Sustainability Report 2010:

Private Sector Leadership in Energy Efficiency, Conservation and Sustainability

October 12, 2010

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Introduction

Twenty-first century America will be defined by how the United States confronts an increasingly complex problem: the lack of a strong energy policy that properly expands domestic energy production through an "all of the above approach." Affordable, abundant and accessible energy is necessary to fuel a growing economy and ensure the security of our nation. Yet, energy production and consumption must also account for environmental concerns, market volatility and long-term demand and supply. As global demand for energy continues to rise, supply will be increasingly strained.

Promoting and expanding energy efficiency, conservation and sustainability practices throughout the U.S. economy will produce significant energy and cost savings that will help solve these challenges and put the United States on a path toward a balanced energy future. The positive impact that sustainability practices will have on America's future are indisputable, and it is imperative that businesses, policymakers and consumers collaborate to ensure all economic sectors - including residential, commercial and industrial - move toward a sustainable future.

Integrating sustainable practices into the U.S. economy will require innovative technology, focused policy and successful collaboration between the private and public sectors. Consumers, government and private industry have all undertaken initiatives to increase energy efficiency and conserve use, and the activities of Consumer Energy Alliance's (CEA) 145 affiliated organizations illustrate the new and proactive ways in which private industry has advanced corporate sustainability and become a key leader in the sustainability revolution.

CEA members represent a wide variety of sectors across the U.S. economy, including agriculture, manufacturing, trucking and distribution, small businesses, energy providers and energy producers. As this publication demonstrates, each of these sectors has undertaken initiatives that have created more sustainable operations, energy savings and a reduced environmental footprint; CEA is glad to act as a collective force, engaging both energy-producing and -consuming sectors on the necessity and challenges of sustainability.

Over the next 20 years, U.S. energy consumption is projected to increase by 14 percent while global consumption will increase by 49 percent, according to estimates from the Energy Information Administration. However, according to a 2009 report by McKinsey & Company, if the United States fully adopted currently available energy-efficient technologies, annual energy consumption could be reduced by 23 percent - saving 18.4 quadrillion BTUs. With the industrial sector accounting for approximately 40 percent of U.S. energy consumption, industry-driven efforts can greatly reduce energy consumption, helping to lower emissions and pass along cost savings to consumers.

Though conservation of energy is an essential means of reducing costs, corporate sustainability transcends considerations confined exclusively to the bottom line. Through innovative technologies and practices, industry has pioneered new ways to minimize water usage, recycle waste products, limit carbon emissions and decrease the consumption of other raw materials, resulting in greater efficiencies and

lower pollution levels.

For CEA and its affiliates, corporate sustainability means a synthesis of technological improvement, adaptation and collaboration with customers, stewardship of resources and a culture dedicated to long-term solutions. Sustainability practices not only produce immediate savings for one business but also create a multiplier effect impacting several markets.

As the following chapters demonstrate, a diversity of sustainability solutions has already been adopted by CEA members, and added investment in research and development will surely produce greater savings for consumers and for the environment. The members of CEA agree that the benefits of sustainability are real and present and must be incorporated into any rational energy policy that also advocates for domestic energy production and greater use of renewable and alternative energy. We call on the federal government to embrace a commonsense energy policy that stimulates the economy and fosters greater confidence amongst American consumers.

About Consumer Energy Alliance

Consumer Energy Alliance is a nonprofit, nonpartisan organization whose mission is to expand the dialogue between the energy and consuming sectors and to advance a better understanding of energy security and the thoughtful development and utilization of energy resources in order to help create a balanced energy policy and maintain stable prices for consumers.

On the Web:
http://www.consumerenergyalliance.org

Executive Summary

In an era of highly volatile energy markets, implementing sustainable practices can be an important tool to help meet the expanding needs of society. From the private-sector perspective, expanding corporate sustainability lowers operations costs, helps meet corporate social responsibilities and stakeholder obligations and helps to preserve the planet for future generations.

Consumer Energy Alliance has asked several of its organizations to write summaries outlining the technologies, programs and policies they have implemented that help address the U.S. energy challenge and promote energy efficiency, conservation and sustainability.

The result: Organizations across a broad range of sectors are making real progress on sustainability initiatives and practices while saving money, lowering energy usage and reducing environmental impacts.

The following chapters will more fully illustrate:

- Deutsche Post DHL helped one customer in Australia cut its carbon emissions by 41 percent (2,600 metric tons) by relocating switching centers and changing transportation modes.

- According to a study by the American Highway Users Alliance, congestion relief at the worst 233 traffic bottlenecks over the next 20 years could save 40 billion gallons of fuel and reduce wasted fuel by 77.2 percent.

- Due to advancements in technology and consumer-awareness programs, the Natural Gas Supply Association reports that energy efficient household appliances have contributed to a 40 percent reduction in the use of natural gas per household over the past 40 years.

- A 2008 survey of American Public Power Association members revealed the proactive steps that utilities companies are pursuing to reduce consumption: 72 percent of the respondents have improved their transmission and/or distribution efficiency over the previous five years, and 76 percent have plans to do so over the next five years; further 63 percent of all respondents have energy efficiency/demand-side management/energy conservation programs in place, and 90 percent plan to expand these programs in the next five years.

- Since Dow Chemical Company set its first sustainability goals, roughly $1 billion has been invested to fulfill them. Although Dow only expected a return of between $2 billion and $3 billion, the return on investment has been over $5 billion.

- Caterpillar's Remanufacturing & Sustainable Solutions Division returns end-of-life components to same-as-new condition while reducing waste and minimizing the need for raw materials to produce new parts. Caterpillar recycles more than 100 million pounds of end-of-life iron annually, much of which is used for remanufactured engine, transmission and hydraulic components.

- According to the Nuclear Energy Institute, nuclear plants are the lowest-cost producer of baseload electricity. The average production cost of 2.03 cents per kilowatt-hour includes the costs of operating and maintaining the plant, purchasing fuel and

paying for the management of used fuel.

- The U.S. agricultural industry is producing more food and fiber than ever before, and the industry is doing so while using 50 percent less energy-related inputs than it did just two decades ago, according to the Colorado Farm Bureau.

- Currently, there are more than 6,000 local window film dealers and installers in the United States, all with window films that can stop 50 to 85 percent of all solar energy transmission without appearing dark or shiny, according to the International Window Film Association.

- The National Association of Home Builders reports that nearly 20 percent of new homes garnered Energy Star® certification in 2009 – up from about 12 percent the previous year – signifying an increasing commitment to energy efficiency.

- According to the National Petrochemical and Refiners Association, the use of plastic building and construction materials saved 467.2 trillion BTU of energy use over alternative construction materials in one year – enough to meet the average annual energy needs of 4.6 million U.S. households.

- The Air Transport Association of America writes that the U.S. airline industry has improved fuel efficiency 110 percent since the late 1970s – saving more than 2.9 billion metric tons of carbon dioxide (CO_2), equivalent to taking approximately 19 million cars off the road each of those years.

- According to the American Iron and Steel Institute, new technologies and innovation of human capital on the plant floor have reduced energy intensity per ton of steel shipped by 30 percent across the industry since 1990 and have reduced emissions per ton of steel produced for that same period by 35 percent.

- The Virginia Manufacturers Association has launched various advocacy and education programs to prepare the next generation of workers for careers in technology and renewable energy. *Dream It Do It Virginia* promotes wind, solar and nuclear energy occupations to ensure a future pool of qualified employees for Virginia's energy industry.

- By reusing scrap steel, Nucor Steel has been able to reduce mining waste by 97 percent, air pollution by 86 percent and water pollution by 76 percent. Nucor is currently the nation's largest recycler of steel, using more than 13 million tons of scrap steel in 2009 to create new products.

- Since 2004, American Trucking Associations partners have reduced fuel consumption by 1.5 billion gallons and reduced CO_2 emissions by 16.2 million tons – the equivalent of taking 2.88 million cars off the road. Over the next nine years, CO_2 reductions under the ATA plan are estimated at 119 million tons.

As the following pages demonstrate, the energy savings of sustainable practices are significant, as are the economic and environmental benefits. The benefits highlighted throughout these chapters are necessary to continue economic growth and environmentally-sound development for generations.

Industry, the agricultural sector and the transportation and logistics sectors have emerged as leading forces in this new frontier, but their success will not be the sole solution to our nation's energy problem. As America looks to enhance its energy future, the private sector and political leaders must work together to ensure that sustainability remains a strong component of a balanced energy policy.

Air Transport

Air Transport Association

"We are America's airlines – Connecting and Protecting Our Planet.®" These words are part of our covenant with those who fly – and our impressive record demonstrates this unfailing commitment. Federal Aviation Administration (FAA) confirms that the number of people in the United States affected by aircraft noise has diminished yet again, by more than 94 percent since 1975 – 56 percent just since 2000 – though passenger boardings have increased almost fourfold. At the same time, we've flown progressively more fuel-efficient and cleaner aircraft. For example, we've improved our fuel efficiency 110 percent since the late 1970s – saving more than 2.9 billion metric tons of carbon dioxide (CO_2). These savings are equivalent to taking approximately 19 million cars off the road each of those years – fairly remarkable since the U.S. Environmental Protection Agency data confirms that commercial aviation accounts for only two percent of the nation's greenhouse gas emissions.

But we are not resting on our record; we are committed to continuing to do more to protect our planet. To do so, we are driving technology, operations and infrastructure toward further noise and emissions savings. In technology, the Air Transport Association of America (ATA) continues its role as a founding and leading member of the Commercial Aviation Alternative Fuels Initiative (CAAFI), a consortium of airlines, manufacturers, airports, energy producers, researchers and government agencies dedicated to the development and deployment of environmentally-friendly alternative fuels. In addition to a string of successful test flights with alternative fuels, CAAFI ushered in a new jet-fuel specification for such fuels in 2009, which ensures that tomorrow's fuels will be as safe as today's. In operations, we continue to implement innovative flight procedures within the limits of the existing air traffic management (ATM) system to further reduce noise and emissions. And we are working toward a modernized ATM system that will reduce not only delays but also undue emissions.

As part of our overall commitment, we have joined airlines around the world in adopting an ambitious set of targets to mitigate emissions associated with climate change under a global framework, including collective industry commitments to:

1. improve fuel (and, hence, CO_2) efficiency by an annual average of 1.5 percent per year through 2020;
2. cap industrywide CO_2 emissions from 2020 (carbon-neutral growth), subject to critical aviation infrastructure and technology advances achieved by the industry and government; and
3. reduce CO_2 emissions by 50 percent by 2050, relative to 2005 levels.

For U.S. airlines alone, these commitments will result in additional emissions savings of 1.1 billion metric tons of CO_2 from 2010 through 2030 – equivalent to taking an average of 10 million cars off the road every year during that period.

To meet our targets, we must be able to invest – in newer aircraft, fleet upgrades, alternative fuels and other emissions - and noise-saving measures. While we are committed to doing all that we can, government also has a role to play. First, it must not add to the already significant tax burden of the airline industry through emissions taxes or cap-and-trade requirements, which siphon away the very funds we need to continue to improve. Second, government must do its part by reinstating funding in aviation research and development programs and by making necessary ATM infrastructure investments on the ground and in the air.

We want to continue to connect people in America with the rest of the world and vice versa while transporting goods critical to the American economy. To do this, we must continue to act responsibly – protecting our planet.

About the Air Transport Association

ATA airline members and their affiliates transport more than 90 percent of all U.S. airline passenger and cargo traffic.

On the Web:
http://www.airlines.org

Roads, Highways & Transportation

American Highway Users Alliance

Mobility and The American Dream

Affordable automobility has been a critical ingredient to America's long-term economic growth and high quality of life. Since 1950, the correlation between vehicle-miles-traveled (VMT) and Gross Domestic Product (GDP) has been an astounding 99.46 percent. Compared to most Western countries, America's relatively low price of highway fuel has given nearly our entire population the ability to access a wide array of employment, shopping and recreational destinations in whichever vehicle-type suits their family needs. Roads and cars yield important societal benefits as well: according to the Progressive Policy Institute, the best hope for long-term employment for America's poorest citizens is through access to a reliable car – more so than any government program or the availability of public transit. We are extremely fortunate to live in a country where, even in urban areas, more than 90 percent of people have at least one family car. The freedom and opportunity that comes from driving a car is a major part of the American dream.

Sustainable Mobility: An Introduction

Not surprisingly, most Americans do not want their mobility restricted through pain at the pump. Yet, we also generally agree on the importance of energy efficiency, sustainability and conservation. Are these core values contradictory? A new concept known as "sustainable mobility" holds great promise for aligning these values and creating both environmental progress and enhanced personal mobility.

Around the world, automobile companies have led the way in advancing the sustainable mobility concept. Industry focus areas include new technology deployments accelerated by fleet renewal, as well as support for traffic flow improvements and EcoDriving educational programs. Energy industry advancements for both traditional and alternate fuels are also a major benefit to the vehicle industry. Other chapters of this publication discuss energy advancements in detail.

CAFE Standards

Many industries observed with great interest when auto manufacturers dropped their longstanding opposition to increased corporate average fuel economy (CAFE) standards in 2007. At the time, the industry supported raising CAFE to 35 miles per gallon (mpg) by 2020. In 2009, auto industry chief executives supported an even tougher standard of 35.5 mpg by 2016 that created the first national standard for both fuel economy and greenhouse gas emissions. These new rules made the auto industry the first major industry to be regulated for greenhouse gases by the U.S. Environmental Protection Agency.

Internal Production Efficiency

The auto industry is also improving internal efficiencies that affect the life-cycle energy costs that motorists don't directly notice. Carmakers now conduct complete reviews of the entire supply chain of raw materials and component selections with a focus on reusing, recycling and recovering products. They also implement low environmental impact production processes and ask the same from their suppliers. Finally, a focus on more efficient logistic and transport systems reduces energy use and saves time and money.

Vehicle Technology Progress

For consumers, vehicle manufacturers are accelerating the development of new technologies, including low and even zero emission vehicles, through massive research and development investments and deployment. The total global R&D investment by automakers was over $86 billion in 2008. Carmakers compete to develop new ways to improve the efficiency of their products, focusing on a broad array of approaches that allow for the most marketable, cost-effective technologies to take hold. Public policies that are based on performance metrics rather than specific technology mandates lead to optimal, least-cost solutions that maximize the public good. As technologies develop, consumer tax incentives compensate early adopters for these cost premiums and accelerate market penetration. Faster public acceptance of new technologies leads to more progress on additional generations of advancement.

The Importance of Fuel Price Stability

Fuel price stability is a critical factor in the research, development and deployment of new efficiency technologies. Sudden fuel price spikes have created problems for the advancement of rational vehicle technology programs. Price spikes in the summer of 2008, for example, created sudden and short-lived changes in vehicle preferences. By early 2009, the consumer preferences for light trucks and SUVs re-emerged. For highway users, stable and reliable production of domestic and other energy resources is critical to a stable vehicle technology market.

Accelerating Fleet Renewal

The average vehicle on the road is more than eight years old and it takes about 15-18 years to replace vehicles that are currently on the road, so accelerating fleet turnover is a tool to speed the deployment of new technologies. Tax incentives to scrap older, more polluting vehicles have been used in many countries, including the United States. For example, new cars sold or leaded under the "Cash-for-Clunkers" program had an average fuel consumption that was 34 percent lower than the vehicles they replaced.

Traffic Flow Improvements

Traffic flow improvements are another driver-friendly way to improve the efficiency and sustainability of automobiles. According to the Texas Transportation Institute, traffic congestion alone wasted 2.8 billion gallons of fuel in 2007. Another study, by the American Highway Users Alliance found that over 20 years, congestion relief at the worst 233 traffic bottlenecks could save 40 billion gallons of fuel and reduce wasted fuel by 77.2 percent. Solutions include infrastructure investments, intelligent transportation systems, improved logistics systems, traffic light synchronization and carpooling programs.

EcoDriving

EcoDriving is a promising behavioral strategy that does not impose the kind of draconian mobility restrictions favored by anti-highway activists. Eco-driving training programs include techniques to increase fuel efficiency such as keeping a uniform pace, predicting traffic trends, using higher gears, avoiding passing, proper tire inflation and reducing unnecessary loads. Eco-driving courses have yielded excellent results at low costs. In a U.S. study, 48 volunteers trained in eco-driving showed an average 24 percent improvement in fuel economy as a result of the training. If all Americans practiced EcoDriving, it would be equivalent to 450 billion emission-free miles of travel each year. Information about EcoDriving can be found at http://ecodrivingusa.com.

Conclusions

Sustainable Mobility practices create a toolkit of beneficial practices that will increase the energy efficiency of cars, vans, light trucks and SUVs. By achieving win-win solutions that embrace both the environment and freedom, we can move forward without a polarizing debate over the relative importance of either. After all, drivers care deeply about both. With the combined efforts of motorists and the highway, auto and energy industries, we are making strong progress toward a brighter future.

About the American Highway Users Alliance

The American Highway Users Alliance represents motorists, RV enthusiasts, truckers, bus companies, motorcyclists, and a broad cross-section of businesses that depend on safe and efficient highways to transport their families, customers, employees, and products. Highway Users members pay the taxes that finance the federal highway program and advocate public policies that dedicate those taxes to improved highway safety and mobility.

On the Web:
http://www.highways.org

Iron & Steel

American Iron and Steel Institute

American Iron and Steel Institute

"If all industries were as interested in the environment as steel, the habitats for both animals and mankind would be dramatically improved."

– Jan Hartke, former Executive Director, EarthVoice

Industry Commitment

The American Iron and Steel Institute (AISI) has long identified environmental stewardship and commitment to sustainability as part of our industry's strategic plan and our vision for the future. As we have in the past, we will continue to actively examine strategies to advance that vision and our commitment to global leadership for our sector.

As a result of this commitment, we are aggressively seeking ways to reduce our environmental footprint even while producing the advanced and highly recyclable steel that our economy needs. In fact, the American steel sector is recognized as having the steepest decline of total air emissions among nine manufacturing sectors studied in the U.S. Environmental Protection Agency's (EPA) 2008 Sector Performance Report.[1]

The steel industry's long-standing commitment to sustainability is backed by significant investment in state-of-the-art facilities that improve energy efficiency, reduce carbon emissions and heighten productivity. We have also been a leader in reducing energy intensity in steel manufacturing processes and correspondingly reducing greenhouse gas emissions through recycling and process innovation. Since 1975, steel companies have invested over $60 billion on new technologies, and that investment has paid off. By deploying new steelmaking technologies, and through the innovation of the women and men working on the plant floor, the industry has reduced energy intensity per ton of steel shipped by 30 percent since 1990 and has reduced emissions per ton of steel produced, for that same period, by 35 percent. The American steel industry, in fact, is the only significant industry in the U.S. that has reduced its total energy consumption while increasing its production from 1990 to 2005.[2]

Steel is fundamental to American society and to our modern way of life. Our nation's energy supply, transportation infrastructure, urban centers, clean water and safe food supply all depend on steel.

Manufacturing steel by today's steelmaking processes produces CO_2 as a by-product. CO_2 is one of the major greenhouse gases identified as contributing to climate change. On average, 1.14 tons of carbon dioxide was emitted in 2007 for every ton of steel produced in the USA.[3] One of the American steel industry's objectives is to reduce this figure by lowering the carbon footprint of our products throughout their life cycle, including the development of increased resource and energy efficiency in the production of steel and during the use of steel products. As part of that objective, we actively promote the recovery, reuse and recycling of steel.

Recycling

AISI's long-term focus on recycling has resulted in a continuous steady rise in the recycling rate for steel. For example, the steel can has outperformed the aluminum can for the past several years by having a higher recycling rate.[4]

The overall recycling rate of steel has reached an all-time high based on the most recent data compiled through 2008, with an overall recycling rate of 83.3 percent.[5] As a result of this high recycling rate, steel scrap is the American steel industry's number one raw material. Surprisingly, the industry still must work to make the public aware that steel is the most recycled material on the planet. In fact, more steel is recycled each year than aluminum, paper, glass and plastic *combined*. Steel is the engine that drives the recycling of many consumer goods as evidenced by computed recycling rates for the following products: automobiles (100 percent), appliances (90 percent) and steel packaging (over 65 percent).[6]

Life Cycle Analysis

Innovation has led to the introduction of a wide variety of new steels. In fact, 50 percent of the steels used to make automobiles today did not exist just 10 short years ago. The efficiencies gained from using lighter-weight yet higher-strength steel components are impressive. Such mass savings not only conserve material but, when taken in the context of life cycle assessment (LCA), help, as well, to achieve significant emissions reductions. If, for example, currently available Advanced High Strength Steels (AHSS) were applied throughout the present U.S. automotive fleet, Greenhouse Gas Emissions from automobiles would be reduced by approximately 12 percent – an amount greater than the emissions generated by the entire American steel industry today.[7] This reduction in emissions is, in fact, occurring already as automotive designers around the world use increasing amounts of AHSS in their vehicles.

In considering greenhouse gas emissions, this LCA approach is essential to measuring the real environmental impact of a material. It considers the total greenhouse gas emissions generated by the production, use and end-of-life (recycling or disposal) phases of a product. Of course, some materials are lower density than steel and they might, at face value, seem to offer environmental advantages. However, LCA demonstrates that steel offers superior environmental benefits largely because of its relatively low production energy (in comparison to other materials), its recyclability, structural progress and the tremendous process efficiencies the industry has achieved.

Breakthrough Technologies

The U.S. steel industry has the lowest overall energy consumption per ton of production and the lowest CO_2 emissions per ton of production in the world.[8] Production of steel in the U.S. as compared to other parts of the world is therefore environmentally-preferable. Because of advances in energy management over the last two decades, U.S. steelmaking processes are highly optimized and further efforts will be made to continue to achieve incremental improvements. However, in order to continue to make major reductions in future energy use, new processes are required.

The development of new methods of making steel requires completely fresh and innovative thinking into new transformational processes for making steel.

The American steel industry is currently conducting research on the next generation of iron and steelmaking technologies that will dramatically reduce or eliminate CO_2 emissions. This research is called the CO_2 Breakthrough Program.[9] These new "breakthrough technologies" are being developed over the next 15 to 20 years. Accordingly, any proposed CO_2 reduction regulations must recognize the time required for these technologies to first be fully developed and tested in order from them to then become commercially available. Widespread adoption of new technology historically has proven to take from two to three decades in our industry.

An example of a breakthrough technology project is the current program with Massachusetts Institute of Technology to produce iron by molten oxide electrolysis

(MOE). The technique generates near-zero CO_2 emissions.[10] A second project called "Ironmaking by Hydrogen Flash Smelting," now being conducted at the University of Utah, replaces carbon as a blast-furnace fuel with hydrogen.[11] These projects represent significant steps towards carbon-free ironmaking since both will have near-zero CO_2 emissions if successful.

In the nearer–term, AISI members are also developing the Paired Straight Hearth Furnace, a high productivity, low energy ironmaking unit that can process steel plant wastes, as well as virgin iron materials. Using coal instead of coke, this type of equipment will be available for commercial demonstration in less than five years.

These research investments make clear steel's commitment to a sustainable future. The results thus far are promising. AISI recognizes that these projects represent long-range research and development that could fundamentally change the way steel is produced. With Congress and the country focused on the issue of climate change, America's steel industry is demonstrating that it will be part of the solution to this challenge.

Notes

[1] 2008 DOE Sector Strategies Performance Report.
[2] U.S. EPA Report on Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 - 2005
[3] AISI Statistics.
[4] Steel Recycling Institute, 2008.
[5] Steel Recycling Institute, 2008.
[6] Ibid.
[7] AISI
[8] Based on AISI Statistics, world steel statistics and comparative data analysis.
[9] "Steelmakers to launch CO_2 breakthrough program; international effort aims to develop enabling technologies to reduce CO2 emissions," November 19, 2003, AISI press release.
[10] *Engineers forge greener path to iron production*, MIT Newsletter, August 25, 2006. http:web.mit.edu/newsoffice/2006/iron.html
[11] *Environmental Briefing*, Washington, D.C., by Dr. H.Y. Sohn, University of Utah, April 2008.

About the American Iron and Steel Institute

AISI serves as the voice of the North American steel industry in the public policy arena and advances the case for steel in the marketplace as the preferred material of choice. AISI also plays a lead role in the development and application of new steels and steelmaking technology. AISI is comprised of 23 member companies, including integrated and electric furnace steelmakers, and 138 associate and affiliate members who are suppliers to our customers of the steel industry. AISI's member companies represent approximately 75 percent of both U.S. and North American steel capacity.

On the Web:
http://www.steel.org

Public Power

American Public Power Association

The American Public Power Association (APPA) is the national trade association representing the interests of the nation's 2,009 publicly-owned electric utilities in 49 states, all but Hawaii, that collectively serve 45 million Americans. Publicly-owned electric utilities are not-for-profit public enterprises, often affiliated with the municipal government structure, but others have been formed on county or state lines – public utility districts and irrigation districts are a couple of examples. Public-power utilities are locally regulated by elected or appointed boards and/or city councils and mayors, which make them uniquely suited to respond to the needs of their particular communities, and have often spurred innovation, as will be discussed in more detail below.

Of the 2,009 public power utilities nationwide, 70 percent are located in communities of 10,000 or less. However, there are also a number of medium and large cities served by public power utilities, including Springfield, Missouri, Seattle, Washington, San Antonio, Texas, and Jacksonville, Florida. This size diversity is mirrored by the diversity of assets owned and operated by each utility. The majority of public power utilities are distribution systems that purchase power from others and pay to transmit the power over large transmission lines owned by others. But, others own a variety of generation and transmission facilities in addition to distribution systems. Public power's generation portfolio is diverse, with 36.6 percent of the capacity being natural gas, another 27.7 percent coal, 19.1 percent hydropower, 8.1 percent nuclear, 7.8 percent oil and .8 percent non-hydropower renewables. Approximately 1,000 public power utilities also have some form of either internal or external communications networks.

APPA was established in 1940 as a nonprofit, nonpartisan organization. Its purpose is to advance the public policy interests of its members and their customers before the federal government and to provide member services to ensure adequate, reliable electricity at a reasonable price with the proper protection of the environment.

It is important to note that public power provides electric service to approximately 15 percent of the country. The remaining end-use electricity is provided by for-profit, investor-owned utilities (68 percent), not-for-profit, privately-owned rural electric cooperatives (13 percent) and power marketers (four percent).

While the definition of sustainability varies within the electric utility industry, for purposes of this discussion, we will focus on both end-use programs that have been implemented by our members to enhance energy efficiency and programs to enhance efficiency at the utility itself (transmission and distribution line capacity improvements, for example). Public power utilities continue to seek ways to meet growing electricity demand and manage increasing energy costs

while reducing the impact of electricity generation on the environment. Increasingly, energy efficiency is viewed not as a social program but as a resource that should be incorporated into utility resource planning.

The benefits of energy efficiency programs are myriad. They can provide both capacity and energy savings, lower fuel costs, defer generation investment and reduce required reserves. Given the often high cost of building new generation, as well as the environmental considerations, it can be more cost-effective to save kilowatt hours rather than adding them. In addition, energy efficiency can: help a utility manage increasing energy costs; provide customers with tools to save energy and have more control over their energy bills; help meet the continued growth in electricity demand from rising population and the increased use of larger and more sophisticated electronics products that often require more electricity than in the past (HDTV, for example); help delay or avoid construction of new generation in some situations; contrastingly, build support for new generation development once the utility demonstrates a commitment to energy efficiency; demonstrate environmental stewardship by reducing emissions from power plants; potentially improve a utility's ability to respond to climate change laws or regulations; gives utilities opportunities to help commercial and industrial customers minimize electricity usage and thereby increase their profitability, which can also help with economic development efforts in the community.

Energy efficiency aligns well with public power utilities' mission to act in the best interests of their communities and serve their customers at the lowest possible cost because these programs seek to reduce use and therefore can reduce customers' bills. In addition, because public power utilities are located in their communities and locally-regulated, they can cater their energy efficiency programs to the specific needs of their customers. This has resulted in innovative programs being developed in public power communities well in advance of the current emphasis on the issue and increase in federal grant money. For example, in 1990, citizens in Burlington, Vermont, voted to issue a $11.3 million energy conservation bond, which allowed them to initiate their successful energy efficiency program, that is still in place today. Also, since 1983, Emerald People's Utility District in Oregon has had a resource planning citizens' advisory committee to help plan the future power supply resources for the utility, with energy conservation being a key part.

More recently, public power utilities have launched aggressive programs to encourage customers to undertake a variety of energy efficiency measures. In San Antonio, CPS Energy undertook the "Million Bulb Challenge" to encourage customers to trade in their incandescent bulbs for energy-saving CFL bulbs. The utility provided rebates for the bulbs, which are more expensive than incandescent bulbs, but last longer and use much less energy. Within 10 months, the customers had cashed in and traded nearly 1.5 million bulbs. This bulb exchange has saved more than 3.9 megawatts of electricity, enough to power 2,200 San Antonio homes.

Launched in the spring of 2009, North Carolina's Hometown Green program, advertised by the slogan "Painting the Town Green" and run by public power utilities in the state, is intended to raise awareness of energy efficiency (and renewable energy) options in the state. Components of the program include: energy efficiency kits and audits; online calculators for determining the energy use of appliances; and easy-to-use tools for comparing the efficiency of heating/cooling and water-heating systems.

Beyond these anecdotal examples of a few public power energy efficiency programs, APPA surveyed our members in 2008 about the status of their energy efficiency/demand-side management (DSM) programs. Some notable results were: 72 percent of the respondents had improved their transmission and/or distribution efficiency over the previous five years, and 76 percent had plans to do so over the subsequent five years; 63 percent of all respondents had energy efficiency/DSM/energy conversation programs in place, and 90 percent planned to expand these programs in the subsequent five years; the most common programs offered to commercial and industrial customers are energy audits, lighting, bill stuffers or newsletters, incentives, rebates or

financing and energy education programs, lighting programs were identified as the most effective in terms of reducing demand, saving energy and customer popularity; and, finally:

Only 22 percent of those public power utilities engaged in energy efficiency, DSM and conservation are receiving federal or state funding to do so.

While more can and will be done on energy efficiency and other sustainable practices by public power utilities in the coming years, it is clear that these community-owned utilities are responding to their customers' needs in this area, with or without federal mandates or incentives. However, as federal incentives are created, it is important to provide parity across the electric utility sector so that those communities that need additional help to implement important energy efficiency programs can do so.

About the American Public Power Association

Based in Washington, D.C., APPA is the national service organization for the nation's more than 2,000 community- and state-owned not-for-profit electric utilities serving 45 million customers.

On the Web:
http://www.appanet.org

Trucking & Distribution

American Trucking Associations

In 2008, the American Trucking Associations (ATA) committed to a bold sustainability program that will have an immediate impact on the environment, reducing fuel consumption by 86 billion gallons and reducing the carbon footprint of all vehicles by nearly a billion tons over ten years. With its 37,000 members and affiliated organizations, ATA has positioned itself to make a major contribution toward industry-wide corporate sustainability and energy efficiency.

By implementing the following six recommendations, ATA is confident that the trucking industry can make a significant contribution to sustainability while continuing to meet its obligations to its customers, its employees and to the nation's economy.

1. Speed limits and speed governing — enact a national 65 miles per hour (mph) speed limit for all vehicles, and govern truck speeds at 65 mph for trucks manufactured after 1992.

A truck traveling at 75 mph consumes more than 20 percent more fuel than one going at 65 mph. Bringing speed limits for trucks down to 65 mph would save 2.8 billion gallons of diesel fuel in 10 years and reduce carbon dioxide (CO_2) emissions by 31.5 million tons. Automobile consumption of gasoline would drop by 8.7 billion gallons, with an accompanying drop in CO_2 emissions of 84.7 million tons. More aggressive enforcement would further reduce fuel consumed and carbon produced.

2. Support national fuel economy standards — setting technologically feasible fuel economy standards for medium and heavy-duty trucks can reduce fuel consumption if they do not compromise the performance of the vehicles.

ATA supports increasing fuel economy standards for commercial medium and heavy-duty trucks that are technologically feasible and do not compromise truck performance. Given that fuel economy in the industry has remained flat over the last quarter century and fuel is the second largest operating expense for many fleets, it is more critical than ever to promote standards for increased truck fuel economy.

3. More productive truck combinations — allowing broader operation of higher productivity vehicles, including single tractor trailer maximum gross vehicle weights of 97,000 pounds, use of heavier double 33-foot trailers and expanded use of western longer combination units.

Permitting truck combinations to be more productive can help decrease the industry's carbon footprint, reducing fuel consumption both by reducing congestion and the number of trucks needed on the road. A large body of research shows that by easing restrictions

on truck sizes and weights, increased volumes of freight can be moved per amount of fuel consumed. A reduction of 294.7 million tons of CO_2 could be achieved with these changes.

4. Congestion reduction — improved highway infrastructure would reduce congestion and further reduce carbon emissions — highway infrastructure improvements should be paid for with a dedicated fuels tax if necessary.

Congestion relief is one of the most viable strategies for reducing carbon emissions. Dealing with the inadequacies and the bottlenecks in the nation's highway system is necessarily a long-range challenge. ATA recommends a 20-year program, with an initial focus on fixing critical bottlenecks, followed by a program to increase traffic flow in critical freight corridors. These improvements require dedicated revenue, which could be generated by an increased fuels tax. If congestion in all 437 urban areas were eliminated, the reduction in truck CO_2 emissions would be 45.2 million tons over ten years.

5. Idling — pursue a federal solution that reduces non-discretionary idling through highway infrastructure improvements and reduces discretionary idling through financial incentives for technology improvements.

Idling in congested traffic or running the engine to keep the driver warm or cool while resting, annually consumes an estimated 1.1 billion gallons of diesel fuel. Reducing discretionary idling (for truck cab heating and cooling) can be achieved with the deployment of anti-idling technologies that reduce fuel consumption. Options currently available to fleets to minimize idling have the potential to reduce CO_2 emissions by an estimated 61.1 million tons over ten years.

6. Fuel efficiency — encourage fuel efficiency improvement through carrier and shipper participation in the U.S. Environmental Protection Agency's (EPA) voluntary greenhouse gas reduction program known as the SmartWay Transport Partnership program.

Fuel efficiency improvement hinges on reducing the amount of fuel consumed by an entire truck fleet relative to the amount of cargo moved over a given distance. The EPA's SmartWay program encompasses the entire freight industry – shippers, truckers, rail carriers, even dealer service centers and truck stops. Trucking companies must develop three-year plans to reduce fuel consumption and greenhouse gas emissions to qualify as SmartWay members and use the program logo. Since 2004, partners have reduced fuel consumption by 1.5 billion gallons and reduced CO_2 emissions by 16.2 million tons – the equivalent of taking 2.88 million cars off the road. Over the next nine years, CO_2 reductions under ATA's plan are estimated at 119 million tons.

In an industry with thin profit margins and escalating fuel costs, increasing fuel efficiency and minimizing fuel consumption are major goals of any trucking company. Those goals coincide with the global need for industries to reduce their carbon footprint and to lessen their environmental impact. ATA firmly believes that advancing the recommendations in its sustainability plan will significantly reduce the carbon footprint of the trucking industry while moving the nation's freight more efficiently.

About the American Trucking Associations

Founded in 1933, the American Trucking Associations (ATA) is the largest national trade association for the trucking industry. Through a federation of other trucking groups, industry-related conferences, and its 50 affiliated state trucking associations, ATA represents every type of motor carrier in the United States. ATA strives to serve and represent the interests of the trucking industry with one united voice; to influence in a positive manner Federal and State governmental actions; to advance the trucking industry's image, efficiency,

competitiveness, and profitability; to provide educational programs and industry research; to promote safety and security on our nation's highways and among our drivers; and to strive for a healthy business environment.

On the Web:
http://www.truckline.com

Heavy Equipment Manufacturing

Caterpillar

Caterpillar makes sustainable progress possible. It is how we do business. It's a serious commitment and a real business opportunity, now and in the future. Good things happen for our customers and our world when we integrate sustainability into our products, services and solutions. We improve our competitiveness and create and capture customer value while saving money and reducing environmental impacts. We are committed to providing our customers around the world with more sustainable solutions that not only help their businesses succeed but also help improve their efficiencies while reducing environmental impacts.

Caterpillar recognizes that providing sustainable solutions starts with having sustainable operations. To demonstrate our commitment, we have established corporate long-term aspirational goals focused on sustainability for all company operations worldwide. By 2020, Caterpillar aims to increase energy efficiency by 25 percent, reduce greenhouse gas emissions by 25 percent, use alternative or renewable sources to meet 20 percent of energy needs, hold water consumption flat, as well as eliminate waste by reducing waste generation and reusing or recycling all that remains.

Global energy consumption is rising rapidly, driven by worldwide population growth, swiftly developing economies, improving global living standards and the burgeoning use of electricity. With global energy demand expected to increase as much as 40 percent by 2030, innovative solutions to develop energy from non-traditional sources are essential and represent tremendous opportunities. Of course, efficient harvesting and processing of traditional resources will continue to play a dominant role in global energy needs as well.

The world has only just begun to tap the energy potential generated by natural organic processes. Caterpillar supplies our customers with power systems that support alternative energy sources - one of the many ways we leverage technology to meet customer demands.

One example of how we're providing customers with more sustainable, highly efficient energy solutions is our work to convert biogas into useful energy. It is a compelling competitive advantage that ensures a winning scenario for our business, our customers and our world. Our efforts culminate in our reciprocating engine and gas turbine products – providing unparalleled availability, high performance and cost-effective reduction of fugitive methane gas. Caterpillar gas engines are the preferred choice for coalmine methane, landfill gas and biogas markets around the world.

The following are some real-world examples of how we're working with our customers to apply these exciting new technologies around the world.

Coal Mine Methane (CMM) Applications

Significant methane gas is released during the coal mining process. Predrainage of the gas is typically required to enhance mine safety. Traditionally, the drained gas is flared or simply vented to the atmosphere. One effective use of this CMM is to utilize it in a gas engine and convert the chemical energy into power and heat.

Caterpillar has been involved in providing gas engine technologies for CMM applications for more than 20 years and has participated in successful applications around the globe. In China, ninety Cat® G3520 CMM gensets help power the Jincheng Phase 1 (JC1) CMM project in Sihe, Jincheng City, Shanxi Province. Commissioned in 2008, it is the world's largest CMM cogeneration power plant. *In the JC1 project, both the exhaust waste heat and the jacket water waste heat are recovered, yielding an overall plant efficiency of over 80 percent.* The 180 MW of total power produced is exported to the provincial grid to support the fast growing Chinese economy.

Landfill Gas (LFG) and Biogas (BG) Applications

Methane gas is produced during the anaerobic decomposition of municipal and industrial solid waste in traditional or managed landfills – called landfill gas (LFG). It can also be produced during fermentation of organic animal, agricultural and industrial waste and/or wastewater – called biogas (BG). In the past, the LFG and BG were left untreated and vented to the atmosphere leading to significant amounts of fugitive emissions and bad odor. Today, combustion engines are replacing traditional flaring techniques to reduce and control LFG and BG and to convert it to useful energy.

Caterpillar has been involved in providing gas engine technologies for LFG applications for more than 30 years. One example is the South East New Territories Landfill, located in Hong Kong. The site installed two Cat® G3516 landfill generator sets in 1997. Each unit is rated at 970 kW, providing 1.9 MW of continuous power for the landfill infrastructure and an on-site wastewater treatment plant. The units operate in parallel with the local utility, exporting excess power to the grid. An example of how Cat® BG technology can be successfully applied is the Nong Rai Farm in Rayong, Thailand. The Nong Rai Farm sought a means of tapping its biogas resources to fuel electrical generators for on-site power. The farm partners with the CP Group, one of the largest food suppliers in Thailand, and operates a feeder operation for more than 30,000 hogs. Nong Rai Farm consumes approximately 200 kW of power for blowers, drying systems and other auxiliary needs associated with its operations. Cat® G3406NA and G3306NA gas generator sets produce enough power for all of Nong Rai Farm's electric power requirements.

Combined Heat and Power (CHP) Applications

Combined heat and power (CHP) is the primary application for Caterpillar subsidiary Solar Turbines' power generation products. CHP is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat. It is one form of energy recycling. In this configuration, it is possible to more than double the useful energy output from a typical generator set through utilization of the substantial amount of energy in the turbine exhaust stream. In addition to this highly efficient form of energy conversion, it is possible for CHP units to operate on renewable or waste fuels, including landfill gas, digester gas and refinery off gases.

An application in which Solar Turbines' generator sets are prominent is the coke production process of the steel-making industry. Turning coal into coke – used in steel-making blast furnaces – creates gases, which are often released to the air, missing an opportunity to turn waste into energy and at the same time reduce emissions.

Solar Turbines is helping customers use the gases as a fuel for CHP generation. They can recycle the gases into much-needed energy, while reducing overall impact on the environment. In 2008, Solar customer Jinneng, a coal gasification company from the Shandong Province of China, became the first company outside of the U.S. to win the Environmental Protection Agency's (EPA) International CHP Award. The award is given

to a CHP system that demonstrates considerable fuel and emissions savings over comparable forms of conventional electrical and thermal energy generation. EPA estimates that this CHP system effectively reduces carbon dioxide emissions by 40,000 tons per year, which is the equivalent of taking 6,600 cars off the road.

Progress Rail - Reducing Waste and Improving Efficiency

Caterpillar subsidiary Progress Rail Services is a leading service provider to the rail industry. Its extensive service and supply network operates reconditioning and recycling and return programs that harvest reusable components, reduce waste, save energy and minimize the consumption of raw materials needed to produce new parts.

Upgrading older, less efficient diesel locomotives to meet more stringent emission standards and improve fuel efficiency is one way Caterpillar helps our rail customers not only get their work done while meeting their long-term sustainability goals but do so while improving their operating efficiency.

Progress Rail Services combines its expertise in remanufacturing locomotives with Caterpillar's expertise in enhanced electronics and engine systems integration to reduce overall fuel consumption significantly – by as much as 17 to 40 percent – and reduce regulated locomotive emissions by 50 to 90 percent. Several of the locomotive models are capable of meeting the U.S. Environmental Protection Agency Tier 2 or Tier 3 locomotive emissions standards, and certain configurations qualify as "Ultra-Low Emissions Locomotives" as defined by the California Air Resources Board (CARB).

Remanufacturing – Energy Efficiency, Conservation and Customer Value

Caterpillar Remanufacturing & Sustainable Solutions Division returns end-of-life components to same-as-new condition while reducing waste and minimizing the need for raw materials to produce new parts. Cat Reman recycles more than 100 million pounds of end-of-life iron annually, much of which is used for remanufactured engine, transmission and hydraulic components.

Remanufacturing is an advanced form of recycling that transforms end-of-life goods into "like-original-new" products and provides them to the marketplace on an exchange basis. This exchange process insures recovery of end-of-life goods so they can be remanufactured or recycled. Caterpillar has remanufacturing expertise in industrial gas turbines, diesel and gas engines, powertrain components for automotive and industrial products, and rail – both locomotives and rolling stock. Through remanufacturing, we make one of the greatest contributions to sustainable development – keeping nonrenewable resources in circulation for multiple lifetimes.

Studies have shown that the process of remanufacturing requires 85 to 95 percent less energy and material than manufacturing the same, new component. Caterpillar's proprietary technologies salvage a significant percentage of original material, thereby reducing new parts usage. Our remanufacturing process on average maintains 70 percent of the original product materials. Remanufactured components are an excellent repair option for customers, offering a same-as-new warranty for a fraction of the cost. But remanufacturing is about more than just cost; it's about being sustainable in our operations. The environmental impact of remanufacturing end of use products versus creating products from new materials is substantial.

About Caterpillar

For more than 85 years, Caterpillar Inc. has been making progress possible and driving positive and sustainable change on every continent. With 2009 sales and revenues of $32.396 billion, Caterpillar is the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines and industrial gas turbines. The company also is a leading services provider through Caterpillar Financial Services, Caterpillar Remanufacturing Services, Caterpillar Logistics Services and Progress Rail Services.

On the Web:
http://www.cat.com

Colorado Farm Bureau

The term "sustainability" with regard to the United States agricultural industry has many different definitional meanings that vary greatly depending on individual's viewpoints. One first needs to ask: can anything really be sustainable? What do we want to sustain? How can we implement such a nebulous goal? Does sustainable agriculture mean growing food organically or should a farm which uses conventional methods (fertilizers and chemicals) that has been in operation for multiple generations be considered "sustainable?"

The word "sustain," from the Latin sustinere (sus-, from below and tenere, to hold), means to keep in existence or maintain, implies long-term support or permanence. As it pertains to agriculture, sustainable describes farming systems that are "capable of maintaining their productivity and usefulness to society indefinitely. Such systems, according to one U.S. researcher, must be resource-conserving, socially supportive, commercially competitive, and environmentally sound."

Sustainable agriculture was addressed by Congress in the 1990 Farm Bill (Food, Agriculture, Conservation, and Trade Act of 1990). Under that law, "the term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs
- enhance environmental quality and the natural resource base upon which the agricultural economy depends
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- sustain the economic viability of farm operations
- enhance the quality of life for farmers and society as a whole."

The vast majority of U.S. agricultural producers view sustainability through the prism of their ability to increase food and fiber production more and more efficiently over a long (sustained) period of time. As a whole, U.S. agriculture has done just that. Food and fiber production has come a long ways in the last 50 years. In the 1960s, each U.S. farmer raised and grew enough food annually to feed 26 people. In 2010, each U.S. farmer will raise and grow enough food annually to feed 155 people.

While less than two percent of the U.S. population is involved directly in farming and ranching, agriculture supports over 24 million American jobs. A whopping 42 percent of the world's corn supply is produced here in the U.S. Farmers and ranchers provide food and habitat for 75 percent of the nation's wildlife.

The efficiencies developed within agriculture over the last 50 years have led to a safe, abundant and affordable food supply for the U.S. population. Today, Americans enjoy the luxury of spending less than 10 percent of

their disposable income on food. This is by far the lowest of any country in the world.
To be clear, the business of food production is energy intensive. Agriculture uses energy in the form of fuel to operate machinery, natural gas used in the production of fertilizers and chemicals and various forms of energy to pump water for irrigation and to operate dryers to dry grains. In total, U.S. agriculture consumes approximately 1.5 quadrillion BTUs of energy annually to produce food and fiber for U.S. and global consumers. This does not account for the significant amount of energy used to further process and refine the food and fiber raised by U.S. farmers and ranchers into the finished and convenient food products that consumers enjoy purchasing on a regular basis.

The efficiencies that have led to a more sustainable U.S. agricultural industry have come in large part through technology advancements and specifically through bio-technology breakthroughs. Biological technology advancements and gene technology have led to crops that require less water or less fertilizer, crops that require less pesticides and herbicides, all this leading to greater and greater food and fiber production while using less energy-intensive inputs. As a matter of fact, U.S. agricultural producers are producing more food and fiber in history and the industry is doing it while using 50 percent less energy-related inputs than they did just two decades ago. This is not only efficient; it is sustainable.

As efficient and sustainable as U.S. agriculture has become, there are limitations to agricultural-based technology, and eventually, more energy will be required if we are to hope to keep up with the ever-growing global demand for food and fiber.

To put this in perspective, the world population is growing at a rate of 200,000 people each day. By 2050, an additional 2.5 billion people will inhabit this planet. Farmers across the world will need to produce as much food in the next 50 years then was produced in the last 10,000 years combined. That is an awesome challenge for the U.S. and global agricultural industry…one that the industry is ready to tackle head on.

It won't be easy. As the global population continues to increase, farmers and ranchers will need to squeeze more and more production out of every available acre and do so year after year. Certainly bio-technology will play an ever-increasingly important role, as will access to an affordable and abundant U.S. energy supply.

Without access to an affordable and abundant domestic energy supply, U.S. agriculture will not be able to lead the way in meeting the global food production challenge that lies before us. As a matter of fact, if an affordable and abundant domestic energy supply is not available here in the U.S., then food production could and likely would begin moving to those areas of the world where affordable and abundant energy supplies do exist. It should be a primary concern of most Americans that we could indeed lose much of your domestic food and fiber production in a similar fashion to what has been lost in this country from an energy production perspective.

The long-term sustainability of food and fiber production here in the United States is fragile. Can the industry sustain increased production long-term in an effort to meet increased global food demand? Yes. But only if agriculture continues to have access to new technology and to an affordable and abundant U.S. energy supply.

Like pieces of a puzzle, it will take all forms of production: conventional, organic and advanced production methods coming together and working in tandem to meet the future global demands for food and fiber. Similarly, it will take all types of energy production (renewable, conventional oil and gas, clean coal technology and advanced next generation nuclear technology) to meet the future energy needs of this country and the world. Together, we can solve both the agriculture and energy puzzles if we put our minds to it.

About the Colorado Farm Bureau

The Colorado Farm Bureau, as the premier grassroots organization, promotes the future of agriculture and protects rural values. It is a

united group of farm and ranch families who come together for the purpose of analyzing their problems and formulating action to achieve education improvement, economic opportunity, and social advancement and thereby, to promote the national well being.

On the Web:
http://www.colofb.com

Deutsche Post DHL

Until recently, cost, speed and reliability were the main criteria by which customers evaluated logistics operations. Yet, research indicates a changing attitude. Now, a fourth dimension is often included in the decision-making process: sustainability, including social, environmental and economic aspects. The quest for energy efficiency, conservation and sustainability will ultimately transform the logistics industry. The logistics industry, which includes the entire supply chain, can serve as an example for other industry sectors as they move to become more energy efficient in a new low-carbon economy.

Sustainable logistics is economically viable because it contributes to international trade and greater economic growth. With this in mind, a significant reduction in the transportation of goods and related services is not an option in today's globalized and deeply interconnected world. However, in response to market demands, and out of a sense of responsibility to customers, employees, and indeed the planet, the logistics industry should significantly reduce its fuel consumption and thereby its CO_2 emissions. The industry needs to develop and adopt promising technologies and solutions that take into account all three aspects of sustainability.

The logistics industry is already responding to increased environmental awareness and customer demand for greener products. Numerous business initiatives illustrate that reducing energy consumption (and thereby emissions) also improves cost structures and, ultimately, bottom lines. For instance, Deutsche Post DHL was the first major postal services and logistics company to offer carbon neutral products and services and the first to voluntarily commit to improving its carbon efficiency by 30 percent by the year 2020. Other logistics providers have followed Deutsche Post DHL's example and begun offering efficient logistics solutions and carbon neutral shipping, which provide significant cost savings through increased energy efficiency *and* generate value from new products and improved brand perception.

Specific Tools To Reduce CO_2 Emissions

In developing sustainable logistics, solutions and technologies need to be adjusted or developed. This is true for operations in the logistics sector where a variety of levers can help reduce carbon emissions:

- **Road Transportation Technologies**

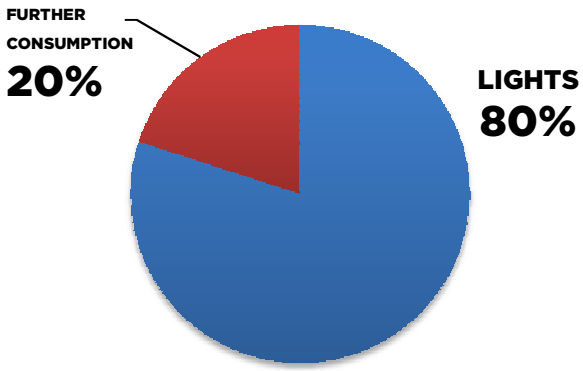
Given that road transport accounts for the major share of fuel consumed by the logistics sector, significant emphasis has been placed on developing hybrid, electric and fuel cell vehicles. These road vehicles are slowly becoming available on the market, yet high investment costs pose a major challenge. Furthermore, up to now, emphasis has been placed on the development of passenger vehicles, generally ignoring heavy freight vehicles which are indispensable for an efficient logistics industry. And while

alternative fuels are increasingly explored as a means to reduce dependence on fossil fuels and to reduce CO_2 emissions, legitimate concerns about the sustainability of the fuels, the lack of a refueling infrastructure and the limited adaptability of existing vehicles tend to slow down progress toward that objective. In the meantime, increasing the efficiency of existing methods of transportation remains key. Aerodynamics and driving behavior can play an important role. Improving the aerodynamics of trucks, for instance, can improve fuel efficiency by up to 20 percent. And while using lightweight materials for vehicle design and construction reduces fuel consumption, increasing the size of trucks can also lead to fewer vehicles on the road.

- **Aircraft And Ship Technologies**

Major improvements in aviation and maritime technologies, including better aerodynamics, more fuel efficient engines and the use of alternative fuels have been achieved. The biggest challenge, however, remains the slower fleet replacement rate compared to road transport. While some changes are being implemented to more efficiently operate aircraft and ships, thereby reducing fuel consumption, rapid and drastic improvements will be difficult to achieve.

Electricity Consumption at Logistic Facilities



- **Warehousing**

Beyond innovations in transportation, warehousing efficiency is also a prime target for conserving energy and improving the overall sustainability of the logistics sector. Warehouses consume significant amounts of energy for lighting, heating, cooling and operations. Given that up to 80 percent of the energy used in warehouses is consumed by the electrical lighting, and that it is primarily the direct responsibility of the logistics service provider instead of the property owner to pay the energy costs, savings in this area are vigorously pursued.

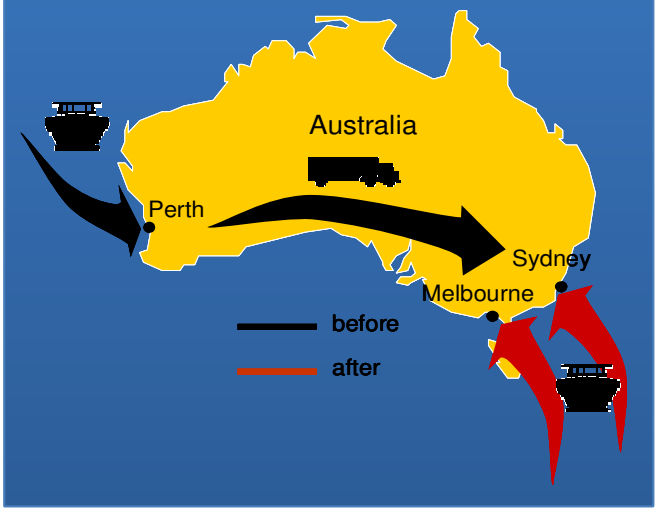
- **Employee Motivation And Process Improvement**

These factors can be critical elements in helping a logistics provider improve its sustainability-related performance. The challenge is to maintain a sustained commitment to the cause over longer periods of time, which can only happen if employees perceive behavioral changes as directly benefiting themselves.

Conceptually, solutions can be found in all areas of a typical supply chain: sourcing, manufacturing, distribution and returns.

CASE STUDY:
Supply Chain Redesign

One DHL customer in Australia cut its carbon emissions by 41% (2,600 metric tonnes) by relocating switching centers and changing transportation modes. The center was moved from Perth to Sydney removing the need for overland transport. Working with DHL, a new switching center was opened in Melbourne allowing deliveries directly to the largest customers on site instead of offloading everything in Sydney.



- **Sourcing**

Due to increased fuel prices and environmental concerns, sourcing regionally is becoming more attractive to companies. Regional sourcing can lead to a reduction in transport-related fuel consumption and carbon emissions. The contribution that sourcing can make depends on the exact modal split.

- **Manufacturing**

Reduced packaging in manufacturing, such as using light-weight or alternative materials, can lead to a significant CO_2 savings due to weight reductions.

- **Distribution**

Environmental goals can also be realized by optimizing the network design (consolidation center and multi-user warehouses), modal mix (rail as well as truck), route management and capacity management (less-than-container-load and "milk runs"). Even though these principles are not new, corporate inertia and limited decision power given to logistics service providers curtail development, thus leaving a high potential for improvement. With rising fuel costs and environmental legislation, more companies could start to apply such principles.

CASE STUDY:
City Logistics

"City logistics" is a special form of distribution tailored to the specific circumstances of cities. Rapid urbanization causes severe challenges in many parts of the world. Increased pollution, high congestion and the lack of appropriate transportation infrastructure make it particularly important to find innovative solutions for logistics, since these also influence supply chains, service levels, and utilization of space.

These complexities in turn result in inefficient logistics from both a cost and energy perspective. The key is both a holistic view and collaborative approach. Using existing infrastructure to transport freight, urban-based consolidation centers and night transportation with electric vehicles have the potential to improve the quality of life in today's cities.

- **Returns**

In end-of-life and returns strategies, load capacity of trucks can be optimized by taking returns from the store, and the need for "virgin materials" can be decreased by using spare parts and returned products.

Lack of transparency can stymie both logistics providers and their customers in their move toward greater sustainability. Information about energy consumption and eco-friendliness of products often is not easily accessible, and the varying models individual companies apply to account for their energy consumption and emissions make accurate comparisons tedious and imprecise. Private consumers and the business customers who use logistics services expect eco-labeling to become standard in the next few years. Deutsche Post DHL has worked with numerous international organizations to establish common carbon accounting standards. CO_2 labeling provides information on a product's carbon footprint, and this transparency will help customers and end consumers make more energy efficient choices.

Conclusion

Sustainability criteria are becoming increasingly important. Thus, for the logistics industry, business as usual is not an option. Shifting toward more sustainable solutions is not only mandatory but also achievable – even in the near future. While there is no silver bullet that will help businesses to swiftly and dramatically improve efficiency and cut their carbon footprint to a minimum, the consistent implementation of existing and soon-to-be available technologies, as well as the adoption of emissions-reducing, efficiency-enhancing concepts could be enough to greatly improve the sustainability of this sector.

Thus, the barriers to a significantly more sustainable logistics industry can be overcome, but all stakeholders need to embrace a change in attitudes and behavior, moving away from business-as-usual and starting today down the path toward a more sustainable future.

For more information on the role of logistics, look for the upcoming Deutsche Post DHL

report entitled *"Towards Sustainable Logistics"* which will be released in Fall 2010.

About Deutsche Post DHL

Deutsche Post DHL is the world's leading logistics group. Its integrated companies offer tailored, customer-focused solutions for the management and transport of goods and information through a global network combined with local expertise.

On the Web:
*http://*www.dp-dhl.com

The Dow Chemical Company

Dow combines the power of science and technology with the "Human Element" to innovate solutions for a more sustainable world. With over 96 percent of manufactured products enabled by chemistry, world challenges will ultimately be solved by companies like Dow, who collaborate with customers, industries, governments, academia and civil society. Our innovation engine is focused on development and commercialization of carbon mitigation, alternative energy, water purification, crop productivity, building efficiency and many more solutions that improve lives while protecting the planet. We are as committed to reducing our own footprint as we are to delivering technology that helps the rest of society do the same. In 2006, we established our second set of Sustainability Goals, which we report on publicly every quarter. Our commitment to sustainability is integral to our corporate vision, mission and values – which continue to drive change that is good for the environment, good for people and good for business.

Sustainable Business Value

The Dow Chemical Company is in the business of chemistry – a business where world challenges have their most basic connection with sustainable solutions.

Chemistry, and therefore Dow, operates at the nexus between energy and all the manufacturing that occurs in the world today. We have a unique role in helping the world manage resources effectively and sustainably – and, as a result, a unique role in enabling individuals, communities and economies to address their development needs and opportunities in a way that is both credible and sustainable.

Chemistry's role in the value chain and Dow's scale and position in global markets give us a unique perspective on the mega trends (Energy, Health & Nutrition, Infrastructure & Transportation, Consumerism) that are shaping societal development – and a unique opportunity to contribute to solving world challenges:

- A business needs not only to understand, but also to embrace the mega trends that are occurring in the world today. Mega trends are the wellspring of future markets. Many promising markets have emerged, and we see a new growth of consumerism. This drives other mega trends that are now linked with social concerns, such as demands for higher quality health care, emphasis on a secure and renewable energy supply and interest in building a more robust infrastructure.

- Sustainability must be treated as a business opportunity. Sustainability, business strategy and "brand" are the same. If we don't think that way, we create issues by failing to understand unintended consequences on society while focusing only on market opportunities. Finding creative solutions for making profit *and* enhancing society should be the prevailing business model.

- A business strategy must be executed to benefit the three pillars of sustainability: economic, social and environmental conditions. Together, these three ideas define the rules and parameters under which a company can contribute to sustainable progress. Products are discovered and manufactured through science and engineering to meet customer wants and needs. The impact of a product, however, extends beyond the question of whether the customer will purchase it. Products need to be measured across their life cycles, from production and consumption through end-of-life, balancing the impacts to the natural, social and economic environments. If any one of these three conditions is met at the expense of another, the success of a product will ultimately fade. Sustainability must connect to the conscience of an organization, but just as importantly, it needs to be seen as a platform for dynamic business growth, innovation, talent development and capital investment.

Game-changing Goals

To meet these commitments, any company that is serious about sustainability must adopt a culture of continuous improvement. In 1995, we set important public goals for improving our environment, health and safety performance. We have met or exceeded most of those goals, have come very close in others and continue to strive to improve upon all of them. As a result, our workplaces are safer, our facilities are cleaner, our energy use is more efficient, and our corporate governance is stronger and more vigilant.

In 2005, we set the bar even higher with the introduction of a more ambitious, next-generation set of goals. These 2015 Sustainability Goals focus our efforts beyond our own walls, committing Dow to stronger relationships within the communities where we operate, improved product stewardship and accelerated innovation to solve some of the world's most pressing problems and reduce our global footprint.

Dow Sustainable Solution Snapshots

Innovations for Tomorrow

- Solar shingles that will make harnessing energy from the sun practical for common households
- Next-generation high-power battery technology for hybrid and electric vehicles, supported by a $161 million federal grant
- Diesel particulate filters that reduce emissions, for higher performance and lower cost
- Pilot plant uses proprietary advanced-amine technology developed by Dow and Alstom to capture CO_2 from new or existing industrial facilities
- World's largest bio-derived plastics facility under exploration in Brazil to convert sugar cane to polyethylene

Partners for Change

- Net-Zero energy home uses 60-70 percent less energy than conventional homes by incorporating a variety of products from Dow
- Working with Algenol Biofuels to build and operate a pilot-scale algae-based integrated biorefinery that will convert CO_2 to ethanol
- Equity investment in WaterHealth International to provide sustainable, community-owned water treatment solutions for rural villages in India
- Pledged $1.5 million to The Nature Conservancy's Atlantic Forest restoration project in Brazil that will preserve water and demonstrate carbon capture methods
- Partnered with The Keystone Center for Education on high school curriculum encouraging students to use chemistry to solve global sustainability challenges

Smart Solutions for Today

- High-performance epoxies that enable lighter and stronger wind blades
- Proven heat transfer fluids that collect, transport and store solar generated heat
- Breakthrough building insulation products that help improve energy efficiency and lower utility bills
- Plastics and bonding solutions that make vehicles tougher and lighter for increased safety and fuel efficiency
- Water filtration systems that treat 9 billion gallons of water every day, including energy-reduction goals for desalination

Responsible Operations

- Since 1990, we have reduced our own greenhouse gas emissions more than 20 percent, exceeding Kyoto Protocol targets
- Over 270 Product Safety Assessments posted on our website with goal of all

applicable Dow products posted by 2015
- Terneuzen, Netherlands site re-uses municipal household waste water to save water and energy
- Implementation of Nalco cooling water technology at our largest plant in Freeport, Texas resulted in annual water savings of 4 billion gallons

The Energy Equation

Dow is an industry leader in energy management and greenhouse gas (GHG) emission reductions. Energy efficiency has been part of our heritage since the very early years of our company, when Dow helped pioneer the use of industrial cogeneration to recover waste heat to make power and steam in manufacturing products more efficiently. Since 1994, Dow has saved 1,700 trillion Btu, which is equivalent to the electrical energy used by all residential buildings in California for a full year.

Dow is one of the largest producers of innovative products that reduce energy use. Dow products range from building insulation applications, solutions for fuel-efficient vehicles, technology to enable wind power and integrated solar systems for building material applications. Specific examples include:

Dow's chemistry is essential to three 50-megawatt solar units in Spain. Using a mix of specialized heat transfer fluids (DOWTHERM™ A) to help convert heat energy into electricity, the plants will generate 150 megawatts of clean energy, enough to power 90,000 homes and save 450,000 tons of CO_2 per year.

Dow's building insulation products, like STYROFOAM™ Brand Insulation, can save up to 20 percent on heating and cooling costs, and avert hundreds of millions of metric tons of CO_2 each year. Installed in more than 20 million buildings worldwide, STYROFOAM Brand Insulation insulates over 20 billion ft^2, saving more than $10 billion in energy costs annually.

For its past efforts, Dow has been recognized by the U.S. Environmental Protection Agency (EPA) as an Energy Star Partner of the Year and by the American Chemistry Council as a recipient of the Responsible Care® Energy Efficiency Award.

Delivering Results

Dow's sustainability commitments come with an expectation of economic return on investment. When we set our first sustainability goals, we projected we would spend roughly $1 billion to fulfill them, and we expected a return on investment of roughly $2 to $3 billion – y*et, our return on investment has been in excess of $5 billion*. The more we have focused our attention on sustainability, the better our yields. The fewer resources we have consumed, the better our economic performance.

To be sustainable, a company must make products or deliver services that meet economic, environmental and social needs in an integrated way. The Dow Chemical Company strives to be sustainable and to contribute to solving some of the world's major challenges. It is our aspiration to set the standard for our industry in the sustainable application of chemistry – nothing less will do.

About The Dow Chemical Company

Dow combines the power of science and technology with the "Human Element" to passionately innovate what is essential to human progress. The Company connects chemistry and innovation with the principles of sustainability to help address many of the world's most challenging problems such as the need for clean water, renewable energy generation and conservation, and increasing agricultural productivity. Dow's diversified industry-leading portfolio of specialty chemical, advanced materials, agrosciences and plastics businesses delivers a broad range of technology-based products and solutions to customers in approximately 160 countries and in high growth sectors such as electronics, water, energy, coatings and agriculture. In 2009, Dow had annual sales of $45 billion and employed approximately 52,000 people worldwide. The Company's more than 5,000 products are manufactured at 214 sites in 37 countries across the globe.

On the Web:
http://www.dow.com

Window Film

International Window Film Association

Window film has a proven place in the current energy efficiency landscape. Today, there are more than 6,000 local window film dealers and installers in the U.S. all working toward creating and providing greater energy efficiencies through the use of cost-effective and environmentally-friendly products. The use of window film is becoming more commonplace and more property managers and consumers are starting to see the many benefits of window film including energy control, cost savings and improved safety and security. The primary barrier today to the broader adoption of window film is the lack of mainstream awareness of these benefits and the financial incentives available and quick rate of return the technology yields. With so many indisputable benefits to implementing window film, it is important to educate the consumer. With a better understanding of the overall benefits in regards to energy savings, safety and financial incentives, window film has an opportunity to support cleaner and more affordable energy efficiency and increase overall utilization.

Energy Savings and Safety Benefits

Overall window film provides significant reduction in energy demand, providing substantial energy savings for a long-term basis. Specifically, window film provides a reduction in solar gains by allowing solar heat and visible light in but providing glare control and protection from UV (both for personal and property protection); it's like having sunglasses on your windows. In northern climates, window film can lessen losses of room heat in winter and provides increased protection from UV damage – which surprisingly is stronger in the winter months, as there may be less natural shading. Additionally, the angle of incidence of UV rays reaching earth is increased the farther the location is from the equator, allowing more UV to penetrate the earth's outer atmosphere. This can result in a higher relative amount of ultraviolet energy getting through during December in Connecticut than in Florida in July. Window film may also provide safety and security benefits by controlling what happens to glass fragments if a window is broken due to any cause. Most notably, break-ins and smash-and-grabs may be avoided as window film can hold the glass fragments in the frame, attached to the film, in effect preventing easy access and further demonstrating how window film provides an efficient and effective form of physical energy control.

Advancements and Safety

Advancements in window film of which the public may not be aware include scratch resistant technology which allows for easier installation and enables windows to look better longer. For both commercial managers and home owners, maintenance with window film is easily maintained with any normal type of non-abrasive window or glass cleaner. Window film may also be the "clearest" solution, in some cases with no added color

unless desired by the customer. Windom film can be purchased from dark hue all the way to clear film, but what is most impressive is that no matter what color you choose, you may still achieve the same amount of energy control. Since much of any coloration comes from the metals used within the films, the result is greater color stability, thus adding to its long lifetime. Today, films can stop 50-85 percent of all solar energy coming through windows without being dark or shiny – a big misconception with the public.

Environmental Benefits

In addition to its safety features, energy control and ready availability, window film is environmentally-friendly. When compared to the time and energy involved in replacing windows versus installing window film, the benefits to the environment are overwhelming. Simply put – when film is installed on an existing window, the environmental cost of manufacturing an entire new window is avoided. When replacing entire windows the removal and disposal of the old windows must also be taken into account. In some cases only a portion of a window can even be recycled. Moving forward, this may be more of the case, as many existing window now have vinyl frames which create waste disposal issues since they may not be recyclable.

In addition to the environmental costs of removing and disposing of windows, another waste of energy comes from then having to actually manufacture new windows. Many new windows have vinyl frames and at least two panes of glass with at least one pane, if not two or more, treated with special coatings. All of these steps create huge energy and environmental costs that might be avoided through the use of window film on the existing window.

There are many other significant financial benefits to using window film that may vary substantially from market to market due to local labor or business costs. Some examples of these include the ability to put window films on all windows of a house for a fraction of what it would cost to replace all of those windows. The cost comparison of retrofitting existing windows for an average home: a 2,000 square foot home (about 300 sq feet of glass or 20 windows) would be approximately $1,000-3,500 for window film, depending on the climate zone and product chosen while replacing all the windows could cost $6,000-$15,000 with warranties of performance being generally comparable.

Industry Usage

Almost 200 window films now have been certified by the National Fenestration Rating Council (NFRC) for their energy performance specifications. NFRC is the only third party certification organization in the fenestration industry that has been recognized by the U.S. Congress. Window film now meets the same testing criteria for verifying its energy efficiency as windows, doors and skylights, making window film a clear choice for many leading industries. Government buildings have been using window film both for energy improvements and for mandated improvements in safety performance of the glass contained in those buildings. Window film has been proven to control glass during seismic movement; it provides hazard mitigation in bomb blasts and during wind storms, protection from UV, reduction of heat loss in winter and solar heat gain in summer, providing year-round glare control and occupant protection. Office buildings, hotels and motels (lodging) and institutional buildings (hospitals, schools, historic buildings, information storage facilities like post offices, courthouses and libraries) are the top window film commercial users across the country.

Future of Window Film

With so many indisputable benefits to utilizing window film, it is still important to educate the consumer. Many misconceptions still exist. The use of window film will not damage the integrity of the existing window – if you put the right film on a window, it works and it has been proven to do so. Thanks to more advanced technologies and implementation techniques, it is easier than ever before to incorporate window film into environmental sustainability plans. Not only does the use of window film provide financial benefits by reducing energy costs and expenditure to achieve the solution, it lessens a building's carbon footprint. There is a tremendous opportunity for more industries

to incorporate window film into their budgets and reduce their consumption of traditional energy sources while educating the next generation on the importance of consideration of this technology to adequately address future environmental concerns.

About the International Window Film Association

With so many indisputable benefits to implementing window film, it is important to educate the consumer. With a better understanding of the overall benefits in regards to energy savings, safety, and financial incentives, window film has an opportunity to support cleaner and more affordable energy efficiency and increase overall utilization. The mission of the IWFA is to partner with our manufacturers and other members to increase consumer awareness and demand for all types of professionally-installed window film products.

On the Web:
http://www.iwfa.com

Home Construction

National Association of Home Builders

National Association of Home Builders

Members of the National Association of Home Builders build about 80 percent of the new homes constructed every year. It's only natural, then, that NAHB and its members have led the industry in residential green building.

And it's only natural that homeowners and home buyers should turn to NAHB member builders and remodelers for green expertise.

While it was a very small niche in the 1990s, members of the newly formed NAHB subcommittee on green building knew it was gaining adherents – and that members were beginning to look for reputable education and training. Responding to that member demand, NAHB launched the first-ever National Green Building Conference in 1999 – the first, and now largest, educational event targeted to the green residential construction industry.

Since then, green building's growth from a niche market into the mainstream has been a gradual process in response to market demand, availability of materials and education. But in every step of the process, NAHB has led the way.

Builders increasingly incorporate more energy efficiency, water and resource conservation, sustainable or recycled products and attention to indoor air quality into the everyday process of home building. In fact, nearly 20 percent of new homes garnered Energy Star® certification in 2009 – up from about 12 percent the previous year.

Green products – like paints made with fewer noxious chemicals, or countertops made with recycled content – used to be available only by special order. Now, they're stocked by bib-box home improvement stores.

At the same time, questionable claims abound – and some builders and remodelers report "green fatigue" among their clients, who aren't sure whether the additional cost of green building is worth it. They're looking for more certainty, and NAHB is now providing it.

The kitchen in this high-end project by Chandler Design-Build, a North Carolina green builder, is high on style as well as efficient, featuring reclaimed wood on the kitchen countertops.

In 2008, NAHB launched the National Green Building Program to help accelerate regionally appropriate and voluntary, market-driven green building by providing extensive educational and training resources and a third-party green building verification program administered by the NAHB Research Center.

Today, these homes and subdivisions are inspected and certified to ICC-700, or the National Green Building Standard, developed by NAHB and the International Code Council and then approved by the American National Standards Institute in January 2009.

ICC-700 is a green scoring and certification system for new single-family and multifamily residential projects, remodeling and renovation work and residential land development projects. More than 1,600 projects had been certified by September 2010, representing more than 2,300 homes.

Among them: an affordable senior housing project outside St. Louis, a luxury apartment complex built on the site of an old parking lot near the Johnson Space Center in Texas and an Indiana development of single-family homes near the commuter train to Chicago – showing that ICC-700 is flexible enough for any residential application, from affordable multifamily units to luxury, custom single-family homes.

A tightly insulated attic in a home built by North Carolina's Eco Building Group helps keep the energy bills low.

Homes score points to earn ratings at the Bronze, Silver, Gold and ultra-green Emerald levels – but what sets the standard apart from other rating systems is its progressively more stringent requirements in all aspects of green building: energy efficiency, water efficiency, resource efficiency, indoor environmental quality, lot and site development, and homeowner operation and maintenance.

For example, a home built to the Bronze level must meet energy efficiency requirements equivalent to an Energy Star rating, or 15 percent more efficient than the prevailing code. To meet the Silver, Gold and Emerald levels, a home's projected energy efficiency must meet benchmarks of 40 percent, 50 percent and 60 percent, respectively – and meet similarly stringent benchmarks in the other five green categories.

The windows on this staircase built by Ferrier Custom Builders in Forth Worth, Texas, let in natural light so less electric light is needed.

Now, the International Code Council has incorporated the ICC-700 as the residential arm of the International Green Construction Code now in development and expected to be presented for public hearings in 2011. NAHB is advocating for keeping the rating system voluntary, however, by allowing jurisdictions the option of incorporating ICC-700 into their building codes.

NAHB has also been a leader in sustainable development.

The association's policy on smart growth principles call for efficient use of land, a

comprehensive process for planning growth, fair and balanced funding of infrastructure, revitalization of older suburban and inner city communities and a wide range of housing choices that meet the needs of families across the economic spectrum.

Builders and developers across the country have applied those principles to create strong, vibrant communities with a mix of homes, shops, restaurants, offices and great public spaces. And, local governments are increasingly revising their zoning ordinances and land-use regulations to allow more mixed-use, pedestrian-friendly development that is consistent with the principles that NAHB supports.

NAHB's smart growth philosophy is a perfect complement to its leadership in green building.

This Northwest Alabama home built by Stitt Energy Group is both an NAHB National Green Building Award Winner and a Department of Energy EVHA (Energy Value Housing Award) winner.

In addition, nearly 5,500 builders, remodelers and suppliers to the home building industry had by September 2010 achieved the Certified Green Professional (CGP) educational designation, the NAHB initiative launched in 2008. CGPs complete 24 hours of classroom instruction on sustainable design and business management to earn their designations.

In 2011, NAHB will introduce the Master Certified Green Professional designation for more seasoned green builders and remodelers. New coursework now being piloted includes advanced green building science and green project management issues. Already, classes are filling up as residential construction professionals seek more practical knowledge to serve their clients.

About the National Association of Home Builders

The National Association of Home Builders is a Washington-based trade association representing more than 175,000 members involved in home building, remodeling, multifamily construction, property management, subcontracting, design, housing finance, building product manufacturing and other aspects of residential and light commercial construction. NAHB is affiliated with 800 state and local home builders associations around the country.

On the Web:
http://www.nahb.org

Petrochemicals & Refining

NPRA

National Petrochemical and Refiners Association

Petroleum is universally recognized as an abundant, affordable and reliable source of energy utilized by billions of consumers around the world. Petroleum products such as gasoline, diesel and jet fuel are vital in powering the cars, trucks, buses and planes that keep societies moving. Equally important, yet perhaps less immediately recognizable, are the benefits provided through an enormous variety of other petroleum-derived products: petrochemicals.

Products manufactured from petrochemicals include plastics, synthetic fibers and rubbers, soaps and detergents, pharmaceuticals, fertilizer and materials used in the construction of buildings and automobiles. Petrochemicals are found in such common products as aspirin, cars, clothing, electronic equipment and furniture, among literally thousands of others. Products made from petrochemicals are ubiquitous in our society and make our modern standard of living possible. In fact, petrochemicals are used as building blocks throughout the field of organic chemistry.

Petroleum is a critical component of our energy portfolio and will be for decades to come. However, its role in both the production and supply of other forms of energy and in enhancing energy sustainability through efficiency and innovation is also significant, yet often overlooked.

Alternative and supplemental forms of energy such as wind and solar are an important part of our energy mix and are increasingly looked to as sustainable sources of energy and electricity generation. Yet, the current drive toward increased use of these forms of energy is made possible to a large degree through the innovative use of petrochemical products made from petroleum.

Wind turbines rely on rotating blades to produce power, and the length and size of the blades directly affect the electricity generation capacity of the turbines. The use of petrochemical products, such as epoxies and vinyl esters, in composite technologies has enabled the construction of lighter, stronger, longer windmill blades that increase the amount of power turbines are able to generate. Modern wind turbine blades are composed of nearly 45 percent petrochemical-based materials.

Similarly, petrochemical products play an important role in the generation of solar power. A number of petrochemical-based products, such as polyvinyl chloride (PVC), polypropylene, polyethylene and acrylics, are used in the manufacturing of solar cells. Petrochemicals are utilized in solar glazing materials, which act as collectors of solar energy, channeling it to the photovoltaic cells in solar panels; petrochemical-based materials such as ethylene vinyl acetate also encase the solar modules. Polymers are also being explored for their commercial use as solar cell activators.

Enhanced energy sustainability is also being pursued through measures, such as increased vehicle fuel efficiency standards which seek to conserve an abundant, but finite, supply of traditional fossil fuels. Federal Corporate Average Fuel Economy (CAFE) standards are designed to increase the average number of miles per gallon vehicles can drive. Here again, petrochemicals and the products made from them help in attaining these increased efficiency standards. Plastics, composites and other petrochemical-derived materials play a prominent and growing role in modern-day vehicle construction, in large part because of the improvements in efficiency these materials allow.

For every 10 percent reduction in a vehicle's total weight, fuel economy increases by seven percent, according to government statistics. An average vehicle today contains more than 330 pounds of plastics and composites. Because one pound of plastics replaces two to three pounds of traditional materials such as metals, the use of petrochemical-based components reduces the vehicle's total weight by 330 to 660 pounds, providing an increase in fuel economy of up to 11 percent. This translates into an estimated fuel savings of eight to 15 billion gallons annually for cars and light trucks in the United States.

Plastics and chemicals have also made possible innovations in food and beverage packaging that allow increased efficiency, reductions in the amount of overall packaging used and reductions in the energy used to transport goods. Over the past 30 years, plastics have increasingly replaced metals and glass in food packaging with an estimated average annual growth rate of seven to eight percent in the use of plastic beverage containers and a four to five percent annual growth rate for plastics used in rigid food containers.

Plastic packaging materials allow significant weight and materials efficiency advantages over glass and metal materials. While two pounds of plastic beverage containers can deliver 1000 ounces of a beverage, three pounds of aluminum, eight pounds of steel, or 27 pounds of glass are needed to deliver the same quantity. Plastic food containers provide similar advantages: plastic jars require up to 38 percent less material by weight than steel cans and up to 90 percent less than glass containers. Continued improvements in innovation have led to an approximate 1/3 reduction in the weight of two-liter plastic beverage bottles and one-gallon milk jugs compared to similar plastic containers manufactured in the 1970s. Such improvements in food packaging weight and efficiency translate into less energy use, decreased emissions from product transport and lower shipping costs for consumer goods. In addition, many of these materials can be – and are – recycled, as more than 80 percent of U.S. households now have access to plastic recycling programs.

Petrochemical-based plastics, often recycled, are also increasingly utilized in building construction because of the advantages they offer in structural integrity, energy efficiency, and economic savings over materials such as metals, wood and glass. Plastic materials are used in a wide variety of building-construction components, including roofing, windows, walls, piping, decks, fences, railings and insulation. According to a one-year study by the American Plastics Council, the use of plastic building and construction materials saved 467.2 trillion Btu of energy use over alternative construction materials, or enough to meet the average annual energy needs of 4.6 million U.S. households.

These are just some of the myriad ways petroleum-based products provide benefits to consumers; and through innovation and advances in technology, those applications continue to grow in both number and scope. Without petrochemicals, countless products and goods we rely on – often unknowingly – in our daily lives would simply not exist.

As we continue to develop supplemental forms of energy production and greener products, petrochemicals will remain a vital source of abundant, affordable, clean and reliable raw manufacturing materials for the foreseeable future. Less immediately obvious, but equally important, is the fact that products derived from petrochemicals can be recycled, unlike products derived from other materials that degrade at faster rates. And as we continue to recycle more and more products, the sustainability of petrochemicals will also be enhanced; recycling gives petrochemical-based products a means of

sustainability that is only limited by the imagination.

About the National Petrochemical and Refiners Association

NPRA members include more than 450 companies, including virtually all American refiners and petrochemical manufacturers. NPRA's members supply consumers with a wide variety of products and services used daily in their homes and businesses. These products include gasoline, diesel fuel, home heating oil, jet fuel, lubricants and the chemicals that serve as "building blocks" in making everything from plastics to clothing to medicine to computers.

On the Web:
http://www.npra.org

Natural Gas

Natural Gas Supply Association

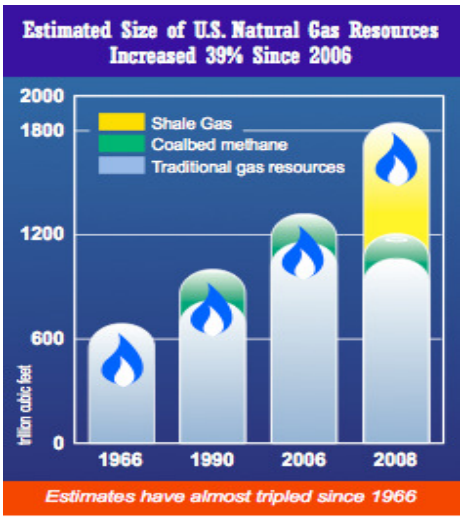
Natural gas fuels the American economy and is one of the nation's most abundant and diverse commodities. The United States uses natural gas every day to heat millions of homes, power cities and help manufacture an array of diverse products, such as fertilizer and other chemicals. The natural gas industry has created three to four million American jobs and provides billions in government revenue, both in taxes and royalties. Natural gas burns cleaner than any other fossil fuel and is widely available and deliverable throughout the country. Natural gas is more than a bridge fuel – it is a clean and sustainable energy source that is vital to sustaining our nation's energy future, environment and economy.

Resource Base Has Changed: Abundance and Sustainability

Throughout the United States, natural gas found in hard, shale rock formations, sometimes referred to as "unconventional gas," has led to a dramatic increase in domestic natural gas supply. Just one decade ago, the U.S. natural gas resource base was considered in decline because existing natural gas resources were maturing and producing abundant new unconventional resources such as shale natural gas was technically difficult and costly. However, recent advances in drilling technology have allowed producers to economically tap into the vast U.S. shale natural gas resource base and bring new supplies to market, reversing the view that the resource base is in decline.

Today, the United States is the world's largest natural gas producer and has more energy in natural gas than Saudi Arabia has in oil. [1]

Government and academic studies have concluded that the nation has more than 2,074 trillion cubic feet (Tcf) of natural gas reserves. At today's consumption rate, that is more than 100 years of supply. Estimates of U.S. natural gas supply have almost tripled since 1966 and have increased 39 percent since 2006. The U.S. Energy Information Administration (EIA) estimates that the Marcellus Shale, which is just one among several large natural gas shale basins in the United States and stretches across West Virginia, Pennsylvania and New York, contains more than 272 Tcf of recoverable natural gas and may very well be one of the largest natural gas fields in the world.

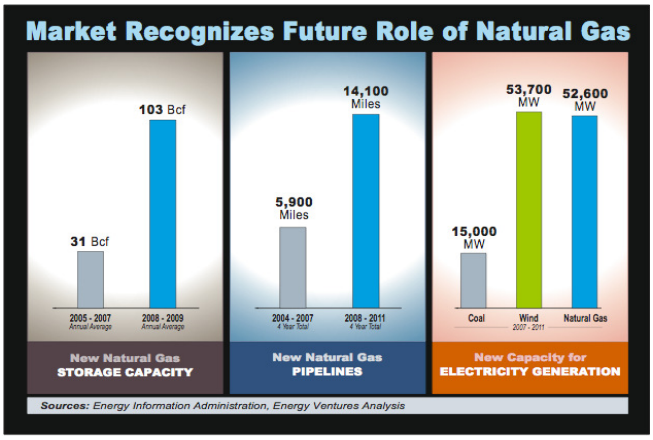


A comparison of the different sources of new natural gas supplies into the marketplace provides a striking indication of the recent supply revolution in the natural gas industry. A glance at the EIA's latest data shows that U.S. production of natural gas increased by a substantial 15 percent between 2005 and 2009. During that same time period, production of natural gas from shale increased by 150 percent, or two-and-a-half-fold, growing from 1 Tcf per year to 2.5 Tcf. Clearly, the abundance and accessibility of natural gas from shale has transformed the role that natural gas can play in the economy. Supply is more plentiful and geographically diverse than ever before, with more than 75 different shale natural gas resource areas spread out across the Lower 48. In fact, about 85 percent of the natural gas we consume is domestically produced in 32 states, and most of the remaining 15 percent is imported from Canada.[2] New supply and geographically-diverse onshore production areas have helped to reduce regional price disparities and minimize hurricane-related supply interruptions – one of the historic causes of price volatility.

The Market is Ready for Increased Role for Natural Gas

Having vast amounts of domestic natural gas alone is not enough to ensure that natural gas is efficiently delivered to the customer. Because many of the new supply regions are not located in traditional natural gas-producing areas, new transportation and storage infrastructure is also needed to accommodate new supply and new demand areas. Fortunately, the market has anticipated the future role of natural gas in the economy and is already positioned with significant new pipeline and storage infrastructure to efficiently deliver the new supplies to growing markets.

Natural gas pipelines deliver natural gas from production areas to supply areas and play an important role ensuring the reliability of the natural gas market. Pipeline construction is proceeding at record rates. As of 2010, there are more than 220,000 miles of natural gas transmission pipeline located across North America connecting supply areas with demand areas. From 2008 to 2011, EIA estimates that 14,100 miles of new



transmission pipeline will have been constructed. That is nearly triple the 5,900 miles constructed in the previous four years. As new natural gas supply resources continue to flow into the market, pipeline companies also continue to build new infrastructure in response to the industry's exceptionally transparent supply and demand signals.

In addition to pipelines, natural gas storage is an important component of natural gas deliverability. Storage facilities help provide the market with additional supply reserves that can be located closer to customers and easily delivered to help match changes in demand. As is the case with pipeline growth, storage growth is proceeding at breakneck speed. Between 2006 and 2010, a record amount of storage capacity was added to the U.S. storage infrastructure, increasing working gas capacity by 670 billion cubic feet (Bcf), half of which is high-deliverability salt cavern storage, allowing suppliers to respond more rapidly and efficiently to swings in customer demand. In just the last three years, the average growth in storage capacity has been 103 billion cubic feet (Bcf) per year, which is more than triple the 31 Bcf average growth in storage capacity of the previous three winters (2005-2007).

In the past, natural gas supply could not swiftly respond to changes in demand because bringing new natural gas supply to the market was a lengthier process, with natural gas wells concentrated in fewer geographical areas that were not necessarily close to customer load centers and which could take longer to locate and develop. However, today's market is characterized by abundant and geographically-diverse supplies

of natural gas, coupled with robust pipeline and storage infrastructure development, thus improving the industry's ability to quickly deliver natural gas where it is needed and offering consumers a transparent and competitive gas supply market.

Ample and geographically-diverse supply resources, additional pipeline capacity, new storage facilities and liquefied natural gas (LNG) import capacity help smooth regional price disparities and stabilize volatility. With FERC market transparency provisions in place, the U.S. natural gas market is one of the most responsive and robust commodity markets in the world.[3] The market recognizes the economic, environmental and energy security benefits of natural gas and is making the necessary investments today to ensure a stable natural gas market for the future.

Natural Gas and the Environment

Natural gas burns cleaner than every other fossil fuel and is widely available and deliverable throughout the United States. Natural gas has the ability to immediately address some of the nation's most pressing carbon reduction challenges. In fact, natural gas has been credited by the U.S. Environmental Protection Agency (EPA) for helping meet the nation's first goal for air quality improvement standards.[4] When generating electricity, natural gas emits about half the amount of CO_2 as coal and contains no mercury or sulfur oxide.

The U.S. natural gas resource base is a national treasure. Technology and efficiency advances help ensure that natural gas is used wisely and is sustainable for future generations. For example, energy efficient household appliances have contributed to a 40 percent reduction in the use of natural gas per household over the past 40 years.[5] In addition, compared to all types of economically-viable energy sources, producing electricity from natural gas requires the least amount of land, just 0.3 acres per 1,000 households, leading natural gas to have the smallest environmental footprint of all economically-viable clean fuel sources for electricity.

Today, with market-driven technology improvements and advanced drilling techniques, development practices help reduce natural gas development's impact on the environment. From a single drilling platform, we now can drill dozens of different wells in every direction, each thousands of feet deep and miles long, thereby reducing land use and preserving natural environments.

Innovative and environmentally-sustainable technologies are constantly being field tested. For example, new water-use technologies and water recycling best practices have helped to significantly reduce the amount of water needed to develop natural gas supplies. Traditionally, developing natural gas from shale has required about three million gallons of water per well. However, today operators are capable of recycling and treating a single source of water onsite to develop several natural gas wells, reducing water use and fostering a more sustainable production lifecycle. In addition, some companies are developing other cutting-edge technologies, such as produced-water remediation systems, which enhance water management and disposal plans, meet the strictest EPA and state discharge standards and significantly reduce environmental liabilities.

Conclusion

Natural gas is an abundant, reliable, clean and sustainable American product. The natural gas supply and delivery infrastructure is capable of handling demand from increases in new U.S. manufacturing capacity, electricity generation and transportation. Natural gas helps create and support millions of American jobs and helps bolster state and local economies through taxes, royalties, rates and wages. Natural gas is more than a bridge fuel – it's a clean and sustainable American energy source that is vital to the U.S. energy future, environment and economy.

Notes

[1] EIA datacomputation; per mmbtu per Bbl/e
[2] Energy Information Administration
[3] Federal Energy Regulatory Commission
[4] EPA
[5] American Gas Association

About the Natural Gas Supply Association

NGSA represents integrated and independent companies that supply natural gas. Established in 1965, NGSA encourages the use of natural gas within a balanced national energy policy, and promotes the benefits of competitive markets to ensure reliable and efficient transportation and delivery of natural gas and to increase the supply of natural gas to U.S. customers.

On the Web:
http://www.ngsa.org
http://www.naturalgas.org
http://www.bluejobs.org

Nuclear Energy

NUCLEAR ENERGY INSTITUTE

Nuclear Energy Institute

The U.S. Department of Energy (DOE) projects that U.S. electricity demand will rise 28 percent by 2035. That means our nation will need hundreds of new power plants to provide electricity for our homes and continued economic growth. Maintaining nuclear energy's current 20.2 percent share of generation would require building about one reactor per year starting in 2016, based on DOE forecasts. No other source of electricity can provide the combined benefits of nuclear energy: large amounts of reliable and affordable electricity, long-term price stability and no greenhouse gas emissions.

Electricity

Nuclear plants are the lowest-cost producer of baseload electricity. By providing a reliable and affordable source of electricity, nuclear energy helps keep American business competitive. Nuclear power accounts for nearly 20.2 percent of all power production in the United States and 16 percent of all power production in the world.

Nuclear plants are the lowest-cost producer of baseload electricity. The average production cost of 2.03 cents per kilowatt-hour includes the costs of operating and maintaining the plant, purchasing fuel and paying for the management of used fuel.

Jobs and Manufacturing

Careers in the nuclear energy industry offer challenging work, competitive salaries and benefits and opportunities for advancement. Nuclear professionals help to protect the environment by supporting the nation's emission-free nuclear power plants, which provide 20 percent of U.S. electricity.

Nuclear plants are engines for local job growth. To date, private investment in new nuclear power plants had created an estimated over 15,000 jobs and can provide thousands more. In addition to the opportunities provided by new plants, existing nuclear power plants generate substantial economic value. In 2008, nuclear companies procured over $14.2 billion in materials, fuel and services from domestic suppliers. Ongoing maintenance of the existing plants provides substantial economic benefit for American manufacturers.

Economics

Congress and the Obama administration should support a new financing mechanism for large-scale electricity projects - a clean energy development bank that provides debt financing and drives private investment in the development of low-carbon or carbon-free energy solutions, as well as the supporting infrastructure for the electric power sector. A clean energy development bank would provide loan guarantees, lines of credit and equity investments in nuclear energy facilities and other low-carbon energy projects. Loan guarantees give the nuclear industry the financial stability to move forward with hiring and new-plant construction.

Clean

Nuclear energy provides the largest amount of carbon-free electricity, which helps the nation meet its growing electricity needs while reducing the effects of climate change. Nuclear power plants aid compliance with the Clean Air Act of 1970, which set standards to improve the nation's air quality. Because they generate heat from fission rather than burning fuel, they produce no greenhouse gases or emissions associated with acid rain or urban smog. Using more nuclear energy gives states additional flexibility in complying with clean-air requirements.

Climate change increasingly is important as federal, state and local policymakers consider energy supply and greenhouse gas mitigation. Given those concerns and the need for baseload electricity production, policymakers and energy industry leaders are evaluating an expanded role for nuclear power.

Safety and Security

The nation's nuclear power plants are among the safest and most secure industrial facilities in the United States. Multiple layers of physical security and high levels of operational performance protect plant workers, the public and the environment. U.S. nuclear plants are well-designed, operated by trained personnel, defended against attack and prepared in the event of an emergency. Stringent federal regulation, automated, redundant safety systems and the industry's commitment to comprehensive safety procedures keep nuclear power plants and their communities safe. Operators receive rigorous training and must hold valid federal licenses. All nuclear power plant staff are subject to background and criminal history checks before they are granted access to the plant.

Each nuclear power plant has extensive security measures in place to protect the facility from intruders. Since September 11, 2001, the nuclear energy industry has substantially enhanced security at nuclear plants. Every nuclear power plant in the country has a detailed plan for responding in the event of an emergency. Companies test that plan regularly with the participation of local and state emergency response organizations.

Used Fuel

Like other industrial facilities, nuclear power plants produce necessary byproducts. These include used nuclear fuel and less radioactive material like filters, tools and protective clothing. Used fuel is and has been safely managed, stored and secured for decades without any incidents in robust containers regulated by the NRC. It has also been safely transported throughout the country in the same fashion. Consolidated interim storage facilities are possible, with communities in the U.S. interested in hosting such facilities. Eventually the United States will follow France, Japan, England and others in recycling used fuel to extract energy and placing the remaining product in a repository.

New Plants

A new generation of nuclear power plants will feature advanced designs, refined construction techniques and a licensing process geared to a mature technology - improvements built on 50 years of experience in operating nuclear plants.

Companies started applying to the U.S. Nuclear Regulatory Commission for combined construction/operating licenses in 2007 - for the first time in 30 years. Although no company in the United States has decided to build a new reactor, 17 companies and consortia are exploring the licensing and financial issues associated with such an

endeavor. Construction of the next generation of U.S. nuclear plants will differ markedly from the old process, when companies built plants as the designs and regulations were evolving. Designs for the next plants built will have all design-related safety issues resolved before construction begins.

Vogtle Nuclear Power Plant is a 2-unit plant located in Waynesboro, GA. Groundwork for two additional reactors is underway.

About the Nuclear Energy Institute

The Nuclear Energy Institute (NEI) is the policy organization of the nuclear energy and technologies industry and participates in both the national and global policy-making process. NEI's objective is to ensure the formation of policies that promote the beneficial uses of nuclear energy and technologies in the United States and around the world. NEI has nearly 350 members in 19 countries. Members' businesses span the range of commercial nuclear technologies.

On the Web:
http://www.nei.org

Steel Manufacturing

Nucor

Nucor's commitment to sustainable management is nothing new. Great companies always prepare for the good times in the tough times and for the tough times in the good times. Focusing on the long-term goal is what has enabled Nucor to prosper during good times.

As the largest recycling company in the Western Hemisphere, running efficient operations and protecting the environment is critical to Nucor's long-term success. Nucor values the environment of the communities in which they operate and recognizes its importance to Nucor's teammates, their families and their continued success. To this end, Nucor endorses these principles to demonstrate their commitment to the sustainable management.

Nucor's long history as an innovator in the steel industry has created lasting environmental benefits for the entire steel industry. Just forty years ago, our country's landscape was littered with expansive junkyards piled high with rusting heaps of demolished cars and broken down appliances. But then the Electric Arc Furnace (EAF) was born on a simple concept: using scrap metal as the feedstock and melting it with electrical energy. Each EAF can hold the equivalent of several crushed automobiles' worth of scrap, keeping them out of junkyards, landfills or other places where the material would blight the environment. Nucor was instrumental in perfecting the electric arc furnace (EAF) process.

In 1969, Nucor pioneered the mini-mill concept, which employs the EAF technology. The industry greeted this concept with skepticism, but now 60 percent of U.S. steel production comes from mini-mills. Mini-mills are small-scale steel plants that not only use less energy in production but also employ scrap as their main raw material source. That means less wattage and less waste, as old material is put back to work. The steel produced in a mini-mill can have typically more than 70 percent recycled content, contingent on the type of product the mini-mill is creating. In contrast, a traditional furnace, the basic oxygen furnace (BOF), typically allows for less than 30 percent recycled content for domestic steel and even lower for foreign steel.

In the beginning, EAF-generated mini-mills were supposed to be little operations that produced low-end materials such as rebar, but Nucor didn't stop there. With all of that scrap steel available, new technology was developed to turn that scrap into quality, and in less than a decade mini-mills were competing with "old school" integrated steel mills. Suddenly, people stopped thinking of scrap steel as garbage and started thinking of it as an economically valuable commodity. Today, 64 percent of all steel is now recycled and kept out of landfills, and Nucor Corporation is the nation's largest recycler, using over 13 million tons of scrap steel in 2009 to create new products. And unlike most recycled products that carry a premium

price, recycled steel from a mini-mill became cheaper to buy than virgin steel from an integrated mill.

Nucor has always been focused on lowering our energy and water use per ton of steel produced across all facilities. Nucor beat the category's industry average for the United States measurements of steel manufacturers' energy consumption in energy intensity per ton of steel. And when you consider that American steel companies lead all other countries in energy efficiency, it's not a stretch to say Nucor is among the most energy-efficient steel companies in the world.

And yet, Nucor continues to improve facilities to become even more lean and efficient. During the economic turn-down in 2009, Nucor continued installing technology that reduces energy use during peak times when supplies are lower and prices are higher. At a time when many competitors were shutting down some of their facilities, Nucor used the lull in production to make further improvements to plants. The improvements included incorporating computerized controls on large horsepower motors and pumps. These controls restrict energy use to non-peak hours, which will save the company millions annually and reduce the environmental footprint. In addition, Nucor is incorporating energy-recovery systems in mills to capture and reuse energy that would normally be wasted.

As the name implies, Nucor mini-mills are small. But their small footprint on the land is just one benefit to their very environmentally-friendly nature. It all starts with recycling. By cleaning up our land of scrap steel, we're able to reduce mining waste by 97 percent, air pollution by 86 percent and water pollution by 76 percent. While conservation of natural resources is by itself an environmental benefit, it pales in comparison to the benefits brought about by the reduction of criteria pollutants released into the atmosphere. Compared to the blast furnace, the mini-mill's arc furnace releases approximately 86 fewer pounds of pollutants into the air for every ton of steel made. In a year's time, that has the effect of reducing particulate matter emissions by over two million tons.

As the largest domestic recycler, Nucor has also had a major role in the documented reduction of carbon equivalent emissions. The Electric Arc Furnace technology utilized by Nucor uses post-consumer scrap steel material as the major feedstock, which, in turn, produces 67 percent less carbon equivalent emissions than those produced by the current predominant steelmaking technology.

Below are additional examples of how Nucor has applied energy efficient and environmentally-friendly principles to achieve profitable and responsible long-term growth.

Downstream Recycling of By-Products

Not only is Nucor the largest recycler of scrap iron steel in North America, but there are also vast amounts of by-products that others recycle from Nucor's steelmaking process. As an example, take a look at the recyclables generated by a typical Nucor mini-mill that produces approximately one million tons of steel a year.

First, there's mill scale, also known as iron oxide. As the red-hot steel cools, the surface oxidizes or rusts. As part of the finishing process, this rust is washed off with high-pressure water jets. As this water is treated for reuse, polymer flocculants are used to get the tiny rust particles to bond together. As a result, every year at one typical Nucor mini-mill, 14,000 tons of mill scale are recovered and sold as an ingredient to the cement industry.

Then, there's slag. Because impurities are present in scrap steel, lime is added to the melt process. The slag is skimmed off the top, it is cooled, and sent to a processor where it is put through a rock crusher and sorted according to size. Not only does crushed slag look like crushed limestone, it possesses similar physical and chemical properties of limestone. So every year at one typical Nucor mini-mill, 150,000 tons of slag is processed and recycled and sold for use in building roads and parking lots.

Another product of the EAF is dust. Due to galvanizing auto bodies, EAF dust contains enough zinc to be a desired recyclable. In the past, a majority of this dust was sent to landfills for disposal, but currently Nucor

recycles a majority of the dust by converting it into usable products. Dust is captured in state-of-the-art baghouse air pollution control devices. These devices filter the exhaust of the furnace to ensure that all of the dust is removed for recycling. This process cleans the air being discharged, removing more than 99 percent of the particulate in the air. The dust is sent to a recycler, where it is converted into steel slag, zinc oxide and pig iron. Afterward, this material can be used in other products. Nucor is continually working to increase the percentage of EAF dust that is recycled every year. In 2007, Nucor's steel mills recycled 59 percent of the EAF dust generated by operations. In 2009, this total was 87 percent.

Even the oils used in machinery and plant trucks are recycled. And because employees take pride in minimizing the environmental footprint, paper, bottles, cardboard, cans, gloves, computer equipment, printer cartridges and batteries are often also recycled at Nucor facilities.

Finally, there's water. In the water-intensive steel manufacturing process, water is used to not only cool the steel product but the steel making equipment. To avoid discharging any of the used water into the environment, a typical Nucor mini-mill may maintain its own treatment plant. To keep up with one typical Nucor mini-mill's demands, the plant must collect, cool, treat and recycle approximately 35,000 gallons of water every minute. In one day, that treatment plant saves enough water to take care of the needs of a city of 500,000 people.

Continuous Improvement & Measuring Success

Protecting the environment is something Nucor takes very seriously. To encourage facilities to continually improve their environmental metrics, Nucor developed the Nucor President's Environmental Award to recognize excellence in environmental stewardship. Facilities are measured based on nine criteria including energy consumption, waste reduction and environmental compliance. Those facilities that meet or exceed the metrics developed by Nucor will receive the President's Environmental Award.

Our efforts have also received recognition externally from various organizations:

- *In March 2010, Nucor Corporation received the Chemical Safety Award from CSX Corporation, one of the nation's leading rail-based transportation companies. In order to be eligible, Nucor had to ship more than 600 hazardous material carloads with zero non-accident releases. Based on our performance in 2009, CSX recognized Nucor for safe shipment of hazardous materials by rail.*

- *In 2008, Nucor Corporation earned the Green for Profit Business Award from the Charlotte Business Journal. The 2008 Green Awards were co-sponsored by the Charlotte region chapter of the U.S. Green Building Council (USGBC).*

- *In 2009, Nucor Building Systems – Texas earned the Energy Champion Award, which is issued through the U.S. Department of Energy's industrial assessment program. Through this program, Texas A&M University engineering students worked with the Nucor Buildings Systems facility to help the college reduce its energy consumption by 20 percent or more.*

- *Additionally, two of our facilities qualified for the U.S. Environmental Protection Agency (EPA) National Environmental Performance Track. Nucor Steel – Nebraska earned the award in 2008 and 2007, while Nucor Steel – Auburn received the recognition from 2002 to 2009. Performance Track recognizes and drives environmental excellence by encouraging facilities with strong environmental records to go above and beyond their legal requirements.*

- *In 2007, the South Carolina Department of Commerce named Nucor Cold Finish South Carolina the Recycler of the Year.*

- *In 2007, Nucor Fastener – Indiana earned the Industrial Waste Water Plant Award.*

- *In 2007, Nucor Steel Jackson, Inc. received the Secretary of Defense Employer Support Freedom Award.*

Castrip® Innovation

Nucor continues its long history of innovation and environmental stewardship through the use of new technology employed at one of their environmentally-friendly mini-mills in Crawfordsville, Indiana. This facility is the home of Nucor's first Castrip® Micro Mill and it just might be the most advanced steel plant in the world.

The process instantly transforms molten steel directly into Ultra-Thin Cast Steel (UCS) sheets in just one remarkable step. Essentially, molten steel enters a pair of twin-roll casters, and sheets of solid steel exit the other side. This is the first flat-rolled product to be direct cast into sheets as thin as 1.4 mm and output at an incredible 0.7 mm. This single-step process dramatically reduces the amount of time, space, energy and manpower needed to produce each coil. In terms of environmental benefits, the Micro Mill consumes 84 percent less energy than a conventional mill with a 75 percent reduction in greenhouse gas emissions. Nucor has already expanded the use of this technology by opening a second Castrip facility in Blytheville, Arkansas, in January 2009.

Cradle-to-cradle Life Cycle Assessment

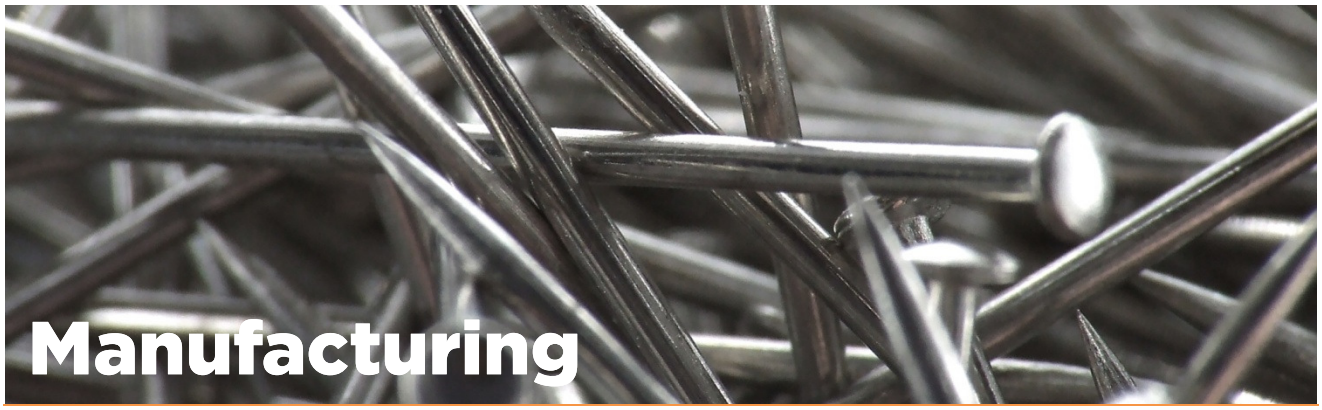
In February 2009, Nucor embarked on a complete cradle-to-cradle life cycle assessment (LCA) to identify the environmental impacts of steel bar products produced by the Nucor mini-mill electric arc furnaces (EAF) process. Nucor's products have significant environmental advantages over products of other manufacturers. These advantages offer significant benefits to customers using our products in their projects that are going for certification under U.S. Green Building Council's LEED®. Because we use scrap as our primary feedstock, the product we deliver to our customers is sustainable by its very nature. It's more energy efficient and sustainable to recycle scrap into new steel than to produce it from iron ore. In addition, our decentralized approach offers our customers upstream sustainable advantages because our proximity helps to minimize costs and our environmental footprint. Our sustainable high-recycled content products and regional presence help our customers achieve credits toward certification.

The cradle-to-cradle assessment of the total life cycle assessment included the environmental impacts associated with transportation and processing of the recycled steel. Scrap metal is gathered, processed and transported largely to Nucor mills by truck, rail and river barge by Nucor's subsidiary, DJJ. Finished steel is transported to the customer and, at end of life, is recycled as scrap metal and returned to a Nucor mill. Typically, scrap metal going to a Nucor bar mill is transported an average of 80 miles by truck or 304 miles by river barge. The distance and method of transportation are important in determining environmental impact. LEED currently takes into account the distance that raw materials travel to the job site, and this distance has to be within 500 miles in order to earn some of the LEED credits. Our network is the largest in the country, and we can deliver steel from the closest facility to meet LEED requirements.

About Nucor

Nucor and affiliates are manufacturers of steel products, with operating facilities primarily in the U.S. and Canada. Products produced include: carbon and alloy steel -- in bars, beams, sheet and plate; steel joists and joist girders; steel deck; fabricated concrete reinforcing steel; cold finished steel; steel fasteners; metal building systems; light gauge steel framing; steel grating and expanded metal; and wire and wire mesh. Nucor is North America's largest recycler.

On the Web:
http://www.nucor.com



Manufacturing

Virginia Manufacturers Association

Advanced technology industries, such as manufacturing, are essential to the United States of America and Virginia economies. The U.S. is still the world's largest manufacturing economy and manufactured goods represent over 80 percent of Virginia's total exports. Due to the global nature of manufacturing, the industry is susceptible to the increasing costs of energy, regulation and taxation. The U.S. and individual states must be vigilant in continually adopting competitive regulations in comparison to competing trading partners because of the mobility of the industry. U.S. manufacturers are also the most productive workers in the world, commanding higher average wages and benefits than the rest of the workforce. The intellectual capital of manufacturers is equally valuable. U.S. manufacturers perform half of all research and development (R&D) in the country - the total research and development of manufacturers is equivalent to the total R&D of the rest of the private sector, colleges and universities, the Federal government and R&D centers combined. This means that the manufacturing sector's transformation from labor-intensive to technology-intensive continues to advance at an ever increasing pace. Therefore, the United States and the Commonwealth of Virginia must adapt to the continuously changing nature of advanced technology industries in order to glean the economic rewards they have to offer.

State-level Public Policy Priorities

Drawing upon the lessons of the last decade, specifically those of the 2009 U.S. recession, state public policies must focus on job creation. In order to spur job creation in the manufacturing sector, state public policies play an integral role in a number of key policy areas. Of course, these state-level strategies require coordination with a national and global focus that is the responsibility of the U.S. Congress and the President. Thus, it is recommended that governments at all levels place a special emphasis on energy and workforce development policies.

The convergence of individual and corporate innovation and energy usage are inextricably linked in fostering the sustainability of natural resources.

Energy policies are essential to ensuring sustainable economic growth in manufacturing with an emphasis on reliable supply at affordable prices, conservation, increased lighting and motor efficiency, strengthened infrastructure and investments in new technologies. In order to assure future energy supplies and national energy independence, alternative energy sources must be developed along with traditional resources. The decision to develop energy alternatives, which are not market-competitive but are found to be in the public interest by policy-makers, should be supported through federal and state tax incentives or general fund appropriations to the extent necessary to render them cost

competitive in voluntary energy markets. One should reject renewable portfolio mandates and similar energy regulation mandates on the basis that they create economic inefficiencies and result in higher costs for consumers.

Workforce Development policies must empower today's and tomorrow's workers, whether in school, recently dislocated or in the workforce, to acquire certified skills and competency-based assessments and credentials that meet employer demands and create a world-class pipeline of competitive employees at the "technician" level of employment, while at the same time improving the industry's image by educating community leaders and parents about the rewards of pursuing career pathways such as the Virginia Council on Advanced Technology Skills Career Pathway (www.vacats.org).

Innovative Industry Solutions

The Virginia Manufacturers Association and its affiliate educational foundation, the Virginia Industry Foundation, have produced three innovative educational and public relations programs aimed at improving industrial competitiveness, fostering the growth of alternative energy production and reducing the consumption of industrial energy.

- **Certified Industrial Energy Auditor**

This program trains individuals to audit the business performance and operational excellence of their organization's energy management. The Auditor will be proficient in leading the organization through a continuous improvement program of energy demand reduction. This may lead their organization toward certification as an Energy Start Leader and a Save Energy Now recognized company. The Auditor will also expand the organization's awareness of techniques, technologies and resources that result in reduction of energy demand, carbon footprint and costs. The program was supported, in part, by the U.S. Department of Labor and in cooperation with the Shenandoah Valley Energy Partnership. The training platform was provided by DuPont Sustainable Solutions. The Certified Industrial Energy Auditor curriculum has five online modules:

- Energy Smart Course
- Energy Management and Best Practices Course
- Electricity Generation and Distribution Course
- Energy System Instrumentation and Controls Course
- Lean Energy Course

Registration and materials are available at: http://www.vamanufacturers.com/professionaldevelopment/

- **World Class Manufacturing (WCM)**

WCM assessor training is based on Shingo principles of continuous improvement. This program is designed to train individuals to improve employee morale, individual and company performance and company profits at all levels of the company by highlighting value- and non-value-added activities. WCM training will be customized to a company's needs, performed in its workplace and include significant hands-on training. WCM certificate holders will have learned to eliminate waste working across the enterprise through teamwork and communication. By completing the WCM assessor program, participants will have demonstrated cost-savings, reduced waste, increased efficiency and improved employee engagement. The WCM curriculum has eight supplemental training courses:

- Value Stream Mapping
- Total Productive, Predictive and Preventive Maintenance (TP3M)
- Quick Changeover
- Error Proofing
- Cellular Layout
- 5S Organization
- Visual Workplace
- Individual Assessment and Development Planning

Registration and materials are available at http://www.vamanufacturers.com/professionaldevelopment/

- ***Dream It Do It Virginia***

To effectively introduce people to exciting careers in advanced technology fields, such as energy production, as well as the education and training needed to successfully pursue these career opportunities, job seekers, school counselors, parents,

teachers/professors and the public must be excited about advanced technology occupations. *Dream It Do It Virginia* is that solution. This is also a cooperative program with the NAM/Manufacturing Institute. In fact, *Dream It Do It Virginia* has launched an energy-focused public relations campaign aimed at promoting wind, solar and nuclear energy occupations to promote skills and a future pool of qualified employees for Virginia's energy employers.

For more information, go to:
http://www.dreamitdoitvirginia.com/

About the Virginia Manufacturers Association

The Virginia Manufacturers Association develops constructive policies and activities on behalf of industry by serving as an advocate for legislative, regulatory, taxation, environmental, workplace, business law, insurance, and technology issues, and as an aggregator of business services for our Members. The VMA serves as its Members' primary resource for consultative services and programs which they require to remain highly competitive, technology-intensive and efficient organizations. The VMA has served as the leading trade organization for advanced technology industries, such as manufacturing, and as Industry's Advocate continuously since 1922.

On the Web:
http://www.vamanufacturers.com

Conclusion

To confront the energy challenges facing our nation in the twenty-first century, Consumer Energy Alliance (CEA) urges the federal government to advance a reasonable, robust energy policy that ensures a proper balance between the use of traditional sources of energy, the continued development of alternatives and expansion of energy efficiency, conservation and sustainability.

Our national energy policy must actively support the full utilization of sustainability practices, as well as the responsible development of all available energy resources in order to provide long-term price stability for consumers and enhanced energy and economic security. CEA believes that improved dialogue amongst consumers, industry and policymakers is essential to fully implementing a balanced, rational energy policy that marries these two goals.

More specifically, CEA supports the following:

Improved Energy Efficiency, Conservation and Sustainability

- Create public-private partnerships to make energy efficiency and conservation measures more accessible and affordable for consumers;

- Support legislation and policies that provide tax credits, rebates and other incentives for consumers who invest in energy improvements and energy efficient products for residential and commercial purposes, ultimately increasing consumer demand for such measures, curbing energy costs, growing our economy and reducing our environmental footprint;

- Promote and expand the ENERGY STAR® program and ensure products certified meet high standards for efficiency;

- Support existing public-private partnerships such as SmartWay℠ and expand similar collaboration to a variety of economic sectors; and

- Ensure industry receives proper resources and support to research, develop and market products aimed at expanding sustainability.

Responsible Access to all Domestic Energy Resources

- Consider lifting moratoria on offshore and onshore oil and natural gas development;

- Support legislation and policies that would allow states to exercise responsible control over their energy resources;

- Promote technological advances in the exploration and production of traditional energy resources to ensure further gains in environmental stewardship; and

- Consider lifting the moratoria on, and thoughtfully expanding, unconventional resource development.

Promote the Use of Alternatives and Renewable Resources

- Recognize long-term development of these resources by creating realistic alternative energy production policies and feasible timelines;

- Streamline the permitting processes to encourage the creation of new and improved

alternative energy production facilities, including significant production from wind power, hydro-power, solar facilities and nuclear power; and

- Promote technological advances in liquid biofuels, wind, solar, hydro-power and other forms of alternative energy while recognizing that all energy forms must be utilized.

Expanded Energy Education

- Increase government funding for energy education and additional research and development related to both conventional and alternative energy resources to complement private-sector investment;

- Expand education outreach to consumers regarding ways to improve energy efficiency and conservation at home and at work; and

- Develop a comprehensive U.S. program aimed at maintaining U.S. intellectual competitiveness through the education of skilled scientists, engineers and trade professionals who are needed to ensure a vibrant and progressive energy industry.

CEA strongly encourages the U.S. Congress and the Obama Administration to cooperate both with each other and with the private sector to embrace meaningful energy policies and practices that provide Americans with jobs, increased availability to all domestic energy sources, local community stability and necessary protections for the environment. Such a rational, straightforward approach will allow us to responsibly develop America's domestic energy resources, ultimately stimulating the economy, fostering greater confidence amongst American consumers and reducing our nation's dependence on foreign energy.

Acknowledgments

Consumer Energy Alliance is extremely grateful to all its affiliated organizations who participated in this report. Together with its members, CEA believes that this publication provides a strong insight into the many ways in which the private sector has advanced sustainability practices and produced significant cost savings for consumers and benefits for the environment.