

ENERGY 2030

Recommendations to
Double U.S. Energy
Productivity by 2030



INVEST



MODERNIZE



EDUCATE

*Alliance Commission on National
Energy Efficiency Policy*

 **ALLIANCE**
TO SAVE ENERGY
Using less. Doing more.



LETTER FROM COMMISSION CO-CHAIRS

As co-chairs of the Alliance Commission on National Energy Efficiency Policy, we are pleased to present this set of recommendations that can set our nation on a path to double our energy productivity and make our economy more competitive. Over the past year we have worked with our commission members and the Alliance staff to produce a bipartisan plan that has the support of all the major groups in energy efficiency.

This set of recommendations reflects the thoughtful, in-depth efforts of the Commission. We considered a wide range of policies and technologies that have the potential to increase our energy productivity and allow us to get more return from our nation's energy dollar, and we selected those that have the best chance to help us achieve that goal. The Commission itself is a diverse group of national leaders that generously donated their time and expertise to this bipartisan effort, and we want to thank them for their selfless efforts.

The nation – both the public and private sector – finds itself at the heart of one of the greatest challenges facing our society; to create new sustainable energy solutions for the future and develop an energy system that can supercharge our economic prosperity for the 21st century. The Alliance Commission on National Energy Efficiency Policy has helped chart this course towards that future.

The recommendations stated goal of doubling energy productivity by 2030 is an aggressive, yet achievable goal. Increased energy productivity is a worthy pursuit, with multiple benefits related to growing and strengthening our economy, as well as supporting strong environmental stewardship. This blueprint provides a path for federal, state and local officials to make policy decisions that will unleash investment in energy productivity and allow us to bolster our energy security.

We look forward to helping advance a diversity of energy efficiency policy solutions, especially those developed and championed through the critical public-private partnerships emphasized in the Commission's report.



Handwritten signature of Mark R. Warner in black ink.

Mark R. Warner
*United States Senator
Commonwealth of Virginia*

Handwritten signature of Thomas B. King in black ink.

Thomas B. King
*President
National Grid US*



LETTER FROM ALLIANCE PRESIDENT

I am pleased and excited to present the recommendations of the Alliance Commission on National Energy Efficiency Policy. This ambitious endeavor – dubbed Energy 2030 – is the culmination of a year's worth of research, collaboration and hard work by those involved.

Created and led by Senator Mark Warner (D-Va.) and National Grid US President Tom King, the Alliance's Commission includes energy thought leaders from business, academia, government, and the non-profit sector. In collaboration with technical and international advisory councils, the Commissioners shaped their policy prescriptions to address some of the most pressing matters of our time: improving economic performance and global competitiveness; enhancing the quality of life for all Americans; driving technological innovation; and increasing the reliability, resiliency and security of our energy infrastructure – all while ensuring a healthy and clean environment.

For decades energy efficiency has been America's most abundant, affordable and accessible energy resource, and the policies and strategies that support it, many crafted by the Alliance to Save Energy, have benefited our nation's people, economy and environment. In keeping with this Alliance history and recognizing the urgent need to drive our economy forward, the Commission established an ambitious goal of doubling U.S. energy productivity (getting twice as much from each national energy "dollar") by 2030.

The Commission has concluded that this aggressive goal can be realized through greater investment, modernization and education. Energy 2030 is carefully crafted to appeal broadly to lawmakers of both parties and the general public, and to ensure that we maximize energy productivity in every aspect of our economy – from family homes to the shop floor to the ways we move people and goods.

On behalf of the Board of Directors, Associates and staff of the Alliance, as well as energy efficiency advocates worldwide, my sincerest thanks and appreciation go to all of those involved in creating Energy 2030 – a clarion, national goal and a plan for how to act quickly to achieve it. The Alliance will work to make certain that the goal of doubling U.S. energy productivity is embraced widely and fully, and that the Commissioners' tireless work ultimately translates into actionable policy offerings and best practices for businesses and consumers.

If you are not yet part of Energy 2030, please join us. By working together, we can make today's challenge of achieving greater energy productivity tomorrow's reality.

Kateri Callahan

President of the Alliance to Save Energy



COMMISSION RECOMMENDATIONS

Based on the findings from the research reports, the Alliance Commission on National Energy Efficiency Policy developed this set of unanimous recommendations for federal, state, and local governments as well as the private sector, with the intention of doubling energy productivity by 2030. While we believe that doubling energy productivity will be cost-effective and bring benefits to consumers, businesses, and the nation, a large number of barriers will prevent success without concerted government and private sector action.

The recommendations were selected based on an assessment of their potential impact, their political viability, and their implementability. Because energy productivity decisions are made by everyone, most of the recommendations cut across economic sectors. As many of the recommendations seek national harmonization and state or local implementation, the federal, state, and local recommendations often are intertwined.

THE RECOMMENDATIONS ARE ORGANIZED UNDER THREE OVERARCHING STRATEGIES:



INVEST in energy productivity throughout the economy—well over a trillion dollars in cost-effective energy savings opportunities are available in the United States, but achieving the savings will require investment of hundreds of billions of dollars;



MODERNIZE regulations and infrastructure to improve energy productivity—investments by governments, businesses, and individuals to modernize our nation's infrastructure and other capital (buildings, equipment, vehicles) provide tremendous opportunity to improve energy productivity; and



EDUCATE and engage consumers, workers, business executives, and government leaders on ways to drive energy productivity gains—to succeed we need to develop human capital throughout the economy.

INVEST

MAKE FINANCING MORE EASILY AVAILABLE FOR ENERGY EFFICIENCY PROJECTS

Convenient and affordable financing is vital in order to provide the hundreds of billion dollars in investment needed to double energy productivity and to overcome the barrier posed by the high initial cost of many measures. But there currently is little financing specifically for energy efficiency investments other than the Energy Savings Performance Contracts and Utility Energy Service Contracts, which are used mostly for government buildings (discussed later in this section). In particular there is a need for a "secondary market" for energy efficiency loans and other financial obligations, essentially selling the obligations wholesale to investors to free up capital for more projects. There is an additional need for better valuation of the cost savings from energy efficiency that enable borrowers to pay back loans.

Make more capital available by enabling institutional investors to buy energy efficiency financial obligations on a large scale using securities based on uniform contract structures and better performance data:

- » The Alliance to Save Energy should convene a consortium of financial institutions, rating agencies, energy efficiency program evaluators, and others in the private sector, to work with the federal agencies to foster a secondary market for energy efficiency financial obligations. The consortium should draft uniform contract language, underwriting guidelines, and energy data requirements (for obligations that depend on energy performance) to allow for sufficient scale of consistent financial obligations to interest investors. The consortium should also gather reliable data on energy efficiency and loan performance of projects in order to better quantify the risks.
- » State and local governments should work to aggregate and resell loans in secondary capital markets, such as in the Warehouse for Energy Efficiency Loans (WHEEL) program.

Establish state and local programs for financing of efficiency measures, which may use repayment on utility bills or on property tax bills (the capital could be provided by institutional investors):

- » States and local governments should work with utilities, the private sector, and the federal government to establish effective energy efficiency financing mechanisms for residential and commercial buildings (including loans, leases, energy services agreements, power purchase agreements). Repayment on utility bills or property tax bills can reduce risk by encouraging timely payment and by allowing an obligation to stay with the building when it is sold. (Of course administrative costs and any impacts on payment of the bills would need to be addressed.) Such financing mechanisms may include:

- *On-bill repayment (OBR) programs administered by utilities but with capital provided by third parties, including banks and other investors;*
 - *On-bill finance programs with capital provided by utilities from ratepayer or shareholder funds; and*
 - *Property assessed clean energy (PACE) financing with repayment on property tax bills. The capital is usually obtained by local or state governments issuing bonds for residential buildings and by third parties working directly with the building owner for commercial buildings.*
- » Congress should direct the Federal Housing Finance Agency, working with the Department of Energy (DOE), to establish guidelines and rules for residential PACE financing that are compatible with mortgage lending practices in order to allow a senior lien like that of property taxes for cost-effective projects.

Consider household energy and transportation costs when underwriting mortgages to allow for larger or more attractive loans for homes with lower monthly costs:

- » The Department of Housing and Urban Development (HUD) should improve the accuracy of mortgage underwriting by ensuring that reductions in energy and transportation costs are considered in the underwriting process of loans backed by federal mortgage agencies. Larger loans (or more attractive loans with strict income or assessment requirements) should be permitted for energy-efficient homes and for homes in locations that allow transportation options other than driving because the homes are more valuable and because owners with lower energy and transportation bills are able to make higher mortgage payments.

ADVANCE ENERGY PRODUCTIVITY THROUGH FEDERAL TAX REFORM

Federal tax incentives have played a key role in encouraging market adoption of energy-efficient new homes, home improvements and appliances, new commercial buildings and upgrades, hybrid cars and heavy duty vehicles, and public transportation. But the incentives are not always carefully targeted or kept up-to-date. At the same time the tax code has discouraged business investments with unrealistically slow depreciation—in some cases equipment that typically lasts fifteen years can only be depreciated over 39 years (and the energy costs that would be saved can be expensed in one year). Federal tax reform offers the opportunity to create a more efficient incentive structure.

Reform federal energy efficiency tax incentives so that they focus on high efficiency technologies and measures and on promoting innovation and market transformation:

- » Congress should reform and extend federal tax incentives that promote energy efficiency. The incentives should be reformed by strengthening their qualifying criteria, amounts, and durations to ensure that they focus on high efficiency technologies and measures and on promoting innovation and market transformation. One approach would be to direct DOE or EPA to set the specific criteria, preferably based on designations used in market transformation programs, which would allow for more timely and expert response to market changes.

Adjust commercial and industrial depreciation schedules to encourage investments that can boost energy productivity:

- » Congress should adjust commercial and industrial depreciation schedules to reflect more accurately the average lifetimes of equipment and measures. Congress should also consider accelerated or bonus depreciation to encourage modernizing capital stock. New equipment, buildings, and vehicles tend to be more energy efficient than old stock. Since depreciation adjustment changes the timing but not the total amount of tax paid to the Treasury, fiscal impacts can be relatively modest (and the increased economic activity may be fiscally beneficial).



SUPPORT ENERGY PRODUCTIVITY INNOVATION & MARKET ADOPTION

Private R&D budgets are small in many sectors related to energy productivity in part due to the fragmented markets and industry structures and to the spillover of knowledge. Market barriers also prevent adoption and commercialization of new innovations. Thus government support both for R&D and for a wide range of deployment programs has been critical to advances in energy productivity. Often these programs have been most effective in concert: R&D support helps develop technologies, technical assistance and incentives assist early market introduction, information programs spur broad commercialization, and standards ensure that all consumers benefit and push markets forward toward further innovation.

Increase federal investment in basic and applied research, development, demonstration, deployment, and technical assistance:

- » Congress should increase support for DOE and other energy efficiency R&D for all economic sectors. The federal government should also encourage private R&D through other policy approaches such as public-private consortia, the R&D tax credit, and supporting challenges or contests.
- » Congress should increase support for energy efficiency demonstration, deployment, and technical assistance at DOE, EPA, and other agencies (from Building America to Industrial Assessment Centers to Energy Star to weatherization of low-income homes). DOE should maintain a balanced portfolio of research and deployment programs.

- » Federal, state, utility, and other technical assistance providers should coordinate activities to offer companies a unified array of services across energy and non-energy areas. Congress and the states should include energy productivity in manufacturing and agricultural extension services and other technical assistance.
- » Federal, state, and local governments should coordinate their efforts to offer, and encourage the private sector to offer, the use of buildings and other facilities as test beds to demonstrate and validate emerging energy productivity technologies and practices, and as early markets for the innovations.

GOVERNMENTS LEAD BY EXAMPLE

The federal government is the largest single energy user, responsible for just over 1% of energy use, in the United States. State and local governments combined own one fifth of commercial building space, with much larger energy use.¹ But beyond their own energy use, governments can serve as highly visible test beds and early adopters of innovative technologies and practices. They also can influence their large base of contractors and suppliers to increase their energy productivity.

Apply innovative best practices to government buildings and vehicle fleets:

- » Federal, state, and local agencies should apply innovative best practices to government buildings and vehicle fleets, including (several of these already are required for federal buildings):
 - *Setting targets for efficiency improvement;*
 - *Implementing energy management systems, including under the ISO 50001 standard;*
 - *Benchmarking, rating, and disclosing of building energy use and efficiency (see below);*
 - *Conducting ongoing or periodic recommissioning to ensure buildings are performing as they were designed;*
 - *Considering location efficiency when siting facilities;*
 - *Procuring innovative high-efficiency equipment and vehicles; and*
 - *Encouraging energy management in supply chains.*

Make all cost-effective efficiency improvements to federal buildings, using private financing and public funds:

- » Federal agencies should make all cost-effective efficiency improvements in their buildings with annual targets for savings and/or funding. Agencies can use private financing (energy savings performance contracts and utility energy service contracts, under which private contractors and financial institutions are paid from energy savings over time) as well as public funds, especially since appropriations are very tight.

REFERENCES

¹U.S. Energy Information Administration. "Annual Energy Review." Released Oct. 19, 2011, last updated August 2012, Tables 1.3 and 1.12, <http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0306>.

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MODERNIZE

CREATE A "RACE-TO-THE-TOP" STYLE ENERGY PRODUCTIVITY COMPETITION TARGETED AT STATES & COMMUNITIES

State policies including building energy codes, regulation of utility demand-side management, and transportation and land use planning are key drivers of energy productivity. More recently cities have taken the lead on building energy disclosure, community-based building energy upgrade programs, and other areas. But the best practices need wider dissemination. The education "Race to the Top" initiative has spawned significant education reforms and has received broad, bi-partisan support. An energy productivity competition that similarly provides federal resources and rewards states for progress toward becoming more energy productive could spur significant advances in efficiency throughout the nation.

Incentivize innovation and adoption of best practices by state and local governments based on energy productivity improvements, investments, and regulatory reform. States would receive technical assistance and funding based upon policy and regulatory reforms like those recommended in this report on building energy codes and disclosure, efficiency programs and financing, utility reform, and transportation planning and investments.

» The federal government should develop an energy productivity "Race to the Top" to spur state and local energy policy reform as the education initiative spurred education reform, with the goal of doubling U.S. energy productivity by 2030.

- » DOE should help states and local governments implement innovative policies and programs, and should develop scoring criteria on energy productivity improvements in the jurisdiction, increased effectiveness of efficiency codes and programs, transportation infrastructure investments, and regulatory reform (because of wide differences between the states, they should be graded on improvements, not on an absolute scale).
- » The Office of Management and Budget should work with federal agencies to use these criteria in setting a variety of related federal funding to states and local governments, including as scoring factors in competitive grants.
- » The assistance and scoring should focus on policies like those recommended to states and local governments throughout this report.

STRENGTHEN BUILDING, EQUIPMENT & VEHICLE EFFICIENCY STANDARDS

Standards and codes have been among the most effective energy efficiency policies, setting a performance floor for equipment, buildings, and vehicles. They protect consumers (especially some renters and buyers who pay the energy bills but cannot choose the products), lower prices, and spur innovation. They also have enormous potential: New appliance standards could save an estimated 3% of all energy use by 2035 and save consumers a net \$170 billion.² Potential savings from building codes are similar if they were to be adopted and enforced nationwide. And new vehicle standards are projected to save another 3% of energy use by 2030.

Steadily and aggressively increase the stringency of building energy codes, with quick adoption and effective compliance measures:

- » The International Code Council and American Society of Heating, Refrigerating, and Air-Conditioning Engineers, with DOE support, should build on recent 30% energy savings and steadily increase the energy efficiency of their model building energy codes and standards. The updates should continue to be cost-effective, stakeholder-driven, and fuel and technology neutral.
- » State and local governments should quickly adopt these updates or more stringent "stretch" codes, and should deploy the resources needed (including resources from building permit fees) to achieve full compliance with the codes.
- » HUD should quickly update efficiency requirements for new homes with federally subsidized loans and for public housing, and DOE should quickly update the requirements for federal buildings, based on the most recent model codes.

End current delays and update federal appliance and equipment, vehicle, and manufactured housing efficiency standards to maximum technologically feasible and economically justified levels:

- » DOE and the Office of Management and Budget (OMB) should end current delays in setting appliance efficiency standards and make timely updates at the "maximum level that is technologically feasible and economically justified," as required by law.
- » DOE and OMB should end current delays and quickly set efficiency standards for manufactured housing based on the most recent model codes.
- » Both the federal government and states should set new standards for electronics, industrial equipment, and other products when justified by the energy savings.
- » The Department of Transportation and EPA should strengthen the new heavy duty vehicle standards as they extend them.





USE ENERGY PRODUCTIVITY TO ACHIEVE REGULATORY & PLANNING GOALS

A wide range of regulations and government investments affect energy use in every economic sector. Increasing energy productivity can be an important way to meet the goals of those regulations and investments if they are designed well. Thus electric and natural gas state and utility programs funded by ratepayers are the primary delivery vehicle for energy efficiency in our nation, with budgets over \$8 billion in 2011 (more than double those of three years before).³ The programs avoid much larger investments in power plants, transmission lines, and gas pipelines. Transportation and land-use planning can help reduce the need to drive by creating walkable communities and transportation alternatives. Industrial efficiency measures such as combined heat and power can reduce air pollution while lowering costs. And investments in water and wastewater systems can reduce water losses, thus reducing the power needed to pump and treat the water.

Adopt utility policies that make full use of all cost-effective demand-side management (end-use energy efficiency and demand response) as a resource. Such state-level policies may include broad and targeted savings goals, financial incentives for utilities, time-variant customer rates, fair treatment of combined heat and power and other distributed resources, and harmonized program evaluation:

- » State public utility commissions (PUCs) and municipal and cooperative utilities should adopt policies that make full use of all cost-effective end-use energy efficiency and demand-response resources. Recognizing differences between states, such policies may include:
 - *Set energy savings and demand reduction goals based on the available cost-effective potential, measure progress toward the goals, and provide incentives to achieve them;*
 - *Set goals, metrics, and incentives to achieve the enhanced benefits of demand-side resources enabled by smart grid technologies;*
 - *Use time-variant rates where appropriate to create actionable price signals to customers based on the real-time cost of energy, accompanied by effective customer education to help them make use of the savings opportunities;*
 - *Adopt utility rate structures that remove financial disincentives to use end-use energy efficiency and demand response resources that benefit customers and create earnings opportunities;*
 - *Ensure that demand-side management programs are available to all customers, including low-income customers; and*
 - *Encourage combined heat and power and other distributed resources where they enhance energy productivity and reliability, are cost-effective, and meet efficiency criteria. Adopt interconnection rules and rates and fees for combined heat and power and other distributed resources that are fair and reasonable (including utility recovery of associated costs and avoidance of cost shifting) and ensure reliability and safety.*
- » DOE should strengthen its State and Local Energy Efficiency Action Network work to convene states, utilities, evaluation professionals, industry, consumer and environmental organizations, and other stakeholders to develop nationally harmonized evaluation, measurement, and verification (EM&V) approaches and protocols that are credible, transparent, reasonable in cost, and adaptable to regional and state jurisdictional contexts. DOE should also provide technical assistance to states to facilitate adoption of these approaches and protocols.

Advance regional and local transportation and land use plans that promote energy productivity by improving access to work, services, school, and play, and by increasing transportation options including safe walking, biking and public transportation. Provide funding and technical assistance to enable efficient development patterns and transportation infrastructure that is consistent with the regional and local plans:

- » Congress should direct the Department of Transportation and the Environmental Protection Agency (EPA) to establish performance standards for long-range regional transportation plans, which are developed by Metropolitan Planning Organizations, to achieve increases in energy productivity for the transportation sector and related environmental goals while improving mobility and connectivity for all transportation modes.

- » Metropolitan Planning Organizations and other regional planning agencies should establish or update regional transportation plans and land use plans that meet the standards, and local governments should establish or update local transportation and land-use plans, codes, and zoning that are consistent with the regional plans (both with federal, state, and private sector assistance). This planning should seek to achieve energy-efficient mobility, connectivity, and accessibility.
- » Congress (together with and as a catalyst to state governments, local/regional governments, and the private sector) should provide resources and enable directed funding and incentives to promote efficient development patterns and transportation infrastructure that are consistent with the regional and local plans.

Use energy efficiency as an emissions reduction strategy in environmental regulations:

- » EPA, state, and local air regulators should, to the extent possible, encourage energy efficiency as an emissions reduction strategy and, as appropriate, allow and credit efficiency measures as compliance options in their regulations and procedures.
- » EPA, DOE, and other relevant agencies should collaborate with state and local authorities to facilitate recognition and crediting of energy efficiency in state and regional air quality plans, and should provide guidance and technical assistance to encourage regulated entities to implement energy efficiency as compliance and productivity strategies.

Ensure major government and regulated infrastructure spending on energy grids, transportation infrastructure, and water and waste systems increases energy productivity.

- » Utilities and state PUCs should use smart grid capabilities to increase energy productivity, including by targeting demand-side management, providing consumers with detailed use information, and improving system efficiency through better voltage control.
- » Congress, the Department of Transportation, and state transportation agencies should direct transportation funding to increase viable transportation options other than driving.
- » Congress, EPA, and state and local governments should ensure new water and wastewater infrastructure achieves both water efficiency and energy efficiency, including water use savings, leak reductions and efficient equipment. They also should increase recycling and more efficient collection of municipal solid waste.

REFERENCES

²Lowenberger, Amanda, Joanna Mauer, Andrew deLaski, Marianne DiMascio, Jennifer Amann, and Steven Nadel. *The Efficiency Boom: Cashing in on Savings from Appliance Standards*, pages 3, 5. American Council for an Energy-Efficient Economy, March 2012, <http://www.appliance-standards.org/content/efficiency-boom>.

³Wallace, Patrick and Hillary Jane Foster. "State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2011", page 15. Consortium for Energy Efficiency, March 14, 2012, <http://www.cee1.org/files/2011%20CEE%20Annual%20Industry%20Report.pdf>.

EDUCATE

PROVIDE INFORMATION ON BUILDING ENERGY EFFICIENCY & ENERGY USE

Car drivers see fuel economy information in every advertisement and receive frequent feedback when they look at the dashboard (especially those with fuel economy gauges). But homeowners and commercial building managers often have no idea about the efficiency of a building. Major appliances are labeled in stores, but even whole tenant spaces in commercial buildings often are not submetered in operation. Better energy information may transform how buildings are designed and operated if it is made available at the right times and in useful ways. New smart technologies provide much more detailed information, while new policies are making the information more available to consumers.

Develop effective building energy ratings, benchmarks, and disclosure methods for commercial and residential buildings; require periodic disclosure in commercial buildings and disclosure at time of sale or rental in residential buildings; and incorporate the information in building appraisals and real estate listings:

- » DOE and EPA should engage a stakeholder coalition to develop model building energy ratings, benchmarks, and disclosure methods for commercial buildings and for residential buildings that are based on the best existing systems and practices, user friendly, adjusted to climate regions, and universally available. The coalition should consider inclusion of location efficiency information. DOE should ratify the ratings/benchmarks/disclosure developed by the stakeholders as the national models, and ensure needed comparative data are available and up-to-date.
- » The federal government should adopt the national models for use in all federal buildings and, where practical, federally subsidized buildings and buildings with loans from federal mortgage agencies. HUD and DOE should encourage appraisers, lenders, and the real estate industry to incorporate the information into valuation of buildings and real estate listings.
- » State and local governments should require disclosure of energy information using the national models in commercial buildings and at time of sale or rental in residential buildings.

Enable customers and third parties authorized by the customers to access their energy usage data, while ensuring customer privacy:

- » PUCs should develop rules and procedures that enable customers to access their energy usage data and to authorize third parties to access their data. The data should be accessible in a national standard data format such as Green Button. The rules and procedures should ensure effective privacy protections and address legacy data systems.

Develop harmonized energy use labels with discrete ratings for appliances and vehicles that are coordinated with building energy labels.

- » DOE, EPA, and the Federal Trade Commission should develop harmonized energy use labels for appliances and vehicles, coordinated with building labels above, and harmonized product certifications. The labels should show discrete ("categorical") energy efficiency ratings, which have been shown to be more effective with consumers and are used in most other countries. DOE also should study ratings and test methods for building energy subsystems.

IMPROVE CORPORATE ENERGY MANAGEMENT & TRANSPARENCY

Private sector energy management is critical for achieving energy productivity gains since the private sector dominates economic activity. While specific best practices and standards are important, increasing corporate energy productivity must start with good management and reporting. Corporate goals and commitments, employee incentives and accountability, use of formal Energy Management Systems, and transparent reporting of energy use can encourage energy productivity gains. Companies also can influence the energy productivity of their peers, supply chains, and others.

Effectively manage corporate energy use and report on energy productivity as part of corporate sustainability reporting.

- » Companies should effectively manage their energy use, including by implementing the new ISO 50001 standard for energy management systems with certification through DOE's Superior Energy Performance.
- » Companies should report on their energy use, energy productivity, and energy efficiency investments as part of corporate sustainability reporting, providing accountability to investors and the public (as comparisons between companies often will be difficult, may need common benchmarks or to compare companies only against their own historical performance).
- » Companies should work to encourage improved energy management among their suppliers, customers, and peers in order to make supply chains more cost-effective.



DEVELOP EDUCATED CONSUMERS & TRAINED TECHNICIANS

In order to succeed, all of these recommendations need people with the skills to implement them. We need government leaders and business executives who understand the importance of energy productivity to our economy, environment, and security. We need construction workers, building and plant managers, city planners, and many other kinds of workers skilled at implementing efficiency measures (and with credentials that prove it). We need consumers who understand what steps they can take to lower energy bills. In other words, we need to invest in human capital as well as physical capital.

Develop school and university curricula on energy use and productivity, conduct consumer campaigns, develop technical certifications, and provide related workforce training and continuing education:

» Companies, professional associations, labor organizations, secondary and higher educational institutions, government, and other stakeholders should collaborate to promote, improve, and, as warranted, develop technical training curricula and credentials to include energy efficiency technologies and practices. These could include training and credentials for energy management (such as energy auditing and building commissioning) as well as incorporating energy content into related technical and continuing education curricula (such as for building trades, vehicle repair, and equipment operation).

» Energy management and productivity should be incorporated in secondary and higher education curricula and continuing education programs, including vocational-technical, architecture, engineering, and business management programs.

» Governments, companies, non-governmental organizations, media, and, as appropriate, educational institutions should collaborate to heighten consumer awareness, understanding, and motivation regarding actions to improve energy efficiency and productivity, using behavioral research to increase the effectiveness of the education.



IMPACTS OF ENERGY 2030

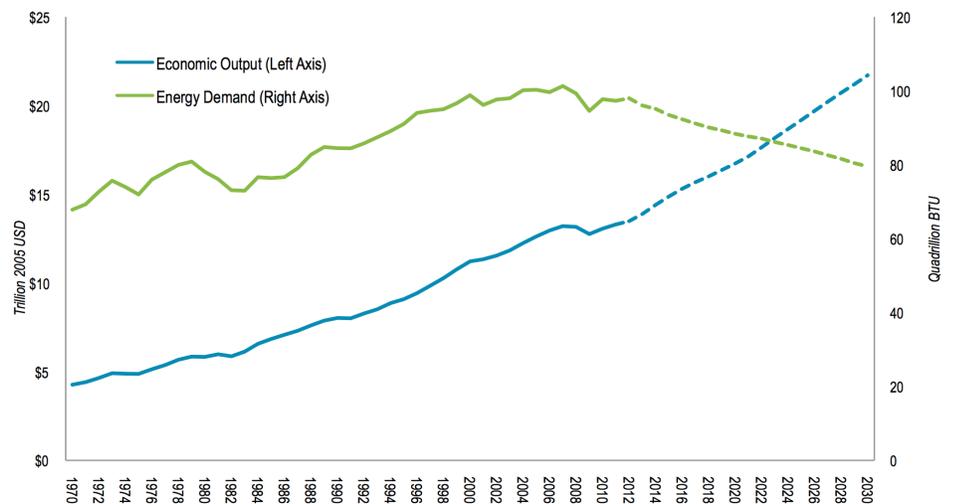
The Commission asked the Rhodium Group (RHG) to analyze the economic, employment, environmental, and security implications of doubling American energy productivity by 2030. RHG conducted the analysis independently of the Commission or participating organizations. Its findings are summarized here. Details on the methodology used for the analysis, as well as detailed results, are available at www.rhgroup.net/ase.

ECONOMIC IMPACTS

The United States can achieve the Commission's goal of doubling energy productivity by 2030 with currently available technology and design practices. To do so, households, businesses, and federal, state, and local governments will need to invest an additional \$166 billion a year (in real 2010 U.S. dollars) in building improvements, energy efficient vehicles and industrial equipment, and energy saving transportation systems (Table 1). This investment would both reduce the amount of energy needed to run the American economy and the price of energy for U.S. consumers, lowering overall energy costs by \$494 billion a year. Net of investment costs, annual savings to American households, businesses, and government agencies would total \$327 billion, and economic growth and energy demand would be decoupled for the first time in recent history (Figure 1).

FIGURE 1: UNTYING ECONOMIC GROWTH AND ENERGY DEMAND

Economic output (left axis) and energy demand (right axis) under a doubling energy productivity scenario
Source: BEA, EIA and Rhodium Group estimates



By 2030 the average household would save \$1,039 per year in energy costs, net of the investment required to deliver those energy savings. That is roughly the same as what the average American household spends on education and nearly as much as average household spending on medicine and produce combined. American business would save \$169 billion a year, almost as much as the corporate sector paid in federal income tax in 2011. Efficiency improvements combined with lower energy prices would also make energy-intensive industries like chemicals, glass, steel, and cement more competitive internationally. And efficiency improvements in government buildings and vehicles would save taxpayers \$13 billion a year, nearly as much as the annual budgets of the Department of Commerce and Environmental Protection Agency combined.

Capturing the benefits of profitable efficiency investments in buildings, industry, and transportation could increase U.S. economic output by as much as 2% in 2030. Doubling American energy productivity would also change the composition of the U.S. economy, redirecting revenue from energy supply to more labor-intensive manufacturing and service sector activities. We estimate that successfully achieving the Commission's goal could increase overall U.S. employment by 1.3 million jobs.

TABLE 1: ANNUAL COSTS AND BENEFITS OF DOUBLING US ENERGY PRODUCTIVITY*Billion 2010 USD*

BY SECTOR			
SECTOR	INVESTMENT COSTS	ENERGY SAVINGS	NET SAVINGS
Buildings	\$72	\$167	\$95
Industry	\$15	\$109	\$94
Transportation	\$79	\$218	\$139
Total	\$166	\$494	\$327

BY CONSUMER			
CONSUMER	INVESTMENT COSTS	ENERGY SAVINGS	NET SAVINGS
Households	\$97	\$241	\$145
Businesses	\$61	\$230	\$169
Government	\$9	\$22	\$13
Total	\$166	\$494	\$327

Notes: Investment costs are annualized using sector-specific interest rates and financing terms. Energy expenditures and savings are in the year 2030 once a doubling is achieved. May not sum to totals due to rounding.

ENVIRONMENTAL BENEFITS

Doubling energy productivity would deliver substantial reductions in carbon dioxide (CO₂) emissions, providing a cost-effective strategy for addressing climate change. We estimate that if the Commission's goal is achieved, U.S. CO₂ emissions will decline to 4.65 billion tons by 2020, 22% below 2005 levels. That surpasses America's 17% emission reduction commitment made at the Copenhagen climate change conference in 2009. By 2030, the Commission's goal would reduce U.S. CO₂ emissions to 4 billion tons, or 33% below 2005 levels.

Doubling energy productivity will have other environmental benefits as well. We estimate that in 2030, sulfur dioxide (SO₂) and nitrogen oxides (NO_x) emissions would be, respectively, 55% and 45% lower than business-as-usual, yielding important public health benefits.

SECURITY IMPLICATIONS

The recent boom in domestic oil and natural gas supply is reducing American dependence on imported energy. Doubling energy productivity would accelerate this process. We estimate that achieving the Commission's goal would reduce net energy imports to 7% of U.S. energy consumption by 2030, down from 19% today. More importantly, it would make the U.S. economy more resilient to future energy price spikes. Even if net U.S. energy imports decline to zero, America will remain part of the global energy market and thus vulnerable to supply disruptions elsewhere in the world. But by doubling energy productivity, the direct economic cost of a global price spike would be reduced by up to 30%.

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The Alliance to Save Energy promotes energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security. Founded in 1977, the Alliance to Save Energy is a non-profit coalition of business, government, environmental, and consumer leaders.

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