

Kick-Starting Building Efficiency: A policy workplan for maximizing the economic benefits of energy efficiency in buildings

The buildings sector is the largest source of global warming pollution in the United States, including emissions from generating the electricity used in buildings. Buildings and the appliances within them currently account for roughly one-third of U.S. greenhouse gas (GHG) emissions, and that number is on the rise. Fortunately, buildings also offer the quickest and most cost-effective opportunity to reduce global warming pollution while yielding direct economic benefits, saving consumers money and boosting U.S. industry. Energy efficiency measures such as retrofitting existing buildings and increasing the energy efficiency of new buildings can generate net savings using technology that exists today. NRDC recommends a clear set of policy solutions for reaping the immediate benefits of building efficiency.

Building Efficiency Saves Money

Appliances and equipment, which account for more than half of current carbon dioxide (CO₂) emissions from the buildings sector, offer considerable room for cost-effective efficiency improvements. The vast majority of potential energy efficiency opportunities can be realized through market uptake of efficient products and the retrofitting of existing building stock. Most of these improvements generate net savings, reducing the cost of a cap on emissions, and can be implemented using existing technology, as illustrated by the U.S. greenhouse gas abatement cost curve above.¹

In fact, analysis by McKinsey & Company suggests that we can achieve annual savings of \$33 billion per year from cumulative buildings sector efficiency improvements, with even greater savings resulting from more aggressive policies.² Moreover, the energy cost savings of incorporating policies to drive rapid adoption of efficiency in all sectors (the payoff below the line in the U.S. greenhouse gas cost curve) can roughly cover the cost of other abatement measures, which are more expensive, but necessary.

For more information, please contact **Rick Duke** or **Yerina Mugica** at (212) 727-2700, or **Lane Burt** at (202) 289-6868

www.nrdc.org/cap2.0



Kick-Starting Building Efficiency:

A policy workplan for maximizing the economic benefits of energy efficiency in buildings

Strong Legislation Is Needed to Maximize Efficiency Gains

Effective legislation can capture efficiency potential through the following four elements:

1. Regular updating and enforcement of national energy codes and standards for new buildings and equipment.
2. Performance-based allocation of allowance value to states and local distribution companies (LDCs) that demonstrate rapid efficiency gains.
3. Incentive programs for buildings, appliances, and equipment at the national level.
4. Designation of funds for energy efficiency programs that target low-income sectors.

No one approach can capture all the cost-effective energy efficiency available in the market. Therefore, each of these strategies is needed to unlock the full potential of energy efficiency.

Kick-Starting Buildings Efficiency

Federal cap-and-trade legislation should set a limit (or cap) on the amount of CO₂ that firms emit in the United States. It should direct a federal agency to auction emission allowances and use a substantial portion of the proceeds to fund incentives to invest broadly in cost-effective energy efficiency. A comprehensive approach to global warming legislation can start unlocking the efficiency potential of buildings immediately, even before the formal cap-and-trade policy is in place. This swift action is crucial to ensure smooth scale-up of efficiency incentives and begin unlocking the energy productivity payoff as quickly as possible.

The first step toward reaping economic and environmental benefits through efficiency is to begin investing in these measures immediately. Congress should kick-start these investments by including funding for these programs in an economic stimulus package and subsequent energy policy in early 2009. This would immediately motivate investment in “high multiplier effect” efficient infrastructure. This short-term deficit spending could then be paid back using a portion of the revenues from a carbon cap. In this way, even though the formal cap-and-trade market will not launch before 2012, we can begin to stimulate the economy immediately, develop green jobs, and enjoy efficiency savings.

This approach allows us to fight a “Japan-style” multi-year recession by investing in energy productivity rather than simply jacking up short-term consumption. It has the added advantage of allowing us to finance this 2009-2011 economic recovery spending with revenue raised from post-2012 allowances.

Key Policies to Drive Buildings Efficiency

State and federal policies have been successfully delivering energy efficiency for many years. At the same time, building codes and product efficiency standards have substantially increased efficiency in new buildings and products. Despite this, we have been dramatically under-investing in cost-effective energy efficiency across the country. The following policy proposals build on and complement these successful models by driving toward the order-of-magnitude increase in energy efficiency that is needed (and achievable) to reach our carbon reduction targets at least cost. In addition, we are exploring policies that would improve access to capital for energy efficiency, for example through a federal credit enhancement program. We believe this would further enable increased energy efficiency implementation.

1. Regular updating of codes and standards

In order to achieve GHG abatement at least cost, Congress should mandate increasing minimum levels of efficiency for buildings and appliances, including requirements that agencies regularly or automatically update such standards.

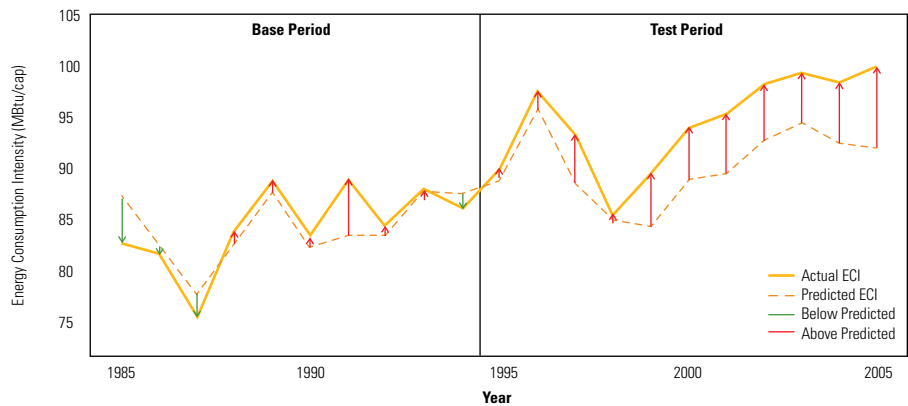
Updating the National Model Energy Code

New federal legislation should improve overall efficiency savings by at least 30 percent with each model code or standard released in or after 2010, and 50 percent with each model code or standard released in or after 2020. These improvements should be made relative to the current building standards—2006 IECC for residential buildings and ASHRAE Standard 90.1-2004 for commercial buildings.

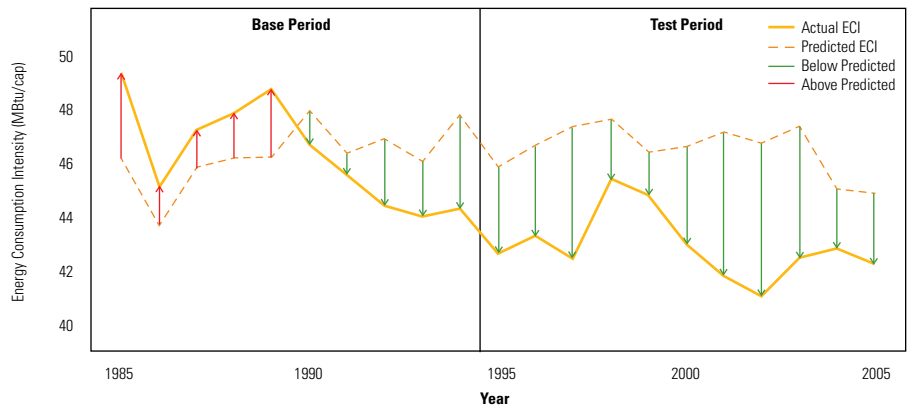
The Department of Energy (DOE) should set targets for the period between 2010 and 2020 and post-2020 at least three years in advance of each target year, coordinated with the IECC and ASHRAE Standard 90.1 cycles, at the maximum level of energy efficiency that is technologically feasible and life-cycle cost-effective.

Figures 1 and 2: Actual and Predicted Energy Consumption Intensity Trends*

North Dakota—Actual vs Predicted Weather Adjusted Energy Consumption Intensity for the Residential Sector



California—Actual vs Predicted Weather Adjusted Energy Consumption Intensity for the Residential Sector



* The figures above illustrate an example of energy consumption per capita in the residential sector for two sample states over time. In the first example energy consumption per capita has generally increased over time. While in the second example energy efficiency policies have resulted in generally declining energy consumption per capita.

Congress should condition the distribution of allowance revenue to states upon their successful implementation of national model building code equivalent or higher.

National Appliance Standards

Congress should fully fund the federal appliance standard program at the DOE and instruct the agency to pursue all cost-effective energy efficiency potential when setting new standards. It should require the DOE to expand the scope of federal standards and cover new products whenever significant energy savings are possible, following the precedent set by California. Additionally, the DOE should establish future efficiency goals for every major appliance category covered to enable manufacturers to rapidly deploy new efficiency technologies while giving them the security they need to develop these more efficient products.

2. Performance-based allowance/funding allocations to states and local distribution companies (LDCs) to pursue increased cost-effective end-use energy efficiency.

Congress should allocate at least \$20 billion of allowance revenue to states for distribution to states and LDCs or other entities that will use the funds to advance energy efficiency in their jurisdictions (either directly or through redistribution to other entities).³ While a baseline level of efficiency support may be distributed to states based on population or other factors, a significant share should be distributed as a reward for measured efficiency results. States should be required to reinvest these funds, both baseline- and performance-based, in cost-effective energy efficiency, and a matching funding requirement should be considered.

Aggressive efficiency policies have consistently decreased residential energy consumption per capita in states that have adopted them, such as California, while the lack of strong efficiency policy in many states has resulted in the progressive increase in energy use in the residential sector. A performance-based efficiency program would reward leading states like California for continuing to decrease energy demand; it would also reward “opportunity” states if they improve their energy performance compared to their historical trend. (See Figures 1 and 2 for illustrative examples).

3. Federal efficiency deployment incentive programs for buildings, appliances, and equipment

A range of private sector entities—including large energy consumers, energy service companies, retailers, manufacturers, property management firms, and real estate developers—can effectively implement efficiency and should be given incentives to help deliver permanent, additional, and verifiable energy efficiency. National programs that allow large- and small-scale private sector entities to earn incentives will allow economies of scale to develop and increase cost-effectiveness. Congress should direct \$10 billion for use toward the following programs:⁴

Appliances

Federal legislation should establish incentives for retailers, manufacturers, and equipment distributors that encourage the sale of energy efficient appliances and provide incentives for retirement of low-performing appliances from

Kick-Starting Building Efficiency:

A policy workplan for maximizing the economic benefits of energy efficiency in buildings

the marketplace. This program, Super Efficient Appliance Deployment (SEAD), would create an upward spiral of efficiency as manufacturers compete to develop products that receive top-performer status and associated support. Much of the benefit would flow directly to consumers in the form of lower-cost efficient products, increased product availability, and lower energy bills resulting from the use of more efficient products.

Buildings

A federal efficient-buildings incentive program should encourage owners of commercial and residential buildings to undertake deep retrofits that radically improve measured building performance. In addition, the program should encourage developers to exceed the required minimum code performance in new buildings.

This requires establishing and publicizing credible efficiency metrics for whole buildings and offering incentives for both new and existing

buildings to dramatically improve their efficiency through a Super Efficient Buildings Incentive (SEBI) initiative (see sidebar). A natural outcome of participation in SEBI will be an energy performance label documenting the performance of that building compared to a code-based reference building. Energy-performance labeling for buildings should include both an assessment of the building's energy efficiency potential, based on envelope and equipment, and its operational energy performance in order to ensure that building owners and users have accurate information regarding the property's energy efficiency.

4. Low-income energy efficiency programs

In order to protect low-income households, at least \$5 billion per year of allowance value should be designated for use towards improving the energy efficiency of these homes.⁵ Significantly increased funding for low-income weatherization through the national Weatherization Assistance Program, which achieves an average of 22 percent reduction in energy use per unit retrofitted, is one of a number of necessary strategies to reduce energy use in this sector. Other strategies include energy efficiency assistance for multi-family and manufactured homes through the Home Investment Partnership and other programs, and the provision of energy efficient appliances and lighting.

The United States can save money through building efficiency right now by enacting the right policies that will unlock efficiency potential. Enacting strong cap-and-trade legislation, along with other key policy changes, including efficiency programs and incentives, will put America on the path to a more stable economy.

Super Efficient Buildings Incentives (SEBI) Save Money

SEBI is a new proposal for a federal incentives program for existing and new buildings.

Existing Buildings – A federal incentive for existing buildings that demonstrate improvement in efficiency relative to past performance, based on retrofits or operational changes.

1. Incentives for demonstrated energy savings resulting from an energy efficiency retrofit. This would be based on the percentage of annual energy consumption saved, as determined by pre- and post-retrofit energy audits, with third-party verification of savings. Retrofit incentives are needed for both residential and commercial buildings.
2. Incentives for energy savings resulting from efficient building operation. This would be available to commercial buildings that reduced their energy consumption based on the previous year's benchmark, while accounting for other relevant factors (such as vacancy level).

New Buildings – A federal incentive for meeting aggressive above-code energy goals for specific types and sizes of new buildings. Metrics could be based on percent above code, or percentile compared to similar buildings. Incentives for new residential and commercial buildings are needed to reward exceptional design and stimulate the market for new efficiency technologies and process improvements.

1 This cost curve scenario is based on NRDC analysis, including extrapolations from 2030 cost estimates done by McKinsey & Company. To view the full McKinsey & Company report visit http://www.mckinsey.com/clientservice/ccsi/pdf/US_ghg_final_report.pdf.

2 McKinsey and Company (2007). Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? sponsored by DTE Energy, Environmental Defense, Honeywell, National Grid, NRDC, PG&E, and Shell and available for download at www.mckinsey.com/clientservice/ccsi/greenhousegas.asp

3 U.S. states currently spend a total of approximately \$3.5 billion annually on energy efficiency programs. However, more than 20 states have almost no efficiency programs in place and many more states have very limited programs. To scale up to the levels of efficiency needed, we must significantly ramp up investment in state-level efficiency. \$20 billion annually would support efficiency savings targets of approximately 1.5 percent reductions per year once fully scaled.

4 This amount is necessary to dramatically increase the number of efficient appliances, equipment, and electronics for which incentives are provided and to achieve the scale of whole building retrofit needed to achieve GHG abatement at least cost to society.

5 There are over 20 million homes in the U.S. that are in need of efficiency retrofits and eligible for weatherization services. However, currently only about 150,000 homes receive these services each year. To achieve the goal of weatherizing 1 million low-income homes per year, a substantial increase in funding to at least \$5 billion annually will be needed.