The Analysis and Recommendations for Global Automotive Low-Carbon Policies in Major Manufacturing Countries

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Abstract. In 2025, a deeper phase of low-carbon transition was witnessed in global automotive industry. Relevant policies in major economies worldwide have been intensively put into practice with differentiated optimization, focusing on the core objective of carbon emission reduction in combination while integrating the orientation towards supporting domestic industries. There was a shared policy-conceiving mindset across various countries regarding the emission reduction pathway: set definite long-term objectives for strategic guidance, adopt supplementary targeted tools including fiscal and tax subsidies and carbon accounting, extend low-carbon requirements to full product lifecycle and formulate localization-oriented policies taking local industry condition into considerations. The policies drove the global automotive industry towards electrification and low-carbon transition on the one hand, and on the other hand brought on carbon barriers in trading environment. In the light of the aforementioned circumstances, the automotive industry must take such measures as construction of carbon management framework, innovation in international development mode and coordination of worldwide low-carbon standards, to align with the emission reduction trend and address new challenges in international competition.

Keywords: automotive industry; low-carbon policy; industry transition

1 Introduction

In 2025, the low-carbon policies for global automotive industry exhibit the characteristic of "overall advancement coexisting with local adjustments." Major economies have introduced a series of policies centered around carbon reduction targets, clarifying policy implementation pathways [1], while further demonstrating an orientation toward supporting domestic industries. The European Union has introduced flexibility adjustments to its new vehicle carbon emission policies [2, 3], maintaining its commitment to carbon reduction targets while alleviating compliance pressures on enterprises.

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France and the United Kingdom have updated their subsidy policies for NEVs [4, 5], with differentiated policy designs reflecting protectionist undertones. Japan has innovatively incorporated the use of green steel into its subsidy incentives, integrating upstream raw material production in the automotive supply chain into its low-carbon policy incentive system to promote carbon emission reduction in the industry [6].

Overall, the global automotive industry low-carbon policies reveal four major trends: unwavering commitment to emission reduction targets, targeted guidance through fiscal and tax measures, closed-loop lifecycle management, and increasingly differentiated policy requirements. While these policies drive the global automotive industry toward a low-carbon and electrified transformation, they also conceal a protectionist bias aimed at shielding domestic industries. This paper focuses on the low-carbon policies for automotive industry of major economies such as the European Union, France, the United Kingdom, and Japan, conducting a systematic study and analysis.

2 The European Union (EU)

The EU's[1] 2025 CO_2 emission regulations for light-duty vehicles introduce a three-year compliance mechanism, and the 2035 carbon reduction target has been revised from 100% to 90%. On August 3, 2023, the newly revised CO_2 emission regulations for passenger cars and light-duty commercial vehicles, (EU) 2023/1623, were published in the Official Journal of the European Union. The CO_2 emission targets for newly sold passenger cars in 2025 and 2030 are set at 93.6 g/km and 49.5 g/km respectively, representing reductions of 15% and 55% compared to 2021 levels; Targets for newly sold light-duty commercial vehicles in 2025 and 2030 are 153.9 g/km and 90.6 g/km respectively. Both passenger cars and light-duty commercial vehicles are ultimately required to achieve a 100% zero-emission target for newly sold vehicles by 2035. If manufacturers fail to meet the emission requirements, a penalty of €95 per vehicle will be imposed for every 1 g/km of CO_2 exceeded.

To balance emission reduction needs with the practical realities of industrial transformation, the European Union has first introduced flexibility adjustments to the industry-wide average emission target for 2025. The year 2025 is a critical year for reviewing corporate average carbon emission compliance under EU regulations, with majority of automakers facing the risk of substantial fines for failing to meet CO_2 emission targets. In March 2025, the European Commission released the "Action Plan for the Automotive Industry," proposing amendments to automobile CO_2 emission regulations to relax the mandatory CO_2 emission standards for light-duty vehicles originally scheduled for implementation in 2025. In April 2025, the European Commission issued an amendment to the CO_2 emission regulations for passenger cars and light-duty commercial vehicles. This amendment allows automakers to assess compliance with emission reduction targets based on the average CO_2 emission levels over the three-year period from 2025 to 2027, providing the EU automotive industry with a two-year buffer period.

[1] Light-duty vehicles generally refer to passenger vehicles and light-duty commercial vehicles.

In response to lobbying pressure from automakers and requests from certain member states, the European Union has further adjusted its 2035 zero-emission target. On December 16, 2025, the European Commission proposed to once again amend the CO_2 emission regulations for passenger cars and light commercial vehicles. According to the plan, by 2035, the average carbon reduction target for passenger cars has been revised from 100% to 90% (compared to 2021 levels). The remaining 10% of carbon reduction must be achieved through the use of low-carbon steel produced within the EU, or by utilizing e-fuel[2], biofuels[3] [7]. Meanwhile, the average carbon reduction target for light-duty commercial vehicles by 2030 has been revised from 50% to 40% (compared to 2021 levels). A comparison of regulatory requirements is provided in Table 1.

Table 1. Average CO_2 emission targets for EU light-duty vehicles

<table>
<tr><th>Regulation name</th><th>Vehicle category</th><th>2025 CO_2 emission target</th><th>2030 CO_2 emission target</th><th>2035 CO_2 emission target</th></tr>
<tr><td rowspan="2">Targets of Regulation 2023/1623 (of 2023 (EU))</td><td>Passenger cars</td><td rowspan="2">A reduction of 15% relative to 2021</td><td rowspan="4">A reduction of 55% for passenger cars compared to 2021 levels; Compared to 2021 levels, a reduction of 50% for light-duty commercial vehicles.</td><td rowspan="3">A reduction of 100% relative to 2021</td></tr>
<tr><td>Light-duty commercial vehicles</td></tr>
<tr><td>Regulation name</td><td>Vehicle category</td><td>2025 - 2027 CO_2 emission target</td></tr>
<tr><td rowspan="2">Regulatory objectives set forth in April 2025</td><td>Passenger cars</td><td rowspan="3">A reduction of 15% relative to 2021</td></tr>
<tr><td>Light-duty commercial vehicles</td></tr>
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<tr><td>Light-duty commercial vehicles</td><td>A reduction of 40% relative to 2021</td></tr>
</table>

3 France

France's subsidy policy is linked to the vehicle's carbon footprint, with preferential treatment tilted toward domestic production. Since 2024, France's NEV subsidy program has incorporated the vehicle's carbon footprint metric. The NEV carbon footprint is calculated as the sum of carbon emissions from six stages: ferrous metals, aluminum,

[2] e-fuel: Using green hydrogen produced by electrolyzing water with renewable energy as the raw material, combined with CO_2 captured from the air for catalytic synthesis, it achieves nearly carbon-neutral status throughout its entire life cycle.

[3] Biofuel: A type of fuel produced by converting biomass (such as plant straw, kitchen waste, oil crops, etc.) into usable forms, with common types including bioethanol and biodiesel.

other materials, battery production, parts and vehicle manufacturing, and transportation (refer to Formulas 1-9) [8]. The policy mandates the use of differentiated country-specific carbon emission factors to calculate the vehicle's carbon footprint and its "Environmental Score"(refer to Table 2). Models whose "Environmental Score" fails to meet the requirement of 60 points are ineligible for subsidies. As of December 5, 2025, the French government has published a list of 937 vehicle models eligible for subsidies. Due to the long maritime transportation distance resulting in a higher carbon footprint, Chinese-made new-energy vehicles are not included in the subsidy list (refer to Table 3).

Formula for carbon footprint calculation:

$$EC_{\text{version}} = EC_{\text{ferreux}} + EC_{\text{aluminium}} + EC_{AM} + EC_{\text{batterie}} + EC_{ATI} + EC_{\text{transport}} \quad (1)$$

Here, EC_{ferreux} represents the production carbon footprint of ferrous metals consumed during vehicle manufacturing (excluding the battery), expressed in kilograms of CO_2 equivalent (kg-eq CO_2); $EC_{\text{aluminium}}$ represents the production carbon footprint of aluminum (pure aluminum and aluminum alloys) consumed during vehicle manufacturing (excluding the battery), expressed in kilograms of CO_2 equivalent (kg-eq CO_2); EC_{AM} represents the production carbon footprint of all other materials (excluding ferrous metals and aluminum) consumed during vehicle manufacturing (battery excluded), expressed in kilograms of CO_2 equivalent (kg-eq CO_2); EC_{batterie} represents the carbon footprint of battery production, expressed in kilograms of CO_2 equivalent (kg-eq CO_2); EC_{ATI} represents the carbon footprint of vehicle and component manufacturing, encompassing the entire process of automotive part production, processing, and assembly (excluding battery production), expressed in kilograms of CO_2 equivalent (kg-eq Co_2); $EC_{\text{transport}}$ represents the carbon footprint of transportation from its assembly location to its distribution point in France, expressed in kilograms of CO_2 equivalent (kg-eq CO_2).

$$EC_{ferreux}^{site} = FE_{ferreux}^{site} \times \frac{m_{ferreux}}{1-T_{PMF}} \quad (2)$$

Here, $FE_{ferreux}^{site}$ represents the carbon emission factor per unit mass for the production of ferrous metals consumed at different assembly locations, expressed in kilograms of CO_2 equivalent per kilogram (kg-eq CO_2/kg); $m_{ferreux}$ represents the total mass of ferrous metals used in all vehicle components, excluding the battery, expressed in kilograms (kg); T_{PMF} represents the material loss rate for ferrous metals during vehicle processing and assembly, which is a fixed value of 0.3.

$$EC_{aluminium}^{site} = FE_{aluminium}^{site} \times \frac{m_{aluminium}}{1-T_{PAL}} \quad (3)$$

Here, $FE_{aluminium}^{site}$ refers to the carbon emission factor per unit mass for the production of aluminum consumed at different assembly locations, expressed in kilograms of CO_2 equivalent per kilogram of aluminum (kg-eq CO_2/kg); $m_{aluminium}$ refers to the

total mass of aluminum used in all vehicle components, excluding the battery, expressed in kilograms (kg); T_{PAL} refers to the material loss rate for aluminum during vehicle processing and assembly, which is a fixed value of 0.3.

$$EC_{AM}^{site} = FE_{AM}^{site} \times m_{AM} \tag{4}$$

Here, FE_{AM}^{site} refers to the carbon emission factor for the production of materials other than ferrous metals and aluminum, expressed in kilograms of CO_2 equivalent per kilogram of this category of materials (kg-eq CO_2/kg); m_{AM} refers to the total mass of materials in the vehicle other than ferrous metals and aluminum, excluding the battery, expressed in kilograms (kg).

$$m_{AM} = m_{hors\ conducteur} - m_{ferreux} - m_{aluminium} - m_{batterie} \tag{5}$$

Here, $m_{hors\ conducteur}$ refers to the total mass of vehicle (excluding the driver), $m_{batterie}$ refers to the total mass of the vehicle's battery.

$$EC_{batterie}^{site} = FE_{batterie}^{site} \times C_{batterie} \tag{6}$$

Here, $FE_{batterie}^{site}$ refers to the carbon emission factor associated with battery production per unit of battery capacity, expressed in kilograms of CO_2 equivalent per kilowatt-hour of battery capacity (kg-eq CO_2/kWh); $C_{batterie}$ refers to the battery capacity, measured in kilowatt-hours (kWh).

$$EC_{ATI}^{site} = FE_{ATI}^{site} \times m_{vehicule\ hors\ batterie} \tag{7}$$

Here, FE_{ATI}^{site} refers to the carbon emission factor associated with vehicle and component manufacturing per unit mass of the vehicle without the battery, expressed in kilograms of CO_2 equivalent per kilogram (kg-eq CO_2/kg).

$$m_{vehicule\ hors\ batterie} = m_{hors\ conducteur} - m_{batterie} \tag{8}$$

Here, $m_{hors\ conducteur}$ refers to the total mass of the vehicle (excluding the driver), and $m_{batterie}$ refers to the total mass of the vehicle's battery.

Here, $m_{hors\ conducteur}$ refers to the total mass of the vehicle (excluding the driver). $FE_{transport}^{maritime}$ refers to the carbon emission factor related to maritime transport, expressed in kilograms of CO_2 equivalent per ton-kilometer of the vehicle's mass (kg-eq CO_2/t.km). As stipulated by the Energy Law, the carbon emission factor for maritime transport is fixed at 0.101 kg-eq CO_2/t.km. $d_{maritime}^{site}$ refers to the average maritime transport distance for shipping the vehicle from its assembly location to its distribution point in France, expressed in kilometers (km). $FE_{transport}^{MDT,zone}$ refers to the carbon emission factor related to non-maritime transport, which depends on the mode of non-maritime transport used and the geographical regions traversed. It is expressed in kilograms of CO_2 equivalent per ton-kilometer of the vehicle's mass (kg-eq CO_2/t.km). $d_{MDT,zone}^{site}$ refers to the average distance for transporting the vehicle from its assembly location to

its distribution point in France for each mode of non-maritime transport and each geographical region, expressed in kilometers (km).

$$EC_{transport}^{site} = \frac{m_{hors\ conducteur}}{1000} \times (FE_{transport}^{maritime} \times d_{maritime}^{site} + \Sigma_{MDT,zone} FE_{transport}^{MDT,zone} \times d_{MDT,zone}^{site}) \quad (9)$$

Table 2. The Environmental Score Criteria for New Energy Passenger Vehicles.

Carbon footprint value (kg-eq CO_2)	Environmental score
When ≥ 21,000	0
When ≤ 21,000	80
When between 12,000 and 21,000	$80 \times \frac{21000 - Carbon\ footprint\ value}{9000}$

Table 3. List of vehicles eligible for subsidies in French (Partial)

Brands	Subsidized vehicle models
Renault	ZOE, Twingo, Renault 5, Renault 4, MEGANE, SCENIC, KANGOO E-TECH ELECTRIC
Peugeot	3008, 5008, e-RIFTER, 308, 408, 208, 2008, E-5008, Expert/Traveller
Citroën	E-C4, E-C4 X, JUMPY SPACE TOURER, e-C3, E-C3 AIRCROSS, Ë-BERLINGO
Audi	Q4 SPORTBACK 45 E-TRON, Q4 45 E-TRON, Q4 SPORTBACK 55 E-TRON, Q4 55 E-TRON
BMW	Q4 SPORTBACK 45 E-TRON, Q4 45 E-TRON, Q4 SPORTBACK 55 E-TRON, Q4 55 E-TRON
MB	CLASSE EQA 205+, EQB 250+, EQT, CLA Berline 250+/350 4M
Volkswagen	ID.3 (PRO/PRO S/GTX), ID.4 (PURE/PRO/GTX), ID.5 (PRO/GTX), ID. Buzz (Pure/Pro), ID.7 (PRO/TOURER PRO)
Nissan	TOWNSTAR, LEAF, MICRA
Toyota	PROACE CITY VERSO ELECTRIC
Tesla	Model Y LR RWD (120kW/125kW/127kW), Model Y SR RWD
Ford	EXPLORER (52kWh/77kWh/79kWh), CAPRI (52kWh/77kWh/79kWh), PUMA GEN-E, E-TOURNEO COURIER

In 2025, France increased subsidy amounts for vehicles assembled and produced in Europe. The French government stipulated that starting in October 2025, an additional subsidy of €1,000 would be granted to new-energy vehicles whose final assembly and battery production both occur within Europe. The current total subsidy now reaches €4,100 – €5,200 per vehicle. The specific requirements for this subsidy are detailed in Table 4.

Table 4. French subsidy policy requirements

Items	Specific requirements
Vehicle type	BEV, FCEV
Vehicle cost	€47,000 or less (inclusive)
Vehicle curb weight	not exceeding 2.4 tonnes
Purchaser's family annual income	below €26,200
"Environmental Score"	reach 60 points

4 United Kingdom (UK)

In July 2025, the UK Department for Transport announced the launch of the Electric Car Grant (ECG) scheme, which was specifically designed to support the promotion of zero-emission vehicles [9], wherein the Science Based Targets of vehicle manufacturers and the carbon intensity factors of electricity in the country of vehicle production are set as prerequisites correlative to the eligibility for the zero-emission vehicle subsidies. The dedicated ECG funding pool has been capitalized with 650 million pounds for an implementation period 16th July 2025 to the end of 2029. Refer to Table 5 for specific subsidy requirements.

Table 5. UK ECG subsidy policy requirements

Items	Specific requirements
Vehicle type	BEV, FCEV
Vehicle cost	37,000 pounds (incl.) or less
Carbon emissions	Zero driving emissions.
Battery range	No less than 100 miles (approx. 160km)
Vehicle warranty	3 years or 60,000 miles (approx. 96,000km)
Battery warranty	8 years or 100,000 miles (approx. 160,000km).
Enterprise requirements	Carbon reduction targets validated by the Science Based Targets initiative (SBTi) [4] is required

The ECG introduces two indicators directly relevant to carbon emissions. First, enterprise eligibility is tied to the Science Based Targets. In addition to the aforementioned technical requirements, vehicle manufacturers are required to hold the carbon reduction targets validated by SBTi for the eligibility for subsidies. Second, subsidy amount is tied to the carbon intensity factors of electricity in the countries of battery production and vehicle assembling. The ECG subsidy is designed with two tiers: Band 1 vehicles are granted with 3,750 pounds per vehicle, while Band 2 vehicles are granted with 1,500 pounds per vehicle. The Bands are determined mainly based on the carbon emissions in the process of vehicle manufacturing, in particular the specific carbon

[4] SBTi is a UK-based climate action organization established to support global businesses and industry institutions address the climate crisis.

emissions from battery production (a weighting 70%) and vehicle assembling (a weighting of 30%). The UK has explicitly stated that carbon emissions will be calculated based on the report Lifecycle Analysis of UK Road Vehicles, issued by the UK Department for Transport in 2022 and the country-specific electricity carbon intensity factors in 2024, published by the International Energy Agency (IEA). By 15th November 2025, only 3 vehicle models from Citroën and Ford are qualified as Band 1 vehicles, while 38 vehicle models have satisfied Band 2 criteria, most of which are European makes, including Citroën, Vauxhall, Peugeot, Renault and Volkswagen, while also Japanese brands such as Nissan and Toyota. Regarding the subsidized models, the battery production and vehicle assembling are concentrated in European countries. Refer to Table 6 for details.

Table 6. List of vehicle models qualified for UK ECG subsidy (partial)

Band 1 Vehicles (total 3 models)					
Brand		***Key models***			
Citroën		ë-C5 Aircross long-range version			
Ford		E-Tourneo Courier, Puma Gen-E			
Band 2 Vehicles (partial) (total 38 models)					
Brand	***No. of vehicle models***	***Percentage***	***Key models***	***Main batt. production locations***	***Main vehicle ass. locations***
Citroën	8	21%	ë-C3 series, ë-C4 series, ë-Berlingo	France, Germany	Spain, France
Vauxhall	7	18%	Corsa Electric, Astra Electric, Mokka Electric	UK, Germany	UK, Spain, Germany
Peugeot	6	16%	E-208, E-2008, E-308, E-408	France, Germany	France, Slovakia
Renault	5	13%	Renault 4, Renault 5, Megane	France, Germany	France
Volkswagen	3	8%	ID.3, ID.4, ID.5	Germany	Germany

5 Japan

Japan's subsidy policy takes the application of green steel and enterprise carbon reduction performance into account. First, subsidy amount is directly correlated to the carbon reduction performance of enterprises and vehicles. The subsidy amount is composed of base subsidy and additional green steel subsidy. With regard to the base subsidy, the Japanese government has set different subsidy caps for various types of clean energy vehicles. The maximum subsidy amounts for BEV, PHEV and FCEV are 850,000 yen, 550,000 yen and 2,550,000 yen, respectively. The specific amount is determined based on the scores gained in assessment of an expert panel (see Table 7). In such assessment,

comprehensive performance of each vehicle model and manufacturer is evaluated, where each is worth 100 points and the total score is 200 points. Vehicle model assessment focuses on such dimensions as energy efficiency & low carbon, vehicle performance, and communication security, while enterprise assessment covers carbon reduction targets, infrastructure construction and aftersales maintenance & service capacity and coverage[10]. See Table 8. The key indicators of the assessment are corporate carbon reduction performance and full vehicle lifecycle sustainability. Expert panel will investigate if clearly defined corporate CO_2 reduction targets are available, if battery product carbon footprint accounting is implemented and battery removal instructions are published, and if vehicle traction batteries undergo recycling process, and award scores based on criteria.

Table 7. Subsidy amount by score range (Yen)

Score	BEV	PHEV	Light-duty EV	FCEV
130-144	850,000	550,000	550,000	(2/3 of the price difference between an FCEV and a gasoline vehicle of the same model design and specifications) ×100%
100-129	650,000			
85-99	450,000			×80%
70-84	350,000			×60%
55-69	250,000			×40%
<54	150,000			×20%

Table 8. CEV subsidy assessment criteria and points

Items	Criteria	Scores
1. Vehicle performance (each model)	Distance travelled per kWh of electricity	40
2. Construction of charging infrastructure (each enterprise)	Number, location and convenience of public charging piles installed by vehicle manufacturer	40
3. Service & maintenance system, supply stability & safety (each model & enterprise)	If vehicle service & maintenance system is complete, effective and affordable; quantity and convenience of aftersales service shops set by vehicle manufacturers; robustness of key parts supply chain	50
4. Development of service employees (each enterprise)	Technical competence and remuneration of vehicle service technicians	15
5. Cybersecurity (each vehicle model)	Security of vehicle communication hardware, software and supply chain	10
6. Full vehicle lifecycle sustainability (each model and enterprise)	If an enterprise set CO_2 emission reduction targets, implement battery carbon footprint calculation and battery recycling, and publish battery removal instructions	30
Others (each model and each enterprise)	If vehicle is externally rechargeable; enterprise's risk resilience	15
Total		**200**

Second, the vehicle models using green steel materials are eligible for extra subsidies. Japan implemented new subsidy policy for introduction and promotion of clean energy vehicle (CEV) in April 2025, incorporating green steel application into consideration for the first time, and assessing corporate and vehicle carbon reduction performance. As for some vehicle models using green steel body components and parts, an extra subsidy of 30,000-50,000 yen is provided in addition to the base subsidy amount. See Table 9 and Table 10 for specific subsidy criteria.

Table 9. Base subsidy criteria by vehicle types

Vehicle type	Base subsidy amount
BEV	Max. 850,000 yen
PHEV & light-duty EV [5]	Max. 550,000 yen
FCEV	Max. 2,550,000 yen

Table 10. Subsidy criteria for vehicles using green steel materials

Vehicle type	Subsidy amount total (green steel incentive included)
BEV	Max. 900,000 yen
PHEV	Max. 600,000 yen
Light-duty EV	Max. 580,000 yen
FCEV	Max. 2,550,000 yen

Till 5th November 2025, vehicle models of many major vehicle manufacturers, such as Toyota, Nissan and Honda from Japan, BMW, Audi and Porsche from Europe, as well as Tesla from the US, are qualified for Japan CEV subsidy criteria. Japanese brands account for more than 60% of the subsidy list. Refer to Table 11 for partial subsidized models.

Table 11. List of enterprises and vehicle models eligible for CEV subsidy (partial)

Enterprises	Subsidized types	No. of eligible models	Subsidy range (10,000 yen)	Representative subsidized models & amounts (10,000 yen)
Lexus	BEV, PHEV	≈ 10 models	60-90	RZ300e (90), RZ450e (72-90)
Toyota	FCEV, BEV, PHEV	≥30 models	48-145.3	Mirai (145.3), bZ4X (90)
Nissan	BEV, light-duty EV	≥25 models	25-89	Leaf (89), Ariya (89)
Honda	BEV, FCEV, light-duty EV	≥10 models	57.4-255	CR-V (255), Honda e (89)

[5] A Japan-specific vehicle category defined based on the practical mobility in Japan. It generally refers to a type of mini vehicle, the Kei Car Class, with displacement equal to or lower than 660cc and dimensions featuring length≤3.4m, width≤1.48m and height≤2.0m.

Enterprises	Subsidized types	No. of eligible models	Subsidy range (10,000 yen)	Representative subsidized models & amounts (10,000 yen)
BMW	BEV, PHEV	≥20 models	36-65	iX1 xDrive30 (65), i4 eDrive 35,40 (65)
Hyundai	BEV	≈ 10 models	67	KONA (67), IONIQ 5 (67)
Tesla	BEV	≈ 10 models	53.6-87	Model S (53.6), Model 3 (87), Model Y (87)
BYD	BEV	≥15 models	35-45	SEAL (35-45)

6 Conclusion

At present, the low-carbon policies for global automotive industry feature 4 major trends. First, the carbon reduction targets remain firm and resolute in most economies, with the exception of the US. The EU has adapted its industrial carbon reduction policies with flexible adjustments, and the major markets, such as the UK, have set zero emission in 2035 as a clear direction, indicating the firm resolve of various countries for carbon reduction. Second, fiscal and tax policies are leveraged as key instruments to guide the industrial low-carbon transition. By means of such policies as carbon accounting incentives and dedicated subsidy, various countries are promoting the adoption of zero-emission and low-emission vehicles. Subsidy policies are largely correlated directly with industrial carbon performance to encourage greater investment by enterprises in research and development of low-carbon technology. Third, policy-based administration is extended to the full product lifecycle. Carbon footprint management covers not only batteries but also complete vehicles, meanwhile the product carbon footprint accounting is thoroughly connected to the carbon intensity factor of the electricity system in the country of production, highlighting the dual requirements of full lifecycle low-carbon considerations and compatibility with energy structures. Four, policy requirements are becoming increasingly localized and differentiated. Eligibility for subsidy is closely tied to the requirements for local industry chains featuring local manufacturing & assembling and local sourcing of raw materials, and differentiated policies are intentionally designed with an emerging tendency towards trade protectionism.

In view of the growing complexity of international trading environment and increasingly stringent carbon barriers, the automotive industry in all countries must advance systematically low-carbon and globalization strategies through 5 approaches.

I. Establishment of a carbon management system for automotive industry. Encourage leading enterprises to carry out carbon footprint accounting pilot projects, whereby to provide practical cases and data references for formulating industrial carbon reduction policies, and the supporting evidences for implementation of various management policies in the future. II. Innovation in global development mode. Encourage enterprises to set up localized operations, integrating R&D, manufacturing and marketing, in key overseas markets, by means of the innovative mode of “local production + industrial

chain collaboration"; support enterprises to enhance the influence and discourse power in global automotive industry chain through such means as transfer of technology and joint formulation of standards. III. Shaping of low-carbon international discourse framework. Promote international coordination of automotive low-carbon standards, engage actively in activities of international organizations, such as the UN WP.29, for regulatory development, lead the multi-literal consultation on low-carbon standards within multi-literal cooperation mechanism, and facilitate the compatibility and alignment of automotive low-carbon standards with mainstream international standards.

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