Market Developments on Electric Vehicles

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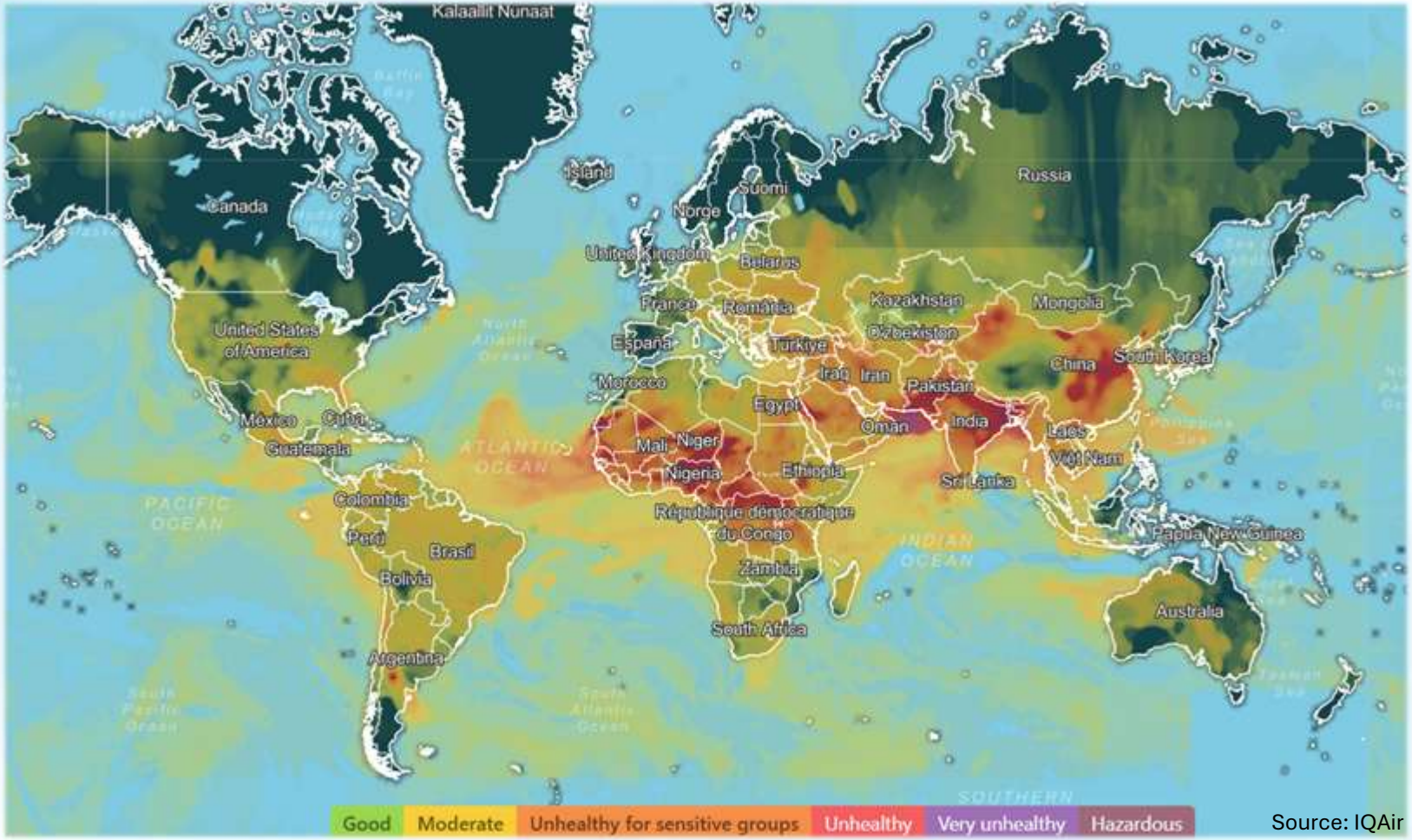
the electric MISSION | Empowering the Mobility and Energy Transition

The Basis for Transformation of Powertrains

Growing Reduction in Air Quality in Cities



Source: IQAir

Evolving Regulations on Vehicle Emissions

	Euro 1 (1992)	Euro 2 (1996)	Euro 3 (2000)	Euro 4 (2005)	Euro 5 (2009)	Euro 6 (2014)	Euro 7 LD (2025)
NO_x (g/km)	0.97*	0.50/0.90*	0.15/0.50	0.08/0.25	0.06/0.18	0.06/0.08	0.06
PM (g/km)	0.14	0.08	0.05	0.025	0.005	0.005	0.0045
PN_{23} (#/km)					$6x10^{11}$	$6x10^{11}$	$6x10^{11}$
	CO HC + NO_x PM (D)		NO_x added		PM (GDI) PN (D)	PN (GDI) Test updates: NEDC to WLTC RDE introduced	Technology neutral PN_{10} added Wide RDE

NO_x 84% reduction (Euro 3-7)
CO 82% reduction (Euro 1-7)
PM 96% reduction (Euro 1-7)

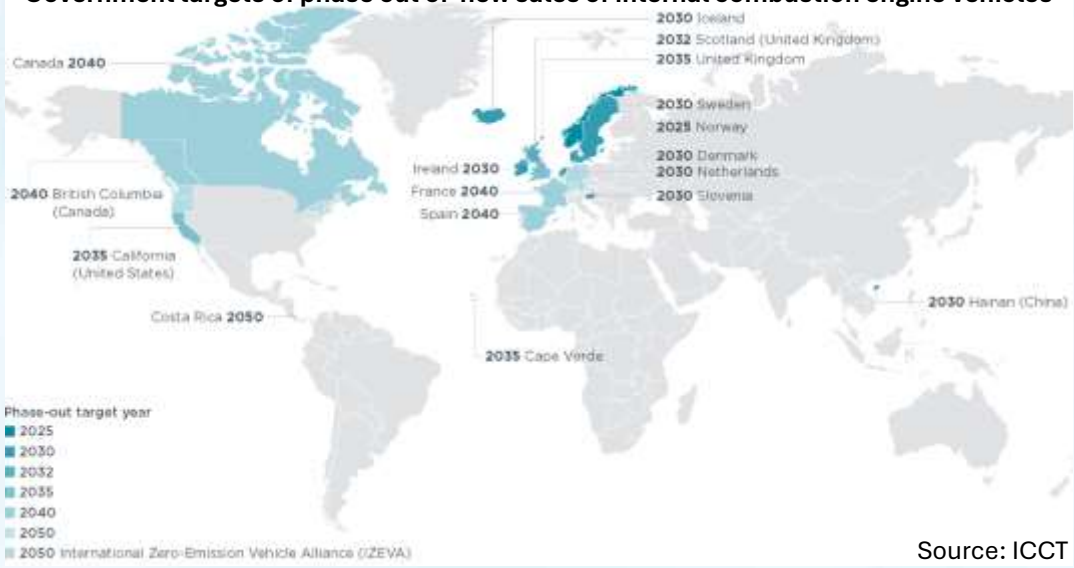
1990 2000 2010 2020 2030

Existing and pending legislation continues to push automakers to introduce new technologies

Source: lubrizol

Response from Governments:

Government targets of phase out of new sales of internal combustion engine vehicles



Source: ICCT

Technology Pathway to Zero Emission Vehicles

NO_x (g/km)	0.97*	0.50/0.90*	0.15/0.50	0.08/0.25	0.06/0.18	0.06/0.08	0.06
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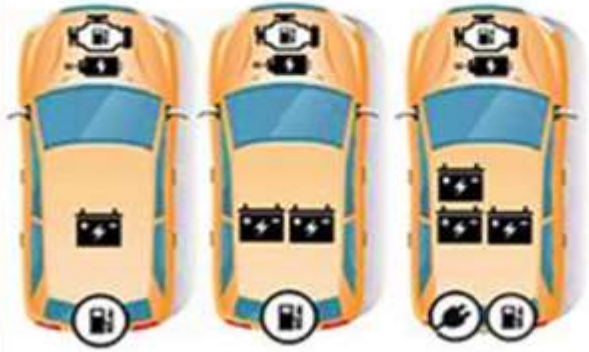
Source: lubrizol

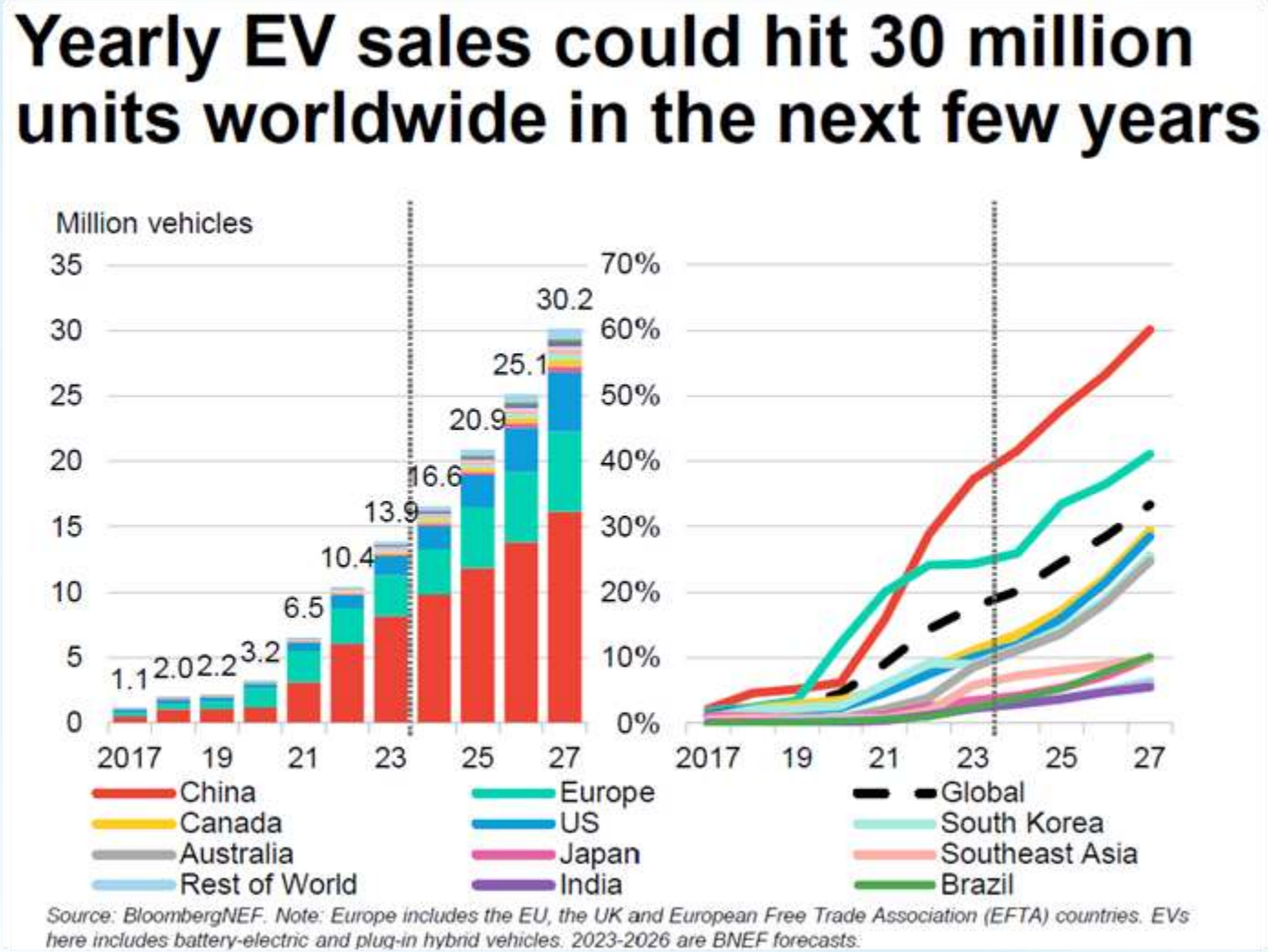
Internal Combustion Engine
ICE

Hybrid Vehicles and Plug-ins
HEV & PHEV



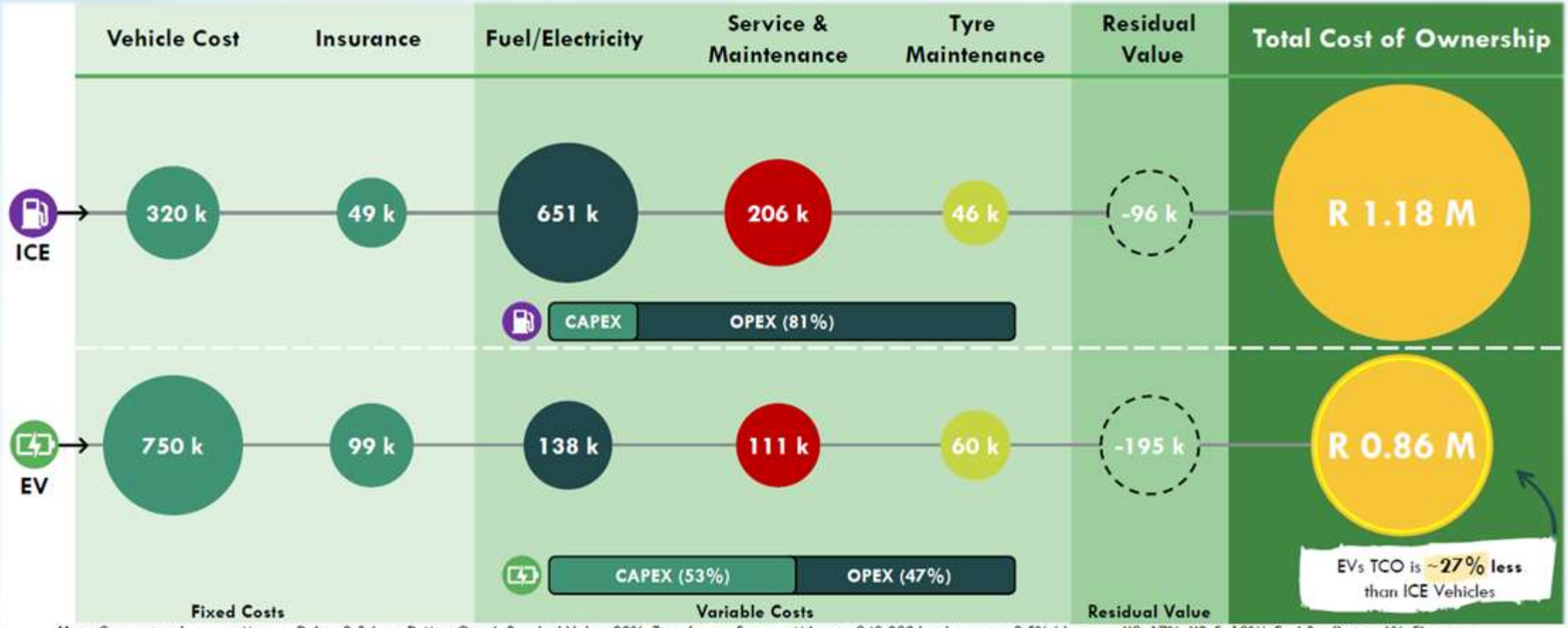
Electric Vehicles
BEV & FCEV

Market Projections



Beyond Sustainability

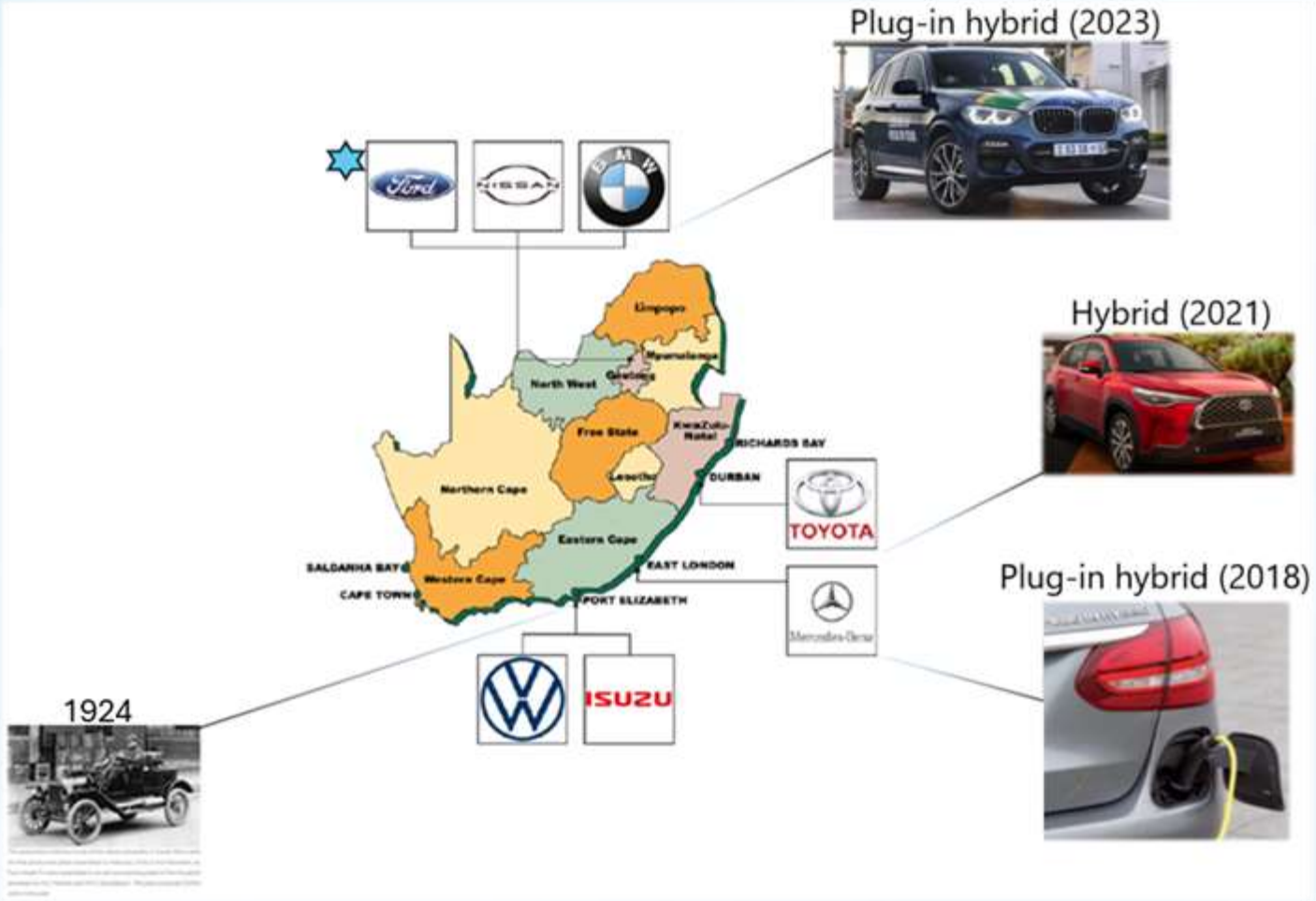
Total Cost of Ownership:
Operating a BEV outperforms that of a comparable ICE



Note: Comparison between Maxus eDeliver3 & Isuzu D-Max Gen 6, Residual Value: 30%, Time frame: 5 years, Mileage: 240 000 km, Insurance: 3.5% (decrease Y2: 17%. Y3-5: 12%), Fuel & inflation: 6%, Electricity inflation: 10%, Service & Maintenance (EV: R0.41/km, ICE: R0.76/km), Tyre Maintenance (EV: R0.22/km, ICE: R0.17/km), Fuel (EV: R0.45/km, ICE: R2.41/km), Prices are ex-VAT.

Source: everlectric

Automotive Manufacturing in South Africa



Vehicles Exports

Top 10 destinations for light vehicles (passenger cars and light commercial vehicles) exported – 2019 to 2023

Country	2019	2020	2021	2022	2023
Total (R billion)	143,4	117,0	133,2	154,3	200,0
Ranking of exporters Number 1 to 5	VW MBSA BMW Ford Toyota	VW MBSA BMW Ford Toyota	VW Ford Toyota BMW MBSA	VW MBSA Ford BMW Toyota	VW MBSA Toyota BMW Ford
Germany	37 152	25 736	42 671	67 399	85 776
UK	101 401	67 798	60 260	67 884	80 550
Japan	33 435	23 645	15 765	23 750	23 207
Italy	14 624	10 546	18 295	18 914	23 185
France	25 629	13 956	22 130	23 772	21 223
USA	12 437	8 584	6 821	20 566	19 590
Spain	11 217	7 345	10 876	9 588	14 899
Belgium	11 379	10 048	11 752	14 812	13 819
Poland	7 606	5 441	6 491	6 426	12 261
Australia	16 284	13 041	9 676	11 507	11 996
Other	115 101	84 590	92 704	86 326	92 289
Total (units)	386 265	270 730	297 441	350 944	398 795
Light vehicle production	603 082	422 905	471 433	524 895	599 631
% of production exported	64,0%	64,0%	63,1%	66,9%	66,5%
Number of base models produced	11	11	10	10	10
Average volume per model produced	54 826	38 446	47 143	52 490	59 963

Source: naamsa

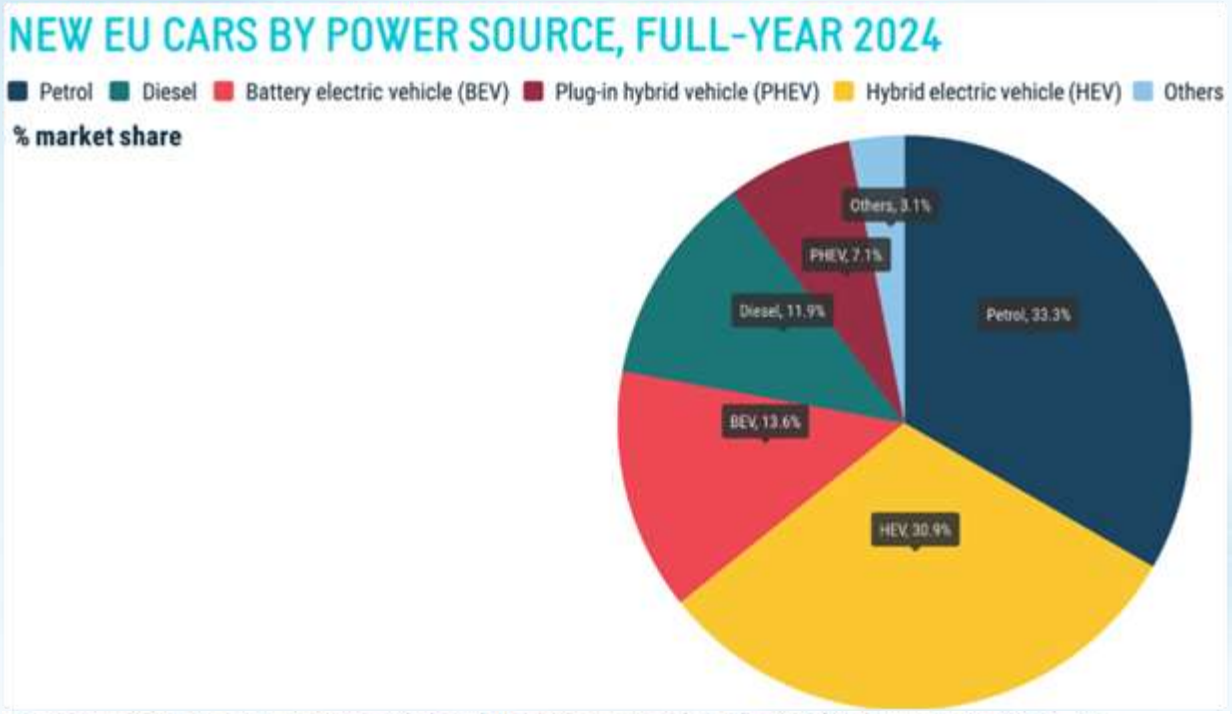
Industry's export sales performance from 2020 to 2024:

	2020	2021	2022	2023	2024	2024 / 2023 % Change
Cars	178,788	173,773	238,631	258,266	192,542	-25,4%
Light Commercials	91,942	123,667	112,312	140,529	115,192	-18,0%
Trucks & Buses	557	579	841	799	646	-19,1%
Total Exports	**271,287**	**298,019**	**351,784**	**399,594**	**308,380**	**-22,8%**

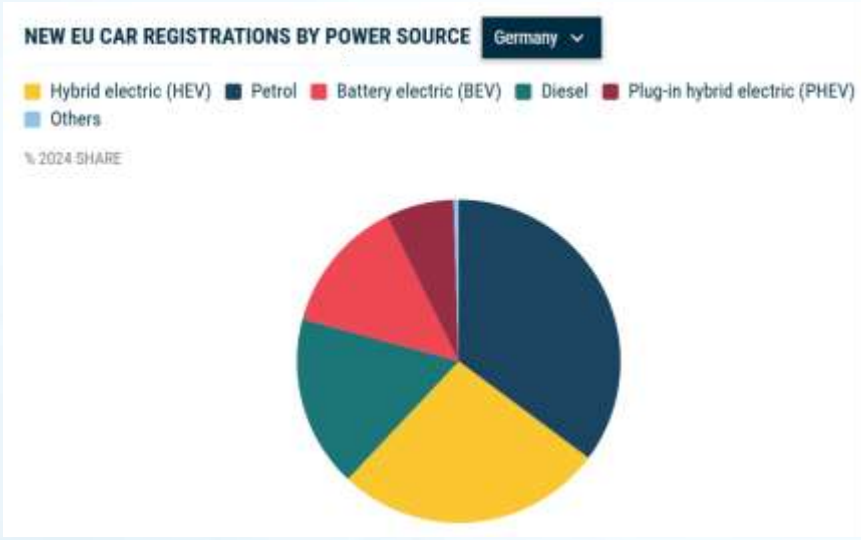
Source: naamsa

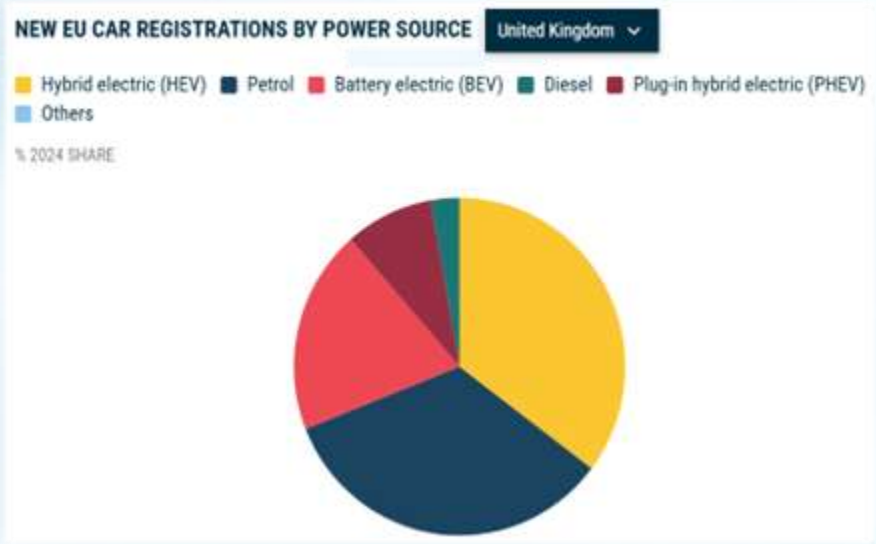
Existing Export Markets for South Africa

Annual Sales



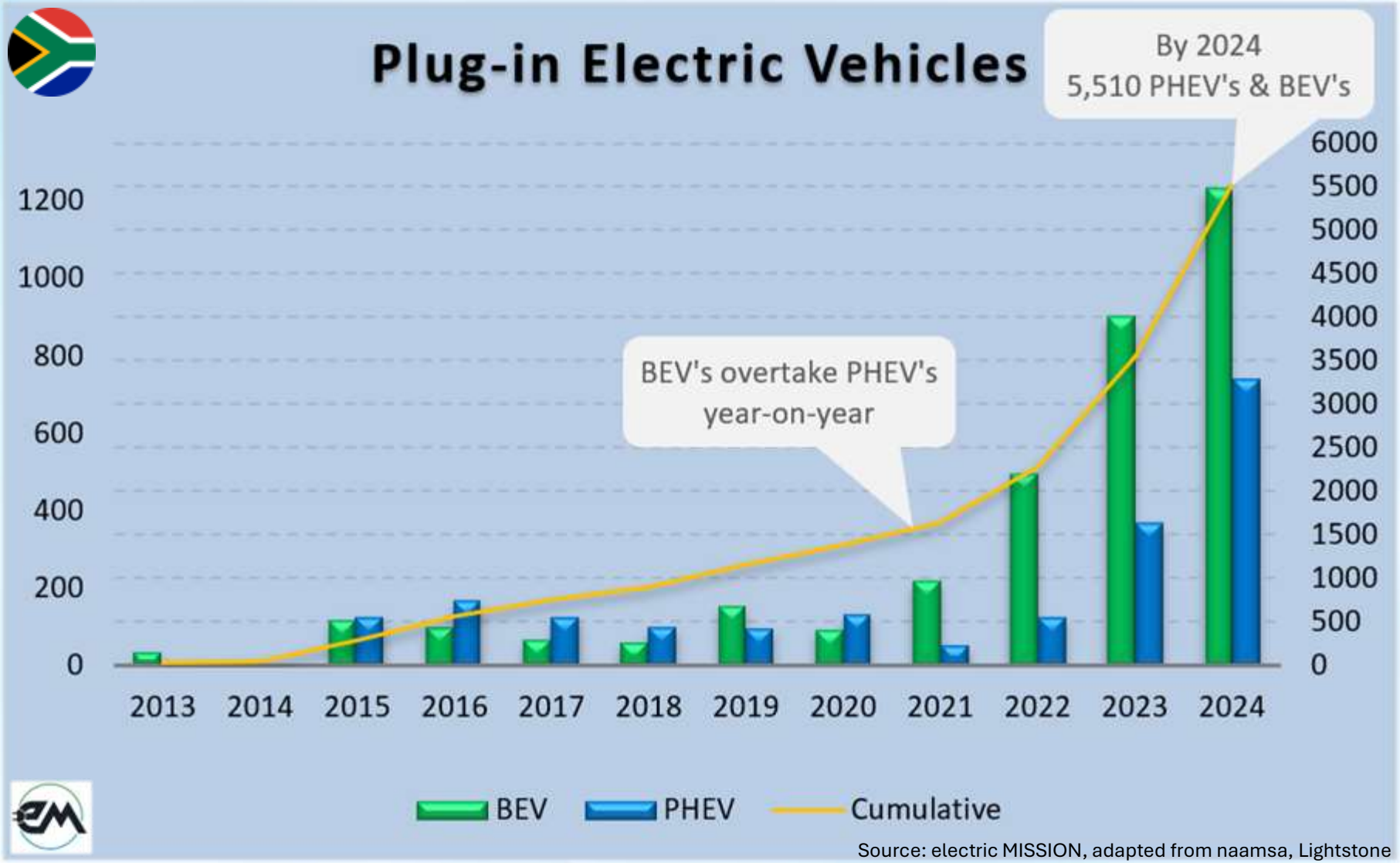
Battery-electric cars remained the third-most-popular choice for buyers in 2024. In December, their market share stood at 15.9%, contributing to a 13.6% share for the full year, again surpassing diesel, which declined to 11.9%. Petrol cars retained their lead at 33.3%, while hybrid-electric cars strengthened their second position, commanding a 30.9% market share.





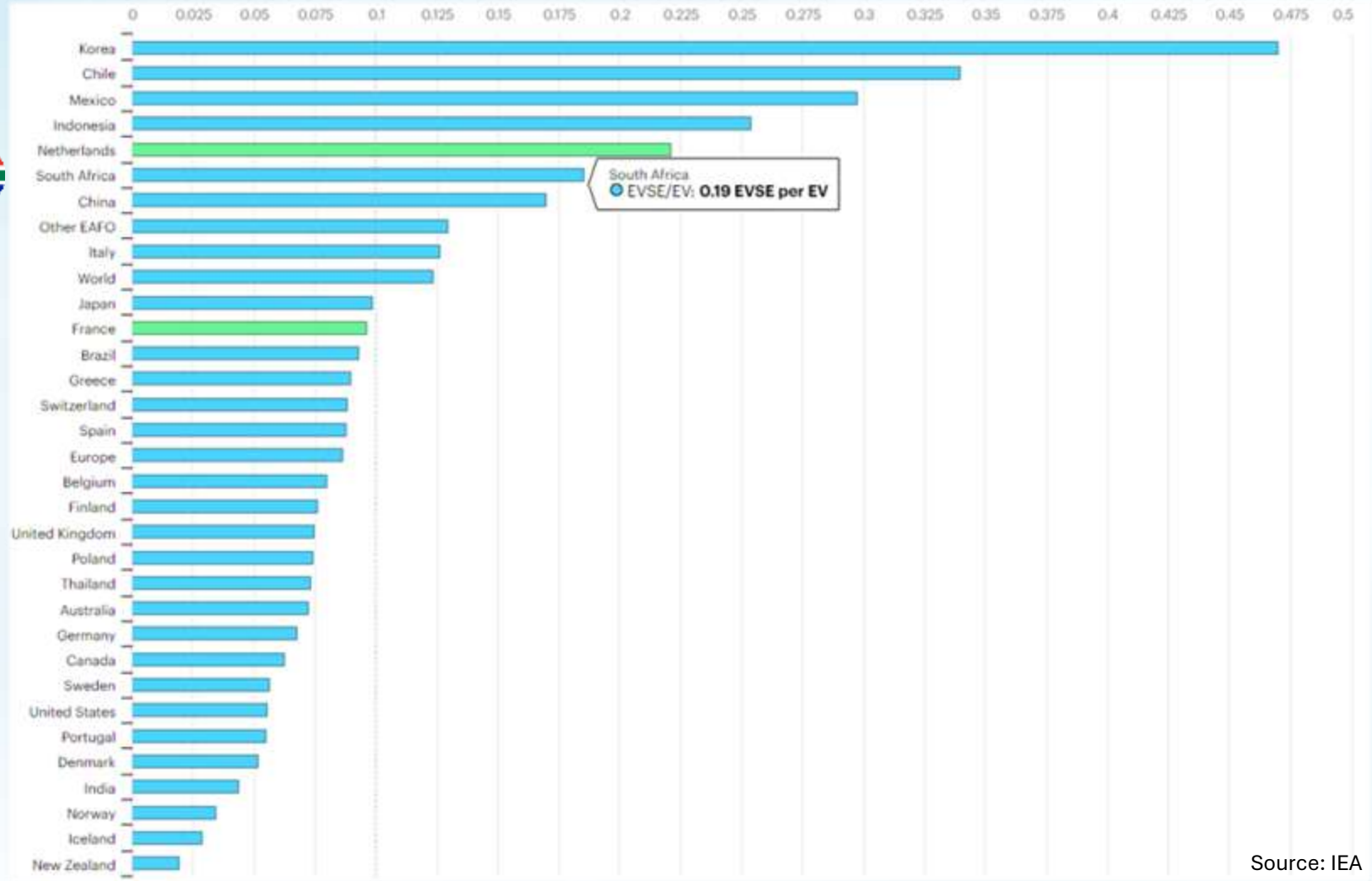
Source: acea

South Africa’s Market Developments



Source: electric MISSION, adapted from naamsa, Lightstone

Ratio of Public Chargers per EV Stock



Source: IEA

The Missing Market Driver: Policy

Green: Represents the most ambitious standards or most supportive ZEV policies.
Yellow: Indicates a policy that falls short of the highest ambition or standards but offers some support for ZEVs or regulates ICE vehicles to the benefit of ZEVs.
Red: Indicates the absence of a policy in a particular area or a policy that is significantly lagging those in other countries/regions.

	Supply-Side Policies (Regulatory)*			Supply-Side Policies (Fiscal)*		Demand-Side Policies (Regulatory)*	Demand-Side Policies (Fiscal)*	Infrastructure*
	ZEV Sales Requirements	Fuel Economy / Efficiency Standards	Vehicle Emissions Standards (including greenhouse gases [GHGs])**	ZEV Manufacturing Incentives (including tax benefits)	Public Financing	Operational Regulations (including fleet requirements)	Purchase / Operating Incentives (including tax benefits)	Policies / Funding Aimed at the Establishment of Public Infrastructure
European Union								
Australia								
Brazil								
China								
India								
Indonesia								
South Africa								
United States***								

The color coding simplifies comparisons and provides a high-level overview –there are many nuances, exceptions, and vehicle segments with weaker policies. Implementation, which is hard to measure, also affects outcomes but was not assessed in detail. See the Appendix for more details.
*Note: see slides 15 and 16 for additional context and information on these policy structures.
**Note: tailpipe emission standards are developed differently and sometimes do not include GHGs or CO_2. At times, these standards are only set up to control PM, NOx, and SOx. Thus, this study examines and rates emissions standards that seek to include GHGs specifically. See the appendix for more details.
***Note: many items for the United States are contingent on policies enacted in California and other states that have adopted California policies. See the appendix for an explanation of how these regional differences were accounted for in the overarching categorical rating.

Source: RMI

Thank You

Empowering the Mobility and Energy Transition

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