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Full Charge: The Economics of Building a National EV Charging Network

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The President's modern American industrial strategy seeks to address market failures that prevent the U.S. economy from serving the nation's economic and national security needs, including by building a clean energy economy. Transportation accounts for the largest share of U.S. greenhouse gas emissions (about a third), with most transportation emissions coming from light-duty vehicles—the cars, small trucks, and vans that many of us drive. Meeting the President's goal of net zero emissions by 2050 will require large-scale adoption of electric vehicles (EVs), which can produce fewer—or zero—emissions.

The U.S. consumer market for EVs is rapidly growing. In the third quarter of 2023, EV and hybrid sales amounted to 18 percent of U.S. light duty vehicle sales; over the year, Americans bought one million fully electric vehicles, a new record. President Biden is supporting this growing demand by setting ambitious goals for accelerating the EV transition through his Investing in America agenda. Through the Inflation Reduction Act, he has worked with Congress to lower the price of new and used EVs by thousands of dollars and to incentivize American EV and battery manufacturing, attracting more than $152 *billion* of investment into the sector since taking office.

Market research indicates that overall consumer satisfaction with electric vehicles is very high. In fact, 80 percent of EV owners are likely to buy an EV again based on ease of charging at home, driving enjoyment, vehicle quality and reliability, and the low cost of ownership. Still, survey data reveal that lack of public charging availability is one of the main reasons causing people not to consider an EV for their next vehicle purchase. Other related issues include concerns about how far EVs can drive on a charge, about whether

chargers will be available and working, and about the amount of time it takes to charge. Economic research indicates that investing in an extensive EV charging network that supports a variety of EV models is a relatively cost-effective way to overcome the market failures limiting EV adoption. To this end, the President has invested $7.5 billion from his Bipartisan Infrastructure Law towards building a national network of EV chargers.

The Administration's approach to public investment in EV charging provides a case study for how Bidenomics is delivering for Americans by making smart public investments that attract private sector investment, supporting fair competition, and encouraging a domestic industry that supports good, union jobs.

Making Strategic Public Investments

The root of the charging network challenge is a classic market failure: the "which comes first" ("chicken or egg") problem. On one hand, consumers are wary of buying EVs without enough charging infrastructure to support them, limiting demand. On the other hand, firms are reluctant to invest in charging infrastructure without enough EVs to support that investment, limiting supply. Even though empirical research shows that there are increasing returns and positive feedback loops with respect to both EV demand and EV charger investment, no single market actor has sufficient incentive to build out a national charging network at a pace that meets our climate goals. For this reason, according to one analysis, public investment in EV chargers is a cost-effective way to increase EV adoption. Research on Norway's EV incentives suggests that policies that increase access to charging stations may be among the best policies to increase EV sales.

President Biden's Investing in America agenda is making public investments to harness the benefits that come from a strong network of EV chargers. President Biden has committed to building a national network of at least 500,000 public chargers by 2030. To this end, the Bipartisan Infrastructure Law invests $7.5 billion in EV charging, $5 billion of which is for building a "backbone" of high-speed chargers spaced no less than every 50 miles along America's major roads, freeways, and interstates through the National Electric Vehicle Infrastructure (NEVI) program. The remaining $2.5 billion is for competitive grants to states and localities to fill gaps along charging corridors and to provide convenient, accessible charging where people live,

work, and shop through the Charging and Fueling Infrastructure (CFI) program. The President also secured a tax credit in the Inflation Reduction Act to make it more affordable for individuals and businesses to install chargers for personal, employee, commercial, or customer use.

Implementation is already underway. All 50 states plus Puerto Rico and the District of Columbia have developed detailed plans for building the necessary infrastructure in their jurisdictions, and many states have begun issuing proposals or awarded contracts for installing NEVI-funded chargers. Ohio has now announced the opening of the first charging station funded through the NEVI program, Vermont, Pennsylvania, and Maine have broken ground on new stations, and additional activity is expected in several other states in the coming weeks.

Supporting Fair Competition

President Biden has implemented proactive policies to ensure that the future U.S. EV charging market is competitive and fair. A problem with the current EV charging network is that there are multiple types of chargers and plugs in use, meaning that certain chargers work only with specific EV models. As a result, EV owners cannot tap into the full network of public chargers that already exists. A recent analysis found that between 2011 and 2015, consumers suffered a loss valued at $400 million due to the lack of a common charging standard. Since 2015 the loss has likely only grown in magnitude, as the EV and charging markets have continued to expand without resolution of the incompatibility.

To tackle this problem, the Biden-Harris Administration established minimum standards for all EV chargers funded through certain federal programs, which also make sure that these standards embody the best technologies. These minimum standards for the NEVI and CFI programs require fast charging stations to support the widely-used Combined Charging System, while providing flexibility for chargers to support the Tesla-developed North American Charging Standard, which is rapidly increasing in popularity. The Administration's minimum charging standards also require charging pricing to be transparent and for chargers be available and working when people need them.

To help ensure that chargers are reliable while creating good jobs for American workers, electricians who install and maintain chargers must be certified through the Electric Vehicle Infrastructure Training Program. Through the Administration's Infrastructure Talent Pipeline Challenge, the International Brotherhood of Electrical Workers has already trained about 20,000 individuals to install EV chargers across the country.

Crowding in Private Investment and Creating Good Jobs

The Bipartisan Infrastructure Law provides a down payment on establishing a nationwide EV charging network. It is designed to incentivize private investment in combination with the Inflation Reduction Act's tax credits.

A recent study from the National Renewable Energy Lab estimated that in order to meet anticipated charging needs by 2030, a cumulative investment of between $31 and $55 billion for about 1.2 million publicly accessible charging units will be required (on top of about 28 million home charging units). As of March 2023, more than $25 billion had already been announced, putting the United States well on track to meet these investment needs. Additionally, seven major automakers announced a new cooperative effort earlier this year to build 30,000 new chargers starting next summer, drastically increasing the total number of public EV chargers (Figure 1). As of December 2023, the United States has more than 165,000 public charging ports—since the start of the Biden Administration, the number of publicly available fast charging ports has increased by more than 70 percent.

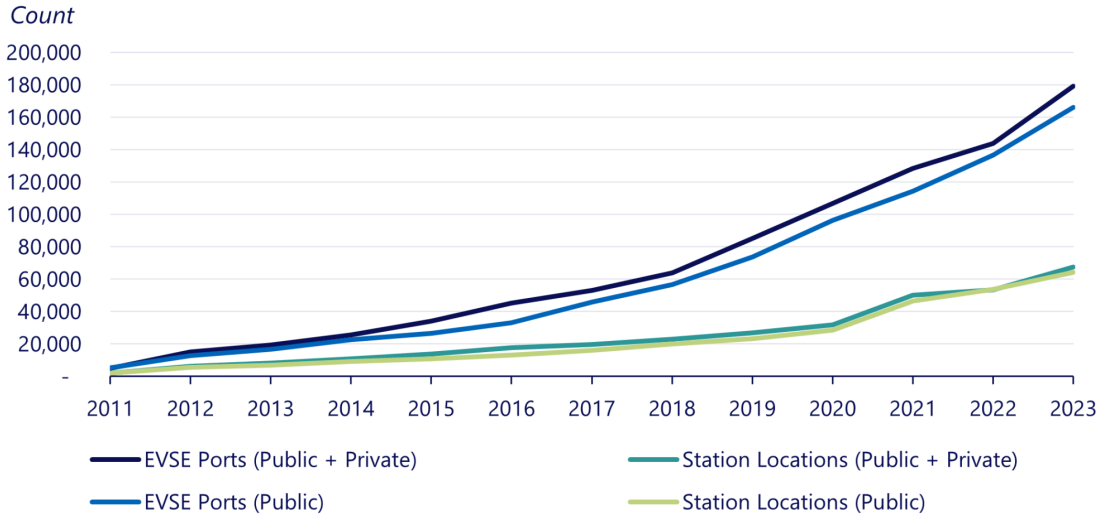
All charging infrastructure eligible for Bipartisan Infrastructure Law grants must be manufactured in America, using domestically produced iron and steel. Starting in July 2024, chargers funded by federal money will also need to source the majority of their components from American manufacturers. Phasing in these requirements over a limited time both accelerates growth of American manufacturing capacity for these chargers and gives manufacturers reasonable time to reorient supply chains and construct needed facilities.

Just three years ago, there was almost no U.S.-based production of fast chargers; now there are at least 26 firms manufacturing these products within the United States. Since President Biden took office, at least 40 U.S.

based facilities to produce EV chargers have been announced or opened. As of September 2023, these facilities now have the capacity to produce more than a million charging stations each year—including 60,000 fast chargers.

These investments create good jobs in manufacturing for American workers and support the jobs of the additional 130,000 Americans who are already working in jobs related to EVs by building out charging capacity.

Figure 1. U.S. Electrical Vehicle Charging Infrastructure, 2011-2023



Source: Alternative Fuels Data Center
Note: Between 2011 and 2013, the electric vehicle charging station counts are an estimate of the number of geographic locations (i.e., station locations) based on the number of EVSE ports because station counts were not captured in these years.
As of December 2023

Conclusion

Publicly accessible EV chargers will play a key role in enabling the United States to meet its climate goals by accelerating consumer EV adoption. The benefits of these investments will be amplified by complementary investments through the Bipartisan Infrastructure Law and Inflation Reduction Act. For example, through the Bipartisan Infrastructure Law, the Administration is investing in establishing clean, modernized power grids across the country, while the Inflation Reduction Act gives the Department of Energy funds to move towards generating more electricity from clean sources. These investments will lower the emissions produced in order to generate a given amount of electricity. The tax incentives in the Inflation Reduction Act also lower the cost of purchasing an electric vehicle at the point-of-sale and facilitate the installation of personal EV chargers.

This approach—implementing a complementary set of investments to address market failures across an industry—is a case study of how President's economic strategy works for American businesses, consumers, and workers, by making smart investments that attract private sector investment, supporting high-quality jobs, and ensuring that markets are fair and competitive.