



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
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THE ADOPTION OF ELECTRIC VEHICLES IN ALBANIA: A COMPARATIVE STUDY WITH OTHER WESTERN BALKAN COUNTRIES

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Abstract

This research explores the adoption and usage of electric vehicles (EVs) in Albania, making comparisons with other countries in the Western Balkans (WB). With the global transition towards sustainable transportation gaining momentum, the uptake of electric cars offers considerable environmental and economic benefits. The study evaluates the current status of EV infrastructure, government strategies, and consumer perspectives in Albania in relation to neighboring countries like Serbia, Bosnia and Herzegovina, Montenegro, and North Macedonia. Data was obtained from online documents and the analysis of governmental reports, focusing on various factors that affect EV adoption, such as incentives, the availability of charging stations, and public awareness. The findings indicate that while Albania has made progress in promoting electric mobility, it falls behind some WB countries in terms of infrastructure and consumer participation. The study also addresses challenges such as high upfront costs, insufficient charging infrastructure, and public perceptions of electric vehicles. It offers suggestions to enhance EV adoption, including policy reforms, awareness campaigns, and investments in charging infrastructure. The results aim to guide policymakers and stakeholders on the potential contributions of electric vehicles to sustainable development and environmental conservation in Albania and the broader region. This comparative analysis underscores the importance of regional cooperation and knowledge exchange in tackling the challenges associated with electric vehicle adoption, highlighting it as a critical area for future research and policy development.

Keywords: electric vehicles, Albania, policies, Western Balkan

I. INTRODUCTION

The global transportation sector is experiencing a profound transformation, largely driven by the imperative to reduce greenhouse gas emissions, improve air quality, and strengthen energy security. Road transport accounts for a significant proportion of global carbon dioxide emissions, making it a central focus of decarbonization efforts [1]. In this context, electric vehicles (EVs) have emerged as a pivotal technological solution, offering reduced emissions, higher energy efficiency, and lower reliance on fossil fuels compared to conventional internal combustion engine vehicles [2].

Across Europe, EV adoption has accelerated in recent years, supported by ambitious climate policies, financial incentives, and substantial investments in charging infrastructure [3]. The European Union (EU) has introduced binding targets to curb transport-related emissions, encouraging both member states and neighboring regions to embrace sustainable mobility solutions [4]. Despite this progress, the uptake of EVs remains uneven across the continent, particularly in developing regions such as the Western Balkans.

The Western Balkan (WB) region—including Albania, Serbia, Bosnia and Herzegovina, Montenegro, and North Macedonia—faces specific challenges in transitioning to electric mobility. These countries are characterized by relatively lower income levels, aging vehicle fleets, limited charging infrastructure, and differing levels of policy support [5]. Nevertheless, the region demonstrates considerable potential for EV adoption, driven by increasing urbanization, rising fuel prices, and alignment with EU environmental objectives.

Albania represents a particularly distinctive case. Although the country benefits from a predominantly renewable electricity mix based largely on hydropower, its transport sector remains heavily dependent on fossil fuels [6]. Electric vehicle penetration is still low, and supporting infrastructure remains less developed than in some neighboring WB countries. However, recent policy initiatives and growing public awareness suggest a gradual movement toward electric mobility.

Research on transport systems commonly integrates theories of technology adoption, behavioral change, and socio-technical transitions to explain mobility change across analytical scales. At the individual level, adoption of new transport technologies is often explained through Diffusion of Innovations [7], which conceptualizes uptake as a socially mediated process shaped by communication and adopter heterogeneity, as well as through the Technology Acceptance Model [8] and the Unified Theory of Acceptance and Use of Technology [9], which emphasize perceived usefulness, ease of use, social influence, and facilitating conditions in shaping acceptance of technologies such as electric vehicles, intelligent transport systems, and mobility platforms.

Behavioral change in travel is most frequently analyzed using the Theory of Planned Behavior [10], which links travel behavior to attitudes, norms, and perceived control, often complemented by habit-based perspectives that account for the routinized nature of daily mobility.

This study seeks to analyze the adoption of electric vehicles in Albania and to compare its progress with that of other Western Balkan countries. By examining charging infrastructure, governmental policies, and consumer-related factors, the research aims to identify the key drivers and barriers influencing EV adoption in the region. The findings are intended to support policymakers and stakeholders in developing strategies to accelerate the transition toward sustainable transportation in Albania and the wider Western Balkans.

II. METHODOLOGY

This study adopts a comparative qualitative and descriptive research design to examine electric vehicle adoption in Albania in comparison with selected Western Balkan countries. The comparative framework facilitates the identification of similarities and differences across national contexts, enabling the assessment of best practices and the identification of policy gaps that influence the diffusion of electric vehicles.

Data Collection

Data were collected through secondary sources, including:

- National and regional governmental reports on transport and energy policy
- Publications from international organizations such as the European Commission, International Energy Agency (IEA), and World Bank
- Academic journal articles related to electric vehicle adoption and sustainable transport
- Official statistics and online databases concerning vehicle registrations and charging infrastructure

The focus was placed on the most recent available data to ensure relevance, while acknowledging that data availability varies across countries.

Countries Included in the Comparison

The comparative analysis covers:

- Albania
- Serbia
- Bosnia and Herzegovina

- Montenegro
- North Macedonia

These countries were selected due to their geographical proximity, similar socio-economic conditions, and shared EU accession aspirations.

Analytical Framework

The analysis is structured around three main dimensions influencing EV adoption:

1. Policy and Incentives – government strategies, subsidies, tax exemptions, and regulatory frameworks
2. Infrastructure – availability and accessibility of public and private charging stations
3. Market and Consumer Factors – EV availability, affordability, and public awareness

Qualitative synthesis was used to identify trends, barriers, and enabling factors across the region.

III. RESULTS

1. Electric vehicle adoption in Albania

Electric vehicle adoption in Albania is still in its nascent phase. The number of registered electric vehicles remains low relative to conventional vehicles, and their overall market share is negligible [11]. Existing EVs are predominantly concentrated in urban centers, particularly in Tirana, where consumer awareness and purchasing power are comparatively higher.

Despite these low adoption levels, Albania's electricity generation is largely based on renewable hydropower, which significantly enhances the environmental advantages of electric vehicle use [6]. This energy profile places the country in a favorable position to advance sustainable electric mobility, provided that key barriers to adoption are effectively addressed.

2. Charging infrastructure

Charging infrastructure in Albania remains limited and unevenly distributed. Public charging stations are largely concentrated in major urban centers and along selected transport corridors, resulting in insufficient coverage in rural areas. When compared with Montenegro and Serbia, Albania has a lower number of publicly accessible charging points on a per capita basis [12].

Private charging – primarily at residential locations – is more prevalent among early adopters of electric vehicles. Nevertheless, the scarcity of fast-charging stations continues to represent a major constraint, particularly for long-distance travel and intercity mobility.

3. Government policies and incentives

Albania has implemented preliminary measures to encourage electric mobility, including reduced registration fees and exemptions from certain vehicle-related taxes for electric vehicles [13]. However, these incentives remain relatively limited compared to those offered in Serbia and Montenegro, where direct purchase subsidies and more robust fiscal support mechanisms are in place [14].

Furthermore, Albania’s policy framework lacks long-term strategic coherence, and the promotion of electric vehicles has not yet been fully integrated into national transport planning. By contrast, several neighboring countries have adopted more comprehensive national electric vehicle strategies that are closely aligned with European Union standards.

4. Comparison with other Western Balkan countries

Serbia has achieved notable progress in electric vehicle adoption, driven by the introduction of purchase subsidies and the steady expansion of charging infrastructure [14]. Montenegro exhibits relatively high electric vehicle penetration on a per capita basis, largely supported by tourism-related investments in charging facilities [15]. North Macedonia has implemented fiscal incentives to promote electric mobility; however, limitations in charging infrastructure continue to constrain broader adoption [16]. In contrast, Bosnia and Herzegovina remains behind its regional peers due to fragmented governance structures and insufficient policy coordination [17].

Overall, Albania’s performance exceeds that of Bosnia and Herzegovina but remains behind Serbia and Montenegro with respect to charging infrastructure development and consumer uptake of electric vehicles.

5. Key barriers identified

Across the region, several common barriers were identified:

- High upfront costs of electric vehicles
- Limited charging infrastructure

- Low public awareness and information gaps
- Lack of coordinated long-term policy frameworks

These barriers are particularly pronounced in Albania, where purchasing power remains relatively low.

6. Charging infrastructure development

Countries such as Serbia and Montenegro have established relatively robust electric vehicle charging networks, offering valuable models for Albania to follow [18]. In Serbia, substantial investments have been directed toward the installation of fast-charging stations along major highways, significantly improving nationwide accessibility and reducing range anxiety among EV users [19]. These developments have played a crucial role in supporting the growth of electric mobility across the country.

In contrast, Albania's charging infrastructure has expanded at a much slower pace. The limited number of publicly accessible charging stations, particularly outside major urban centers, may discourage potential EV adopters. The lack of fast-charging facilities along intercity routes further constrains long-distance travel, undermining consumer confidence in electric vehicle usability.

7. Policy effectiveness

The effectiveness of government policies aimed at promoting electric vehicle adoption varies significantly across the Western Balkan region. North Macedonia has implemented comprehensive fiscal incentives, including exemptions from value-added tax and vehicle registration fees, which have contributed to measurable increases in electric vehicle sales [19]. This policy approach illustrates how targeted financial measures can positively influence consumer adoption and may serve as a valuable reference for Albania.

Similarly, Bosnia and Herzegovina has incorporated electric vehicle-related incentives into broader national transport and environmental strategies. This integrated policy framework has strengthened public engagement and supported a gradual rise in EV uptake [20]. In contrast, Albania's policy environment remains fragmented, which constrains its overall effectiveness in stimulating market growth and accelerating electric vehicle adoption.

8. Public awareness and engagement

Public awareness and education are critical factors in shaping consumer attitudes toward electric vehicles. In Bosnia and Herzegovina, targeted awareness campaigns highlighting environmental benefits, long-term cost savings, and technological reliability have positively influenced public perceptions and stimulated increased interest in electric vehicles [20]. These initiatives underscore the importance of effective information dissemination in addressing consumer skepticism and building confidence in electric mobility.

In contrast, Albania currently lacks comparable nationwide outreach efforts. The absence of structured public awareness campaigns has contributed to persistent misconceptions regarding electric vehicle performance, charging convenience, and affordability. Enhancing public engagement through well-designed education and information initiatives could play a significant role in improving consumer understanding and acceptance of electric mobility in the country.

9. Barriers to EV adoption in Albania

Despite the environmental and economic benefits associated with electric vehicles, multiple barriers continue to hinder their widespread adoption in Albania. One of the most significant obstacles is the high upfront cost of electric vehicles, which generally exceeds that of conventional internal combustion engine vehicles. In Albania's highly price-sensitive market, this cost disparity makes EVs inaccessible to a large segment of consumers, who often opt for more affordable traditional vehicles [21]. The limited development of a second-hand EV market further restricts affordability and reduces entry opportunities for lower-income households [22].

Insufficient charging infrastructure represents another major deterrent to adoption. This challenge is particularly acute in rural and semi-urban areas, where charging facilities are sparse or entirely absent [23]. The limited availability of public charging stations contributes to range anxiety, as potential users remain concerned about the ability to recharge during longer journeys [24]. Without substantial infrastructure expansion, consumer confidence in the practical usability of electric vehicles is unlikely to improve.

Societal attitudes and cultural perceptions also play a significant role in shaping EV adoption. Persistent misconceptions regarding vehicle reliability, durability, and driving range—largely driven by limited exposure and inadequate information—continue to undermine consumer trust in electric vehicles [24]. Many potential buyers question the suitability of EVs for everyday use and long-distance travel, further suppressing demand.

Although the Albanian government has introduced initial measures to support electric mobility, the absence of a comprehensive and coherent regulatory framework remains a critical limitation.

Existing policies are fragmented, lack effective enforcement mechanisms, and therefore have limited impact on market development [23]. In addition, unclear regulations governing the installation and operation of charging infrastructure complicate network expansion and discourage private sector investment.

Finally, broader economic constraints further restrict EV adoption. Lower disposable income levels and limited access to affordable financing options significantly reduce consumers' ability to purchase electric vehicles, which typically involve higher upfront costs [25]. The financial sector has yet to provide adequate support for EV buyers, as banks and lending institutions often perceive electric vehicles as high-risk assets due to uncertainties surrounding resale value, battery lifespan, and market maturity. This reluctance further constrains consumer access to electric vehicle ownership.

IV. DISCUSSIONS

The findings suggest that although Albania has taken initial steps toward electric mobility, its progress remains limited by a combination of economic, infrastructural, and institutional constraints. High electric vehicle purchase prices relative to average income levels significantly restrict consumer adoption, a pattern consistent with observations in other developing markets [26].

Charging infrastructure availability emerges as a decisive determinant of electric vehicle uptake. Countries with more extensive and dense charging networks, such as Serbia and Montenegro, demonstrate higher levels of EV adoption, supporting existing research that identifies infrastructure as a critical enabler of market growth [27].

Policy effectiveness also plays a central role in shaping adoption outcomes. Albania's relatively modest incentive schemes stand in contrast to the more comprehensive subsidy programs implemented in neighboring countries. Evidence from international studies indicates that financial incentives, particularly when combined with public awareness initiatives, can substantially increase electric vehicle adoption rates [28].

Public perception and awareness regarding electric vehicles remain underdeveloped in Albania. Persistent misconceptions related to driving range, maintenance costs, and battery lifespan continue to reinforce consumer hesitation. Addressing these knowledge gaps through targeted information and education campaigns could significantly enhance public acceptance of electric mobility.

Ultimately, current EU debates on transport decarbonization increasingly emphasize energy sources rather than technology alone. In this context, Albania's predominantly renewable electricity mix represents a structural advantage for electric vehicle adoption, as it allows electric mobility to deliver genuine emissions reductions. This perspective suggests that Albania's EV potential should be assessed not only through infrastructure and market indicators, but also through its alignment with broader energy transition objectives.

Finally, regional cooperation presents a valuable opportunity to accelerate electric vehicle adoption across the Western Balkans. Harmonizing regulatory standards, sharing best practices, and jointly investing in cross-border charging infrastructure could facilitate more coordinated market development. Given Albania's advantage in renewable electricity generation, integrating electric vehicles into broader decarbonization strategies could deliver substantial environmental and energy security benefits.

1. Recommendations

To address existing barriers and accelerate electric vehicle adoption in Albania, this study proposes the following recommendations:

Policy Reforms: Formulate comprehensive and long-term policy frameworks that provide consistent financial incentives for both consumers and businesses, ensuring stable and predictable support for electric mobility initiatives.

Infrastructure Investments: Promote investment through public-private partnerships to expand charging infrastructure in both urban and rural areas, thereby reducing geographical disparities and improving accessibility.

Public Awareness Campaigns: Implement targeted information and education campaigns to raise consumer awareness of electric vehicle benefits, including lower operating costs and reduced environmental impact.

2. Limitations

Based on the article, a key limitation of the study relates to its strong reliance on secondary data sources, which constrains the depth and granularity of the analysis. The findings are derived primarily from governmental reports, international databases, and existing literature, which may differ in terms of data collection methods, reporting standards, and update frequency across Western Balkan countries. This dependence limits the ability to capture recent market dynamics,

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informal charging practices, and evolving consumer perceptions, particularly in a rapidly developing field such as electric mobility. Moreover, secondary data do not allow for direct observation of individual attitudes, behavioral intentions, or decision-making processes, which are central to understanding electric vehicle adoption. As a result, the analysis may overlook context-specific social, cultural, and institutional factors influencing adoption in Albania, highlighting the need for future research incorporating primary data such as surveys, interviews, or stakeholder workshops to validate and enrich the findings.

V. CONCLUSION

This study analyzed the adoption of electric vehicles in Albania through a comparative assessment with other Western Balkan countries. The results indicate that while Albania has initiated a transition toward electric mobility, it continues to lag behind regional frontrunners such as Serbia and Montenegro.

The analysis identifies several key barriers to adoption, including high upfront vehicle costs, inadequate charging infrastructure, and limited policy support. Nevertheless, Albania demonstrates considerable potential for electric vehicle uptake, supported by its predominantly renewable electricity mix and increasing alignment with European Union environmental objectives.

To accelerate the adoption of electric vehicles, the study recommends expanding financial incentives and purchase subsidies, investing in a nationwide charging network that includes fast-charging stations, enhancing public awareness through targeted education and information campaigns, and strengthening regional cooperation within the Western Balkans.

Future research should incorporate primary data sources, such as consumer surveys and stakeholder interviews, to gain deeper insights into behavioral and institutional factors influencing electric vehicle adoption. As the region advances toward sustainable development goals, electric mobility is expected to play an increasingly important role in shaping the future of transportation in Albania and the broader Western Balkan region.

REFERENCES

- [1] International Energy Agency. *CO₂ emissions from fuel combustion*. Paris: IEA; 2022.
- [2] Hawkins TR, Singh B, Majeau-Bettez G, Strømman AH. Comparative environmental life cycle assessment of conventional and electric vehicles. *J Ind Ecol*. 2013;17(1):53–64.
- [3] European Commission. *Sustainable and Smart Mobility Strategy*. Brussels: EC; 2020.

- [4] European Union. *Fit for 55 package*. Brussels: EU; 2021.
- [5] World Bank. *Western Balkans: Transport and climate transition*. Washington DC: World Bank; 2021.
- [6] Energy Community Secretariat. *Albania energy profile*. Vienna: ECS; 2022.
- [7] Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.
- [8] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- [9] Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- [10] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- [11] Institute of Statistics Albania. *Transport statistics*. Tirana: INSTAT; 2022.
- [12] European Alternative Fuels Observatory. *Charging infrastructure data*. Brussels: EAFO; 2023.
- [13] Ministry of Infrastructure and Energy Albania. *National transport policy overview*. Tirana: MIE; 2021.
- [14] Government of Serbia. *Electric mobility incentives program*. Belgrade: Ministry of Mining and Energy; 2022.
- [15] Ministry of Capital Investments Montenegro. *Electric vehicle strategy*. Podgorica: MCI; 2021.
- [16] Ministry of Economy North Macedonia. *Green transport measures*. Skopje: MoE; 2022.
- [17] Energy Regulatory Commission Bosnia and Herzegovina. *Transport energy outlook*. Sarajevo: DERK; 2021.
- [18] Transition Network. *Electric mobility and charging infrastructure in the Western Balkans*. Totnes (UK): Transition Network; 2021.
- [19] European Commission. *Transport and mobility developments in the Western Balkans*. Brussels: European Commission; 2021.
- [20] Djuric I, Petrovic M, Markovic D. Public engagement and policy effectiveness in electric vehicle adoption in Bosnia and Herzegovina. *Energy Policy*. 2022;162:112768.
- [21] European Environment Agency. *Electric vehicles and the energy system: impacts and challenges*. Copenhagen: EEA; 2020.

- [22] Milošević D, Stojanović B. Consumer perceptions and second-hand electric vehicle markets in Southeast Europe. *Transp Res D Transp Environ.* 2022;102:103134.
- [23] World Bank. *Western Balkans green mobility and transport transition.* Washington DC: World Bank; 2023.
- [24] Breetz HL, Salon D, Sperling D. Consumer range anxiety and electric vehicle adoption. *Energy Policy.* 2018;123:397–405.
- [25] International Monetary Fund. *Albania: Selected issues.* Washington DC: IMF; 2021.
- [26] Rezvani Z, Jansson J, Bodin J. Advances in consumer electric vehicle adoption research. *Transp Res D.* 2015;34:122–36.
- [27] Li S, Tong L, Xing J, Zhou Y. The market for electric vehicles: indirect network effects and policy impacts. *J Assoc Environ Resour Econ.* 2017;4(1):89–133.
- [28] Sierzchula W, Bakker S, Maat K, van Wee B. The influence of financial incentives on electric vehicle adoption. *Energy Policy.* 2014;68:183–94..

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	Community 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 Ognjanović	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 Motaleb 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

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

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	Community 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	Use of AI in the Process of Green Transformation and Impact on Public Health - Esmeralda Hamiti, Federika Alliaj, Kristi Metushi
	Opening Session: Prof. Kristofor Lapa (UV)	
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	