EUROPEAN DATAWAREHOUSE



EUROPEAN DATAWAREHOUSE

SAFE

DRIVING THE FUTURE: GREEN AUTO SECURITISATION WORKSHOP

12 NOVEMBER 2024



AGENDA

14:00 WELCOME SPEECH
KEITH GORMAN, MORNINGSTAR DBRS

14:05 THE EUROPEAN ENVIRONMENT AGENCY DATABASE
STEPHANIE SCHILLING, EEA

14:25 STUDY ON THE CLIMATE RISK & IMPACT OF AUTO ABS
MAXIME BARTHE, BANQUE DE FRANCE

14:45 PANEL 1: STATUS QUO ON GREEN AUTO SECURITISATION
CHRISTIAN THUN (EDW), ADOLFO RAVASIO (HYUNDAI CAPITAL BANK), GUGLIELMO PANIZZA & PAOLO CONTI (MORNINGSTAR DBRS), JACOB BINNEMA (MUFG)

15:35 COFFEE BREAK

16:00 'MUTUAL FUNDS' APPETITE FOR SUSTAINABILITY IN EUROPEAN AUTO ABS
LORIANA PELIZZON, SAFE

16:20 AUTO ABS DATA EVOLUTION
MARINE MAÎTRE & USMAN JAMIL, EDW

16:40 PANEL 2: POTENTIAL ROLE OF AUTO ABS TO HELP TRANSITION INTO A SUSTAINABLE FUTURE
MARCO ANGHEBEN (EDW), JAN-PETER HÜLBERT (TSI), OLIVIER CLEMENTIN (BANQUE DE FRANCE), SANDRA WITTINGHOFER (BAKER MCKENZIE)

17:30 CLOSING REMARKS
LORIANA PELIZZON, SAFE

17:40 RECEPTION

AT TODAY'S EVENT



CHRISTIAN THUN
EUROPEAN DATAWAREHOUSE
christian.thun@eurodw.eu



KEITH GORMAN
MORNINGSTAR DBRS
keith.gorman@morningstar.com

GUGLIELMO PANIZZA
MORNINGSTAR DBRS
guglielmo.panizza@morningstar.com



MAXIME BARTHE
BANQUE DE FRANCE
maxime.barthe@banque-france.fr



STEPHANIE SCHILLING
EEA
stephanie.schilling@eea.europa.eu

PAOLO CONTI
MORNINGSTAR DBRS
paolo.conti@dbrsmorningstar.com



JACOB BINNEMA
MUFG
jacob.binnema@mufgsecurities.com

ADOLFO RAVASIO
HYUNDAI CAPITAL BANK
adolfo.ravasio@de.hcs.com

OLIVIER CLEMENTIN
BANQUE DE FRANCE
olivier.clementin@banque-france.fr

AT TODAY'S EVENT



USMAN JAMIL
EUROPEAN DATAWAREHOUSE
usman.jamil@eurodw.eu



MARCO ANGHEBEN
EUROPEAN DATAWAREHOUSE
marco.angheben@eurodw.eu



SANDRA WITTINGHOFER
BAKER MCKENZIE
sandra.wittinghofer@bakermckenzie.com



MARINE MAÎTRE
EUROPEAN DATAWAREHOUSE
marine.maitre@eurodw.eu



JAN-PETER HÜLBERT
TSI
jan-peter.huelbert@tsi-gmbh.de



LORIANA PELIZZON
SAFE
pelizzon@safe-frankfurt.de

WELCOME SPEECH

KEITH GORMAN, MORNINGSTAR DBRS

THE EUROPEAN ENVIRONMENT AGENCY DATABASE

STEPHANIE SCHILLING, EEA



Road transport data at the European Environment Agency (EEA)

Stephanie Schilling / GAS workshop/ 2024-11-12

European Environment Agency

Zehra Coplu, Sustainably Yours / EEA

Topics

- Information about the EEA

- Detailed road transport available at the EEA
  - data
  - associated information

Who is the EEA?

- An EU agency – public administration
- Since 1994
- Located in Copenhagen, Denmark
- ~ 300 staff



- More info:
  - https://www.eea.europa.eu/en
  - EEA Corporate Video: https://www.youtube.com/watch?v=AjUtzPG6UcQ

European Environment Agency

What we do

Together with our Eionet network, we provide the knowledge and the data needed to achieve sustainability in Europe.



We support policies with evidence-based knowledge
to help the European Union and our member countries achieve sustainability



We inform public and policy discussions
on sustainability solutions and challenges



We build and maintain networks and partnerships
to facilitate sharing of knowledge and expertise across Europe



We collect, quality check and disseminate data,
making full use of digitalisation and latest innovative technologies

Topic areas


AREAS OF WORK
Biodiversity and ecosystems
1
Climate change mitigation and adaptation
2
Human health and the environment
3
Circular economy and resource use
4
Sustainability trends, prospects and responses
5

Legal obligation for data collection

Annual **new** registrations for following vehicle categories:

Light-duty vehicles (LDVs)

- Cars (M1)
- Vans (N1)

laboratory & real world CO_2 values

- data from EU27, NO, IS and manufacturers

Regulation (EU) **2019/631** setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles

Regulation (EU) **2021/392** on the monitoring and reporting of data relating to CO_2 emissions from passenger cars and light commercial vehicles

Heavy-duty vehicles (HDV)

- Trucks (N1*, N2, N3)
- Buses (M2, M3)
- Trailers (O3, O4)
  - data from EU27 (in future also NO, IS) and manufacturers

Regulation (EU) **2019/1242** setting CO_2 emission performance standards for new heavy-duty vehicles

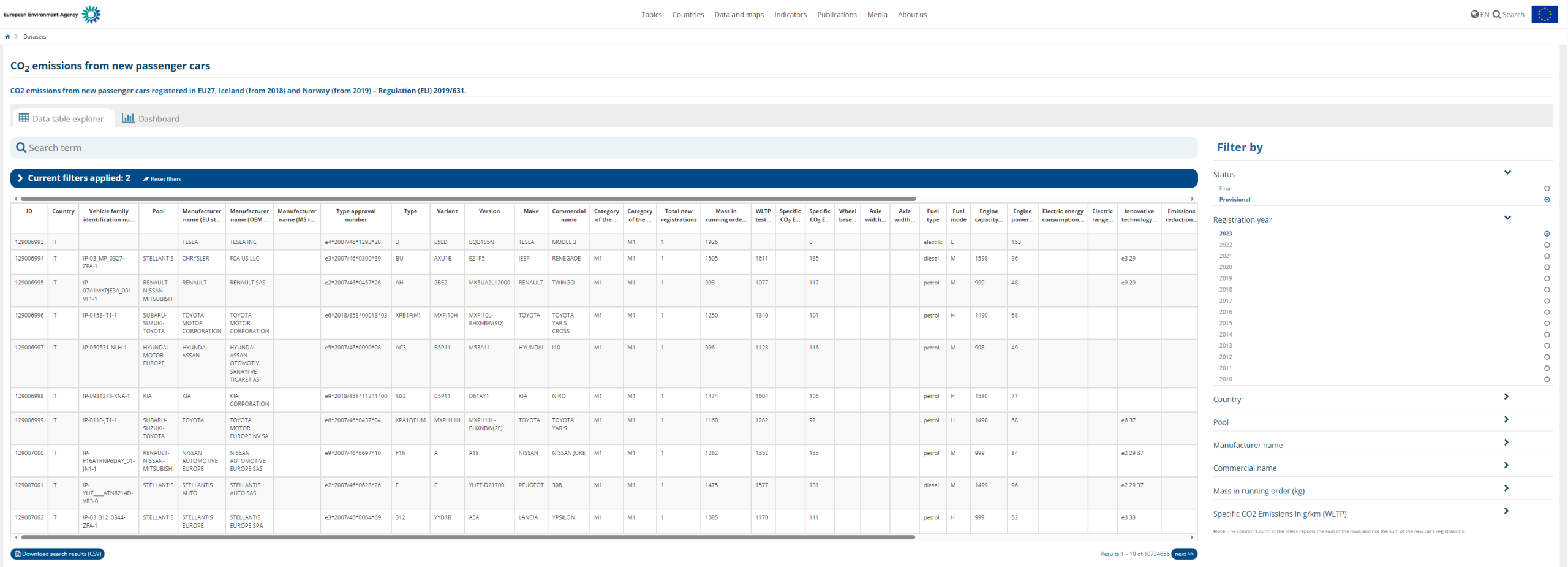
- Exemptions from the scope of the Regulations e.g. vocational vehicles (HDV), national small series (LDV) and others
- Derogations or exemptions also for small manufacturers

*provided that the vehicles do not fall under Regulation 2019/631

Cars and vans data

https://co2cars.apps.eea.europa.eu/

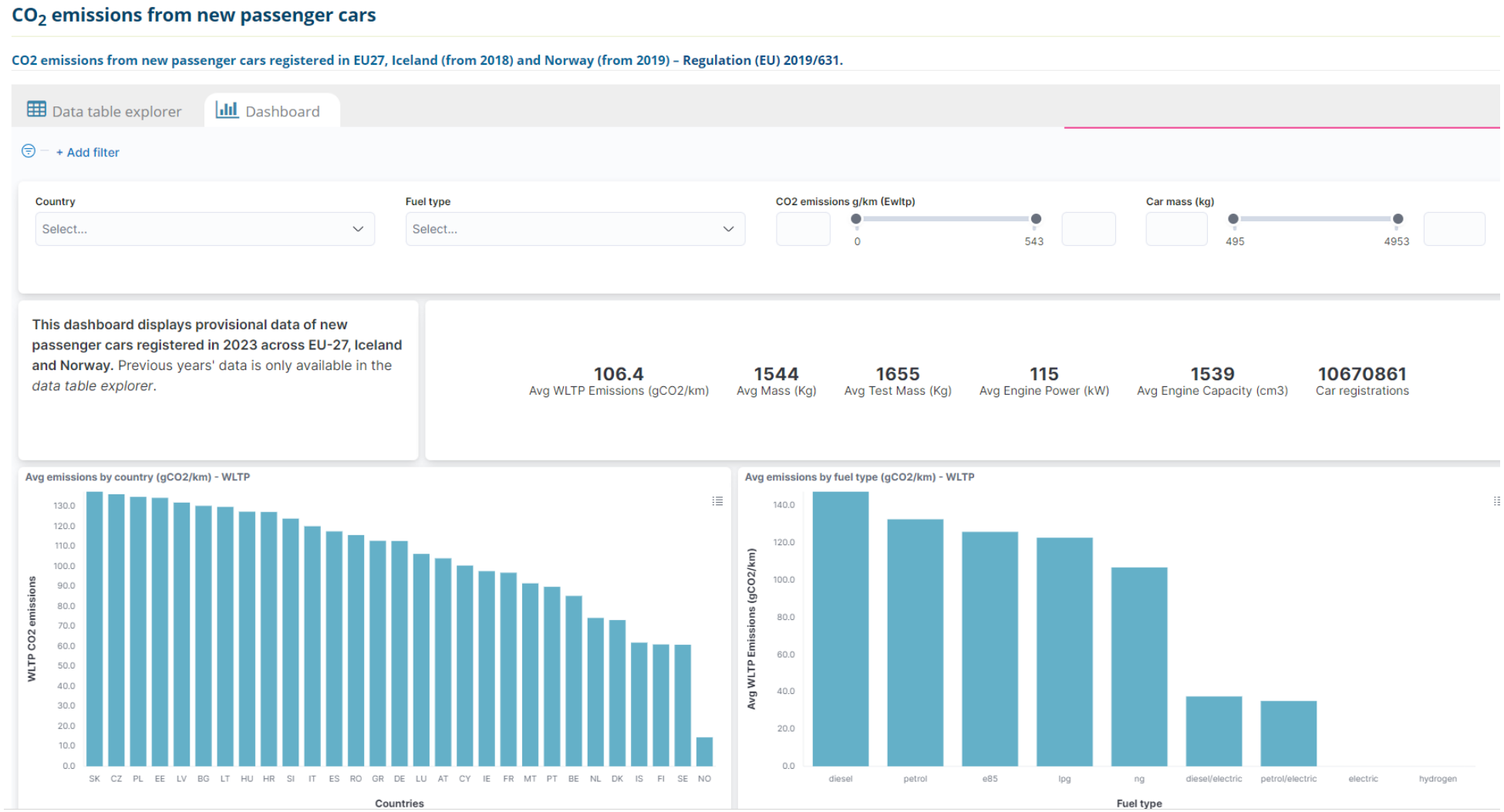
https://co2vans.apps.eea.europa.eu/



ID	Country	Vehicle family identification nu...	Pool	Manufacturer name (EU st...	Manufacturer name (OEM ...	Manufacturer name (MS r...	Type approval number	Type	Variant	Version	Make	Commercial name	Category of the ...	Category of the ...	Total new registrations	Mass in running orde...	WLTP test...	Specific CO_2 E...	Specific CO_2 E...	Wheel base...	Axle width...	Axle width...	Fuel type	Fuel mode	Engine capacity...	Engine power...	Electric energy consumption...	Electric range...	Innovative technology...	Emissions reduction...
129006993	IT			TESLA	TESLA INC		e4*2007/46*1293*28	3	E5LD	BQB1S5N	TESLA	MODEL 3		M1	1	1926			0				electric	E		153				
129006994	IT	IP-03_MP_0327-ZFA-1	STELLANTIS	CHRYSLER	FCA US LLC		e3*2007/46*0300*39	BU	AXU1B	E21P5	JEEP	RENEGADE	M1	M1	1	1505	1611		135				diesel	M	1598	96			e3 29	
129006995	IT	IP-07A1MKPJE3A_001-VF1-1	RENAULT-NISSAN-MITSUBISHI	RENAULT	RENAULT SAS		e2*2007/46*0457*26	AH	2BE2	MK5UA2L12000	RENAULT	TWINGO	M1	M1	1	993	1077		117				petrol	M	999	48			e9 29	
129006996	IT	IP-0153-JT1-1	SUBARU-SUZUKI-TOYOTA	TOYOTA MOTOR CORPORATION	TOYOTA MOTOR CORPORATION		e6*2018/858*00013*03	XPB1F(M)	MXPJ10H	MXPJ10L-BHXNBW(9D)	TOYOTA	TOYOTA YARIS CROSS	M1	M1	1	1250	1340		101				petrol	H	1490	68				
129006997	IT	IP-050531-NLH-1	HYUNDAI MOTOR EUROPE	HYUNDAI ASSAN	HYUNDAI ASSAN OTOMOTIV SANAYI VE TICARET AS		e5*2007/46*0090*08	AC3	B5P11	M53A11	HYUNDAI	I10	M1	M1	1	996	1128		116				petrol	M	998	49				
129006998	IT	IP-0931273-KNA-1	KIA	KIA	KIA CORPORATION		e9*2018/858*11241*00	SG2	C5P11	D61AY1	KIA	NIRO	M1	M1	1	1474	1604		105				petrol	H	1580	77				
129006999	IT	IP-0110-JT1-1	SUBARU-SUZUKI-TOYOTA	TOYOTA	TOYOTA MOTOR EUROPE NV SA		e6*2007/46*0437*04	XPA1F(EUM	MXPH11H	MXPH11L-BHXNBW(2E)	TOYOTA	TOYOTA YARIS	M1	M1	1	1160	1282		92				petrol	H	1490	68			e6 37	
129007000	IT	IP-F16A1RNP6DAY_01-JN1-1	RENAULT-NISSAN-MITSUBISHI	NISSAN AUTOMOTIVE EUROPE	NISSAN AUTOMOTIVE EUROPE SAS		e9*2007/46*6697*10	F16	A	A18	NISSAN	NISSAN JUKE	M1	M1	1	1262	1352		133				petrol	M	999	84			e2 29 37	
129007001	IT	IP-YHZ___ATN8214D-VR3-0	STELLANTIS	STELLANTIS AUTO	STELLANTIS AUTO SAS		e2*2007/46*0628*26	F	C	YHZT-D21700	PEUGEOT	308	M1	M1	1	1475	1577		131				diesel	M	1499	96			e2 29 37	
129007002	IT	IP-03_312_0344-ZFA-1	STELLANTIS	STELLANTIS EUROPE	STELLANTIS EUROPE SPA		e3*2007/46*0064*69	312	YYD1B	A5A	LANCIA	YPSILON	M1	M1	1	1085	1170		111				petrol	H	999	52			e3 33	

European Environment Agency

Cars and vans visualisations (I)

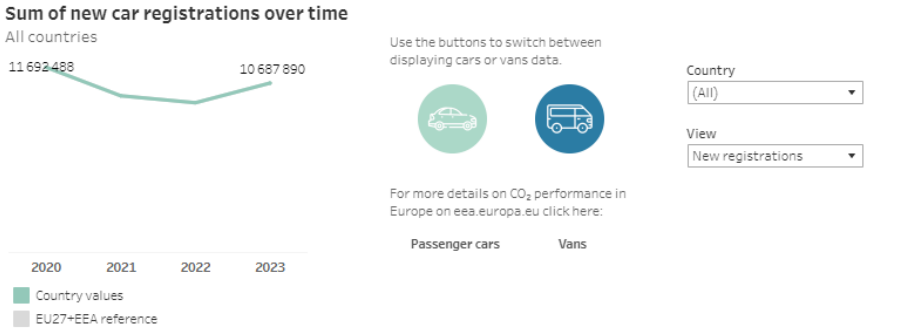


European Environment Agency

Cars and vans visualisations (II)

New passenger cars and vans

The EEA collects data from EU Member States and selected EEA member countries on new light-duty vehicles registered in their territory. The data include vehicle manufacturer, CO2 emissions and technical information about the vehicles (e.g. weight, engine capacity and fuel used).

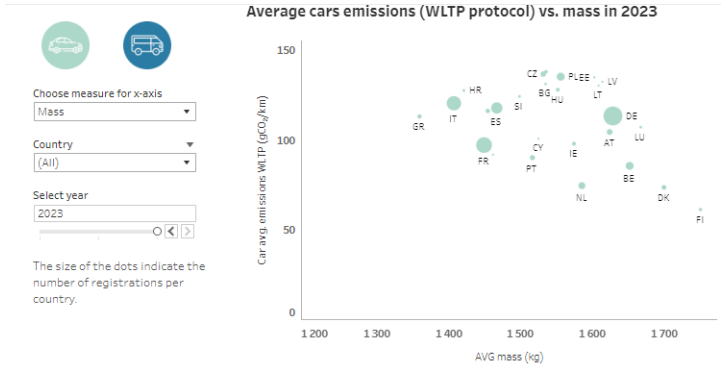


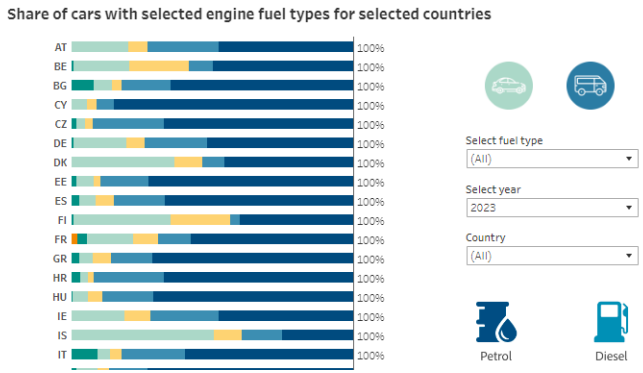
Country comparison

The number of vehicles and the average fuel efficiency of new vehicles vary widely across countries due to the different models and types of vehicles sold in each country.



https://climate-energy.eea.europa.eu/topics/transport/emissions-from-cars/data





European Environment Agency

Real-world data from cars and vans - data

Additional information

This page provides access to key data sources related to the monitoring of the real-world emissions from new cars and vans. They are grouped by the key re

Data - 2022

- Vans - Aggregate Real-world CO2 emissions dataset [2022].
- Cars - Aggregate Real-world CO2 emissions dataset [2022].
- Vans - Raw Real-world CO2 emissions dataset [2022].
- Cars - Raw Real-world CO2 emissions dataset [2022].

Data - 2021

- Vans - Aggregate Real-world CO2 emissions dataset [2021].
- Cars - Aggregate Real-world CO2 emissions dataset [2021].
- Vans - Raw Real-world CO2 emissions dataset [2021].
- Cars - Raw Real-world CO2 emissions dataset [2021].

Documentation

- European Commission Staff Working Document (SWD).
- European Commission Report.

L 77/18 EN Official Journal of the European Union 5.3.2021

ANNEX

1. **Collection and reporting of real-world data and VINS in accordance with Articles 9 and 10**

Table 1

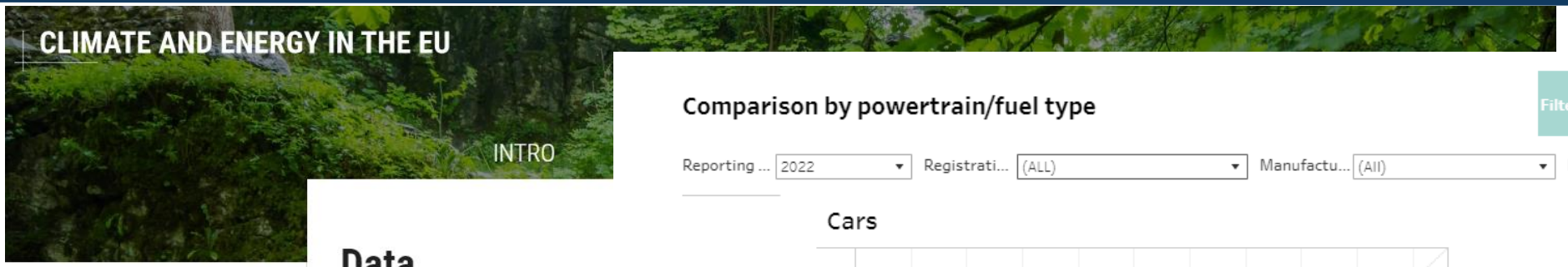
Data to be reported in accordance with Articles 9 and 10

Parameter	Unit	Vehicles of category M1 and N1	
		Pure internal combustion engine vehicles and not-off-vehicle charging hybrid electric vehicles (1)	Off-vehicle charging hybrid electric vehicles (2)
Vehicle identification number	-	√	√
Total fuel consumed (lifetime)	l	√	√
Total distance travelled (lifetime)	km	√	√
Total fuel consumed in charge depleting operation (lifetime)	l	_	√
Total fuel consumed in driver-selectable charge increasing operation (lifetime)	l	_	√
operation with engine running (lifetime)		_	
Total distance travelled in driver-selectable charge increasing operation (lifetime)	km	_	√
Total grid energy into the battery (lifetime)	kWh	_	√

https://climate-energy.eea.europa.eu/topics/transport/real-world-emissions/additional_information

European Environment Agency

Real-world data from cars and vans - visualisation



TOPICS

Transport

CO2 emissions from new passenger cars and vans

CO2 emissions from new heavy-duty vehicles

Real world emissions

Fuel quality

COUNTRIES

CATALOGUE

ABOUT

Data

Real-wor

The tables and graphs
fuel consumption of p

They are based on an a

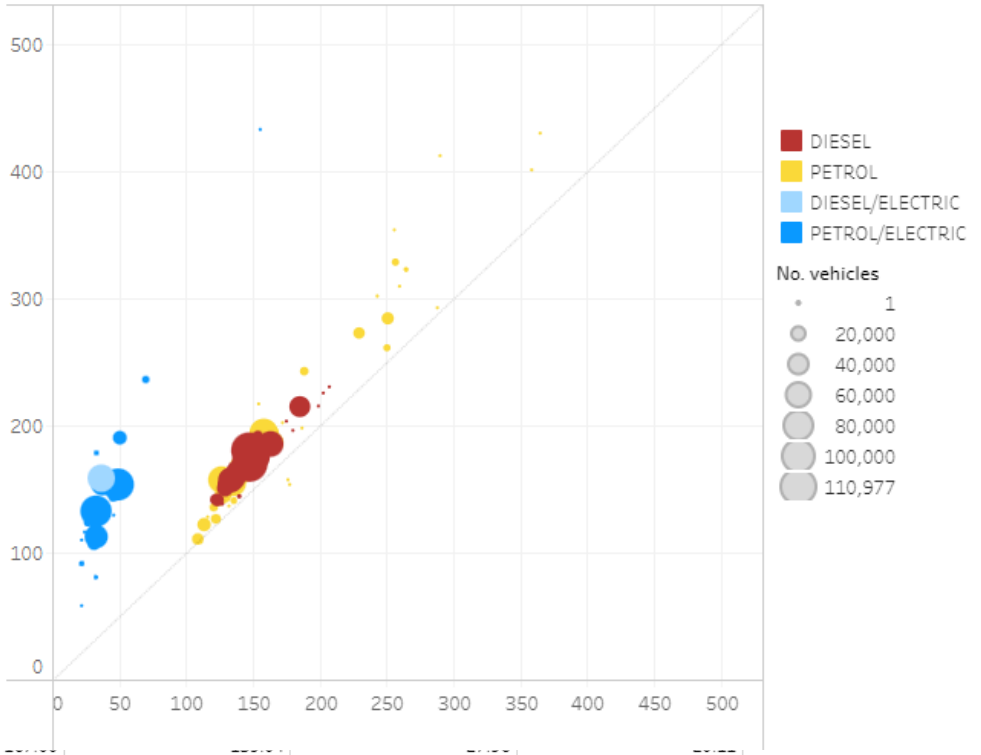
Comparison by powertrain/fuel type

Filter by cars or vans: Cars

Reporting ... 2022 | Registrati... (ALL) | Manufactu... (All) | Fuel consu... CO2 emissions (g/km)

Cars

Avg real-world CO2 emissions..



Results by manufacturer

Reporting year: 2022 | Registration year: (ALL)

	Number of veh				
PETROL	1,[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DIESEL	896,887	179.22	151.96	27.25	17.94
PETROL/ELECTRIC	373,552	134.38	37.95	96.43	254.07
DIESEL/ELECTRIC	64,940	155.36	36.47	118.89	325.98
ICEV	2,455,751	171.46	143.76	27.70	19.27
PHEV	438,492	137.49	37.73	99.75	264.36

European Environment Agency

Heavy-duty vehicles - data

Match	UniqueData	OEM_ManufacturerName	OEM_Make	OEM_Model	OEM_VehicleGroup	OEM_VehicleSubgroup	OEM_ZeroEmissionVehicle	OEM_HybridElectricHDV	OEM_DualFuelVehicle
Match	Yes	Ford Otosan	Ford Otosan	1850T	5				
Match	Yes	Ford Otosan	Ford Otosan	1850T	5				
Match	Yes	Ford Otosan	Ford Otosan	1850T	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.470 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.470 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.470 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.470 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.470 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.510 4x2 BL SA	5				
Match	Yes	MAN Truck & Bus SE	MAN	TGX 18.510	5				

Match (713605)
OEM_only (142463)

UniqueData

[all]
No (12092)
Yes (701513)

OEM_ManufacturerName

[all]
Akpinar Mah. Hasan Basri Cad. No:2 34885 Istanbul, TURKEY (37
Akpinar Mah. Hasan Basri Cad. No:2 34885 Sancaktepe/istanbul
Anadolu Isuzu Otomotiv Sanayi ve Ticaret A.S. (100)

OEM_Make

[all]

OEM_VehicleGroup

[all]

OEM_VehicleSubgroup

[all]
[null] (487620)
10-LH (6429)
10-RD (45)

OEM_ZeroEmissionVehicle

(•) [all]
( ) No
( ) Yes

https://discomap.eea.europa.eu/app/CO2HDV/

European Environment Agency

Heavy-duty vehicles - visualisation

https://climate-energy.eea.europa.eu/topics/transport/emissions-from-heavy-duty-vehicles/data

New heavy-duty vehicles in European countries

EU Member States and selected EEA member countries report data on new heavy-duty vehicles registered in their territory. Countries collect data for trucks, buses, coaches and trailers. Data includes vehicle manufacturer, vehicle type, fuel used, mass, etc. These data are reported annually to the EEA, from 2020. They contain all unique vehicles registered since 01/07/2019, as reported by Member States.

Choose time period (year/semester)

(Multiple values)

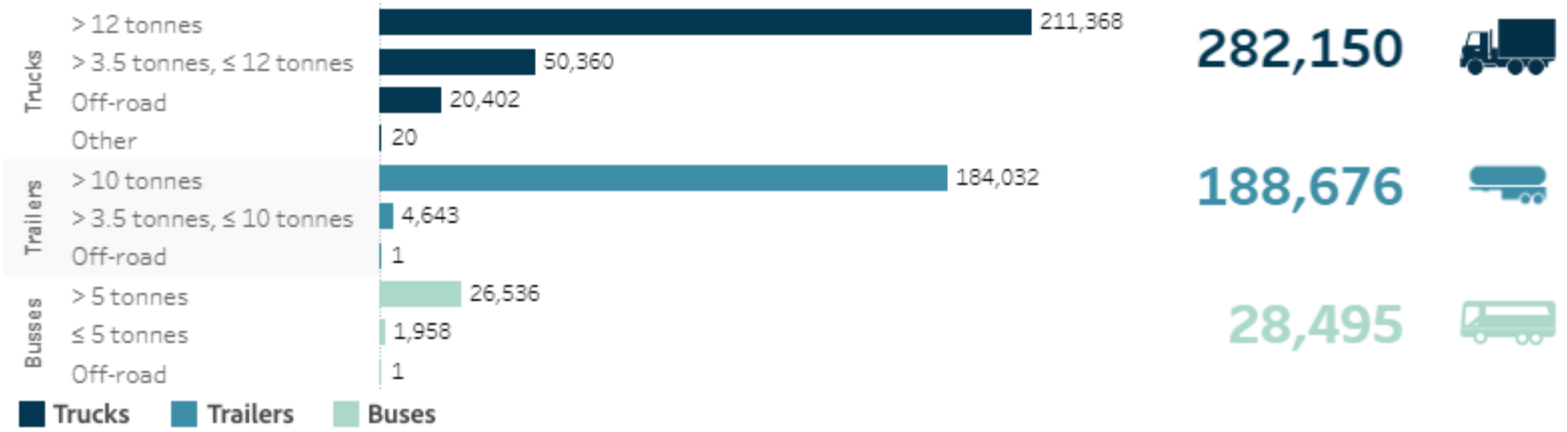
Number of vehicles of different types registered in selected time period & countries

Choose countries

(All)

Note: if all is selected Norway and United Kingdom are included

Hover over the bars to see a description for categories



European Environment Agency

Questions?



Picture: Stephanie Schilling

Now?

Later?

→ stephanie.schilling@eea.europa.eu

→co2.monitoring@eea.europa.eu
→Real-world-data-monitoring@eea.europa.eu
→HDV-monitoring@eea.europa.eu

Thank you

European Environment Agency

© Stephanie Schilling

EXPLORATORY STUDY ON THE CLIMATE RISK & IMPACT OF AUTO ABS

MAXIME BARTHE, BANQUE DE FRANCE

Exploratory study on the Climate Risk & Impact of Auto ABSs

Maxime Barthe and students from the ENPC

12 November 2024

DISCLAIMER

These slides and the associated report reflect the opinions of the authors and do not necessarily express the views of the Banque de France or the Ecole Nationale des Ponts & Chaussées.

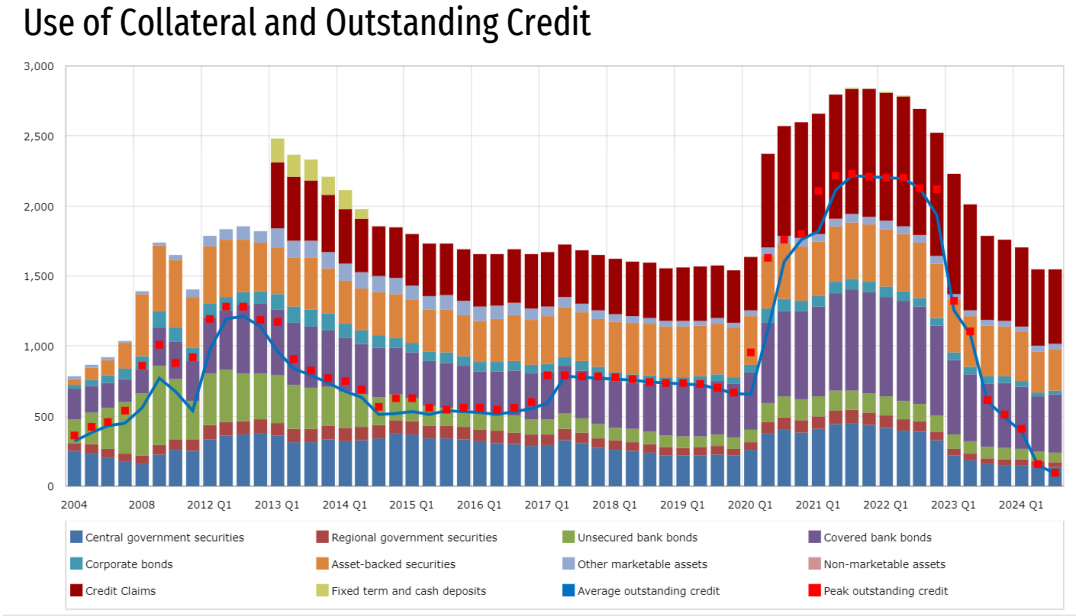
Focus on Auto ABSs

Main types of ABS pledged as collateral:

- RMBS
- Auto ABS

Auto ABSs

- Around 10% of Eurosystem collateral
- Intuitively mostly transition risks



ABSs pledged as collateral represented around 292 billion euros at the end of the 2024 Q3. Source: Eurosystem collateral data (ECB)

Key points of the project

A basis for our research

Loris André et al. *Climate Risk Measurement of Assets Eligible as Collateral for Refinancing Operations – Focus on Asset Backed Securities* (ABS) :

A theoretical framework to study climate risks

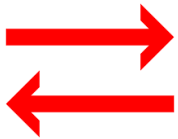
Our research contributions

- An exploration of the data available on Auto ABSs ; identification of bias, better understanding of these assets, highlight the need for completeness
- Building on previous work, metrics to measure climate risks and impacts of Auto ABSs

Several challenges for central banks

Double materiality

Climate materiality
The financial system has a major impact on climate change



Financial materiality
Climate change has a major impact on the financial system

We must therefore be able to :

- **Quantify climate risks of Auto ABSs,**
- **Quantify climate impacts of Auto ABSs.**

At the heart of EDW data

Financial data

- Many metrics
- Coverage rates close to 100%
- Weak links with climate data

Autos data

- One major metric : the Energy Performance Certificate (EPC)
- Other metrics : brand, model, new or used, etc
- Low coverage rates for EPCs, inconsistencies in the formatting of other fields

Use of EPCs

We consider the emissions, in gCO2/km, of each loans in order to assess the climate risks and impacts of ABSs, while taking into account the country of origin

	A	B	C	D	E	F	G
DBRS assumptions for french ABS	50,5	110,5	130,5	150,5	180,5	225,5	300
DBRS assumptions for german ABS	57,9	131,1	146,6	162	177,4	192,8	275,3

CO2 emissions in France and Germany according to DBRS (gCO2/km). Source: (DBRS, 2022)

A first solution to deal with the low coverage rates of EPCs

The goal is to progressively penalise the lack of coverage:

Methodology : Impute an EPC « D » to the first 10 % uncovered rows, a « E » to the next 20 %, a « F » to the following 20 % and a « G » for the remaining 50 % after.

Example : For an ABS which has an EPCs' coverage rate of 22%, we impute the 78 % of uncovered rows with 10 % of DPE D, 20 % DPE E, 20 % DPE F and 28 % EPC G.

Proposed metrics

General Emission Average

$$\text{GEA} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times e_l$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Impact

$$\text{NTE-I} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Risk

$$\text{NTE-R} = \sum_{l=1}^{N}\frac{outstanding_l}{\sum_{i=1}^{N} outstanding_i} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

Proposed metrics

General Emission Average

$$\text{GEA} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times e_l$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Impact

$$\text{NTE-I} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Risk

$$\text{NTE-R} = \sum_{l=1}^{N}\frac{outstanding_l}{\sum_{i=1}^{N} outstanding_i} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

- N is the number of loans within the collateral pool of the ABS
- e_l indicates the emissions of vehicle l derived from its EPC
- $loan_l$ is the initial value of the loan l
- val_l is the initial value of the vehicle l
- $\bar{e}_l$ is the average emissions of the vehicle category to which the vehicle l belongs
- $outstanding_l$ is the current outstanding amount of loan l

Proposed metrics

Climate materiality

Key assumption: when a loan finances x% of a vehicle's value, it is responsible for x% of its emissions

General Emission Average

$$\text{GEA} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times e_l$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Impact

$$\text{NTE-I} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

Financial materiality

Key assumption: the neutral temporal emissions of a vehicle is a proxy for its transition risks

Neutral Temporal Emission-Risk

$$\text{NTE-R} = \sum_{l=1}^{N}\frac{outstanding_l}{\sum_{i=1}^{N} outstanding_i} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

- N is the number of loans within the collateral pool of the ABS
- e_l indicates the emissions of vehicle l derived from its EPC
- $loan_l$ is the initial value of the loan l
- val_l is the initial value of the vehicle l
- $\bar{e}_l$ is the average emissions of the vehicle category to which the vehicle l belongs
- $outstanding_l$ is the current outstanding amount of loan l

Proposed metrics

General Emission Average

$$\text{GEA} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times e_l$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Impact

$$\text{NTE-I} = \frac{1}{N}\sum_{l=1}^{N}\frac{loan_l}{val_l} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

Neutral Temporal Emission-Risk

$$\text{NTE-R} = \sum_{l=1}^{N}\frac{outstanding_l}{\sum_{i=1}^{N} outstanding_i} \times (e_l - \bar{e}_l)$$

Derived from (André et al., 2022)

These 3 metrics allow us to compare ABSs

- We classify ABSs into four climate performance categories. We rate the climate impact of ABSs from A to D based on the two first metrics: GEA and NTE-I.
- We rate the transition risks of ABSs from 1 to 4 based on their NTE-R.

ABSs ranking

Score	A	B	C	D	Total
1	13	2	0	1	15
2	3	21	4	0	28
3	0	0	28	9	37
4	0	0	2	2	4
Total	16	23	34	12	85

French and german ABS in each category

Score	A	B	C	D	Total
1	4,830019333	0	0	0	4,830019333
2	2,185001742	5,860979464	15,90969141	0	23,95567262
3	0	0	13,25216412	9,540633881	22,79279801
4	0	0	1,499999598	1,291301198	1,291301198
Total	7,015021075	5,860979464	30,66185513	10,83193508	54,36979075

Sum of outstanding amounts for each category (in billion of euros)

The majority of data is gathered arount the diagonals of the tables, confirming the link between transition risks and climate impacts of Auto ABSs

Conclusion

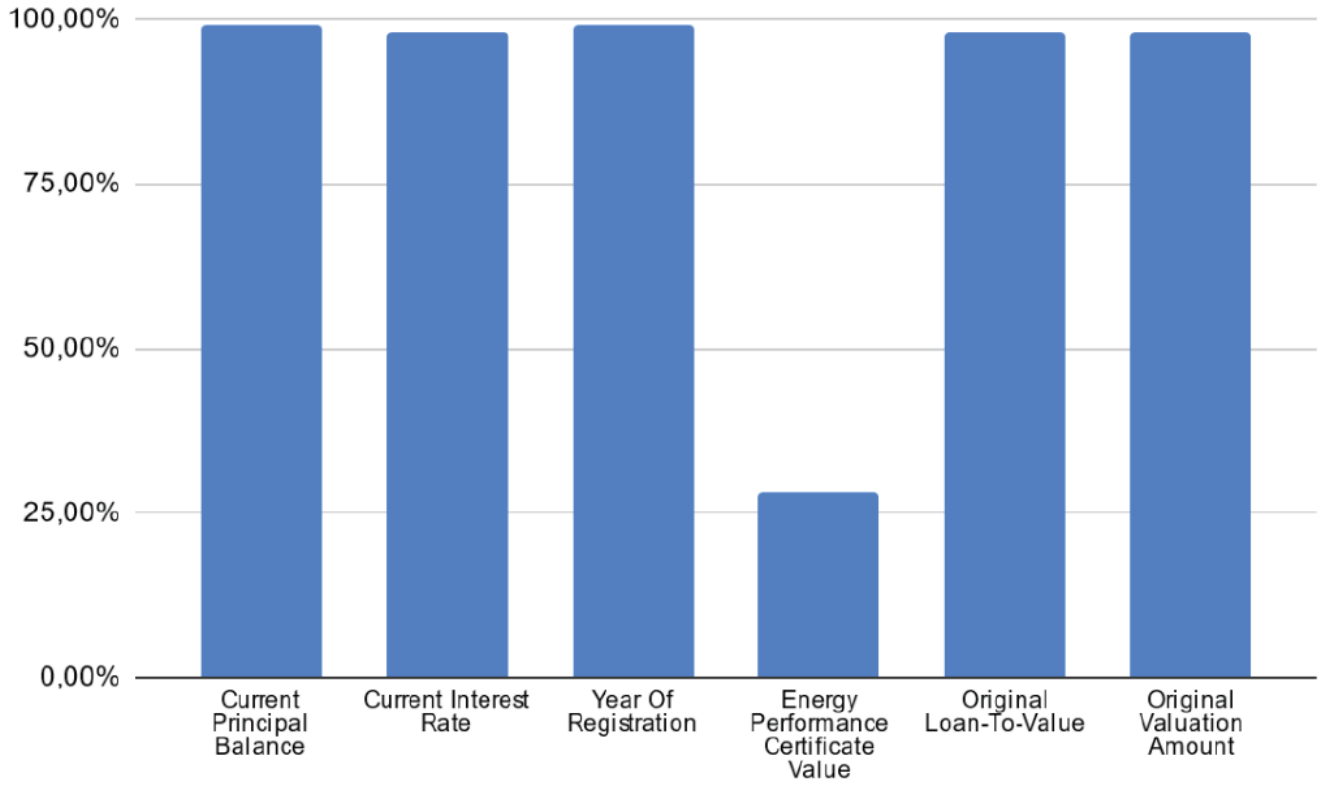
Maxime Barthe and students from the ENPC

12 Novembre 2024

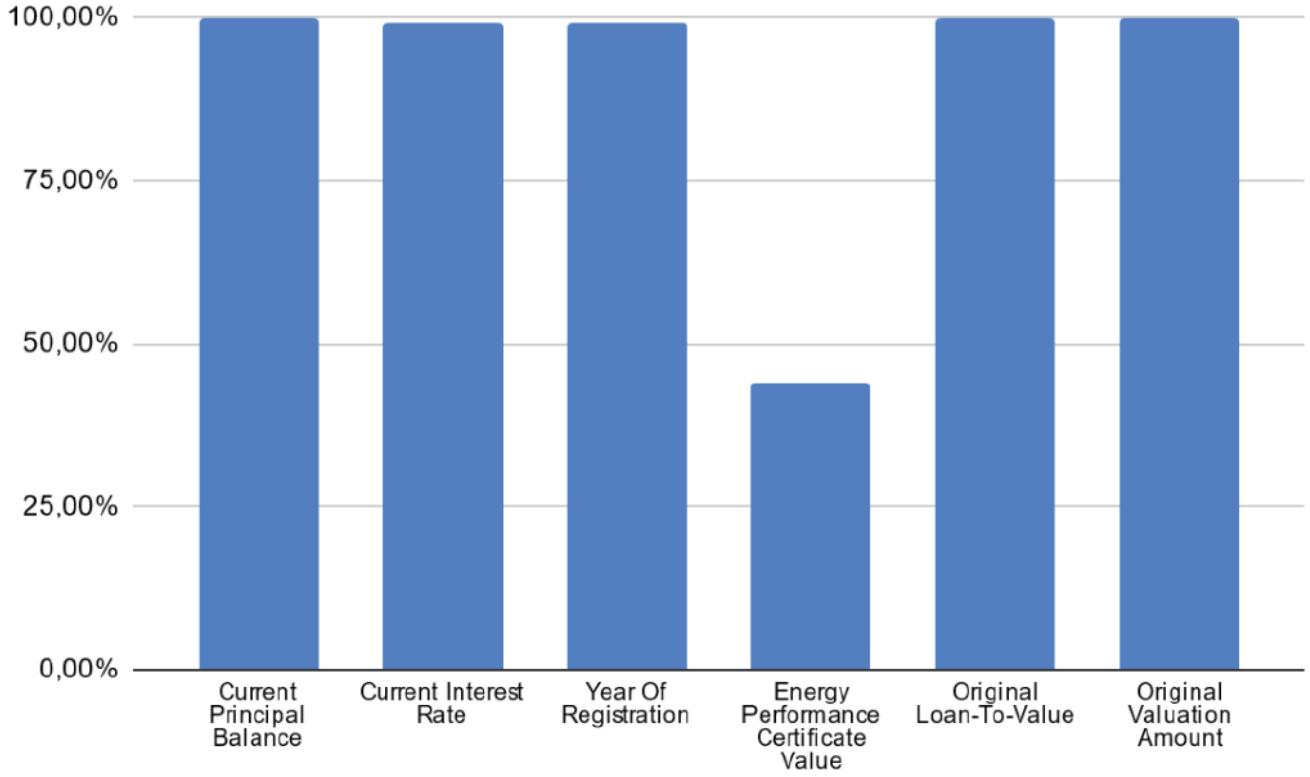
Bibliography

- DBRS Morningstar. “European Auto ABS: Auto EPCs on a Diverging Road”. In: (Sept. 2022). url: https://dbrs.morningstar.com/research/402539/european-auto-absauto-epcs-on-a-diverging-road.
- ECB. “Eurosystem Collateral Data.” ECB, 28 October 2024, https://www.ecb.europa.eu/mopo/coll/charts/html/index.en.html.
- Loris André et al. Climate Risk Measurement of Assets Eligible as Collateral for Refinancing Operations – Focus on Asset Backed Securities (ABS). url: https://publications.banque-france.fr/en/climate-risk-measurement-assets-eligible-collateralrefinancing-operations-focus-asset-backed.

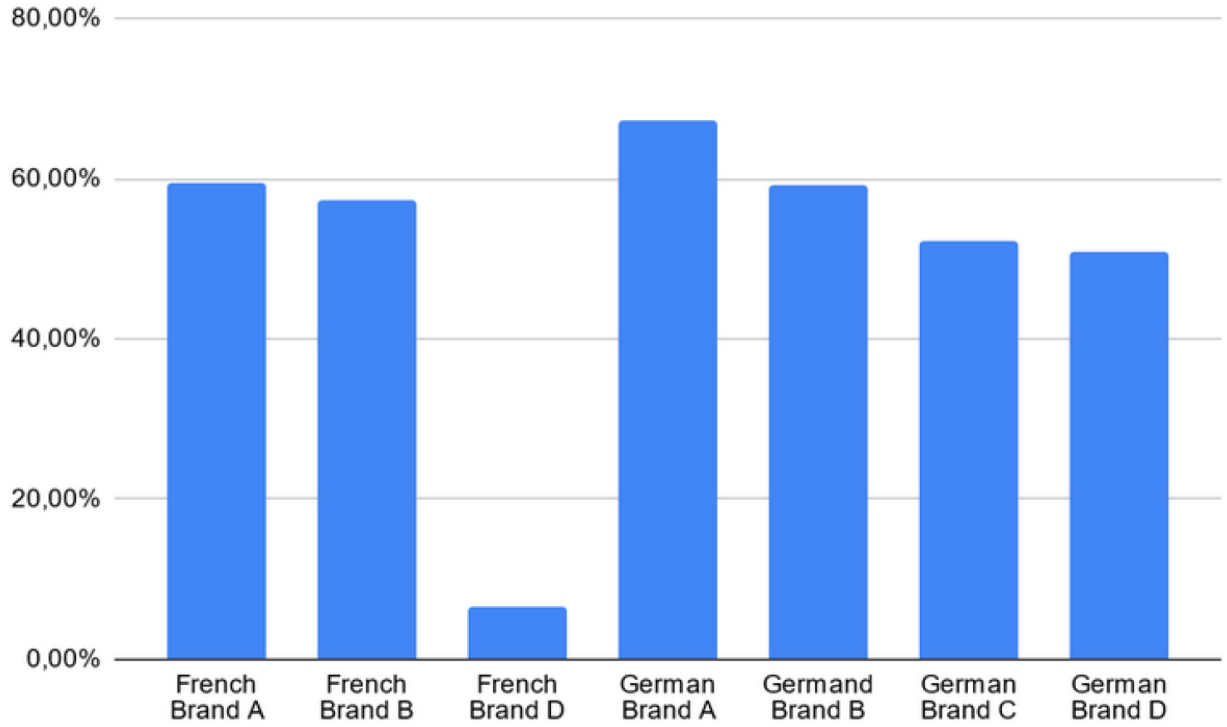
French coverage rates (value for EPCs: 28.1%)



German coverage rates (value for EPCs: 44%)



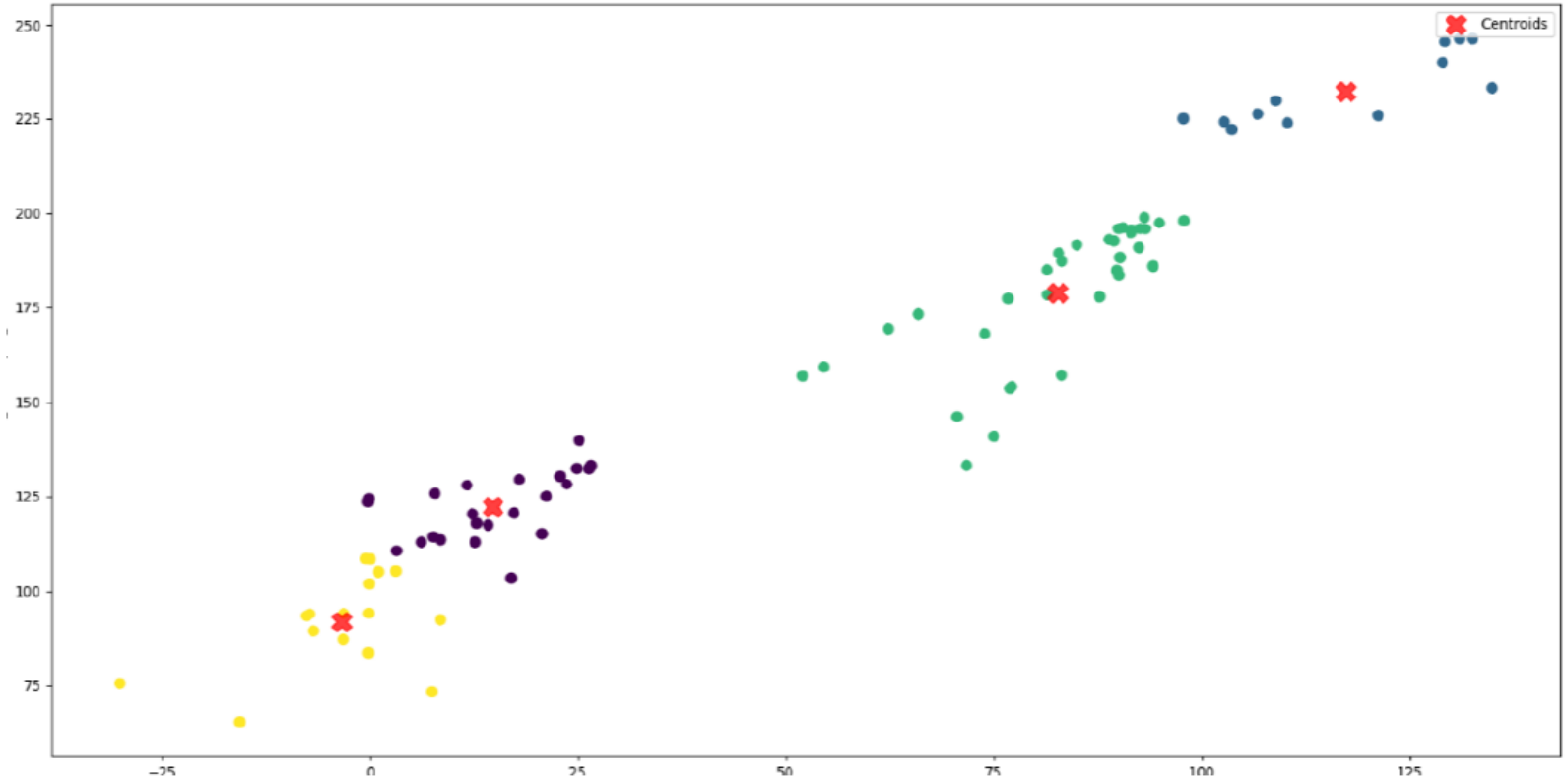
Coverage rates of EPCs for the biggest brands in France and Germany



Reference emissions by category of vehicles

	0-20 000€	20 000-40 000€	40 000-60 000€	60 000-80 000€	80 000€ ou +
2010	150.11	147.01	161.12	150.50	150.50
2011	145.53	157.38	161.23	160.72	158.17
2012	137.61	145.97	161.39	158.17	150.50
2013	131.95	139.29	169.20	161.23	158.17
2014	120.51	109.80	144.39	187.74	186.57
2015	113.48	105.98	127.30	167.91	206.45
2016	112.79	106.18	120.19	146.11	189.64
2017	115.31	110.34	123.25	135.21	176.74
2018	123.85	120.15	130.04	144.21	171.90
2019	128.99	121.75	126.39	131.35	141.27
2020	115.68	114.57	117.06	119.77	131.75
2021	114.44	112.12	109.12	113.00	129.78
2022	121.88	113.70	108.75	119.04	121.55
2023	118.84	108.97	102.74	113.57	113.79
2024	109.41	81.82	100.88	150.50	150.50

K-means clustering with 4 clusters. GEA on the x-axis, NTE-I on the y-axis

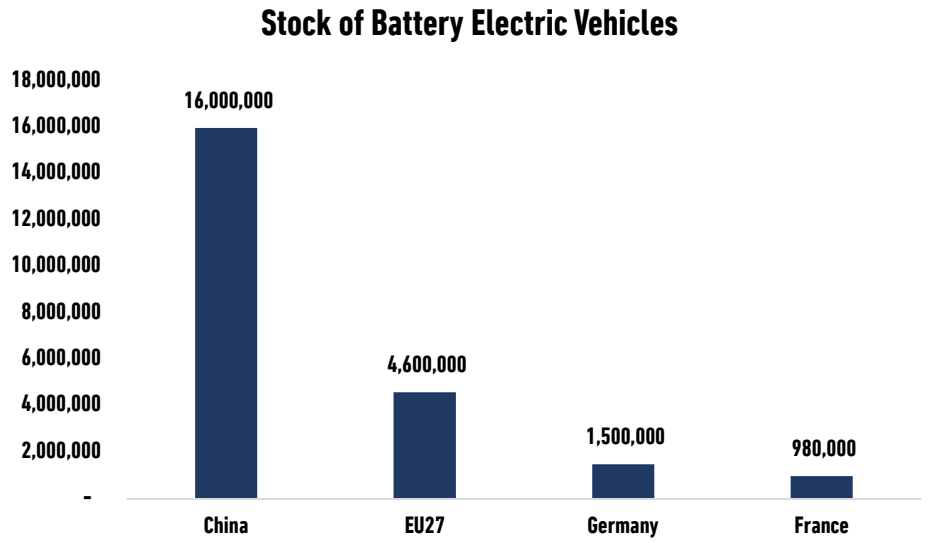


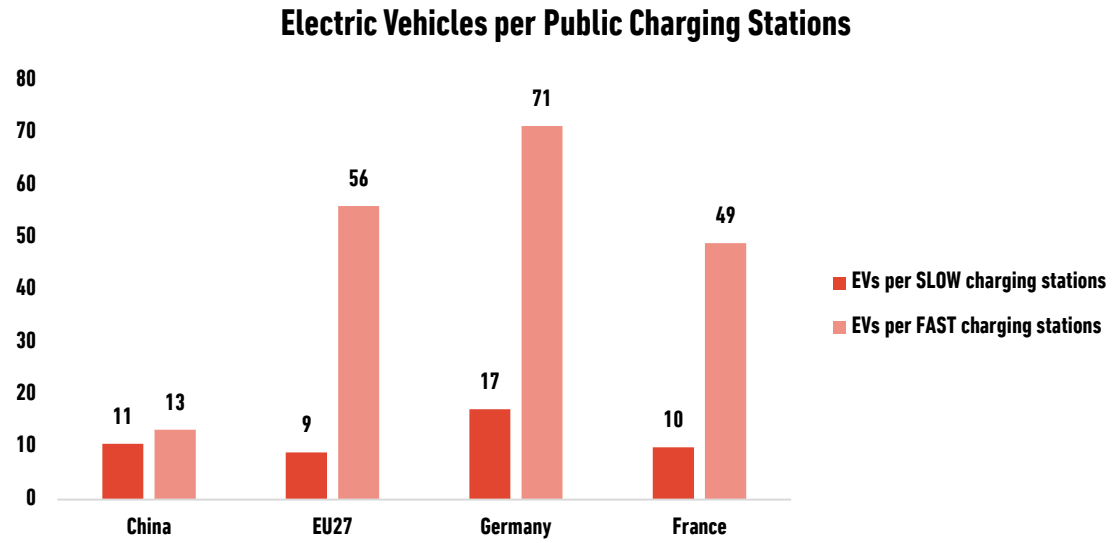
PANEL: STATUS QUO ON GREEN AUTO SECURITIZATION

CHRISTIAN THUN, EUROPEAN DATAWAREHOUSE
ADOLFO RAVASIO, HYUNDAI CAPITAL BANK
GUGLIELMO PANIZZA, MORNINGSTAR DBRS
PAOLO CONTI, MORNINGSTAR DBRS
JACOB BINNEMA, MUFG

CHARGING INFRASTRUCTURE

EUROPE LAGGING BEHIND

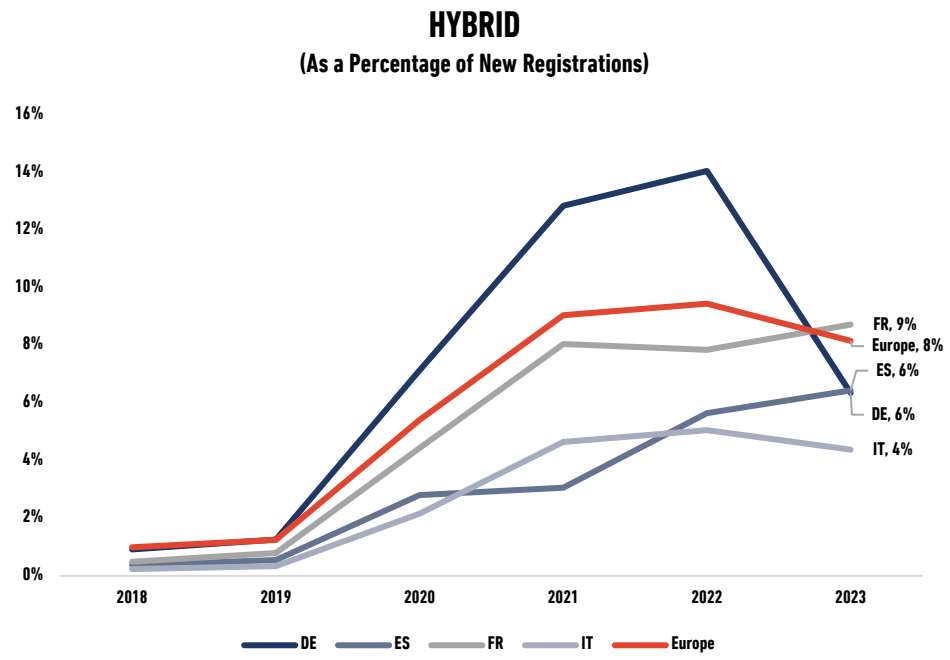


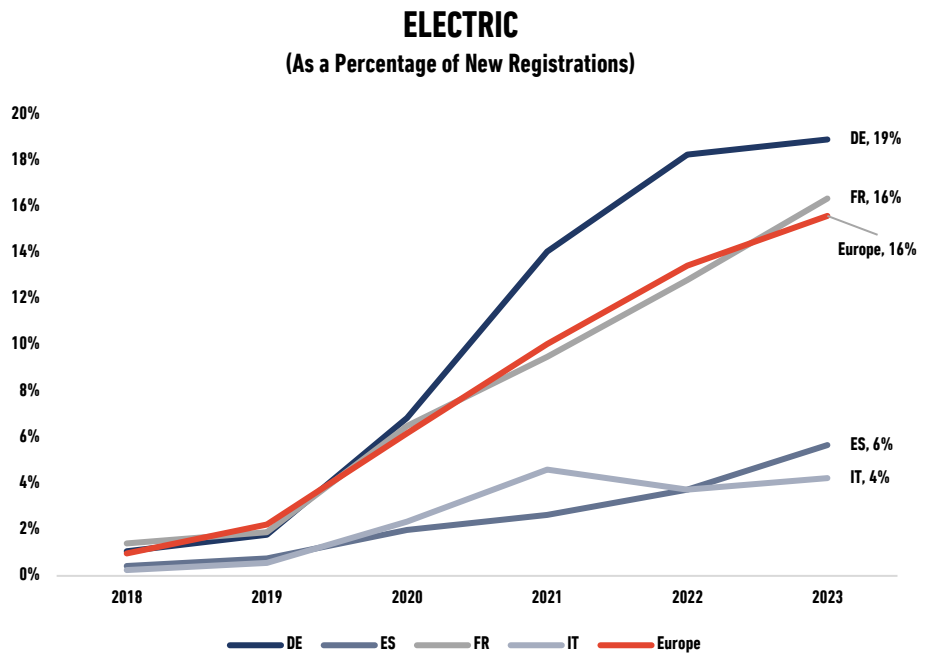


Source: International Energy Agency

ANNUAL NEW CAR REGISTRATIONS IN EUROPE

SHARE OF HYBRID AND ELECTRIC VEHICLES





Source: European Environment Agency

‘MUTUAL FUNDS’ APPETITE FOR SUSTAINABILITY IN EUROPEAN AUTO ABS

LORIANA PELIZZON, SAFE

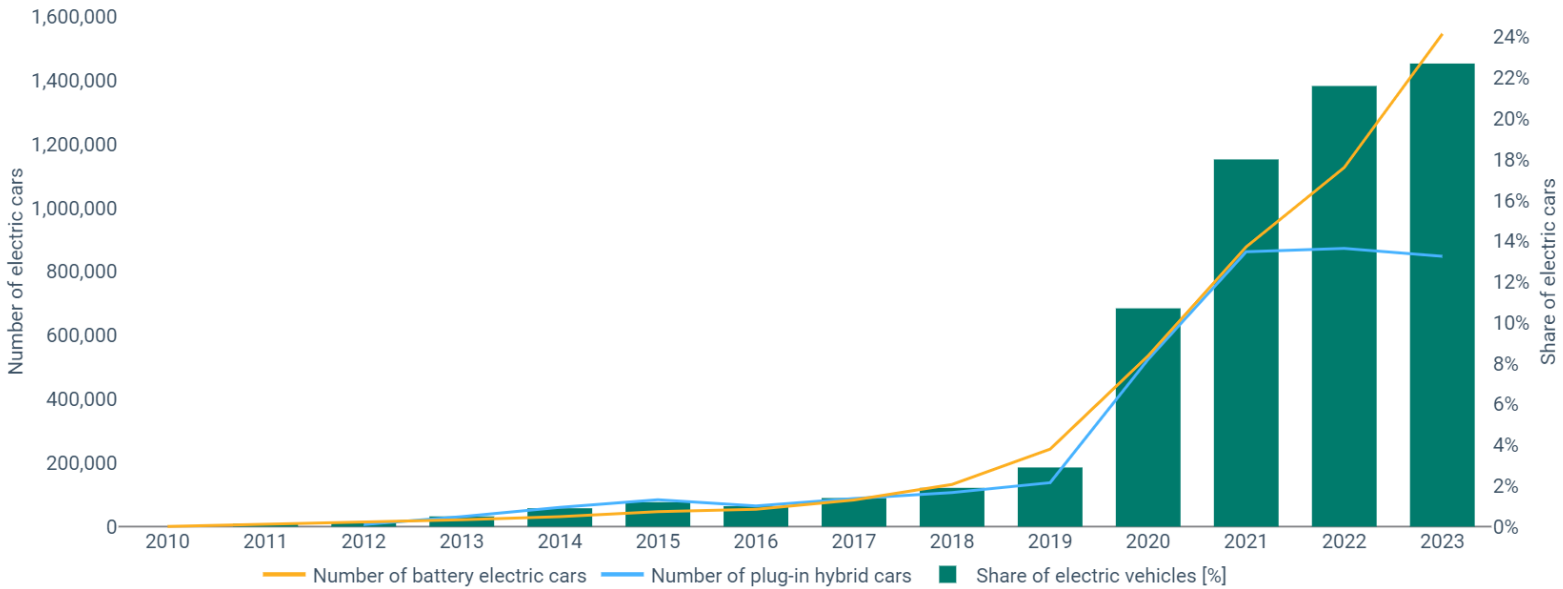
Mutual Funds' Appetite for Sustainability in European Auto ABS

Carmelo Latino, Loriana Pelizzon, Max Riedel, Yue Wang

Driving the Future: European Green Auto Securitisation
12. November 2024

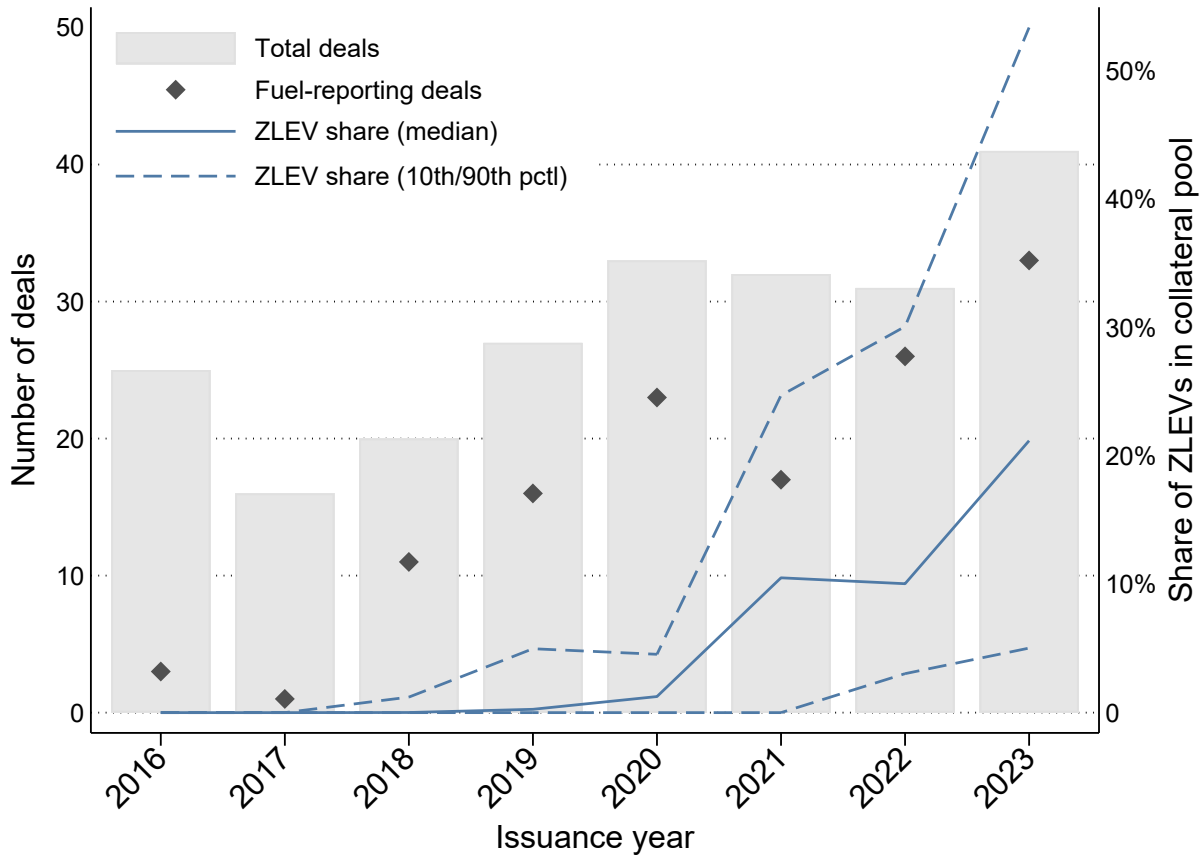
Motivation

- Emissions from transport account for one quarter of the EU's greenhouse gas emissions.
- **EU Green Deal (2019):** to achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050.
- **Regulation (EU) 2019/631**: zero-emission target for new cars and vans from 2035 onwards



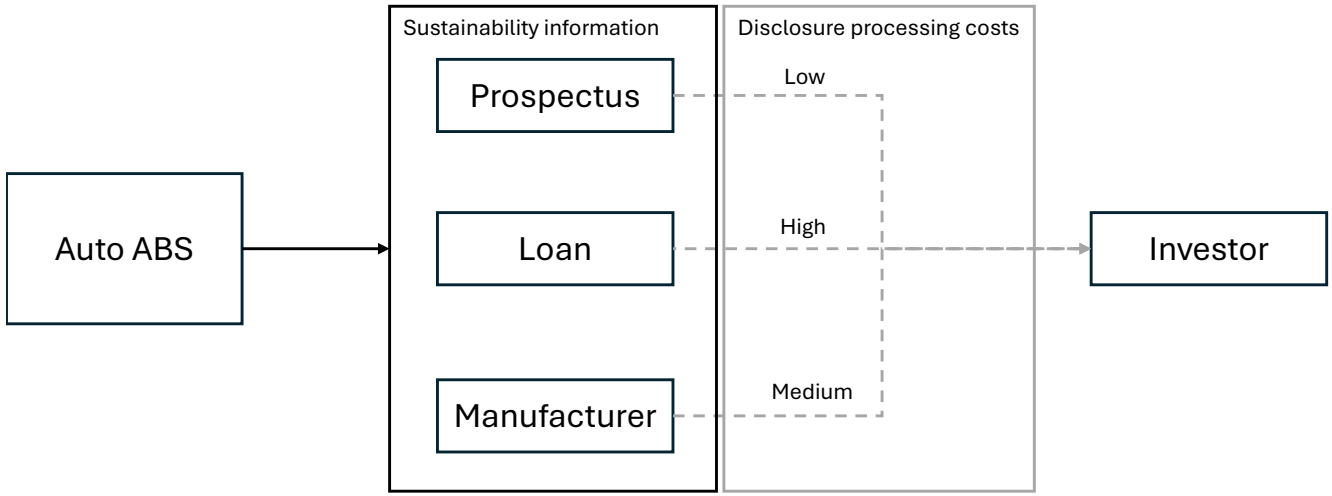
Role of Auto ABS

- After diesel scandal, Auto ABS issuers started to report fuel type information of underlying collateral
- The share of zero- or low-emission vehicles (electric & hybrid) in collateral pools has been steadily increasing, reaching 21% in 2023



What we do

- We focus on the **sustainability information of underlying vehicles**
  - We use three sources for obtaining this information
    - Auto ABS offering prospectuses: fuel type distribution
    - Auto ABS loan-level data: fuel type and CO_2 emissions
    - Auto manufacturer data: production emissions, waste recycling, etc



- We study the **demand of mutual funds (MFs) for sustainability of Auto ABS**
  - We differentiate between green and non-green MFs using SFDR Art. 8/9 and Art. 6 classifications

Results preview

- All MFs value transparency about collateral composition and its sustainability
- Green MFs in particular have higher exposures to Auto ABS with larger shares of zero- or low-emission vehicles (ZLEVs)
- Sustainability at manufacturer-level matters only for green MFs, potentially due to too high data retrieval and preparation costs

Literature contribution

- Studies on Auto ABS
  - Auto ABS in the US (Kontz, 2023), measuring carbon intensity in Auto ABS (André et al., 2022), pricing of auto loans after the diesel scandal in 2015 (Beyene et al, 2022)
- **Information disclosure**
  - Information asymmetries in ABS markets (Acharya et al., 2009; Pagano & Volpin, 2012), introduction of disclosure requirements (Latino et al., 2023; Krahnen & Wilde, 2022; Klein et al., 2021), disclosure processing costs (Blankespoor et al., 2020), textual analyses of prospectuses (Debener et al., 2023; Zhang et al., 2024)
- Sustainability information
  - Securitisation of green assets and climate risks (Agliardi, 2022), measurement of loan carbon intensity (Faiella & Lavecchia, 2022), mutual funds use ESG information (Hartzmark & Sussman, 2019; van Duuren et al., 2015)
- Automotive industry
  - Environmental impact of car production (Orsato & Wells, 2007; Nieuwenhuis & Katsifou, 2015), green supply chain management (Koplin et al., 2007; Thun & Müller, 2010; Caniëls et al., 2013), waste reduction, financial performance, and stakeholder pressure (Szász et al., 2021)

The data

ABS sustainability measures

1. Offering prospectuses of 321 Auto ABS deals (European DataWarehouse)
   Focus on fuel type distribution; zero- or low-emission vehicles (electric/hybrid)
2. Approx. 20 million auto loans (European DataWarehouse)
   Focus on vehicle's model name, engine size, and fuel type to identify ZLEV share; estimation of CO_2 emissions
3. Manufacturer-level information (Bloomberg)
   Total GHG emission ratio per vehicle sold; Energy intensity per million sales; EU Taxonomy eligible capex share; ESG score; Waste recycled ratio

Mutual fund data

- Mutual fund quarterly holdings (Morningstar Direct)
- Funds: 332
- Period: 2013Q4 - 2023Q3
- Fund characteristics: Domicile, inception date, brand name, investment type, SFDR Art. 6/8/9, etc
- Asset characteristics: Face issued total, maturity date, coupon rate, tranche number, etc. (Refinitiv Workspace)

Fund characteristics

Variable	Mean	SD	p1	p99	Obs
Panel A: Fund characteristics					
Market value fund (million EUR)	1716.92	6024.70	8.94	25985.16	11,488
No. asset holdings	737.44	1162.26	9.00	5865.00	11,488
Fund age (year)	13.99	10.39	0.00	49.50	11,488
ABS share (% of fund)	13.06	21.51	0.00	96.98	11,488
Auto ABS share (% of ABS)	5.88	14.59	0.00	91.74	9,953
Fuel-type-reporting (% of Auto ABS)	31.19	39.31	0.00	100.00	4,453
Bond share, ex sovereign (% of fund)	40.56	26.77	0.00	95.35	11,488
Equity share (% of fund)	4.62	13.35	0.00	66.94	11,488
Sovereign bond share (% of fund)	29.40	24.84	0.00	91.90	11,488
Other assets share (% of fund)	12.37	22.60	-41.23	100.00	11,488
Panel B: Auto ABS					
Market value (million EUR)	2.12	4.45	0.00	21.10	24,857
Portfolio weight (% of fund)	0.25	0.46	0.00	2.31	24,857
Coupon rate (%)	2.46	2.43	0.00	7.76	24,857
Senior tranche	0.68	0.47	0.00	1.00	24,857
Original maturity (year)	10.86	4.01	5.75	23.33	24,857

- Average fund size is EUR 1.7 billion
- Predominantly fixed-income funds
- Approximately 35.8% of funds are classified as green
- Average market value for the ABS deals held by these funds is EUR 2.1 million.

Which Auto ABS are held by funds?

- MFs avoid Auto ABS issued by captive banks
- The more detailed the ABS prospectus, the more likely the Auto ABS is held by a fund
- The disclosure of fuel type in offering prospectus positively affects the probability of an Auto ABS being held, both at the tranche and deal level
- The odds of a tranche being held by an MF is 74% higher for fuel-type-reporting deals than for non-fuel-type-reporting deals

	Pr(Auto ABS tranche held by MF)		
	(1)	(2)	(3)
Fuel-type-reporting			**0.555****
			[0.254]
Prospectus pages		**3.336*****	3.329***
		[0.541]	[0.539]
Captive bank	**-0.713*****	-0.945***	-0.981***
	[0.194]	[0.203]	[0.204]
Face value	0.457***	0.448***	0.437***
	[0.073]	[0.072]	[0.072]
Coupon rate	0.002	-0.009	-0.010
	[0.021]	[0.025]	[0.025]
Is callable	1.240***	1.273***	1.250***
	[0.393]	[0.375]	[0.373]
Senior tranche	0.127	0.332	0.370
	[0.247]	[0.249]	[0.249]
Original maturity	-2.850***	-3.805***	-3.710***
	[0.324]	[0.397]	[0.398]
Observations	1,032	1,032	1,032
Pseudo R-squared	0.221	0.254	0.258
Asset controls	Yes	Yes	Yes
Model	Logit	Logit	Logit

Asset controls: prospectus year

What types of mutual funds invest in Auto ABS?

- Green MFs tend to avoid ABS, but prefer exposure to transparent Auto ABS
- Large, experienced, and specialized MFs tend to hold Auto ABS

	ABS (% of fund) (1)	Auto ABS (% of ABS) (2)	Fuel-reporting ABS (% of Auto ABS) (3)
Green fund	-3.283***	1.786***	**6.850*** **
	[0.257]	[0.371]	[1.068]
Fund size	0.419***	-0.188	1.830***
	[0.077]	[0.131]	[0.443]
Fund age	-0.767***	0.517***	3.568***
	[0.158]	[0.192]	[0.652]
Diversification	-0.261**	-1.105***	-3.836***
	[0.120]	[0.214]	[0.716]
Fund turnover ratio	0.009	-0.045***	0.117*
	[0.011]	[0.014]	[0.066]
Observations	11,449	9,914	4,444
R-squared	0.765	0.172	0.487
Fund controls	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
Sample	All holdings	ABS holdings	Auto ABS holdings

Fund controls: global category, investment type, base currency, fund domicile

Do MFs care about transparency and sustainability?

- Transparency matters
- Green funds pay attention to both fuel-reporting and ZLEV share

Prospectus-level sustainability measures				
	Portfolio weight			
	(1)	(2)	(3)	(4)
Green fund * Fuel-type-reporting		0.144***		
		[0.011]		
Fuel-type-reporting	0.095***	0.037***		
	[0.007]	[0.008]		
Green fund * ZLEV share				0.003***
				[0.001]
ZLEV share			0.006***	0.004***
			[0.001]	[0.001]
Green fund	-0.072***	-0.114***	-0.010	-0.026*
	[0.006]	[0.007]	[0.012]	[0.014]
Observations	24,846	24,846	7,048	7,048
R-squared	0.368	0.372	0.432	0.432
Asset controls	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes
Sample	Auto ABS	Auto ABS	Fuel-reporting ABS	Fuel-reporting ABS

Do MFs care about transparency and sustainability?

Loan-level sustainability measures				
	Portfolio weight			
	(1)	(2)	(3)	(4)
Green fund * ZLEV share * Fuel-type-reporting				0.026***
				[0.005]
Green fund * Fuel-type-reporting				0.106***
				[0.013]
Green fund * ZLEV share			0.007***	-0.018***
			[0.002]	[0.004]
ZLEV share * Fuel-type-reporting		0.005*		-0.009**
		[0.003]		[0.004]
ZLEV share	0.013***	0.007***	0.009***	0.017***
	[0.001]	[0.002]	[0.001]	[0.004]
Green fund			-0.083***	-0.103***
			[0.007]	[0.007]
Fuel-type-reporting		0.085***		0.045***
		[0.007]		[0.009]
Observations	24,509	24,509	24,509	24,509
R-squared	0.363	0.368	0.368	0.377
Asset controls	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes

Controls: pool coverage, inception year

Do MFs care about financed CO_2 emissions?

- Higher average vehicle's CO_2 emissions are associated negatively with MF exposures
- Green MFs do not invest differently from conventional MFs

Loan-level sustainability measures		
	Portfolio weight	
	(1)	(2)
Green fund * CO_2 estimate		-0.000
		[0.000]
Green fund	-0.080***	-0.013
	[0.007]	[0.053]
CO_2 estimate	-0.003***	-0.003***
	[0.000]	[0.000]
Observations	23,835	23,835
R-squared	0.370	0.370
Fund controls	Yes	Yes
Asset controls	Yes	Yes
Quarter FE	Yes	Yes

Controls: pool coverage, inception year

Additional findings

- Manufacturer-level results
  - MFs hold lower exposure to Auto ABS with high manufacturer concentration
  - Green MFs tend to invest more in Auto ABS with car manufacturers that

    (i) have a higher share of EU taxonomy eligible capex
    (ii) higher ESG scores
    (iii) lower total GHG ratio per vehicle sold
- Results hold if we
  - exclude hybrids and focus only on electric vehicles
  - restrict the sample to 2019Q4 - 2023Q4

Summary

- Our paper is the first to examine the relationship between MF holdings and Auto ABS sustainability measures at prospectus-, loan-, and manufacturer level
- We find that
  - MFs value transparency regarding fuel type distribution of underlying collateral
  - in particular green MFs tend to hold larger exposures to Auto ABS that are more transparent or composed of a larger share of ZLEVs
- We observe that
  - financed CO_2 emissions matter for all MFs
  - MFs avoid strong manufacturer concentrations
  - green MFs tend to hold a larger share of Auto ABS with more sustainable manufacturers



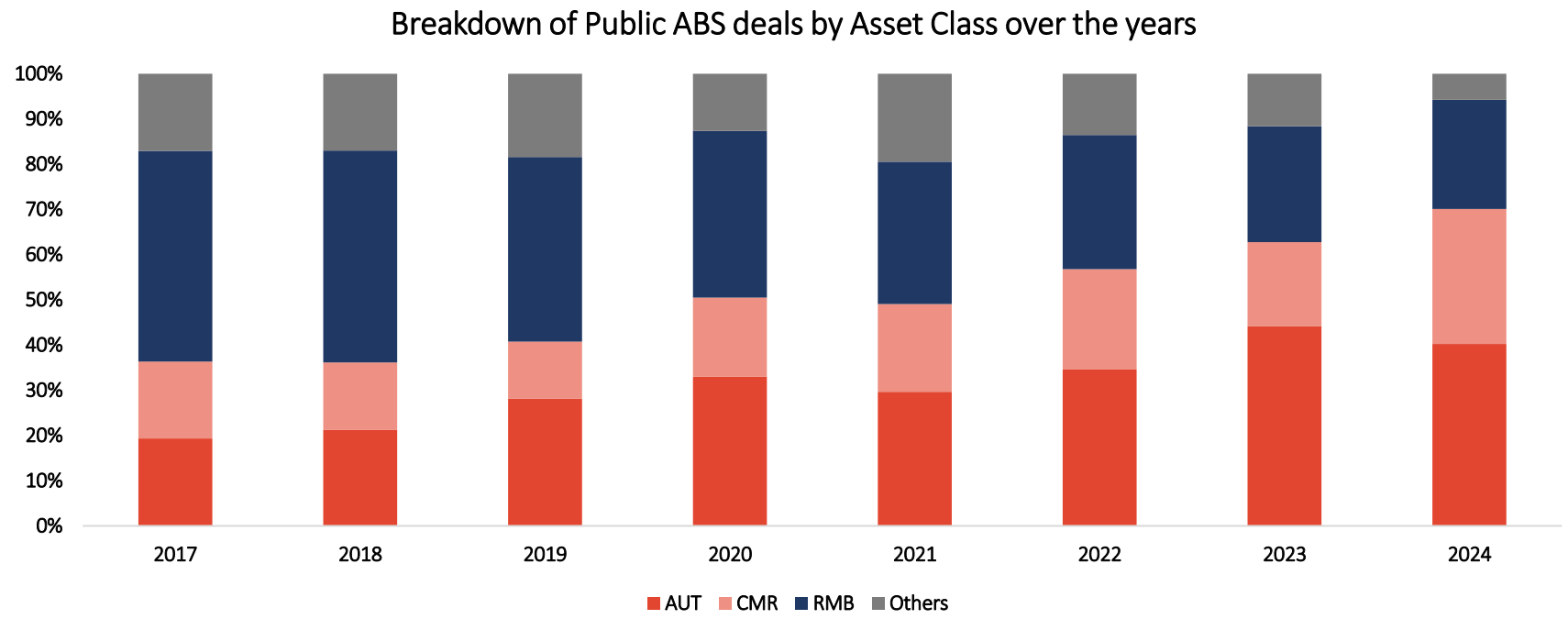
Thank you for your attention!

AUTO ABS DATA EVOLUTION

MARINE MAÎTRE & USMAN JAMIL, EUROPEAN DATAWAREHOUSE

PUBLIC DEALS ISSUED OVER THE YEARS BY ASSET CLASS

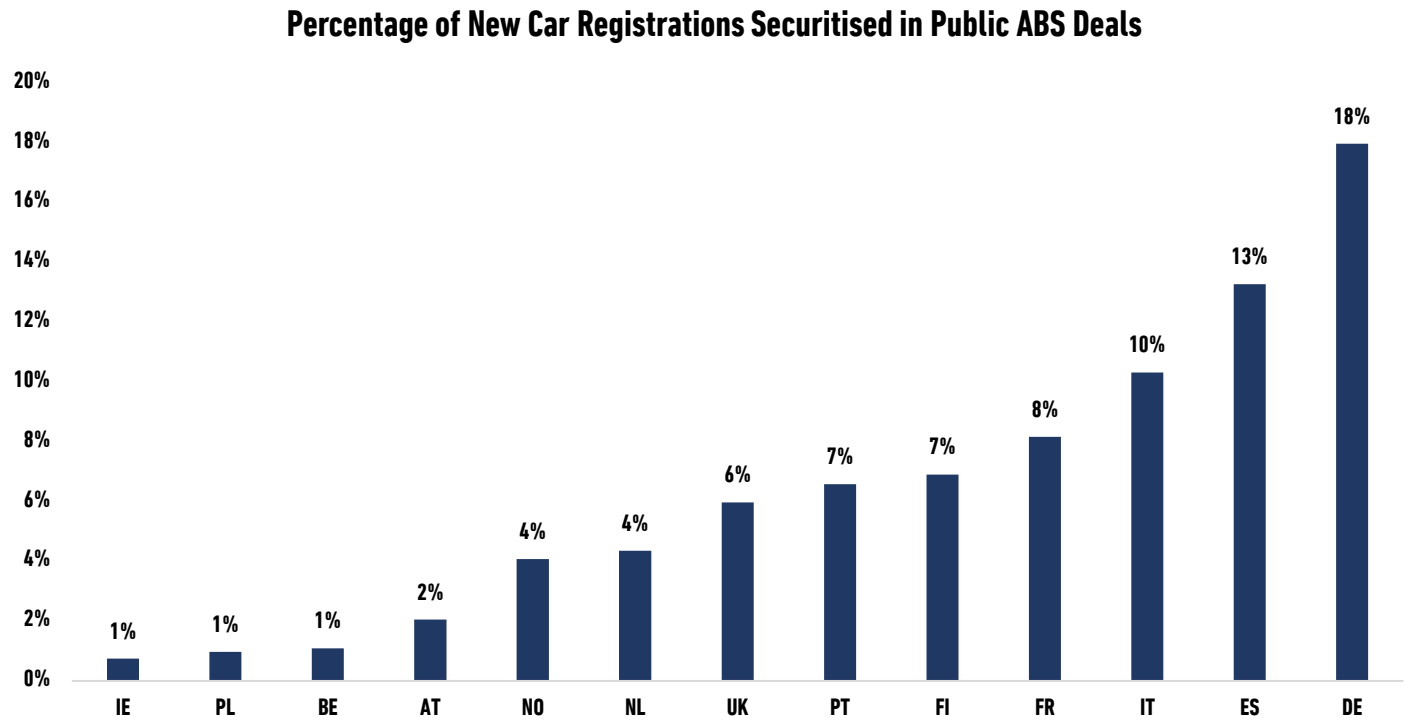
AUTO ABS IS NOW THE LARGEST ASSET CLASS – FOLLOWED BY CONSUMER AND THEN RMBS



Source: EDW calculations

PERCENTAGE OF NEW CAR REGISTRATIONS SECURITISED IN PUBLIC ABS DEALS

A SIGNIFICANT PORTION OF NEW CARS FROM GERMANY, SPAIN, ITALY AND FRANCE SHOW UP IN PUBLIC AUTO ABS



Source: EDW calculations
*using car loan/leases for New cars with a year of registration of 2010 or later
*UK data only till 2020

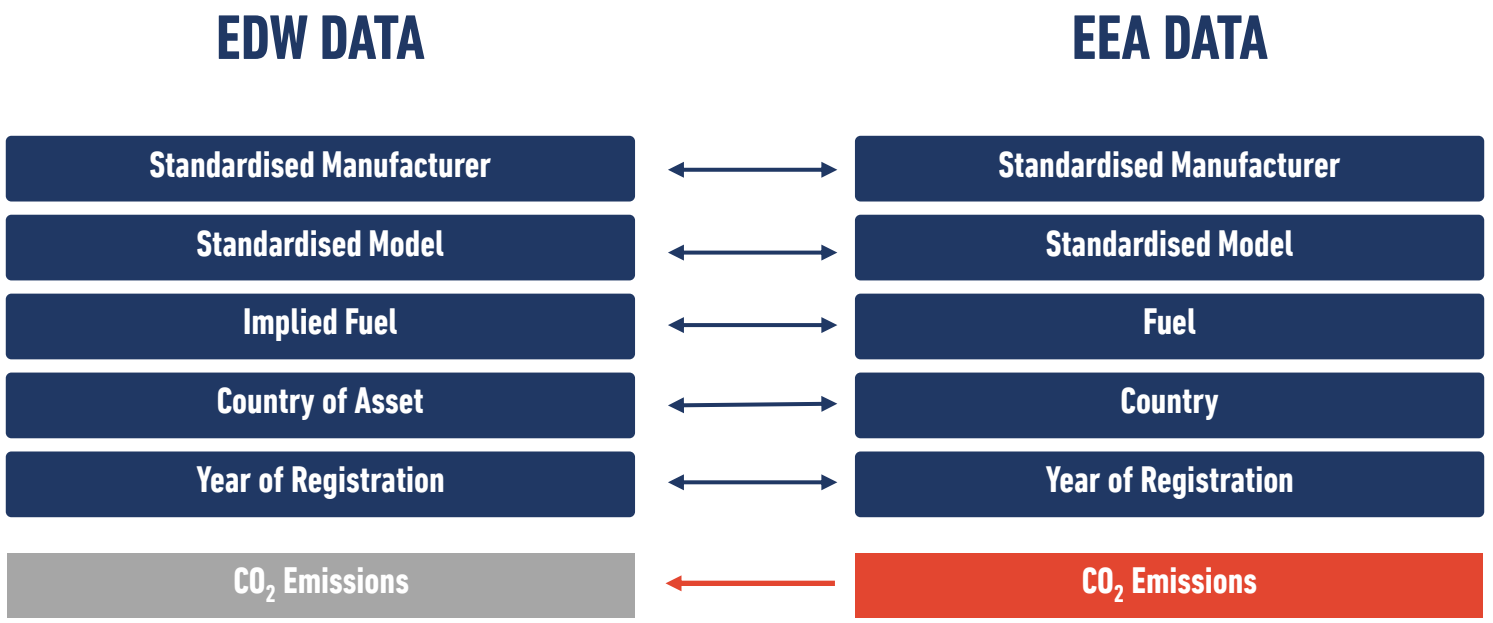
ESMA DISCLOSURE REQUIREMENTS

ENERGY PERFORMANCE CERTIFICATE IS A MANDATORY FIELD BUT ONLY REPORTED IN 24% OF CASES

FIELD CODE	FIELD NAME	CONTENT TO REPORT
Underlying exposures information section		
AUTL53	Manufacturer	Brand name of the vehicle manufacturer E.g. enter "Skoda", not "Volkswagen".
AUTL54	Model	Name of the car model.
AUTL55	Year Of Registration	Year the car was registered.
AUTL56	New Or Used	Condition of vehicle at point of underlying exposure origination: New (NEWX) Used (USED) Demo (DEMO) Other (OTHR)
AUTL57	Energy Performance Certificate Value	The energy performance certificate value of the collateral at the time of origination: A (EPCA) B (EPCB) C (EPCC) D (EPCD) E (EPCE) F (EPCF) G (EPCG) Other (OTHR)

ESTIMATING CO_2 EMISSIONS FOR CAR LOANS/LEASES IN EDW DATA

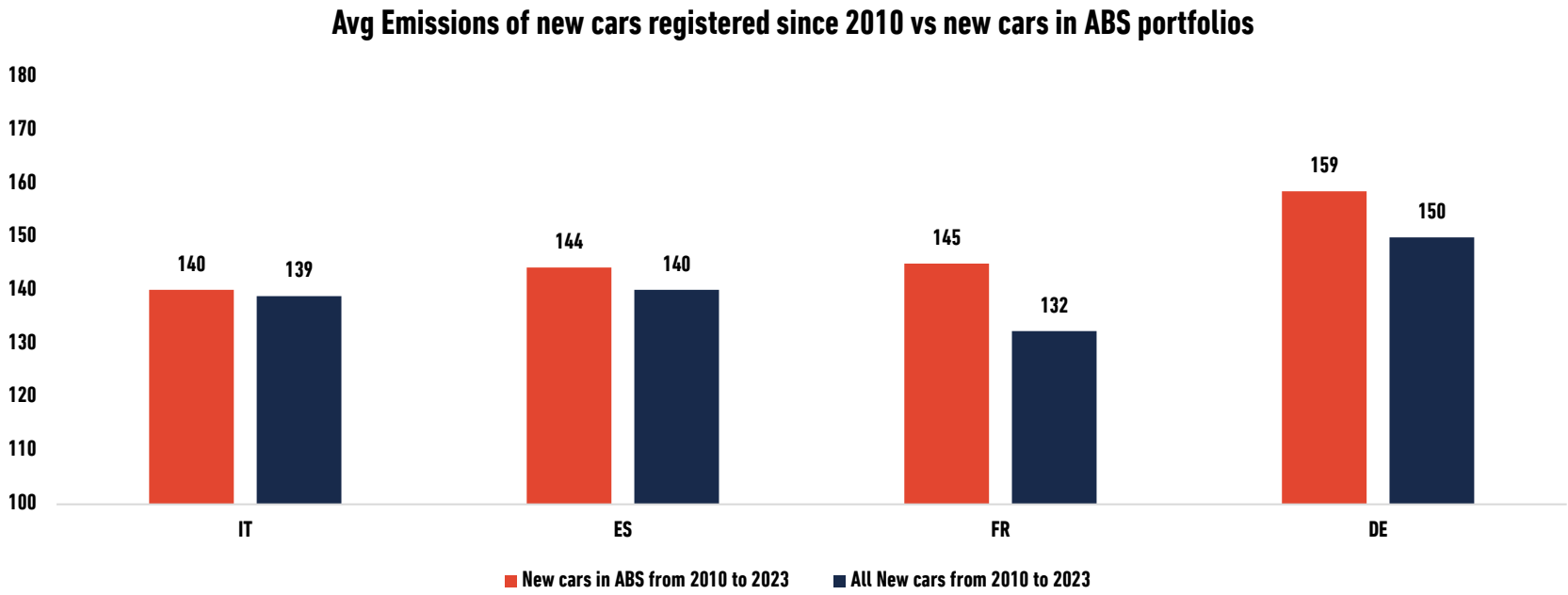
MATCHING EDW DATA WITH EUROPEAN ENVIRONMENT AGENCY (EEA) DATA, 87% OF LOANS/LEASES SUCCESSFULLY MATCHED WITH A CO_2 EMISSIONS ESTIMATE – INCL. ECB DATA



COMPARISON OF AVERAGE CO_2 EMISSIONS: ALL NEW CARS VS. NEW CARS IN ABS PORTFOLIOS

EMISSIONS OF NEW CARS IN ABS POOLS ARE A LITTLE HIGHER THAN THE AVERAGE OF NEW CARS FOR THE COUNTRY

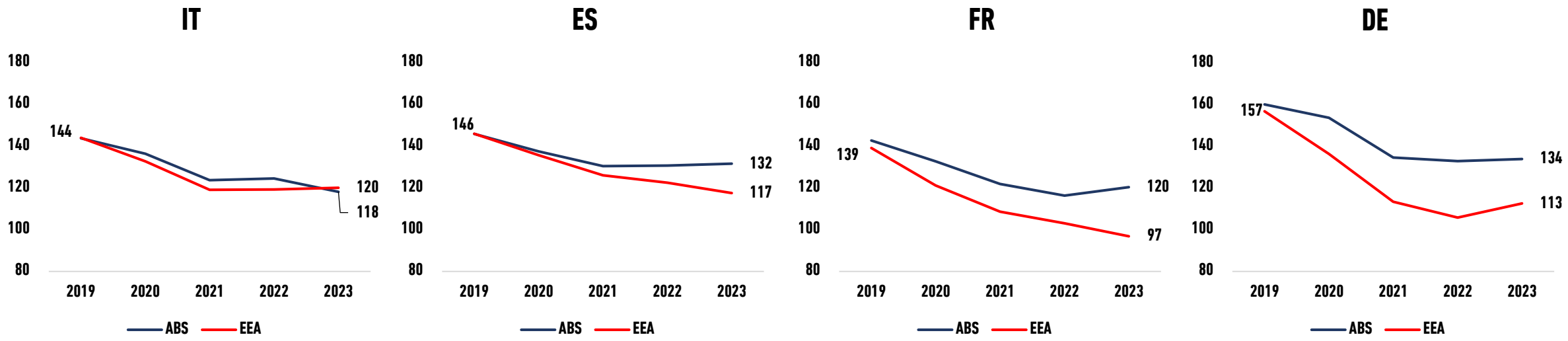
- New cars in German and French ABS pools have above average CO_2 emissions



Source: EDW calculations and EEA data
* Only New cars registered in 2010 or later were used in the calculations

COMPARISON OF AVERAGE CO_2 EMISSIONS: ALL NEW CARS VS. NEW CARS IN ABS PORTFOLIOS – LAST 5 YEARS

EMISSIONS OF NEW CARS IN ABS POOLS ARE A LITTLE HIGHER THAN THE AVERAGE FOR THE COUNTRY, NEW CARS IN GERMANY AND FRANCE ALSO HAVE A MORE DRASTIC DROP IN AVG EMISSIONS IN THE LAST 5 YEARS



Source: EDW calculations and EEA data
* Only New cars were used in the calculations

AMBITIOUS NEW CO_2 LABELING ORDINANCE FOR CARS IN GERMANY

MANDATORY SINCE 1ST MAY 2024

Major changes:

1. Car weight ✗

   Absolute Thresholds on CO_2 emissions! ✓

2. NEDC ✗

   WLTP cycle ✓

4. Die §§ 3a und 4 werden wie folgt gefasst:

„§ 3a

Zuweisung zu einer CO_2-Klasse

(1) Der Hersteller muss neue Personenkraftwagen entsprechend der Höhe der kombinierten CO_2-Emissionen einer der nachfolgend bestimmten CO_2-Klassen zuweisen:

CO_2-Klasse	Wert der kombinierten CO_2-Emissionen (in Gramm CO_2 je Kilometer)
A	0
B	1 bis 95
C	96 bis 115
D	116 bis 135
E	136 bis 155
F	156 bis 175
G	176 und mehr

Für extern aufladbare Hybridelektrofahrzeuge ist die CO_2-Klasse jeweils auf der Grundlage des Werts der gewichtet kombinierten CO_2-Emissionen und auf der Grundlage des Werts der kombinierten CO_2-Emissionen anzugeben; letztere Angabe ist zu benennen als „bei entladener Batterie“.

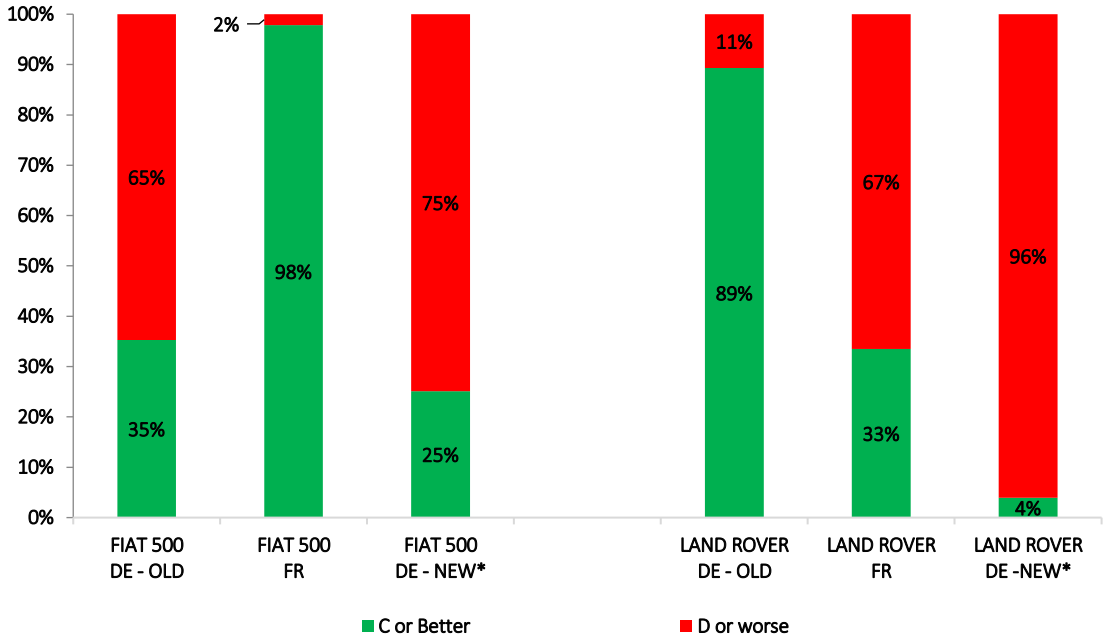
(2) Maßgeblich für die Zuweisung eines individuellen Personenkraftwagens zu einer CO_2-Klasse ist der Wert der CO_2-Emissionen, der sich aus der Übereinstimmungsbescheinigung dieses Personenkraftwagens ergibt.

*NEDC (New European Driving Cycle) was replaced by WLTP (Worldwide Harmonised Light Vehicles Test Procedure) after September 2018

AMBITIOUS NEW CO_2 LABELING ORDINANCE FOR CARS IN GERMANY

ITS IMPACT ON EPCS ASSIGNED TO COMMON CARS







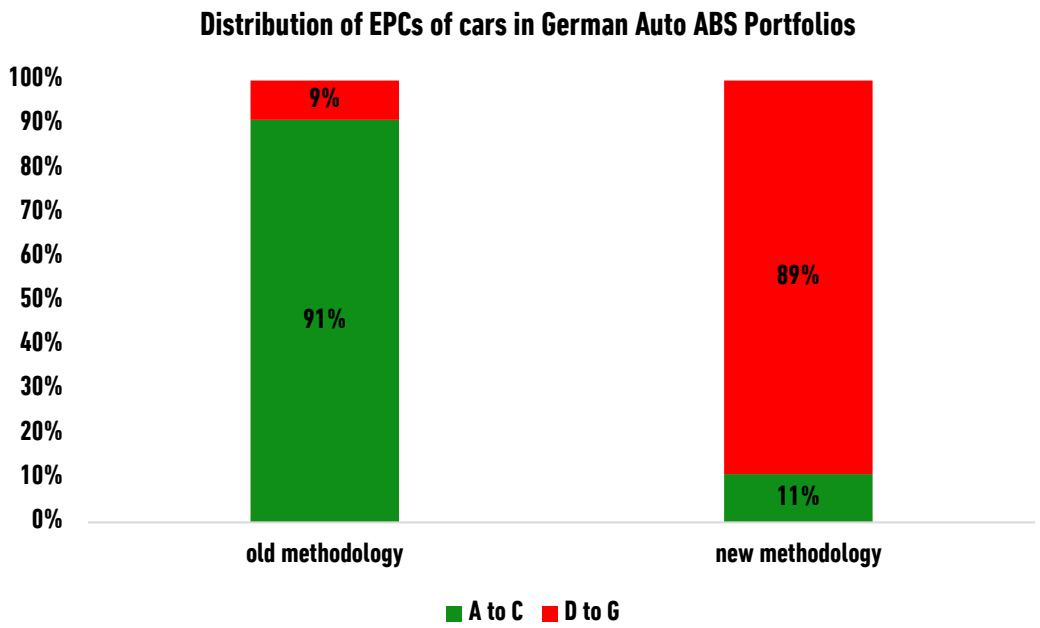
* Based on new thresholds on estimated CO2 emissions

AMBITIOUS NEW CO_2 LABELING ORDINANCE FOR CARS IN GERMANY

IF ALL EPCS REPORTED TO EDW (OLD METHODOLOGY) WERE CONVERTED TO EPCS ACCORDING TO THE NEW METHODOLOGY

- **Old methodology:** About 90% of cars in German AUTO ABS are rated C or better!
- **New methodology:** About 90% of cars in German Auto ABS would be rated D or worse!

	OLD EPC	NEW EPC
A	38.4%	5.0%
B	39.4%	3.6%
C	13.3%	2.3%
D	5.9%	16.6%
E	1.4%	33.0%
F	0.6%	19.2%
G	1.1%	20.3%

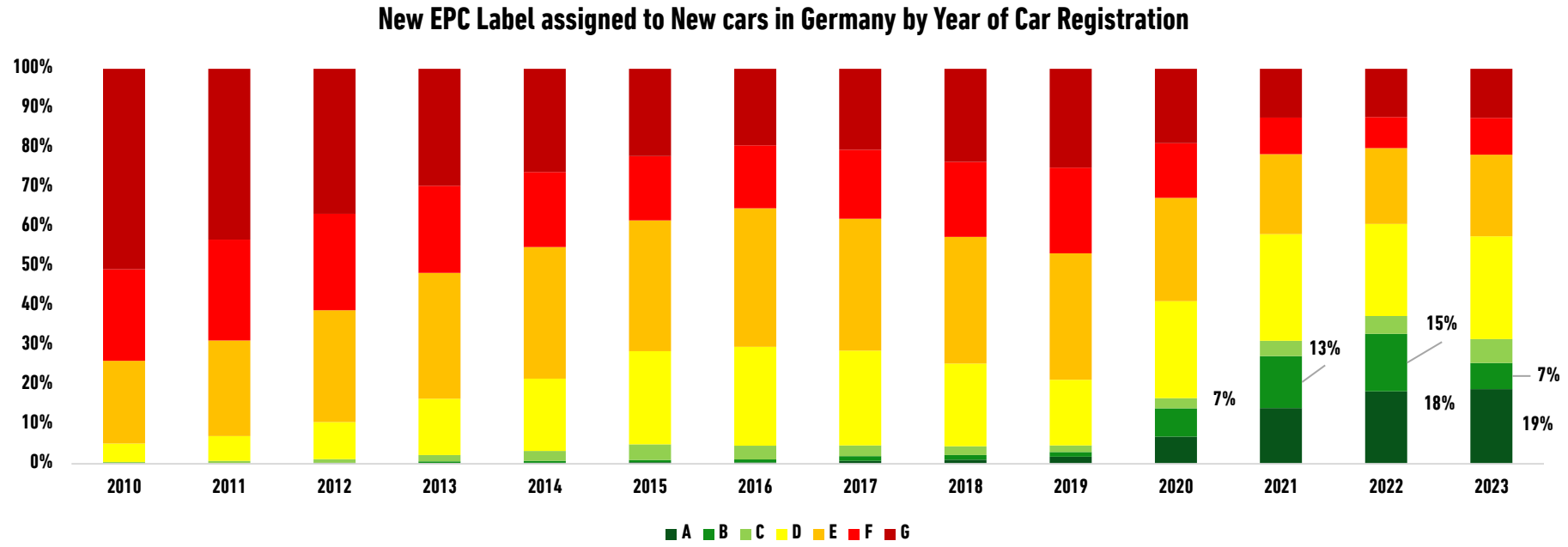


Source: EDW calculations

AMBITIOUS NEW CO_2 LABELING ORDINANCE FOR CARS IN GERMANY

IF NEW EPC LABELS WERE ASSIGNED TO ALL NEW PASSENGER CARS REGISTERED IN GERMANY SINCE 2010

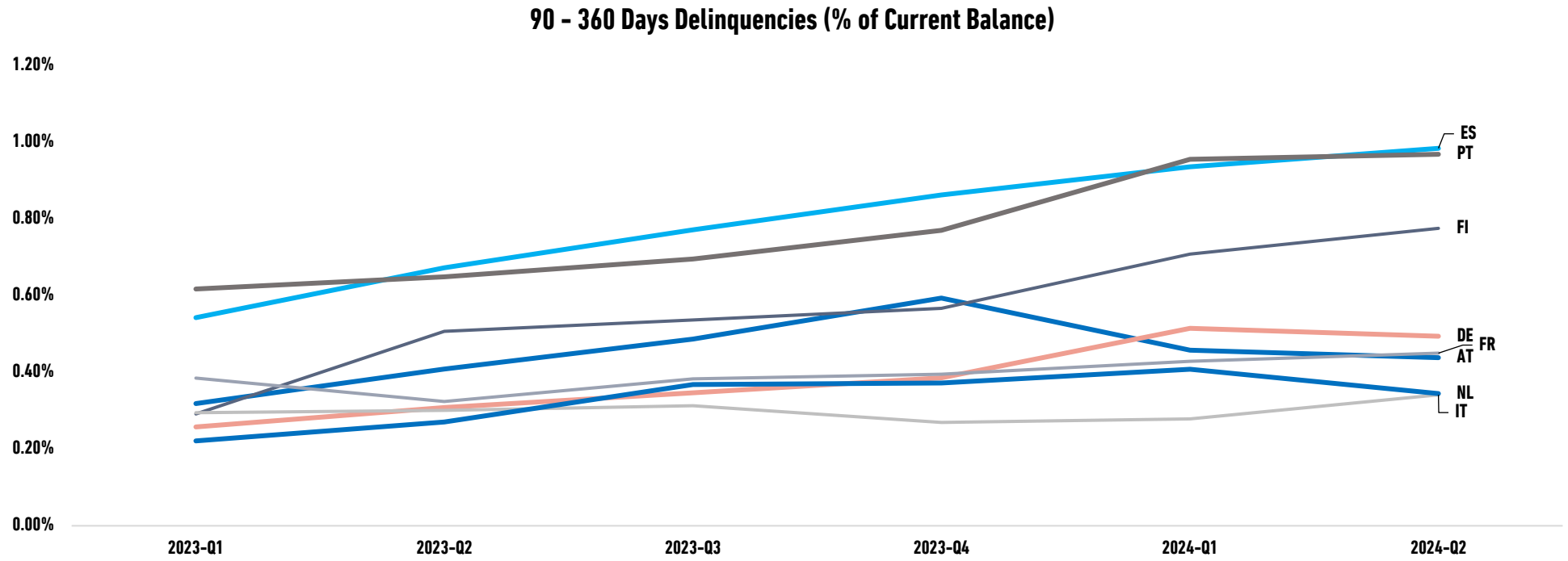
- 51% of 2010 cars would be rated G according to the latest standards
- 7% of 2023 cars would be rated B (possible impact of reduced subsidies for Hybrids)



Source: EDW calculations using EEA data

AUTO ABS – DELINQUENCIES BY COUNTRY

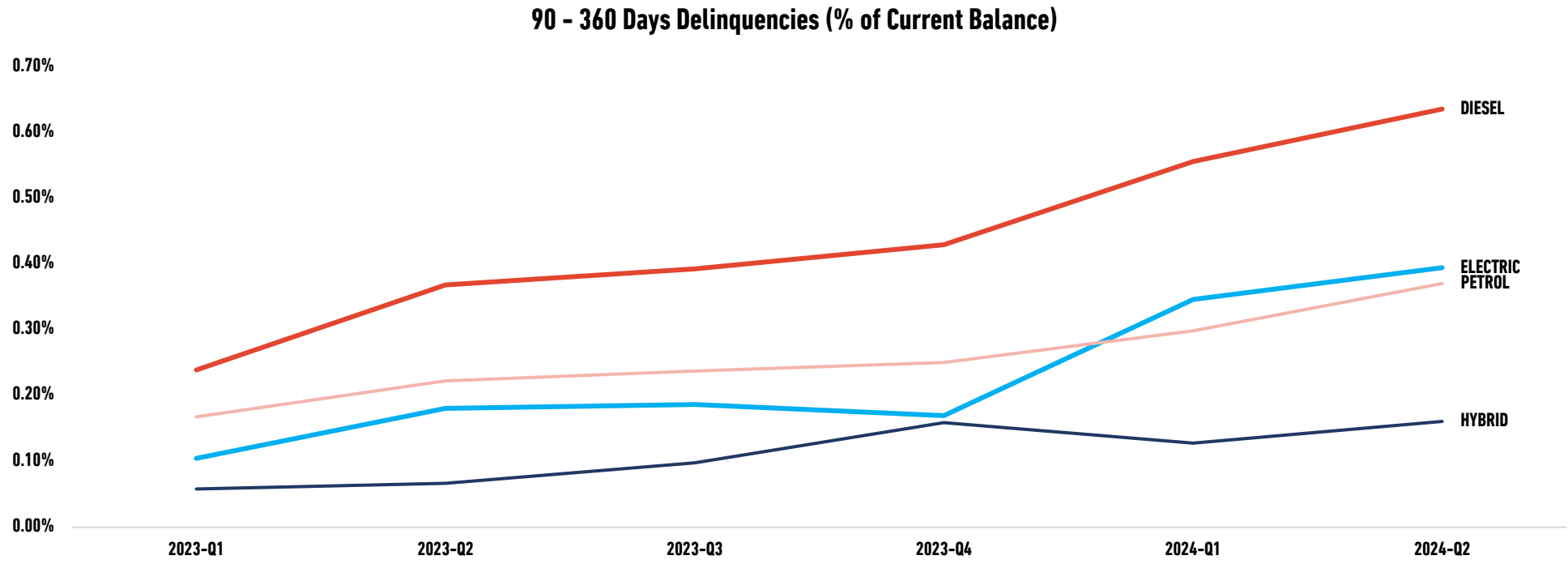
PORTUGAL, SPAIN AND FINLAND WITH SLIGHTLY HIGHER DELINQUENCIES



* Only those deals were included that reported in every quarter since 2022-Q1 till 2024-Q2 to allow for 1 year seasoning by 2023-Q1

GERMAN AUTO ABS – DELINQUENCIES BY FUEL

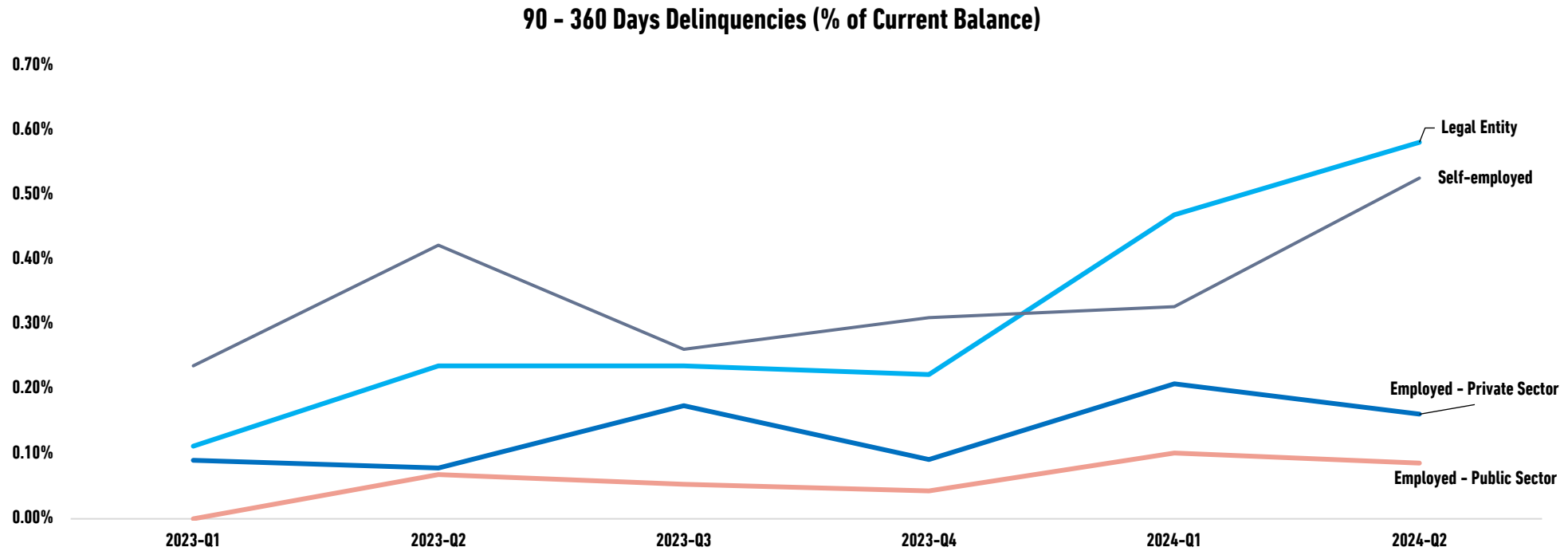
PERFORMANCE OF ELECTRIC CAR LOANS/LEASES HAS DETERIORATED SLIGHTLY



* Only those deals were included that reported in every quarter since 2022-Q1 till 2024-Q2 to allow for 1 year seasoning by 2023-Q1

GERMAN AUTO ABS – ELECTRIC ONLY - DELINQUENCIES BY EMPLOYMENT

SMALL BUSINESSES DRIVING DELINQUENICES FOR ELECTRIC CAR LOANS/LEASES



* Only those deals were included that reported in every quarter since 2022-Q1 till 2024-Q2 to allow for 1 year seasoning by 2023-Q1

PANEL: POTENTIAL ROLE OF AUTO ABS TO HELP TRANSITION INTO A SUSTAINABLE FUTURE

MARCO ANGHEBEN, EUROPEAN DATAWAREHOUSE
JAN-PETER HÜLBERT, TSI
OLIVIER CLEMENTIN, BANQUE DE FRANCE
SANDRA WITTINGHOFER, BAKER MCKENZIE

CLOSING REMARKS

LORIANA PELIZZON, SAFE

Q&A



THANK YOU

CONTACT US

EUROPEAN DATAWAREHOUSE GMBH
Walther-von-Cronberg-Platz 2
60594 Frankfurt am Main

www.eurodw.eu
+49 (0)69 50986 9017
enquiries@eurodw.eu

This presentation (the "Presentation") has been prepared by European DataWarehouse GmbH (the "Company") and is being made available for information purposes only. The Presentation is strictly confidential and any disclosure, use, copying and circulation of this Presentation is prohibited without the consent from the Company. Information in this Presentation, including forecast financial information, should not be considered as advice or a recommendation to investors or potential investors in relation to holding, purchasing or selling securities or other financial products or instruments and does not take into account your particular investment objectives, financial situation or needs. No representation, warranty or undertaking, express or implied, is made as to the accuracy, completeness or appropriateness of the information and opinions contained in this Presentation. Under no circumstances shall the Company have any liability for any loss or damage that may arise from the use of this Presentation or the information or opinions contained herein. Certain of the information contained herein may include forward-looking statements relating to the business, financial performance and results of the Company and/or the industry in which it operates. Forward-looking statements concern future circumstances and results and other statements that are not historical facts, sometimes identified by the words "believes", "expects", "predicts", "intends", "projects", "plans", "estimates", "aims", "foresees", "anticipates", "targets", "may", "will", "should" and similar expression. The forward-looking looking statements, contained in this Presentation, including assumptions, opinions and views of the Company or cited from third party sources are solely opinions and forecasts which are uncertain and subject to risks.

THANK YOU