

ELECTRONIC TOLLING

Europe Study

**FREE
ABSTRACT**

*The latest reference
report on ETC and
Road Usage Charging
in Europe*



From road funding to green mobility pricing

The road charging industry is tasked to deliver sustainable mobility by 2030



Dear reader,

This is PTOLEMUS' 7th report on electronic tolling and the result of 8 months of work by a team of 8 consultants and researchers.

What has changed since our 2020 Global Study? While road infrastructure and tolling sometimes appear as a slow motion movie, the last 3 years have broken this pattern.

The Eurovignette Directive, incarnation of the Green Deal in road transport, delivers a lot:

- **A move towards distance-based charging** across Europe, phasing out vignettes by 2030-32;
- **Mandates for road charging on air and noise pollution and CO₂ emissions** for trucks but also light commercial vehicles by 2026;
- **Clear rules for congestion charging;**
- **The phasing out of DSRC-only devices**, etc.

Combined with the new EETS Directive and GDPR, it **gives Europe the most sophisticated system for a fairer and greener road charging.**

European countries and cities now have the **best toolbox in the world to make transport more sustainable and reduce CO₂ emissions.**

But the action is not only on the regulatory side, as this shows:

- **Germany** just decided to double its heavy vehicle toll;
- After many years of standstill, **MLFF** is being rolled out, from France to Italy;
- The first **smartphone-based RUC contract** was tendered;
- **ANPR** is making growing inroads in the tolling of small facilities, as seen at Dartford Crossing;
- Axxès and Continental partnered on **tachograph tolling**;
- Mercedes launched fingerprint authentication for **Mercedes Pay**;

- Many countries are looking to introduce **nationwide RUC schemes**, from Spain to the UK;
- Many countries are looking how to **recoup with RUC the lost fuel tax revenues from EVs**;
- **Low Emission Zones** are starting to include charging mechanisms, etc.

My conclusion: we won't recognise the European tolling landscape in 2030!

To make sure you can seize the short- and mid-term implications of these dramatic changes, we chose to publish this **550-page report focused on Europe**. We also built **10-year market forecasts for 28 countries**.

Thank you for your continued trust.

Sincerely,

Frederic Bruneteau

Managing Director

Electronic Tolling Europe Study - Free abstract

1. Report highlights

- 2. Detailed contents
- 3. Purchasing and pricing options
- 4. About PTOLEMUS Consulting Group
- 5. Extracts from the report



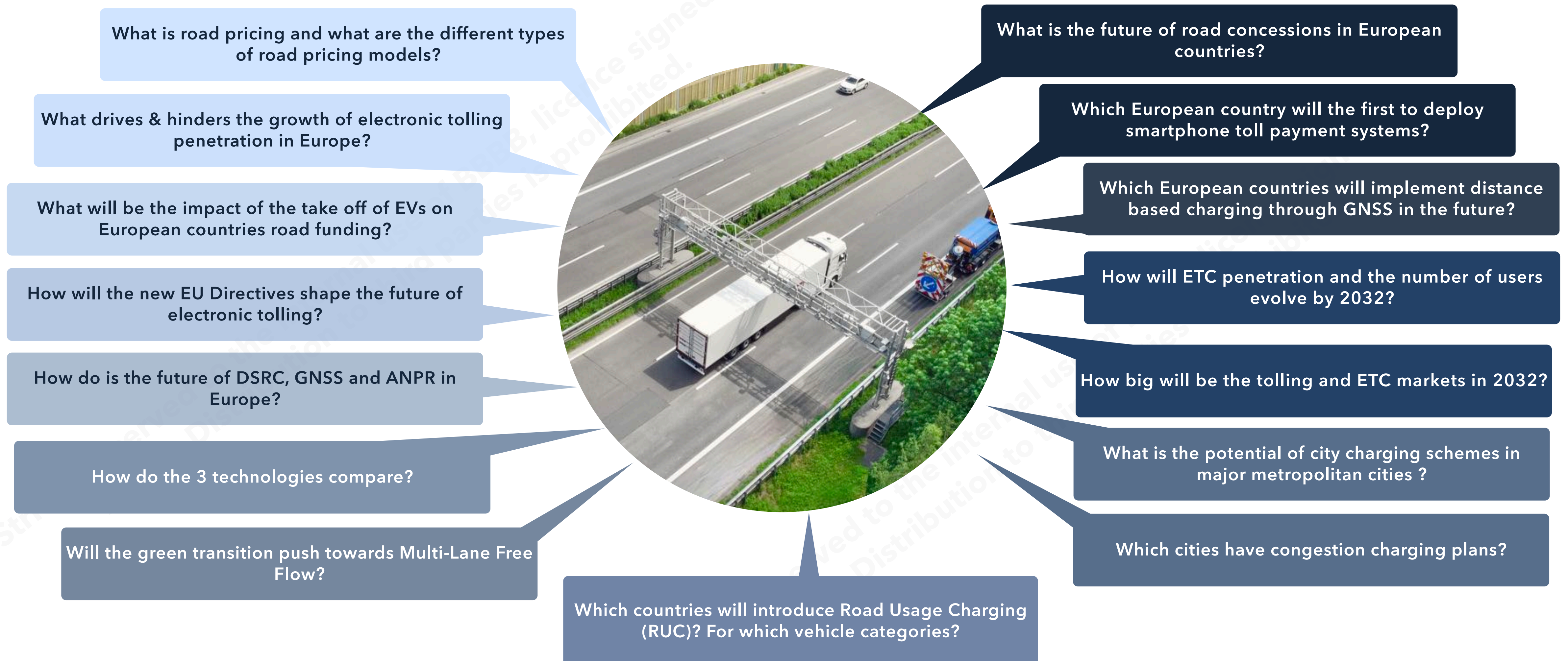
This report is a comprehensive analysis of the electronic tolling market in Europe covering 28 countries

- A **550-page** analysis of the current and future electronic tolling market in Europe based on:
 - **10** years of constant market surveillance
 - PTOLEMUS' consulting experience with **52** tolling / RUC client assignments
 - **8** months of research and analysis including interviews with key stakeholders
 - More than **310** figures presented in the report
 - More than **230** companies mentioned
- **An examination of the economic, financial, political and technological context behind ETC**
- **An analysis of the latest regulatory landscape for ETC in Europe and how it will impact the industry**
- **A detailed assessment of traditional and emerging toll collection technologies & models**
 - DSRC, ANPR, GNSS
 - AET, MLFF, RUC, CC, LEZ, AC
 - Smartphone tolling, video tolling, connected vehicle payments
- **An in-depth analysis of the tolling and ETC markets in 28 European countries**
 - Detailed road and ETC statistics, tolling history and value chain in each country
 - Major extensions and developments of toll domain
 - Outlook for ETC in each country and likelihood of new projects / schemes
 - Forecast ETC users and toll revenues until 2032
- **2020-2032 Excel forecasts, built bottom up**
 - With inputs from over 200 reputable sources and PTOLEMUS' own automotive and EV forecasts
 - Tolling revenues by vehicle type for 28 countries
 - ETC subscriptions by vehicle type for 28 countries
 - ETC revenues by vehicle type for 28 countries
 - All key outputs analysed in the slides
- **The future of ETC in Europe** based on regulatory, technology and demand trends incl. potential evolution scenarios
- **Strategic recommendations to key stakeholders incl. Ministries of Transport, concessionaires, toll service providers, toll solution providers**



The reference report for all industry stakeholders to understand and prepare the future of tolling

The study answers many critical questions on European tolling, ETC, RUC as well as urban schemes (AC, congestion charging, LEZ, etc.)



The road funding imperative is about to make ETC a *must have* solution for all governments and cities in Europe

MORE FUNDING IS NEEDED FOR ROADS...

- In many European countries, governments have pressed the Pause button on road investment
- In our view, current road funding levels are not sustainable to handle increasing traffic because...
- ... even in a greener world, roads will remain the most efficient channel to transport most passengers & goods (at least outside cities)
- This funding gap is made worse by inflation-driven surging road construction costs

... BUT WHERE IS THE MONEY?

- In almost all countries, general budget challenges are becoming unsurmountable
 - The fall in fuel tax revenues driven by the take off of EV sales will only exacerbate the shortfall
- Unfortunately debt / GDP ratios have reached levels that cannot grow much further
- The recent jump in state bonds' interest rates will force governments to make the harsh decisions in the next 3-5 years, as paying more interests has never been a winning solution for politicians to win elections
- The current situation is not sustainable in most countries and will require new funding sources

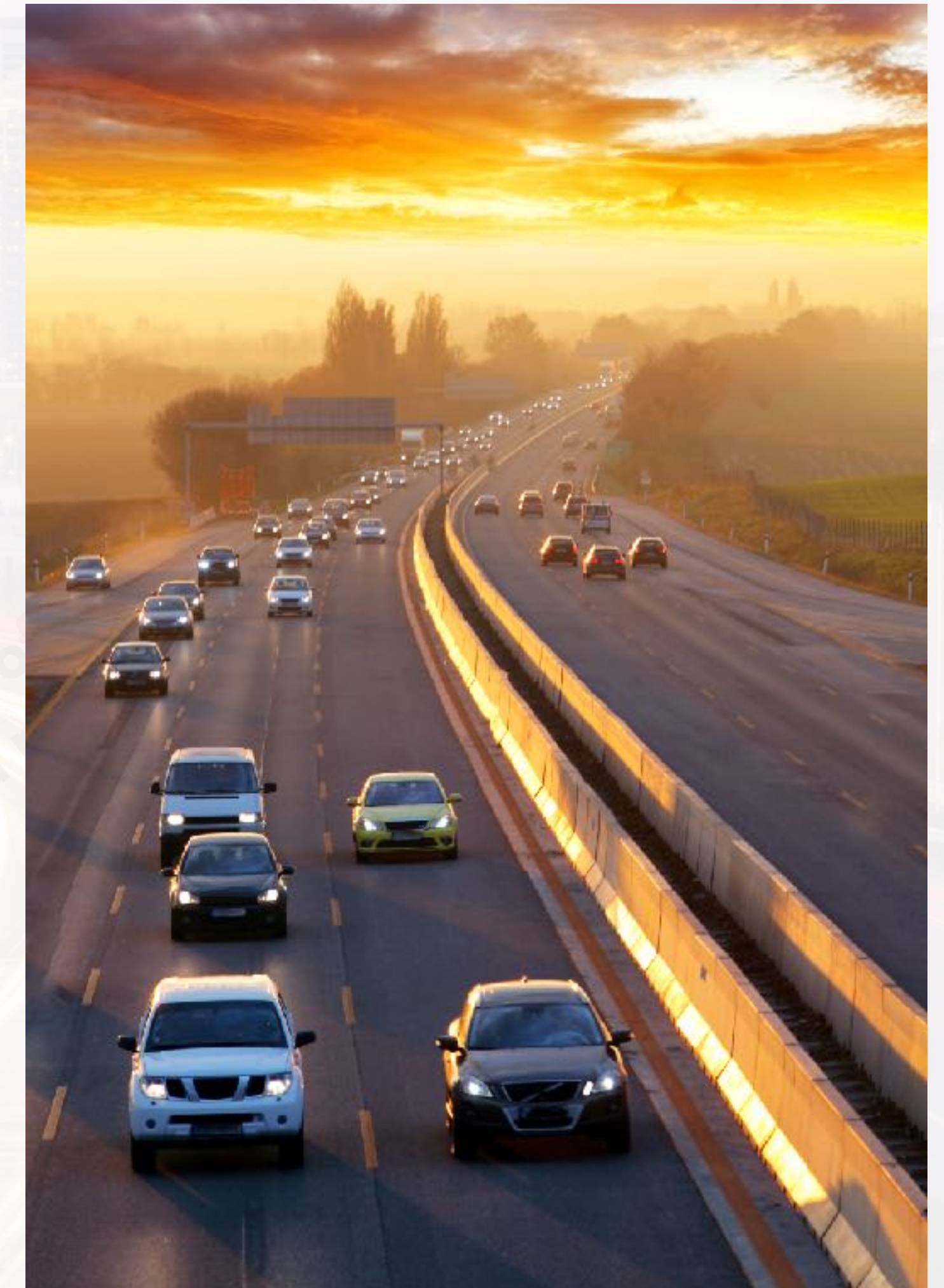
- The fact that the German streetlight coalition decided to double truck tolls is a case in point

THIS FUNDING & ENVIRONMENTAL CRISIS WILL MAKE TOLLING AN ACCEPTABLE SOLUTION

- Tolling has never been popular but new taxes are even less well received by voters
- In addition, distance-based tolls have proven their effect on reducing congestion and limiting pollution
- As a result, to bridge the funding gap, we expect European countries to:
 - Launch new Road Usage Charging (RUC) schemes
 - Set up new concessions / PPPs
 - Extend current schemes to all vehicles / road classes

THE NEW EUROPEAN ROAD CHARGING FRAMEWORK IS GIVING COUNTRIES & CITIES THE TOOLS TO ACT

- The new Eurovignette Directive is a revolution in road charging and offers the EU the most sophisticated toolbox to introduce smart road pricing schemes
- European countries & cities now have **clear rules to implement RUC, Congestion Charging (CC) as well as environmental charging** to reduce CO2 emissions and air & noise pollution
- The revised EETS directive also provides the effective tools to **complete the "common market of tolling"**



ETC is on the road to become universal, bringing €600 billion in revenues to European governments and concessionaires

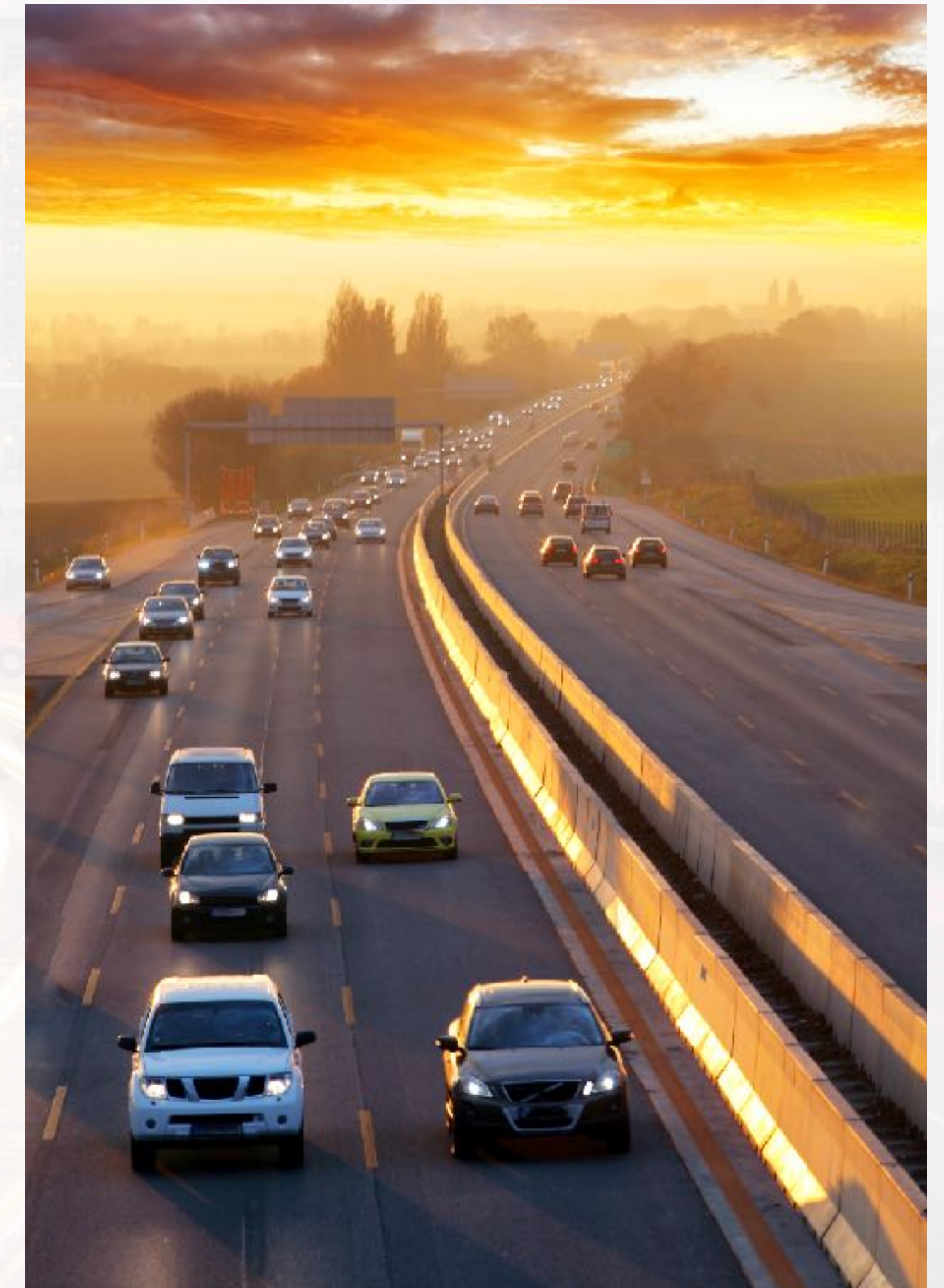
ETC IS BECOMING UNIVERSAL

- Today, electronic tolling remains a local affair, with some countries (mostly in the South) having it, some not
- By 2032, we predict that all European countries save one will have adopted some form of tolling to finance their infrastructure
- As a result, the number of ETC subscribers will more than double to reach almost 120 million by 2032
 - In many countries, penetration will reach 100% and will exceed 35% of vehicles in Europe
- The new provision to allow ANPR charging will also facilitate device-free / subscription-free models and make ETC a universal service, closely connected to mobility payments and converged fleet services
- This success story will make ETC a considerable source of revenues for all road operators, generated a cumulated €600 billion in the next 10 years
- Heavy Goods Vehicles, which damage the road and pollute the most, will generate 2/3 of these ETC revenues in 2032
 - This will be accelerated by the phasing out of vignettes for trucks across the EU in the period

- Light Vehicles will also increasingly contribute and we expect universal RUC schemes to be implemented in at least 3 countries by 2032

THE UBIQUITY OF ETC WILL MAKE IT AN ATTRACTIVE SERVICE FOR ALL STAKEHOLDERS

- Today ETC remains a business of specialists
- As all countries and cities transition to road pricing, more stakeholders will come to the fore e.g.:
 - **Automotive OEMs**, which will integrate it into a suite of connected vehicle payments
 - **Tech giants**, which will make it a feature of their Mobility-as-a-Service apps and integrate its cost in their automated shuttle services
 - **Energy companies** and other fleet service providers which will integrate it in their converged fleet solutions
 - **Card issuers and other payment stakeholders**, which will make toll domains just other payment acceptance points
 - **Insurance companies**, which will combine ETC with Usage-based Insurance (UBI)
- To resist, tolling specialists will need to move pure charging to end-to-end solution providers for their chosen customers, be they consumers, companies or governments



The report leverages PTOLEMUS’ road charging experience and the expertise of a diverse team of mobility consultants (1/2)



Frederic Bruneteau
Managing Director



Alberto Lodieu
Senior Manager



Vijay Govindaraju
Senior Research analyst

Experience

27 years

The founder of PTOLEMUS, Frederic has accumulated 27 years of experience of the mobility and transport domains and 17 years of strategic and financial advisory.

He has become **one of the world’s foremost experts of connected mobility** and is interviewed on the subject by publications such as the *Financial Times*, *Forbes*, the *Wall Street Journal* and *The Economist*. He has also spoken at over 40 conferences on the subject.

He has **led over 180 consulting assignments and helped many world leaders define their strategy and implement it.**

Clients he has served include A-to-Be, Abertis, AETIS, AGC Automotive, Allianz, Axxès, BP, Bridgestone, BRP, CNH Industrial, Danlaw, DKV, Egis, Emovis, the European Commission, Edenred / UTA, Ferrovial, Guardian Smart Infrastructure, Kapsch, the Netherlands’ Ministry of Transport, Neology, OMV, MPTC, Neology, Q-Free, Scania, SkyToll, ST Engineering, Switzerland’s Ministry of Transport, Telepass, Telit, TotalEnergies, Toyota, Transurban, T-Systems, and WEX.

Frederic has led 50 assignments related to tolling and RUC.

Frederic directed the research, contributed to and reviewed this report.

15 years

Alberto has more than 15 years of experience in strategy consulting.

He has specialised in **mobility, location-based services and smart road infrastructure** in projects related to corporate and competitive strategy, operations excellence and business analytics.

He has performed more than 30 consulting assignments for clients such as Abertis, Abertis Mobility Services, Advent International, AGC Automotive, Bain Capital, CNES, the French space agency, Edenred / UTA, Emovis, Ferrovial, Guardian Smart Infrastructure, Neology, SkyToll, Telepass, Telespazio, Transurban and UnipolSai.

One of the key projects in road infrastructure includes assisting a **major provider of RUC solutions in defining its international expansion strategy** in the Road Usage Charging, Congestion Charing and Low Emission Zones markets, including identifying & recommending business as well as acquisition and partnership opportunities.

Alberto holds an MBA from HEC Paris and a BSc in Industrial and Systems Engineering from the Tecnologico de Monterrey.

Alberto co-led the research and writing of this report alongside Frederic.

8 years

Vijay has an overall 8 years of experience in the global mobility and automotive landscape

Vijay has **worked on multiple consulting assignments on the ITS and road infrastructure** topics within PTOLEMUS.

His core specialities include electronic tolling, traffic management, connected vehicle data & services, fleet telematics and vehicle electrification.

Vijay contributed to the market due diligence for the acquisition of TransCore by ST Engineering.

Other organisations he has served include Abertis Mobility Services, Emovis, Guardian Smart Infrastructure, Michelin, Motability, Neology, Nestlé, Renault, Royal Enfield, and Telepass.

Vijay holds an MSc from Skema Business School, Paris.

Vijay participated in the research and writing of this report.

Biography

The report leverages PTOLEMUS' road charging experience and the expertise of a diverse team of mobility consultants (2/2)

Experience

Biography



Filippo Frezet
Senior Business Analyst

3 years

An ESCP graduate, Filippo has started developing an expertise in emergency services, in Electronic Toll Collection (ETC) and Road Usage Charging (RUC), in Usage Based Insurance (UBI), in last-mile delivery, in vehicle data hubs and vehicle data monetisation.

In over 3 years at PTOLEMUS, Filippo has contributed as a core team member to 12 consulting assignments and 4 research reports.

Filippo contributed to the research and writing of this report.



Williams Demanou
Business Analyst

5 years

An HEC Paris MBA graduate, Williams joined PTOLEMUS where he has developed an expertise in RUC, ETC, and UBI.

Since he joined PTOLEMUS, Williams led a comparison of the New York City and Brussels congestion charging models.

He also participated in the feasibility study of a RUC scheme for EVs for a European Ministry of Transport.

Prior to joining PCG, Williams worked for 5 years in an engineering consulting firm focused on transport infrastructure.

Williams built the market forecasts for this study.



Fatima Essakhi
Business Analyst

4 years

An electronics and telecommunication engineer, she also holds a master degree in Smart Mobility from ENPC, Paris.

Fatima joined PTOLEMUS in 2021 and started to specialise in Electronic Toll Collection (ETC), Road Usage Charging (RUC), Intelligent Transportation Systems (ITS), Autonomous Vehicles (AV), Connected Vehicle Data (CVD).

Before joining PCG, Fatima started her career in the automotive industry. She was a software project leader for Renault for 3 years.

Fatima participated in the research and writing of the report.



Katrina Lin
Research Analyst

3 years

Katrina is an experienced Research Analyst who has developed expertise in ETC, connected vehicles, and electric vehicles through client consulting projects and research.

She has worked on several tolling-related projects.

For a global electronic tolling solutions provider, she was in charge of analysing more than 50 government ETC tenders in North America.

She also helped a tolling & enforcement solutions provider, analyse and forecast tolling markets and create a pipeline to support its business growth.

Katrina participated in the research and writing of our analyses of European countries.



Matilde Gusmaroli
Business Analyst

2 years

Matilde is a Business Analyst with experience in research and consulting.

Within PTOLEMUS, Matilde develops and leverages her knowledge and expertise in Usage-based Insurance and Electric Vehicles.

Since joining PCG, Matilde has contributed to the Fleet electrification Global Study, where she analysed and created profiles for fleet management suppliers.

The Norway Vehicle Electrification Study, where she performed an in-depth review of the report.

She is an Italian native speaker, fluent in English and Spanish, and is learning French.

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Avenue Louise 363

1050 Brussels

Belgium

contact@ptolemus.com

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Disclosure

The recommendations and opinions expressed in this study reflect PTOLEMUS' independent and objective views. However, PTOLEMUS cannot provide any guarantee as to the accuracy of the information provided or the reliability of its forecasts.

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Electronic Tolling Europe Study - Free abstract

1. Report highlights

2. Detailed contents

3. Purchasing and pricing options

4. About PTOLEMUS Consulting Group

5. Extracts from the report



The study provides a fully updated analysis and forecast of the electronic tolling market of Europe

- We have structured The Electronic Tolling Europe Study into **8 sections**
- **In section 1, we introduce the fundamentals of ETC and RUC** by defining the key terms and providing an overview of tolling schemes in Europe
- **In section 2, we analyse the drivers of growth and challenges of the electronic tolling ecosystem in Europe**
 - The drivers we analysed are:
 1. Increase in road funding needs
 2. Tolling expanding at the city level
 3. Tolling as an instrument to reduce emissions and achieve green transition targets
 4. Expansion of interoperability
 5. Expansion of new ETC technologies and devices
 6. Use of AI and data analytics
 7. Integration of tolling with other mobility services
 - The inhibitors we analysed are:
 1. Public and political acceptance
 2. Fraud and violation
 3. Toll collection costs
 4. Interoperability
 5. Need for standardisation
 6. Security risks
- **In section 3, we explain in detail how new EU legislation is shaping the future of tolling in Europe**
 - We provide the objectives, timeline, implementation, and key provisions present in the EU legislations that impact tolling, such as the Eurovignette directive and the EETS directive
 - We also analyse the impact of GDPR on electronic tolling technologies, notably GNSS and ANPR
- **In section 4, we take an in-depth look at the technology landscape in Europe**
 - We explore the main configuration alternatives of ETC technologies in Europe
- **In section 5, we performed an in-depth country-by-country analysis of the evolution of the ETC ecosystem for 28 countries**
 - We provide an overview of the main building blocks in an ETC system, including roadside systems, back office systems and customer service centres
 - We explore their integration with external and allied agencies
 - We also analyse in detail the characteristics, implementation options, and performance of DSRC, GNSS, ANPR
 - We compare, using the SWOT methodology, DSRC, GNSS and ANPR in Europe,
 - We illustrate the current toll configurations in European countries for light and heavy vehicles and provide an expected timeline of its evolution
- **In section 6, we analyse, forecast and compare the European tolling market until 2032, notably:**
 - We provide a timeline of key tolling milestones and events
 - We review the current and future toll charging initiatives (RUC, MLFF, CC, etc.)
 - We forecast the number of ETC subscribers and toll revenues until 2032
 - Key drivers of ETC revenue evolution for both Light Vehicles and Heavy Vehicles
 - ETC penetration by country in 2032
 - Total number of ETC subscriptions by country and vehicle category
 - Total tolls collected
 - ETC revenues vs. other collected tolls
 - Total ETC revenues in 2032
- **In Section 7, we bring PTOLEMUS' vision on the future of ETC**
- **In section 8, we offer our conclusions and recommendations to stakeholders in the European ETC value chain and conclude our analysis**

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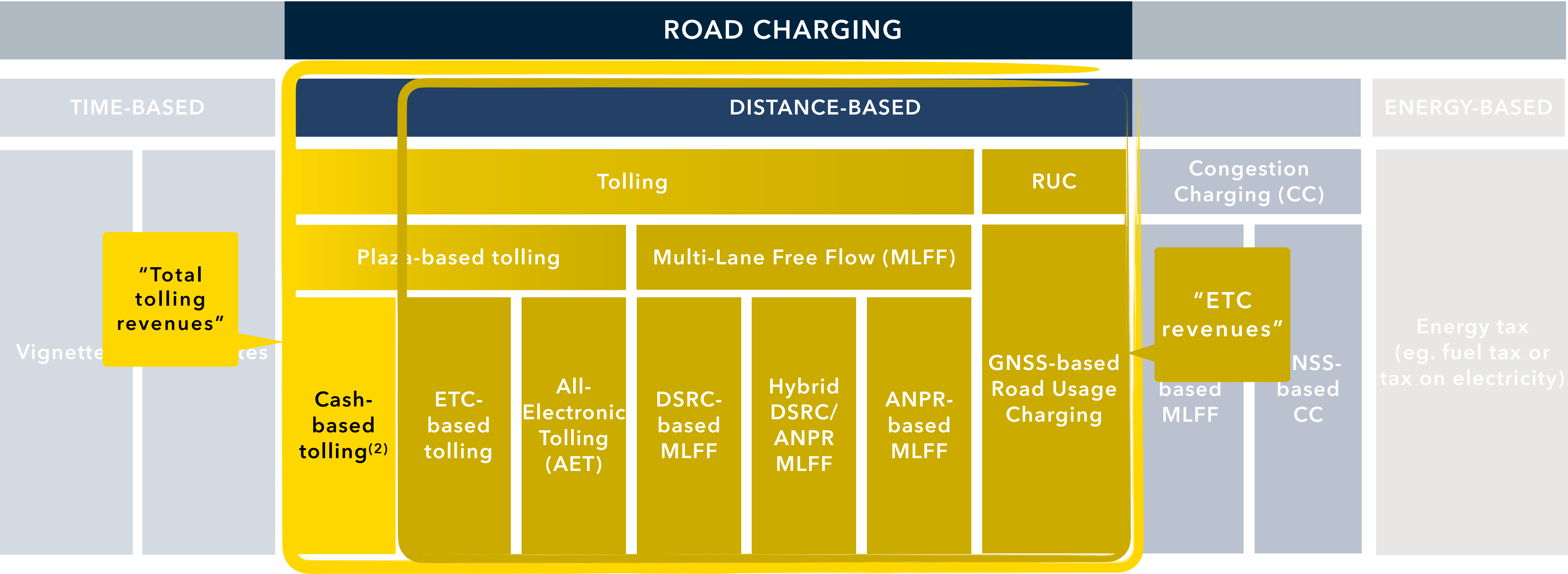
Our forecasts offer tolling and ETC market sizing and forecasts until 2032 for 28 European countries!

Austria		Italy	
Belgium		Latvia	
Bosnia & Herzegovina		Lithuania	
Bulgaria		Netherlands	
Croatia		Norway	
Czech Republic		Poland	
Denmark		Portugal	
Estonia		Serbia	
Finland		Slovakia	
France		Slovenia	
Germany		Spain	
Greece		Sweden	
Hungary		Switzerland	
Ireland		United Kingdom	








Our forecasts include both total tolling revenues and revenues specifically generated from electronic toll collection

Scope of PTOLEMUS European market forecasts



Our forecasts cover privately-owned and fleet-owned Light Vehicles* and Heavy Vehicles

Scope of PTOLEMUS European market forecasts

Vehicle categories		Vehicle characteristics	Vehicle ownership		Tolling segments
	Private passenger cars	<ul style="list-style-type: none">Motor vehicle with at least 4 wheelsUsed for the transport of passengersComprises no more than 8 seats in addition to the driver	Private	Privately-owned vehicles	Light Vehicles (LVs)
	Company cars				
	Light Commercial Vehicles (LCVs)	<ul style="list-style-type: none">Motor vehicle with at least 4 wheels of less than 3.5 tonnesUsed for carriage of goods and in case of minibuses used for the carriage of passengers	Company / government / public body / association	Fleet vehicles	Heavy Vehicles (LVs)
	Heavy Goods Vehicles (HGVs)	<ul style="list-style-type: none">Motor vehicle with at least 4 wheels of more than 3.5 tonnesUsed for the carriage of goods			
	Buses & Coaches (B&Cs)	<ul style="list-style-type: none">Motor vehicle with at least 4 wheelsUsed for the carriage of passengers			

Source: PTOLEMUS - Note: *Only motor-powered vehicles are included, with the exception of two-wheelers

The forecasts provide detailed ETC volumes for 28 countries until 2032

Market forecast contents (Excel file)

ETC MARKET FORECASTS	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
PTOLEMUS Consulting Group													
ETC subscriptions at EoY													
Cumulative subscriptions at EoY (excluding e-vignettes)													
All vehicles	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Cumulative number of ETC subscriptions on all vehicles at EoY													
Penetration in all vehicles (EoY)													
By vehicle category	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Cumulative number of ETC subscriptions on company cars at EoY													
Cumulative number of ETC subscriptions on private passenger cars at EoY													
Cumulative number of ETC subscriptions on LCVs at EoY													
Cumulative number of ETC subscriptions on Light Vehicles at EoY													
Cumulative number of ETC subscriptions on HGVs at EoY													
Cumulative number of ETC subscriptions on buses & coaches at EoY													
Cumulative number of ETC subscriptions on Heavy Vehicles at EoY													
Cumulative number of ETC subscriptions on all vehicles at EoY													
Cumulative number of ETC subscriptions on all vehicles at EoY													
Cumulative number of ETC subscriptions on Heavy Vehicles at EoY													

The forecasts include tolling & ETC revenues for 28 countries until 2032

Market forecast contents (Excel file)

Total collected tolls													
Total collected tolls (all cash and electronic tolls paid, excluding e-vignettes)													
Total collected tolls													
Total ETC revenues													
Total revenues generated from ETC													
Total ETC revenue by segment													
By type of vehicle	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total revenue generated from ETC by company cars													
Total revenue generated from ETC by private passenger cars													
Total revenue generated from ETC by LCVs													
Total revenue generated from ETC by Light Vehicles													
Total revenues generated from ETC by HGVs													
Total revenues generated from ETC by buses & coaches													
Total revenues generated from ETC by all Heavy Vehicles													
By ownership type	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total revenue generated from ETC by privately owned vehicles													
Total revenue generated from ETC by fleet vehicles													
Total revenue generated from ETC by fleet vehicles													
Total revenue generated from ETC by privately owned vehicles													

The report mentions over 230 companies and organisations (1/3)

Company	Country	Type	Company	Country	Type	Company	Country	Type
Øresundsbron	Sweden	Road operator	Autostrada pedemontana	Italy	Motorway concession	Czech Toll	Czech	Toll technology solutions
A-to-Be	Portugal	Toll technology solutions	Autostrade per l'Italia (ASPI)	Italy	Motorway concession	Daimler	Germany	OEM
Storebælt	Denmark	Road operator	AutoTicket	Germany	Toll technology solutions	Daimler financial serviceas	Germany	Financial services
Abertis	Spain	Motorway concession	Aventi	Norway	Toll technology solutions	Dalekovod	Slovenia	Toll technology solutions
Abertis Mobility Services	Spain	ITS technology solutions	Axxes	France	Toll service provider	DARS	Slovenia	Road operator
Adaptive recognition	Spain	ANPR solution provider	BEMobile	Belgium	Smartphone toll solution	DARSGO	Slovenia	Toll service provider
Aegean Motorway	Greece	Motorway Concession	Berlio	Belarus	Fuel card issuer	Dart Charge	UK	Toll service provider
AGES	Germany	Toll service provider	BGToll	Bulgaria	Toll service provider	Denmark Technical University	Denmark	Educational institution
AKA M5 Motorway	Budapest	Motorway Concession	Bina-Istra d.d. and	Croatia	Road operator	Department of Transportation	UK	Government agency
Aktor	Greece	Motorway concession	BIP & Go	France	Toll service provider	Digitoll	Bulgaria	Toll service provider
APRR	France	Motorway concession	BlaBlaCar	France	MSP	Direct route	UK	Toll service provider
ARAL	Germany	Fuel card issuer	Bompengeselskap Nord AS	Norway	Road operator	Directorate of Highways and Motorways	Czech	Government agency
ARH	Croatia	Toll technology solutions	Bosch	Germany	Technology solutions	DKV	Germany	Toll service provider
Ascendi	Portugal	Motorway concession	BP	UK	Fuel card issuer	Durham city council	UK	Government agency
ASECAP	Belgium	Consortium	Brisa	Portugal	Motorway concession	Driver & Vehicle Licensing Agency	UK	Toll service provider
ASF	France	Motorway concession	Bro Bizz	Denmark	Toll service provider	E100	Poland	Fuel card issuer
ASFINAG, Austria	Austria	Road operator/ GA	Capita	UK	Toll technology solutions	easytrip	Ireland	Toll service provider
ASTM Group	Italy	Motorway concession	Celtic Roads Group	Ireland	Motorway concession	eDalnice	Czech	Toll service provider
ATMB	France	Toll service provider	CEPSA	Spain	Toll service provider	edc	UK	Fuel card issuer
ATOS	France	IT solutions provider	Cintra	Spain	Motorway concession	Efkon	Austria	Toll service provider
ATOSCA	France	Motorway concession	Conduent	USA	Toll technology solutions	Eflow	Ireland	Toll service provider
Attiki Odos	Greece	Motorway concession	Confiroute	France	Motorway concession	egis	France	Toll technology solutions
Autocesta Zagreb-Macelj d.o.o	Croatia	Road operator	Continental	Germany	Technology solutions	Egnatia Oase	Greece	Toll service provider
Autopay S.A	Poland	Financial services	Cornwall Council & Plymouth	UK	Road operator	Egnatia Odos	Greece	Motorway Concession
Autopistas	Spain	Motorway concession	CTS Eventim	Germany	Toll technology solutions	Eiffage	France	Motorway concession

Note: GA: Government Agency, MSP: Mobility service provider

The report mentions over 230 companies and organisations (2/3)

Company	Country	Type	Company	Country	Type	Company	Country	Type
emovis	Spain	Toll technology solutions	GEA	Germany	Toll technology solutions	itrack	Hungary	Toll declaration data
eni	Italy	Fuel card issuer	Gefyra ePass	Greece	Toll service provider	Jenoptik	Germany	ANPR solution provider
ePass	Netherlands	Toll service provider	Gefyra Rion-Antirrion	Greece	Motorway Concession	JP Autoceste	Bosnia &	Government agency
ESCOTA	France	Motorway concession	General Estates Company	UK	Road operator	Kapsch	Austria	Toll technology solution
Esso	UK	Fuel card issuer	Globalvia	Spain	Motorway concession	Kentriki Odos	Greece	Motorway Concession
eToll	Ireland	Toll service provider	Google maps	USA	Navigation providers	Klaxit	France	Mobility service providers
Euro Toll	France	Toll service provider	Großglockner	Austria	Motorway concession	Lease plan	Netherlands	Fleet management solutions
EuroWag	Czech	Toll service provider	Hochalpenstraßen AG			Lithuanian Road Administration	Lithuania	Road operator/GA
Eway	Greece	Toll service provider	Grundig	Germany	Technology solutions	Logpay	Germany	Fuel card issuer
Fast pass new Odos	Greece	Toll service provider	GSP Bulgaria	Bulgaria	Toll DDP	M6 Duna Autópálya Koncessziós Zrt	Hungary	Motorway Concession
Fastpass Kentriki Odos	Greece	Toll service provider	Head of the National Revenue Administration	Poland	Government agency	M6 toll	Hungary	Road operator
Federal Logistics and Mobility Office	Germany	Government agency	Hrvatske Autoceste d.o.o.	Croatia	Road operator	M6 Tolna Autópálya Koncessziós Zrt	Hungary	Motorway Concession
Federal Ministry of Transport	Germany	Government agency	Humber bridge board	UK	Road operator	Magyar Közút Nonprofit Zrt	Hungary	Motorway Concession
Federal public service mobility & transport	Belgium	Government agency	IBI Group	Canada	Toll technology solutions	Merseyflow	UK	Road operator
FEIG Electronic	Germany	Toll technology solutions	IBM	USA	IT solutions provider	MerseyTravel	UK	Road operator
Felbertauernstraßen AG	Austria	Motorway concession	Icell	Hungary	Toll DDP	Midland Motorways Group	UK	Road operator
Femern A/S	Denmark	Road operator	IDOM	Spain	Technology solutions	Midlink M7/M8	Ireland	Motorway concession
Ferde	Norway	Road operator	Indra	Spain	Toll technology solutions	Ministry of Environment	France	Government agency
Ferrovial	Spain	Motorway concession	Infraestruturas de Portugal	Portugal	Road operator/GA	Ministry of infrastructure and Water Management	Netherlands	Government agency
Fjellinjen	Norway	Road operator	Institute Mihailo Pupin	Serbia		Ministry of regional development & public works	Bulgaria	Government agency
Flyt	Norway	Toll service provider	Instituto Da Mobilidade e dos Transportes)	Portugal	Road operator/GA	Ministry of transportation	France	Government agency
Fremtind Service	Norway	Toll service provider	Intertoll	UK	Road operator	Mobiliz	Turkey	Toll DDP
Fulli	France	Toll service provider	Intertoll Polska	Poland	Road operator	mooney go	Italy	Toll service provider
Gdansk Transport Company	Poland	Road operator	Intrakat	Greece	Toll technology solutions	Moreas	Greece	Motorway Concession
GDDKiA	Poland	Road operator	Intrasoft	Belgium	Toll technology solutions	Movenience	Netherlands	Toll technology solutions
			ITIS Holding	Czech	Toll service provider			

The report mentions over 230 companies and organisations (3/3)

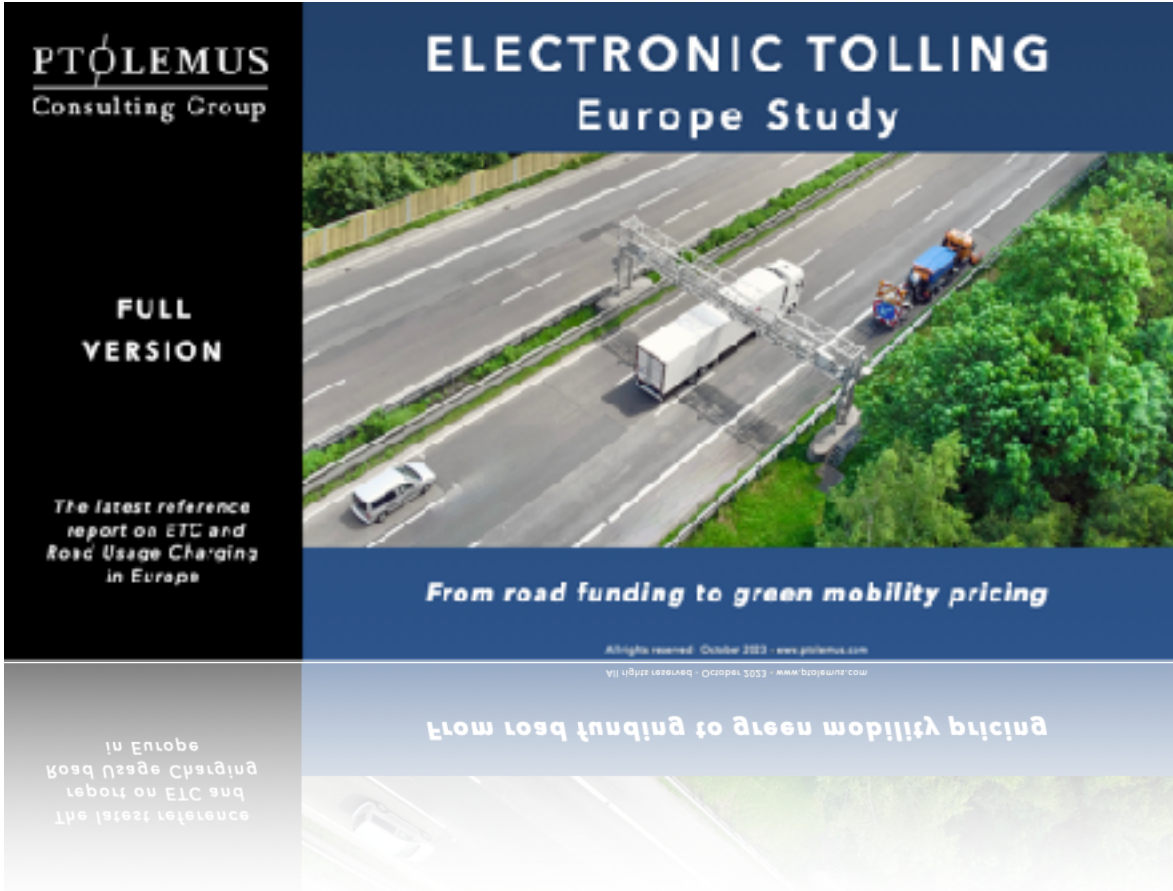
Company	Country	Type	Company	Country	Type	Company	Country	Type
Movyon	Spain	Toll technology solutions	Roads of Serbia	Serbia	Road operator/GA	Tecsidel	Spain	Toll technology solutions
msts	Netherlands	Toll service provider	Sanef	France	Motorway concession	Telekom Slovenia	Slovenia	Toll technology solutions
Mundys	Italy	Motorway concession	SAPN	France	Motorway concession	Telepass	Italy	Toll service provider
MYTO-CZ	Czech	Toll service provider	Satelise	Spain	Financial services	Thales	France	IT solutions provider
National Highways	UK	Road operator/GA	Satellic	Belgium	Toll technology solutions	Toll 4 Europe	Germany	Toll service provider
National Motorway	Slovakia	Road operator/GA	Scania	Sweden	OEM	Toll Collect GmBH	Germany	Toll service provider
Nea Odos	Greece	Motorway Concession	SEITT	Spain	Road operator/GA	Toll Tickets	Germany	Toll service provider
Netcompany	Denmark	Toll technology solutions	SICE	Spain	Toll technology solutions	Tollnet	Czech	Device and equipment
Norbit	Norway	Toll technology solutions	Siemens	Germany	Technology solutions	TollPass	Bulgaria	Toll service provider
Northgate	UK	IT solutions provider	Siemens mobility	Germany	Toll technology solutions	Total Energies	France	Toll service provider
Norwegian Institute of Transport Economics	Norway	Government agency	Sinelec	Italy	Toll technology solutions	Trafikverket	Sweden	Road operator/
Norwegian Public Roads Administration	Norway	Road operator/GA	Skycash	Poland	Financial services	Transport for London	United	Road operator/
NSL	United	Toll technology solutions	Skytoll	Slovakia	Toll technology solutions	Transurban	Australia	Road operator
Núsz	Hungary	Motorway Concession	Skyttel Pass	Norway	Toll service provider	TT2 Limited	UK	Road operator
Olympia Odos	Greece	Motorway Concession	Smartcar	United States	Technology solutions	Turas Mobility services	Ireland	Toll technology solutions
Olympia pass	Greece	Toll service provider	Sopra Steria	France	IT solutions provider	Ulys	France	Toll service provider
OMV	Austria	Fuel card issuer	Stalexport Autostrada Malopolska	Poland	Road operator	Unipol Move	Italy	Toll service provider
Oresund pay	Denmark	Toll service provider	Statens Vegvesen	Norway	Road operator/GA	UTA	Germany	Fuel card issuer
Øresundsbro Konsortiet I/S	Denmark	Road operator	Strabag	Austria	Technology solutions	Vegamot	Norway	Road operator
Pagatelia	Spain	Toll service provider	Sund & Bælt Holding A/S	Denmark	Road operator/GA	Vegfinans	Norway	Road operator
PPF Group	Czech	Private equity	Survision	France	ANPR solution provider	Via Plus	USA	Toll technology solutions
Q-Free	Norway	Toll technology solutions	Swedish Transport	Sweden	Road operator/GA	Via Verde	Portugal	MSP
Republic of Estonia Road	Estonia	Government agency	Swiss Confederation	Switzerland	Road operator/GA	Vialtis	France	Fuel card issuer
Republic of Slovenia Ministry of Infrastructure	Slovenia	Government agency	T-Systems	Germany	Toll technology solutions	Vinci Autoroutes	France	Motorway concession
Ressa	Spain	Fuel card issuer	Tattile	Italy	ANPR solution provider	Vitronic	Germany	ANPR solution provider
						W.A.G Payment solutions	UK	Toll service provider
						Waze	Israel	Navigation providers
						Westerschelde Tunnel	Netherlands	Road operator
						Wex	USA	Fuel card issuer
						Yunex traffic	Germany	ITS technology solution

Electronic Tolling Europe Study - Free abstract

1. Report highlights
2. Detailed contents
- 3. Purchasing and pricing options**
4. About PTOLEMUS Consulting Group
5. Extracts from the report



The study comes with a worldwide company license



For any question on the report, email contact@ptolemus.com



You can purchase the report by requesting an invoice or buying online** (Visa or MasterCard) on our web site

	Report (1)	Market forecasts (2)	(1) + (2)
Contents	<ul style="list-style-type: none">• 550-page pdf report of the current and future electronic tolling market in Europe including:<ul style="list-style-type: none">- An analysis of key market drivers and challenges- The evolution of European regulation and its implications- The evolution of the ETC technology landscape (AET, MLFF, RUC, AC, CC, LEZ, etc.)- In-depth analysis of 27 countries in Europe with forecast slides and rationale for their growth- The future of ETC in Europe- Conclusions and recommendations for multiple stakeholders in the tolling value chain	<ul style="list-style-type: none">• 2020-2032 Excel forecast outputs (650 lines)<ul style="list-style-type: none">- Based on a bottom-up model- With inputs from over 200 reputable sources and PTOLEMUS' own automotive and EV forecasts- Tolling revenues by vehicle category for 28 countries- ETC penetration for 28 countries- ETC subscriptions by vehicle category for 28 countries- ETC revenues by vehicle category for 28 countries- ETC revenues by ownership category for 28 countries- Key outputs analysed in the slides	<ul style="list-style-type: none">• 550-page analysis of the current and future electronic tolling market in Europe• 2020-2032 Excel forecast outputs (650 lines)
Company-wide license	4,995 €	1,995 €	5,995 €

Electronic Tolling Europe Study - Free abstract

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PTOLEMUS is the first strategy consulting and research firm entirely focused on geo-connected mobility and automation



Strategy consulting services

Strategy definition	M&A advisory	Procurement strategy
Partnership strategy	Partnership strategy	Market forecasting



Market research services

Off-the-shelf reports	Subscription services	Custom market research
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Fields of expertise

RUC and tolling	Digital & connected insurance	Vehicle data and analytics
IoT & connectivity	Emergency services	Vehicle services
Mobility services	Vehicle automation	Electrification

We serve over 350 clients across the ecosystem of mobility

Analytics,
maps &
apps
providers



Automotive
OEMs &
suppliers



Telematics
solution
providers



Mobile
telecom
players



Fleet,
tolling &
ITS



Device &
location
suppliers



Insurers,
aggregators
& assistance
providers



Banks &
private
equity
investors



A member of the IBTTA, PTOLEMUS has advised many organisations on tolling, RUC and ITS

ROAD OPERATORS / CONCESSIONNAIRES



GOVERNMENTS, AGENCIES & TRADE BODIES



TOLL SYSTEM & DEVICE SUPPLIERS



TOLL ISSUERS & SERVICE PROVIDERS

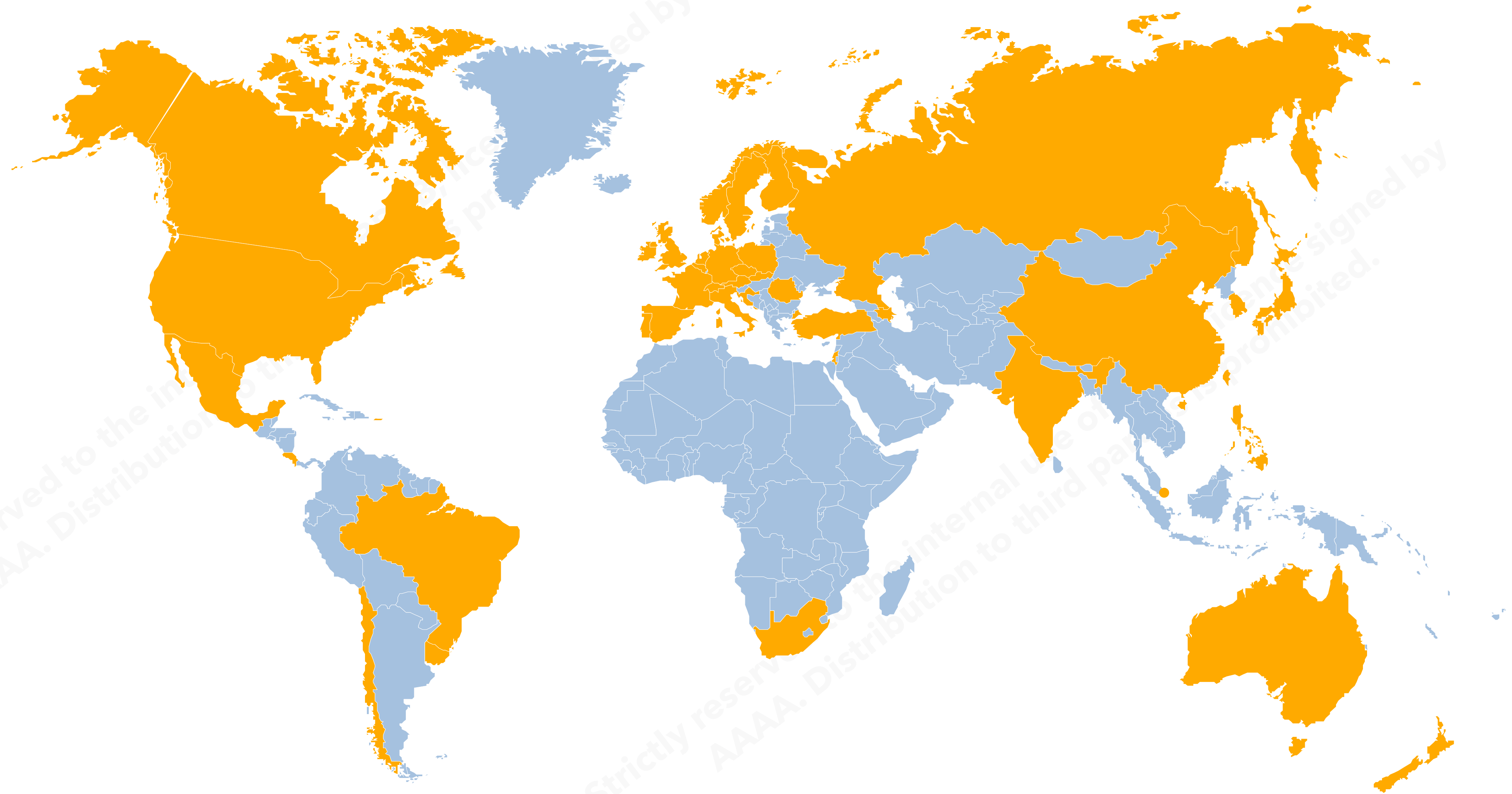


INVESTORS



OTHER STAKEHOLDERS





We have performed nearly 200 consulting assignments including 52 in tolling, RUC and ITS



Advised on the optimal structuring of the truck tolling scheme



Ministerie van Infrastructuur en Waterstaat



Evaluated the costs & benefits of the deployment of E112 solutions in 7 countries



Evaluate the feasibility study of moving to an Open Road Tolling scheme



Evaluated global market opportunities in Road Usage Charging and Congestion Charging



Conducted the due diligence of TransCore, the global leader of tolling & traffic management solutions



Identify & evaluate potential M&A targets in traffic management & smart city markets

Private equity firm



Evaluated the technologies & business potential of the EU electronic tolling market



Defined its global data & analytics strategy to predict incidents



For the Wallonian road operator, evaluated the feasibility of a shadow tolling scheme



Detected opportunities from connected & autonomous vehicles for the space industry



We have performed nearly 200 consulting assignments including 52 in tolling, RUC and ITS



Define global B2B2C mobility services strategy & value proposition

kapsch >>>



Defined toll pricing strategy & marketing plan across Europe

eegis



Defined its entry strategy into the European ETC market

AGC



Conducted the strategic review of a major road operator's mobility services business

abertis
Mobility Services



For a major European toll charger, forecast the tolling & ETC markets in 42 countries

T Systems



Evaluated the European electronic tolling services market

Advent International
GLOBAL PRIVATE EQUITY



Help the company in defining its 10-year future strategic plan

Global ITS leader



Assisted the board in its strategy definition for 3 years

A-to-Be
Powered by **Brisa**



Evaluated the feasibility of a RUC programme for electric vehicles (EVs)

European country's Ministry of Transport



Evaluated & forecast the tolling & ETC markets in a Nordic market

Telepass

PTOLEMUS can help you define and achieve your strategy in the domain of electronic tolling, RUC, and mobility

- **Strategy definition**

- Road policy strategy assistance
- Scenario planning, simulation & analysis
- Strategy development
- Multimodal mobility design & planning
- Connected vehicle payment integration
- Strategy orientation workshops
- Feasibility studies

- **Innovation strategy**

- Vertical market assessments
- Product definition
- Consent management
- Data collection & analytics strategy
- Device strategy
- Stakeholder consultation / engagement

- **Innovation delivery**

- Proof of concept design & launch
- Architecture definition
- Project management

- **Investment assistance**

- M&A strategy
- Commercial due diligence
- Technology due diligence
- Feasibility studies
- Vehicle data market sizing
- Business case development
- Cost benefit analyses
- Post-merger integration

- **Procurement**

- Definition of road charging schemes
- Assistance to tenders
- Selection and sourcing of technology

- **Project management**

- Assistance in management of road pricing projects
- Congestion charge project management



PTOLEMUS has published 30 landmark reports and market forecasts on mobility markets

AUTONOMOUS DRIVING



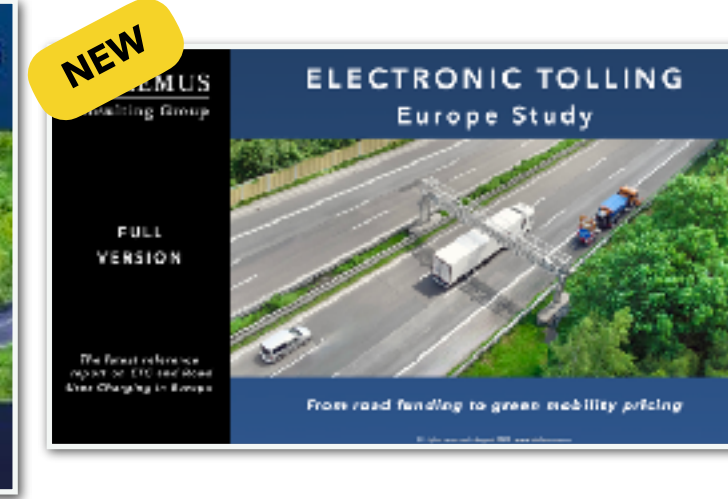
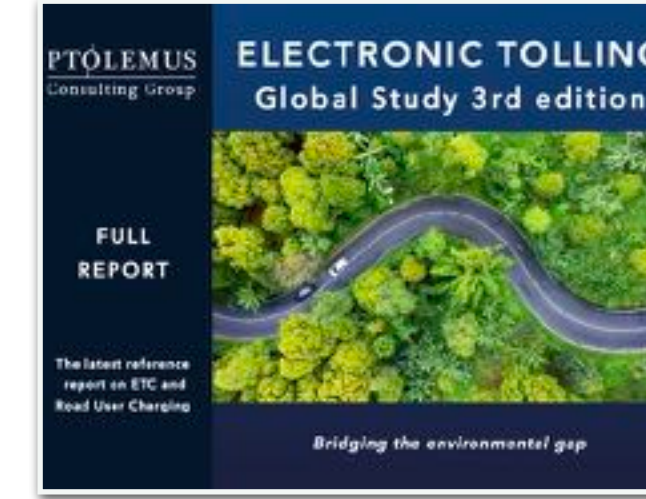
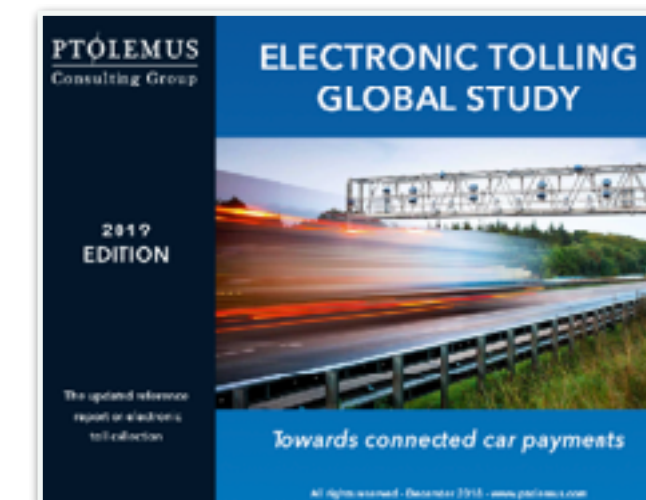
CONNECTED VEHICLE



ELECTRIFICATION



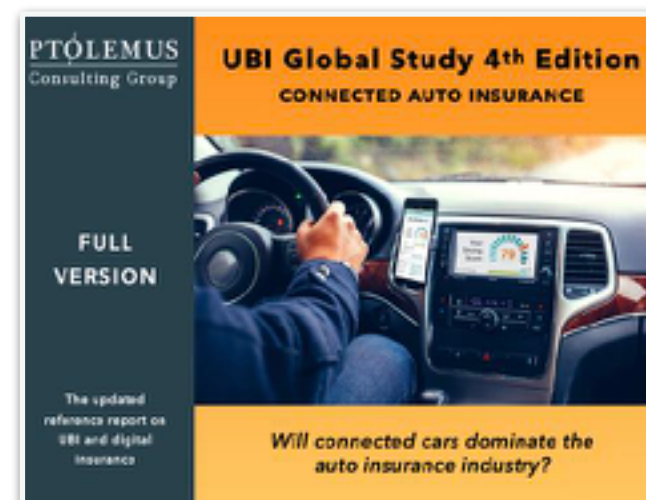
ROAD INFRASTRUCTURE FUNDING



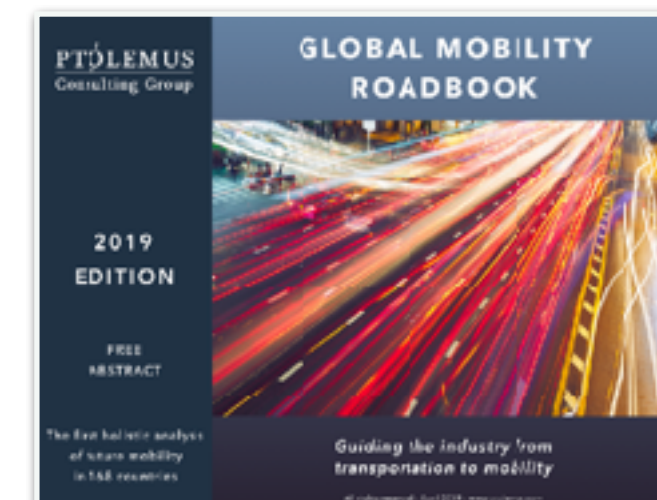
FLEET MANAGEMENT



INSURANCE



MOBILITY



Notes: 1. Most of our reports come with bottom-up market forecasts for 18 regions for 10-year timeframe,
2. To receive all our reports & other research, a subscription model exists

Electronic Tolling Europe Study - Free abstract

1. Report highlights
2. Detailed contents
3. Purchasing and pricing options
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- 5. Extracts from the report**



Electronic Tolling Europe Study

1. Fundamentals of electronic tolling and road user charging

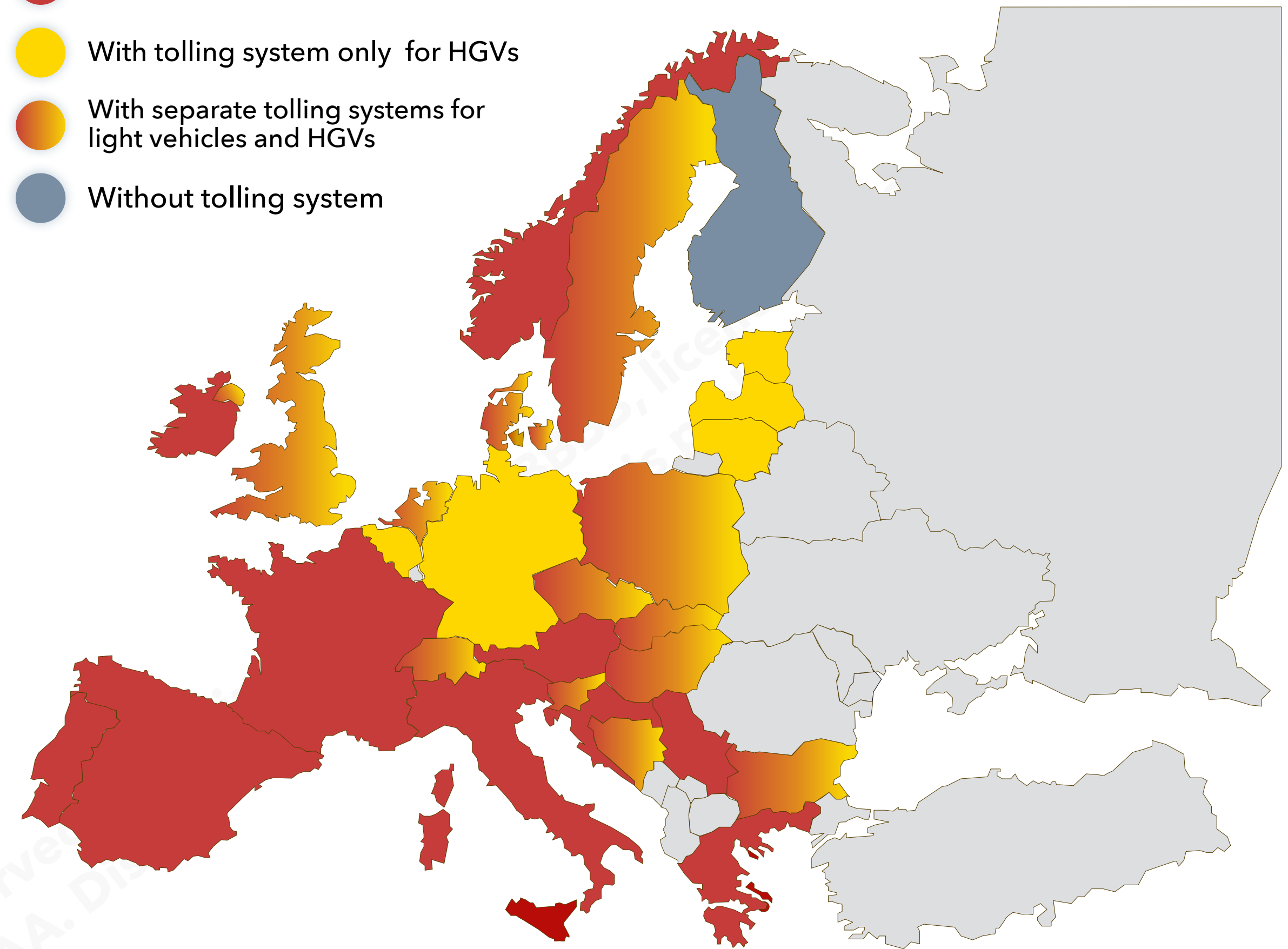
2. Key drivers and challenges of the ETC ecosystem
3. How EU regulation is shaping the future of tolling
4. Traditional and emerging toll collection technologies
5. Country profiles
6. European tolling & ETC market forecasts
7. General outlook: the future of ETC
8. Conclusions and recommendations





37% of European nations have a tolling system for all vehicles, while 44% have combined tolling systems for light and heavy vehicles

- The **DSRC-based tolling system** is widely used in European countries and charges **all types of vehicles**
 - Countries such as France, Portugal, Spain, Italy, Norway, Ireland, and Croatia have all implemented a **DSRC tolling scheme for all vehicles, with traditional plaza or MLFF**
- Some European countries have no tolls on roads for light vehicles and **only charge heavy good vehicles** exceeding certain weights, to avoid traffic congestions on highways
 - **Belgium** charges **all HGVs weighing more than 3.5 t**
 - **Germany** charges for **all HGVs weighing more than 7.5t**
 - **Denmark and the United Kingdom** levy fees for HGVs weighing more than 12 t
- **Latvia** charges for vehicles weighing **more than 3t, and combination of good vehicles weighing more than 3.5t**
- 44% of countries have **separate tolling schemes in place for light vehicles and heavy vehicles**
 - For example, countries such as Bulgaria, Czech Republic, and Slovakia have **time-based vignette system for light vehicles less than 3.5t** and a **distance-based road user charge scheme for heavy vehicles**
- For the moment, **Finland** is the only country without a tolling system

- With tolling system for all vehicles
- With tolling system only for HGVs
- With separate tolling systems for light vehicles and HGVs
- Without tolling system








Congestion charging is a demand-based charging scheme which goes beyond traffic management

Congestion Charging Models	Description	Examples
 Cordon area congestion charging	Variably-priced charging for access a cordoned area, usually a city centre	<ul style="list-style-type: none">• London, Stockholm and Milan
 Urban tolls	Variably-priced charging for access specific pieces of infrastructure, such as highways, tunnels, and bridges	<ul style="list-style-type: none">• Oslo, Bergen, Kristiansand, Stavanger, Trondheim

Congestion Charging definition

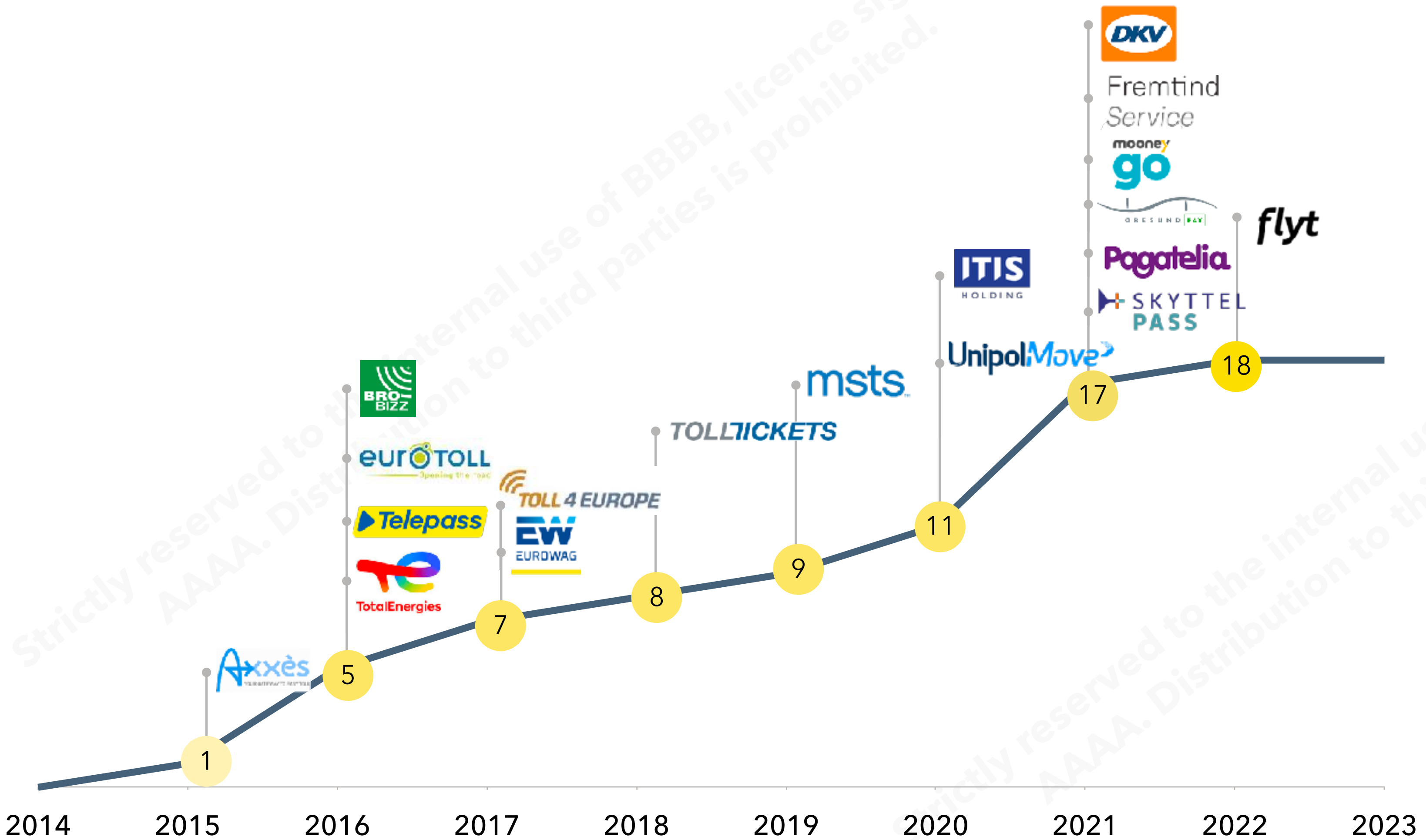
- **Congestion charging is a demand-based scheme that charges users to access a piece of infrastructure or area** based on demand at the time of access
- It is a fee imposed on a vehicle when entering an urban area, often limited to certain hours
 - It is usually aimed at **discouraging the use of congested roads in peak hours and reducing the traffic demand**
- In congestion pricing models, access costs typically **vary by time of day**
 - They are estimated with historical demand data or real-time traffic predictions and are collected at highway speeds using electronic toll-collection technology
 - **Payment may be collected through traditional ETC technologies, including RFID, DSRC, GNSS and ANPR**
 - To date, the scheme is most often enforced through ANPR technology

Key objectives of congestion charging

-  **1 Road infrastructure funding**
-  **2 Congestion reduction**
-  **3 Pollution and noise reduction**
-  **4 Public transportation funding**
-  **5 Modal shift**

The number of EETS providers has been growing continuously to bring interoperability in 18 European toll domains

EETS providers' registration timeline (2022)



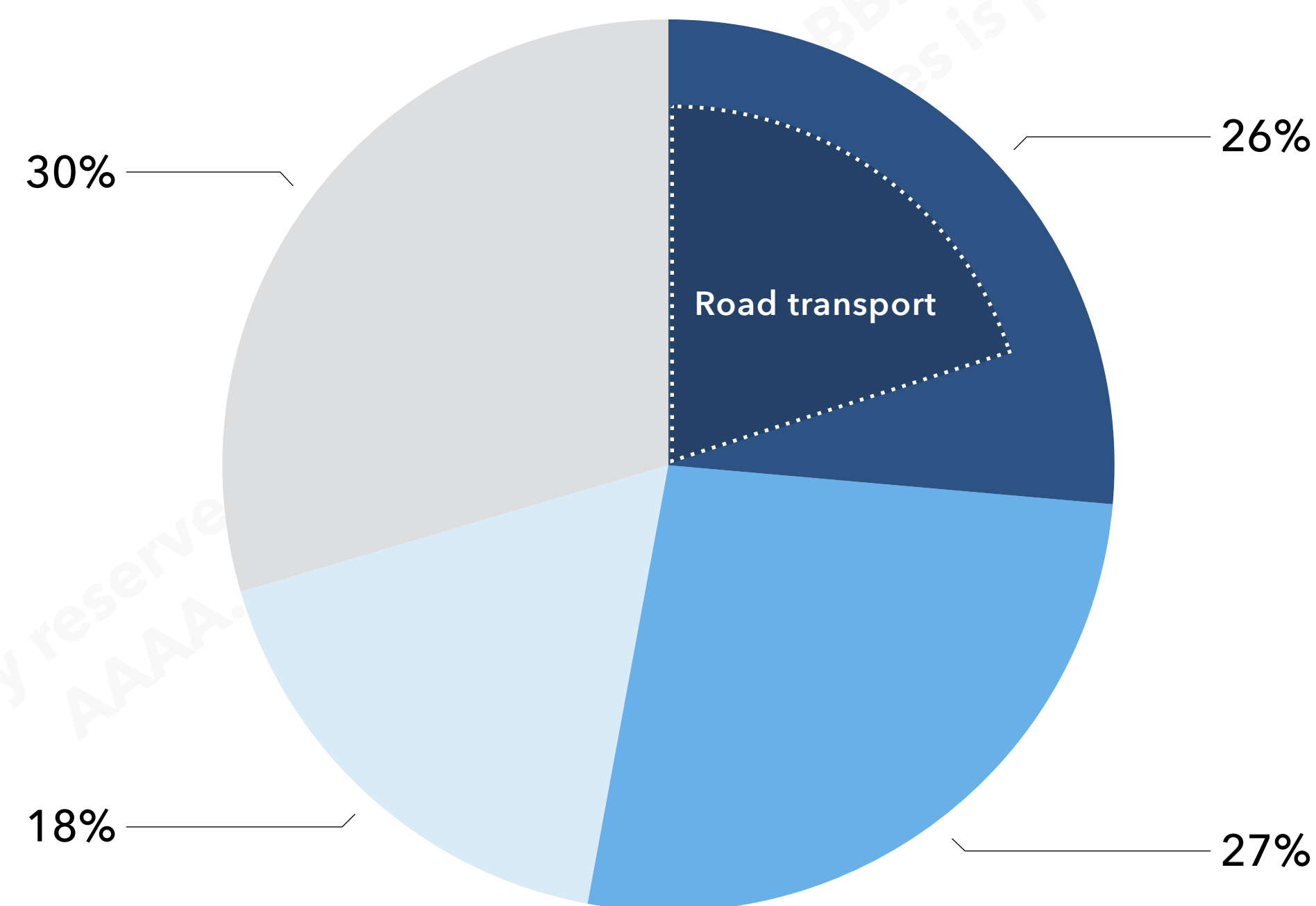
Source: PTOLEMUS, EETS Directive - Note: HGV: Heavy Goods Vehicle; GNSS: Global Navigation Satellite System; OBUs: On-Board Units

- The **European electronic toll service (EETS)**, as required by Directive 2004/52/EC, will achieve **interoperability of the electronic road toll systems** in the EU
 - The directive aims to **simplify the payment and administration of tolls for road users** by enabling them to use a **single electronic device or service to pay tolls** across different countries
 - EETS members includes players in **30 countries in the EU as well as EEA region**.
 - Today there are **18 EETS providers registered in the EU and EEA region**
- EETS involves two main stakeholders:
 - **Toll chargers**, which operate either on behalf of a Member State or in the framework of a concession contract with a Public Authority of a Member State, manage the infrastructure or levy the tolls for the circulation of vehicles on the network they manage.
 - **EETS providers**, supplying drivers or vehicle owners with the necessary equipment and services to access tolled infrastructure in the EU and ensuring the payment to the toll chargers of the fees due for use of their network

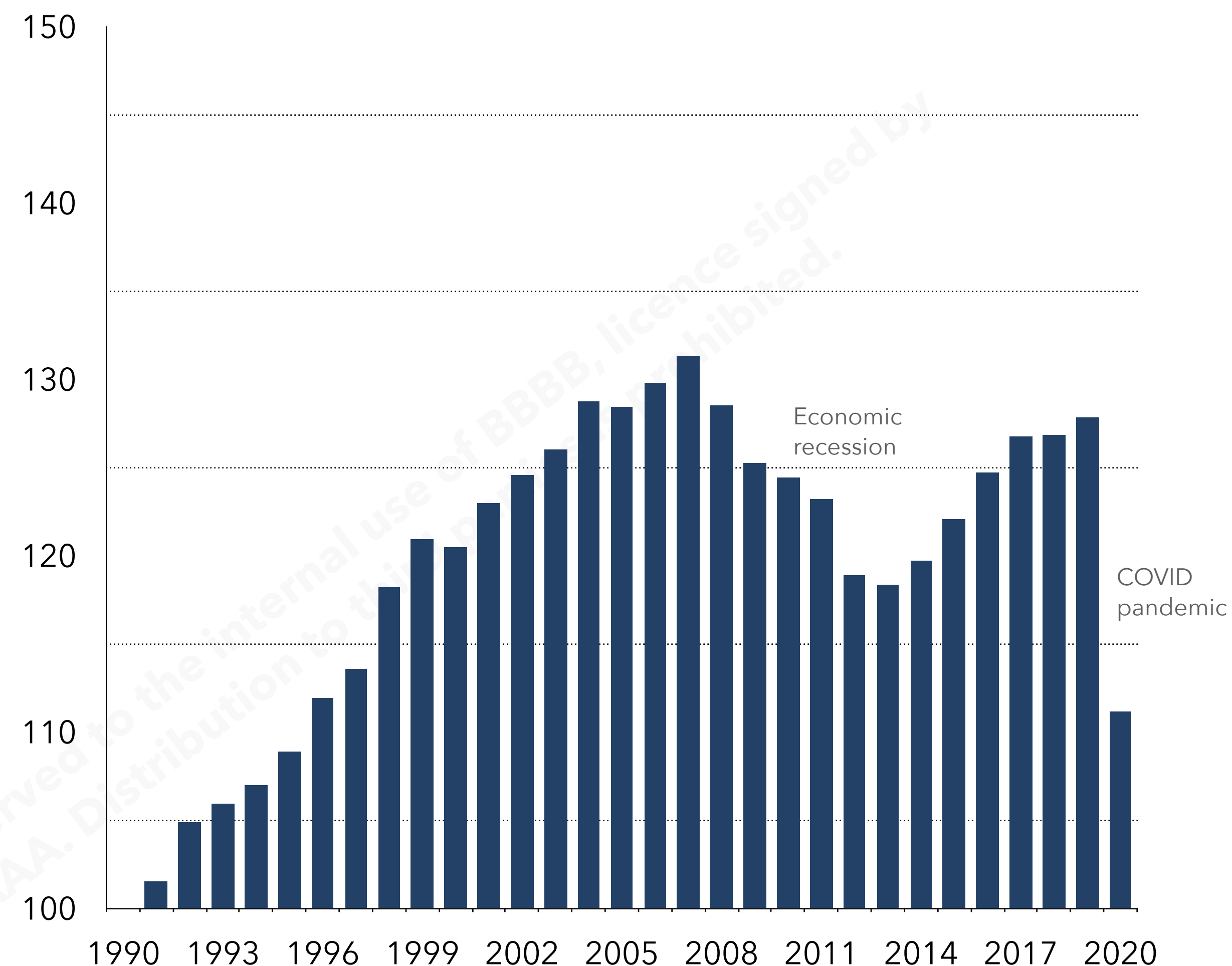
The road transport sector has been a significant contributor to the increase in EU emissions

Greenhouse gas emissions by source in the EU (% , 2020)

- Transport
- Energy
- Households, commerce, institutions & others
- Other

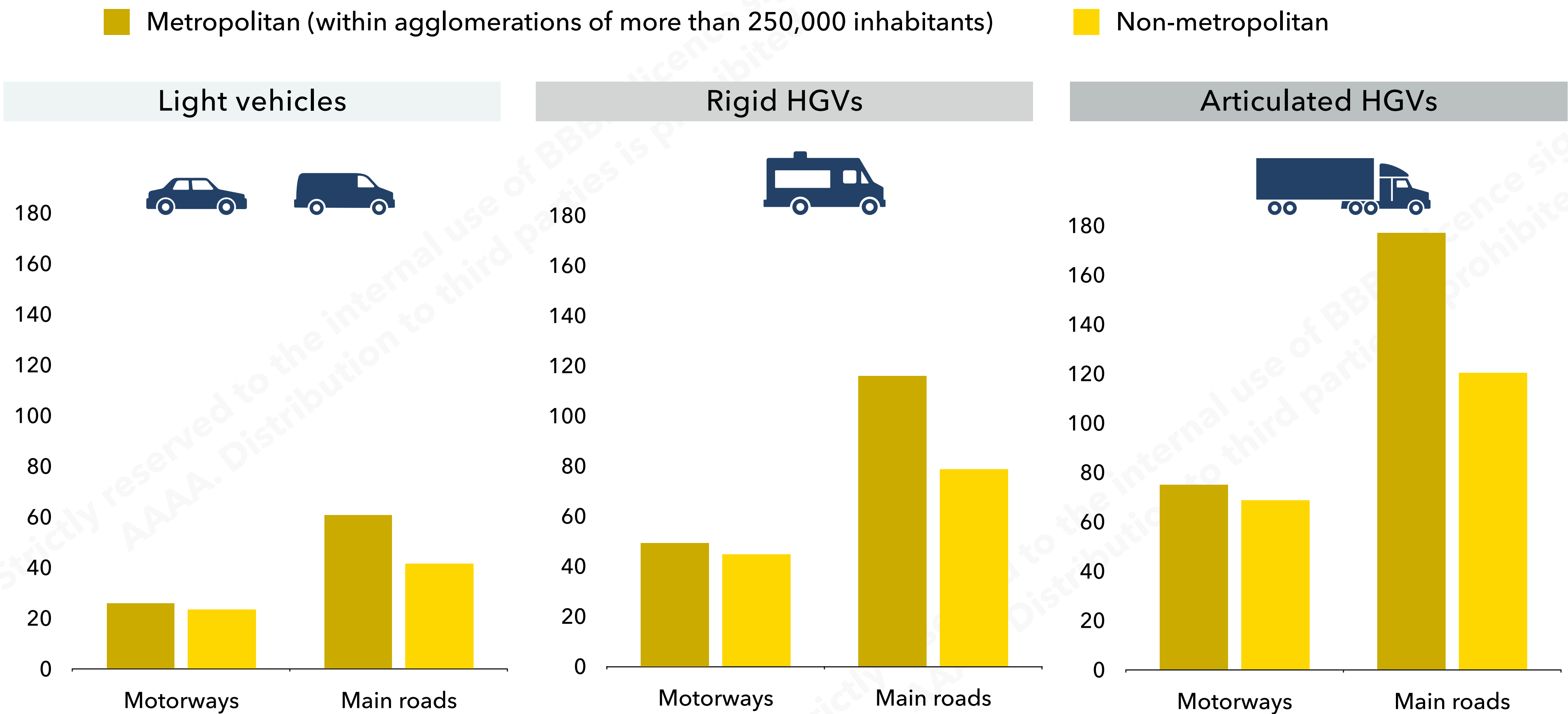


Greenhouse gas emissions of road transport (1990=100)



Urban arteries will have the highest congestion charges and commercial road traffic will be the most discouraged

Reference value* of the congestion charge (Eurocent/vehicle-km)

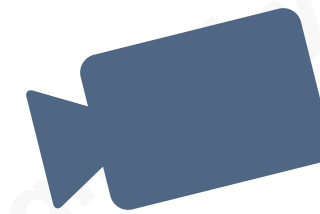


Source: European Commission, PTOLEMUS - Note: * Each Member State shall review the level of charges regularly, at least every 3 years, to ensure that they do not exceed the costs of the actual congestion on the road sections subject to the charge

ANPR is the most problematic technology regarding privacy

GDPR considerations for ANPR

- Contrarily to DSRC and GNSS, a road user can be requested to pay without having contracted the service
- **Highly sensitive personal data is collected and data is processed all the time the vehicle is in movement**
 - Location data is collected processed & transmitted from the camera to the back office
 - Number plate data is collected, which can be considered as a strong identifier of a person
 - A time stamp is collected for each transaction
- Last but not least, unchecked, camera footage can provide **highly sensitive visual information on the driver and his/her passengers**
- **The risk for the road operator is that it collects highly personal data on users that have not provided their consent**
- In addition, given the highly sensitive and comprehensive character of video information, **the security risks are magnified**



Privacy First against the Netherlands

"Standing policy of Privacy First Foundation is to challenge mass privacy violations in court and have them declared unlawful. In recent years, Privacy First successfully did so against the central storage of everyone's fingerprints under the Passport Act (...).

An issue that also lends itself ideally to such litigation concerns the Dutch legislation on Automatic Number Plate Recognition (ANPR) as it applies under the new art. 126jj Sv since 2019.

Under the ANPR law, the license plates and locations of millions of cars in the Netherlands (i.e. everyone's travel movements) are continuously stored for 4 weeks in a central police database for purposes including investigation and prosecution, regardless of whether one is suspected of anything.

This is totally unnecessary, totally disproportionate and also ineffective, several independent studies have shown in recent years.

Moreover, supervision is lacking and the system can easily be abused, confirmed research by NRC Handelsblad, among others.

The current ANPR law thus constitutes a massive privacy violation and simply does not belong in a free democratic constitutional state.

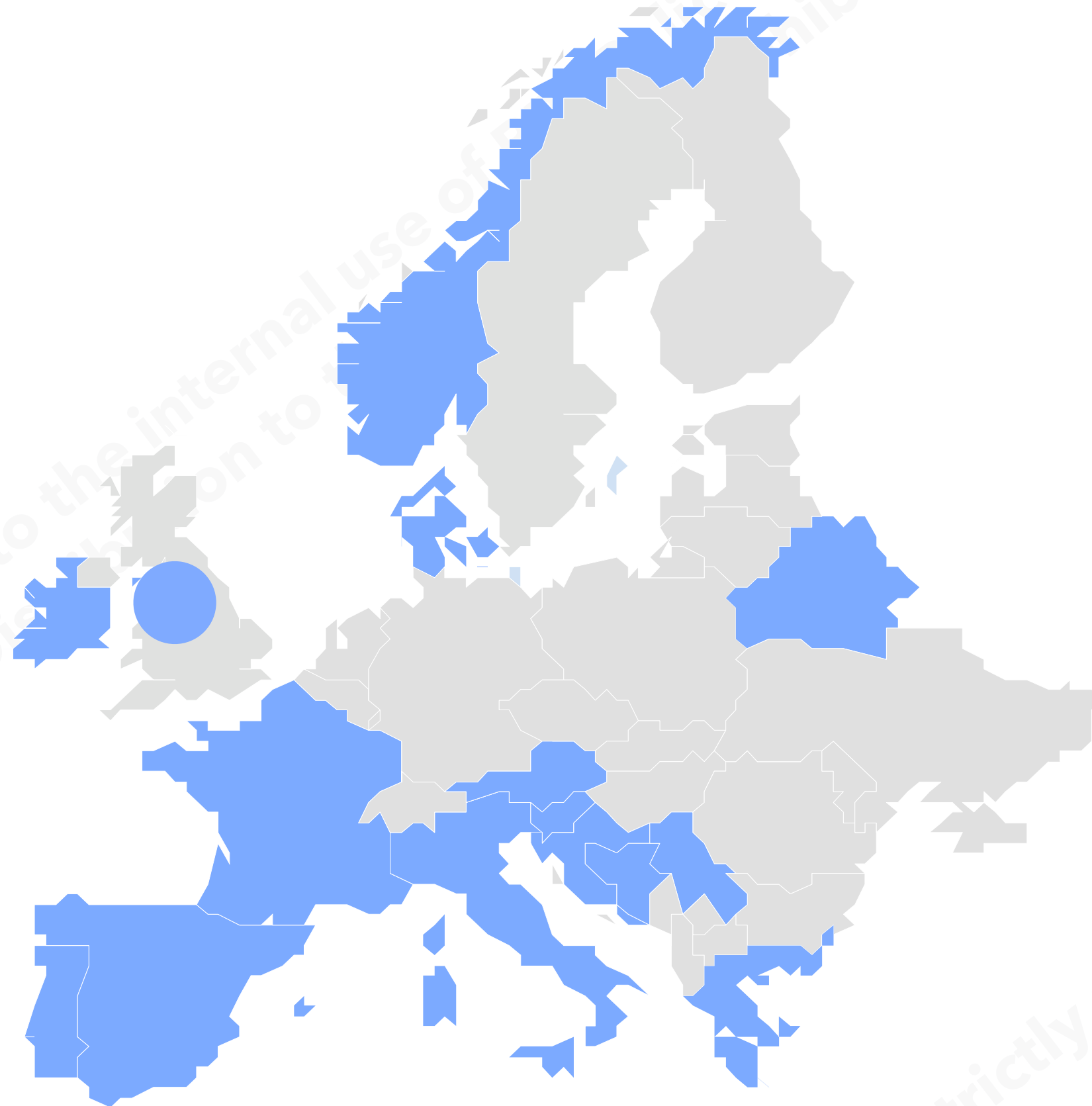
Privacy First has therefore decided to file a lawsuit against the State to invalidate the ANPR law on the grounds of violation of European privacy law."

25th January 2023

DSRC is the main charging technology used for electronic toll collection in Europe

DSRC-based ETC map in Europe

- DSRC** Existing DSRC ETC schemes
- Existing DSRC ETC initiatives

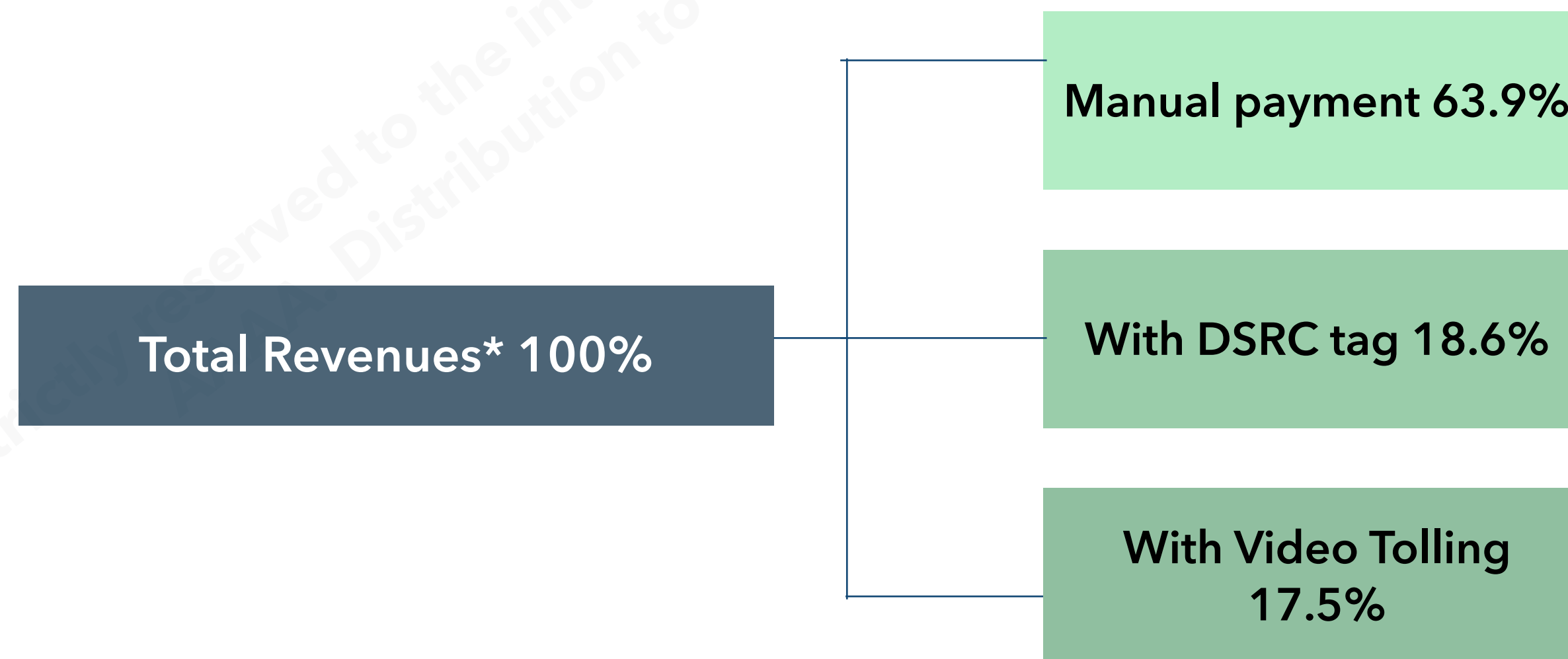
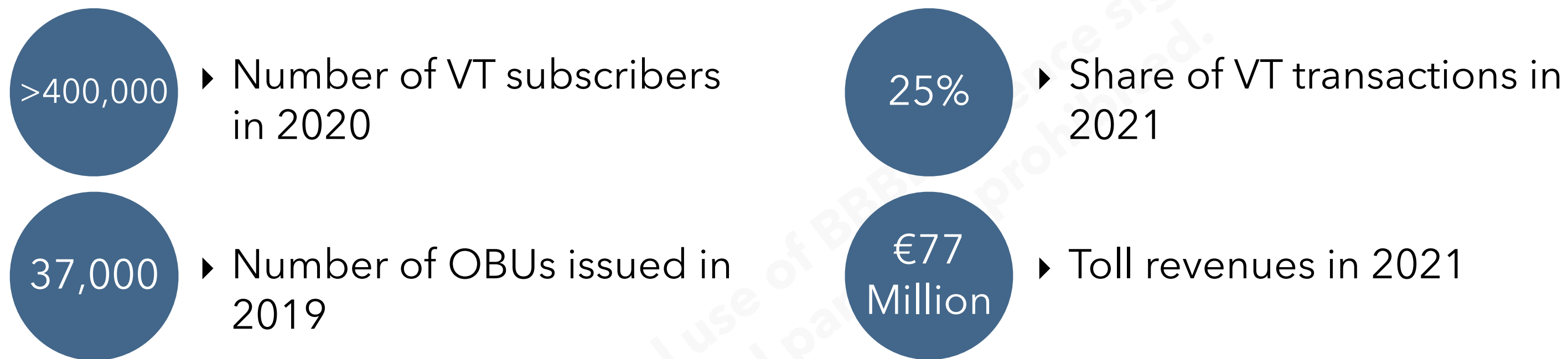


- **Europe is the core market for DSRC, with enabled schemes in 18 European countries**
- In the UK, the M6 Toll and the Humber Bridge are partially/planned to be free flow, with DSRC
- Norway is the country with the highest penetration of DSRC for toll payment; 88% of toll transactions are made with a DSRC tag
- **After 2027, all EETS OBEs, including those for light vehicles, will need to support at least one satellite positioning or mobile communications technology in addition to DSRC**



Only 2 years after its launch, the video tolling transactions reached 25% of total transactions in 2021

Results of the A4 tolling system in Poland



Best practices

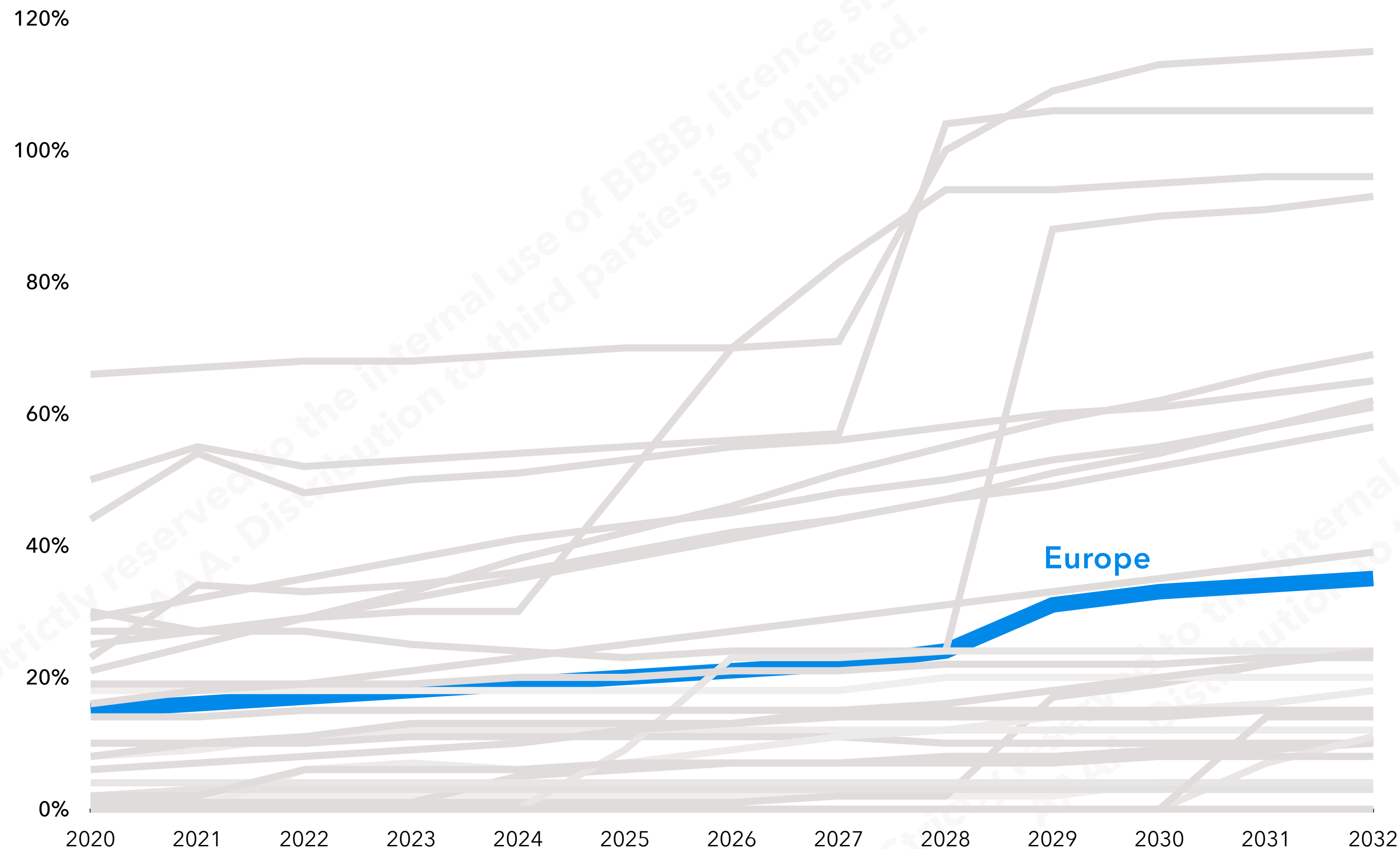
- The OBU is free, requiring only a deposit of PLN 50, and no monthly fees are required
- Telepass OBU can be used to pay tolls in this A4 section
- **Discounts** for light vehicles using an A4GO tag or video tolling system for payment
- Four mobile apps are available to pay tolls using licence plate recognition
- Some fleet card issuers are partnering with Stalexport Autosrada Malopolska in order to link their cards to video tolling
- The video tolling system supports licence plats from the EU and Ukraine
- At the end of 2021, ETC revenues made 36% of total toll revenues, an increase of 9% compared to 2020 (27%)



If the user (car driver) doesn't pay the toll or refuses to pay, a fine will be sent to his address based on the licence plate number

Within 10 years, Europe will double its ETC penetration to reach 35% of vehicles!

ETC penetration by country in 2032 (million)



Source: PTOLEMUS European ETC forecast model

Key influencing factors

- The combination of EU and national regulations with growing road funding needs will help the ETC market make considerable progress
 - **Penetration will grow from 17% in 2022 to 35% in 2032**
- **Tolling will become mainstream as only 4 countries will have a penetration below 5% in 2032** (vs 9 countries today)
- While ETC will still equip a minority of European vehicles then, we expect that **the 120 million market potential will make automotive OEMs consider embedding ETC modules in vehicles, as part of a wider connected vehicle payment options**

Country profiles - Europe

Austria 	Latvia 
Belgium 	Lithuania 
Bosnia and Herzegovina 	Netherlands 
Bulgaria 	Norway 
Croatia 	Poland 
Czech Republic 	Portugal 
Denmark 	Serbia 
Estonia 	Slovakia 
France 	Slovenia 
Germany 	Spain 
Greece 	Sweden 
Hungary 	Switzerland 
Ireland 	United Kingdom 
Italy 	



Country statistics (2022)



BEV & PHEV share of annual registrations: **26%**



Population: **11.5** million



GDP: **€618** billion



Road network: **154,000** km



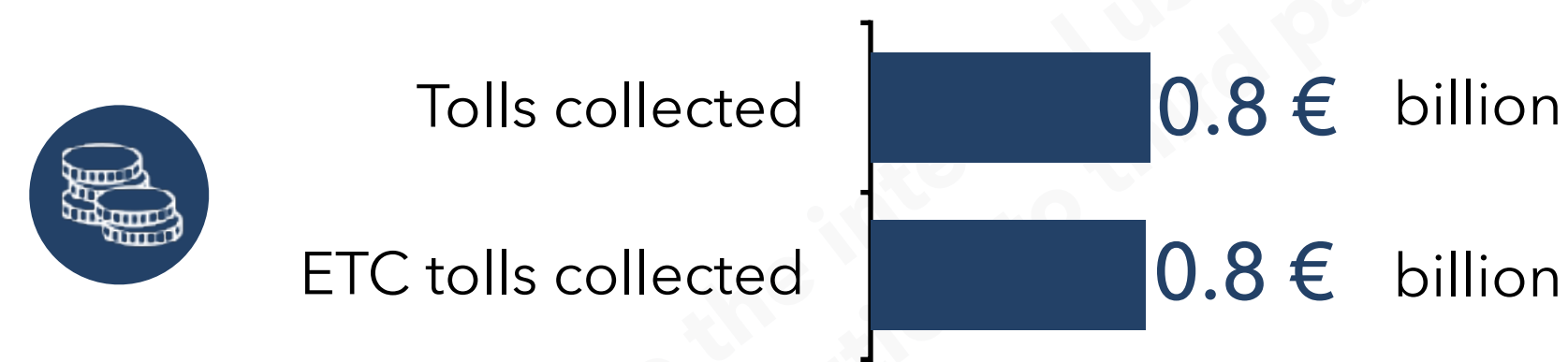
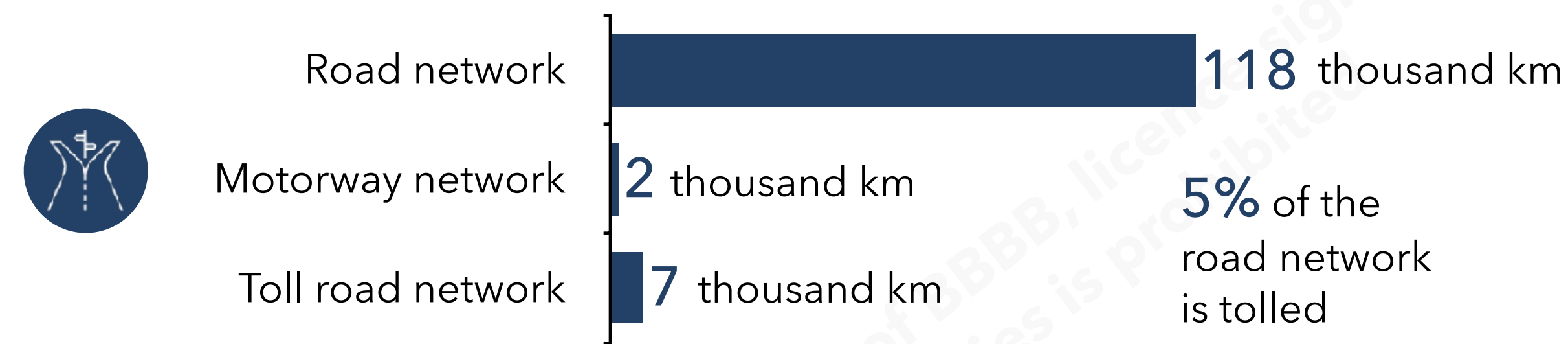
Toll road network: **6,800** km



EETS: **Compatible**

Belgium has a GNSS-based RUC system for HGVs only

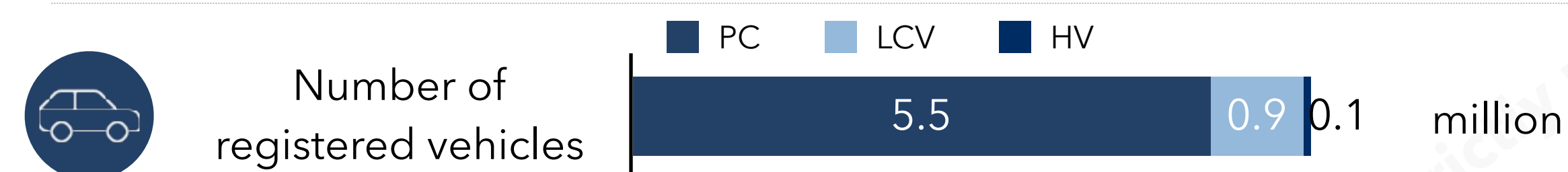
Country statistics (2022)



Vehicles subject to road charges: **HGVs**

Main ETC technology: **GNSS**

ETC subscribers: **0.99 million**



General overview

- **Belgium introduced the Eurovignette system in 1995 for HGVs of more than 12 tonnes**
 - The system was time-based and thus it was not accounting for the distance driven by vehicles, their impact on the road infrastructure and the externalities generated by pollution and noise
- **In April 2016, Belgium left the Eurovignette system to adopt a GNSS-enabled distance-based toll system**
 - The system is called **Viapass**, and it is mandatory for all HGVs heavier than 3.5t
- The system was introduced by the 3 regional governments for several reasons:
 - Ensure a sustainable funding source for road network maintenance
 - Make HGVs pay a fair share for the damage they cause to roads
 - Reduce congestion by making transporters drive in a more efficient way
- Accelerate the adoption of cleaner trucks
- Key stakeholders:
 - Road operators: **Flanders government, Brussels government, Wallonia government (under SOFICO)**
 - Solution provider: Satellic (JV between T-Systems and Strabag)
 - Service providers: Satellic (National Service Provider) and EETS providers
 - Key device & equipment vendors: T-Systems, Continental (devices) and Eikon (enforcement)
- **Flanders and Brussels governments consider the toll fee as a tax, while the Wallonia government consider it as a fee subject to VAT**
- In Wallonia, the revenues are raised by SOFICO, the concession operator
 - It is a company created by the Wallonia region in 1994 in order to accelerate the construction of roads and maintain them

The 3 regional governments designated Satellic to operate the tolling system in Belgium

Value chain structure*

Government oversight and institutions



FEDERAL PUBLIC SERVICE
MOBILITY AND TRANSPORT



Brussels
Government



Flemish
Government



Walloon
Government

Infrastructure operation



Service provision



TAKE THE LEAD



- The road infrastructure network is **managed by the 3 regional authorities**

- Flemish government
- Brussels government
- Walloon government

- The Viapass scheme applies to all of Belgium's 3 regions, with each responsible for its own enforcement

- **65% of the toll revenue is generated in the Flemish region, 34% in the Walloon region and 1% in the Brussels Capital region**

- The regional governments awarded the contract to set up the tolling system to Satellic in 2014

- A joint venture created by T-Systems (76%) and Strabag (34%)

- The contract has a term of 12 years and covers the design, operation and maintenance of the system

- In addition, Belgium has welcomed EETS providers since 2016

- **To date, there are 6 accredited EETS providers**

- **Tolltickets**, a unit of Kapsch, **is being accredited**

- Efkon is the supplier of mobile, portable and stationary enforcement systems including the enforcement back office

- It leverages both DSRC and ANPR

Sub-systems



Systems integration



Systems operation



Devices and equipment

Sub-components



Design and manufacturing



Installation and maintenance



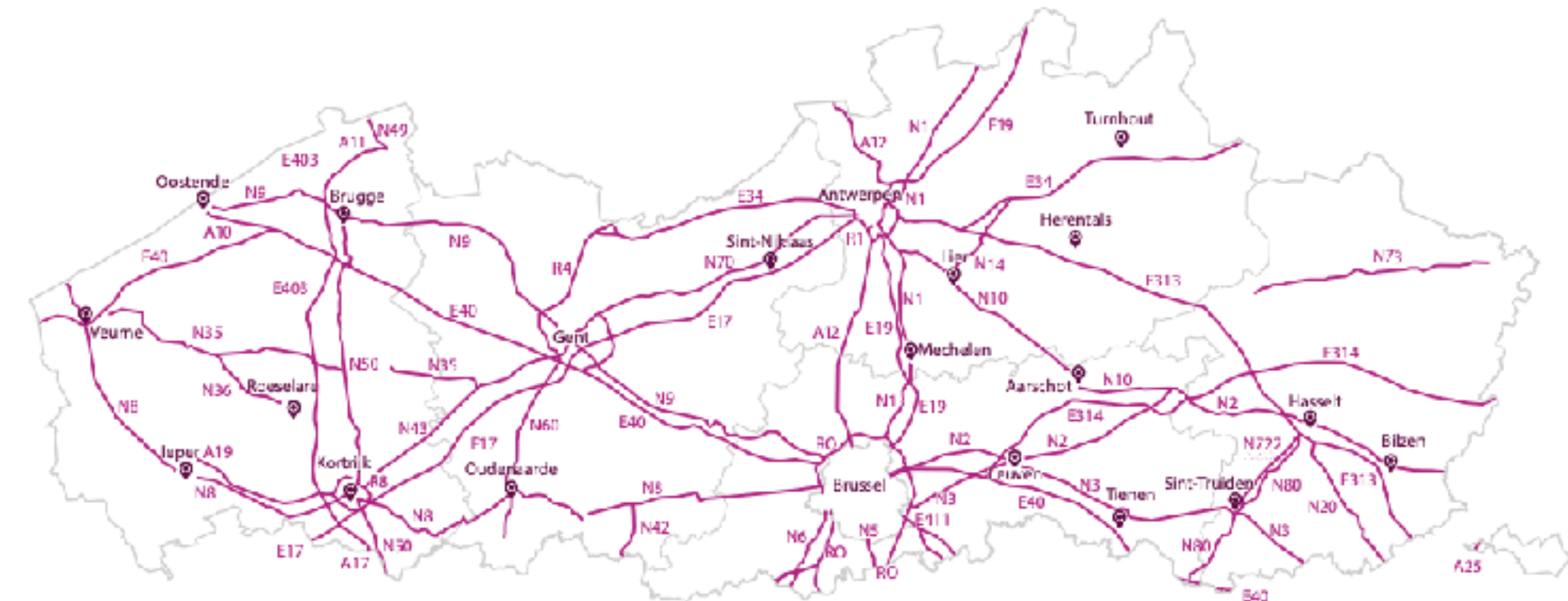
Belgium has a wide tolled network with various and efficient enforcement methods

- The tolling system is applied to **major roads, highways and motorways all over the country**
 - In Brussels, highways as well as regional and local roads are tolled
- The tariffs per kilometre are defined by the regional governments based on:
 - **The Gross Vehicle Weight**
 - **The Euro emission class**
 - **The type of toll road**
- Belgium requires a different rating mechanism: it uses the **"real distance"** to calculate the **toll** (vs the length of tolled sections)
 - This distance must be calculated using the device's latitude and longitude
- For enforcement, gantries are installed in some specific points in the road network
- The gantries are equipped with DSRC readers and ANPR cameras to control the passing vehicles
 - Mobile patrols are also used for enforcement
 - The network is equipped with 39 gantries for enforcement
 - 38 vehicles / motorcycles are equipped for mobile enforcement
 - And 22 mobile tripods help in enforcement
- The use of OBUs requires a deposit from the fleet
 - Satellic for example requires a €135 deposit
- But for other TSPs, a subscription fee is required
 - It could be monthly or only when the OBU is used

FREE ABSTRACT

Tolled network sections by region

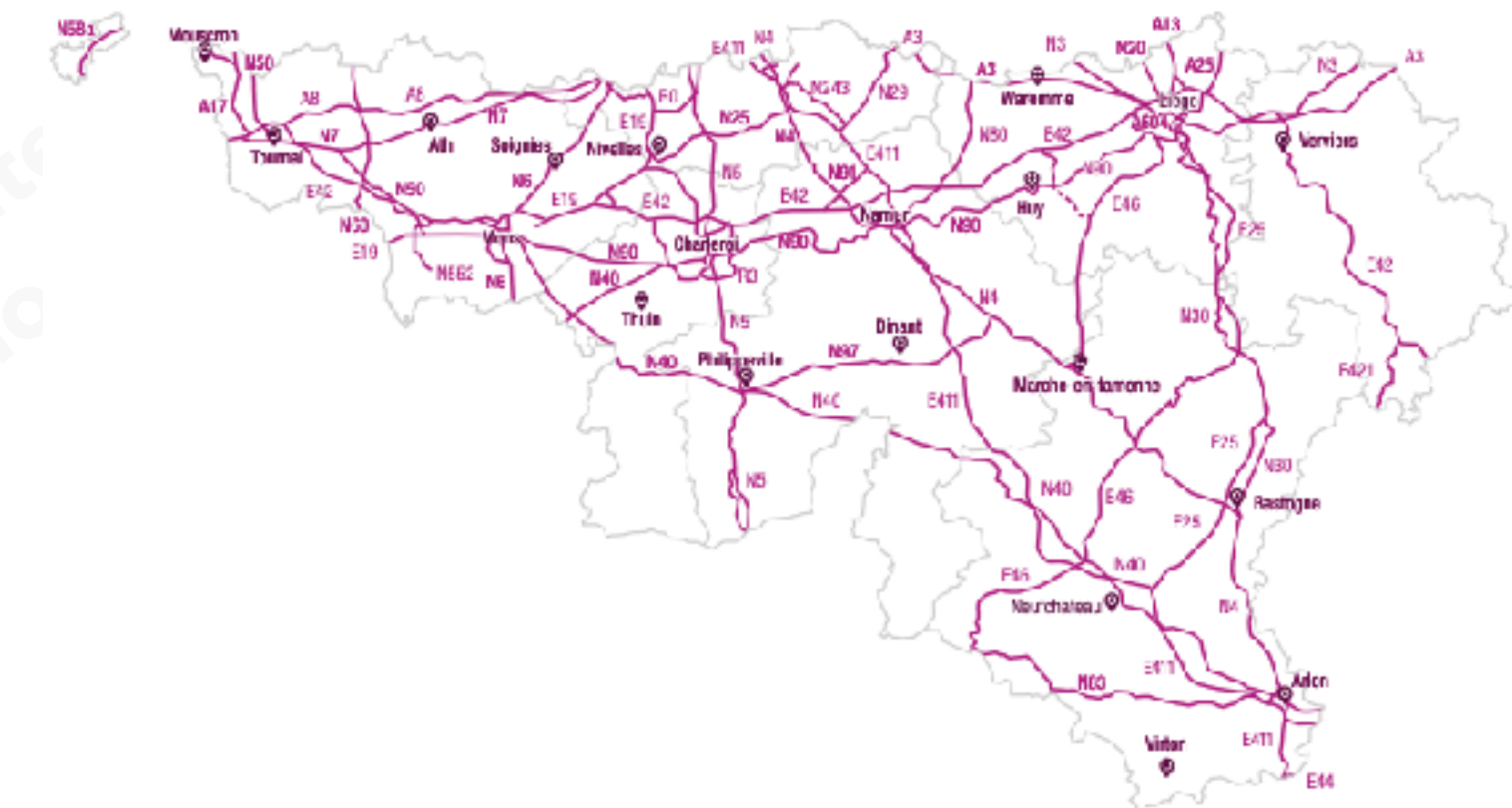
Flanders



Brussels

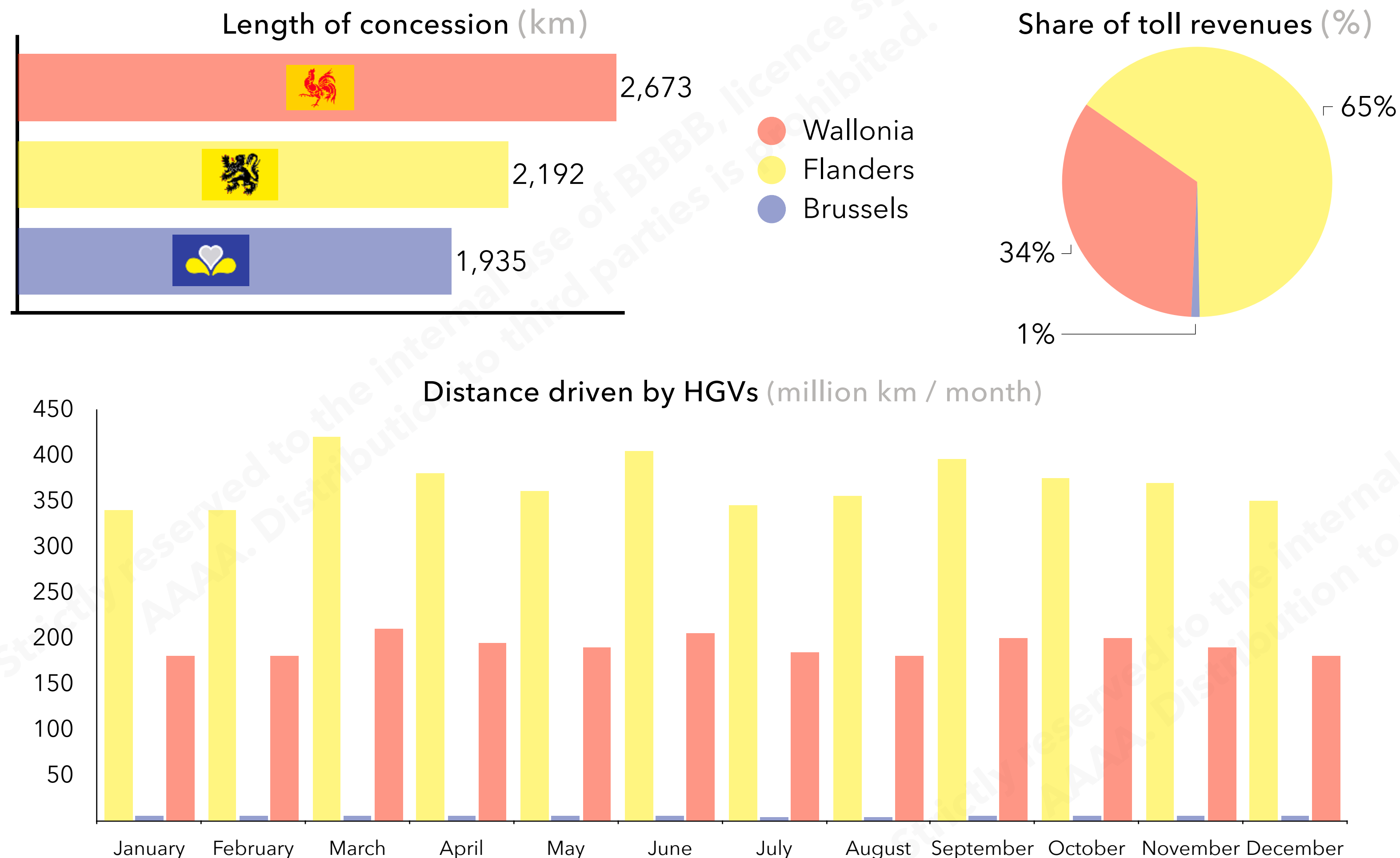


Wallonia



Viapass collected €829 million from its RUC system in 2022, most from Flanders roads

Belgium toll roads statistics (2022)



Source: PTOLEMUS, ViaPass, Wallonie

Toll revenues per region

- Viapass revenues reached €829 million in 2022, an increase of 26% compared to the first year of operations (2016-2017)
 - That is due to an enlargement of the tolled network (about 6% increase)
 - An increase of truck's traffic and toll fees
 - 53.4% of traffic was generated by foreign trucks
- **Flanders is making the highest share of revenues** due to the high traffic passing through its roads
 - Flanders is home of important international seaports in Europe, such as the Port of Antwerp, creating heaving truck traffic
 - Flanders is also the region with the largest population
- Wallonia is less populated than Flanders but the transit traffic is still important in this region,
- **Brussels' region is generating 1% of total revenues** from tolling because of the traffic restrictions and regulations
 - These include traffic control zones, a low-emission zone and specific time restrictions to truck access
 - The tolled network is also smaller than in the other regions

The toll service market in Belgium is open for competition with 6 providers

- In the Viapass system, TSPs distribute OBUs to fleet owners, calculate the kilometres driven and collect the toll fees
 - The TSPs collect data from an average of 147,000 OBUs per business day
- Satellic's devices are only active in Belgium but its 600 000 active OBUs installed in trucks coming from 100 different countries
 - At the end of 2021, Satellic, the national toll service provider was serving 50% of the market thanks to an earlier access to the market
- Belgium is one of the most contested EETS domains in Europe
 - It has accredited EETS providers since 2016
- Viapass has opened the market to 6 TSPs since then
- W.A.G. Payment Solutions became the 6th TSP approved by Viapass in July 2022
- Following its acquisition by Shell, MSTS stopped its accreditation process
- TollTickets has signed its EETS contract with Viapass and is currently in the testing phase
- The offer of value-added services by TSPs in Belgium is still limited
 - Axxès, Eurotoll, Toll4Europe and Total Energies offer parking payments
 - Some others provide truck assistance, fleet management and real time data reporting services for their clients

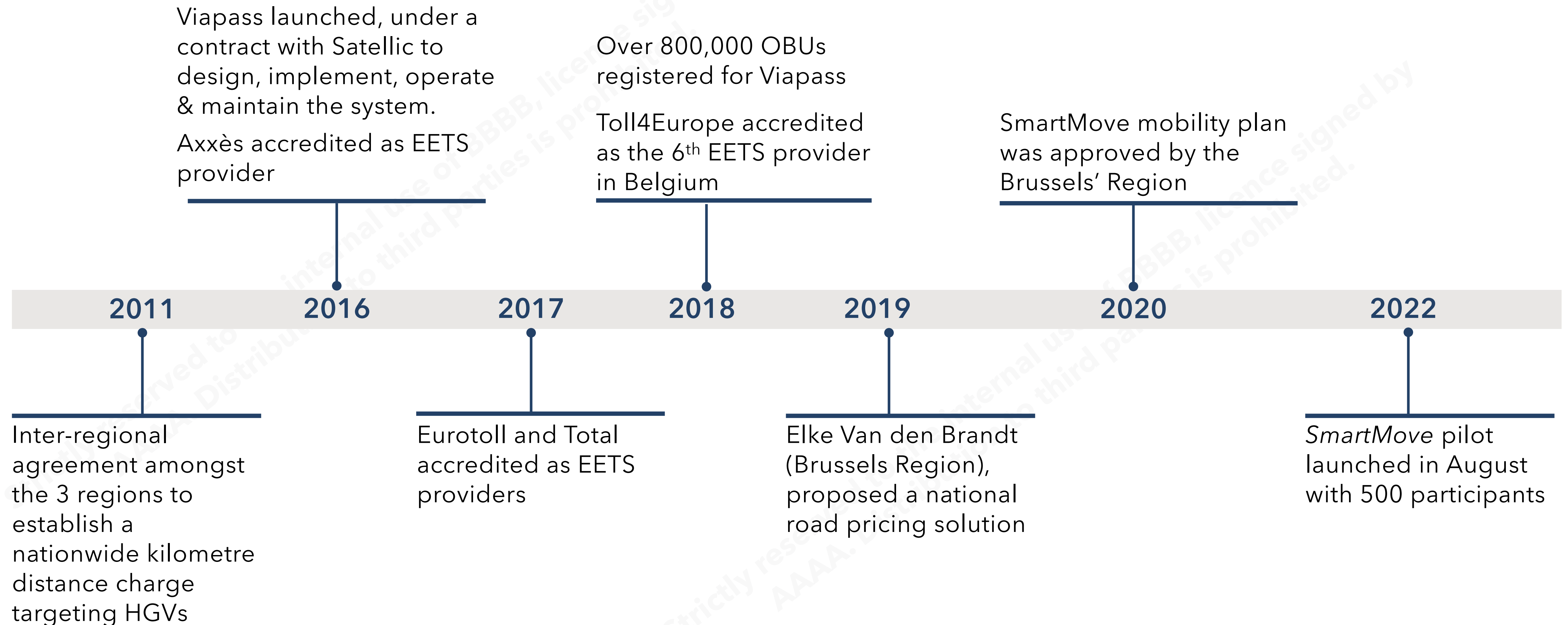
TSPs coverage*



	Satellic 	Axxès 	Eurotoll LUMESIA 	TOLL 4 EUROPE 	Telepass 	TotalEnergies 
Austria		✓		✓	✓	✓
Belgium	✓	✓	✓	✓	✓	✓
Denmark		✓	✓		✓	✓
France		✓	✓	✓	✓	✓
Germany		✓	✓	✓	✓	✓
Hungary		✓		✓	✓	
Italy		✓		✓	✓	
Portugal		✓	✓	✓	✓	✓
Spain		✓	✓	✓	✓	✓
Sweden		✓	✓		✓	✓
Switzerland			✓	✓	✓	

In 2022, Brussels' region launched an experimentation of *SmartMove*, a kilometre charge targeting LVs

Key events in the Belgium tolling industry



Brussels is testing *SmartMove*, a smart kilometre tax to reduce congestion and pollution

- Brussels suffers from heavy traffic, notably due to commuting from other regions and drivers lose 78 hours per year in traffic
- For this reason, **Brussels' government developed a smart kilometre scheme for the city, named *SmartMove*** approved in December 2020 and funded by the EU Horizon 2020 programme
- The project has 2030 targets:
 - Decrease
 - ✓ by 25% the number of single occupant car trips
 - ✓ by 18% km driven in rush hours
 - ✓ by 10% in CO₂ emissions from cars
 - ✓ by 30% time wasted in traffic
 - Increase
 - ✓ by 10% km on foot and by bike
 - ✓ by 30% bus capacity
- **The scheme is expected to allow users to choose between**
 - A fixed day tax (non-distance dependent) using ANPR
 - A variable tax based on distance using a smartphone app
- **The scheme was challenged on a regulatory basis:**
 - In Oct. 2021, the **Council of State confirmed the Region's competence to set up the scheme** but recommended a co-operation agreement with the other regions
 - In Oct. 2021, the APD, the data protection authority, found the use of granular location disproportionate vs the objective and requested adaptation
- Bruxelles Fiscalité, responsible for the implementation, has set up a **pilot scheme**
 - **The app calculates the distance driven on Brussels' road network**
 - ✓ The pilot started in August 2022, and there are now more than 1,000 testers
- If the distance-based charge is applied on a national scheme, it would replace the existing annual road and car registration taxes

SmartMove mobile app



SmartMove charge parameters (for the distance-based option)



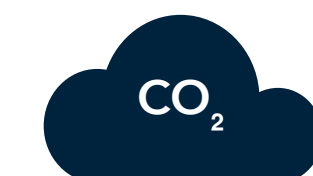
Time of the day



Destination



Engine type



Emissions

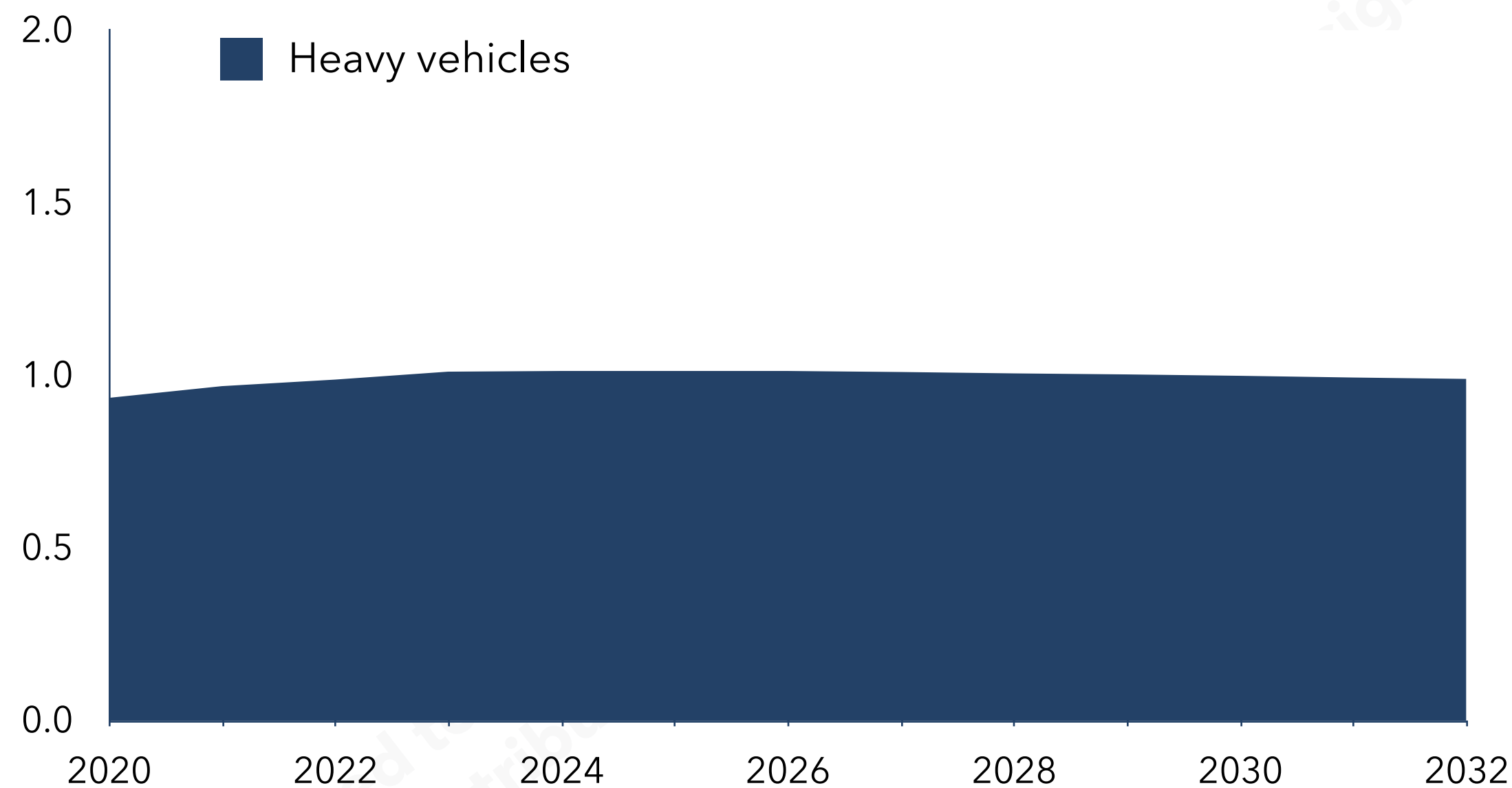
Brussels could be one of the first cities in Europe to implement a mileage-based fee for LVs

- The Viapass RUC system is interoperable and is open to 6 EETS providers
- As in Germany, we understand Viapass is looking towards the thin client model, which could be bringing the map-matching process in-house
 - This would lead to a decrease in EETS providers' remuneration
- The number of EETS providers accredited in Belgium will continue to grow as new providers meet certification requirements
 - TollTickets is in the process of accreditation
- Viapass may start charging toll fees for light commercial vehicles as well in the short term
- **The government is exploring the possibility of extending the toll collection system to passenger cars, although the 3 regions have expressed different opinions on the matter**
 - Brussels' Minister of Mobility, Van den Brandt proposed to introduce RUC to reduce traffic, congestion and CO₂ emissions in the capital region
 - In March 2020, Brussels region approved the *SmartMove* mobility plan, which includes a proposal to abolish car taxes and introduce a "circulation tax"
 - Although not competent*, the Flanders and Wallonia regions are against it and we expect that a nationwide charge could be a way to obtain a consensus
 - probably after the 2024 elections though



We expect Belgium's RUC system revenues to reach a plateau of €1.3 billion in 2032, as environmental charges impact traffic

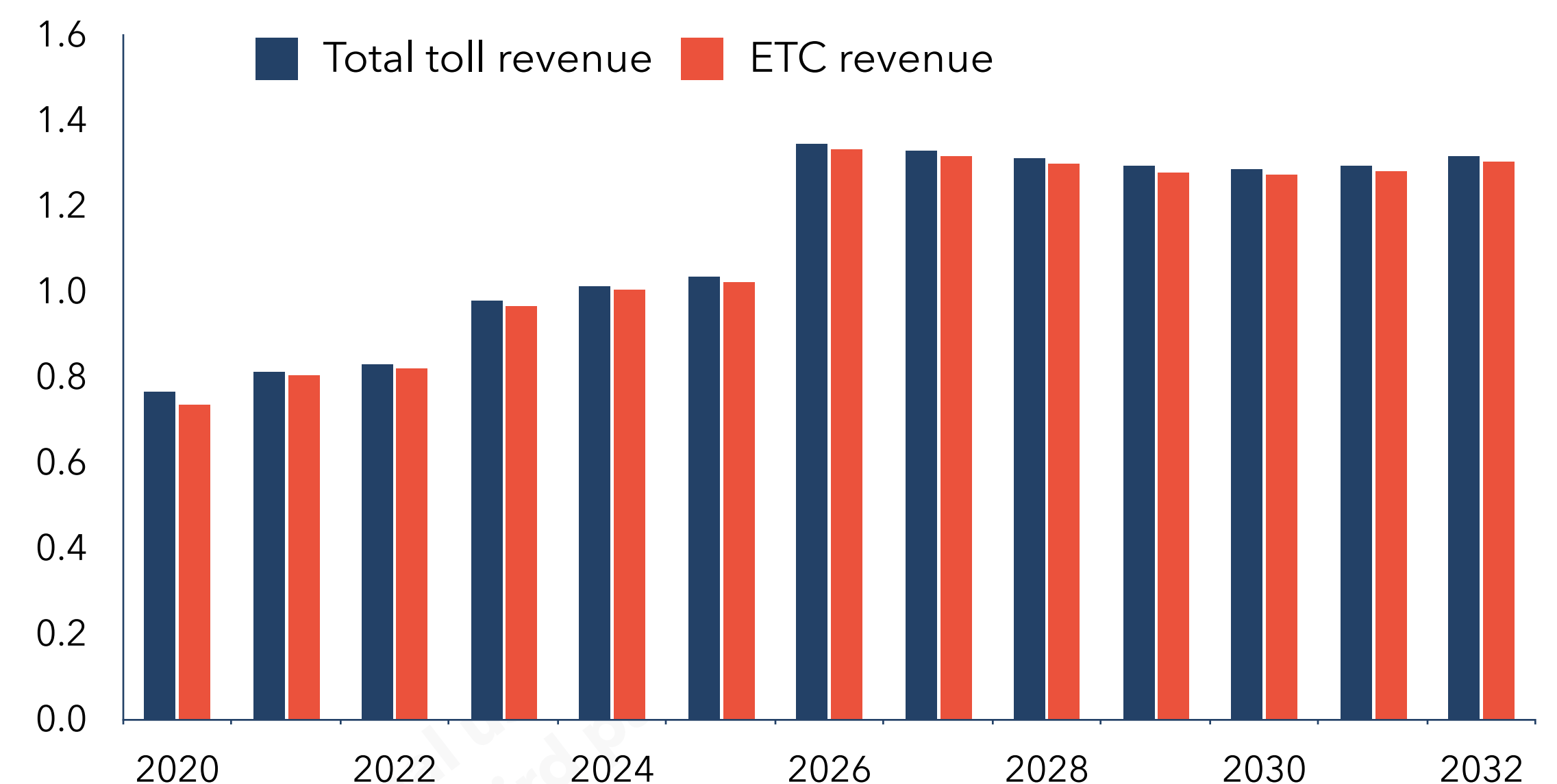
Cumulative number of ETC users (million)



- In Belgium, **the Viapass ETC system for HGVs is mature but still growing**
 - Mandatory since 2016, it is EETS-compatible, involving 6 service providers
 - Flanders expect to add 686 km of existing roads to the toll domain by 2030
- Evolution in the revenues will mostly be driven by the evolution of traffic and rates, which are relatively low
 - **We forecast that the growth of ETC subscribers will be limited in the coming years**, in a context where the number of HGVs in use in Belgium is expected to decline slightly
 - There are no plans for major extensions of the road network in the future, but minor extensions are possible
 - We assume that in the 10 coming years, less than 5% will be added to the network

Source: PTOLEMUS

Toll revenues (€ billion)



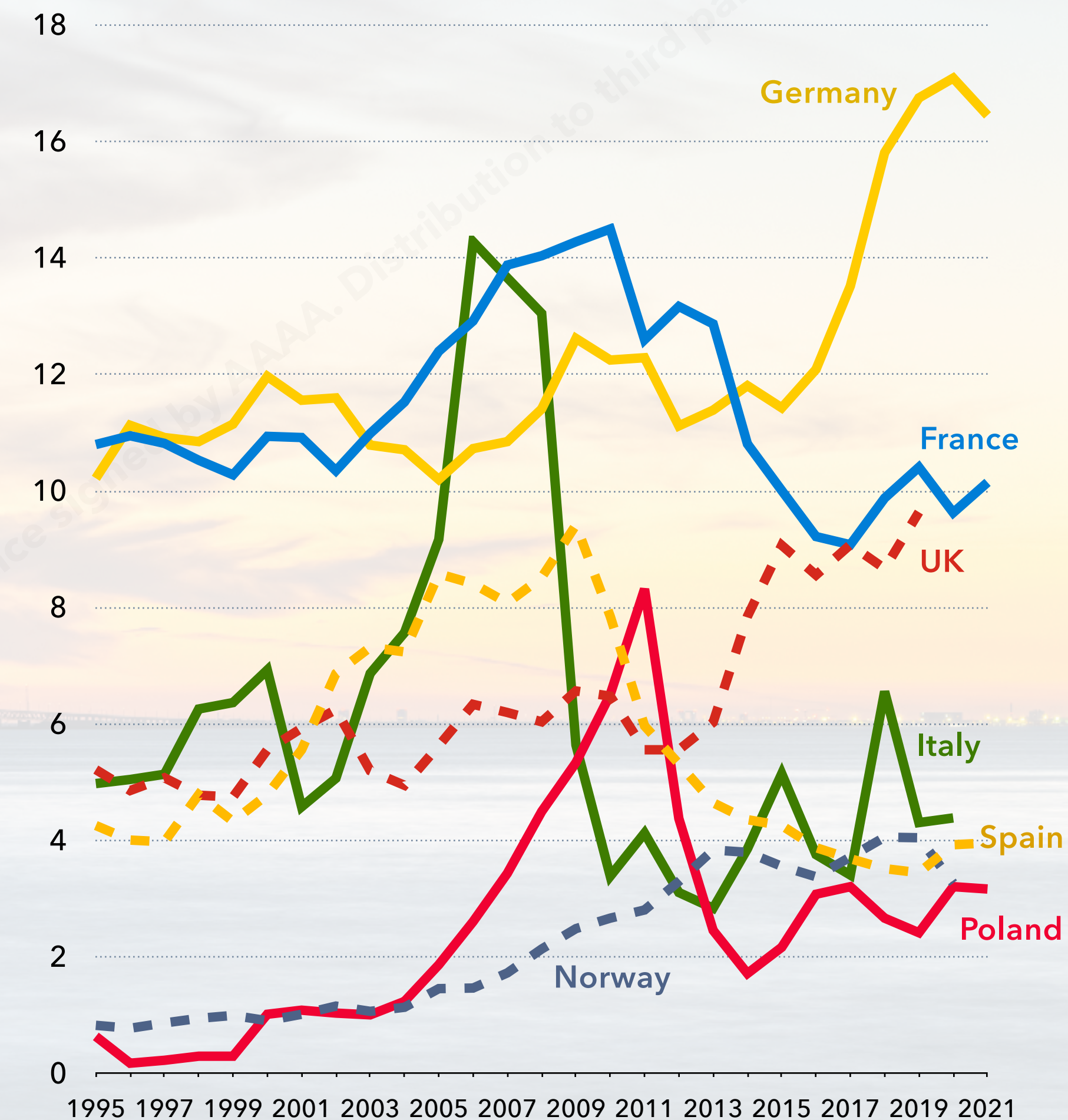
- **We expect toll revenues to reach a plateau from 2026**, as
 - Belgium introduces additional CO₂, air & noise pollution charges to alleviate pressing budget challenges
 - Toll rates in the 3 regions are linked to inflation
 - The significant increases in toll costs start to negatively impact traffic
- **We conservatively assumed that light vehicles would not be tolled**
 - The kilometre charge scheme for LVs in the Brussels region, *Smart Move*, is already at pilot stage but
 - We expect it to be dependent on an agreement between the 3 regions after the 2024 elections, which remains speculative

Road funding is coming into an imminent crisis, from which we expect new solutions to emerge

ROAD FUNDING IS NOT GUARANTEED ON THE CURRENT BASIS

- **Current levels of road infrastructure spending are not sustainable in many European countries**
 - In some of them, the level of investment has decreased significantly in the last 15 years
 - Italy and Spain have divided their investment by 2 between 2011-2020 vs 2001-2010
 - In France, the investment has reached its low water levels
 - Certain CEE countries such as Poland made considerable investment in the 2011-2020 decade but have not been able to sustain them
 - Some of the poorest countries, e.g. Bulgaria, Romania and Serbia have embarked on a major construction drive but will not be able to continue without extra funding source
 - Due to the inflation of raw material prices and staff costs, **road construction becomes more expensive**
- **In addition, in most countries, general budget challenges are growing every year**
 - The combination of inflation, surging defense spendings and rapid ageing of the population are putting considerable pressure on expenditures
- In many countries, **tax and social charges are now exceeding 50% of the GDP**, a level difficult to bear for both households and companies
- **Worse, tax revenues are about to fall due the decrease in fuel tax receipts**
- **During the pandemic, European public debt levels have risen to astronomical levels**
 - **91% of GDP on average in the Euro area**
 - 171% in Greece, 144% in Italy, 113% in Spain, 112% in France, 105% in Belgium, etc.
- **The recent increase in long term interest rates of government bonds is the straw that will break the camel's fall**
 - **As a reminder, these rates are determined by financial markets, not any central banks**
 - 10-year rates* now exceed 4.9% for Italy, 5.9% for Poland, 7.1% for Romania
 - As the 2022 bond sell-off episode in the UK shows, even countries with a good signature are at risk
- **In our view, the current situation is not sustainable in most countries and requires new funding sources, from RUC to new concessions**

Annual road infrastructure spending* (€ billion)



PTOLEMUS

Consulting Group



contact@ptolemus.com
www.ptolemus.com
@PTOLEMUS

Frederic Bruneteau
Managing Director
fbruneteau@ptolemus.com
+32 487 96 1902

Alberto Lodieu
Managing Partner
alodieu@ptolemus.com
+33 6 13 23 61 90