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Market Update

U.S. EPA GHG Phase 3 Rule Challenged

Various groups have filed [lawsuits](#), challenging the medium- and heavy-duty EPA GHG Phase 3 Rule for MY 2027+ vehicles: Clean Fuels Alliance America, American Petroleum Institute, Owner-Operator Independent Drivers Association, National Corn Growers Association, American Farm Bureau Federation.

Broadly, these lawsuits claim that the rule fails to evaluate the use of alternative fuels towards meeting emission standards and that the broad push for electrification will increase transportation and ultimately consumer costs.



CARB Low NOx compliant trucks announced

Several truck manufacturers have announced the availability of new models that will comply with California's MY 2024 requirements. These include Kenworth, Peterbilt and Volvo Trucks North America. Cummins has also announced its redesigned X15 diesel which will meet EPA 2027 standards. Here's a [summary](#) of the various after-treatment solutions adopted.

First hydrogen powered ferry delivered – with a price tag of \$14 million

The San Francisco Bay saw the [launch](#) of the world's first commercial passenger ferry powered completely by hydrogen fuel cells. The MV *Sea Change* is a 70-foot, 75-passenger aluminum catamaran featuring an integrated hydrogen power system with 360kW of PEM fuel cells, 100kWh of Li-Ion battery storage, and 600kW of electric motor propulsion. [CARB](#) contributed ~ \$3M of the total ~ \$14M cost of the project, which started in May 2018. The emissions – pure water – are partially recirculated for on-board drinking fountains.



Regulations / Reports

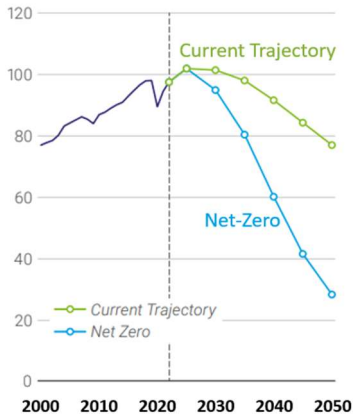
India proposes CAFE III & IV CO2 Standards

India's Bureau of Energy Efficiency has proposed new fleet averaged CO2 standards for passenger cars. The standards lower the CO2 limit from 113 g-CO₂/km today to 91.7 g-CO₂/km for MY 2027 – 2032 (CAFE III) and 70 g-CO₂/km for MY 2032 – 2037 (CAFE IV). The proposal also calls for a change in the test cycle from the current MIDC to the WLTC. By CAFE IV, the credits for EVs are proposed to be increased from 3 to 4, while those for plug-in hybrids are reduced from 2.5 to 1.5, and eliminated for strong hybrids.



Standard	Model Year	CO ₂ (g/km)
CAFE-II (today)	2022	113
CAFE-III (proposed)	2027	91.7
CAFE-IV (proposed)	2032	70

Oil demand Mb/d

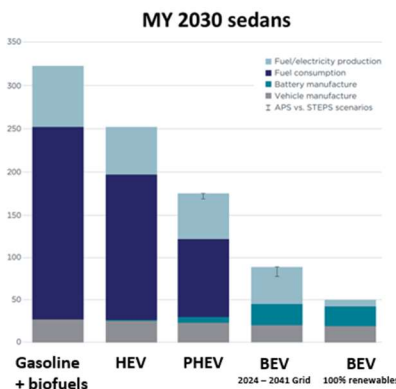
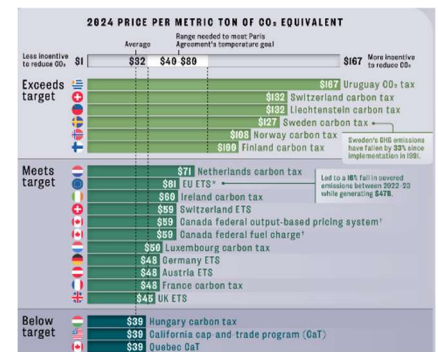


BP Energy Outlook 2024

In their [annual energy outlook](#), BP pointed out that current measures adopted to fight climate change will miss the mark and that more needs to be done in moving towards renewable sources of energy. Two scenarios were selected – one a “current trajectory” and another a “net-zero” scenario – to walk through the impact on various aspects of the energy transition. The report points that we will be using about the same amount of oil in 2050 as in 2000 based on current measures (coupled with growth). The report projects a massive increase in electricity use in both scenarios and emphasizes the significant acceleration of shift to renewable electricity that would be needed, compared to today.

Carbon pricing falls short of expectations

VisualCapitalist has [summarized](#) the latest carbon pricing across the world, based on data from the [World Bank](#). The report finds that only 1% of the global carbon emissions are priced above the price of ~ \$40 – 70 that is required for meeting the Paris agreement. The carbon price is typically implemented through an emissions trading system (ETS) or carbon taxes (the adjoining figure is truncated, see link for full picture)



ICCT report on lifecycle emissions from sedans and SUVs

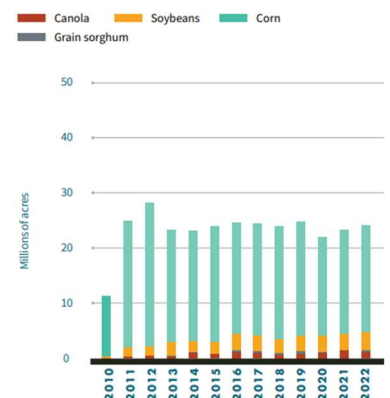
The International Council on Clean Transportation (ICCT) has [published](#) its latest findings on the lifecycle greenhouse gas emissions from cars and SUVs in the US. The study is expanded to include strong hybrids, given their increased share in recent years, and analyzes vehicles today and a projection to 2030. By 2030, compared to a gasoline vehicle, the lifecycle GHG emissions are expected to reduce by ~ 25 – 30% for full hybrids, ~ 45 - 50% for plug-in hybrids, and ~ 75% for battery electric vehicles. The higher embedded emissions in a battery electric are “paid back” after ~ 16,600 miles of driving, when compared to a hybrid.

Comprehensive report on biofuels published

Quick question (and don’t look at the picture): What is the percentage increase in land used for biofuel production in the last decade?

If you guess anything higher than zero, read the comprehensive report, “Balancing the Benefits of Biofuels: The Economics of U.S. Crop-Based Fuel Production” [published](#) by Transportation Energy Institute. This is a rich resource, with information on biofuels, their production pathways and feedstock inputs, acreage, impact on food, production costs, government policies, etc.

FIGURE 15. U.S. CROP NET ACREAGE USED FOR BIOFUEL PRODUCTION (2010-2022)

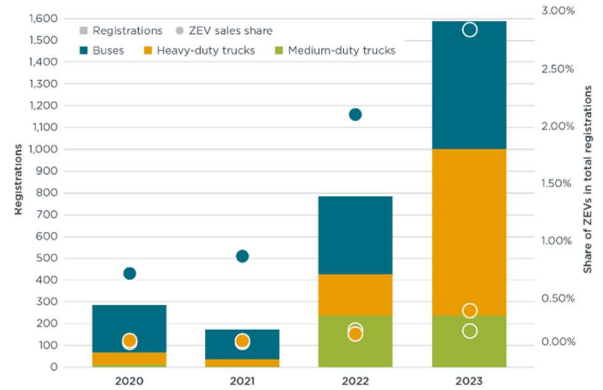


Electrification

U.S. Heavy-Duty ZEV Market Update

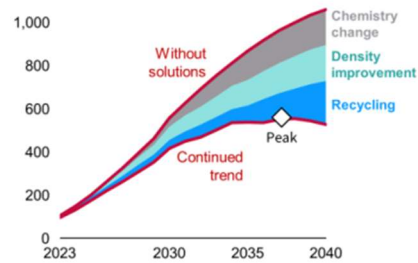
The US is lagging China and EU significantly for heavy-duty ZEV sales, according to a new report by the ICCT. The share of new registrations in 2023 was 1,600 vehicles and 0.3% share of total vehicles sold. In comparison, 11,000 HD ZEVs were sold in the 27 EU Member States and >110,000 in China.

Electric buses accounted for ~3% of total new buses and ~ 1/3rd of overall HD-ZEV registrations



Path to net-zero battery mineral demand by 2050 outlined

Net lithium demand, fast uptake
1,200 kilotons per year



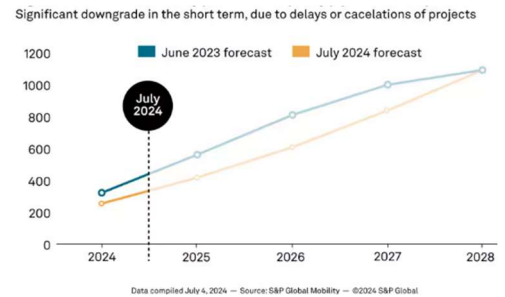
Net-zero battery mineral demand is achievable before 2050...

The Rocky Mountain Institute has [published](#) a report which outlines measures to manage mineral demand. Improved battery energy density and lifetime, recycling, and improved vehicle and mobility efficiency are solutions which can help reduce battery demand such that it peaks in the mid-2030s and can reach net-zero by 2050. Battery capacity is expected to increase from 1 TWh in 2023 to 12 TWh by 2050 (including vehicular and storage applications). The report makes the case that a > 10X increase in battery demand need not translate to a > 10X increase in mineral demand.

Slowdown in battery investments in Europe

S&P Global Mobility has significantly [downgraded](#) the production capacity of batteries in Europe due to a slowdown in EV market leading to reduced battery investments:

- Automotive Cells Company (ACC), a joint venture of Stellantis, Total and Mercedes-Benz, is hitting pause on two planned EV battery plants in Europe with capacity of 40 GWh each in 2030.
- Mercedes-Benz has announced a delay in its electrification plans, pushing back its goal of 50% electrified vehicle sales from 2025 to 2030.
- Svolt is dropping plans to set up a 16 GWh plant in Germany, with expected start of production in 2025.
- Volkswagen is reconsidering its fourth battery plant in Eastern Europe.



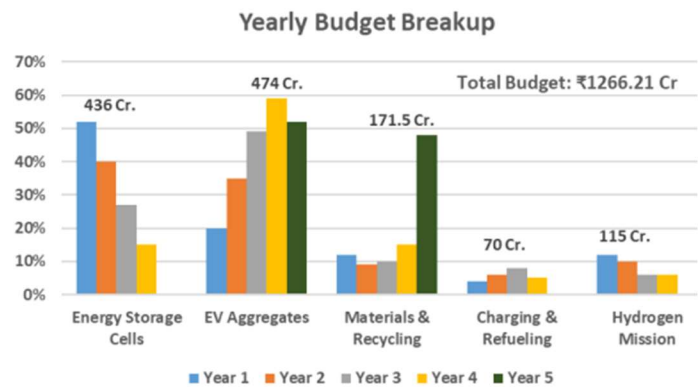
According to another [report](#) by SC Insights, the current pullback in investments affects around 158 GWh of battery production forecast at the start of this year.

Scania establishes new company for providing charging solutions

Scania has [announced](#) the formation of a new company, Erinion, which will specialize in providing charging points at customer locations. Depot charging is seen as a key enabler for driving heavy-duty electric vehicle sales. Scania has a goal of 50% electric sales by 2030, and Erinion plans to deploy 40,000 charging points by that time. The company will focus operations in Europe.

India publishes eMobility R&D Roadmap

The Office of the Principal Scientific Adviser to the Govt. of India has published the “[eMobility R&D Roadmap for India](#)”, which outlines the R&D projects to be undertaken in the next five years. India has set ambitious targets of EV share of new sales of 30% for private cars, 40% for buses, 70% of commercial cars and 80% of 2- and 3-wheelers by 2030. The R&D projects cover the topics as shown in the figure – energy storage cells, EV aggregates, Materials & Recycling, Charging & Refueling and Hydrogen. Total funding allocated is Rs. 1,266 crores or ~ \$150 million over five years.



Electrification of transport in India will add to the already rapidly increasing electricity demand. In a recent [report](#), the India Energy and Climate Center warns that the country will face significant (20 – 40 GW) power shortages by 2027 even if all the thermal & hydro capacity currently under construction comes online as planned. India’s electricity demand has increased at an annual rate of 6.5% for the past 5 years and the majority is still coal-derived. The report calls for large scale solar and storage deployment as the main pathway for avoiding these shortages.

Conferences

Here are some upcoming conferences to consider attending –

SAE COMVEC, September 10 – 12, Schaumburg, Illinois

[COMVEC™ \(sae.org\)](https://www.sae.org/comvec/)

THIESEL 2024, September 10 – 13, Valencia, Spain

[THIESEL 2024, 10 – 13 September 2024 – EARPA](https://www.thiesel.com/)

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