

# The role of R&D in the planning of sustainable urban mobility through the example of Széchenyi István University

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- **Climate change** is a process that threatens the future of humanity
- Large-scale agriculture, industry and transport have significantly changed the atmosphere and are causing **climate change**
- **International cooperation** to deal with climate change (in particular: complete and rapid elimination of the use of fossil energy sources (coal, oil, gas, biomass))
- **Transport** is currently the most polluting sector

- **Sustainable and Smart Mobility Strategy (2020):** The European Commission's Sustainable and Smart Mobility Strategy sets out a concrete vision for achieving carbon neutrality until 2050
- The EU mobility strategy formulates its objectives in 10 priority areas
  - **1.Boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable & low-carbon fuels and related infrastructure**
  - 2.Creating zero-emission airports and ports
  - **3.Making interurban and urban mobility healthier and more sustainable**
  - **4. Making the transport of goods more environmentally friendly**
  - 5.More effective incentive of carbon pricing and users
  - **6.Implementing connected and automated multimodal mobility**
  - **7.Boosting innovation and the use of data and artificial intelligence (AI) for smarter mobility**
  - 8.Strengthening the Single Market
  - **9.Making mobility fair and equitable for all**
  - **10.Step up transport safety and security across all modes**

- **The sustainable urban transport system:**
  - It supports freedom of movement, health, safety and quality of life for both present and future generations,
  - It is environmentally efficient,
  - It supports the lively city life, including the economy, by providing access to opportunities and services for everyone, including the less affluent, the elderly or disabled urban or non-urban citizens.” (European Commission, 2004)
- **Stakeholders of the sustainable urban mobility:**
  - Municipalities/Local authorities
  - Citizens, Civil society
  - Local companies
  - Local university (RD)

- You can find an extensive literature base for the description of the cooperations (**Triple Helix** (Etzkowitz - Leydesdorff, 1995; **Quadruple Helix** (Carayannis – Campbell 2009), **Quintuple Helix** (Carayannis – Barth – Campbell (2012) – state (1) – industry (2) – academic sector (3) – society-nonprofit (4) – sustainable environment(5))
  - **Triple Helix:** universities are becoming more and more open to their environment, in which, besides providing educational and research activities, they also play a significant role in the social level, therefore they maintain **academic, business and government** cooperations
  - **Quadruple Helix:** the **actors of the innovation ecosystem** also join to the three sectors mentioned earlier (civil society)
  - **Quintuple Helix:** adds the **natural environment**, specifically the social-ecological interactions, so it can be applied to sustainable development

- Urban strategy and measures
- University research and development
- Civil initiatives
- Developments of companies, social responsibility, corporate culture

- **Comprehensive goal in Győr's Integrated Urban Development Strategy:**
  - In addition to the continuous improvement of the quality and accessibility of urban transport, the amount of energy used for their operation should be significantly reduced, and the share of renewable energy sources should be increased
- **Sub-goals (Environment-friendly transport):**
  - Private urban transport
  - Development of parking
  - Development of public transport
  - Infrastructural development of bicycle transport
  - Formation of an intermodal transport hub
  - Development of ports

## Most significant projects:

- In the Integrated Transport Development Operative Program, **suburban transport** will be renewed: The passenger information system will be renewed, the procurement of electric buses and their charging stations will begin, and new P+R, B+R parking spaces will be established with the support of more than one billion.
- **Development of infrastructure and services for the bicycle transport network** in Győr: as a result of an investment of nearly HUF 700 m, the city's cycle path network will be expanded, and bicycle transport will become safer
- Completed: **TOP-6.4.1-15-GY1-2016-00001 Development of cycling and parking infrastructure** in Győr (HUF 2 billion)
- **Győr-Bike project**



- **In 1968**, the immediate legal predecessor of the institution, the Technical College of Transport and Telecommunications, was founded
- **University since January 1, 2002**
- The institution has currently nearly 15,000 students and covers almost all disciplines with its courses
- AUDI Hungaria Zrt maintains a close relationship with the University. (joint department, faculty)
- SZE Faculty of Architecture, Construction and Transport Engineering (2015)
  - 6 Departments, including:
    - Department of Transport (in addition to general operational and organizational issues of transport, teaching and research work in the field related to passenger transport and fixed-track transport)
    - Department of Transport Construction and Water Engineering (technical infrastructure, development and operation of settlements, training and further training of engineers, as well as research, development, planning and consulting)
- **SZE participates in many projects that institutionalize business-industry relations and focus on regional development.**

# Széchenyi University, R+D Tenders related to sustainable transport (2014 - )

Project ID	Title	Amount (SZE - HUF m)
<b>Projects implemented in corporate cooperation</b>		
2020-1.1.2-PIACI-KFI-2020-00149	Integration possibilities of automation and digitalization in railway construction, development of complex procedures in order to increase transparency	1 873
GINOP-2.2.1-15-2017-00040	RID Gate - Development of the safety device and process system for the transport of dangerous goods by rail	392
ÉZFF/956/2022-ITM_SZERZ	Production and Validation of Synthetic Fuels in Large Company and University Cooperation	2 950
2020-1.1.2-PIACI-KFI-2020-00065	Development of a lightly armored military and disaster prevention off-road base vehicle with a modular system, which can be controlled remotely and is suitable for self-control	200
<b>Domestically funded tender projects</b>		
TKP2020-IKA-10	Thematic Excellence Program -2020 Institutional excellence sub-programme	550
TKP2020-NKA-14	Thematic Excellence Program - Autonomous transport systems	1 950
NKFIH-829-2/2021	Autonomous Systems National Laboratory	376
NKFIH-828-2/2021	National Laboratory of Artificial Intelligence	150

# Széchenyi University, R+D Tenders related to sustainable transport (2014 - )

Project ID	Title	Amount (SZE - HUF m)
<b>EU tender projects</b>		
EFOP-362-16-2017-00002	Research of autonomous vehicle systems related to the Zalaegerszeg test track	344
EFOP-3.6.2-16-2017-00015	HU-MATHS-IN – Deepening the activities of the Hungarian Industrial Innovation Mathematical Service Network	588
EFOP-3.6.2-16-2017-00016	Dynamics and control of autonomous vehicles in synergy with the requirements of automated transport systems	899
		<b>10 272</b>
<b>International projects</b>		
2019-1-HU01-KA203-06122_Urban Scope	Urban Sustainable Mobility in focus: student education, community involvement and participative planning	52 e EUR

# Company developments, social responsibility, corporate culture

## Audi Hungaria

- Founded in 1993
- It is one of the country's largest exporters and one of the companies with the largest sales revenue
- The largest employer in the region (employed 12,342 employees on December 31, 2021)
- One of the largest foreign investors in Hungary
- In 2021, a total of 1,620,767 engines and 170,964 vehicles were produced in Győr
- The world's largest motorcycle factory
- Audi Hungaria Faculty of Automotive Engineering at Széchenyi István University:
  - continuous cooperation,
  - intercultural education system,
  - joint developments
  - participation in development teams (Formula Student, Shell Eco Marathon),
  - foreign language courses and
  - many practical opportunities abroad, which all promote the quick and efficient integration of new engineers into the industrial environment.

# Company developments, social responsibility, corporate culture

## Audi Hungaria

### Operation

- Mission Zero program: the goal is to reduce the company's ecological footprint in the areas of production and logistics. (e.g. reduction of CO2 emissions and water use, resource efficiency and biodiversity)
- Audi Hungaria is Hungary's largest industrial user of geothermal energy
- From January 1, 2020, after the Brussels site, Audi Hungaria also achieved full carbon neutrality
- Earth Week: bike to work

### Production

- In 2018, serial production of electric motors started in Győr
- Alternative drives (powered by compressed natural gas)

# Contribution of projects to the EU Mobility Strategy

## THE MOST SIGNIFICANT PROJECTS RELATED TO SUSTAINABLE URBAN MOBILITY IN GYŐR IN THE REFLECTION OF THE EU MOBILITY

1. Boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable & low-carbon fuels and related infrastructure 2. Creating zero-emission airports and ports 3. Making interurban and urban mobility healthier and more sustainable 4. Making the transport of goods more environmentally friendly 5. More effective incentive of carbon pricing and users 6. Implementing connected and automated multimodal mobility 7. Boosting innovation and the use of data and artificial intelligence (AI) for smarter mobility 8. Strengthening the Single Market 9. Making mobility fair and equitable for all 10. Step up transport safety and security across all modes	1	2	3	4	5	6	7	8	9	10
City of Győr Suburban Transport Project	x		x			x	x		x	
Bicycle transport network infrastructure and service development	x		x							
TOP-6.4.1-15-GY1-2016-00001 Development of cycling and parking infrastructure	x		x							
Győr-Bike project	x		x							
2020-1.1.2-PIACI-KFI-2020-00149 Integration possibilities of automation and			x	x		x	x			
GINOP-2.2.1-15-2017-00040 RID Gate - Development of the safety device and process system for the transport of dangerous goods by rail			x	x						x
ÉZFF/956/2022-ITM_SZERZ Production and Validation of Synthetic Fuels in Large Company and University Cooperation	x			x						
TKP2020-IKA-10 Thematic Excellence Program -2020 Institutional Excellence Subprogramme						x	x			
TKP2020-NKA-14 Thematic Excellence Program - Autonomous transport systems						x	x			

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10. Step up transport safety and security across all modes										
NKFIH-829-2/2021 Autonomous Systems National Laboratory						X	X			
NKFIH-828-2/2021 National Laboratory of Artificial Intelligence						X	X			
EFOP-362-16-2017-00002 Research of autonomous vehicle systems related to the Zalaegerszeg test track	X						X			
EFOP-3.6.2-16-2017-00015 HU-MATHS-IN – Deepening the activities of the Hungarian Industrial Innovation Mathematical Service Network							X			
EFOP-3.6.2-16-2017-00016 Dynamics and control of autonomous vehicles in synergy with the requirements of automated transport systems						X	X			
2019-1-HU01-KA203-06122_Urban Scope-Urban Sustainable Mobility in focus: student education, community involvement and participative planning	X	X	X	X	X	X	X	X	X	X



- Active collaborations in the implementation of sustainable urban transport: with the participation of the Municipality, the University and Audi Hungaria
- Historical reasons (transport higher education, Rába, Audi)
- The participation of civil society organizations enables a higher level of cooperation (possibility of further progress)



**Thank you for your attention!**

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