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UNIVERSITETI POLIS

BOOK OF PROCEEDINGS

INTERNATIONAL CONFERENCE

SUSTAINABLE MOBILITY

5-6 MARCH 2026

The INTEC International Conference brings together academics, researchers, policymakers and industry experts to discuss innovative approaches and collaborative solutions for a sustainable future in engineering and mobility. The conference will be hosted by POLIS University in Tirana, Albania, and co-organized by partners from across the EU as part of the Erasmus+ CBHE Project 101081873-ERASMUS-EDU-2022-CBHE-STRAND-2.

INTEC International Engineering Competence Centres to push sustainable mobility development in Albania and Montenegro
Project Reference: 101081873-ERASMUS-EDU-2022-CBHE-STRAND-2

Project Partners:
FH JOANNEUM University of Applied Sciences
FRANKFURT UNIVERSITY OF APPLIED SCIENCES
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Frankfurt University of Applied Sciences (FRA-UAS), Germany
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14

IMPACT OF HEAT PUMP SYSTEMS ON WINTER ENERGY USE AND DRIVING RANGE IN BATTERY ELECTRIC VEHICLES

DOI: 10.37199/c41001014

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Abstract

Battery electric vehicles (BEVs) are increasingly common, but in winter their range is strongly reduced by the energy used for cabin heating instead of traction. In cold climates, simple resistive heaters with a coefficient of performance (COP) close to one can consume a large fraction of the available battery energy. Automotive air-source heat pumps offer a more efficient alternative, yet they must work in fast-changing driving conditions and at low ambient temperatures, so their practical advantages and drawbacks are not always obvious. This work is based on a structured review of published experimental and simulation studies on automotive heat pumps, complemented by technical documentation from vehicle manufacturers and independent winter range tests. Reported values of electrical energy use for cabin heating with resistive heaters and with heat pumps are extracted, normalised where necessary to similar ambient temperatures and driving conditions, and then compared. From these data, typical ranges for heating-energy reduction and the associated change in total vehicle energy use and driving range are estimated and discussed. Across the surveyed studies, heat pump systems typically reduce the electrical energy required for cabin heating by about 30–50 % under winter conditions between roughly 0 °C and −10 °C. Depending on the driving cycle and climate, this can lead to reductions of around 10–25 % in overall vehicle energy use and range gains of about 10–30 % relative to purely resistive heating. At temperatures below approximately −10 °C the COP falls, frost management is needed and resistive back-up heating is often activated, so the advantage decreases but does not vanish. The literature also points to higher system cost, greater complexity and packaging constraints. Overall, heat pump systems appear to be a meaningful improvement for BEVs in moderately cold climates, making winter use more practical while improving energy efficiency, provided that their added cost and integration challenges are justified by the expected range benefits.

Keywords*:* electric vehicles, heat pumps, cabin heating, winter range, energy efficiency

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I. INTRODUCTION

Battery electric vehicles (BEVs) are increasingly adopted to reduce tailpipe emissions and support the decarbonisation of road transport. However, their real-world energy consumption is strongly influenced by auxiliary loads, especially the energy required to maintain cabin comfort.

Unlike internal combustion engine vehicles, BEVs have little or no waste heat available for space heating. Many models therefore rely on positive temperature coefficient (PTC) resistive heaters (coefficient of performance (COP) ≈ 1), which draw directly from the traction battery and can account for a substantial share of trip energy use in winter (Qi, 2014; AAA, 2019).

Air-source heat pumps can provide cabin heating with lower electrical input by moving heat rather than generating it. Their benefits depend on ambient temperature, frosting/defrost cycles and control strategy, and resistive back-up heating is often required at very low temperatures (Peng & Du, 2016; Zhang et al., 2016; Zhang et al., 2016). Heat pumps are increasingly offered in production BEVs as an efficiency option (Volkswagen, 2020). This paper reviews reported impacts of automotive heat pumps on winter heating energy demand and the resulting effect on overall energy use and driving range.

II. METHODS

This study is based on a qualitative and quantitative literature review of automotive heat pump systems for BEV cabin heating. Peer-reviewed journal articles were identified through Scopus, Web of Science and academic databases and search engines using combinations of the terms “electric vehicle”, “heat pump”, “HVAC”, “cabin heating” and “winter range”. Review articles were used to map the state of the art and to identify key experimental and simulation studies (Qi, 2014; Peng & Du, 2016).

1. Search strategy and selection criteria

The search focused on peer-reviewed studies of BEV cabin heating and integrated heat-pump HVAC systems. Keywords were combined around “electric vehicle”, “heat pump”, “HVAC”, “cabin heating”, and “winter range”, and the initial results were filtered by relevance to automotive applications. Studies were prioritised when they reported measurable heating power, COP, or vehicle-level energy use over a defined ambient temperature range and driving condition (Qi, 2014; Peng & Du, 2016; Saraireh, 2023; Li et al., 2014; Zhang et al., 2016).

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2. Data extraction and comparison approach

From each source, the reported heating energy (or heating power over time) and the operating temperature were extracted. Where papers reported only COP or component-level performance, the implications for battery energy use were discussed qualitatively. Because studies differ in cabin set-points, vehicle size, and test cycles, comparisons were made in broad temperature bands (around 0°C, −10°C, and below −10°C) rather than as a single universal percentage. When independent winter range tests were used, they were treated as external validation rather than a direct like-for-like comparison across models (AAA, 2019; Norwegian Automobile Federation, 2023).

To complement academic sources with real-world performance evidence, independent winter range test reports were also reviewed (AAA, 2019; Norwegian Automobile Federation, 2023). In addition, manufacturer press information was consulted to document the practical availability of heat pumps in production BEVs (Volkswagen, 2020). From each eligible source, values of electrical energy consumption for cabin heating (or equivalent metrics such as COP) were extracted for resistive heating and for heat pump operation. Where studies used different ambient temperatures or driving cycles, results were interpreted within comparable winter ranges (approximately 0 °C to −10 °C) and the associated uncertainty is noted qualitatively in the discussion.

III. RESULTS

1. Performance ranges reported in the literature

Across the journal papers reviewed, reported COP values for air-source heat pumps in automotive operation are typically above 1 (often between about 1.5 and 3) for winter ambient temperatures around 0°C to −10°C, depending on compressor technology, refrigerant choice, and control strategy (Qi, 2014; Peng & Du, 2016; Li et al., 2014; Zhang et al., 2016; Saraireh, 2023). When these systems replace pure resistive heating, the literature commonly reports a reduction in electrical heating energy in the order of roughly 30–50% within this temperature band, with the vehicle-level benefit depending on driving cycle and baseline consumption (Peng & Du, 2016; Li et al., 2014; Zhang et al., 2016; Saraireh, 2023).

2. Evidence from independent winter range testing

Independent testing highlights the scale of winter penalties and the practical value of efficient HVAC. AAA dynamometer testing at 20°F (−6.7°C) shows substantial range reduction when cabin heating is active, and notes different HVAC configurations (heat pump with backup resistive heating

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versus resistive-only) among the tested EVs (AAA, 2019). Field testing in Scandinavian winter conditions (El Prix Winter) similarly reports large differences between models and confirms that cold weather (including sub-zero temperatures) can produce major deviations from nominal range figures (Norwegian Automobile Federation, 2023).

Table 1. Indicative heat-pump performance trends by ambient temperature (synthesised from the reviewed literature).

Ambient temperature band	***Indicative COP trend***	***Practical implications for EVs***
Around 0°C	Higher (often >2)	Good efficiency; clear range benefit versus resistive heating
Around −10°C	Moderate (often 1–2)	Benefit remains but COP drops; defrost events become more frequent
Below −10°C	Low; can approach ~1 (e.g., COP ≈ 1.25 at −20°C in Zhang et al., 2016)	Risk of frosting + limited heat source; backup resistive heating may engage

Across the reviewed experimental and review papers, heat-pump performance generally declines as ambient temperature drops, mainly due to lower evaporating temperatures and additional frost/defrost losses. Table 1 summarises these indicative trends, while Table 2 lists the evidence sources and what was extracted from each (Qi, 2014; Peng & Du, 2016; Li et al., 2014; Zhang et al., 2016).

This improvement in heating efficiency reduces the electrical energy required for cabin heating. The surveyed literature most often reports heating-energy reductions of about 30–50 % when comparing heat pump operation with purely resistive heating in similar conditions, with corresponding reductions of about 10–25 % in overall vehicle energy use and typical range gains of about 10–30 % (Peng & Du, 2016; Zhang et al., 2016; Zhang et al., 2016). Independent tests also document substantial winter penalties and show that vehicles using heat pumps can mitigate part of this loss compared with resistive-heated vehicles, although the magnitude varies by vehicle and test protocol (AAA, 2019; Norwegian Automobile Federation, 2023).

Table 2. Evidence sources included in the review and the type of information extracted.

Source	**What is used in this paper**

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AAA (2019)	Quantifies cold-weather range penalty with HVAC load; used to contextualize winter-range impact.
NAF(2023)	Real-world winter test context and temperature range; used to illustrate performance variability across models.
Qi(2014)	Background on EV thermal management and HVAC energy impacts; used for general framing.
Peng & Du (2016)	Heat-pump HVAC architectures for EVs; used to describe system options and trade-offs.
Saraireh (2023)	Frosting/defrost effects and need for auxiliary heating at low temperatures; used in the discussion.
Zhang et al. (2016)	Reports heating performance degradation in cold climates (incl. COP at very low temperature); used to support low-temperature limitations.

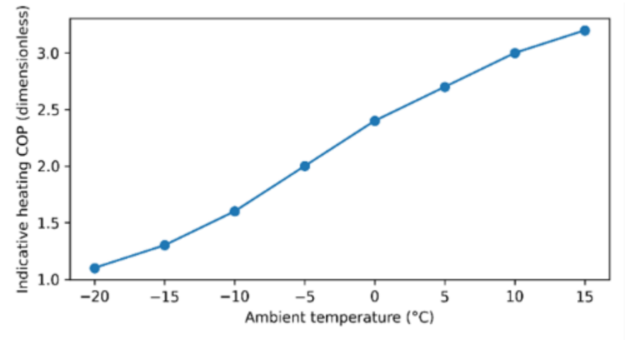

Figure 1. Conceptual decrease of heat-pump heating COP with ambient temperature (illustrative).

Below roughly −10°C, frosting and limited heat availability typically reduce COP and may trigger auxiliary resistive heating, reducing the relative advantage of the heat-pump system.

In very cold conditions (e.g., below about −10°C), heat-pump heating capacity and efficiency can decline because of low evaporating temperatures and frosting/defrost constraints, so systems often rely more on auxiliary resistive heating. As a result, the relative advantage of heat pumps tends to shrink in these conditions compared with mild winter weather (Peng & Du, 2016; Qi, 2014; Saraireh, 2023; Li et al., 2014; AAA, 2019).

IV. DISCUSSION AND CONCLUSION

Overall, the reviewed evidence indicates that heat pump systems can materially improve winter energy efficiency and driving range in BEVs in moderately cold climates. By reducing cabin-heating electrical demand relative to resistive heating, heat pumps address one of the main sources of winter range reduction (Qi, 2014; Peng & Du, 2016).

However, the benefit is not uniform: it depends on ambient temperature, frosting/defrost behaviour, driving cycle, and the extent to which resistive back-up heating is required (Zhang et al., 2016; AAA, 2019). In addition, literature and manufacturer information highlight higher system cost, increased complexity and packaging constraints compared with resistive heating (Peng & Du, 2016; Volkswagen, 2020).

1. Interpretation and practical implications

From a practical perspective, the largest gains are expected when cabin heating forms a large share of total battery power (for example, during short urban trips or at low speeds). In these situations, improving heating COP can translate into a noticeable range benefit even if traction consumption is unchanged (Qi, 2014; Peng & Du, 2016). Integration choices also matter: some designs recover heat from the powertrain and battery loop, while others rely mainly on ambient air, which makes them more sensitive to frosting and low air temperatures (Peng & Du, 2016; Zhang et al., 2016). Manufacturers report the availability of heat pumps on production vehicles and present them as a range-support feature, but the real-world impact will depend on climate, user set-point, and control calibration (Volkswagen, 2020).

2. Limitations of this review

This work synthesises heterogeneous sources rather than running a new controlled experiment. The reviewed papers use different vehicles, cabin comfort targets, driving cycles, and definitions of “heating energy”, and independent winter tests compare different models rather than the same car with and without a heat pump. For that reason, the reported percentage ranges should be read as indicative bands, not as a single universal improvement that applies to all BEVs. Where numerical comparisons are made, they are anchored to the temperature band and the test context described by each source (AAA, 2019; Norwegian Automobile Federation, 2023).

Controlled dynamometer testing by AAA at 20°F (−6.7°C) reported an average reduction of combined driving range of 41% when HVAC was used, relative to 75°F baseline conditions (AAA, 2019). AAA also notes that its test set included both resistive-heated vehicles and vehicles with

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heat-pump cabin heating (with auxiliary resistive backup) (AAA, 2019), illustrating that HVAC strategy is a major contributor to winter range loss and a key lever for improvement.

Real-world winter testing from NAF (El Prix Winter 2023) (El Prix Winter 2023) was conducted under Nordic conditions with temperatures ranging from about 0°C down to −20°C (FIA, 2023; Norwegian Automobile Federation, 2023), showing substantial model-to-model variation in deviation from WLTP range. These field tests highlight that drivetrain efficiency, battery conditioning, vehicle size, and HVAC control all interact with heat-pump performance, so the relative benefit of heat pumps is best interpreted as a range of outcomes rather than a single fixed percentage.

Future work should therefore focus on low-temperature performance, robust frost management and integrated thermal architectures that share heat between cabin and powertrain/battery needs, supported by transparent reporting of test conditions to enable better cross-study comparisons.

AKNOWLEDGEMENTS

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REFERENCES

American Automobile Association. (2019, February). *AAA electric vehicle range testing: AAA proprietary research into the effect of ambient temperature and HVAC use on driving range and MPGe.* https://www.aaa.com/AAA/common/AAR/files/AAA-Electric-Vehicle-Range-Testing-Report.pdf

Gambini, M., Manno, M., & Vellini, M. (2024). Energy and exergy analysis of transcritical CO_2 cycles for heat pump applications. *Sustainability, 16*(17), 7511. https://doi.org/10.3390/su16177511

Li, H.-J., Zhou, G.-H., Li, A.-G., Li, X.-G., Li, Y.-N., & Chen, J. (2014). Heat pump air conditioning system for pure electric vehicle at ultra-low temperature. *Thermal Science, 18(*5), 1667–1672. https://doi.org/10.2298/TSCI1405667L

Norwegian Automobile Federation. (2023). *Alt om El Prix vinter 2023.* https://www.naf.no/elbil/elprix/elprix-vinter-2023

Peng, Q., & Du, Q. (2016). Progress in heat pump air conditioning systems for electric vehicles—A review. *Energies, 9*(4), 240. https://doi.org/10.3390/en9040240

Qi, Z. (2014). Advances on air conditioning and heat pump system in electric vehicles—A review. *Renewable and Sustainable Energy Reviews, 38,* 754–764. https://doi.org/10.1016/j.rser.2014.07.038

Saraireh, M. (2023). Thermal management in electric vehicles: Modeling and prospects. *International Journal of Heat and Technology, 41*(1), 103–116. https://doi.org/10.18280/ijht.410111

Volkswagen. (2020, July). *The new ID.3: International media drive.* https://uploads.vw-mms.de/system/production/files/vwn/016/185/file/a22d2c891d2a3fb4edb2510a8cb63b4aef305cb0/The_new_ID_3_-_International_Media_Drive.pdf

Zhang, Z., Li, W., Shi, J., & Chen, J. (2016). A study on electric vehicle heat pump systems in cold climates. *Energies, 9*(11), 881. https://doi.org/10.3390/en9110881

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International conference on sustainable mobility

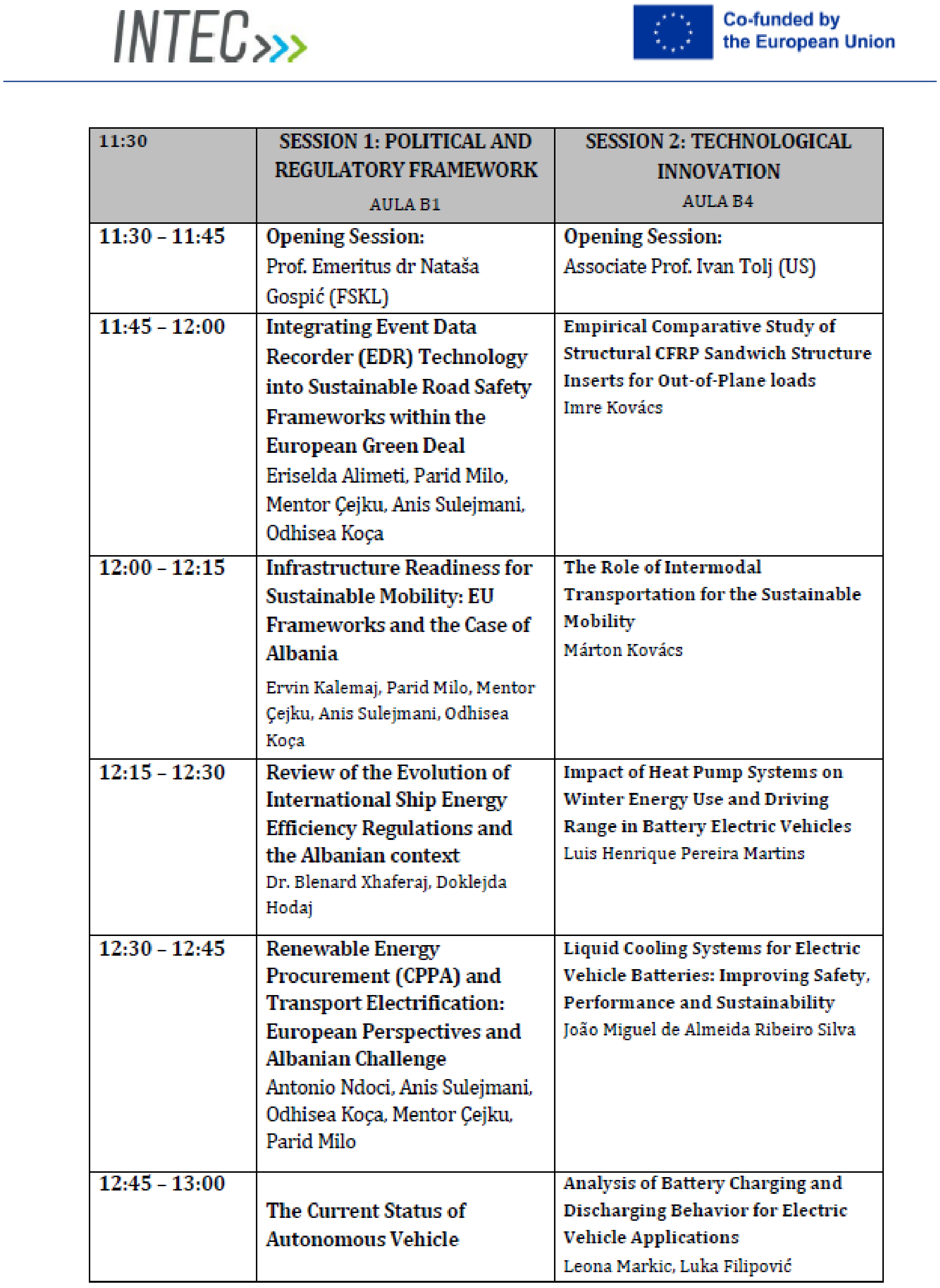
Agenda

Project title: International Engineering Competence Centres to push Sustainable Mobility Development in Albania and Montenegro
Acronym: INTEC

Work package	
WP11	**International conference**
TASK	
11.4	Cuommunity Building Events

Dates	05.03.-06.03.2026
City	Tirana
Meeting venue	POLIS University Entrance Hall
Address	Rr. Bylis 12, Kodi Postar 1051, Kutia Postare 2995, Tirana, Albania

05.03.2026	
Entrance Hall, POLIS University	
8:30 – 9:00	**Registration**
9:00 – 9:30	**Opening Performance**
Welcome session – Auditorium A5 (Ground floor)	
9:30 – 10:00	**Opening Remarks** **Dr. Elona Karafili** (Vice Rector, POLIS University) **Dr. Flora Krasniqi** (Head of Office of Projects and Internationalization, POLIS University) **DI Daniela Wenzl** (INTEC Project Coordinator)
Auditorium A5 (Ground floor)	
10:00 –11:00	**Keynote speakers** **DI Horst Pflügl AVL** Collaborative Research for sustainable Mobility **DPSHTRR Representative** – (General Directorate of Road Transport Services in Albania)
11:15 – 11:30	**Coffee break (Moving into parallel sessions)**



11:30	SESSION 1: POLITICAL AND REGULATORY FRAMEWORK AULA B1	SESSION 2: TECHNOLOGICAL INNOVATION AULA B4
11:30 – 11:45	**Opening Session:** Prof. Emeritus dr Nataša Gospić (FSKL)	**Opening Session:** Associate Prof. Ivan Tolj (US)
11:45 – 12:00	**Integrating Event Data Recorder (EDR) Technology into Sustainable Road Safety Frameworks within the European Green Deal** Eriselda Alimeti, Parid Milo, Mentor Çejku, Anis Sulejmani, Odhisea Koça	**Empirical Comparative Study of Structural CFRP Sandwich Structure Inserts for Out-of-Plane loads** Imre Kovács
12:00 – 12:15	**Infrastructure Readiness for Sustainable Mobility: EU Frameworks and the Case of Albania** Ervin Kalemaj, Parid Milo, Mentor Çejku, Anis Sulejmani, Odhisea Koça	**The Role of Intermodal Transportation for the Sustainable Mobility** Márton Kovács
12:15 – 12:30	**Review of the Evolution of International Ship Energy Efficiency Regulations and the Albanian context** Dr. Blenard Xhaferaj, Doklejda Hodaj	**Impact of Heat Pump Systems on Winter Energy Use and Driving Range in Battery Electric Vehicles** Luis Henrique Pereira Martins
12:30 – 12:45	**Renewable Energy Procurement (CPPA) and Transport Electrification: European Perspectives and Albanian Challenge** Antonio Ndoci, Anis Sulejmani, Odhisea Koça, Mentor Çejku, Parid Milo	**Liquid Cooling Systems for Electric Vehicle Batteries: Improving Safety, Performance and Sustainability** João Miguel de Almeida Ribeiro Silva
12:45 – 13:00	**The Current Status of Autonomous Vehicle**	**Analysis of Battery Charging and Discharging Behavior for Electric Vehicle Applications** Leona Markic, Luka Filipović

	Technology Adoption in the Balkan Region Darjana Lopičić, Oliver Popović, Miloš Ilić, Bojan Kocić	
13:00 – 14:00	**Lunch**	
14:00 – 14:15	**Reviewing the European Green Deal in Energy, Mobility and Industry** Veselinka Calasan, Ivana Ognjanovic	**Automotive Cooling Systems Sustainability: A Focus on the Expansion Tank** Ana Inês Barbeiro Casimiro
14:15 – 14:30	**The European Green Deal and its National Implementation: From Strategy to Practice** Blerina Bektashi, Andi Bektashi	**Design and Development of a Constant-Volume Combustion Chamber for Optical Investigation of Hydrogen and Water Injection Under Engine-like Conditions** Julius Hollerith, Prof. Dr. Bhavin Kapadia
14:30 – 14:45	**From Prediction to Regulation: Evidence Production Approaches in Autonomous Mobility Research and Their Policy Implications** Sadmira Malaj	**Emission Reduction of Marine Propulsion Systems in SECA Zones Through the Integration of Hydrogen Technologies** Motalleb Miri, Ivan Radaš, Marija Mandić, Ivan Tolj
14:45 – 15:00	**Questions and Discussion**	**A Comprehensive Analysis of Ventilation System for Enhanced Energy Efficiency in Marine Propulsion Applications** Sara Blašković, Gojmir Radica, Jakov Šimunović

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15:00 - 15:15		**Design and Topology Optimization of a Lightweight Chain Sprocket for Electric Motorcycle Applications** Teo Čolović, Ivo Marinić-Kragić
15:15 - 15:30	**SESSION 3: ECONOMIC AND BUSINESS PRESPECTIVES + CASE STUDIES AND GOOD PRACTICES** Aula B1 **Opening Session:** Dr. Anis Sulejmani (PUT)	**Questions and Discussion**
15:30 - 15:45	**Managing Renewable Energy Resources as a Foundation for Sustainable Mobility Transitions** Deivi Sinanaliaj, Martin Bektashi	
15:45 - 16:00	**Feasibility of Electric Bus deployment in Montenegro: A Case Study of Budva (Erasmus+ INTEC / IECC Context)** Anastasija Mrkajic, Vinko Nikic.	
16:00 -16:15	**Children Paths as an Urban Regeneration Strategy: Naim Frasheri Study Case** Dejvi Dauti	
16:15 - 16:45	**Questions and Discussion**	

International conference on sustainable mobility

Agenda

Project title: International Engineering Competence Centres to push Sustainable Mobility Development in Albania and Montenegro
Acronym: INTEC

Work package	
WP11	**International conference**
TASK	
11.4	Coummunity Building Events

Dates	05.03.-06.03.2026
City	Tirana
Meeting venue	POLIS University Entrance Hall
Address	Rr. Bylis 12, Kodi Postar 1051, Kutia Postare 2995, Tirana, Albania

06.03.2026		
First Floor Hall, POLIS University		
8:30 – 9:00	Registration	
9:00- 9:15	SESSION 4: SOCIAL AND ENVIRONMENTAL IMPACT AULA B1	SESSION 5: FUTURE SCENARIOS AULA B4
9:00 – 9:15	Opening Session: Prof. Dr. Bhavin Kapadia (FHF)	Opening Session: MA Adrian Millward-Sadler (FHJ)
9:15 – 9:30	**Comparison of Lifecycle Emissions of a SUV with Fuel Cell and Battery Electric Powertrains** - Bhavin Kapadia, Alper Sayin, Sandra Eisenträger	**GENAI Literacy as a Transversal Skill for Emerging Professionals: Implications for Sustainability-Critical Knowledge Work –** Adrian Millward-Sadler
9:30 – 9:45	**Smart Mobility Technologies and their Impact on Urban Sustainability: Insights from**	**Effects of Technical Traffic Calming Measures –** Filip Perović

	European and Western Balkan Cities – Alma Gjonaj, Vjola Ziu	
9:45 – 10:00	**The Disappearing Squares: Social and Environmental Impacts of Urban Mobility Planning in Durres –** Arjola Sava	**Cybersecurity Vulnerabilities in Electric Vehicle Operating Systems: A Global Awareness Analysis -** Aleksa Radević
10:00 – 10:15	**The City that Demands Continuous Movement: The Disappearance of the Right not to Move within the Framework of Sustainable Mobility –** Avrili Meshi	**Development of a risk assessment model for the transport of hazardous materials using ALOHA and GIS software tools –** Marko Radetić
10:15 – 10:30	**Between Rhetoric and Reality: Discursive Framings, Greenwashing and Outcomes in Sustainable Mobility –** Kejsi Veselagu	**Mapping Distance and Time Leveraging Isochrone Intelligence in Emerging Cities -** Andia Vllamasi, Erjon Cobani
10:30 – 10:45	**Reimagining the City Through Green Mobility Strategies: The Case of Tirana -** Vjola Ziu, Alma Gjonaj	**Can AI develop its Own "Taste" Automotive Design? -** Gregor Andoni, Kristjana Meço
Coffee Break		
11:00 – 11:15	**Linking Morphology, Perceived Safety, and Sustainable Mobility in Post-Socialist Urban Contexts-** Sindi Doce	**Optimizing Public Transport Corridors Using AI-Based Scenario Modelling: A case Study on Tirana's Ring Road -** Erjon Çobani, Julian Beqiri, Merita Guri
11:15 – 11:30	**Towards Sustainable Transport: A Comparative Analysis of Electric Vehicle Adoption in Montenegro and Albania -** Radmila Milić	**Threat Landscape and Multi-Layered Protection Mechanisms for Autonomous and Electric Vehicle Systems -** Marko Asanovic, Oliver Popović, Zoran Avramović, Nataša Gospić

11:30 – 11:45	Questions and Discussion	**Cybersecurity Challenges in Modern Vehicular Communication Networks** - Aleksandar Grgurević, Nataša Gospić, Oliver Popović
11:45 – 12:00		**Green Transition in Albania: Challenges and Future Actions** - Erik Kushta, Andi Hyka, Enea Nasto
12:00 – 12:15	SESSION 6: CONTROVERSIES AND CHALLENGES Aula B1 Opening Session: Prof. Kristofor Lapa (UV)	**Use of AI in the Process of Green Transformation and Impact on Public Health** - Esmeralda Hamiti, Federika Alliaj, Kristi Metushi
12:15-12:30	**The Adoption of Electric Vehicles in Albania: A Comparative Study with Other Western Balkan Countries** - Doklejda Hodaj, Andrea Lapa	**Development of an Automatic Traffic Sign Detection System Using YOLOv8** - Valentina Vojinović, Luka Filipović
12:30-12:45	**Application of Quality Tools in the Analysis of Factors Influencing the Development of Electromobility in Montenegro** - Jelena Šaković Jovanović, Draško Jovanović, Mirjana Grdinić Rakonjac, Marko Lučić, Miloš Perović, Aleksandar Vujović, Gordana Radulović	**The Historical Development of Artificial Intelligence and Its Influence on the job market in Automotive Engineering** - David Josef Pilgram
12:45 – 13:45	Questions and Discussion	Questions and Discussion
13:45	**Lunch**	