



American Council for an Energy-Efficient Economy
WASHINGTON, DC

Responding to Katrina's Energy Challenges: Options for Increasing Energy Efficiency through Appropriations, and Oil and Natural Gas Policies

Therese Langer, Neal Elliott, Bill Prindle, and Steven Nadel

September 2005

One of a series of white papers by the
American Council for an Energy-Efficient Economy (ACEEE)

Introduction

Hurricane Katrina, in addition the massive destruction and human tragedy it caused along the Gulf Coast, is creating aftershocks in energy markets that will affect most Americans for the coming months if not longer. Energy market trends include:

- Fifteen percent of the nation's oil production and 5 percent of its refinery capacity will be offline for at least several more weeks.
- Natural gas wholesale prices for the winter season are hitting new record highs at greater than \$12 per thousand cubic feet, more than five times 1990s levels.
- Heating bill forecasts show home energy costs soaring by 50 percent or more this winter in some regions.
- Coal prices are up due to increased demand from power generators and railroad problems on western shipping lines.
- Electricity prices, driven by high gas and rising coal prices, are likely to increase as utilities pass on fuel prices.

These effects taken together put our energy markets under greater pressure than they have seen in 25 years. Combined with Katrina's other effects on the economy—like interrupted shipping, industrial production, and rail operations, these energy trends could create major economic setbacks, both for individual families struggling to pay high energy bills and for the economy's overall health. Economists are already forecasting a one-point loss in economic growth for the year; energy efficiency can minimize that impact and speed the economic recovery

Energy conservation in the short run, and energy efficiency investments in the longer term, should be an essential part of the Katrina recovery effort. ACEEE research has shown that small energy savings in such tight markets can lead to major drops in energy prices. To blunt the effects of energy market disruptions and keep prices from spiraling out of control over the next several weeks, ACEEE recommends action in three areas:

- Special appropriations for energy efficiency initiatives that soften impacts on energy consumers while helping to rebuild the Gulf region sustainably
- Policy initiatives for reducing oil consumption
- Policy initiatives for saving natural gas

These recommendations are outlined in greater detail on the following sections.

Federal Spending on Energy Efficiency to Blunt Katrina's Aftershocks

Congress and the Administration are already directing tens of billions of dollars to the Gulf for the relief effort and to begin the rebuilding process. However, in addition to these efforts, strategic use of energy efficiency and conservation is needed to blunt the wider effects Katrina has had on energy markets across the nation. Ramping up key federal efficiency programs can keep energy prices from wrecking household budgets and stalling the national economy.

ACEEE recommends ramping up funding for new and existing programs for the 2006 budget cycle. These are discussed below.

1. Efficiency Provisions of the Energy Policy Act of 2005

Programs and costs: Several provisions of the recent energy bill can help offset post-Katrina energy woes, including:

- *Public Information Campaign* (Section 134)—\$90 million authorized
- *State Energy Efficiency Resource Standard* study and pilot program (Sections 139–140)—\$5 million authorized
- *Expanded State Building Codes Grants* (Section 128)—\$25 million authorized
- *Public Buildings Efficiency Grants* (Section 125)—\$30 million authorized
- *Low-Income Community Energy Efficiency Grants* (Section 126)—\$20 million authorized

The new energy bill authorizes new programs totaling \$170 million.

Comments: Most of these programs could directly assist the Gulf States, and most would also provide broader national energy cost relief.

A major Public Information Campaign, is probably the most important step that can be taken to address tight energy markets and the high prices they are causing. In 2001, California faced a major electricity supply crisis. To address this crisis, it launched a major public information campaign and reduced energy use by more than 6 percent.¹ A similar campaign should be launched at the national level, including direct involvement of the President and other high-level officials. If such a national campaign had only half the impact of the California campaign, it

¹ Global Energy Partners. 2003. *California Summary Study of 2001 Energy Efficiency Programs*. http://www.calmac.org/publications/CALMAC_final_03-13-03.pdf.

would have a significant impact on natural gas prices² and could also help reduce gasoline, heating oil and electricity prices because of the interrelated nature of our energy markets.

The other new programs will primarily help over the medium term.

2. The ENERGY STAR Programs

Programs and costs: ENERGY STAR is a joint effort of DOE and EPA: EPA current spends about \$50 million annually and DOE \$5 million. We recommend an additional \$20 million for EPA and \$5 million for DOE.

Comments: ENERGY STAR has been the federal government's most successful voluntary energy efficiency program, with thousands of private sector partners. However, ENERGY STAR is most effective where state and regional programs provide an infrastructure in which to promote the Energy Star brand. Additional DOE and EPA funding could not only ramp up national efforts, it could focus special efforts at getting ENERGY STAR buildings built and products supplied to the Gulf rebuilding areas.

3. The DOE Industrial Best Practices and Industrial Assessment Centers Programs

Programs and costs: These programs provide technical assistance to medium and small manufacturers. We recommend an additional \$5 million for FY 2006 to help smaller industrial firms cope with rising energy bills.

Comments: These programs are among the most effective in helping the business sector to improve its energy efficiency. They benefit smaller manufacturers, those without the expertise or access to capital to identify and invest in efficiency opportunities. These programs can also provide special assistance to manufacturers recovering from Katrina in the Gulf.

4. The Agriculture Section 9006 Energy Efficiency Programs

Programs and costs: Since 2002, the Department of Agriculture has operated a small \$23 million program to provide loans and grants to farmers to develop energy efficiency and renewable energy projects. We recommend this funding be doubled for FY 2006, to \$46 million.

Comments: Because the farm sector is hit doubly hard by rising fuel prices (indirectly through fertilizer prices, which depend on natural gas prices and directly through higher fuel bills), we believe that a doubling of funds for this program is important to help the farm sector stay healthy by reducing its energy-related costs. The program receives far more applications than it can fund, indicating that it can quickly ramp-up its level of activity.

² Elliott et al. 2005. *Impacts of Energy Efficiency and Renewable Energy on Natural Gas Markets.* <http://aceee.org/pubs/e052full.pdf>

5. The Weatherization Assistance Program (WAP)

Program and costs: Currently funded at \$227 million, WAP could be increased to \$300 million for FY 2006, helping another 50,000 families reduce energy costs.

Comments: WAP has become a cost-effective way to help lower-income families reduce their energy bills, for years to come, by reducing energy waste.

6. The Low-Income Home Energy Assistance Program (LIHEAP)

Program and costs: LIHEAP appropriations should increase substantially for FY 2006, in concert with expected energy bill increases forecast for this winter.

Comments: LIHEAP not only helps lower-income families pay bills, but up to 15 percent of the funds also can be used for weatherization, including replacing failed heating systems with more efficient models. This will enable the program to not only meet increased current needs, but reduce future cost increases through improving low-income homes' efficiency.

Saving Oil: Seven Policies Within Reach

Recent events have highlighted the folly of having passed an energy bill that does so little to save oil. There are in fact many policies that could be enacted that would save substantial amounts of oil, beginning immediately. Here we describe six of them. In several cases, the policies could work together in a complementary fashion.

Oil savings estimates are given in million barrels per day (MBD). By way of reference, in 2005, the US. is using 20.6 MBD. This use is projected by the DOE's Energy Information Administration (EIA) to grow to 23.0 MBD in 2010 and 26.3 MBD in 2020.

1. Vehicle Efficiency Incentive Program

Policy: Establish a vehicle "feebate" program, paying or charging new vehicle buyers a sum dependent on the fuel consumption of the vehicle purchased.

Savings: 0.27 MBD by 2010 and 1.77 MBD by 2020. This is based on recent Oak Ridge National Laboratory estimates that a feebate of \$1,000 per gallon per 100 miles could reduce new vehicle fuel consumption by 22.5 percent.

Cost: Net cost to government is determined by the "zero point" of the program; this can be adjusted to be revenue-neutral or to produce revenue to fund a supporting policy, if necessary.

Comments: This incentive program would shift consumer demand toward efficient vehicles and prompt manufacturers to put more of the fuel efficiency technologies now available into their vehicles. A vehicle-class-based scheme, which would be regarded by some interests as more attractive, could be considered but should be approached with caution.

2. Fuel Economy Standards

Policy: Increase vehicle fuel economy standards. Fuel economy of 40 miles per gallon, averaging over all cars and light trucks, could be achieved cost-effectively over the next decade.³ If that is not politically feasible, a low- to mid-thirties target, consistent with the findings of the National Academy of Sciences fuel economy panel, would be a worthwhile step.

Savings: For 40 mpg by 2015: 0.30 MBD by 2010 and 2.80 MBD by 2020. For 36 mpg by 2015: 0.23 MBD by 2010 and 2.30 MBD by 2020. For 32 mpg by 2013: 0.20 MBD by 2010 and 1.77 MBD by 2020.

Cost: ACEEE's *Technical Options* report cited above shows that a fleet-wide average fuel economy of 41mpg can be achieved at an average cost of \$1,372 per vehicle and 35 mpg at \$866. These estimates assume no change in the size of vehicles from today's fleet mix. In both scenarios, the fuel economy improvements pay for themselves in fuel savings within a few years.

Comments: Regardless of the level of CAFE improvement found to be achievable in this Congress, a provision to close the various loopholes in fuel economy regulation should be considered as well: bring vehicles weighing 8,500-10,000 pounds into the program; fix the fuel economy test to reflect real-world driving; treat minivans and SUVs like other passenger vehicles; and fix the dual-fuel vehicle credit to reflect actual use of alternative fuels. Some of these changes could be carried out in conjunction with the DOT rulemaking now underway on light truck fuel economy.

Raising CAFE standards may be more feasible if the increase is tied to "retooling" incentives for manufacturers to accelerate the U.S. auto industry's transition to producing high efficiency, advanced technology vehicles.

3. Advanced Technology Vehicle Tax Credit Expansion

Policy: Replace the 60,000 vehicle-per-manufacturer cap for advanced technology vehicle tax credits in the Energy Policy Act of 2005 with a cap of 60,000 for each vehicle class (per manufacturer).

Savings: Direct savings would be small; the primary benefit of the credits would be to reduce hybrid costs by bringing economies of scale to their production throughout the vehicle market. We estimate that, if increased hybrid production is not offset by greater production of gas guzzlers, the indirect benefit of the credits would be 0.07 MBD in 2010 and 0.21 MBD in 2020.

Cost: Cost to the federal government would be about \$720 million.

³ See *Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010–2015* at aceee.org/pubs/t012.htm.

Comments: Hybrid vehicles are enjoying great success in the market, but full hybrids do not yet exist in some of the vehicle classes in which they are most urgently needed (e.g., pickup trucks). This expansion of credits prods both leaders and laggards in hybrid development to branch out.

4. Gas Tax Hike

Policy: Increase the federal gas tax by \$0.10 per gallon. Use 25 percent of revenues to fund programs to reduce oil dependence, such as tax incentives for manufacturers to retool their plants, and rebate 75 percent of revenues to consumers by reducing the social security tax, expanding the earned income tax credit, or providing a rebate on a flat per capita basis to low-income households.

Savings: Short term savings would be 0.06 MBD, assuming -0.15 price elasticity of gasoline demand (e.g. if price doubles, demand declines 15%). In the longer term, elasticity would be higher, and savings would come about both through behavioral changes and improvements in vehicle technology. Elasticity of -0.3 in 2010 and -0.7 in 2020 would lead to savings of 0.12 MBD in 2010 and 0.32 MBD in 2020.

Cost: The increase in gasoline tax revenue to the federal government would be about \$14 billion per year in 2006 and increasing to \$17 in 2020. Net federal revenue would be zero, however, as three-quarters of the income would be returned to the public and the remainder used to fund retooling incentives or other measures to reduce oil dependence. Net cost to consumers in the aggregate would be \$3.5 billion in 2006.

Comments: The net cost to consumers in the early years of the tax would go towards accelerating production and sales of more efficient vehicles, eventually resulting in oil savings far greater than the reduction in demand directly attributable to the tax. Three years' gas tax revenues could finance a retooling incentive of over \$10 billion, probably sufficient to shift U.S. automakers' course in the direction of hybrids and other advanced technology efficient vehicles.

A far larger gasoline tax increase might be contemplated to reduce oil consumption directly and substantially. As we enter an era in which supply constraints will be frequent and will aggravate oil price volatility, there is much to be said for imposing a gas tax that can restrain demand. A variable tax that makes a major contribution to stabilizing oil prices could be highly beneficial to the U.S. consumer and to business.

5. Tire Standards

Policy: Require replacement tires for cars and light trucks to be as efficient, on average, as original equipment tires.

Savings: 0.26 million barrels per day by 2020.

Cost: A set of low rolling resistance tires is estimated to cost from \$5 to \$12. A recent report prepared for the California Energy Commission on tire efficiency concluded that any incremental

costs of these tires to consumers would be paid back through fuel savings in about one year's time.⁴

Comments: Tires on new vehicles are on average at least 3 percent more efficient than replacement tires.⁵ The policy recommended here has already been proposed: Senator Schumer introduced a provision into the Senate energy bill requiring that testing and labeling procedures for tires be established and that, by 2008, the average replacement tire sold would equal or exceed the average original equipment tire in fuel economy.

6. Home Weatherization

Policy: Establish a low-interest loan program for home weatherization of oil-heated homes, along with technical assistance to help homeowners identify the most effective improvements and the best contractors.

Savings: 0.09 MBD in 2020.

Cost: \$7 billion to the government spread over a 10-year period.

Comments: Many states have electricity-saving programs funded through electric rates, and some have natural gas saving programs, but there is no comparable mechanism for oil-heated homes (including propane, which is derived from oil). While many homeowners and building owners can turn to banks for financing such as home equity loans, not all are eligible, and the interest rates may be more than they can afford. This is particularly a problem for low-income homeowners and owners of low-rent apartments that are commonly used by low-income tenants. Low-interest loan programs could be set up by states and offered through local banks and local oil dealers with straightforward application requirements and quick approval times. Funding for the program could come from a tax on the applicable fuels of just a few cents a gallon.

7. Oil Savings Target

Programs to save oil that specify the means of doing so are most likely to succeed. Should this Congress regard specification of such programs as infeasible or undesirable, legislation requiring the saving of a certain quantity of oil could be an acceptable substitute, provided there is clear assignment of responsibility to devise and implement policies to achieve the required reduction and progress is tracked annually.

Based on the discussion above, oil savings of 1 million barrels per day by 2015 and 3 million barrels per day by 2020, relative to a reference scenario, are eminently achievable goals. Even within this subset of measures, various combinations could reach the stated targets with savings to spare.

⁴ *California State Fuel-Efficient Tire Report*, 2003, California Energy Commission 600-03-001F.

⁵ See <http://aceee.org/transportation/tire.pdf>.

Oil Savings Summary

	Savings in 2010 (MBD)	Savings in 2020 (MBD)
Feebate	0.27	1.77
fuel economy standards		
40 mpg by 2015	0.30	2.83
36 mpg by 2015	0.23	2.30
32 mpg by 2013	0.20	1.77
efficient replacement tires	0.20	0.26
vehicle tax credit expansion	0.07	0.21
\$0.10 gas tax increase	0.12	0.32
home weatherization	0.03	0.09
TOTAL	0.70	3.50

Saving Natural Gas: Three Near-Term Policies

While the Energy Policy Act of 2005 included some provisions, such as appliance standards, that curb consumption of natural gas consumption (both directly and from saving natural fuel used to generate electricity), several significant proposals were not included. Below we summarize three of the biggest opportunities. All savings are reported in billion cubic feet (Bcf). By way of reference, the U.S. will use about 23,000 Bcf of gas in 2005 and is projected by EIA to use about 30,000 Bcf in 2020.

1. Energy Efficiency Resource Standard

Policy: An EERS consists of electric and gas end-use savings targets for retail utilities, with flexibility to achieve them through a market-based trading system. We recommend that the EERS targets for electricity and natural gas start at modest levels (e.g., 0.25 percent of sales annually) and ramp-up over several years to savings levels currently achieved by the most successful states (e.g., 0.75 percent of sales annually). Alternately, an EERS could be a component of a Clean-Energy Resource Standard (CERS) that might also include renewable energy, recycled energy, CHP, and other clean, alternative energy sources.

Savings: An EERS could save 955 Bcf of gas in 2010, increasing to 1,465 Bcf by 2020.

Cost: Costs would be included in gas and electric rates and would be around two-tenths of a cent per kWh of electricity and 2 cents per therm of natural gas. Since the cost of energy efficiency is lower than the current cost of natural gas or of natural gas-generated power, an EERS would reduce costs for all consumers.

Comments: EERS would provide clear policy guidance to electricity and natural gas utilities on the levels of efficiency resources they need to procure. With trading, a utility that saves more than its target can sell savings credits to utilities that fall short of their savings targets. Trading would also permit the market to find the lowest-cost savings nationwide. To make an EERS more acceptable to utilities, a revenue decoupling provision might need to be included so that fixed utility costs could be covered as sales drop. Examples of such mechanisms include the

“conservation tariff” implemented in Oregon for NW Natural and the California ERAM ratemaking policy.

2. Expanded Implementation of CHP

Policy: Combined heat and power (CHP) is broadly efficient, but faces challenges from market hurdles. Providing a 10 percent investment tax credit (ITC) for new CHP installations would help to offset the cost of these hurdles. The Senate version of EPAct provided such a credit for two years, restricted to facilities with a power capacity of no more than 15 MW.

Savings: The ITC would result in 137 Bcf of gas savings in 2010 and 152 Bcf by 2020.

Cost: The Congressional Joint Tax Committee projected that this provision would cost the Treasury \$261 million dollars over 10 years, while producing significant savings to consumers in the form of reduced natural gas and electricity purchases while also exerting a downward pressure on natural gas prices.

Comments: This tax credit has been a part of energy legislation for the past 6 years and was removed from EPAct 2005 in conference as part of an attempt to control costs. Additional savings would result if the cap was raised higher or the period of the credit was extended. If the two-year period is continued, we recommend that its beginning be delayed by one year to allow time for the market to respond to the presence of the credit.

3. Efficient Dispatch of Gas-Fired Generation

Policy: The federal government would mandate that standards be established to guide public utilities in the implementation of efficient system dispatch. Such standards would be designed to ensure that all generation resources have the opportunity (under terms that are just, reasonable, and not unduly discriminatory or preferential) to specify their availability to provide, and their price for, power and energy for inclusion in efficient system dispatch.

Savings: Efficient dispatch implemented in those portions of the U.S. that do not currently operate under competitive markets would reduce natural gas consumption from the power generation sector by 644 Bcf in 2010 and 271 Bcf in 2020. The benefits of this provision diminish with time as the least efficient natural gas plants are retired and are replaced by more efficient generation.

Cost: This proposal would not require any additional investment by either the public or private sector and would lower costs to consumers since this provision would increase dispatch of low-cost units.

Comments: While modern combined-cycle natural gas turbine electric-only generation facilities (CCGT) can achieve heat rates⁶ of less than 7,000 Btu/kWh, according to EIA, the average natural gas generation plant in the United States had a heat rate of almost 12,000 Btu/kWh in 2004. In efficient dispatch, the system operator chooses which generation plants to operate by using the plants' efficiency and operating costs as the criterion. Choosing to dispatch a more efficient plant can result in significant savings. Many regions of the country, particularly those that have moved to competitive wholesale markets, already operate under efficient dispatch. However, almost half of the country does not.

Gas Savings Summary			
Policy	Savings in 2010 (Bcf)	Savings in 2020 (Bcf)	Cost (\$ million)
Energy Efficiency Resource Standard	955	1,465	~ 0
Expanded Implementation of CHP	137	152	261
Efficient Dispatch of Gas-Fired Generation	644	271	~0
Total	1,736	1,887	\$261

Conclusion

The events of the past month, including Hurricane Katrina and rising energy prices, indicate that Congress needs to do more to address our nation's energy problems. The Energy Policy Act of 2005 contains some useful provisions, but it does little to address our short-term problems, little to address rising oil use, and not enough to address very tight natural gas markets. Energy efficiency and energy conservation are among the few strategies that can be quickly employed to have an impact this winter and in the next five years. Many of our suggestions are designed to have substantial impacts over this period. In addition, some of our suggestions will have impacts over the longer term, helping to slow growth in energy use and reducing the chances that today's tight energy markets, and the high energy prices they produce, will continue into the next decade.

⁶ Heat rate is defined as the fuel (measured in Btus) required to generate one kWh of electricity net of any use of electricity in the generation process.