

A Roadmap to 100% Clean Electricity by 2035

Power Sector Decarbonization through a Federal Clean Electricity Standard
and Robust Clean Energy Investments and Justice-Centered Policies

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Executive Summary

- President Joe Biden and Vice President Kamala Harris campaigned and won on a bold platform for confronting the climate crisis and building a clean energy economic recovery—including a 100% clean energy standard for electricity by 2035, plus a \$2 trillion investment in clean energy and infrastructure, and deep commitments to confronting systemic environmental injustice.
- Congress must act on these commitments, and pass a federal Clean Electricity Standard (CES). This approach is proven in states—already one in three Americans live in a place targeting 100% clean, carbon-free power. It is popular, with more than two-thirds of voters supporting this policy. It is also a practical approach, which can ensure job creation and justice are at the center of a rapid clean energy transition.
- In Part 1 of this report, we explain how the next two years are critical for progress towards 100% clean electricity. Congress must act now to pass a CES, and to make bold investments in clean energy transformation. Passing a CES can be done by getting rid of the filibuster, but it can also be accomplished with 51 votes in the U.S. Senate; there are numerous options to enact CES through budget reconciliation. Under existing authority, the administration must also begin making important progress toward 100% carbon-free power.
- In Part 2, we outline key design options for a federal CES policy, including targets and timetables, the importance of regional equity, alternative compliance payments, the implementing agency, and integration with other regulatory structures.
- Equity and environmental justice must be central to a CES policy. We propose several policies to ensure that investments are targeted into disadvantaged communities and that distributed generation is prioritized. Energy efficiency should also be pursued alongside a CES policy, to minimize total additional electric capacity needed.
- There are several ways to design a CES so as to optimize for its passage through budget reconciliation. We outline 3 such federal CES policies: a CES with an “On the Books” Zero-Emissions Electricity Credit System (ZEC), a CES with Reverse-Auctions for ZECs, and a Mass-based federal CES. We also discuss 3 more federal CES-alternatives, in conditional block grants to states, a federal carbon-intensity standard, and use of the tax code to drive towards 100% carbon-free power.
- In Part 3, we outline additional, essential policies that are critical in reaching 100% carbon-free electricity. These include: federal clean energy investments through tax incentives, grants and public financing; energy transition support through debt retirement for coal plants and financial resources for fossil fuel communities; speeding up electrification of other sectors, including vehicles and buildings; streamlining clean energy siting and permitting, including on public lands; promoting electricity market competition, and intervenor compensation to ensure transition costs remain as low as possible; and policies to the technology innovation gap.
- In Part 4, we summarize and compare existing CES proposals in Congress.

Introduction

The United States of America must act urgently to reduce its carbon pollution to address the climate crisis. But this is not just a climate imperative—it is an opportunity to recharge the U.S. economy and create millions of good-paying jobs in the process. It is also an opportunity to address ongoing injustices, through transitioning away from polluting fossil fuel infrastructure overwhelmingly placed in communities of color. Achieving 100% clean, carbon-free electricity is a crucial first-order priority.

Transforming electricity generation is a linchpin to rapidly decarbonizing the US economy. Not only will it eliminate carbon and other air pollution from electric power—the second-largest sector for domestic emissions—it will also enable the clean electrification of transportation, buildings, and parts of heavy industry. In this way, achieving carbon-free electricity throughout the economy can help to catalyze upwards of a 70-80% reduction in U.S. carbon pollution.¹ The Evergreen Action Plan has called for the president and Congress to pass a Clean Electricity Standard (CES), alongside complementary investments and justice-centered policies, to achieve 100% clean, carbon-free electricity by 2035.² This policy is a foundational pillar in a national mobilization to defeat the climate crisis and build a more just and thriving American economy.

President Joe Biden and Vice President Kamala Harris campaigned on and won the 2020 election with this commitment to a 100% carbon-free electricity standard by 2035. It was a central feature of their Build Back Better agenda for a clean energy economic recovery, which also called for a \$2 trillion federal investment into clean energy and infrastructure, and ensuring at least 40% of those investment benefits accrue to disadvantaged communities. The 100% clean power by 2035 commitment was a policy the new president and vice president regularly discussed on the campaign trail.³

During the campaign, President Biden made climate change—and a clean energy economic recovery—a top priority. The campaign ran climate ads in Michigan and Arizona, key swing states that Democrats won. The public responded positively to this unprecedented focus on the climate crisis and a better clean energy future. In exit polls, climate change was a top issue for voters.⁴ Several polls right before the election also showed more than two-thirds of voters, crossing partisan, geographic, and demographic lines, supported the federal government moving the country to

¹ Stokes, L., "[Cleaning Up the Electricity System](#)", *The Democracy Journal*, Spring 2020.

² Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

³ Joe Biden for President Campaign, "[The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future](#)," July 2020.

⁴ NBC News, "[NBC News Exit Poll: Two-thirds of Voters See Climate Change as Serious Problem](#)", Nov. 2020; Graziosi, G., "[2020 Election Exit Polls Show Economy, Climate Change, Coronavirus Among Voters' Top Issues](#)", *Independent*, Nov. 2020.

100% clean power by 2035.⁵ Congress has a strong mandate to act on the climate crisis and clean energy.

During the first days of his administration President Biden has already demonstrated his deep commitment to 100% clean electricity by 2035. In announcing several historic climate executive orders on January 27, 2021, Biden said “we’ll take steps toward my goal of achieving a 100% carbon pollution-free electric sector by 2035. Transforming the American electric sector to produce power without carbon pollution will be a tremendous spur for job creation and economic competitiveness in the twenty-first century.”⁶

Now, therefore, achieving 100% clean electricity, through a federal Clean Electricity Standard (CES) and complementary policies, must be at the top of the new White House’s and Congress’ priority list this year. **CES policies are a proven, popular, and practical approach to effectively drive clean energy transformation on the ground.**

In this report, we outline how Congress can use a CES to put the U.S. on a path to 100% clean electricity by 2035. We show how a CES can be designed to rapidly decarbonize the power sector and center equity, good jobs, and community benefits while doing so.⁷ We also outline a number of investments and justice-centered policies that will be required to achieve this rapid 100% clean power goal. And we argue that this crucial policy commitment made by Democratic leaders can and must overcome any potential legislative barriers. This includes eliminating the filibuster in the United States Senate, or pass CES legislation through budget reconciliation.

CES Policies are Proven in States

States across the country have used CES and related policies for four decades, with great success. Since the early 1980s, thirty states, the District of Columbia (DC) and 3 U.S. territories have implemented Renewable Portfolio Standards (RPS) and CES policies that require utilities to increase their use of renewable or carbon-free energy resources, respectively, in electricity generation.⁸ **These electric utility performance standards have proven one of the most—if not the most—effective government policies that Americans have used to reduce carbon pollution and transform our energy system.**⁹

Since 2015, eight states plus DC and Puerto Rico have passed CES laws requiring fully 100% carbon-free electricity, while another six states have committed to a 100%

⁵ Data for Progress, [Voters Support the Thrive Agenda](#), Sept. 2020; Climate Nexus & Yale Program on Climate Change Communication (YPCCC), [“Poll: Voters Support Transition to 100% Clean Economy.”](#) Oct. 2020.

⁶ President Joseph R. Biden, Jr., January 27, 2021. Video taken by CSPAN, [“President Biden Signs Executive Orders on Environmental Policy.”](#)

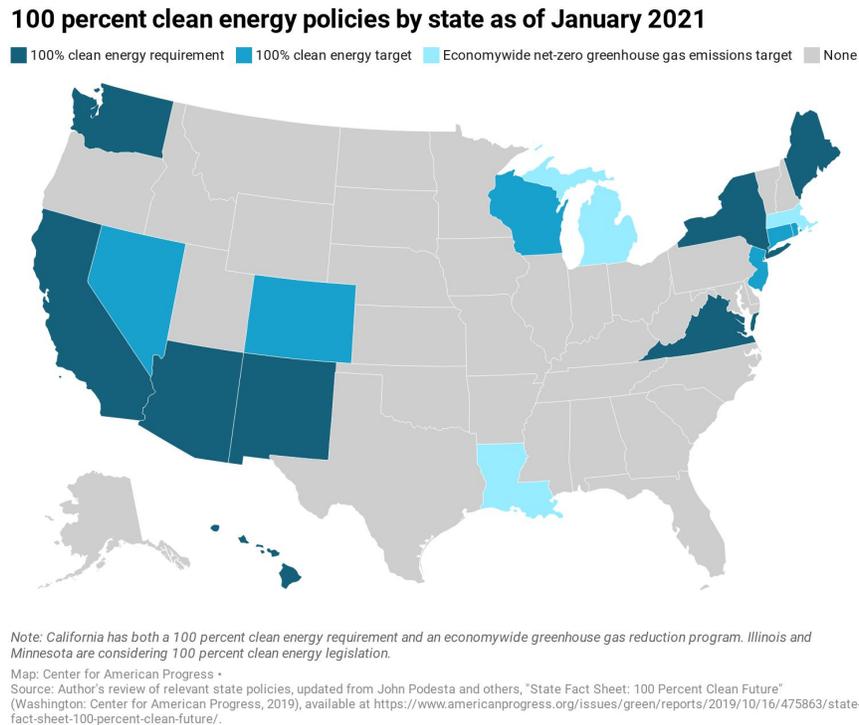
⁷ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

⁸ National Conference of State Legislatures (NCSL), [State Renewable Portfolio Standards and Goals](#), April 2020.

⁹ Wisner, R. et al., [“A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards”](#), Lawrence Berkeley National Laboratory (Berkeley Lab) & the National Renewable Energy Laboratory, Jan. 2016; Barbose, G. [“U.S. Renewables Portfolio Standards: 2019 Annual Status Update”](#), Berkeley Lab, July 2019.

clean target via non-binding legislative or executive action, some with strong binding interim benchmarks.¹⁰ These 16 states and territories are further joined in this 100% clean power commitment by over 200 cities and counties, 12 large utilities, and at least 150 businesses (Figure 1).¹¹ **Progress is accelerating: more than 1 in 3 Americans already live in a state or city that is committed to 100% clean electricity.**¹² Still other states, like North Carolina and Pennsylvania, are moving forward with plans for greenhouse gas pollution reductions from power plants.¹³ Notably, some of America’s largest companies, like Google, are currently targeting 100% clean power in real time to all their facilities by 2030.

Figure 1. States with 100% Clean Electricity Policies¹⁴



This material was published by the Center for American Progress.

¹⁰ Authors review of existing state policies, including through the Clean Air Task Force (CATF), “[State and Utility Decarbonization Commitments](#),” Oct. 2020; UCLA Luskin Center for Innovation, [Progress Toward 100% Clean Energy in Cities & States Across the U.S.](#), Nov. 2019; Clean Energy States Alliance (CESA), “[Advancing Toward 100 Percent: State Policies, Programs, and Plans for Zero-Carbon Electricity](#),” Dec. 2020; Center for American Progress (CAP) “[The Biden Administration Brings State Climate Leadership to the White House](#),” Jan. 2021; Sierra Club, “[Ready for 100%](#)”; Natural Resources Defense Council, “[Race to 100% Clean](#).”

¹¹ UCLA Luskin Center for Innovation, [Progress Toward 100% Clean Energy in Cities & States Across the U.S.](#), Nov. 2019.

¹² UCLA Luskin Center for Innovation, [Progress Toward 100% Clean Energy in Cities & States Across the U.S.](#), Nov. 2019.

¹³ Bonner, L., “[New North Carolina Energy Plan Cuts Greenhouse Gases from Electricity 70% by 2030](#),” *The News & Observer*, Sept. 2019; Legere, L., “[Pennsylvania Plan for Carbon Cap on Power Plants Advances](#),” *Pittsburgh Post-Gazette*, Sept. 2020.

¹⁴ Source: Center for American Progress (CAP) “[The Biden Administration Brings State Climate Leadership to the White House](#),” Jan. 2021

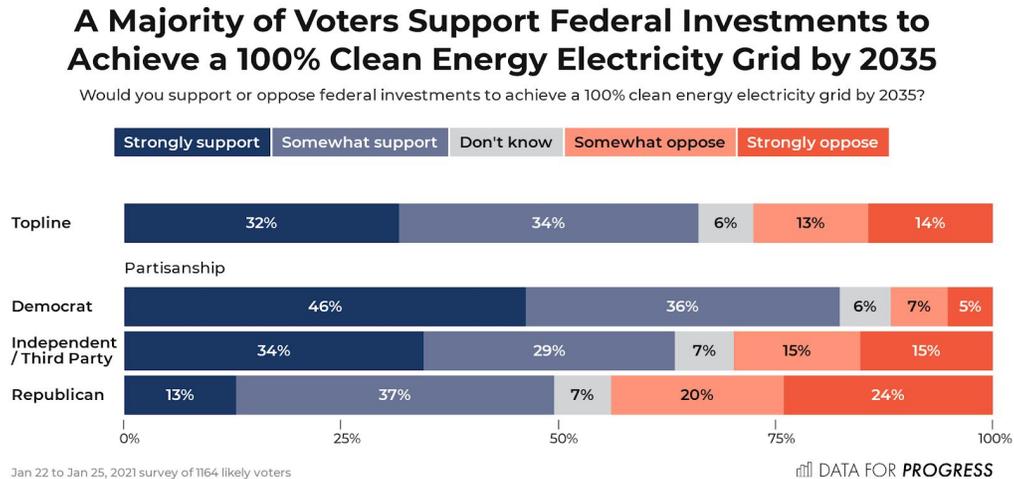
However, in spite of all this movement across the state and local landscape, federal action is critical. Particularly because 17 of the top 20 electric power sector-emitting states lack any kind of a clean electricity target.¹⁵ Moreover, very few of the existing targets are as ambitious as either science or President Biden’s commitments demand. A federal CES, that applies to all 50 states, is an essential part of a bold national agenda for climate action and clean energy economic recovery that advances social equity, job creation, and the growth of competitive domestic industries.

CES Policies are Popular with the Public

The American public strongly supports 100% clean electricity by 2035. In two recent, independent polls from Data for Progress and the Yale Program on Climate Change Communication, more than two-thirds of voters supported the federal government moving the country to a 100% carbon-pollution free electricity grid by 2035.¹⁶

In a national survey of likely voters fielded in January 2021, Data for Progress found that two-thirds of voters support federal investments to achieve a 100% clean energy electricity grid by 2035 (Figure 2). This proposal enjoys support across party lines, including an overwhelming majority of Democrats (82 percent), a majority of independents (63 percent), and a plurality of Republicans (50 percent).

Figure 2. National Likely Voter Support for 100% Clean Electricity by 2035



Support for clean energy is just as high in the key states that decided the 2020 elections as it is across the nation as a whole (Figure 3). A majority of voters in Minnesota (57 percent), Arizona (56 percent), Pennsylvania (56 percent), Nevada (54 percent), and Georgia (52 percent) support federal investments to achieve a 100% carbon pollution-free electricity sector by 2035.¹⁷ Clearly, Congress and the President have a strong mandate from the public to act.

¹⁵ NCSL, [State Renewable Portfolio Standards and Goals](#), April 2020; U.S. Energy Information Administration (EIA), [2017 State Energy-Related Carbon Dioxide Emissions by Sector](#), May 2020.

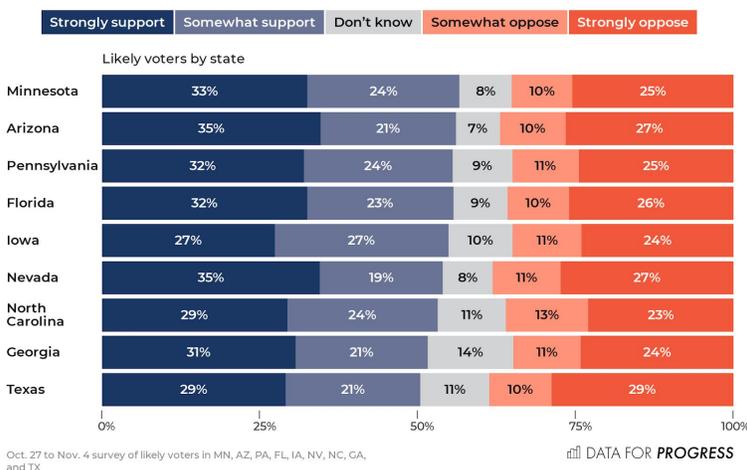
¹⁶ Data for Progress, [Voters Support the Thrive Agenda](#), Sept. 2020; Climate Nexus & Yale Program on Climate Change Communication (YPCCC), [Poll: Voters Support Transition to 100% Clean Economy](#), Oct. 2020.

¹⁷ Indivisible & Data for Progress. [2020 Senate Project](#).

Figure 3. Support in Key States for 100% Clean Electricity by 2035

A Majority of Battleground Senate Voters Support a 100% CES by 2035

Do you support or oppose federal investments to achieve a 100% carbon pollution-free power grid by 2035?



CES Policies will Drive Job Creation

Decarbonizing the power that flows on the nation’s electricity grid is an enormous challenge, but also an incredible opportunity for economic growth and social justice. The United States installed an estimated 33 GW of renewables in 2020—a new record and a dramatic improvement over the previous 2016 high water mark of 17 GW.¹⁸ This is an encouraging sign that clean power is ready to ramp up. However, meeting ambitious clean energy targets will require further acceleration, rapidly scaling deployment of clean electricity generation to 40-100 gigawatts (GW) of new capacity each year.¹⁹

To ensure success in this national agenda for 100% clean electricity, the federal government must play a leadership role in driving investment into clean energy deployment. And in addition to a carbon-free generation, this must include significant and sustained investments in transmission and distribution, storage, energy efficiency, demand-response, electric vehicles, and buildings technologies, and more. Federal lawmakers must provide significant direct public investment, and use those monies and public policies to leverage even greater private capital, through the tax code and grants, public financing, and strong performance standards. On the path to 100% carbon-free power by 2035, projections for necessary capital investment in the electricity system over the coming decade range from \$500 billion to \$600 billion.²⁰ And these policies can create millions of good jobs and drive environmental justice and equitable economic opportunity. Together, this new wave of public and private

¹⁸ EIA, “Renewables Account for Most New U.S. Electricity Generating Capacity in 2021,” Jan. 2021.

¹⁹ Princeton Net-Zero America Project, “Net-Zero America by 2050: Potential Pathways, Infrastructure, and Impacts,” Dec. 2020

²⁰ Princeton Net-Zero America Project, “Net-Zero America by 2050: Potential Pathways, Infrastructure, and Impacts,” Dec. 2020; Inslee for America, “The Evergreen Economy Plan,” May 2019

investment in power sector decarbonization could create a net increase of 500,000 to 1 million more jobs in the supply-side energy sector in this decade, reaching 2.2 million in the 2030s. Related jobs in energy efficiency could double these estimates.²¹

CES Policies will Advance Environmental Justice and Equitable Economic Opportunity

The transition to 100% carbon-free power by 2035 through a clean electricity standard is also an opportunity for healthier communities, environmental justice, and greater equity. According to a landmark paper from UC Berkeley’s Goldman School and GridLab, rapidly scaling up to 90% clean energy over the next 15 years would avoid \$1.2 trillion in health and environmental costs, while simultaneously lowering consumers electricity bills.²²

Currently, low-income communities and communities of color are disproportionately exposed to electricity sector air pollution, and more likely to suffer adverse health impacts and to die prematurely, as a result.²³ Nationwide, 6 of the 10 groundwater sites most contaminated by coal ash pollution are surrounded by residential areas in which people of color and low-income communities exceed state averages, a discovery only made possible by a recent ruling that now requires coal-fired electric utilities to publicly disclose groundwater monitoring data.²⁴ Additionally, recent research concludes that “Black and Hispanic minorities bear a disproportionate burden from the air pollution caused mainly by non-Hispanic whites.”²⁵ This air pollution burden leads Black children to have asthma rates two times as high as their white counterparts.²⁶ An effective national CES could help confront this long-standing environmental injustice, by virtually eliminating air pollution from power plants.²⁷ Phasing out coal from the electricity system by 2030 could avoid more than 100,000 premature deaths, and around \$1 trillion in damages.²⁸

A clean, efficient electricity system also has the potential to address the socio-economic and racial disparities in household income spent on utility bills.²⁹ Far from increasing the cost of energy services, the Berkeley and GridLab paper actually finds that wholesale electricity costs across the country (including the cost of

²¹ Sierra Club, [Millions of Good Jobs: A Plan for Economic Renewal](#), May 2020; Princeton Net-Zero America Project, [“Net-Zero America by 2050: Potential Pathways, Infrastructure, and Impacts”](#), Dec. 2020

²² Goldman School of Public Policy - UC Berkeley, [2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Energy Future](#), June 2020.

²³ Thing, M. et al., [“Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography”](#), *Environmental Science & Technology*, Nov. 2019.

²⁴ Environmental Integrity Project (EIP), [“Coal’s Poisonous Legacy: Groundwater Contaminated by Coal Ash Across the U.S.”](#), July 2019.

²⁵ Tessum, C., et al., [“Inequity in Consumption of Goods and Services Adds to Racial–Ethnic Disparities in Air Pollution Exposure”](#), *PNAS*, 2019.

²⁶ U.S. Department of Health and Human Services, [“Asthma and African Americans”](#), Jan. 2018.

²⁷ Goldman School of Public Policy - UC Berkeley, [2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Energy Future](#), June 2020.

²⁸ Princeton Net-Zero America Project, [“Net-Zero America by 2050: Potential Pathways, Infrastructure, and Impacts”](#), Dec. 2020

²⁹ ACEEE, [“Energy Burden” on Low-Income, African American, & Latino Households up to Three Times as High as Other Homes. More Energy Efficiency Needed](#), April 2016.

generation plus new transmission investments), could actually decline, with costs lower than 10% below today's, by 2035.³⁰

100% by 2035 starts with 80% by 2030

On the road to 100% clean energy by 2035, federal lawmakers should be targeting at least 80% clean electricity generation by 2030. The Evergreen Action Plan calls for the next president and Congress to enact a CES that requires “utilities to achieve 100% carbon-neutral electricity by 2030, and all-clean, renewable and zero-emission energy in power generation by 2035.”³¹ This initial ten-year benchmark, based on successfully implemented state policy in both Colorado and Washington, would require utilities to achieve at least 80% carbon-free generation by 2030.³² A federal CES should prioritize 80% carbon-free generation by 2030 as the near-term target that will ensure sustained carbon pollution reductions in the power sector over the coming decade.

CES is Part of a Broad Portfolio of Policies for a Clean Energy Recovery

A CES policy is an essential tool to target deep decarbonization. Of course, numerous other policies are critical to achieve 100% clean electricity and an equitable and prosperous clean energy economy. We explore several complementary policy approaches in Section 3. Federal lawmakers must make unprecedented investments in renewable energy, energy storage, transmission, smart grid, energy efficiency and related climate solutions. Public investments must unlock much greater private sector capital, and they must be designed with intentionality to ensure high-road labor standards and quality jobs, as well as real economic opportunities for the disadvantaged and deindustrialized communities that have too often been left behind and forgotten.

In particular, to drive down emissions throughout the economy, a focus on decarbonizing the transportation, building, and industrial sectors through electrification will be crucial. And while a CES can enable that transition, it is not sufficient—other sectoral standards and investments will also be needed. For example, Senator Chuck Schumer's (D-NY) Clean Cars for America proposal is one approach to driving clean car deployment and manufacturing to help decarbonize the transportation sector.³³ A CES can also be used alongside carbon pricing policy, particularly to target emissions outside of the electricity sector.³⁴ Similarly, as we discuss extending clean energy tax credits, or turning them into direct-pay grants, should also be prioritized in federal legislation, and should be used alongside a CES.

³⁰ Goldman School of Public Policy - UC Berkeley, [2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Energy Future](#), June 2020.

³¹ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

³² Washington State Legislature, [Washington Clean Energy Transformation Act \(RCW 19.405\)](#), May 2019; Office of the Colorado Governor, [Colorado Greenhouse Gas Pollution Reduction Roadmap](#), September 2020.

³³ Senate Democrats, [Leader Schumer Unveils New Clean Cars for America Climate Proposal\[...\]](#), Oct. 2019.

³⁴ MIT Center for Energy and Environmental Policy Research (CEEPR), [Trade-offs in Climate Policy: Combining Low-Carbon Standards with Modest Carbon Pricing](#), Nov. 2020

Among other complementary federal policy actions towards 100% clean electricity, lawmakers should provide financial support to retire existing fossil assets as rapidly as possible, particularly coal plants. This approach must center support for fossil fuel workers and communities navigating this ongoing energy transition. Scaling up the buildout of renewables will also require streamlining clean energy and transmission siting and permitting rules, through both legislative and executive action. To guarantee that the lower electricity prices we know are possible during a clean energy transition are passed on to customers, this agenda must promote competition and fairness in clean energy development, cost allocation and electricity delivery, and an intervenor compensation program to ensure the public interest is well represented in formal regulatory proceedings. And, to guarantee we have the technologies necessary for unlocking the last, most challenging 10% of decarbonization in the electricity sector, the federal government must accelerate its commitment to clean energy innovation, with increased investment in research, development, demonstration, and commercialization, including a concerted focus on bringing down the costs of energy storage.

This agenda provides an opportunity to promote greater environmental and economic justice, and to support high-quality good-paying union jobs building the clean energy economy. Achieving 100% clean electricity will unlock significant air pollution reductions that will improve people's health in disadvantaged communities. And it will also enable the U.S. federal government to act at the speed and scale necessary to meet our climate crisis. This agenda can ensure that any short-term costs of transition are not pushed onto everyday Americans struggling just to make ends meet. Throughout, the goal should be to drive sustained clean energy investment that will not only accelerate decarbonization but also unlock enormous economic opportunity. And to target these investments into parts of our country that have disproportionately provided and suffered from a legacy of environmental injustice, economic inequality, and de-industrialization.

Part 1. The Next Two Years are Critical for 100% Clean Electricity

The next two years are crucial. The Biden-Harris administration and the 117th Congress must confront the climate crisis and enact transformational policies that sustain a clean energy recovery for a more just, equitable and thriving American economy. History shows that new presidential administrations are at the height of their political power in their first two years. And 2021-2022 represents the first time in over a decade when the U.S. Congress will have an opportunity to advance meaningful climate and energy legislation. This moment must not go to waste. The last decade was lost in federal climate inaction, and there are no more decades left for Congress to delay the bold national mobilization that the climate crisis requires.

Given the critical importance of clean electricity to unlocking carbon pollution reductions throughout the American economy, the new Biden–Harris administration and Democratic leaders in the House and Senate must use the next two years to set the country on the path to 100% clean electricity by 2035. This means passing standards, investments, and justice-driven legislation, that includes a federal Clean Electricity Standard (CES), alongside supportive policies including crucial investments in clean energy deployment, manufacturing and innovation, and that supports good jobs and environmental justice. Simultaneously, the Biden–Harris administration must be committed to immediately using all existing authorities, including the federal *Clean Air Act*, to help achieve this goal by blocking new polluting power plants and reducing pollution from the conventional fleet that remains in service. Both executive and legislative action will be required for success on all of these fronts.

Heading into 2021, national Democratic leaders appear united around the necessity of this agenda for swift power sector decarbonization. President Biden and Vice President Harris’ Build Back Better economic plan calls for implementation of a nation-wide combined Energy Efficiency & Clean Electricity Standard to “achieve carbon-pollution free energy in electricity generation by 2035.”³⁵ In Congress, the House Select Committee on the Climate Crisis published a report in July 2020 that points to the implementation of a national Clean Energy Standard for the electricity sector as its very first policy recommendation.³⁶ And Senate Democrats’ 2020 report—*The Case for Climate Action*—identified a CES as a key national policy to guarantee the power sector’s contribution to economy-wide decarbonization by mid-century.³⁷ **In January 2021, Senate Majority Leader Chuck Schumer said on national television: “We have to do something about climate. We don’t have any more time. We need strong bold action. One way or another, we’ve got to get it done. We can even use reconciliation for a much broader proposal: [President] Biden’s Build Back Better.”** A 100% CES is at the center of the Biden plan.

The Filibuster as an Impediment to Climate Policies with Strong Bipartisan Support

Historically, CES policies have found bipartisan support in Congress. Republican senators Lindsey Graham (R-SC) and Richard “Dick” Lugar (R-IN) each introduced national CES bills in 2010. Former Senate Energy & Natural Resources Committee Chairman Jeff Bingaman (D-NM) introduced CES legislation in 2014.³⁸ The 116th Congress saw 3 CES bills introduced in the House and Senate, with 2 more discussion drafts released by lawmakers—including the Democratic leaders of the powerful House Energy & Commerce Committee.³⁹ Other CES bills are now in development.

³⁵ Joe Biden for President Campaign, [The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future](#).

³⁶ House Select Committee on the Climate Crisis, [Solving the Climate Crisis](#), June 2020.

³⁷ Senate Democrats’ Special Committee on the Climate Crisis, [The Case for Climate Action](#), Aug. 2020.

³⁸ Center for Climate and Energy Solutions (C2ES), [Clean Energy Standards: State and Federal Policy Options and Considerations](#), Nov. 2019.

³⁹ Bipartisan Policy Center (BPC), [Pathways to Decarbonization: A National Clean Energy Standard](#), March 2020; Advanced Energy Economy (AEE), [Overview of Clean Energy Standard Proposals in 116th Congress](#), Sept. 2020; 116th Congress, [S.1974 - Renewable Electricity Standard Act](#).

However, history has also taught us that Republican support cannot be counted upon for any sort of “climate” legislation under a Democratic president. More likely is that, in 2021, Republican leadership in the House and Senate will again weaponize legislative obstruction to deny bipartisan support for any Democratic legislative goals, just as they did in 2009, no matter the cost to the country or the planet. Therefore, the new Biden-Harris administration and Democratic majorities in Congress must be prepared to press ahead independently, firm in their conviction to build a 100% clean energy economy. Democrats must anticipate advancing their agenda without Republican votes in Congress even as—and especially because—a broad bipartisan majority of American voters support these policies.

This reality has already forced members of Congress and advocacy organizations to confront undemocratic Senate rules, in particular the “Filibuster” that allows a minority of Senators to block any legislation with just 41 votes. A majority of Americans support eliminating the filibuster, as shown in Data for Progress polling.⁴⁰ An increasing number of Democratic Senators have suggested they could support its elimination, as well.⁴¹ In a July speech former President Barack Obama called the filibuster a “Jim Crow relic,” and proposed that Democrats should end the rule if Republicans used it to block voting rights legislation.⁴²

The elimination of the filibuster would certainly serve to advance implementation of a federal CES. Further, when you combine the critical legislative policy changes needed for truly bold climate action with those necessary to ensure Americans’ right to vote, affordable health care, collective bargaining rights, and a humane and modern immigration system, it is not hyperbolic to say that the fate of American democracy, and of the world, require the death of the filibuster.

Clean Electricity Standards are Compatible with Budget Reconciliation

However, as helpful as it would be to eliminate the filibuster in the U.S. Senate, the opportunity to pass a CES is not dependent on success in this regard. Nor does other meaningful climate legislation—including realizing President Biden’s \$2 trillion investment vision—rest on rolling back this outdated and anachronistic Senate rule. Rather, the new Senate majority empowers federal lawmakers to follow through on their 100% clean energy policy commitments within the budget process.

The undemocratic idiosyncrasies of the U.S. Senate mean that supporters of climate action now contemplate use of the “Budget Reconciliation” process to achieve their legislative goals. This process allows for passage of legislation with a simple majority in the upper chamber. (Fifty-one votes or, 50 votes plus the vice president’s.) Reconciliation has been historically allowed use in a limited number of times per federal fiscal year, and has been confined only to legislation tailored to issues concerning the federal government’s outlays, revenues, budget and debt limit.

⁴⁰ Data for Progress, [Voters Support Eliminating the Filibuster](#), Aug. 2020.

⁴¹ Klein, E., “[The Definitive Case for Ending the Filibuster](#)”, Vox, Oct. 2020.

⁴² Millhiser, I., “[Obama: The Filibuster is a "Jim Crow Relic"](#)”, Vox, July 2020.

While some have voiced skepticism about the possibility of passing CES legislation via reconciliation, we argue strongly and unequivocally that a CES can absolutely fit within the confines of the “Byrd Rule” that defines its terms. Within this paper we discuss 3 options that could optimize a well-structured CES for successful passage under such a parliamentary strategy, and we further discuss 3 CES-alternative policies that are aimed at the same goal and should also fit within reconciliation. These 3 federal CES options are: **1) a federal CES with an “on the books” system for Zero-emissions Energy Credits (ZECs), inside the federal budget; 2) a CES with Reverse-Auctions for ZECs; 3) and a Mass-Based federal CES.** The CES-alternative policies are: 1) Conditional Block Grants to States for 100% Clean Power; 2) a federal Carbon-Intensity Standard for Electricity; and 3) Tax Code-Based Clean Electricity Policy. All 6 of these options are discussed in greater detail in Sec. 2.5.

In this paper, we centrally propose that a CES, and related policies that contribute to full power sector decarbonization, could pass through reconciliation and achieve an 80% reduction in carbon pollution in the power-sector over the 10-year federal budget window that is traditionally germane to reconciliation by 2030, putting the nation well on its way to fully meeting the goal of 100% clean, carbon-free electricity by 2035.

Use Existing Authorities to Get Started Immediately

Finally, it must be recognized that the Biden-Harris administration cannot wait for Congress before it takes aggressive action to drive carbon pollution reductions in the power sector that will realize its 100% clean energy commitments. This agenda must begin immediately. And it must include using existing federal authorities under the *Clean Air Act* through the Environmental Protection Agency (EPA), flowing from the 2007 *Massachusetts v. EPA* decision and the agency’s subsequent Endangerment Finding, to advance stringent greenhouse gas pollution standards for power plants.⁴³ It must also include carbon pollution co-benefits that are achieved as the Biden EPA reverses Trump rollbacks and promulgates new standards for toxic air pollution from power plants, such as for particulate matter, ozone, mercury, and air toxics standards.

The Federal Energy Regulatory Commission (FERC)—which now has a full suite of 5 Commissioners—could also play a critical role in driving the transition to 100% clean electricity. FERC could decide to use its existing authorities under the *Federal Power Act* to restructure markets to encourage competition, distributed energy technologies like flexible load technologies, and demand-response. These changes would enable greater levels of large-scale renewable energy resources to be integrated into the grid. The country’s largest energy buyers, with their own decarbonization goals, are leveraging their combined procurement power to support policies that expand grid

⁴³ Supreme Court of the United States, [Massachusetts et al. v. Environmental Protection Agency et al.](#), 549 U.S. 497, 2007; U.S. EPA, “[Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Section 202\(a\) of the Clean Air Act](#)”, 2009.

access to clean energy resources. Within the first week of the Biden Administration, the Renewable Energy Buyers Alliance, representing dozens of corporations—including Amazon, General Motors, Google, and Microsoft—released a policy statement calling on the federal government to expand and improve existing organized wholesale electricity markets,⁴⁴ a move they argue would accelerate grid decarbonization at least-cost.

The new administration should also take immediate, aggressive and creative action in using all of its existing federal financing authorities and funding mechanisms that can leverage greater private investment into clean energy deployment. These tools are legion: ranging from the Department of Energy (DOE) Loan Guarantee Program, and the Department of Agriculture (USDA) Rural Utilities Service, to the *Defense Production Act* and aggressive use of procurement authorities to deploy more renewable energy and grid storage at federal facilities throughout the country.

The subject of *Clean Air Act* regulation of carbon and criteria air pollution in the power sector under existing authorities is particularly important for 100% carbon-free power, and deserves a deeper treatment than it will receive in this paper. It should be understood as crucial for federal leadership on the climate crisis in the Biden-Harris administration.

Part 2. Implementing a Federal Clean Electricity Standard

Setting a national Clean Electricity Standard (CES) will unlock enormous investments that will rapidly deploy new technologies and investment to sustain new businesses, job creation, and economic recovery. This approach is technologically feasible, cost-effective, and will result in significant direct and indirect benefits for the American economy.

2.1. Design of a Federal CES

A Clean Electricity Standard (CES) is a well-tested policy approach. It involves establishing a target and a deadline (with intervening compliance periods) for the electricity sector. This policy creates a performance standard that electricity suppliers must meet in the execution of their operations: in the percentage of carbon-free electricity that they generate or use to service customers. A CES offers flexibility for regulated entities by giving them two alternate modes of compliance to help them meet their obligations under the standard—the purchase of credits through a Zero-emissions Electricity Credit (ZEC) trading system, and an Alternative Compliance Payment (ACP). A ZEC is representative, in relevant state policies, of the environmental, social and other non-power attributes of one megawatt-hour (MWh) of power that was generated from an eligible clean resource. There are a number of policy considerations in designing a ZEC system.

⁴⁴ Renewable Energy Buyers Alliance (REBA), "[Energy Buyer Federal Clean Energy Policy Statement](#)", Jan. 2021.

Targets, Compliance and Credits

Similar to Renewable Portfolio Standards (RPS), and existing CES policies in states across the country, a federal CES can be implemented by setting the requirement for the share of clean electricity in retail electricity sales and increasing the requirement until it reaches 100% by 2035. Each retail electricity provider (aka load-serving entity or LSE) begins with its current electricity mix, and a requirement to make demonstrable annual or regular improvements in its generation portfolio to reach that goal. We believe this requirement should be set as a linear percentage of increases until it reaches the 100% target in 2035. Each year, the utility must comply with their annual benchmark by retiring ZECs. They can earn those ZEC credits by generating clean power or through buying them from other generators that have extra credits. If an electric utility falls short of achieving its compliance obligation, it can pay an Alternative Compliance Payment (ACP) to the government agency implementing the program, for each unit of power necessary to meet its annual compliance obligation.

In creating a ZEC program, Congress can establish standards with which an entity must comply in order to qualify to sell ZECs. ZEC markets can also offer an economically efficient solution to obtaining the cheapest clean energy deployment in the short- to medium-term. However, economic efficiency cannot be prioritized over regionally equitable reductions in carbon pollution.

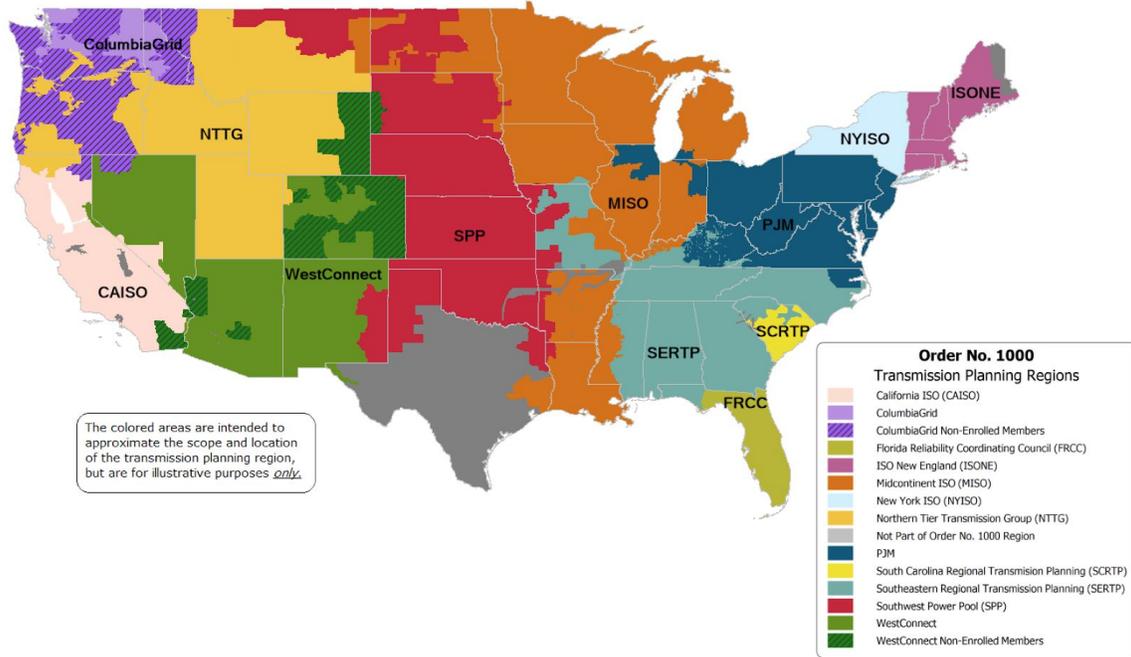
Regional Equity

A federal CES must consider how costs and benefits will fall regionally. Regions of the country have different clean energy resources, like hydropower, geothermal, wind and solar. Some parts of the country have already made significant strides in power sector decarbonization, while others have not. And regions vary in their current energy costs and economic challenges. A federal CES should promote regional equity as a central goal.

One way to promote regional equity in clean energy investments is to have ZEC trading areas limited to smaller geographic boundaries. This would help ensure that all regions of the country are capturing benefits from job creation and cleaner air. Regional boundaries could be defined based on existing Regional Transmission Organizations (RTO) and Independent System Operators (ISO), or other electricity market boundaries such as regional transmission planning bodies under FERC Order 1000 or the NERC regions (see Figure 4). This approach could also have the benefit of integrating regional transmission planning with the CES policy. Congress could also delegate to the implementing agency to establish regional boundaries. Resources with a direct connection or delivery to a given region could receive ZECs for that region—essentially bundling together the power and the credits. Alternatively, the policy could allow for some fraction of bundled ZECs—perhaps 80%—and some fraction of unbundled ZECs.

Figure 4. Potential Regional Boundaries for ZEC trading⁴⁵

Regional Transmission Planning Bodies under FERC Order 1000



North American Electric Reliability Corporation Regions



⁴⁵ Source: Lawrence Berkeley National Laboratory, "[Planning Electric Transmission Lines: A Review of Recent Regional Transmission Plans](#)", Feb. 2017.

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For example, LSEs could procure and retire credits only from clean energy resources that could also sell energy to that LSE, such as within a balancing authority or connected by transmission. The specific rules around implementing cross-region trading could be delegated to the implementing agency, such as the existing regional transmission planning bodies under FERC Order 1000.⁴⁶ Such a design would also avoid legal challenges surrounding out-of-state discrimination. Alternatively, Congress could delegate to states whether and how they organize into multi-state trading agreements. ZECs could still be traded across regions when there are imports through transmission connected sources.

Qualified Clean Energy Resources

Resource eligibility under a ZEC trading system should be tailored to maximize the buildout of new renewable energy resources, while maintaining existing zero-carbon resources and ensuring the reliability of the electricity system. All zero-carbon energy resources should be provided full credits under the system.

Using existing technology pathways, electricity system models show that during periods of normal generation and demand, wind, solar, and other renewables (e.g. geothermal, marine hydrokinetic), plus battery storage, could eventually provide approximately 70% of generation, coupled with an additional 20% from nuclear and hydropower.⁴⁷ Climate models also show that we cannot continue to build new uncontrolled fossil energy infrastructure and meet a 1.5 °C temperature target.⁴⁸ For the interim future, and pending technology breakthroughs, in times of poor renewable generation or extremely high demand, existing gas generation could step in to compensate for the mismatch between demand and clean generation. This gas generation could, theoretically, be controlled and emit no carbon pollution in electricity generation, using carbon capture. Biogas and synthetic gas could also be allowed to qualify for credits provided it can be shown that utilized fuels have a zero-carbon lifecycle. But the lifecycle carbon pollution associated with these resources, and therefore their climate benefit, are subject to a robust policy debate.⁴⁹

There is a discussion over whether uncontrolled gas plants, without carbon capture technology, should receive a partial credit under a CES. Some modelling suggests that such an approach could help to shutdown coal somewhat faster, leading to air pollution benefits. Compared to the business as usual scenario, a CES with or without partial crediting for uncontrolled gas will result in less overall gas being built. However, providing any incentives for uncontrolled fossil gas in a CES may not adequately discourage further overbuilding of gas infrastructure, leading to stranded costs and climate impacts. Some have also raised concerns that partial crediting for

⁴⁶ FERC, "[Order No. 1000 - Transmission Planning and Cost Allocation](#)," July 2011.

⁴⁷ Goldman School of Public Policy - UC Berkeley, [2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Energy Future](#), June 2020.

⁴⁸ Tong, D. et al., "[Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5 °C Climate Target](#)," *Nature*, July 2019.

⁴⁹ Searchinger, T. et al., "[Fixing a Critical Climate Accounting Error](#)", *Science*, Oct. 2009.

gas could create further financial challenges for nuclear plants by deflating wholesale electricity prices.

Methane leakage associated with gas production and distribution is a serious climate problem.⁵⁰ Estimates for the scale of methane leakage are challenging to pin down, but may be higher than the EPA has previously assessed.⁵¹ Depending on the scale of methane leakage, uncontrolled fossil gas plants can even have higher carbon footprints than coal plants.⁵² Methane leakage could be minimized through effort from industry and new regulations from the Biden Administration. As some have proposed, if gas plants receive partial credits, ZECs could be adjusted to account for the methane leakage per MWh of generation.

Some current CES proposals in Congress propose partial credit for fossil gas electricity generation resources. Legislation offered during the 116th Congress by Senators Tina Smith (D-MN) and Ben Ray Lujan (D-NM) set an emissions benchmark of 0.4 metric tons/MWh, which effectively excludes all fossil fuel resources except for fossil gas with carbon capture.⁵³ The bill proposed by Rep. Diana DeGette (D-CO), meanwhile, would establish an emissions benchmark of 0.82 metric tons/MWh. The House Energy & Commerce Committee later adopted this benchmark in its proposed *CLEAN Future Act*.⁵⁴ This benchmark provides for partial credit for fossil gas-fired power plants as a means of differentiation between coal and gas, which have different emissions profiles. This would theoretically push coal, the more carbon-intensive fuel, offline faster—a worthy objective. However, given the aforementioned methane leakage, such partial crediting of gas fails to account for the fuels' lifecycle climate impact, which may be quite large.

The DeGette bill seeks to address the issue of lifecycle climate impact by accounting for upstream greenhouse gas emissions and instructs the Energy Secretary to “use the best available science” to determine the carbon intensity of the fuel sources used by utilities to qualify with a CES, with a particular focus on fossil gas. This could provide a valuable tool as long as fossil gas remains a part of the electricity mix. However, in practice, this may be difficult to implement, as methane leakage occurs at various points from production to transportation of natural gas. The bill language includes emissions from extraction, flaring, processing, and transportation of gas—it has proven difficult to accurately and consistently measure the emissions across these areas.

⁵⁰ Alvarez, R. et al., “[Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure](#)”, *PNAS*, April 2012; Zhang, Y. et al., “[Quantifying Methane Emissions From the Largest Oil-Producing Basin in the United States From Space](#)”, *Science Advances*, April 2020.

⁵¹ Alvarez, R. et al., “[Assessment of Methane Emissions From the U.S. Oil and Gas Supply Chain](#)”, *Science*, July 2018.

⁵² Zhang, X. et al., “[Key Factors for Assessing Climate Benefits of Natural Gas Versus Coal Electricity Generation](#)”, *Environmental Research Letters*, Nov. 2014.

⁵³ 116th Congress, [S. 1359 - Clean Energy Standard Act of 2019](#).

⁵⁴ House Committee on Energy & Commerce, “[E&C Leaders Release Draft Clean Future Act Legislative Text to Achieve a 100 Percent Clean Economy](#)”, Jan. 2020.

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A similar approach was adopted in a recent bipartisan CES proposal released by Reps. David McKinley (R-WV) and Kurt Schrader (D-OR).⁵⁵ The proposal provides the Energy Secretary the option of working in consultation with the EPA Administrator (and technical input from FERC) to develop a dynamic crediting model that accounts for “the carbon dioxide emissions from electricity generation resources that are avoided or displaced by increasing the generation from generating facilities eligible to receive clean electricity credits.” A critical omission in the McKinley-Schrader proposal for dynamic crediting is its specific reference to “carbon dioxide emissions” as opposed to “greenhouse gas emissions,” or more specifically “methane emissions,” which would be the primary concern in a system that partially credits fossil gas. It should also be noted that the dynamic model that the DeGette and McKinley-Schrader proposals call for can be subject to erosion under future administrations, given discretion in how such a rule could be implemented and modified.

We believe that fossil gas generation without carbon capture should not receive credit under a federal CES. Ending carbon and other pollution from coal power plants is an important policy goal, towards which the CES will contribute, as will other policies, such as criteria pollutant regulations as well as debt retirement or securitization (section 3.2). As an alternative to a partial credit for uncontrolled fossil gas, coal plants that shut down early could be given credits, as C2ES has recently proposed.⁵⁶ This would have the effect of loosening the CES policy stringency, so such credits should likely be for a short duration.

In addition to questions around fossil fuel-powered generation resources, existing nuclear plants may also merit special consideration. The Rhodium Group projects that, under current policy, up to two-thirds of the existing nuclear energy fleet could be retired from the grid by 2030, striking an enormous blow to the country’s largest current source of carbon-free electricity.⁵⁷ Federal lawmakers should take pains to ensure that all safely-operating existing nuclear generators continue to remain online and contribute toward a fully carbon-free electricity grid.

Alternative Compliance Payments

Alternative Compliance Payments (ACPs) provide a backstop compliance mechanism when there is a scarcity of ZECs available for LSEs to purchase, and provide an important accountability mechanism throughout the enforcement term of a CES. Additionally, the value of the ACP can effectively serve as a price ceiling for ZEC trading systems, as LSEs would only purchase ZECs if they are cheaper than the ACP. The ACP can be pegged to a dynamic value that increases year-on-year to ensure that the cost of non-compliance with a CES becomes greater over time. A study by

⁵⁵ 116th Congress, [Clean Energy Future through Innovation Act of 2020](#); Rep. David McKinley, “[McKinley, Schrader Introduce Bipartisan Bill to Spur Innovation, Reduce Power Sector Emissions](#)”, Dec. 2020.

⁵⁶ Center for Climate and Energy Solutions (C2ES), [Clean Energy Standards: State and Federal Policy Options and Considerations](#), Nov. 2019.

⁵⁷ Rhodium Group, [An Assessment of the GREEN Act: Implications for Emissions and Clean Energy Deployment](#), Dec. 2019.

Resources for the Future of Sen. Bingaman's 2012 CES legislation found that its ACP would mitigate any retail electricity price increases.⁵⁸ The flipside of this, however, is that an ACP could have the effect of undercutting emissions reductions unless it is valued high enough to deter its significant use.

We believe that an ACP is an important part of a federal CES, and that it should begin at a modest value but increase gradually and then sharply over time, to ensure a cost-effective CES that appropriately incentivizes compliance and sustained decarbonization for LSEs in all regions of the country. In setting this amount, in early years especially, Congress and/or the program administrator should contemplate in particular consequences upon the fleet of existing nuclear plants, and their ability to continue to compete versus gas and continue providing carbon-free electricity generation. Furthermore, we propose reinvesting the revenues derived from ACPs in a way that drives an equitable clean energy transition, including in renewable energy and energy efficiency projects in low-income communities and communities of color, and in economic development in communities experiencing retirement of fossil fuel assets - coal-fired power plants, in particular.

2.2. Regulatory and Legal Considerations in Implementing a Federal CES

Implementing a federal CES will require concerted federal oversight and integration with existing regulatory structures. Federal agencies will need to oversee compliance with the CES as well as the monetary flows between regulated actors in the implementation of a CES.

Implementing agency

The Department of Energy (DOE), the Environmental Protection Agency (EPA), or the Federal Energy Regulatory Commission (FERC) could be designated as the lead agency in implementing a federal CES. DOE, with its Office of Energy Efficiency & Renewable Energy (EERE) can leverage its coordination with State Energy Offices and the U.S. Energy Information Administration, giving it the capability to collect and utilize data on the electricity generation mix of LSEs. The EPA has experience regulating air pollution from power plants under the *Clean Air Act*. FERC is also an experienced regulator, particularly with oversight of wholesale electricity markets and therefore firm institutional knowledge of and regular engagement with LSEs. Alternatively, any one of these federal agencies can serve as the coordinating body with relevant agencies in enforcing CES, including the Department of Treasury, the Department of Labor, and the Federal Trade Commission.

Integration with Other Regulatory Structures

As states continue to assert their clean energy leadership, the jurisdictional line between federal and state energy policy has become increasingly blurry, and occasionally in conflict. Under the Trump administration, FERC has taken extraordinary steps to undercut state clean energy subsidy programs, as in the case

⁵⁸ Resources for the Future (RFF), [Analysis of the Bingaman Clean Energy Standard Proposal](#), May 2012.

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of Illinois, New Jersey, and Maryland,⁵⁹ and in limiting the ability for wholesale electricity markets to favor renewable energy resources, as in the case of New York.⁶⁰ State RPSs have also come under attack. As recently as 2015, Colorado's RPS was challenged by an industry group for allegedly running afoul of the constitution's Dormant Commerce Clause because out-of-state fossil fuel energy producers were burdened in their ability to sell electricity to Colorado LSEs.⁶¹ While the Colorado RPS was upheld unanimously, states continue to be constrained in their ability to support clean energy, or even just to make gas and coal plants pay some small share.⁶²

A federal CES could further clarify the jurisdictional lines between federal and state authority in energy policy and therefore further empower states in their efforts to advance clean energy. In addition to putting state clean electricity standards on relatively stronger legal footing, it would also send a clear signal to FERC, wholesale electricity operators (RTO/ISOs), and state public utility commissions, to establish the rules necessary to allow a federal CES to be implemented most efficiently, while allowing states to maintain their authority and the implementation of their complementary programs. This is especially important as a bulwark against potential backsliding in future federal policy.

Separately, the EPA's Clean Air Act authority to regulate greenhouse gas pollution from stationary sources should remain intact under a federal CES. And, the implementation of a federal CES would not and should not in any way subtract from the important work that the EPA must do to limit traditional air pollutants from power plants, such as through rules like *Clean Air Act* Mercury and Air Toxics Standards (MATS). These rules - and the life-saving pollution-reductions they will cause - are particularly critical to an all-of-government agenda for environmental justice, given that communities of color and low-income communities face a significant amount of toxic air pollution and suffer greater associated death and health impacts as a result.⁶³

⁵⁹ Kuckro, R. & Dillon, J., "[FERC Throws Support to Fossil Fuels in Largest Power Market](#)", *E&E News*, Dec. 2019.

⁶⁰ St. John, J., "[FERC Order May Undermine Renewables, Energy Storage in New York's Capacity Markets](#)", *Greentech Media*, Sept. 2020.

⁶¹ Thaler, J., "[Tenth Circuit Rejects Commerce Clause Challenge to Colorado's RPS](#)", *American College of Environmental Lawyers*, July 2015.

⁶² McDevitt, R., "[PA. House Moves to Block RGGI Entrance as DEP Estimates It Will Save Money and Lives](#)", *The Allegheny Front*, July 2020.

⁶³ Thing, M. et al., "[Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography](#)", *Environmental Science & Technology*, Nov. 2019.

2.3. Equity and Environmental Justice in a CES

The Biden-Harris Build Back Better plan placed environmental justice at the center of its agenda for a just and thriving clean energy economy. The federal government must ensure that climate policy brings all communities along in the transition. Too often, environmental policy-making has discriminated against Black and brown communities by saddling them with the toxic costs of environmental pollutants, while simultaneously making it difficult for these communities to access the benefits of public investments in clean energy development.⁶⁴ These failures are not acceptable, and now is the chance for federal lawmakers to advance policies that confront these inequities and build a just and truly inclusive clean energy recovery.

A 100% CES policy in itself is designed to ensure air pollution reductions throughout the full power sector - and under this ambitious policy design, to eliminate carbon pollution from the sector over the next 15 years, along with a suite of criteria air pollutants. This will result in enormous public health benefits for the American public, and in particular in these disadvantaged communities who suffer a significantly disproportionate burden of overall air pollution from power plants.⁶⁵ This overall federal agenda for 100% clean electricity must involve a commitment to air pollution reductions specifically in disadvantaged communities, including through enforcement of stringent *Clean Air Act* pollution standards and investments that speed the retirement of coal plants and other fossil fuel infrastructure.

However, we propose that a federal CES policy should be designed to go further in support of environmental justice and equity goals, by intentionally targeting clean energy investments into disadvantaged communities, and by promoting residential and community solar and other distributed energy generation resources. The Evergreen Action Plan, inspired by the New York State *Community Protection & Climate Leadership Act*, called for the next president and Congress to “work together to direct at least 40% of all green federal investments into disadvantaged communities.”⁶⁶ The Biden-Harris Build Back Better Agenda fully embraced that goal.⁶⁷ The Evergreen Action Plan also calls for adoption of “a national goal to meet 10% of total electricity demand through distributed solar energy generation,” to shift “away from corporate, centralized power in a fossil fuel economy to more distributed ownership and power in the clean energy economy.”⁶⁸ This latter proposal, which

⁶⁴ Sunter, D. et al., “[Disparities in Rooftop Photovoltaics Deployment in the United States by Race and Ethnicity](#)”, *Nature Sustainability*, Jan. 2019.

⁶⁵ Thing, M. et al., “[Fine Particulate Air Pollution from Electricity Generation in the US: Health Impacts by Race, Income, and Geography](#)”, *Environmental Science & Technology*, Nov. 2019.

⁶⁶ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020; New York State, [A08429 - Climate Leadership and Community Protection Act](#), 2019.

⁶⁷ Joe Biden for President Campaign, “[The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future](#),” July 2020.

⁶⁸ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

could drive an estimated \$150 billion of additional investment over the next ten years, was adopted in the *Solving the Climate Crisis* report issued by the House Select Committee on the Climate Crisis.⁶⁹ We propose that a federal CES should focus on progress toward these important goals.

Reducing Electricity Costs, Particularly for Disadvantaged Communities

Clean electricity is cheap electricity, and a national CES paired with supportive federal investments could decrease customer electricity bills 10% from current levels.⁷⁰

In practice, however, new infrastructure and technology costs related to the energy transition could be passed on to some consumers (even as costs decrease in the aggregate), disproportionately harming those households that already pay a large share of their income on energy bills.⁷¹ From Appalachia to Detroit, frontline communities are concerned about their ability to adapt to the energy transition.⁷² The CES could be designed so that marginal additional costs in the energy transition are carried in the federal budget, as we explain is possible with various CES policies through reconciliation (Section 2.5).

Relatedly, the existing Low Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP) can help Americans cover energy costs. Studies confirm that these programs achieve their desired outcomes, improving overall energy efficiency, draftiness, and related health outcomes, and providing utility bill assistance and winter crisis relief.⁷³ However, both the LIHEAP and WAP are severely underutilized, with only a fraction of eligible households receiving assistance.⁷⁴ Both programs' application processes and eligibility requirements should be loosened, outreach efforts improved, and landlord-renter incentives made equitable. Energy insecurity assistance programs such as these should be made integral to the federal government's just transition efforts.

In response to continuing economic stress caused by the COVID pandemic, more than 600 racial justice, labor, environmental and religious organizations have called on President Biden to implement an immediate nationwide moratorium on utility shut-offs.⁷⁵ And, although previous pandemic-related shutoff moratoriums at the state and utility level have enabled small businesses and residential customers to defer utility payments and keep the lights on, *these customers have accrued upwards*

⁶⁹ Browning, A., "[Expanding Local Solar and Storage Could Save Ratepayers Nearly Half Trillion Dollars](#)", *Vote Solar*, Dec. 2020; House Select Committee on the Climate Crisis, *Solving the Climate Crisis*, June 2020.

⁷⁰ Goldman School of Public Policy - UC Berkeley, [2035 Report: Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Energy Future](#), June 2020.

⁷¹ ACEEE, "[Energy Burden](#)" on Low-Income, African American, & Latino Households up to Three Times as High as Other Homes. [More Energy Efficiency Needed](#), April 2016.

⁷² Graff, M. et al., "[Stakeholder Perceptions of the United States Energy Transition: Local-level Dynamics and Community Responses to National Politics and Policy](#)", *Energy Research & Social Science*, Sept. 2018.

⁷³ Carley, S. & Konisky, D. "[The Justice and Equity Implications of the Clean Energy Transition](#)", *Nature Energy*, June 2020.

⁷⁴ *Ibid.*

⁷⁵ Grandoni, D. "[The Energy 202: Biden Under Pressure to Stop Utility Shutoffs During Pandemic](#)", *The Washington Post*, Jan. 2021.

of \$30 billion in unpaid bills.⁷⁶ The Biden administration has made a \$5 billion commitment to help cover those costs as part of its proposed coronavirus package⁷⁷ Without adequate federal support, or a national shutoff moratorium, many households and small businesses will face an impossible decision: pay back thousands in unpaid bills or go without energy and water access altogether. This crisis requires immediate action from the administration and Congress.

Carve-Outs for Equity

Clean Electricity Standards have often been designed to include carve-outs, wherein a certain portion of the ZECs acquired by LSEs must meet specific criteria. Setting carve-outs could be one important way to ensure the transition advances equity and accomplishes economic and environmental justice goals. Specifically, we propose two different carve-outs: one that targets utility clean energy investments into disadvantaged communities, and another that requires dedicated build-out of distributed energy generation resources. In practice, these carve-outs will require creating different classes of ZECs — Zero-emissions Electricity Credits-Community (ZEC-Cs) and Zero-emissions Electricity Credits-Distributed Generation (ZEC-DGs).

Disadvantaged Community Carve-out (ZEC-Cs): Clean energy projects should be targeted towards disadvantaged communities that have experienced cumulative impacts of environmental harm and economic inequality. Disadvantaged communities would necessarily be defined through a federal Equity Mapping program. This could include low-income communities and communities of color, as well as communities that have experienced economic disinvestment and deindustrialization. Given these projects may take additional time to develop, we propose a compliance deadline every 5 years. By 2025, LSEs must fulfill their ZEC obligation with at least 10% ZEC-Cs; by 2030, 15% of all ZECs from the previous 5 year period must meet this criteria; by 2035, 20% of ZECs from the previous 5 year period must be ZEC-Cs. The electricity system investments that flow through this program would complement the Biden-Harris Build Back Better Plan's broader commitment to target at least 40% of their green economic investments into disadvantaged communities. The communities where clean energy projects are located should benefit from clean energy projects. One model is Community Benefit Agreements, which are signed between community groups and project developers and detail specifically how the developer will ensure project benefits in the community.⁷⁸

Distributed Generation Carve-out (ZEC-DGs): Investments in small-scale, distributed renewable energy generation can help advance equity by reducing the disproportionate energy burden borne by low-income households, strengthening community self-determination and ownership of energy resources, and addressing

⁷⁶ Trabish, H. "[Utility Customers Owe up to \\$40B in COVID-19 Debt, but Who Will Pay it?](#)", *Utility Dive*, Dec. 2020.

⁷⁷ Grandoni, D. "[The Energy 202: Biden Under Pressure to Stop Utility Shutoffs During Pandemic](#)", *The Washington Post*, Jan. 2021.

⁷⁸ Partnership for Working Families, [Community Benefits 101](#).

the unequal impacts of fossil fuel pollution.⁷⁹ Distributed energy resources are also a key tool to strengthen grid resilience in the face of wildfires, superstorms and other climate disasters.⁸⁰ To advance these equity and resilience goals, and fulfill the distributed energy target set forth in the Evergreen Action Plan, we propose that 10% of ZECs be set aside for generation from distributed solar and other generation projects, as ZEC-DGs, defined as installations with generating capacity of 1 MW or less.⁸¹ We propose a compliance deadline every 2 years.

Implementation of the ZEC-C carve-out, in particular, requires the federal government to define disadvantaged communities. To do so it should follow the lead of several states in identifying communities most impacted by environmental harms and the transition. Environmental justice groups in states like California and Washington have worked with their state governments to implement statewide Equity Maps.⁸² An Equity Map gathers data about environmental exposures, as well as health, economic, demographic, and social inequities, and displays which communities have faced the greatest cumulative impact from environmental harm. Evergreen Action and Demos have together proposed the creation of a federal Equity Map, utilizing as a foundation the existing EPA EJSCREEN program.⁸³

2.4. Energy Efficiency Targets linked to a CES

In parallel with cleaning the carbon out of our electricity system, we must focus on energy efficiency. This is particularly important as we electrify other sectors and in so doing dramatically increase domestic electricity demand. In their Build Back Better plan Biden and Harris actually proposed a combined national “Energy Efficiency and Clean Energy Standard” (EECES)⁸⁴ to drive both efficiency improvements and the transition to clean generation in utilities and grid operators, on the way to 100% carbon-free power by 2035. This combined standard has precedent at the state and federal levels, and will warrant attention from federal lawmakers in consideration of CES policies.

We propose that a national Energy Efficiency and Resource Standard (EERS) should be enacted as a complementary policy to a CES. It would play an important role holding down electricity demand growth while clean energy assets replace existing fossil fuels—critical support for meeting a 100% CES as fast as possible. Energy efficiency is the great “low hanging fruit” of climate policy, with the potential to cut

⁷⁹ Institute for Policy Studies (IPS), [How States Can Boost Renewables with Benefits for All: Renewable Portfolio Standards and Distributed Solar Access for Low-Income Households](#), April 2017.

⁸⁰ Wang, Yi et al., “[On Microgrids and Resilience: A Comprehensive Review on Modeling and Operational Strategies](#)”, *Renewable and Sustainable Energy Reviews*, Sept. 2020.

⁸¹ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

⁸² Evergreen Collaborative and Demos, [Designing a New National Equity Mapping Program](#), Oct. 2020.

⁸³ Ibid.

⁸⁴ Joe Biden for President Campaign, “[The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future](#),” July 2020.

domestic greenhouse gas pollution in half by 2050 and generate hundreds of billions of dollars in consumer savings.⁸⁵ And energy efficiency can reduce loads during periods of emerging peak demand (hot summer evenings and cold winter mornings), reducing the amount of power we will need to generate and store. An EERS requires electricity and natural gas providers to reduce energy demand via efficiency measures, overcoming market barriers and failures⁸⁶ to chip away at the two-thirds of US electricity production that is currently wasted before end use *and* by partnering with energy consumers to reduce demand overall.⁸⁷

Currently, 28 states have standalone EERSs or include energy efficiency as part of their Renewable Portfolio Standards.⁸⁸ While there is some variation in the design and implementation of these policies—energy savings targets, regulated entities, and efficiency delivery mechanisms—the vast majority are successful in reaching their targets. For example, in 2017, states with an EERS policy saved 1.2% in retail electricity sales on average (measured as a reduction in previous year demand), compared to just 0.3% savings in states without a policy—this is four times more savings.⁸⁹

Setting a Federal Energy Efficiency Target

Many state EERS policies don't cover every utility within the state, with some large industrial ratepayers, rural co-ops, and municipally-owned utilities opting out completely. As a result, the total percentage of retail electricity and gas sales covered by EERS policies ranges from 50% to 100% depending on the state.⁹⁰ A national energy efficiency benchmark should be pursued alongside a CES to provide comprehensive efficiency targets and close the gaps in the current state-based system (Figure 5). Setting a bold retail electricity reduction target, with planned incremental increases, would spur the adoption and improvement of existing energy efficiency technology by retail electricity and natural gas sellers. A federal goal should be to reduce cumulative electricity demand 25% and natural gas 50% by 2035. Compliance with the federal target can be met in various ways: through end-use efficiency programs, transmission and distribution infrastructure improvements, and waste heat recapture.⁹¹ A federal EERS policy should direct the Department of Energy to establish an efficiency program that delegates implementation to the states wherever states are willing to take the lead. In this way, states that already maintain robust EERS policies that exceed the federal standard can continue doing so without federal pre-emption. State policies that fail to meet or exceed the benchmark would be compelled to implement the federal standard.

⁸⁵ American Council for an Energy-Efficient Economy (ACEEE), [Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050](#), Sept. 2019.

⁸⁶ Acadia Center, [Best Practices for Advancing State Energy Efficiency Programs: Policy Options & Suggestions](#), Feb 2012.

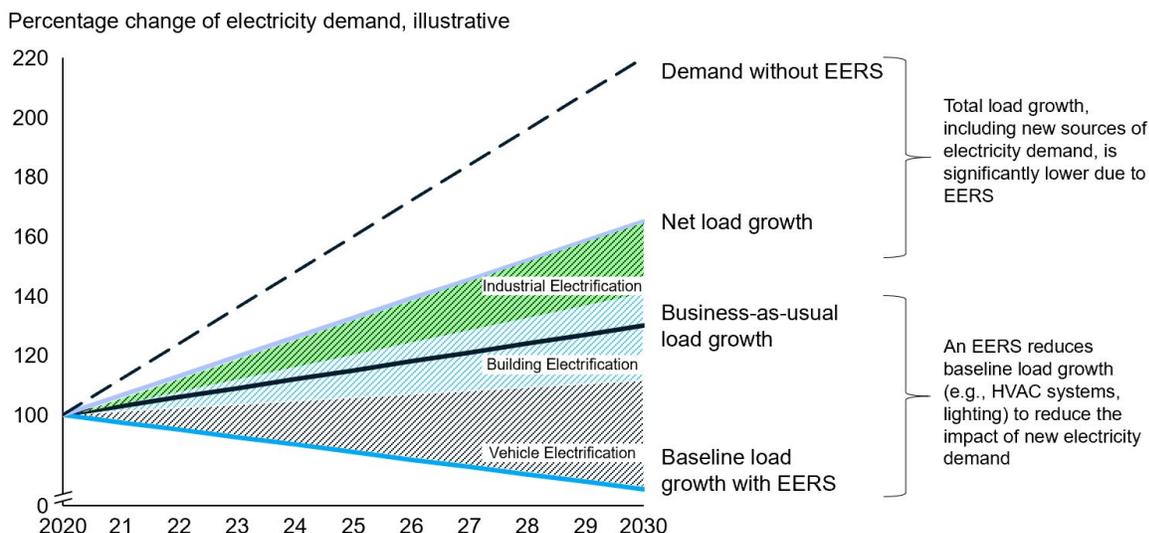
⁸⁷ Lawrence Livermore National Laboratory, [Estimated U.S. Energy Consumption in 2019](#), April 2020.

⁸⁸ C2ES, [Energy Efficiency Standards and Targets](#), March 2019.

⁸⁹ ACEEE, [Next Generation Energy Efficiency Resource Standards](#), July 2019.

⁹⁰ *Ibid.*

⁹¹ CAP, [The Importance of a National Energy Efficiency Resource Standard in Progressive Infrastructure](#), March 2019.

Figure 5. Impact of an EERS on load growth through 2030

By setting clear, long-term efficiency targets, a nationwide EERS would introduce regulatory certainty and establish an energy efficiency economic sector, employing hundreds of thousands of Americans.⁹² A recent economic analysis by the Political Economy Research Institute and the Sierra Club estimates 700,000 jobs could be created in the efficiency sector alone.⁹³ These jobs will employ high-skilled workers in all 50 states—in rural, suburban, and urban communities alike—from industrial engineers and software developers to manufacturing and construction workers, to design, install, and maintain energy efficiency upgrades. Workers in the energy efficiency sector already benefit from higher-quality jobs, with a rate of unionization that is nearly 70% higher than the national average.⁹⁴ And labor and equity mechanisms built into a federal EERS would ensure that these jobs are domestic, high-wage, and unionized.

Energy Efficiency in Frontline Communities

Energy efficiency investments should also center equity. As a percentage of their income spent on utility bills, low-income households pay more than three times the amount of high income households.⁹⁵ Targeted efficiency investments would help close this affordability gap between low-income and minority households and their wealthier, white counterparts, ensuring a just transition. A significant and primary portion of utilities' efficiency investments—and never less than 40%—should flow to low-income, high-need communities.

⁹² ACEEE, [2015 Federal Energy Efficiency Legislation: Projected Impacts](#), Sept. 2015.

⁹³ Sierra Club, [Millions of Good Jobs: A Plan for Economic Renewal](#), May 2020.

⁹⁴ National Association of State Energy Officials (NASEO) & Energy Futures Initiative (EFI), [2020 US Energy & Employment Report](#), March 2020.

⁹⁵ ACEEE, ["Energy Burden" on Low-Income, African American, & Latino Households up to Three Times as High as Other Homes. More Energy Efficiency Needed](#), April 2016.

Reforming the Utility Business Model

Lost utility revenues may be a concern for some utilities, though this will be offset in part by federal support for vehicle and building electrification. This policy could preempt that opposition by encouraging states to reform their utility regulatory processes, to decouple energy sales from revenue.⁹⁶ More than half of states have adopted rate reconciliation mechanisms for electric and gas utilities, decoupling the recovery of fixed costs from sales. Leading states have gone further to align incentives by sharing the consumer savings with the utility shareholders – a “shared savings mechanism.”⁹⁷ Reforming the ratemaking process alongside an EERS incentivizes utility investment in energy efficiency programs and, with targeted efficiency investments in low-income households, maximizes cost-savings for utility customers.⁹⁸

2.5. Budget Reconciliation and a CES

Federal CES policies should be understood to be compatible with the congressional budget reconciliation process. As set out in the Congressional Budget Act, budget reconciliation can be used for legislation that affects spending, revenues, and the federal debt limit.⁹⁹

The primary benefit of legislation considered under budget reconciliation is that it only requires a simple majority vote in the U.S. Senate, rather than the 60-vote cloture threshold required for most bills. However, budget reconciliation has been subject to constraints imposed by the Byrd Rule (see box below), which is designed to ensure that all provisions of a reconciliation bill have budgetary impacts that are not “merely incidental” to broader changes intended in policy. The limiting nature of this parliamentary procedure has caused some to suggest that it is not possible to pass a CES through budget reconciliation. We wholly reject that hypothesis, and herein discuss why a CES should be viewed as eligible for inclusion in reconciliation and policy designs that could optimize for this unique parliamentary process.

The Byrd Rule

According to a 2020 report from the Congressional Research Service (CRS),¹⁰⁰ under the terms of the Byrd Rule, a legislative provision could be considered “extraneous” to the reconciliation instructions provided to committees in the budget resolution, and thus subject to removal from a budget reconciliation bill, if it falls under one of the six following definitions:

⁹⁶ U.S. Environmental Protection Agency (EPA), [Aligning Utility Incentives with Investment in Energy Efficiency](#), Nov. 2007.

⁹⁷ ACEEE, [Performance Incentives](#), Feb. 2020.

⁹⁸ Natural Resources Defense Council (NRDC), [Gas and Electric Decoupling](#), Aug. 2018.

⁹⁹ Center on Budget and Policy Priorities (CBPP), [Introduction to Budget “Reconciliation”](#), Nov. 2016.

¹⁰⁰ Congressional Research Service (CRS), [“The Budget Reconciliation Process: The Senate’s ‘Byrd Rule’”](#), Dec. 2020.

1. “it does not produce a change in outlays or revenues or a change in the terms and conditions under which outlays are made or revenues are collected;
2. “it produces an outlay increase or revenue decrease when the instructed committee is not in compliance with its instructions;
3. “it is outside of the jurisdiction of the committee that submitted the title or provision for inclusion in the reconciliation measure;
4. “it produces a change in outlays or revenues which is merely incidental to the non-budgetary components of the provision;
5. “it would increase the deficit for a fiscal year beyond the ‘budget window’ covered by the reconciliation measure” (typically 10 years); and
6. “it recommends changes in Social Security” (typically considered to include the Old-Age, Survivors, and Disability Insurance (OASDI) program, but not include Medicare or other programs established as part of that act).

Several versions of CES legislation should be considered germane to the budget reconciliation process because of the system of revenues and outlays such policy could establish that would fit clearly within the parameters of the Byrd Rule (Figure 6). This process is opaque, and subject to the discretion of the one individual serving as Senate parliamentarian at any given time. Therefore the success of advancing a legislative schema through this process is fundamentally unknowable for any given specific policy until the parliamentarian’s perspective on it is understood. Nevertheless, we here discuss three different ways of designing a federal CES to be consistent with the Byrd Rule, and three additional Byrd-friendly alternatives that seek to approximate the impacts of a CES. All of these options would fit within reconciliation criteria and could drive the nation’s electricity system to 80% carbon-free power by 2030, en route to 100% by 2035. We do not consider this list exclusive nor exhaustive—there may indeed be other ways of passing a CES policy through reconciliation.

Federal CES Option 1: “On the Books” ZEC System

First, a system that a CES would establish for Zero-emissions Electricity Credits (ZECs) could be designed to be similar to market systems proposed in past legislation that the CBO has deemed appropriate to treat fully within the federal budget, in which ZECs would function as “cash-like assets,” whose “supply and distribution would be determined by the federal government.”¹⁰¹ Just like a typical state CES, this program could require load-serving entities (LSEs) to demonstrate compliance by obtaining an increasing number of ZECs each year as it relates to the overall percentage of electricity they deliver to retail customers. In this program an absolute number of ZECs would be created by the federal government and made available in the system each year equivalent to the total amount of carbon-free electricity that the policy desired for all LSEs to deliver to electricity consumers. This number should

¹⁰¹ Congressional Budget Office (CBO), [Cost Estimate - H.R. 2454 American Clean Energy and Security Act of 2009](#), June 2009.

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be aggressive - driving an ambitious amount of carbon-free power onto the power grid annually.

Each ZEC could be claimed by LSEs towards compliance in one of two ways: Tier 1: by delivering one megawatt-hour (MWh) of carbon-free electricity to retail customers, similar to a traditional CES; and Tier 2: purchasing a ZEC, in this case *directly from the federal program*, at a cost determined by region. This Tier 2 credit would function more like an Alternative Compliance Payment (ACP) in state CES policies. To meet the aforementioned CBO criteria, the overall number of ZECs in this system would necessarily be set by the federal program.

Tier 1 ZECs would be claimed and retired by LSEs from the federal program at no cost for every MWh of carbon-free electricity they demonstrate to have delivered to customers. The Tier 2 category of ZECs would provide a revenue stream to the federal government. And that should be reinvested directly in federal programs supporting clean energy deployment - prioritizing renewable energy projects in disadvantaged communities. Each LSE could also be limited in the number of Tier 2 ZECs it could purchase towards compliance to ensure meaningful performance change over time. A potential secondary market for ZECs may, if included, provide an opportunity for cost-containment and for incentivizing first-movers.

The Tier 1 category of ZECs could also be accompanied by a rebate from the federal program to the LSEs, with which utilities would be further incentivized to shift to carbon-free power generation, in a “feebate”-like system that provides both a bonus financial incentive and the avoidance of additional cost. If this payment declined over time it could press more utilities into early action. The rebate value can be scaled to any level (i.e., \$1/MWh, \$5/MWh, \$10/MWh, etc.), and it could even be differentiated for important early-stage or at-risk carbon-free resources (e.g. nascent-but-growing offshore wind, or aging nuclear facilities) to effectively shift a portion of the cost of compliance from electricity ratepayers to the federal tax base. To ensure no ongoing negative budgetary impact from Tier 1 ZEC outlays after the 10th year, and thus comply with the Byrd Rule, the rebate and the credit itself would likely need to sunset by the end of the 10th year of the program, *or else* the projected revenues raised by the program would need to match or exceed these credit and rebate outlays.

This model of reconcilable-CES could be congruent with states’ existing CES and RPS laws. This could provide the benefit of minimal federal interference or pre-emption of these state policies that have served as a foundation pillar of America’s climate progress for decades, through Republican and Democratic presidents alike. Under this system, LSEs could fulfill their obligations to both their state electricity standard and this federal CES with the same credit, where there is overlap in how each policy treats the emissions characteristics of different energy technologies. Although, for the time being in most states, LSEs would be required to obtain more federal ZECs

over and above the number they would need to obtain for compliance with the state-based standard, given the latter are frequently less-ambitious in their targets.

Federal CES Option 2: Reverse-Auction for ZECs

A second federal CES policy design similarly involves the creation of a federal ZEC system led by an implementing federal agency, but establishes a two-sided auction process used for LSEs to demonstrate compliance. Under this system the agency would purchase in periodic reverse-auctions a quantity of ZECs from qualified generators sufficient to meet the annual clean electricity share requirement established in the CES. There could be a single national auction or several regional auctions, to establish regional fungibility of ZECs and avoid transfers between regions, as previously discussed in this paper. The reverse-auction would involve considerable federal outlays in the form of payments to clean electricity generators. After conclusion of the reverse-auction, LSEs could be charged a fee equal to the product of the total cost of the reverse auction, and the LSE's share of annual retail sales of electricity by covered LSEs. Alternatively, the government could keep some portion of the costs of the ZECs on the federal budget, and pass the other portion of the costs onto LSEs. The reverse-auction could also include a price cap equal to the ACP, as well as a price floor. If, as a result of the price cap, the quantity of ZECs purchased via reverse-auction is less than the annual obligation, LSEs would make up the difference via the ACP. This would involve significant federal revenues.

Both the revenue and expenditure processes under the CES policy are intrinsic to the design of the policy, and therefore should be germane to reconciliation. Additionally, the implementing agency could pass on only a portion of the cost of the reverse-auction to LSEs, resulting in a net outlay of expenditures. In effect this would shift a portion of the cost of compliance from electricity ratepayers to the federal tax base. To comply with the Byrd Rule, this federal share of the cost of compliance would have to be set to zero by the end of the 10th year of the program, to ensure no ongoing negative budgetary impact. Or, this federal cost share would need to be exceeded by revenues collected from LSEs through ACPs.

This model of CES would closely resemble how the New York state RPS is implemented, with the New York State Energy Research & Development Agency (NYSERDA) buying RECs from renewables via reverse-auction and passing along the cost to LSEs.

Federal CES Option 3: Mass-Based Standard

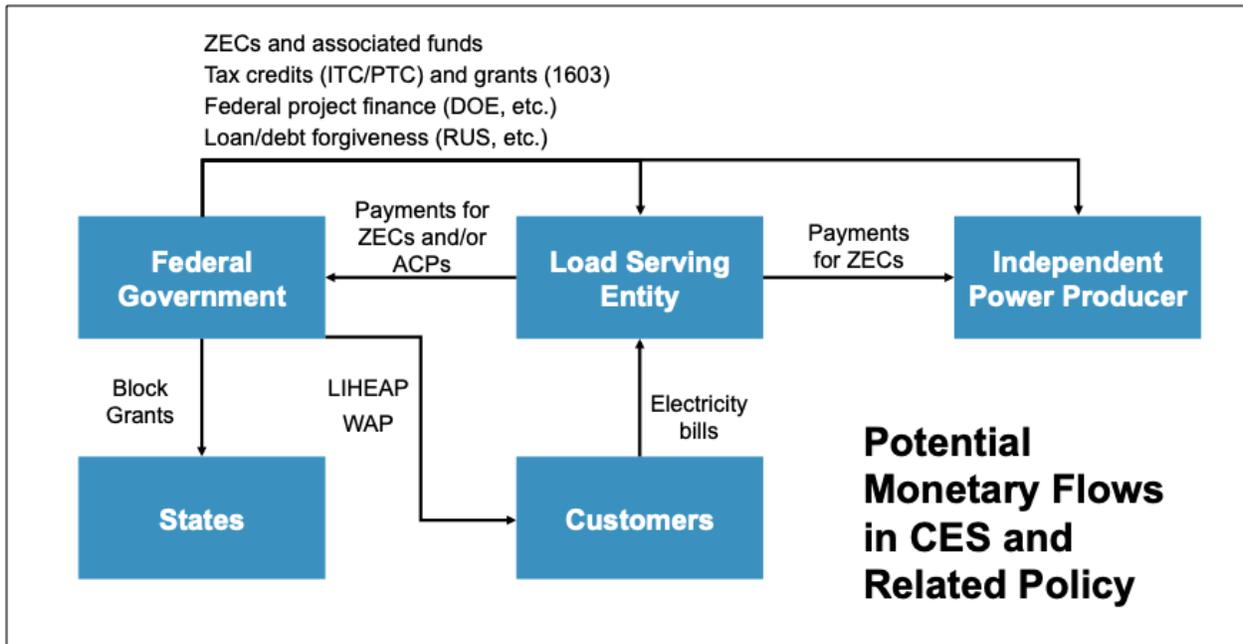
A third option for a federal CES that could be implemented as a variant of Options 1 or 2 above is a "Mass-Based" standard. Such a proposal, advanced by groups like Clean Air Task Force and Western Resource Advocates, and scholars like Jesse Jenkins, is similar to other CES designs in that it places the burden of compliance upon LSEs and their responsibility to deliver increasing amounts of zero-carbon electricity to end-use customers, demonstrated through ZECs. However, under this formulation these ZECs would correspond to emissions reductions and would be

obtained based on the the difference between the emissions rate (per MWh) of a clean resource and that of a conventional coal-fired power plant (~1 ton/MWh; e.g. 1 ZEC = 1 metric of avoided carbon pollution).

Under a Mass-Based CES, each LSE would be provided an emissions reduction compliance trajectory based on their baseline amount of annual carbon pollution from the start of the program that declines to zero-emissions by 2035. These utilities would then need to demonstrate their compliance with this trajectory through a combination of reducing their emissions directly and purchasing and retiring a quantity of ZECs equal to 100% of their retail sales of electricity less the permitted quantity of annual emissions in that year.

Notably, this CES design was recently adopted by the Arizona Corporation Commission,¹⁰² as a result of a petition by Western Resource Advocates. In this way it could provide an easier congruence with at least one state’s CES policy, as well as with other state-based power-sector programs like the 11-state Regional Greenhouse Gas Initiative (RGGI). A Mass-Based CES is also unique in that it would provide greater incentive for energy efficiency, because every MWh of demand reduction substitutes for a MWh of required clean electricity.

Figure 6. Potential Flow of Funds in CES and Related Policy



Alternatives that Emulate a CES

In addition to these options for the creation of a federal Clean Electricity Standard, we here discuss 3 additional forms of federal CES-alternative policies that could set

¹⁰² Walton, R., “[In Split Vote, Arizona Regulators Take Major Step Toward 100% Carbon-free Mandate for Utilities](#)”, *Utility Dive*, Nov. 2020.

the country towards 100% carbon-free electricity and also fit the conditions imposed by the Byrd Rule. To be clear, these policies are not the same thing as a federal CES, and as such each has their weaknesses as compared to that policy. However, each provides an alternative for federal lawmakers to consider as part of a climate investment package through reconciliation.

CES-Alternative Option 1: Conditional Block Grants to States for 100% Clean Power

First, federal policy could more explicitly build itself upon the foundation of state 100% clean electricity standards, by functioning through a federal investment to states conditioned upon and in support of their movement towards carbon-free power. This concept has been advanced by experts at Energy Innovation: Policy & Technology, LLC.

Based on the federal government’s expansive authority to attach conditions to spending, states could be given conditional block grants based on their utilities’ commitments to meet certain clean electricity criteria. These criteria could be: a gradual improvement in carbon-intensity in its portfolio; a commitment to early retirement of coal-fired power plants; a commitment to 100% carbon-free power by 2035 or 80% by 2030; and, an enforceable commitment to technology-neutral competitive procurement solicitation. These commitments could be enshrined in regulation or as a requirement in the long-term integrated resource plans and near-term procurement or investment plans approved by the state’s utility commission.

At the outset, grant amounts could be determined based upon the current carbon intensity of states or electric utilities. Among the requirements of the conditional block grant would be that State Energy Offices, Public Utilities Commissions and Departments of Environmental Quality oversee the development of near-term investment plans and integrated resource plans that chart the course for electric utilities to decarbonize their generation portfolios.

In order to promote a just, equitable and thriving clean energy economy, these grants to states could also be conditioned upon minimum standards for its utilities’ use of unionized labor, job quality assurance, and justice and equity considerations including guaranteed investment into disadvantaged communities.

CES-Alternative Option 2: Carbon-Intensity Standard for Electricity

Second, and quite differently, a federal program could be fashioned as a carbon-intensity standard that incentivizes LSEs to remain below a declining emissions-intensity threshold, by charging them an increasing penalty for failing to do so. This model would establish an emissions-intensity baseline for each LSE beginning in 2022 (i.e., “start where you are”), and from there draw a declining limit down to 0 lbs/MWh by 2035. This design should straightforwardly fit within the Senate’s Byrd Rule, given that it is plainly a system of deriving revenue from covered entities under specified terms. Another version of this option would be a program

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with the same core structure but with a clean-energy-percentage threshold instead of an emissions-intensity threshold. That version would charge each LSE a fee based on the amount by which the LSE fails to achieve the specified clean energy percentage for a given year.

Under such a regime, each LSE would be incentivized, at a pace determined by its current emissions, to make continuous improvement in the carbon-intensity or percent clean of its supply portfolio. This CES design would simultaneously incentivize utilities to rely less on the dirtiest power plants and build or procure more clean generation because both paths reduce carbon-intensity and increase the clean energy percentage. Each year, a fee would be assessed based on the amount by which the LSE exceeded its carbon-intensity threshold (or missed the clean energy percentage threshold) multiplied by the total MWh supplied by the LSE. The fee would start small to nudge utilities to start cleaning up their supply and would raise revenue from utilities that move slowly. Then the penalty should increase over time, providing a strong incentive for LSEs to act swiftly to transition to renewables and other zero-emitting resources.

This proposal, as with each of these policy designs, should be paired with an investment package that lowers the cost of clean electricity and aggressively deploys energy efficiency to ensure lower bills for customers. In addition, in order to keep the potential fees at a reasonable level, a limit could be placed on the amount by which an LSE's average emission intensity could be deemed to exceed the threshold in any given year.

LSEs that own generation (traditionally regulated utilities, rural co-ops, and municipally-owned utilities) can reduce or eliminate their fees by adjusting their Integrated Resource Plans (IRPs), so their emissions intensities decline over time in accordance with the standard. To the extent that they do not and fail to keep up with the required emissions-intensity decline (or clean energy percentage increase), they would be subject to a greater fee.

Still another way of implementing a carbon-intensity-based federal standard would function as a fee-bate rewarding and penalizing LSEs below and above a baseline carbon-intensity target. Under this regime a CES would establish a declining carbon intensity target, and generators with an emissions intensity below the national average emissions intensity for all generation would be paid a rebate equal to the product of a nominal rebate and $(\text{average emissions rate} - \text{generators emissions rate}) / \text{average emissions rate}$. Generators with a carbon-intensity above the national average emissions intensity for all generation would be charged a fee equal to the product of a nominal fee and $(\text{average emissions rate} - \text{generators emissions rate}) / \text{average emissions rate}$. Carbon-free resources would receive the nominal rebate under this formula. The magnitude of the fee and rebate could be set to be equal, thus ensuring revenue neutrality, or could be arranged to result in net

revenues or outlays. In either case, significant changes in outlays and revenues would be intrinsic to the policy design.

Additionally, under this program, in any year following a year when the achieved national emissions intensity or clean energy share falls behind the target for the year, the magnitude of the fee and rebate would increase. And in any year following a year when the achieved national emissions intensity or clean energy share is ahead of the target for the year, the magnitude of the fee and rebate would decrease. In this way, the policy would provide appropriate incentives for the electricity market to achieve the target clean energy share/emissions intensity over time.

CES-Alternative Option 3: Tax Code-Based Clean Electricity Policy

In another design, an alternative to a federal CES could be constructed to act through the tax code in a way that rewards LSEs for continuing to increase their carbon-free power delivery, and to penalize them for failing to do so. Under the tax code, which is notoriously germane to the Byrd Rule, an increasing percentage of an electric utility's delivery would be taxed based on its carbon content. For example, starting in 2025, 25% of its carbon-emitting generation would be taxed; in 2030, 50% of generation would be taxed; and in 2035, 100% of generation would be taxed. All zero-emission electricity under this system would be tax-free.

In addition, to incentivize electric utilities to utilize increasing levels of clean electricity as a percentage of their portfolio, a complementary performance tax credit could be provided to electric utilities if their carbon-free electricity delivery exceeded the interim target of clean electricity delivery. This added incentive could be deployed using existing or expanded versions of federal clean energy tax incentives, or could come through whole new incentives provided directly to LSEs of all types.

Others have argued for the utilization of more traditional tax policies to drive decarbonization in the power sector over the coming decade. For example, some have posited that the long-term extension of key clean energy tax incentives, like the Renewable Energy Production Tax Credit (PTC) and Investment Tax Credit (ITC), coupled with a financial incentive for existing at-risk nuclear facilities, can continuously incentivize the deployment and utilization of clean energy resources and prejudice them over declining fossil generation, which should also face increasing constraints under EPA regulation as well as market forces.¹⁰³ Others have proposed the creation of new technology-neutral clean energy tax production and investment tax credits, as in the *Clean Energy for America Act* proposed by Sen. Ron Wyden (D-OR), to accomplish the same policy goal.¹⁰⁴ While still others have put forward the concept of using these tax incentives to deploy clean energy coupled with a fee on

¹⁰³ Rhodium, "[Can Tax Credits Tackle Climate?](#)", Sept. 2019.

¹⁰⁴ U.S. Senate Committee on Finance, "[Wyden, Colleagues Introduce Legislation to Overhaul Energy Tax Code, Combat Climate Change](#)", May 2019.

carbon pollution to make progress on greenhouse gas pollution (and drive out coal plants, especially) in the electricity system.¹⁰⁵

These more traditional uses of the federal tax code alone, while straightforward in their interaction with the Byrd Rule, rely more on price signals and tax equity markets than the more-certain and proven policy structure afforded by a CES, in such a significant sectoral transformation. At the same time, these clean energy deployment incentives (the ITC and PTC especially) are themselves an absolutely essential policy tool for power sector decarbonization over the coming decade. The same is also true of the EPA's regulation of air pollution from power plants under the *Clean Air Act*. And it should also be noted that a CES and a price on carbon pollution can coexist—and even complement one another—as part of a comprehensive federal climate agenda.¹⁰⁶

Part 3. Additional Federal Policies for 100% Clean Power

In addition to setting clear performance standards for utility distribution of clean and renewable energy and enabling market rules that support rapid growth in this industry, Congress and the incoming Biden-Harris Administration must also drive new investments in clean electricity through a series of complementary policies. The success of a clean energy economic transformation depends in equal measure upon robust investments and a commitment to good jobs and justice that will be fostered by these further measures, as it does upon standards driving carbon-free electricity requirements. Many of these policies could, on their own, make an enormous contribution towards achieving 100% clean electricity in a way that delivers good jobs and equity benefits.

3.1. Federal Clean Energy Investments and Financing

Realizing 100% clean electricity requires robust public sector investment that will leverage even greater private capital to deploy clean energy and sustain rapid growth in job creation and economic productivity. These clean energy investments should include an extension of existing federal tax incentives for clean energy deployment, the creation of new incentives for deployment of new and existing technologies, and passage of grant programs that make these incentives more accessible for more Americans. This should also involve enhancing federal clean energy financing programs—including through a new Clean Energy Accelerator or Green Bank. And it should include investments that ensure good-paying union jobs for American workers building these critical clean energy industries and policies to support and grow domestic manufacturing of these clean energy technologies and supply chains.

¹⁰⁵ Columbia University SIPA Center on Global Energy Policy, "[The Next Generation of Federal Clean Electricity Tax Credits](#)", June 2019.

¹⁰⁶ MIT Center for Energy and Environmental Policy Research (CEEPR), "[Trade-offs in Climate Policy: Combining Low-Carbon Standards with Modest Carbon Pricing](#)", Nov. 2020

Extending Clean Energy Tax Incentives as Direct Payments

Federal clean energy tax incentives have been among the most critical domestic policies in deploying carbon-free electricity and building the clean energy industries that have grown to employ nearly 3.5 million Americans.¹⁰⁷ Congress, as part of any reconciliation investment package, must pass 10-year extensions of these critical clean energy tax incentives. And it should expand them to include additional technologies as well as changes to make them more accessible to a larger pool of eligible claimants. In their “Clean Jumpstart Plan” released in May 2020, Evergreen and Data for Progress called for these long-term extensions and reforms.¹⁰⁸

There has recently been good progress on these federal clean energy investments. The COVID-19 relief and omnibus appropriations package passed in December 2020 as part of the omnibus spending bill for 2021,¹⁰⁹ included a number of sorely needed and long awaited tax provisions that will provide important support for private investment into deployment of proven renewable energy within the US electricity grid. These measures included extension of the solar investment tax credit (ITC) for two additional years at the current 26% rate. It also extended the current production tax credit (PTC) for one year to cover wind, hydropower, biomass, marine and hydrokinetic electricity generation. Further, it established a 30% ITC for offshore wind facilities lasting for five years, among a range of other incentives for new clean energy investment and enhanced environmental stewardship.¹¹⁰

Each of these tax provisions are welcome and will aid in accelerating deployment of zero carbon renewable energy. However, these belated and short-term extensions of existing policy are not in themselves transformative, and much more must be done to speed clean energy investment. This should include extending for a full 10-year period for both the federal Renewable Energy ITC and PTC to provide market certainty for investors, and to drive a decade of robust investment that will be required. Alternatively, Congress may consider passage of an equivalent incentive, in the form of a technology-neutral clean energy production and investment tax credit. These tax incentives should be extended to fully cover energy storage technology - which must be deployed rapidly throughout the electricity grid over the coming decade. And Congress should also extend new tax incentives for additional technologies that will be needed for power sector decarbonization, as with Senator Martin Heinrich’s (D-NM) *Electric Power Improvement Act* that would provide an investment tax credit for transmission technologies. These incentives should also be made more effective in a time of economic downturn, by giving claimants a refundable option and by re-establishing a grant program offering payments in-lieu of taxes to ensure that private capital flows even in the face of constrained tax equity markets.

¹⁰⁷ E2, [Clean Jobs America](#), Mar. 2019.

¹⁰⁸ Evergreen Collaborative and Data for Progress, [A Plan for a Clean Jumpstart to Rebuild America’s Economy](#), May 2020.

¹⁰⁹ 116th Congress, [Consolidated Appropriations Act, 2021](#).

¹¹⁰ Crouse, E. et al., “[The Sun Also Rises: Congress Votes to Stimulate the Renewable Energy, Efficiency, Carbon Capture and Storage Industries](#)”, *The National Law Review*, Dec. 2020.

The 1603 Treasury Grant Program for clean energy projects established through a previous stimulus bill under the American Recovery and Reinvestment Act of 2009, transformed the ITC and PTC into a direct grant payment from the U.S. Treasury department, in lieu of tax credits. This program ran successfully from 2009-2012, and in that time deployed over \$26 billion in federal investment to support nearly 110,000 clean energy projects throughout the country. This program was one of the most successful clean energy measures under ARRA, transforming the industry, and it would be easy to replicate today.

These credits can also be designed to encourage a faster transition. For instance, Rep. Diana DeGette's *Clean Energy Innovation and Deployment Act of 2020* proposed incentivizing utilities with clean energy tax credits pegged to the speed with which they commit to a zero-emission generation fleet.¹¹¹ For example, if a utility were to commit to 100% clean energy by 2025, it can recover up to 50% of its costs through clean energy tax credits and grants from the federal government; for 100% clean energy by 2030, the utility can recover 40% through clean energy tax credits and grants; and so forth. This would accelerate the clean energy transition and target tax credits and grants to be deployed where they can be most effective.

Centering Workers and Justice in Incentive Distribution

The path to 100% clean electricity, and the investment it will catalyze, is a powerful opportunity for the creation of good union jobs in growing clean energy sectors. Emerging commitments and partnerships in the offshore wind industry with the U.S. Building Trades unions are an exciting demonstration of this growing opportunity.¹¹² To advance at the speed and scale required, climate policy must promote job quality and the development of organized labor within these emerging industries and ensure a strong voice for the needs of workers in the clean economy. Lawmakers can advance strong job quality provisions like requiring Davis-Bacon Prevailing Wage laws and the use of Project Labor Agreements (PLAs) within government-contracted clean energy projects along with access to government financial support.

Senator Jeff Merkley (D-OR) has proposed the *Good Jobs for 21st Century Energy Act*, which makes available an additional 10% investment credit to projects that meet certain labor standards.¹¹³ This bill echoes a Washington state law providing enhanced tax incentives for clean energy projects that meet certain labor standards, like prevailing wage requirements, the utilization of registered apprentices, and the execution of PLAs or Community Benefits Agreements (CBAs).¹¹⁴ It also adds several additional requirements, such as a presumption that workers are employees rather than independent contractors, thus ensuring that employers must provide standard

¹¹¹ 116th Congress, [H.R. 7516 - Clean Energy Innovation and Deployment Act of 2020](#).

¹¹² North America's Building Trades Unions (NABTU), "[NABTU and Ørsted Sign Landmark MOU for U.S. Offshore Wind Workforce Transition](#)", Nov. 2020.

¹¹³ 116th Congress, [S.2185 - Good Jobs for 21st Century Energy Act](#).

¹¹⁴ Washington Governor Jay Inslee, [Policy Brief: "Washington Enacts Strongest Clean Electricity Standard in the Nation"](#), May 2019.

benefits, and a ban on mandatory arbitration that would deny workers their day in court in the instance of workplace discrimination or harassment. Similar provisions appeared in the *Moving Forward Act* (H.R. 2), which passed the House in the summer of 2020.¹¹⁵ Promoting labor standards in federal clean energy investments is an important part of building a truly just and inclusive clean energy economy.

Expanded tax incentives should also be extended to clean energy deployment, transmission and also manufacturing projects in communities transitioning out of fossil fuel production and power generation. This should include offering an expanded investment credit in counties where a coal mine or coal-fired power plant has recently closed. Federal energy grants should likewise accommodate clean energy projects developed by community-based non-profit organizations, which lack tax liability and therefore often lack access to tax financing for their renewable energy and energy efficiency projects.

Creating a National Clean Energy Accelerator or Similar Green Finance Institution

Congress should create a new national Clean Energy Accelerator or Green Infrastructure Bank or (also known by many other names), and capitalize it with \$90 billion, to further accelerate deployment of clean energy and assist in the retirement of fossil fuel assets.¹¹⁶ Such a federal financing authority would deploy low-cost loans and loan guarantees that earn a return, allowing for cost-effective support for clean energy transformation on an ongoing basis. Through such a green finance institution, the federal government stands to catalyze enormous investment in clean energy construction-- by one estimate, a green bank can attract private investment more than 10 times the size of its initial capitalization.¹¹⁷ Further, unlike the \$455 billion recently offered in loan funds through the U.S. Treasury under the CARES Act, a Clean Energy Accelerator would provide strong public accountability, transparency, and job creation in return for public support.

This entity should work directly with state and local green banks, clean energy funds, and infrastructure finance authorities to leverage aggressive state climate leadership for accelerated clean energy deployment. And the Green Infrastructure Bank can help ensure that the benefits in building a clean energy economy enjoy broad and equitable participation through support for increases in on-bill investments in energy efficiency and distributed energy solutions. Greater federal investment should also be made available to front-line and low-income communities and those facing a transition away from extractive industries – with priority placed upon comprehensive community-developed projects with multiple benefits.

Promoting Domestic Content and American Manufacturing in Clean Energy Industries

¹¹⁵ 116th Congress, [H.R. 2 - Moving Forward Act](#).

¹¹⁶ American Green Bank Consortium, [Green Banks in the United States: 2020 US Green Bank Annual Industry Report](#).

¹¹⁷ Vivid Economics, [Bounce Back Greener: The Economic Impact Potential of a Clean Energy Jobs Fund](#), June 2020.

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There is also significant opportunity to support and expand domestic supply chains for clean technologies and materials. The federal government can direct the way federal money is spent, including requiring that funds be used to purchase goods and supplies produced by domestic industries (so-called “Buy America” and “Buy American” provisions first passed by Congress in 1933).¹¹⁸ The American Recovery and Reinvestment Act of 2009 required projects using public money to follow such Buy American provisions—clean energy projects that use public investment dollars should also be required to use domestic content in production and manufacturing. In the past, Buy American rules have included exceptions that undermine their efficacy and benefit large firms.¹¹⁹

The Blue Green Alliance has laid out a detailed National Manufacturing Agenda¹²⁰ further articulating standards for “fair and Responsible” procurement practices, and the use of requirements or incentives for procurement from designated “qualified” or “preferred” domestic suppliers who demonstrate positive compliance with strong labor and equity standards and who protect workers’ rights. The Biden platform includes a plan to strengthen requirements and ensure that more federal dollars are spent domestically.¹²¹ Similarly, President Biden’s January 27th executive orders on tackling the climate crisis directs each federal agency to prepare action plans addressing strategies to advance domestic clean energy technology production and addressing issues of manufacturing supply chain resilience.¹²² The federal government can go further still, in advancing the creation of American jobs and the integrity of US supply chains in clean energy technologies through robust engagement of Defense Production Act (DPA) authorities to assess and enhance the domestic industrial and technological base to meet critical infrastructure needs in clean energy and accelerate federal procurement.¹²³

Beyond direct domestic procurement requirements, policymakers can take additional steps to ensure that U.S. workers and businesses are the ones benefiting from public investment. Incentives such as the Advanced Energy Manufacturing Tax Credit, passed in the 2009 *Recovery Act (Section 48C)*,¹²⁴ can boost investment and growth in domestic manufacturing capacity for clean energy industries. Senator Joe Manchin (D-WV) has developed draft legislation to renew this successful credit, and to target at least half of its investments in job creation and economic development in communities undergoing transition away from the fossil fuel economy. Likewise, domestic supply chains can be encouraged through tax incentives and direct

¹¹⁸ Morgan, M., [“Buy American vs. Buy America: A Simple Guide to Successfully Navigating the Differences”](#), MBP.

¹¹⁹ American Economic Liberties Project, [Caveat Emptor: Reversing the Anti-Competitive and Over-Pricing Policies that Plague Government Contracting](#), June 2020.

¹²⁰ BlueGreen Alliance, [Manufacturing Agenda: A National Blueprint for Clean Technology Manufacturing Leadership and Industrial Transformation](#)

¹²¹ Joe Biden for President Campaign, [The Biden Plan to Ensure the Future is “Made in All of America” by All of America’s Workers](#).

¹²² The White House, [Executive Order on Tackling the Climate Crisis at Home and Abroad](#), Jan. 2021.

¹²³ Federal Emergency Management Agency (FEMA), [“Defense Production Act Authority and Functions of the FEMA Administrator”](#), June 2020.

¹²⁴ DOE, [48C Phase II Advanced Energy Manufacturing Tax Credit Program Selections](#).

investment, especially in key industries -- such as offshore wind and grid transmission -- where major manufactured products like turbines and towers offer economic benefit from local domestic production.¹²⁵ More broadly, all opportunities to link American industrial supply chains to the challenge of delivering 100% clean energy, should be assessed and advanced through a Quadrennial Industrial Review led by the U.S. Departments of Commerce, Energy, and Defense as called for in the Evergreen Action Plan¹²⁶. Together these measures can ensure that substantial new waves of capital investment in decarbonizing America's energy supply translates directly into new jobs and investment for U.S. industries and skilled workers.

Funding Research and Technical Assistance for Grid planning and Operation

Energy market regulators, operators, and participants will face significant technical hurdles over the next decade as they make financial and operational decisions to build an electricity grid that depends on a significantly higher share of zero marginal cost, inverter-based, variable power sources. Congress can assist in this transition by providing the Department of Energy (DOE) with additional funding for research, technical assistance, and training. For example, many Load Serving Entities (LSEs) lack experience with demand response programs and do not regularly model them as an option in developing Integrated Resource Plans (IRPs) even though they are often less expensive than procuring new generation. Similarly, market regulators are in the early stages of understanding how grid services such as frequency regulation can be most efficiently procured in an entirely inverter based system, or how to regulate to promote non-wires alternatives to new transmission and distribution resources in the form of battery storage, microgrids, and other load balancing technologies. These are example areas where DOE's Office of Electricity and the national laboratories can develop open-source tools, promulgate best practices, and provide targeted direct assistance. DOE's State Energy Program is also critical in deploying resources to state agencies working on the ground in clean energy-led economic development. Funding for these programs should be a priority. Further, in relation to a CES, there is an opportunity to set-aside a percentage of any revenue raised through the program for these research and technical support programs.

3.2. Federal Support for the Fossil Fuel Transition

Beyond policies, like CES and clean energy investments, that will facilitate the deployment of carbon-free technologies and help decarbonize the sector, federal lawmakers need take additional steps to provide for a "just transition" for power plant communities, and their ratepayers and workers, into the new advanced energy economy. Federal policy must ensure that fossil fuel communities and their workers are full participants in this just and thriving new economic future.

¹²⁵ Data for Progress, Evergreen Collaborative, & Urban Ocean Lab. [Advancing Offshore Wind Energy in the U.S.](#), Aug. 2020.

¹²⁶ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

Accelerating Retirement of Fossil Fuel Assets

Existing fossil fuel assets — and their associated debt obligations — pose a significant financial impediment to utilities investing in the new clean energy resources that will enable 100% carbon-free power. Early retirement of these outdated and polluting assets can also have the adverse effect of passing on stranded costs to ratepayers. To address this challenge, federal financial support to retire utility company debt stranded in fossil fuel assets can be provided on the condition of reinvestment of those dollars into new clean energy assets. This strategy of fossil debt retirement would both accelerate the transition to clean electricity and also lessen the cost to ratepayers of implementing other federal clean energy requirements. Debt retirement could be made conditional on reinvesting associated benefits in customer rate reductions, energy efficiency programs, carbon-free electricity generation, community-based distributed energy investments, and workers impacted by the transition.

Securitization, a form of debt refinancing for investor-owned utilities can “free up funds for clean energy projects while keeping utilities financially viable and reducing ratepayer costs.”¹²⁷ Securitization provides utility owners an opportunity to recoup the stranded asset value on non-economic fossil fuel generation while minimizing price hikes on ratepayers. In this model, ratepayers raise the funds for financing new, cleaner sources of electricity by issuing bonds to debt investors instead of the utility owners raising their own funds to build and operate new assets.¹²⁸ At the federal level, and through an expansion of its authority, the Loan Programs Office at DOE could offer partial or full loan guarantees that would allow utilities to implement ratepayer-backed bond securitization.¹²⁹ Critically, this DOE financing must be sized to cover the phaseout of carbon-emitting power generation *and* to fund just transition efforts. Utility requests for securitization would also need to be paired with a complementary resource procurement plan outlining how carbon-emitting assets will be replaced with carbon-free power generation.

For publicly-owned utilities, debt retirement can be applied more broadly towards phasing out coal plants and other fossil fuel infrastructure. One way to accomplish this goal, detailed by the Rocky Mountain Institute, would be to use repayment relief via a reverse auction to forgive debt obligations. Under the program, any entity with debt held or guaranteed by a federal agency or financing authority could petition the U.S. Treasury Department to reduce its principal and interest payments by an amount proportional to the entity’s planned emissions reductions.¹³⁰ Petitions would be required to include information about how the entity would achieve reductions in carbon emissions while still providing equivalent goods, services, pricing, and

¹²⁷ Sierra Club, [Harnessing Financial Tools to Transform the Electric Sector](#), Nov. 2018.

¹²⁸ *Ibid.*

¹²⁹ Rocky Mountain Institute (RMI), [How to Retire Early: Making Accelerated Coal Phaseout Feasible and Just](#), June 2020.

¹³⁰ *Ibid.*

workforce engagement to ensure a just transition for workers. Additionally, the entity would be required to directly ensure lower carbon pollution and not achieve their reductions through offsets or unbundled renewable energy certificates. Applying a reverse auction mechanism would help to arrive at a repayment relief price that efficiently incentivizes debt forgiveness applications.

Debt Retirement for Rural Electric Co-ops

The Hardship Loan program at the USDA's Rural Utilities Service is a ready-made instrument for retirement and reinvestment that could serve electric cooperatives.¹³¹ Rural electric cooperatives rely on fossil fuels for the majority of the power that they deliver to more than 40 million people, and a majority of these cooperatives are federally financed. However, there are – as yet – no terms for forgiveness for federally insured RUS Hardship Loans akin to those that have made the Small Business Administration's federally insured loan program such an important vector for \$945 billion in stimulus funds.

Co-ops are uniquely vulnerable to stranded assets as they have long-dated debt for assets that must be retired and replaced before 2035. Further, as customer owned organizations, they prioritize ratepayer protection extremely highly as a matter of public mission. According to analysis conducted by the Center for American Progress, retirement of \$7 billion of outstanding federal loans from the Rural Utilities Service (RUS) to co-ops for coal power plants could alone reduce as much as 44 million metric tons of carbon emissions.¹³² Replacing these assets is a financial undertaking that is far larger than the current mandate of grant programs like the Rural Energy for America Program, which nonetheless would serve as a highly valuable complement for project-based funding to accompany financing solutions for clean energy and grid infrastructure.

The Tennessee Valley Authority is a federal agency that sells power into parts of six states, and more than 40% of its supply is fossil fueled.¹³³ It is financially constrained by a congressionally imposed \$30 billion debt limit. In part because of its financial constraints, TVA has a plan to only achieve a *five percent* reduction in greenhouse emissions in the next decade.¹³⁴ This lack of ambition in a publicly chartered economic development organization is unacceptable. Rather, by retiring federally-insured loans on the condition of reinvestment in fossil free energy solutions, the Rural Utilities Service (RUS) borrowers as well as TVA would be able to redirect their debt payments towards a combination of bill relief and clean energy development, placing TVA and its ratepayers at the vanguard of the clean energy revolution.¹³⁵ Further, as the Biden-Harris Administration and the 117th Congress look to drive new job creating and stimulative investments into community based projects

¹³¹ USDA, "[Electric Infrastructure Loan & Loan Guarantee Program.](#)"

¹³² CAP, [Reducing Carbon Pollution Through Infrastructure: A Roadmap for Congress](#), Sept. 2019.

¹³³ Tennessee Valley Authority (TVA), "[Our Power System.](#)"

¹³⁴ Center for Biological Diversity et al., "[Before the Tennessee Valley Authority Board and President \[...\]](#)", Aug. 2020.

¹³⁵ CAP, "[Reducing Carbon Pollution Through Infrastructure: A Roadmap for Congress](#)", Sept. 2019.

that advance economic and environmental justice, the model of the TVA and RUS can serve as a useful framework for further regionally based clean energy initiatives.

Support for Fossil Fuel Workers in the Clean Energy Transition

To address the disparate economic burdens associated with the transition away from fossil fuels, major federal programs should help support local economic development and just outcomes for workers and communities in fossil energy dependent areas. In his Executive Order on Tackling the Climate Crisis at Home and Abroad of January 27, 2021, President Biden directed the creation of a new “Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization” to “coordinate the identification and delivery of Federal resources to revitalize the economies of coal, oil and gas, and power plant communities.”¹³⁶

The National Economic Transition Platform, a roadmap for just transition, called for the federal government to harness its resources to drive the transition through the creation of a dedicated federal office.¹³⁷ Now, this newly-created office should support, with robust funding and other resources, economic development and good-paying jobs in the sectors identified by the community stakeholders listed above. Investment should be made in the environmental restoration of lands polluted by fossil fuel extraction and processing. Dedicated funding should be allocated, under the condition of automatic eligibility, to support the retirement and health benefits of affected workers, and the displaced economic activity and revenues of affected communities. Education and retraining grants, linked to in-demand, high-quality jobs, should be provided to workers as they transition to new employment, as called for in the Evergreen Action Plan.¹³⁸

New economic diversification, clean energy manufacturing and deployment investments should also be prioritized for workers and communities experiencing transition out of fossil fuel production and power generation. For example, Senator Joe Manchin (D-WV) has proposed a reauthorization and new funding allocation for the federal Section 48(C) Advanced Energy Manufacturing Tax Credit. This innovative approach would award half of that program’s total funding allocation to counties in which a coal mine or power has closed, or immediately adjacent to those counties.¹³⁹ This targeted economic development incentive provides a potent policy model for linking new clean energy investment to historically fossil fuel dependent communities more systematically. The “Manchin framework” for 48(C) should be combined with additional policy to provide additional economic support to communities in which a coal-fired power plant has also recently closed. This could include a bonus tax credit added to projects receiving federal clean energy production (PTC) or investment tax

¹³⁶ The White House, [Executive Order on Tackling the Climate Crisis at Home and Abroad](#), Jan. 2021.

¹³⁷ The Just Transition Fund, [The National Economic Transition Platform](#), Summer 2020.

¹³⁸ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

¹³⁹ Toth, J., “[Manufacturing the Future of Clean Energy with 48C](#),” Webinar hosted by Third Way, BlueGreen Alliance, & the Environmental Defense Fund, Dec. 2020.

credits (ITC), as well as for targeted investment flowing from CES policy--in both credits carved out of the ZEC trading program as well as reinvestment of revenues derived from alternative compliance payments. In this way, a federal CES can serve as an engine of urgently needed reinvestment in “coal belt” states, workers and communities.

3.3. Electrification Push

A 100% clean energy agenda for the U.S economy will also demand policies that ramp up electrification in the transportation, building and industrial sectors. While these policies are largely outside the scope of this memo, we touch briefly on them here as an important way to understand the true demands upon, and incentivize broad support for, a federal 100% clean electricity agenda. In particular, so-called “beneficial electrification” replaces fossil fuel combustion, in cars, residential and commercial buildings, and industrial applications, with electricity. Fully electrifying the transportation, residential and commercial sectors by 2050 will not only reduce greenhouse gas pollution by 70 percent, it will double electricity use.¹⁴⁰ For utility companies, this beneficial electrification could be seen as the ‘carrot’ that invites them to support federal CES; promising load growth, investment opportunities, and an expanded pool of ratepayers for decades to come.

Promoting Electrification

The administration should work to design and implement a comprehensive electrification financing program, bringing together the expertise and authority of HUD, DOE and the EPA. The program should provide credit enhancement, loan protection, and direct cash rebates to consumers or utilities that seek electrification upgrades. Two areas of particular importance in this effort, transportation and building electrification, are discussed below.

Electrification of Vehicles

The large-scale deployment of electric vehicles (EVs) has the potential to generate billions in new revenues for utility companies, with the vast majority of EV charging done at home, and thus added to a consumer’s electricity bill -- as opposed to gasoline costs at the pump. Utilities are also well positioned to bridge the ‘charging infrastructure gap’ by deploying charging stations across cities and regions, lessening the ‘range anxiety’ of potential EV customers, and again, generating revenue from beneficial load growth.¹⁴¹ On the supply-side, the federal electrification financing program should provide loan guarantees to lenders that support utility electric vehicle infrastructure upgrades, reducing the associated risk and bringing down financing costs.

¹⁴⁰ Environmental and Energy Study Institute (EESI), [“Beneficial Electrification”](#)

¹⁴¹ NRDC, [Driving Out Pollution: How Utilities Can Accelerate the Market for Electric Vehicles](#), June 2016.

On the demand-side, complementary federal policy should work to remove the barriers of consumer EV adoption and increase demand for supportive utility investments. Senator Chuck Schumer’s (D-NY) Clean Cars for America proposal calls for up to \$400 billion of cash vouchers to consumers for purchasing plug-in electric, plugin-hybrid, and hydrogen fuel cell cars.¹⁴² In tandem, the existing \$7,500 electric vehicle tax credit should be transitioned into a rebate, available at the time of purchase to help consumers, especially lower-income consumers, make the switch. Senator Schumer’s proposal also pledges up to \$45 billion in incentives for states and utilities to build out charging infrastructure. Charging infrastructure should be sited with a view to spur widespread EV uptake and overcome equity disparities.

Electrification of Buildings

Building electrification -- notably that of water and space heating, clothes drying, and cooking -- can provide utilities with valuable load growth and greater grid flexibility. Fortunately, the greatest barriers to this transition are economic, not technical.¹⁴³ Thus, to promote electrification in the residential and commercial sectors, the federal government ought to use the financing program discussed above to provide cash rebates, grants, and low-cost financing to households and other building-owners that enable them to retrofit existing structures and change-out gas-powered appliances and other fossil fuel-powered end-use applications.

This financing should flow to all Americans, regardless of renter status or income. Further, Data for Progress estimated that America’s public housing “is responsible for about 5.6 million metric tons” of annual greenhouse gas emissions “the equivalent of 1.2 million cars used throughout each year.”¹⁴⁴ Direct federal investments in green retrofits, including the electrification of public housing building systems and end-use equipment, would reduce these emissions to zero by 2035 when paired with a CES and broader 100% clean electricity policy, all while improving residents’ health and comfort.

3.4. Streamlining Clean Energy Siting and Permitting

The rapid buildout of new energy infrastructure, especially electricity transmission lines, requires a complementary siting and permitting reform policy agenda, aimed at resolving the tension between the need to fast-track renewable and transmission projects and the often cumbersome review and approval processes. Streamlining the permit process for clean energy projects, without cutting corners or failing to uphold the nation’s environmental regulations or commitments to environmental justice, must be a part of a federal agenda for 100% clean electricity by 2035.

¹⁴² Senate Democrats, “[Leader Schumer Unveils New Clean Cars for America Climate Proposal\[...\]](#)”, Oct. 2019.

¹⁴³ Berkeley Lab, [Electrification of Buildings and Industry in the United States: Drivers, Barriers, Prospects, and Policy Approaches](#), March 2018.

¹⁴⁴ Data for Progress, “[A Green New Deal for American Public Housing Communities.](#)”

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Researchers at the NYU Institute for Policy Integrity and the Columbia Center on Global Energy Policy have proposed reinvigorating existing DOE and FERC statutory authority to expedite the approval process for interstate transmission lines.¹⁴⁵ Specifically, they call for use of the Federal Power Act's Sec. 216 authority to designate National Interest Electric Transmission Corridors (NIETCs) in consultation with states. Past federal attempts at designating NIETCs have been struck down by courts for inadequate consultation with states and consideration of environmental impacts. The researchers argue these are surmountable legal roadblocks to invoking Sec. 216 authority. They also call for use of Sec. 1222 authority under the Energy Policy Act of 2005, which empowers DOE to partner with third parties to develop and construct interstate transmission lines within the Western Area Power Administration and the Southwestern Power Administration. These authorities should be swiftly invoked. DOE could delegate to, or share its Sec. 216 corridor designation authority with FERC, which has extensive experience with interstate infrastructure development. Under such a consolidation, the simultaneous designation of project-specific transmission corridors and issuance of federal permits would significantly shorten the review process, and thus limit opportunities for costly and time-consuming litigation.

Federal agencies could lean even further into the authority provided by Congress to expedite environmental review for clean energy infrastructure in accordance with the 2015 FAST Act. Under the FAST Act, infrastructure projects exceeding \$200 million in investment qualify as "covered projects" whose permitting and environmental review processes are coordinated and overseen by a Federal Permitting Improvement Council.¹⁴⁶

In parallel, federal agencies that conduct environmental reviews for energy projects should include an evaluation of the climate-related environmental benefits associated with clean energy projects, and the climate costs associated with fossil fuel-based energy projects. Currently, for example, FERC does not require or regularly conduct cost-benefit analyses of certain infrastructure projects, and largely ignores the associated climate consequences.¹⁴⁷ By expanding its mandate to conduct these analyses for large-scale permitting and siting decisions, either legislatively or through CEQ directive, and by including the co-benefits associated with zero-carbon energy generation and transmission infrastructure, the transparency and accountability of federal energy project reviews would be improved, and social welfare considerations could compete with long-standing special-interest pressures.

¹⁴⁵ Columbia University SIPA Center on Global Energy Policy, "[Building a New Grid Without New Legislation: A Path to Revitalizing Federal Transmission Authorities](#)", Dec. 2020.

¹⁴⁶ Hayes, D., "[Congress Just Enacted New Permitting Requirements for Energy Projects: Did You Miss It?](#)", *Stanford Law School Blog*, Dec. 2015.

¹⁴⁷ Zevin, A., "[Regulating the Energy Transition: FERC and Cost-Benefit Analysis](#)", *Columbia Journal of Environmental Law*, Aug. 2019

Additionally, finding suitable land on which to site renewable energy facilities and transmission infrastructure can be a significant logistical and political barrier to clean electricity production. Fortunately, these barriers are surmountable. Clean energy projects deliver many co-benefits to site communities, including increased employment and reliable energy, without the environmental or health hazards of fossil fuel power plants.

Centering Equity in Decision-making

Local opposition can be preempted by including site communities in the development and permitting process - as a guiding principle, the clean energy transition must not impose new geographic inequities or reinforce existing ones. For far too long, fossil fuel power plant investors and developers ignored local concerns, causing significant damage to the environment and to public health. Clean energy projects may be stalled or abandoned altogether absent meaningful engagement with those living near proposed development sites. Empowering local communities in the decision-making process will facilitate the permitting and siting process and provide more equitable outcomes in the long-run. As CEQ under a Biden Administration seeks to reverse Trump Administration rollbacks to the environmental review process under the *National Environmental Policy Act*, it should ensure that a balance is struck between the imperative to expedite environmental review for renewable energy projects and adequate community engagement. President Biden's newly-created White House Environmental Justice Advisory Council and White House Environmental Justice Interagency Council should play central roles in developing a streamlined process to seek local input.¹⁴⁸

Public Lands as Clean Energy Generators

Another siting approach utilizes lands currently held in trust by all Americans, by developing large-scale clean energy projects on public lands. In 2010, an Order by the Secretary of the Interior established large-scale solar, wind, geothermal, and other renewable energy generation on public lands as a Department priority, including fast tracking the permitting and environmental review process for transmission rights-of-way applications.¹⁴⁹ The Department of the Interior should re-launch and expand programs (established in 2010 and 2012, respectively) that identified offshore "wind energy areas" and "solar energy zones" to encourage a scale-up of clean energy projects on publicly held lands and offshore waters. The administration could use available executive actions, or support existing Congressional legislation.

The recently passed *Energy Act of 2020*, included within the FY2021 omnibus appropriations bill,¹⁵⁰ set a new national goal for renewable energy production on Federal land, directing the Secretary of the Interior to authorize at least 25 gigawatts of new wind, solar, and geothermal capacity by 2025. To coordinate the siting, permitting, and development of such projects (including related transmission and

¹⁴⁸ The White House, [Executive Order on Tackling the Climate Crisis at Home and Abroad](#), Jan. 2021.

¹⁴⁹ Secretary of the Interior, [Order No. 3285, Amendment No. 1](#), Feb. 2010.

¹⁵⁰ 116th Congress, [Consolidated Appropriations Act, 2021](#).

storage infrastructure) the *Energy Act* also calls for a new office within the Bureau of Land Management (BLM) to oversee the renewable energy permitting process across agencies, a process which slowed dramatically under the previous administration.¹⁵¹ While this new national goal and coordination office are an important first step, the national goal for renewable energy production on federal lands must be far greater to achieve full decarbonization of the electricity sector by 2035. Additionally, and as similarly recommended by the bipartisan *Public Land Renewable Energy Development Act of 2019*,¹⁵² at least half of the revenue collected from fees and leases associated with any given project should be redistributed to the state, Tribal, and local governments surrounding the project. We urge the Biden administration, and the newly appointed Secretary of the Interior, to harness the full potential of our publicly held lands in support of a federal CES policy.

Clean Energy on Remediated Land

The federal government should work to place renewable energy facilities on abandoned industrial sites, Brownfield and Superfund sites, and as a replacement to dirty generators in historically disadvantaged communities. According to a 2011 EPA report on clean energy siting opportunities, Superfund sites can be repurposed into renewable energy generation locations, from community-scale energy projects to utility-scale wind, solar and biomass operations.¹⁵³ Although there is a precedent for repurposing Superfund sites in this way -- a utility-scale wind farm now operates on a closed steel plant and former Superfund site near Buffalo, NY -- thousands of these sites have been pre-screened as viable locations for clean energy generation, yet they remain undeveloped, or have been paused for lack of funding. The federal government ought to refocus existing clean-up and redevelopment programs within the EPA and DOE to fasttrack funding and resources to these sites, especially those under federal ownership, for renewable development. By targeting grants and other resources to environmental justice communities, the benefits are two-fold: replacing abandoned industrial sites and retired fossil fuel power plants with renewable generation reduces public health risks *and* provides reliable, clean energy.

Reform Grid Expansion Cost-Allocation

Finally, one of the single greatest roadblocks to the clean energy transition is the lack of a transmission system that is optimized for the highly distributed nature of renewable generation. Under FERC's current "participant funding" policy, the entire cost of a necessary regional transmission network expansion needed to support the interconnection of a new generator is paid by that generator, meaning many proposed renewable energy generators simply do not get built. To facilitate greater grid access to distributed and variable energy resources, congressional legislation should direct FERC to revisit this policy and instead use its authority to assign transmission costs

¹⁵¹ Yale Center for Business and the Environment & The Wilderness Society, [Key Economic Benefits of Renewable Energy on Public Lands](#), May 2020.

¹⁵² 116th Congress, [H.R.3794 - Public Land Renewable Energy Development Act of 2019](#).

¹⁵³ EPA, [Renewable and Alternative Energy at Superfund Sites: Harnessing New Sources of Power](#), May 2011.

to ratepayers, as the House Select Committee on the Climate Crisis has suggested.¹⁵⁴ Additionally, regional grid planners should be directed to revisit long term distribution planning, to dramatically increase capacity for renewable transmission, thereby socializing the costs broadly with ratepayers. In addition to this cost-allocation reform, permitting reforms are necessary to clear the regulatory backlog and streamline the transmission planning process. The Americans for a Clean Energy Grid (ACEG) recommend legislation be passed clarifying and bolstering FERC's authority to act as a mediator between states and other stakeholders when transmission corridor siting conflicts arise.¹⁵⁵ This can be done by delegating authority from the Department of Energy (DOE) under the National Interest Electric Transmission Corridors (NIETC) provision of the Energy Policy Act (EPAAct). A Presidential Executive Order could call on these reforms as part of a larger national objective, the development of a comprehensive, large-scale clean electricity supply system.

3.5. Promoting Competition

One important consideration during the clean energy transition is ownership of new assets. By default, in much of the country, vertically integrated utilities or affiliates of utilities are likely to develop and own a significant portion of new generation capacity. Utilities have an incentive to develop more costly than needed clean energy resources. Ensuring low cost may require federal policy to consider promoting competition.

Competitive wholesale electricity markets

One way to promote lower cost procurement is through competitive markets. Competitive regional energy markets provide three very important benefits for renewables. They allow a large part of the grid to be operated and planned as a single system at least cost, taking advantage of the geographic diversity of wind and solar resources and allowing different utilities to achieve reliability with fewer power plants in aggregate. Second, they create a greater degree of independence in transmission system access, which allows competitive generators to more fully participate in the transmission access process. This feature also facilitates direct purchasing of clean energy resources by large, environmentally-minded customers, and lowers the cost of delivery thereby encouraging new renewable resource development. Third, regional markets further lower costs and encourage the retirement of emitting high-cost resources by primarily dispatching resources based on their costs. Because clean energy is consistently the lowest-cost option, when true costs are considered, this can save customers and the public trust billions when properly implemented.

¹⁵⁴ House Select Committee on the Climate Crisis, [Solving the Climate Crisis](#), June 2020.

¹⁵⁵ Americans for a Clean Energy Grid (ACEG), [Transmission Policy Recommendations for the Next Administration and Congress](#), Oct. 2020.

Parts of the country remain without organized wholesale electricity markets, most notably the Southeast and West. In these regions, vertically-integrated monopoly utilities plan and operate their grids independently from one another. These utilities essentially operate in their service territories with virtually no competition. They have also proven some of the slowest to transition away from uneconomic coal generation and embrace clean electricity generation, even when costs for clean electricity are lower than their existing assets. In the Southeast, transitioning to a competitive regional market could save consumers up to \$17 billion annually and create 285,000 jobs.¹⁵⁶ In the West doing so could result in over \$1.2 billion annually in customer savings.¹⁵⁷ Federal policy can play a productive role in supporting the expansion of competitive markets into the regions of the country where they do not yet exist. Congress should also provide financial support to states and regions as they make these considerations, and eventually, provide support for the costs of state participation in the governance of the market or for the costs of starting up new markets. Such policy may be a necessary complement to ensuring cost effective implementation of a CES, in particular.

Competitive Procurement at the State Level

State regulators have tremendous influence over utility participation in wholesale markets. In the Southeast and West, state policymakers are early in their advocacy for joining regional markets. Of particular importance is state regulator influence over how state-jurisdictional distribution utilities plan and operate the distribution grid and the resulting impact on power plant fleets. Such policies will influence how quickly clean distributed resources such as rooftop solar, behind-the-meter battery storage, and flexible load control are deployed, thus facilitating large scale renewable resource integration. There are good models for competitive deployment of distributed resources at the state level, including through a practice called all-source procurement and in the model developed by FERC for RTO/ISOs. Federal assistance for clean energy could be contingent on states enacting all-source procurement or on advancing regulations that facilitate development of independent distribution system operators in their states. These best practices are detailed in a report from Southern Alliance for Clean Energy and Energy Innovation.¹⁵⁸

Competitive Procurement within Zero-emissions Electricity Credit Markets

Competition could also be built into the CES program directly by building competitive procurement into the creation of ZECs. There are already several models, either proposed or adopted, of regional competitive procurement programs including a forward clean energy credit market,¹⁵⁹ competitively selected contract for differences,

¹⁵⁶ Energy Innovation, [Summary Report: Economic and Clean Energy Benefits of Establishing a Southeast US Competitive Wholesale Electricity Market](#), Aug. 2020

¹⁵⁷ Mullin R., "[Western RTO Could Yield \\$1.2 B in Annual Savings](#)", *RTO Insider*, Nov. 2020.

¹⁵⁸ Energy Innovation & Southern Alliance for Clean Energy, [Making the Most of the Power Plant Market: Best Practices for All-source Electric Generation Procurement](#), Apr. 2020.

¹⁵⁹ Spees, K. et al., "[How States, Cities, and Customers Can Harness Competitive Markets to Meet Ambitious Carbon Goals Through a Forward Market for Clean Energy Attributes](#)," The Brattle Group, Sept. 2019.

¹⁶⁰ or an integrated capacity and clean energy credit market.¹⁶¹ This approach would allow more market participants to develop clean energy projects and keep the overall price of the program down.

Integrating Voluntary Corporate Purchasing of ZECs

Currently, many corporations are going above and beyond any legal requirements for clean energy by developing and purchasing credits for clean power. This action helps speed up clean energy deployment. Within a CES program, a mechanism should be developed to integrate this voluntary corporate procurement by carving it out of existing LSE compliance obligations. Corporate clean energy purchasers' load could be removed from the overall LSE obligation in a given time period (number of ZECs required, denominator), and the voluntary clean energy purchases removed from the LSE compliance submission (number of ZECs retired, numerator).

PURPA Reform

If full competition in the Southeast and other regions is not achieved, an alternative approach to opening markets and lowering the cost of clean energy transition would be to further expand access for merchant plants to provide power in more regions. This would allow new clean energy market entrants to operate and limit prejudicial action by utilities against independent generators. This approach may require further reforms to the Public Utility Regulatory Policies Act (PURPA) beyond those enacted in July 2020,¹⁶² to require utilities to allow, regardless of size, renewables to come online as long as the utility had not already met their clean energy target for the year. A further option would be to grant the utility the right of first refusal to provide the proposed renewable capacity themselves, if they can demonstrate that they can do it at a lower cost.

3.6. Promoting Intervenor Compensation Programs

The federal government should act to support intervenor compensation programs, both at the Federal Energy Regulatory Commission (FERC), and at state utility regulatory commissions. These programs pay advocates for their time and expenses intervening in the public interest. Under the current regulatory system, monopoly electric utilities have nearly unlimited funds to spend on regulatory proceedings, since they are able to recover these expenses through cost of service rates. This fact tilts the playing field towards utilities, leading to regulatory capture in many states.¹⁶³ By contrast, advocates typically have no dedicated funding to work on electricity

¹⁶⁰ Grubb, M. & Newberry, D., "[UK Electricity Market Reform and the Energy Transition: Emerging Lessons](#)," MIT Center for Energy and Environmental Policy Research, Feb. 2018; Katsigiannakis, G. & Chaurey, A., "[Unpacking New York's Indexed REC Renewable Procurement Framework](#)," ICF, 2020.

¹⁶¹ Energy Innovation, [Wholesale Electricity Market Design For Rapid Decarbonization: Long-term Markets, Working with Short-Term Energy Markets](#), June 2019.

¹⁶² FERC, "[FERC Modernizes PURPA Rules to Ensure Compliance. Reflect Today's Markets](#)", July 2020.

¹⁶³ Stokes, L. [Short Circuiting Policy: Interest Groups and the Battle Over Clean Energy and Climate Policy in the American States](#). 2020.

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policy implementation. They must go to foundations or their membership to raise funds for their efforts. It is only reasonable to provide the public interest the same opportunity as utilities to recover prudent expenses.

Currently, a model for an Intervenor Compensation Program exists in California. This program spent \$25.5 million over the five-year period from 2008 to 2012. A 2013 audit found that one intervenor's participation resulted in a savings of \$354 million for ratepayers -- more than 14 times the cost of the program.¹⁶⁴ Currently, the program costs around \$10 million a year. Groups that are able to demonstrate that they do not have other sources of funding for their work ("significant financial hardship") and demonstrate a significant contribution to a proceeding can be deemed eligible to claim funding for their work in PUC proceedings. Typically, the initial decision for eligibility is made by an Administrative Law Judge, somewhat insulating approvals from political concerns. Parties are paid based on hourly pay scales benchmarked by years of experience and market rates. In practice, these rates are somewhat lower than the parties would receive in the private sector, however, they can be increased over time, for example through automatic adjustments pegged to inflation.

At the federal level, through PURPA Congress instructed FERC to create an Office of Public Participation that would have authority to provide funding for intervenors, but FERC has never implemented these provisions. The House Select Committee on the Climate Crisis endorsed the *Public Engagement at FERC Act* (H.R. 3240) introduced by Rep. Jan D. Schakowsky (D-IL), which would reauthorize FERC to create an Office of Public Participation *and* Consumer Advocacy.¹⁶⁵ This would allow the newly established office to intervene on behalf of customers and also provide funding for community and public interest groups to intervene. The December 2020 omnibus bill made further progress on this issue, with a provision that stated: "FERC is directed to submit to the Committees on Appropriations of both Houses of Congress not later than 180 days after enactment of this Act a report detailing how it will establish and operate the Office of Public Participation required under section 319 of the Federal Power Act, beginning in fiscal year 2022. As part of the report, FERC shall provide an organizational structure and budget for the office sufficient to carry out its statutory obligations. The report shall assume that funding for the Office of Public Participation will be derived through annual charges and filing fees as authorized by the *Federal Power Act* and the *Omnibus Budget Reconciliation Act of 1986*."¹⁶⁶ This office should aim to spend at least \$30 million annually on intervenor compensation funding.

The federal government could also play a role in helping to spur state-level programs by passing legislation that makes funding, for example block grants, contingent on setting up intervenor compensation programs.

¹⁶⁴ California State Auditor, "[California Public Utilities Commission: Despite Administrative Weaknesses, It Has Generally Awarded Compensation to Intervenor in Accordance With State Law](#)" (2012-118), July 2013.

¹⁶⁵ House Select Committee on the Climate Crisis, [Solving the Climate Crisis](#), June 2020.

¹⁶⁶ 116th Congress, [Consolidated Appropriations Act, 2021](#).

3.7. Addressing the Technology Innovation Gap

Federal energy policy must include a plan to develop new clean energy technologies and integrate them into the energy system. Bringing these technologies to market faster will require a massive infusion of research and development (R&D) funding, coupled with a ramp up of large-scale demonstration projects, both critical parts of the energy innovation process (collectively, RD&D). Clean electricity technology must not only work, but work at scale and financially. A concerted federal effort to decarbonize the electricity sector will require investments across the spectrum of technologies, from traditional renewable energy technologies, to improved battery storage, transmission capabilities, and smart-grid management, end-use electrification technologies for the industrial sector, direct air capture, clean hydrogen, advanced nuclear, and carbon capture and sequestration (CCS).

In the final days of 2020, Congress passed the FY2021 omnibus appropriations bill, which included bipartisan, bicameral energy legislation, dubbed the *Energy Act of 2020*.¹⁶⁷ Championed by Lisa Murkowski (R-AK) and Joe Manchin (D-WV), the Energy Act authorized billions for a wide range of clean energy technology RD&D programs, targeting the full spectrum of clean electricity technologies. The act authorized funding for seventeen technology demonstration projects across energy storage, smart grids, advanced nuclear power, CCUS, and more. It also aimed to modernize the federal government's approach to funding innovation, authorizing a near-doubling of the budget for the Department of Energy (DOE) Advanced Research Projects Agency-Energy (ARPA-E) and authorizing the DOE Office of Technology Transitions to speed technology commercialization. Although Congress will still need to appropriate this authorized funding, the Energy Act of 2020 was an important step in addressing the technology innovation gap. Still, we argue that more federal action is necessary to fully support rapid decarbonization of the electricity sector by 2035.

RD&D Funding

There has been significant bipartisan support for energy innovation funding. In 2019, Republican Senator Lamar Alexander called for a “New Manhattan Project for Clean Energy,” recommending a doubling of the Department of Energy’s research funding.¹⁶⁸ In this area, a broad, bipartisan political coalition is possible. One recent report found that the cost of creating a job with federal R&D funding is by far the lowest of any climate policy, at \$15,000 per year; every direct job created in this sector creates 2.7 indirect jobs; and the average compensation across these jobs is 24% higher than the overall economy’s average.¹⁶⁹ Clean energy innovation is one of the highest-leverage

¹⁶⁷ Energy Law Review, “[Energy & Sustainability Washington Updates – January 2021](#),” Jan. 2021.

¹⁶⁸ Senator Lamar Alexander, [Hearing Statement: “A New Manhattan Project for Clean Energy: 10 Grand Challenges for the Next Five Years”](#), March 2019.

¹⁶⁹ Breakthrough Energy, [Impacts of Federal R&D Investment on the US Economy](#), Sept. 2020.

climate policies we have to create high-wage, long-term employment across the country.

The Evergreen Action Plan recommended increasing federal investments to \$35 billion annually in developing next-generation clean energy technologies and other climate solutions, such as industrial carbon capture, utilization and sequestration (CCUS), and carbon dioxide removal (CDR).¹⁷⁰ The Columbia University SIPA Center on Global Energy Policy recommends that “annual public funding for energy innovation, across a range of federal agencies, should triple to \$25 billion” per year by 2025 as part of a National Energy Innovation Mission.¹⁷¹ And in an effort to remain competitive with China and the rest of the world in the “clean energy race”, Former Secretary of State, and newly appointed Special Presidential Envoy on Climate, John Kerry and Representative Ro Khanna recommend increasing ARPA-E’s budget 100-fold, and doubling the budgets of the DOE’s Office of Energy Efficiency and Renewable Energy and the Office of Science.¹⁷²

Demonstration projects for clean energy generation and distribution technologies help propel them through the R&D stage to commercial markets, resolving issues and bringing down costs. Previous utility-scale demonstration programs have faced funding and management challenges, undermining delaying market adoption of promising technologies. A well-funded demonstration office at the DOE would centralize the planning, project selection, and management of these projects, ensuring their success.¹⁷³

Global Leadership

As the U.S. transitions to 100% clean electricity over the next 15 years, it should reassert its global leadership on clean energy technology innovation. A valuable first step involves recommitting to “Mission Innovation.” Established in 2015, the compact calls for a doubling of government R&D funding and the development of collaborative opportunities among its 24 member nations. The U.S. should mainstream clean energy innovation across bilateral and multilateral relationships by developing robust innovation collaboration programs with important partners (e.g. the UK, Canada, the EU, South Korea, Japan, India, Australia). These partnerships can allow collaboration on RD&D and knowledge sharing, for example on how to structure innovation institutions such as ARPA-E. Additionally, partnering with emerging markets by providing clean energy technology and knowledge transfers will reduce costs overall and create economic alliances that will benefit American workers and businesses.¹⁷⁴

¹⁷⁰ Evergreen Collaborative, [Evergreen Action Plan: A National Mobilization to Defeat the Climate Crisis and Build a Just and Thriving Clean Energy Economy](#), April 2020.

¹⁷¹ Columbia University SIPA Center on Global Energy Policy, [Energizing America: A Roadmap to Launch a National Energy Innovation Mission](#), Sept. 2020.

¹⁷² Kerry, J. & Khanna, R., “[Don’t Let China Win the Green Race](#)”, *The New York Times*, Dec. 2019.

¹⁷³ Information Technology & Innovation Foundation (ITIF), [More and Better: Building and Managing a Federal Energy Demonstration Project Portfolio](#), May 2020; Data for Progress, [A Progressive Climate Innovation Agenda: Federal Policy Recommendations](#), Aug. 2020.

¹⁷⁴ Data for Progress, [A Green Marshall Plan: America's Global Climate Compact](#), April 2020.

The United States could position itself to be the world leader on clean energy research and development, bringing much-needed technologies to (and from) the global market and signaling an American commitment to a clean energy future.

Energy Storage and Transmission Technologies

Although tremendous progress has already been made on electricity transmission and battery storage technologies, significant challenges remain. For clean electricity generation to grow at the rate necessary to meet a 2035 CES target, long-range, highly efficient transmission lines will be necessary to connect distant renewable energy generation sites to population centers. In addition, low-cost battery storage technology must be available to store abundant energy for future use over weeks and months.

In grid-scale energy storage, the Administration should work with Congress to do for energy storage systems what the DOE's 2011 SunShot Initiative did for solar -- reduce the price by about 75 percent in under a decade.¹⁷⁵ A great first start is the bipartisan funding package included in the year-end omnibus bill. The bill invests \$1 billion over five years in energy storage technology RD&D projects, focusing on flexible, long duration storage and advancing the commercialization of large-scale storage technologies.¹⁷⁶ What's missing, however, is full Investment Tax Credit (ITC) eligibility for stand-alone energy storage technology. Currently, energy storage systems are eligible for the credit only when paired with a solar installation. Industry advocates have long pushed for an energy storage ITC,¹⁷⁷ as have bipartisan coalitions in Congress.¹⁷⁸ Federal support for the deployment of new energy storage systems (and retrofits of existing systems as new technologies are developed) will be critical to increase the availability and commercial viability of renewable energy.

To build out an efficient, reliable, regional and inter-regional transmission grid, the costs of high-voltage direct current (HVDC) transmission lines should be cut considerably (30 percent by 2030) and HVDC technology development funding increased dramatically (\$50 million appropriated per year over five years), according to the Americans for a Clean Electricity Grid (ACEG).¹⁷⁹ Converting existing long-range transmission lines to HVDC minimizes public opposition and is the least-cost option to deliver desired capacity increases across distances greater than 200km.¹⁸⁰ Administrative directives to the Department of Energy and supportive Congressional appropriations could revolutionize HVDC transmission and refocus attention on advanced grid management systems and planning strategies. Further, the Federal government could significantly facilitate the development of HVDC transmission lines

¹⁷⁵ U.S. Department of Energy (DOE), [Energy Department Announces More than 90% Achievement of 2020 SunShot Goal. Sets Sights on 2030 Affordability Targets](#), Nov. 2016.

¹⁷⁶ 116th Congress, [Consolidated Appropriations Act, 2021](#).

¹⁷⁷ Spector, J., "[Energy Storage Gets Its Day in Congress](#)", *Greentech Media*, July 2018.

¹⁷⁸ 116th Congress, [S. 1142 - Energy Storage Tax Incentive and Deployment Act of 2019](#).

¹⁷⁹ ACEG, [Transmission Policy Recommendations for the Next Administration and Congress](#), Oct. 2020.

¹⁸⁰ Reed, L. et al., "[Converting Existing Transmission Corridors to HVDC is an Overlooked Option for Increasing Transmission Capacity](#)", *Proceedings of the National Academy of Sciences*, July 2019.

by opening Federal Highway and Railroad Right of Ways to undergrounding HVDC projects.

In addition to the HVDC transmission infrastructure that needs to be deployed to deliver the renewable resources required to achieve a 100% clean energy CES goal, the AC generation tie lines that connect those newly developed clean energy resources into the HVDC backbone, as well as the lower AC voltage pre-distribution feeder lines from the HVAC transmission networks, all need to be optimized with the best available grid enhancing technologies if consumer costs are to be minimized. These technologies include dynamic line rating devices, flow control systems and software topologies to optimize grid flows. Much of this technology has been developed and commercialized, but little has been deployed in the United States when compared to economic competitors like Australia and the UK. Utilities could be incentivized to make the grid more efficient by structuring compensation for transmission development based on both its consistency with the CES goals and the efficiency and cost effectiveness with which the development meets those goals.

Part 4. Existing Proposals in Congress

Table 1. Existing Congressional CES Proposals

	Clean Energy Standard Act of 2019 (S. 1359)	Clean Energy Innovation and Deployment Act of 2020 (H.R. 7516)	Tradeable Performance Standards Act of 2020 (H.R. 8582)	Clean Energy Future Through Innovation Act of 2020	Clean Energy Standard of 2012 (S.2146)	Clean Energy Standard Act of 2010 (S.20)
Sponsor	Sen. Tina Smith (D-MN) and Rep. Ben Ray Lujan (D-NM)	Rep. Diana DeGette (D-CO)	Rep. Sean Casten (D-IL)	Rep. David McKinley (R-WV) and Rep. Kurt Schrader (D-OR)	Sen. Jeff Bingaman (D-NM)	Sen. Lindsey Graham (R-SC)
Policy	CES	CES	CES	CES	CES	CES
Implementing Agency	DOE	DOE	EPA	DOE	DOE	DOE
Point of Regulation*	Electric utilities	Electric utilities	Electric Utilities + Industrial Thermal Power	Electric utilities	Electric utilities	Electric utilities
Qualified Energy Sources	Renewables, nuclear power, qualified CCS, qualified biomass, qualified CHP, and qualified energy storage. Credits issued to retail electricity generators with a carbon intensity less than 0.4 metric tons per MWh.	Renewables, qualified CHP, qualified biomass, qualified waste-to-energy, qualified low-carbon fuel (ammonia and hydrogen). Credits issued to retail electricity generators with a carbon intensity less than 0.825 metric tons per MWh.	Renewable energy, qualified renewable biomass, hydropower, nuclear power, qualified waste-to-energy, qualified low-carbon fuels, qualified CHP	Renewables, nuclear power, qualified CCS, qualified biomass, qualified CHP. Credits issued to electricity generators with a carbon intensity less than 0.825 metric tons per MWh.	Renewables, nuclear power, fossil fuel use with CCS, and efficient combined cycle natural gas plants (partial credi), qualified biomass, qualified CHP	Non-hydro renewables, incremental hydropower, coal with CCS, incremental nuclear power
Coverage	Large retail electric utilities (with sales of at least 2 million MWh per year) and small retail electric utilities (with sales between 20 MWh and 2 million MWh per year).	Generating facilities that produce at least 20MWh of electric energy annually.	Electric and cogeneration facilities that have a rated capacity of 2MW or more. Facilities producing thermal energy with a rated fuel-based capacity that is at least 50,000,000 British thermal units or higher.	Generating facilities that produce at least 20MWh of electric energy annually.	Retail electric utilities with sales of less than 2 million MWh per year are not covered. The sales threshold decreases 100,000 MWh per year until the threshold reaches 1 million MWh	Retail electric utilities with sales of less than 4 million MWh per year are not covered.

	Clean Energy Standard Act of 2019 (S. 1359)	Clean Energy Innovation and Deployment Act of 2020 (H.R. 7516)	Tradeable Performance Standards Act of 2020 (H.R. 8582)	Clean Energy Future Through Innovation Act of 2020	Clean Energy Standard of 2012 (S.2146)	Clean Energy Standard Act of 2010 (S.20)
Clean Energy Targets	Large retail electric utilities have a target that increases 2.75% annually until reaching 60%, at which point the annual target increases to 1.75%. Small retail electric utilities have a target that increases 1.5% annually. All retail electric utilities have a max clean energy target of 90% until 2040, when the target increases 1% annually until reaching 100% in 2050.	2030 50% reduction in carbon emissions below 2005 levels 2050 100% Net Zero emissions *If technology innovations reduce the estimated costs of zero-emission electricity, the CES target can change to reaching 100% Net Zero emissions by 2037.	For covered entities (from 2019 carbon dioxide equivalent emission levels): 2030 40% reduction 2040 100% reduction	2050 80% reduction in carbon emissions from the level of emissions in the year of enactment	2015 24% 2020 39% 2025 54% 2030 69% 2035 84%	2013–2014 13.0% 2015–2019 15.0% 2020–2024 20.0% 2025–2029 25.0% 2030–2034 30.0% 2035–2039 35.0% 2040–2044 40.0% 2045–2049 45.0% 2050 50.0%
Exclusions	None specified	Deductions specified for qualified beneficial electrification-related reductions	None specified	Excludes electric utilities located in the States of Alaska and Hawaii	Nuclear or hydropower placed in service before 1992	Existing hydropower and MSW
Energy Efficiency	Credits for qualified CHP	None specified	None specified	Creates performance-based energy efficiency tax credits for commercial and residential buildings	Credits at least for industrial CHP	Credits for electricity savings from efficiency can be used for up to 25% of compliance

	Clean Energy Standard Act of 2019 (S. 1359)	Clean Energy Innovation and Deployment Act of 2020 (H.R. 7516)	Tradeable Performance Standards Act of 2020 (H.R. 8582)	Clean Energy Future Through Innovation Act of 2020	Clean Energy Standard of 2012 (S.2146)	Clean Energy Standard Act of 2010 (S.20)
Alternative Compliance Payments	\$30/MWh, and increasing annually 3% above inflation until 2030 and then increasing annually 5% above inflation	Starting in 2022, \$20/MWh, increasing by \$1.50 each year till 2050	Tradeable allowances determined by a market price	\$30/MWh, and increasing 5 percent annually	\$30/MWh, and increasing 5 percent annually	\$35/MWh
Other Notable Provisions	Initially, credits can be banked for three years until 2040, credits can be banked for two years from 2040 to 2050, and credits can be banked for one year after 2050.	Credits may be used for compliance in the year the credit was issued and any subsequent 5 years from 2022-2029 any subsequent 4 years from 2030-2034 any subsequent 3 years from 2035-2039 any subsequent 2 years from 2040 onwards	Emission allowances can be used for compliance either the same calendar year when the allowance is distributed or the following year. Includes noncompliance penalties equivalent to twice the market price of an allowance.	The standard is paired with new or extended tax credits, including for nuclear energy generation; investments into clean energy technology innovation, including battery storage and renewable generation; and authorizes billions of dollars for carbon capture technology	Unlimited banking	Credits for early retirement of coal plants and generator-side-efficiency improvements
* see bill text for specific definition of covered entities						

Adapted and updated from the Center for Climate and Energy Solutions (C2ES) Report, [Clean Energy Standards: State and Federal Policy Options and Considerations](#), Nov. 2019.