Northwest **Power** and **Conservation** Council

November 8, 2022

MEMORANDUM

TO: **Power Committee Members**

FROM: **Brian Dekiep; Senior Analyst Montana Office**

SUBJECT: **Inflation Reduction Act and Changes to EV Tax Credits and EV Infrastructure**

BACKGROUND:

This Power Committee item will cover many of the current issues regarding electric vehicles, chargers and recent legislation that is impacting all aspects of EV production and sales.

The Infrastructure Investment and Jobs Act (IIJA), passed and signed in the summer of 2021, (infrastructure bill), will increase federal spending on infrastructure by about $550 billion over the next decade. The bill also invests $7.5 billion to build out a national network of EV chargers in the United States referred to as the National Electric Vehicle Infrastructure (NEVI). The bill will provide funding for deployment of EV chargers along highway corridors to facilitate long-distance travel and within communities to provide convenient charging where people live, work, and shop. One of the major goals of NEVI is to provide a charging station every 50 miles along major highways and interstates. All states have received approval regarding the NEVI plans.

The Inflation Reduction Act (IRA) passed and signed this summer (2022) includes many incentives for EVs and batteries, however, it also changes the structure of electric vehicle tax credits. Those changes will phase in over the coming months and years and most of the credits are focused on bringing more EV and battery production to the US. Looking forward, only non-commercial EVs assembled in North America qualify for the credits. Critical materials need to be sourced and components need to be assembled in

countries not on the “countries of concern list.” The phase in times of various provisions has created a lot of confusion about which vehicles will qualify and when. Battery material and critical mineral sourcing guidelines are currently under development. Currently, some information is available and will be provided in the presentation as well as in a separate document.

The Department of Energy’s Alternative Fuels Data Center has released the list of vehicles with final assembly in North America. The IRS has also released information explaining section 30D of the Internal Revenue Code, which is the section that contains the EV tax credit. Some vehicles will not qualify for the EV tax credit once the IRS guidance is final, due to being above the $55K MSRP cap for cars and $80K MSRP cap for trucks. Income caps will also be put into place, for example, those earning over $150K ($225K head of household, $300K filing jointly) will not qualify. The new rule also eliminates the sale cap which removed the credit once sales exceeded 200k per model. Additional parts of the bill allow buyers to take advantage of the EV tax credit upfront at the point of sale but doesn’t go into place until 2024. The bill provides an $4,000 incentive for the purchase of used electric vehicles starting in 2023 as long as they meet specific criteria. The bill also allows for a written, binding contract that states EV buyers can take the old tax credit (August 2022) if they signed a purchase contract before the day the IRA was signed.

The IRA further creates a new commercial EV tax credit under new Internal Revenue Code section 45W. This credit is applicable for qualified commercial clean vehicles (EVs and fuel cell vehicles) for sales on or after January 1, 2023 and before January 1, 2033. Additionally, auto and battery manufacturers are eligible under the IRA and IIJA for tax credits and funding programs designed to encourage US manufacturing of clean energy technology. In total, the Infrastructure and Jobs Bill, the CHIPS and Science Act and the Inflation Reduction Act provide nearly $135 billion toward electric vehicle and battery manufacturing.

THE INFLATION REDUCTION ACT AND THE INFRASTRUCTURE INVESTMENT AND JOBS ACT:

UPDATE ON ELECTRIC VEHICLES AND BATTERIES

- Power Committee (P4) (NWPCC)
- Tuesday, November 15, 2022
- Portland Oregon
- Brian Dekiep; Montana office, Senior Energy Analyst

2022 Sales Q2

- About 440,000 EV sales, Q2 in 2022, 12.9% combined sales. 12.6% of the U.S. market.
- In Q2, BEV sales, 5.6% of the total market. Sales of hybrids and PHEV fall in Q2. The Jeep Wrangler 4xe was the top-selling plug-in hybrid
- Newly launched EV models accounted for almost 30,000 sales in Q2 2022. The Hyundai IONIQ is a fast-growing entry: Zero sales Q2 of 2021 to 7,448 sales in Q2 2022,
- Toyota leader in hybrid powertrains. Ford was the No. 2 hybrid seller, with 11.7% share.
- Electrified trucks are growing in sales.
- EV prices remain elevated, according to Kelley Blue Book, the average price for a new EV in June of 2022 was more than $66,000, well above the average and comparable to luxury auto prices.

2022 SALES Q3

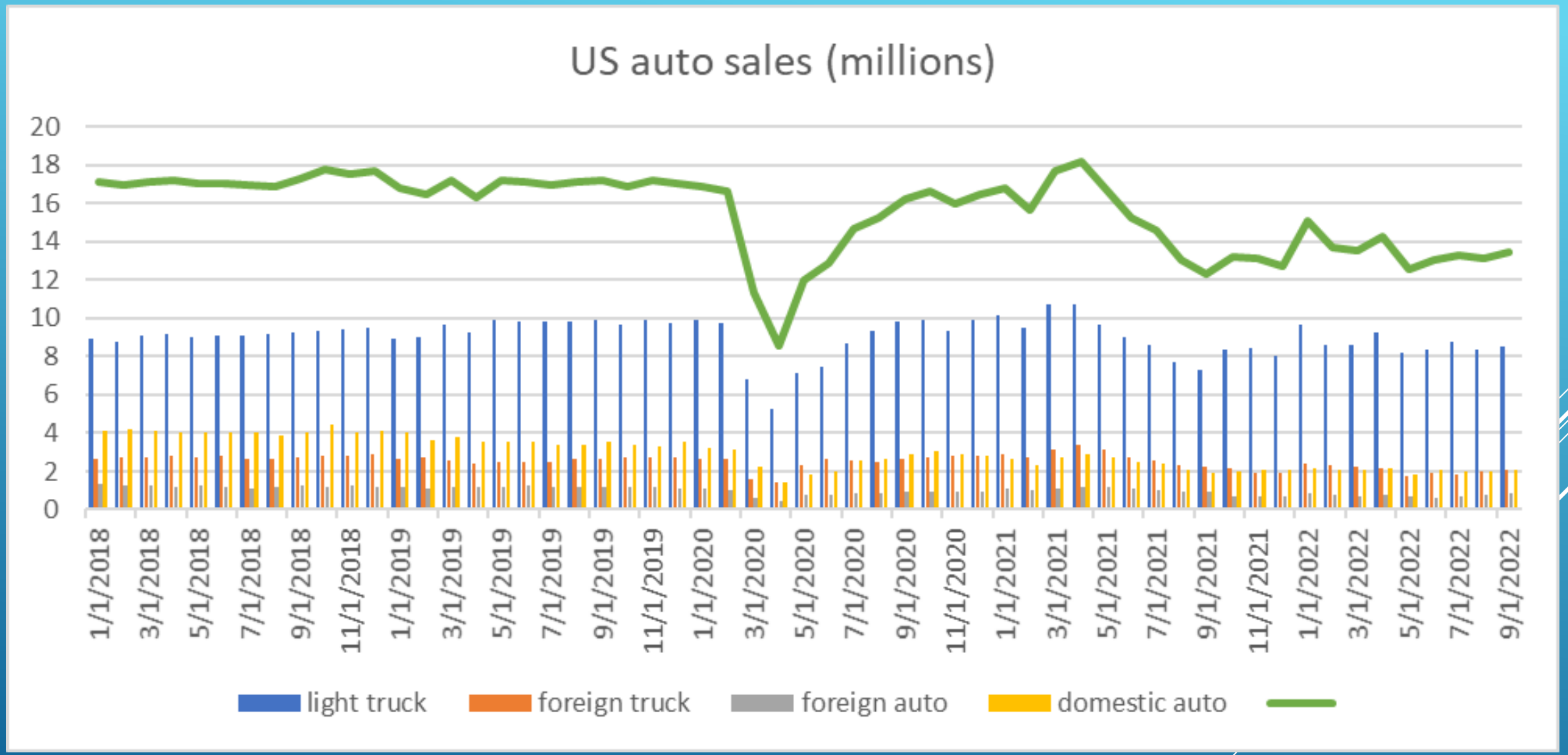
- 2022 looks to be the big year for Battery Electric Vehicles (BEV) sales in the US. In The third quarter of 2022, electric vehicle sales continued to outpace internal combustion vehicles (ICE), with a record of over 200,000 BEVs sold and over 206,000 Plug in Hybrid (PHEV) in the three months.

- Tesla remains the market leader in BEVs, with 64% of the share, down from 66% in Q2 and 75% in Q1. Sales of BEV vehicles are trending upward, declining sales of PHEV.

US Sales 2021 and 2022						
EV market	Q2 2021	Q3 2021	EOY 2021	Q2 2022	Q3 2022	Est EOY 2022
EV	118,000	123,000	487,460	197,000	205,800	791,469
HEV PHEV	273,000	245,450	969,407	245,000	206,000	887,704
Fuel Cell	1,070		2,140	796		1,592
Total Non ICE or Hybrid	392,070	368,450	1,459,007	442,796	411,800	1,680,765

https://mediaroom.kbb.com/

Source and notes : Doesn't include all EV sales or PHEV: https://cleantechnica.com/2022/10/13/fully-electric-vehicles-reached-6-of-auto-sales-in-usa-in-3rd-quarter/



https://alfred.stlouisfed.org/release?rid=93

Global EV Sales

- Consumers looking to buy EVs globally has hit 52%.

- Adoption continues to rise as global policy pressure grows, more electric car models become available, and consumer interest increases.

- Sales from 6.6 million in 2021 to 20.6 million in 2025. Predicted to be 23% of new passenger vehicle sales globally in 2025, up from just under 10% in 2021. Three-quarters of those will be fully electric.

- EV sales reached a record high in 2021, despite supply chain issues and the Covid-19 pandemic sales nearly doubled to 6.6 million in 2021, Global total number of EVs on the road to 16.5 million.

- The sales share of electric cars increased by 4 percentage points in 2021. EVs to represent over half of total vehicle production by 2030.

Supply Constraints and Critical Battery Materials:

- The IEA global EV outlook for 2022 states that over half the lithium, cobalt and graphite processing and refining capacity is located in China.
- The US has a small role with only 10% of the EV production and 7% of the battery capacity.
- Mining in resource rich countries like Australia, Chile, Russia and the Democratic Republic of Congo. Pressure to meet the supply of materials will be an issue as electrification expands.
- Significant investment is needed in mining space.
- Lithium iron phosphate does not require nickel or cobalt, less energy density and is more suitable for short range.
- New chemistries and recycling could further reduce the pressure on mining.

Vehicle types

Passenger vehicle are light-duty vehicles used to primarily transport passengers, with gross vehicle weight up to 3.5 tons . Commercial vehicle includes to cargo vans, trucks and buses.

BEV — A battery electric vehicle has an electric motor and is powered exclusively by the electricity stored in its battery, which can be recharged by plugging into an external electricity source.

ICE — An internal combustion engine vehicle has a traditional engine typically powered by gasoline or diesel.

MHEV — A mild hybrid electric vehicle is not a PEV as it cannot be recharged from external electricity sources. The electric motor only assists the primary power source, the internal combustion engine.

NEV — New energy vehicles is a term typically used in the Chinese market. It includes BEVs, PHEVs and vehicles powered by other non-hydrocarbon energy sources, such as hydrogen fuel cells.

PEV — Plug-in electric vehicles is an umbrella term that includes BEVs and PHEVs since batteries in both vehicle types can be recharged via an external electricity source.

PHEV — A plug-in hybrid electric vehicle has both an electric motor and an internal combustion engine fueled by gasoline or diesel, and can be powered by the electricity stored in its battery or by the hydrocarbon-based fuel. The battery can be recharged by plugging into an external electricity source.

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Battery chemistries

LFP — Lithium-iron-phosphate is used more today by PEV manufacturers in China than by their counterparts in Europe and North America. It has the advantages of chemical stability and less expensive battery raw materials but the disadvantage of lower energy density. Tesla Inc. and Volkswagen AG are leading the dissemination of the LFP cathode in their entry-level BEVs in ex-China markets.

LMFP — Lithium-manganese-iron-phosphate is a newer type of cathode chemistry. Manganese is added to the **LFP** chemistry to improve energy density while retaining LFP's advantages of safety and cost effectiveness.

LMNO — Lithium-manganese-nickel-oxide is a type of next-generation chemistry still under development. LMNO is cobalt-free and low in nickel content, and has the potential to deliver high energy density and fast charging properties.

LMO — Lithium-manganese-oxide is also a popular cathode chemistry for power tools as well as for **MHEVs**.

NCA — Nickel-cobalt-aluminum, developed by Panasonic Holdings Corp., was commercialized for use in long-range Tesla vehicles. The chemistry offers high energy density, fast-charging properties and a longer life span compared with **NMC** chemistries. More battery players, including Samsung SDI Co. Ltd., are introducing NCA cathodes.

NMC — Nickel-manganese-cobalt is the most popular cathode chemistry used in PEVs today. The NMC designation is followed by a series of three numbers, which represents the respective proportions of the constituent metals in the cathode (e.g. 811 is eight parts nickel to one part manganese to one part cobalt). Other popular combinations include 111, 532 and 622.

NMCA — Nickel-manganese-cobalt-aluminum is a newer cathode type with 90% nickel content and reduced cobalt content to deliver higher drive range at lower cost, and with added aluminum to improve stability and life cycle.

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Inflation Reduction Act Tax Credits

Summary of 30D Provisions

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
200,000 per man. cap	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
MSRP cap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Income cap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tax credit as rebate	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Final Assembly in North America	✓[1]	✓	✓	✓	✓	✓	✓	✓	✓	✓
Critical mineral % of value requirement[2] ($3,750 tax credit)	40%	50%	60%	70%	80%	80%	80%	80%	80%	80%
Critical minerals foreign entities of concern rule	—	—	✓	✓	✓	✓	✓	✓	✓	✓
Battery component % of value requirement[3] ($3,750 tax credit)	50%	60%	60%	70%	80%	90%	100%	100%	100%	100%
Battery component foreign entities of concern rule	—	✓	✓	✓	✓	✓	✓	✓	✓	✓
Maximum tax credit	$7500	$7500	$7500	$7500	$7500	$7500	$7500	$7500	$7500	$7500

1. Immediately following the date of enactment (i.e., 2022 and 2023)
2. Percentage of value of critical minerals mined or processed in the U.S. or FTA countries, or recycled in North America
3. Percentage of value of battery components manufactured or assembled in North America

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IRA Credits Continued

Effective January 1, 2023, EVs placed in service on or after this date are subject to AGI and MSRP caps:

- $150,000 (individual), $225,000 (head of household) or $300,000 (married joint return) are ineligible to claim the credit.
- Retail prices over $80,000 (sport utility vehicles, vans, or pickup trucks), or $55,000 (all other vehicles) are ineligible for the 30D credit.

Used EV Tax Credit

- Lesser of $4,000, or 30 percent of the sale price. ($13,333 x .3 = $4,000). The sales price is limited to $25,000. Only applies to first resale and restrictions between related parties.
- Must meet eligibility requirements in the section 30D credit for new clean vehicles and must be a model year that is at least 2 years earlier than the date of sale.
- AGI of $75,000 (individual), $112,500 (head of household) or ($150,000) (married joint return) are ineligible for the credit.
- Purchase from a dealership and cannot claim the credit more than once every 3 years. The credit is transferrable to the dealer.

Business credit for Commercial EVs

IRC section 45W, for qualified commercial clean vehicles (EVs and fuel cell vehicles) for sales on or after January 1, 2023 and before January 1, 2033.

- Credit of 30 % of the cost of the vehicle, up to $7,500 in the case of a vehicle that weighs less than 14,000 pounds, and up to $40,000 for all other vehicles.
- Credit no to exceed the amount by which the EV exceeds the cost of a comparable (otherwise comparable in size and use) internal combustion powered vehicle.
- A qualified commercial clean vehicle is any vehicle:
  - the original use of which commences with the taxpayer,
  - which is acquired for use or lease by the taxpayer and not for resale,
  - which is made by a qualified manufacturer, an auto OEM under title II of the Clean Air Act, and that files required sales reports with the Secretary of the Treasury
  - which is treated as a motor vehicle for purposes of title II of the Clean Air Act or mobile machinery
  - which is propelled to a significant extent by an electric motor which draws electricity from a battery which has a capacity of not less than 15 kilowatt hours (7 kilowatt hours for vehicles that weigh less than 14,000 pounds) and is capable of being recharged from an external source of electricity, or is a fuel cell vehicle based upon the requirements of Internal Revenue Code section 30B,
  - Subject to the allowance for depreciation.
  - Vehicles powered by an internal combustion engine in addition to an electric or fuel cell motor are eligible for a reduced credit of 15 percent.

EV and Battery Incentive's (manufacturing)

- Manufacturers are eligible under the IRA and IIJA for tax credits. Funding programs designed to encourage US manufacturing of clean energy technology.
- The Infrastructure and Jobs Bill, awards of $2.8 billion in grants for 20 companies to produce batteries for electric vehicles in the United States. The grants are being allocated through the Department of Energy with funds from the Infrastructure Law to companies in 12 states. Creation of battery-grade materials including lithium, graphite and nickel. Increasing manufacturing capacity of in the United States.
- In all, the Infrastructure Law, the CHIPS and Science Act and the Inflation Reduction Act allocated around $135 billion toward electric vehicle manufacturing.

Section 45X Advanced Manufacturing Tax Credit

- A production tax credit that was introduced with the IRA, the Section 45X Advanced Manufacturing Tax Credit, is a credit for manufacturers of eligible components produced by a taxpayer within the United States and sold to an unrelated party. Eligible components include among many others battery cells and modules.

- The tax credits are available to the taxpayer who manufacturers the equipment in the United States or a possession of the United States. Credits are available on an annual basis for eligible components sold beginning in 2023, going through 2032 (with a phaseout beginning in 2030).

- Qualified advance energy project are eligible of a 30% tax credit for project investment to reequip, expand or establish certain energy manufacturing facilities. Credits cannot be allocated to projects located in census tracts where projects have been previously allocated.
- Includes projects that reequip, expand, or establish a manufacturing or industrial facility for production of recycling of energy storage systems and components, electric or fuel cell vehicles and components, grip modernization equipment and components and more.
- Other, 30% credit for qualified projects, with restrictions Section 48C.

Charging Stations and NEVI

There are currently three primary types of EV charging stations in use:

- **Level 1** Lowest cost, a standard 110-volt outlet and typically used at home.

- **Level 2** Require a 220-volt outlet and are frequently in commercial settings and, increasingly, at home as well. Level 2 stations are much faster, adding 18-28 miles of range per hour and can fully charge an average EV in about 8 hours. **DC**

- **Fast Charging (DCFC)** stations are the highest-power, fastest-charging stations available and are typically found along major travel corridors. A 50 kW can add about 200 miles of range (a full tank for many EVs) in about an hour.

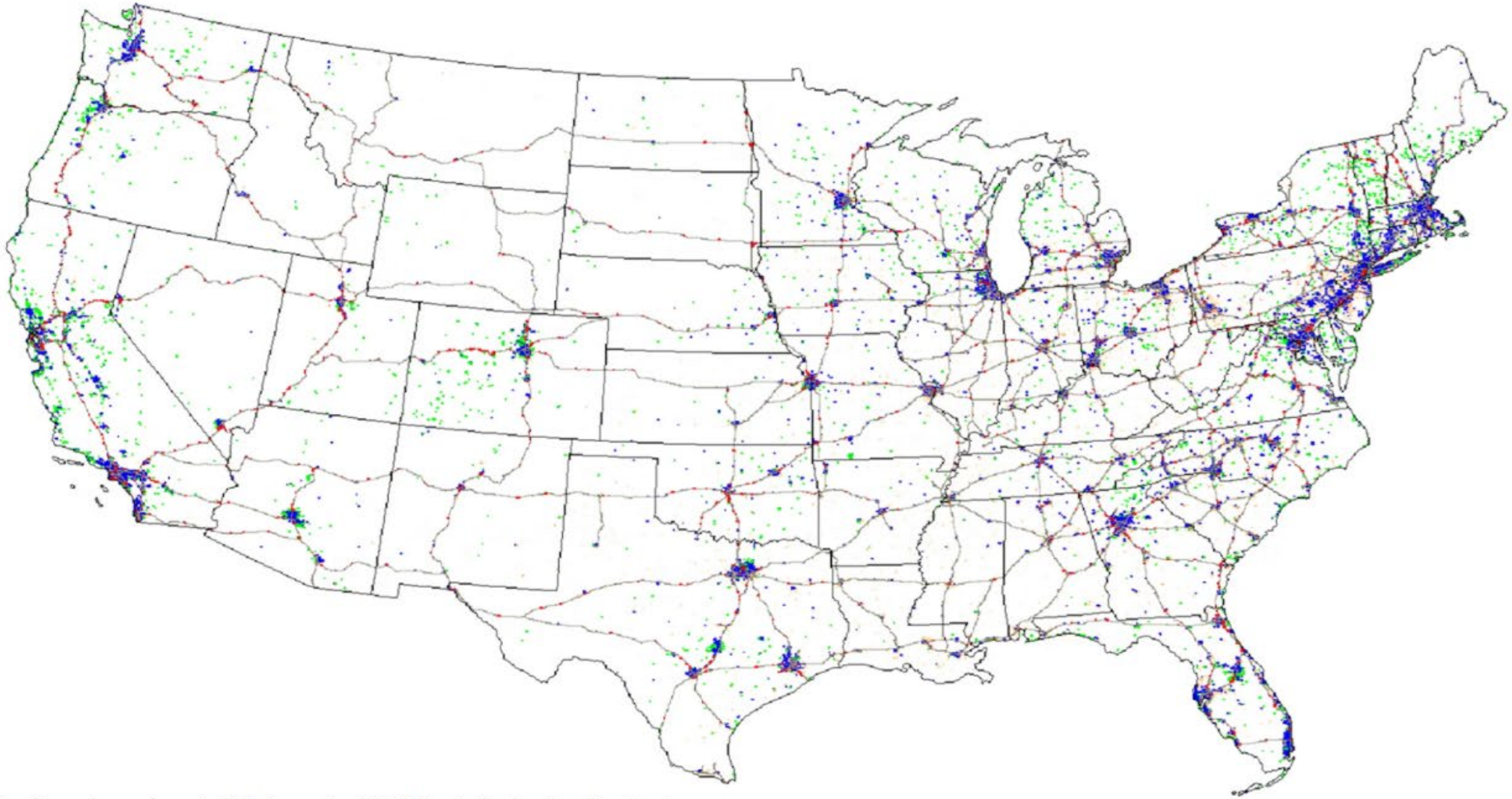
National Electric Vehicle Infrastructure (NEVI) Formula Program

- The November 2021, Infrastructure bill provides $7.5 billion to help with local and long-distance trips. $5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program and the $2.5 Discretionary Grant Program for Charging and Fueling Infrastructure.

- 50,000 EV charging stations currently in operation. Of these, 93% are publicly accessible, and 17% are on non-urban roads. A large share of direct current (DC) fast chargers are public (99%) and located on highways, reflecting the faster charging needs at these locations.

Alternative Fuels Data Center: Electric Vehicle Charging Station Locations (energy.gov)

EV charging stations in the contiguous United States, 2022



https://www.iea.org/reports/global-ev-outlook-2022/trends-in-charging-infrastructure

NEVI Formula Program

- 75,000 miles of U.S. roads and highways.. The federal government's EV and battery investments fit alongside over commitments. (GM; $35 b in EV-related spending from 2020 to 2025, Ford; $11.4 b across a similar time frame).

- The Federal Highway Administration has approved plans for all 50 states plus D.C. and Puerto Rico.

- Over five years to build EV charging stations every 50 miles along the federal highway system. The FHWA's approval unlocks $1.5 billion in NEVI funds through fiscal years 2022 and 2023

- Ten percent of the NEVI Formula Program that is set aside each fiscal year for the Secretary of Transportation to help fill gaps in the national network through discretionary grants.

- https://driveelectric.gov/state-plans/

Montana Plan:

- Year 1 Focus Areas/Quantitative Goal: In the first year, Montana will focus on filling large charging gaps with stations no more than 100 miles apart along Interstates 15 (I-15), 90 (I-90), and 94 (I-94). Approximately 10 new locations will be needed to fill these large gaps with spacing of no more than 100 miles.
- Year 2-5 Focus Areas: After large gaps along interstates are addressed, the State will prioritize locations that fill large charging gaps along US-2 and US-93 with stations no more than 100 miles apart. After stations are built out with spacing of no more than 100 miles, the State will prioritize locations spaced no more than 50 miles apart, as required by NEVI. Gateway communities to national parks and recreation/tourism destinations will also be a priority for investment.

Idaho Plan:

- The Baseline Plan establishes the goals and framework for EV deployment by establishing a vision, goals and setting targets for implementation.
- The second phase of the Baseline Plan (October 2022 – August 2023) consists of a Siting, Feasibility and Access (Study) to provide detailed analysis of electric vehicle charging deployment and administrative options. Oregon, Washington, Montana, Wyoming and Utah have completed studies and have sufficient data and detail to move forward with charging station deployment. Phase 3, pilot NEVI stations and larger deployment.

Oregon:

- With FY22 funding ODOT aims to build out I-5, US 97, and I-205. I-5 is critical, high-traffic routes, and US 97 is a key route through central Oregon, carries high volumes to both urban and rural areas. I-205 serves high traffic volumes in the Portland metropolitan area and travels through or adjacent to numerous DACs.
- FY23 will focus on I-84, I-82, and US 20, high volume routes for east-west travel. I-84 provides service to numerous DACs and accommodates a high proportion of long-distance trips. I-82 connects directly with I-84 and enhances connectivity with Washington. US 20 is a strategic freight corridor.
- FY24 anticipates build out of US 26, US 101, and I-405.

Washington:

- $71 m from this program over five years, along with a 20 percent non-federal match of $17.75 m.
- Identify investments in fast charging along the state's AFCs) beginning with interstates.
- The priorities are north/south and east/ west interstates, I-5 and I-90, to federal standards. Secondary priorities include completing the I-82/I-182 and US 395 AFCs followed by US 101 and US 195.
- State funding of Direct Current fast chargers will supplement corridors that may not receive federal funding in the initial years of NEVI funding.