FACT SHEET

Electric Vehicles: Mandates and Challenges

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Did you know...?

According to a Pew Research Center poll released last week, **almost 60% oppose** 'phasing out the production of new gasoline cars and trucks by 2035.'

Read more at The Washington Examiner →

At the end of 2022, the average cost of an electric vehicle according to Kelley Blue Book was $61,448, compared with a traditional new car being $49,507.

Read more at The New York Times →

According To Reuters, a mid-sized electric vehicle produces more than **8.1 million grams of carbon dioxide** before it reaches the market due to its production method and materials used.

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"By pushing the industry to make the transition faster, Biden could risk a backlash from unwilling consumers, complicate questions about China's dominance of electric vehicle supplies, and escalate his administration's legal fight with the oil industry and GOP governors who oppose his efforts to phase out internal combustion engines."

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ELECTRIC VEHICLES MANDATES AND CHALLENGES

AMERICAN OPPOSITION TO EV MANDATES

Nearly 60% Of Americans Oppose Phasing Out The Production of New Gasoline Cars, With Only 19% Saying They Were Very Likely To Purchase An EV

According To The Pew Research Center, Almost 60% Of Americans Oppose "Phasing Out The Production Of New Gasoline Cars And Trucks By 2035"

According To The Pew Research Center, Almost 60% Of Americans Oppose "Phasing Out The Production Of New Gasoline Cars And Trucks By 2035." "According to a Pew Research Center poll released last week, almost 60% oppose 'phasing out the production of new gasoline cars and trucks by 2035.' Opposition has grown by 7 percentage points in just two years. Biden's policy would force automakers to ensure that 67% of all new vehicles sold were electric vehicles by 2032. Pew did not mention it to respondents, but there is simply no way automakers will be able to obtain all the necessary rare earth minerals needed to produce that many electric vehicles in less than a decade. Neither will automakers be able to install the charging station capacity to keep that many electric vehicles running." (Conn Carroll, "Most Drivers Don't Want Biden's Electric Vehicle Mandate," *The Washington Examiner*, 7/3/23)

In 2023, Only 19% Of U.S. Adults Said They Were "Very" Or "Extremely" Likely To Purchase An EV, While 47% Said They Are Unlikely To Purchase An EV. "A new poll released Tuesday shows that many Americans aren't yet sold on going electric for their next cars, with high prices and too few charging stations the main deterrents. Only 19% of U.S. adults say it's 'very' or 'extremely' likely they will purchase an EV the next time they buy a car, while 22% say it's somewhat likely. About half, 47%, say they are unlikely to go electric, according to the poll by The Associated Press-NORC Center for Public Affairs Research and the Energy Policy Institute at the University of Chicago." ("White House Proposes Strict New Auto Emission Limits To Boost Electric Vehicle Sales," CBS News, 4/12/23)

The United Auto Workers Has Raised Concerns About The Expansion Of EV Production, With Concerns About Lower Wages, Going So Far As To Withhold A 2024 Endorsement Of Biden

United Auto Workers President Shawn Fain Has Criticized The Biden Administration For Failing to Defend Gas Powered Car Workers Represented By UAW, Going So Far As To Withhold An Endorsement Of Biden's 2024 Campaign. "State of play: The newly elected president of the UAW has struck a fiery tone, saying the administration is 'actively funding the race to the bottom with billions in public money.' UAW President Shawn Fain ripped the president after the Energy Department announced a $9.2 billion loan to Ford to build battery plants in the South. 'Why is Joe Biden's administration facilitating this corporate greed with taxpayer money?' Fain said in a statement. The UAW is withholding an endorsement for Biden's 2024 campaign, after backing him in 2020. 'We want to see national leadership have our back on this before we make any commitments,' Fain wrote in a memo to members, first reported by The Detroit News. The big picture: The UAW's first job, before deciding which political candidates to support, is to protect its members — and most

of them are building gas-powered vehicles, which are gradually being phased out in favor of EVs." (Nathan Borney, Joann Muller, and Joe Guillen, "Biden's Push For Electric Cars Alienates Longtime Union Allies," Axios, 6/29/23)

- **United Auto Workers: "We Want To See National Leadership Have Our Back On This Before We Make Any Commitments."** (Nathan Borney, Joann Muller, and Joe Guillen, "Biden's Push For Electric Cars Alienates Longtime Union Allies," Axios, 6/29/23)

UAW President Fain also Worries That EV Factories Won't Employ As Many Workers As Traditional Car Plants, And The Possibility Of Lower Wages At Battery-Making Joint Ventures With Foreign Partners. "Fain worries EV factories won't employ as many people as traditional assembly plants because EVs are simpler to build, with fewer parts. Plus, the union is upset about the prospect of lower wages at new battery-making joint ventures with foreign partners without collective bargaining agreements." (Nathan Borney, Joann Muller, and Joe Guillen, "Biden's Push For Electric Cars Alienates Longtime Union Allies," Axios, 6/29/23)

John Bozzella, CEO Of The Alliance For Automotive Innovation, Called The EPA Proposal "Aggressive By Any Measure"

John Bozzella, CEO Of The Alliance For Automotive Innovation, Called The EPA Proposal "Aggressive By Any Measure." "John Bozzella, CEO of the Alliance for Automotive Innovation, a trade group representing Ford, General Motors and other automakers, called the EPA proposal 'aggressive by any measure' and wrote in a statement that it exceeds the Biden administration's 50% electric vehicle sales target for 2030 announced less than two years ago. Reaching half was always a 'stretch goal,' contingent on manufacturing incentives and tax credits to make EVs more affordable, he wrote. 'The question isn't can this be done, it's how fast can it be done,' Bozzella wrote. 'How fast will depend almost exclusively on having the right policies and market conditions in place.'" ("White House Proposes Strict New Auto Emission Limits To Boost Electric Vehicle Sales," CBS News, 4/12/23)

General Motors Issued A Statement Urging For Other Policies To Be Implemented, Such As Permitting Reform And Increased Manufacture Of EV Materials

General Motors Issued A Statement Urging For Other Policies To Be Implemented, Such As Permitting Reform And Increased Manufacture Of EV Materials. "General Motors said in a statement that it was reviewing the EPA proposal and called for other policies to be implemented that would help speed up investment and adoption of EV cars, like permitting reform and support for domestic investments in manufacturing, supply chain and charging infrastructure.' European car maker Stellantis said officials were 'surprised that none of the alternatives' proposed by EPA 'align with the president's previously announced target of 50% EVs by 2030.'" ("White House Proposes Strict New Auto Emission Limits To Boost Electric Vehicle Sales," CBS News, 4/12/23)

SALES AND PRODUCTION ISSUES WITH EVS

Consumers Are Confronted By An EV Market Which Is More Expensive And Less Accessible Than Traditional Car Markets

At The End Of 2022, Consumers Are Faced With Average Costs For An Electric Vehicles Costing Over $61,000 And Concerns About The Range Of EVs On A Single Charge

At The End Of 2022, The Average Cost Of An Electric Vehicle According To Kelley Blue Book Was $61,448, Compared With A Traditional New Car Being $49,507. "Market demand is another challenge. Even with federal tax incentives of up to $7,500 for consumers, electric vehicles cost more upfront than conventional cars and trucks. At the end of 2022, the price of an

average new car was $49,507 compared with $61,448 for an electric vehicle, according to the Kelley Blue Book." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

According To *The New York Times*, Of The 91 Unique Electric Vehicle Models On The Market, Fewer Than 40 Qualify For The $7,500 Tax Credit. "The most basic hurdle is price. The federal government will offer buyers up to $7,500 in tax credits for the purchase of an electric vehicle for the next decade, depending on how much of the vehicle was made in the United States. But of the 91 unique electric vehicle models now on the market in the country, fewer than 40 qualify for the tax credits, Mr. Bozzella said." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

Consumers Also Express Concern About The Range Of An Electric Vehicle On A Single Charge And A Lack Of Fast-Charging Stations Available For Electric Vehicles. "But even for motivated consumers who can afford electric vehicles, a major stumbling block is what's known as range anxiety, the fear of being stranded because an electric vehicle cannot reach its destination on a single charge and not enough fast-charging stations exit." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

- **S&P Global Estimates The U.S. Will Need More Than 2 Million Public Charging Stations To Meet The Governments Demand By 2030, Up From A Current Estimate Of 130,000 Available.** "Drivers are also worried about charging electric vehicles. There are currently 130,000 public electric vehicle charging stations in the United States, according to the White House. Under the 2021 infrastructure law, the government will spend $7.5 billion to build half a million electric vehicle charging stations along federal highways. But a January report from S&P Global concluded that the nation would need more than 2 million public charging stations by 2030, in addition to private home and garage chargers. Doug Freeman, an insurance executive in Amesbury, Mass., is an obvious customer for an electric vehicle. He has a 140-mile round trip commute to work, and currently drives a Chevrolet Volt hybrid. 'For me, the green side isn't number one on the priority list, but the savings on fuel from an electric vehicle would be a lot more than for the average consumer,' he said. But the model he covets, the Kia EV6, is not made in the United States and doesn't qualify for the $7,500 tax credit. 'Without the credit, it's $50,000 to $54,000,' Mr. Freeman said. 'I've never paid more than about $33,000 for a car.'" (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

Despite The Electric Vehicle Markets Expansion, A Majority Of EV Models Lie Between SUVs And Trucks, With Less Options For Smaller Sized Electric Vehicles, Limiting Options For Consumers. "Americans considering a new electric vehicle can choose from an unprecedented array of options, but most of them lie on the spectrum between big and gigantic. Among the SUVs and trucks dominating carmakers' growing EV lineups are the Cadillac Lyric (which weighs about 5,900 pounds), the Chevy Silverado EV (more than 8,000 pounds), and the GMC Hummer EV (more than 9,000 pounds). 'If someone wants a small EV, it will be very difficult' to find one, Carla Bailo, the former CEO of the nonprofit Center for Automotive Research, told me." (David Zipper, "Biden Is Ignoring The Menace Of Mega-EVs," *The Atlantic*, 6/1/23)

Automakers Have Expressed Concerns About Producing Profits On Their Electric Vehicles, While Laying Off Workers To Cut Costs During The Same Period

Automakers Have Concerns About Proposed Government Regulations On Electric Vehicles, Impacting Products, With GM And Ford Saying They Did Not Produce Profits On EVs in 2023

According To *The New York Times,* Despite Investing Billions In Electrification, Automakers Are Concerned About How To Meet The Proposed Regulations While Maintaining Profits. "Although nearly every automaker has already invested billions in electrification, the proposed regulations create a dilemma: how to continue to manufacture gasoline-powered vehicles, which provide profits, while investing even more in new electric facilities. The aggressive timeline envisioned by the government means the carmakers could also struggle to source the materials required for vehicle batteries, already difficult to obtain." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

In April 2023, General Motors And Ford Have Said They Are Not Producing Profits On Electric Vehicles, With Ford Saying Its Electric Division Will Lose $3 Billion This Year. "Manufacturers are funding their electric vehicle production now from substantial profits on their gas-powered trucks and sport utility vehicles. But maintaining profitability as they produce more electric vehicles and fewer gas-powered models will be a challenge, experts say. General Motors has said it is not yet making money on its electric vehicles, and Ford recently said its electric division was set to lose $3 billion this year. Both companies hope to turn the corner as they ramp up production of electric models but are also trying to cut costs now, especially in view of the uncertain economy." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

In 2023, General Motors Has Eliminated 5,000 Jobs To Reduce Costs By $2 Billion While Cutting Their Bolt Line Of Electric Vehicles, While Ford Has Trimmed 3,000 From Its Workforce

In 2023, General Motors Has Eliminated 5,000 Jobs To Reduce Costs By $2 Billion, And Ford Has Trimmed 3,000 From Its Workforce. "G.M. is in the process of eliminating 5,000 jobs as part of an effort to reduce costs by $2 billion. Ford last year began to trim about 3,000 jobs from its work force. 'Getting to 50, 60 percent E.V.s is certainly possible,' said Sam Abuelsamid, a principal research analyst at Guidehouse Insights. 'But this isn't going to be easy. Not at all.' And while the pace of electric vehicle purchases is ticking up, many car buyers are uncertain about the new technology. 'We're making sales to early adopters and easy adopters but we need to get beyond them,' said John Bozzella, president of the Alliance for Automotive Innovation, which represents large U.S. and foreign automakers. 'We have a long way to go.'" (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

In April 2023, General Motors Announced It Would End Production Of The Bolt Line Of Electric Vehicles, Despite The Bolt Being Viewed As A High Value For An Electric Vehicle. "That's enough of a price difference to keep many prospective buyers from considering an EV, even before we get to the conversation of charging and range. But Chevrolet's Bolt EV and Bolt EUV were evidence that the EV market didn't have to be this way, at least until GM announced that it would be ending production of them later this year so that it can make a bunch of giant electric trucks. The Bolt was (and is, so long as you can still find it) the best value in EVs you can buy today. The smaller Bolt EV started at $27,495 (including destination); the slightly larger EUV model ran $28,795 (including destination). That got you a modern EV with over 200 miles of real-world usable range,

enough space to seat five, and all of the modern creature comforts and safety features you'd expect with a new car in 2023. On top of that, the Bolts are among the few EVs you can buy today that qualify for the full $7,500 tax credit from the federal government, which among other requirements, has a price cap." (Dan Seifert, "GM Killed The Chevy Bolt And The Dream of A Small, Affordable EV," *The Verge*, 4/26/23)

INCREASED DEPENDENCE ON CHINA

A Majority Of Key Minerals And Components Required For EV's Are Controlled By China, With U.S. Production Lagging Far Behind Meeting The Biden Administration's Goals

China Produces 75% Of All Lithium-Ion Batteries, A Key Part Of Electric Vehicles, And Maintains Majority Control Of Mines Producing Key Minerals For Electric Vehicles Production Such As Cobalt

In Response To The Biden Administration's Push To Expand Electric Vehicle Production, Questions Were Asked About Producing Parts And Minerals Without Increasing Dependence On China. "This is, as President Joe Biden said in a different context, a big f--ing deal. His administration wants to change the way Americans have traveled the roads for more than a century. But by pushing the industry to make the transition faster, Biden could risk a backlash from unwilling consumers, complicate questions about China's dominance of electric vehicle supplies, and escalate his administration's legal fight with the oil industry and GOP governors who oppose his efforts to phase out internal combustion engines. … Other obstacles to getting more motorists to go electric include the patchy availability of charging stations and questions about whether the new breed of cars and trucks will be made in the U.S., with American-sourced parts and minerals, or would further dependence on China." (Tanya Snyder, James Bikales, and Alex Guillen, "Biden Unveils Push To Send Electric Car Sales into Overdrive," *Politico*, 4/12/23)

According To The International Energy Agency, China Produces 75% Of All Lithium-Ion Batteries, A Key Part Of Electric Vehicles. "According to the International Energy Agency (IEA), though, China produces about 75% of all lithium-ion batteries, a key part of EVs, worldwide. The nation also boasts 70% of production capacity for cathodes and 85% for anodes, two key components of such batteries." (Tanya Snyder, James Bikales, and Alex Guillen, "Biden Unveils Push To Send Electric Car Sales into Overdrive," *Politico*, 4/12/23)

- **In Comparison To China, The United States Only Accounts For 7 Percent Of Global Lithium Battery Production.** "The nation's ability to deploy EVs at an aggressive clip will hinge, in part, on bringing down the price tag of EV batteries — which account for up to 40 percent of the car's cost — and securing supplies of critical minerals and metals needed to manufacture them. As it stands, today's battery and mineral supply chains revolve around China, and the International Energy Agency has said that supply chains will need to expand tenfold to meet the world's ambitions for EV adoption. China pumps out three-quarters of all lithium-ion batteries, and over half of lithium, cobalt and graphite processing and refining capacity is located there, according to IEA. The U.S., in comparison, has a much smaller role, with only 10 percent of EV production and 7 percent of battery production capacity. EPA in the justification for its car tailpipe rule acknowledged uncertainty around the supply and demand of critical minerals and noted that the U.S. is largely reliant on minerals sourced from global suppliers. EPA also acknowledged new mines and processing plants will face questions around permitting and investor expectations of demand and future prices. Those factors, EPA said, make it 'difficult to predict with precision the

rate at which new capacity will be brought online in the future.'" (Hannah Northey, "Biden's EV Bet Is A Gamble On Critical Minerals," E&E News, 4/18/23)

Other Minerals Vital For Electric Vehicles, Including Lithium, Cobalt, And Graphite, Are Located In China Or Countries China Has A Purchasing Stake In, Such As The Democratic Republic Of The Congo. "More than 50% of lithium, cobalt and graphite processing and refining capacity is located in China, the IEA data showed. Those three critical minerals, in addition to copper and nickel, are vital for EV batteries. Chinese investment firms have also been aggressive in purchasing stakes in African mines, especially those rich with cobalt in the Democratic Republic of the Congo, in recent years to ensure a firm control over mineral production." (Thomas Catenacci, "More Than 150 Republicans Unite To Condemn Biden's 'Ill-Considered' Electric Vehicle Push," Fox News, 5/22/23)

The Price Of Key Materials In EVs, Including Lithium, Have Increased In Price By Almost 400% Since 2020, With Industry Experts Saying The Market Remains Incredibly Volatile

According To The EPA, The Price Of Lithium Is Expected To Stabilize From Near Historic Levels By The Mid 2020s, A Claim Industry Experts Say No One "Has Any Idea Whether That's Correct Or Not." "The Biden administration's electric vehicle plan bets the U.S. will be able to secure enough critical minerals to electrify up to two-thirds of the nation's new cars within less than a decade. But industry experts say the plan rests on assumptions that are bullish given volatility in the still-burgeoning mineral markets, a disconnect that could undermine one of President Joe Biden's most aggressive climate rules. EPA in its proposed tailpipe rules released last week, which would aggressively limit emissions from cars, SUVs and trucks on U.S. roads by 2032, includes key assertions about the future of the EV industry. Among those: The price of lithium needed to make batteries will 'likely stabilize' at or near historic levels by the mid-2020s, a crucial detail as this would help make EVs more affordable for consumers. EPA says that contention is supported, among other things, by proprietary price forecasts, analysis and news stories. 'No one … has any idea whether that's correct or not,' said Morgan Bazilian, public policy professor at the Colorado School of Mines." (Hannah Northey, "Biden's EV Bet Is A Gamble On Critical Minerals," E&E News, 4/18/23)

Prices For Rare Earth Materials Necessary For Electric Vehicles Have Increased Between 60% And 400% Since 2020, With Lithium Increasing By Around 400% Since 2020. "Second, increasing the demand for EVs will increase the demand for the materials to manufacture batteries, which are the single largest cost of an EV. Prices for rare earths, for example, have increased between 60% and 400% since 2020. Prices for lithium, the basic ingredient in most EV batteries, have increased by about 400%. Moreover, the US continues to prevent development of new mines to supply those materials. Instead, China has a stranglehold on them, and lax environmental rules to boot. Then there is the electricity needed to charge those EVs, along with the charging stations in homes, apartment buildings, and on highways. Claims that this electricity will actually reduce emissions are based on huge predicted increases in wind and solar energy development. Yet, the US Energy Information Administration projects that, by 2050, wind and solar will provide only about 40% of electricity supplies. Consequently, much of the electricity needed to charge those millions of EVs will be provided by natural gas and even coal. So, while the EPA may limit tailpipe emissions, it will transfer many of those emissions to power plants." (Jonathan Lesser, "Forcing Consumers To Purchase Electric Vehicles: A New Low For The Biden Administration," RealClear Energy, 5/1/23)

Mining Officials Have Said That The Opaqueness Of This Rare Mineral Market Make Predictions Extremely Challenging And Predict "Incredibly Volatile" Pricing Around EV Necessary Minerals. "Right now, critical minerals like lithium, cobalt and nickel needed to make EV batteries are largely mined and processed abroad — an industry dominated by China. As

part of its EV push, the Biden administration has pledged to help shift that supply chain to the United States and allied countries, giving itself an enormous additional challenge on top of shepherding automakers away from gas-powered cars and trucks. That means the cost and availability of minerals like lithium in new supply chains will play a central role in EV adoption — and, ultimately, Biden's climate and national security goals. EPA in its proposed clean car rule acknowledges uncertainty around pricing, as well as the pace of permitting of new mines and just how fast supply chains for refining and processing, EV battery manufacturing, and recycling can scale up. But the agency also concludes that prices for lithium — currently the essential ingredient in batteries — will stabilize and sufficient supplies will be available through at least 2027, and likely beyond. But Bazilian, a former energy specialist at the World Bank, said it's difficult to make predictions about critical minerals markets given they're small, opaque, and don't have good liquidity or price discovery. Andrew Miller, chief operating officer at U.K. mining data firm Benchmark Mineral Intelligence, said he doesn't expect the U.S. to be able to produce the amount of lithium it needs over the coming decades. Miller also said he expects the "incredibly volatile" pricing around lithium and other minerals seen in recent weeks and months to continue, throwing into question the United States' ability to secure enough material in an increasingly competitive global landscape. 'That's really a warning sign of what's to come in the future,' said Miller. 'So I think there's a lot baked into those assumptions around the U.S.'s ability, in particular, to source raw material and establish the security of supply.'" (Hannah Northey, "Biden's EV Bet Is A Gamble On Critical Minerals," E&E News, 4/18/23)

Industry Analysts Don't Expect United States Lithium Resources To Reach Their Full Potential Or Even "Some Type Of Production" Until The 2030s. "But Benchmark's Miller said that while the U.S. does have potentially plentiful lithium resources, it will take time to actually use them. Establishing the mines and processing plants to turn raw material into a battery-grade chemical could require multiple years and even decades. Miller said it's 'incredibly optimistic' to look at the lithium in the ground across the United States and expect the nation can rely on projects coming into production. 'This isn't something that happens quickly,' he said. He predicted many projects wouldn't reach 'their full potential or even … some type of production' until the 2030s. 'I agree that the potential for some of these lithium resources in the U.S. definitely does give you a trajectory past 2028 and into the 2030s, but that's also because a lot of these won't be reaching their full potential or even … some type of production before the 2020s or 2030s.'" (Hannah Northey, "Biden's EV Bet Is A Gamble On Critical Minerals," E&E News, 4/18/23)

While The EPA Highlighted Domestic Efforts For Recycling Materials Used In Electric Vehicles To Reduce Foreign Dependence, Industry Analysts Noted That The EV Industry Must First Develop Or Purchase Those Materials In The First Place

While The EPA Highlighted Domestic Efforts For Recycling Materials Used In Electric Vehicles To Reduce Foreign Dependence, Industry Analysts Noted That The EV Industry Must First Develop Or Purchase Those Materials In The First Place. "Aaron Mintzes, senior policy counsel for Earthworks, said EPA's rule will coincide with the growing supply for recycled and reused batteries, fueled by policies taking shape in Europe, as well as the Inflation Reduction Act's mineral sourcing provisions. EPA concurred in its rule, stating that 'minerals that are imported for vehicle production remain in the vehicle and can be reclaimed through recycling.' Going forward, Miller agreed there's a big potential for the United States to emerge as a leader in recycling EV battery materials — taking the pressure off of mining — instead of playing catch-up to China. But first, an EV industry must develop that produces the materials that can be recycled. 'You're constrained by the fact that there's fundamentally not enough material to recycle to meet your ambitions,' he said. 'You're going to need new mines, you're going to need recycling, we're going to need technology to play a role.'" (Hannah Northey, "Biden's EV Bet Is A Gamble On Critical Minerals," E&E News, 4/18/23)

Beginning In 2024, Any Vehicle Containing Battery Components Manufactured By China, Will Be Disqualified From Government Support Programs, Leading To Further Price Increases

Beginning In 2024, Any Vehicle Containing Battery Components Manufactured By a "Foreign Entity Of Concern," Including China, Will Be Disqualified From Government Support Programs, Leading To Further Price Increases. "In order to address this challenge, the Treasury and IRS guidance lists countries that currently meet the sourcing requirement: 21 with which the United States has a comprehensive free trade agreement, plus Japan through the aforementioned critical minerals deal. The list includes large lithium producers like Australia and Chile but not the world's top producers of nickel (Indonesia, the Philippines) or cobalt (Democratic Republic of the Congo). An additional challenge is the fact that investments in expanding processing capacity for all three minerals – which is currently dominated by China – lag behind battery assembly. Only two projects (one Tesla lithium processing plant in Texas, one pilot multipurpose facility in Illinois) have been announced since the IRA went into effect.[1] A strategy based on friendshoring will be hard pressed to meet the challenges necessary to access the IRA's full tax credits unless the United States is able to craft narrow, critical minerals agreements with non-FTA countries. If accessing the IRA's incentives will be a challenge, avoiding its punishments may be even more so. Beginning in 2024, any vehicle containing battery components manufactured by a 'foreign entity of concern' – a diverse list of terrorist organizations and states but specifically the People's Republic of China – will not qualify at all. In 2025, the ban extends to critical minerals." (Cullen S. Hendrix, "'Made In America' Puts The Brakes On Electric Vehicles Biden Hopes To Push," Peterson Institute For International Economics, 4/10/23)

LACK OF INFRASTRUCTURE TO SUPPORT EVS

There Is A Lack Of Infrastructure And Fast-Charging Stations To Support The Expansion Of Electric Vehicles

Consumers Have Expressed Concerns About The Lack Of Fast-Charging Stations Available For Electric Vehicles. "But even for motivated consumers who can afford electric vehicles, a major stumbling block is what's known as range anxiety, the fear of being stranded because an electric vehicle cannot reach its destination on a single charge and not enough fast-charging stations exit." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

- **A Poll By Automotive Research Firm J.D. Power Showed 21 Percent Of EV Owners Who Attempted To Charge At A Public Charging Station In The First Three Months Of 2023 Were Unable To Do So, Up From 15 Percent In 2021.** "Since 2021, automotive research firm J.D. Power has regularly polled electric car owners on their experiences at public charging stations. That infrastructure is vital to the world's transition away from fuel-burning cars and drivers' comfort with battery-powered vehicles. Many of today's EV owners can charge at home, but a complete transition to electric requires a solution for cars that park on the street or take longer trips. The latest data suggests public charging is currently a mess. According to J.D. Power, 21 percent of EV owners who attempted to charge at a public charging station in the first three months of 2023 were unable to do so, up from 15 percent in 2021. The failure rate stems from a range of problems, such as broken displays, software bugs, severed power cords, or gas-guzzling drivers hogging charging spots. 'It's mind-boggling and really unfathomable for someone who is used to going into a gas station,' says Brent Gruber, the J.D. Power executive who oversees the survey." (Aarian Marshall, "Tesla's Supercharger Strategy Starts A Winning Streak," *Wired*, 6/9/23)

S&P Global Estimates The U.S. Will Need More Than 2 Million Public Charging Stations To Meet The Governments Demand By 2030, Up From A Current Estimate Of 130,000 Available. "Drivers are also worried about charging electric vehicles. There are currently 130,000 public electric vehicle charging stations in the United States, according to the White House. Under the 2021 infrastructure law, the government will spend $7.5 billion to build half a million electric vehicle charging stations along federal highways. But a January report from S&P Global concluded that the nation would need more than 2 million public charging stations by 2030, in addition to private home and garage chargers. Doug Freeman, an insurance executive in Amesbury, Mass., is an obvious customer for an electric vehicle. He has a 140-mile round trip commute to work, and currently drives a Chevrolet Volt hybrid. 'For me, the green side isn't number one on the priority list, but the savings on fuel from an electric vehicle would be a lot more than for the average consumer,' he said. But the model he covets, the Kia EV6, is not made in the United States and doesn't qualify for the $7,500 tax credit. 'Without the credit, it's $50,000 to $54,000,' Mr. Freeman said. 'I've never paid more than about $33,000 for a car.'" (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

- **McKinsey & Company Estimates That An Additional 28 Million Private EV Chargers Would Need To Be Installed By 2030 To Meet The Governments Goals.** "In response, the Bipartisan Infrastructure Law (BIL) provides $7.5 billion to develop the country's EV-charging infrastructure. The goal is to install 500,000 public chargers—publicly accessible charging stations compatible with all vehicles and technologies—nationwide by 2030. However, even the addition of half a million public chargers could be far from enough. In a scenario in which half of all vehicles sold are zero-emission vehicles (ZEVs) by 2030—in line with federal targets—we estimate that America would require 1.2 million public EV chargers and 28 million private EV chargers by that year. All told, the country would need almost 20 times more chargers than it has now." ("Building The Electric-Vehicle Charging Infrastructure America Needs," McKinsey & Company, 4/18/22)

More Electric Vehicles Means More Pressure On The Existing Malfunctioning Stations, As Well As More Drivers Who Live In Apartments Or Don't Have Easy Access To Home Charging. "New federal subsidies, offered under the Inflation Reduction Act, are making EVs more accessible to Americans. More EV drivers means more pressure on the existing malfunctioning stations, as well as more drivers who live in apartments or don't have easy access to home charging. While early adopters and EV enthusiasts might be happy to build in multiple contingency plans, mainstream EV adoption is going to require a more streamlined system." (Shannon Osaka, "Here's The Biggest Hurdle Facing America's EV Revolution," *The Washington Post*, 4/13/23)

Bien Administration Action

In June 2023, The Biden Administration Reinforced A Pledge "Build A Convenient And Reliable Network Of Made-In-America Electric Vehicle (EV) Chargers." "Through his Investing in America Agenda, President Biden is building the economy from the middle out and bottom up, creating American-made products in American factories with American workers and positioning the United States as a leader in the clean energy economy. President Biden understands that to compete and win the 21st century global economy, strengthen the American auto industry, and tackle the climate crisis, we must build a convenient and reliable network of made-in-America electric vehicle (EV) chargers along America's highways and throughout all our communities, especially underserved and overburdened communities. That's why President Biden set the country on a path to achieve net-zero emissions by 2050 and advance an industrial strategy that will continue to build out the domestic EV and EV charging industry – all while creating good-paying union manufacturing and installation jobs on the way." ("FACT SHEET: Biden-Harris Administration Driving Forward on Convenient, Reliable, Made-in-America National Network of Electric Vehicle Chargers," The White House, 6/27/23)

The Biden Administration Is Requiring That Electric Vehicle Charger Networks Be Built In The United States Immediately, With 55 Percent Of Their Cost Coming From U.S.-Made Components By 2024. "The Biden administration on Wednesday issued long-awaited final rules on its national electric vehicle charger network that require the chargers to be built in the United States immediately, and with 55% of their cost coming from U.S.-made components by 2024. The White House hopes the new rules, issued after nearly eight months of debate, will jump-start the biggest transformation of the U.S. driving landscape in generations. It seeks to give consumers unfettered access to a growing coast-to-coast network of EV charging stations, including Tesla Inc's (TSLA.O) Superchargers." (Jarrett Renshaw and Hyunjoo Jin, "New Biden EV Charger Rules Stress Made In America, Force Tesla Changes," Reuters, 2/15/23)

$7.5 Billion In Federal Funding Is Being Made Available To Companies To Expand Their Charging Stations, But Only If They Adopt A Standard For Charging Connectors, Known As 'Combined Charging System' (CCS) And Work 97 Percent Of The Time. "Companies that hope to tap $7.5 billion in federal funding for this network must also adopt the dominant U.S. standard for charging connectors, known as 'Combined Charging System' or CCS; use standardized payment options; a single method of identification that works across all chargers; and work 97% of the time." (Jarrett Renshaw and Hyunjoo Jin, "New Biden EV Charger Rules Stress Made In America, Force Tesla Changes," Reuters, 2/15/23)

- **Companies Have Warned The Government That Global Demand For EV Chargers Is Putting Strain On The Supply Chain That Makes It Difficult, If Not Impossible, To Meet The Made-In-America Standards And Expedite Construction Of New Chargers.** "Global demand for EV chargers is putting strain on the supply chain that makes it difficult, if not impossible, to meet the made-in-America standards and expedite construction of new chargers, states and companies warned in comments to the Department of Transportation. The new rules would allow Tesla to keep its unique connectors, but it will have to add a permanently attached CCS connector or adapter that charges a CCS-compliant vehicle, similar to a gas pump that has a separate handle for gas versus diesel. Tesla told the DOT that the plan was 'aggressive' and 'could lead to a shortfall in the number of compliant charging stations available given the pace and scale of deployment,' records show." (Jarrett Renshaw and Hyunjoo Jin, "New Biden EV Charger Rules Stress Made In America, Force Tesla Changes," Reuters, 2/15/23)

HIGH CARBON FOOTPRINTS FROM EVS

Due To Production And Manufacturing Methods, Electric Vehicles Produce High Levels Of CO2 Which Dampen Their Environmental Impact

According To *Reuters*, A Mid-Sized Electric Vehicle Produces More Than 8.1 Million Grams Of Carbon Dioxide Before It Reaches The Market Due To Its Production Method And Materials Used

Energy Systems Analyst Explained That Electric Vehicles Generate More Carbon Than Combustion Engine Cars Due To The Extraction And Processing Of Minerals In EV Batteries And Power Cells. "Jarod Cory Kelly, principal energy systems analyst at Argonne, said making EVs generates more carbon than combustion engine cars, mainly due to the extraction and processing of minerals in EV batteries and production of the power cells." (Paul Lienert, "Analysis: When do electric vehicles become cleaner than gasoline cars?," *Reuters*, 7/7/21)

The Reuters Analysis Showed That The Production Of A Mid-Sized EV Generated More Than 8.1 Million Grams Of Carbon Dioxide Before It Reaches Its First Customer. "The

Reuters analysis showed that the production of a mid-sized EV saloon generates 47 grams of carbon dioxide (CO_2) per mile during the extraction and production process, or more than 8.1 million grams before it reaches the first customer." (Paul Lienert, "Analysis: When do electric vehicles become cleaner than gasoline cars?," *Reuters*, 7/7/21)

According To The Massachusetts Institute Of Technology Energy Initiative, The Battery And Fuel Production For An Electric Vehicle Generate Higher Emissions Than Manufacturing A Traditional Automobile. "Electricity grids in most of the world are still powered by fossil fuels such as coal or oil, and EVs depend on that energy to get charged. Separately, EV battery production remains an energy-intensive process. A study from the Massachusetts Institute of Technology Energy Initiative found that the battery and fuel production for an EV generates higher emissions than the manufacturing of an automobile." (Saheli Roy Choudhury, "Are Electric Cars 'Green'? The Answer Is Yes, But It's Complicated," CNBC, 7/26/21)

According To A Fellow At The Cambridge Centre For Environment, Energy And Natural Resource Governance, EVs Generate 30% To 40% Extra In Production Emissions. "EVs rely on rechargeable lithium-ion batteries to run. The process of making those batteries — from using mining raw materials like cobalt and lithium, to production in gigafactories and transportation — is energy-intensive, and one of the biggest sources of carbon emissions from EVs today, experts said. Gigafactories are facilities that produce EV batteries on a large scale. 'Producing electric vehicles leads to significantly more emissions than producing petrol cars. Depending on the country of production, that's between 30% to 40% extra in production emissions, which is mostly from the battery production,' said Florian Knobloch, a fellow at the Cambridge Centre for Environment, Energy and Natural Resource Governance." (Saheli Roy Choudhury, "Are Electric Cars 'Green'? The Answer Is Yes, But It's Complicated," CNBC, 7/26/21)

Electric Vehicles Are Estimated To Require Traveling At Least 13,500 Miles Before They Are Doing Less Harm To The Environment Than A Traditional Car

In July 2021, Reuters Published An Analysis That Identified Needing To Drive A Tesla Model 3 13,500 Miles Before The Car Is Doing Less Harm To The Environment Than A Traditional Car. "You glide silently out of the Tesla (TSLA.O) showroom in your sleek new electric Model 3, satisfied you're looking great and doing your bit for the planet. But keep going - you'll have to drive another 13,500 miles (21,725 km) before you're doing less harm to the environment than a gas-guzzling saloon. That's the result of a Reuters analysis of data from a model that calculates the lifetime emissions of vehicles, a hotly debated issue that's taking center stage as governments around the world push for greener transport to meet climate targets." (Paul Lienert, "Analysis: When do electric vehicles become cleaner than gasoline cars?," *Reuters*, 7/7/21)

A Researcher At The University Of Liege Estimated That A Typical Electric Vehicle Would Need To Travel Between 67,000 And 151,000 Kilometers Before It Emitted Less Emissions Than A Traditional Car. "University of Liege researcher Damien Ernst said in 2019 that the typical EV would have to travel nearly 700,000 km before it emitted less CO_2 than a comparable gasoline vehicle. He later revised his figures down. Now, he estimates the break-even point could be between 67,000 km and 151,000 km. Ernst told Reuters he did not plan to change those findings, which were based on a different set of data and assumptions than in Argonne's model. Some other groups also continue to argue that EVs are not necessarily cleaner or greener than fossil-fueled cars." (Paul Lienert, "Analysis: When do electric vehicles become cleaner than gasoline cars?," Reuters, 7/7/21)

Electric Vehicles Are Reliant On Traditional Electricity, Such As Coal, Leading To Concerns About The Possibility Of Overloading Traditional Power Grids

Electric Vehicles Are Reliant On Traditional Powers, Such As Coal, Leading Some Analysts To Be Concerned About The Possibility Of Overloading Traditional Power Grids. "One of the main critiques of B.E.V.s has centered on a reliance on coal to produce the electricity needed to power these vehicles, along with the emissions produced by battery production and the shortness of battery life. For example, a study conducted at the Leibniz Institute for Economic Research at the University of Munich, said that a Mercedes C220 diesel creates less greenhouse gas emissions than does a Tesla Model 3. Michael Kelly, professor emeritus of engineering at Cambridge University, argued that the need to charge electric vehicles would overload the electric grid and could lead to power cuts in Britain. He also believes the world does not have enough raw materials to make the large quantities of batteries needed." (Eric A Taub, "E.V.s Start With a Bigger Carbon Footprint. But That Doesn't Last.," *The New York Times*, 11/7/22)

BIDEN ADMINISTRATION EV MANDATES

The Biden Administration Has Supported Mandates Pushing For Two-Thirds Of New Cars To Be Electric By 2032

In April 2023, The Biden Administration Announced A Goal Of Having 50 Percent Of All New Vehicle Sales Be Electric Vehicles By 2030

In April 2023, The Biden Administration Announced A Goal Of Having 50 Percent Of All New Vehicle Sales Be Electric Vehicles By 2030. "As part of President Biden's goal of having 50 percent of all new vehicle sales be electric by 2030, the White House is announcing public and private commitments to support America's historic transition to electric vehicles (EV) under the EV Acceleration Challenge. These commitments are part of President Biden's Investing in America agenda to spur domestic manufacturing, strengthen supply chains, boost U.S. competitiveness and create good-paying jobs. Because of President Biden's leadership and historic investments, electric vehicle sales have tripled and the number of publicly available charging ports has grown by over 40 percent since he took office. There are now more than three million EVs on the road and over 135,000 public EV chargers across the country." ("FACT SHEET: Biden-Harris Administration Announces New Private and Public Sector Investments for Affordable Electric Vehicles," The White House, 4/17/23)

To Support This Transition, The Biden Administration Has Used The Inflation Reduction Act To Expand Tax Credits For Electric Vehicles And Worked To Increase The Number Of Electric Car Chargers Available Publicly. "President Biden's Inflation Reduction Act adds and expands tax credits for purchases of new and used EVs—helping bring the benefits of clean energy to communities across the nation. The law also provides incentives to electrify heavy-duty vehicles like school buses, and includes support for the installation of residential, commercial, and municipal EV charging infrastructure. These incentives complement investments from the Bipartisan Infrastructure Law and other federal initiatives that are spurring the domestic manufacturing of EVs and batteries and the development of a national EV charging network that provides access to low income and disadvantaged communities." ("FACT SHEET: Biden-Harris Administration Announces New Private and Public Sector Investments for Affordable Electric Vehicles," The White House, 4/17/23)

In April 2023, The Environmental Protection Agency Outlined Regulations To Ensure That Two-Thirds Of New Passenger Cars And A Quarter Of Heavy Trucks Are All-Electric By 2032

In April 2023, The Environmental Protection Agency Outlined Regulations To Ensure That Two-Thirds Of New Passenger Cars And A Quarter Of Heavy Trucks Are All-Electric By 2032. "Aggressive rules proposed by the Biden administration to drastically speed up the country's transition to electric vehicles, and significantly cut the auto pollution that is dangerously heating the planet, face several economic, logistical and legal challenges. The plans, outlined Wednesday by the Environmental Protection Agency, are designed to ensure that two-thirds of new passenger cars and a quarter of new heavy trucks sold in the United States are all-electric by 2032. If enacted as proposed, the regulations would mean a quantum leap for the auto industry in the United States, where just 5.8 percent of new cars and less than 2 percent of trucks sold last year were all-electric." (Coral Davenport and Neal E Boudette, "Biden Plans An Electric Vehicle Revolution. Now, The Hard Part," *The New York Times*, 4/13/23)

The EPA Proposed Regulations Limiting Greenhouse Gas Emissions Which Would Require Automakers To Produce At Least 60% Of New Vehicles To Be All Electric By 2030 and 67% Be All Electric By 2032. "Q. What is the EPA proposing? A. The proposed tailpipe pollution limits don't require a specific number of electric vehicles to be sold every year but instead mandate limits on greenhouse gas emissions. Depending on how automakers comply, the EPA projects that at least 60% of new passenger vehicles sold in the U.S. would be electric by 2030 and up to 67% by 2032. For slightly larger, medium-duty trucks, the EPA projects 46% of new vehicle sales will be EVs in 2032." ("White House Proposes Strict New Auto Emission Limits To Boost Electric Vehicle Sales," CBS News, 4/12/23)

In June 2023, The Biden Administration Reinforced This Pledge To Increase Electric Vehicle Accessibility As Part Of Their Path To Net-Zero Emissions By 2050

In June 2023, The Biden Administration Reinforced This Pledge To Increase Electric Vehicle Accessibility As Part Of Their Path To Net-Zero Emissions By 2050. "Through his Investing in America Agenda, President Biden is building the economy from the middle out and bottom up, creating American-made products in American factories with American workers and positioning the United States as a leader in the clean energy economy. President Biden understands that to compete and win the 21st century global economy, strengthen the American auto industry, and tackle the climate crisis, we must build a convenient and reliable network of made-in-America electric vehicle (EV) chargers along America's highways and throughout all our communities, especially underserved and overburdened communities. That's why President Biden set the country on a path to achieve net-zero emissions by 2050 and advance an industrial strategy that will continue to build out the domestic EV and EV charging industry – all while creating good-paying union manufacturing and installation jobs on the way." ("FACT SHEET: Biden-Harris Administration Driving Forward on Convenient, Reliable, Made-in-America National Network of Electric Vehicle Chargers," The White House, 6/27/23)