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ANNEXES 1 to 2

ANNEXES

to the

COMMISSION IMPLEMENTING DECISION

laying down the template including key performance indicators for reporting by the Member States under Directive 2010/40/EU of the European Parliament and of the Council

ANNEX I

Template for the initial report and progress reports

Directive 2010/40/EU Implementation Report 2025 *Luxembourg*

14/04/2025

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1. INTRODUCTION

The Grand Duchy of Luxembourg continues to make progress in the development and implementation of Intelligent Transport Systems (ITS) as part of its broader strategy to enhance mobility and improve road safety. This report, prepared by the Ministry of Mobility and Public Works, summarizes the progress made in 2024, in line with Article 17 of Directive 2010/40/EU. It highlights key projects, organizational developments, and the integration of ITS into Luxembourg's mobility strategies.

1.1. General overview of the national activities and projects

Luxembourg has been actively working on the development and deployment of Intelligent Transport Systems (ITS), leveraging digital technologies to enhance mobility, improve road safety, and promote sustainable transportation. The country's ITS initiatives are guided by the European Union's Directive 2010/40/EU, which encourages the deployment of ITS across Europe. Luxembourg's efforts are supported by a collaborative framework involving multiple stakeholders, including government ministries, research institutions, public transport operators, and private sector partners.

Key Stakeholders and Their Roles

The implementation of ITS in Luxembourg is a collaborative effort involving several key stakeholders:

- **Ministry of Mobility and Public Works (MMTP)**: The MMTP plays a central role in coordinating ITS initiatives at the national level. It oversees the development of transport infrastructure, including roads, highways, and public transport systems, and is responsible for the deployment of ITS technologies such as the CITA (Control and Information on Traffic on Highways) system and the mobiliteit.lu platform.
- **Administration des Ponts et Chaussées (PCH)**: The PCH is responsible for the maintenance and operation of Luxembourg's road network, including the deployment of ITS technologies such as dynamic traffic management systems and real-time traffic information services.
- **Administration des Transports Publics (ATP)**: The ATP oversees the operation of public transport services in Luxembourg, including the integration of ITS technologies such as real-time passenger information systems
- **Luxtram**: As the operator of Luxembourg's tram network, Luxtram plays a key role in integrating ITS technologies into urban mobility. This includes real-time passenger information, traffic signal prioritization for trams, and the use of telematics to optimize operations.
- **CFL (Société Nationale des Chemins de Fer Luxembourgeois)**: CFL, the national railway company, is a major partner in Luxembourg's ITS initiatives. It contributes to multimodal travel planning through real-time data sharing and the integration of rail services with other modes of transport.

- **AVL (Autobus de la Ville de Luxembourg)**: AVL, the public bus operator in Luxembourg City, is actively involved in ITS deployment, including real-time bus tracking, dynamic route planning, and the integration of bus services with other transport modes.
- **Ministry of Economy**: The Ministry of Economy is responsible for promoting innovation and digitalization in the transport sector. It supports research and development projects in areas such as connected and automated mobility (CAM), electric mobility, and smart logistics. The ministry also collaborates with international partners to promote cross-border ITS initiatives.
- **Luxembourg Institute of Science and Technology (LIST)**: LIST is a key research partner in the development of ITS technologies. It conducts cutting-edge research in areas such as data analytics, artificial intelligence (AI), and Internet of Things (IoT), providing valuable insights and solutions for the deployment of ITS in Luxembourg.
- **University of Luxembourg**: The University of Luxembourg contributes to the development of ITS through its research and educational programs. It collaborates with government agencies and private sector partners to develop innovative solutions for mobility challenges.

Key National Projects and Initiatives

Luxembourg has implemented several ITS projects that have significantly improved the efficiency, safety, and sustainability of its transport network. These include:

1. The **national access point** on the Luxembourgish government's open data portal https://data.public.lu centralizes ITS and other mobility-related data posted by the aforementioned stakeholders. The platform facilitates data discoverability through its tagging mechanism. In many instances, data are stored on the portal, providing historical records in addition to the public service mandated under the ITS directive.

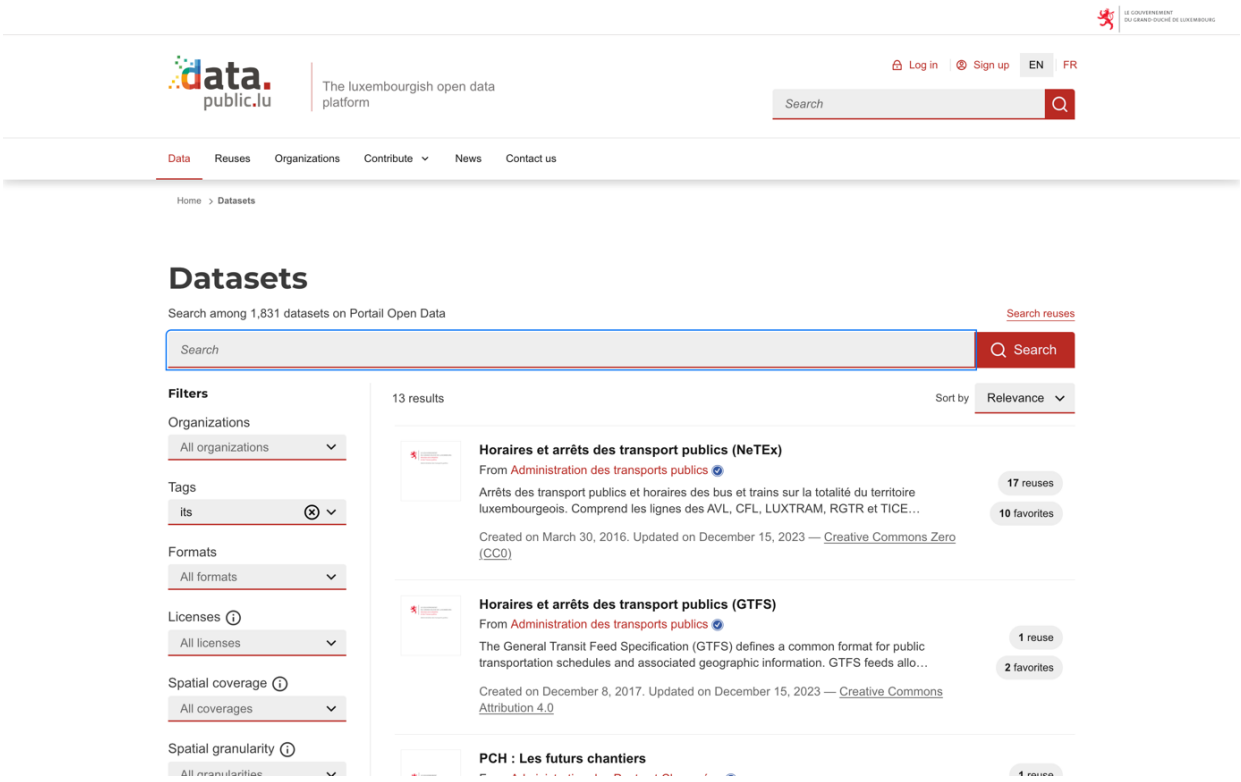

Fig 1: Public open data portal Luxembourg

2. **mobiliteit.lu Platform**: Launched in 2018, the mobiliteit.lu (see Fig. 2) platform serves as Luxembourg's central hub for multimodal travel information. It provides real-time updates on public transport schedules and alternative mobility options such as bike-sharing and carpooling. The platform is accessible via a website and a mobile app, making it easy for users to plan their journeys and access real-time information on the go.

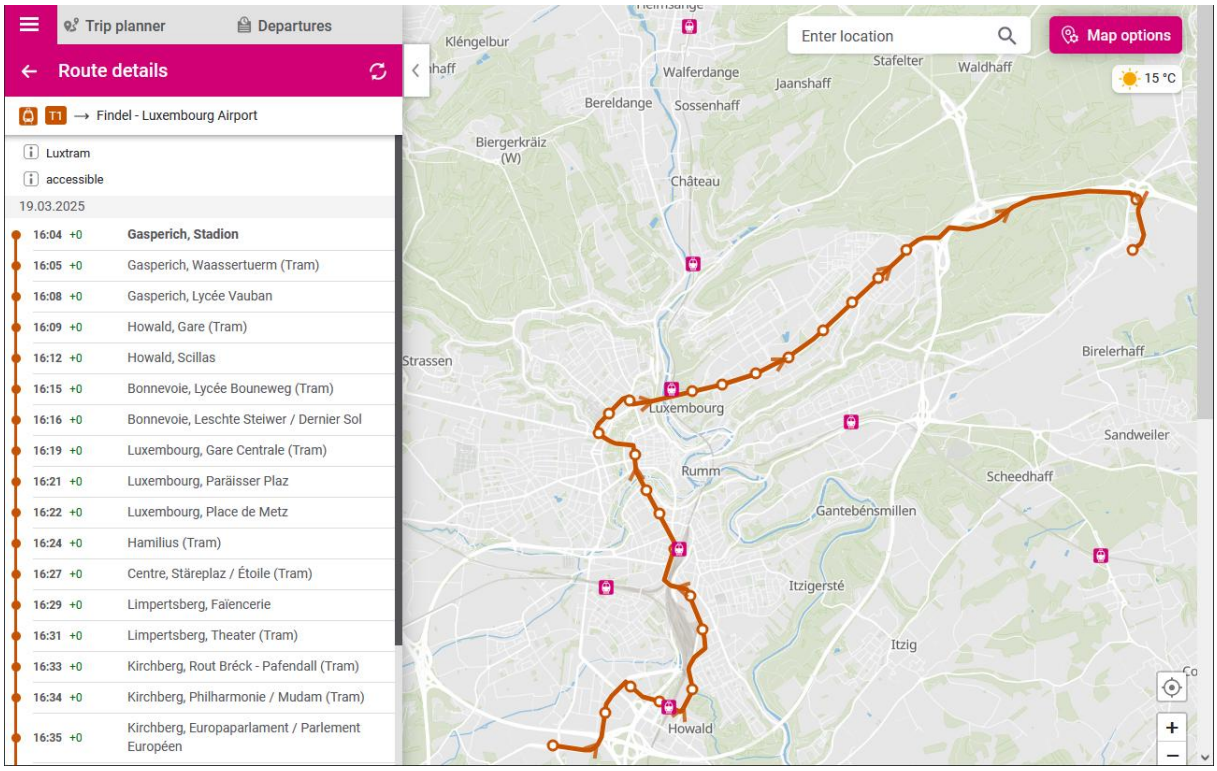

Fig. 2: a screenshot of the graphical interface to the public mobiliteit.lu platform

3. **CITA System**: The **CITA** system, operated by the PCH, provides real-time information (see Fig. 3) on traffic conditions, including congestion, accidents, and roadworks. The system uses a network of sensors, cameras, and dynamic message signs to monitor and manage traffic flow on Luxembourg's highways.

4. **Cross-Border Digital Testbed**: Luxembourg has established a Cross-Border Digital Testbed in collaboration with France and Germany to test connected and automated vehicles in real-world conditions. The testbed covers a network of roads in the Greater Region, providing a unique environment for the development and deployment of CCAM technologies.

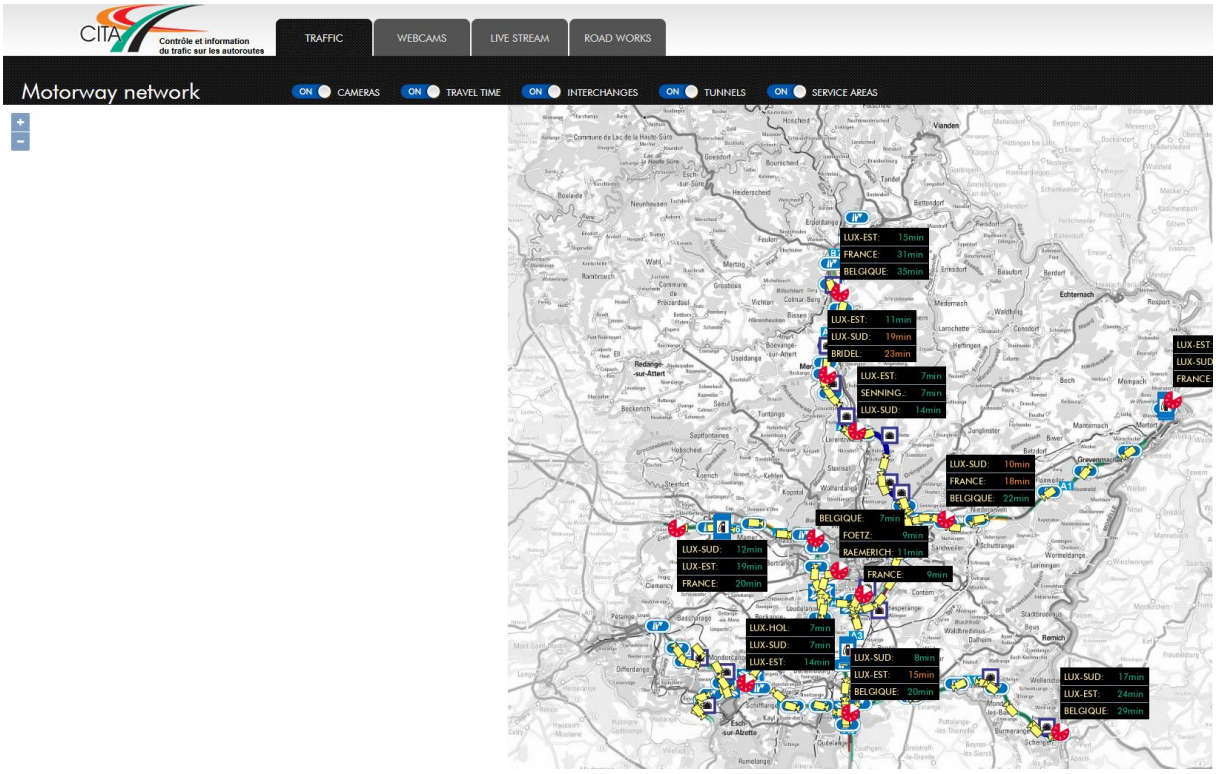

Fig. 3: Indication of traffic information on www.cita.lu

5. **Observatoire Digital de la Mobilité (OdM):** OdM was established to collect, analyze, and disseminate mobility data. It plays a critical role in centralizing data from Luxembourg's five transport operators i.e. RGTR, TICE, AVL, Luxtram, and CFL and ensuring data quality and interoperability. OdM provides valuable insights into mobility trends and supports evidence-based decision-making in the transport sector (see Fig. 4).

6. **Free Public Transport**: Since March 2020, public transport services on Luxembourgish territory are free of charge for everybody. As a result, digital ticketing has become largely obsolete with the exception of cross-border services and certain special services, such as first class on domestic trains (see below). Note that one of the reasons why the government centralized mobility data collection in OdM was because of the loss of ticketing sales as a strategic data source on mobility behavior.

7. **Chargy Network**: Luxembourg has deployed a nationwide network of Chargy electric vehicle charging stations, with over 350 stations now operational across the country. The network is part of Luxembourg's efforts to promote the adoption of electric vehicles and reduce greenhouse gas emissions. Realtime data on the location and availability of public charging stations are being redistributed via the open data portal and are also available as a convenient web-map service on geoportail.lu.

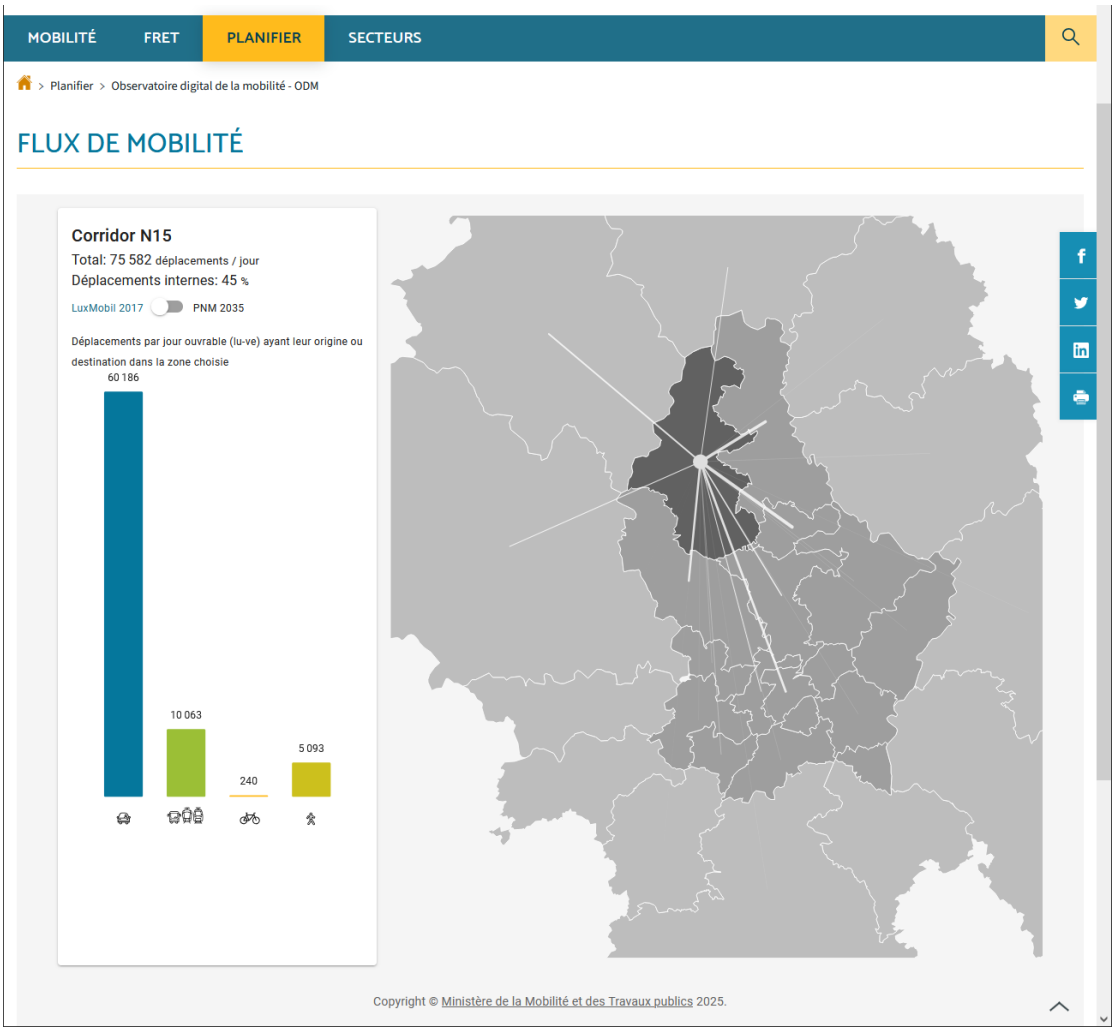

Fig. 4: OdM's public website (odm.lu) where it shares mobility data as user-friendly dashboards, here: the number of trips from and towards certain regions as per the national mobility plan (PNM2035).

Alignment with European Union Directives

Luxembourg's ITS initiatives are closely aligned with the European Union's Directive 2010/40/EU, which sets out a framework for the deployment of ITS across Europe. The directive identifies four priority areas for action:

1. **Optimal Use of Road, Traffic, and Travel Data**: Luxembourg has implemented several projects to improve the collection, sharing, and use of road, traffic, and travel data. These include the mobiliteit.lu platform, the CITA system, and the Observatoire Digital de la Mobilité.
2. **Continuity of Traffic and Travel Management Services**: Luxembourg has developed a comprehensive framework for traffic and travel management, including the deployment of dynamic traffic management systems and real-time traffic information services.

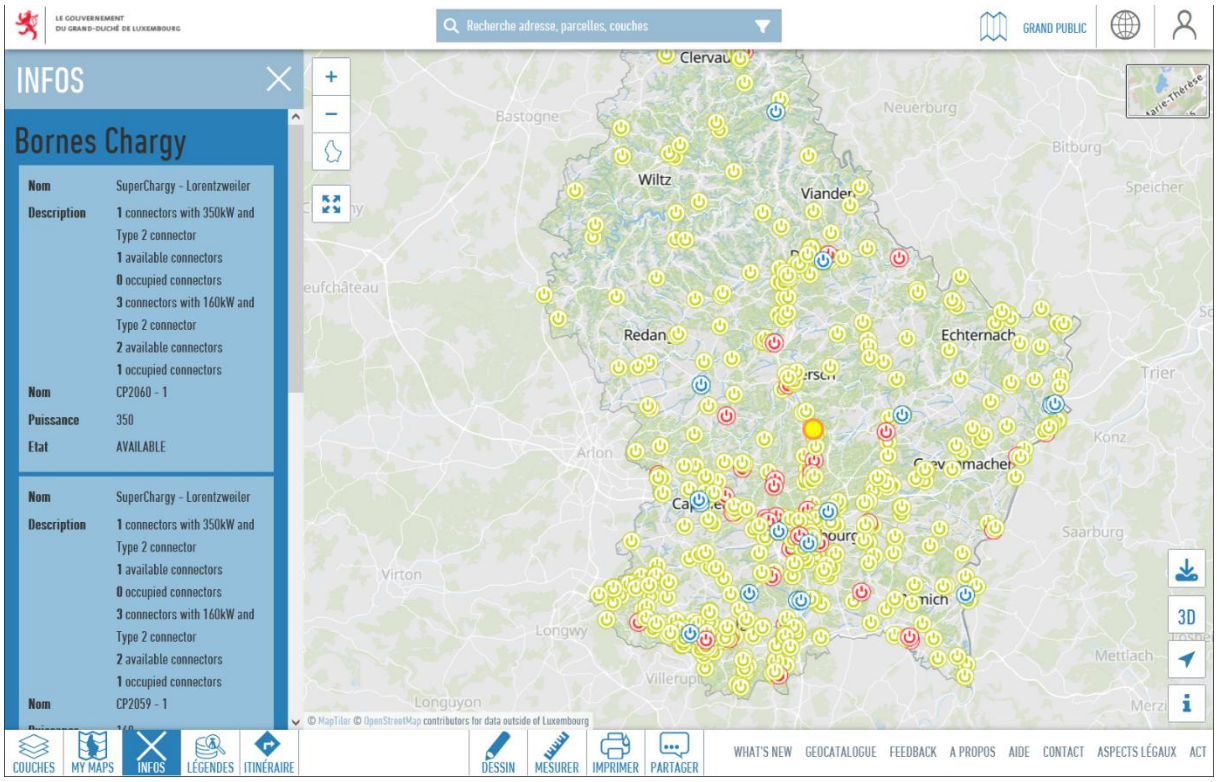

Fig 5: public charging stations in Luxembourg and their availability

3. **Road Safety and Security**: Luxembourg has prioritized road safety through the deployment of ITS technologies such as the eCall system, which automatically alerts emergency services in the event of a serious road accident.
4. **Integration of the Vehicle and Transport Infrastructure**: Luxembourg is at the forefront of developing ITS services for cooperative, connected, and automated mobility (CCAM), with a focus on creating a seamless and integrated transport network.

1.2. General progress since 2023

Since 2023, Luxembourg has continued to develop its Intelligent Transport Systems (ITS) initiatives, building on the foundation laid in previous years. The country has continued to prioritize the integration of digital technologies into its transport infrastructure, aiming to enhance mobility, improve road safety, and promote sustainable transportation. Key developments since 2023 include the expansion of the Observatoire Digital de la Mobilité (Digital Mobility Observatory), the enhancement of the mobiliteit.lu platform, and the further deployment of cooperative, connected, and automated mobility (CCAM) technologies.

Expansion of the Observatoire Digital de la Mobilité

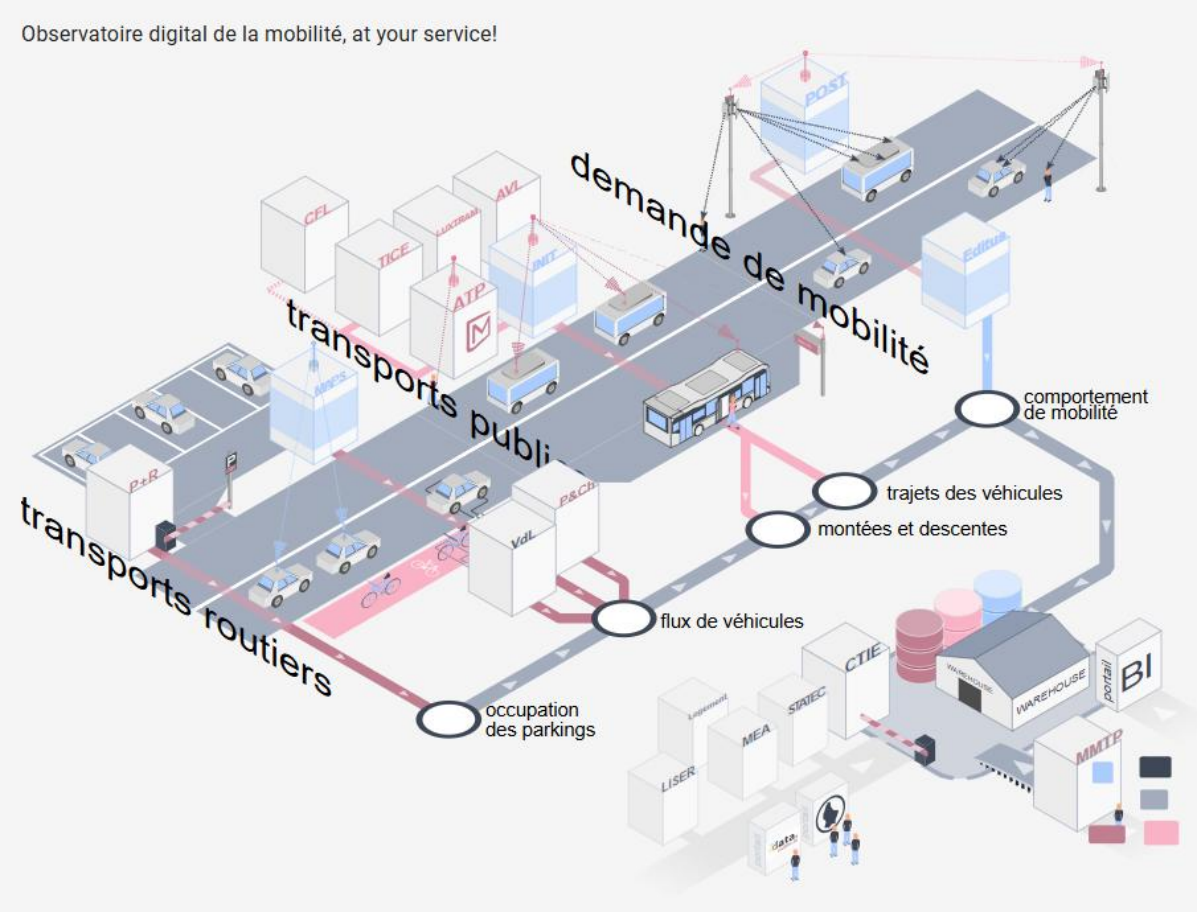

Fig. 6: Data integration and redistributions within OdM

The Observatoire Digital de la Mobilité, established as part of the 2018-2023 coalition agreement, has become a cornerstone of Luxembourg's ITS strategy. Since its inception, the observatory has been instrumental in collecting, analyzing, and disseminating mobility data to support evidence-based decision-making. In 2023, the observatory underwent significant upgrades, including the creation of a central data collection and storage platform, the integration of advanced data analytics tools and the inclusion of data produced by third parties, such as vehicle manufactures and mobile phone network operators.

The observatory now aggregates data from a wide range of sources, including automated traffic counters, public intermodal transport management systems, floating car data, and anonymized mobile phone data to measure the flow of people and vehicles on Luxembourgish transport infrastructures. This comprehensive dataset enables the government to monitor mobility trends, identify bottlenecks, and develop targeted interventions to improve the efficiency of the transport network.

One of the key achievements of the observatory in 2023 was the launch of a public data portal (https://odm.public.lu/). It provides citizens, researchers, and policymakers with access to historical mobility data as collected by OdM. They complement the raw data publications on

the government's open data portal with friendly, interactive dashboards, trend analyses, and downloadable datasets, making it a valuable resource for understanding and addressing mobility challenges.

OdM has strengthened its collaboration with international partners. In particular, in 2024 preparations for the national household mobility survey "LuxMobil" allow its 2025/2026 edition to be carried out in synchronization with our French, Belgian and German neighbors. This will provide a complete picture of cross-border travel. This in turn serves projects like the Interreg project "MMUST", where OdM and its partners develop a traffic flow simulation model by the same name. The model uses the aforementioned data to understand the possible response to changes in the mobility offer, spatial development and the general evolution of the economy and population within the greater region.

Enhancement of the mobiliteit.lu Platform

The mobiliteit.lu platform, launched in 2018, has continued to evolve as Luxembourg's central hub for multimodal travel information. Since 2023, the platform has introduced several new features to improve user experience and expand its functionality. These include:

Fig. 7: Application for personalized, intelligent and relevant multi-mobility journeys

Real-Time Parking Availability: Users can now access real-time information on parking availability at certain Park & Ride (P&R) facilities and other public parking areas, helping them plan their journeys more effectively.

There is also a new Park+Ride App streamlining and facilitating the usage of a growing number of P+R facilities. The app provides discovery services, helps manage access and greatly simplifies the process by which users prove that they used a P+R for its intended purpose, i.e. parking their car and shifting to another mode of transport. Indeed, P+R services in Luxembourg are generally free or discounted when used accordingly. Users can prove compliance through the app and their phone's satellite navigation capabilities. Upon tapping a button, they momentarily reveal their current position, proving that while their car was parked at the P+R, they themselves were in an area far enough away from the P+R to no longer qualify as local parking.

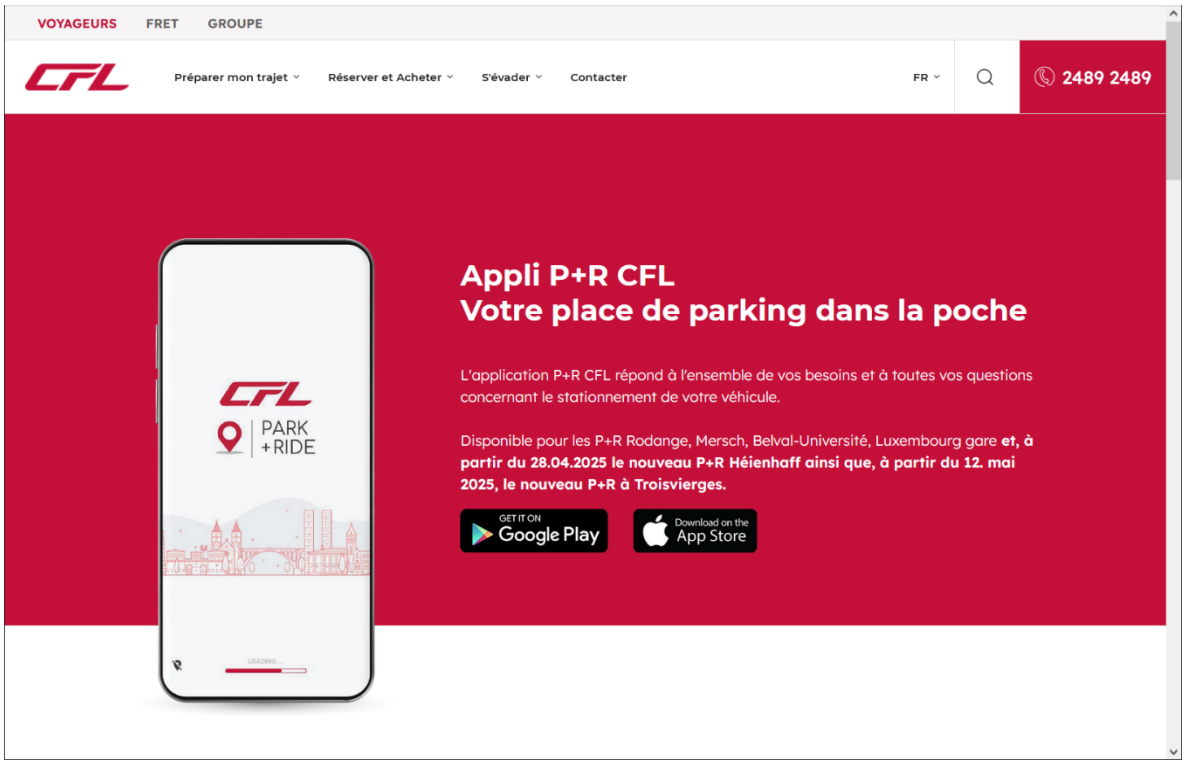

Fig. 8: new park and ride app by CFL

Dynamic Route Planning: The platform now offers dynamic route planning, taking into account real-time traffic conditions, public transport schedules, and alternative mobility options such as bike-sharing and carpooling.

Integration of New Mobility Services: The platform has integrated additional mobility services, including electric vehicle charging stations and bike-sharing systems providing users with a comprehensive overview of available transport options.

The mobiliteit.lu platform has also been optimized for mobile devices, with a dedicated app that offers push notifications for real-time updates on delays, cancellations, and alternative routes. This has made it easier for users to access travel information on the go, further enhancing the platform's utility as a one-stop solution for multimodal travel planning.

Deployment of Cooperative, Connected, and Automated Mobility (CCAM) Technologies

Luxembourg has continued its deployment of CCAM technologies, with a focus on creating a seamless and integrated transport network. The government continues operating its Cross-Border Digital Testbed, which allows for the testing of connected and automated vehicles in real-world conditions. The testbed, which covers a network of roads in the Greater Region (Luxembourg, France, and Germany), has been used to conduct a series of pilot projects.

Autonomous Shuttles:

Since 2023, several projects tested autonomous shuttles for last mile connectivity on private and public ground, including in Luxembourg city, Esch and Belval.

Connected Vehicle Technologies: The government has deployed connected vehicle technologies on the A1 motorway, enabling vehicles to communicate with each other and with roadside infrastructure.

Cross-Border Testing: Luxembourg has continued to collaborate with France and Germany to test cross-border CCAM technologies, including the use of connected vehicles to facilitate seamless travel across national borders. These initiatives have demonstrated the potential of CCAM technologies to transform the transport sector, paving the way for wider adoption in the coming years.

Strengthening of Data Governance and Interoperability

Since 2023, Luxembourg has placed a strong emphasis on strengthening data governance and ensuring the interoperability of ITS systems. The Minister for mobility and public works has established the "Comité de la Coordination de la Transformation Digitale de la mobilité" (CCTD), a task force that brings together key stakeholders from the public and private sectors to coordinate the development and deployment of ITS technologies. The task force is currently assembling a roadmap for the digital transformation of the transport sector, with a focus on data sharing, interoperability, and cybersecurity.

OdM, as primary a re-user of ITS and other mobility data, has emerged as a curator of the Luxembourgish datasets. As such, it works with CCTD and in line with the government's data strategy, towards a harmonized catalogue of mobility data in Luxembourg.

Progress in Multimodal Mobility and Sustainable Transport

Since 2023, the government has implemented several measures to encourage the use of public transport, cycling, and other sustainable modes of transport. These include:

- **Free Public Transport:** Since March 2020, Luxembourg has offered free public transport to all residents and visitors , rendering access to public transport services as simple as can be.
- **Digital Ticketing:** While domestic public transport is free, cross-border services still require ticketing. Luxembourg is a hub of cross-border mobility, with a significant portion of the workforce commuting to Luxembourg from neighboring countries every day by the tens of thousands. To further enhance these users experience, the government is working to digitize cross-border tickets, which many people still purchase with the drivers in the bus. The aim is providing a simple and convenient alternative, leveraging digital distribution channels.
- **Cycling Infrastructure:** The government has invested heavily in the development of cycling infrastructure, including the construction of new cycle lanes, bike-sharing stations, and secure bicycle parking facilities. These efforts have been complemented by the introduction of subsidies for all types of bicycles, including e-bikes, to encourage residents to adopt cycling for their daily commutes. Automated traffic counting systems have been deployed. Capacity and service monitoring of bike parking and sharing facilities are available via APIs. mobiliteit.lu leverages them to provide multi-model information services and itinerary calculation. It even allows cyclists to indicate that they want to use a bike from a specific bike parking or sharing station.

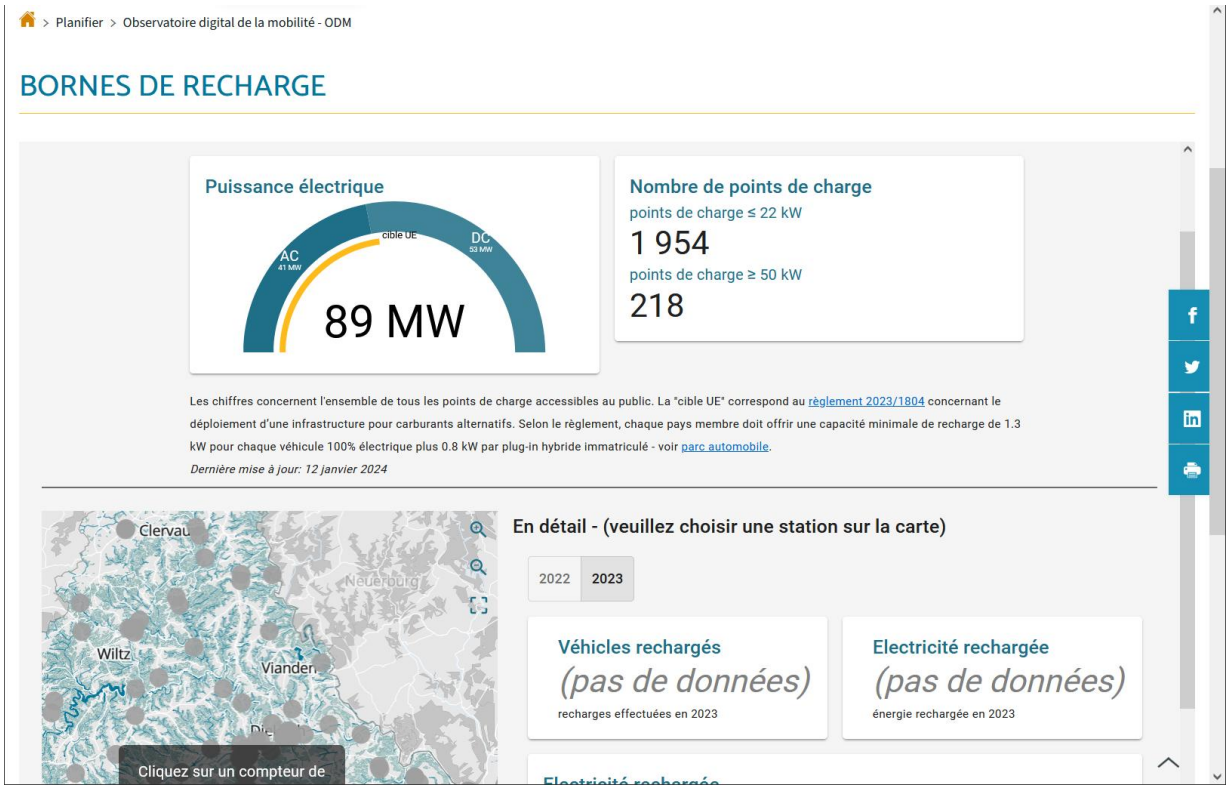

Fig. 9: installed capacity and location of public charging points in Luxembourg

- **Electric Mobility:** Luxembourg has continued to promote the adoption of electric vehicles (EVs) through the expansion of the Chargy network, which now includes over 350 public charging stations across the country. The government has also introduced incentives for EV buyers, including tax breaks and subsidies for home charging installations. Data on public charging stations and their utilization is available on the national access point (see section 1.1, 3 point 7). There is also a monitoring of current deployment targets available on odm.lu.

1.3. Contact information

Observatoire digital de la mobilité

LE GOUVERNEMENT DU GRAND-DUCHÉ DE LUXEMBOURG

Ministère de la Mobilité et des Travaux publics

Direction générale III Mobilité, circulation et infrastructures de transport

Service Planification de la mobilité

observatoire@mmtp.etat.lu

2. MAIN PROJECTS, ACTIVITIES AND INITIATIVES

2.1. Priority area I. Information and mobility ITS services

2.1.1. Description of the national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

Luxembourg has been actively developing and implementing Intelligent Transportation Systems (ITS) to enhance mobility and provide real-time information to users. Below is an expanded and detailed description of the main national activities and projects:

1. **Mobiliteit.lu Platform**

The Mobiliteit.lu platform is a cornerstone of Luxembourg's ITS strategy, designed to provide a unified and comprehensive source of real-time travel information. The platform integrates data from various transportation modes, including public transport, traffic conditions, bike-sharing and parking availability. The primary objective of Mobiliteit.lu is to offer users a seamless and efficient way to plan their journeys. Since its launch in 2018, the platform has undergone continuous updates and expansions to incorporate new features and data sources. Key milestones include the integration of cross-border transport data in 2021 and the addition of bike-sharing information in 2023. The platform is funded by the Luxembourg Ministry of Mobility and Public Works. The lead stakeholders include the Ministry of Mobility and Public Works, Administration des Transports Publics (ATP), the Luxembourg National Railway Company (CFL), and Luxembourg City Public Transport (AVL). The platform is fully operational, with ongoing efforts to enhance user experience, data accuracy, and coverage.

2. **Electric Vehicle (EV) Infrastructure Development**

Luxembourg is committed to supporting the transition to electric mobility by continuing to expand its network of EV charging stations and ensuring it keeps pace with the growing electrification of the vehicle fleet. Publicly accessible charging stations must comply with the new AFIR regulations concerning the provision of both static and dynamic data. Charge point operators are required to feed this data into the National Access Point (NAP).

2.1.2. Progress since 2023

Description of the progress in the area since 2023:

Since 2023, the mobiliteit.lu platform has been expanded to include new features such as real-time parking availability and dynamic route planning. The platform now supports seamless multimodal journey planning, combining public transport, cycling, and car-sharing options. These developments have significantly improved the user experience, making it easier for citizens and visitors to navigate Luxembourg's transport network.

2.1.3. Delegated Regulation (EU) 2017/1926 on the Provision of EU-Wide Multimodal Travel Information Services (Priority Action a)

Luxembourg has fully implemented the requirements of Delegated Regulation (EU) 2017/1926, which mandates the provision of EU-wide multimodal travel information services. The mobiliteit.lu platform complies with the regulation by offering comprehensive travel information across multiple modes of transport, including real-time updates on delays, cancellations, and alternative routes. The platform in future will provide information on accessibility features, such as low-floor vehicles and wheelchair-accessible stations, ensuring that all users can access the information they need to plan their journeys.

2.1.4. Reporting Obligation Under Delegated Regulation (EU) 2022/670 on the Provision of EU-Wide Real-Time Traffic Information Services (Priority Action b)

In compliance with Delegated Regulation (EU) 2022/670, Luxembourg has established a robust system for providing real-time traffic information services. The CITA (Control and Information on Traffic on Highways) system, operated by the Road and Highway Administration (PCH), offers real-time updates on traffic conditions, including congestion, accidents, and roadworks. This information is disseminated through various channels, including cita.lu, the national access point "data.public.lu", the mobiliteit.lu platform, mobile apps, and dynamic message signs on highways. The system also provides estimated travel times for key routes, helping users make informed decisions about their journeys.

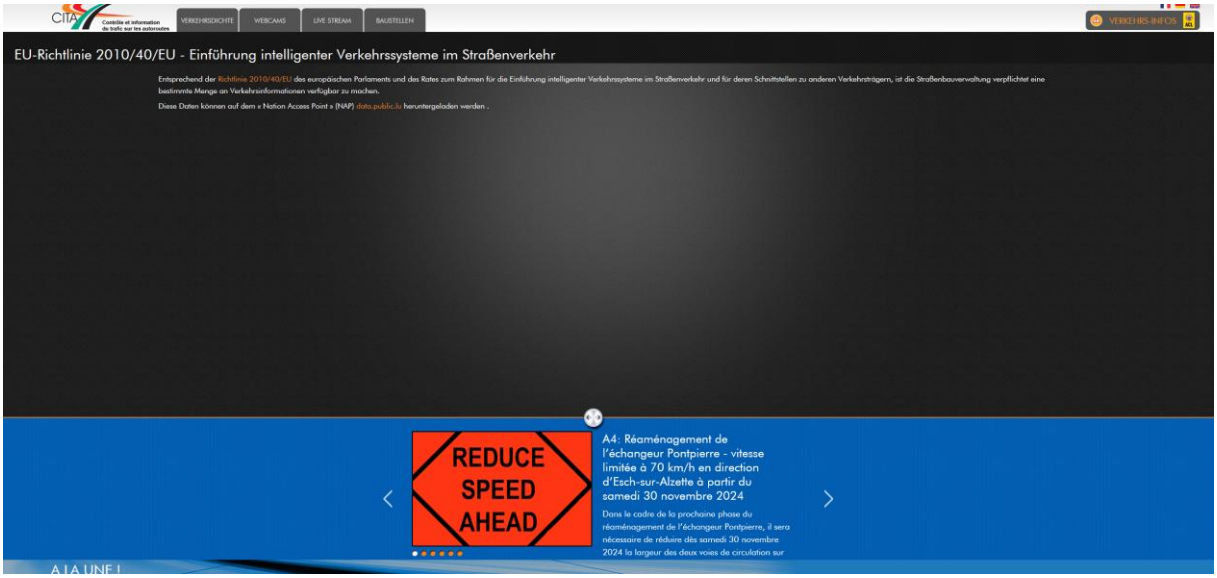

Fig. 10: Incidents on the motorway network as dynamically displayed on www.cita.lu

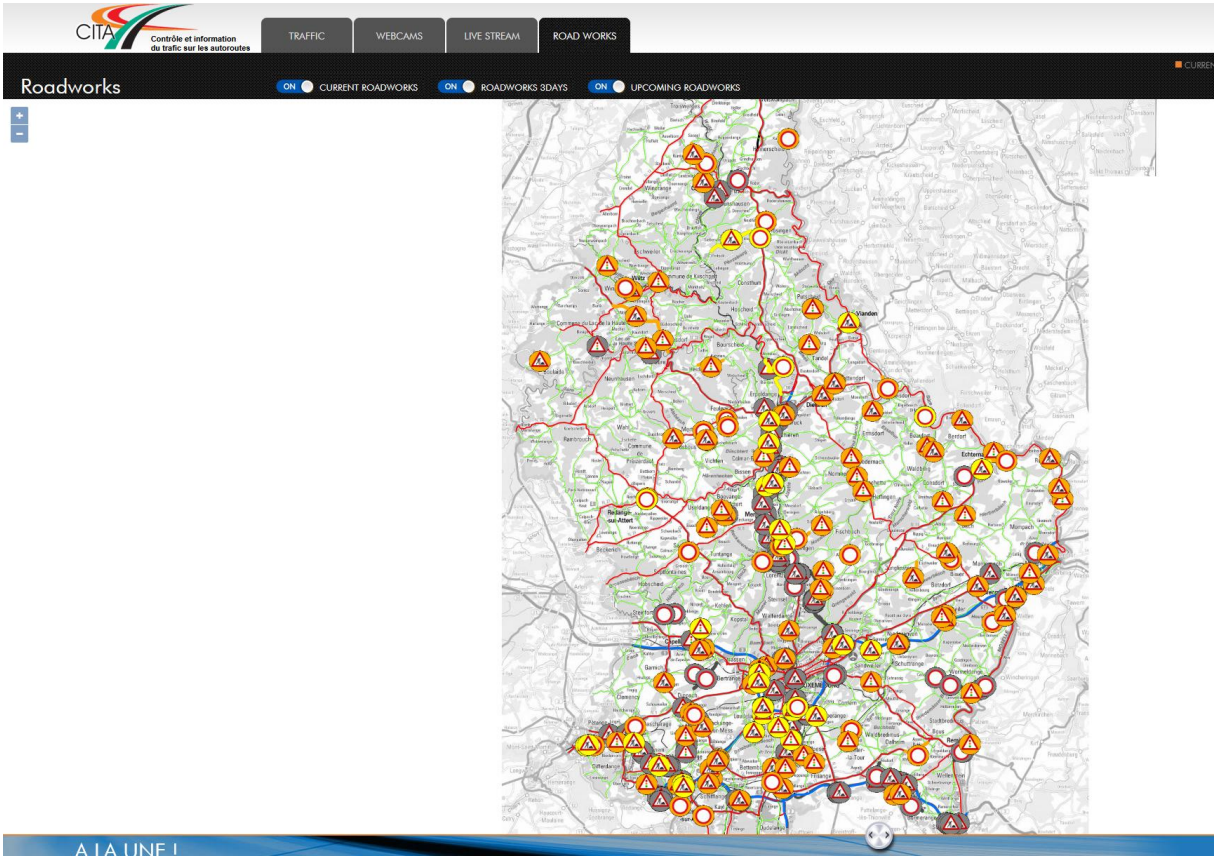

Fig. 8: Web-map showing current and projected construction sites on the road network on www.cita.lu

2.2. Priority area II. Travel, transport and traffic management ITS services

2.2.1. Description of the main national activities and projects

Luxembourg has implemented several ITS projects aimed at improving traffic management. The **CITA** system plays a central role in monitoring and managing traffic flow on the country's highways. The system uses a network of sensors, cameras, and dynamic message signs to provide real-time information on traffic conditions and to implement traffic management measures, such as variable speed limits and lane control. Additionally, the government and several cities have introduced dynamic traffic management systems, with a coordinated push of prioritizing busses to improve the efficiency of the public transport network.

2.3. Priority area III. Road safety and security ITS services

2.3.1. Description of the main national activities and projects

Luxembourg has been working on developing and using *Intelligent Transportation Systems (ITS)* to improve road safety and security for car drivers. These efforts aim to reduce accidents, speed up emergency response times, and create safer driving conditions. Below is a clear and detailed description of the main national activities and projects focused on improving safety for car drivers:

112 eCall System: Luxembourg has prioritized road safety through the deployment of ITS technologies. The eCall system, operated by the Grand Ducal Fire and Rescue Corps (CGDIS), automatically alerts emergency services in the event of a serious road accident, reducing response times and improving the chances of survival for accident victims. Additionally, the government has implemented a range of safety-related ITS services, including real-time information on road conditions, weather-related hazards, and traffic incidents. These services are designed to help drivers make safer decisions and reduce the risk of accidents.

2.3.2. 112 eCall (Priority Action d – Delegated Regulation (EU) No 305/2013)

Luxembourg has fully implemented the **112 eCall** system, which automatically contacts emergency services in the event of a serious road accident. The system is integrated with the country's existing emergency response infrastructure, ensuring that emergency services can quickly locate and respond to accidents. The **112 eCall** system has been widely adopted, with all new vehicles sold in Luxembourg required to be equipped with the technology.

2.3.3. Reporting Obligation Under Delegated Regulation (EU) No 886/2013 on Data and Procedures for the Provision of Road Safety-Related Minimum Universal Traffic Information (Priority Action c)

In compliance with Delegated Regulation (EU) No 886/2013, Luxembourg provides free, real-time information on road safety-related events, such as roadworks. This information is disseminated through the DATEX feed on data.public.lu, mobile apps, and dynamic message signs on highways.

2.3.4. Reporting Obligation Under Delegated Regulation (EU) No 885/2013 on the Provision of Information Services for Safe and Secure Parking Places for Trucks and Commercial Vehicles (Priority Action e)

Luxembourg has implemented the requirements of Delegated Regulation (EU) No 885/2013 by providing information on safe and secure parking places for trucks and commercial vehicles. The CITA system offers real-time information on the availability of parking spaces at rest areas along the country's highways, helping drivers plan their journeys and reduce the risk of fatigue-related accidents.

2.4. Priority area IV. ITS services for cooperative, connected and automated mobility

2.4.1. Description of the main national activities and projects

Luxembourg is developing ITS services for cooperative, connected, and automated mobility (CCAM). The government has established a Cross-Border Digital Testbed in collaboration with France and Germany, allowing for the testing of connected and automated vehicles in real-world conditions. The testbed covers a network of roads in the Greater Region, including highways, urban roads, and rural areas, providing a unique environment for testing CCAM technologies.

2.4.2. Availability and Accessibility via NAPs of Data Types Listed in Annex III to Directive 2010/40/EU

Data Relating to the Provision of EU-Wide Road Traffic Information and Navigation Services

Luxembourg has established a National Access Point (NAP) for ITS data, which provides access to a wide range of data types listed in Annex III to Directive 2010/40/EU. The NAP, hosted on the data.public.lu portal, offers static and certain dynamic traffic data, public transport schedules, and parking availability. The data is available in standardized formats, such as DATEX II and NeTEx, ensuring interoperability with other EU member states. The NAP also provides access to historical data, enabling researchers and policymakers to analyse trends and develop evidence-based policies.

Data Relating to Information and Reservation Services for Safe and Secure Parking Places for Trucks and Commercial Vehicles

The NAP provides real-time information on the availability of safe and secure parking places for trucks and commercial vehicles. This information is collected from rest areas along Luxembourg's highways and is updated in real-time to reflect changes in availability. The data is made available through the data.public.lu portal, allowing drivers to plan their journeys and reduce the risk of fatigue-related accidents.

Data on Detected Road Safety-Related Events or Conditions Relating to Road Safety-Related Minimum Universal Traffic Information

The NAP provides real-time data on road safety-related events, such as roadworks.

Static Multimodal Traffic Data for EU-Wide Multimodal Travel Information Services

The NAP provides static data on the transport network, including information on public transport routes, cycling paths, and pedestrian walkways. This data is used to support multimodal travel planning, enabling users to combine different modes of transport to reach their destination. The data is available in standardized formats, namely NeTEx and GTFS, ensuring interoperability with other EU member states. The NAP also provides access to historical data, enabling researchers and policymakers to analyze trends and develop evidence-based policies. Table 1 provides a detailed overview of available data and formats.

Dataset	Format	Link
Address identifiers (building number, street name, postcode)	GEO / INSPIRE	https://data.public.lu/fr/datasets/inspire-annex-i-theme-addresses-addresses-45/
Topographic places (city, town, village, suburb, administrative unit)	GEO / INSPIRE	https://data.public.lu/fr/datasets/inspire-annex-i-theme-geographical-names-named-places-4/
Operational Calendar, mapping day types to calendar dates	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/

Dataset	Format	Link
Identified access nodes (all scheduled modes)	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Geometry/map layout structure of access nodes (all scheduled modes)	NETEX	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Connection links where interchanges may be made, default transfer times between modes at interchanges	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Network topology and routes/lines (topology)	NETEX / GTFS	https://data.public.lu/fr/datasets/transport-en-commun-reseau/
Transport operators	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Timetables	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Hours of operation	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Stop facilities access nodes (including platform information, help desks/information points, ticket booths, lifts/stairs, entrances and exit locations)		https://www.mobiliteit.lu/
Vehicles (low floor; wheelchair accessible.)	NETEX / GTFS	https://data.public.lu/fr/datasets/horaires-et-arrets-des-transport-publics/
Road network	GEO / INSPIRE	https://data.public.lu/fr/datasets/inspire-annex-i-theme-transport-networks-roads-roadlink-2/
Cycle network (segregated cycle lanes, on-road shared with vehicles, on-path shared with pedestrians)	GEO / INSPIRE	https://www.mobiliteit.lu/
Pedestrian network and accessibility facilities	GEO / INSPIRE	https://www.mobiliteit.lu/

Dataset	Format	Link
Park & Ride stops	GEO / INSPIRE	https://data.public.lu/fr/datasets/parkings-relais-existants/#_
Bike sharing stations	GEO / INSPIRE	https://data.public.lu/fr/datasets/mobilite-veloh/
Publicly accessible refuelling stations for petrol, diesel, CNG/LNG, hydrogen powered vehicles, charging stations for electric vehicles	GEO / INSPIRE	https://data.public.lu/fr/datasets/bornes-de-chargement-publiques-pour-voitures-electriques/
Disruptions (all modes)	SIRI CEN/TS	https://www.mobiliteit.lu/
Real-time status information — delays, cancellations, guaranteed connections monitoring (all modes)	SIRI CEN/TS	https://www.mobiliteit.lu/
Estimated departure and arrival times of services	SIRI CEN/TS	https://data.public.lu/fr/datasets/arrets-de-transport-public-et-departs-en-temps-reel/
Current road link travel times		https://data.public.lu/fr/datasets/cita-temps-parcours/
Availability of publicly accessible charging stations for electric vehicles and refuelling points for CNG/LNG, hydrogen, petrol and diesel powered vehicles		https://data.public.lu/fr/datasets/bornes-de-chargement-publiques-pour-voitures-electriques/
Car-sharing availability, bike sharing availability		https://data.public.lu/fr/datasets/mobilite-veloh/
Car parking spaces available (on and off-street), parking tariffs, road toll tariffs		https://data.public.lu/fr/datasets/mobilite-circulation-et-parkings/

Table 1: MMTIS datasets available on data.public.lu

2.5. Availability and accessibility via NAPs of data types listed in Annex III to Directive 2010/40/EU

Calculation principles:

** For static information: based on length divided by total length in kilometres. The total length is the length of the network on which underlying information exists, e.g. speed limits apply (almost) everywhere, but access conditions for tunnels apply only to (the length of) tunnel sections.*

*** For dynamic/temporary information: availability of data refers to the ability to make the data available and accessible in a machine-readable format on a certain percentage of the network, whenever the underlying information exists / appears, based on the length of the network with this capability divided by total length in kilometres.*

2.5.1. Data relating to the provision of EU-wide road traffic information and navigation services

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
1. Data relating to the provision of EU-wide road traffic information and navigation services:				
1.1 Category: Static and dynamic traffic regulations, where applicable, concerning:				
1.1.1 Subcategory: - access conditions for tunnels - access conditions for bridges - speed limits - overtaking bans on heavy goods vehicles - weight/length/width/height restrictions	The trans-European *core* network for roads	access conditions for tunnels*	*100 %*	*data in preparation and not yet published*
		access conditions for bridges*	*100 %*	*data in preparation and not yet published*

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
		speed limits*	*100 %*	*Static data in preparation and not yet published*
		overtaking bans on heavy goods vehicles*	*100 %*	*data in preparation and not yet published*
		weight/length/width/height restrictions*	*100 %*	*data in preparation and not yet published*
	The comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)	access conditions for tunnels*	*n/a*	*Road class not existing in Luxembourg*
		access conditions for bridges*	*n/a*	*Road class not existing in*

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
				Luxembourg
		speed limits*	*n/a*	*Road class not existing in Luxembourg*
		overtaking bans on heavy goods vehicles*	*n/a*	*Road class not existing in Luxembourg*
		weight/length/width/height restrictions*	*n/a*	*Road class not existing in Luxembourg*
Subcategory: - one-way streets	*Road infrastructure in the cities at the centre of each Urban Node*	one-way streets*	*n/a*	*Not applicable for NRA (urban)*
Subcategory: - freight delivery regulations	*Road infrastructure in the cities at the centre of each Urban Node*	freight delivery regulations*	*n/a*	*Not applicable for NRA*

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
				(urban)
Subcategory: - direction of travel on reversable lanes	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	direction of travel on reversable lanes*	*0 %*	*Category not existing in Luxembourg*
Subcategory: - traffic circulations plans	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	traffic circulations plans*	*100 %*	*Publication via press communication*
Subcategory: - permanent access restrictions	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	permanent access restrictions*	*0 %*	*Category not existing in Luxembourg*
Subcategory: - boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones*	*0 %*	*Category not existing in Luxembourg*

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
1.2 Types of data on the state of the network:				
Subcategory: - road closures - lane closures - roadworks	*The trans-European core network for roads*	road closures**	*95 %*	*Category included in roadworks*
		lane closures**	*95 %*	*Category included in roadworks*
		roadworks**	*95%*	
	The comprehensive trans-European network for roads	road closures**	*n/a*	*Road class not existing in Luxembourg*
		lane closures**	*n/a*	*Road class not existing in Luxembourg*
		roadworks**	*n/a*	*Road class not existing in Luxembourg*

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
Subcategory: - temporary traffic management measures	*The trans-European core and comprehensive network for roads*	temporary traffic management measures**	*100 %*	*Via VMS*

2.5.2. Data relating to information and reservation services for safe and secure parking places for trucks and commercial vehicles

Data type	Geographical coverage	% of parking places for which data are available		Comments
2. Data relating to information and reservation services for safe and secure parking places for trucks and commercial vehicles:				
Category: static data *Subcategory:* - static data related to the parking areas - information on safety and equipment of the parking area	*The trans-European core network for roads*	static data related to the parking areas	*100 %*	
		information on safety and equipment of the parking area	*n/a*	*Data not extisting in NRA*
	The comprehensive trans-European network for roads	static data related to the parking areas	*n/a*	*Road class not existing in Luxembourg*

Data type	Geographical coverage	% of parking places for which data are available		Comments
		information on safety and equipment of the parking area	*n/a*	*Road class not existing in Luxembourg*
Category: dynamic data *Subcategory:* - dynamic data on availability of parking places including whether a parking is: full, closed or number of free places which are available.	*The trans-European core and comprehensive network for roads*	dynamic data on availability of parking places including whether a parking is: full, closed or number of free places which are available.	*33.3 %*	*Truck Parking only*

2.5.3. Data on detected road safety-related events or conditions relating to road safety-related minimum universal traffic information

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
3. Data on detected road safety-related events or conditions relating to road-safety-related minimum universal traffic information:				**)*
Category: dynamic data *Subcategory:* - temporary slippery road - animal, people, obstacles, debris on the road - unprotected accident area - short-term roadworks - wrong-way driver - unmanaged blockage of a road	*The core and comprehensive trans-European network for roads and other motorways not included in that network*	temporary slippery road**	*n/a*	
		animal, people, obstacles, debris on the road**	*n/a*	
		unprotected accident area**	*n/a*	
		short-term road works**	*50 %*	*V2I for NRA vehicles only- operator checked*
		wrong-way driver**	*n/a*	
		unmanaged blockage of a road**	*n/a*	
Subcategory: -congestioned visibility - exceptional weather conditions	*The core and comprehensive trans-European network for roads and other motorways not included in that network*	reduced visibility**	*n/a*	
		exceptional weather conditions**	*n/a*	

**) NRA communicates via Trafic Info and all other means of communication. All data in category 2.5.3 RTTI related data via NAP is work in progress*

2.5.4. Static multimodal traffic data for EU-wide multimodal travel information services

**** Where possible, provide figures per scheduled transport mode, referred to in the Annex to Delegated Regulation (EU) 2017/1926 (such as air, rail including high-speed rail, conventional rail, light rail, cableways, long-distance coach, maritime including ferry, inland waterways, metro, tram, bus, trolley-bus)*

Data type	Geographical coverage	% of nodes where data are available for the scheduled transport mode		Comments
4. Static multimodal traffic data for EU-wide multimodal travel information services:				
Category Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)	*Urban nodes as defined in Article 3, point (p), of Regulation (EU) No 1315/2013 and listed in that Regulation, including those administered by the cities*	Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)***	n/a	Not applicable for NRA (urban)
	The entire transport network of the Union	Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)***	n/a	Not applicable for NRA

2.6. Availability of services listed in Annex IV to Directive 2010/40/EU

2.6.1. Road safety-related minimum universal traffic information services

Service	Geographical coverage	% geographical scope covered
Road safety-related minimum universal traffic information (SRTI) service	The ***core and comprehensive*** trans-European network for roads	0%. Service provider/OEM responsible for in-vehicle solution. NRA is planning to integrate aggregated DFRS data flow into Traffic management end 2025→ included in dynamic RTTI/NAP flow.

2.7. Other initiatives / highlights

2.7.1. Description of other national initiatives / highlights and projects not covered in priority areas 1 to 4:

Luxembourg's primary focus has been on the expansion of its digital observatory of mobility. It aims to leverage existing Luxembourgish data, which were discussed previously, but also to complement the data space with new datasets where applicable and leverage data produced by third parties. The main objective remains to objectively measure the effectiveness of public expense into mobility infrastructures and services in the Grand-Duchy and uncover opportunities for optimization.

Main data production efforts are the national household travel survey (see section 4.1) and the so called "mobility surface database", a surface-based map of the Luxembourgish road network. The map provides detailed information on how public space is attributed to transport, and how transport surfaces are attributed to specific modes and functions, such as cycling lanes, pedestrian crossings and parking on or off roads.

The observatory has also created a platform centralizing automated passenger counting data and vehicle departure times at stops of public transport. Those data are enriched with floating car data to measure the potentials of accelerating in particular road based public transport.

3. KEY PERFORMANCE INDICATORS (KPIS)

KPIs will be reported separately by type of road network / transport network and nodes (where appropriate).

For better readability, values are provided in a table in Annex II.

3.1. Deployment KPIs

3.1.1. Information-gathering infrastructures / equipment (road KPI)

Figures to be provided by type of network.

Figures to be provided by type of services, and where relevant by distinguishing between fixed and mobile equipment.

KPIs to be calculated by type of network.

- Length of road network type / road sections (in km) equipped with information-gathering infrastructures and the total length of this same road network type (in km):
  KPI = (kilometres of road network type equipped with information-gathering infrastructures / total kilometres of same road network type) x 100

3.1.2. Incident detection (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) equipped with ITS to detect incident and the total length of this same road network type (in km):

  KPI = (kilometres of road network type equipped with ITS to detect incident / total kilometres of same road network type) x 100

3.1.3. Traffic management and traffic control measures (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) covered by traffic management and traffic control measures and the total length of this same road network type (in km):
- KPI = (kilometres of road network type covered by traffic management and traffic control measures / total kilometres of same road network type) x 100

3.1.4. Cooperative-ITS services and applications (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) covered by C-ITS services or applications and the total length of this same road network type (in km):

KPI = (kilometres of road network type covered by C-ITS services or applications / total kilometres of same road network type) x 100

3.1.5. Real-time traffic information (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) with provision of real-time traffic information services and total length of this same road network type (in km):

  KPI = (kilometres of road network type with provision of real-time traffic information services / total kilometres of same road network type) x 100

3.1.6. Dynamic travel information (multimodal KPI)

Figures to be provided by type of network / node.

KPI to be calculated by type of network / node (where relevant); if relevant, indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.

- Length of transport network type (in km) with provision of dynamic travel information services and total length of this same transport network type (in km):

  Number of transport nodes (e.g. rail or bus stations) covered by dynamic travel information services and total number of the same transport nodes:

- KPI = (kilometres of transport network type with provision of dynamic travel information services / total kilometres of same transport network type) x 100

- KPI = (number of transport nodes with provision of dynamic travel information services / total number of same transport nodes) x 100

3.1.7. Freight information (multimodal if possible or road KPI)

Figures to be provided by type of network / node.

KPI to be calculated by type of network / node (where relevant); if relevant, indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.

- Length of road network type / road sections (in km) with provision of freight information services and total length of this same road network type (in km):

  Number of freight nodes (e.g. ports, logistics platforms) covered by freight information services and total number of the same freight nodes:

  KPI = (kilometres of road network type with provision of freight information services / total kilometres of same road network type) x 100

  KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100

3.2. Benefit KPIs

3.2.1. Change in travel time (road KPI)

Figures to be provided also include vehicle.km for the route / area considered.

KPI = ((travel time before ITS implementation or improvement – travel time after ITS implementation or improvement) / travel time before ITS implementation or improvement) x 100

3.2.2. Change in the number of road crashes resulting in deaths or injuries (road KPI)

If possible, a distinction can be made between crashes resulting in deaths, serious injuries or slight injuries.

Figures to be provided also include vehicle.km for the route / area considered.

- Number of road crashes resulting in deaths or injuries before ITS implementation or improvement:

  unknown
  Number of road crashes resulting in deaths or injuries after ITS implementation or improvement:

  unknown

3.2.3. Change in traffic-CO2 emissions (road KPI)

Please specify routes / areas where ITS has been implemented or improved. The length along or area within which the change in CO2 emissions is calculated shall be long or wide enough to be representative.

KPI = ((traffic-CO2 emissions before ITS implementation or improvement – traffic-CO2 emissions after implementation or improvement) / traffic-CO2 emissions before ITS implementation or improvement) x 100

unknown

3.3. Financial KPIs

ITS includes any types of systems and services together.

Annual public* investment in road ITS (as % of total transport infrastructure investments):

Annual public* operating and maintenance costs of road ITS (in euro per kilometre of network covered):

** public administrations or publicly-owned entities*

Where possible, please provide the same figures for private investments and costs.

ANNEX II: VALUES FOR KPIS

Key performance indicators (KPIs)

	KPI name	Geographical scope	Timeline
Deployment KPIs	Information-gathering infrastructures / equipment (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways eqp1: traffic monitoring: service level (in-road sensors, loop detectors,radar) eqp2: traffic monitoring (Cameras / CCTV): overhead cameras	Mandatory in 2025 eqp1/TEN-T: 77.0% eqp1/motorway (other): 86.82 % eqp2/TEN-T: 72% eqp2//motorway(other): 71%
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before) Urban nodes not applicable
		Entire road network	Additional KPI to be provided on voluntary basis
	Incident detection (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways eqp1: automatic incident detection (AID) eqp2: traffic monitoring (Cameras / CCTV): overhead cameras	Mandatory in 2025 eqp1/TEN-T: 3.59 % eqp1/motorway(other): 13.18 % eqp2/TEN-T: 72% eqp2//motorway(other): 71%
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before) Urban nodes not applicable

	KPI name	Geographical scope	Timeline
		Entire road network	Additional KPI to be provided on voluntary basis
	Traffic management and traffic control measures (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways eqp1: floating car data	Mandatory in 2025 eqp1/TEN-T: 100.0% eqp1/motorway(other): 100.00 %
		eqp2: speed cameras	eqp2/TEN-T: 0.0% eqp2/motorway(other): 59.31 %
		eqp3: weigh-in-motion	eqp3/TEN-T: 11.26 % eqp3//motorway(other): 0 %
		eqp4:Variable message signs (VMS)	eqp4/TEN-T: 75 % eqp4//motorway(other): 65.9 %
		eqp5:Variable message signs (VMS trailers)	eqp5/TEN-T: 100 % eqp5/motorway(other): 100 %
		eqp6: automatic incident detection (AID)	eqp6/TEN-T: 3.59 %

	KPI name	Geographical scope	Timeline
			eqp6/motorway(other): 13.18 %
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before) Urban nodes not applicable
		Entire road network	Additional KPI to be provided on voluntary basis
	Cooperative-ITS services and applications (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways eqp1 – C-ROADS none	Mandatory in 2025 Eqp1/TEN-T: 0 % Eqp1/motorway(other): 0 % NRA is DFRS member.
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before) Urban nodes not applicable
		Entire road network	Additional KPI to be provided on voluntary basis
	Real-time traffic information (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways Feed1: NAP/DatexII SituationRecord – Software implementation Feed1.1: Datex II Parking (dynamic) Feed1.2: Datex II Roadworks Feed1.3: Datex II Accident Feed1.4: Datex II Public Event Feed1.5: Datex II Poor Environment Condition Feed1.6: Datex II Weather related Road Condition Feed1.7: Datex II Obstruction Feed 2: Trafic Info, Broadcast, Internet	Mandatory in 2025 Feed1: 100% Feed1.1:33.3% Feed1.2:100% Feed1.3:100% Feed1.4*:100% Feed1.5*:100% Feed1.6*:100% Feed1.7*:100% *e.g. if underlying sensor/info available Feed2: 100%

	KPI name	Geographical scope	Timeline
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before) Urban nodes not applicable
		Entire road network	Additional KPI to be provided on voluntary basis
	Dynamic travel information (multimodal KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025 TravelTime Information on Motorway available on WMS and cita.lu
		Urban nodes from TEN-T + transport nodes + primary roads	Mandatory in 2028 (voluntary before) NRA no competency
		Entire transport network	Additional KPI to be provided on voluntary basis n/a
	Freight information (multimodal if possible or road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025 n/a
		Urban nodes from TEN-T + transport nodes + primary roads	Mandatory in 2028 (voluntary before)
		Entire transport network	Additional KPI to be provided on voluntary basis
Benefit KPIs	Change in travel time (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
	Change in the number of road crashes resulting in deaths or injuries (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
	Changes in traffic-CO2 emissions (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
Financial KPIs	Annual public investment in road ITS *(+ figures for private investments where possible)*	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025 No separate monitoring for ITS maintenance and invest equipements and systems on TEN-T and motoways : Total 11,8 Mio EUR 2024

	KPI name	Geographical scope	Timeline
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Annual public operating and maintenance costs of road ITS *(+ figures for private costs where possible)*	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025 Cf. above.
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis