Energy Security, Innovation & Sustainability Initiative
COMPETE: Energy

Drive.

Private Sector Demand for Sustainable Energy Solutions

A Comprehensive Roadmap to Achieve Energy Security, Sustainability and Competitiveness

Compete.

Council on Competitiveness

Drive. Private Sector Demand for Sustainable Energy Solutions

The Council on Competitiveness would like to acknowledge and express appreciation for the excellent contributions of James L. Wolf in the crafting of this report.

ISBN 1-889866-47-4

THE COUNCIL ON COMPETITIVENESS is a nonprofit, 501(c) (3) organization as recognized by the U.S. Internal Revenue Service. The Council's activities are funded by contributions from its members, foundations, and project contributions. To learn more about the Council on Competitiveness, visit our home page at www.compete.org.

DESIGN Soulellis Studio

Printed in the United States of America

Energy Security, Innovation & Sustainability Initiative
COMPETE: Energy

Drive.

Private Sector Demand for Sustainable Energy Solutions
A Comprehensive Roadmap to Achieve Energy Security, Sustainability and Competitiveness

Council on Competitiveness

Drive: Private Sector Demand for Sustainable Energy Solutions
Table of Contents

Letter from the Council on Competitiveness Leadership

In July 2007, the Council on Competitiveness launched the Energy Security, Innovation & Sustainability (ESIS) Initiative in recognition of the critical linkages among these three issues and their profound impact on future U.S. productivity, standard of living and global market success. The genesis for the Initiative was the Council's 2004 groundbreaking National Innovation Initiative (NII). The NII recognized energy as a significant challenge on the horizon—one that if left unaddressed could undermine America's competitiveness in the years ahead.

Energy consumption is rising exponentially, driven by worldwide population growth, swiftly developing economies, improving global living standards and the burgeoning use of ever more energy-dependent technologies. Consumption of nearly every major energy source is up markedly. If current trends continue, humans will use more energy over the next 50 years than in all of previously recorded history.

In the United States, growing dependence on imports to meet our energy needs is a major factor in the trade deficit and results in the loss of precious capital from our economy. Increases in energy prices erode the competitive cost structure of energy-intensive industries, increasing the risk that these industries and the jobs they represent will move offshore. Our growing dependence on foreign sources of natural gas and petroleum also poses a serious challenge to U.S. national and economic security. Moreover, we must lower the risk of climate change by reducing carbon dioxide (CO_2) emissions resulting from the combustion of fossil fuels.

Energy efficiency must be our first priority, but our goals will not be achieved through efficiency alone. Without a plentiful and affordable supply of energy in the future, the United States will lose current and future jobs and entire industries and see the further erosion of U.S. innovation capacity and our manufacturing base. Prices for goods and services will go up, our ability to create wealth will decline, and our very way of life may be threatened. If we allow this to happen, we will lose both the investment and the technological capacity we need for new energy solutions, goods and services. This is why we must establish an energy policy focused on expanding domestic production and making all energy sources more available, while employing efficiency and technology to protect the environment.

There is no one single solution to providing abundant, secure, clean and reasonably-priced energy. It will require legal, regulatory, policy and tax changes at both the federal and state levels that will support technological advances that improve the way energy is produced and used. If true change is going to occur, citizens and businesses will have to adapt to new circumstances, and it will require U.S. leadership to forge consensus and a commitment to global action to address climate change and economic development together.

While government policies can help enable the right conditions for progress, ultimately the private sector and the research community must come together to develop and deploy solutions. We must ensure that our best companies, experts, researchers, inventors and entrepreneurs have the freedom, the flexibility and the resources to develop cleaner, more secure energy—and more of it. We need to encourage innovation that leads to new sources of energy and improved use of existing, abundant resources. The way to accomplish this—the way to achieve game-

winning innovation, higher energy productivity, economic growth and stronger national security—is by driving demand for sustainable energy solutions in the private sector.

Drawing upon over a year's work of inquiry and real-time research and analysis, and in anticipation of the new administration, the Council issued *Prioritize: A 100-Day Energy Action Plan for the 44th President of the United States* in September 2008. The plan identified six "pillars" as integral to U.S. energy transformation and as top priorities for presidential action upon taking office. At that time, the Council stressed that the action plan recommended in *Prioritize* marked the beginning, not the end, of a concerted commitment to ensure the United States achieves energy security in a sustainable manner, while ensuring the competitiveness of its workers, industries and economy.

Drive: A Comprehensive Roadmap to Achieve Energy Security, Sustainability and Competitiveness builds upon the energy action plan in *Prioritize* and sets forth the next set of integrated building blocks for America's energy transformation, sustainability and competitiveness in a low-carbon world. We believe that the recommendations presented in *Drive* will unleash a new era of American innovation, create new industries, revitalize and re-build manufacturing jobs across our nation, keep and grow high-skilled jobs for this generation and the next and accelerate economic prosperity for all Americans as we lead global growth, environmental stewardship and security.

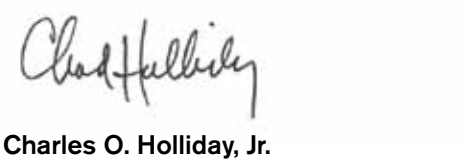
We are pleased to have the opportunity to present these recommendations at the National Energy Summit on September 23, 2009, in Washington, D.C. The recommendations set forth within *Drive* represent the voice of a very broad cross-section of America's preeminent business, academic and labor leaders, and citizens across the nation, committed to America's future prosperity and security. We urge policymakers to assign them the highest priority.

Moving forward, in the next phase of its work under the ESIS Initiative, the Council will delve deeper into the manufacturing, workforce and technology issues that will determine the success with which our nation converts today's energy and sustainability challenges into tomorrow's opportunity for economic growth and prosperity.

We would not have arrived at this point were it not for the contributions and dedicated commitment of so many individuals. We commend the reader to the Acknowledgements section of this report, as it reflects the breadth and stature of leading business, research, labor, academic, government and non-governmental leaders who gave so generously of their time and expertise to help us shape this roadmap. The ESIS Initiative Steering Committee has our gratitude for their leadership, with particular thanks to those members who generously hosted the Regional Energy Summit Series.

Reflecting the spirit and purpose of the Council, we declare, as leaders of industry, universities, national laboratories and labor, that we have come together to address this great challenge of our time—one that

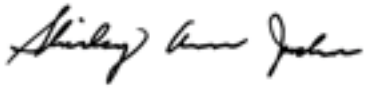
will determine the future of our nation and shape the lives of our children. We are filled with hope and optimism, but grounded in reality. We stand at the crossroads of the 21st century energy and sustainability revolutions. We ask our nation's leaders and citizens to join us as we embark upon this great journey of discovery, opportunity and transformation.



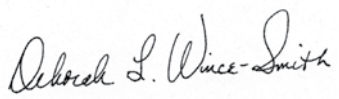
Charles O. Holliday, Jr.
Council Chairman
Chairman
DuPont

D. Michael Langford
ESIS Initiative Co-Chair
National President
Utility Workers Union of America, AFL-CIO

James W. Owens
ESIS Initiative Co-Chair
Chairman and Chief Executive Officer
Caterpillar Inc.



Shirley Ann Jackson
Council Vice Chairman and ESIS Initiative Co-Chair
President
Rensselaer Polytechnic Institute



Deborah L. Wince-Smith
President
Council on Competitiveness

Executive Summary

Energy is the lifeblood of our economy. America's competitiveness cannot be separated from energy issues. The efficiency with which we use energy affects our industrial and manufacturing cost competitiveness. Our dependence on foreign oil translates into an outflow of $439 billion dollars annually—accounting for over 45 percent of our trade deficit. Fully utilizing energy resources at home would direct precious capital to grow our domestic economy. In developing new industries to supply the sustainable energy and related services needed here and abroad, America can drive economic growth, create millions of new jobs and enhance the competitiveness and prosperity of the entire nation.

The United States must invest, create, commercialize and market the new products and services of the low-carbon energy future. We must actively engage in the intense global competition well underway in Asia, Europe, the Middle East and the Americas to capture the economic value, jobs and global market share for these new industries and infrastructure. As an example of what is at stake, within the past decade the United States has fallen from first to fifth among top solar manufacturing countries and now imports solar cells from the European Union and Asia.

Revenue in just three clean energy sectors—wind, solar and biofuels—is projected to nearly triple over the next decade, from $116 billion in 2008 to $325 billion in 2018. Markets for clean technologies like carbon capture and sequestration for coal plants will expand exponentially as demand for this abundant energy resource continues to grow. These markets and the employment and economic growth they bring can be ours if we act now with the right set of policies and programs to catalyze research and development (R&D), investment, manufacturing and commercial deployment.

Our national security is challenged and will increasingly be compromised by our energy supply and usage—ranging from our dependence on oil imports and the vulnerability of our energy infrastructure to the impact on our armed forces on the land, sea and air. In 2008, we imported over 66 percent of our oil, much of it from areas of the world that are insecure and not always friendly to American interests.

Energy's impact on the environment is pervasive, particularly from the combustion of fossil fuel energy. If we are to mitigate climate change and keep changes in global temperatures to a safe level, we need to limit the concentrations of CO_2 in the atmosphere from using fossil fuels. Using old technologies to supply energy for the next few decades will lock in increases of emissions and make any needed reductions more expensive and harder in the future.

The Council identified six critical "pillars" as integral to U.S. energy system transformation in *Prioritize: A 100-Day Energy Action Plan for the 44th President of the United States* issued last September. These pillars are listed in Figure A. Recommendations for actions on each pillar were made.

Over the past year, Congress and the new Administration have made considerable efforts to reinforce and strengthen these pillars, and progress has been made and several of the Council's recommendations adopted. Nonetheless, the Council believes that additional critical actions in each of these six areas are necessary if true breakthroughs in U.S. performance are to be achieved. In many respects these pillars are interdependent. Progress in one area cannot be achieved without progress in one or more of the other areas.

Drive Recommendations

Create the Foundation for Success—at Home and Abroad

Expand trade, demonstrate leadership in Copenhagen and collaborate with the developing world. To have maximum impact, we need to lay the foundation for success. This includes actions in both the international and domestic arenas. Internationally, we must act to expand trade, remove tariff and non-tariff barriers and protect intellectual property rights. The United States needs to demonstrate leadership at the United Nations (UN) conference in Copenhagen on climate change by committing to reduce greenhouse gases. We should seek an agreement that all major greenhouse gas-emitting countries agree to targets to limit emissions and confirm that the United States will provide technical and financial support to developing countries so they may achieve their aims of economic growth with cleaner technologies.

Clarify policies and inform the public. Here in America, we need to clarify and coordinate policies across federal agencies and take a systems approach to policy and funding decisions. The American public must be better educated on energy and environmental issues and technologies, and the consequences of policy choices.

Drive: Private Sector Demand for Sustainable Energy Solutions builds upon the six pillars of the energy system described in *Prioritize* (summarized in Figure A). This report details specific actions with assigned responsibilities under each overall recommendation.

Reward Efficiency. Efficiency is the cleanest, cheapest and most abundant energy "resource" available. Electric utilities are uniquely positioned to promote energy efficiency because they touch virtually every consumer and business in the United States. We must make sure that regulation gives utilities the right incentives to promote efficiency and that they can profit from helping their customers reduce their energy bills. Appliance standards should be set to match the best current appliance, and corporate average fuel economy (CAFE) standards for cars should be increased over time to 100 miles per gallon (mpg) by 2030. States which are most effective in reducing vehicle miles traveled per person should get additional funding from the federal government. And consumers of all types should be provided information and tax incentives to purchase the most efficient vehicles, equipment, appliances and homes.

Use It All and Price It Right. The future will likely include all the fuels we use now, although some in different forms. We must use coal-fired electricity generated with carbon capture and sequestration technologies, advanced nuclear power, natural gas and oil as well as renewables like biofuels, wind and solar power. A roadmap to rationalize state and federal siting, permitting and planning processes for critical energy infrastructure must be developed, as well as expediting nuclear approvals and commissioning and resolving the disposal of nuclear waste must be developed. A low carbon standard, including requiring a percentage of electricity generation be from renewable sources coupled with assuring equal access to the grid for all renewables, must be adopted. A clear legal and regulatory structure for the storage of carbon emissions, including appropriate long term responsibilities and liability caps, must be established.

Figure A:

Prioritize Pillar	*Drive* Recommendation
1. Setting the Global Bar for Energy Efficiency	Reward Efficiency
2. Assuring Access to Clean and Competitive Energy	Use It All and Price It Right
3. Jumpstarting Energy Infrastructure and Manufacturing Investments	Capitalize Growth and Make It Here
4. National Transmission Superhighway and Smart Grid	Build It Fast and Smart
5. Spawning Technological Breakthroughs and Entrepreneurship	Discover the Future and Break the Technology Barriers
6. Mobilizing a World-Class Energy Workforce	Bridge the Skills Gap and Train the Talent

Energy prices should include the costs that are not currently reflected in their prices such as the impact of oil imports to our national security and trade deficit and the impacts of carbon emissions on the climate. A gasoline price floor should be established with a gasoline tax indexed to CAFE standards and inflation, and a price on carbon emissions should be set as we seek an international agreement in which all major emitters, including developing countries, agree to emission targets.

Capitalize Growth and Make It Here. The magnitude of investment needed to achieve energy system transformation is immense. Access to patient capital is essential if investors are to move forward on large-scale, long-term infrastructure projects. The financial risks associated with capitalizing large scale, high risk projects need to be addressed through a comprehensive suite of polices including lowering corporate tax rates from 35 to 25 percent and limiting liability damages for clean energy technologies. Individual investors should be encouraged to invest in the clean energy future through tax-exempt CompeteAmerica savings bonds. To ensure that the technologies of tomorrow will be manufactured in the United States, a steady stream of financing support should be provided, including 40 percent of the revenues derived from any future carbon pricing program. Supported programs should include: federal, state or local clean manufacturing initiatives; the creation of clean energy development zones; financial assistance for the first two to three commercial manufacturing facilities for energy technologies; the expensing of the costs of retooling for production of qualified products, equipment or energy options; operating Regional Manufacturing Centers to promote advanced manufacturing technology; and dedicating a high performance computing (HPC) center for clean energy manufacturing.

Build It Fast and Smart. The transmission system is the backbone of the electric system. As we move to an energy system with more renewable and other advanced technologies such as plug-in hybrids, we

need to ensure that power may move easily and with minimum losses from where and when it is produced to where it is consumed. We need to set national criteria for transmission siting, have the costs for new transmission lines recovered regionally and set national standards so the devices that enable advanced energy management are secure and capable of being used on any smart grid.

Discover the Future and Break the Technology Barriers. America's technological leadership was built on a strong commitment to scientific discovery and collaboration across the triad of the nation's research community: universities, industry and national laboratories. That commitment waned in the last few decades of the 20th century as federal R&D investment experienced starts and stops. To ensure continued U.S. leadership we need to guarantee a long-term, stable source of funding. In the future, 30 percent of any revenue from carbon pricing should be allocated to R&D, including the demonstration of technologies. Three technologies—energy storage including batteries, carbon capture and storage and advanced nuclear reactors—are enabling technologies that are critical to develop if we are to fully exploit our renewable, coal and nuclear resources. Several demonstrations at commercial scale of each technology should be fast tracked with set dates for timely completion.

Bridge the Skills Gap and Train the Talent. Education is critical to develop the skilled workforce that will be required in the transformed energy system. DOE should establish a permanent early career research program. Twenty percent of any revenue from carbon pricing should be allocated to programs such as state and regional workforce training initiatives, funds to provide financial aid to American students pursuing education in career paths for energy disciplines and a national youth energy corps. Immigration laws should be modified so that foreign students graduating from U.S. higher education institutions with a specialty in sustainable energy-related disciplines may receive a United States Permanent Resident Card (i.e. green card). Tax incentives should be given to businesses which provide mentoring, internships and on the job training for new entrants into clean energy careers. The entire continuum of America's educational system—from community colleges and technical schools to our most preeminent research institutions—must be actively engaged in the mobilization of a world class energy workforce. Job and career training programs should be supported that position state entities, including Workforce Investment Boards, as the galvanizing force behind local coalitions including industry, educational institutions, government and labor.

Drive sets forth, in its comprehensive roadmap, specific recommendations that we believe if implemented will achieve the trifecta of simultaneously promoting America's economic competitiveness, enhancing our national security and improving the global environment. The payoff will be huge. Now is the time for action. Delay puts us at unacceptable risk to realizing these goals. Harnessing the power of America—its businesses of all sizes, its academic and laboratory excellence and its talented workforce—is the most effective way to seize this opportunity and achieve results.

Council on Competitiveness
1500 K Street NW, Suite 850, Washington, D.C. 20005 T 202 682 4292
Compete.org

Compete.

Council on
Competitiveness