



## Dow's Energy Plan for America

The Dow Chemical Company

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### Introduction

Energy has been and will continue to be the catalyst for economic growth and prosperity. With the world's appetite for energy on the rise, forces such as increased price volatility and unreliable supply coupled with concerns about escalating greenhouse gas (GHG) emissions threaten economic growth.

Dow operates at the nexus of energy and manufacturing, using energy as a basic building block for modern materials that our global society needs. As one of the largest energy users and providers of energy solutions and technologies, no one has more at stake in the solution — or more of an ability to have an impact on — the overlapping issues of energy supply, feedstock security and climate protection than we do.

Dow envisions a renewed economic future for America. A future powered by the same clean, affordable energy that our people and factories enable through innovative technologies, capabilities, and expertise. This future requires optimizing fossil fuels and accelerating the development of cleaner alternatives. We refer to this scenario as the **next energy paradigm**, which leads to a more comprehensive approach for production and consumption of all our energy choices. We are committed and uniquely positioned to being a key contributor to this transition to a sustainable energy future.

***Dow believes that the United States needs a comprehensive national energy and climate change policy that focuses on four main areas in order to transition to a sustainable energy future:***

- 1) Aggressively pursue energy efficiency and conservation;
- 2) Increase, diversify and optimize domestic hydrocarbon energy and feedstock supplies;
- 3) Accelerate development of alternative and renewable energy and feedstock sources; and
- 4) Transition to a low carbon economy

Already recognized as an industrial leader in energy efficiency, we are directing significant portions of our \$1.6 billion research and development investments toward energy solutions that will be economically sustainable and environmentally effective. Our innovations help society solve its energy challenges through insulation, advanced photovoltaics, and solutions that make renewables and alternatives more cost effective as well as enhancing the sustainability of fossil fuel production and use.

The transition to a sustainable energy future will require a fundamental, long-term transformation in the economy as a whole. This transition can only occur with major

strategic shifts in how the U.S. develops, finances and deploys new energy sources in a more sustainable manner. It will require unprecedented innovation and an evolution of our national infrastructure. The U.S. economy must remain strong throughout this transition, and continued access to affordable hydrocarbon resources is vital to avoid the flight of our manufacturing base with its technology and jobs offshore.

Achieving a sustainable energy future will require a vibrant manufacturing base with the capacity to continuously improve how the world produces and uses that energy. Energy and manufacturing are interwoven and interdependent. Revitalizing the U.S. manufacturing sector will need to be done in parallel with efforts to develop a more sustainable energy future. A new energy paradigm is therefore an essential element of any comprehensive ***advanced manufacturing strategy***.

Compounding the transition to a sustainable energy future are three major factors that have changed the way the world thinks about energy. The first factor is **economic**; affordable and less volatile energy is critical to economic investment and growth. The second is **security**; supply may be impacted by geopolitical issues and aggravated by political instability in some of the world's largest oil and gas producing regions. The third factor is **environmental**; there are growing concerns about escalating GHG emissions and their impact on the planet.

Without bold policy initiatives and increased collaboration between the public and private sectors, actions to address the challenges of affordable energy, energy security and climate change will simply be too small to make an impact or too slow to make a difference. As outlined later in our individual policy requests, government support and financial incentives will play a prominent role in the transition to a more sustainable energy future. This requires a reprioritization of how we incentivise this change as part of a sensible ***government funding approach***. With a common vision and goals, we as a nation can make this transition a reality.

## **Energy Outlook**

According to the World Economic Forum, global population is expected to grow from 6.6 billion to more than 8 billion in the next 25 years. This growing population, combined with rising incomes in the emerging economies, will dramatically increase the need for energy.

The International Energy Agency forecasts that global energy use will rise 70 percent by 2050 with major increases seen across the building, transportation and industrial sectors. In the U.S., energy consumption will grow an estimated 14 percent by 2035, with fossil fuels providing 78 percent of all energy. Providing these services while slowing, stopping and ultimately reversing the growth of greenhouse gas emissions will be one of the most daunting challenges facing our global society.

The trend for future energy demand is clear. As we transition to a low-carbon future, the growth of the U.S. economy will depend on the development of all sources of energy – including oil, coal, natural gas, nuclear power, wind, solar, and more. Without an effective, sustainable and comprehensive energy policy to drive development of all energy sources and the management of demand, the U.S. economy will struggle to grow and create the jobs of the future.

### ***Dow's Contribution to a Sustainable Energy Future***

Dow is aggressively reducing our own impact on the environment and harnessing our innovation engine to help customers, communities and society do the same.

Dow's innovations are leading to more energy efficient products, cost effective energy alternatives and less carbon-intensive raw materials and manufacturing processes. These solutions include solar shingles for builders and homeowners, higher efficiency building and appliance insulation materials, energy storage technology and innovations to put carbon to work.

Dow has been a recognized pioneer and leader in industrial energy efficiency. From 1990 to 2009, Dow reduced its energy intensity by 38%, saving 1,700 trillion Btu, which is the equivalent to the electrical energy used by all residential buildings in California for a full year.

And we are not done. As part of our 2015 Sustainability Goals, established in 2005, we have pledged a further 25% reduction in our energy intensity. If the U.S. was to adopt a similar economy-wide goal, this country could save the Btu equivalent of all of its oil imports from the Middle East.

### **Path to a Sustainable Energy Future**

We believe that America needs a comprehensive and sustainable national energy and climate change policy that enables the transition to a sustainable energy future -- balancing economic, environmental and security concerns. For any economy, especially one the size of the United States, this takes time.

We are confident that policies supporting these principles will also stabilize energy prices, lead to innovative technologies, strengthen our economy, boost our competitiveness and revitalize U.S. manufacturing. For the materials industry, "energy security" includes feedstock security -- meaning competitively priced raw materials with lower price volatility and sufficient alternate approaches to ensure diversity of supply.

Dow firmly believes there are four fundamental principles to create a new energy policy that will make the transition possible. They include: 1) Aggressively pursue energy efficiency and conservation; 2) Increase, diversify and optimize domestic hydrocarbon energy and feedstock supplies; 3) Accelerate development of alternative and renewable energy and feedstock sources and; 4) Transition to a low carbon economy.

#### **1. Encourage Aggressive Energy Efficiency and Conservation**

Today, few in the U.S. would disagree that we waste too much energy, whether we are talking about drivers, homeowners, or businesses.

Energy efficiency is often the most affordable and most available way to improve the U.S. energy situation and reduce carbon emissions. In a 2009 report from the National Academy of Sciences, accelerated deployment of cost-effective technologies in buildings could reduce energy use by 25 to 30 percent by 2030. The National Petroleum Council found that available efficiency technology applied today to residential and commercial buildings would reduce energy use 15 to 20 percent and yet our nation's building industry continues to lag behind other sectors in effective policies that could provide the savings estimated.

As a first step in this comprehensive and more sustainable energy policy, we need an accelerated energy efficiency program over the next 10 years.

Our recommendations highlight tackling all energy demand sources and climate change contributors. As an example, the building sector in the U.S. accounts for about half of all energy consumption. In addition, greenhouse gas emissions have seen growth in the transportation and building construction sectors, with both areas representing more than 60 percent of final energy demand.

***We call for:***

- Policies that provide incentives for power generators and distributors to undertake cost-effective and innovative energy efficiency measures.
- A combination of federal financial incentives, low interest loan programs and energy efficiency building codes to provide large-scale savings and significantly improve our nation's building stock and increase our country's energy security.
- Promote the use of tools and incentives to assist manufacturers of all sizes in implementing energy efficiency measures.

## **2. Increase, Diversify, and Optimize Domestic Hydrocarbon Energy and Feedstock Supplies**

Hydrocarbon resources, in the transition to a sustainable energy future, must be leveraged for their greatest intrinsic value as a raw material or feedstock for products and solutions that not only drive our economic activity, but are also critical to unlocking the energy and feedstock sources of the future.

These hydrocarbon resources will continue to enable multiple improvements including increased agricultural production, pharmaceutical breakthroughs, and the production of insulation, photovoltaics and windmill blades. The wise use and availability of these resources for value added products must remain a policy imperative to ensure continued economic growth and job creation.

American economic growth will continue to rely on hydrocarbon energy and will require additional domestic supplies to improve energy security and reduce price volatility. Surprisingly the U.S. is the only country in the world sitting on known reserves of oil and gas that it has chosen not to develop. Chemical technologies will play an increasingly important role in enhancing the recovery of both conventional and unconventional oil and gas supplies and thus have an important role in responsibly accessing our domestic resources.

We believe that the increased supply of natural gas from unconventional sources, such as shale gas, will be an important resource for the United States over the next decades. However, further work on the production side is required to ensure the potential reserves can be brought to market in an environmentally acceptable manner at an affordable cost. We must avoid any measure that drives increased demand without first assuring ample supply is really available. This becomes even more critical for use in categories that have inelastic demand characteristics as is the case in electric power production and transportation.

Incentivizing fuel switching to gas in the power sector will exacerbate natural gas volatility, as utilities will pay nearly any price to assure heat and electricity to homes, schools and hospitals. Manufacturing companies, faced with foreign competition, become the shock absorber for high natural gas prices, in the form of disinvestment and lost jobs.

The data on new natural gas supply from shale and other unconventional sources is quite promising, but our experience has shown that the government is good at legislating demand, but not as good at promoting supply (access) to meet that demand. As recently as the 1990's the Clean Air Act drove significant demand for natural gas while at the same time Congress and predecessor administrations systematically increased restrictions on access both on and off shore. As a result, natural gas prices went up over 400% and more than a million good manufacturing jobs left the U.S.

There are numerous examples of how markets can and do transition to more sustainable future. A ***pragmatic approach to energy security*** that first creates adequate supply capabilities is the best way to ensure these transitions are viable over the long term.

According to the Department of the Interior, there are 93 billion barrels of oil and 456 trillion cubic feet of natural gas offshore on our nation's Outer Continental Shelf. These are domestic supplies that can be produced with state-of-the-art technologies that assure environmentally friendly production, while greatly enhancing our nation's energy and feedstock security.

More than 50 percent of the electric power used in this country is coal-generated electricity. We believe that more sustainable uses of coal are critical components of any energy plan. Deployment of cost-effective carbon capture and storage (CCS) is necessary to promote energy security and to help offset price pressures on domestic natural gas.

To accelerate CCS as part of the climate change solution, options beyond storage also need to be considered. The U.S. needs to implement a "putting CO<sub>2</sub> to work" strategy that includes value creating opportunities such as enhanced oil recovery, creation of bio-fuels and bio-feedstocks and coal bed methane recovery.

***We call for:***

- Policies that include measures to first ensure reliable access to natural gas supplies
- A new political consensus on offshore oil and gas production that is both environmentally responsible and accesses significant resources
- Policies that recognize and promote the value add of hydrocarbon feedstocks and ensure there are no penalties for fossil energy used as a feedstock material.
- The federal government to provide direct loans and other assistance to demonstrate commercial scale carbon capture and storage (CCS) viability and other carbon sequestration strategies.

### **3. Accelerate Development of Alternative and Renewable Energy and Feedstocks**

The third component of our plan is to reprioritize government support and policy to accelerate the development of effective and more sustainable alternative energy sources, including renewables.

According to analysis by the Pew Charitable Trusts, policies that advance the clean energy economy show great promise because they create incentives and send clear signals for both the private and public sectors to develop technologies, infrastructure and processes for clean energy, efficiency and conservation. As the saying goes, “It is easy to find the first investor to the second plant.” The U.S. needs government support to make the first plant a reality.

While incentives are necessary for early adoption to minimize the risk for early movers of innovative technologies, we need to ensure these technologies are economically viable in normal market conditions. This includes the development of new incentives to encourage development and deployment of renewable feedstocks, which can help replace fossil fuels to produce a range of chemical and plastic products. In addition, we support revising government financial incentives to accelerate commercial application of emerging technologies in uses such as solar, wind, tidal and geothermal energy.

Support for energy storage devices, including electric batteries is required to enable a new era of cost and performance capability to achieve the demands of both the power and transportation markets.

Finally, we support the federal government’s efforts to provide financial support to enable leadership in advancing development of new nuclear power technologies. One promising example is the High Temperature Gas Reactor (HTGR), which has the potential to produce synthetic fuels and feedstocks when combined with gasification of coal or other domestic carbon sources. This technology emits almost no CO<sub>2</sub>.

***We call for:***

- Direct loans, loan guarantees and other appropriate aid to fund cost-shared demonstration of nuclear power
- The extension of financial incentives to provide for public/private research on photovoltaics, next generation biofuels, including renewable feedstocks, as multiple chemical and plastic products could eventually be made using bio-based instead of fossil-derived feedstocks
- The continuation of incentives to develop the next generation of energy storage devices

#### **4. Transition to a low carbon economy**

A fundamental element to realizing a sustainable energy future is a long-term shift to a low carbon economy. The principal catalyst behind this transition will be efforts to slow, stop and reverse the growth of greenhouse gas emissions (GHGs) while preserving economic growth and future prosperity.

The right mix of fundamental research, innovation and aggressive implementation is needed to achieve both this transition and continued economic growth. The next decade of this journey must see dramatic improvements in energy efficiency and the optimization of existing energy resources. At Dow, we believe the following decade of this undertaking will be characterized by an increased reliance on the implementation of new, but known technologies at an impactful scale. Throughout both decades, federal and state policies should be designed to facilitate basic research to drive the development, commercialization and deployment of yet to be discovered technologies necessary to increase efficiency, bolster our energy security and drive emissions even lower.

Dow believes an important first step to simultaneously reduce emissions and accelerate innovation is a combination of measures that puts a price on carbon. We support the enactment of environmentally effective and economically sustainable energy and climate legislation. If this legislation is to foster the transition to a low carbon economy, it must make possible the shift to an advanced manufacturing economy which produces and employs a spectrum of clean, low-GHG technologies designed to keep energy prices stable and affordable. A flexible, market-based approach to lower emissions is the only real solution. Regulation of greenhouse gas emissions through the Clean Air Act would be rigid, stifle innovation and impose significant new costs on U.S. manufacturers.

The latest World Energy Outlook from the International Energy Agency (IEA) includes abatement scenarios to reduce global GHGs. The most aggressive scenario aims to limit atmospheric CO<sub>2</sub>e concentrations to 450 ppm and includes significant reduction options from all energy technologies. The IEA study further indicates that it will take approximately a decade for global emissions to level off and another 10 years to reduce emissions below their 2009 levels. This scenario reinforces the need for an effective plan to include achievable implementation timelines to slow GHG growth before tackling the significantly more difficult challenge of reversing GHG emissions.

An effective U.S. commitment to reduce greenhouse gas emissions must include short and long term targets to spur commitments by other major emitting countries to reduce absolute levels of GHGs in the atmosphere. This will also send strong signals to the marketplace to develop and adopt innovative solutions and new clean technologies. Ultimately, the transition to a low carbon economy must be global, so American policy should therefore include incentives that encourage actions by other countries to implement GHG emission reduction strategies and introduce new, global markets for clean technologies.

***We call for:***

- Coordinated policies which allow an adequate timeframe to reduce GHGs without sacrificing economic growth.
- A price on carbon that is primarily pursued through market-based mechanisms to assure the lowest cost of compliance without hindering innovation.
- A targeted approach to promote aggressive basic research and development with accelerated demonstration and deployment of clean energy and new generation energy efficient technologies
- Minimizing carbon leakage by maintaining the competitiveness of energy-intensive, trade-exposed manufacturers

**Summary**

In order to transition to a sustainable energy future, Dow believes that we need a comprehensive national energy and climate change policy that addresses economic, security of supply and environmental impacts. We must balance these factors with energy policy constructed on four fundamental principles: 1) Aggressively pursue energy efficiency and conservation; 2) Increase, diversify and optimize domestic hydrocarbon energy and feedstock supplies; 3) Accelerate development of alternative and renewable energy and feedstock sources; and 4) Transition to a low carbon economy.

These principles have driven and will continue to drive Dow's investment in our own operations and innovations, but policy change is required achieve a sustainable energy future. As a nation and as a leader on these global issues we must join together now to chart this transition.

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