OUTPUT FACTSHEET

Project index number	CE0200649	**Acronym**	EnCLOD			
Output type *("x" to be included)*	**Strategy/ action plan**		**Pilot action**	X	**Solution**	
Output number (O.xx)	O 2.1	**Output title**	City of Debrecen Pilot Action on Open Data to improve territorial governance			
If the output target is > 1 in the AF, please specify the output(s) described in the factsheet	1					
Output delivery date	30/04/2026					
Project website	https://www.interreg-central.eu/projects/enclod/					

Summary description of the output

Please present the output by addressing the following topics.

Territorial challenges and needs in the regions specifically addressed by the output
(max. 700 characters)

Debrecen is a representative example of many fast-growing cities across Central Europe, where major industrial investments are creating new jobs, attracting new residents and increasing daily commuting demand. While this growth creates important economic opportunities, it also places increasing pressure on urban transport systems. For DKV, the city's public transport operator, this creates a significant challenge in planning routes, schedules and services on the basis of reliable evidence on how traffic patterns are changing.
Adapting public transport services requires reliable and up-to-date evidence on changing mobility patterns, yet such information has been limited due to fragmented data sources and insufficient real-time monitoring. The Pilot Action addressed this need by deploying an IoT sensor network and Open Data framework to support smarter, more sustainable public transport planning and urban mobility governance.

Main aim(s) of the output and how it contributes to tackle the identified challenge(s)
(max. 500 characters)

The traffic sensors installed aim to generate reliable, real-time data on traffic flows and commuting patterns along key access routes to Debrecen's key industrial locations, which will inform mobility strategies for improving access to these areas. The data collected, with an Open Data approach, will support evidence-based public transport planning, improve understanding of emerging mobility needs and strengthen data sharing among authorities, researchers, citizens and local stakeholders.

Technical description of the output (e.g. scope, main features, innovative elements etc.)
(max. 1500 characters)

The Pilot Action was designed to support sustainable mobility in Debrecen by providing public authorities with reliable, data-driven evidence on traffic flows and commuting patterns around the city's rapidly expanding industrial areas. Using the EnCLOD methodology, it combined IoT sensing, Open Data, microzoning and stakeholder engagement to improve public transport planning and support future Mobility-as-a-Service (MaaS) solutions.
The pilot deployed a network of 42 traffic magnetometers at key access roads serving 4 major industrial zones. The sensors continuously collected data on vehicle counts, speeds and traffic composition, which were integrated with existing datasets from the Hungarian Meteorological Service, Hungarian Public Roads and other local monitoring systems. These datasets were published through an Open Data platform and organised using a microzoning framework, enabling public transport operators to more effectively analyse and visualise mobility patterns to inform urban mobility decision making.
The innovative element of the pilot lies in the integration of multiple data sources into a shared Open Data ecosystem that supports evidence-based transport planning. Beyond the technical infrastructure, the pilot promoted knowledge uptake through training sessions, public events and a hackathon, encouraging authorities, researchers, citizens and innovators to reuse mobility data and develop new solutions for more efficient and responsive urban transport governance.

Involvement of target groups during output development and/or implementation
(max. 700 characters)

The stakeholders reached and involved during the Pilot Action activities have been divided into two groups: local and national stakeholders.
The involved local stakeholders are:
- EDC, Economic Development Center of Debrecen
- DVÜ, company responsible for the operation and maintenance of the city
- KER, agency responsible for operation of the Environmental Monitoring System
- Municipality’s Urban Development Department
- University of Debrecen, Innovation and Ecosystem Center and Faculty of Informatics

The involved national stakeholders are:
- HungaroMet, the National Meteorological Service
- National Roads

Cooperation dimension of the output, i.e. joint development within the partnership and, if applicable, joint implementation (see output indicator definitions in chapter I.3.3 and Annex 2 of the programme manual)
(max. 700 characters)

The Debrecen Pilot Action followed a methodology jointly developed by the EnCLOD partnership, combining traffic sensor deployment, Open Data publication, data analysis, a decision-support tool, training, public events and a hackathon. The pilot was directly implemented by DKV, Debrecen Exclusive Public Transport Company LTD (HU) in collaboration with CityOne (CZ) and CITIQ (CZ) for technological support, sensors deploiment and scientific expertise. The Palacký University of Olomouc (CZ) led the microzoning framework elaboration, while the University of Zilina (SK) supported stakeholder engagement and hackathon design. The University of Lubljiana (SO) and Province of Vicenza (IT) ensured overall pilot coordination and monitoring.

Results - expected change and lasting effects in the territories generated specifically by the output, its uptake by relevant organisations and benefits for target groups
(max. 1000 characters)

The pilot generated, for the first time, continuous traffic data around Debrecen's rapidly expanding industrial areas, allowing DKV to analyse travel patterns, compare traffic demand with bus occupancy and identify where future public transport services, routes and schedules will be needed. The data collected on traffic volumes, entries and exits, vehicle categories enable the transition from assumptions to measurable evidence for planning public transport in this fast-growing industrial city and putting the basis for the elaboration of the Traffic Management Tool.
Therefore, the output is expected to strengthen Debrecen's transition towards integrated, data-driven and sustainable mobility governance. At city level, new traffic datasets combined with energy, meteorological and environmental data support comprehensive transport planning and wider sustainability initiatives such as the Sustainable Urban Mobility Plan and Green Codex. Validated datasets are published through public dashboards to increase citizen involvement, while cooperation with the University of Debrecen, formalised through a Memorandum of Understanding, will support knowledge transfer to data management and urban governance experts through future public events.

Ownership and durability of the output after the project end, considering financial and institutional support including, if applicable, maintenance
(max. 700 characters)

This pilot action was designed with the Municipality of Debrecen as associated partner and main future user. The sensors deployed during the Pilot Action are owned by CITIQ, which provided them under a Data-as-a-Service model, as foreseen in the approved Application Form. Most sensors were installed on city assets, while some traffic sensors were connected to infrastructure managed by Debrecen. CITIQ is responsible for their operation and maintenance. The local transport operator company, DKV, is assessing how to fully integrate the sensor data, monitoring tools and related Open Data workflows into its internal systems and routine operations, including the infrastructure required for long-term data collection and management. To support incorporation, maintenance and possible expansion of the sensor network, DKV will explore both national and European funding opportunities, alongside its own resources.

Transferability of the output to other territories, sectors or target groups and planned measures for supporting such transfer
(max. 700 characters)

The methodology jointly developed by the partnership to implement data-driven territorial governance is a good foundation for transferability, supported by the example provided by the Pilot Action. The good practice provided by DKV for data use in management of public transport can be a prompt for adopting a similar approach to local and national stakeholder engaged during the activities.
The common project methodology (publicly available as Deliverable D.1.3.1 - preliminary version) will also be the basis for the EnCLOD Guidelines on effective Open data usage for territorial governance (Deliverable D.3.3.1 - Final revised version available at the end of the project) that will promote knowledge uptake and transferability at the European level, benefitting from all the Pilot Actions to trigger wider replication of the project approach.

Related final deliverable(s) (Number(s) and title(s) to be included)	D2.3.2 "Debrecen Pilot Action report & lesson learned"

Output web link (if applicable)	https://www.interreg-central.eu/projects/enclod/?tab=media
GPS coordinates (if applicable)	City of Debrecen: 47.530, 21.625