ENERGY INNOVATION
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2035 THE REPORT

APRIL 2021

TRANSPORTATION

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EXECUTIVE SUMMARY

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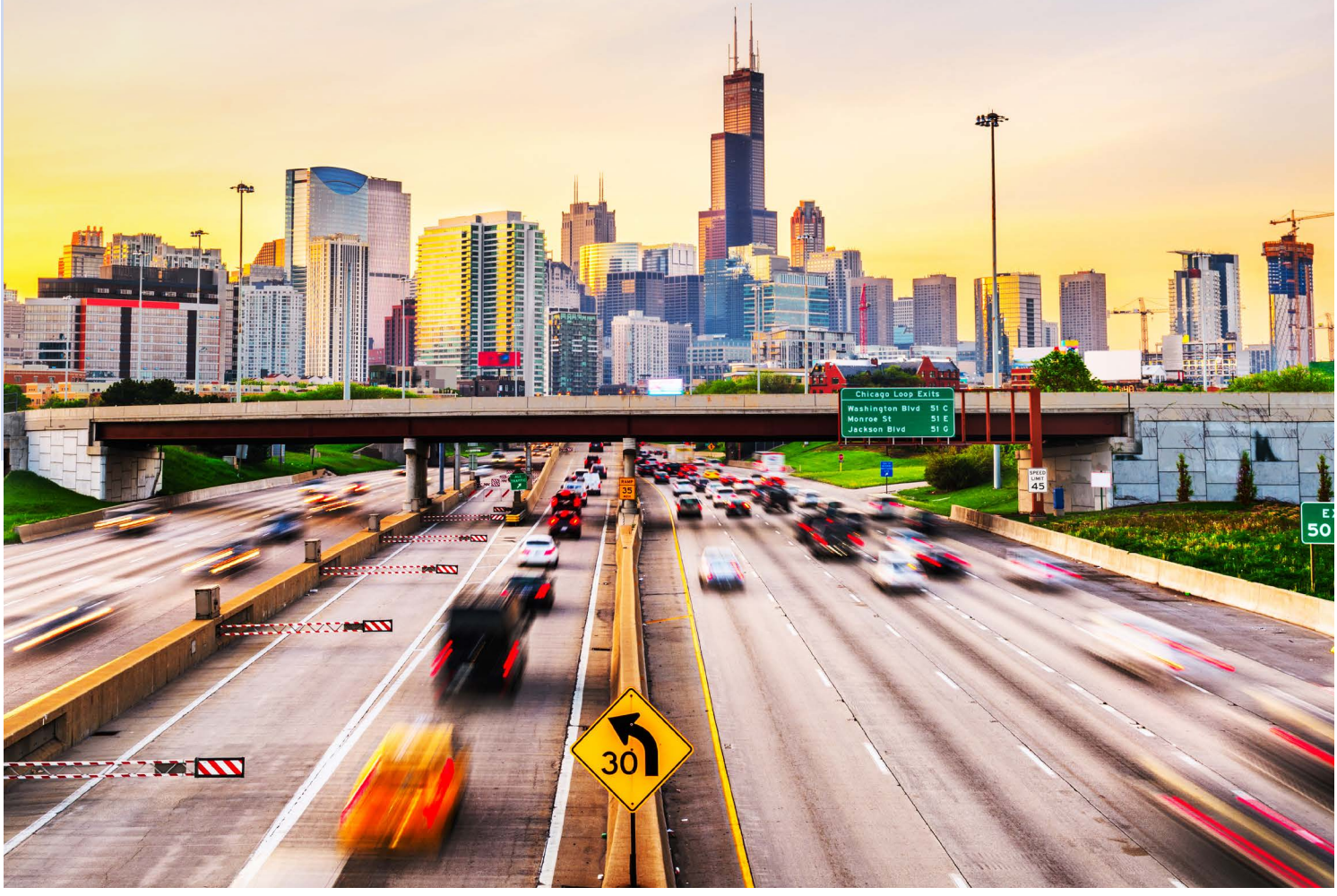

ACCELERATING CLEAN, ELECTRIFIED TRANSPORTATION BY 2035: POLICY PRIORITIES

A 2035 2.0 COMPANION REPORT

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ABOUT ENERGY INNOVATION

Energy Innovation is a nonpartisan energy and environmental policy firm, delivering high-quality research and original analysis to policymakers to help them make informed choices on energy policy. Energy Innovation's mission is accelerating clean energy by supporting the policies that most effectively reduce greenhouse gas emissions, working closely with policymakers, other experts, NGOs, the media, and the private sector.

GOLDMAN SCHOOL OF PUBLIC POLICY
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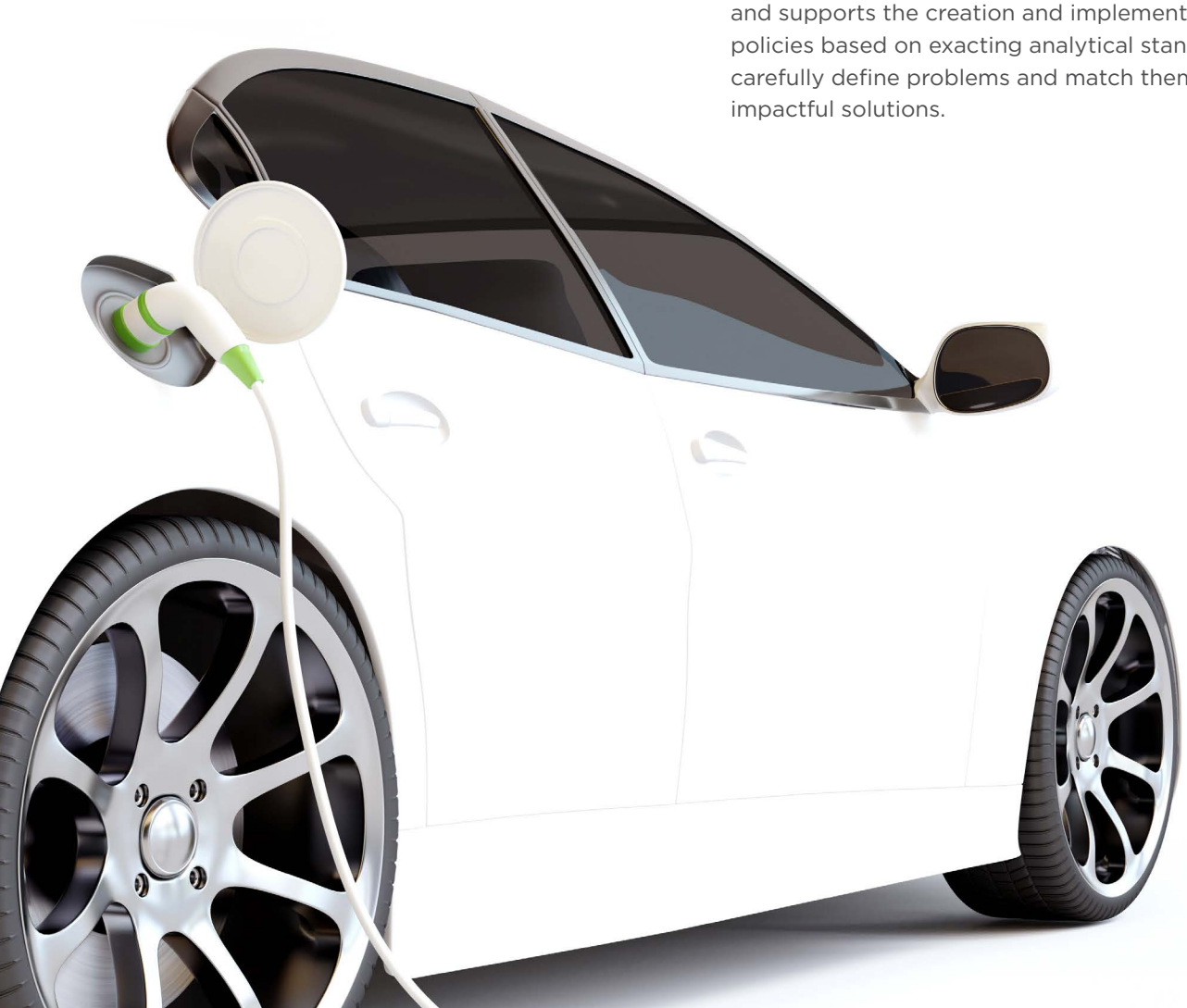
ABOUT UNIVERSITY OF CALIFORNIA BERKELEY GOLDMAN SCHOOL OF PUBLIC POLICY

The Center for Environmental Public Policy, housed at UC Berkeley's Goldman School of Public Policy, takes an integrated approach to solving environmental problems and supports the creation and implementation of public policies based on exacting analytical standards that carefully define problems and match them with the most impactful solutions.



EXECUTIVE SUMMARY

America is at a crossroads: we are approaching the end of fossil fuel-powered internal combustion engine vehicles (ICEVs) as the dominant mode of transport. Since the early 1900s, they have been a pillar of economic growth and improved mobility for people and goods. But, they have taken a toll on public health, consumers' wallets, and climate stability. As the largest source of greenhouse gas emissions (GHGs) in the United States, the transportation sector is key to unlocking economy-wide decarbonization by 2050 and to avoiding the worst impacts of climate change. We have the technologies to transition to a lower-cost, cleaner transportation future, but we lack a comprehensive clean transportation policy strategy to get us there.

The *2035 Report 2.0: Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate our Clean Transportation Future* shows that it is technologically feasible and economically beneficial to rapidly decarbonize the transportation sector (via widespread electrification), while cleaning up the

electricity grid. **The study by University of California, Berkeley (UC Berkeley), GridLab, and Energy Innovation, finds that, compared to a business-as-usual (BAU) No New Policy Scenario, the DRIVE Clean Scenario of achieving 100 percent EV sales by 2030-2035, combined with a 90 percent clean electricity grid by 2035, could result in major benefits:**

- **$2.7 trillion in consumer cost savings through 2050;**
- **150,000 avoided premature deaths, and nearly $1.3 trillion in avoided health and environmental costs through 2050;**
- **45 percent economy-wide carbon emissions reductions by 2030 (relative to 2005 levels) when combined with additional electrification of buildings and industry; and a 93 percent reduction in ground transportation carbon emissions by 2050 (relative to 2020 levels);**
- **A dependable grid and achievable investments in renewable energy, batteries, and charging infrastructure;**
- **Over 2 million net jobs created in 2035 with opportunities to bolster job growth and global competitiveness through sound industrial policies to support manufacturing.**

Without strong policy to reach those targets, Americans will forgo these benefits and miss the chance to steer toward a better future. Policymakers and other stakeholders can take bold actions, bolstered by the widespread support among Americans for more aggressive policy action to address climate change and increasing interest in EVs. In step with this transition, America can jump-start domestic manufacturing, sustain and create millions of jobs, and reinvigorate America's economy and industries.

This report is a guide and reference for policymakers leading this transition and serves as a companion to the 2035 2.0 Report. The policy recommendations in this report are designed primarily to achieve the 100 percent EV sales by 2030/2035 targets from the 2035 2.0 Report DRIVE Clean Scenario, while also addressing social equity. We highlight the near-, mid-, and long-term actions that the federal government, states, local governments, and utilities should take to: 1) accelerate the transportation sector's transition away from fossil fuels within the decade; and, 2) overcome the most common barriers to transportation electrification.

The policy and market changes needed for such a transformation must also prioritize environmental justice, social equity, and mobility. Inclusive processes are needed to address these challenging issues meaningfully. Policies should prioritize pollution reductions, especially for those disproportionately burdened by health damaging emissions from trucks and buses. In addition, policies should support electric vehicles access for low- and moderate-income (LMI) consumers, and should proactively consider how transportation system changes will impact communities.

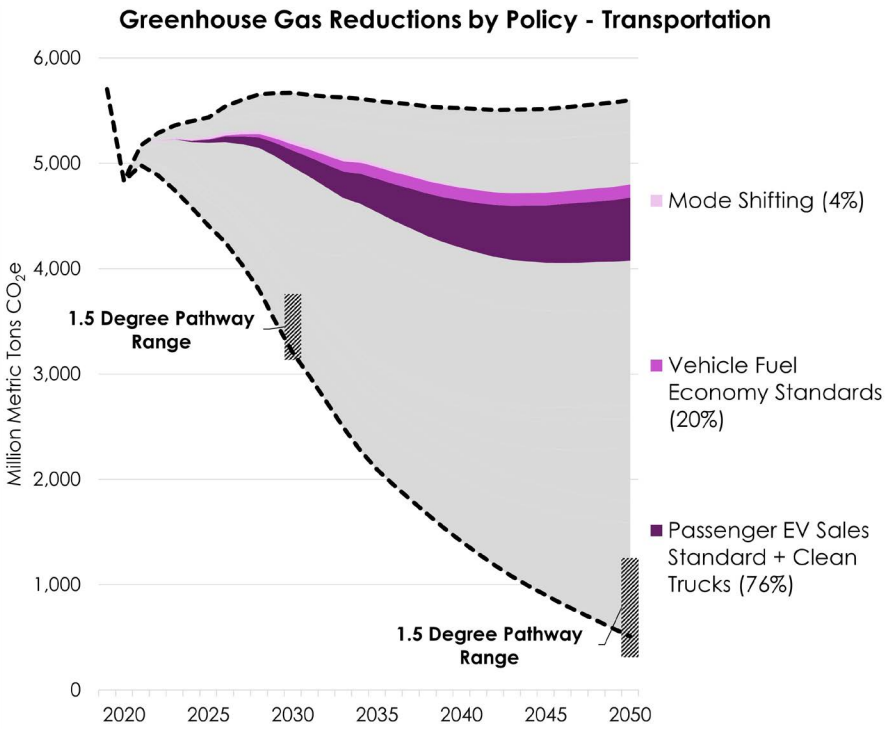


FIGURE ES-1.

Modeling from Energy Innovation's Energy Policy Simulator identifies the policies across the major sectors of the economy, including transportation, needed to align with a 1.5 degree Celsius by 2050 scenario. The transportation policies shown here reflect their contributions to overall emissions reductions in that sector, shown in percentages. Of note, this model run assumed 100% EV sales for LDVs by 2035 and HDVs by 2045, which are slower timelines than those modeled in the 2035 2.0 Report. Moving the timeline to align with the DRIVE Clean Scenario would have the effect of accelerating the overall emissions reductions, among other benefits. Source: Robbie Orvis, A 1.5° Celsius Pathway to Climate Leadership for the United States, Energy Innovation, February 2021.

The goal of achieving 100 percent EV sales by 2030/2035, supported by a 90 percent clean grid by 2035, is certainly ambitious. But so too was the notion of an automobile-dominant future at a time when horses and carriages ruled the roads. We need a fresh vision for the future to accelerate transportation electrification within this decade. Policymakers across all levels of government should focus on the policies that address near-term barriers, while also supporting the long-term transition to a zero-emission transportation system. The priority policy actions are as follows:

- **Strong national fuel economy and tailpipe emissions standards for all vehicle classes** will pave the road for market transformation, spur technology innovation, reduce local pollution, and lock in consumer savings. Combined with state leadership in ZEV standards, strong national standards will protect consumers, improve public health, and ensure U.S. manufacturers remain globally competitive. America needs strong standards to reduce greenhouse

gas emissions in line with a 1.5 degree Celsius global target (see Figure ES-1). These are the highest priority policies in terms of emissions reductions.

- **Equity-focused policies and programs** designed with input from communities most adversely impacted by transportation pollution — namely communities of color in historically redlined neighborhoods, and frontline and underserved communities — will ensure all people, regardless of race or other socio-economic demographics, benefit from cleaner, more efficient transportation solutions.
- **Targeted incentives that ramp down over time as the market matures** will encourage early adoption and drive down costs to benefit all consumers. Means-based incentives will help ensure low- and moderate-income consumers and small businesses also benefit. Consumer education programs will increase awareness of expanding EV model availability and suitability. Incentive programs for EV infrastructure are also key to an all-electric future.
- **Investments in a ubiquitous charging network and a modern grid** will address range anxiety and ensure reliability as the EV market grows. Meeting the mobility needs of families and businesses will boost consumer and business confidence in EVs for urban, rural, and long-distance trips.
- **Strong "Made in America" policies to encourage domestic manufacturing** will help retool U.S. industry to manufacture batteries, EVs, energy storage, and other advanced technologies. An early focus on these policies will improve global competitiveness, sustain jobs, and support workers in the transition.
- **Smart electric utility regulations and local government leadership** will reduce permitting and other soft costs and elicit full electrification transportation value for the benefit of EV owners, utility customers, and the grid. Efforts to streamline interconnection and integration of EVs in homes, businesses, and communities will pay dividends as demand grows.

A transition away from fossil fuel-powered vehicles and toward electric vehicles powered by a clean grid is within reach, but we must enact policies that transform the transportation sector this decade. In doing so, we will secure our role as global leader in innovation and improve competitiveness. We will sustain and create jobs, while saving consumers trillions. Widespread transportation electrification will also dramatically reduce dangerous air pollution and is essential to securing a safe climate future. Now is the time to move full speed ahead.

Table ES-1 provides a summary of the policy recommendations from the full report.

TABLE ES-1.

Summary of Policy Recommendations to Achieve the DRIVE Clean Scenario from the 2035 2.0 Report. Please note that the timeline for enactment indicates when the policy action should be taken. It does not indicate the duration of the policy nor the implementation timeline.

	POLICY ACTIONS & TIMELINE FOR ENACTMENT			FEDERAL ACTION	STATE ACTION	LOCAL ACTION	UTILITY ACTION
	NEAR-TERM (2021 - 2023)	MID-TERM (2024-2026)	LONG-TERM (2027-2035)				
NATIONAL/STATE 100% EV SALES STANDARD	Adopt federal GHG Emissions Standards reaching 0g/mile by 2030/2035			●			
	Adopt increasingly rigorous Federal Fuel Economy (CAFE) Standards			●			
	Adopt state 100% ZEV Sales Standards				●		
INCENTIVES AND FUNDING TO SUPPORT EV ADOPTION	Reform and expand Federal Plug-In EV Consumer Tax Credit			●			
	Provide incentives for public and private fleet conversion			●	●		
	Provide used EV incentive			●	●		
	Offer competitive grants and funding programs for public and non-profit entities			●	●	●	
	Require EV procurement for public fleets, transit, buses			●	●	●	
	Offer federal/state tax exemption or reduction			●	●		
	Adopt special lane access for EVs, parking incentives, road toll fee waivers, and licensing incentives				●	●	
	Support new financing models and innovative funding programs that significantly expand consumer and business access			●	●	●	●

	POLICY ACTIONS & TIMELINE FOR ENACTMENT			FEDERAL ACTION	STATE ACTION	LOCAL ACTION	UTILITY ACTION
	NEAR-TERM (2021 - 2023)	MID-TERM (2024-2026)	LONG-TERM (2027-2035)				
EXPAND EV CHARGING INFRASTRUCTURE	Expand and improve the Federal Alternative Fuel Infrastructure Tax Credit (30C)						
	Modify and extend the Fixing America's Surface Transportation (FAST Act)						
	Make charging infrastructure an Allowable Expense in Federal Funding Programs, as applicable						
	Install charging infrastructure on federal property						
	Direct electric utilities to develop plans to support and accelerate widespread transportation electrification and promptly approve the corresponding infrastructure programs						
	Create stackable incentives, targeted at underserved locations, to fill charging gaps						
	Continue the Alternative Fuel Corridors and increase corridor signage						
		Update the National Highway Freight Network to align with transportation electrification goals.					
		Remove the current federal prohibition on commercial activity at rest areas to encourage EV charging (and signage) at interstate rest areas.					
		Direct funding to support "make-ready" investments					
	Create MUD-specific dedicated incentives						
	Authorize utility programs targeting MUD charging infrastructure						
	Expand workplace and public charging						
INCREASE DOMESTIC MANUFACTURING	Adopt a transportation infrastructure stimulus package						
	Provide a 30 percent ITC for investment in domestic battery manufacturing						
		Create or expand EV Manufacturing Finance Programs					
	Create a Battery Cell Manufacturing Production Incentive						
	Expand R&D efforts to develop a domestic supply chain for battery raw materials (e.g., mining, processes, and battery recycling),						
	Fund or support workforce training programs						
	Require procurement of EVs						

	POLICY ACTIONS & TIMELINE FOR ENACTMENT			FEDERAL ACTION	STATE ACTION	LOCAL ACTION	UTILITY ACTION
	NEAR-TERM (2021 - 2023)	MID-TERM (2024-2026)	LONG-TERM (2027-2035)				
STREAMLINE DEPLOYMENT WITH EV-FRIENDLY INTERCONNECTION, PLANNING, PERMITTING, AND CODES	Adopt interconnection best practices that proactively address EVSE				✓		✓
	Adopt and implement hosting capacity analyses (HCAs) and maps; integrate EVs and EVSE into methodologies				✓		✓
		Investigate EV and EVSE impacts on the bulk-grid and wholesale markets		✓	✓		✓
	Adopt Integrated Distribution Planning (IDP) with a framework for EVs and EVSE				✓		✓
	Direct (and fund) relevant stakeholders to convene, share relevant data and maps, and make information publicly available			✓	✓	✓	✓
		Adopt and implement streamlined EVSE permitting			✓	✓	
	Adopt EVSE, EV-ready, and EV parking provisions in building codes			Natl. Code-Setting Bodies	✓	✓	
	Allow local governments to go beyond the state code/ base code				✓	✓	
	Funding to streamline permitting processes and train building code officials			✓	✓	✓	✓
ADOPT SMART RATE DESIGN	Enable time-varying rates for LDEVs				✓		✓
	Enable Actively Managed LDEV Charging				✓		✓
		Explore V2G and Bi-Directional Charging, and Adaptive Load Management			✓		✓
	Rate reform to mitigate demand charge impacts				✓		✓
	Incentives for co-located distributed generation and/or energy storage at strategic EVSE charging locations			✓	✓	✓	✓