

ELECTRONIC TOLLING

Global Study

**FREE
ABSTRACT**

The latest reference
report on ETC and
Road User Charging



Bridging the environmental gap

The first strategy consulting & research firm entirely focused on augmented mobility & automation

Strategy consulting services

Strategy
definition

Investment
assistance

Procurement
strategy

Innovation
management

Business
development

Project
management

Market research services

Off-the-shelf
reports

Subscription
services

Custom
market
research

Fields of expertise

Mobility services

Car pooling
Car sharing
MAAS

Micro-mobility
Ride hailing
Shared mobility

Smart parking
Tax refund

Vehicle services

bCall
eCall
FMS
SVT / SVR

Tracking
VRM
In-car Wi-Fi
Parking

Navigation
Speed cameras
Traffic information

New energies

BEV
EV charging
Fuel cards

Fuel cells
Hydrogen

PHEV
Vehicle-to-grid

Usage-based charging

Car As A Service
Electronic Toll
Collection

Mobility-as-a-
Service
RUC

UBI / PAYD
Vehicle rental
Vehicle leasing

Vehicle data & analytics

AI
CAN-bus
Crowd-sourcing
Data protection

Driving behaviour
OBD
Predictive
analytics

Remote
diagnostics
xFCD

Vehicle automation

ADAS
Autonomous cars

Autonomous
trucks

Robo-taxis
Shuttles

Enabling technologies

Positioning (GNSS
/ WiFi / cellular)
M2M /
connectivity

Smartphones
Sensors

Telematics
devices
V2X

We serve 320 clients across the mobility ecosystem

Analytics, maps & applications providers



Device & location suppliers



Automotive manufacturers & suppliers



Telematics solution providers



Insurers, aggregators & assistance providers



Mobile telecom players



Fleet & fuel, ITS & regulators

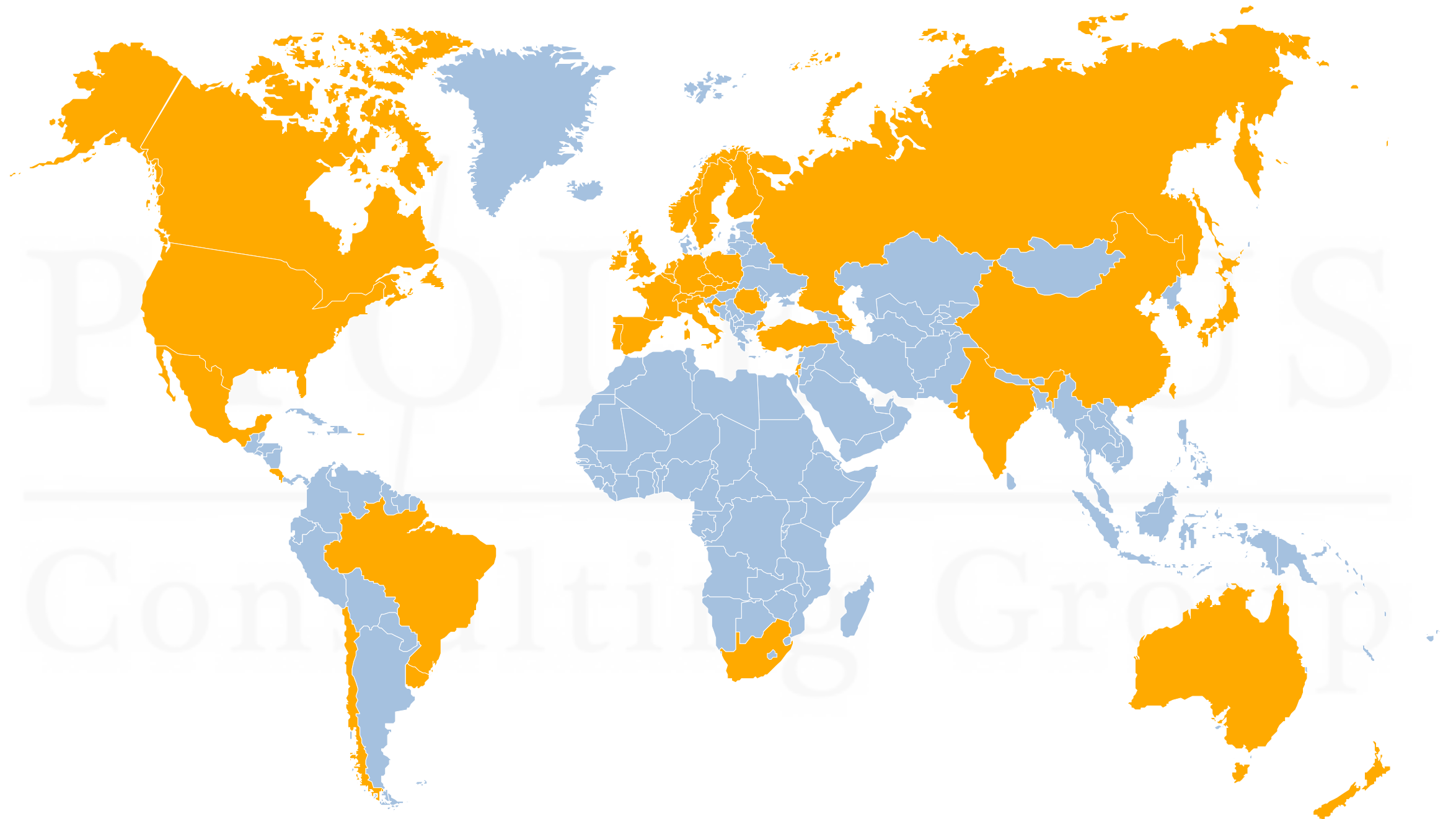


Banks & private equity investors



Our team of consultants, experts & analysts consisting of 10 nationalities helps our clients worldwide

 Clients



35 assignments to help our clients define & implement their ETC and RUC strategies



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



Evaluated GNSS heavy vehicles tolling solutions and assessed building blocks and barriers

Major road operator



Defined & implemented its partnership strategy in the connected vehicle ecosystem

Future EETS provider



Identified market opportunities & defined strategic plan in connected mobility services

Road & infrastructure operator



Defined toll pricing strategy & marketing plan across Europe

Future EETS provider



Assisted the board of its technology unit in its strategy definition

Global motorway operator



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



Defined its global data & analytics strategy to predict incidents

Major road operator



Helped a major EETS provider redefine its strategy and go-to-market plan

EETS provider



Conducted the strategic review of its mobility services business

Major road operator

We help all stakeholders define their e-tolling strategies...



Benchmarked the European market for ETC, fuel card & tax refund services

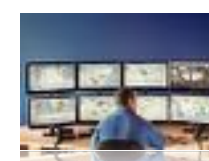
Major fuel card provider



Advised on the optimal structuring of the truck tolling scheme



Defined its strategic positioning in the field of fleet connected vehicle services



Built company strategy, value proposition & go-to-market plan in fleet mobility services

Global electronic tolling supplier



Assisted in forging partnerships in EU connected vehicle ecosystem

Global ETC system provider



Understand the trends of the commercial road transport & payment markets

Group of energy companies



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

Global ETC system provider



Detected opportunities from connected & autonomous vehicles for the space industry

Space agency



Defined its entry into the European ETC market

Automotive tier-1 supplier



Helped the fuel card business unit the impact of key mega-trends in fleet services on their strategy

European oil company

Our experience of due diligence, market sizing & business planning in ETC and fleet services



Led the technology due diligence of Arvento, the leading Turkish fleet management service provider

INVESTCORP



Conducted the due diligence of a major toll service provider

Private equity fund



For its fleet, evaluated the benefits of telematics and scheduling solutions

EUROMASTER



Assisted in the strategic & technology evaluation of an Irish fleet Telematics Service Provider

Motorway operator



Evaluated future changes in the European fleet services market

Fuel card services group



Helped evaluate European OBD market opportunities in fleet services

Major telematics device vendor



Defined our client's strategic plan in the field of connected fleet services

Major motorway operator



Defined the European pricing strategy for FMS, fuel card services, tolling & tax refund

Fleet services provider



Led commercial due diligence of ITmobile, a Belgian fleet TSP

FleetComplete



Led technology due diligence of Lytx, a US video-based fleet Telematics Service Provider

BainCapital



Define its 5-year US fleet services strategy & go-to-market plan

Global fuel card company



Helped define the insurance and fleet management specifications of its eCall on-board unit

Global automotive OEM

PTOLEMUS can help your organisation define and achieve its strategy in fast moving times

- 
- **Strategy definition**
 - Road policy strategy assistance
 - Market entry assistance
 - Data strategy and analysis
 - Mobile tolling strategy development
 - Multimodal mobility design and planning
 - Future vision of vehicle payments
 - Strategy orientation workshops
 - **Innovation strategy**
 - Vertical market assessments
 - Product definition
 - Consent management
 - Data analytics strategy
 - **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 ETC technology
 - **Business development**
 - Partnership strategy definition
 - Assistance to tender response
 - **Project management**
 - Assistance in management of road pricing projects
 - Congestion charge project management

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The report was written by an international team of 7 experts



Frederic Bruneteau

Managing Director, Brussels

The **founder** of PTOLEMUS, Frederic has accumulated **25 years of experience of the mobility and transport domains** and 15 years of strategic and financial advisory.

He has become **one of the world's foremost experts of connected car services & automation** 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.

Within PTOLEMUS, Frederic has led 150 consulting projects and helped many world leaders define their strategy and implement it including:

- **Road operators and ETC solution providers** including Abertis, A-to-Be, Axxès, Brisa, Ferrovial, Egis, Kapsch, Sofico, Transurban, T-Systems / Satellic, Q-Free, etc.
- **Fleet services providers** including AGC, Arvento, Astrata, Bridgestone, BP, Danlaw, DKV Euroservice, Easytrip, ENI, Fleet Complete, Nationwide Insurance, OMV, Routex, TomTom and WEX.
- **Automotive OEMs and their tier-1 suppliers:** AAA Data, AGC Automotive,

Bridgestone, Allianz Partners, AXA Partners, Cihon, CNH Industrial, Coyote System, Europ Assistance, HERE Technologies, Michelin, Scania, Telit, TomTom, Toyota and wejo.

- **Some of the world's most prestigious telematics / analytics suppliers:** Alfa Evolution (UnipolSai), Arvento Mobile Systems, Danlaw, DriveFactor, Eliocity, Fleet Complete, LexisNexis / Wunelli, Mobile Devices, Movelo, Octo Telematics, Orion, Pioneer, Qualcomm, Sentiance and Vodafone Automotive.
- **Financial investors** including Advent International, Amadeus Capital Partners, Amundi, Apax Partners, Atlantis Vest, Bain Capital, Baupost Group, Capvis, Cinven, CIP Capital, Crédit Agricole, CVC Capital Partners, Disruptive Capital Partners, Hellman & Friedman, Hutton Collins, Intek Group, Investcorp, Leonardo & Co, Montezemolo & Partners, Pamplona, Renova Group, Rothschild Capital Partners, Silver Lake Partners, Tantalum and Time for Growth.

Frederic, who contributed to the 2 previous versions of this study, performed a complete review of this report.



Andrew Jackson

Research Director, London

With a career in market research spanning 12 years, **Andrew has over 8 years of experience working in the automotive and industrial sectors for companies** such as Datamonitor, EurotaxGlass and JATO Dynamics;

He has delivered **advisory services, custom projects, data and insights for some of the biggest names in the automotive OEM and OES sectors**, including: BCA, Continental, CNH Industrial, Delphi, Johnson Controls, Hyundai, LeasePlan, Mannheim, Mercedes Benz, Mobis, Philips Automotive Lighting, PSA, SEAT, Tenneco and Volkswagen.

Over the years, he has been sought to share his opinion via a variety of publications such as the *Financial Times*, the *Wall Street Journal* and *Automotive Industries*, *AMonline*, *Fleetworld* and *Fleet News* as well as a variety of national newspapers. He is also interviewed on global automotive events by Bloomberg, CNBC and Reuters.

A Certified Member of the Market Research Society (CMRS) Andrew directed the research and entirely reviewed this report.



Marissa Burkett

Consultant, Paris

Marissa has more than **5 years of experience** in management consulting for organisations such as Advent International, AGC Automotive, Apax Partners, Axxès, CIP Capital, Eagle Hill Consulting, GSGroup, Nationwide Insurance, the Netherlands' Department of Transport, OMV, Q-Free, Transurban, the United Nations, USAid, the US Federal Acquisition Service.

Marissa started at PTOLEMUS as a contributor to the previous ETC Global Study, with a focus on North America.

Since then, she has become the PTOLEMUS in-house ETC expert and led the research team for this report.

Marissa led the research, analysis and writing of this report.

The report was written by an international team of 7 experts



Nina Neubauer
Business Analyst, Brussels

An urban planning and transportation engineering graduate, Nina has developed expertise in **Autonomous Vehicles (AVs), Electronic Toll Collection, Smart Cities and connected cars** by assisting companies such as AXA Partners, Bain Capital, Advent International, Baumarc Project, kasko2go and Vodasun Energie.

She has completed several research projects related to **traffic management and engineering** for the AVL Motor Test Center AB in Gothenburg and within the TU Munich.

For a global roadside assistance operator, she helped defining a **connected car service**

strategy and built a **market forecast of 7 connected car services markets** in Europe.

For a private equity firm Nina conducted market research on the **European electronic tolling market** regarding global business and regulatory trends.

She has built our **2020-2030 global automotive market forecasts** and contributed to our **Connected Vehicle Payments Global Study**.

Nina built the market forecast model for this report.



Jacopo Scudellari
Research Analyst, Brussels

A graduate of urban and mobility planning from Politecnico di Torino, Jacopo has developed expertise in **Electronic Tolling Collection (ETC), congestion charging, and electric vehicles (EVs)** by assisting companies such as Advent International and Hitachi Automotive Systems.

He has gained knowledge of state of the art of the **European and Asia Pacific ETC market**, the main tolling systems currently adopted and the technologies in use while updating the third edition of the ETC Global Study.

He has also **appraised the US electric vehicle market** for a company engaged in the development, manufacture, sales and services of automotive components.

Before joining PTOLEMUS, Jacopo worked for the Politecnico di Torino, Turin, carrying out **research work about the spatial impacts of the diffusion of Autonomous Vehicles (AVs)**.

Jacopo worked on the European and Asia Pacific sections.



Victor Lerin
Business Analyst, Paris

A French-Japanese citizen, Victor obtained a MBA in Business Intelligence in 2018 specialising in open source intelligence, mapping business ecosystems and consultancy work. His final project consisted in producing an in depth study and analysis for a consortium of scientific research institutes (**CVT Allenvi**) to make recommendations on strategic positioning in the field of resilience and smart cities.

Furthermore, he also gained business knowledge by working as the Anti Illicit Trade Advocacy Officer at the **European Chamber of Commerce in Myanmar**

(**EuroCham**). Victor elaborated the strategy for the second edition of the Anti Illicit Trade Forum in held in the capital city of Nay Pyi Daw. His mission was to strengthen dialogue and cooperation between the Myanmar Government and European companies operating locally such as **Unilever, Heineken, Carlsberg, Pernod Ricard, British American Tobacco, Luther Law Firm and Metro**.

Victor worked on the African and Asia Pacific sections.



Solène Pinel
Business Analyst, Brussels

Solene completed her Grande École programme at **EDHEC Business School**. Her **MSc. in Strategy, Consulting and Digital Information** enabled her to acquire essential skills to succeed in the domain of strategy consulting in connected mobility markets.

Prior to joining PTOLEMUS, Solene was part of the SMB (Small & Medium Businesses) team within **Microsoft** France, where she provided guidance and made recommendations on the **strategic actions** required to drive customer acquisition. She also drafted a **detailed assessment of competitive the environment landscape**.

She then moved to **Singapore**, where she worked for a start-up specialised in 3D printing services. She was responsible for **delivering and executing the company's digital strategy**, with a specific focus on the **website revamping and marketing campaigns**.

Within PTOLEMUS, Solene has participated in the launch of the **Connected Vehicle Payments Global Study**.

She led our research into the North American market.

1. Fundamentals of electronic tolling and road user charging

- History, definitions, applications and use cases
- Global overview of technologies and schemes

2. Trends impacting the ETC ecosystem

A. Major political, technological, and market trends

- Political trend overview and impact
- Technological trend overview and impact
- Market trend overview and impact
- Trend assessment by region

B. The impact of COVID-19

- Global COVID-19 response map

- Global traffic volumes and recovery
- Impact on ETC penetration

C. Tolling as a service within mobility payments

- Expansion of toll service offering
- Entrance of mobility service providers and navigation giants into tolling
- Services and payment use cases in the connected car

D. The alignment of road user charging and environmental policy

- The United States and road user charging
- Tolling types and their effects on emissions
- Europe and the green movement
- Congestion charges and Low Emission Zones (LEZ)

3. Traditional and emerging devices and technologies

E. Global technological overview

F. Technology in detail

- RFID
- DSRC
- GNSS
- ANPR
- Infrared
- Mobile
- Fleet telematics
- Embedded

4. The ETC value chain and power players

A. The ETC value chain explained

- Value chain integrators
- Device manufacturers
- Active toll chargers
- Service operators

- Systems specialists
- Active and passive smartphone platforms

B. ETC power players

- The traditional players
 - Road operators
 - Toll service providers
 - Fuel card issuers
 - Energy companies
 - Fleet management service providers
- The new entrants
 - Fleet telematics providers
 - OEMs
 - Navigation giants
 - Payment providers
 - Mobility service providers
- How new entrants will shake up the market

5. Expanding the value with dynamic data

- Data collection and its usage

6. Country-specific analysis

A. North America

- Regional overview
 - Introduction to the region
 - Legislation
 - Potential areas for investment
 - Regional value chain
 - Major local players
 - Technology roadmap
 - Efforts at interoperability
 - Market forecast
- Country profiles
 - Canada
 - USA (including assessment of 14 US states)

B. Latin America

- Regional overview
 - Introduction to the region
 - Legislation
 - Potential areas for investment
 - Regional value chain
 - Major local players
 - Technology roadmap
 - Efforts at interoperability

- Market forecast
- Country profiles
 - Argentina
 - Brazil
 - Chile
 - Colombia
 - Mexico

C. Europe

- Regional overview
 - Introduction to the region
 - Legislation
 - Potential areas for investment
 - Regional value chain
 - Major local players
 - Technology roadmap
 - Efforts at interoperability
 - Market forecast
- Country profiles
 - Austria
 - Belarus
 - Belgium
 - Bulgaria
 - Czech Republic
 - Croatia
 - France
 - Germany
 - Greece
 - Hungary
 - Italy

- Latvia
- Lithuania
- Norway
- Poland
- Portugal
- Russia
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- The Netherlands
- The UK
- Turkey
- Ukraine

D. Asia Pacific

- Regional overview
 - Introduction to the region
 - Legislation
 - Potential areas for investment
 - Regional value chain
 - Major local players
 - Technology roadmap
 - Efforts at interoperability
 - Market forecast
- Country profiles
 - Australia
 - China
 - India

- Indonesia
- Japan
- Malaysia
- New Zealand
- Philippines
- Singapore
- South Korea
- Taiwan
- Thailand

E. Africa

- Regional overview
 - Introduction to the region
 - Legislation
 - Potential areas for investment
 - Regional value chain
 - Major local players
 - Technology roadmap
 - Efforts at interoperability
 - Market forecast
- Country profiles
 - Kenya
 - Morocco
 - South Africa
 - Uganda

7. Global outlook: the future of ETC and RUC

The report mentions more than 335 companies (1/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
407 ETR	Canada	Toll road operator	APRR	France	Road operator	Autostrade per l'Italia	Italy	Toll operator
A-to-Be	Portugal	Tolling, urban mobility, RUC, traffic operations	Aral	Germany	Oil company	Autostrade Tech	Italy	Device and equipment supplier
A4 Mobility	Italy	Systems integrator	Arteris	Brazil	Road concessionaire	Autostrady	Poland	Toll operator
ABCR	Brazil	Association	Arya Omnitalk	India	Systems provider and integrator	Avis	USA	Rental car company
Abertis	Spain	Toll road operator	AS24	France	Fuel provider	Avtodor	Russia	Toll charger
Agencia Nacional de Infraestructura	Colombia	Government institution	ascendi	Portugal	Road operator	Axxès	France	Toll service provider
AISCAT	Italy	Association	ASETA / SEOPAN	Spain	Association	Azuga	USA	Device and equipment supplier
Aleatica	Mexico	Transportation company	ASFINAG	Austria	Toll charger	Baidu	China	Technology company
Alibaba	China	Technology company	ASPI	Italy	Road concessionaire	Bakwena	South Africa	Toll operator
Alipay	China	Technology company	ATI	USA	Association	BancPass	USA	Service provider
Alliance for Toll-Free Interstates (ATFI)	USA	Association	Atlantia	Italy	Concessionaire	Bank Mandiri	Indonesia	Service provider
Allianz	Germany	Insurer	Audi	Germany	Automotive OEM	Beijing Wanji Technology Co., Ltd.	China	Device and equipment supplier
Amazon	USA	Technology company	Automatic	USA	OBD dongle service provider	Belorusneft	Belarus	Petroleum company
AmberOne	Poland	Toll operator	Autopase	Chile	Service provider	BelToll	Belarus	Toll operator
ANIH Berhad	Malaysia	Toll operator	AutoPass	Norway	Service provider	BEMOBILE	Belgium	Mobility service provider
APCAP	Portugal	Association	Autopay	USA	Auto loans service provider	BestPass	USA	Service provider
Apple	USA	Technology company	Autostrada Pedemontans Lombardia	Italy	Toll operator	Bip&Go	France	Service provider

The report mentions more than 335 companies (2/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
Bips&Drive	Spain	Service provider	Chevron	USA	Petroleum company	DBA Group	Italy	Integrator
BlaBlaCar	France	Mobility service provider	Cintra	Spain	Concessionaire	Department for Transport, UK	UK	Toll charger
Blueridge Transportation Group	USA	Transportation company	Citra Marga Nusaphala Persada	Indonesia	Concessionaire	DKV	Germany	Toll service provider
BMW	Germany	Automotive OEM	Cofiroute	USA	Concessionaire	Dots	Latvia	Technology provider
Bosch	Germany	Device and equipment supplier	Comdata	USA	Fleet management service provider	DriveNow	Germany	Mobility service provider
BP	USA	Toll service provider	Conduent	USA	Technology company	e pass	USA	Service provider
Bradesco	Brazil	Banking/financial services	ConectCar	Brazil	Service provider	E-Toll	Australia	Service provider
Brisa	Netherlands	Road operator	Confidex	Global	Mobility service provider	E-ZPass Group	USA	Toll operator
BroBizz	Denmark	Toll service provider	Continental	Germany	Device and equipment supplier	E100 fuel card	Poland	Fuel card provider
California Department of Transportation	USA	Transportation Authority	Coretex	New Zealand	Telematics service provider	EastLink	Canada	Telecom company
Caltrans	USA	Transportation Authority	Costanera Norte	Chile	Toll operator	EasyPark	France	Parking provider
Caminos y Puentes Federales	Mexico	Government institution	Cubic	USA	Transportation company	Easytrip	France	Service Provider
CAVITEX	Philippines	Toll operator	Cyclope.ai	France	Technology provider	Edenred	France	Service provider
Ceitec	Brazil	Chip provider	czechtoll	Czech Rep.	Toll operator	EFKON AG	Austria	Device and equipment supplier
Central Texas Regional Mobility Authority	USA	Toll operator	Daimler AG	Germany	Automotive OEM	EFKON India	India	Device and equipment supplier
Changan	China	Automotive OEM	Daitek	Argentina	Technology company	eFlow	Ireland	Service provider
Chevin	UK	Fleet management service provider	DARS	Slovenia	Toll service provider	Egis	Global	Toll operator/ Service provider
			Dart Charge	UK	Payment provider	Eiffage	France	Transportation company

The report mentions more than 335 companies (3/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
Electronic Transaction Consultants Corp.	USA	Service provider	Feig Electronic	USA	Technology company	GMV	Spain	Technology company
emovis	France	Systems integrator and operator	FleetCor	USA	Service provider	Go PASS	USA	Service provider
ENI	Italy	Service provider	Fleetio	USA	Fleet management service provider	Good to Go	USA	Service Provider
Enterprise	USA	Rental car company	FleetPride	USA	Automotive supplier	Google	USA	Technology company
EROAD	New Zealand	Fleet management service provider	Florida Department of Transportation	USA	Transportation Authority	Greenpass	Brazil	Service provider
European Commission	Europe	Government institution	Florida Turnpike Enterprise	USA	Toll operator	Grundig	Germany	Device and equipment supplier
Eurotoll	France	EETS service provider	Flypass	Colombia	Service provider	Grupo ICA	Mexico	Road operator
Eurowag	Czech Rep.	EETS service provider and fuel card issuer	Ford	USA	Automotive OEM	Hellastron	Greece	Association
Express Toll	USA	Service provider	Fuelman	USA	Fuel card provider	Here	Netherlands	Software editor
ExxonMobil	USA	Petroleum company	GDDKiA	Poland	Infrastructure operator	HGS	Turkey	Service provider
FAI Service	Italy	Fleet management service provider	GeauxPass	USA	Service provider	Hochtief	Germany	Construction company
Far Eastern Toll Company	Taiwan	Toll operator/ Service provider	General Directorate of Highways (KDM)	Turkey	Toll charger	Honda	Japan	Automotive OEM
Fastrak	USA	Service provider	General Motors	USA	Automotive OEM	Horizon Roads	Australia	Road operator
FASTTag	USA	Service provider	Gentex	USA	Automotive supplier	Hu-Go	Hungary	Service provider
FCA	Italy	Automotive OEM	Geotab	Canada	Fleet management service provider	Hyundai	South Korea	Automotive OEM
Federal Highways Administration	USA	Federal transportation agency	GeoToll	USA	Mobile application service provider	I-95 Corridor Coalition	USA	Association
Federal Motor Carrier Safety Administration	USA	Federal agency	GIA Pinfra	Mexico	Concessionaire	I+D	Mexico	Toll operator

The report mentions more than 335 companies (4/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
IAVE	Mexico	Service provider	Kapsch TrafficCom AG	Global	Device and equipment supplier, system integrator and concessionaire	Microlise	UK	Fleet management service provider
IBI	Canada	Systems provider and integrator	Klaxit	France	Carpool service provider	Microsoft	USA	Technology company
IBM	Belgium	System integrator	Korea Expressway Corporation	South Korea	Toll operator	Mitsubishi	Japan	Automotive OEM
IBTTA	Global	Toll associtaion	Liber-T	Belgium	Service provider	Mitsubishi Heavy Industries, Ltd	Japan	Device and equipment supplier
IMS	Canada, USA	Service provider	Link Aja!	Indonesia	Interbank network	MnPass	USA	Service provider
Indra	Spain	System integrator	LinktGO	Australia	Service provider	Morning Station	South Korea	Device and equipment supplier
InsideEVs	USA	Electric car service provider	LogPay	Germany	Toll service provider	Movemais	Brazil	Service provider
Intertoll	Hungary	Toll and motorway infrastructure operator	LOTTOMATICA	italy	Service provider	MSTS	Netherlands	EETS Service provider
INVIAS	Colombia	Government institution	MAC PASS	Canada	Toll service provider	National Highways Authority of India	India	Government institution
itronics	France	Electronic card manufacturer	Mack	USA	Automotive OEM	NationalPass	USA	Service provider
ITS Teknik	Denmark	Technology company	Marga Mandalasakti	Indonesia	Concessionaire	Navistar	USA	Automotive OEM
Jasa Marga	Indonesia	Concessionaire	massDOT	USA	Government institution	NCS	Singapore	Systems integrator
Jawaz	Moroco	Service provider	Mastercard	USA	Payment service provider	Neology	San Diego US	Device and equipment supplier
JD.com Inc.	China	Payment application	Maven	USA	Technology company	NEXCO	Japan	Road operator
Jenoptik	Germany	Device and equipment supplier	McDonalds	USA	Fast food company	Nissan	Japan	Automotive OEM
JP Autocested	Bosnia and Herzegonia	Concessionaire	Mercedes-Benz	Germany	Automotive OEM	NLEX	Philippines	Toll solutions provider and systems management company
K-Tag	USA	Service provider	Metro Pacific Tollway Company	Philippines	Tollway company	Norbit	Norway	Device and equipment supplier

The report mentions more than 335 companies (5/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
Northgate Public Services	UK	Systems integrator	Pase Urbano	Mexico	Service provider	Rosavtodor	Russia	Toll charger
Northwest Parkway	USA	Toll operator	PaseYa	Colombia	Service provider	RT-invest Transport Systems	Russia	Device and equipment supplier
Novopayment	Latin America	Latin American payment provider,	PayByPlate	USA	Service provider	RUC Monkey	New Zealand	Telematics service provider
Nusantara Infrastructure	Indonesia	Concessionaire	PayTollo	USA	Service provider	Sacyr	Spain	Construction company
NZ Transport Agency	New Zealand	Toll operator	PeachPass	USA	Toll operator	SANEF	France	Road operator
OmniAir	USA	Association	Pikepass	USA	Toll operator	SANRAL	South Africa	Road operator
Omulus Infotech	India	Technology company	Platon	Russia	Toll solutions provider and systems	Satellit	Belgium	Service provider
OMV	Germany	EETS service provider	PLUS Expressway	Malaysia	Concessionaire	Scandlines	Denmark	Ferry operator
Oracle	USA	Technology company	PlusPass	USA	Service provider	Scania	Sweden	automotive OEM
Oregon Department of Transportation	USA	Transportation Authority	PSA Group	France	Automotive OEM	Schneider Electric	Global	Integrator
ØRESUNDSBRO KONSORTIET	Denmark	Road operator	Q-Free	Norway	Device and equipment supplier	SCTEX	Philippines	Road operator
OSI Optoelectronics	USA	OSI sytems company	Qualix	India	Integrator	Sem Parar	Brazil	Service provider
Pagatelia	Spain	Service provider	Quickpass	USA	Service provider	Shell	Global	Energy company
pagseguro	Brazil	Digital payment services provider	Raytheon	USA	Technology company	SIC TransCore	Latin America	Device and equipment supplier
Palmetto Pass	USA	Service provider	Renault	France	Automotive OEM	SICE	Spain	System integrator
Panasonic	Japan	Device and equipment supplier	Ressa	Italy	Energy company	Siemens	Germany	Device and equipment supplier
ParkNow	France	Parking solutions	Rivian	USA	Automotive OEM	Skycash	Poland	Payment service provider

The report mentions more than 335 companies (6/7)

Company	Country	Type	Company	Country	Type	Company	Country	Type
Skytoll	Slovakia	Toll charger	Telekom Slovenia	Slovenia	Telecomms company	Tolplan	South Africa	Toll road operator
Statefarm	USA	Insurance company	Telekomunikasi Indonesia (Telkom)	Indonesia	Service provider	TomTom	Netherlands	Telematics service provider
STRABAG	Austria	Construction company	Telepass	Italy	Toll operator	Tönnjes	Africa	Tolling solutions provider
Sund & Bælt Holding A/S	Danemark	Infrastructure operator	Teletrac Navman	USA	Fleet telematics providers	Total	Global	Energy company
Sunpass	USA	Service provider	Televia	Mexico	Service provider	Touch 'n Go	Malaysia	Service provider
Survision	France	Technology provider	Telit	Global	Technology provider	Toyota	Japan	automotive OEM
Suzuki	Japon	Automotive OEM	Telkom Indonesia	Indonesia	Telecomms company	Traffic Management Technologies	South Africa	Traffic management company
Syndicate RFID	India	Device and equipment supplier	Tencent	China	Technology company	Trafineo GmbH & Co. KG	Germany	Toll service provider
T pass	Russia	Service provider	Tenpay	China	Payment service provider	TransCore Inc.	USA	Device and equipment supplier
T-Systems International GmbH	Denmark	Integrator	Texas Department of Transportation	USA	Transportation Authority	Transport for London	UK	Transportation authority
Taggy	Brazil	Service provider	Thales	France	Transportation and technology company	Transurban Group	Australia	Toll operator
Tanktaler	Germany	Mobile application provider	The Toll Roads	USA	Service provider	TxTAG	USA	Service provider
Tata Motors	India	Automotive OEM	Toll Tag	USA	Service provider	U.S. Bank	USA	Bank
Tattile	Italy	Device and equipment supplier	Toll2Go	Austria	Service provider	Uber	USA	Mobile application
Teco Smart Technologies Co., Ltd	Taiwan	Device and equipment supplier	Toll4Europe	Europe	EETS Service provider	uly	France	Service provider
Tecsidel	Spain	Systems provider and integrator	Tollr	India	Service provider	UnipolSai Assicurazioni S.p.A.	Italy	Insurance company
Teletronica	Argentina	Technology company	Tolltickets	Germany	EETS Service provider	United States Department of	USA	Federal agency

The report mentions more than 335 companies (7/7)

Company	Country	Type	Company	Country	Type
Uproad	USA	Payment application	Vitronic	Germany	Device and equipment supplier
UTA	Germany	EETS service provider	Volkswagen	Germany	Automotive OEM
Veloe	Brazil	Service provider	Volvo	Sweden	Automotive OEM
Vendeka	Turkey	Device and equipment supplier,	Wanji	Asia	ETC manufacturer
Verdeva, Inc	USA	Payment application	Washington State Department of	USA	Transportation Authority
VeriToll	USA	Tolling as a Service operator	WeChat	China	Technology company
Verizon Telematics	USA	Telematics service provider	Wex	USA	Fleet management service provider
Verra Mobility	USA	Transportation Authority	WirelessCar	Sweden	Telematics service provider
Via Verde	Portugal	Service provider	WSP	Canada	Professional service company
Via-T	Spain	Service provider	Xevo	USA	Telematics company
Vialitoral	Portugal	Concessionaire	YOUNGWIN	South Korea	Parking solutions
Vialtis	France	Fleet management service provider	ZTE	China	Toll solutions provider and telecomms
Viapass	Belgium	Toll operator			
Vias Chile	Chile	Concessionaire			
viaTOLL	Poland	Service provider			
Vinci	France	Road operator			
Visa	USA	Payment service provider			

The study will answer the key strategic questions

What technology and model will be used in my geographical market in 2030?

Where are the main opportunities to invest in surface infrastructure?

What will be the split between manual and electronic toll payments in 2030?

Is the US ready to implement road usage charging (RUC)?

What is the impact of interoperability programmes on toll chargers and service providers?

Will new technologies help drivers accept tolling?

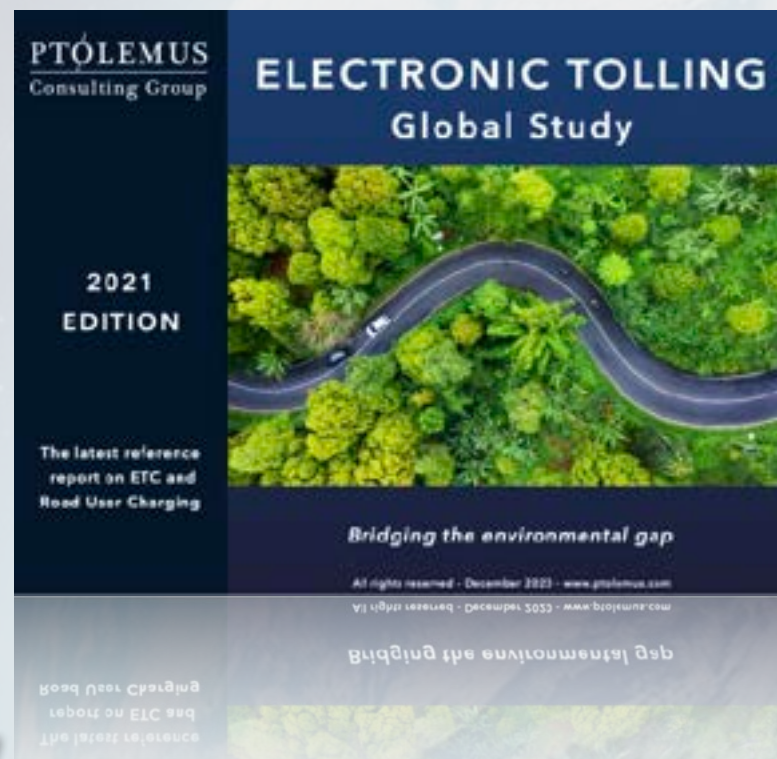
How does data help providers expand their service offerings?

Will multi-lane free flow tolling become the new normal?

Which OEMs are implementing connected toll payment?

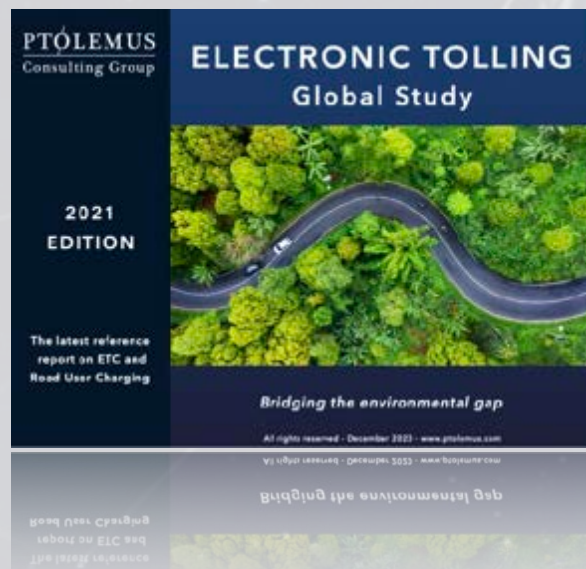
Will toll devices disappear?

How are toll service providers addressing the growth of smartphone use?



How can toll service providers protect their market share against new entrants?

The most comprehensive report on electronic tolling and road user charging



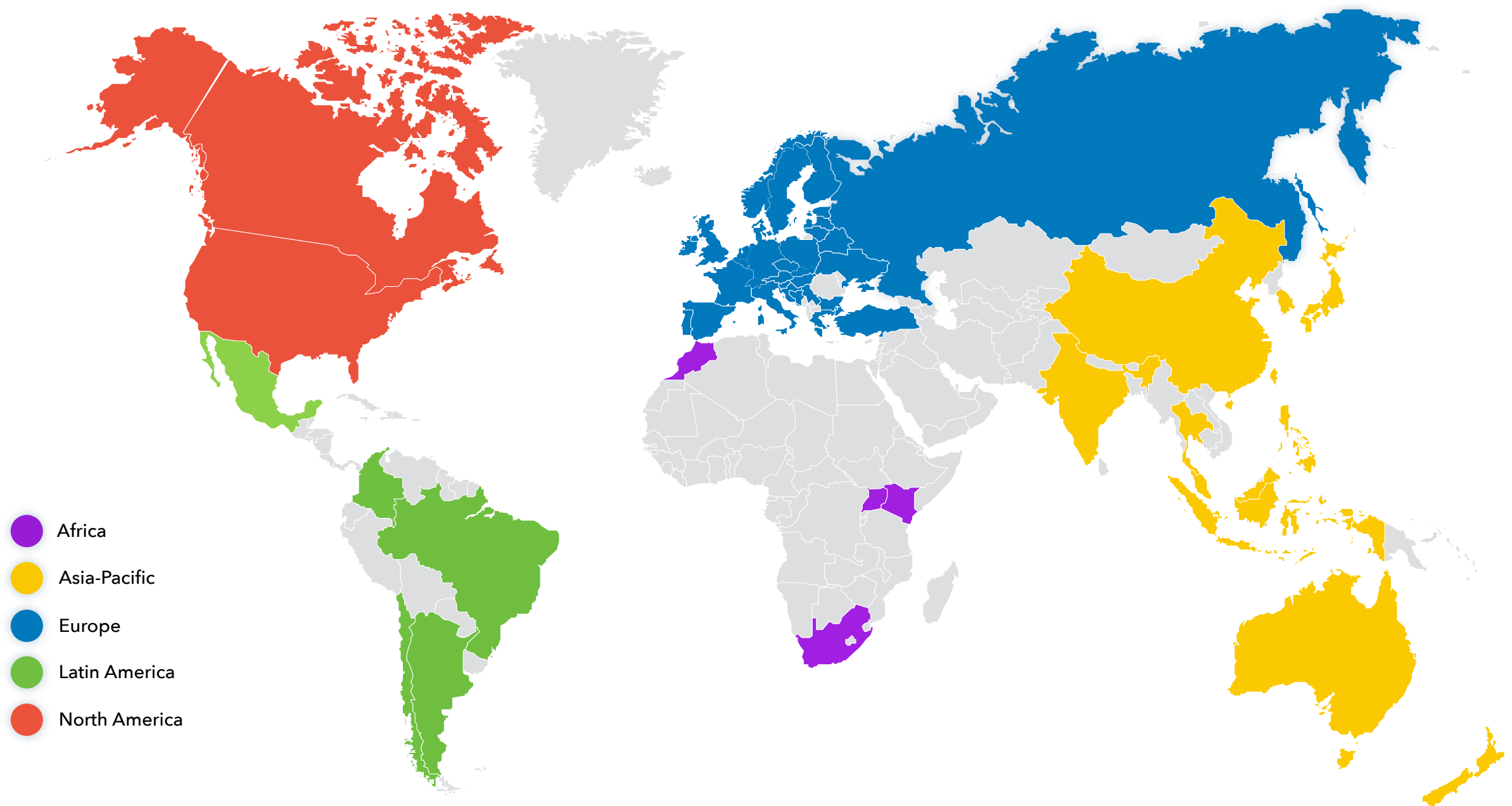
More than just market research.

A strategic analysis on the future of road pricing and environmental standards

- An update to our 2018 Electronic Toll Collection Global Study providing an all-encompassing overview and outlook on the electronic tolling market
- A 950-page analysis of the global electronic tolling landscape based on:
 - 9 years of constant market surveillance
 - 60 interviews with key stakeholders
 - 6 months of desk research by a team of 7 consultants
 - 35 strategy consulting assignments in the domain
- An in-depth review of the 55 largest countries that operate tolling worldwide with traffic volumes, technology, model, size and revenues projections
- A comparative assessment of all tolling technologies:
 - Deployment models and impacting trends for ANPR, DSRC, Infrared, GNSS and RFID
 - Assessment of emerging technologies including fleet telematics devices, smartphones, and connected car payments
 - Forecast of the technology mix
- 9 EETS service providers profiled, analysing:
 - Strategic position
 - Service breakdown
- An in-depth assessment of each of the 5 main regions including:
 - Introduction to each region including legislation and major infrastructure campaigns
 - Forces and models shaping interoperability
 - Review of current and future projects
 - Regional value chain and presentation of major local players
 - Regional technology roadmap
 - Country profiles for the major tolling domains in each region
- 2020-2030 bottom-up market forecast
 - Global scope: 49 countries investigated in detail
 - Regional and global projections of the toll and electronic toll market: toll revenues, subscription volumes, share of ETC, key influencing factors
 - An Excel file with subscription volumes by technology and vehicle type, devices sold, total revenues collected and ETC-only revenues collected

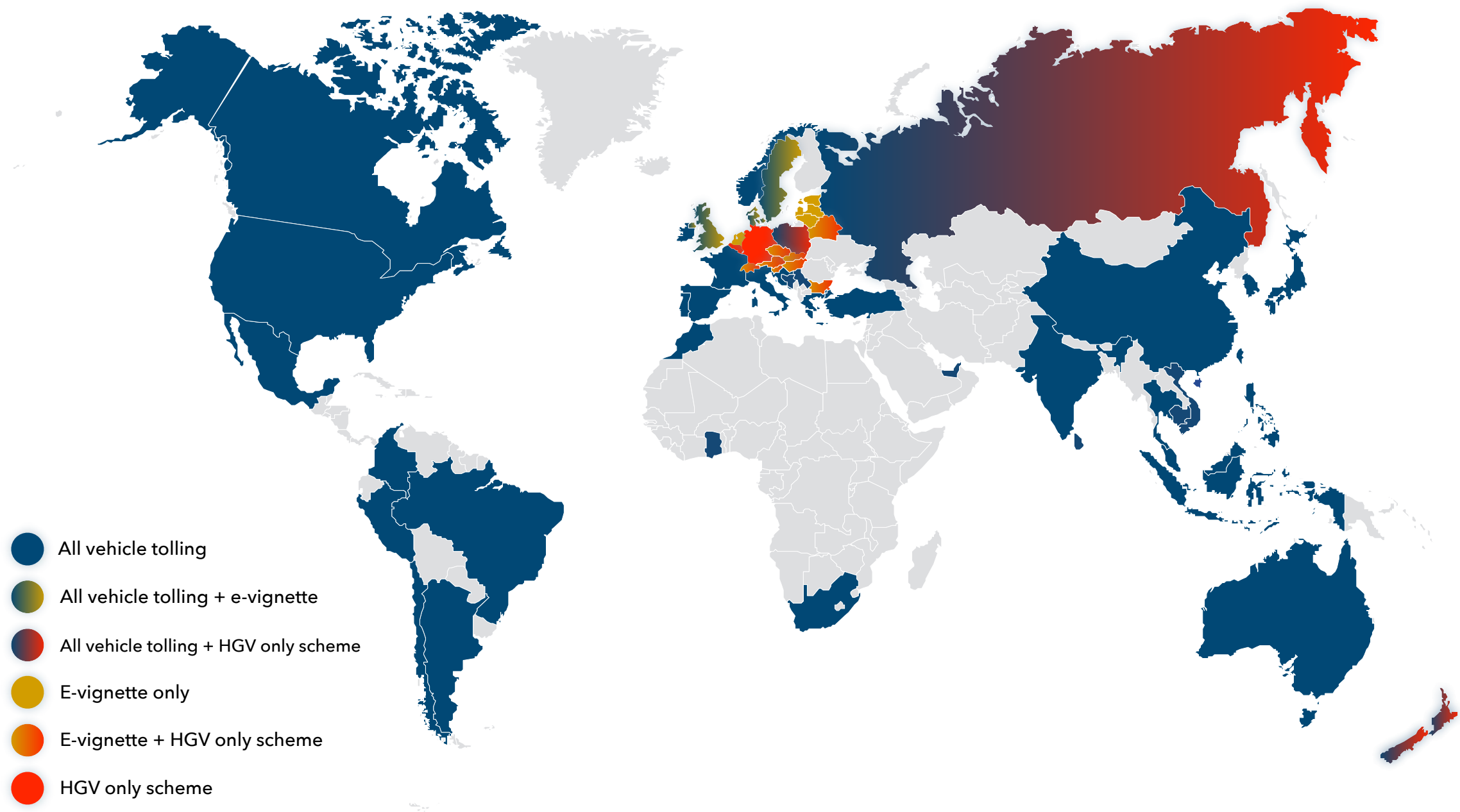
Across the report, we deliver qualitative and quantitative insights into 55 countries

Report coverage



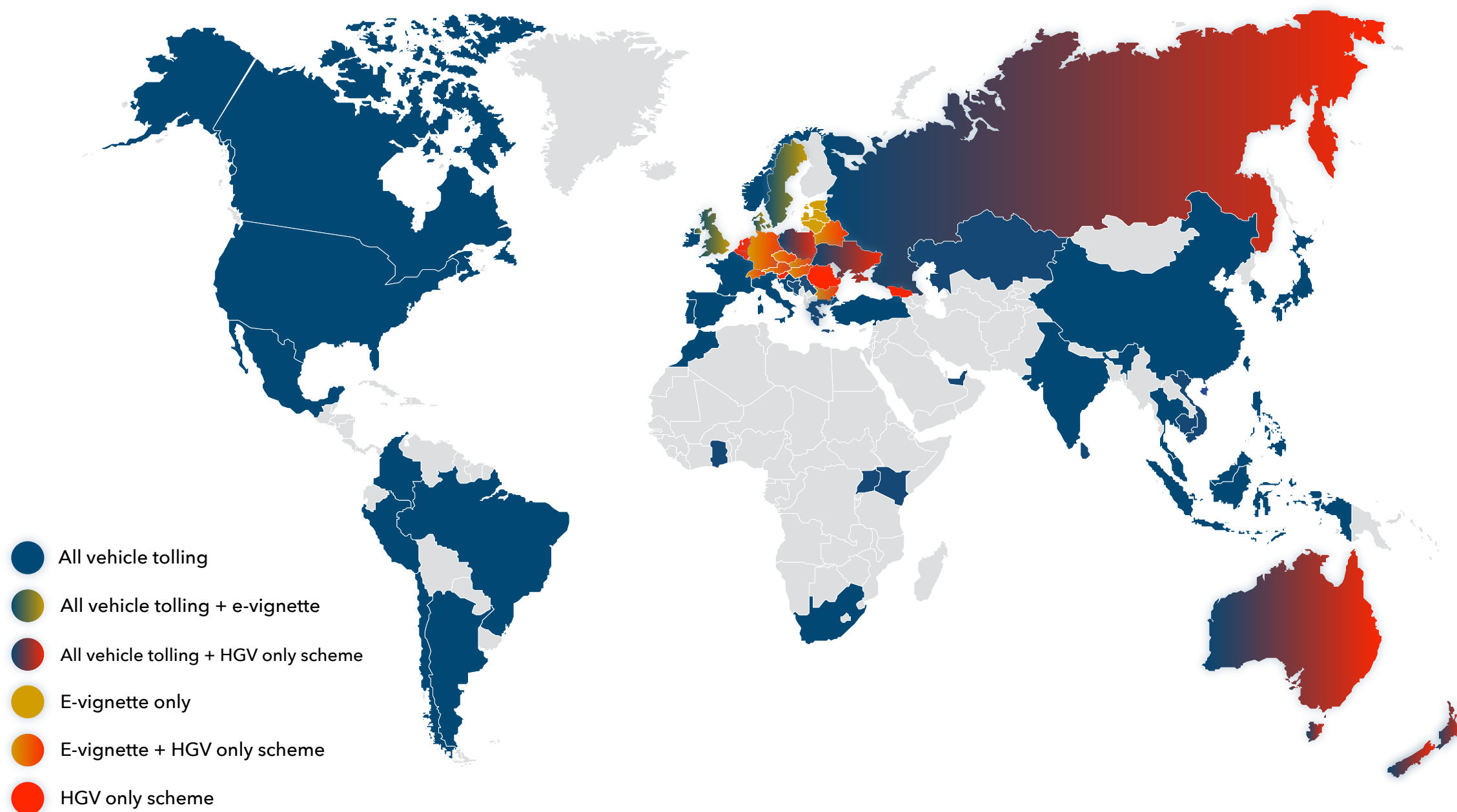
Electronic road tolls currently exist in 53 countries

Electronic tolling schemes in place, 2020



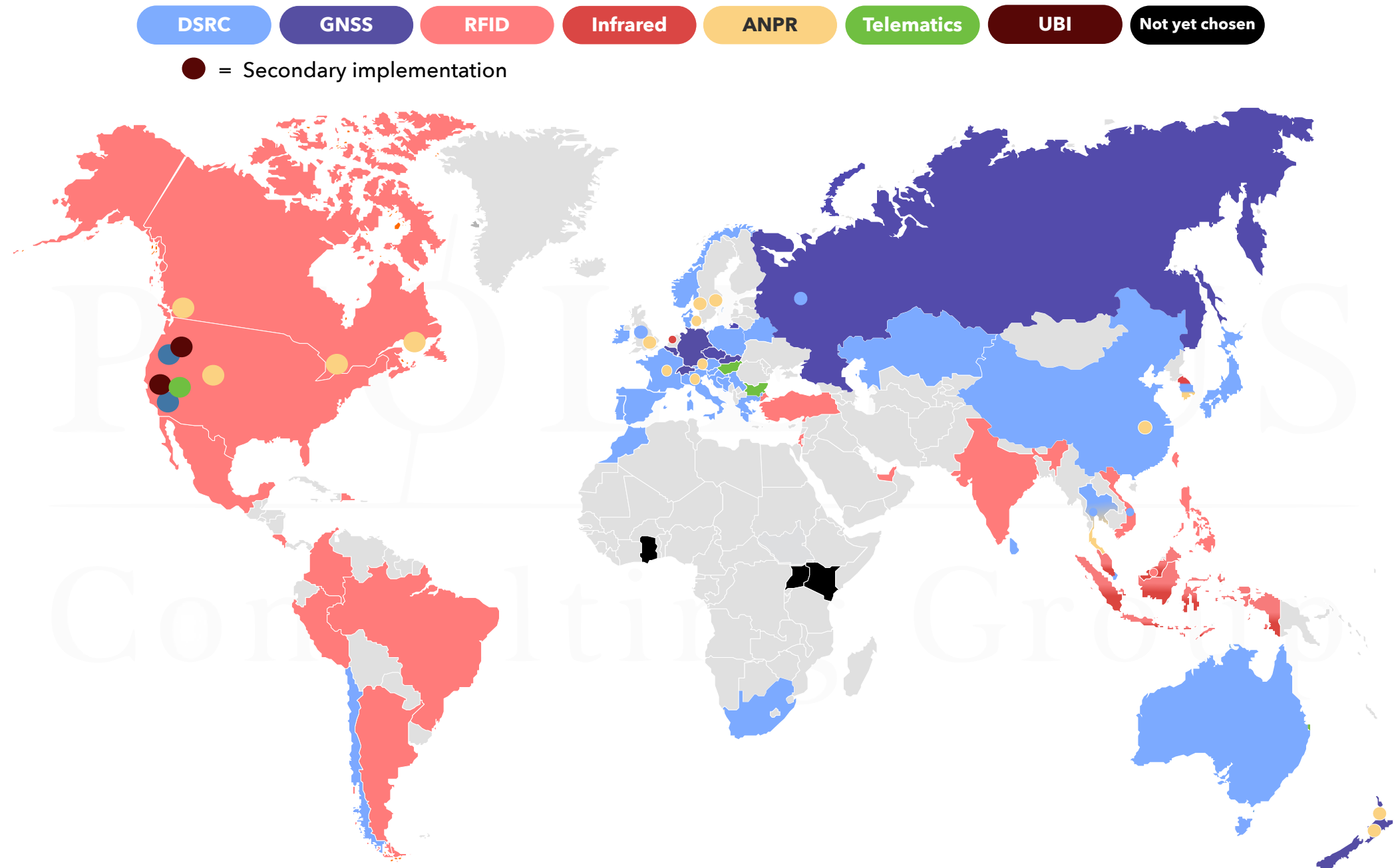
We expect to see new and more sophisticated schemes in the next 5 years

Electronic tolling schemes in place, 2025

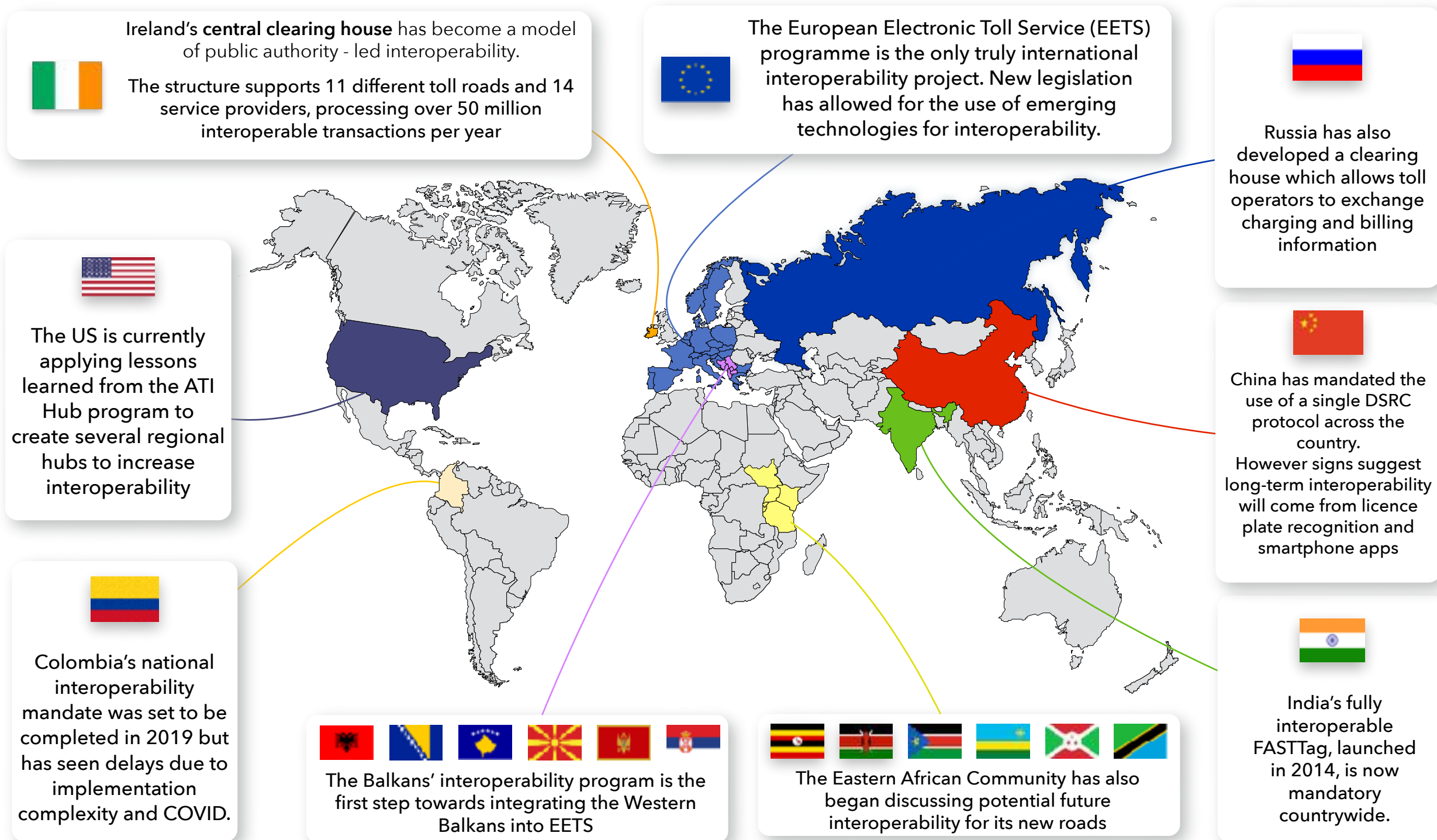


But the tolling technology landscape is still driven by regional regulations and national decision-making

Global technology landscape, 2020



This fragmentation has resulted in interoperability initiatives, which have had varying levels of success



RUC projects are becoming a reality in North America

Summary of key changes in North America

NEW IMPLEMENTATIONS

Oregon launches US' first Road User Charging pilot project, 'OReGO'

The Eastern Transportation Coalition, also known as the I-95 Corridor Coalition, launched its first passenger vehicle pilot to start exploring MBUFs

California launches the California Road User Charge program

Utah's RUC scheme for EVs is launched

Planned all-vehicle road usage charge to be launched in Wyoming

Canada removes tolls from the Port Mann bridge

US launches first mileage-based road user charging scheme for HGVs

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

The United States passes the Moving Ahead for Progress in the 21st Century Act (MAP-21) to govern surface transportation.

Fixing America's Surface Transportation (FAST) Act reauthorised for one year

President-elect Biden promises \$50 billion for highway bridges and road repairs in the first year of his administration

California to test how road charges can work with 4 technologies: usage-based insurance, ride-sharing, EV charging stations/pay-at-the-pump systems, and autonomous vehicles

REGULATORY CHANGES

Latin American countries are ramping up infrastructure investment, which requires revenues

Summary of key changes in Latin America

NEW IMPLEMENTATIONS

Brazil announces a national mandate demanding full interoperability between ETC tag providers and established RFID 915 MHz as the standard tech

Mexico implements one of the largest remote toll systems in the world, covering 4,000km

Paso Rapido in the Dominican Republic reaches 25.7% of all toll payments

Argentina announced mandatory ETC through the TelePase system on Buenos Aires highways

In Chile, Indra announced that it will implement the first Chilean free-flow system

Colombia expected to become interoperable

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Argentina launches a new PPP program to fund \$26.5 billion of infrastructure investments by 2022

In Colombia, ANI (the National Infrastructure Agency) Published the 5G concession agreement for infrastructure development

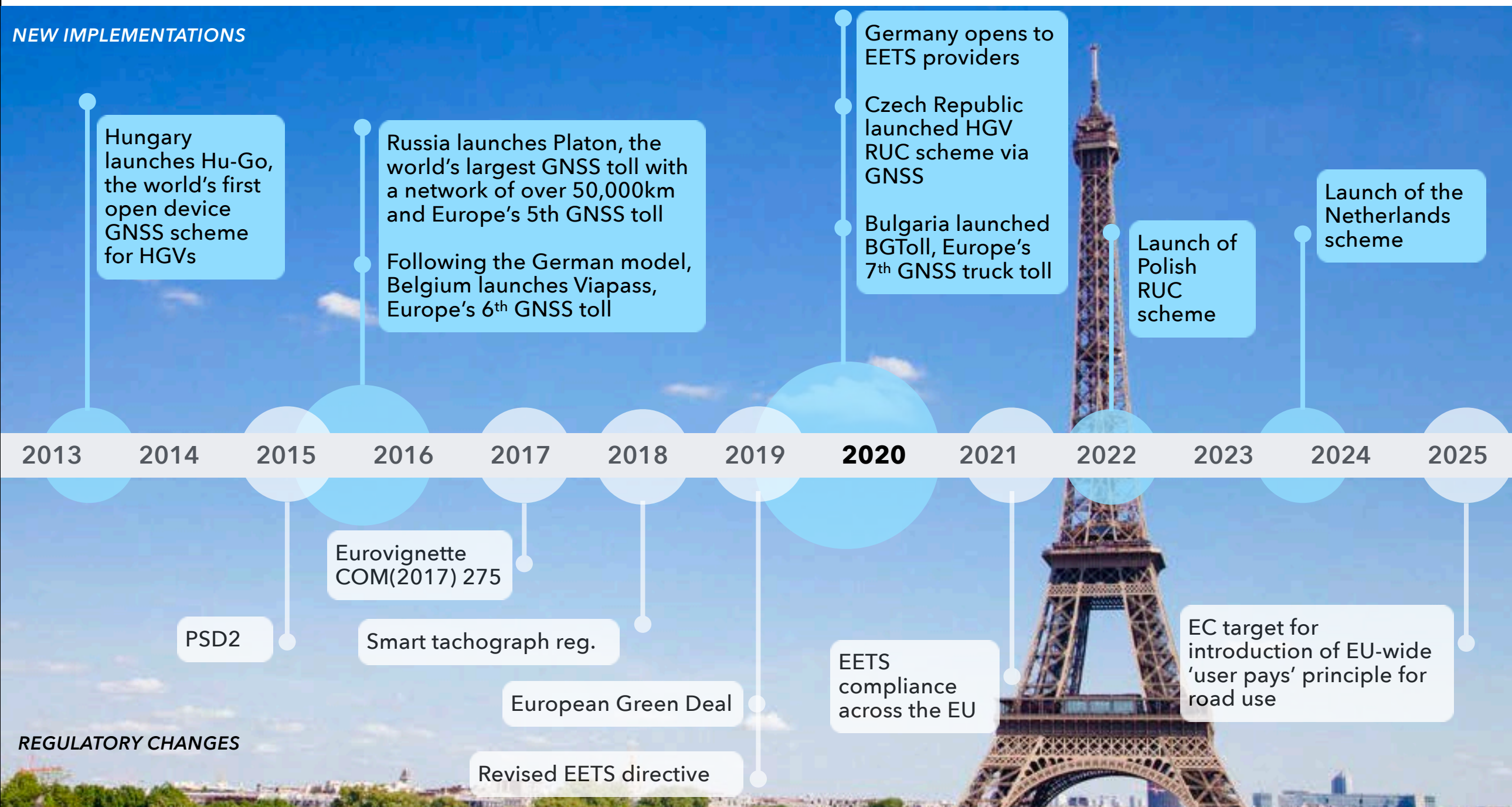
In Argentina, the Public Works Minister announced that 5 road concessions held by private firms and totalling 3,208km of roadway would be turned over to state control

REGULATORY CHANGES

In Europe, new schemes are being driven by legislation

Summary of key changes in Member States and at EU level

NEW IMPLEMENTATIONS



Asia has seen great advancements in ETC in the past decade

Summary of key changes in Asia Pacific

NEW IMPLEMENTATIONS

RFID FASTags become mandatory for all new 4 wheeled vehicles

India launches nationwide interoperable RFID standard (FASTag)

Japan launches ETC 2.0, with a focus on services

Mobile wallets WeChat Pay and AliPay enabled for toll payments in Shandong province

Australia's largest toll operator, Transurban, launches smartphone based payment app LinktGO

Phillipines begins phasing out the DSRC tags introducing RFID based tolling system.

South Korea begins adoption of the Multi Lane High Pass, called Smart Tolling system

Singapore converts its ERP system from DSRC to GNSS

2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

China's Ministry of Transport announces that China has removed all 487 physical expressway toll booths on provincial borders/

Indonesia launches a competition for a new multilane free flow (MLFF) tolling system.

In the Philippines, the government announces the adoption of a 100% cashless scheme by December 2020 on toll roads.

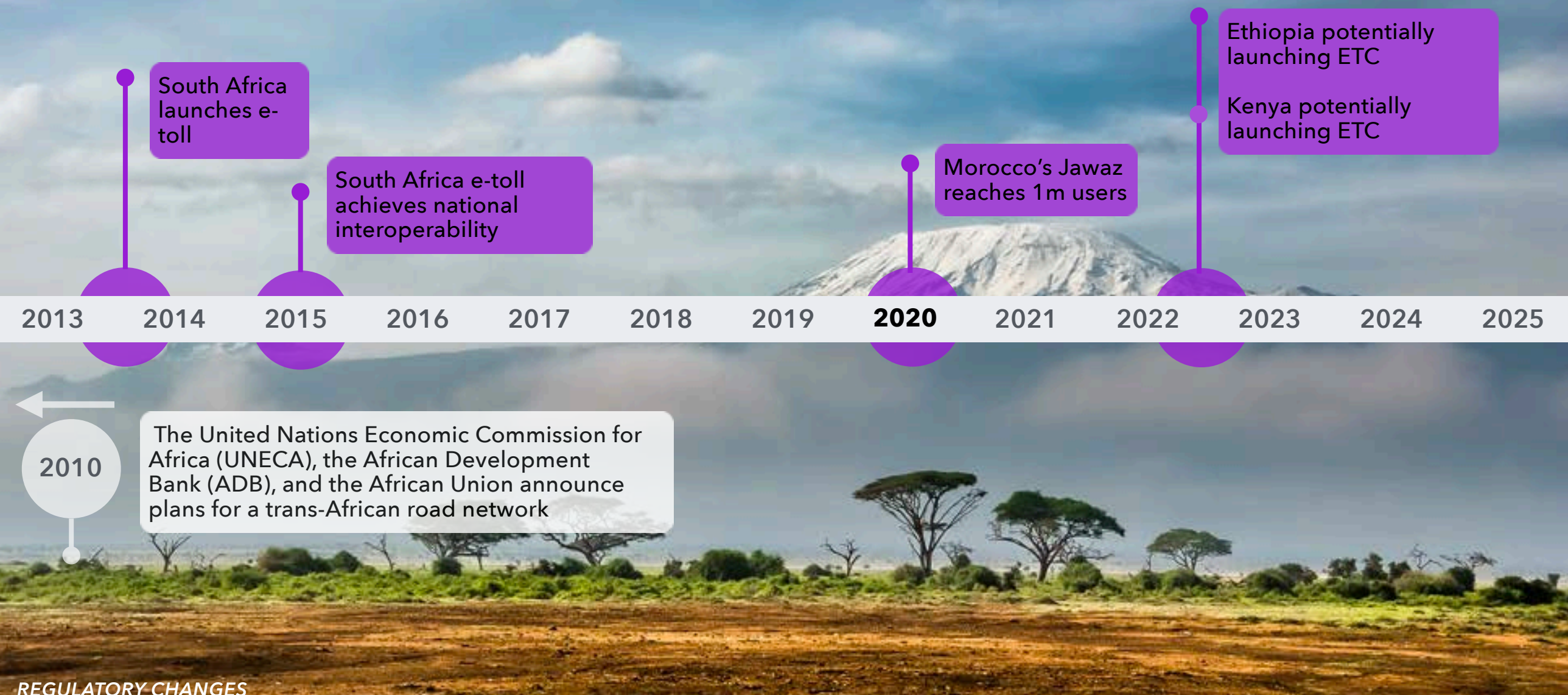
Adoption of the Heavy Vehicles National Law Review (HVNL) and Heavy Vehicle Road Reform (HVRR) in Australia

REGULATORY CHANGES





Africa has limited electronic tolling, but several countries are considering future schemes

Summary of key changes in Africa

NEW IMPLEMENTATIONS



Traditional solutions will face stiff competition from new technologies, as demand for value-added services grows

Technology	DSRC	GNSS/Hybrid	ANPR/ALPR	RFID	Infrared	Fleet telematics	Smartphone	Embedded
Devices								
Implementation	<ul style="list-style-type: none"> • E-Toll (China) • Libert-T (France) • Telepass (Italy) • ETC 2.0 (Japan) 	<ul style="list-style-type: none"> • Toll Collect (Germany) • ERP (Singapore 2020) • Platon (Russia) • Viapass (Belgium) 	<ul style="list-style-type: none"> • HGV charge (New Zealand) • London congestion charge • Colorado turnpike (USA) 	<ul style="list-style-type: none"> • FASTag (India) • E-Toll (Vietnam) • E-ZPass (USA) • HGS (Turkey) 	<ul style="list-style-type: none"> • E-Toll (Indonesia) • Westerschelde Tunnel (Netherlands) 	<ul style="list-style-type: none"> • Hu-Go (Hungary) • Bulgaria 	<ul style="list-style-type: none"> • AmberOne (Poland) • Autuma (Spain) 	<ul style="list-style-type: none"> • Audi's Integrated Toll Module in the US
Device cost	€5 - 15	€70 - 150	n.a.	€0.20 - 20	€10 - 20	€15-50	€0	n.a.
Opportunity for VAS	Medium	High	Low	Medium	Low/Medium	High	High	High
Read rate	>99%	Device dependent	90-98%	>99%	>99%	>99%	90-98%	n.a.
TRADITIONAL TECHNOLOGIES						EMERGING TECHNOLOGIES		

New forces are impacting the growth and penetration of ETC

POLITICAL TRENDS

- P1** Infrastructure funding crises
- P2** Environmental movement
- P3** Use of road charging as congestion management tool
- P4** Introduction of free flow tolling
- P5** Growing acceptance of public-private funding models
- P6** Cross-border transport movement
- P7** Nationalisation trends
- P8** Merger between infrastructure and environmental goals

TECHNOLOGICAL TRENDS

- T1** Advancements in mobile technologies
- T2** Growth of cashless payments
- T3** Growth of connected payments
- T4** Shift towards centralised map matching
- T5** Introduction of V2X
- T6** Introduction of autonomous vehicles

MARKET TRENDS

- M1** Integration into mobility services
- M2** Entry of new mass market providers
- M3** Shift in stakeholder business models

The number of players competing to deliver tolling payments and services continues to increase

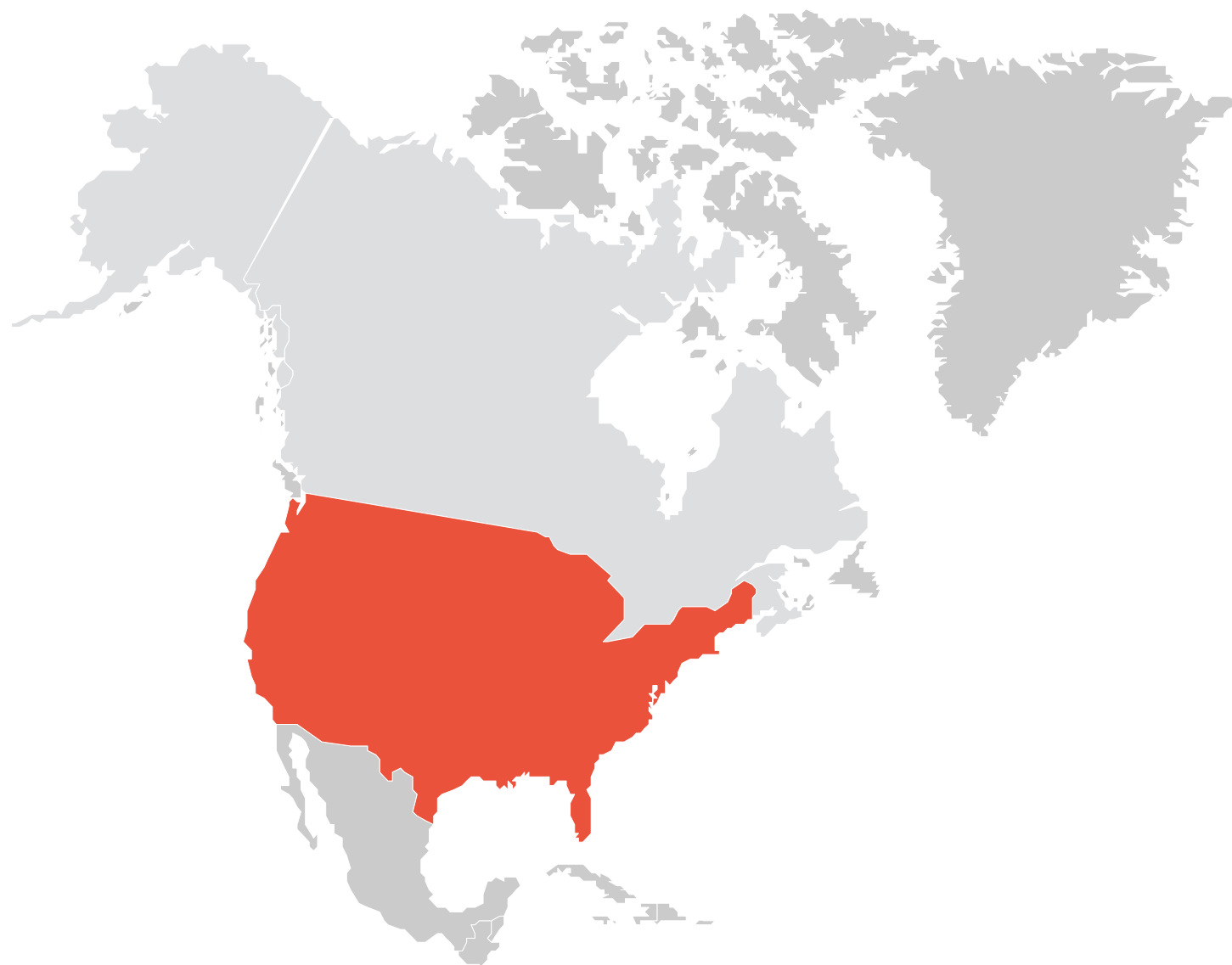
10 groups are now positioned as toll service providers



This report contains profiles of 55 countries worldwide...

North America	Belgium 	Ireland 	Sweden 	Malaysia 
Canada 	Bosnia & Herzegovina 	Italy 	Switzerland 	New Zealand 
USA 	Bulgaria 	Latvia 	The Netherland 	Philippines 
Latin America	Croatia 	Lithuania 	Turkey 	Singapore 
Argentina 	Czechia 	Norway 	UK 	South Korea 
Brasil 	Denmark 	Poland 	Ukraine 	Taiwan 
Chile 	Estonia 	Portugal 	Asia-Pacific	Thailand 
Colombia 	Finland 	Russia 	Australia 	Africa
Mexico 	France 	Serbia 	China 	Kenya 
Europe	Germany 	Slovakia 	India 	Morocco 
Austria 	Greece 	Slovenia 	Indonesia 	South Africa 
Belarus 	Hungary 	Spain 	Japan 	Uganda 

...and 14 individual states specifically in the USA



United States of America



California



Minnesota



Colorado



Oregon



Delaware



Pennsylvania



Florida



Texas



Georgia



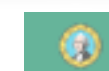
Utah



Hawaiï



Washington



Indiana



Wyoming





Asia Pacific

Australia



New Zealand



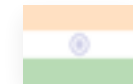
China



Philippines



India



Singapore



Indonesia



South Korea



Japan



Taiwan



Malaysia

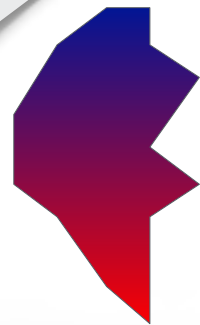


Thailand



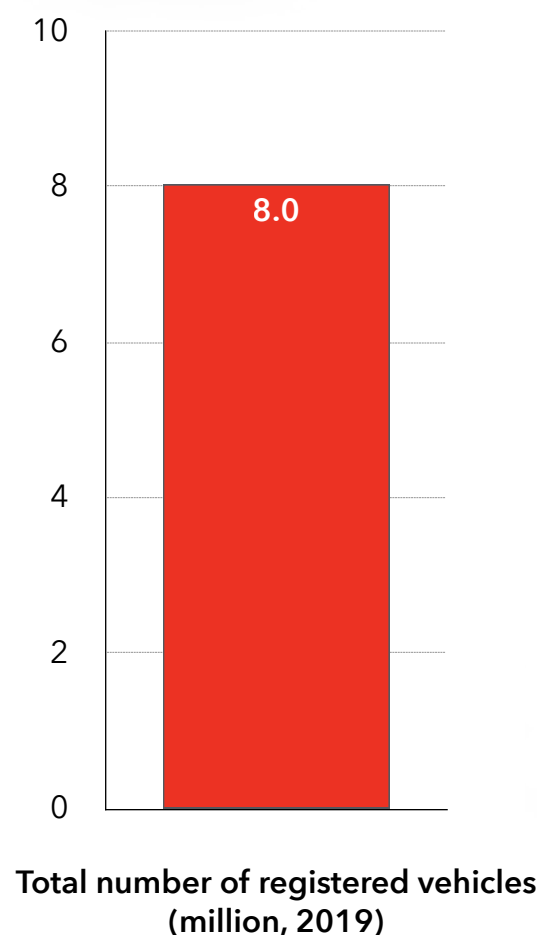


Taiwan's successful ETC scheme has reached almost 90% penetration

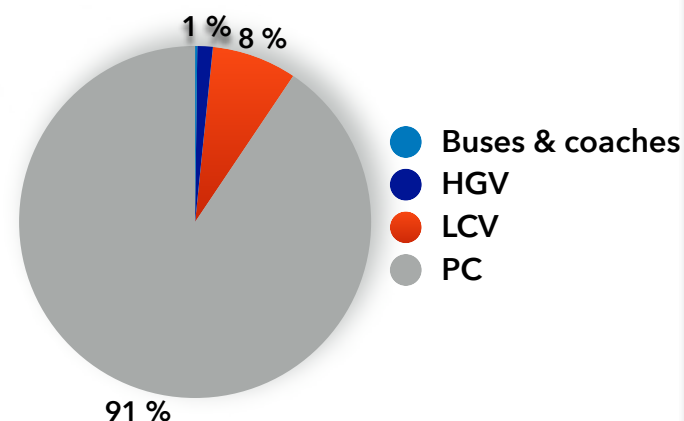


Taiwan

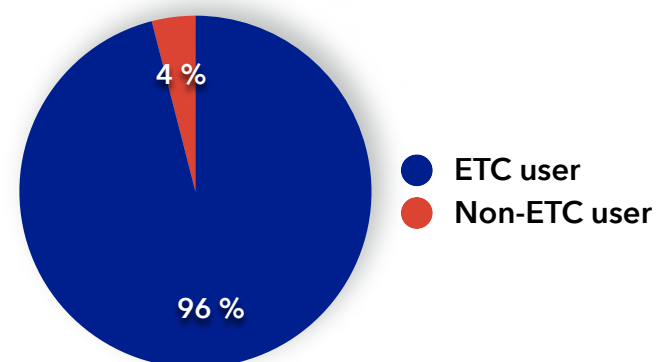
- **Population:** 23.8 million
- **Total road network:** 43,133 km
- **Total toll road network:** 926 km
- **Current tolling schemes:** RFID Tag one concessionaire in charge of building and operating all electronic toll roads
- **Future schemes:** Continue with the current free flow tolling until concession contract end in 2024



Domestic vehicle split



ETC penetration rate



Qualitative analysis

- In 2013, Taiwan became the first country to **switch from manual tolling to all ETC, multi-lane free flow tolling** on all freeways
 - **Taiwan Area National Freeway Bureau (TANFB)** is responsible for motorway maintenance, expansion, traffic management, tolls travel services
 - **Far Eastern Electronic Toll Collection Co. (FETC)** is responsible ETC system, including front-end and back-end as well as business model, from planning, building, and operation
- The distance-based ETC system is a milestone in Taiwan's transportation industry and is setting a model for neighbouring countries to learn from
- Since the introduction of this ETC system, an estimated **\$67 millions** is saved annually in fuel savings; shortened travel time; less congestion resulting in reduced CO2 emission level; cost of printing toll ticket
- Since its inception in 2005, Taiwan ETC proved efficiency resulting major achievements, as of 2019:
 - ETC Customer with RFID Tag 6.7 million ETC daily Transactions
 - Daily average: 16 million eTag Usage Rate 94%
 - Successful Tolling Rate 99.98%
- The **concession contract lasts for 20 years** and is **expected to expire by 2024** and the tolling operating will be transferred back to the TANFB
- eTag, the RFID sticker, was launched in 2012 and still in use today
 - **eTag users have a 10% discount** on toll charges
 - **Non-eTag users** can pay by **plate number recognition** without discounts
- eTag has a **wide application** in **daily payments, parking, fuelling, and smart city management**

Far Eastern Group is the only concessionnaire appointed to build and operate ETC roads

Concession comparison

Concession	Network length (km)	No. of tolling transactions (m)	No. of ETC tags	ETC payment penetration
Far East ETC	1.050	76 million	7 million	93 %

- Freeway Bureau has adopted a public-private-partnership (PPP) to design and operate the ETC system through granting build-operate-transfer (BOT) concession right of 20 years
 - In 2004 Far Eastern Electronic Toll Collection, owned by the Far Eastern Group, **was awarded the rights to build and operate the ETC systems until 2024**
 - In 2006, a flat-rate pay-per-use DSRC system was introduced
 - In 2012/2014, the tolling system migrated to RFID technology
 - By the end of the concession the motorway is expected to return the operation to the **Freeway Bureau of Taiwan**
 - The concessionnaire **collects tolls on behalf of the Freeway Bureau** and gets a **commission fee based** on the contract terms
- All toll roads are free flow ETC roads** include National Freeway 1,3, 3A and 5

Map of the Taiwan toll road network

National Freeway

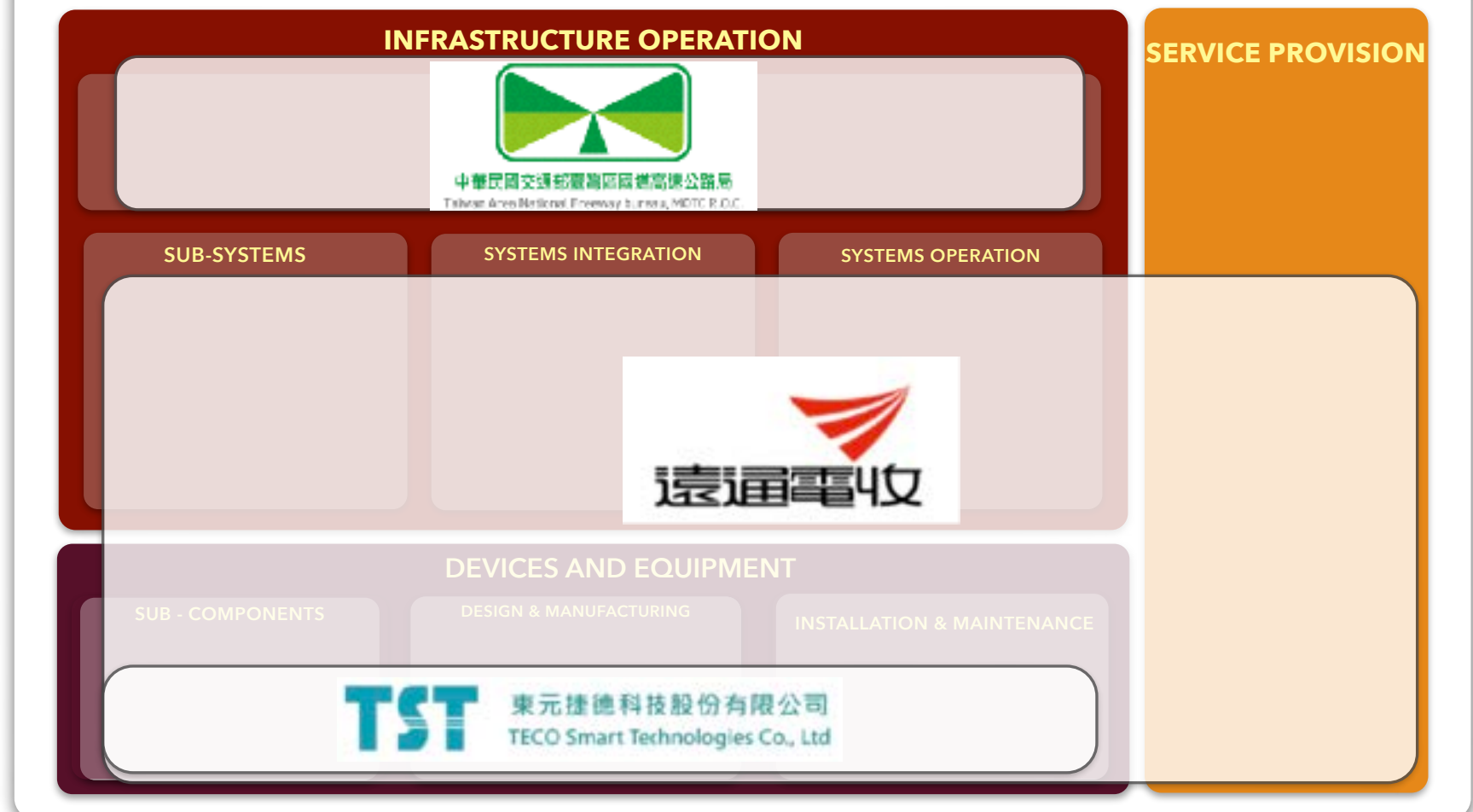


TECO Smart Technologies is in charge of the design & manufacturing of the eTag device



- **Launch date:** 2012
- **Total tolled network:** 926 km
- **Device:** RFID tag + video tolling
- **Scope:** All vehicles, all toll roads
- **No. of vehicles equipped:** 7.7 million
- **Total tolls collected (2020):** € 7.2 billion

Value chain structure



- The ETC system also includes an **ANPR solution** to recognise non-eTag users with plate numbers by the cameras on the gantries
- Drivers can register for service of **automatic toll deduction by linking bank cards** or pay later
- **eTag card is a small sized card** for users to top-up their accounts offline at convenience stores, fuel stations, or service points of Far Eastern ETC
- By showing the eTag card, users can get discounts from a wide range of service providers such as restaurants, hotels, and vehicle services

FETC offers value-added services via its app in partnership with several service providers

FETC Application



遠通電收ETC

- **App name:** Far Eastern ETC
- **Launch date:** April 2014
- **No. of installation:** 1 million+ (Android)
- **Main functions:** Account top-up, payment history, parking location, access to VAS, traffic information

Key Partners & Value Added Services



Taiwan Designated Driver

• Designated driver service:

- The service includes calling a designated driver to drive for the customer, often to avoid drunk driving



• Vehicle services:

- Services include **car repair, maintenance, diagnostics, windshield replacement, roadside assistance**, etc.
- eTag users are offered approximately **10% off** selected services and **free vehicle diagnostics service**



Bo's restaurant



• Discounts at local commerce and fast food companies:

- Local businesses are increasingly joining to provide eTag users with discounts

Services

• ELECTRONIC TOLLING COLLECTION

- eTag users always get **10% off** of the standard toll fee
- The toll fee is automatically deducted and drivers are notified via a **SMS or the ETC app**
- Drivers can check **payment history** on the app

• SMART TRAFFIC

- The public authority **syncs traffic information with Far Eastern ETC** so that they are able to **notify drivers with important traffic updates** via SMS or the ETC app including **traffic accidents, congestion, extreme weather, construction**, etc.

• SMART PAYMENT

- With eTag on the vehicle, payments can be completed automatically including **payment for fuel and at drive-through restaurants**

• SMART PARKING

- eTag can be **recognised at the entry of the parking lots** and **parking fees will be automatically deducted**
- The **parking location is recorded** and can be checked on the app or be sent to the driver via SMS
- In October 2019, the eTag system parking solution was enabled for roadside parking in Taipei

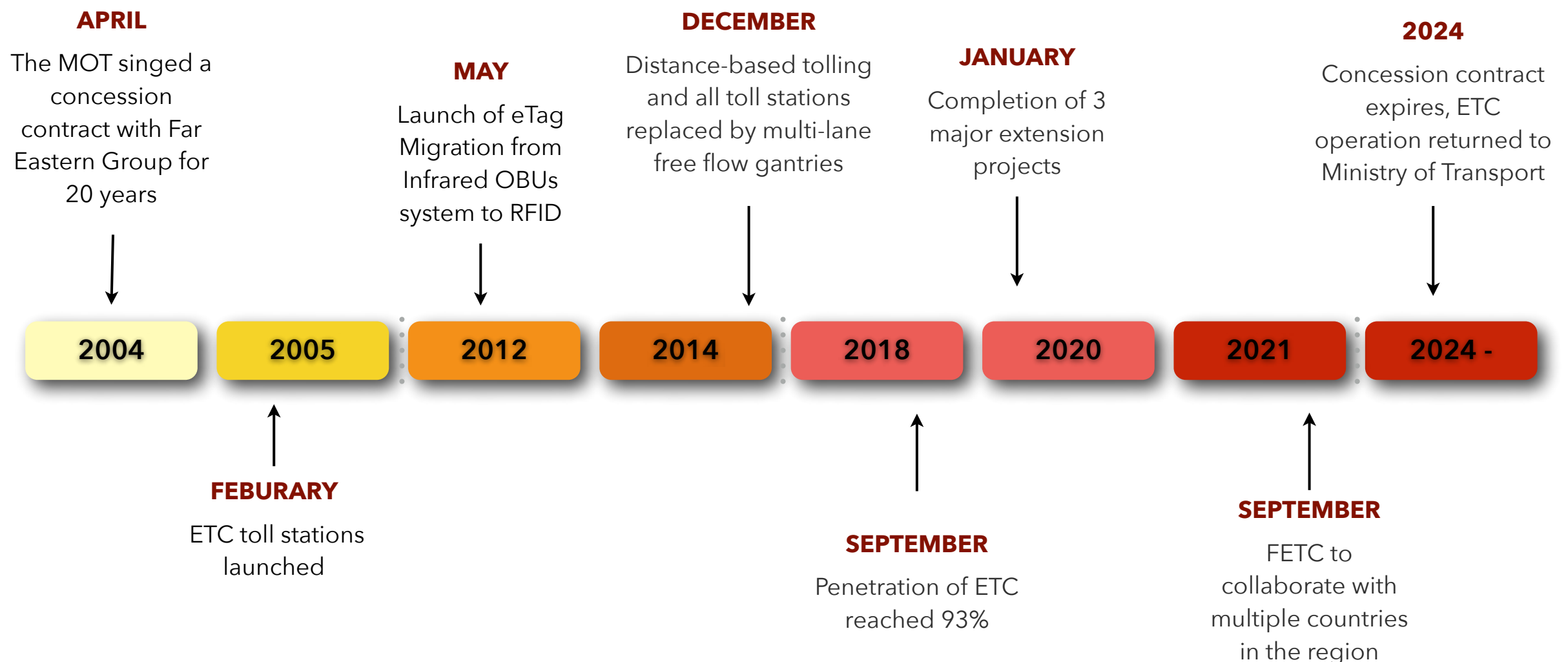
• VALUE ADDED SERVICES

- Value-added services are accessible on the app including vehicle accessory **e-shop, roadside assistance, designated driver service**, etc.



The Taiwanese ETC system is fully Multi-Lane Free Flow since 2014

Taiwan tolling timeline

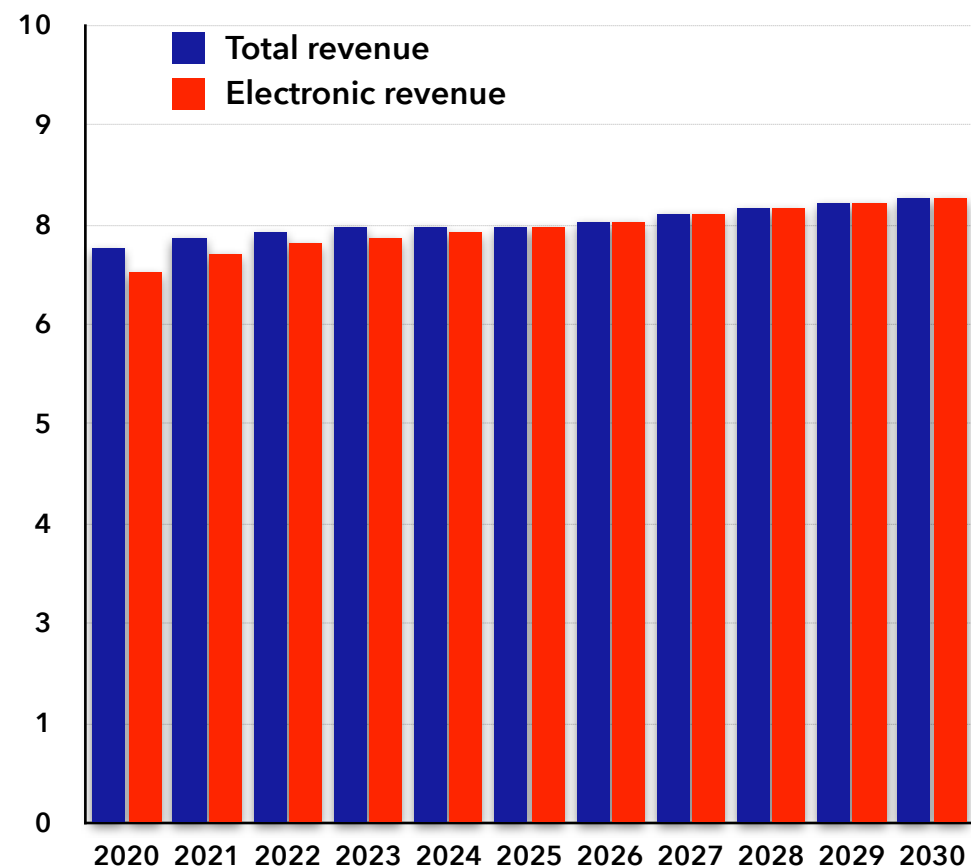




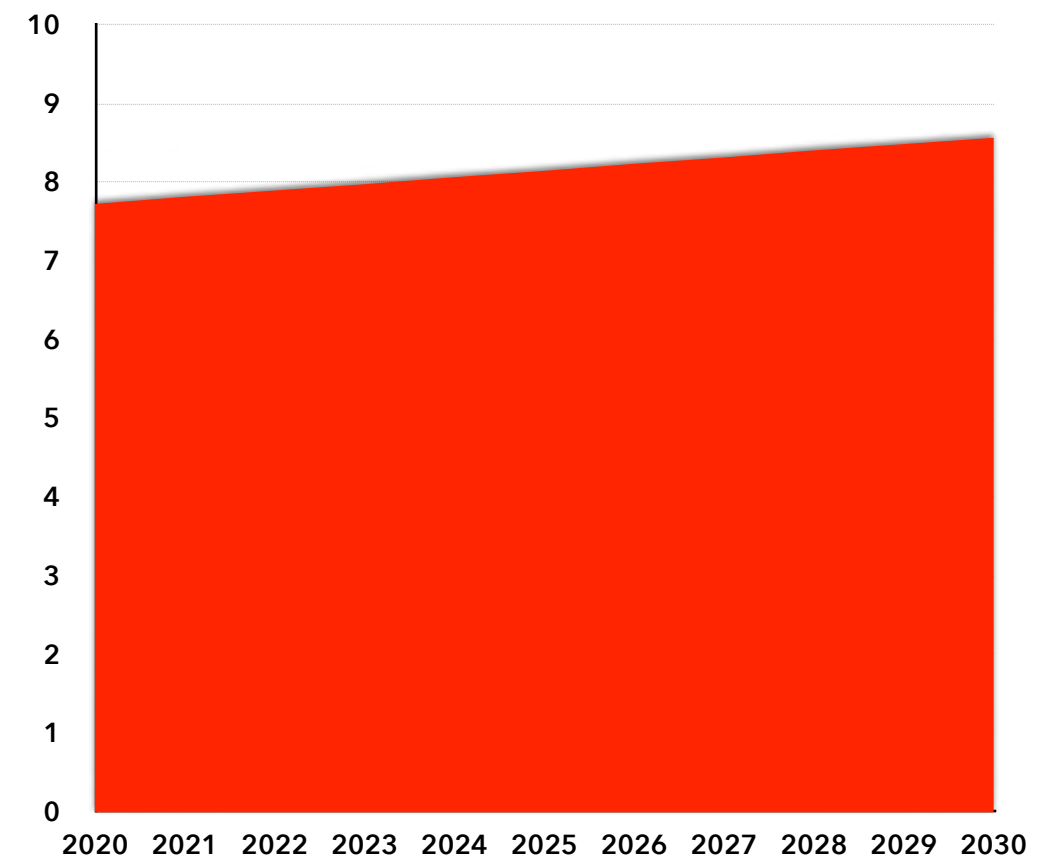
Tolls will be 100 % electronic from 2025 on

Total volumes and revenues in Taiwan

Total tolling revenue (€ million)



Number of registered OBUs (million)



- An increasing growth in tolling revenues is driven by countrywide multi-lane free flow tolling schemes
- The use of ETC is supposed to increase further in Taiwan and we expect a 100 % penetration will be reached until 2025

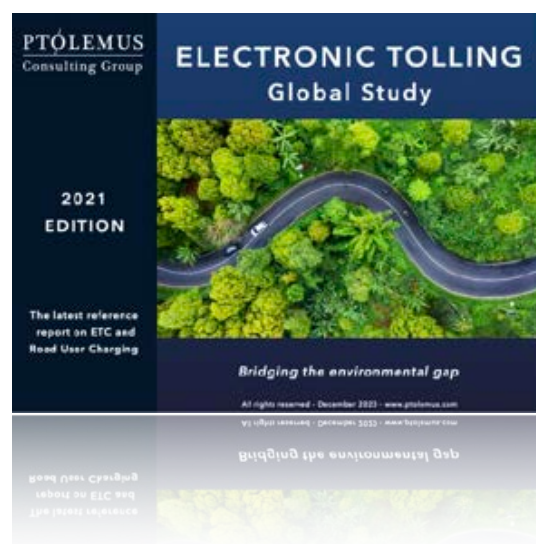
Taiwan's success in implementing ETC and smart city technology is a model for the world

Taiwan ETC & a smart city solution

- Taiwan is one of the few countries in the world that **did not implement a lockdown** during the COVID-19 pandemic; on the contrary, inland tourism rose resulting in a rise in toll road usage
- Taiwan's **success in implementing free flow ETC was praised** has become a model of success:
 - Nominated for the R&D 100 Awards
 - Received a US IBTTA (International Bridge, Tunnel and Turnpike Association) Toll Excellence Award
 - ITS (Intelligent Transport System) World Congress Industry Award.
- The eTag solution is now going beyond ETC and increasingly expanding into **smart city eTag payment**
 - There is wide application in parking, fuelling, and in daily purchases
- Taiwan is extending its highway network; 3 projects were completed in 2020, totalling approximately **€4 billion**:
 - Suhua Expressway Improvement Project on Highway No. 9 aiming to enhance tourism in the region
 - Extension the width of the South Link Highway (part of Highway No. 9)
 - The Sibin Expressway (Highway No. 61), also known as the "freeway for the poor," was completed after 20 years of construction



The study comes with a single, worldwide company licence



**The global
reference
report on ETC and
road user charging**

	Full Study		Additional market forecast	Additional workshop
	Buy direct (Invoice)	Buy online (Visa or MasterCard)		
Contents	<ul style="list-style-type: none"> • 950-page study with 55 country profiles, including qualitative, competitive and value chain analysis • Service provider best practices • Interoperability models analysis • Smartphone-based tolling model analysis • In-depth regional assessment 		<ul style="list-style-type: none"> • Excel file with outputs and charts • Estimates of the subscription volumes by technology and vehicle type • Devices sold, total revenues collected and ETC-only revenues 	<ul style="list-style-type: none"> • The full study presented to your board or strategy team • Half-day workshop*
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