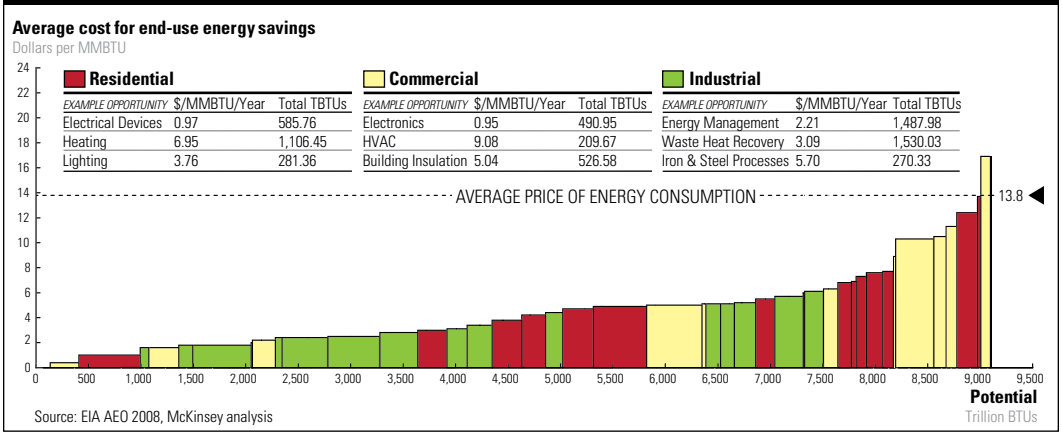
Part of a series on
CAP 2.0

Policy Brief

Figure 1: Energy Efficiency Investments are Cheaper than Projected Average Price of Energy Consumed in 2020



Source: EIA AEO 2008, McKinsey analysis

Boosting Energy Efficiency Nationwide Through Measurement and Performance-Based Rewards

Energy efficiency is the most cost effective means for reducing global warming pollution. According to McKinsey & Company, the energy bill savings from efficiency investments could roughly offset the cost of implementing a mandatory carbon cap.[1] And many of these investments already make sense economically: McKinsey estimates that a $50 billion per year investment could result in $1.2 trillion in energy bill savings by 2020 while reducing end-use energy consumption by about 23 percent of projected demand.[2] In addition to saving Americans money on their utility bills, investments in energy efficiency would put downward pressure on electricity, natural gas, and carbon allowance prices (when a carbon cap has been established), while creating 600,000 to 900,000 new jobs.[3] Establishing a reliable measurement for energy efficiency performance and rewarding success in improving performance will help America reach its full energy-saving potential.

Overcoming Obstacles to Reach America's Full Energy Efficiency Potential

Across the country, the private sector has failed to take advantage of many available opportunities to increase efficiency, often due to market barriers and a lack of information about or access to more efficient products. With heightened awareness about the economic benefits of energy efficiency and increased focus on combating global warming, Congress and the states are starting to put in place the policies needed to overcome the regulatory and market barriers to increase efficiency. The American Recovery and Reinvestment Act (ARRA) provides significant support for energy efficiency efforts across the United States. And the American Clean Energy and Security (ACES) Act that recently passed the House of Representatives contains several provisions to mandate or encourage energy efficiency. These measures have the potential to dramatically improve the efficiency of the U.S. economy, but currently there is no effort to track how effectively states, utilities and other recipients of federal dollars are using those funds. Tracking efficiency gains at a broader level will provide the transparency and accountability needed to ensure that energy efficiency funding and programs achieve their full potential.

For more information, please contact
Yerina Mugica
(212) 727-7200

www.nrdc.org/cap2.0

NRDC
THE EARTH'S BEST DEFENSE

September 2009

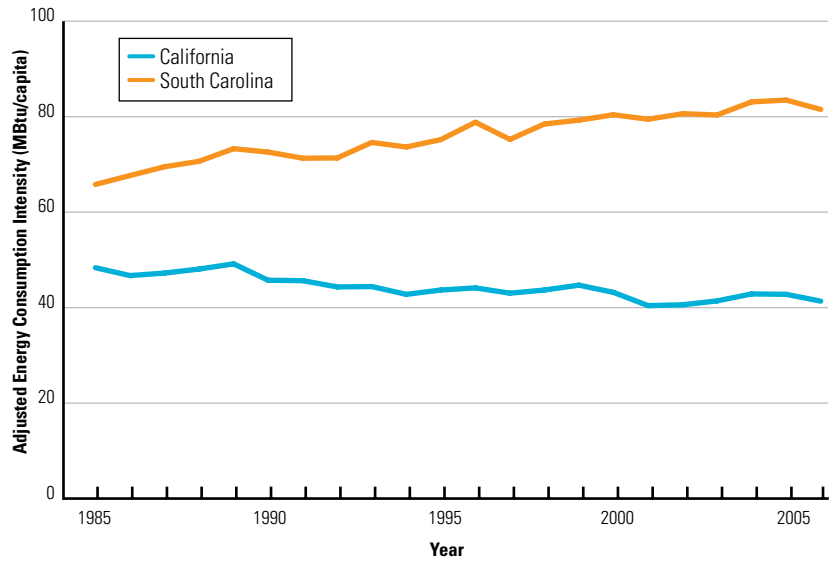
Policy Brief

Boosting Energy Efficiency Nationwide Through Measurement and Performance-Based Rewards

Tracking Energy Efficiency Can Spur Greater Results

A measure for tracking changes in energy consumption per capita would boost energy efficiency in two important ways. First, it would provide states and local distribution companies (LDCs) with a top-down, holistic way of measuring whether or not their policies, programs, and initiatives are reducing energy use in their states and service territories. This level of accountability and transparency would help them focus on the approaches to energy efficiency that are most effective. While it is still important for policy makers to review "bottom up" data such as energy savings delivered from individual programs, this information does not show whether overall energy use is going up or down. For example, efficiency program administrators could dramatically reduce consumption in new homes and commercial refrigerators while ignoring growing energy demand from consumer electronics or home heating. In addition, it is difficult to ensure apple-to-apples comparisons among states and LDCs with different program designs and different measurement and verification protocols. Simply establishing a credible, uniform assessment of the energy intensity of the residential and commercial sectors can drive friendly competition among states and LDCs and result in improved efficiency results.

Figure 2: Energy Efficiency Incentives Work: Contrasting Case Studies in California and South Carolina



California has a long history of providing incentives for energy efficiency. Its trend towards reduced energy consumption per capita over time illustrates the successful impact of rewarding improved energy efficiency performance. South Carolina, by contrast, shows a consistent trend towards increased energy use per capita.

Second, in the context of a carbon cap, federal policy makers can use a performance-based measure to reward states and LDCs for achieving aggregate-level energy efficiency improvements in the residential and commercial sectors. Such an approach would award an increasing portion of allowance value to states and/or LDCs that lower per-capita end-use energy consumption relative to their own baseline—not a national average—giving all states an opportunity to compete for allowances on equal footing. This would encourage states and LDCs to use the value of federal allowances and ratepayer funds (small charges added to utility bills to support particular programs) in ways that maximize consumer benefits and put downward pressure on allowance prices, reducing the overall cost of a carbon cap for everyone.

New Tools for Measuring Energy Efficiency Using Existing Data

We propose using an aggregate-level measure to track improvements in energy efficiency over time that is based on energy consumption for the residential and commercial sectors and adjusted for weather within states and service territories. Preliminary research confirms that it is possible to track trends in state energy consumption intensity (per capita energy use) even with the imperfect data sets that are currently available.[4] With improved data collection, an administrator could strengthen this approach into a more precise and powerful tool to encourage states and LDCs to reduce energy consumption.

Using existing data, we applied the following methodology to establish a measurement tool that tracks changes in per capita energy use while controlling for factors outside the influence of a state or utility policy (e.g., weather variations):

1. We tracked aggregate-level state energy consumption (BTU per capita) in the residential and commercial sectors, covering all building level energy sources including electricity, natural gas, and fuel oil, using data reported through the Energy Information Administration's (EIA) State Energy Data System.

2. We adjusted this data to control for weather variations using data from the National Climatic Data Center.

3. To evaluate a state's performance in reducing adjusted ECI, we estimated the linear trend through the five years preceding (and including) a given test year. States qualify for an incentive if

they pass a statistical test (80 percent confidence) ensuring that their five year trend is decreasing. Figure 2 illustrates the varying performance of two states, California and South Carolina, when compared using this measurement.

Rewards for Energy Efficiency Achievements Can Further Accelerate Progress

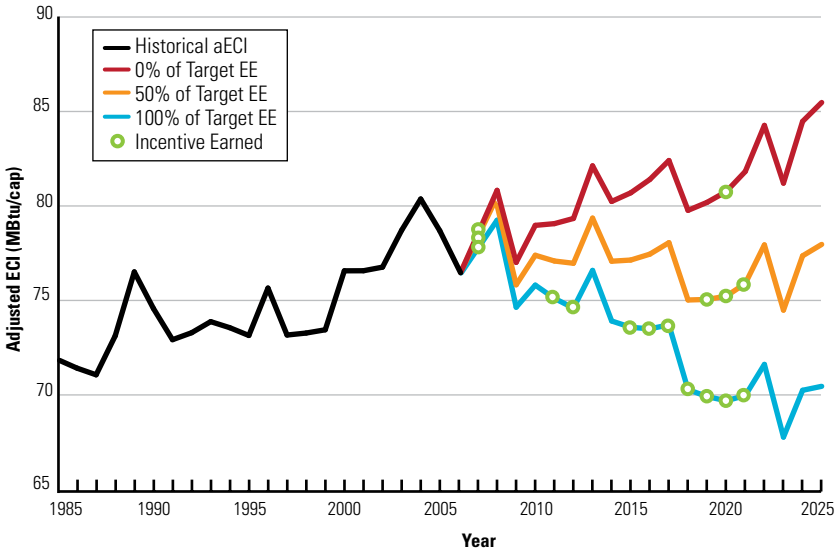
When adopted, aggressive efficiency policies have consistently decreased per capita energy consumption. However, many states and utilities have done little or nothing to reduce energy consumption. Even the significant number of states and utilities that have achieved notable reductions in energy consumption through investments in energy efficiency still have the potential to dramatically scale up their programs without running out of cost-effective efficiency opportunities.

The performance-based system we propose rewards both "leading" (demonstrated commitments to increasing energy efficiency) and "opportunity" (little or no demonstrated commitment to increasing energy efficiency) states and LDCs for improving their energy performance compared to their own historical baseline. This approach creates a "race to the top" by establishing public pressure (in the case of reporting) and financial incentives (if performance is tied to carbon allowance rewards) for states and utilities to continuously improve energy efficiency within their respective areas of influence, encouraging them to take advantage of federal programs and maximizing state- and utility-based efficiency efforts. This is the most effective way to ensure that states and utilities use the value of allowances that would be distributed under proposed climate change legislation to invest in cost-effective energy efficiency, and to use federal allowances to encourage state policy innovation. Figures 3 and 4 provide illustrative examples of how two "opportunity" states could earn rewards by improving their energy use compared to their historic trend.

Once a consistent aggregate level efficiency measure is established for all states and LDCs, federal agencies can report on performance and adopt a performance-based reward system, both of which would leverage the existing energy efficiency infrastructure to help drive the significant increase in investments that is needed in all 50 states to reduce global warming pollution in the United States at least cost.

Figure 3: An Example of an Energy Efficient Future for Pennsylvania

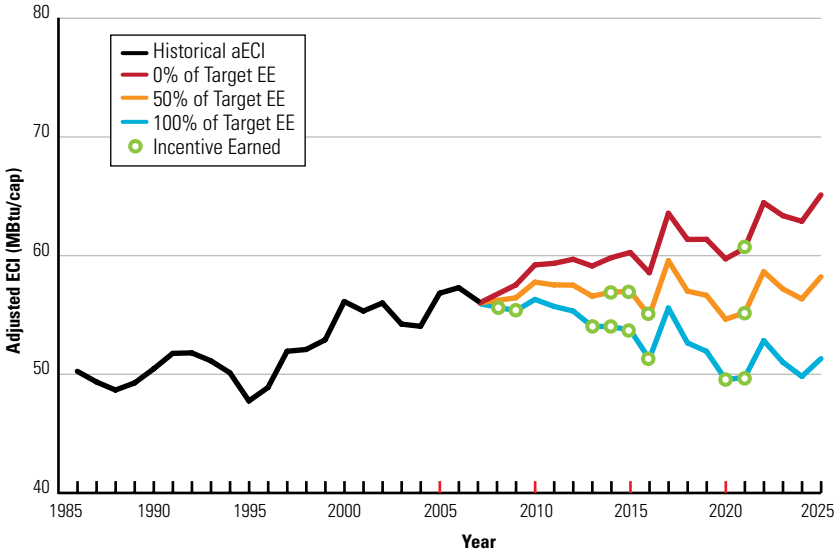
Potential for Pennsylvania to earn rewards for energy efficiency based on a target energy efficiency improvement of 18 percent of projected 2025 adjusted energy consumption intensity (aECI).



The above is an example scenario of Pennsylvania's potential to earn performance-based rewards by achieving all or some of the efficiency that potential studies have determined are economically feasible.[5]

Figure 4: An Example of an Energy Efficient Future for New Mexico

Potential for New Mexico to earn rewards for energy efficiency based on a target energy efficiency improvement of 22 percent of projected 2025 adjusted energy consumption intensity (aECI)



The above is an example scenario of New Mexico's potential to earn performance-based rewards by achieving all or some of the efficiency potential that studies have determined are economically feasible. New Mexico already has an efficiency target in place that calls for efficiency savings equal to 10 percent of 2005 levels by 2020. Achieving even a portion of this goal would likely earn New Mexico an efficiency reward under this proposed system.[6]

Policy Brief

Boosting Energy Efficiency Nationwide Through Measurement and Performance-Based Rewards

The proposed performance measure would reward states and LDCs for their "all-in" efficiency gains, including the effect of setting and enforcing strong building codes, imposing tough appliance standards, establishing utility regulations that reward efficiency, and running successful efficiency programs. This approach builds on the successful models of leading states while allowing states and LDCs the flexibility to customize individual programs and policies to meet the needs of local markets.

Distributing Allowance Under ACES to Boost Immediate Efficiency Investments

We recommend distributing allowances to states and LDCs according to the formulation in the American Clean Energy and Security Act (ACES) for an initial 2- to 3-year ramp-up period, during which states and LDCs can begin making progress by developing and launching efficiency programs and policies. During the ramp-up phase, an administrator should begin measuring and publicly reporting state and LDC efficiency performance data. Disclosing this data even before using it as the basis to distribute allowance value will drive healthy competition among states as well as help refine the measurement process.

Congress should require the administrator to shift to the performance-based distribution system in year three or four, pursuant to which he or she would adjust each state's and LDC's distribution upwards or downwards depending on their performance reducing aggregate energy consumption compared to their baseline. The objective would be to reward good performance with additional funds and to reward excellent performance with even more, while providing a strong financial disincentive for poor performance.

Getting Better Data to Improve Efficiency Tracking and Performance

To increase the long-run reliability and effectiveness of the performance-based measure we need to improve data collection in key areas. Congress should direct the administrator of climate legislation to establish and fund the following data collection improvements:

- Increase frequency of state-level energy consumption data collection from annual to quarterly.
- Standardize State Energy Data Systems (SEDS) classification system across all states and disaggregate sectors into homogeneous sub-sectors (e.g. for commercial, disaggregated subsets could include office, retail space, and warehouse.)
- Implement an auditing system to ensure the reliability of data reported through SEDS.
- Instruct the National Climatic Data Center (NCDC) to use annual estimates of population in the weighting calculations for degree days instead of the latest census figures (e.g. NCDC currently uses 2000 population to weight 2009 degree days even though the census publishes estimates of 2009 population.)
- Establish clear leadership and coordination across agencies involved in the collection and analysis of data necessary to establish aggregate-level state efficiency performance measurements—including the EIA, NCDC, Bureau of Economic Analysis, EPA, and Census Bureau—to ensure that agencies provide required data on a timely basis.
- Improve timeliness of SEDS data reporting. SEDS data for the prior year should be compiled and released no later than 12 months after the end of the prior calendar year.

[1] McKinsey & Company (2007): "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" Available for download at www.mckinsey.com/clientservice/ccsi/greenhousegas.asp

[2,3] McKinsey & Company (2009): "Unlocking Energy Efficiency in the U.S. Economy." Available for download at http://www.mckinsey.com/USenergyefficiency/

[4] Our initial report and supporting appendices, including proof-of-concept simulations for each of the 48 continental U.S. states, can be downloaded from http://www.schatzlab.org/projects/psep/psep.php.

[5] This estimate is based on the following study: Eldridge, Maggie et al., 2009. "Potential for Energy Efficiency, Demand Response, and Onsite Solar Energy in Pennsylvania." American Council for an Energy-Efficient Economy, Summit Blue Consulting, Vermont Energy Investment Corporation, ICF International, and Synapse Energy Economics. April 2009, ACEEE Report Number E093.

[6] This estimate is based on the following study: Geller, Howard et al, 2008. "New Mexico Energy Efficiency Strategy: Policy Options." Southwest Energy Efficiency Project, American Council for an Energy-Efficient Economy, ETC Group, LLC. November 2008.

