glover *et al.*, 2018, Hoolohan *et al.*, 2021). Illustrating this is a 2018 study examining sustainability and academic air travel in Australian universities (Glover *et al.*, 2018). In this study, more than half of the 43 universities examined were deemed “air travel ignorers”; although many had sustainability policies, initiatives, and reporting systems in place, they did not determine air travel to be a sustainability issue or plan on addressing it. 16% of the sample considered air travel as a sustainability issue but did not propose interventions, and only 13% followed through with interventions (Glover *et al.*, 2018; Glover *et al.*, 2022). Furthermore, among the higher education institutions that are actually committed to reducing air travel emissions, uptake has only been recent; Kreil & Stauffacher (2021) show that only three out of 35 Western European and American higher education institutions in their sample implemented air travel policy before 2016, with the majority only beginning in 2019.

The measures used to influence travel behaviour will vary firstly according to their strategy for carbon footprint reduction - in other words, whether they attempt to avoid, improve, or shift travel. Taking a broad approach encompassing not only academic mobility but other purposes of international travel such as conferences, ‘avoid’ measures have been found to be the most commonly planned and implemented category of measures targeting staff, followed by ‘shift’ measures, which happened to have the highest number of failed attempts, and finally ‘improve’ measures (Kreil & Stauffacher, 2021, Glover *et al.*, 2018). However, a combination of strategies is common, depending on who is travelling, across what distance, and for what purpose (Kreil & Stauffacher, 2021). Staff members are usually those being targeted, and with more coercive measures compared to measures geared towards students; staff members are usually more capable of being influenced than students who are more autonomous. For students, we have found from interviews 2, 3 and 4 that ‘avoid’ measures are rare, with most of the focus going to ‘shift’ and ‘improve’ measures, which makes sense given that they mainly travel under the scope of a mobility program, the experience of which is arguably difficult to replace with other means, as will be discussed during later sections of the report.

From a review of academic literature and higher education institution policy, as well as focus groups, we have identified 15 types of measures that have the potential to be utilised by higher education institutions and/or Erasmus+ management bodies, in six overarching categories. We focus mostly on measures that attempt to shift travel from air travel to alternatives, as has been mentioned prior. In this subsection, each category will be introduced and discussed, with select impactful measures and case studies highlighted. For a full catalogue of potential measures, refer to Table 1 in the Annex.



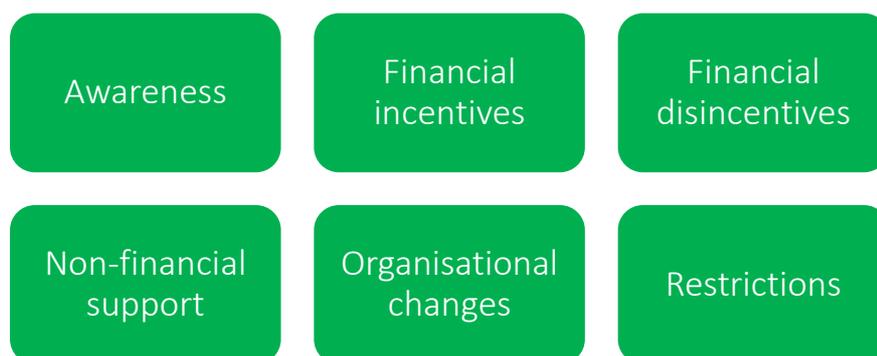


Figure 3: Categories of behavioural change measures

3.2 Awareness

Awareness can be the first step to achieve a voluntary change in travel behaviour. This can take multiple forms - being educated about a problematic behaviour and its alternatives, building feelings of identification and positive attitudes around the cause, and/or being equipped with the knowledge to commit to change, as can be seen in Table 2. The measure is applicable in cases of both students and staff, and can be implemented by bodies such as Erasmus+ management bodies, higher education institutions, or peer groups such as student or staff associations together or independently of one another. According to focus groups 1 and 2, students and staff expect awareness measures to come from higher education institutions and peer groups in their role as socialisation agents.

| Category | Measures | Examples |
|-----------|--|---|
| Awareness | Educational communication that raises initial awareness and highlights travel alternatives by presenting easily digestible evidence | Facts & figures, carbon footprinting |
| | Positive, social communication that improves attitudes and identification around the desired travel behaviour | Personal testimonies, framing, pledges, calls to action |
| | Practical, informational communication that equips the person to change their travel behaviour and reduce their carbon footprint in other ways | Tips & tricks, resource sharing |

Table 2: Overview of awareness measures

The strengths of awareness measures lie firstly in the fact that they tackle multiple tenets of behavioural change. First, they can address knowledge - having more information about your decisions helps you weigh costs and benefits more accurately. Although behavioural change is reliant on a number of factors aside from information, reducing information asymmetry is a simple way to instigate voluntary changes to travel behaviour among segments of the target group that are especially sensitive and capable of change. Second, awareness measures can improve attitudes and the way people perceive the desired behaviour, making it more likely for them to be open to changes, and lastly, they can reduce the perceived difficulty of a behaviour, making it easier for a person to commit to it and



follow through - in other words, it has the potential to address the “how” of sustainable travel along with other supportive measures. These points have been confirmed anecdotally in focus group 1 and 2, in which awareness measures garnered high levels of interest and acceptance.

Why travel by train?

1. More luggage can be carried by train without ticket upgrades or fines
2. Trains usually drop you off right in the city centre
3. On the train you can work or study at more ease
4. Visiting other cities on-route is more feasible by train
5. Travelling by train means less time wasted going through check-in procedures and security checks

Box 1: Positive characteristics of train travel highlighted during focus groups 1 and 2

Awareness measures become especially enticing when considering the relative ease of their implementation, as well as their alignment with other measures and values. On the first point, though the cost of awareness measures can vary quite a bit depending on their scale and form, they can be a relatively low-cost tactic, and they do not usually require various rounds of feedback and approval within the implementing organisation due to their low commitment level. Furthermore, awareness measures are an avenue through which peers of the target group can get involved and relay the message. For example, students or members of staff who have travelled with sustainable modes of transport can be featured in campaigns, sharing their stories and experiences as trusted and relatable messengers. Not only does this improve interest and acceptance among the target group and promote a can-do attitude, as has been stressed by members of focus group 1, but this is also a way for Erasmus+ management bodies, higher education institutions, and student or staff groups to encourage the active, bottom-up involvement of students. Finally, awareness measures are quite complementary to other measures aiming to reduce the travel-related carbon footprint of the mobility program, in that they can drive acceptance of measures like restrictions and promote participation in measures like financial incentives.

Awareness campaigns come with their drawbacks, starting with the issue that their low-effort nature does not necessarily signal commitment on the part of the implementing body. In addition, alone, they are quite limited in what they can do - accurate knowledge, positive attitudes and perceptions, and improved self-efficacy are not enough to garner behavioural change. Factors like habits stand in the way, not to mention significant contextual variables such as cost that are not directly addressed through such a measure, as has been expressed by members of focus groups 1 and 2, in addition to interviewed members of higher education institutions who are working on international travel policy. To quote an interviewed representative of a higher education institution, *“I think the doubters will give way through the campaign. [...] But when an obstacle comes their way, they quickly opt for air travel. So, we really think that hard measures form the basis”*. In that sense, **awareness measures usually have the most potential when they are integrated with and**



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reinforce other measures aiming to reduce the travel-related carbon footprint of mobility programs.

There are some other considerations that need to be taken into account when it comes to awareness measures. First, there are a variety of tools that can be utilised in awareness measures, such as social media campaigns, promotional events, and debates, each with their own value propositions. Here, it is important to note that students in focus group 1, 2 and 3 indicated that they would prefer if awareness be built through long-term and consistent messaging, integrated with each step of the exchange process, as opposed to one-off campaigns or events. For example, one student in focus group 1 proposed that higher education institutions show sustainable travel options for each host higher education institution during the selection phase of the Erasmus+ mobility program application. Such an approach would keep travel decisions on the student’s radar and give a consistent signal that travel decisions are impactful decisions that higher education institutions will continue to care about. The final point worthy to mention is that messaging around travel-related carbon emissions can be easily coupled and integrated with messaging surrounding other ways to reduce carbon emissions of exchanges, such as commuting with active transport or committing to a low waste lifestyle.

3.3 Financial incentives

The aim of financial incentives is to reduce the monetary burden associated with the desired travel behaviour. They can be used to compensate for direct costs such as ticket prices, or the costs of products and services which, if purchased, make travel more convenient, as outlined in Table 3. While financial incentives are most effective with price-sensitive groups such as students, their use is applicable in cases of both students and staff, and can be implemented by bodies of Erasmus+ management and higher education institutions independently but in awareness of one another. For reference, Erasmus+ currently provides students with a 50-euro top-up contribution (ESN & Erasmus by Train, 2022).

| Category | Measures | Examples |
|----------------------|--|---|
| Financial incentives | Partial to full monetary compensations of direct costs of sustainable travel | Upfront top-ups, reimbursements |
| | Partial to full monetary compensations of complementary products and services that improve the convenience of sustainable travel | Discounts, upfront top-ups, or reimbursements of products and services such as travel cards or extended accommodation |

Table 3: Overview of financial incentives

There are several strengths to financial incentives. First of all, they align with the target group’s reported barriers to sustainable travel uptake. As has been explored in a previous section, the overwhelming majority of students report basing their travel decisions on cost. Although perhaps not to the same degree, members of staff have also reported costs to have an influence on their travel decisions; they may be limited by departmental or project-



related cost limits, or by softer factors like informal rules or organisational culture or norms. Second, financial incentives have been proven to be widely accepted by the target group, as has been found during focus groups 1, 2, and 3. According to members of students and staff, financial incentives do not only reduce cost barriers, but are a way in which the implementing body can signal commitment to the cause and improve its awareness, although this will naturally depend on the amount provided.

The challenges of financial incentives lie mainly in their implementation. First, organising it is likely to take time; it is a high-commitment intervention that would need to be approved by top management bodies. In the case of top-ups and reimbursements, they require monetary costs to be paid out to the traveller as the incentive is utilised, and are therefore another expense incurred. This can produce administrative burden since the entity would likely pay out sums directly to each single individual, unlike the case with discounts on, say, travel products and services where the deal and bulk purchase would be organised at a higher, organisation-to-organisation level and not require so many individual transactions. That being said, it seems as though there is opportunity for these payout processes to be combined with other Erasmus+ grants and exchange processes of higher education institutions - one representative from Utrecht University (interview 1) stated that it was actually rather easy to add an additional step in their application procedure. Another challenge lies in the process of validating tickets - there must be clear and straightforward directions, otherwise the entity runs the risk of the incentive not being used or outbound travellers becoming frustrated. This is also the case for the time it takes to transfer the top-up or reimbursement. The last challenge associated with financial incentives is that, while they may encourage participants to try out a new, desirable behaviour, they may inhibit long-term behavioural change from happening; they may crowd out a participant's intrinsic behaviour, making it so that the participant acts less environmentally friendly once the scheme is removed or does not apply to them any longer (Zeiske *et al.*, 2021). This is an important consideration, particularly in the case of students, because they tend to go on leisure trips to surrounding countries (although usually by train according to Green Erasmus' 2022 report) or travel back home during their exchange.



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Green Travel Grant

In 2021, Utrecht University launched the Green Travel Grant: a reimbursement scheme that is available to students going on a Erasmus+ exchange using a sustainable mode of travel. The grant covers the tickets of the outbound journey up to €185,-. If the journey is likely to exceed that amount, students are advised to purchase an Interrail ticket.

A representative of the International Office mentioned some of the measure's success factors and areas of improvement. These were the most striking:

- The grant was co-designed by students involved in the university's Green Office. It was helpful to have their insights into student needs, their knowledge about sustainability and their endorsement toward the board of directors. The group is still involved in communication about the grant.
- The application process is embedded into the university's application system for exchanges. Applying for the scheme is therefore a simple, additional step that students take. Yet, the procedure could be even more simplified.
- The scope of the grant is rather limited as it only covers outbound journeys of students. It does not cover return journeys and journeys of staff or traineeships.

The grant was implemented during a time where international travel and exchanges were still restricted by COVID-19 restrictions. It is therefore challenging to draw conclusions about the overall effectiveness of the grant.

Source: Interview 1

Box 2: Example of a financial incentive from Utrecht University

When it comes to financial incentives, several points must be taken into consideration. **First, the amount of the financial incentive will be judged based on local travel conditions; while Western and Central Europe is fortunate with relatively high accessibility and competitive alternatives to air travel, other regions are not, making cost differences between air travel and alternatives larger and the effort required for a modal shift higher. The option of segmenting financial incentives based on such criteria needs to be explored.** On that note, it is also worthy to mention that financial incentives can be segmented and structured even further and need not be flat. For example, Ghent University subsidises train and bus trips by 30 euros for tickets exceeding 100 euros, and by 100 euros for tickets exceeding 200 euros (Ghent University, n.d.). Financial incentives will also be perceived according to the many variations in ticket prices over time - for example, train tickets tend to become significantly more expensive than aeroplane tickets as the date of travel approaches, making it so that the level of financing is perceived as more reasonable and sound well in advance (Interview 4). This is something that can be communicated to the target group. Lastly, several universities have been found to be in partnerships with airlines, providing discounts to their students and/or staff - such a scheme may send contradictory messages if they are not revisited against amendments to international travel policies, as is discussed further in later sections.



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3.4 Financial disincentives

Financial disincentives aim to discourage undesirable travel behaviour by imposing monetary punishments, whether they be in the form of deductions, restrictions or limits, as seen in Table 4. They can be implemented within the Erasmus+ program or by higher education institutions.

| Category | Measures | Examples |
|-------------------------|--|---|
| Financial disincentives | Monetary deductions for undesirable travel behaviour | Generic carbon taxes or fines, payments towards carbon offsetting initiatives |
| | Monetary restrictions or limits for undesirable travel behaviour | Limiting funding for air travel per person or administrative entity such as a faculty |

Table 4: Overview of financial disincentives

The potential for financial disincentives is quite limited when it comes to the mobility of students. They have been proven to be quite controversial during focus groups 1 and 2, with the majority of students and staff considering financial disincentives to be unfair, not only because students tend to have lower disposable income, but because substitutions to air travel are not always feasible in certain geographical contexts, or given individual circumstances like disabilities and the needs that come along with them. While exceptions to the rule could be made, concerns were also raised around the process of validating which travel mode was used and associated increases in administrative burden. When it comes to mobility of staff, there is more room, although questions of desirability still exist - people are usually more disagreeable when you take a liberty away from them, especially on an individual basis. However, the advantages of financial disincentives are clear - should the amount be high enough, they are a hard measure that is likely to create significant improvements and add to discourse.

Fines and CO₂ contributions

At Ghent University, an external booking agency is responsible for booking travel tickets in line with restrictions put in place. To ensure that members of staff do not book their own tickets, the university has a fine in place for tickets booked outside of the travel agency. These costs can go as high as 250 € for intercontinental trips. The reasons that the university strives to have all bookings via the travel agency is that (i) they want to have a complete dataset; (ii) the travel agency automatically calculates the emissions associated with each trip.

The latter is important because the university has set an internal CO₂ contribution of €50,- per ton CO₂. A price is set to eventually match the price per ton CO₂ within the ETS system. This price would not only cover the costs of compensation, but could also disincentivize staff from opting for flying.

Source: 'Transitieplan duurzaam reisbeleid 2020-2030' retrieved from ugent.be and interview 3

Box 3: Example of financial disincentives from Ghent University



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3.5 Non-financial support

Non-financial support around reductions in travel-based carbon footprint can come in various different forms, but the gist is that their aim is to make travelling with sustainable modes more straightforward, convenient, and desirable through the provision of administrative support, as seen in Table 5.

| Category | Measures | Examples |
|-----------------------|---|--|
| Non-financial support | Guiding travel planning and booking decisions | Decision-making tools, individualised or destination-specific feedback, booking support, changing default travel options to sustainable modes |
| | Facilitating group travel by linking up travellers going to the same destination around the same time | Travel buddy groups such as those facilitated by Go2Rail |
| | Directly providing or enabling easy access to complementary travel products and services that improve convenience | Offering option to easily book Interrail passes or public transport cards (possibly with a financial incentive), partial to full monetary compensations for extra nights at accommodation or ticket upgrades |

Table 5: Overview of non-financial support

The usefulness of non-financial support measures lies in the fact that they attempt to address the contextual barriers faced by students and staff members when it comes to sustainable travel.

For example, during focus group 1, it was highlighted time and time again that air travel can be more straightforward and reliable than other modes of international travel - not only is air travel familiar, but it benefits from integrated booking systems and common standards and practices across countries, whereas modes like trains lag behind in this regard. **Most students and staff members reported not knowing whether train travel was possible between certain destinations, especially when travels are not within Western Europe, and how they would go about booking and dealing with practical matters during their travels, like delays and so forth.**

Guiding travel planning and booking decisions is one measure that demonstrates how contextual barriers can be addressed. This could involve providing decision-making tools, such as maps (see Box 4) or flowcharts, which is a measure that could be done centrally by Erasmus+ management bodies, or it could involve more intensive measures, such as providing case-specific feedback and advice, per trip or per individual. Providing the opportunity for feedback and advice is a measure potentially interesting for higher education institutions, and can entail providing a point of contact that outbound students and staff members can reach out to in case of questions, and/or systematically providing travel guidance to cohorts travelling to certain destinations. This provides the avenue for travel to be shifted to other modes, and if not possible, for suggestions around reductions in carbon footprint to be given. The reason why this measure could be useful for higher education institutions is that they are considerate to variations in geographical contexts,



allow a degree of personalization and make way for personal connections to be made. For example, the employee serving as a point of contact may choose to link people travelling to a certain destination with people who have had experience travelling the same route, which appears to be valued in the case of participants from focus group 1. In addition, while the measure assumes capacity, having a point of contact that can be reached even just through email has been proven to be utilised. For example, an interviewed member of a higher education institution who is partly responsible for sustainable international travel policy stated that professors have reached out to them for advice on organising international student trips in a sustainable manner.

Decision-making tools

TRAVEL TIME

- For these destinations you travel by train, they can be reached in less than 6 hours.
- These destinations can be reached in 6 to 8 hours. You can travel by aeroplane, but the train is recommended!
- These destinations have a travel time of more than 8 hours. Travelling by train is the sustainable option, but does take more time.

All travel times are based on Monday mornings in October. Travel times and itineraries may change. This map gives an indication.

Source: Rijksuniversiteit Groningen, rug.nl the image was created in collaboration between the Green Office and the Facility Services department and were designed by Cake Mixstore.

Box 4: Example of non-financial support from University of Groningen



Directly providing or enabling easy access to complementary travel products and services is another type of measure that aims to improve the convenience of sustainable travel. One example of such a product is the Interrail pass, with which Erasmus+ management bodies can incentivize students and members of staff to explore sustainable travel with less hassle and uncertainty, as seen in Box 5. Another example, albeit limited to the case of staff members, is arranging extra nights at places of accommodation to allow for rest periods, or providing ticket upgrades to enhance the comfort of the travel experience and facilitate more efficient use of travel time for working.

Such products or services can be provided in several ways, the most cost-effective being having them easily accessible and integrated into the exchange process; during focus group 1, students suggested that they would have been willing to buy an Interrail pass and have the cost deducted from their Erasmus+ grant had it been offered and easily arranged e.g., through a tick of a box in their application. Another way to go about offering such products or services is to have them financially covered, partially or fully. Naturally, this would require a high level of commitment, and perhaps for a deal or bulk purchase to be arranged upfront through a tender, but it would likely entail little administrative oversight compared to other financial incentives where students or members of staff are dealt with on an individual basis.

“Provide free Interrail passes!”

This is what Erasmus Student Network and student-led advocacy group ‘Erasmus by Train’ call for. They propose that Erasmus+ program management bodies offer Interrail passes or similar kinds of travel passes to students participating in Erasmus+ programmes. In that way, the Erasmus+ programme more sustainable, more accessible for students with limited financial means and would strengthen European cohesion by allowing for a more elaborate journey through the continent.

The idea showed massive support by students participating in the focus groups of this research. Besides it being a financially attractive option, students said that it would allow for an easy process, as well as offer flexibility in terms of booking, choosing travel dates, times and stopover that many of the involved students mentioned to be of importance.

Source: Interview 5 and focus groups 1 and 2

Box 5: Example of non-financial support called for by Erasmus by Train

3.6 Organisational changes

Travel behaviour can be influenced by policies and practices set and nurtured by an organisation. One area that Erasmus+ management and higher education institutions can therefore focus their efforts on is looking inwards and examining whether policies and practices in place can be adjusted to avoid unnecessary travel or steer the choice of travel mode towards air travel. These may not necessarily be directly related to travel.



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While Table 6 provides an overview of potential measures, it is necessary to note that they are by no means comprehensive and that they only tackle several identified points of leverage. **Institutions will need to take a broad scope and revise all policies that have the potential to incur a certain pattern of travel behaviour, beyond the Erasmus+ mobility program, in order to reflect their new priorities.** Examples include: providing airport pick up services for incoming students and staff, requiring that travel be booked considering financial rather than environmental impacts to be reimbursed, and evaluating academic staff on the basis of the number of flyouts to conferences (Hopkins *et al.*, 2016; Poggioli & Hoffman, 2022). More discussion on flyout culture can be found in Section 6.

| Category | Measures | Examples |
|------------------------|---|---|
| Organisational changes | Considering added travel time associated with sustainable travel modes as work or study hours | Extending Erasmus+ grant in accordance with hours of travel on sustainable travel mode |
| | Providing flexibility in mandatory in-person attendance and improving possibilities for virtual participation | Allowing the option for virtual participation in case of schedule conflicts, preventing long gaps in between events, investing in virtual solutions and support |
| | Shifting travel booking responsibilities beyond the individual to a centralised entity | Hiring a travel agency, creating an internal booking office, ensuring only support staff can book travel |

Table 6: Overview of organisational change measures

Duration of travel is a key deterring barrier to sustainable travel that has been reported by both staff members and students and, although higher education institutions and Erasmus+ management have no direct influence in this regard, what they do have influence on is the way it is handled administratively. It is often the case that added travel time incurred with sustainable modes like train are not factored in, being considered personal rather than official working time (Dällenbach, 2020). This may be the case more indirectly rather than directly, in the form of informal rules or organisational culture or norms rather than an explicit policy (2CV, 2015), and is exacerbated by perceptions of travel time as wasted time with little productive value. Thus, higher education institutions may consider revisiting and addressing their practices to help improve attitudes towards sustainable travel, create a positive social norm, and signal organisational commitment to the cause, especially in the case of long-distance travel.

It is also worthy to note that considering added travel time as working hours is a measure that can be extended and applied to the case of exchange time for students. In this case, the measure is more of an added incentive that could be provided by Erasmus+ management, one that doesn't necessarily stem from a strong, identified need. The measure has potential to be effective even in the case of students since more official hours or days as an exchange student would translate into a higher contribution to their Erasmus+ grant. As mentioned previously, students are a cost-sensitive group and would likely consider making use of such an incentive should the barriers to its utilisation be low. Erasmus+ management currently provides 4 days of additional grant funding for students and staff who travel sustainably.



Disadvantages arise when considering added travel time as working or exchange hours. The most crucial is that costs are likely to be considerable. Higher education institutions would essentially be paying their employees at the same internal hourly rate for time that is arguably less efficient and riddled with uncertainties. While modern ways of working are no doubt evolving, with employees being more autonomous and it by no means being uncommon to work and even attend meetings while on the move, the ability to efficiently work during travel time is highly dependent on the transport mode taken and their facilities and service offerings, which will vary quite extensively between regions. Nevertheless, higher education institutions can choose to be proactive in this regard and combine such measures with other forms of support that would improve their ability to spend their travel time comfortably and efficiently, such as upgrades to first class. While institutions such as Erasmus+ management bodies are not faced with the same dilemma when it comes to considering added travel time as exchange hours for students, costs will nevertheless be considerable due to increases in grant contributions, although extra compensation will be limited to at most a couple of days, and also because another process of validation of sustainable travel will be required. Therefore, in both cases, measures will need more deliberation to get approved.

Another way that the use of sustainable travel modes can be increased is by addressing practices around travel booking and, in essence, changing the default. Depending on the higher education institution and department, travel bookings are usually arranged by the individual or by support staff. Students are much more autonomous, most often arranging their travels themselves. In the case of staff, higher education institutions can consider centralising the responsibility of travel bookings, whether that be an outsourced travel agency, an internal booking office, or each department's support staff. They are instructed to book travels according to certain guidelines. This limits the autonomy of the traveller, which is why this measure can be considered a form of restriction which can be coupled with other coercive measures. Another purpose of this measure is to provide a mechanism through which data can be collected easily; in fact, some higher education institutions such as Ghent University choose to fine those that book their travels separate from the travel agency, as discovered during interview 3 (see Box 3).

While Erasmus+ program management bodies could potentially take charge of such a measure, higher education institutions are more equipped to do so given they regularly deal with international business travels and may have policies surrounding that, which is becoming more common, meaning that synergies can be made. In terms of implementation, centralising the responsibility of travel bookings is relatively straightforward, as has been confirmed by an interviewee from a higher education institution. That being said, it incurs another cost element, whether that be through the hire of a travel agency, the increase in administrative capacity needed, or the training of administrative staff responsible for booking. In addition, booking systems for air travel are reportedly more advanced than for other modes, even those used by professional travel booking agencies, meaning that the whole picture of travel possibilities may not always be clear; multimodal trips and train travel using several rail operators are most challenging in terms of booking. Finally, it is



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interesting to note that, while centralised travel booking cannot be enforced with students, Erasmus+ program management bodies or higher education institutions can consider supporting students with the option to use such services at a partially or fully subsidised rate, although one questions to what degree it will be utilised.

Organisational changes can also be done to avoid unnecessary travel from being done. While this is not a measure that shifts travel from one mode to another, we believe it is relevant to discuss since it removes efficiencies. Especially with longer durations of mobility, it is not uncommon for students and staff to have overlaps between their schedules that put them in a position where they need to travel back and forth. This can appear in different ways. For example, in the case of students, higher education institutions may have mandatory, in-person introductory sessions that start a couple of weeks before classes, or they may have in-person exams like resits that they need to attend beyond the end of their exchange period. With a dispersal of in-person events across and beyond the timeline of mobility periods, there is a greater likelihood that schedules clash; students and staff may consider travelling back home to fulfil personal obligations, like care duties, or obligations created by the sending higher education institution, such as the attendance of an exam, PhD defence, project meeting, or otherwise. **While these obligations may be informal and unwritten, and exceptions granted if requested, they nevertheless point towards a structural problem that induces travel that could otherwise be avoided by providing flexibility and improving possibilities for virtual participation.** Doing so has other advantages - potential cost savings, more inclusivity, and more convenience for students and staff.

While providing flexibility in mandatory in-person attendance and improving possibilities for virtual participation has its advantages, there are several considerations. First, rethinking fundamentals such as academic calendars will need support from different departments and will require coordination between the host and home higher education institution which may not be straightforward. Second, despite increased utilisation and acceptance of digital tools in progression with the covid-19 pandemic and the development of the Erasmus+ blended intensive program, employing virtual solutions to promote flexibility may be difficult. Not only does it require the deployment of digital tools and ongoing technical support, but it requires higher education institutions to avoid reverting back to business-as-usual and re-examine what an Erasmus+ mobility means to them. At the end of the day, the move towards virtualization brings to question the larger discourse around its role in mobility, linked to topics such as accessibility and internationalisation. This discourse will be discussed further in the report.

3.7 Restrictions

Restrictions encompass bans and limitations for travel, and imposing them is a highly coercive way to instigate travel behaviour change (Kreil & Stauffacher, 2021). Restrictions come in different forms, as seen in Table 7 below, and can be enforced at multiple administrative levels. There is little room for Erasmus+ program management bodies to be



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involved in imposing restrictions, whereas higher education institutions can do so, most prominently in the case of staff since the travel behaviour of students is much more difficult to enforce.

| Category | Measures | Examples |
|--------------|--|---|
| Restrictions | Enforcing fixed travel-related budgets at administrative levels | Carbon or flight budgets at university, faculty, or departmental levels |
| | Prohibiting the use of certain modes of transport under certain conditions | Conditions such as travel duration, travel distance, duration of stay, purpose of visit, number of past exchanges, etc. |

Table 7: Overview of restriction measures

Restrictions are advantageous since they do not rely on voluntary travel behaviour change and thus have the most potential to produce direct reductions in carbon emissions. According to a 2021 review of policy options available to higher education institutions by Kreil & Stauffacher (2021), the use of restrictive policies is highly limited. This can be explained by several considerations.

The first consideration is that the implementation costs of restrictions can be quite high since they require compliance enforcement. This means that those with the responsibility of booking trips should be aware of the restrictions in place and their conditions, and that they follow through; otherwise, consequences are upheld. **In cases where booking is not centralised and is rather the responsibility of the individual, high monitoring costs are incurred.** Accordingly, some institutions, such as Ghent University, contracted an external booking agency, which has been reported to be a crucial success factor. Another cost lies in managing requests for exemptions, which is why it is beneficial to have clear documentation and combine such a measure with forms of non-financial support like decision-making tools.

Along with restrictions comes the potential for resistance, although this may be the case for other coercive measures. Reactions will depend, firstly, on the conditions under which restrictions will apply. Conditions will need to be perceived as fair and effective (Larsson *et al.*, 2020; Kreil & Stauffacher, 2021). For example, restrictive measures should be applied in areas where travel with sustainable modes is actually feasible and realistic. In addition, they should ideally target low-cost behaviours (de Groot & Schuitema, 2012; Kreil & Stauffacher, 2021). For example, mandating a certain mode of travel for short distances (Kreil & Stauffacher, 2021), or for destinations that are the most obviously accessible will likely face little resistance. It is also important to note that staff members will have different types of needs and meanings attached to (air) travel, which need to be fully understood through open dialogues and taken into account.

Take the example of academic staff. Early career researchers may think that making travel more difficult will inhibit their ability to network and risk their career progressions (Jacobson, 2022; Kreil & Stauffacher, 2021). Researchers in general may also believe that restrictions harm their recognition and status as well as productivity and quality of their work, not to mention the fact that they may perceive restrictions to be in direct conflict with



the strategic goals and international orientation that higher education institutions have continuously pushed for (Higham *et al.*, 2019; Kreil, 2020; Poggioli & Hoffman, 2022; Urry, 2012). Additionally, restrictions will need to take into account the different areas of research that are being conducted and their geographical focus; for research in the Global South, for example, restrictions whether they be around travel mode could pose a detrimental barrier to collaboration and would be undesirable due to ethical reasons (Kreil & Stauffacher, 2021).

Prohibiting air travel under certain conditions

In 2022, Erasmus University Rotterdam began prohibiting air travel for business purposes under certain conditions:

- “One travel by train instead of the plane for business trips less than 700 kilometers and with a travel time up to 8 hours from Rotterdam Central.
- If the destination is further than 700 km or the journey takes longer than 8 hours, you have the ability to choose whereby travelling by train is preferred.
- If one opts for travelling by plane, then direct flights where possible, unless the price difference is too large (1.5 x ticket price) and where compensation of CO2 emissions is always chosen.”

Source: Sustainable Mobility, <https://www.eur.nl/en/about-eur/vision/sustainability/operations/sustainable-mobility>

Box 6: Example of restriction measure from Erasmus University Rotterdam



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4. Review of emission offsetting measures

4.1 Introduction

In this section, emission offsetting as a measure to improve the carbon efficiency of travel is discussed as a last resort, secondary to measures aiming to change travel behaviour, some of which were outlined in the previous section. Emission offsetting is not the only way an institution can reduce the cost-to-benefit ratio of travel; an institution can choose to encourage or stipulate the avoidance of stopovers, the use of light luggage, the combination of multiple travel purposes into one trip, and the extension of trip durations (Fulton *et al.*, 2013; Fletcher *et al.*, 2019; Kreil & Stauffacher, 2021). However, emission offsetting has been found to be one of the most prevalent measures in academic air travel, and is definitely one of the most controversial ones (Kreil & Stauffacher, 2021; Glover *et al.*, 2018), making it worthy of a deeper discussion.

According to Nordic Offset (2022), emission offsetting is based on principles of sustainable development that were set out in the 1997 Kyoto Agreement on Climate Change under the auspices of the UN. The idea of offsetting is that a company, organisation or an individual can compensate for greenhouse gases that arise out of their operations and cannot be avoided, as a last resort (Carbon Footprint, 2022a; Nordic Offset, 2022).

Offsetting is done by buying carbon credits equivalent to the same amount of greenhouse gases that are caused, in essence neutralising the carbon footprint (Nordic Offset, 2022). **The money coming from offsetting is then used in different projects that either reduce CO₂ emissions, increase permanent carbon sinks or remove CO₂ permanently from the atmosphere.** There are many different standards for carbon offsetting which help ensure that offset projects are trustworthy. These include the Verified Carbon Standard (VCS) and Gold Standard (GS), which follow rigorous accounting standards, monitoring, verification, and certification standards, as well as registration and enforcement systems (Kollmuss *et al.*, 2008). There are two types of carbon markets: regulatory compliance and voluntary. Compliance markets are used by companies and governments that by law have to account for their greenhouse gas emissions, regulated by national, regional or international carbon reduction regimes. Voluntary markets are self-explanatory. (Kanematsu & Ishibashi, 2021) Carbon offsets market is not ready nor regulated. Without regulation, the carbon offsets market is like “a Wild West”. Europe is making the fastest progress toward setting out rules. The European Commission has proposed a framework for certifying carbon removal projects to create demand for credits generated by European farmers and forestry companies (McDonnell, 2021; Schwartzkopff, 2022).

Emission offsetting is a divisive subject, with some environmental organisations, such as the World Wildlife Fund for Nature (WWF), being actively involved, and others dismissing it and deeming it as nothing more than a means for businesses to continue their operations as usual and justify polluting (Hyams & Fawcett, 2013). Supporters of emission offsetting state that it is better to offset than to do nothing, especially if it is done in an additional and



permanent way and on the short-term (Co2nsensus, 2021; Smoot, 2022; Stiftung, 2021), whereas opponents view offsetting as a public relations tactic than actual climate action (Al Ghussain, 2020; Smoot, 2022).

In light of the many claims for and against carbon offsetting, it helps to take a look at some specific issues of the effectiveness and ethics of offsetting. First, it is rare that those who purchase voluntary carbon offsets have done so as a last step. For example, they are often sold in unison along with the purchase of avoidable, carbon inefficient activities such as flying, without a prompt to question behaviour (Hyams & Fawcett, 2013). Second, there are questions of its legitimacy. **According to Kaskeala *et al.* (2021), up to 90% of international offsetting projects fail to meet sufficient criteria for offsetting. An American study about California's forest carbon offset program has also found cases of systematic over-crediting, with the program creating incentives to generate offset credits that do not reflect real climate benefits** (Badgley *et al.* 2021). Another technical critique is that, while offsetting is seen as a quick fix, it is oftentimes the contrary, with voluntary market credits sold before emission reductions are achieved (House of Commons, 2007; Lovell *et al.*, 2009). Third, there are ethical questions around carbon offsetting that arise with their predominance in the Global South. For example, in the case of tree planting, questions arise around what the land was previously used for, who it was owned by and their rights, and the consequences of interventions for local livelihoods (House of Commons, 2007; Hyams & Fawcett, 2013; Lovell *et al.*, 2009). A study examining private sector investment in public lands for plantation forestry in Uganda reports the eviction of local community members and the decline of food security (Lyons & Westoby, 2014). Lastly, McAfee (2020) describes other problems of offsetting like leakage, non-additionality, non-permanence, perverse incentives and conflicts of interest.

One broader problem concerning offsetting is so-called double counting. It is shortly described as a situation where the same carbon removal or emission reduction is done by two parties. A practical example of double counting is, when a company offsets its emissions in order to be carbon neutral, and at the same time the host country counts this offset to its own, national environmental goals. Offset organisations do not have a convergent opinion about whether double counting is a problem or not (Compensate, 2021).

4.2 Options for offsetting

What kind of offsetting methods should be preferred? Based on the literature review, it seems that different offsetting methods uniformly have their own advantages and disadvantages, and it is quite challenging to compare which ones are the best. WWF (2019) has given a recommendation that all new carbon credit units to be procured in the future should be aimed at projects that support new projects. For example, a plant based on renewable energy funded by offsets may already be market-driven while there are still unsold carbon credits to that project (Fearneough *et al.*, 2020). When it comes to new technologies and quality of the methods in offsetting, Oxford University has published principles of what kind of methods of offsetting should be used in the future. This research



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emphasises carbon capture and storage over reducing carbon emissions. According to this research, the steps are as follows, with the first being the start and the final being the aim (Allen *et al.*, 2020):

1. Avoiding the emissions or removal of emissions without storage (e.g., renewable energy, ecological stoves)
2. Emission reduction into a short-term storage (e.g., avoiding harms of damages to ecosystems)
3. Emission reduction into a long-term storage (e.g., carbon capture from emissions of industry)
4. Carbon capture into a short-term storage
5. Carbon capture into a long-term storage (e.g., Bioenergy with Carbon Capture and storage (BECCS))

There are various offsetting organisations and programs that have focused on certain types of offsetting. Organisations who have focused on travelling and tourism are, for example, Sustainable Travel International, Atmosfair, Terrapass and GoClimate. The variety of offsetting projects that travel offsetting organisations offer is broad including e.g. clean energy, ecological stoves, the rebuilding of tourist infrastructure, environmental education, forests & biodiversity, and biogas production (Atmosfair, 2022; GoClimate, 2022.; Sustainable Travel International, 2022.; Terrapass, 2022). It is worth noting that some airlines also offer offsetting services to their passengers (Aviation Benefits, 2022).

Some of the most used methods to offset carbon emissions are described below.

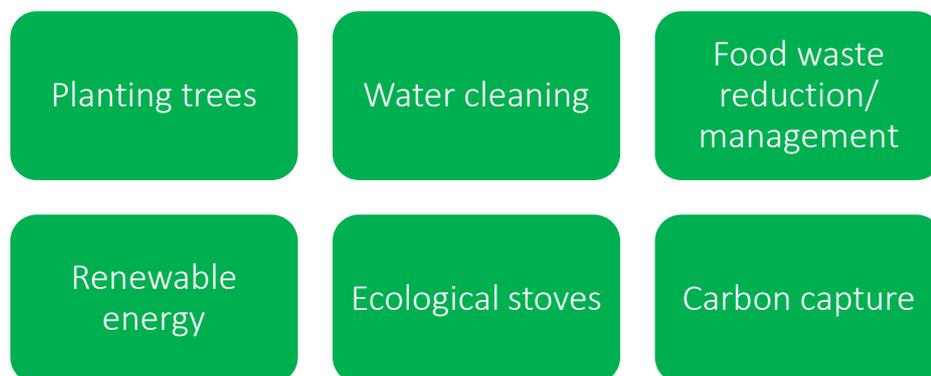


Figure 4: The most used methods to offset carbon emissions

4.2.1 Planting trees

As trees are planted, they begin absorbing and storing carbon dioxide emissions. Trees absorb carbon dioxide (CO₂) from the atmosphere to produce oxygen and wood through photosynthesis. The amount of carbon captured by a tree depends on its species, age and

location. Of the wood species, mangroves and redwoods are one of the most efficient species in absorbing carbon, storing 3,082 (Eden Restoration Projects, 2022) and 2,600 (YaleEnvironment360, 2016) metric tons of carbon per hectare respectively. Old trees absorb more carbon than newly planted trees in proportion to their size - probably due to old trees being tall and having consistent access to sunlight (Köhl *et al.*, 2017). Location of trees determines whether trees are good at capturing carbon or storing it long term. Trees in the Amazon are good at carbon sequestration, whereas spruce trees in the north (e.g. in Alaska) are excellent carbon sinks (Norman & Kreye, 2020).

Most offsetting projects are located in developing countries, but local projects can also be found from numerous providers. Methods of planting trees for creating carbon offsets are for instance to plant trees that grow naturally in the area, and to use polyculture planting (Terrapass, 2021).

Offsetting by planting trees does not always achieve the goals it was set out to do, and can have negative side effects. The goal of compensating carbon remaining sequestered for decades in trees is not met in cases such as forest fires or land being repurposed for another use, like mining. There can also be problematic compromises to be made for land use: whether to plant trees or use land for food production (McAfee, 2022).

Planting trees also requires a lot of land. If the world wanted to achieve “net zero” by 2050 by using only land-based methods - tree-planting, reforestation and sequestering carbon in the soil -, 1.6 billion hectares of land would be needed, equivalent to the size of Brazil and Australia combined (Singh, 2021). A study led by Professor Crowther at ETH Zürich found that there are 1,7 billion hectares of treeless land in the world that can be reforested and used for absorbing carbon. The study estimates that a worldwide planting programme could remove just under one-third of all the emissions from human activities that remain in the atmosphere today, and also states that planting billions of trees across the world is one of the cheapest ways of taking CO₂ out of the atmosphere (Carrington, 2019). However, planting trees is also a socially complex enterprise.

Most forestation activities happen in the Global South, as demonstrated by a 50% increase in the rate of forestation in Africa between 1990 and 2010 (Lyons & Westoby, 2014). **At the same time, forestation as offsetting is mostly conducted by countries of the Global North. This generates a kind of disconnection between the offsetting actors and the places they operate.** Lyons and Westoby (2014) refer to this as “carbon colonialism”, addressing the fact that a large volume of land in Africa has been granted to private investors from Europe or America, who sometimes abuse their position and create a sense of insecurity among the local communities. During the fall of colonialism in the 1960’s, many African countries granted free access to public land for the local communities, but private investors are increasingly granted rights to use the land, with local people now being treated as trespassers. Moreover, some offsetting investors are not fully aware of the importance of biodiversity, which creates the risk of tree monocultures hampering the balance of the natural forests in the region. See Box 7 below for more information. All in all, despite



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forestation being the easiest and perhaps most effective offsetting form, it still requires thoughtful execution in order to avoid causing more harm than benefit.

Carbon colonialism - the case of Green Resources in Uganda

Green Resources is a Norwegian company that deals with offsetting investment in Africa. They operate on many national markets, including Uganda - usually under local brands. Since Uganda has suffered the problems of deforestation, it was eager to cooperate with private investors who would perform the reforestation of the land. Green Resources established their first forest farms in Uganda in 1996.

The first problem was that they focused on trees that could be later utilised in business - mostly pine and eucalyptus. Therefore, in this case, forestation was nothing but an introduction for timber. However, at first their coexistence with local tribes was peaceful. Both sides developed a cooperation scheme, based on which local tribes could grow crops between sectors of tree farms and use the forest, but this has quickly changed and the security, with the help of police, is removing local people as trespassers. The members of the community, who were used to using the forest as pasturage, source of food and timber as well as a place of worship and burial were now forced out with the use of financial fines and even jail sentences.

The tensions between the local people are growing. Many local activists lament that this situation is a triumph of business interest over the wellbeing of the people and natural balance. Since Green Resources have valid contracts until 2032, one expects the tensions to continue.

Source: Lyons and Westoby (2014)

Box 7: A case of carbon colonialism

4.2.2 Water cleaning

Clean water is essential for life, but it is not accessible for all people in the world, being scarce especially in rural areas of developing countries in Africa and South-East Asia. Water cleaning projects are accordingly located in these areas. Water cleaning projects aim for clean water with reduced carbon emissions, which come from the reduced need to boil water for purification. Benefits of the water cleaning projects, other than reduced carbon emissions, include the reduced consumption of firewood and cooking fuel, reduced deforestation, improved water security and improved livelihoods. Projects can encompass, for instance, providing ceramic purifiers, providing chemicals to purify drinking water, restoring boreholes, funding water purification plants and wastewater treatment plants, and establishing improved water sources (Gold Standard, 2022).

4.2.3 Food waste reduction/management

Food is lost and wasted in all stages: production, processing, distribution, retail and consumption. In developed and industrialised countries, food waste occurs primarily in the retail and consumption stages, while, in developing countries, food loss takes place primarily in the production, processing and distribution stages (Jain *et al.*, 2018). When taking all food waste in the world into consideration, it would be equivalent to a country that is the third highest emitter of greenhouse gases after the United States and China



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(Food and Agriculture Organization of the United Nations, 2015). In Europe, food waste totals approximately 88 million tonnes per year, which equals to a carbon footprint of 186 Mt CO₂-eq. On an individual level, around 180 kg of food is wasted per person per year (Jain *et al.*, 2018). Almost three quarters of all food waste-related impacts originate from greenhouse gas emissions in the production of food. About 6% of the related impacts result from food waste management (Scherhauser *et al.*, 2018).

The most important and preferred management methods in food waste management are the donation of food as well as the prevention of food waste altogether. When food is inedible to humans, food waste could be considered as animal feed. When waste cannot be prevented, preferred recovery methods are composting and anaerobic digestion. The least preferred method is incineration with energy recovery. Incineration without energy recovery, landfilling and disposal in sewers should be avoided, as all nutrients and energy are lost (Jain *et al.*, 2018). An example of offsetting of organic waste is to fund and build a biogas plant.

4.2.4 Renewable energy

Renewable energy includes, in this setting of options for offsetting, hydro power, solar power and thermal energy.

Hydro power is a source of renewable energy. Energy from hydro power arises from the natural flow of moving water. There are many different types of hydro power facilities but they all have the same main process, based on the kinetic energy of flowing water when it moves downstream. In a hydro power plant, the flowing water rotates a turbine, which rotates a generator in which the electricity is generated (Department of Energy, 2022). Hydro power has a low carbon footprint and is a reliable and cost-effective alternative for fossil fuels. Independent research suggests that the amount of electricity generated in the last 50 years by hydro power would equal 100 billion tonnes of avoided CO₂ emissions if all that electricity had not been generated by using fossil fuels (International Hydropower Association, 2022; International Atomic Energy Agency, 2020) This is about 20 times the total annual electricity consumption of the United States of America (International Hydropower Association, 2022). According to the Intergovernmental Panel on Climate Change's (IPCC) latest report, hydro power is one of the most important means to mitigate climate change impacts (Pörtner *et al.*, 2022).

Solar power is a power generation method that converts the radiation energy of the sun into electricity. Solar power is collected with solar panels that consist of photovoltaic cells. The cells turn sunlight into direct current electricity. After this, an inverter converts direct current electricity into alternating current electricity. The generated energy is then used, fed into the grid, or stored in a battery (Fortum, 2022). Solar power is a renewable and clean source of electricity. Another main advantage in solar power is its scalability; solar power can be used at every level between a single household and a large-scale industry (Fortum, 2022) As a carbon offset method, solar energy projects, after completed, produce energy



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that would otherwise be procured from other sources, like the use of fossil fuels (Rivera & Sebring, 2022).

Renewable thermal energy is defined as a mode of thermal energy that is generated from primary energy sources that replenish themselves over a short period of time, or sources that would otherwise be wasted. Typical examples of renewable thermal energy are geothermal energy and biogas (Arkesteyn, 2020). Geothermal energy is the internal heat of the earth, and is often used for heating and cooling buildings and domestic hot water (Arkesteyn, 2020). Geothermal energy can also be used to produce electricity by utilising the steam of hot water in reservoirs below the Earth's surface to rotate a turbine that activates a generator to produce electricity (Carbon footprint, 2022b). Compared to fossil fuels, geothermal plants emit only little carbon dioxide, very low amounts of sulphur dioxide and no nitrogen oxides (Department of Energy, 2022). Biogas, on the other hand, is the result of the decomposition process of organic material when microorganisms decompose the components of the organic mass (Arkesteyn, 2020) Biogas is one part of the circular economy; compared to fossil fuels, biogas can help reduce greenhouse gas emissions over the entire life cycle by up to 90% (Gasum, 2022).

4.2.5 Ecological stoves

Ecological stoves have certain characteristics that make them more environmentally friendly compared to an open pit fire or non-ecological stove (Big Change, 2020; Portillo, 2020). In rural areas, for example in Guatemala, an open pit fire inside a home is the most common method for cooking. This method has many disadvantages, as the amount of wood needed is high, efficiency is low and the impact to the environment is harmful. Additionally, stagnant smoke inside a house causes respiratory problems (Big Change, 2020). Ecological stoves are designed so that the efficiency of wood is better; this enables faster cooking and smaller consumption of firewood. Moreover, well-designed ecological stoves can avoid smoke emissions up to 90% (Portillo, 2020).

4.2.6 Carbon capture

In addition to the above-mentioned emission compensation methods, newer ways of emission compensation have also become available. These include, for example, various carbon capture methods. Carbon capture and storage is a technology in which CO₂ emissions are captured and then stored so that carbon doesn't end up in the atmosphere (Budinis *et al.*, 2018). Bioenergy with carbon capture is a two-phased technique; at first biomass (organic material) is converted into heat, electricity or liquid or gas fuel, and then carbon emissions from this conversion are captured and stored in geological formations or embedded in long lasting products (American University, 2020). Both of these methods are estimated by the IPPC to have potential and be needed in order to achieve the Paris Agreement's 1.5 degrees Celsius decrease globally (Al Amer, 2022; Creutzig *et al.*, 2021).

4.3 Emission offsetting at higher education institutions



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Offsetting is sometimes criticised as being the second-best option, behind the actual reduction of emissions. It is considered relatively ineffective and expensive, because it is hardly ever done on a scale large enough and a large portion of funds designated for offsetting are consumed by administrative and other non-core costs. Moreover, it is claimed to be non-pedagogical, because it promotes an attitude of absolution rather than real mitigation (Greenberg & Fang, 2015). Most of these arguments have been raised during focus group 1. Participants raised doubts about the effectiveness of offsetting both in terms of its performance (e.g. they stressed that planting trees, which is one of the most common offsetting forms, brings effects after many years and there is no guarantee that the actual results will meet the desired effects) and financial transparency (many participants demonstrated significant lack of trust, as they believed that external offsetting agencies consume most of the funds they receive for other activities and, generally, they viewed offsetting as a field that creates too many opportunities for “murky” business practices).

While offsetting has its drawbacks, higher education institutions do have the potential to generate a necessary scale to make offsetting meaningful. That is why more and more universities try to build sustainable strategies that include offsetting. In fact, offsetting has been included as one of the short-run priorities for HEIs under the UN Climate Change Conference (Mitchell-Larson *et al.*, 2020). This is because as much as offsetting may be considered a suboptimal solution, it is also cheaper and easier to execute than solutions aimed at emission reduction.

Research conducted among American HEIs proved that they mostly engage in offsetting associated with renewable energy, which constitutes about 75% of their total offsetting. The second biggest activity is waste disposal (17%) and the third forestry (6%) (Zhang, 2021). It is worth noting that offsetting in some states is mandatory, which creates a stronger motivation for HEIs in the United States.

Renewable energy – University of Illinois, Urbana, USA

University of Illinois, Urbana is a large HEI of about 40 thousand students and staff which became one of the key contributors of offsetting among HEIs in the United States. It is estimated that the University made offsetting investments of approximately 625,000 USD between 2015–2020. The uniqueness of the university lies in the fact that it specialises in solar farms. In cooperation with external providers, it established seven solar farms that now contribute to 7% of the university’s energy consumption.

In addition to the above, the University of Illinois, Urbana also works on reducing its own emissions. Since 2008, when their sustainability programme was launched, they have managed to cut down their use of energy by 20% and gas emissions by 15%. It is worth mentioning that the university’s decision was motivated by a larger plan implemented by the State of Illinois (Illinois Climate Action Plan).

Source: Zhang (2021)

Box 8: The case of renewable energy in the University of Illinois



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In Europe, forestation and renewable energy also seem to be the dominant types of activities, but one could come under an impression that projects associated with forestation and sustainable farming are relatively more important, especially in England where universities are among the largest land owners (Werner, 2021). Focus group 2, held in Lapland UAS, supported this finding. Most participants, when asked what kind of offsetting they would select if they had such a choice, pointed towards tree planting. Other choices were supporting fossil-free energy and development of low-carbon technologies in the region. Choices of the Finns are not surprising, as trees and forests are important to Finns in terms of income and leisure activities, and Finland is a high-tech country.

Forestation – Greifswald University, Germany

Greifswald University has 115,000 students and plays an important role in the North and East of Germany. In 2012, the University decided to change its strategy and move towards carbon neutrality. At first, they implemented a pilot scheme that gave promising results within two years, leading to a full strategy being established in 2014.

The first step of the strategy was to implement proper administrative structure, that included, as a minimum, a sustainability coordinator on the rector's level as the main executive body for sustainability projects, a senate sustainability commission as the main decisive body, and faculty-level semi-formal sustainability working groups.

At the first stage, the university started with some solutions to limit emissions. Lighting was changed to LED, buildings were thermo-modernised and the fleet of cars was modified so that only natural gas and electric cars remained and each car has a speed limit at 130 km/h.

Finally, when "unavoidable" emissions were established, the university decided to engage in offsetting through proper land use. It has to be noted, that Greifswald University is an owner of large forestated areas, and tree harvesting is a significant business aspect of the university's activity. In this case, offsetting could be implemented by reduction of harvesting.

It is worth notifying that this offsetting plan is scheduled for 100 years, throughout which the university is planning to decline its annual harvesting eventually by up to 40%. This should compensate for emissions of about 9.5 thousand tonnes of CO₂ per year. One should also stress that increased forestation not only allows the trees to transform more carbon dioxide into oxygen, but also allows some of the carbon dioxide to be stored in the biomass itself and in the soil, which can increase its capacity if not agitated.

Source: Udas *et al.* (2018)

Box 9: The case of forestation in the Greifswald University

One final interesting aspect of HEIs' offsetting and general sustainability activities is the educational benefit. However, as much as social awareness in terms of emission reduction is observable and growing, offsetting is much less noticed. In fact, during focus group 3, the issues of offsetting were not mentioned by any participant until the moderator directly asked. And when that happened, the only example of offsetting that was brought up was planting trees. Another interesting conclusion came from focus group 2, where most participants claimed that they would like to engage in offsetting, but, so far, they had not.



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Most of them used a lack of knowledge about existing offsetting policies as their reasoning. However, a study shows that offsetting of individual activities, such as Erasmus mobilities of particular users, can only be properly executed if offsetting is common and at least to some extent mandatory (Tyers, 2016). Participants of focus group 3 also stressed that mandatory or administratively required instruments would definitely be more effective than behavioural nudging.²

² We have done additional research of the websites of the top 100 sending HEIs of the Erasmus programme in its 2014–2020 edition to look for publicly disclosed information about offsetting. To start with, in the entire period, there were about 12,000 sending HEIs, which means that the top 100 constitutes less than 1% of all HEIs. However, over 25% of all mobilities originated in these HEIs, which demonstrates the level of concentration within the programme and, to be honest, its lack of inclusiveness. These 100 HEIs have the biggest impact and most of them probably engage in some offsetting. And yet, only 11 HEIs have clear and transparent websites dedicated to sustainability, where an external user can find in-depth information, while additional 15 provide partial information. In other cases, there is practically no disclosure of information about their good practices and strategies, even if they exist.



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5. Recommendations for the Erasmus+ Mobility Programme

5.1 Introduction

In this section, we tackle the question of how entities involved in the management of the Erasmus+ mobility program should go about reducing its travel-related carbon footprint. In essence, what measures stand out as ones with potential, and what roles should they play?



Figure 5: Recommendations for the Erasmus+ Mobility Programme

5.2 Begin by monitoring and planning

Monitoring and planning is a fundamental starting point that management bodies of Erasmus+ are recommended to delve into once they have made the decision to address their mobility program’s travel-related carbon footprint. They form the foundation with which an institution can assess their situation, envision a new future, and commit to a path with transparency and accountability. Here, it is necessary to note that Erasmus+ management has several direct target groups of influence: first, higher education institutions, and second, participants i.e., higher education institution students and staff. Monitoring and planning will likely need to be done in consideration of their roles in influencing both actors.

5.2.1 Data collection

We recommend that Erasmus+ program management begins with a baseline scoping study. This serves as an objective reference point and reality check, helping map out where exactly carbon reductions are feasible, with a geographic scope, and accordingly allowing for targets and plans to be set and reflected upon (Interview 6). On a program, regional, national, and ideally subnational level, data granular enough to understand how many people are travelling, who they are, for which purpose, from and to which destinations, and with which travel mode needs to be collected. These form some of the key performance indicators that, on an ongoing basis, Erasmus+ program management bodies will need to collect with a standardised system for the purpose of evaluation and reflection. Here, a pitfall to avoid is seeing data collection as a goal in and of itself. As an interviewee from a higher education institution said, *“We are gathering this data to be actionable, but it doesn't have to be correct down to the last decimal number. Because if you spend that time - that energy - on just collecting the data, you never get to actually doing anything, and it's also an excellent stalling strategy that people can use to say ‘well, but the data isn't good*



enough yet’.” In addition, indicators on transport are recommended to be collected, such as accessibility to popular international destinations by different modes of transport, the state of transport service provision, and the availability of high-speed rail, among others. Accordingly, to what extent a modal shift can be incurred can be understood given the types of trips being made and enabling or limiting contextual factors, which helps build realistic and segmented carbon reduction targets, plans, and strategies on multiple programmatic and geographic levels.

5.2.2 Target setting and planning

Following a scoping study, management bodies of Erasmus+ are recommended to devise targets which they can remain accountable to through frequent monitoring. Once targets are set, plans need to be developed to address what approach and measures need to be taken to bring about the necessary change, accordingly guiding implementation. As mentioned prior, targets and plans cannot be blind to variations in geographical and socio-political contexts - these variations warrant adjustments in approach.

Target setting and planning can be a time-consuming and sensitive process in the context of higher education, limiting the extent to which they are aligned with the scale and urgency of environmental issues. During an interview with a representative from a higher education institution, it was mentioned that hesitations arose around committing to concrete, long-term targets and plans. Targets and plans were *“reconsidered and reformulated ten times”* and the representative was *“not allowed to put specific figures on paper”*. This is not surprising given the implications of reductions in carbon emissions on internationalisation goals; mobility is a matter and point of agenda that concerns many public and private actors within and outside the field of higher education. Accordingly, it becomes necessary to communicate with these stakeholders, consider their perspectives, and secure their buy-in. Alignment in strategy will also be needed.

5.2.3 Broadening the scope

When it comes to monitoring and planning, it is necessary to acknowledge that emissions are produced not only from cross-border travel to and from the host higher education institution, but through other forms of travel. Within the scope of the Erasmus+ mobility program, this can encompass day-to-day commuting, study trips, and leisure trips, amongst others. While they are likely to not produce a significant amount of emissions compared to travels within the scope of this study, partially due to their short distances and the predominance of ground-based travel modes (ESN & Eurail, 2020), they are nonetheless incurred and thus need to be considered and shaped, naturally in close collaboration with higher education institutions. **The reduction of travel-related carbon emissions cannot be approached as an isolated topic and needs to be integrated within discourses around travel, and arguably wider consumption habits.**

5.3 Stimulate behavioural change



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One recommendation to the management of the Erasmus+ mobility program is to stimulate behavioural change through the direct provision of measures. Previously, measures in six overarching categories were reviewed and analysed. Out of these, financial incentives, and awareness and non-financial support stand out as areas that management bodies of Erasmus+ can focus on in a design and implementation role. Since considerations for design and implementation for each category of measure had already been discussed in Section 3, this subsection focuses more on explaining why certain measures are suitable for management bodies of Erasmus+, and what considerations come up that may be specific to them.

5.3.1 Financial incentives

Erasmus+ management bodies can consider providing financial incentives, whether that be in the form of full or partial compensations for the use of sustainable travel modes or complementary travel products such as travel cards. This is relevant for Erasmus+ management bodies to provide to participants of the Erasmus+ mobility program for a number of reasons. First, financial incentives are likely to instigate sustainable travel behaviour, especially among student participants since they tend to be cost-sensitive. Students are relevant to cater towards since they tend to travel shorter distances, for which air travel is more likely to be substituted for other modes, and since they make up the bulk of trips for Erasmus+ mobility. Second, providing financial incentives to program participants is suitable for Erasmus+ management bodies to do since grants are already being paid out, meaning that a process for financial compensation already exists - one that in fact already encompasses the compensation of travel costs. Finally, by providing financial incentives, Erasmus+ management helps ensure that participants across higher education institutions and regions are being given similar opportunities. Higher education institutions are already offering financial incentives for mobility, but this is an exception rather than a rule, and the level of compensation varies. **If financial incentives are given directly by Erasmus+ management, rather than relying on higher education institutions to play their part, participants of mobility programs from higher education institutions across the board will have a measure in place that stimulates the use of sustainable travel modes.** It is important to note here that, while the Erasmus+ program currently provides a top-up contribution for students, this amounts only to 50 euros, which in most cases does not reflect real differences in costs between modes and is suggested to be revisited (ESN & Erasmus by Train, 2022).

5.3.2 Awareness and non-financial support

While the majority of awareness and non-financial support measures are suited for implementation by higher education institutions as socialisation agents, we see an opportunity for the involvement of Erasmus+ management bodies in providing standardised, practical knowledge and decision-making tools to improve the awareness and know-how of participants around sustainable travel. This is relevant because, as mentioned prior, most students and staff members reported not knowing whether train travel was possible between certain destinations and how they would go about dealing with practical



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matters. Erasmus+ management bodies are well-suited to provide standardised information and resources that do not need to be tailored towards the specific case - for example, carbon footprint calculators, decision-making trees, or general tips and tricks around travelling sustainably. Having these resources developed by Erasmus+ program management is more efficient than relying on each and every higher education institution to provide these resources themselves. It also ensures that participants have one, central place to go to when they have general questions. Furthermore, this set up makes it so that resources are developed to be all-encompassing and user-friendly. Although some higher education institutions are already taking initiative and providing similar resources in their efforts to reduce travel-related carbon emissions from mobility, business travel, or otherwise, this is an exception rather than a rule. However, it is necessary to note here that dissemination from higher education institutions to their students and staff is key to ensure utilisation.

5.4 Tread lightly with offsetting

There are certain activities that might not be able to be fully reduced or replaced by a zero-emission equivalent. In these cases, we recommend that offsetting be explored as a last resort. Potential solutions include establishing a mandatory offsetting fund which higher education institutions would have to support whenever they allow their staff members and students to travel by high-carbon means of transport.

When exploring carbon offsetting solutions, Erasmus+ management bodies must consider and address the many questions surrounding its effectiveness and ethics. First, they must ensure that offsetting is truly done as a last step, and that it not be used as a way to shorten the period of reaching carbon neutrality. Planning offsetting for unavoidable emission schemes should have a timeline of a matter of decades or even longer (Udas *et al.*, 2018). It is more important to control the programme's real contribution and to ensure its additivity. In this context one may find it particularly important to remember that "*haste is a poor counsellor*" (Alexandre Dumas, The Count of Monte Cristo). Second, should carbon offsetting be part of its carbon reduction strategy, Erasmus+ program management bodies should ensure that the projects it funds are legitimate and transparent and meet rigorous accounting, monitoring, verification, and certification standards, as well as registration and enforcement systems. Systematic over-crediting must be avoided. In this regard, one area which Erasmus+ program management bodies can explore is creating disclosure guidelines around offsetting activities in higher education institutions. Third, Erasmus+ program management bodies must consider seriously the ethical dilemmas that surround offsetting. Offsetting can be considered non-pedagogical, creating an attitude of absolution after the fact, and has been shown to be viewed as such by students and staff members, as shown by focus group 1, and in many cases has detrimental consequences for local livelihoods.

5.5 Steer higher education institutions



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Beyond the direct provision of measures, Erasmus+ management bodies are recommended to steer higher education institutions towards sustainable travel policy. In this subsection, we discuss the unique role of higher education institutions and their characteristics, ending with ways in which Erasmus+ management can influence them.

5.5.1 The role of higher education institutions

Beyond being Erasmus+ funding recipients, higher education institutions have a unique role in directing their students and staff to sustainable travel behaviour – one that Erasmus+ management cannot do without. They are suited to provide measures to influence the travel behaviour of the target group, whether that be through measures of awareness, organisational changes, financial incentives, non-financial support, monitoring and planning, or restrictions. They can also encourage offsetting.

Ultimately, higher education institutions form the context in which students and staff operate. They have their own policies and practices around travel and sustainability that can shape the behaviour of Erasmus+ mobility participants. Accordingly, they are suited to make necessary organisational changes conducive to sustainable travel, such as providing flexibility in mandatory in-person attendance or considering added travel time as work hours, and can also provide forms of non-financial support. They are also in a position to enforce restrictions in the case of staff travels; for higher education institutions are already working on carbon reduction around international business travel, synergies can easily be made here.

As socialisation agents, higher education institutions determine institutional culture and set social norms. With this line of reasoning, they are better able to raise different types of awareness in an influential way and make use of opportunities to empower students and staff to influence their peers, as compared to Erasmus+ management bodies. Their close proximity to students and staff also helps them provide measures that are embedded in local realities - for example, they would be able to tailor travel advice and guidance. Higher education institutions are also the main point of contact for students and staff when it comes to Erasmus+ mobility, which essentially determines to what extent participants are made aware of priorities and efforts taken by Erasmus+ program management bodies in the reduction of travel-related carbon footprint. In that sense, they can be a massive facilitator or blocker, which places emphasis on the importance of coordination.

5.5.2 Characteristics of higher education institutions

In order to steer higher education institutions, it is necessary to first understand the way that they operate and what challenges might rise in the transition towards low-carbon mobility. The first characteristic to note is that higher education institutions have diverse areas of activity. Not only are they involved in education and research, but external engagement too, partnering up with civil society and the business environment and shaping public opinion (Adams *et al.*, 2018; Dabija *et al.*, 2017; Interview 6). This brings along an array of internal and external stakeholders who are concerned with and complicate the



institution's strategic direction and policies - students, academic staff, non-academic staff, partner institutions, board members, local businesses, and so on (Chapleo & Simms, 2020). Higher education institutions also have a legacy of long-standing organisational culture which may slow down change, and often have a strong public image and international visibility (Interview 6). Accordingly, they have been compared to small cities where decisions have long-term and wide consequences, illustrating their scale and complexity (Adams *et al.*, 2018; Dabija *et al.*, 2017).

When it comes to the transition towards sustainable travel behaviour at higher education institutions, and more broadly sustainable development as a whole, several obstacles stand in the way of planning and implementation. The first barrier is that, while focusing sustainability has its benefits to public image and can be a way in which a higher education institution distinguishes itself, it does not directly make its core functions of education and research more competitive and improve associated key performance indicators (Interview 6). The second hindrance is resources. There is usually a lack of financial support to execute programs or action plans on, and, perhaps even more critically, a lack of bandwidth. Employees responsible for sustainability often have other tasks to do (Leal Filho *et al.*, 2018; Leal Filho *et al.*, 2021), and it is often that measures taken for the purpose of carbon emission reduction have ripple effects on other departments, regardless of their interest in and commitment to the cause (Interview 2; Interview 6). Finally, ensuring support from strategically influential units or individuals such as leadership, procurement, finance, or sustainability has been reported to be critical (Interview 6; Kreil & Stauffacher, 2021). With their support, structural changes can be authorised easily and new resources can be more easily arranged. On top of that, such commitment can foster changes in organisational culture and be a strong motivator for students and staff members (Savvidou *et al.*, 2020).

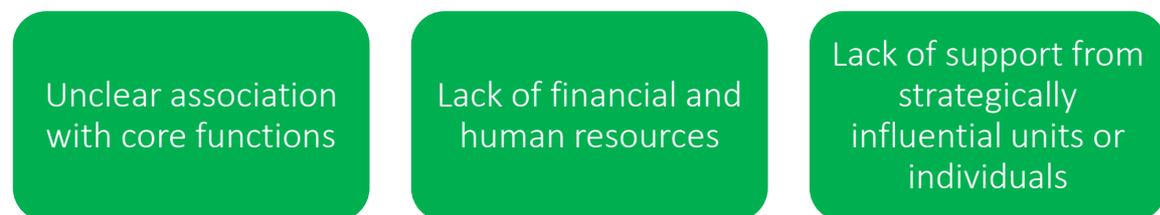


Figure 6: Barriers of planning and implementing sustainable travel initiatives in higher education institutions

5.5.3 Influencing higher education institutions

In order to maximise reductions in travel-related carbon footprint, it is crucial that the management bodies of Erasmus+ work together with higher education institutions and guide, support, and incentivize them to influence participants of the Erasmus+ mobility program. **We recommend that management bodies of Erasmus make it a priority to embed sustainable travel practices within higher education institutions where they can (Interview 6), such as:**



- Utilising their position and creating certain conditions for the applicability of grants and their level of funding, such as necessitating that each higher education institution have a sustainable travel policy encompassing mobility.
- Reviewing agreements between Erasmus+ and higher education institutions, such as the Erasmus Charter for Higher Education, and making amendments that expand the role of higher education institutions to encompass supporting Erasmus+ management bodies in their efforts through, for example dissemination, and/or providing certain, reasonable packages of measures themselves to create carbon footprint reductions.
- Considering less coercive measures such as training relevant departments of higher education institutions around the ways in which they can reduce the travel-related carbon footprint of their students and staff, and in that sense build their capacity.

Complementary to this approach would be to build a network of higher education institutions dedicated towards the vision, in which good practices and success stories can be shared and knowledge built. Overall, collective action will be needed, and Erasmus+ management bodies and higher education institutions will need to work closely together to make strides.



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6. Discussion

6.1 Introduction

With this section, we aim to link the findings of this research to broader challenges and opportunities remain relevant points of discourse to consider, despite their being beyond the scope of the research.

6.2 Contextual factors that favour air travel

While addressing socio-psychological and institutional barriers has the potential to change travel behaviour, the measures that higher education institutions and Erasmus+ management bodies can take are limited in their potential. Structural conditions exist that to some extent pre-determine behaviour and lock people into unsustainable practices. Transitions will require transformations in elements such as policy, culture, infrastructure, and markets (Geels, 2018; Markard *et al.*, 2012), which will differ according to regional political and economic context. In the case of shifting air travel to more sustainable forms of travel, reforms will be important to address drivers of the competitive advantage of air travel.

Air travel is largely considered to be the cheaper mode of travel, and has been found to be a reason why participants of the Erasmus+ mobility program opt for air travel. To understand the price differences, one cannot overlook the existing subsidies and aid in aviation. These include, among others, tax exemptions on tickets and fuel, state aid to airports and airlines, crisis relief funding and subsidies to manufacturers and infrastructure providers (Peeters *et al.*, 2006; Gössling *et al.*, 2017; Truxal, 2020). **These direct and indirect subsidies, a large part of which have been hidden and undisclosed to the public (European University Institute, 2014), have contributed to the growth and normalisation of air travel throughout Europe, with an increase of environmental impact as a result (Gössling *et al.*, 2017).**

There is room for improvement of sustainable travel modes when it comes to convenience as well. According to Eriksson *et al.* (2022, p. 169), ways in which academics believe the system or infrastructure need to change include “*faster trains, more connections, improved booking systems and generally better trains that can also house meeting rooms*”. While these prove to be relevant areas of reform, a crucial one to discuss in relation to this research is integrated ticketing. **Earlier research by Witlox *et al.* (2022) shows that the complexity of booking train tickets is one of the major bottlenecks that steer people towards air travel, stating that “people who want to plan and book a journey get caught up in a confusing maze of rules and information” (Witlox *et al.*, 2022, p. 7).** Traditional airline carriers cooperate in international alliances, which provides platforms like Skyscanner access to data and reservation systems that are integrated or made available to third parties, unlike the case with railway operators (Witlox *et al.*, 2022).



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Although these factors are outside the direct sphere of influence of higher education institutions and Erasmus+ management bodies, they can be of great influence on travel patterns and are accordingly important to consider when designing measures for implementation, especially given the fact that these contextual factors will vary across regions. Furthermore, where possible, they should be challenged and addressed.

6.3 Challenging the need to travel

In this research, the majority of the focus was placed on measures to shift travel behaviour and, marginally, measures to make travel less harmful. However, avoiding travel altogether was rarely discussed, despite the fact that such a strategy is quite likely to produce significant emission reductions. **The covid-19 pandemic has shown members of higher education institutions worldwide the possibilities that come with digital alternatives and their utility** (Bjørkdahl & Duharte, 2022). Despite being grounded, people were able to partake in knowledge exchange and access opportunities they would have otherwise not been able to attend due to financial considerations, legalities, caretaking duties, and such (Jäckle, 2022). While virtualization has its limitations and challenges - for example, online formats may not be as conducive to networking, and high-speed data connections may be lacking in some regions -, the pandemic has shown us that a new normal is possible (Jack & Glover, 2021).

The promise of virtualisation is an interesting topic of debate when it comes to the Erasmus+ mobility program. To suggest that travels are completely avoided in favour of digital alternatives would be to call into question the fundamentals of the Erasmus+ mobility program. While it is the case that the Erasmus+ mobility program is embracing virtualisation, incorporating it into the program's horizontal dimensions and encouraging blended forms of mobility, online mobility is currently treated as a complementary part of the physical program rather than a substitute. Participants still take physical trips to other higher education institutions, incurring environmental impacts. By proposing that participants simply carry out the entirety of their mobility at home, one proposes that the theory of change of the program be revised, and that the proven benefits of the program be put at risk. On the other hand, one could argue that climate change requires envisioning a future where the values of the Erasmus+ mobility program can be fostered without an environmental sacrifice, and making bold, radical decisions. As one interviewee put it, *"to [...] have an inspiring vision of what a globally interconnected higher education system could be that fosters values like tolerance and intercultural skills but does not act in a carbon-intensive way"*. Following this line of argument, **we call for a serious consideration and discussion of other ways in which the Erasmus+ mobility program can be reimagined and shaped to achieve its goals of European integration without necessitating travel in the long run.** To quote an interviewee, *"It's not going to be train travel that saves the day [...]. 20% of emissions, maybe, can be saved by moving to train travel. 20% of the energy should be spent on the transition process in my opinion and 80% [...] on virtualizing long-distance travel. For me, virtual communication really is the obvious solution and the resistance to it is the obvious challenge to solve"*.



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In the discussion around avoiding travel, the role of higher education institutions in reinforcing the need to travel, generally as well as by aeroplane, is necessary for Erasmus+ program management to consider. Travel is deeply embedded within higher education institutions. At the institutional level, it is the core enabler of internationalisation and is therefore central to its core business (Higham *et al.*, 2022). With the mobility of their students and staff, institutions can aid their international standing and reputation in an increasingly competitive environment. Under this strategic imperative, students are encouraged to become global citizens, and academic staff members are expected to collaborate internationally to produce intellectual capital and remain visible globally, and are rewarded for it with opportunities for career advancement (Glover *et al.*, 2019; Higham *et al.*, 2022; Nursey-Bray *et al.*, 2019; Tseng *et al.*, 2022; Wit & Altbach, 2020). At the individual level, engaging in mobility can give a certain prestige and elite status to those participating in mobility programs (Ballatore & Ferede, 2013; Prazeres *et al.*, 2017). For academic staff, travel is a routine part of an academic work life, seen as an irreplaceable determinant of a successful career and job satisfaction (Glover *et al.*, 2019; Nursey-Bray *et al.*, 2019; Urry, 2012). Those who are immobile are seen as the ones with insufficient funding, parenting or caring duties, or who are geographically remote (Glover *et al.*, 2022). Accordingly, it is no shock that academics are especially hypermobile, belonging to the “kinetic elite” and making a disproportionate contribution to the high growth of aviation emissions from the academic centres of Europe and North America (Creutzig *et al.*, 2016; Gossling *et al.*, 2019; Hopkins *et al.*, 2019; Sheller, 2018). **Therefore, frequent travel and flying is a highly challenging topic to bring up in higher education - one that is “morally untouchable” as an interviewee put it -, with high resistance to change even among academics working on sustainability** (Schrems & Upham, 2020).

Overall, the discussion around carbon reduction of the Erasmus+ mobility program cannot be had without acknowledging and challenging the need to travel. **Across multiple levels, institutions and people must actively consider alternatives to achieving internationalisation without side-lining sustainability. This is not only for the sake of the environment, but for the sake of improving the accessibility and diversity of mobility programs - a core dimension of the Erasmus+ mobility program.** Previous research has shown that participating in Erasmus+ is more accessible to those with prior (human) capital (Ballatore & Ferede, 2013; Souto-Otero, 2008; Teichler, 2004), and moving beyond travel can provide an opportunity to address existing inequalities and privileges. As put by Poggiolo & Hoffman (2022, p. 256), *“reducing the need to travel by air could help diversify academia by becoming more welcoming and supportive of people who cannot travel, dislike flight and time away from home, [and] do not have the means to be away from home”*.



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7. Conclusion

Efforts towards the internationalisation of higher education have come at the expense of the environment. With air travel being the most prominent mode of transport within the Erasmus+ mobility program for higher education students and staff, shifting to alternative, more sustainable modes of transport was identified as a strategic priority in the short- to medium-term.

While behavioural change is by no means straightforward, with modal choice being influenced by hard, objective and contextual factors as well as soft, socio-psychological ones, both known and unknown to individuals, several barriers have been highlighted from desk and primary research. In the shift towards sustainable travel modes, (perceived) differences in cost and duration have a significant effect among the target group, in addition to a lack of know-how and perceived behavioural control. Furthermore, contextual barriers such as institutional policies and practices, both formal and informal, and regional transport conditions lock people into certain behaviours.

Accordingly, several leverage points have been identified to be suitable for intervention: awareness, financial incentives, non-financial support, organisational changes, and restrictions. In this regard, higher education institutions and entities involved in the management of the Erasmus+ mobility program have different roles and degrees of involvement. **Due to their scale, their existing administrative processes, and their responsibility in ensuring equal opportunities, Erasmus+ management bodies are especially suited to provide financial incentives for the use of sustainable modes of transport as well as standardised resources to improve practical knowledge and support travel-related decision-making.** On the other hand, higher education institutions have the potential to provide all types of measures; they benefit from forming the institutional policy and cultural context in which students and staff operate, and from being in close proximity to students and staff, meaning that they are also embedded in and deeply aware of their local realities. It is necessary to note here the need for close cooperation between Erasmus+ management bodies and higher education institutions. **In addition to being responsible for the direct implementation of emission reduction measures, Erasmus+ management bodies must put the right structure in place to steer higher education institutions towards sustainable international travel and ensure it is embedded within their policies and practices through the use of incentives as well as the provision of guidance and support.**

While ‘*shift*’ measures strike an adequate balance between travel emission reduction and internationalisation goals given the current position of Erasmus+, other strategies exist. One that was discussed within the scope of this research was the improvement of the carbon efficiency of travel through emission offsetting, which is by no means an alternative and must always be used as a last resort due to issues of legitimacy, effectiveness, and ethics. **Accordingly, it is recommended that offsetting be explored, if necessary, as a last resort while following high standards and ethical principles.**



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Finally, we call for management bodies of Erasmus+ and higher education institutions, within and beyond the scope of the Erasmus+ mobility program, to challenge the need to travel and dare to envision a future where the values of internationalisation and integration can be fostered without necessitating travel and therefore an environmental sacrifice. Along with virtualisation comes new opportunities which must be explored for the sake of the environment and accessibility. Other points of relevance include the need to consider and attempt to address contextual factors favouring air travel.



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8. Annex

8.1 Catalogue of behavioural change measures

| Category | Measures | Examples |
|--------------------------------|--|--|
| Awareness | Educational communication that raises initial awareness and highlights travel alternatives by presenting easily digestible evidence | Facts & figures, carbon footprinting |
| | Positive, social communication that improves attitudes and identification around the desired travel behaviour | Personal testimonies, framing, pledges, calls to action |
| | Practical, informational communication that equips the person to change their travel behaviour and reduce their carbon footprint in other ways | Tips & tricks, resource sharing |
| Financial incentives | Partial to full monetary compensations of direct costs of sustainable travel | Upfront top-ups, reimbursements |
| | Partial to full monetary compensations of complementary products and services that improve convenience of sustainable travel | Discounts, upfront top-ups, or reimbursements of products and services such as travel cards or extended accommodation |
| Financial disincentives | Monetary deductions for undesirable travel behaviour | Generic carbon taxes or fines, payments towards carbon offsetting initiatives |
| | Monetary restrictions or limits for undesirable travel behaviour | Limiting funding for air travel per person or administrative entity such as a faculty |
| Non-financial support | Guiding travel planning and booking decisions | Decision-making tools, individualised or destination-specific feedback, booking support, changing default travel options to sustainable modes |
| | Facilitating group travel by linking up travellers going to the same destination around the same time | Travel buddy groups such as those facilitated by Go2Rail |
| | Directly providing or enabling easy access to complementary travel products and services that improve convenience | Offering option to easily book Interrail passes or public transport cards (possibly with a financial incentive), partial to full monetary compensations for extra nights at accommodation or ticket upgrades |
| Organisational changes | Considering added travel time associated with sustainable travel modes as work or study hours | Extending Erasmus+ grant in accordance with hours of travel on sustainable travel mode |
| | Providing flexibility in mandatory in-person attendance and improving possibilities for virtual participation | Allowing the option for virtual participation in case of schedule conflicts, preventing long gaps in between events, investing in virtual solutions and support |
| | Shifting travel booking responsibilities beyond the individual to a centralised entity | Hiring a travel agency, creating an internal booking office, ensuring only support staff can book travel |



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| | | |
|---------------------|--|---|
| Restrictions | Enforcing fixed travel-related budgets at administrative levels | Carbon or flight budgets at university, faculty, or departmental levels |
| | Prohibiting the use of certain modes of transport under certain conditions | Conditions such as travel duration, travel distance, duration of stay, purpose of visit, number of past exchanges, etc. |

Table 1: Overview of behavioural change measures

8.2 Description of interviews

Six hour-long interviews were conducted to gain insight into the effectiveness of offsetting and behavioural change measures and the success factors and challenges associated with their implementation at higher education institutions. Five were semi-structured, where the interviewer followed a protocol with set questions around measures implemented, their implementation, and their impact, as well as potential measures that Erasmus+ could use. These were held with representatives of higher education institutions who were involved in international travel policy as well as one student activist group. The sixth interview was unstructured in nature, and was focused rather on the challenges of planning and implementing for sustainable travel at higher education institutions, and what Erasmus+ would need to do to steer higher education institutions. It was held with a researcher of transport economics who has, over the years, been involved in steering sustainable travel policy at their university. For more information, see Table 2.

| Reference number | Higher education institution | Date | Interviewed by |
|------------------|------------------------------|----------|-------------------------------|
| 1 | Utrecht University | 22-04-22 | Mara de Pater |
| 2 | ETH Zurich | 05-04-22 | Mara de Pater and Maryam Omar |
| 3 | Ghent University | 05-04-22 | Mara de Pater |
| 4 | Erasmus University Rotterdam | 06-04-22 | Mara de Pater |
| Reference number | Student activist group | Date | Interviewed by |
| 5 | Erasmus by Train | 18-03-22 | Mara de Pater |
| Reference number | Expert | Date | Interviewed by |
| 6 | Dr. Giuliano Mingardo | 17-05-22 | Mara de Pater and Maryam Omar |

Table 2: Overview of interviews

8.3 Description of focus groups

One focus group was held by each higher education institution participating in this research: Erasmus University Rotterdam, University of Lodz, and Lapland University of Applied Sciences. This was done to ensure that perspectives from different backgrounds and contexts were considered. Participants included students and academic and administrative staff who had participated or were planning on participating in an Erasmus+ program. The sample was put together to try to be representative of the Erasmus+ population, while taking into account diversity and inclusion principles. The focus groups followed a basic protocol which encompassed an introduction and icebreaker section, a brainstorm, and a discussion on the strengths and weaknesses of measures to reduce the travel-related



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carbon footprint of the Erasmus+ program. The sessions of the focus groups lasted between 1.5 to 2 hours.

| Reference number | Higher education institution | Number of students to staff | Number of nationalities | Date | Facilitated by |
|------------------|--|-----------------------------|-------------------------|----------|---|
| 1 | Erasmus University Rotterdam | 7:2 | 3 | 20-04-22 | Mara de Pater and Maryam Omar |
| 2 | Lapland University of Applied Sciences | 1:2 | 2 | 20-04-22 | Henna Meriläinen |
| 3 | University of Lodz | 5:3 | 1 | 21-04-22 | Mariusz E. Sokołowicz and Piotr Gabrielczak |

Table 3: Overview of interviews

8.4 Description of web search

Research of the websites of the TOP100 sending HEIs of the Erasmus+ programme in 2014–2020 was carried out to find out carbon offsetting measures that have been applied in practice in these higher education institutions. The HEIs are listed in the report of Gabrielczak & Sokołowicz (2021). Research was carried out by using following phrases: offset, carbon offset, carbon footprint, CO₂, transport CO₂ footprint, emission reduction, emission compensation, green erasmus, green mobility, green transport, flight emission, travel by train, and railway mobility.



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