



The States as Green New Deal Policy Labs

By Caitlin McCoy

The Green New Deal resolution's¹ climate provisions illustrate the dramatic scope and scale of the change needed to curb greenhouse gas emissions. The resolution envisions a ten-year period of economic and societal change to begin making progress on its climate goals. Policymakers will have to design programs that reduce emissions immediately and into the future. These programs should be built with policy tools that are strong enough to drive progress and flexible enough to adapt to changing circumstances. Fortunately, many of the tools exist and are already in use.

The idea of a Green New Deal isn't new—its name and some of its current principles can be traced back to 2007.² Also not new: borrowing from state activities to create federal policy. The history of environmental policy is full of examples of states generating and testing programs to address environmental issues which federal policymakers then adapt for their purposes. The Green New Deal will likely follow the same path, and its federal policy package will borrow from the states.

The Green New Deal resolution is a proposal for discussion. There's no Green New Deal legislation yet and we have few details about how the resolution's goals might become a reality. But states have been working to achieve similar goals for decades.

In this paper, I match climate goals from the Green New Deal resolution with state and local efforts to achieve similar goals. States are a proving ground for policy tools and their work reveals which tools are well-suited to the resolution's goals. The Green New Deal has been described as "...a holistic combination of solutions at every level—federal, state, and local—[that] addresses many problems simultaneously."³ The first step toward building a scheme that

¹ H.R.J. Res. 109, 116th Cong. (2019). Available at: <https://www.congress.gov/116/bills/hres109/BILLS-116hres109ih.pdf>.

² David Roberts, *The Green New Deal, Explained*, Vox (Feb. 7, 2019) <https://www.vox.com/energy-and-environment/2018/12/21/18144138/green-new-deal-alexandria-ocasio-cortez>.

³ Greg Carlock et al., *A Green New Deal: A Progressive Vision for Environmental Sustainability and Economic Stability*, DATA FOR PROGRESS 4 (Sept. 2018). https://static1.squarespace.com/static/5aa9be92f8370a24714de593/t/5ba14811032be48b8772d37e/1537296413290/GreenNewDeal_Final_v2_12MB.pdf.



involves all levels of government is to assess the structures that already exist. Federal policy in a Green New Deal will need to build on existing state and local policies and potentially transform them.

In September 2018, think tank Data for Progress released a policy report⁴ which provides an example of the policy brainstorming that needs to happen for the Green New Deal. David Roberts of Vox described their report as, "...less a specific set of policy choices than an extensive policy menu — a set of options for each of the program's large-scale goals....It is something like a detailed snapshot of the policy landscape, from which an architect could bricolage together a plan."⁵ The report sets out a variety of targets that are similar to the goals in the Green New Deal resolution and provides a laundry list of possible policy and investment options for each one.

I focus on three major environmental and energy goals from the Green New Deal (GND) resolution. I pair each goal with two or more of the policy or investment options presented in the Data for Progress report to evaluate how states have deployed similar policies in order to achieve similar goals.

- I. **GND Electricity sector goal:** "meeting 100 percent of the power demand in the United States through clean, renewable, and zero-emission energy sources, including— (i) by dramatically expanding and upgrading existing renewable power sources; and (ii) by deploying new capacity;"⁶

- A. **Establish high clean and renewable energy portfolio standards in every state**

States have adopted and implemented renewable portfolio standards (RPS) for decades.⁷ Twenty-nine states, Washington, D.C., and three territories have enacted RPSs.⁸ Most RPS policies require that a certain percentage of the energy sold by utilities in the state be from renewable sources and most RPS targets are met through renewable energy credit trading. Some states also require utilities to purchase the energy associated with the renewable energy credits, and some require that the credits come from within the same region as the state. An RPS

⁴ Id.

⁵ David Roberts, *The Green New Deal, explained*, Vox, Feb. 7, 2019 <https://www.vox.com/energy-and-environment/2018/12/21/18144138/green-new-deal-alexandria-ocasio-cortez>.

⁶ H.R.J. Res. 109(2)(C) 116th Cong. (2019). The policy report framed this goal in terms of two more specific goals: "100 percent Clean and Renewable Electricity by 2035" and "Zero Net Emissions from Energy by 2050". Carlock, *supra* note 3 at 5.

⁷ *State Renewable Portfolio Standards and Goals*, NATIONAL CONFERENCE OF STATE LEGISLATURES (Feb. 1, 2019) <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

⁸ Id.



policy in a state doesn't always signal that renewable energy generation capacity is increasing in that state; a utility could be fulfilling its mandate by buying electricity or credits from renewable generation outside the state. Some RPS policies have quotas for renewable capacity to be built in the state, leading to renewable generation and associated jobs. Such policies have faced legal challenges on the basis of the dormant commerce clause and need to be structured carefully to avoid improperly favoring or protecting in-state generation.⁹

Regardless, RPS remains a powerful and affordable driver of renewable capacity. The Lawrence Berkeley Lab found that about half the growth in renewable electricity generation and capacity in the U.S. since 2000 is used to comply with state RPS policies.¹⁰ RPS policies accounted for 34 percent of new renewable energy capacity added in 2017.¹¹ Compliance with RPS cost 2 percent of average electric bills in RPS states in 2017.¹²

Looking forward, renewable generation will need to increase about 50 percent by 2030 in order to meet existing state RPS requirements.¹³ Renewable electricity will then reach 15 percent of electricity sales by 2030, an increase from 11 percent in 2018.¹⁴ These figures could go up if more states adopt RPS and states with RPS policies raise their targets like California, Connecticut, Massachusetts, and New Jersey did in 2018.

Over time, states have refined their RPS policies with design features to manage the costs of compliance. Twenty states and Washington, D.C., have cost caps in their RPS policies to ensure that consumers' electric bills will not increase dramatically.¹⁵ Some states have cost caps of 6-8 percent of average retail rates and some are more restrictive with caps at 1-4 percent.¹⁶ These caps could become less important as the price of renewable energy continues to drop and it becomes more competitive with traditional generation sources.¹⁷

⁹ See Ari Peskoe & Kate Konschnik, *Minimizing Constitutional Risk: Crafting State Energy Policies that Can Withstand Constitutional Scrutiny*, HARVARD LAW SCHOOL ENVIRONMENTAL LAW PROGRAM POLICY INITIATIVE (Oct. 18, 2017)

<https://statepowerproject.files.wordpress.com/2017/10/harvard-epi-minimizing-constitutional-risk-10-18-2017.pdf>.

¹⁰ Galen Barbose, *U.S. Renewable Portfolio Standards 2018 Annual Status Report*, LAWRENCE BERKELEY NATIONAL LABORATORY 3 (Nov. 2018) http://eta-publications.lbl.gov/sites/default/files/2018_annual_rps_summary_report.pdf.

¹¹ National Conference of State Legislatures, *supra* note 7.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ Lori Bird, *Renewable Portfolio Standards: Costs and Benefits*, NATIONAL RENEWABLE ENERGY LABORATORY & LAWRENCE BERKELEY NATIONAL LABORATORY (Dec. 4, 2014) http://resource-solutions.org/images/events/rem/presentations/2014/Bird_Lori.pdf.

¹⁷ *Lazard's Levelized Cost of Energy Analysis, Version 12.0*, LAZARD (Nov. 2018)

<https://www.lazard.com/media/450773/lazards-levelized-cost-of-energy-version-120-vfinal.pdf>.



States have also addressed price volatility in renewable energy credit trading markets, which can complicate financing for renewable generation projects and raise costs.¹⁸ New Jersey and Massachusetts have worked to mitigate this issue by requiring utilities to enter into long-term contracts with generators for renewable energy credits.¹⁹ Longer contracts make financing less expensive by reducing uncertainty and investor perceptions of risk.²⁰ California and Illinois have achieved these same goals by creating auction programs that the state's electric utilities use to procure generation to meet the RPS.²¹ The standardized procurement process reduces regulatory burdens and provides stability for generators as utilities stick to a reliable schedule to procure specific amounts of renewable energy.²²

B. Enforce the Clean Power Plan to regulate carbon dioxide emissions from power plants and;

C. Set federal and state prices on carbon, particularly corporate pollution

Although the Green New Deal resolution's goal is to meet 100 percent of power demand with renewable and zero-emission energy sources, reducing carbon and other pollutant emissions from the power generation sector in the meantime will be necessary to reduce greenhouse gas (GHG) accumulation. As detailed in a recent report from the Breakthrough Energy group, it could be a while before we have a clean energy system given "...the sheer size and complexity of existing systems, the degree to which these systems are embedded in our economy, and the high public expectations of safety and reliability they must meet."²³

Additionally, plans to decarbonize the electric system will necessarily involve state action. Policymakers could look to the Clean Power Plan as a model and set a nationwide emissions

¹⁸ Brendan Pierpont, *What's working and what's not in state renewable portfolio standards*, CLIMATE POLICY INITIATIVE (July 2013) <https://climatepolicyinitiative.org/2013/07/11/whats-working-and-whats-not-in-state-renewable-portfolio-standards/>.

¹⁹ Id.

²⁰ Uday Varadarajan et al., *The Impacts of Policy on the Financing of Renewable Projects: A Case Study Analysis*, CLIMATE POLICY INITIATIVE (OCT. 3, 2011) <https://climatepolicyinitiative.org/publication/the-impacts-of-policy-on-the-financing-of-renewable-projects-a-case-study-analysis/>.

²¹ Brendan Pierpont, *What's working and what's not in state renewable portfolio standards*, CLIMATE POLICY INITIATIVE (July 2013) <https://climatepolicyinitiative.org/2013/07/11/whats-working-and-whats-not-in-state-renewable-portfolio-standards/>. See *Renewable Auction Mechanism Program*, CALIFORNIA PUBLIC UTILITIES COMMISSION http://www.cpuc.ca.gov/renewable_auction_mechanism/. *Overview of the New Illinois RPS and the Long-Term Renewable Resources Procurement Plan*, ILLINOIS POWER AGENCY (May 17, 2017) <https://www2.illinois.gov/sites/ipa/Documents/RPS-Overview-workshop-presentation-20170517.pdf>.

²² Id.

²³ IHS Markit & Energy Futures Initiative, *Advancing the Landscape of Clean Energy Innovation*, BREAKTHROUGH ENERGY 2 (Feb. 2019) http://www.b-t.energy/wp-content/uploads/2019/02/Report_-_Advancing-the-Landscape-of-Clean-Energy-Innovation_2019.pdf.



budget with caps tailored for each state. States would then submit compliance plans reflecting their needs and opportunities, informed by their knowledge of their electric systems.

About a dozen states have programs that cap CO₂ emissions and use tradeable emissions allowances to comply with the cap. The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort among Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont to cap and reduce CO₂ emissions from the power sector in the region.²⁴ RGGI functions by limiting the emissions of CO₂ from electric power plants with a capacity of 25 megawatts or greater, issuing CO₂ allowances, and holding regional allowance auctions.²⁵ Simply put, the states agree to a regional cap and negotiate state allowance budgets; over time, they may also employ mechanisms to adjust the cap and trigger the release of reserve allowances if needed.²⁶ RGGI currently covers 15 percent of emissions in RGGI states and it could soon cover 17 percent, as Virginia is in the process of joining RGGI and New Jersey plans to re-join.²⁷

California's landmark climate cap-and-trade law, AB 32, goes beyond CO₂ and covers six other greenhouse gases as well.²⁸ It also goes beyond the electric power system to cover almost the entire economy in the state. Under AB 32, 80 percent of California's GHG emissions are covered, including emissions from imported electricity, existing buildings, transportation, and industrial sources.²⁹ Washington state has tried to impose a price on carbon dioxide emissions through a carbon tax and a regulation that creates a hybrid cap and trade program.³⁰ Other states are considering similar measures—lawmakers in 13 states have already introduced carbon pricing bills in 2019.³¹

Both California's and RGGI's actions can be described as setting a price on carbon, given that both systems set prices for the credits or allowances of GHG emissions to be bought and traded.

²⁴ *Elements of RGGI*, THE REGIONAL GREENHOUSE GAS INITIATIVE (2019) <https://www.rggi.org/program-overview-and-design/elements>.

²⁵ Id.

²⁶ Id.

²⁷ John Larsen, *The Footprint of US Carbon Pricing Plans*, RHODIUM GROUP (May 23, 2018) <https://rhg.com/research/the-footprint-of-us-carbon-pricing-plans/>.

²⁸ Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF₆), Nitrogen trifluoride (NF₃). *Assembly Bill 32 Overview*, CALIFORNIA AIR RESOURCES BOARD <https://www.arb.ca.gov/cc/ab32/ab32.htm>.

²⁹ *California's 2017 Climate Change Scoping Plan*, CALIFORNIA AIR RESOURCES BOARD (Nov. 2017) https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

³⁰ Michelle Melton, *Willing to Face Legal Obstacles, Washington State Persists in Climate Policy Efforts* HARVARD LAW SCHOOL ENVIRONMENTAL & ENERGY LAW PROGRAM (Feb. 21, 2019) <https://eelp.law.harvard.edu/2019/02/willing-to-face-legal-obstacles-washington-state-persists-in-climate-policy-efforts/>.

³¹ *State Carbon Pricing Network*, CLIMATE XCHANGE (2019) <https://climate-xchange.org/network/>.



These two programs combined cover 6 percent of emissions nationally; RGGI expansion would raise coverage to 7 percent.³²

However, these programs are not clear-cut success stories in terms of lowering emissions. Both programs have faced criticism regarding their efficacy in reducing GHG emissions. Specifically, critics have asserted that the caps employed in these programs are not tight enough to drive reductions on the basis of the caps alone. In California's case, reports have attributed drops in emissions to increased hydropower and other climate policy measures.³³ In RGGI's case, reports have found that the allowance price is relatively low, and it is difficult to say that it is responsible for reductions that would not have occurred otherwise.³⁴ Regardless, these programs offer invaluable information and experience for designing cap and trade programs (and variations like cap and reduce) in the U.S. The lessons learned from the design, implementation, operation, and even the shortfalls of these programs can help inform future initiatives on the state or national level.

II. GND building energy efficiency goal: “upgrading all existing buildings in the United States and building new buildings to achieve maximal energy efficiency, water efficiency, safety, affordability, comfort, and durability, including through electrification”³⁵

A. Plan to set net-zero energy and high-performance buildings standards for new commercial and residential construction and retrofit requirements for existing structures

Most states have adopted building energy codes with energy efficiency requirements. The two commonly used model codes are the International Energy Conservation Code (IECC) for residential buildings and ANSI/ASHRAE/IES Standard 90.1 for commercial buildings.³⁶

Four states have adopted residential building energy codes that are more energy efficient than the 2012 or 2015 IECC, eight states and the District of Columbia have adopted the 2015 or 2012

³² John Larsen, *The Footprint of US Carbon Pricing Plans*, RHODIUM GROUP (May 23, 2018) <https://rhg.com/research/the-footprint-of-us-carbon-pricing-plans/>.

³³ Danny Cullenward et al., *California's climate emissions are falling, but cap-and-trade is not the cause*, NEAR ZERO (Nov. 10, 2017) <http://wp.nearzero.org/wp-content/uploads/2017/11/Near-Zero-2016-MRR-Research-Note.pdf>. Craig Miller, *10 Years In, Has California's Climate Law Really Lowered Emissions?* KQED SCIENCE (Sept. 26, 2016) <https://www.kqed.org/science/1010716/10-years-in-has-californias-climate-law-really-lowered-emissions>.

³⁴ David Roberts, *The Northeast's carbon trading system works quite well. It just doesn't reduce much carbon*, VOX (Feb. 28, 2017) <https://www.vox.com/science-and-health/2017/2/28/14741384/rggi-explained>.

³⁵ H.R.J. Res. 109(2)(E) 116th Cong. (2019). The policy report framed this goal as “100 percent Net-Zero Building Energy Standards by 2030.” Carlock, *supra* note 3 at 7.

³⁶ American National Standards Institute, Illuminating Engineering Society, American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 90.1



IECC or equivalent, and 28 states have adopted the 2009 IECC or a code between the 2009 and 2012 or 2015 IECC.³⁷

The 2015 IECC can increase energy savings by 15 percent in comparison to the 2009 IECC.³⁸ Jurisdictions are currently considering whether to adopt the 2018 IECC; many jurisdictions have a process to adopt the newest IECC every three years. The 2018 IECC is estimated to be 2-5 percent more efficient than the 2015 IECC.³⁹

For commercial building energy codes, seven states have adopted ASHRAE 90.1 (2013) or more efficient codes, and seven states and the District of Columbia have adopted ASHRAE 90.1 (2010) or a code between the 2010 and 2013 versions.⁴⁰ Twenty-three states have commercial building codes between 90.1 (2007) and 90.1 (2010).⁴¹

California's Building Energy Efficiency Standards are a notable example of standards for new buildings which were designed to tighten over time to reach high levels of efficiency and now serve as the foundation for the state's Zero Net Energy building plans. California has been creating and adopting Building Energy Efficiency Standards since 1977, covering new construction as well as additions and renovations to existing buildings. The state's standards have consistently tightened by 12-15 percent in each three-year standard revision and adoption cycle.⁴² California's 2019 standards, effective in January 2020, will take the final step toward zero net energy for newly constructed residential buildings. Homes and multi-family buildings should use a combination of improved efficiency and distributed renewable energy generation to meet 100 percent of their annual energy needs.⁴³ These standards were crafted to implement the

³⁷ *Status of State Energy Code Adoption*, U.S. DEP'T OF ENERGY BUILDING ENERGY CODES PROGRAM (Dec. 15, 2017), <https://www.energycodes.gov/status-state-energy-code-adoption>.

³⁸ See Ryan Meres, *2015 IECC: What You Need to Know*, BUILDER (Nov. 18, 2014), http://www.builderonline.com/building/code/2015-iecc-what-you-need-to-know_o.

³⁹ See Nevada Governor's Office of Energy, Significant Changes to the 2018 IECC 1 (2018) <http://energy.nv.gov/uploadedFiles/energyngov/content/Programs/TaskForces/2017/2015%20v%202018%20IECC%20Summary%20-%20GOE%20Final%20w%20sources.pdf>.

⁴⁰ *Status of State Energy Code Adoption*, U.S. DEP'T OF ENERGY BUILDING ENERGY CODES PROGRAM (Dec. 15, 2017), <https://www.energycodes.gov/status-state-energy-code-adoption>.

⁴¹ Id.

⁴² *Zero Net Energy Action Plan*, CALIFORNIA PUBLIC UTILITY COMMISSION 20 (June 2015). http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Demand_Side_Management/EE_and_Energy_Savings_Assist/ZNERESACTIONPLAN_FINAL_060815.pdf

⁴³ All new single-family homes and low-rise apartment buildings will be required to install solar panels or connect to community solar power. There are exemptions for homes that will be shaded by trees or are otherwise not suitable for solar energy generation.



state's goals of achieving net zero energy use in all new residential construction by 2020 and commercial construction by 2030.⁴⁴

California also has a Green Building Standards Code⁴⁵ which provides mandatory and voluntary requirements for new residential and nonresidential buildings with a focus on their environmental impact and sustainability during construction and operation.⁴⁶ The Green Building Standards Code covers five areas: planning and design; energy efficiency; water efficiency and conservation; material conservation and resource efficiency; and environmental quality.⁴⁷

California has faced challenges in adopting these standards, and there have been plenty of incredulous headlines about the requirements and added costs (not unlike those generated by the Green New Deal itself). That said, California has been wise to employ an incremental approach. California has gradually increased the stringency of their energy efficiency requirements over time with a predictable tightening every three years. California also set its net zero energy goals for buildings in 2008, giving the regulated community time to prepare for the changes.

For states without a history of progressive building standards or who are using an older code, the adoption of a newer building code that dramatically maximizes energy efficiency may be challenging. Some speculate that the 2018 IECC could be an opportunity for states that have older codes like the 2009 IECC to jumpstart their efforts in the building sector and adopt the new 2018 version.⁴⁸

Improving the energy efficiency of existing buildings is more challenging than enhancing energy efficiency in new construction. There are at least two ways of addressing existing buildings—programs that require retrofitting and upgrades according to a timeline, and programs that may require upgrades to the entire building if it is renovated in a significant way. Some policies require that additions be built according to the most up-to-date building code and only trigger

⁴⁴ *Long Term Energy Efficiency Strategic Plan*, CALIFORNIA PUBLIC UTILITY COMMISSION 6
www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=5305.

⁴⁵ *California Codes*, INTERNATIONAL CODE COUNCIL <https://codes.iccsafe.org/public/collections/CA>.

⁴⁶ 2016 California Green Building Standards Code, CAL. CODE REGS. tit. 24, part 11. Available at:
<https://codes.iccsafe.org/content/chapter/2079/>.

⁴⁷ *Guide to the 2016 California Green Building Standards Code: Nonresidential*, CALIFORNIA BUILDING STANDARDS COMMISSION & INTERNATIONAL CODE COUNCIL (Jan. 2017) <https://www.dgs.ca.gov/-/media/Divisions/BSC/05-Resources/CALGreen/2016-CALGreen-Guide-FINAL.ashx?la=en&hash=8A80694A21C7DB8466E4B6D8F5F9E364A2459542>.

⁴⁸ *Looking Forward to 2018 IECC Code*, EVERBLUE TRAINING INSTITUTE (April 20, 2018)
<https://www.everbluetraining.com/blog/looking-forward-2018-iecc-code>.



retrofitting of the entire building if the renovations surpass a percentage of the building's value or increase its floor area by a certain percent.

Boulder, Colorado has adopted the first approach, requiring energy efficient retrofitting in accordance with a timeline to meet its goal of reducing its GHG emissions by 80 percent or more below 2005 levels by 2050.⁴⁹ In 2015, their city council adopted the Boulder Building Performance Ordinance and set requirements for existing buildings to reduce energy use after its 2015 GHG inventory revealed that over half of the city's emissions footprint came from commercial and industrial buildings, more than 3,700 buildings in total.⁵⁰ Further analysis highlighted major energy savings opportunities in the largest buildings.⁵¹ Capturing these reductions would "require approximately \$25 million in energy efficiency investments, and could result in \$10 million in energy cost savings annually...and the creation of over 120 jobs."⁵² The city decided to act—Boulder's Municipal Code now requires privately-owned commercial and industrial buildings and city-owned buildings to: (1) rate and report building energy use annually⁵³ and (2) implement efficiency requirements,⁵⁴ including: performing energy assessments every ten years; performing retro-commissioning every ten years and implementing cost effective measures within two years of the study; and implementing one-time lighting upgrades.⁵⁵ Compliance deadlines depend on the square footage of the building and whether it is new, existing, or city-owned.⁵⁶

The City of Boulder offers rebates for energy assessments to help offset the costs for commercial and industrial building owners who are subject to the Building Performance Ordinance.⁵⁷ The earlier the energy assessments are performed before the compliance deadline,

⁴⁹ CITY OF BOULDER, BOULDER'S CLIMATE COMMITMENT 2 (May 2017) https://www.globalcovenantofmayors.org/wp-content/uploads/2017/11/City_of_Boulder_Climate_Commitment_5.9.2017-FINAL.pdf.

⁵⁰ City of Boulder, Ordinance No. 8071 (Oct. 20, 2015). Now codified in Chapter 7.7: Commercial and Industrial Energy Efficiency of the Municipal Code https://library.municode.com/co/boulder/codes/municipal_code?nodeId=TIT10ST_CH7.7COINENEF.

⁵¹ BOULDER BUILDING PERFORMANCE PROGRAM 2015-2016 REPORT 3 [HTTPS://WWW-STATIC.BOULDERCOLORADO.GOV/DOCS/Buildings-Performance-Report-Boulder-FINAL-1-201706010950.pdf](https://www-static.bouldercolorado.gov/docs/Buildings-Performance-Report-Boulder-FINAL-1-201706010950.pdf).

⁵² Id.

⁵³ *Boulder Building Performance Rating & Reporting*, CITY OF BOULDER, COLORADO, <https://bouldercolorado.gov/sustainability/boulder-building-performance-rating-reporting>.

⁵⁴ *Boulder Building Performance Efficiency Requirements*, CITY OF BOULDER, COLORADO, <https://bouldercolorado.gov/sustainability/boulder-building-performance-efficiency-requirements>.

⁵⁵ City of Boulder, Chapter 7.7: Commercial and Industrial Energy Efficiency of the Municipal Code https://library.municode.com/co/boulder/codes/municipal_code?nodeId=TIT10ST_CH7.7COINENEF.

⁵⁶ *Boulder Building Performance Program*, CITY OF BOULDER, COLORADO, <https://bouldercolorado.gov/sustainability/boulder-building-performance-home>.

⁵⁷ City of Boulder Rebate Application, Building Performance Ordinance Level II Energy Assessment https://www-static.bouldercolorado.gov/docs/Rebate_Application_Level_II_EA-1-201706201116.pdf?_ga=2.74509842.1841840731.1543962158-1068505832.1543615849.



the larger the rebate.⁵⁸ The city also offers a robust compliance assistance program for building owners and property managers.⁵⁹

Chicago has adopted the second approach, requiring additions to meet the current building code and retrofitting if the addition passes a certain threshold. In Chicago, if an addition increases the building's floor area by 25 percent or less, the new construction must conform to the city's current building code.⁶⁰ If an addition increases the building's floor area by more than 25 percent, the entire building must conform to the city's current building code.⁶¹ The state of Illinois takes a slightly different approach to retrofitting requirements. For state-owned buildings in Illinois, retrofitting is required when "major renovations" occur, defined as "a project with a construction budget that equals 40 percent or more of the building's current replacement cost."⁶² These policies recognize that retrofitting during renovations can reduce the cost and provide an opportunity to upgrade components.⁶³

B. Expand energy efficient appliance and equipment rebates

Appliances, equipment for HVAC systems, and water heaters are relatively easy to replace with more energy efficient models, especially when compared with the difficulty and cost of upgrading structural components of existing buildings. Appliances and equipment have much shorter lifespans than the buildings in which they operate: 10-20 years for appliances compared with 70-100 years for buildings.⁶⁴ Given the opportunity for regular replacement and the potential of these products to affect building energy use, many states offer rebate programs for energy efficient appliances and end-use equipment to shrink the gap in price between more energy efficient models and competitors and encourage people to choose energy efficient models when they replace or spur early replacement.

⁵⁸ Id. For 2016-2017: Up to 30 percent of total cost; for 2018: Up to 20 percent of total cost; and for 2019: Reduced rebates may be available.

⁵⁹ *SmartRegs Steps to Compliance*, CITY OF BOULDER, COLORADO, <https://bouldercolorado.gov/plan-develop/smartregs-steps-for-action>.

⁶⁰ Municipal Code of Chicago, Rehabilitation Code, Chapter 13-200-250(a). Available at: [http://library.amlegal.com/nxt/gateway.dll/Illinois/chicago_il/title13buildingsandconstruction/chapter13-200rehabilitationcode?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:chicago_il\\$sanc=JD_Ch.13-200](http://library.amlegal.com/nxt/gateway.dll/Illinois/chicago_il/title13buildingsandconstruction/chapter13-200rehabilitationcode?f=templates$fn=default.htm$3.0$vid=amlegal:chicago_il$sanc=JD_Ch.13-200).

⁶¹ Id.

⁶² Green Buildings Act, 20 ILL. COMP. STAT. 3130/10
<http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=3109&ChapterID=5>.

⁶³ Richard Paradis, *Retrofitting Existing Buildings to Improve Sustainability and Energy Performance*, NATIONAL INSTITUTE OF BUILDING SCIENCES, WHOLE BUILDING DESIGN GUIDE <https://www.wbdg.org/resources/retrofitting-existing-buildings-improve-sustainability-and-energy-performance>.

⁶⁴ *State Energy-Efficient Appliance Rebate Program: Volume 2- Program Results*, U.S. DEP'T OF ENERGY BUILDING TECHNOLOGIES OFFICE 12 (June 2015)
https://www.energy.gov/sites/prod/files/2015/06/f23/SEEARP_volume_2_report_UPDATED_percent206-18-15.pdf.



A major expansion in state rebate programs took place between 2010 and 2014 when the U.S. Department of Energy (DOE) developed the State Energy Efficient Appliance Rebate Program (SEEARP) with funding from the American Recovery and Reinvestment Act of 2009. States had the freedom to design their own programs, determining which products would be eligible for rebates, setting the rebate amounts, and deciding to offer recycling bonuses for the items being replaced.⁶⁵ In the end, “SEEARP provided almost \$300 million to the 56 U.S. states and territories to support state-level consumer rebate programs...”⁶⁶ It’s important to note that SEEARP was a stimulus program meant to induce consumers to upgrade before a replacement was needed.⁶⁷

Based on the results of the various state programs, DOE suggested that maximizing the rebates available and the size of incentives led to greater participation and positive experiences with the programs. DOE noted some ways of achieving that, including pairing federal rebate funds with state rebate and tax incentive programs.⁶⁸ For example, Maryland integrated SEEARP into the existing rebate program structure run by utilities in the state. It selected products already covered by utility rebates and used SEEARP funds to add additional rebates. Maryland also used state funds from another program to cover the utilities’ additional administrative costs of managing the enhanced rebates. By setting up the program this way, Maryland kept administrative costs low overall and ensured that the utilities could not seek to recover additional administrative costs from ratepayers.⁶⁹ New Hampshire also used the SEEARP funds in a way that was complementary to past and existing rebate programs by offering rebates on products it hadn’t offered rebates on before: solar and ground-source HVAC equipment. The state treated this as an opportunity to stimulate interest in these products and create a market for them.⁷⁰

Some states struggled to strike the right balance on the size of the rebate to offer and experienced problems. Arkansas had significant participation at the beginning of its program and as participation dropped off, it realized that people participating had been planning to replace appliances. It was clear that the rebate was not high enough to induce people to replace appliances earlier than they planned. After raising the rebate values, participation picked up again.⁷¹ On the other hand, Iowa invested in marketing for the program, offered large rebates

⁶⁵ Id. at 3-4.

⁶⁶ *State Energy-Efficient Appliance Rebate Program*, U.S. DEP’T OF ENERGY OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY <https://www.energy.gov/eere/buildings/state-energy-efficient-appliance-rebate-program>.

⁶⁷ *State Energy-Efficient Appliance Rebate Program: Volume 1- Program Design Lessons Learned*, U.S. DEP’T OF ENERGY BUILDING TECHNOLOGIES OFFICE 11 (June 2015) https://www.energy.gov/sites/prod/files/2015/06/f23/SEEARP_volume_1_report_UPDATED_percent206-18-15.pdf.

⁶⁸ Id. at 14.

⁶⁹ Id. at 13.

⁷⁰ Id.

⁷¹ Id. at 11.



for specific appliances, and generated so much demand that the website and phone system for the program crashed. In reflecting on lessons learned, Iowa stated that smaller rebate values would have made demand more manageable and would have allowed the program to run smoothly over a longer time period.⁷²

The overall amounts and types of rebates under SEEARP were: “[a]pproximately 88 percent of rebates issued (1,575,406) were for major appliances, 10 percent (177,903) for HVAC, and 2 percent (30,116) for water heaters.”⁷³

III. GND transportation goal: “overhauling transportation systems in the United States to eliminate pollution and greenhouse gas emissions from the transportation sector as much as is technologically feasible, including through investment in— (i) zero-emission vehicle infrastructure and manufacturing; (ii) clean, affordable, and accessible public transportation; and (iii) high-speed rail”⁷⁴

A. National electric vehicle charging infrastructure, including highways, workplaces, and housing

Many states are working to expand electric vehicle charging infrastructure within their jurisdictions. States are proceeding in different ways, depending on their goals, available funding sources, and the type and amount of utility involvement in these efforts.

Some states, like Maryland, are planning to use funds allocated to them under the Volkswagen settlement to facilitate electric vehicle use.⁷⁵ Maryland’s final plan “reserves over \$11 million for electric vehicle charging stations, the maximum percentage allowed under the settlement....”⁷⁶

⁷² Id.

⁷³ *State Energy-Efficient Appliance Rebate Program: Volume 2- Program Results*, U.S. DEP’T OF ENERGY BUILDING TECHNOLOGIES OFFICE 2 (June 2015) https://www.energy.gov/sites/prod/files/2015/06/f23/SEEARP_volume_2_report_UPDATED%206-18-15.pdf.

⁷⁴ H.R.J. Res. 109(2)(H) 116th Cong. (2019). The policy report framed this goal in terms of two more specific goals: “100 percent Zero Emission Passenger Vehicles by 2030” and “100 percent Fossil-Free Transportation by 2050”. Carlock *supra* note 3 at 8.

⁷⁵ National Association of State Energy Officials & National Association of Clean Air Agencies, *About the settlement*, VOLKSWAGEN SETTLEMENT CLEARINGHOUSE <https://vwclearinghouse.org/about-the-settlement/> (explaining the settlement agreement that was reached with automaker, Volkswagen, and the U.S. Environmental Protection Agency and Federal Trade Commission in 2016, which provides an environmental mitigation fund allocated among the states for mitigation plan efforts).

⁷⁶ David Iaconangelo, *Md. Unveils plan for spending VW settlement*, ENERGYWIRE (Feb. 14, 2019) <https://www.eenews.net/energywire/2019/02/14/stories/1060121019>.



Minnesota recently released a new report outlining the state's vision for increasing electric vehicle (EV) use.⁷⁷ The state currently has over 600 public charging station outlets, but plans to expand the charging network to support its goal of powering 20 percent of the light-duty cars in the state with electricity by 2030.⁷⁸ The 20 percent figure assumes half of the vehicles will be battery electric vehicles and half will be hybrid electric vehicles.⁷⁹ A complementary state goal is to have 200,000 electric vehicles registered in Minnesota by 2030.⁸⁰

The New York Public Service Commission recently approved a plan by the state's utilities to install up to 1,074 fast chargers for public use over seven years. The utilities will be able to recover the costs, up to \$32 million, of investing in the chargers from utility ratepayers.⁸¹ Currently, there are only 78 DC fast-charger plugs⁸² available across New York state. Authorities have estimated that about 1,500 fast chargers will be necessary to support the state's goal of 800,000 zero-emissions vehicles by 2025.⁸³ One significant barrier to building out fast chargers is the demand charges imposed by utilities for power-use during peak times. The utilities and New York Public Service Commission have negotiated a work-around, providing incentives to balance the demand charges. The incentives range from \$4,000 to \$17,000 for every plug installed, depending on location and capacity, but can't exceed the total cost of power delivery annually.⁸⁴ Once a certain number of chargers are installed and used above certain rates (30-40 percent) the demand charges will be balanced out.⁸⁵

Virginia recently passed a bill that allows its Department of General Services, Department of Motor Vehicles, and Department of Transportation to operate charging stations for EVs on any property or facility controlled by agencies with charging fees set at prevailing market rates.⁸⁶ This bill complements another new law that allows localities, public institutions of higher education, and the Department of Conservation and Recreation to operate EV charging stations

⁷⁷ *Accelerating Electric Vehicle Adoption: A Vision for Minnesota*, MINNESOTA DEPARTMENT OF TRANSPORTATION, MINNESOTA POLLUTION CONTROL AGENCY & GREAT PLAINS INSTITUTE <http://www.dot.state.mn.us/sustainability/docs/mn-ev-vision.pdf>.

⁷⁸ Id.

⁷⁹ Id.

⁸⁰ Brett Hoffland, *Minnesota agencies unveil plan for growing electric vehicle industry*, KSTP-TV (Feb. 15, 2019) <https://kstp.com/news/minnesota-agencies-unveil-plan-for-growing-electric-vehicle-industry/5248294/>.

⁸¹ David Iaconangelo, *N.Y. regulators approve \$32M fast-charger plan*, ENERGYWIRE (Feb. 11, 2019) <https://www.eenews.net/energywire/2019/02/11/stories/1060120169>.

⁸² Roland van der Put, *Everything you've always wanted to know about EV fast charging*, FASTNED (May 18, 2018) <https://fastned.nl/nl/blog/post/everything-you-ve-always-wanted-to-know-about-fast-charging> (explaining how fast charging works and its benefits: fast chargers maximize a single grid connection and reduce waiting time for charging).

⁸³ Id.

⁸⁴ Id.

⁸⁵ Id.

⁸⁶ Serena Fischer, *Bill to let state operate EV charging stations passes*, GREENWIRE (Feb. 22, 2019) <https://www.eenews.net/greenwire/stories/1060122197/>.



on their property and allows them to limit usage to employees and authorized visitors.⁸⁷ Virginia currently has about 550 EV charging stations and more than 1,250 charging outlets.⁸⁸

Former California Governor Jerry Brown boosted his previous goal of having 1.5 million electric vehicles on the road in the state by 2025 to 5 million by 2030.⁸⁹ The state currently has 5,043 stations and 19,211 EV charging outlets, more than any other state.⁹⁰ In order to reach its ambitious goals, California has launched a multi-pronged effort involving a variety of agencies to increase EV adoption and use while building out charging infrastructure.⁹¹ California's 2016 Green Building Standards Code requires new one- and two-family dwellings and townhouses with attached private garages to be wired to support an EV charger.⁹² For new multi-family dwellings, where 17 or more units are constructed, three percent of the parking spaces provided must be EV charging spaces capable of supporting future chargers.⁹³

A new regional transportation initiative, the Transportation and Climate Initiative, was announced in December 2018. Nine states and the District of Columbia have committed to developing a cap for transportation emissions, similar to RGGI. The plan is to invest money earned from the sale of credits, that can be bought and traded for compliance, in electric vehicle infrastructure.⁹⁴ The agreement between the states also mentioned that they are considering coordinated electric vehicle infrastructure planning.

You can see amount of EV stations and chargers in each state at the [Alternative Fueling Station Data Center](#).

⁸⁷ Id.

⁸⁸ *Alternative Fueling Station Data Center: Virginia*, U.S. DEP'T OF ENERGY OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY https://afdc.energy.gov/stations/widget#/analyze?region=US-VA&fuel=ELEC&show_map=true.

⁸⁹ *Governor Brown Takes Action to Increase Zero-Emission Vehicles, Fund New Climate Investments*, OFFICE OF GOVERNOR EDMUND G. BROWN JR., STATE OF CALIFORNIA (Jan. 26, 2018) <https://www.ca.gov/archive/gov39/2018/01/26/governor-brown-takes-action-to-increase-zero-emission-vehicles-fund-new-climate-investments/index.html>.

⁹⁰ *Alternative Fueling Station Data Center: California*, U.S. DEP'T OF ENERGY OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY https://afdc.energy.gov/stations/widget#/analyze?region=US-CA&fuel=ELEC&show_map=true.

⁹¹ Rob Nikolewski, *California Commits Billions to Advance EV Programs*, THE SAN DIEGO UNION-TRIBUNE (Feb. 4, 2019) <https://www.tnnews.com/articles/california-commits-billions-advance-ev-programs>.

⁹² 2016 California Green Building Standards Code, CAL. CODE REGS. tit. 24, part 11, § 4.106.4.1. Available at: <https://codes.iccsafe.org/content/chapter/2079/>.

⁹³ Id. at § 4.106.4.2. See also 2019 California Green Building Standards Code (to be effective in 2020) <https://www.dgs.ca.gov/-/media/Divisions/BSC/03-Rulemaking/18MonthCodeAdoption/2018-Triennial-Cycle/2018-19-Commission-Meetings/January-2019-Approved-Standards/HCD-0618Part-11.ashx?la=en&hash=5F581C6A0DF638E559CCE369FCB128B9FDD89CE3>.

⁹⁴ Robert Walton, *Regional initiative to reduce transportation emissions would mirror RGGI*, UTILITY DIVE (Dec. 19, 2018) <https://www.utilitydive.com/news/regional-initiative-to-reduce-transportation-emissions-would-mirror-rggi/544738/>.



B. Public procurement of 100 percent electric vehicles

States own nearly 500,000 vehicles in the U.S. Many states have adopted measures to increase the fuel economy of their vehicles by adopting: 1) fuel efficiency standards, 2) fuel consumption reduction mandates, and/or 3) mandates to procure a greater percentage of hybrid, electric, or hydrogen-fuel vehicles.⁹⁵ California, Washington, and Massachusetts have the most robust policies.

California's most recent action was the passage of S.B. 498 in 2017, which requires at least 50 percent of the light-duty vehicles in the state vehicle fleet to be Zero Emission Vehicles (ZEVs) by 2025.⁹⁶ California defines ZEVs as battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles.⁹⁷ This new target builds on a previous mandate for at least 25 percent of state vehicle purchases to be ZEVs by 2020.⁹⁸ Additionally, A.B. 739 requires that 15 percent of newly purchased heavy vehicles⁹⁹ by state entities be zero-emission by December 31, 2025, and 30 percent by December 31, 2030.¹⁰⁰

Washington established its State Electric Fleet Initiative in 2015, with goal that 20 percent of new passenger vehicle purchases would be EVs by 2017.¹⁰¹ State agencies were required to achieve average fuel economy of 36 mpg for their fleet by 2015.¹⁰² Agencies could purchase ultra-low carbon fuel vehicles, which are excluded from average fuel economy calculation,¹⁰³ or conventional vehicles with average fuel economy of 40 mpg for light-duty vehicles and 27 mpg for light-duty vans.¹⁰⁴ Governor Executive Order 05-01 (2015) directed agencies to give priority to purchasing and using hybrid and fuel efficient vehicles.¹⁰⁵ Washington then took the step of

⁹⁵ *State and Local Policy Database: Fleets*, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY <https://database.aceee.org/state/fleets>.

⁹⁶ S.B. 498, codified at CAL. PUB. RES. CODE § 25724 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB498.

⁹⁷ *The Zero Emission Vehicle (ZEV) Regulation Fact Sheet*, CALIFORNIA AIR RESOURCES BOARD (2018) https://www.arb.ca.gov/msprog/zevprog/factsheets/zev_regulation_factsheet_082418.pdf.

⁹⁸ Press Release, Nancy Skinner, California State Senator for Senate District 9, Governor Signs Skinner Bill Jumpstarting Zero-Emission Vehicles for California Fleets (Oct. 10, 2017), <https://sd09.senate.ca.gov/news/20171010-governor-signs-skinner-bill-jumpstarting-zero-emission-vehicles-california-fleets>.

⁹⁹ With gross vehicle weight rating of over 19,000 pounds.

¹⁰⁰ A.B. 739, codified at CAL. PUB. RES. CODE § 25722.11 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB739.

¹⁰¹ *State and Local Policy Database: Fleets*, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY <https://database.aceee.org/state/fleets>.

¹⁰² WASH. REV. CODE § 43.19.622 <https://apps.leg.wa.gov/rcw/default.aspx?cite=43.19.622>.

¹⁰³ Also excluded: emergency response vehicles, vehicles driven less than 2,000 miles per year, and passenger vans over 8,500 lbs.

¹⁰⁴ Id.

¹⁰⁵ Gary Locke, Governor of Washington, Executive Order 05-01, Establishing Sustainability and Efficiency Goals for State Operations (Jan. 5, 2015) https://www.governor.wa.gov/sites/default/files/exe_order/eo_05-01.pdf.



requiring all state agencies and local governments to meet 100 percent of their fuel usage for publicly owned vessels, vehicles, and construction equipment from electricity or biofuel, to the extent practicable.¹⁰⁶

In Massachusetts, the Green Communities Act of 2007 required the state vehicle fleet to become 50 percent hybrid or alternative fuel by 2018.¹⁰⁷ The state also set average fuel efficiency standards for the fleet of 32 miles per gallon for passenger cars and 22 miles per gallon for light duty trucks, vans and sport utility vehicles.¹⁰⁸

Massachusetts is also a part of a multistate Memorandum of Understanding (MOU) on State Zero-Emission Vehicle Programs which includes California, Connecticut, New York, Oregon, Rhode Island, Vermont and Maryland. The states have committed to promote purchase of zero emission vehicles in a variety of ways, including “...to establish ZEV purchase targets for government and quasi-governmental agency fleets and report annually on ZEV acquisitions.”¹⁰⁹ The overall goal is to ensure 3.3 million electric vehicles are in state fleets by 2025.¹¹⁰

C. Electrification of mass transit, buses, rail lines, and train engines

Electric buses are expected to become a larger portion of public transit given pledges that states and cities are making to reduce emissions and electrify their bus fleets. About 33 percent of all transit buses in the U.S. are projected to be electric by 2045.¹¹¹

New York City’s Metropolitan Transit Authority has announced plans to convert the city’s public bus system to an all-electric fleet by 2040.¹¹² The fleet has more than 5,700 buses and is already is testing 10 electric buses and has plans to purchase 60 more in the near future.¹¹³ California

¹⁰⁶ WASH. REV. CODE § 42.19.648 <https://apps.leg.wa.gov/RCW/default.aspx?cite=43.19.648>

(allowing compressed natural gas, liquefied natural gas, or propane to be substituted for electricity or biofuel if the department of commerce determines that electricity and biofuel are not reasonably available).

¹⁰⁷ An Act Relative to Green Communities, codified at MASS. GEN. LAWS ch. 7, § 9A

<https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter7/Section9A> (“not less than 50 per cent of the motor vehicles owned and operated by the commonwealth shall be hybrid or alternative fuel vehicles by the year 2018”).

¹⁰⁸ *Fuel Efficiency Standard for State Fleet*, COMMONWEALTH OF MASSACHUSETTS (2016)

<https://www.mass.gov/files/documents/2016/10/tq/fueefficiencystandard-final.pdf>.

¹⁰⁹ State Zero-Emission Vehicle Programs, Memorandum of Understanding (Oct. 2013)

<http://www.nescaum.org/documents/zev-mou-8-governors-signed-20131024.pdf/view>.

¹¹⁰ Id.

¹¹¹ David Iaconangelo, *A third of U.S. buses on path to be carbon-free — report*, ENERGYWIRE (Feb. 5, 2019)

<https://www.eenews.net/energywire/2019/02/05/stories/1060119603>.

¹¹² Phil McKenna, *New York City Aims for All-Electric Bus Fleet by 2040*, INSIDE CLIMATE NEWS (April 26, 2018)

<https://insideclimatenews.org/news/26042018/nyc-air-pollution-electric-bus-public-transportation-mta-clean-technology>.

¹¹³ Id.



has committed to zero-emissions procurements for buses starting in 2029 with a statewide goal of reaching 100 percent zero-emission bus fleets by 2040.¹¹⁴

Seattle has committed to increasing the amount of electric buses in the King County fleet serving the Seattle metropolitan area. Specifically, King County announced plans in 2017 to purchase 120 all-electric buses by 2020 and a goal of electrifying its entire bus fleet by 2040.¹¹⁵ The existing fleet contains about 1,400 buses (most of which are hybrids that rely on both diesel and electrical power).¹¹⁶ Indianapolis has also committed to including electric buses in its public transit fleet and has 13 electric buses in use now.¹¹⁷

Most light rail systems in the U.S. already run on electricity, systems like Boston's T, New York City's Subway, Washington D.C.'s Metro, Chicago's L, and San Francisco's BART.¹¹⁸ The vast majority of passenger rail and all freight rail in the U.S. is diesel-powered.¹¹⁹ Some passenger rail lines have converted to electric power, specifically Amtrak's Northeast corridor line and Harrisburg, PA line,¹²⁰ and one is undergoing electrification: the CalTrain in the San Francisco Bay Area.¹²¹

These states, cities and transit systems show what is possible in terms of electrification and illuminate a path forward toward completely electric systems.

Conclusion

The efforts of cities and states across the country are important starting points for planning the ten-year mobilization outlined in the Green New Deal resolution. Federal policymakers have an opportunity to design programs that can be plugged into existing state policy architecture. They would be wise to take note of how states have faced challenges in these efforts and worked to overcome them. Congress should make the most of the advantages of federal action: creating more uniformity in climate efforts at the state level by establishing a federal floor and mobilizing

¹¹⁴ Press Release, California Air Resources Board, California transitioning to all-electric public bus fleet by 2040 (Dec. 14, 2018) <https://ww2.arb.ca.gov/news/california-transitioning-all-electric-public-bus-fleet-2040>.

¹¹⁵ Josh Keley, *King County Rolls on With Its Electric Bus Fleet Plans*, SEATTLE WEEKLY (July 20, 2018) <https://www.seattleweekly.com/news/king-county-rolls-on-with-its-electric-bus-fleet-plans/>.

¹¹⁶ Id.

¹¹⁷ *IndyGo receives first of 13 electric buses to serve Red Line*, INDIANAPOLIS BUSINESS JOURNAL (Sept. 14, 2018) <https://www.ibj.com/articles/70488-indygo-receives-first-of-13-electric-buses-to-serve-red-line>.

¹¹⁸ *This Is Light Rail Transit*, TRANSPORTATION RESEARCH BOARD (Nov. 2000)

https://www.apta.com/resources/reportsandpublications/Documents/light_rail_bro.pdf.

¹¹⁹ *Electrification of U.S. Railways: Pie in the Sky, or Realistic Goal?*, ENVIRONMENTAL AND ENERGY STUDY INSTITUTE (May 30, 2018) <https://www.eesi.org/articles/view/electrification-of-u.s.-railways-pie-in-the-sky-or-realistic-goal>.

¹²⁰ Id.

¹²¹ Roger Rudick, *Caltrain Electrification Charges Forward*, STREETS BLOG SF (Aug. 22, 2018) <https://sf.streetsblog.org/2018/08/22/caltrain-electrification-charges-forward/>.



federal resources to reach goals. The federal government needs to be mindful of the history of state control over some of these critical areas targeted for change and the specialized knowledge of subnational government units. Policymakers should craft cooperative plans that take into account the balance of federal, state and local authority in these areas while driving emissions down and transforming the country.