

Economics of Energy Efficiency

September, 2009



Investments in energy efficiency reduce energy consumption and save consumers money on their bills. Additionally, reductions in electricity consumption bring down wholesale electricity prices, and lower nationwide consumption of natural gas and heating oil should similarly depress wholesale natural gas and heating oil prices. In a greenhouse gas cap and trade system, efficiency investments also reduce the amount of carbon dioxide produced by power plants, lowering allowance prices and overall program costs. The following “Economics 101” style figures illustrate these supply and demand concepts graphically, and show that investing in energy efficiency is a very effective, low cost means of reducing emissions while providing lasting benefit to consumers.

The current nationwide investment opportunity in cost-effective efficiency programs (capturing all efficiency that is cheaper than traditional supply) is approximately \$20 billion annually, based on funding levels in leading states. The House-passed American Clean Energy and Security Act of 2009 (ACES) provides funding on the order of \$8-\$10 billion annually for natural gas and fuel oil efficiency, and for efficiency programs run by states. *If the Senate were to extend comparable efficiency funding to the electric sector by requiring that one-third of electric local distribution company allocations fund efficiency*, efficiency investments over the 2012-2019 period could reach \$158 billion, providing direct energy savings of \$475 billion and creating an estimated 1.4 million direct jobs in the efficiency sector (Doyle/Green Economy, 2009).

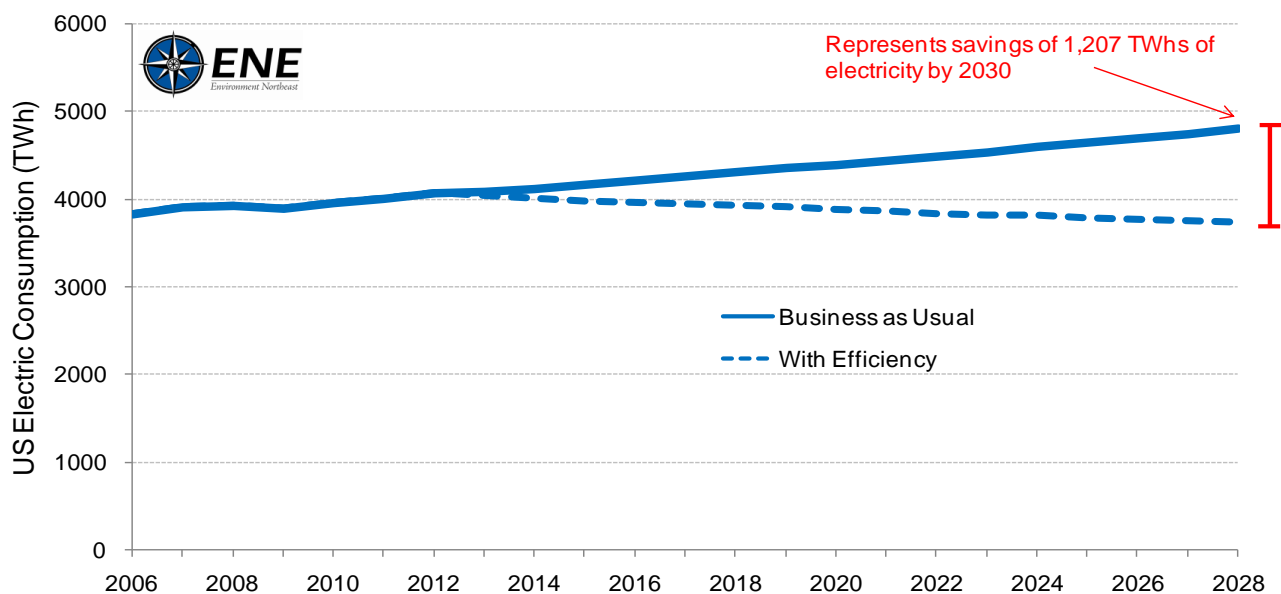
The Need for Efficiency Programs

Efficiency programs are needed to overcome market failures that inhibit consumers from spending money on efficiency measures that require up-front investments to deliver net economic benefits. Examples of these market failures include:

- Liquidity Constraints** – inadequate access to capital to purchase efficient equipment or improve building energy performance
- Split Incentives** – the owner of a piece of equipment or building (usually the landlord) does not pay the energy bill and is thus unlikely to invest in efficiency improvements that would benefit the resident/renter
- Information Problems** – purchasers do not know the future energy costs of a product or property and are thus unlikely to invest in the more efficient option
- Behavioral Problems** – the complexity of a decision is beyond the ability of a consumer to make an economically rational choice

Figure 1: Electric Efficiency Reduces Demand

ACES requires that 1/3rd of allocations to natural gas local distribution companies (LDCs) be invested in energy efficiency. *If the Senate were to require a similar 1/3rd efficiency funding level for electric LDC allocations*, annual electric efficiency investments would average ~\$13 billion,¹ which could reduce demand by ~1.5% annually, or ~25% below projected consumption by 2030. This level of spending is in line with expenditures in leading states (such as VT, MA, MN and CA).



¹ Annual funding level based on CBO allowance price projections for 2012-2019 (<http://www.cbo.gov/ftpdocs/102xx/doc10262/hr2454.pdf>), which would deliver \$103 billion from 2012-2019. Allowance prices will likely increase from 2020-2029, so actual funding levels and savings may be higher.

Figure 2: Energy Efficiency Reduces Electricity Prices

Electricity demand is met with a variety of electric generation resources that are typically deployed based on cost. Decreasing electricity demand through efficiency can reduce the utilization of the most expensive sources of electricity and reduce prices for all consumers.

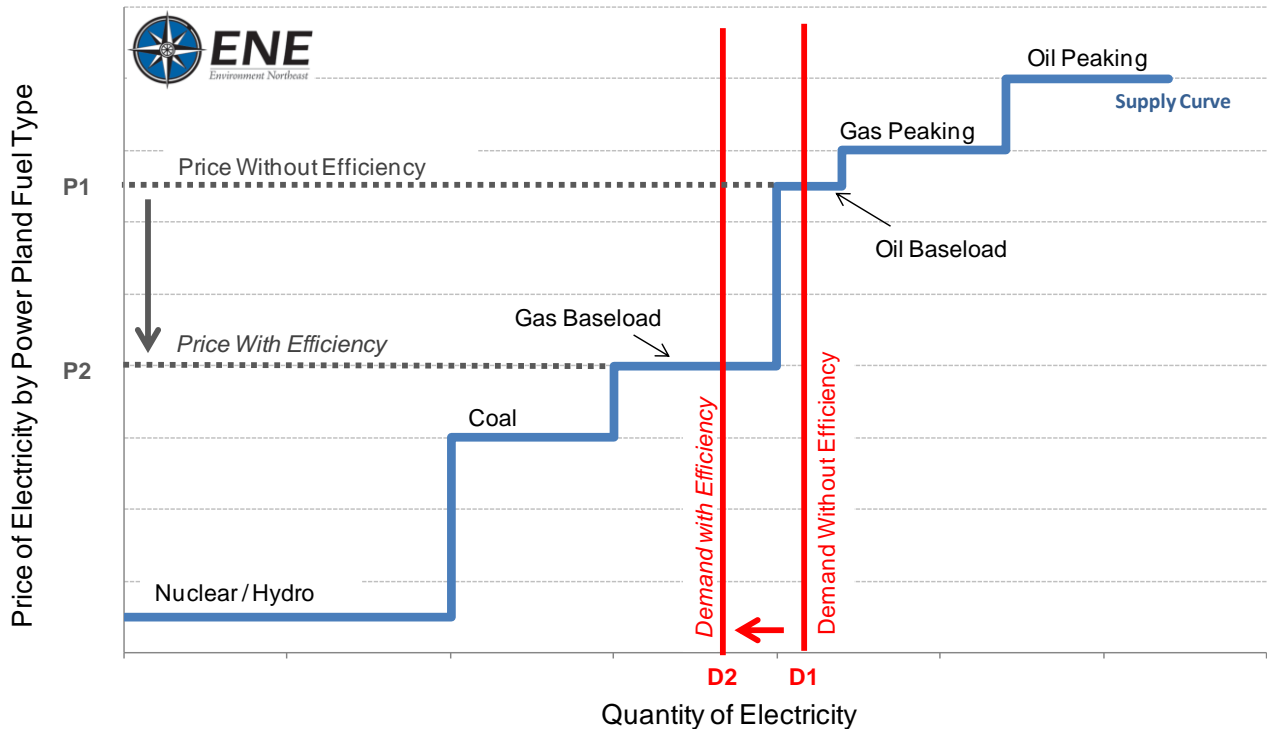


Figure 3: Energy Efficiency Reduces Carbon Prices

Energy efficiency investments decrease demand for electricity. Lower electricity demand reduces emissions associated with energy production. Reduced emissions lead to lower demand for emissions allowances, lower prices for allowances, and lower cap and trade costs.

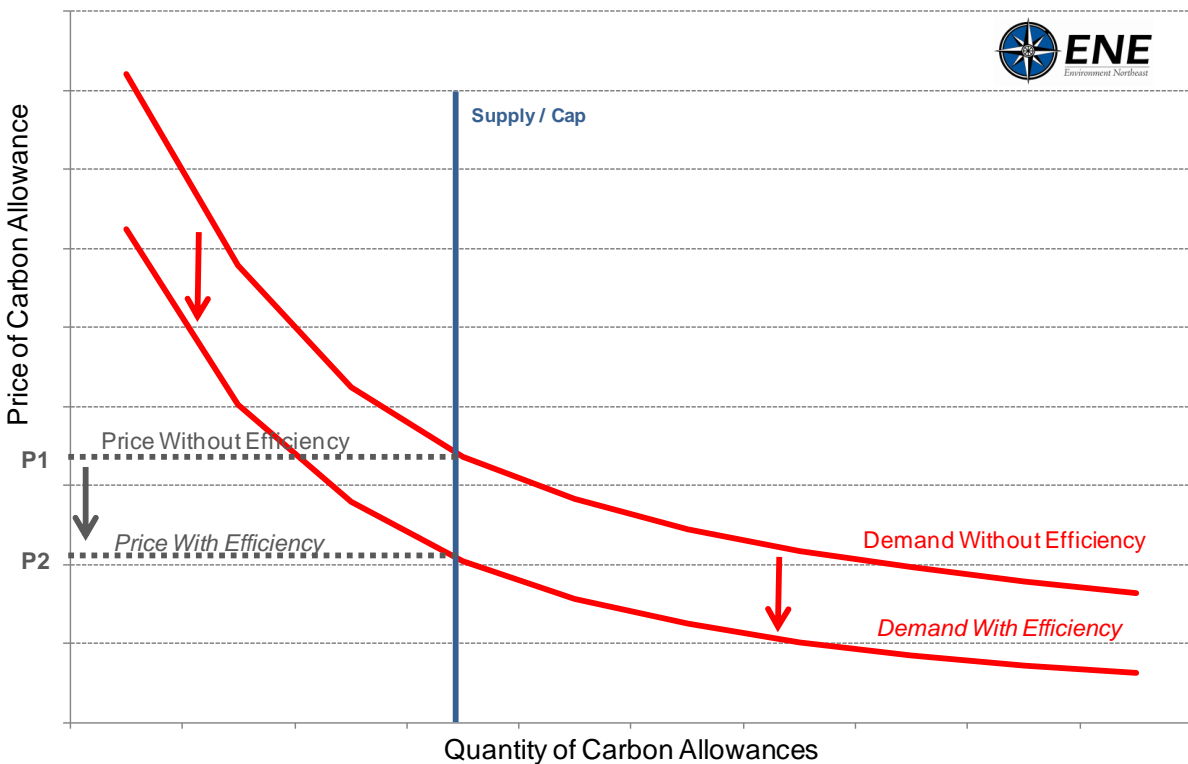


Figure 4: Elements of Efficiency Investment Benefits

In a cap and trade program like ACES, investments in energy efficiency deliver three streams of savings to consumers (electric efficiency commitments are to be determined):

- 1) Decreased energy production reduces emissions and allowance prices, leading to lower cap and trade costs
- 2) Decreased energy consumption reduces bills
- 3) Lower consumption reduces wholesale prices for electricity, and should reduce natural gas and heating oil prices

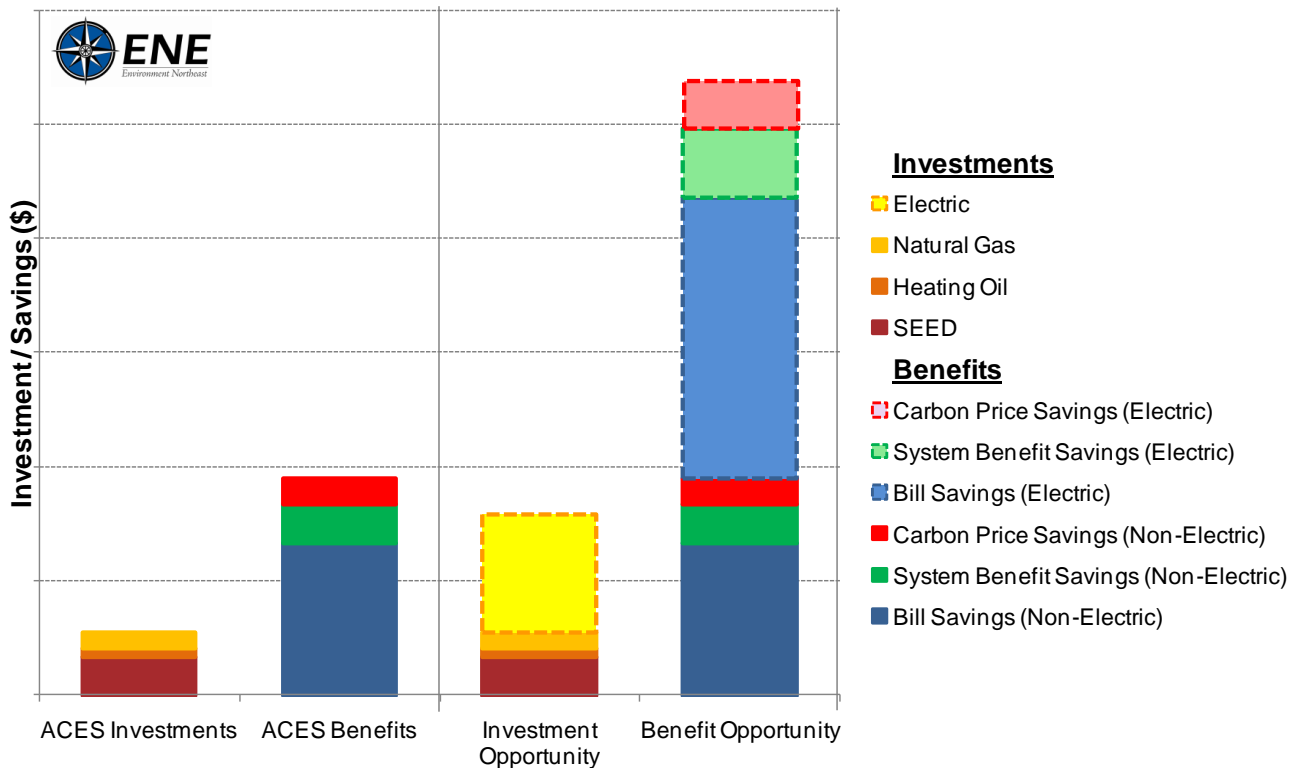


Figure 5: Efficiency Benefits in Cap and Trade

The results of extensive electric sector modeling for RGGI illustrate the benefits of investing in efficiency, with lower energy consumption reducing prices for emissions allowances and the underlying cost of electricity

