EMISSION FREE EUROPEAN UNIVERSITIES

Strategic Development of Students' Sustainability Competences in Engineering Sciences

Work Package #4 Part E

State-of-the-art analysis for universities on their way to emission neutrality

Part E – Activity 4.4b: Best Practices Guide for Sustainable Mobility Solutions on University Campuses

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About this Publication

This publication forms Part E – Activity 4.4b: *Good Sustainable Mobility Practices Guide* within Work Package 4 – "University Practices Assessment and Continuous Improvement – Keeping on Track to Emission Neutrality" of the *Erasmus+ Strategic Partnership project* Emission Free European Universities (EFEU).

It compiles and systematises the most effective mobility solutions identified across the four partner universities—DHBW Stuttgart (Germany), Metropolia University of Applied Sciences (Finland), Université Polytechnique Hauts-de-France (France), and Polytechnic of Leiria (Portugal)—and their regional partners. Drawing on evidence from the EFEU Mobility Survey (Activity 4.1), the CO_2e Computation Model and Software (Activity 4.2), the Carbon Footprint of Teaching Calculator (Activity 4.3), and the Sustainable Mobility Co-Creation Workshops (Activity 4.4a), this Guide distils practices that have proven effective in reducing mobility-related emissions and promoting behavioural change in higher-education environments.

The publication serves both as a reference document and a transfer tool. It categorises good practices into five thematic domains—*Public Transport Optimisation, Active Mobility Promotion, Personal Vehicle Management and Incentives, Digital Integration and Smart Mobility, and Behavioural and Policy Interventions*. Each category includes concise, evidence-based proposals, substantiated by empirical findings from the EFEU mobility data and the results of stakeholder workshops with municipalities, transport operators, and industry partners.
Within the broader WP4 framework, this Guide represents the final step in a structured knowledge-generation process:

- *Data Collection* (Mobility Survey)
- *Modelling and Tool Development* (CO_2e Software and Teaching Calculator)
- *Stakeholder Engagement* (Workshops and Co-Creation)
- *Dissemination and Transfer* (Good Practices Guide).

Its purpose is to support universities and local governments in designing emission-free campus mobility strategies by providing replicable models for integrating sustainable transport, improving accessibility, and fostering a culture of low-carbon commuting. The practices described herein are adaptable to diverse geographical, institutional, and socio-economic contexts across Europe and directly contribute to the objectives of the *European Green Deal* and the *United Nations Sustainable Development Goals*—notably SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).

The online version of this report can be obtained from the project's website: *https://www.dhbw-stuttgart.de/efeu*

1 Introduction

Sustainable mobility in university campuses is critical for reducing carbon footprints and fostering environmentally friendly habits among students and staff. With increasing urbanization and rising concerns over emissions, universities must take a proactive approach to integrate sustainable transportation solutions.

The *Good Sustainable Mobility Practices Guide* has been developed within the framework of **Work Package 4 – "University Practices Assessment and Continuous Improvement – Keeping on Track to Emission Neutrality"** of the *Erasmus+ Strategic Partnership project* **Emission Free European Universities (EFEU)**. The main objective of this guide is to compile, systematise, and disseminate effective and replicable practices that promote sustainable mobility across higher education institutions. It serves as a reference document for universities and local authorities seeking to design, implement, and enhance low-carbon transport systems in alignment with European climate neutrality objectives and institutional sustainability commitments.

This publication builds upon the analytical and developmental activities carried out throughout WP4. The *EFEU Mobility Survey* (Activity 4.1) provided an evidence base on commuting habits, transport modes, and their associated carbon emissions among students and staff across the four partner universities. The *CO_2e Computation Model and Software* (Activity 4.2) translated this data into measurable and comparable emission values, supporting both institutional decision-making and individual awareness. The *Carbon Footprint of Teaching Calculator* (Activity 4.3) extended the analytical approach to educational operations, linking teaching formats to mobility impacts. Finally, the *Sustainable Mobility Co-Creation Workshops* (Activity 4.4a) facilitated collaboration between universities, municipalities, and private partners to generate locally adapted, data-driven solutions. The outcomes of these activities form the empirical and conceptual foundation for the present guide (Activity 4.4b).

The guide organises best practices into five thematic areas reflecting the diversity of institutional contexts and strategies observed within the consortium: **Public Transport Optimisation, Active Mobility Promotion, Personal Vehicle Management and Incentives, Digital Integration and Smart Mobility, and Behavioural and Policy Interventions**. Each section provides practical recommendations derived from quantitative findings and qualitative insights gained through collaborative engagement with stakeholders. By linking individual behaviour, institutional policy, and municipal planning, the guide highlights how universities can function as catalysts for sustainable mobility transitions in their regions.

As the concluding output of WP4, this publication fulfils the work package's overarching objective of supporting higher education institutions in **measuring, understanding, and improving their mobility-related carbon performance**. It contributes to the dissemination of knowledge and the transfer of solutions across the European Higher Education Area, promoting the adoption of sustainable campus mobility frameworks that are both context-sensitive and scalable. Coherent with the structure and terminology of other EFEU WP4 deliverables (Parts A–E), this guide exemplifies the EFEU consortium's commitment to evidence-based, collaborative, and practical approaches to achieving **emission-neutral universities** in line with the principles of the **European Green Deal** and the **United Nations Sustainable Development Goals (SDGs 11 and 13)**.

2 Public Transport Optimization

Public transportation is the backbone of sustainable university mobility. Enhancing accessibility, affordability, and efficiency can encourage higher adoption rates.

2.1 Incentivise and promote the use of Public Transportation

Mobility report finding: "The survey results revealed that 80% of students and 70% of staff have a public transport stop within 10 minutes from home, yet over 40% of students and 65% of staff use internal combustion engine vehicles daily".

Proposal: Set up collaborative initiatives between universities and city councils to identify challenges with the public transportation network and approaches in efficiently addressing these challenges.

2.2 Adapt and improve Public Transport Timetables and Routes

Mobility report finding: "The most common reason students cited for not using public transport was ‘inconvenient routes/timetable’ across all four institutions".

Proposal: Align public transport schedules with university timetables for seamless connectivity.

2.3 Support funding students’ Public Transport Passes

Mobility report finding: "Cost-effectiveness was one of the main reasons students opted for public transport, as indicated by 24.25% (DHBW), 30.77% (IPLeiria), 23.90% (Metropolia), and 26.03% (UPHF)”.

Proposal: Universities should offer a targeted mobility program that includes subsidized or fully covered public transportation passes for students and staff, negotiated in partnership with local transit authorities.

2.4 Create Campus Shuttle Services

Mobility report finding: "Survey results showed that a significant number of students live within 5–10 minutes of public transport stops but still use private vehicles due to poor last-mile connectivity".

Proposal: Implement a free or low-cost university-operated shuttle service connecting campuses with key residential areas, transit hubs, and underserved locations.

3 Active Mobility Promotion

This section focuses on the promotion of active forms of mobility such as walking and cycling as primary means of commuting.

3.1 Enhance/complement existing Bicycle Infrastructures

Mobility report finding: "The mobility report indicates that a majority of students travel less than 5 km to campus, making cycling a viable and sustainable option. Additionally, a lack of secure bicycle parking was identified as a barrier to increased bicycle use”.

Proposal: Expand bicycle lanes as well as install secure parking and electric bike charging racks to promote cycling to and around campus.

3.2 Offer free or discounted Bicycle Rentals

Mobility report finding: "Students living within 5 km of campus could significantly reduce emissions by switching to bicycles or e-scooters".

Proposal: Universities should create, contract or combine existing bicycle sharing solutions to encourage sustainable mobility.

3.3 Promote walking for Short Distances

Mobility report finding: "Survey data highlights that a significant portion of students live within walking distance of campus yet opt for cars due to inadequate pedestrian infrastructure and perceived safety concerns".

Proposal: Enhance pedestrian infrastructure on and around campus by considering the possibility of widening sidewalks, improving lighting, installing clear signage, adding shaded walkways, and implementing speed-reducing measures such as raised crosswalks and speed bumps.

4 Personal Vehicle Management and Incentives

To reduce carbon emissions from personal vehicles, universities should implement policies that regulate and incentivize low-carbon commuting.

4.1 Implement Carpooling Programs

Mobility report finding: "Encouraging carpooling could significantly reduce carbon emissions and alleviate parking congestion".

Proposal: Develop user-friendly digital platforms or mobile apps to facilitate and promote carpooling among students and staff. These platforms can match users based on route, schedule, and preferences, and include features such as real-time ride tracking, cost-sharing options, and statistics relating to carbon dioxide emissions or personal carbon footprint. Create priority or free parking for carpool service vehicles.

4.2 Incentivize Electric Vehicles (EVs) for Campus Commutes

Mobility report finding: "Only a small percentage of students (12) reported using an electric car, while 238 used gasoline/diesel vehicles".

Proposal: Install accessible and strategically located electric vehicle (EV) charging stations across campus. Complement this infrastructure with incentives for students and staff to adopt EVs, such as discounted parking permits for EV users, free or priority parking, charging credits, or financial subsidies for vehicle purchases or leases by exploring strategic partnerships with the automobile industry. Also consider partnering with city councils to create dedicated shared lanes for buses and electric vehicles, encouraging greater EV adoption.

4.3 Restrict Parking for Internal Combustion Engine Vehicles

Mobility report finding: "Data shows that over 40% of students and 65% of staff use personal vehicles for commuting, contributing significantly to emissions. Restricting parking for high-emission vehicles can serve as a disincentive".

Proposal: Introduce campus-wide policies that limit parking access for high-emission vehicles by prioritizing parking permits for low-emission and electric vehicles. This can include creating tiered parking fees based on vehicle emissions, designating premium parking spaces for cleaner vehicles, and gradually phasing out access for high-polluting cars.

5 Personal Vehicle Management and Incentives

Technology plays a crucial role in making mobility smarter, more convenient, more fun and more efficient to be used by students and staff.

5.1 Establish Mobility as a Service (MaaS) Platforms

Mobility report finding: "MaaS can provide seamless mobility solutions but faces barriers like integration difficulties and low technological affinity among some users".

Proposal: Develop an integrated digital platform combining real-time information on public transport, biking, and carpooling for the campus users and visitors.

5.2 Develop an Emission-Free Campus Roadmap

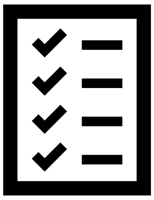
Mobility report finding: "Mobility contributes significantly to the carbon footprint of higher education institutions".

Proposal: Universities should establish clear, measurable targets for reducing mobility-related greenhouse gas emissions as part of their broader sustainability goals. Progress should be tracked and reported regularly through accessible channels, such as sustainability dashboards, annual reports, and campus-wide updates.

5.3 Implement Smart Parking Systems

Mobility report finding: "Inefficient parking management contributes to congestion and increased emissions. Smart parking solutions can improve efficiency and encourage sustainable commuting options".

Proposal: Implement smart digital systems to monitor, manage, and optimize campus parking allocation in real time.



Mobility report finding: "Include mobility survey findings on preference for online learning and revelations from academic literature comparing the carbon footprint of online learning and in-person teaching".

Proposal: Consider the inclusion of online learning formats e.g. synchronous (real-time) and asynchronous (pre-recorded) online learning, hybrid (online and in-person), massive open online courses (MOOC), flipped classroom (learning through pre-recorded sessions and integrate knowledge during live sessions), and online collaborative learning environments. Tap into resources available through university networks, partnerships, and globally.

6 Behavioural and Policy Interventions

Behavioural change and policy frameworks are essential for long-term sustainable mobility adoption.

6.1 Raise awareness on Sustainable Mobility Benefits

Mobility report finding: " Only 10% of students reported using public transport for sustainability reasons”.

Proposal: Conduct awareness campaigns to inform students and staff about the environmental impact of their commuting choices.

6.2 Promote Sustainable Mobility Ambassadors

Mobility report finding: "Survey responses indicate that only 10% of students use public transport for sustainability reasons. Student ambassadors can help raise awareness and shift perceptions”.

Proposal: Identify and train students who use sustainable transport to act as campus influencers.

6.3 Host annual Sustainable Mobility events

Mobility report finding: "Campus events can create a culture of sustainability”.

Proposal: Organize car-free days and mobility fairs to promote sustainable options.

6.4 Conduct Regular Mobility Surveys

Mobility report finding: "The EFEU mobility survey provided crucial insights for mobility planning”.

Proposal: Continuously monitor, assess and adjust mobility policies based on user feedback.

7 Best Practices at the Partner Universities

This collection highlights a series of best mobility practices implemented across the four partner universities, each showcasing innovative approaches to create more sustainable, efficient, and accessible campus transportation systems. By examining a diverse range of strategies, this compilation aims to provide valuable insights and practical models for institutions.

7.1 Best Practices at DHBW Stuttgart

At the DHBW Stuttgart, there are several practices currently in use:

- Micro mobility: DHBW Stuttgart provides electric cargo bikes and e-scooters for employees. These are stored in the DHBW campus building and charged with solar electricity.
- Electric vehicle charging point: DHBW Stuttgart provides an electric vehicle charging point, which is driven by solar electricity.
- Deutschlandticket: The German federal government and the 16 federal states subsidize the “Deutschlandticket”, a monthly ticket system for everybody, for all regional trains in the entire country for a price of currently 59 € per month on a subscription basis.
- The state of Baden-Württemberg (who is the owner of DHBW) pays a benefit of around 20 € per employee of universities per month who uses public transportation.
- Students get a reduction on the “Deutschlandticket” of approximately 20 € per month. Alternatively, they can buy a “Studiticket” only for the Stuttgart region for an even lower price.
- Jobbike: The state of Baden-Württemberg subsidizes the purchase of an electric bike for employees in order to increase the use of bicycles and reduce the number of car rides for commuters.
- Regiorad: The region of Stuttgart and the DHBW subsidize the “Regiorad”: A bike-sharing system with electric and non-electric bicycles. The service is highly affordable, and for users with a public transport subscription, the first 30 minutes of each ride are free. Bicycles can be picked up and returned only at specific RegioRad stations. RegioRad stations are abundant; two of them are at the main train station and one is located at the DHBW’s engineering faculty building.

Currently, this service has been questioned because of very high costs and limited acceptance by users.

- The urban area of Stuttgart with about 2 million inhabitants has a decent public transportation system with regional trains, metropolitan trains (S-Bahn), tram (U-Bahn) and buses.
- DHBW does not provide any parking spots neither for students nor for staff. Students and staff have therefore to commute by public transportation or have to pay for parking on an individual basis.

7.2 Best Practices at UPHF Valenciennes

The Université Polytechnique Hauts-de-France is located in the centre of Valenciennes (Tertiales and Ronzier sites), Cambrai, Maubeuge and Wallers-Arenberg.
The Mont-Houy campus is located in three municipalities: Famars, Trith-Saint-Léger and Aulnoy-Lez-Valenciennes. In total, nearly 10,000 people work or study at the Mont-Houy site.

Public transport

At UPHF INSA, for more than 20 years, 50% of the cost of monthly public transport passes for staff has been covered. Students under the age of 25 on 1 September who live in one of the 82 municipalities around UPHF benefit from the Pass & Go programme, which allows them to travel free of charge and without restriction on the entire Transvilles network (BUS, TRAM and TER around Valenciennes).

The Pass & Go is valid from 1 September to 31 August each year. It is issued after online registration, provision of supporting documents and payment of the €20 annual application fee.

Carpooling

The UPHF has created a search interface available to UPHF students and staff: https://www.uphf.fr/covoiturage/. Percentage of students carpooling represents 35.41% of car users. Alternative private services exists (Blabla Car) and propose some solutions mainly using the car parking facilities in the campus.

For staff members who own an electric vehicle, several free charging stations have been installed since the start of the 2024 academic year (10 in the main UPHF campus Mont Houy and 2 each other locations).

Two-wheelers (bicycles and scooters)

Several secure bicycle shelters are currently being implemented at the campuses:
• Mont Houy, near the Abel de Pujol 1 building: 40 spaces;
• Mont Houy, near the Eisen building: 40 spaces;
• Maubeuge: 20 spaces; and
• Leiria campus: 15 spaces.

A secure shelter with 20 spaces will also be soon established at the Cambrai campus and another with 40 spaces at the Tertiales campus.

Scooter lockers have been installed near the lecture halls on the Mont Houy campus to ensure the security of personal scooters.

7.3 Best Practices at IPL Leiria

IPL, in partnership with the City Council of Leiria, has implemented several sustainable mobility practices:

- Eco-friendly mobility: Leiria city provides electric cargo bikes for citizens. These are charger points in several places inside the city, IPL campus included.
- MOBIS app system: Leiria's public transportation company offers the MOBIS app, which allows users to track bus locations in real time.
- Train card: For only €20 per month, users can access regional trains, including routes from Caldas and Figueira da Foz to Leiria.
- Students aged 23 and under are eligible for free public transport, with no monthly pass required.

7.4 Best Practices at Metropolia University of Applied Sciences

Commuting Emissions from commuting to campuses are assessed as part of Metropolia's expanded calculation method for emissions. The calculation included travel by both students and personnel. In 2023, Metropolia invested in a mobility survey, which provided more accurate data for assessing emissions. With the increased accuracy of data gathering, emissions caused by travel to campuses were assessed to be much lower than in the previous year. Nevertheless, such emissions still formed one of the largest categories of emissions under the expanded calculation method, accounting for 40% of emissions. In 2023, an open discussion was organised for Metropolia personnel and students on sustainable mobility. As a result, conditions have been improved for cyclists through the implementation of additional secured bicycle storage areas and drying opportunities in locker rooms. Also, personnel was given the opportunity to survey the suitability of various sustainable mobility measures at the university. The decision to invest in charging opportunities for electric vehicles and the promotion of cycling during the next year was also taken.

Business travel emissions caused by business travel increased in 2023 when measured under both calculation methods. The majority of the emissions was generated by air travel, which is estimated to have returned to the pre-pandemic level. Business travel comprised 10% of emissions based on the shared calculation method of universities of applied sciences and 4% based on the expanded calculation method. Travel guidelines intended for personnel were clarified in 2023 in terms of the climate aspect: In the future, sustainable means of travel will be prioritised in domestic travel and air travel will only be used in exceptional situations. Correspondingly, the detrimental impact of international travel will be minimised through prioritising travel by train or bus where possible and by assessing the need for travel and flying. The rising trend in emissions from business travel demonstrates that there is a need to monitor the impact of the updated travel guidelines and develop them further where necessary.