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Quantifying then Employment Effects of Policies to Promote Electric Vehicles

Prepared For:
Energy and the Economy: Opportunities and Challenges of the Energy Transition
Federal Reserve Bank of Kansas City & Federal Reserve Bank of Dallas

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Agenda for Today

1. Project Overview
2. Overview of National-Level Methodology
3. National-Level Results
4. Follow-Up State-Level Analysis

1. Project Overview

Keybridge is a boutique consulting firm based in Washington, D.C. We work with clients across a range of macroeconomic and public policy areas including in the government, private sector, and NGOs.

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Keybridge is a boutique economic and public policy consulting firm. Founded in 2001, Keybridge's mission is to be a highly trusted source of analysis and advice on issues at the forefront of public policy economics. Keybridge staff serve as economists, policy experts, and strategic advisers to a diverse clientele that includes Fortune 500 companies, global financial firms, leading trade associations, non-profit organizations, federal government agencies, and other institutions that operate at the intersection of economics and public policy.

Recently, we were hired by SAFE to model the employment impacts of various policy proposals to accelerate the shift to electric vehicles with a particular focus on bolstering U.S. manufacturing.

Securing America's Future Energy

Electrification Coalition

2. Overview of National-Level Methodology

We used the IMPLAN model to estimate employment impacts of the policy proposals given to us. IMPLAN calculates the economic impacts of spending shocks based off BEA industry data.

Our approach – IMPLAN economic model:

- Static macro model estimates shocks using BEA Input-Output data
- Input increase demand for products/government spending
- Outputs economic impacts (e.g., jobs, value-add, etc.)

IMPLAN

Policy Proposal Topics

Light-duty EV incentives and regulations

Medium and heavy-duty EV incentives

Transportation manufacturing grants and tax incentives

Electric charging and storage infrastructure

We used some general guiding principles to form the basis of our modeling assumptions. In total, we built out models for 29 policies across the four proposal topics.

Resulting Assumptions

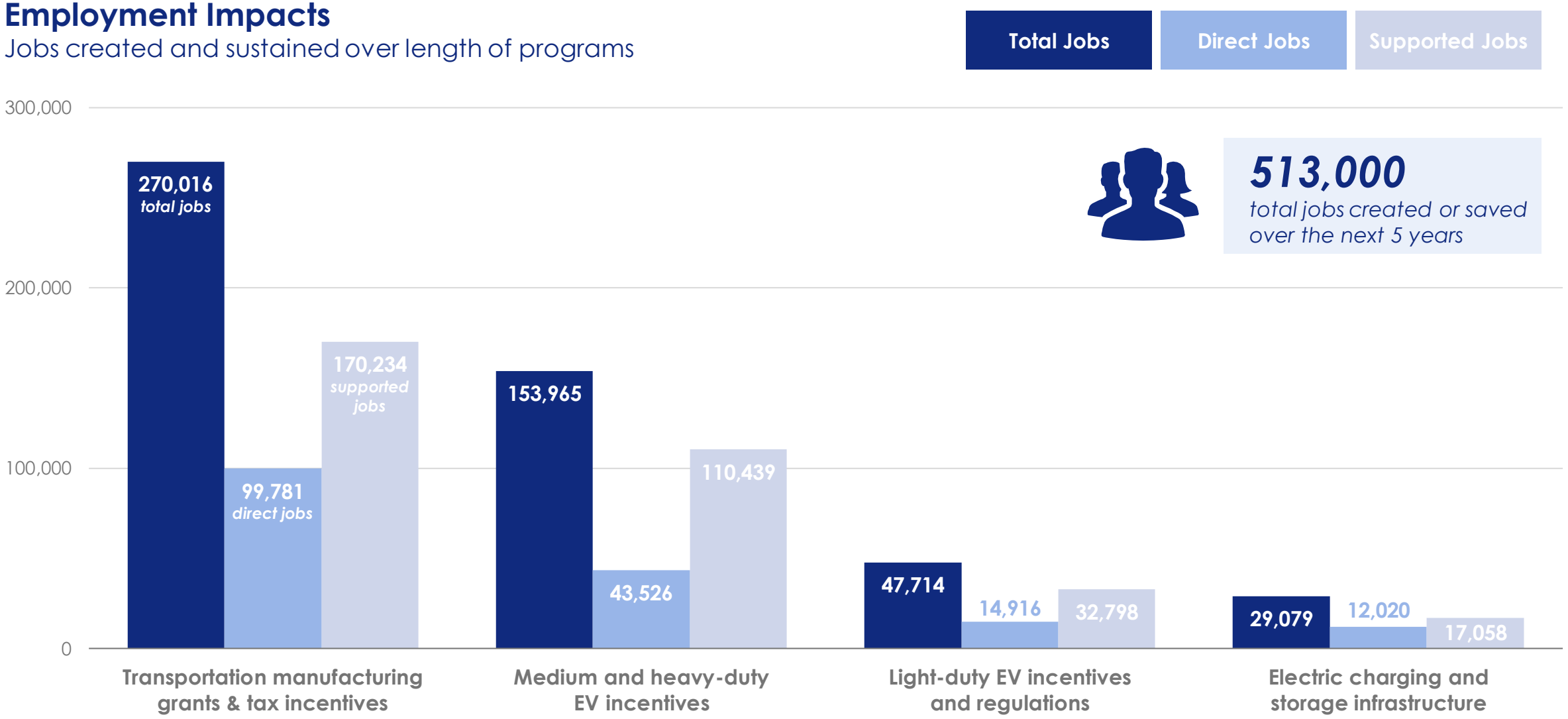
- Lifetime impacts not considered
  - *Long-run savings on EVs, impacts on spare parts manufacturers and dealers, oil & gas sector*
- Increase in EV manufacturing → decrease in ICE manufacturing
- For some policies, higher domestic content share than IMPLAN defaults
- EV price premium over ICE
  - *ICE: $32,000 per vehicle*
  - *EV: $43,111 per vehicle*
- EVs modeled as 1/3 battery, 2/3 vehicle
- Focus on increasing battery range → constant battery cost

3. National-Level Results

Overall, the four EV-related policy proposals were projected to create or sustain 513,000 jobs over the five-year modeling period. The manufacturing incentive policies had the largest employment impacts.

Employment Impacts

Jobs created and sustained over length of programs



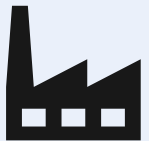
Some of the more interesting proposals we modeled included consumer EV incentives and grants to retool EV manufacturing facilities. Both employment and industry impacts were noteworthy.

Reform 30D Light Duty EV Tax Credit

- **Policy:** Reform and extend $7,500 tax credit
- **Cost:** $6 billion over 3 years
- **Direct Jobs:** 14,900
- **Total Jobs:** 47,700
- **Industry Impacts:** Additional 285,000 EVs sold per year

Advanced Tech. Vehicle Manufacturing (ATVM) Grants

- **Policy:** Fund EV facility investments via DOE
- **Cost:** $10 billion over 5 years
- **Direct Jobs:** 37,700
- **Total Jobs:** 101,050
- **Industry Impacts:** Funds 13 facilities at average of $750 million



Diesel Emissions Reductions Act (DERA)

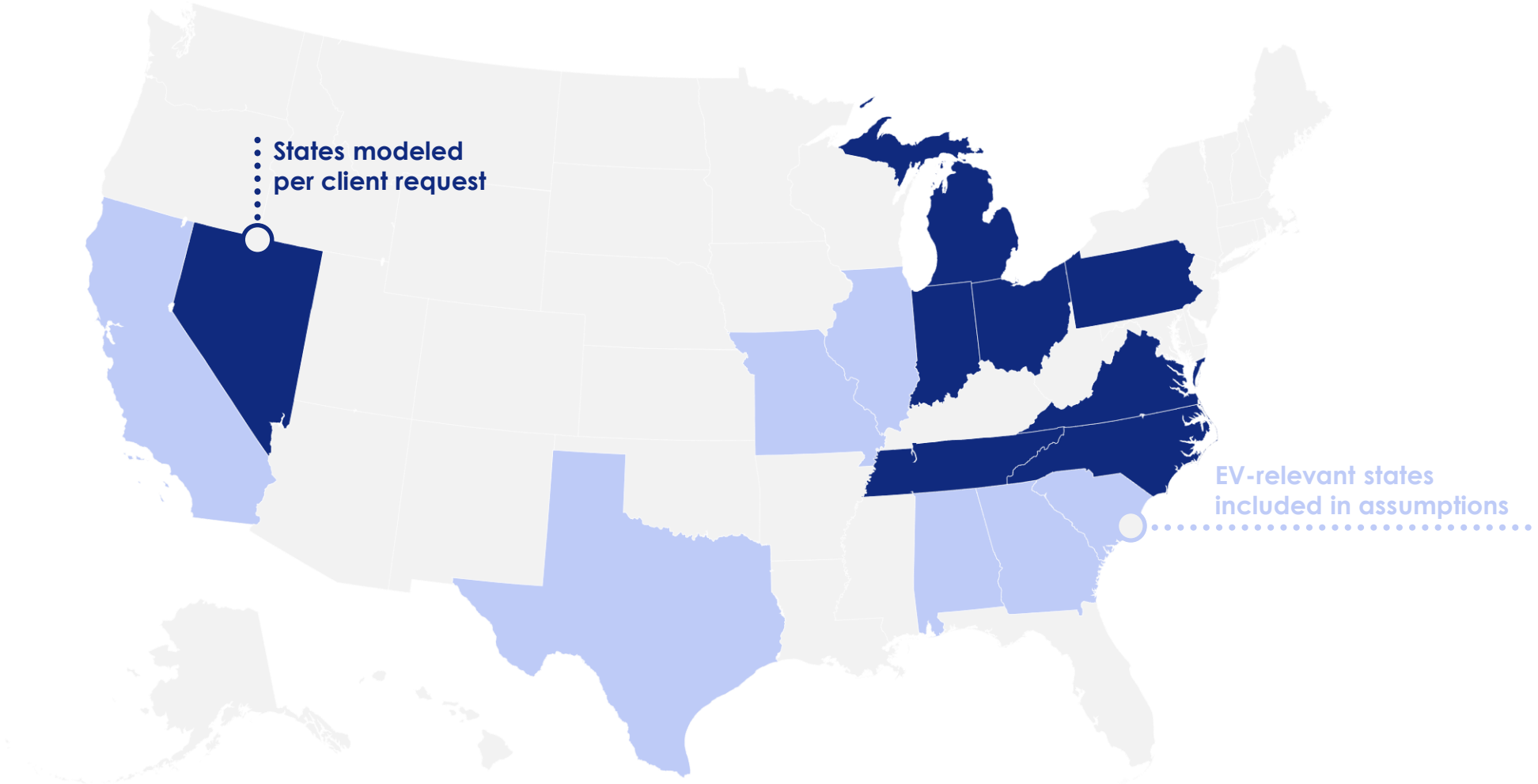
- **Policy:** Replace diesel school buses w/ AFVs
- **Cost:** $12.5 billion over 5 years
- **Direct Jobs:** 14,900
- **Total Jobs:** 59,600
- **Industry Impacts:** Additional 38,500 AFV buses per year

EV Charger Incentives

- **Policy:** Grants & tax incentives to expand EV charging infrastructure
- **Cost:** $5.75 billion over 5 years
- **Direct Jobs:** 10,200
- **Total Jobs:** 24,900
- **Industry Impacts:** Additional 1.1 million charging ports thru 2024

4. Follow-Up State-Level Analysis

Following the national level analysis, SAFE wanted further modeling estimates at the state-level, requesting eight states. The state-level analysis took a slightly different methodological approach.



To determine state-level impacts, we took a top-down approach. We began with a series of national level assumptions to estimate the level of investment necessary given future estimates of EV demand.

High-Level Assumptions

1. *Estimated 2025 EV market share / battery demand*
2. *Researched existing EV / battery production facilities & standardized*
3. *Calculated total investment necessary to meet 2025 demand*
4. *Subtracted out announced EV investment*

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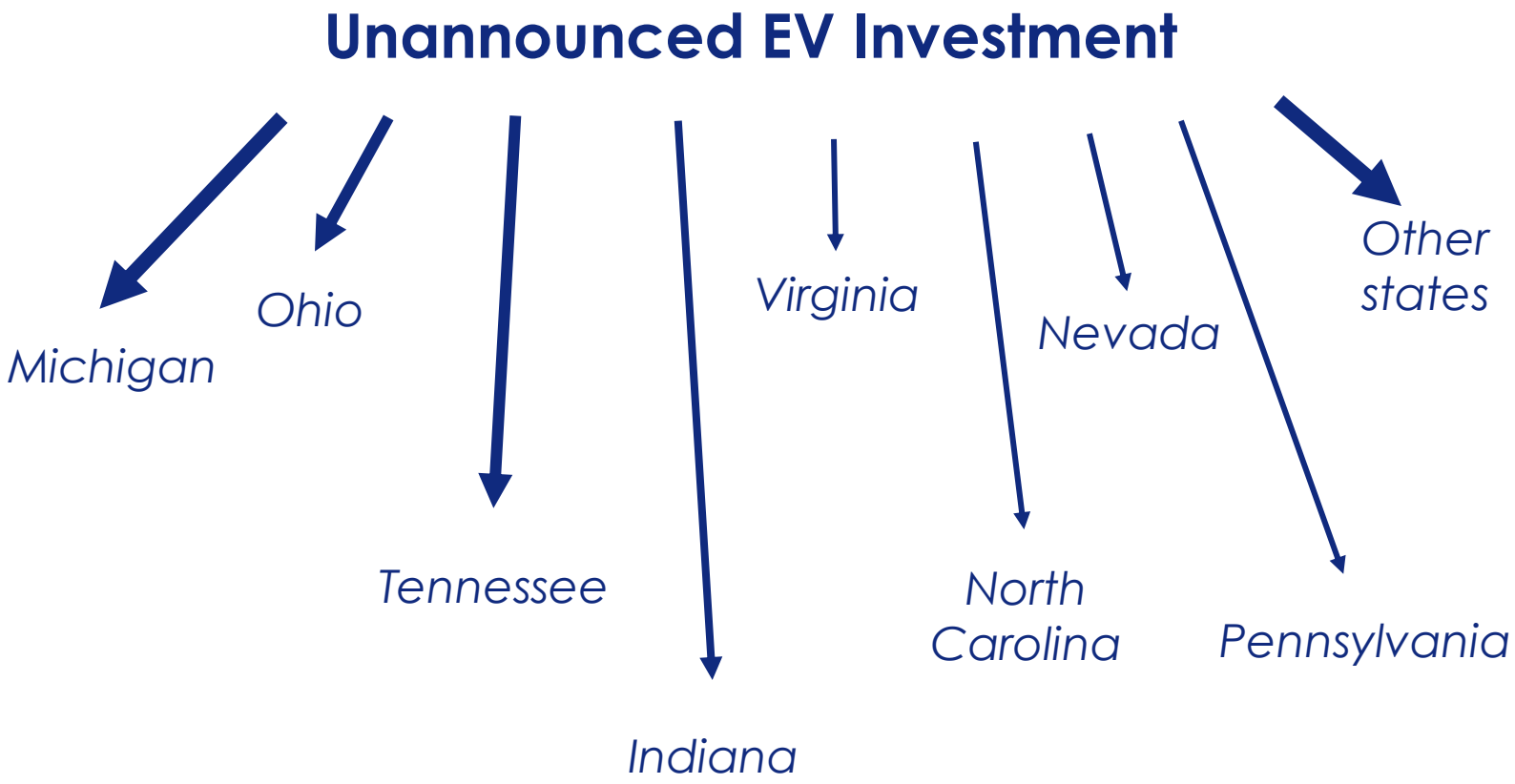
5. ***Estimate of additional, unannounced EV investment necessary***

Assumption	Moderate EV Scenario	Aggressive EV Scenario
EV Market Share in U.S.	**10%**	
Domestic Battery Production and EV Production Rate	**75%**	**90%**
Total Investment Necessary (Billions)	**$27.2**	**$34.6**
Announced EV Investment	*$18.8*	*$18.8*
Unannounced Additional EV Investment Necessary	*$8.4*	*$15.8*

We then took these high-level estimates and devised simple algorithms to allocate investment spending in the various states. State-level spending was then input in the model to estimate job impacts.

State-Level Assumptions



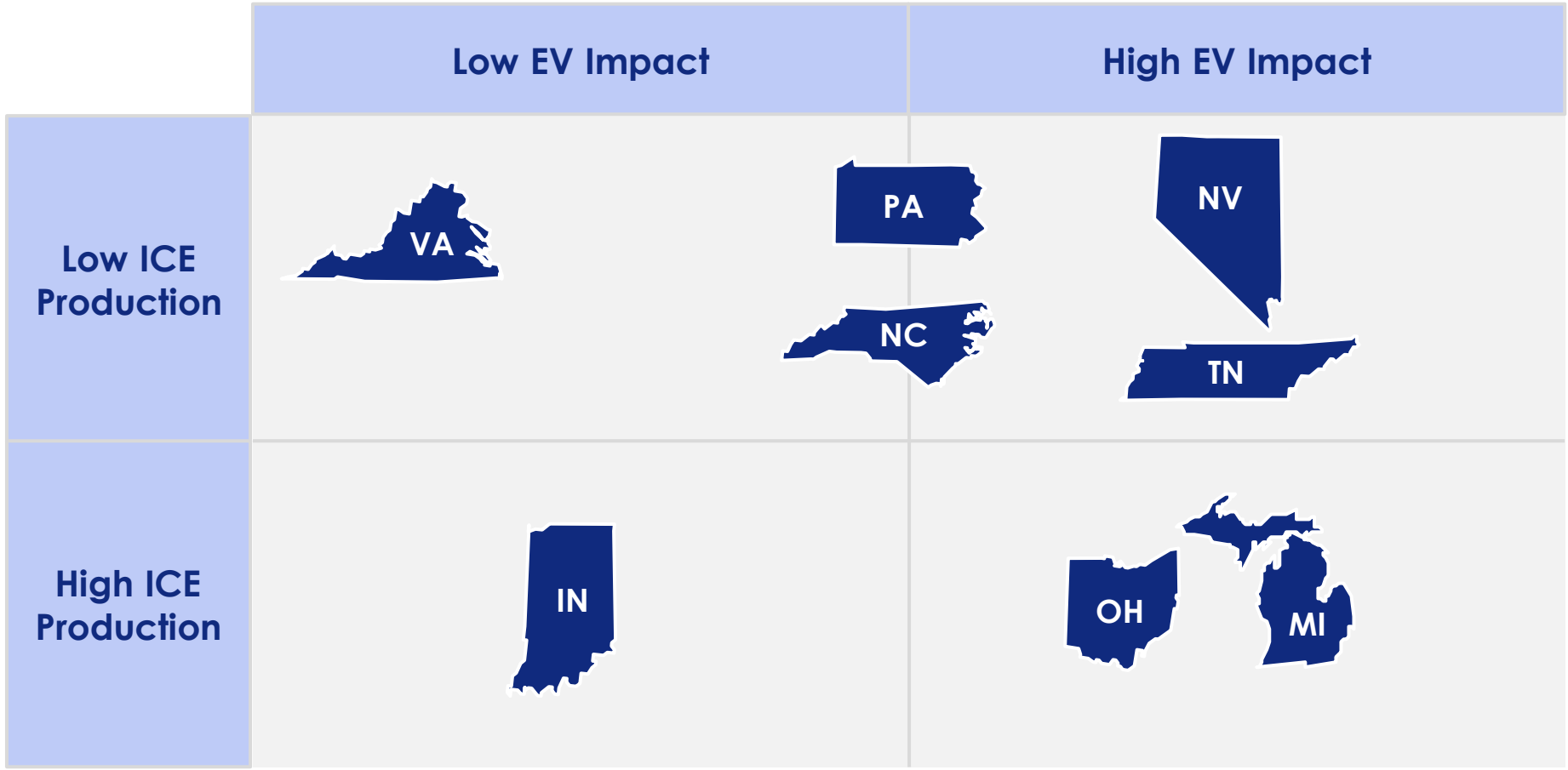
State Share Calculation

75%	**X**	State share (%) of **current U.S. vehicle production**
	+	
25%	**X**	State share (%) of **announced U.S. EV investment**

State share of unannounced investment

Regarding employment impacts, some historic manufacturing hubs, like OH and MI, are likely to benefit from the EV transition. Meanwhile, new vehicle industry hubs may be forming around TN and NV.

Grouping the State-level Results



While neither Texas nor Missouri was modeled for their employment impacts, our investment projections suggest that both states are likely to receive an influx of new capital from the shift to electric vehicles.

Dallas and Kansas City Fed Focus

Since completing the modeling project, battery and automakers have announced billions of dollars of additional investments. It remains an outstanding question how beneficial the transition will be for labor.

Union jobs? Ford's plan for new EV factories raises question

Ford building massive electric vehicle and battery plants with $11.4 billion investment

Automaker says production hubs will bring 11,000 jobs to Tennessee and Kentucky

The battle for Motor City: why Ford chose Tennessee for its electric factory

US carmaker drawn by 'shovel ready' sites, incentives and cheap energy costs

Toyota and Stellantis to build US battery plants

Japanese carmaker will create 1,750 jobs while Peugeot owner agrees deal with LG Energy Solution