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Summary

ACEEE research shows that energy efficiency is the most viable near-term strategy for moderating natural gas prices, and is also vital to stabilizing longer-term gas markets. Our testimony first discusses the roots of the current situation, assesses the potential impact of energy efficiency on wholesale natural gas prices, and points out the limits of supply-side solutions. It then focuses on ACEEE's recent analysis, which shows that if we can reduce gas demand by as little as 4% over the next five years, we can reduce wholesale natural gas prices more than 20%. These savings would put over $100 billion back into the U.S. economy, at a cost of $30 billion in new investment, of which $7 billion would be public funds.

Moreover, this investment would help bring back U.S. manufacturing jobs that have been lost to high gas prices, and would help relieve the crushing burden of natural gas costs experienced by many lower-income households. In addition, the efficiency investments generated by this policy scenario would create two to five times as many jobs as a comparable level of investment in energy supply options. Interestingly, most of the gas savings in our analysis come from electricity efficiency measures, because so much electricity is generated by natural gas, often inefficiently.

Federal and state governments current spend over $2.5 billion annually on energy efficiency, in research, development, deployment, and other programs. The 5-year, $7 billion public investment we recommend would average $1.4 billion annually, and would represent a 56% increase in public commitment to efficiency. Given the benefits—a 20%-plus drop in natural gas prices, more than $100 billion in direct economic benefits, and thousands of new jobs, an aggressive federal and state energy efficiency and conservation effort over the next five years is perhaps the best investment we could make in the American economy.

ACEEE's recommendations for near term action include:

1. **Increase funding for efficiency deployment programs.** We recommend Congress increase FY 2005 appropriations for federal programs that deliver energy savings to consumers, including the Energy Star programs, the Weatherization program, and DOE's suite of other deployment programs, and that the Administration follow suit in its FY 2006 budget request.
2. **Expand public benefits funds for efficiency.** 18 states collectively spend over $1 Billion on public benefits efficiency programs funded through utility bill fees. Other

states, and Congress, should follow this example, and states with current programs should increase funding levels.

3. **Create tax incentives for high-efficiency technologies.** Congress should pass incentives for energy efficiency technologies immediately, using the FSC-ETI tax bill or other mechanisms.
4. **Conduct a national efficiency and conservation campaign.** DOE should lead a partnership effort among efficiency manufacturers, farm organizations, utilities, states, and others to accelerate efficiency practices and investments and encourage short-term behavior modifications.

Recommendations for longer-term action include:

1. **Accelerate federal efficiency standards.** DOE should accelerate its standards rulemakings for residential heating equipment and commercial air conditioning equipment, and should take current gas price trends and supply issues into account in setting these standards.
2. **Support Advanced Building Codes.** States should act aggressively to adopt and upgrade building energy codes, and DOE should both push for more aggressive codes at the national level and should provide more assistance to states for code implementation.
3. **Expand research and development.** DOE budgets for advanced technologies that save electricity and gas in the residential, commercial, industrial, agricultural and power sectors should be increased.
4. **Create efficiency performance standards for utilities.** Congress and the states should follow Texas' example and require utilities to offset a portion of demand growth through energy efficiency.
5. **Expand support for Combined Heat and Power (CHP).** Congress should expand support for CHP (also know as cogeneration) by improving proposed CHP tax credits, and by encouraging states and utilities to provide fair and reasonable interconnection and tariff treatment for new CHP systems.

Introduction

ACEEE appreciates the opportunity to provide our comments to the Committee on the important subject of energy efficiency as a response to the severe problems in U.S. natural gas markets. Our analysis shows that energy efficiency and conservation efforts are the most effective response to these challenges over the next few years, and also offer longer-term insurance against future gas price spikes and shortages.

ACEEE is a non-profit organization dedicated to increasing energy efficiency as a means for both promoting economic prosperity and environmental protection. We were founded in 1980 and have developed a national reputation for leadership in energy efficiency policy analysis, research and education. We have contributed in many ways to congressional energy legislation adopted during the past 20 years, including the current energy bills, the Energy Policy Act of 1992, the National Appliance Energy Conservation Act of 1987, and the Energy Title of the 2002 Farm Bill. We are also an important source

of information for the press and the public on energy efficient technology, policies, and programs.

The Current Natural Gas Problem

Senior officials, including Chairman Greenspan and Secretary Abraham, have repeatedly stated that natural gas price and supply problems are significant enough to warrant serious federal response in the near term. As Chairman Greenspan said in Energy and Commerce Committee testimony last year, gas prices have shut down some industrial production, costing many thousands of U.S. jobs and threatening the economic recovery, particularly among gas-intensive industries such as metals, glass and chemicals. The fertilizer industry has been hit particularly hard, with more than 20% of U.S. fertilizer manufacturing capacity shut down by high gas prices. Fertilizer prices have risen sharply, hurting the farm economy. While these sectors have felt the wrath of runaway gas markets most acutely, economists agree that the overall economy needs lower energy prices to get fully on track. The Wall Street Journal's August 2004 survey of economists indicated that the best way to restore economic growth to desired levels is to reduce energy prices.

Gas prices are not only historically high, they have been quite volatile, meaning that the rapid swings in prices we have seen since 2000 are likely to continue. Volatility is almost as much a threat to economic growth as high prices, because it makes it difficult for investors to plan rationally, either for exploration and development of new supplies, or for energy efficiency investments. It was expected that the sophisticated risk-management and trading techniques pioneered by companies like Enron would provide a price-stabilizing effect in energy markets. However, the demise of Enron and other traders has left gas markets without many of the hedging options that might moderate price swings.

Natural gas is proving to be a prisoner of its own success: increasing demands for this relatively low-emission, low-cost fuel over the past 15 years has outrun the North American supply system. As a result of these tight markets, we are experiencing prices that are both high and volatile. Indications are that new resources in North America will have a limited impact on this situation, especially in the near term, and that policy actions on the demand side are the most effective near-term measures to bring gas markets back into balance.

Natural gas markets have been largely deregulated since the 1970s, when federal price regulation limited supply investments, shortages appeared in many markets, and new gas connections were embargoed by many gas utilities. Since the late 1980s, natural gas has become more widely available, and more popular as an environmentally-preferred, relatively inexpensive fuel.

Electric power generation continues to be the fastest-growing demand sector for gas. (See Figure 1.) While industrial demand remains the largest consuming sector, its gas use has

declined somewhat from peak levels in the late 1990s. Commercial and residential natural gas demand continues to be strong. However, the power sector has been the dominant factor in driving gas demand recently, as gas is increasingly preferred for environmental and other reasons. (See Figure 2.) Gas is increasingly the dominant fuel used in peak-period generation: gas combustion turbines are relatively inexpensive to install and can be brought on line quickly.

However, these "peaker" turbines are also among the least efficient generation technologies, with thermal efficiencies between 12% and 20%. Today's combined-cycle gas power plants can perform at close to 50% efficiency, and combined heat and power (CHP) technology provides efficiencies approaching 80%. The overall U.S. electric generation has an average thermal efficiency of about 33%; so gas peaking generation is about half as efficient as average generators, and wastes more than three times the energy as today's best generation technologies.

The disproportionate use of natural gas for peak generation, combined with the low efficiency of peaking units, shows that saving electricity, especially at peak times, is a key to freeing up natural gas for other uses. In this way, pursuing electric energy efficiency in peak demand periods is a powerful tool for saving natural gas.

The long-term prospects for significant expansions in U.S. gas production are limited. The exploration and production of natural gas and petroleum are historically linked. U.S. oil production peaked in 1970, and has declined since. Oil imports have steadily grown to make up the difference. U.S. natural gas dry production peaked in 1973, and in 2002 was 13% below that peak. Most low-cost fields have been drilled; recovery of additional gas from existing and new fields will come at a premium price. The average depletion rate for newly-opened natural gas fields in the continental U.S. is approaching 30%[1]. This means that the gas industry must work harder each year just to offset depletion, let alone increase net production.

Imports, mostly from Canada, have helped fill the supply gap in the past years, but Canada's growing domestic consumption and declines in production have resulted in a significant reduction exports. Liquefied natural gas (LNG) imports have dramatically in the last few years as the gas industry reactivated the full capacity of our four existing LNG terminals. LNG bears a premium price, and our ability to increase imports will be dependent upon building new terminals or expanding capacity at existing facilities – a costly and time consuming endeavor. If we rely on LNG as the marginal source for gas, it will also tie U.S. gas markets to a permanent higher cost baseline.

U.S. gas production and delivery can be increased on the margin in the medium term through industry investments and policy measures. However, these efforts will not ultimately reverse the long-term decline in U.S. gas production. Imports may provide limited additional supply, but as LNG they will come at a price premium and also bear safety and homeland security risks. Most of these new supply initiatives are likely to

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1 National Petroleum Council. 2003. *Balancing Natural Gas Policy: Fueling the Demands of a Growing Economy.* Washington, DC. Volume 1, page 30.

come at a price premium, so most industry forecasts are for higher prices into the foreseeable future.

Given the limitations and cost premiums associated with natural gas supply options, Congress must consider options to manage demand as part of a balanced energy policy. Energy efficiency and conservation are proven resources for moderating energy demand, and are also the most effective tools to apply in the near term to bring balance to gas markets. By combining aggressive demand management with prudent supply development, we can stabilize natural gas markets and husband this strategic fuel to support America's economic growth and environmental protection.

Energy Efficiency as a Vital National Resource

Energy efficiency is a quiet but effective energy resource, contributing substantially to our nation's economic growth and increased standard of living over the past 30 years. Energy efficiency improvements since 1973 accounted for approximately 25 quadrillion Btu's in 2002, which is about 26% of U.S. energy use and more energy than we now get annually from coal, natural gas, or domestic oil sources. Consider these facts which are based primarily on data published by the federal Energy Information Administration (EIA):

- Total primary energy use per capita in the United States in 2002 was almost identical to that in 1973. Over the same 29-year period, economic output (GDP) per capita increased 74 percent.

- National energy intensity (energy use per unit of GDP) fell 43 percent between 1973 and 2001. About 60% of this decline is attributable to real energy efficiency improvements and about 40% is due to structural changes in the economy and fuel switching.[2]

- If the United States had not dramatically reduced its energy intensity over the past 29 years, consumers and businesses would have spent at least $430 billion more on energy purchases in 2002.

- Between 1996 and 2002, GDP increased 21 percent while primary energy use increased just 2 percent. Imagine how much worse our energy problems would be today if energy use had increased 10 or 20 percent during 1996-2002.

Energy Efficiency's Resource Potential

Even though the United States is much more energy-efficient today than it was 25 years ago, there is still enormous potential for additional cost-effective energy savings. Some

[2] Murtishaw and Schipper, 2001, *Untangling Recent Trends in U.S. Energy Use*. Washington, D.C.: U.S. Environmental Protection Agency.

newer energy efficiency measures have barely begun to be adopted. Other efficiency measures will be developed and commercialized in coming years, with proper support:

- The Department of Energy's national laboratories estimate that increasing energy efficiency throughout the economy could cut national energy use by 10 percent or more in 2010 and about 20 percent in 2020, with net economic benefits for consumers and businesses.[3]

- ACEEE, in our *Smart Energy Policies* report, estimates that adopting a comprehensive set of policies for advancing energy efficiency could lower national energy use from EIA projections by as much as 11 percent in 2010 and 26 percent in 2020.[4]

- The opportunity for saving energy is also illustrated by experience in California in 2001. Prior to 2001 California was already one of the most-efficient states in terms of energy use per unit gross state product (ranking 5th in 1997 out of 50 states[5]). But in response to pressing electricity problems, California homeowners and businesses reduced energy use by 6.7% in summer 2001 relative to the year before (after adjusting for economic growth and weather)[6], with savings costing an average of 3 cents per kWh,[7] far less than the typical retail or even wholesale price of electricity.

- A recent ACEEE analysis of efficiency potential studies shows that cost-effective technologies could save a median 24% of electricity use and 9% of gas use nationwide.[8] While the efficiency potential number for gas seems low, there has been relatively little analysis of gas efficiency potential. Moreover, other ACEEE analysis shows that the greatest source of natural gas savings is indirect; it comes through reducing electricity use, which then displaces gas consumed in power generation.

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[3] Interlaboratory Working Group, 2000, *Scenarios for a Clean Energy Future*. Washington, D.C.: Interlaboratory Working Group on Energy-Efficient and Clean-Energy Technologies, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.

[4] Nadel and Geller, 2001, *Smart Energy Policies: Saving Money and Reducing Pollutant Emissions through Greater Energy Efficiency*, www.aceee.org/energy/reports.htm. Washington, DC: American Council for an Energy-Efficient Economy.

[5] Geller and Kubo, 2000, *National and State Energy Use and Carbon Emissions Trends*. Washington, DC: American Council for an Energy-Efficient Economy.

[6] California Energy Commission, 2001, *Emergency Conservation and Supply Response 2001.* Report P700-01-005F. Sacramento, CA.

[7] Global Energy Partners, 2003, *California Summary Study of 2001 Energy Efficiency Programs, Final Report.* Lafayette, CA.

[8] Nadel, et al. 2004. "The Technical, Economic, and Achievable Potential for Energy Efficiency in the United States: A Meta-Analysis of Recent Studies". In *Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings.* American Council for an Energy-Efficient Economy, Washington, DC.

Energy Efficiency Potential for Natural Gas

ACEEE has conducted years of research on the energy efficiency potential in a wide range of technologies and end-use sectors. We have a research effort underway to refine energy efficiency potential estimates specifically for natural gas. On a preliminary basis, we identified a number of cost-effective efficiency measures that would collectively save more than 10% of U.S. gas usage by 2020. A sample of these measures is shown in Table 1. It is important to note that these savings are only direct gas end-use savings; indirect savings, which reduce gas used in power generation by saving end-use electricity, greatly expand the potential for gas energy efficiency.

Table 1
A Sample of Natural Gas Energy Efficiency Measures

	Measure	Current Efficiency	Efficiency Target	Units for Efficiency Target	Potential Gas Savings In 2020 (TBtu)	Average Cost of Saved Energy ($/therm)*
1	Ind'l management practices	Typ. plant	8%	savings	402	0.351
2	Comm'l building retrocommissioning	149	134	kBtu/sf	362	0.229
3	Res duct sealing & infiltration reduction	Avg. home	20%	H&C svgs	310	0.450
4	Residential windows	.64/.65	.33/.44	U-Factor/ SHGC	233	0.154
5	Commercial furnaces and boilers	standard units	Power burner	savings	181	0.082
6	New homes	Avg. home	30%	H&C svgs	178	0.401
7	Res. furnaces/boilers (equip. & install.)	82%	90%+	AFUE+	162	0.479
8	Sector-based comm retrofit (e.g. offices)	0.5	0.4	therms/sf	162	0.361
9	Advanced commercial glazing	1.3/.69	.45/.45	U/SHGC	145	0.301
10	Comm'l new construction	90.1-1999	30%	savings	140	0.322
11	Res. combo gas space & water htg unit	82/59	90/90	AFUE/EF	85	0.543
12	Comm'l cooking and ventilation	typ equip	improved		76	0.300
13	Major residential appliances	Federal Standards	21%	savings	53	-0.859
14	Res. gas water htg (stand-alone units)	0.59	0.62	Energy Factor	52	0.370
15	Bldg. operator training & certification	Typ O&M	Better		51	0.063
				TOTAL1	2,590	

* Note: Cost of Saved Energy is the cost of a measure per unit of unit of fuel saved. Measures costing less than retail gas prices (currently averaging $0.83/therm for residential customers) are cost-effective. A negative cost of saved energy means that savings in non-energy costs can fully pay for the measure.

Source: Nadel, Steven, 2002, *Screening Market Transformation Opportunities: Lessons from the Last Decade, Promising Targets for the Next Decade*, Washington, DC: American Council for an Energy-Efficient Economy available online at http://aceee.org/pubs/u022full.pdf.

Energy Efficiency's Effect on Wholesale Natural Gas Prices

In 2003, we conducted an analysis of the effect energy efficiency and renewable energy could have on natural gas wholesale prices. In the tight markets we are experiencing, small changes in demand or supply have large impacts on price. To test this market

principle, we used one of the best available computer model of U.S. gas markets, designed and operated by Energy and Environmental Analysis, the consulting firm who used the same model to support the National Petroleum Council (NPC)'s 2003 natural gas study. We tested the wholesale prices impact of small (2-4%) changes in natural gas demand over the next 1-5 years. The next five years contain large risks for the American economy if gas prices do not stabilize (see Figure 3), and energy efficiency is the most widely available resource in that timeframe, as most new gas supply options will take six or more years to bring on line.

What we found was that moderate gains in end-use efficiency over the next five years can reduce wholesale gas prices by about 20%, or about $1 per thousand cubic feet (see Figure 4). This would bring substantial price relief to all gas consumers, particularly farmers and manufacturers. Achieving these results would cost about $30 billion in new investment, including about $7 billion in public expenditures, but would generate over $100 billion in direct economic benefits, including direct energy savings to customers who invest in efficiency and lower gas prices to all energy users. The ratio of benefits to costs would be more than three to one.[9]

Our findings are quite consistent with those of the National Petroleum Council study. The NPC report calls for energy efficiency to offset about 4% of demand growth by 2010, and about 19% by 2025. [10] It also estimates that 2010 wholesale prices would fall by about 20% under its Balanced Future policy scenario. [11] Our analysis simply took a more detailed look at a specific efficiency investment scenario, using the same analytical approach and tools.

A major finding of our study, which is not apparent in the NPC report, was that the majority of the natural gas savings came indirectly, through investments in electricity efficiency. This effect stems from the fact that natural gas has become the marginal generating fuel in many power markets, so that electricity savings tend to displace gas used for generation more than any other fuel. Also, because the average efficiency of natural gas generation remains low, especially at peak times, saving one unit of electricity backs out several units of gas at the generator. Thus saving electricity is the key to saving natural gas, and adding electricity-saving measures to the list in Table 1 would greatly expand the potential for gas demand reduction.

Efficiency and Gas Prices: A 2004 Update

We are currently updating our 2003 analysis in light of the even-tighter markets we are now experiencing, anticipating that the price effects of reduced demand from efficiency and renewable energy may be even greater. As we anticipated, our initial results show that expanded energy efficiency and renewable energy implemented nationally will reduce wholesale natural gas prices at the benchmark Henry Hub by 26% in 2010.

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[9] Elliott et al. 2003. *Natural Gas Price Effects of Energy Efficiency and Renewable Energy Practices and Policies.* American Council for an Energy-Efficient Economy, Washington, DC.
[10] National Petroleum Council. 2003. Op. cit., Vo. 1, page 8, Figure 3.
[11] Ibid., page 11, Figure 6.

We also analyzed a scenario based on natural gas and electric end-use efficiency investment in eight Midwestern states (IA, IL, IN, MI, MN, MO, OH, and WI). Gas prices for power generators in the region have tripled since 1999, while industrial rates jumped 64% and residential/commercial rates increased by 44%. These price increases translate into an increase in natural gas expenditures of almost $350 per household in the Midwest.

Realizing these efficiency gains in the Midwest would benefit both the region and the nation as a whole. Our analysis shows a national reduction in natural gas prices of 2% in the first year and 6 % in 2010; this would benefit all U.S. gas users. Within the Midwest region, natural gas bill savings to residential, commercial, and industrial consumers would exceed $4.14 Billion from an investment of about $1.12 Billion over five years. Energy efficiency investments could reduce residential gas bills by over 3% in the first year alone, savings the average Midwest household $36 in the first year. These savings will continue into the future, averaging $86 per year per residential natural gas customer.

The bottom line of our 2004 update is that with gas markets becoming tighter this year, as the economy grows and as high oil prices induce some industrial users to switch back to gas, a near-term strategy to invest in energy efficiency holds even greater potential to benefit the economy

Economic Impacts of Investments in Natural Gas Savings

Our analysis shows that a new public commitment to energy efficiency investment, on the order of $7 billion over 5 years, would generate $23 billion in private investment and create over $100 billion in economic benefits. These benefits would appear in the form of natural gas and electric bill reductions to consumers who invest in efficiency, price reductions to all natural gas users, and price reductions to electric utilities. We have not accounted for the non-energy benefits of energy-efficient technology, which can include increased productivity and improved quality. Moreover, we have not modeled the indirect economic impacts of increased sales and services related to energy efficiency investments, nor the induced effects of consumer spending of reduced energy bills on other goods and services. These effects would substantially increase the economic benefits of energy efficiency investment.

The combined benefits of energy efficiency and lower natural gas prices would be especially helpful to two consumer groups: lower-income households and gas-intensive industries. High energy prices are generally very regressive, as lower-income households spend a much higher percentage of total income, and of housing costs, on energy. Households that are able to obtain below-market housing may initially believe that they have found affordable housing, but a series of high gas heating bills can change that perception. Non-payment can lead to gas service disconnection, which can lead to health problems from under-heated homes, safety problems from improvised heating devices, and homelessness. Federal programs, such as the Low Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP), can help offset the

impacts of high energy prices, but these programs are under-funded, particularly in this current high energy price environment. Indications are that last winter's LIHEAP allocations were used up well before the winter was over. An energy efficiency scenario that emphasized low-income programs would make LIHEAP dollars go much further.

Gas-intensive industries have a very different but nonetheless vital set of concerns regarding natural gas prices. Leaders of the chemical industry wrote to the President and leaders of Congress at the beginning of 2004, urging major new policy action to balance natural gas markets.[12] This letter pointed out that natural gas has imposed more than $100 billion in an effective "tax" on the economy since 2000, and that many thousands of industry jobs have been lost as a result. Since many of these companies, being unusually attuned to gas prices, have already implemented many energy efficiency and other measures, their ability to control gas costs internally is very limited. They depend on the broader efficiency policy scenario we describe to bring relief to their businesses. If we can achieve the price reductions our analysis shows is possible, we can reduce costs in these vital industries, bring back some good manufacturing jobs to the U.S., and support the overall economic recovery.

In this context, we suggest that the energy efficiency policy scenario we describe should be viewed as an economic stimulus, analogous to a tax cut. Our analysis shows that an efficiency policy commitment could generate a "tax cut" of similar magnitude. Moreover, the efficiency scenario provides economic benefits at a very low public cost. Our analysis shows that the $100 billion-plus in benefits from efficiency requires a public outlay on the order of $7 billion, achieving very high leverage ratio.

Energy efficiency investments not only provide substantial economic benefits at low levels of public expenditure, they also compete very effectively in terms of net employment and GDP impacts in comparison to other energy resource investments. A key fundamental economic reality in this regard is that energy efficiency investments create more jobs per dollar invested than do energy supply investments. For example, sectoral employment multipliers differ greatly between sectors. Energy supply sectors, including mining, refining, and utilities, create 5 to 10 jobs per million dollars of expenditure. Sectors affected by efficiency investments, including services, construction, and retail trade, create 19 to 25 jobs per million dollars of expenditure.[13] This means that energy efficiency investments can create two to five times as many jobs as supply-side investments. While both supply and demand-side investments will be needed to achieve and sustain balanced natural gas markets, we submit that energy efficiency investments provide a stronger job-creation stimulus.

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[12] Letter from 11 chemical industry CEOs to President Bush and leaders of Congress, January 20, 2004
[13] 2001 IMPLAN database for the United States, per MRG Associates 2004.

Barriers to Free-Market Solutions to the Natural Gas Problem

A free-market advocate might argue that high natural gas prices contain their own remedy, since by economic theory price elasticity would cause demand to fall when prices rise. This argument contains a fundamental element of truth, and ACEEE believes in markets as a key focus for energy efficiency solutions. However, several factors in today's U.S. markets keep the laws of economics from being applied in their purest form:

- **Falling energy intensity.** Over the last 30 years, U.S. energy intensity (measured in BTU per dollar of GDP) has fallen by more than 40%. While this is generally good news for the economy, it also has the effect of blunting the market-based response to high energy prices. When energy costs less as a percentage of the total cost of running a business, owning a home, or driving a car, consumers typically are less sensitive to price increases. This means it takes larger and larger price increases to induce a given level of change in energy demand. The implication is that relying solely on market response to price signals would require energy prices to rise to economically damaging levels before the market corrects itself. We should not, and need not have to incur such economic damage—judicious energy policy action can forestall needlessly high natural gas prices.
- **Income elasticity of demand.** Indications are that rising incomes in many demographic segments tends to increase demand for energy services. Households that can afford half-million dollar homes and $50,000 vehicles are relatively insensitive to energy costs. The falling-intensity effect compounds this phenomenon; more-efficient homes and vehicles shrink the cost of energy as a percentage of income, as well as a percentage of the cost of driving or homeownership
- **Current policies promote increased use of natural gas.** Environmental policies aimed at reducing air pollutant and greenhouse gas emissions have made natural the fuel of choice for power generation and industrial use in many areas. This tends to override fuel price considerations.
- **Lack of Price Transparency.** Price signals work only when customers receive clear, consistent, and timely price information. In today's gas markets, it is very difficult to understand prices in ways that encourage efficiency investments. Several issues stem from this point:
  - Contract structures, in which many utilities and customers purchase gas in annual or multi-year contracts, can delay the "bad news" of price increases, such that motivations for efficiency investment are delayed.
  - Price volatility not only confuses customers on predicting future prices, it also reduces investors' willingness to take risks on efficiency or on supply investments.
  - Most customers see prices only retrospectively, after they receive bills for past consumption. And with today's complex bills, calculating the full price per unit of energy and normalizing it for weather or other factors, takes a level of analytical ability beyond most customers.

These factors are currently insulating many consumers from the pending gas crisis. But they must not mislead Congress into waiting to take action on this problem. If we wait until most customers feel the full effect of today's gas prices, the ensuing crisis could be much worse than if we act now to take prudent steps that will help keep markets in balance. Market forces will ultimately drive gas demand down, but the question is how soon and at what cost to our economy.

In addition to these broad barriers to efficiency investment, a variety of more specific market barriers to energy efficiency keep worthwhile investments and behavior changes from being made, even when prices rise. These barriers are many-fold and include: "split incentives" (landlords and builders often don't make efficiency investments because the benefits of lower energy bills are received by tenants and homebuyers); panic purchases (when a product such as a water heater needs replacement, there often isn't time to research energy-saving options); and bundling of energy-saving features with high-cost extra "bells and whistles."

Energy efficiency is also hobbled by being a "distributed resource". It is found in more than 100 million homes, over 5 million commercial buildings, and hundreds of thousands of factories. In most homes and smaller businesses, the information and technical skills needed to understand and pursue energy efficiency projects are not available. Moreover, the transaction costs of developing, financing and implementing a multitude of small projects are much higher than for a relatively few, large energy supply projects. This tends to shift investment capital toward the larger projects, even when studies show that the efficiency resource is more cost-effective.

For these reasons, policy and program initiatives are needed to realize the benefits of energy efficiency for the economy and the environment as a whole.

Recommended Near-Term Steps

ACEEE recommends the following near-term actions for Congress and the Administration to respond to the looming threat of natural gas prices.

1. **Increase funding for efficiency deployment programs.** We recommend Congress increase FY 2005 appropriations for federal programs that deliver energy savings to consumers, including the Energy Star programs, the Weatherization program, and DOE's suite of other deployment programs, and that the Administration follow suit in its FY 2006 budget request. These programs have been shown to be effective in the limited geographic areas, and at the limited funding levels in which they have operated. With added funding, they can quickly ramp up energy savings in the next few years.

2. **Expand public benefits funds for efficiency.** 18 states collectively spend over $1 Billion on public benefits efficiency programs funded through utility bill fees. Other states, and Congress, should follow this example, and states with current programs should increase funding levels. Most states operating such programs coordinate their

efforts with federal programs like Energy Star; this partnership should be continued and expanded, so that the benefits can be felt in more states.

3. **Create tax incentives for high-efficiency technologies.** Congress should pass incentives for energy efficiency technologies immediately, using the FSC-ETI tax bill or other mechanisms. A suite of efficiency incentives have been part of the energy bill for the last few years; since the overall bill is stalled, however, it is important to pass these key provisions separately, because they can create an economic stimulus beginning next year.

4. **Conduct a national efficiency and conservation campaign.** DOE should lead a partnership effort among efficiency manufacturers, farm organizations, utilities, states, and others to accelerate efficiency investments and encourage short-term behavior modifications. California spent about $30 million in 2001 on a concerted public awareness campaign; evaluations indicate that this campaign was responsible for about one-third of the energy savings realized in that year.

These initiatives can make a difference in the next five years, which will be critical in avoiding crippling gas market problems. Otherwise, U.S. economic growth will remain at risk.

Recommended Longer-Term Steps

Looking three years and beyond, ACEEE recommends the following actions:

1. **Accelerate federal efficiency standards.** The Department of Energy's appliance efficiency standards program currently has a rulemaking underway for residential heating equipment. DOE should accelerate this rule, allowing cold-weather states to elect a higher standard level, and including furnace fan efficiency in the standard. DOE should take higher gas prices into account in setting the final rule. DOE should also accelerate its commercial air conditioning standard rulemaking, as commercial cooling is served mainly by inefficient gas-fired peaking turbines.

2. **Support Advanced Building Codes.** Building codes are an important element in the efficient policy portfolio, insuring that buildings built today place minimum strain on tomorrow's energy supplies and put minimum pressure on market prices. The International Energy Conservation Code (IECC) is widely adopted in states, but many states need to update their codes. DOE should both push for more aggressive model codes like the IECC, and provide more support to states and local governments in implementing better codes.

3. **Expand research and development.** Congress should increase funding for advanced technologies that save natural gas in: buildings through advanced heating, cooling, and hot water systems, advanced envelope designs, and control systems; in industry through CHP, advanced manufacturing processes, motors and other

components; and in power generation through CHP and other advanced generation technologies, plus efficient transmission and distribution technologies.

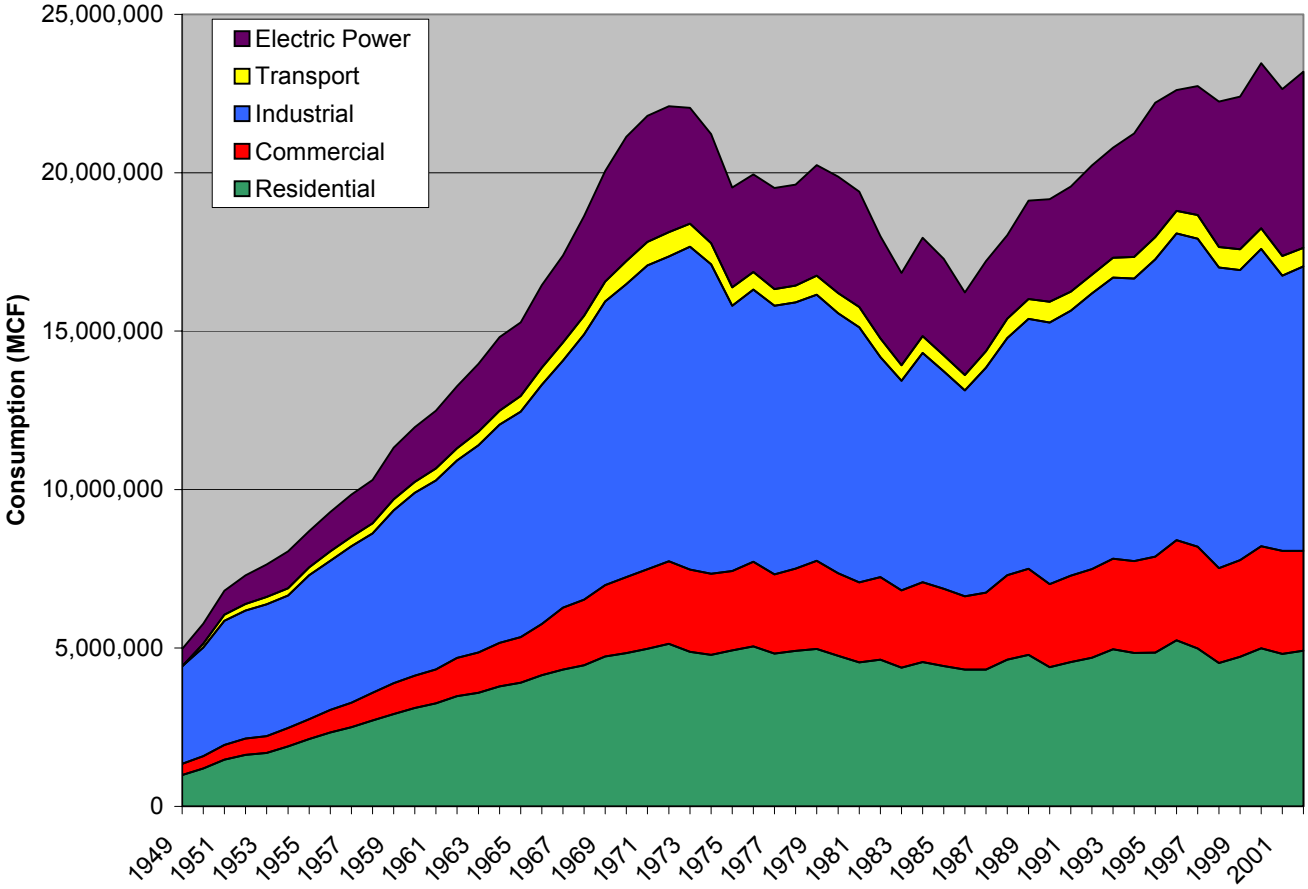
4. **Create efficiency performance standards for utilities.** Texas' electricity restructuring law created a requirement for electric utilities to offset 10% of their demand growth through energy efficiency, and enabled them to use public benefits funds for this purpose. Bills along these same lines have been introduced in Colorado and Washington, and have been discussed in Congress. This kind of performance standard also can be applied to natural gas utilities.

5. **Expand support for Combined Heat and Power (CHP).** CHP generates electricity far more efficiently than the majority of the conventional natural gas generation. Congress should expand its support for CHP by passing the proposed CHP tax credit now under consideration as part of the package of energy efficiency and renewable tax credits. The Congress should also include language in the energy bill that encourages states and utilities to provide fair and reasonable interconnection and tariff treatment for new CHP systems.

ACEEE's experience with these programs and policies gives us confidence that they can make a critical difference in bringing balance to natural price prices and supplies in the coming years. We look forward to working with the Committee on these important issues.

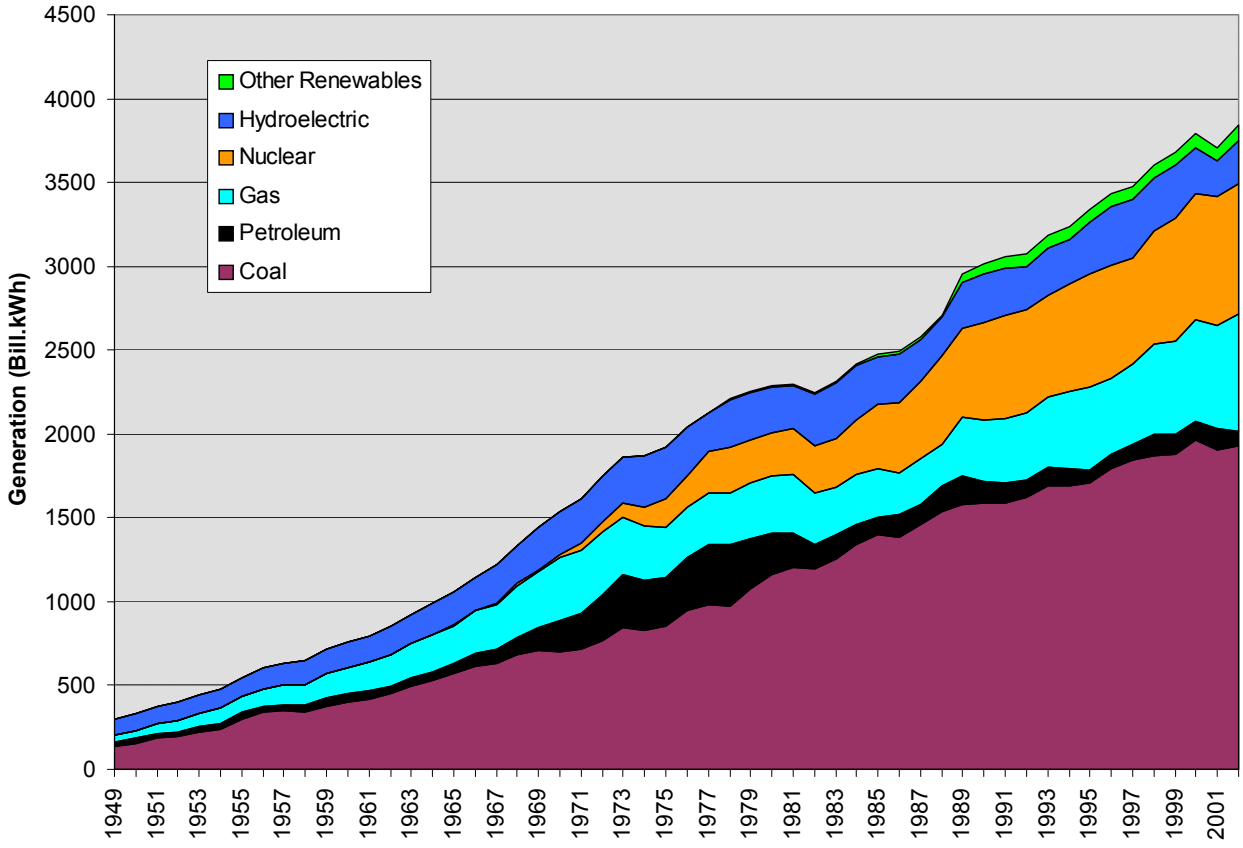
Thank you for the opportunity to share our views with the Subcommittee.

Figure 1
Natural Gas Demand By End-Use Sector



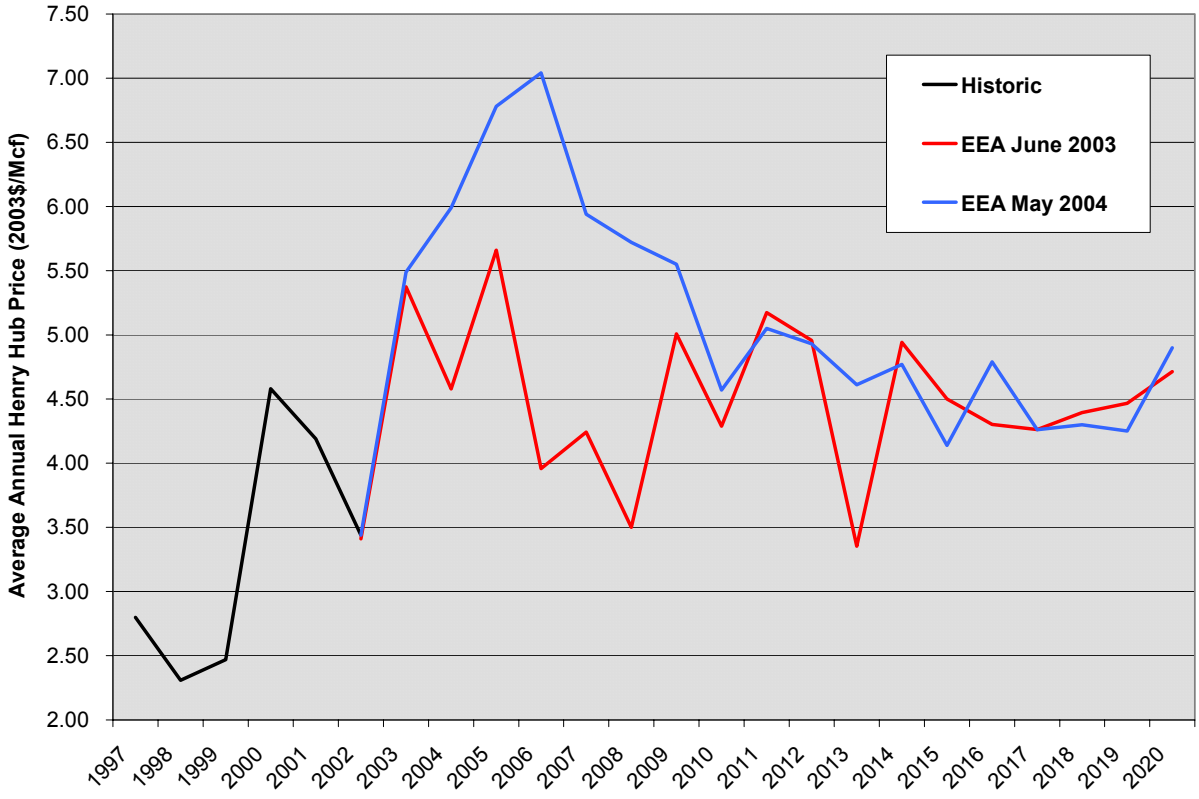
Source: ACEEE staff analysis based on Energy Information Administration data

Figure 2
Fuel Sources for Electricity Generation



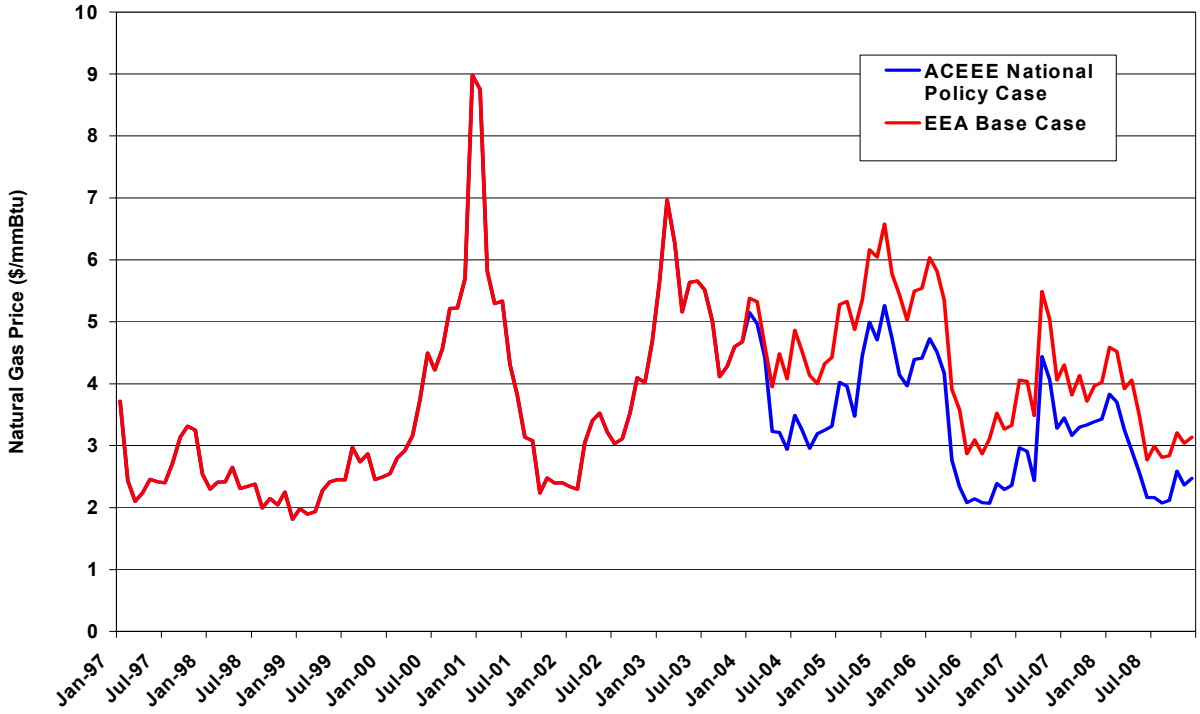
Source: ACEEE staff analysis based on Energy Information Administration data

Figure 3. Natural Gas Price Forecast
(Henry Hub)



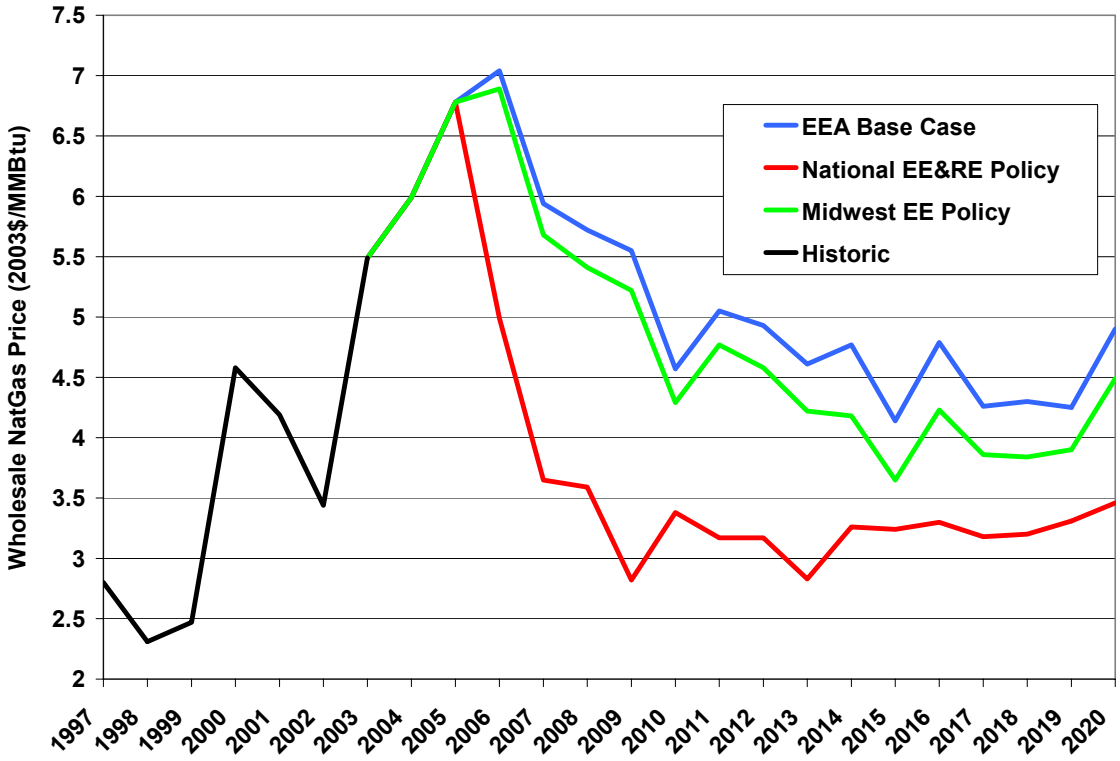
Source: ACEEE Staff analysis based on EEA gas price forecasts

Figure 4. Impacts of Efficiency and Renewables Investments on Wholesale Natural Gas Price (Henry Hub) Relative to the EEA 2003 Forecast



Source: Elliot, et al. 2003. *Natural Gas Price Effects of Energy Efficiency and Renewable Energy Practices and Policies.* American Council for an Energy-Efficient Economy, Washington, DC.

Figure 5. Impact of Midwest and National Scenarios on Wholesale Natural Gas Prices (Henry Hub) Relative to 2004 EEA Forecast



Source: Forthcoming ACEEE Analysis, 2004.