Center for American Progress

The Clean-Energy Investment Agenda

A Comprehensive Approach to Building the Low-Carbon Economy

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Introduction

The United States is having the wrong public debate about global warming. We are asking important questions about pollution caps and timetables, carbon markets and allocations, but we have lost sight of our principal objective: building a robust and prosperous clean energy economy. This is a fundamentally *affirmative* agenda, rather than a restrictive one. Moving beyond pollution from fossil fuels will involve exciting work, new opportunities, new products and innovation, and stronger communities. Our current national discussion about constraints, limits, and the costs of transition misses the real excitement in this proposition. It is as if, on the cusp of an Internet and telecommunications revolution, debate centered only on the cost of fiber optic cable. We are missing the big picture here.

Let's be clear: Solving global warming means investment. Retooling the energy systems that fuel our economy will involve rebuilding our nation's infrastructure. We will create millions of middle-class jobs along the way, revitalize our manufacturing sector, increase American competitiveness, reduce our dependence on oil, and boost technological innovation. These investments in the foundation of our economy can also provide an opportunity for more broadly shared prosperity through better training, stronger local economies, and new career ladders into the middle class. Reducing greenhouse gas pollution is critical to solving global warming, but it is only one part of the work ahead. Building a robust economy that grows more vibrant as we move beyond the Carbon Age is the greater and more inspiring challenge.

Reducing greenhouse gas emissions to avert dangerous global warming is a moral challenge, but it is also an economic, national security, social, and environmental imperative. The "cap and trade" provisions, which will set limits on pollution and create a market for emissions reductions that will ultimately drive down the cost of renewable energy and fuel, represent a very important first step and a major component in the mix of policies that will help build the coming low-carbon economy. But limiting emissions and establishing a price on pollution is not the goal in itself, and we will fall short if that is all we set out to do. Rather, cap and trade is one key step to reach the broader goal of catalyzing the transformation to an efficient and sustainable low-carbon economy. With unemployment at 9.5 percent, and oil and energy price volatility driving businesses into the ground, we cannot afford to wait any longer. It is time for a legislative debate over a comprehensive clean-energy investment plan. We need far more than cap and trade alone.

This is not just an exercise in rhetoric. Articulating and elevating a comprehensive plan to invest in clean-energy systems and more efficient energy use will affect policy development and the politics surrounding legislation now moving through the Senate, as well as international negotiations underway around the globe. The current debate, which splits the issue into the two buckets of "cap and trade" and "complementary policies," has missed the comprehensive nature of the challenge and its solutions. It also emphasizes the challenge of pollution control instead of organizing policy for increased development, market growth, reinvestment in infrastructure, and job creation through the transition to a more prosperous, clean energy economy.

This paper lays out the framework for just such an investment-driven energy policy, the pieces of which work together to level the playing field for clean energy and drive a transformation of the economy. Importantly, many elements of this positive clean-energy investment framework are already codified within existing legislation such as the American Clean Energy and Security Act, passed by House of Representatives earlier this year. But with all the attention given to limiting carbon, too little attention has been placed on what will replace it. These critical pieces of America's clean-energy strategy should be elevated in the policy agenda and political debate as we move forward into the Senate, and used to help move legislation forward that advances a proactive investment and economic revitalization strategy for the nation.

The private sector and public policy

Private sector investments will be the main engine driving growth in the clean energy economy. The scale of the energy transformation is simply too large for public sector resources and programs to tackle alone. The significant public investments in clean energy included in the American Recovery and Reinvestment Act were a one-time stimulus to respond to dire economic circumstances. And it is unlikely that we'll see additional public funds at the same magnitude of ARRA anytime soon given the current state of U.S. government finances.

Private businesses will create most clean-energy jobs, as well. Existing sectors will expand, and whole new industries will develop to respond to increasing demand and new markets for clean-technology goods and services. The private sector will also lead the way in technological innovation, developing new products that will serve the domestic market and be exported to a global economy hungry for low-carbon energy solutions.

Yet these private sector investments will not materialize at nearly the scale needed without an initial dose of public investment coupled with strong public policy drivers. This is particularly true given the current policy environment, which disregards the cost of inaction on global warming and lacks the foresight to calculate the tremendous benefits that would accompany a strong clean-energy investment effort.

This is a time-tested script. Smart policy sets a framework for investment. It sends signals to the market that in time can transform the larger economy. This is how we built the railroads, electrified rural America, deployed the National Highway System, and launched a nuclear energy industry. In each case, public investment and public policy created vast new opportunities for jobs and profits in the private sector, enabling market transformation and industry growth.

Public policies are now necessary to correct existing market failures and put clean energy on an even playing field with fossil fuels; to establish the market certainty that businesses need to make long-term investment decisions; and to provide stable, long-term support for clean-energy research, development, and deployment, just as they have done in the past for the medical, aeronautical, and information technology sectors. The government itself can play a role in creating a market for clean-energy products by passing procurement policies that require it to purchase renewable energy and efficient goods and services.

Public investment is also required to bring the aging electrical and transportation infrastructure that powers our industries and facilitates commerce into the 21st century, and to ramp up our workforce and manufacturing infrastructure to meet the enormous new demands for goods and services that will result from new clean-energy markets. And finally, there is a public role to play in ensuring that we transition to a clean energy economy in a way that creates broadly shared prosperity and tangible economic and environmental benefits to local communities.

We will need a policy architecture that is much more comprehensive and nuanced than a simple cap-and-trade system for global warming pollution if we are going to achieve these goals. For example, existing buildings account for 40 percent of all energy use and greenhouse gas emissions, and the complexities of the real estate sector necessitate a specific strategy to encourage energy efficiency retrofits at scale. A gradual increase in the cost of energy from polluting sources will not be enough, nor is it a viable option for many low- and moderate-income consumers. Similarly, putting a cap and price on pollution will certainly help drive the market for less-polluting energy generation, but we will not see the ramp-up in new energy sources that we need without a corresponding strong renewable energy standard that requires every state to meet a set percentage of its power needs through renewable generation.

The Center for American Progress identifies three core pillars of the clean-energy transformation:

- **Markets:** Expanding markets and driving demand for new clean and efficient energy products and services.

- **Financing:** Encouraging and investing in research, development, deployment, and commercialization of the technologies needed to meet demand.

- **Infrastructure:** Revitalizing and reinvesting in the nation's physical and economic infrastructure upon which the clean-energy transformation—like all major industrial transformations in the past—will be built.

Each of these pieces is distinct and essential to building a low-carbon economy, and each will require specific policy attention. The American Clean Energy Leadership Act recognizes this and contains provisions that directly address each of these core pillars.

Expanding markets and driving demand

A host of market failures and distortions have conspired to inhibit the deployment of clean, renewable energy. First, a century of subsidies and infrastructure investments to support the provision of carbon-based energy has severely tilted the playing field. Second, the hidden costs associated with greenhouse gas emissions and other pollutants have been typically treated as negative externalities and never factored in to the market price that we pay for traditional energy. These costs affect our public health, national security, and our environment—indeed, the unchecked release of global warming pollution into the atmosphere has been called the greatest market failure of all time. And third, clean-energy solutions face major market barriers specific to their sector—the fact that landlords often do not pay their own utility bills hinders energy efficiency investments in buildings; the lack of distribution infrastructure inhibits the availability of ethanol and other alternative fuels; and our outdated transmission grid poses major obstacles to deploying greater quantities of utility-scale renewable energy. A comprehensive policy approach will help us to overcome these numerous market failures and increase demand for clean energy.

Establishing a cap and a price on global warming pollution

Putting a cap and price on pollution is a critical first step and a major component in the mix of policies that will help build a prosperous low-carbon future. A price on pollution turns the negative environmental effects of carbon emissions into a real business cost for emitters, thus correcting a major market failure. A cap on emissions sets a clear goal and establishes a long-term signal in the market, encouraging innovation and allowing businesses to plan their investment strategies.

The American Clean Energy and Security Act proposes a cap-and-trade system as the mechanism to establish a cap and a price on greenhouse gas pollution. This system has the additional benefit of allowing companies to trade emissions permits, which results in the highest-emitting firms and industries buying permits from—and therefore investing in—the lowest-emitting, most efficient firms and technologies.

Measures to rapidly deploy new renewables and other low-carbon energy technologies

Creating dependable markets and driving demand for low-carbon energy is critical to giving the private sector the security it needs to make capital-intensive investments. One simple and budget-friendly approach is to adopt new standards and codes that require policymakers and firms to adopt low-carbon, high-efficiency policies and practices. Some examples from ACES include:

- A renewable electricity standard, or RES, requiring every state to meet a set percentage of its power needs through renewable generation.
- An energy efficiency resource standard, or EERS, requiring every state to decrease its energy consumption through efficiency measures.
- Updated codes to increase home appliance efficiency.
- Updated codes to increase residential, commercial, and industrial building efficiency.

These are all examples of policies that create demand and help develop new markets and new industries. The net social benefits of these initiatives are quite large, but they are not being captured due to failures in the current market. Public policy intervention can help.

Policies should not be overly prescriptive, but rather should encourage the private sector to innovate and apply the best technologies and approaches. This strategy prevents unnecessary government intervention in the marketplace and removes concerns about the danger of "picking winners." Setting clear standards that induce broad public benefits—then letting the private sector meet the goal in the most efficient and profitable way possible—is a hallmark of good public policymaking.

The government procurement process is an additional tool to help deploy new low-carbon energy technologies. Government procurement represents a source of stable and sizeable demand that can encourage businesses to ramp up production and achieve the economies of scale necessary to bring down the marginal costs of each new unit. This, in turn, can make the given technology more appealing to private consumers—another example of using public policy to recognize and capture the true net social benefits of the clean-energy transformation.

Incentives to spur supply and demand

Promising innovations can languish "on the shelf" due to a lack of initial market demand. It takes time to build consumer familiarity with a new product or service, and often the first units off the assembly line have high marginal production costs because economies of scale have not yet been achieved. Public support during this phase is critical, and a host of

tools are available to help incentivize demand at the outset—from direct government procurement to tax incentives or other subsidies for manufacturers, investors, and consumers. Good examples include:

- Production and investment tax credits for renewable energy
- Rebates for building owners who invest in efficiency improvements
- Performance-based incentives to reduce carbon emissions from existing fossil fuel resources such as carbon capture and sequestration

The federal government should extend these types of incentives and allocate adequate resources for promising new technologies. The initial cost to the Treasury will be far outweighed by the long-term economic benefits of developing new markets and standing up new industries. Financial support can be phased out over time as economies of scale increase, production costs go down, and the emerging technologies become more competitive. But the initial kick-start to spur demand through public support is critical.

Providing secure financing for research, development, and deployment

There is a long and successful history of public support for emerging technologies with demonstrable public benefits, from land grants to the railroad companies to military investments in ARAPANET, the precursor to the Internet. Quite often, it is this initial seed of public support that enables the launch of a vibrant new industry led by private investment. Given the myriad benefits and enormous economic development potential of the emerging clean-energy sector, these nascent technologies are clear candidates for similar kinds of public assistance.

Investing in research and development

It is in the public interest to provide stable, long-term support for clean-energy research and development and public investments in science and technology, using all the means at our disposal, including the National Science Foundation; national laboratories and land grant universities; federal programs such as ARPA-E, which is designed to invest in early-stage, high-yield technologies; and the various Cabinet agency budgets with relevant jurisdictions such as defense, energy, and education. America's incredible history of success at innovation and global technological leadership is due in no small part to our decisive support of the pursuit of science as a public good. This support has waned in recent years in almost all sectors besides those with purely military applications. It is time to reverse this trend.

Financing clean energy deployment through a "Green Bank"

The residual tightness in the credit markets has made it difficult for developers to secure adequate capital to invest in clean-energy projects. And some investments carry slightly more fiduciary risk than traditional capital markets are willing to bear, particularly in these conservative economic times. These factors make a strong case for government support for financing investments in clean energy, either through direct loans, or through various types of credit enhancements to reduce some of the risk for private investors.

A publicly funded but independent financial institution focused solely on clean-energy financing—a "Green Bank"—would accomplish this policy objective by providing up-front capital or credit enhancements for emerging clean-energy projects. Working in partnership with the private sector, a well constructed "Green Bank" would open the credit markets and motivate businesses to invest again. It would enable energy technologies such as wind, solar, geothermal, advanced biofuels, and energy efficiency to be deployed on a large scale and to be commercially viable at current electricity costs. It would send a signal to private investors that these are worthy projects with a long-term future. The Green Bank would also provide project developers with a fairly seamless one-stop shop for project financing that is appropriate to each specific situation and technology. Ultimately these investments, and the resulting scale-up of renewable and efficient technologies, would bring down the price of low-carbon energy solutions and lower costs to consumers.

The Green Bank could also support an innovative financing mechanism for energy efficiency retrofits and small-scale renewable energy systems knows as PACE (Property Assessed Clean Energy) bonds. Loan guarantees provided by a Green Bank would help draw private investment into PACE bonds, which can be issued by municipal financing districts or finance companies, with the proceeds then lent to commercial and residential property owners to finance energy retrofits, and who then repay their loans over time via an annual assessment on their property tax bill.

ACES includes several provisions intended to help finance clean energy deployment. These include:

- The Clean Energy Deployment Administration, a Green Bank overseen by the Department of Energy
- Specific language on federal loan guarantees and other credit enhancements to help draw private capital into the market for energy efficiency retrofits

Revitalizing and reinvesting in our physical and economic infrastructure

America's physical infrastructure has suffered from years of disinvestment and neglect. The American Society of Civil Engineers gives the country's infrastructure a "D" grade, and estimates the need for $2.2 trillion in new investments. Building the clean energy economy and keeping America competitive in a globalized world will require major investments—both public and private—in revitalizing our infrastructure and laying the foundation for growth and prosperity. We must also think of our workforce and manufacturing sector, which at the most basic level produce our nation's goods and services, as key pieces of America's clean-energy infrastructure.

Rewiring the electrical grid

The electricity grid is the most egregious example of the consequences of underinvestment. The Electric Power Research Institute estimates that electricity disruptions cost the economy $100 billion a year in damages and lost business. And our current electricity distribution system is the equivalent of a phonograph—utilizing technology that was invented during the time of Thomas Edison. We need to rewire the grid and overlay it with a new generation of information technology and "smart" components to increase its performance, efficiency, resilience, and security.

What's more, the bulk of our utility-scale renewable resources are located in remote areas of the country, far from the population and industrial centers where electricity demand is greatest. We will need to extend the high-voltage backbone of the transmission grid to provide access to these wind, solar, geothermal, and hydroelectric resources and bring them on-line.

Rewiring the transmission grid can be done primarily through private investments, but will require a series of public policy fixes, including:

- Resolving the gridlock over planning, siting, and cost allocation
- Providing incentives for the deployment of "smart grid" components
- Taking measures to increase the physical and cybersecurity of the grid
- Providing the conditions necessary to ensure that new grid investments help lower emissions from the electricity sector

ACES includes a sparse transmission grid title, but it was intended as a placeholder in the legislation while some of the policy details are ironed out. The benefits that a smart grid would provide the nation are enormous—akin to building a national superhighway for clean electricity.

Transportation infrastructure in a low-carbon economy

The infrastructure for distributing and storing clean fuels such as ethanol, biodiesel, and electricity is scarce and underdeveloped, as are most mass transit systems nationwide. Clean fuels and mass transit must also compete with a petroleum and automobile-based system that's had 100 years to get established and has, over time, benefited from hundreds of billions of dollars in direct and indirect subsidies. Leveling the playing field will require a shift of incentives away from pollution and toward clean-energy solutions, using policy to enact new standards, allocate some public dollars, and drive new private investment into our nation's low-carbon transportation infrastructure. Specifically, transportation policy should:

- Shift the focus of federal transportation spending away from new roads and toward mass transit options and the repair and maintenance of existing roadways.

- Develop a mix of incentives and standards to encourage private investment in alternative-fuel vehicles and fuel distribution infrastructure, including electric vehicles, the use of natural gas in the heavy-duty fleet, and increasing production of high-yield, low-carbon biomass feedstocks for ethanol and biodiesel.

This piece of the clean-energy transformation brings economic and environmental benefits from diversifying and decarbonizing the transportation sector, but it is particularly relevant to improving U.S. national security, which remains severely compromised due to our heavy dependence on oil, and on foreign oil imports in particular. We will only kick this dependence by renewing and rebuilding our transportation infrastructure around efficiency, reduced vehicle-miles-traveled, and clean and domestic fuel resources. The transportation bill up for reauthorization in the coming year is the perfect opportunity to set the policy framework for this transformation.

Workforce development and community investment

The infrastructure to build a clean energy economy goes beyond pipes, pumps, wheels, and wires. We also need to strengthen our workforce development and community investment infrastructure to provide the training necessary to build a labor pool with the requisite skills, and ensure that "green" economic development benefit local populations across the country. Once again, there are public policy instruments to support these outcomes,

such as a dramatic increase in the Workforce Investment Act, which provides the funding used to train workers in the skills that will be most sought after as we ramp up the clean energy economy. We must also ensure that any allocation of federal funds to support this ramp-up is accompanied by strong labor standards and community reinvestment strategies so that the fruits of investments in clean energy benefit all Americans.

Clean-energy manufacturing

Over 70 percent of all component parts for installed clean and efficient energy systems in this country are currently imported—many from countries with higher labor costs and environmental standards than ours. Germany, Spain, Japan, and China have each made a concerted effort to invest not only in clean-energy technologies, but in clean-energy manufacturing infrastructure, as well.

The United States must expand its clean-energy policy vision to support the small and midsize component manufacturers that are willing and able to become suppliers of clean and efficient products, but that need up-front capital to retool or expand their facilities. Without these investments, we run the risk of trading our dependency on foreign oil and pollution-based energy for a dependency on imported clean-energy components and systems—and being left behind in the new global race to build and export high-quality, low-carbon technologies.

- In the Senate, the American Clean Energy Leadership Act includes provisions on industrial efficiency, and the IMPACT (Investments for Manufacturing Progress and Clean Technology) Act currently before the Commerce committee would provide low-cost loans to help manufacturers retool to produce clean-energy technologies.

- Provisions similar to those in the IMPACT Act were incorporated into the House ACES bill as the Clean Energy Manufacturing Revolving Loan Fund Program and the Clean Energy and Efficiency Manufacturing Partnerships.

Conclusion

Building a clean energy economy and tackling global warming are challenges too large to be solved with a single policy or program. We need a comprehensive suite of solutions that transforms the way we fuel our economy to use clean and renewable power; radically improves the energy efficiency of our homes and workplaces; reconstructs our infrastructure to use resources more wisely and with greater benefit; develops new markets for low-carbon products and services; and supports new finance and investment tools to help entrepreneurs, inventers, and workers revitalize the American economy.

The Center for American Progress offers here a national policy framework necessary to build the clean energy economy in the following manner:

- **Markets:** Expanding markets and driving demand for new clean and efficient energy products and services.

- **Financing:** Encouraging and investing in research, development, deployment, and commercialization of the technologies needed to meet demand.

- **Infrastructure:** Revitalizing and reinvesting in the nation's physical and economic infrastructure upon which the clean-energy transformation—like all major industrial transformations in the past—will be built.

The answer to global warming lies in what we build and how we build it. We must keep this front and center in the debate. The national dialog on climate legislation has so far focused largely on proposals to enact a cap-and-trade system for regulating emissions. Limiting the release of greenhouse gasses into the atmosphere—and establishing a price on harmful pollution so that the negative externalities are properly acknowledged in the marketplace—are vital steps in this economic transition, but they are only one piece of the puzzle.

Making pollution expensive and limiting harmful practices is only one half of the equation. Equally important to realizing this transition are provisions in current energy legislation that make clean energy cheap and abundant, promote high-performance building practices, drive down the cost of capital to promote new investment, train workers to meet new demand for skilled labor, and improve consumer choice and savings. Taken as a package, this national undertaking offers a comprehensive plan to rebuild our economy and invest in a new foundation of clean, low-carbon energy today.

The Center for American Progress is a nonpartisan research and educational institute dedicated to promoting a strong, just and free America that ensures opportunity for all. We believe that Americans are bound together by a common commitment to these values and we aspire to ensure that our national policies reflect these values. We work to find progressive and pragmatic solutions to significant domestic and international problems and develop policy proposals that foster a government that is "of the people, by the people, and for the people."

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