U.S. Electric Vehicle Manufacturing Investments and Jobs

Characterizing the Impacts of the Inflation Reduction Act after 2 Years

August 2024

Environmental Defense Fund

wsp

This report summarizes the significant private investments in the electric vehicle (EV) ecosystem that have been announced over the past 9 years. This includes announced investments in manufacturing EVs, EV components, EV batteries, EV battery components, and EV battery recycling. This is the fourth iteration of this report with earlier versions of the report issued every six months since March 2023.

Key Takeaways – August 2024

- **Investment**. Over the last 9 years, manufacturers have announced $199 billion in concrete investment in U.S. EV and EV battery manufacturing facilities. Federal policies have dramatically expanded and accelerated these investments: 63 percent of announced EV investments have occurred in the last 2 years since passage of the Inflation Reduction Act (IRA) and 83 percent have occurred in the last 33 months since passage of the Bipartisan Infrastructure Law (BIL).

- **Jobs**. Supported by these investments, over the last 9 years, manufacturers have announced 201,900 new U.S. EV-related jobs. Federal investments and incentives that are specifically designed to onshore the EV manufacturing supply chain have likewise substantially expanded and accelerated new job announcements. Of all the EV jobs announced since 2015, 54 percent are represented by announcements occurring in the last 2 years (since the passage of the IRA) and 75 percent are represented by announcements occurring in the last 33 months since the passage of the BIL. Announced EV and battery manufacturing could also generate up to 931,000 additional jobs in indirect/secondary employment.

- **States**. 10 states account for 84 percent of announced EV manufacturing investments. Georgia has over $31 billion in investment supporting 39,400 jobs. Michigan and North Carolina have seen over $21 billion and $19 billion in investment, respectively, supporting 35,400 created and retained jobs in both states combined.

- **Production Capacity.** In 2027, U.S. EV manufacturing facilities will be capable of producing approximately 5.8 million new electric vehicles annually (which represents 36 percent of new vehicles sold in the U.S. 2023). In 2028, U.S. battery manufacturing facilities will be capable of producing 1,164 Gigawatt hours (GWh) of EV batteries, sufficient to supply 13.2 million new electric passenger vehicles each year, 83 percent of vehicles sold last year.

- **Continuing Growth.** U.S. investments, jobs, and production capacity will likely continue to grow in response to strong federal investments and incentives. Global EV and battery manufacturers have announced aggressive and sustained investment needs worldwide to support the EV transition over the next decade. While many have not yet specified where those investments will occur, current investment data demonstrates that the IRA has made the U.S. a highly attractive market for EV ecosphere manufacturing facilities.

- **Additional Policies.** Each new investment announcement represents an opportunity to set a strong standard for what high-quality, community-sustaining jobs in the clean economy can look like. Policymakers and granting agency staff should work with employers, labor, and community-based organizations to maximize the benefits of onshoring the EV manufacturing supply chain for the workers who comprise it, and for the communities where new investments are being made.

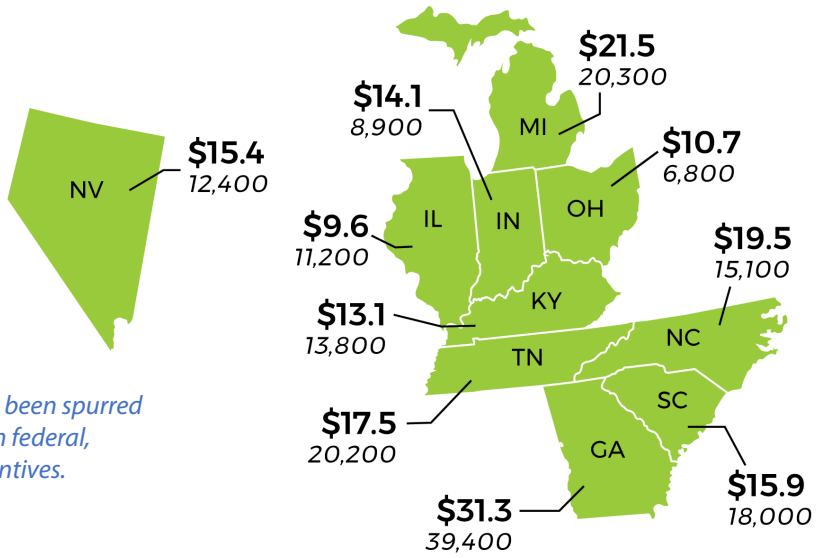
Announced EV, EV Battery, Battery Component, and Battery Recycling Investment & Employment

January 2015 - July 2024

Manufacturing	Investment	Announced New Jobs
Passenger vehicles	$51.6 billion	72,500
Medium- and heavy-duty vehicles	$6.5 billion	12,200
EV components	$4.7 billion	10,100
EV batteries	$105.4 billion	87,000
EV battery components	$25.6 billion	18,100
EV battery recycling	$5.6 billion	1,900
Total	**$199.4 billion**	**201,900**

84% of Announced Investment is in 10 States

$ Billions of Investment
Number of new jobs

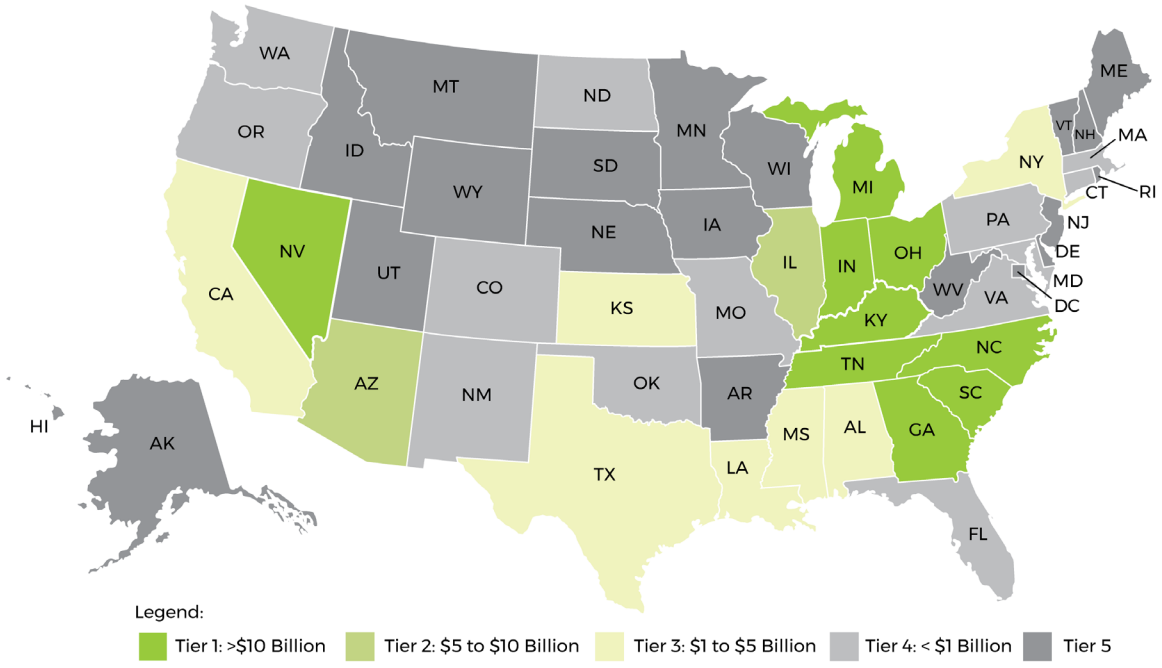


Investment has also been spurred by over $29 billion in federal, state, and local incentives.

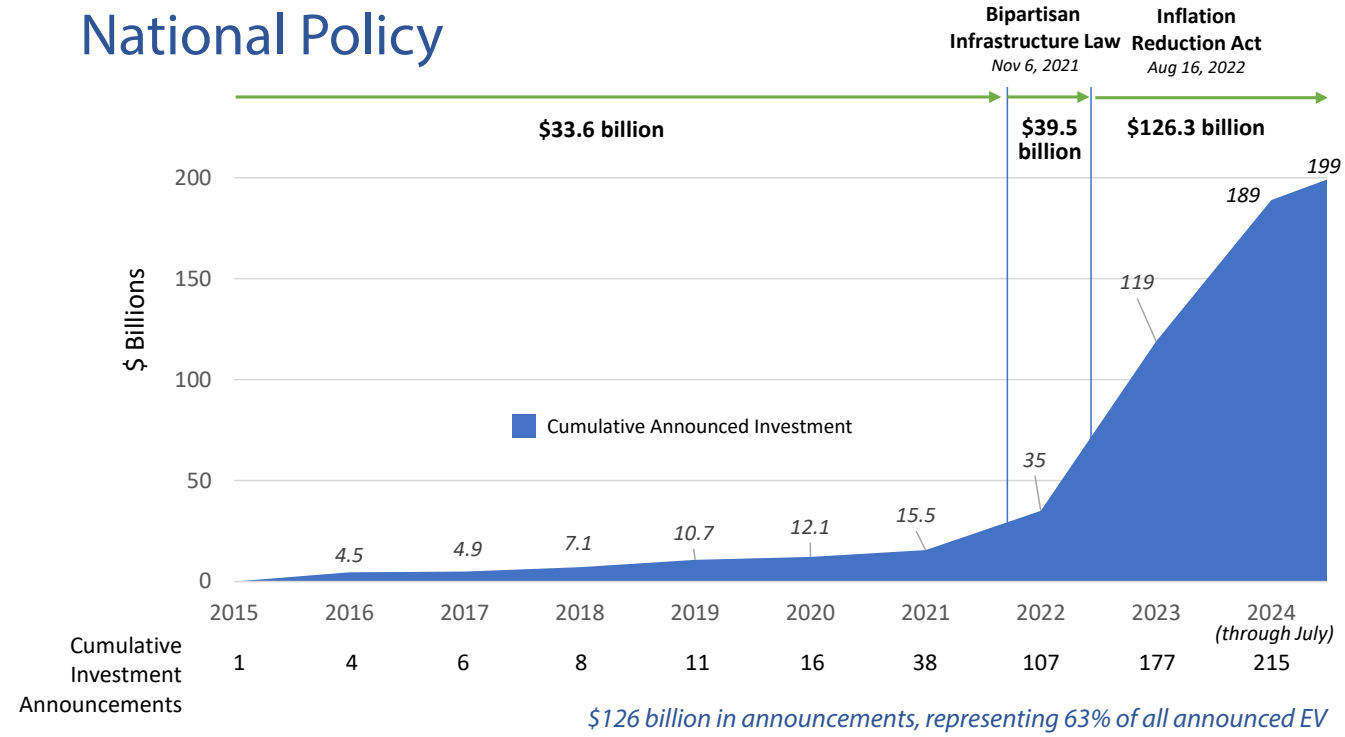
State	Total Announced Investment *($ billions)*
Georgia	$31.3
Michigan	$21.5
North Carolina	$19.5
Tennessee	$17.5
South Carolina	$15.9
Nevada	$15.4
Indiana	$14.1
Kentucky	$13.1
Ohio	$10.7
Illinois	$9.6
Other	$30.8
Total	**$199.4**

Announced EV Ecosystem Investment

- 215 distinct manufacturing investments announced at 179 project sites in the past 9 years
- $199 billion in private investment announced
- These investments will result in 201,900 new jobs, and could generate up to 931,000 addition jobs in secondary employment[1]



EV Investment is Spurred by National Policy



$126 billion in announcements, representing 63% of all announced EV investments, have occurred in the 24 months since the passage of the IRA.

[1]Climate Nexus; Job Impacts from the Shift to Electric Cars and Trucks and Nevada Governor's Office of Economic Development; Economic Impact of Tesla Gigafactory on Washoe and Storey Counties

Environmental Defense Fund

Massive investments in new EV plants are nearing completion

The EV transition is bringing massive investments in new production facilities to communities across the U.S.

- Ford is on schedule to open BlueOval City in western **Tennessee**. The plant will build electric pickups and batteries. Ford will start training employees next year for planned 2026 production.
- Ford is also building two battery plants in central **Kentucky**.
- Combined, these three projects will:
  - create almost 11,000 new jobs
  - bring $11.4 billion of investments to the two states
  - annually produce 129 GWh of batteries – enough to power 1.3 million passenger vehicles.

EV manufacturing hubs bring suppliers and jobs to communities

For example, Hyundai broke ground on a $7.6 billion EV and battery plant, Metaplant America, near **Savannah, Georgia** in 2022. Hyundai will begin manufacturing the IONIQ5 there this fall. When complete, the facility will create 8,500 full-time jobs.

Metaplant, in turn, has attracted at least 17 offsite suppliers to Georgia, who have invested more than $2.7 billion and almost 7,000 additional job so far. They include:

- Seohan Auto Georgia, a components plant in **Midway, Georgia**. It is expected to create 180 jobs when it opens later this year.
- Ajin Georgia, a $317 million stamped metal facility in **Register, Georgia** which opened in July.

EV manufacturing breathes new life into existing plants

In July, the U.S. Department of Energy announced $1.7 billion "to support the conversion of 11 shuttered or at-risk auto manufacturing and assembly facilities across eight states...to manufacture electric vehicles and their supply chain."

- General Motors, which received a $500 million grant, is converting its Grand River Assembly Plant in **Lansing, Michigan** to produce new electric models, retaining more than 650 jobs plus creating 50 new jobs –all unionized. Together with the UAW, GM will help train workers at the plant for the new skills needed to manufacture EVs.

The jobs retained at facilities are not included in the new job estimates in this report. This represents a conservative estimate of EV related jobs in the U.S.

Investments in EV trucks and buses are rising

Three of the major manufacturers of heavy-duty vehicles and engines – Daimler Trucks, PACCAR, and Cummins – broke ground in June on Amplify Cell Technologies, an advanced EV battery manufacturing plant in **Marshall County, Mississippi**. The joint venture expects to:

- Start production of batteries for EV trucks and buses in 2027 creating more than 2,000 jobs.
- Deliver 21 gigawatt hours of batteries every year – enough to power 120,000 delivery vans.
- Create more than 2,000 U.S. manufacturing jobs.

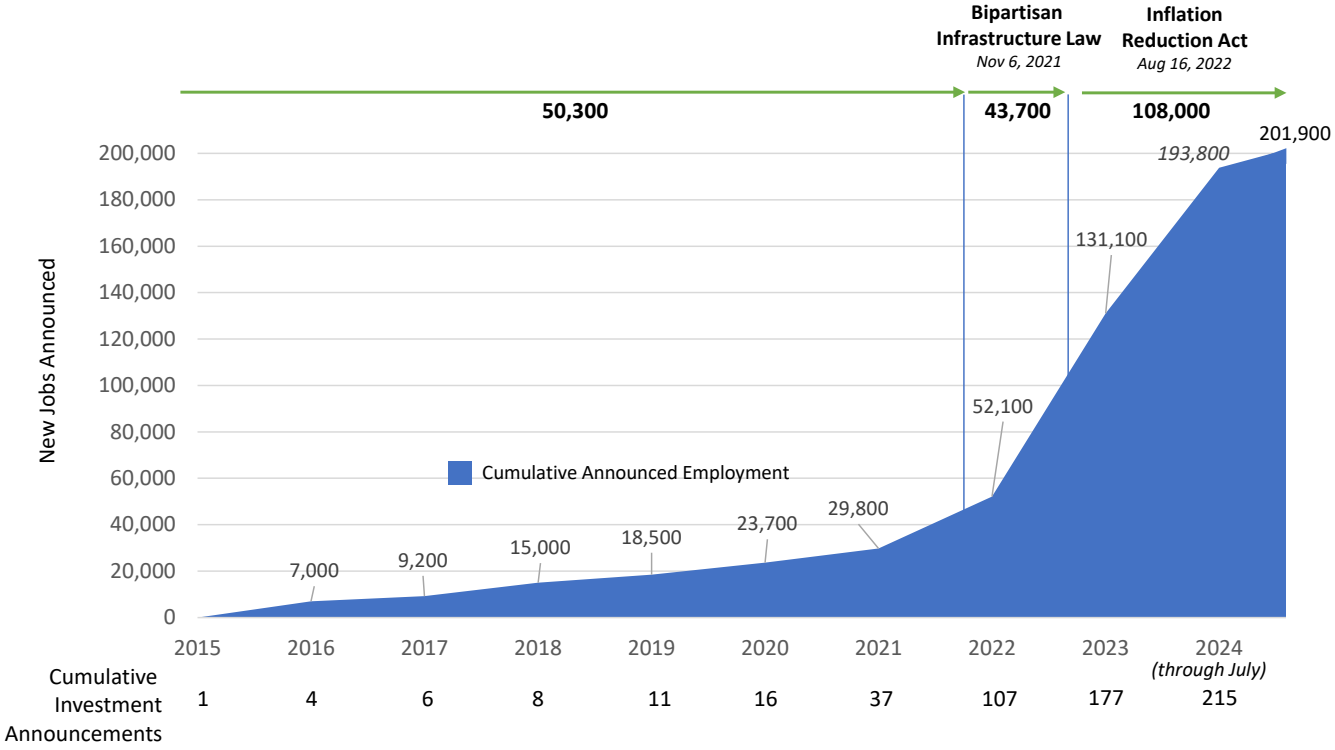
Facilities are building the next generation of battery technology

Batteries are getting cheaper, lighter, and made from materials that are easier to source.

- The $3.2 billion **Queen Creek, Arizona** LG Energy Solutions EV battery plant will make larger 46-Series cylindrical batteries at scale with better energy density and output than current models starting next year.
- In **Colorado**, two facilities, Solid Power and Amprius Technologies are making solid state and silicon anode batteries, respectively. Combined, these bring an investment of $250 million and more than 500 jobs. Both represent exciting advances in battery tech.

New EV Job Announcements Accelerated by National Policy

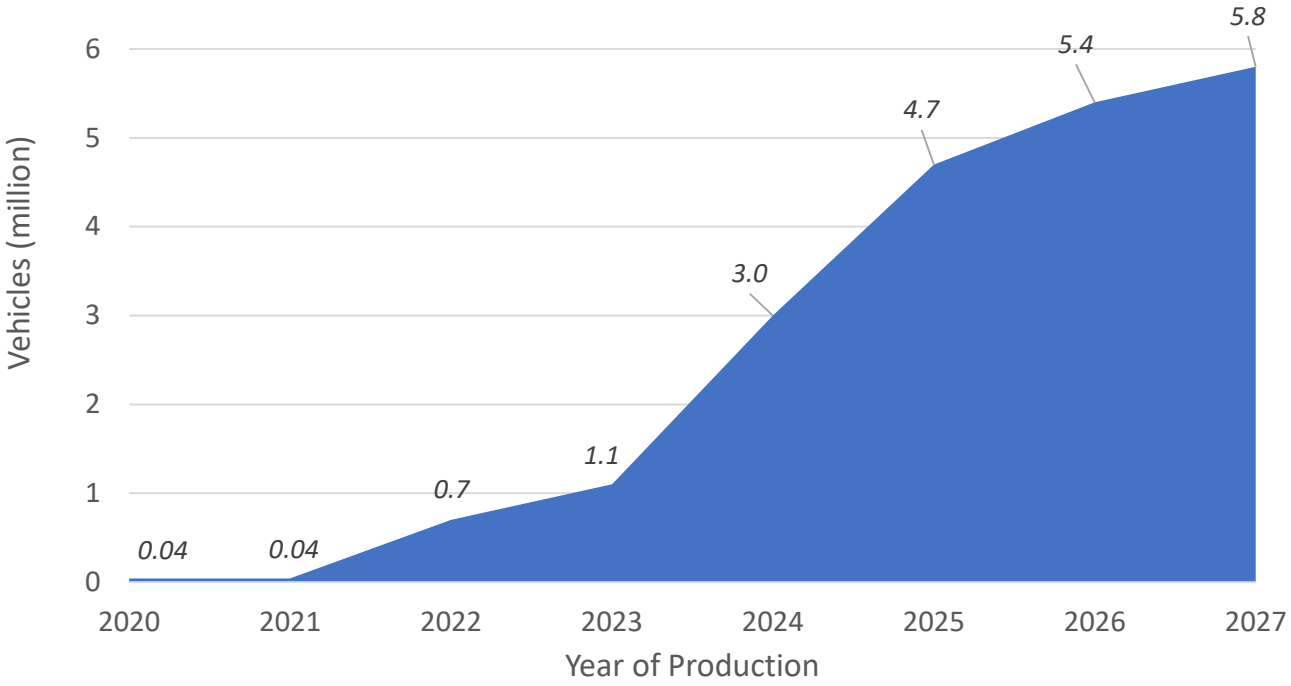
108,000 announced new jobs, representing nearly 54% of all EV job announcements, have occurred in the last 24 months since the passage of the IRA.



State	Announced New Jobs
Georgia	39,400
Michigan	20,300
Tennessee	20,200
South Carolina	18,000
North Carolina	15,100
Kentucky	13,800
Nevada	12,400
Illinois	11,200
Arizona	9,700
Indiana	8,900
Other	32,900
Total	**201,900**

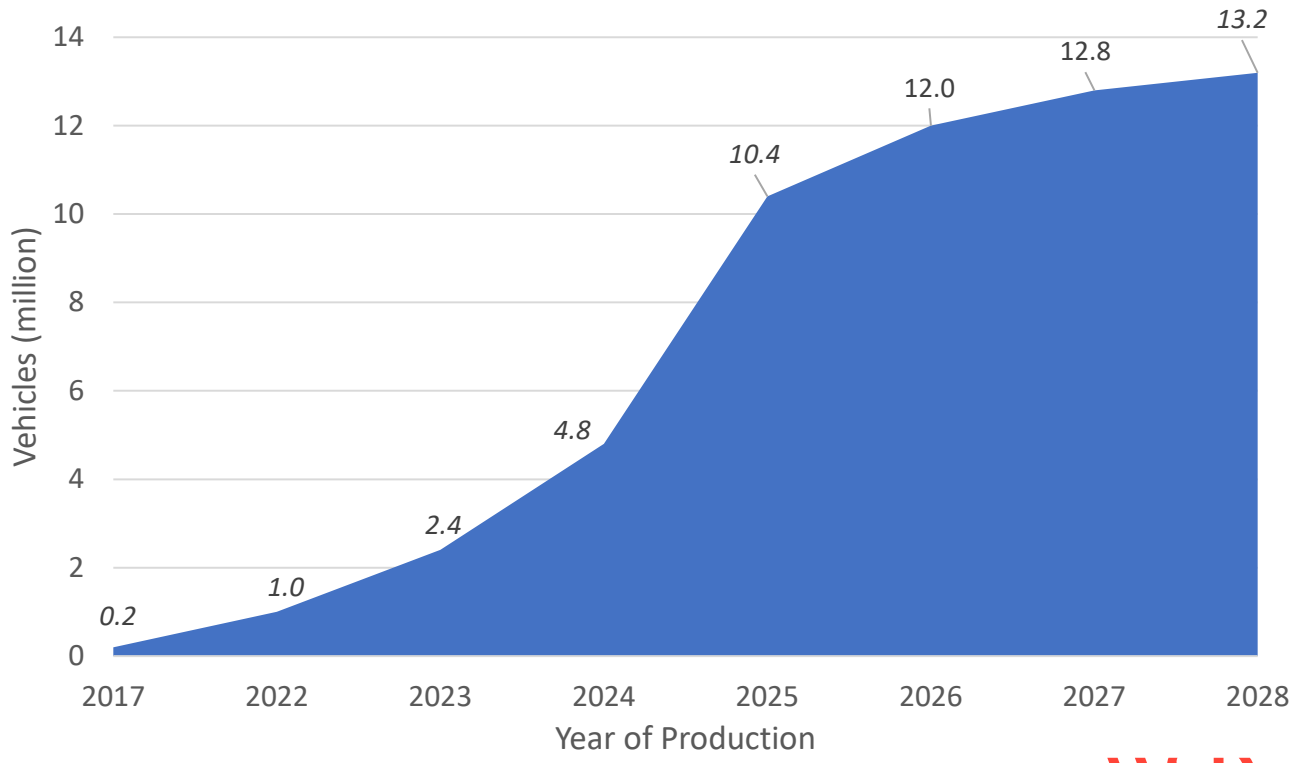
Total EV Manufacturing Capacity

U.S. EV manufacturing facilities will be capable of producing approximately 5.8 million new light-, medium-, and heavy-duty electric vehicles each year in 2027, which represents approximately 36 percent of all vehicles sold in the U.S. in 2023.



Battery Manufacturing Capacity

By 2028, U.S. battery manufacturing facilities will be capable of producing 1,1,64 GWh of EV battery capacity, enough capacity to power 13.2 million passenger vehicles, 83 percent of the vehicles sold in the U.S. in 2023.



Methodology

This report summarizes private investments made or announced within the past 9 years in the U.S. electric vehicle (EV) ecosphere. This includes investments in the manufacturing of EVs, EV batteries, and EV battery components. The research builds from previous work contained in the Environmental Defense Fund's (EDF's) August 2022 document, Electric Vehicle Market Update: Manufacturer Commitments & Public Policy Initiatives Supporting Electric Mobility in the U.S. & Worldwide. The research also builds off of the first three iterations of this report, which were issued in March 2023, August 2023, and March 2024.

The underlying data was collected through a review and compilation of U.S. investment announcements conducted by WSP in 2023 and 2024 as well as review clean energy investment lists other organizations have produced such as the Blue Green Alliance, the Department of Energy, and Environmental Entrepreneurs. The research team reviewed announcements released by investors, state and local governments, industry publications and local media, to capture the following data for each project:

- Company name and nationality
- Investment type (EV assembly plant – passenger cars and medium/heavy-duty vehicles, Battery manufacturing plant, Battery component plant, Battery recycling plant), EV component plan and EV motorcycle manufacturing plant
- Location (City, State)
- Announced investment value ($ billions)
- Facility production capacity (vehicles/year, Gigawatt-hours/year, tons/year)
- Announced facility employment (number of jobs when facility is at full production)
- Announcement date
- Schedule (construction begins, production begins)
- Local Incentives value ($ billions) and description
- Federal Incentives value ($ billions) and description

The research team identified a total of 215 individual investment announcements at approximately 180 project sites. Thirty-one of these investment announcements have been added since the release of the March 2024 iteration of this report. For 25 of the projects included in the March 2024 version of this report, changes have since been announced to timelines for construction or operation, and/or announced changes (plus and minus) to investment value, capacity, or employment. This update captures these announced changes to the 25 prior projects.

The data set only includes projects with announced investment levels or jobs announced and known construction start or completion dates. If an investment was announced, but no corroborating information could be found that the project is moving forward, it was excluded from the data set. In all, the research identified 36 projects announced prior to the passage of the BIL on November 6, 2021; 26 projects announced after passage of the BIL and before adoption of the IRA, and 153 projects announced in the past 2 years since the enactment of the IRA.

For announcements involving the retooling of existing vehicle assembly plants to support the production of EVs, the number of employees reflects new jobs but not retained jobs at the facilities. If there is a specific number of existing jobs that will support EV production, those are included. However, the majority of investment announcements does not include specific information on retained jobs. In addition to direct employment figures, this iteration of the U.S. EV Manufacturing Investments and Jobs analysis also includes estimates of indirect and induced employment. Indirect jobs are generated to produce the goods and services needed by workers with direct jobs. Induced jobs involve employment created by the additional personal spending of both direct and indirect workers. We have applied the following multipliers to direct employment figures to calculate induced and indirect employment:

- EV manufacturing: +7 jobs for each direct job (Climate Nexus Job Impacts from the Shift to Electric Cars and Trucks)
- EV batteries, battery components, EV component: + 2.5 jobs for each direct job (Nevada Governor's Office of Economic Development; Economic Impact of Tesla Gigafactory on Washoe and Storey Counties)

Using these multipliers, indicates that the announced direct investments in the EV vehicle and battery manufacturing ecosphere could generate as many as 931,000 new induced and indirect jobs.

Not all parameters of interest were necessarily available for all projects in the dataset. The research team developed average values announced for each investment type for: investment level, employment, capacity, and construction time. In cases where certain parameters were unknown for a given project, the research team used the average values to calculate the missing information. Similarly, for projects for which production start date is unknown, the project team estimated a production start date based on the construction start date and the average construction duration for similar projects for which both construction start and production start dates are known. The total values for cumulative production and jobs by year shown in this report include these estimates. Of the $199.4 billion in total investment, 99% are announced investment levels, the remaining 1% has been calculated. Of the cumulative 201,900 EV ecosystem jobs announced between 2015 and July 31, 2024, 92% are announced jobs, with the remainder estimated jobs. Of the 5.8 million in annual EV manufacturing capacity expected online in 2027 (both passenger and medium/heavy-duty vehicles), 71% is announced capacity and the remainder is estimated capacity. Of the 13.2 million in annual EV battery manufacturing capacity expected online in 2028, 85% is announced capacity and the remainder is estimated capacity.

It should be noted that the battery manufacturing capacity is reported in terms of the approximate number of light duty vehicles that the batteries could power, for consistency. Battery manufacturing capacity values were available in gigawatt-hours for most of the projects, which were converted into vehicles using a factor of 89 kWh per EV battery for a light-duty vehicle. This is the average of the values used by the U.S. Department of Energy Office of Energy Efficiency, Vehicle Technologies Office (77 – 100 kWh/EV) to estimate 2030 North American EV battery production capacity in Fact of the Week #1271, published January 2, 2023. This figure is larger than the current size of most EV batteries, so the resulting battery production figures can be considered conservative. Given the variety of measures used to quantify the production of battery component plants, this information was noted, but not included in the quantitative analysis.