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Global Update on Fuel Quality Policies – What is New for 2024?

GFS Webinar

Feb. 7, 2024

8.00 am U.S. Central



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Agenda

Global Overview

Regional Overviews

Asia Pacific

Middle East & Africa

Russia & CIS

Europe

Central & Latin America

North America

Summary and Q&A

Meet Our Speakers

Introducing the Global Fuel Specifications (GFS) team



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Global

Global Overview

Regulatory developments occurring globally for fuel sulfur and octane

- **Overall**

- Gasoline: Sulfur is key focus but changes are also expected for other parameters such as octane, benzene and aromatics
- Diesel: Sulfur is key focus but changes are also expected for other parameters such as cetane and polyaromatics
- Specification changes are also expected for biofuels and blends (due to new biofuel mandates), off-road diesel, marine fuels etc.

- **Sulfur**

- Several countries to reduce sulfur to 50 ppm and below in the next 5 years
- A number of countries plan to leapfrog from very high sulfur limits to very low ones
- On the other hand, larger countries follow the traditional route of reducing first to 150/350 ppm, then 50 ppm and eventually 10 ppm (e.g. China, India, Russia)

- **Octane**

- Emerging issue with sulfur reduction being implemented
- MTBE and ethanol are most common enhancers

- **Vehicle Emissions and Fuel Economy**

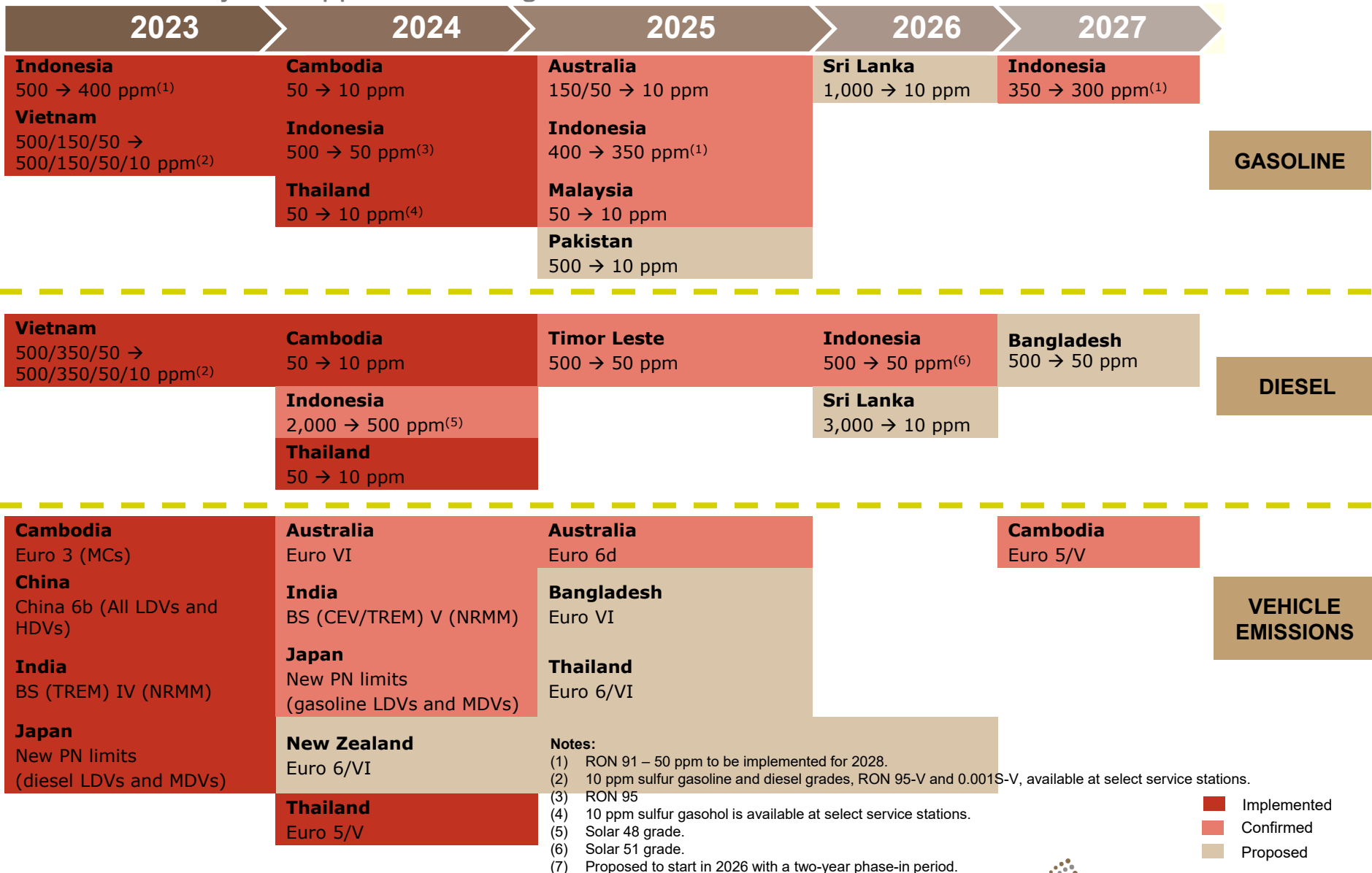
- New emission standards ranging from Euro 4/IV to 6/VI to be implemented in the next five years
- Fuel economy targets to be tightened in the next five years



Asia Pacific

2023 Wrap Up, Outlook for 2024 and Beyond

Australia delayed 10 ppm sulfur for gasoline from Dec. 15, 2024 to December 2025



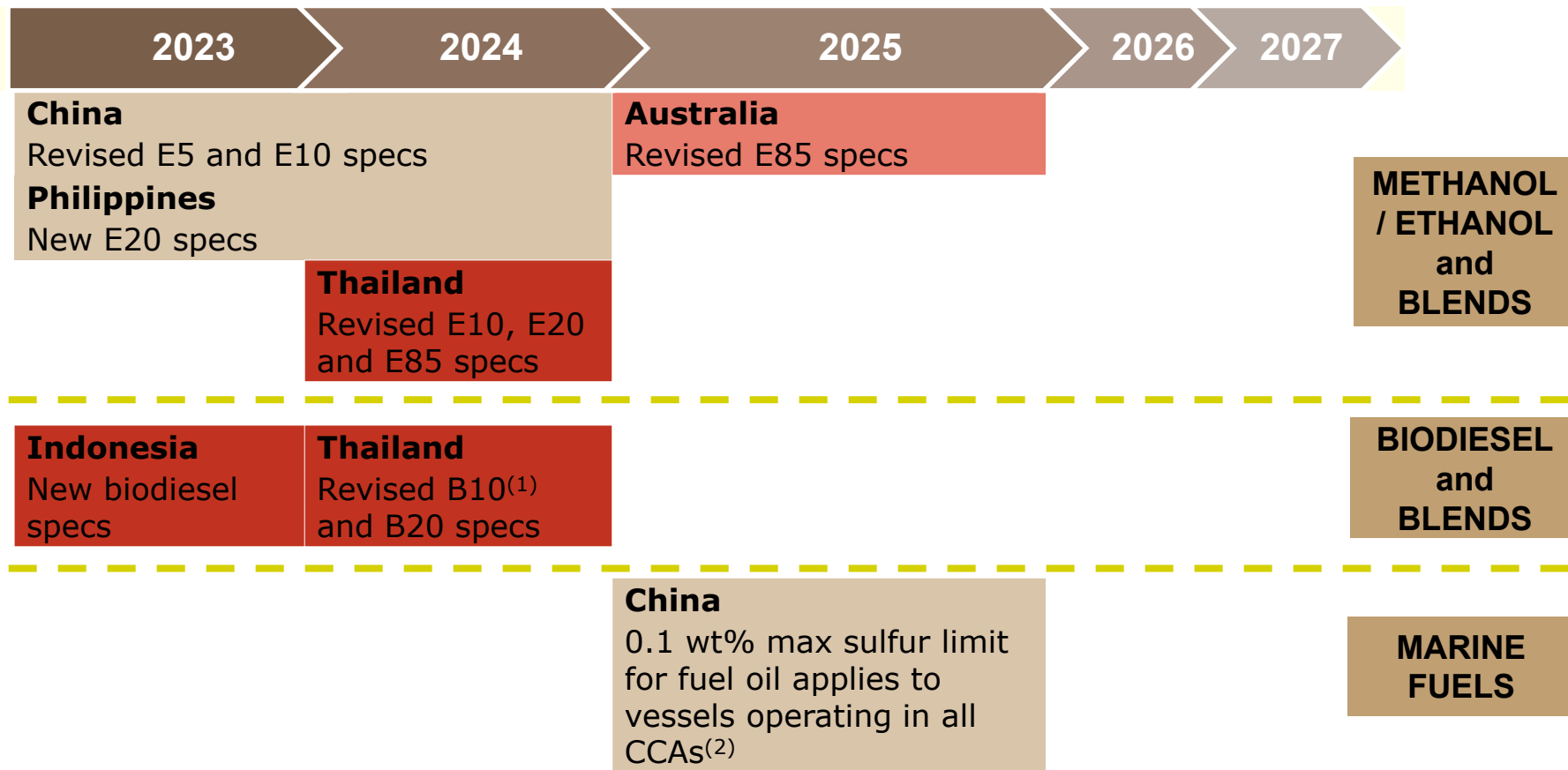
Notes:

- (1) RON 91 – 50 ppm to be implemented for 2028.
- (2) 10 ppm sulfur gasoline and diesel grades, RON 95-V and 0.001S-V, available at select service stations.
- (3) RON 95
- (4) 10 ppm sulfur gasohol is available at select service stations.
- (5) Solar 48 grade.
- (6) Solar 51 grade.
- (7) Proposed to start in 2026 with a two-year phase-in period.

■ Implemented
■ Confirmed
■ Proposed

2023 Wrap Up, Outlook for 2024 and Beyond

China's proposed E5 specs set to replace conventional gasoline in the future



Notes:

- (1) To be phased out by May 1, 2024.
- (2) In China, domestic ECAs refer to the combination of coastal control areas (CCAs), which stretch from the southern coastline of Guangxi Zhuang Autonomous Region in southern China to the eastern coastline of Liaoning province in northeast China, and inland river control areas (IRCA), which consists of parts of the Yangtze River and Xijiang River.

- Implemented
- Confirmed
- Proposed

2023 Wrap Up, Outlook for 2024 and Beyond

Fuel efficiency improvements of PCs and LDVs are the main focus of several countries

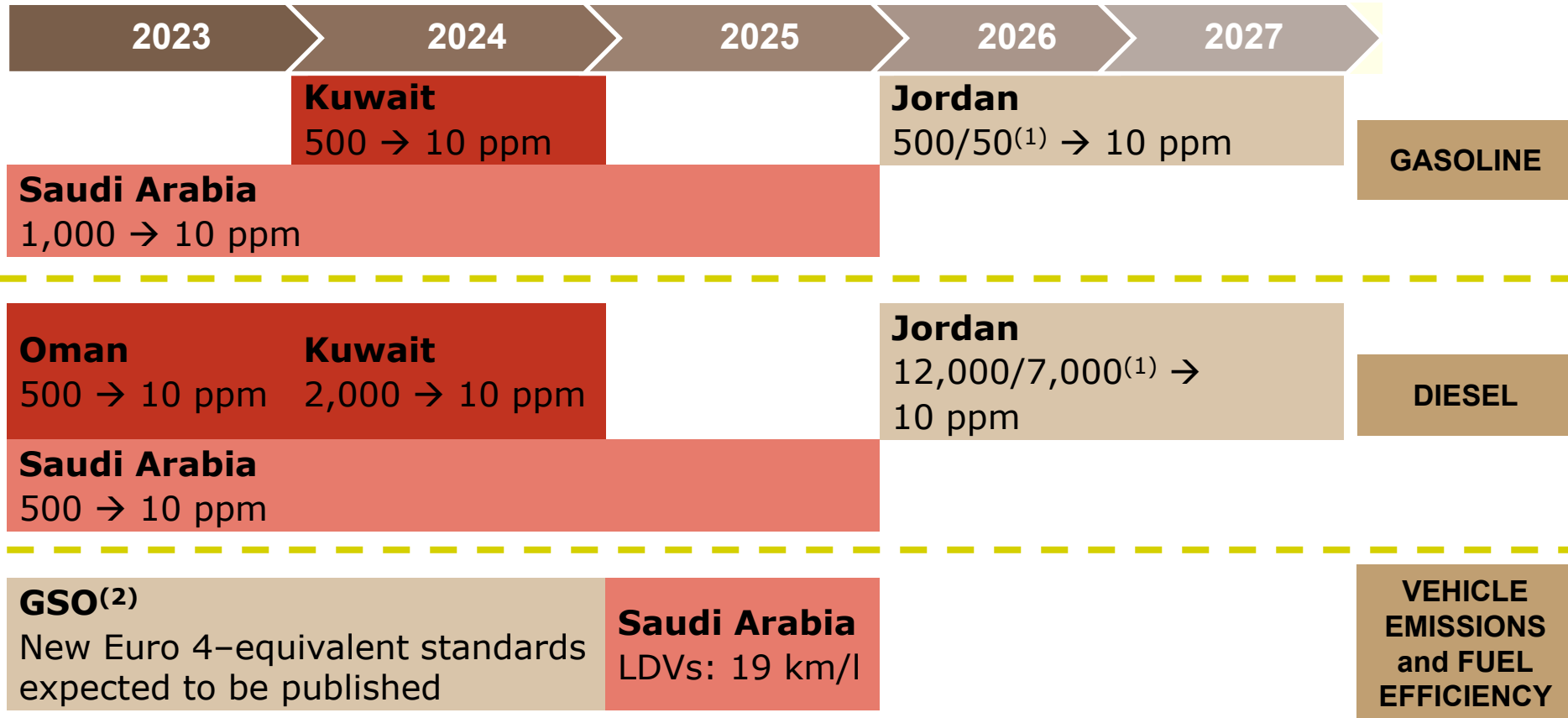




Middle East

2023 Wrap Up, Outlook for 2024 and Beyond

Saudi Arabia delayed 10 ppm from 2022 to 2023 and again to 2024



Notes:

(1) Refinery limits.

(2) GSO – GCC Standardization Organization. Member countries include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and U.A.E.

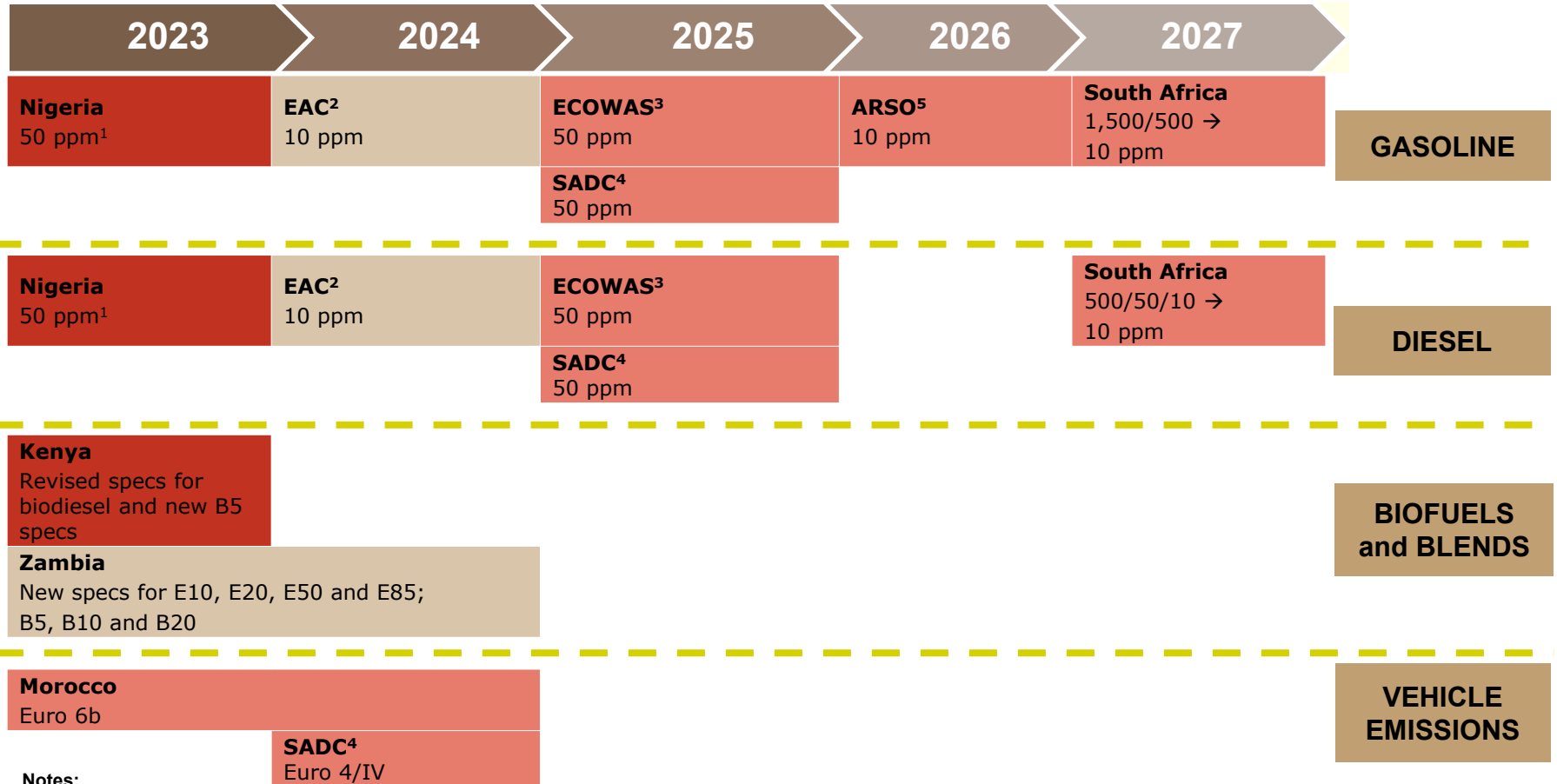
- Implemented
- Confirmed
- Proposed



Africa

2023 Wrap Up, Outlook for 2024 and Beyond

South Africa delayed 10 ppm from Sept. 1, 2023 to July 1, 2027



Notes:

- (1) Imports only.
- (2) EAC – East African Community. Member countries include Burundi, Kenya, Rwanda, South Sudan, Tanzania and Uganda.
- (3) ECOWAS – Economic Community of West African States. Member countries include Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.
- (4) SADC – Southern African Development Community. Member countries include Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe.
- (5) ARSO – African Organization for Standardization. ARSO has membership in 40 African countries (74% of African Countries are ARSO members).

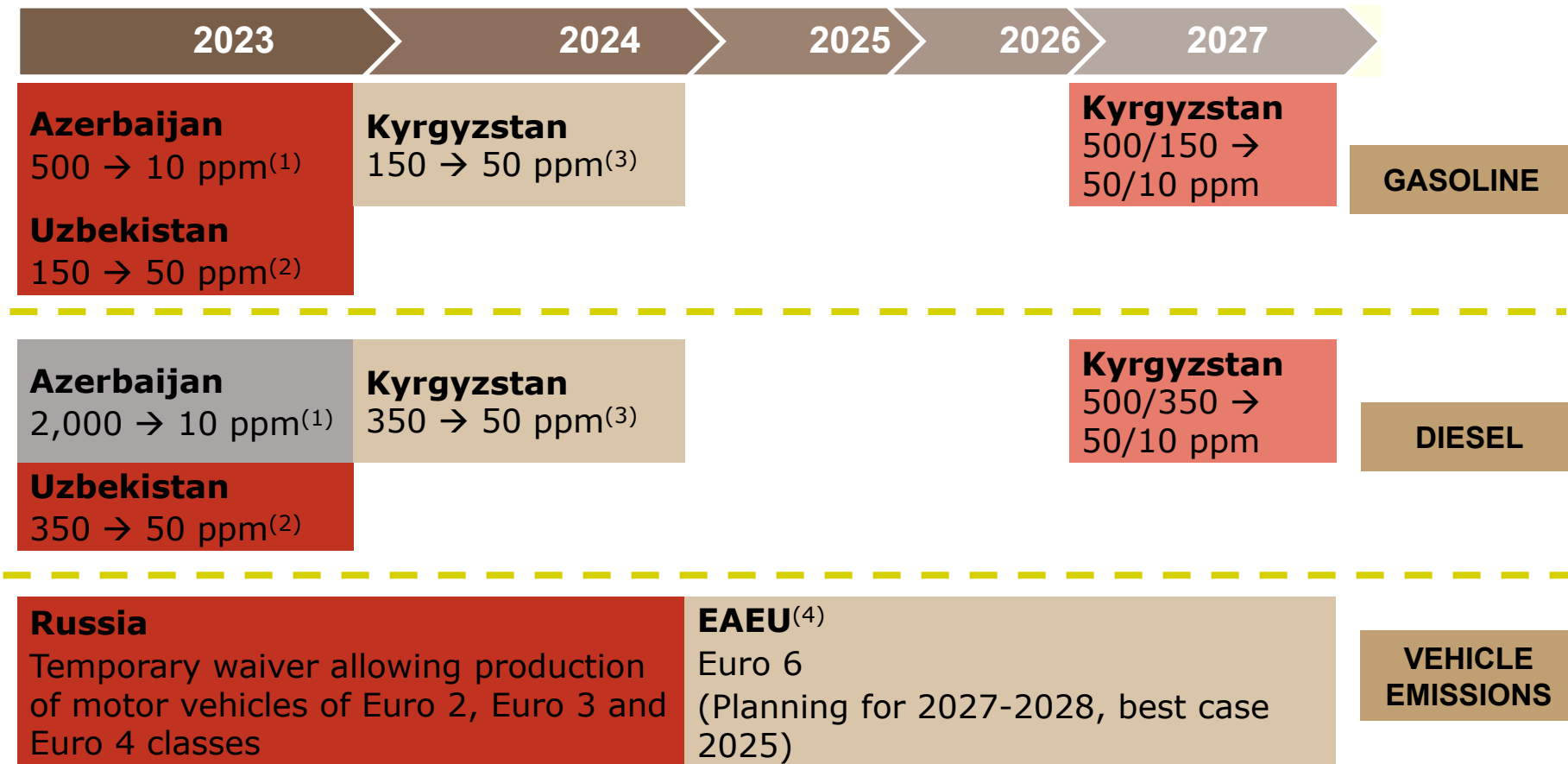
- Implemented
- Confirmed
- Proposed



Russia & CIS

2023 Wrap Up, Outlook for 2024 and Beyond

Kyrgyzstan delaying 50&10 ppm implementation multiple times with latest deadline set for 2027



- Notes:**
- (1) Gasoline sulfur reduction to 10 ppm effective since June 2023 but not for diesel, although SOCAR refinery already started producing 10 ppm sulfur diesel, but not yet for gasoline.
 - (2) Imports only.
 - (3) Refinery indications.
 - (4) EAEU or EEU - Eurasian Economic Union. Member countries include Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia.
- Implemented
 - Legislation confirmed
 - Industry/ ministry indication / refinery upgrades



Europe

2023 Wrap Up, Outlook for 2024 and Beyond: EU Fuels and Vehicles Policy Status and Outlook

EU focusing on CO2 and other emissions reduction from the transportation sector

Fuel Quality Directive (FQD)

May 2023	European Parliament (EP) and Council of the EU approved the final version of the new directive amending the FQD. Once ratified and entered into force, the latest amendments to the FQD will include a change to Annex II increasing the maximum limit of FAME content from 7 vol% to 10 vol%. Article 4 of the FQD is also being amended, introducing an EU-wide protection grade for B7 fuel. These new changes are yet to be published in the EU Official Journal with deadline for implementation set for the end of 2024 at the latest.
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CEN Standards

2023	Standards approved: Paraffinic diesel (EN 15940:2023), Gasoline for small internal combustion engines (EN 17867:2023)
2024	Revised standards under approval: Auto LPG (EN 589:2024), B20-B30 (prEN 16709), Gasoline (prEN 228 rev)
Date unavailable	Standards under review: Diesel (prEN 590 rev), Biodiesel (prEN 14214) New Technical Specification (TS) to be set: E10+ fuel

Emission Standards for On-road vehicles and Non-road Mobile Machinery (NRMM)

Sept. 1, 2023	Euro 6e standard (amending Regulation (EU) 2017/1151) entered into force. Euro 6e is mostly based on the previous Euro 6d applied to all new cars since Sept 1, 2019, but with more stringent testing requirements.
Dec. 18, 2023	After facing opposition in the Council in November 2022, lawmakers modified the EC's proposal for Euro 7/VI in October 2023, introducing relaxed NOx limits for trucks and delaying car rules. A provisional agreement was reached on Dec. 18, 2023, pending formal approval. If endorsed, the regulations could take effect from 2026 for light-duty vehicles (LDVs) and 2027 for heavy-duty vehicles (HDVs). Ongoing trilogue negotiations are expected to conclude with approval in early 2024. The original dates proposed by the EC were July 1, 2026 for LDVs and July 1, 2027 for HDVs.

Fuel Efficiency and CO2 Standards

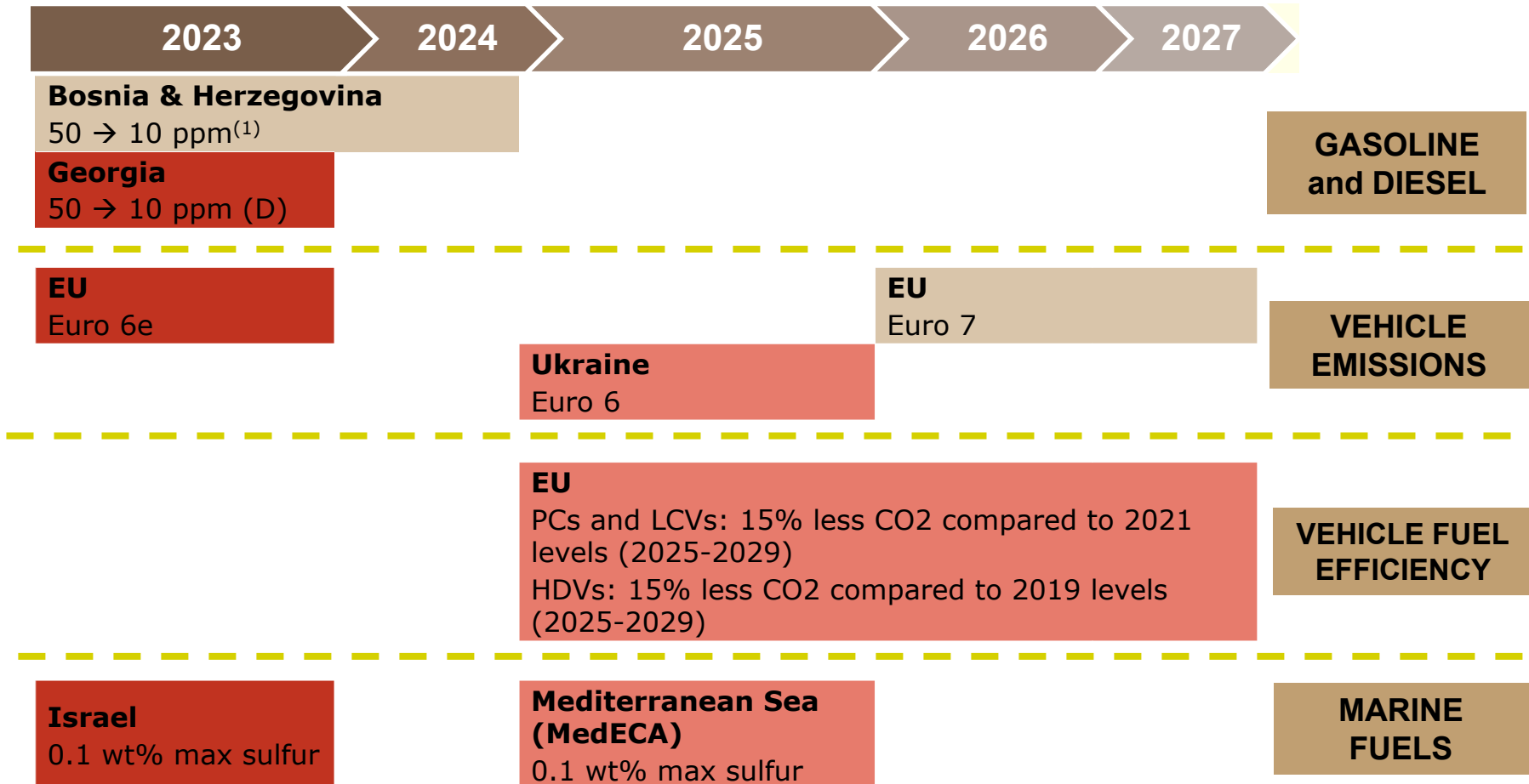
Jan. 1, 2024	EU Regulation No. 2022/1379 is an Amending Regulation to (EU) 2017/2400 as regards to the determination of CO2 emissions and fuel consumption of medium and heavy lorries and heavy buses, which expands scope to M3 and other N2 categories of HDVs and made mandatory for those manufactured from Jan. 1, 2024.
January 2024	The Environment, Public Health and Food Safety (ENVI) committee of the EP is responsible for tabling and discussing EP amendments to the draft regulation on HDV and medium-duty vehicle (MDV) CO2 emissions reduction, which proposes new vehicle emissions reduction requirements for trucks and buses, expanding HDV and MDV emissions reduction targets through post-2040s and de facto prohibiting the sale of new urban buses running on internal combustion engines (ICEs) after 2030 (ZEV mandate). A provisional agreement between the EP and the Council was reached on Jan. 18, 2024.

Marine Fuels

Jan. 1, 2025	Emission Control Area for Sulfur Oxides (SOx-ECA) and PM covering the whole Mediterranean Sea (MedECA) requiring all vessels to use fuel with a maximum sulfur content of 0.1 wt%
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2023 Wrap Up, Outlook for 2024 and Beyond

Ukraine temporarily allows Class 3 and Class 4 fuels in place of Class 5 until termination of martial law



Notes: D – diesel. LCV – light commercial vehicles, PC – passenger cars

(1) At the entities level, 50 ppm has been in force for gasoline and diesel as of Dec. 19, 2014 in the Federation of Bosnia & Herzegovina (FBiH), and de facto also applied to the other entities of the country.

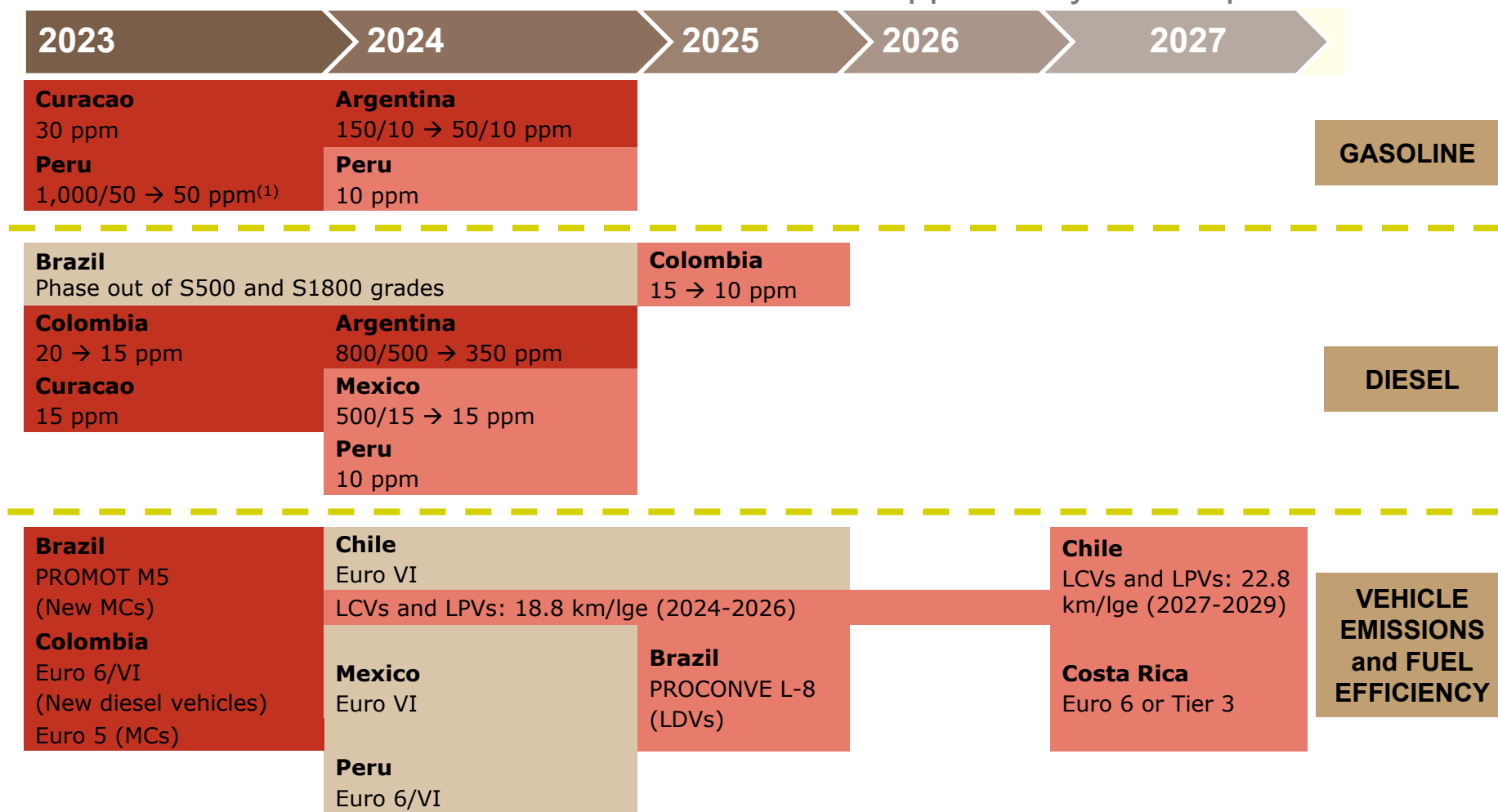
- Implemented
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- Proposed



Central & Latin America

2023 Wrap Up, Outlook for 2024 and Beyond

Mexico's nationwide diesel sulfur reduction to 15 ppm delayed multiple times



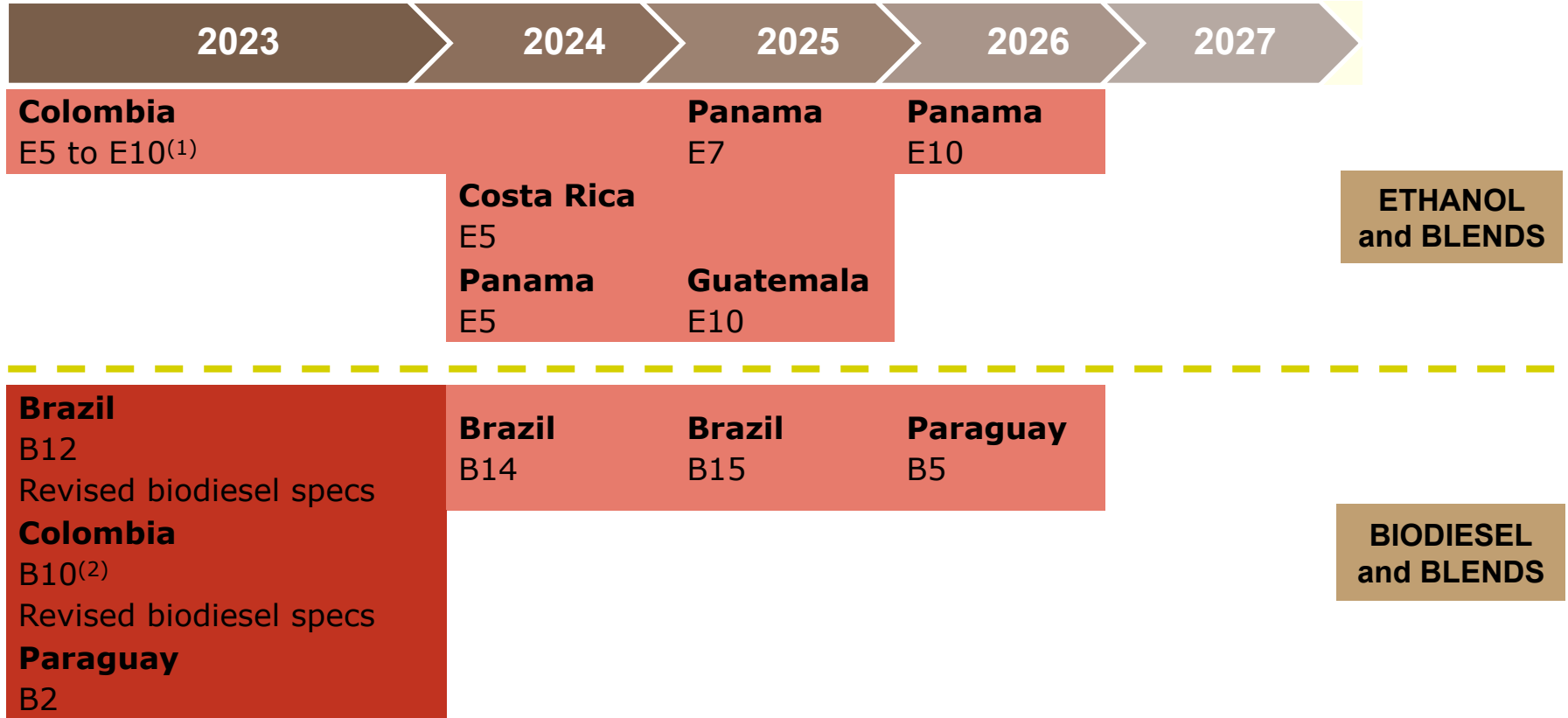
Notes: LCV – light commercial vehicles, LPV – light passenger vehicles, MC – motorcycles

(1) For gasoline and gasohols with RON 95 or higher (95/97/98), except in the departments of Loreto and Ucayali. Lower octane grades with max sulfur limit of 1,000 ppm will continue to exist nationwide.

- Implemented
- Confirmed
- Proposed

2023 Wrap Up, Outlook for 2024 and Beyond

Expected increase of biodiesel blending mandate and use of HVO in Brazil



Notes: Changes to fuel specifications expected for Brazil.

- (1) At the national level: 5 vol% from December 2022 to March 2023, 4 vol% for April 2023, 2 vol% for May and June 2023, 4 vol% for July to November 2023, 6 vol% for December 2023, 8 vol% for January 2024 and 10 vol% for February 2024. For Dept. of Archipelago de San Andres, Providencia and Santa Catalina; ethanol blend volumes will go into effect as of March 2023. From September 2023 to February 2024, blend may be adjusted by 1 vol% based on ethanol supply. For all blends, ±0.5 vol% is allowed.
- (2) At the national level with the exception to the municipalities listed in Article 2.2.1.1.2.2.5.1 in Decree 1073/2015 and Resolution 40188/2019; November and December 2022 at 8 vol% and 10 vol% from January 2023. For all blends, ±0.5 vol% is allowed.

- Implemented
- Confirmed
- Proposed



North America

2023 Wrap Up, Outlook for 2024 and Beyond

Focus on reducing emissions from vehicles and aircraft, boosting efficiency

2023

2024

2025

2026

2027

Federal

- EPA and NHTSA jointly issued **SAFE Vehicles Rule** to implement changes at the federal level to CAFE requirements for PCs and LDTs covering model years (MY) 2021-2026.
- EPA finalized **GHG emission standards** for MY 2023-2026 LDVs.
- NHTSA issued final rule on **CAFE standards** for MY 2024-2026 PCs and LDTs.
- EPA finalized rule to reduce **NOx emissions** from MY 2027 heavy-duty gasoline and diesel engines.

California

- California adopted voluntary framework agreement for clean cars to reduce **GHG emissions** from PCs and LDTs through MY 2026 as well as **NOx emissions** reduction rule to be phased in for HDVs covering MY 2024-2027.
- California **HD Omnibus Regulations** approved by CARB including amendments to NOx and PM emission standards for MY 2024-2031 HDVs.

Federal

- EPA proposes more stringent vehicle emission standards for MY 2027-2032 LDVs, MDVs and HDVs, which are expected to result in an industry-wide average target for LDV fleet of 82 g CO₂/mi in MY 2032.
- EPA submitted final draft on GHG Phase 3 standards for HDVs of MY 2027-2023 and later
- NHTSA proposes to update fuel economy standards under the CAFE standards for MY 2027-2032 PCs and LDTs and fuel efficiency standards for MY 2030-2035 heavy-duty pickup trucks and vans (HDPUV)

California

- CARB announces Clean Truck Partnership with the Truck and Engine Manufacturers Association (EMA) to advance the development of ZEVs for use in the commercial trucking industry with plans to align with EPA's 2027 regulations for NOx emissions and modify elements of the 2024 NOx emission regulations.

FAA's **Eliminate Aviation Gasoline Lead Emissions** (EAGLE) initiative to transition to lead-free aviation fuels for piston-engine aircraft by the end of 2030

FAA proposes to reduce GHG emissions from new subsonic jets, turboprop and propeller aircraft, and new planes built after Jan. 1, 2028

EPA finalized rule for **PM emission standards for civil aircraft engines** effective Jan. 1, 2023

Notes: PC – passenger cars, LDT – light-duty trucks, LDV – light-duty vehicles, MDV – medium-duty vehicles, HDV – heavy-duty vehicles.

- Implemented
- Confirmed
- Proposed



Summary

Summary of Upcoming Fuel Spec Changes in 2024

Primary focus continues to be sulfur reduction for developing regions

Region	Country / Sub-Region	Sulfur Reduction		Expected Implementation Date	Likelihood of Implementation
		Gasoline	Diesel		
Africa	EAC	10 ppm		2024	Likely for imports
Asia Pacific	Indonesia	-	2,000 → 500 ppm*	December 2024	Likely
Latin America	Mexico	-	500/15 → 15 ppm	December 2024	Unlikely
	Peru	1,000/50 → 10 ppm	5,000/50 → 10 ppm	March 2024	Likely
Middle East	Saudi Arabia	1,000 → 10 ppm	500 → 10 ppm	2024-2025	More likely for 2025

Note: *Solar 48



Q & A

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The Q&A transcript will be made available 1-2 weeks after this webinar.

Upcoming Scheduled GFS Reports for 2024 – Tentative Schedule

Feedback and suggestions are welcome

Month	Topics
February	Top 100 diesel sulfur ranking
	Overview and outlook of fuel quality and vehicle emissions in Africa
March	Top 100 gasoline benzene ranking
	2022 market fuel quality in China
April	Overview and outlook of gasoline quality, vehicle emissions and fuel efficiency
May	Diesel market share by sulfur
	Overview and outlook of fuel quality and vehicle emissions in Latin America
June	Top 100 gasoline sulfur ranking
July	Global FQMS update
	Overview and outlook of fuel quality and vehicle emissions in Southeast Europe
August	Expected global fuel spec changes
September	Octane market share
	Overview and outlook of fuel quality and vehicle emissions in Asia Pacific
October	Overview and outlook of on-road diesel quality, vehicle emissions and fuel efficiency
November	Overview and outlook of off-road diesel quality, vehicle emissions and fuel efficiency
	Overview and outlook of fuel quality and vehicle emissions in Central America & Caribbean

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