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# Efficiency Works

## Creating Good Jobs and New Markets Through Energy Efficiency


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# Introduction and summary

The United States is mired in an urgent jobs crisis. Despite some early signs of a sustained economic recovery, in many parts of the country the debilitating fallout from the Great Recession on employment remains a painful fact of daily life. Few industries have felt the economic downturn harder than the construction industry, which suffered the most from the consequences of a decade of gross mismanagement of our nation's mortgage markets and financial services industries.

The unemployment rate in the construction industry hovers at Depression-era levels, remaining near 25 percent for three straight months by March of this year. Between 2006 and early 2010, total payroll employment in construction fell by 2.1 million jobs, with residential construction declining by 38 percent, meaning that more than one in three construction workers lost their job as a result of this recession. And this collapse in construction cascades across other industries as well. Construction-related retail jobs fell by 14 percent, and manufacturing jobs in wood products by 30 percent over the same period.[1]

Collapsing demand for labor in construction industries is devastating to American families and communities nationwide. To confront this crisis, the U.S. jobs market needs sustained new demand for the skills of construction workers that is grounded in providing real value to the economy through enhanced productivity, greater efficiency, and improved asset value for real estate. For that to happen, we need a sound strategy for investment in our nation's stock of residential and commercial buildings—a strategy that will get banks lending again, put construction crews back on the job, and improve the long-term economic value of buildings for homeowners, businesses, and investors alike.

Such a solution is readily available. Our country needs a national program to retrofit America's homes, offices, and factories for energy efficiency—a program that can provide an important answer to the jobs crisis facing our country (see box on page 2). But it will take public policy leadership to mobilize the private sector investment that is needed to grow this emerging market. Fortunately, many states

around the country are already demonstrating that with public sector leadership it is possible to jumpstart market demand for energy efficiency retrofits of our homes and businesses.

In this paper, the Center for American Progress and Energy Resource Management look at state regulations and incentives for energy efficiency that are working today in leading states to accelerate demand for energy efficiency services, businesses, and ultimately jobs. As this market rapidly grows in coming years, states that have put in place strong policies for energy efficiency will be best positioned to capture these new employment opportunities for construction workers in clean energy. Despite the growing state leadership documented here, however, more must be done to capture the full potential of energy efficiency to serve as a national engine of reinvestment and job creation.

## Energy efficiency retrofits: Fast facts

### A national program to make our homes and offices energy efficient is a sure job creator

A national program to retrofit America's homes, offices, and factories for energy efficiency can provide an important answer to the jobs crisis facing our country. The Center for American Progress estimates that retrofitting just 40 percent of the residential and commercial building stock in the United States would:

- Create 625,000 sustained full-time jobs over a decade
- Spark $500 billion in new investments to upgrade 50 million homes and office buildings
- Generate as much as $64 billion a year in cost savings for U.S. ratepayers, freeing consumers to spend their money in more productive ways[2]

Whether we are motivated by economic, national security, or environmental concerns, a national commitment to energy efficiency will create substantial new demand for labor across the economy, and especially in construction and construction-related manufacturing jobs.

Investing in energy efficiency provides economic benefits in other ways as well. Increasingly efficiency means state-of-the-art buildings, enhanced comfort, better health, and improved economic value. Highly efficient "green" buildings use less energy, attract higher rents, spend less time vacant, and command higher prices at the time of sale. Energy cost savings and well-designed financing structures also reduce net building operating costs permanently.

Energy efficiency is driving innovation in business models as well. As entrepreneurs generate value and profit by mining current inefficiency and waste for new economic opportunities, they improve the competitiveness of the broader economy. And increased efficiency makes both homeowners and the economy as a whole less vulnerable to fluctuations in energy prices, while advanced building materials and cutting-edge information technology for better building management represent fast-growing markets for American manufactured products.

Smart policies for energy efficiency can be not only an engine of economic recovery but a catalyst for innovation as well.

Choices in policy can have a tremendous impact on setting the market conditions that entice private sector investment and put skilled construction workers back on the job. This paper identifies 10 policies that are effectively used in states and can have an especially large impact in shaping the market for energy efficiency. Using a state-by-state analysis of existing policies (including both regulations and investment incentives), as well as market conditions (including energy prices and building stock), the Center for American Progress and Energy Resource Management identified the leading states where smart policies are poised to set the stage for clean energy jobs and the homegrown businesses that will serve this new demand.

These leading states can be found in every region of the country, in states with high- and low-cost sources of energy, and in both heating and cooling intensive climates. The key driver of these markets for efficiency is the presence of policies and market prices that allow businesses to profitably recover the cost of their investments in productive, innovative, and cost-effective energy efficiency measures.

None of these states has put in place the entire suite of policies, and each is only now beginning to develop the potential of energy efficiency to create a robust market for clean energy jobs. But these states have developed important pieces of the puzzle. In the pages that follow we will detail how we chose the "Top 10 Energy Efficiency States" and identified an additional "Top 10 High Market Potential States" that also could be poised to assume leadership in building energy efficiency as a new industry and source of increased economic competitiveness.

For other states that do not appear on this list, policy innovations could rapidly create the structures for energy efficiency as a growth business sector. Our rankings looked specifically at the potential market for energy efficiency, especially for the underserved commercial building market segment. A significant factor in determining the market potential for energy efficiency is energy prices, and it is important to realize that some of the most successful market structure innovations undertaken have been in states that rank relatively far down on our list, or even out of the top 10, because their retail energy prices are below the norm, slowing the recovery of investments in energy-saving measures. For other states that do not appear on this list, following this path of policy innovation could rapidly create the structures for energy efficiency as a growth business sector.

We based our analysis on what we consider the 10 key energy efficiency policies that states are adopting or experimenting with to varying degrees. These policies are:

### Our top 10 list of leading state energy efficiency markets

1. Connecticut
2. California
3 Maryland
4. Massachusetts
5. Pennsylvania
6. New York
7. Texas
8. North Carolina
9. New Jersey
10. Ohio

### Our top 10 states that deserve special attention for their high-market potential for future energy efficiency development

1. Virginia
2. Hawaii
3. Michigan
4. Maine
5. Nevada
6. Delaware
7. New Mexico
8. Florida
9. Illinois
10. Utah

- **Energy efficiency measures in Renewable Portfolio Standards**—policies that not only require utility companies to meet a set portion of demand from renewable energy but also include energy efficiency as a qualifying form of clean energy.

- **Energy efficiency measures in Renewable Energy Credits**—policies that establish markets for tradable clean energy credits and include energy efficiency as a qualifying clean energy resource.

- **Energy efficiency specific standards** that require utilities to plan for meeting a percentage of future growth in demand through energy efficiency instead of increasing supply. These policy tools include Energy Efficiency Resource Standards and Energy Efficiency Portfolio Standards.

- **Unbundled utility structures** in which energy transmission and distribution utilities are separate from power generation companies that own power plants, encouraging least costs strategies for meeting energy demand through conservation.

- **Decoupled utility rate structures,** where utilities' rates are adjusted to compensate for changes in the volume of energy sold, removing the structural disincentive to conserve energy.

- **Aligning efficiency with utility companies' shareholder benefits,** such as bonus rates of return, reimbursing program costs, or other incentives that help transform efficiency from a special program into a core business practice.

- **Penalties for noncompliance with energy efficiency standards,** to ensure that well-intentioned programs are effectively implemented, monitored, and improved upon over time. Effective policies must have real consequences.

- **Regulatory cost-benefit tests that focus on utilities' real costs,** in order to isolate the specific value offered by energy efficiency investments.

- **Property-assessed financing structures** that link the benefits of installed efficiency to a building, rather than the owner of the building, allowing repayment of financed investments to transfer automatically to new owners.

- **Service assessment delivery structures,** which allow government jurisdictions to directly facilitate financing of upfront capital costs, assuring repayment through municipal or other service assessment mechanisms.

As we will demonstrate in this paper, these policies enacted at the state level (in different mixes in different states) are already providing numerous real-world examples of how policy-driven energy efficiency markets can create a new industry to power job creation in the construction sector profitably and sustainably. These same policies help to combat global warming and lower our nation's reliance on foreign fossil fuels—both important national goals. But make no mistake: No state has fully developed the potential of their energy efficiency market to create clean energy jobs, let alone the federal government.

As a country, the United States substantially lags behind our closest economic competitors in the energy efficiency of our economy. We believe the examples presented in this paper can set the stage for a powerful new national energy efficiency strategy, which fixes market barriers to unleash entrepreneurs, investment, and innovation. This is must reading for anyone interested in broad-based job creation and economic prosperity, enhanced national energy security, and a clean, sustainable environment powered by new ideas, new private capital and fresh policy prescriptions for the 21st century.

# Learning from the states to restore national and global leadership on energy

The United States seriously lags behind our closest economic competitors in improving the energy efficiency of our economy. In the United States today, it takes nearly twice the energy required to produce every dollar of economic output compared with European and Asian nations.[3] Our current patterns of waste and inefficiency harm our environment with avoidable pollution and reduce the productivity of the whole economy, slowing growth and costing consumers money in needlessly high energy bills. Ultimately, this inefficiency costs jobs, as precious resources are spent on unproductive wasted energy instead of investing in the skilled labor and advanced manufactured products that would be required to bring down electricity demand through new technology and better design.

But our current inefficiency is also a hidden resource. Increasingly, this waste is recognized as a potential source of jobs, economic growth, and long-term economic value. In some states, because of strong policies to support efficiency, energy use per person is already a fraction of the national average—without any sacrifice to quality of life. Because levels of energy use vary so widely across the states, there is much that we can learn from their current experience in setting pragmatic energy efficiency policies. By recognizing what states are already doing well and bringing it to national scale, we can speed our economic recovery and help out struggling homeowners and businesses.

## Why we need smart policies to fix a broken market

Before turning to our state-level analysis, it is essential to understand what has stood in the way of progress on efficiency to date. It is no accident that we find ourselves today with buildings and appliances that hemorrhage wasted energy. Indeed, much of the output of our power plants is wasted, never producing the comfort, lighting, or computing power we desire. Even when cost-effective alternatives are available, too often very real and significant market barriers—in energy, financial, and real estate markets—stand in the way of achieving the deep energy savings that are possible.

To begin with "information failures" mean that consumers rarely see the true costs of their energy choices or the true benefits of the decision to conserve when they buy a building or invest in new equipment. Then there are "split incentives," which mean that the people outfitting new or remodeled buildings are often not the same ones who pay the energy bills over time. As a result of these two problems, construction investments in more efficient buildings tend to be small, even when they would yield far greater sustained savings over a building's life.

In financial markets, there are similar inherent barriers to energy efficient investments. There are "first-cost" barriers, or the high upfront costs that frequently deter building owners from borrowing to improve efficiency. There also are market practices in real estate valuation, lending, and cost-benefit allocation that do not recognize the true economic value of energy efficiency investments. This leads consumers and businesses who would tap financial markets to improve the value of their homes or building to predictably choose inefficiency, even when it is not in their self-interest.

Because the causes of much of our energy inefficiency come from these structural barriers, simple fixes are not enough. Instead, the United States needs thoughtful, well-targeted policies to fix these broken market signals within energy and real estate markets in order to give consumers better information, building owners more choices, utilities easier access to business models that promote efficiency, and entrepreneurs the opportunity to make job-creating investments in new businesses built on efficiency.

McKinsey & Company estimates that each year Americans waste $130 billion in energy that could cost effectively be saved through simple investments in our homes, office buildings, and factories.[4] These wasted dollars could drive new industries and new jobs, but developing those markets will require fixing the rules, regulations, and policies that guide our infrastructure and energy choices.

This should come as no surprise. Energy markets have always been profoundly shaped by policy choices. Utility regulation drives energy pricing because public utility commissions determine which costs may be passed on to consumers in their electricity rates. Government subsidies affect the costs of energy whether it is derived from coal, oil, natural gas, hydroelectric dams, or wind farms. And public investments in infrastructure affect the total cost of delivering power, whether building long-distance transmission lines or deploying smart meters on homes. Government policy shapes the overall market and the underlying cost structure of delivering energy to consumers.

As a result, with market distortions causing systematic underinvestment in advanced energy-saving technology, better ground rules in public policy are an essential means of leveling the playing field because the market so clearly tilts in favor of energy inefficiency today. To realize a robust and functioning market that provides innovation, investment, and consumer protection, we actually must look to thoughtful policies and incentives to set conditions for private capital investment and the growth of a robust and transformed private sector energy efficiency industry.

The following policies are by no means an exhaustive list of all that can be done to promote energy efficiency, and no single policy alone provides a silver bullet. But together, this set of measures is crucial to creating conditions for energy markets that support robust and profitable energy retrofit industries. Lawmakers should consider these policies not because they will solve the energy inefficiency problem by themselves but because they set the groundwork for moving the whole economy forward.

## Energy efficiency measures in Renewable Portfolio Standards

Many states have Renewable Portfolio Standards for increasing the use of renewable energy resources when meeting future power needs. RPS policies require utilities to use renewable energy to account for a certain percentage of their retail electricity sales or generating capacity according to a specified schedule. But leading efficiency states also include demand-side management and other energy efficiency measures, such as programs to reduce electricity demand in midday peak hours, consumer education on energy conservation, and retrofitting buildings to make them more energy efficient, as qualifying resources for meeting their RPS goals. These states recognize that reducing demand for energy is the most effective, lowest-cost way of ensuring that future power needs are met and reducing carbon emissions.

When an RPS statute only focuses on new sources of renewable power, the unintended consequence may be that the best economic and environmental choice is impaired. For instance, even though energy efficiency is the least cost, most reliable, and most environmentally sensitive resource, an RPS policy may force a utility to add solar power resources instead of programs that reduce energy consumption so that the utility can meet its RPS target. Pairing efficiency and renewable sources of energy gets us to the lowest-cost structures that meet our policy goals.

If the goals are jobs, energy independence, and a low-carbon resource, then all sources that lead to these goals should be encouraged to compete on the basis

of cost. A fully featured policy has this effect, and the most effective Renewable Portfolio Standards will be those in which efficiency energy is fungible with any other low-carbon energy source. Leading states—notably Utah and Nevada—have defined their RPS to recognize in-state efficiency resources as the equivalent of wind or solar for purposes of meeting state targets.

Other states, such as Connecticut, set goals for renewable supply-side energy (wind, solar, biomass, geothermal) separately from goals for efficiency energy. The separate standard for efficiency is often referred to as a "Class III" or "Tier 3" standard, and typically the target is smaller, in the same time period, than the target for supply-side resources. In Connecticut, the 2020 target for Class I (wind and solar) is 20 percent of the total state electricity load, while the 2020 target for the combination of energy efficiency and combined-cycle distributed generation (heat and power) at industrial sites is 4 percent.[5] Providing qualifications for efficiency energy in some way is better than having no efficiency goals at all, but it has the effect of creating a protected market for more expensive resources, unnecessarily limiting the contribution that energy efficiency could make to meeting power load requirements.

Most states, however, do not include energy efficiency in any form in their Renewable Portfolio Standards, depriving their local economies of this highly cost-effective, jobs-enhancing, zero-carbon energy resource. (The ranking table in the Appendix summarizes RPS approaches in 22 states.)

### Energy efficiency measures in Renewable Energy Credits

Renewable Energy Credit statutes enable utilities and energy providers to meet their RPS goals by trading credits for eligible renewable energy resources as nontangible commodities. RECs are a natural progression from RPS laws. When energy efficiency measures can be traded like any other qualifying clean energy resource, the REC market can drive demand for conservation programs.

The benefits of trading increase with market size. REC markets that place no geographic restrictions and that treat energy efficiency equivalently with renewable energy leverage the greatest potential for trading RECs. Potentially in the future, REC markets for all forms of green energy—whether renewable supply-side resources or efficiency energy—will extend across regional borders, allowing trading even on a nationwide basis.

While it is not intuitively obvious that one can export efficiency benefits from one territory to another, we already see this happening on the West Coast. BC Hydro is the state-owned corporation delivering power to the Canadian province of British Columbia. BC Hydro's 90 percent hydroelectric resource commands a higher price on the West Coast spot markets—driven largely by California demand—than BC Hydro gets at its regulated rates from consumers in British Columbia. BC Hydro has a duty to serve all consumers in its service territory with the electricity they need first, so if it wants to take advantage of higher prices elsewhere, it needs to reduce demand at home.

This is one benefit BC Hydro realizes from being an active participant in efficiency programs in British Columbia. The net effect is the export of so-called "negawatt-generated" electricity—energy saved through efficiency programs in British Columbia that can be exported to California—with consumers benefiting in both jurisdictions.

Current U.S. policy leaders in the REC market for energy efficiency are Utah and Nevada, where in-state efficiency RECs are fungible with gridwide renewables RECs for purposes of meeting state RPS goals. The effect is to encourage utility purchases of efficiency energy as an alternative to more expensive renewable resources, and by doing so provide funding mechanisms for business and consumer installations that reduce energy demand. Other states, such as Connecticut, maintain categories of in-state efficiency RECs separately from their renewables RECs, and the effect is a difference in price between RECs for efficiency energy and RECs for wind or solar energy. But as with RPS policies, most states have not yet adopted any efficiency REC program. (The ranking table in the Appendix summarizes REC programs in 22 states.)

## Energy efficiency specific standards

Many states have enacted energy efficiency specific statutes, such as the Energy Efficiency Resource Standard, or EERS, and the Energy Efficiency Portfolio Standard, or EEPS, both of which are market-based mechanisms to encourage more efficient generation, transmission, and use of electricity and natural gas with energy-saving targets for utilities. Governors and state policymakers have set aggressive energy efficiency targets effectively with these alternative statutes because they have a sense of urgency that reducing energy consumption is critical for the environment, economic future, and quality of life in their states.

In 1999, Texas was the first state to create an Energy Efficiency Resource Standard, requiring electric utilities to offset 10 percent of their load growth (growth in electricity demand that may require additional electricity generation resources) through end-use energy efficiency, or in plain English by reducing customers' electricity usage.[6] As of 2008, nine utilities in Texas had exceeded their efficiency goals for the sixth straight year.[7] The experience in Texas demonstrates that including energy efficiency as a resource in utility planning enables efficiency investments to compete on a more level playing field in energy markets.

Similarly, Hawaii's recently passed Energy Efficiency Portfolio Standard sets an aggressive goal of 4,300 gigawatt hours of savings by 2030—equivalent to approximately 40 percent of their 2007 electricity sales.[8] California's Long Term Energy Efficiency Strategic Plan and Massachusetts's Green Communities Act are other good examples of states developing policies targeted specifically at energy efficiency.[9]

These are just a few of the approaches states can take to reduce energy consumption. Many states, however, impose an obligation on utilities to find efficiency gains through means that structurally, or by policy, effectively bar utilities from finding profit in doing so.[10] Utilities understandably have mixed emotions about these requirements.

### Unbundled utility structures, or distribution utilities that do not own power generation facilities

Energy efficiency is one way to balance energy supply and demand. Another way is to build new power generation plants. Many studies show that reducing demand through efficiency gains is a more cost-effective solution than adding most kinds of available sources of power generation.[11] To maximize economic effectiveness, energy efficiency, and generation, projects should compete in a marketplace structured so that profits increase if the lowest-cost resource is adopted.

One structural change that supports this shift is "unbundling," or breaking up utilities so that the generation, transmission, and distribution of energy are divided into separate businesses. In an unbundled utility structure, distribution and transmission utilities buy energy for consumers from the lowest-cost source, and also can give customers the right to choose their own source, charging only a delivery charge for the energy. Unbundling thus creates competitive markets

for power generation. Many important U.S. energy markets, including California, New England, and the combined Pennsylvania-New Jersey-Maryland marketplace, are now "unbundled."

Utilities that are compelled to "unbundle" their power generation units supply only the distribution and/or transmission system. Because such utilities can no longer invest capital in centralized power generation facilities a major traditional source of capital investment, and therefore of utility profits is no longer available to them.[12] But distribution utilities do invest in distribution efficiencies. Energy efficiency is by its nature a distributed, not centralized, resource, and represents in some sense an understanding that the distribution network extends past the meter, all the way to "ground."

An investment in efficiency assets logically falls in the same category as an investment in any other distribution asset, and some regulators are recognizing and encouraging this. Duke Energy's Save-a-Watt program (now in place in Ohio, Indiana, and North Carolina) is an illustration of such an approach. Customer-side-of-the-meter improvements, however, are dual purpose: Lighting, heating, building shell, and control systems are primarily intended to serve building productivity and comfort, and regulators have logically insisted that building owners contribute to the improvements, which has limited their appeal.

Innovative approaches—such as funding commercial and institutional building retrofits based on energy efficiency Power Purchase Agreements with building owners and utilities in ways that deal separately with the value proposition to each of these dual users—can create new opportunities for unbundled utilities to meet their energy efficiency targets within a structure that assures ratepayers of delivery of permanent demand reduction.

Conceptually, any sale of efficiency energy to a utility system, whether through today's relatively modest programs of lighting retrofits, subsidies for energy-efficient hot water heater upgrades and the like, or through more complete solutions, involves the purchase of "forward capacity" or "forward energy."[13] "Forward" in this sense just means acquired for future needs. In these capacity markets, so-called demand response service providers such as EnerNOC and Comverge have made a business of aggregating the ability to turn off appliances to meet summer or winter peak demand. More recently, ISO New England, the regional body responsible for assuring sufficient generation resources in the New England

region, developed a more rigorous and measured approach to capacity resources that allows demand-side resources to compete head-to-head with supply-side resources in its forward capacity auctions. According to ISO New England officials, since ISO New England initiated this policy in 2006,[14] efficiency projects have proven to be very competitive capacity resources.[15]

Moreover, ISO New England pioneered the development of utility-qualified measurement of real-time demand reduction from energy efficiency to a standard that meets the rigorous requirements of the utility grid.[16] The result is aggregate lower energy bills for New England consumers, as expensive peaking resources can be offset with far less expensive demand reduction resources. ISO New England is now studying the extension of its demand reduction principles in its forward capacity market into a forward energy market.[17]

### Decoupled utility rate structures, or decoupling utility profits from volume of energy sold

When energy efficiency on customer premises reduces energy use, utility sales can decline. When rates are only reset every few years, selling lesser amounts of energy can cause challenges to a utility's operating budget, and will adversely affect profits in utilities that are owned by shareholders (called "investor-owned utilities" or IOUs, to distinguish them from not-for-profit cooperatives, people's utility districts, or municipal utilities). So utilities hurt themselves by selling less energy. Utilities are thus financially disincentivized to make energy efficiency work. This misalignment of incentives is often credited for the low levels of commitment to energy efficiency within energy markets.

"Decoupling" addresses this problem. The term refers to a change in the way rates are set by regulatory bodies. In both traditional and a "decoupled" rate structures, regulatory bodies generally set the price per unit of energy to permit recovery of all appropriate operating and capital costs. This includes a fair return on invested shareholder capital, or in other words, profit. This regulatory process is designed to produce "fair and reasonable" rates for both utilities and customers. Establishing the right rates per unit therefore requires an estimate of the number of units that will be sold. Utilities are financially incented to be conservative in their outlook, because if the estimate of energy to be sold is too high, there will be insufficient revenues to cover all operating expenses and cost of capital.

In a traditional rate structure, once the unit price is set, it generally remains fixed between rate cases. Thus the utility's revenue is "coupled" to the number of units actually sold. Although the purpose of the rate setting is to permit recovery of appropriate operating expenses and cost of capital, utilities can do better than their regulated rates of return if they can sell more units than projected. Similarly, if they sell fewer units than projected, they will lose money and put operations at risk. It is this "coupling" that produces the incentive to sell more and the disincentive to drive energy efficiency.

In a "decoupled" rate structure, by contrast, utility rates are frequently reset to adjust for the actual number of units sold, taking into account retrospective as well as prospective units. Thus utility revenues are disconnected, or "decoupled," from volume of units sold. Utilities are assured of collecting the revenues they need to operate, and so are less at risk. Consumers get the benefit of that reduced risk, both through an adjustment to the regulated rate of return (lowered to reflect the lower risk) and through lower average rates directly.

Decoupled rate structures also fundamentally change utility financial incentives as they relate to energy efficiency. Now, reducing units sold will not adversely affect utility revenues. In this sense, utilities face no disincentive to participate in the efficiency process—and if their regulators will permit it, investor-owned utilities can increase shareholder profits by investing their shareholders' money in reducing consumption.[18]

Decoupling by itself can remove the disincentives for utilities to support energy efficiency, but more is needed to allow energy efficiency to scale as a utility-grade energy resource.

Regulators do not let utilities pass costs on to ratepayers unless the ratepayers get benefit from the cost. For traditional power generation, this means measuring the output of plants owned by the utility to assure continued productivity. For generating resources sold to unbundled utilities, it means utilities do not pay for energy that has not been delivered, as measured currently by an appropriate metering system. Indeed utilities do not contract for generation resources whose managers cannot demonstrate both the technical and financial wherewithal to deliver as required. This alignment of incentives and proven resource delivery capability is the essence of utility-grade resources.

Traditionally, energy efficiency gains have been hard to measure and prove, and have not required ongoing maintenance, measurement, or verification. State regulators and consumer protection advocates voice appropriate concerns that decoupling for purposes of energy efficiency can cause rising rates for consumers without sufficient verification that efficiency programs are actually reducing unit demand. If a utility pays to replace incandescent bulbs with compact fluorescent bulbs, for example, the savings are generally estimated, and the costs included in rates based on the estimated savings. But how long are the new bulbs in place? And when the new bulbs burn out, how do regulators know they will be replaced with new compact fluorescent bulbs instead of incandescent bulbs, which are cheaper to buy? Or if a new high-efficiency furnace replaces an old one, how do regulators know that all aspects of the system (fans, filters, moving parts, ductwork) will be kept in peak operating condition? What are the energy consequences if they are not kept in peak condition?

These concerns are justified. Industry research shows what the foregoing examples suggest: Efficiency gains deteriorate unless the systems producing them are properly maintained. Different efficiency measures deteriorate at different rates, but in general the least expensive tend to deteriorate fastest. Consumers, for instance, do replace those compact fluorescent bulbs with incandescent bulbs, eliminating the savings completely in a relatively short time, while new windows may suffer from caulking and weatherstripping deterioration but will experience much slower degradation. Absent a program to keep a building continuously commissioned in the same sense in which windmills on a wind farm are regularly maintained and kept in top operating condition, energy efficiency gains are not permanent.

Most energy efficiency programs do a reasonable job assuring that initial installations are properly done, but very few actually monitor, measure, and verify the persistence of the savings, let alone require that they be maintained. Very few, in short, insist that energy efficiency installations actually meet the standards required of other utility-grade assets.

But a properly monitored, measured, verified, and maintained efficiency installation does create a long-term, persistent, verifiable utility-grade resource. When combined with a decoupled rate structure, this can create an asset with the same long-term persistence and value as any other long-term generation resource, which reduces total revenue requirements and therefore total energy bills for utilities and customers alike.

Decoupling is a relatively new ratemaking solution. Public utility commissions appear to be approaching it gingerly, often embracing only half measures, such as Oregon's decision to limit true decoupling to customers with loads of less than one megawatt, leaving larger customers on the old ratemaking system. Such half measures are better than none, but they create market complexity and distortion that interferes with efficiency being treated as a resource equivalent to generation.

## Aligning efficiency with utility companies' shareholder benefits

Policy can profoundly shape the incentives for utility companies and their shareholders to invest in energy efficiency. Policymakers nationwide are working extremely hard to find ways to bring new capital into markets for energy efficiency, but in doing so bankers, elected officials, nonprofit organizations, consultants, and motivated investors are attempting to create a whole new financial market from scratch.

Utilities already know how to organize very large amounts of private capital into energy marketplaces. In fact, that's what utilities are and are regulated to be—economic structures for pooling capital to build energy infrastructure to support what is in the United States a $466 billion revenue industry (2008 retail sales to electric and gas utilities from residential, commercial, and industrial customers).[19] Utility bonds (issued by both municipal and investor-owned utilities) and utility stocks are among the most widely traded and widely held types of fixed income and equity instruments in the country, and the stocks and bonds issued by energy companies selling to utilities and supported therefore by cash flows based on utility-grade credit, are likewise substantial. If that capacity could be unleashed in the service of conservation, the United States could substantially and more swiftly improve energy efficiency across the country.

States with "decoupled" utility rates now have the ability to allow shareholders to make money on energy efficiency. States with "unbundled" utility structures, which close off the historical opportunity for utility shareholders to earn profits from central power generation, may find their regulated distribution utilities particularly willing to explore profitable efficiency investments. For such utilities, efficiency represents one part of a set of opportunities to invest in a more broadly defined distribution network, including efficiency investments in buildings, on the customer's side of the utility meter.

Virtually all states have reported to the Department of Energy that they are in some form considering a move toward an energy efficiency incentive structure, but few appear to have embraced the full concept by moving all the way to a fully decoupled structure.[20]

The goal of energy efficiency regulators should be to move utility energy efficiency from being a special purpose program into the mainstream of core business practice for utilities. This would reflect a fundamental shift in the understanding of the purpose (and business model) of distribution utilities. With newly aligned incentives, these new utilities would move away from serving as distributors of energy and toward becoming long-term, least-cost managers of the energy grid itself. As business practices come to reflect a growing understanding that investments in increasing supply or decreasing demand can accomplish the same outcome, the cost of these investments would be treated equally under shared community rate structures. This removes a fundamental historic barrier for energy efficiency.

### Penalties for noncompliance with energy efficiency standards

Opportunities to increase shareholder earnings represent a powerful carrot. But it is equally important that public utility commissions enforce penalties when investor-owned utilities do not meet their energy efficiency targets. Policies and policymakers need to clearly define the consequences of noncompliance and avoid loopholes in legislative language such as "at the discretion of the public utility commission." Without the stick, Renewable Portfolio Standards and other energy efficiency goals may never be met.

Some states, such as California, Connecticut, Pennsylvania, and Texas, have explicit financial penalties for noncompliance with RPS or other energy efficiency statutes. The penalty in dollars per megawatt hour, or MWh (1 million watt hours of electricity), applies to the shortfall below the utility's target. Another type of "stick" used in Massachusetts, Maine, New Hampshire, New Jersey, and Rhode Island is Automatic Cost Recovery, in which payments for noncompliance generally go into a renewable energy fund. If the utilities fail to pay, remedies may include license suspension or revocation and/or financial penalties.[21]

### Regulatory cost-benefit tests that focus on utilities' real costs

It is important to evaluate and monitor the cost effectiveness of energy efficiency programs, but there is no perfect methodology. A few public utility commissions use a combination of up to five different cost-benefit tests to evaluate these programs. One of the most commonly used methods, the Total Resource Cost test, can be a potential barrier for some types of energy efficiency programs if the Total Resource Cost test is the only test used to assess a program. The reason: This test factors in total costs of a program, including both the participant's and utility's costs. This means utilities seeking to justify their investments in energy efficiency as cost effective need to demonstrate cost effectiveness based not just on what it costs the utility and its ratepayers but also on what the participant pays for the investment. Including both sets of costs makes the resource appear less competitive, even though its costs to utility ratepayers may be low.

The better approach for assessing the value of building retrofit projects is to use the Utility Cost Test as the primary test. The UCT only factors in the costs the utility pays and expects to pass on to ratepayers. The UCT better isolates the energy value of efficiency installations because it does not require utilities to analyze cost benefits associated with comfort, productivity, or other values achieved by the building owner from the installation. The sole question will be whether the utility's acquisition of the efficiency energy as a system resource is less costly than other resources would be to the utility and its ratepayer customers.

### Property-assessed financing structures

All the policy innovations discussed so far deal with utility market involvement in efficiency. Many jurisdictions, however, have attempted to set up energy efficiency deployment mechanisms that focus on the owners of homes, offices, and factories. These mechanisms are designed to help property owners raise the money they need to improve energy efficiency in their buildings, using financing to reduce out-of-pocket payments and avoid upfront cost barriers to undertaking energy efficiency improvements.

Cities and counties around the country recently began to establish financing programs for energy efficiency improvements and on-site clean energy generation on privately held property in a way that is similar to the way sewer improvements are funded—through municipal bonds supported by property assessments that are

paid off over many years. The programs are often referred to as Property Assessed Clean Energy bond programs.

PACE programs were designed as a variation on commonly used local or special improvement districts, known as LIDs or SIDs. These allow a group of property owners to share the cost of infrastructure improvements such as street improvements or sewers by establishing a district that issues bonds backed by special tax assessments on district properties. This approach reduces the financing cost of the improvements, as the initial borrower is a municipality and not an individual property owner. The likelihood of collection is high because tax liens take priority over other liens—including mortgage liens. This approach means that the assessment stays with the property upon the sale of the house rather than needing to be repaid by the initial homeowner.

Traditional improvement districts establish multiproperty tax assessments to support shared community assets. If you are in the district, you pay the tax. PACE attaches itself to this tradition by defining energy efficiency improvements and onsite energy generation on privately held property as a "public benefit." But PACE's key innovation is to permit districts of just a single home, where the establishing "vote" is essentially signing up for the finance program. PACE is entirely voluntary with the initiating homeowner.

In the vast majority of states, with only a few exceptions, the state legislature must pass PACE-enabling legislation to permit communities to use their local authority to establish the appropriate assessment district (depending on state law) for the purposes of energy efficiency or on-site clean energy generation, and then the programs must be implemented at the local level.[22] Without such legislation, communities cannot move forward with PACE programs. At present, 16 states have passed such legislation, and two states permit it based on existing law. A number of municipal governments have also issued bonds to launch PACE energy efficiency finance programs. But recent decisions by financial regulators have raised questions about the future prospects of PACE programs.

PACE proponents believe that this approach will allow homeowners to access low-cost funding for energy efficiency home renovations on a large scale. Yet PACE's most controversial feature stems from the fact that these loans trump the homeowner's mortgage. Like all municipal liens, the amount owed on the PACE loan takes first lien priority over the home mortgage loan.

Annual operating costs for the home (energy bills) will, in theory, decline by more than the annual assessment, and proponents argue that this will strengthen the homeowner's ability to pay the mortgage. But there is no guarantee that this net-cash-flow benefit will accrue, and a great deal depends on the quality of the work performed and the contractor and homeowner's knowledge. A PACE assessment could therefore increase the risk of a mortgage default. The broader home-purchase market has also not yet heavily factored energy efficiency into home values, so lenders worry that the higher-than-normal tax assessment will depress a house's price without the offsetting increase in value from greater energy efficiency.

The Federal Housing Finance Agency, in light of concerns over these risks, has provided new direction on this issue to Fannie Mae, Freddie Mac, and the Federal Home Loan Banks—thus covering the vast majority of all mortgages issued in the United States. FHFA has told these financial institutions to consider any energy efficient loans given after July 6, 2010 that take a first lien to be contrary to the standard GSE loan documents' guidance. It also directs that:

> *"PACE programs with first liens, Fannie Mae and Freddie Mac should undertake actions that protect their safe and sound operations. These include, but are not limited to: Adjusting loan-to-value ratios to reflect the maximum permissible PACE loan amount available to borrowers in PACE jurisdictions; Ensuring that loan covenants require approval/consent for any PACE loan; Tightening borrower debt-to-income ratios to account for additional obligations associated with possible future PACE loans; Ensuring that mortgages on properties in a jurisdiction offering PACE-like programs satisfy all applicable federal and state lending regulations and guidance … [and] Fannie Mae and Freddie Mac should issue additional guidance as needed."*

These underwriting standards will, in effect, make mortgages harder to get in PACE jurisdictions—whether or not a homeowner has signed up for a PACE loan. FHFA's direction has therefore effectively put the brakes on PACE adoption for the present. Yet PACE remains a young program that merits further study into the consumer friendliness of the loans and the long-term benefit of the energy efficiency improvements undertaken.

Property assessed financing structures offer a potential mechanism for providing ready access to capital for retrofit projects, secure repayment of loans based on energy savings, and a strategy to rapidly scale these efforts nationally. If regula-

tors' legitimate concerns regarding risk, leverage, and the underlying value of the retrofits can be effectively addressed in the future, PACE tools may again become important to the energy efficiency retrofit market.

## Service assessment delivery structures

Innovative jurisdictions have discovered other finance mechanisms in addition to PACE programs with features that offer the potential for financing that better matches the life of the building, and that transfers the responsibility to pay with the title or leasehold.

Oregon law allows utility energy service charges for efficiency upgrades to be billed to the property along with the utility bill in a way that automatically transfers to a new owner. And Babylon, New York has by ordinance recognized that CO2 is waste and is using their garbage collection financial reserves as a pool of funds from which to lend money to constituents to reduce carbon emissions.[23] Babylon provides security on its energy efficiency bonds or loans by using existing city service charge mechanisms to create liens on a property when the homeowner does not make timely repayments.[24]

These types of financing strategies, like PACE, effectively bridge the gap between the reality that energy efficiency finance makes great economic sense over the life of a building and the fact that it is hard to justify over the shorter, forward-planning horizon of the typical family, tenancy, or commercial owner.

## A primer on the basic structure of energy efficiency markets

### Rates versus bills

Too often, the debate over energy policy focuses solely on keeping electricity prices low. This emphasis on energy rates takes the conversation down the wrong path. To protect consumers, the real test should be the overall operating costs of their homes or businesses.

Using monthly operating costs as a better test of consumer benefits from deploying energy efficiency makes it possible to employ pragmatic policies that open energy markets to energy efficiency and clean renewable energy while leaving citizens better off financially—even as we reduce their exposure to energy price swings and the dangers of pollution. In making this transformation, policymakers need to continue to be mindful that the operating cost benefits of energy efficiency go to those who adopt it, but that reduction in energy use by some people can actually put upward pressure on costs for others.

Utility rate structures in the United States compute the cost per unit of energy by taking the utility's total allowed costs and dividing them by the number of units sold.[25] If overall use goes down, we still have to pay for the system costs, and so rates will go up. But bills overall will still go down, because if the cost of energy per unit goes down, then total systemwide costs also go down as fuel is saved.

When some people conserve and others don't, all other factors remaining equal, the total of all bills will go down at the same time rates go up. But the reduction in *bills* is not evenly distributed. The reduction goes to people who have reduced their use. People who have not reduced their use can actually wind up paying higher bills.

### Protecting consumers

As a matter of equity and cost effectiveness, states will want to design policies that allow everyone access to the benefits of efficiency, regardless of means. Otherwise, those least able to afford the change will be trapped bearing the burden of systems costs their neighbors no longer share.

Today's most common energy efficiency programs associated with utilities frequently can become reverse Robin Hood programs from an economic perspective. They add a surcharge on everyone's bill to create a pool of resources for efficiency. Then the deployment programs use that pool to defray *a portion* of the capital cost of an installation, with the owner required to pick up the rest. The philosophy is "people need skin in the game." The unintended effect is only people with extra "skin" can play, which means everyone pays the surcharge to create a pool from which only a few—those wealthy enough to add the "skin" to make the improvements—benefit.

This limit on access to a pool funded by everyone's surcharge seems wrong as a policy matter, and most jurisdictions agree. The usual way to fix this defect is to create companion poverty-oriented programs that give the poor access to greater help, though at the cost of program complexity and means testing.

One way to fix this problem is to return cash to building owners and tenants at rates related to the value of the efficiency energy harvested from their building. Approaching the problem from the perspective of the energy value rather than the building cost means low-income housing is analyzed not primarily for the occupants' ability to pay, but primarily for the amount of energy that can be harvested and is thus not wasting as a result of investments in energy efficiency. The more energy the building used to waste, the more valuable the efficiency gains will be. This approach thus turns the conventional approach inside out—low-income buildings then often become the most valuable, instead of the least.[26]

### New business models for private sector investment in energy efficiency

The low-hanging fruit in clean energy is to harvest the "negawatt" of energy efficiency, a term coined by physicist Amory Lovins to describe power avoided or saved from use on the energy grid.[27] Negawatt potential can be found everywhere, in every building,

in every home, in every business, and in every institution, but one of the biggest barriers to capturing negawatts is the lack of capital available for investments that generate these kinds of energy use reductions in commercial and residential markets.

In the current economic climate, few individual property owners have money to invest in building improvements. In a recent survey by Johnson Controls, of more than 1,400 real estate and facilities managers, limited capital availability was cited as the most common barrier to capturing potential energy savings, with 42 percent of respondents citing limited capital availability and 21 percent citing unattractive paybacks—the two largest barriers cited.[28] No new technologies are needed to create significant near- and long-term energy savings. But we have to create public-private partnerships between regulatory agencies, utilities, building owners, and investors in the capital markets to break through financing barriers and put more people to work on energy efficiency projects.

First and foremost, this new collaboration in the growing energy efficiency market means jobs at a time when America is in desperate need of job creation. With these kinds of partnerships in place, an ambitious but achievable goal of retrofitting 40 percent of American homes and offices would have the impact of adding 625,000 new sustained full-time jobs to the U.S. workforce, and more than $500 billion of new investment in the built environment.[29] These numbers demonstrate the magnitude of a sustained commitment to retrofitting 5 million homes and commercial buildings annually for a decade, at an average investment level of $10,000 per property. This scale of retrofit activity is not at all unreasonable to imagine in a robust national market for energy efficiency services driven by utility customer demand.

One innovative tool for delivering and financing energy efficiency is a utility-grade investment in energy services through the use of energy efficiency Power Purchase Agreements. Under a traditional PPA, third-party developers construct power plants by borrowing money on the strength of a utility's long-term commitment to buy that resulting output power from the plant. Recent developments in the measurement of "negawatt hours" and the ability to continuously commission efficiency installations—defined as a demand-side energy resource—take advantage of this well-established financing model. Applied to energy efficiency, this kind of financing approach enables public and private capital resources to invest capital on the strength of measureable and durable efficiency cash flows, and opens up the entire existing energy finance infrastructure to the efficiency transformation.

By aggregating portfolios of retrofit projects and providing measurement and verification systems on a long-term basis, this kind of public-private partnership financing arrangement offers a low-cost, utility-scale, utility-grade energy resource to utilities. In this way, private investors in energy efficiency alongside their public partners—through Independent Power Producer channels or in conjunction with utility partners on a joint venture basis—provide the capital as investors in energy efficiency "generation" so that building owners do not need to divert what are often scarce capital resources into building energy efficiency improvements.[30]

Instead, these new investors could actually pay owners for the privilege of building an "efficiency generator" in their buildings. This aligns the interests of building owners, utilities, and energy efficiency private and public investors. Such financial tools could have a transformational impact on the energy efficiency opportunity while creating jobs immediately.

# Evaluating top performing states in energy efficiency

Private markets for energy efficiency are dependent upon both existing market conditions and the policy framework of regulation and incentives. Because of the extremely variable market conditions from state to state across our country, it is difficult for businesses to effectively target those markets that will best support a thriving energy efficiency industry. Likewise, as policymakers seek to develop a national strategy to increase investment in clean energy jobs and businesses, and reduce energy waste, it is often hard to know how to target efforts and where they will best succeed.

In response to this business challenge, this paper contains a detailed review of state regulations and incentives to determine which markets would be most receptive to new investment. To determine the best market entry opportunities, we looked at key market drivers and policies across 22 states to determine where energy efficiency retrofit programs generated the most value, especially for the underserved commercial building market segment. (See the ranking table in the Appendix). We also looked at opportunities for innovative financing of energy efficiency retrofits at the municipal level.

Different stakeholders will have different perspectives on how to score these variables. But regardless of the methodology of how states are ranked, the underlying message is the same. We cannot "move the needle" significantly without creating effective partnerships between regulatory agencies, utilities, building owners, and private capital investors.

These findings illustrate clearly how pragmatic clean energy policies can make a regional economy more attractive for private capital investment and job creation. In fact, this exercise was launched with a direct tie to business expansion and investment decisions. This is significant as the nation struggles to rebound from a jobless recovery.

Presented here are just a few examples of the innovations already underway in states and regions around the country. No state supports all 10 of the policies outlined in the preceding sections, but a number of states have enacted effective combinations of statutes for promoting energy efficiency programs and reducing overall consumption of energy. It is not surprising that some of the leaders are located in regional clusters. General similarities in climate and resultant energy needs give them an opportunity to learn from and leverage adjacent states' successes.

The most progress has been made in California, New England, the Mid-Atlantic region, and New York. But every region of the country shows leadership in some areas, and all parts of the country can participate in an expanded market for clean energy investment. This analysis showcases the diverse regional leadership that is already in place. Further, it gives special attention to policies supporting commercial retrofits, as they are an important energy efficiency sector, which has too often lagged behind public and residential efforts.

## California

Driven by high power costs and electricity demand over the past 30 years, California today is an energy efficiency leader. The state does not include energy efficiency measures in its Renewable Portfolio Standards and Renewable Energy Credit statutes, but it enacted several other statutes with aggressive energy efficiency targets. California's Long Term Energy Efficiency Strategic Plan, for example, includes a commercial sector goal to have 50 percent of existing buildings achieve zero net energy equivalency by 2030 through deep levels of energy efficiency and clean distributed generation, which would result in 250 million square feet of commercial building retrofits per year. Zero net energy is a general term applied to a building with a net energy consumption of zero over a typical year.[31]

The California Public Utilities Commission estimates that its Long Term Energy Efficiency Strategic Plan will create 15,000 to 18,000 new jobs between 2010 and 2012 alone.[32] Included in its $3.1 billion budget for 2010-12 is California's Commercial Energy Efficiency Program, which establishes statewide programs to achieve optimal energy management for existing commercial buildings.[33] For the residential sector, the California plan's 2020 goals are to have 25 percent of existing homes achieve a 70 percent decrease in purchased energy from 2008 levels and to have 75 percent of existing homes achieve a 30 percent decrease in purchased energy.

In addition to robust programs for decreasing commercial and residential energy use, California was the first state to enact decoupling laws—in 1978 for natural gas and in 1982 for electricity[34]—and unbundled utilities in 1996.[35] Logical shareholder incentives for investing in energy efficiency exist for electric and natural gas utilities.[36] Although there is some flexibility in the RPS compliance rules,[37] California has a good "carrot-and-stick" policy and an effective public utility commission regulatory environment overall. After the California Global Warming Solutions Act of 2006 (Assembly Bill 32) went into effect, for example, the California Public Utilities Commission established a Risk/Reward Incentive Mechanism, which mandates that if the major investor-owned utilities meet the state's Minimum Performance Standard in energy savings they are eligible to receive financial rewards, but financial penalties begin to accrue if the energy savings fall below the 65 percent MPS threshold. Total earnings and penalties for the four investor-owned utilities operating in the state combined are capped at $450 million over each three-year program cycle.[38]

California also offers options for property-assessed financing structures, such as PACE bonds. As an example, Assembly Bill 811 is a contractual assessment program that enables California cities and counties to finance the installation of renewable energy sources and energy efficiency improvements that are permanently fixed to residential, commercial, or industrial property. Property owners who choose to participate can pay for the improvement through a tax assessment, which transfers with the sale of the property.[39] In addition, California's Long Term Energy Efficiency Strategic Plan includes financing and incentives to support commercial sector goals such as demand-side management retrofit solutions including rebates, financing options, and nonfinancial support—"carrots that help *pull* consumers into choosing the efficient option," according to the state's long-term energy plan.[40]

## New England

The Northeast is the best at coordinating adjacent states' conservation efforts. ISO New England, which oversees New England's bulk electric power system and wholesale electricity markets, formed an energy efficiency initiative to understand the long-term impact of state-sponsored energy efficiency programs and analyze progress on a regional basis. In addition, beginning in 2006, energy efficiency is an eligible resource in ISO New England's forward capacity market.[41] It is worth noting that while Vermont is a national leader in energy efficiency retrofits especially in residential construction, it is not included in this analysis due to its more limited potential for commercial and institutional retrofits. Here we look at two New England states, Connecticut and Massachusetts, in greater detail.

## Connecticut

Connecticut is a particularly impressive case study because it implemented 9 of the 10 policies, missing only the availability of PACE programs. The state has had energy efficiency programs in place for 12 years, beginning with the Connecticut Energy Efficiency Fund, created in 1998. CEEF is a public-private partnership with the state's utility companies and funded by a small charge on customers' bills to provide cost-effective energy efficiency and load management programs, including financial incentives for residential and business customers.[42]

Connecticut's RPS statute requires that by 2010 each electric supplier obtain at least 4 percent of its retail load with so-called Class III resources, which include energy efficiency measures.[43] There are no geographic restrictions, as long as the qualified RPS resources are in ISO New England or adjacent states that have RPS statues compatible with Connecticut's policy.[44] In addition, the state passed An Act Concerning Electricity and Energy Efficiency in 2007, which mandates that investor-owned utilities treat cost-effective energy efficiency measures as their first priority resource. The state's Department of Public Utility Control is active and has a noncompliance penalty of $55 per MWh for utilities that do not meet their energy efficiency targets.[45]

Connecticut passed unbundling legislation in 1998.[46] Decoupling is in place, and good shareholder incentives to invest in energy efficiency exist.[47] In order to measure the success of these programs through cost-benefit analysis, Connecticut primarily uses the Utility Cost Test, which provides more flexibility for commercial and other building retrofits. The Total Resource Cost test also is factored in while analyzing a range of conservation programs and determining performance incentives, but it does not have as much weight as the Utility Cost Test for individual programs.[48]

Over the past year, Gov. M. Jodi Rell and the legislature undertook additional steps to drive job creation and job training as part of their renewable energy and energy efficiency initiatives. In March 2009, leaders from three legislative committees held a Green Energy Jobs Forum with CEEF and the Connecticut Clean Energy Fund to discuss the impact of state public policy on the creation and retention of green energy jobs in Connecticut. The Phase I baseline study done by Navigant Consulting estimates that for every $1 million of energy efficiency subsidies that leverage private financing, an average of 36.7 "job years" are created for direct jobs, indirect jobs (jobs created primarily through the direct work efforts of others) and induced jobs, or those jobs generated by the increased purchasing power of people who benefit from additional wages and business income.[49]

The residential energy efficiency segment yields even higher results, with an average of 48.1 "job years."[50] This is yet another important example of how Connecticut is effectively leveraging public-private partnerships to conserve energy and create new jobs.

## Massachusetts

Massachusetts also stands out as an energy efficiency leader. The state's RPS and REC statutes currently do not include energy efficiency measures, but their Green Communities Act includes ambitious targets. Under this statute, Massachusetts must develop a plan to reduce energy consumption by 10 percent by 2017 through investing in energy efficiency measures when more cost effective than buying or constructing more power plants. The statute also mandates that by 2020, 25 percent of the state's electric load will be met using demand-side resources, including energy efficiency, load management, combined heat and power (the use of a heat source to generate both electricity and useful heat simultaneously), and other measures.[51] In October 2009, the Massachusetts Energy Efficiency Advisory Council announced a three-year plan that sets an energy savings target of 2.4 percent of electricity sales in 2012.[52]

The unbundling process began in 1997 when Massachusetts passed their Electricity Restructuring Act.[53] And like Connecticut, the state has an effective Department of Public Utilities. Decoupling must be implemented by 2012, and utilities can earn about 5 percent of program costs for meeting established energy efficiency program goals.[54] Massachusetts also strictly enforces stiff penalties of $55 per MWh for noncompliance.[55]

In two policy areas, Massachusetts is not as supportive to building retrofit programs as some of the other states. The Total Resource Cost test is its primary and only cost-benefit test,[56] and municipalities currently are not able to use PACE programs as a funding option.[57] But Massachusetts has taken a strong leadership position in forming public-private partnerships focused on dramatically reducing energy use and job creation. Gov. Deval Patrick over the past three years worked with legislative leaders to pass five landmark pieces of environmental legislation, including the Green Communities Act and the Green Jobs Act of 2008, which focuses on stimulating growth of green jobs and funding workforce training.[58]

In support of these two policies, a coalition of energy efficiency providers and utilities announced in June 2009 a three-year plan to deliver services to consumers and businesses that ultimately will net more than $4 billion in energy savings.[59] This type of public-private alliance transforms policies into meaningful results.

## The Mid-Atlantic region

The PJM Interconnection is the regional transmission organization in the Mid-Atlantic region that coordinates the movement of wholesale electricity in all or parts of Pennsylvania, New Jersey, and Maryland, as well as Delaware, Illinois, Indiana, Kentucky, Michigan, North Carolina, Ohio, Tennessee, Virginia, West Virginia, and the District of Columbia.[60] Three states in the Mid-Atlantic region in particular—Pennsylvania, New Jersey, and Maryland—have policy strengths. Together they fall slightly behind New England in terms of expanding programs for commercial building retrofits. Yet changes in the political climate of the region could accelerate momentum in this region.

### Pennsylvania

Pennsylvania gets excellent marks for energy efficiency measures in three statutes. Tier II sources, which include demand-side management, must make up 10 percent of the mandated 18.5 percent RPS goal by 2021. Demand-side management measures also qualify for the state's REC policy.[61] In addition, Pennsylvania's Act 129 requires each electric distribution company with more than 100,000 customers to reduce energy consumption by at least 1 percent by May 2011, increasing to 3 percent by May 2013. Peak demand must be reduced by 4.5 percent by May 2013.[62] There are no RPS-REC geographic restrictions, as long as the qualifying resources are in the PJM Interconnection or in the Midwest Independent Transmission System Operator, or Midwest ISO, which delivers electric power for a small portion of western Pennsylvania.[63]

Utilities are unbundled in Pennsylvania, and there are strong noncompliance penalties of $45 per MWh for failing to comply with RPS requirements.[64] Another plus for building retrofits is that there are no specific tests required for the cost-benefit analysis of energy efficiency measures.[65] In 2008, Pennsylvania also passed The Alternative Energy Investment Fund, a clean energy fund of $650 million to provide incentives for energy efficiency and clean energy resources.[66] The American Council for an Energy-Efficient Economy estimates that these existing policies, combined with ACEEE's other recommended energy efficiency strategies, could save Pennsylvania consumers close to $5 billion each year on energy bills and help create 27,000 new, local jobs by 2025.[67]

## New Jersey

Utility energy efficiency goals are still under development for New Jersey's RPS policy, but under the state's Administrative Procedure Act, the New Jersey Board of Public Utilities may adopt an Electric Energy Efficiency Portfolio Standard that requires public utilities to implement energy efficiency measures that reduce state usage to a level that is 20 percent below the projected usage by 2020.[68] Utilities are unbundled,[69] and New Jersey gets high marks for noncompliance penalties. The state's public utility commission's noncompliance penalties include suspension or revocation of a utility's license, financial penalties, disallowance of recovery of costs in rates, and prohibition on accepting new customers.[70]

In 2003, the New Jersey Board of Public Utilities established the Office of Clean Energy, a ratepayer-funded program that promotes energy efficiency and renewable energy. The Office of Clean Energy sponsors a suite of residential energy efficiency programs as well as the New Jersey SmartStart Buildings Program, which enables energy efficiency upgrades for commercial and industrial buildings.[71] Last year, it also approved $225.4 million in energy efficiency projects for residential, commercial, and industrial customers who are served by three of New Jersey's seven utility companies. The utilities estimate that these projects will create nearly 1,000 direct jobs.[72]

## Maryland

Energy efficiency measures are not part of Maryland's RPS and REC policies yet, but the EmPOWER Maryland Energy Efficiency Act of 2008 has a statewide goal of reducing per capita electricity consumption 15 percent by 2015. Utilities must meet two-thirds of this goal, with state-administered programs making up the other 5 percent. Utilities also are required to reduce peak demand by 15 percent by 2015.[73] Utilities are unbundled,[74] decoupling is in place,[75] and there are good RPS noncompliance penalties.[76] The Maryland Public Service Commission, however, has not yet approved shareholder incentives for energy efficiency programs.[77]

Maryland ranks high in terms of funding flexibility and PACE programs are an option for municipalities.[78] In November 2009, Gov. Martin O'Malley announced that the Maryland Energy Administration will offer low-interest loans through the EmPOWER Commercial and Industrial Energy Efficiency Loan Fund to help

Maryland businesses retrofit their facilities. Proposed funding for the EELF is $5.6 million through the end of fiscal year 2011.[79]

Gov. O'Malley also recently announced his 2010 Energy Agenda, which is focused on promoting green jobs and sustainability, increasing renewable energy production, and providing tax credits for families.[80] This strong momentum forward on several fronts during the past few years provides an excellent policy framework for Maryland to achieve its energy efficiency goals.

## New York

New York has many of the same market drivers as New England and the Mid-Atlantic regions, but it is taking a little longer to get a few policies in place and partner with utilities to reduce energy consumption. Energy efficiency measures are not part of their RPS statute yet, and New York is still developing their REC policy and automated trading system.[81] In 2008, the state enacted an Energy Efficiency Portfolio Standard, which has a target of reducing electricity usage 15 percent below projected levels by 2015.[82] The state gets high marks for unbundling,[83] decoupling, and good shareholder incentives,[84] but there are no RPS penalties for noncompliance.[85]

Most of the state's energy efficiency programs are run by the New York State Energy Research and Development Authority, a public benefit corporation focused on helping the state meet its energy goals. NYSERDA administers numerous energy efficiency programs, which are funded by New York's system benefit charge and Regional Greenhouse Gas Initiative funding. The agency has established financing programs through partner banks, who lend to residential, multifamily, and commercial property owners in the state to fund efficiency retrofits. NYSERDA provides interest rate buy downs that improve the attractiveness of bank financing, as well as audit funding and grants for many retrofit projects that achieve a 20 percent energy consumption reduction.[86]

The agency has facilitated tens of millions of loans in the state for efficiency retrofits to date. NYSERDA is currently evaluating mechanisms that can significantly increase retrofit financing alternatives, including developing a capacity to act as a state-level aggregator for energy efficiency financing programs established at the local level, with a focus on PACE. The state recently established a $112 million fund, administered by NYSERDA, to increase availability of financing for retrofits

to New Yorkers, with a focus on deploying this money to advance on-utility bill efficiency programs.[87] NYSERDA is seeking to ensure the availability of multiple financing options for New Yorkers seeking to retrofit their properties.

Investor-owned utilities in New York are getting more involved in running energy efficiency programs. In addition to NYSERDA's programs, these utilities are empowered now to spend public resources on energy efficiency, although the bulk of state resources in this area remain with NYSERDA.

In New York City, the mayor and other officials are very interested in retrofitting commercial and multifamily buildings. New York City established PlaNYC over two years ago, which commits the city to 30 percent emissions reduction by 2017 for municipal operations and 30 percent overall emissions reductions from 2005 levels by 2030.[88] In 2009, the New York City Council passed a comprehensive package of legislation designed to significantly increase efficiency in NYC buildings. The legislation includes mandatory lighting upgrades, benchmarking, audits, and retro-commissioning for all buildings in excess of 50,000 square feet per lot, which covers nearly half of NYC square footage.[89] The city also is actively undertaking options for increasing access to retrofit financing options for building owners.

The state of New York is a great example of officials at the state level and municipal level taking an aggressive, multifaceted approach to energy efficiency. Their regulatory requirements, coupled with financing options for New Yorkers, lay the foundation for creating new jobs and reducing energy consumption, which is particularly critical in the United States' largest city.

## Examples of strong energy efficiency policies in other states

### Ohio

Ohio's RPS statute includes demand-side management and other energy efficiency improvements. Up to one half of the RPS goal may be met through demand-side management and other alternative advanced resources (at least 12.5 percent required by 2024). Utilities are required to implement energy efficiency and peak demand reduction programs that achieve cumulative energy savings of 22.5 percent by December 2025.[90] Ohio also gets high marks for unbundling, decoupling, shareholder incentives,[91] and noncompliance penalties.[92]

## Florida

Florida passed their first energy efficiency legislation 30 years ago. The 1980 Florida Energy Efficiency and Conservation Act requires utilities to implement cost-effective energy efficiency programs, including demand-side management goals. The seven Florida utilities that must comply with this 1980 act currently offer more than 100 demand-side management and conservation programs to residential, commercial, and industrial customers.[93] The Florida legislature also recently introduced performance incentives for electric and natural gas utilities.[94]

## Texas

Texas's RPS policy currently does not include energy efficiency measures, but it is a very well-written statute with strong compliance penalties of $50 per MWh.[95] In addition to being the first state to establish an Energy Efficiency Resource Standard in 1999, Texas has done an excellent job of exceeding their energy efficiency goals from 2003 through 2008. In 2007, the legislature raised the goal to 20 percent by the end of 2009 and is investigating even higher targets. The state's utilities are unbundled,[96] and there are good shareholder incentives.[97]

## New Mexico

New Mexico's Efficient Use of Energy Act enacted in 2005 allows utilities to recover approved costs for energy efficiency and load management programs through tariff riders, which are per kilowatt hour charges to electricity users to fund energy-reduction programs.[98] In 2008, New Mexico passed HB 305, which directs electric investor-owned utilities to achieve 5 percent energy savings from 2005 electricity sales by 2014, and 10 percent by 2020.[99] In addition, the state recently implemented decoupling and shareholder incentives.[100] To spur job growth, Gov. Bill Richardson launched a Green Jobs Cabinet a year ago. The cabinet's goals are to align New Mexico's education and workforce systems, and to explore opportunities in manufacturing of renewable energy system components, utility-scale renewable energy, biofuels production, sustainable agriculture, green buildings, and energy efficiency programs for residential, commercial, and institutional customers.[101]

### Oregon

Energy efficiency measures currently are not part of Oregon's RPS policy, but payments of noncompliance penalties are used to help fund the Oregon Energy Trust's renewable energy and energy efficiency programs.[102] Building retrofit programs are supported by several state policies, providing financial incentives in the form of rebate programs and energy tax credits for consumers and businesses. Oregon also boasts an innovative statute that allows utilities to transfer tariff schedules for property-specific energy efficiency measures to successive property owners.[103] Oregon also supports utilities' energy efficiency programs by using the Utility Cost Test as the primary cost-benefit test.[104]

## Other innovations leading to utility-level energy efficiency

ISO New England developed the measurement standards and market infrastructure to permit energy efficiency resources (demand reduction resources) to be bid into the New England Forward Capacity Market on an equal basis with supply-side resources. This means making a building energy efficient can compete with a new gas-fired generator for utility system dollars. Doing so opens a channel for third-party investments in energy efficiency. ISO New England is studying the expansion of the Forward Capacity Market into a Forward Energy Market as well.

Utah and Nevada have each passed laws making in-state energy efficiency "negawatt hours" the legal equivalent of additional wind or solar energy for purposes of compliance with the state's RPS statute. Doing so recognizes that carbon reduction is carbon reduction, regardless of where it comes from, and provides an even playing field in those states for efficiency resources against other forms of renewable generation.

Washington state's Utility and Transportation Commission is studying the merits of a shift in energy efficiency subsidization programs from a "sum-of-measures" approach, in which each measure represents only its own potential for energy savings, to a "whole building" approach, in which it is the actual performance of the entire building that matters, and the test for funding is proof of effectiveness without regard to prior lists.[105] This change holds the promise to remove the regulatory review bottleneck to technology improvements and to allow access to the synergistic value of measures working together.

# Conclusion

## Taking state lessons nationwide to transform America's energy efficiency capabilities

Today, civic leaders and forward-thinking businesses are rallying around the task of rebuilding America for greater energy efficiency and as an engine for jobs, innovation, and sustained economic growth. We are in a unique historical moment that presents a valuable opportunity to stand up a new and vibrant industry to meet the growing demand for energy efficiency services in the residential, commercial, institutional, and industrial sectors of our economy.

We can only expect the demand for energy efficiency to grow in coming years with growing global energy challenges. As the United States seeks to rejoin the community of nations in responding to global warming, energy efficiency must top the list of climate solutions. Our nation's cheapest, cleanest, most abundant source of energy is the coal, gas, and oil we never have to mine, transport, or burn because of efficiency gains. Improving energy efficiency is the lowest-cost way to cut our carbon emissions, and it is available in every state in the union. Through efficiency, we can provide consumer protection, even as we enter an uncertain energy future.

Energy efficiency also has important national security dimensions in a world with increasing competition for scarce fossil fuel resources. By reducing demand, we reduce the vulnerability of individual consumers and of the nation as a whole to sudden price spikes or to despotic leaders who would interrupt supplies of the vital energy resources that are the foundation of our economic security.

Reducing our dependence on wasted energy will not come on its own, however. The federal government must lead with pragmatic policies that help create new markets to reflect the real underlying economic benefits of energy efficiency. Tremendous amounts of private capital investment are waiting in the wings for a strong public signal that the United States is committed to investing immediately

in state-of-the-art sustainable buildings and power sector infrastructure. When that happens, the foundation of landmark state policies outlined here, enhanced through new tools for finance, procurement, and information sharing, will support this transition to a more efficient, cleaner, and more productive economy, with profound results.

This paper focused on how state regulatory efforts can lead to a more energy efficient economy, but these policies are only some of the necessary changes. Federal lawmakers and regulators also need to act. Because of our federal system, some solutions will be better implemented by states, while others rely on national leadership. The federal government's economic strength and scale uniquely positions it to lead in financing the transition toward efficiency, and reducing risk for private investors.

One key measure of federal leadership will be for Congress to pass a comprehensive energy bill, not only to place a cap on carbon emissions but also to advance a deeper investment agenda for clean energy. Investment-led policies will notably include a Green Bank to finance innovative energy efficiency projects, sustained streams of new capital investment for both commercial and residential retrofits such as the Retrofit for Energy and Environmental Performance program as well as Renewable Energy Standards, both of which recognize energy efficiency investments, and a dedicated Energy Efficiency Resource Standard. Federal leadership is also important in areas such as research and development for new technology, modernizing building codes for energy, and advancing a national program of smart grid infrastructure construction that allows efficiency to be treated as a source of energy along with new generation.

Together, a comprehensive investment-led strategy to promote the efficient use of clean energy can fix the market failures that disadvantage energy efficiency today, hurt consumers, and weaken the U.S. economy's competitiveness. The 10 policies outlined in this paper provide the basis for a roadmap that can guide the important policy work of the federal government, as well as states and localities alike. These measures are already guiding the investment decisions of the private sector in states around the country, but to meet the scale of new investment that a clean energy transition requires, more must be done.

The states showcased here represent important proof that even with an uncertain energy future and volatile prices, consumers can be protected through lower bills and business investment can thrive. These are important lessons for the U.S. economy if we are going to compete and win in the global race for clean energy, and if we hope to ensure that American workers remain world leaders at the cutting edge of technological change and innovation.

As we look to the future, one thing is clear. For creating good jobs and new business opportunities, protecting consumers' pocketbooks, and strengthening regional electricity markets, energy efficiency works. It's time to get down to the business of rebuilding America.

# Appendix

## Methodology for Ranking Leading Energy Efficiency States

The policies described in this report are the primary variables in the Center for American Progress and Energy Resource Management's ranking methodology. But there are four market dynamics that also are important for assessing the business opportunities in states. CAP and EnergyRM used the following criteria to rank 22 states' potential for energy efficiency building retrofits in the commercial and institutional markets:

- **Power costs**—High electricity and natural gas costs are a major market driver for pursuing energy efficiency strategies. Six of the top ten states have power costs that are above the national average for commercial and residential customers and received a high score of 15. The three states that are ranked at the bottom of the list had a low score of zero, because their power costs are below the national average. It should be noted that the power costs listed are those experienced by customers. The cost of new sources of power generation vary much less across the country (although the cost of new transmission has a higher geographical variability).

- **Total electricity demand forecast**—States with 2015 five-year compounded annual growth rates, or CAGRs, that are well above the United States average for total electricity demand received the highest score of nine for this criteria. States with five-year CAGRs that are well below the national average received a score of zero, because they do not have as great a need for new energy resources, whether from energy efficiency or any other source.

- **Electricity demand forecast for renewable energy power demand**—States that are forecasted to have a shortage of renewable energy capacity to meet their Renewable Portfolio Standard or other energy efficiency goals by 2015 are more likely to view energy efficiency as fungible with any other low-carbon energy source. They were given a high score of nine. States forecasted to have excess renewable energy capacity received a score of zero for this variable.

- **Energy efficiency measures in Renewable Portfolio Standards**—The highest score of ten was given to states with policies that not only require utility companies to meet a set portion of demand from renewable energy, but also include energy efficiency as a qualifying form of clean energy. States with no RPS policies in place received a score of zero.

- **Energy efficiency measures in Renewable Energy Credits**—Similar to the EE-in-RPS variable, the highest score of 10 was given to states with energy efficiency measures included in their REC policies. States with no REC policies in place received a score of zero. Our ranking does not distinguish between states that treat RPS and RECs for energy efficiency fungibly with other renewable resources, such as Utah, which we regard as the better policy, and states that assign a separate RPS and REC target to efficiency resources, such as Connecticut, which still is market-enabling, although not as effective in enabling true lowest-cost competition for renewable energy.

- **Geographic restrictions**—The benefits of trading increase with market size. Therefore, the states that have no geographic restrictions within their regions for their RPS and REC policies received the highest score of 5, and the states with in-state only restrictions received a low score of zero.

- **Other energy efficiency measures** —RPS and REC statutes represent just one regulatory approach for reducing energy consumption. Other clearly defined policies, such as Energy Efficiency Resource Standards and Energy Efficiency Portfolio Standards, can be very effective alternatives for promoting energy efficiency. Fifteen of the 22 states received the highest score of ten for this ranking criteria.

- **Utility unbundling**—Unbundled utility structures, in which energy transmission and distribution utilities are separate from power generation companies that own power plants, encourage least costs strategies for meeting energy demand through conservation. The ranking for this variable was binary—eight for unbundled utility structures and zero for bundled utility structures.

- **Public utility commission environment/Decoupling**—This ranking criteria has a combined score for decoupled utility rate structures and aligning efficiency with utility companies' shareholder benefits. Scores ranged from a high of 16 for states with decoupling and good shareholder incentives in place to zero for states with no decoupling or shareholder incentives in place.

- **RPS/REC penalties or penalties for non-compliance with energy efficiency standards**—High scores of nine were given to states which have strong penalties for non-compliance, because effective policies must have real consequences. States with some penalties in place or "at the discretion of the public utility commission" were given a score of 4, and states with no penalties received a score of zero.

- **Cost-benefit tests that focus on utilities' real costs**—Public utility commissions and utilities need to isolate the specific value offered by energy efficiency investments. Efficiency resources are particularly important in this regard as virtually any capital investment in energy efficiency is acquiring both energy value and building service value—such as a window keeps the weather outside whether it

## CAP and EnergyRM ranking leading energy efficiency states, based on market dynamics and 10 key policies

| Rank | State | Ranking the leading energy efficiency states | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Power Costs | Elec. Demand Fcst. | | EE in RPS | EE in REC | Geographic restrictions | Other EE measures |
| | | | Total | RE Power | | | | |
| 1 | Connecticut | 15 | 0 | 9 | 10 | 10 | 5 | 10 |
| 2 | California | 15 | 9 | 9 | 5 | 5 | 2 | 10 |
| 3 | Maryland | 15 | 4 | 9 | 5 | 5 | 5 | 10 |
| 4 | Massachusetts | 15 | 0 | 9 | 5 | 5 | 5 | 10 |
| 5 | Pennsylvania | 7 | 4 | 9 | 10 | 10 | 5 | 10 |
| 6 | New York | 15 | 0 | 9 | 5 | 0 | 2 | 10 |
| 7 | Texas | 7 | 9 | 0 | 5 | 5 | 0 | 10 |
| 8 | North Carolina | 7 | 4 | 4 | 10 | 10 | 2 | 10 |
| 9 | New Jersey | 15 | 4 | 9 | 5 | 5 | 5 | 5 |
| 10 | Ohio | 7 | 4 | 0 | 10 | 5 | 2 | 5 |
| 11 | Virginia | 7 | 4 | 9 | 5 | 5 | 2 | 10 |
| 12 | Hawaii | 15 | 4 | 4 | 10 | 0 | 0 | 10 |
| 13 | Michigan | 7 | 4 | 0 | 10 | 10 | 2 | 0 |
| 14 | Maine | 7 | 0 | 9 | 5 | 5 | 5 | 10 |
| 15 | Nevada | 7 | 9 | 0 | 10 | 10 | 2 | 0 |
| 16 | Delaware | 7 | 4 | 9 | 5 | 5 | 5 | 10 |
| 17 | New Mexico | 7 | 9 | 0 | 5 | 5 | 2 | 10 |
| 18 | Florida | 7 | 4 | 4 | 5 | 5 | 0 | 10 |
| 19 | Illinois | 7 | 4 | 0 | 5 | 5 | 2 | 10 |
| 20 | Utah | 0 | 9 | 0 | 10 | 10 | 2 | 5 |
| 21 | Oregon | 0 | 4 | 0 | 5 | 5 | 5 | 5 |
| 22 | Washington | 0 | 4 | 0 | 5 | 5 | 2 | 5 |
| | Highest score | 15 | 9 | 9 | 10 | 10 | 5 | 10 |

Power costs: 15 if average state costs are above the U.S. average.; 7 if average state costs are close to the U.S. average.; and 0 if average state costs are below the U.S. average.

Electricity demand forecast: Both of these categories are scored based on regional forecasts, if not available by state.

- Total demand: 9 if the DOE/EIA 2015 5-year CAGR forecast is well above the U.S. average; 4 if the 2015 CAGR forecast is close to the U.S. average; and 0 if the 2015 CAGR forecast is well below the U.S. average.
- Renewable energy demand: 9 if shortage of RE power forecasted to meet RPS goals in 2015; 4 if RE demand will be close to forecasted supply; and 0 if excess RE capacity forecasted.

EE in RPS: 10 if there are clearly defined energy efficiency measures included in the state's RPS statute; 5 if there is a RPS statute, but EE not included yet; and 0 if no RPS statute.

EE in REC: 10 if there are clearly defined energy efficiency measures included in the state's REC statute; 5 if there is a REC statute, but EE not included yet; and 0 if no REC statute.

RPS/REC geographic restrictions: 5 if no restrictions within region (ISO/RTO); 2 if EE in-state only and/or transmission must be to state; and 0 for in-state only for all sources (transmission in or out).

Other EE Measures: 10 if strong other EE rulings/statutes; 5 if general EE goals, or EE statute not finalized; and 0 if no other EE goals.

is highly energy efficient or not. States which have the Utility Cost Test as their primary test received a high score of 5, states with a range of tests or no tests at all received a score of 2, and states who use the Total Resource Cost test as the primary and only cost-benefit test received a score of zero.

- **Availability of Property Assessed Clean Energy, or PACE programs**— Property-assessed financing structures such as PACE programs link the benefits of installed efficiency to a building, rather than the owner of the building, allowing repayment of financed investments to transfer automatically to new owners. States with PACE programs in place received a score of 5, and states with no PACE programs received a score of zero.

## CAP and EnergyRM ranking leading energy efficiency states, based on market dynamics and 10 key policies (continued)

**Ranking the leading energy efficiency states**

| | | Utility unbundling | PUC environment | RPS/REC penalties | Cost-benefit tests | Availabilty of PACE Programs | # of hospitals & colleges * | Overall score |
|---|---|---|---|---|---|---|---|---|
| 1 | Connecticut | 8 | 16 | 9 | 5 | 0 | 0 | 97 |
| 2 | California | 8 | 16 | 4 | 2 | 5 | 4 | 94 |
| 3 | Maryland | 8 | 8 | 4 | 2 | 5 | 0 | 80 |
| 4 | Massachusetts | 8 | 12 | 9 | 0 | 0 | 2 | 80 |
| 5 | Pennsylvania | 8 | 0 | 9 | 2 | 0 | 4 | 78 |
| 6 | New York | 8 | 16 | 0 | 2 | 5 | 4 | 76 |
| 7 | Texas | 8 | 8 | 9 | 5 | 5 | 4 | 75 |
| 8 | North Carolina | 0 | 12 | 4 | 2 | 5 | 2 | 72 |
| 9 | New Jersey | 8 | 4 | 9 | 2 | 0 | 0 | 71 |
| 10 | Ohio | 8 | 12 | 9 | 0 | 5 | 4 | 71 |
| 11 | Virginia | 8 | 8 | 0 | 2 | 5 | 2 | 67 |
| 12 | Hawaii | 0 | 12 | 4 | 2 | 5 | 0 | 66 |
| 13 | Michigan | 8 | 8 | 9 | 5 | 0 | 2 | 65 |
| 14 | Maine | 8 | 8 | 4 | 2 | 0 | 0 | 63 |
| 15 | Nevada | 0 | 12 | 4 | 2 | 5 | 0 | 61 |
| 16 | Delaware | 8 | 4 | 4 | 0 | 0 | 0 | 61 |
| 17 | New Mexico | 0 | 8 | 4 | 0 | 5 | 0 | 55 |
| 18 | Florida | 0 | 4 | 4 | 2 | 5 | 4 | 54 |
| 19 | Illinois | 8 | 4 | 0 | 0 | 5 | 2 | 52 |
| 20 | Utah | 0 | 8 | 0 | 5 | 0 | 0 | 49 |
| 21 | Oregon | 0 | 8 | 4 | 5 | 5 | 0 | 46 |
| 22 | Washington | 0 | 8 | 9 | 2 | 0 | 0 | 40 |
| | Highest score | 8 | 16 | 9 | 5 | 5 | 4 | 115 |

Utility unbundling: 8 if utilities are unbundled (EE PPAs would give IOUs, who can't invest in generation or transmission equipment, opportunities to deploy additional capital); and 0 if utilities

PUC environment: 16 if decoupling and good shareholder incentives in place; 12 if both decoupling and shareholder incentives, but 1 is pending or no specifics yet; 8 if either decoupling or g are in place, or there are limitations in both; 4 if ether decoupling or shareholder incentives, but pending or some limitations; & 0 if no decoupling or shareholder incentives.

RPS/REC compliance penalties: 9 if strong compliance penalties; 4 if some penalties or at the discretion of the PUC; and 0 if no penalties.

Cost-benefit tests: 5 if the Utility Cost Test is the primary test; 2 if there are a range of tests or there are no tests; 0 if the Total Resource Cost test is the primary and only cost-benefit test.

Availability of Property Assessed Clean Energy, or PACE, programs: 5 if PACE programs are available; and 0 if PACE programs are not available.

Number of hospitals and colleges: 4 if >350 total number of hospitals and colleges; 2 if between 150 and 350 total number of hospitals and colleges; and 0 if <150 total number of hospitals a

Note: Number of hospitals and colleges is used as a proxy for sizing the market opportunity, because no state-by-state statistics found yet for large commercial buildings.

- **Number of of hospitals and colleges**—The number of hospitals and colleges in a state indicates the size of the institutional market, but also is a good proxy for sizing the market opportunity for commercial building retrofits. Scores for this variable ranged from 4 for states with more than 350 hospitals and colleges to zero for states with less than 150 hospitals and colleges.

## Glossary of terms in the table

| | |
|---|---|
| ACEEE | American Council for an Energy-Efficient Economy |
| CEEF | Connecticut Energy Efficiency Fund |
| EE | Energy Efficiency |
| EELF | Energy Efficiency Loan Fund |
| EEPS | Energy Efficiency Portfolio Standard |
| EERS | Energy Efficiency Resource Standard |
| IOU | Investor-Owned Utility |
| IPP | Independent Power Producer |
| ISO | Independent System Operator |
| LID | Local Improvement District |
| MWh | Megawatt Hour |
| MPS | Minimum Performance Standard |
| NYSERDA | New York State Energy Research and Development Authority |
| PACE | Property Assessed Clean Energy |
| PPA | Power Purchase Agreement |
| PUC | Public Utility Commission |
| RE | Renewable Energy |
| REC | Renewable Energy Credit |
| RPS | Renewable Portfolio Standard |
| RTO | Regional Transmission Organization |
| SID | Special Improvement District |
| TRC | Total Resource Cost |
| UCT | Utility Cost Test |

# Endnotes

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11 For an example, see the sixth Northwest Power Plan, available at http://www.nwcouncil.org/energy/powerplan/6/default.htm.

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Equilibrium Capital Group is building a portfolio of operating companies managing assets in key sustainability sectors. Each of these companies is charged with executing a unique investment strategy in one of our key targeted areas: green buildings, resource efficiency, energy, water, land, carbon, and food production. We believe that financial innovation is one of the key catalysts to the scaling of sustainability solutions and impact. For more information, please visit http://www.eq-cap.com.

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## Note on CAP collaboration with EnergyRM

As a non-profit organization, the Center for American Progress does not endorse particular commercial products or businesses. CAP has chosen to partner on a pro-bono basis with the commercial enterprise EnergyRM for this paper due to their particular expertise in the interaction between public policy and private markets. CAP recognizes that building a clean energy economy will require development of new private sector business models that allow markets to capture the economic value of conservation and environmentally preferable energy solutions.

The Energy Efficiency Power Purchasing Agreement under development by EnergyRM, is one among many possible business innovations, which if successfully implemented could allow energy efficiency to be financed, built, and delivered to market on equal and competitive terms with new power plant construction. CAP collaborated with EnergyRM on this research to explore how smart public policy can jumpstart new private markets, enable broad competition in delivering clean energy services, and promote business innovation across the entire economy.

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