Comments of
The American Council for an Energy-Efficient Economy
And
The Alliance to Save Energy
On the Regional Greenhouse Gas Initiative
Draft Model Rule
May 22, 2006

Summary

ACEEE and the Alliance to Save Energy urge the RGGI signatory states to make maximum use of energy efficiency as a resource to minimize RGGI's cost and maximize its chances for success. The staff working group electricity-sector (IPM) and regional-economy (REMI) modeling clearly showed that increasing investment in energy efficiency achieves RGGI's goals at the lowest cost. Most important, energy efficiency is the only way to ensure that RGGI meets its carbon emission targets while also reducing average customer energy bills.

We therefore recommends that:

1. At least 50% of carbon emission allowances be allocated to public-benefit uses, including energy efficiency;
2. At least 50% of the financial proceeds of public-benefit allowance sales be dedicated to energy efficiency;
3. The environmental agencies in participating RGGI states work with their public utility commissions and state energy offices to develop policies that set consistent electricity savings targets, with the goal of doubling the level of energy resources acquired through RGGI-state efficiency programs and policies.
4. The model rule be modified to fully encourage energy efficiency in electricity generation by changing the early-reduction credit formula.
5. The offsets portion of the rule be expanded to permit and encourage certain emission reductions from the transportation sector.

Why is energy efficiency essential to RGGI's success?

Energy efficiency is essential to RGGI's success because:

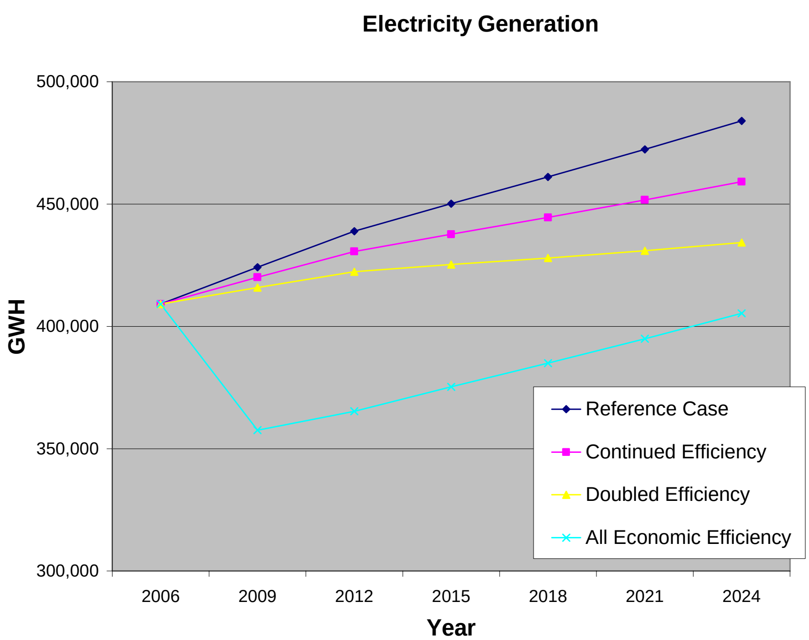
- Increasing efficiency impacts is a key part of limiting carbon emissions leakage;
- Increased efficiency investment produces the lowest energy prices and carbon prices of any policy scenario modeled;
- Increasing energy efficiency investment is the only way for states to meet their carbon emission targets while reducing consumer and business energy bills.

The RGGI state agencies conducted extensive computer modeling of various future scenarios for the region's electricity sector, using the nationally-recognized IPM model for power-sector simulations and the REMI economic analysis model to assess impacts on the regional economy. With both models, the agencies and stakeholders created a reference case to project what would happen without RGGI, and then ran several different scenarios for comparison with the reference case.

Key findings, documented in ACEEE's report entitled *Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative* (copy enclosed with these comments) included the following:

Increasing efficiency investment will slow electricity load growth**—**Figure 1, which compares the reference case to cases with increased efficiency investment, shows that doubling efficiency would cut load growth by about two-thirds in 2024, from about 20% to about 6% above 2006 levels.

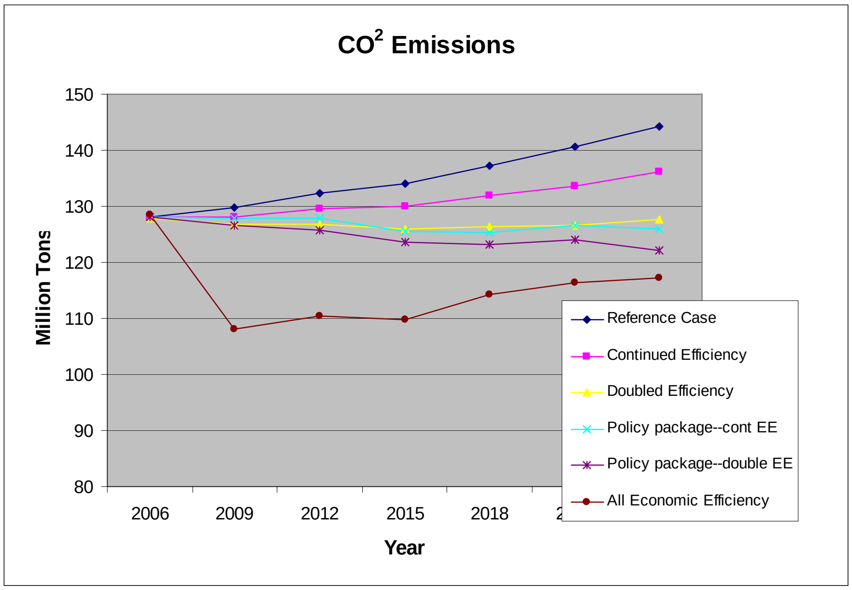
Figure 1



Increasing efficiency investment will reduce the need for new powerplants**—**the doubled-efficiency scenario reduces 2024 capacity additions by about 8,000 MW, or about 25% of the reference case forecast for new capacity. That's more than 25 300-Megawatt powerplants that would not need to be built.

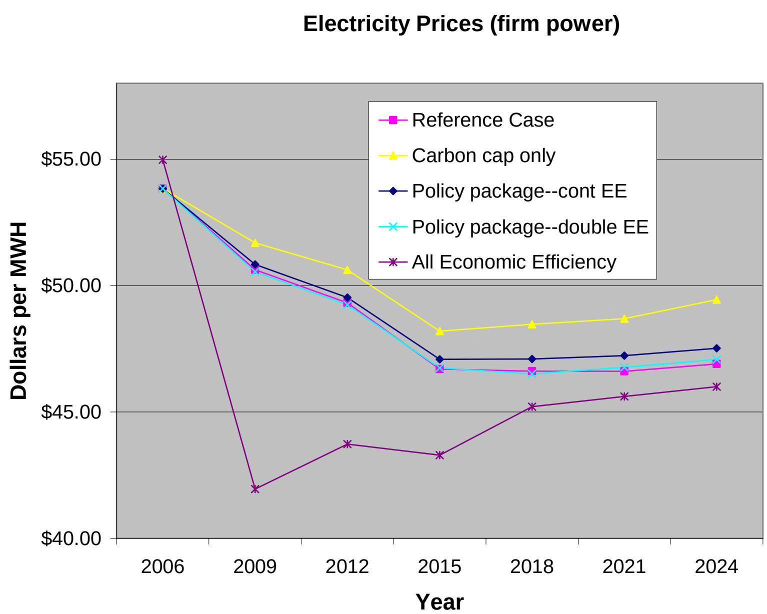
Increasing efficiency investment will reduce carbon emissions**—**Figure 2, also comparing the reference case to increased-efficiency scenarios, shows that doubling energy efficiency keeps carbon emissions virtually flat through 2024, much as the basic RGGI policy package. With the RGGI policy and a doubled commitment to efficiency, emissions fall substantially.

Figure 2



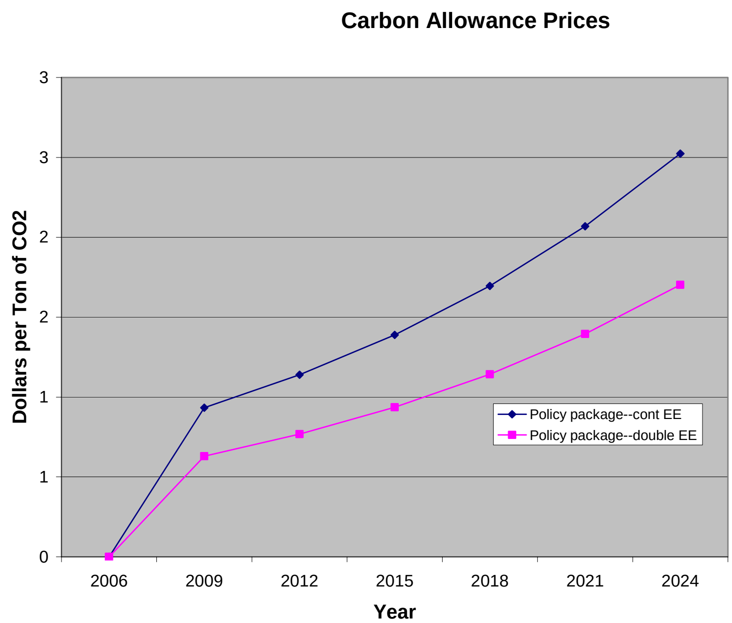
Increasing efficiency investment will reduce energy prices—As shown in Figure 3, doubling efficiency reduces energy price growth to almost nothing; no significant prices impacts occur until after 2020, when they show a less-than-1% impact on wholesale power market prices.

Figure 3.



Increasing efficiency investment will reduce carbon allowance prices—Figure 4, which compares the RGGI policy scenario to one in which energy efficiency results are doubled, shows that allowance prices are also substantially lower with increased energy efficiency investment, falling by about one-third to around $2/ton in 2024.

Figure 4



Increasing efficiency investment will reduce power imports or emissions "leakage"—The IPM modeling process indicated that increased efficiency investment can substantially reduce power imports to levels lower than the reference case. While many factors affect leakage, efficiency can help reduce it, allaying one of the biggest concerns about RGGI, that the program might result in increased emissions from plants selling power into the region. Because of complexities related to the modeling process, we do not present quantitative data on leakage in these comments, but nonetheless find enough indications from the modeling data to suggest that efficiency should be viewed as part of a leakage-reduction policy package.

The regional economic impacts, as projected by the IPM and REMI models, also showed positive impacts from increased efficiency investment:

Greater efficiency investment will reduce consumer energy bills—Analysis of energy savings from the IPM modeling results showed that under the doubled-efficiency scenario, 2021 household electricity bills would be an average $118, or 12%, lower than under the reference case.

Greater efficiency investment will reduce business energy bills—Commercial electricity customers would save an average of $650 in 2021, about 8% relative to the reference case. Industrial electricity users would see bill reductions averaging $4092, about 5% relative to the reference case.

Figure 5 summarizes the energy bill impacts by customer class and year.

Figure 5. Customer Energy Bill Impacts
From Doubled Energy Efficiency Investment
(average bill reductions in dollars and percent)

Residential		**Commercial**		**Industrial**	
2015	**2021**	**2015**	**2021**	**2015**	**2021**
$70.81	$117.56	$390	$650	$2468	$4092
7.5%	12.4%	4.8%	8.1%	2.8%	4.7%

Greater efficiency investment will boost the region's economy**—**RGGI states would see small but measurable economic growth benefits in most of the scenarios that were modeled. When increased efficiency investment was modeled, it produced the strongest gains in economic indicators. Key effects included:

- **Economic output—**doubling efficiency increases regional economic growth from almost no effect to 0.6% positive in 2021, relative to the reference case.
- **Personal income—**the doubled-efficiency scenario increases personal income by almost 1% in 2021.
- **Employment—**the increased efficiency future would increase private-sector job growth by 0.8% in 2021.

RGGI Needs a Subtantial Allowance Allocation, and Efficiency Resource Standards, to Deliver Needed levels of Energy Efficiency

The modeling results are clear: doubling energy efficiency commitments leads to the lowest-cost, most economically-robust energy future for the RGGI program. The question then becomes: will a cap-and-trade system harness this potential, or will more targeted policies be needed to realize efficiency's contribution to RGGI's success?

The needed level of efficiency investment will not happen by itself. In the cap-and-trade system under which RGGI will operate, energy efficiency is an "indirect" emission reduction. That means it reduces energy use at the customer level, but may not reduce overall emissions for the region, because the multitude of power generators can shift their operating hours to adjust to changes in energy demand. If power consumption falls below forecasts, generators can run "dirtier" plants a little longer over the compliance period to use up their emission allowances.

This "indirect emission" problem can only be solved if the RGGI states adopt strong policies to tap efficiency resources directly. One of these options is already in the Model Rule: states must allocate at least 25% of their emission allowances for "consumer benefit or strategic energy purposes", and energy efficiency is a leading candidate for these funds. Several states are moving to allocate higher percentages of allowances—up to 100%--to such public purposes.

Allocating the majority of consumer allowance proceeds to energy efficiency provides the greatest net benefits to customers. While there is interest from some parties in directing allowance proceeds into electricity bill rebates, this approach would produce fewer benefits to consumers than spending the money on energy efficiency. Efficiency provides many more benefits than electricity bill rebates alone. The RGGI modeling process projects that wholesale power prices in the policy package scenario would go up by no more than 1%; simply rebating this amount would save customers less than 1% of their total bills, because the total savings would be diluted by the non-generation parts of the retail bill.

Modeling of the doubled-efficiency scenario, however, shows two effects:

1. Doubled efficiency negates most of the wholesale price increase. The need to rebate customers for higher prices would thus be largely mooted.
2. In addition, *retail* consumer energy bills would fall by 3% to 12%, as shown in Figure 5. Efficiency thus provides ***up to 12 times the total benefits*** of using allowance revenues just to credit customer bills.

These modeling results make a compelling case that the majority of allowance sale proceeds from the consumer allocation should go to energy efficiency.

Energy savings targets in parallel with RGGI may be needed to double efficiency investment. Because carbon allowance prices are expected to be very modest under RGGI ($3/ton or less), the funds realized from allowance sales will also be modest. RGGI states currently spend about $500 million annually on efficiency programs. At $3/ton, the total value of RGGI allowances would not exceed about $400 million a year. This means that even if 100% of allowances went to public benefits purposes, and if all the revenue from those allowances went to efficiency programs, it is unlikely that energy efficiency investment could be doubled. For this reason, states need to take extra steps to realize the level of efficiency investment that would be most beneficial to the RGGI states and their electricity consumers. A promising policy approach now in use by several states is the Energy Efficiency Resource Standard (EERS). Connecticut, for example, created an EERS requirement in 2005 (by amending its Renewable Portfolio Standard to create a new "tier 3" class of energy efficiency resources) that requires utilities to save an incremental 1% of electricity sales each year from 2007 through 2010. If all the RGGI states instituted such targets, this policy would roughly double the impacts of current energy efficiency policies in the region, and would deliver the benefits outlined above.

Recommendations. We recommend that:

1. The Model Rule be modified to require that at least 50% of allowances be allocated for public purposes, including and especially for energy efficiency. The more allowance revenues that are dedicated to energy efficiency, the lower the cost of the RGGI program will be. And the analysis conducted during RGGI's development showed that because of the revenue windfalls that accrue to generators, there is no reason to give all or any allowances to generators for free. 50% strikes a reasonable balance between the

need to keep RGGI's costs down through investment in energy efficiency, and the pressure to give allowances for free to generators.

2. The Model Rule require states to spend at least 50% of their public-benefit allowance allocation revenues (regardless of the percentage of total allowances allocated to public benefits) on energy efficiency. There will be temptations from many quarters to spend allowance revenues for various purposes, especially on direct electricity bill credits. However, our analysis shows that spending the money on efficiency provides many times the benefits to consumers than would direct rebates or bill credits.

   The Model Rule language would be changed as follows, in section XX-5.3:

   > (a) General allocations. **[Allocation provisions will vary from state to state, provided at least 50% of the allocations shall go to a consumer benefit or strategic energy purpose. At least 50% of consumer benefit/strategic energy purpose allowance sale proceeds shall be dedicated to promotion of energy efficiency measures.]**

3. The Model Rule should include a provision that calls on the implementing agency to consult with the utility commission and other cognizant organizations to set efficiency resource standards for energy efficiency, which shall be designed to minimize electricity prices, minimize carbon allowance prices, minimize customer energy bills, insure against leakage, and provide the maximum economic benefits for the state's electricity customers.

   The Model Rule would be modified to add a new Subpart XX-5.4 as follows:

   > The REGULATORY AGENCY shall consult with the state's public utility regulatory agency to develop an energy efficiency resource standard that set electricity savings targets for the entities charged with administering energy efficiency programs in the state. These targets shall be set at levels designed to minimize electricity prices, minimize carbon allowance prices, minimize customer energy bills, insure against carbon emissions leakage, and provide the maximum economic benefits for the state's electricity customers. Targets shall be set for the years 2009-2019.

Early Reduction Credits Should be Modified to Encourage Energy Efficiency in Power Generation

An important energy efficiency opportunity appears to have been overlooked in this part of the model rule by preventing energy-efficient power generation solutions, such as combined heat and power and recycled energy, from qualifying for early reduction credits. This concern focuses on the formula for calculating early-reduction credit, shown on page 41 of the draft rule. As currently formulated, the only emission reduction action that can receive credit is fuel-switching, while efficiency improvement is systematically excluded. The reason for this is the input-based formulation of the rule. The problem can be fixed by re-casting the provision on an output-basis.

There are three generic ways to reduce CO_2 emissions from fossil-fuel processes:

- Reduce utilization
- Increase efficiency
- Switch to lower carbon fuel

It has been made clear that reduced utilization will not receive credit under the early reduction provisions. Fuel-switching can provide genuine emission reductions, however at a very high cost ($30/ton or more), and potentially exacerbating regional concerns over fuel-diversity. Increased efficiency is the lowest-cost and most widely applicable approach to CO_2 reduction and one that RGGI has often endorsed as a vital component of its plans. We therefore recommend that this provision of the model rule be modified to include energy efficiency as an early-reduction option.

Early Reduction Allowances (ERAs) can be awarded under the proposal for operation during the 2006-2008 period compared to operation during the baseline period of 2003-2005. As currently formulated, the ERA calculation considers two cases:

- If heat input during the early reduction period is less than or equal to the heat input during the baseline period, the ERAs are equal to the early reduction period heat input times the reduction in the input-based emission rate (lb/MMBtu) from the baseline to the early reduction period.
- If the heat input during the award period is higher than during the baseline period, the ERAs are equal to the decrease in absolute emissions from the baseline to the early reduction period.

These calculations provide ERAs for a facility that switches to a lower-carbon fuel (e.g. coal to gas). However, they provide no credit for a facility that reduces its emissions through increased efficiency. This can achieved through several technology solutions, such as:

- If the facility increases its generating efficiency and continues to generate the same amount of electricity, its heat input (and emissions) will decline between the baseline and early reduction periods. However, the input-based emission rate (lb CO_2/MMBtu) does not change, since it is dependent only the fuel characteristics. Thus, though the plant has made a real reduction in emissions, it cannot get any ERAs because there is no change in emission rate.
- If the facility increases its generating efficiency and increases its output, there could be a small window at which there is an absolute reduction and the unit could get ERAs. Beyond that, no ERA's are available even though the emission rate is lower.

The results of the second case partly stem from an apparent determination that ERAs should only be available to a unit that makes both an emission rate reduction and an absolute emissions reduction. The same limitation applies to fuel switching. It's not clear to us why the model rule should not encourage the increased use of lower-emitting units through the early reduction provision. As currently drafted, this provision will have a limiting effect on all early reduction actions since plant operators will not know the future level of plant operation and will be reluctant to make early reduction investments if they do not know whether they will be creditable or not.

On the belief that this formulation is simply an oversight rather than intentional policy, we offer the following simple fix to the problem by converting section xx-5.3(c)(3)(i) and (ii) to an output basis that automatically reflects improved efficiency:

xx-5.3 (c)(3)
(i) If total heat input from all CO_2 budget units at the CO_2 budget source during the early reduction period is less than or equal to the total heat input from all the CO_2 budget units at the CO_2 budget source during the baseline period:

$$ERAs = ((AER_{BASELINE} - AER_{ERP}) \times MWh_{ERP})/2000$$

where:

"$AER_{BASELINE}$" is the average CO_2 emission rate for all of the CO_2 budget units at the CO_2 budget source during the baseline period (in pounds/MWh);
"AER_{ERP}" is the average CO_2 emission rate for all of the CO_2 budget units at the CO_2 budget source during the early reduction period (in pounds/MWh); and
"MWh_{ERP}" is the total electric output from all CO_2 budget units at the CO_2 budget source during the early reduction period (in MWh).

(ii) If total heat input from all the CO_2 budget units at the CO_2 budget source during the early reduction period is greater than the total electric generation from all the CO_2 budget units at the CO_2 budget source during the baseline period:

$$ERAs = E_{BASELINE} - E_{ERP}$$

where:

"$E_{BASELINE}$" are total CO_2 emissions from the all of the CO_2 budget units at the CO_2 budget source during the baseline period (in tons); and
"E_{ERP}" are total CO_2 emissions from the all of the CO_2 budget units at the CO_2 budget source during early reduction period (in tons).

This approach provides credit for both fuel-switching and efficiency improvement while maintaining RGGI's interest in recognizing only absolute and rate reductions. More importantly, it sets an example of regulation that recognizes and rewards increased efficiency through output-based regulation. This could also be improved by including the efficiency effects of CHP through recognition of the thermal output of CHP retrofit projects during the early reduction period.

Offsets Language Should be Modified to Permit and Encourage Emissions Reductions in Transportation

ACEEE and The Alliance to Save Energy fully support the commitment of the RGGI process to an offset program that preserves the integrity of the cap-and-trade regime. In particular, the requirements that an offset must be “real, surplus, verifiable, permanent and enforceable” articulated in the RGGI MOU are essential and should be reiterated in the Model Rule. We also support the proposed 3.3% limit on the allowable use of offsets, because any additional use of offsets at present would inappropriately lessen the GHG reductions that the power sector would need to achieve directly.

Within the limits allowed by these two features of the offsets program, however, the Model Rule should acknowledge and help to define categories of measures that could be eligible as offsets beyond the six listed in the Draft Model Rule. Alternatively, the Model Rule could provide the states with guidance on expanding the set of allowable offsets. The importance of having a more expansive provision is that the offset program establishes a framework for thinking concretely about measures that could earn GHG reduction credits in a cap-and-trade scheme that extends well beyond the power sector. This is a very valuable contribution to the RGGI program and indeed to GHG cap-and-trade programs everywhere.

We have a particular interest in the draft rule provisions allowing end-use efficiency as an offset. As explained above, we believe that direct allocation of public-benefit allowance sales will be the most important mechanism for taking advantage of energy efficiency opportunities. At the same time, it is helpful for RGGI to work out the mechanics of crediting GHG reductions based on end-use efficiency measures and of expanding cap-and-trade systems beyond the power sector.

Similarly, certain efficiency measures in the transportation sector should be designated as eligible offsets. Measures to reduce vehicles miles traveled (VMT) can be defined so as to satisfy the RGGI Memorandum of Understanding criteria cited above. In fact, VMT reduction measures have important similarities to offset categories already defined in the Draft Model Rule, especially to “reduction or avoidance of CO_2 emissions from natural gas, oil or propane end-use combustion due to end-use efficiency”. In particular, both categories will allow states to explore how carbon credits can be used to aggregate GHG reductions generated at the end-user level.

Progress in this area will be helpful to future efforts to control GHG emissions from the transportation sector. Transportation emissions are determined by vehicle efficiency, fuel composition, and the amount of driving that occurs. Improving the GHG performance of all three factors will be essential to a successful transportation GHG reduction strategy. While vehicles and fuels can be tackled at the producer level, the amount of driving is essentially an end-user issue, especially given the limited effect that fuel price has on travel behavior. VMT reduction therefore calls for special consideration as cap-and-trade programs evolve.

Smart Growth Zoning. An example of a category of VMT reduction measures that could be considered as offsets is Massachusetts’ Smart Growth Zoning and Housing Production Act (“40R program”). The 40R program allows municipalities to receive funds from the commonwealth for changing the zoning in certain districts to allow higher densities than are currently permitted. The district must be located near a transit station, in an “area of concentrated development,” or in an area that is “highly suitable …for residential or mixed use smart growth zoning districts”, where each of these criteria is defined by regulation. The commonwealth pays to the municipality a “zoning incentive payment” in an amount determined by the projected number of housing units *in excess of* the number of units that could have been built as-of-right on the property under the prior zoning; this is roughly $1000. It then pays an additional one-time density bonus of $3,000 per unit of excess new construction.

The structure of the Massachusetts 40R program is conducive to quantification of its transportation-related GHG reductions, due to its specification of eligibility in terms of density and transit access. Relationships between development characteristics and average VMT have been established over the past decade, while the correspondence between VMT and GHG can be approximated using the average fuel economy for passenger vehicles. One frequently-cited paper[1] estimates VMT per household in a given area based on density, demographics, pedestrian and bicycle friendliness, and so forth. While several factors correlate with VMT, the closest correlation found by these authors is with density. This simplified relationship is given by:

$$VMT/household = C\ Density^{-p},$$

where C and p are constants determined empirically from national (or regional) averages.

For purposes of assigning GHG reduction to a state adopting this program, each extra unit permitted in a given year in a designated smart growth district would be credited with a reduction in VMT (as implied by the relationship above):

$$VMT\ reduction = VMT_{average\ unit\ in\ municipality} - VMT_{smart\ growth\ unit}$$, where

$$VMT_{smart\ growth\ unit} = VMT_{average\ unit\ in\ municipality} * (Density_{smart\ growth\ district} / Density_{municipality})^{-p}.$$

Total VMT reduction due to the program in that year would be the sum of these reductions for all newly permitted "bonus" units. Reductions in VMT would be converted to CO_2 reductions using the national average of per mile emissions rates.

Rezoning under the 40R program requires densities of at least eight units per acre, which is more than double typical metropolitan density. It could therefore be assumed that housing developments claiming credit under the 40R program typically are constructed to have density double the town average. According to the formula above, and using the value of the exponent p found by the above-cited authors on the basis of national data, increasing density by a factor of two reduces VMT by 20%.[2] For a household traveling 20,000 miles per year (the national average), this is a reduction of 4,000 miles per year. Since automobiles currently emit CO_2 at the rate of about one pound per mile, this gives 2 tons CO_2 savings annually per new unit.

An approach along these lines could be used to allocate GHG credits to a zoning incentive program such as the Massachusetts 40R program, thereby creating a new offset category. A key feature of the program that makes it a good offset candidate is that the GHG credits are

[1] Holtzclaw, J., R. Clear, H. Dittmar, D. Goldstein, and P. Haas. 2002. "Location Efficiency: Neighborhood and Socio-Economic Characteristics Determine Auto Ownership and Use: Studies in Chicago, Los Angeles and San Francisco." www.tandf.co.uk/journals/online/0308-1060.html. *Transportation Planning and Technology*, 25 (1).

[2] In the long run, this doubling of density will also reduce VMT for existing units in the same area, but those reductions are not counted here.

demonstrably “real” and “surplus”, in that credits are granted only to units that could not have been built absent the incentive program, due to density restrictions.

The zoning incentive program also presents a challenge, however, in that direct verification would not be practical. The cost of determining the before-and-after vehicle miles traveled by the occupants of each new housing unit in the smart growth district would exceed the value of the GHG reduction credits generated, at least in the short term. The same is true of certain end-use efficiency programs, however, and the RGGI process has acknowledged these as offsets that should be eligible. The Draft Model Rule has addressed this issue by allowing end-use efficiency programs generating savings of less than 1,500 MMBtu per year to verify reductions indirectly, by providing specifications of the installed energy-saving equipment associated with the program (p.125).

Smart growth zoning also raises issues of additionality. The benefits of the program to the state are diverse, and a program of this kind might be adopted in some states without the incentive of CO_2 credits, as the existence of Massachusetts’ 40R program demonstrates. Furthermore, the likely cost per ton of the program indicates that some other source of funding in addition to the sale of CO_2 reductions would be needed to pay the full cost, so the question of “financial additionality” arises as well. Once again, however, these issues are common to some of the proposed offset categories in the Draft Model Rule. Moreover, the Rule currently contains no additionality language that would preclude the eligibility of smart growth zoning.

In conclusion, ACEEE and the Alliance to Save Energy believe that adding an offset category for VMT reduction measures would enable RGGI to begin to resolve several fundamental questions associated with a broader cap-and-trade program that RGGI participants and others will most likely want to establish in the future. While the adoption of a program such as smart growth zoning as an offset category is not without difficulties, these difficulties apply to other important categories of offsets that are clearly desirable additions to the cap-and-trade program.