BIPARTISAN POLICY CENTER

# America's Energy Resurgence: Sustaining Success, Confronting Challenges

BPC Strategic Energy Policy Initiative

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- **Strategic Energy Policy Initiative (SEPI) Overview**
- **Successes and Challenges in the Energy Sector**
- **Report Recommendations**

## Leadership

| | |
|---|---|
| **Project Co-Chairs** | **Byron Dorgan,** former Senator (D-ND)<br>**Trent Lott,** former Senator (R-MS) |
| **Energy Security Chair** | **General James L. Jones USMC (Ret.),** former U.S. National Security Advisor |
| **Energy & Environment Chair** | **William K. Reilly,** former Administrator of the U.S. Environmental Protection Agency |

## Composition

| | |
|---|---|
| **SEPI Members** | Participants from industry, academia, utilities, public utility commissions, non-governmental organizations |

# SEPI MEMBERS



| Name | Affiliation |
|---|---|
| Ralph Cavanagh | Energy Program Co-Director, Natural Resources Defense Council |
| Clarence Cazalot | Chairman, President, and CEO, Marathon Oil Corporation |
| William M. Colton | Vice President, Corporate Strategic Planning, Exxon Mobil Corporation |
| David Cote | Chairman and CEO, Honeywell International, Inc. |
| Mark Gerencser | Executive Vice President, Booz Allen Hamilton |
| James T. Hackett | Executive Chairman and former CEO, Anadarko Petroleum Corporation |
| Edwin D. Hill | International President, International Brotherhood of Electrical Workers |
| William A. Von Hoene Jr. | Senior Executive Vice President and Chief Strategy Officer, Exelon Corporation |
| Colette D. Honorable | Chairman, Arkansas Public Service Commission |
| Thomas O. Hunter, Ph.D. | Former President and Lab Director, Sandia National Laboratories |
| Ellen J. Kullman | Chair of the Board and CEO, DuPont |
| VADM Dennis V. McGinn | President, American Council on Renewable Energy |
| Matt Rose | Chairman and CEO, BNSF Railway Company |
| Richard Schmalensee, Ph.D. | Professor of Management and Economics Emeritus and Dean Emeritus, Massachusetts Institute of Technology |
| Susan Story | President and CEO, Southern Company Services, Inc |
| Susan Tierney, Ph.D. | Managing Principal, Analysis Group; Former Assistant Secretary for Policy, U.S. Department of Energy |

***SEPI Overarching Strategic Goal:***

*The U.S. energy system should provide affordable, secure, and reliable supplies of energy, while ensuring continuous improvement in environmental performance*

***Specifically, SEPI believes U.S. energy policy should be designed to advance four core objectives:***

- Pursue a diverse portfolio of energy resources
- Improve the energy productivity of the economy
- Accelerate innovation and technology improvements across the energy sector
- Improve energy policy governance and accountability

- **Throughout the 18 month process, SEPI:**
  - Met five times
  - Analyzed existing studies
  - Commissioned original research and analysis
  - Negotiated final content and recommendations
- **Ultimately, SEPI identified over 50 recommendations for Congress, federal agencies, states, and industry**
- **SEPI focused on areas that have potential for broad stakeholder and bipartisan support**
  - These recommendations are offered as a package—no single SEPI member necessarily agrees with each individual recommendation in isolation
  - Taken together these recommendations provide the blueprint for a balanced and effective plan for enhancing the nation's prosperity, energy security, and environmental quality in the 21st century

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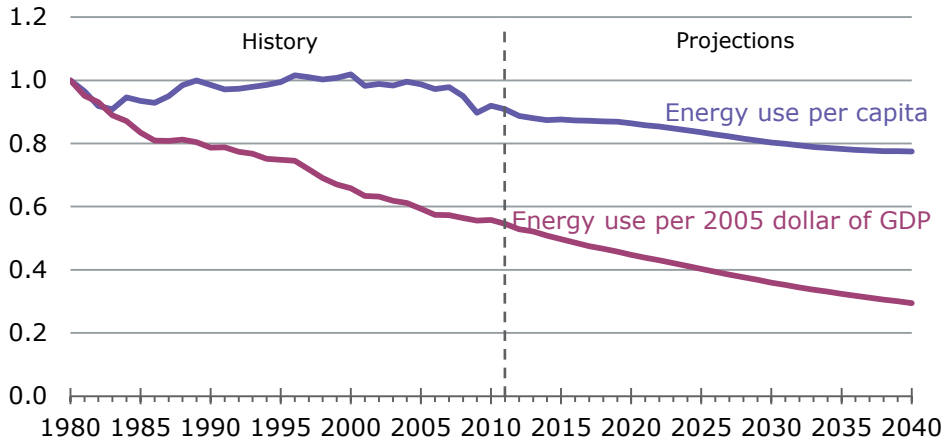
**The state of U.S. domestic energy sectors, energy productivity, and energy security is the best in many decades as evidenced by the following:**

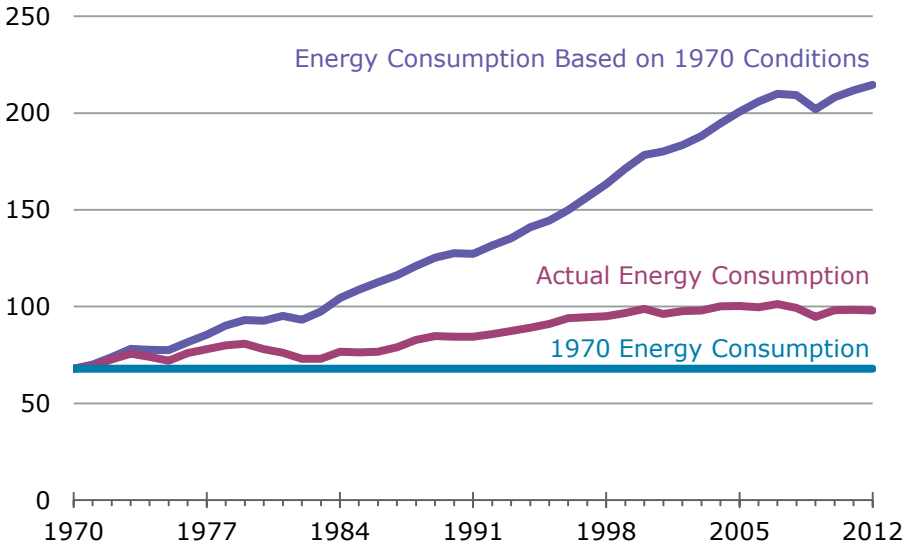
1. The energy savings from energy productivity improvements have exceeded the contribution from all new supply resources
2. Domestic oil consumption has declined
3. Domestic oil, natural gas, and renewable energy production have increased, and energy imports have declined
4. Estimates of U.S. natural gas reserves have soared
5. The cost-effectiveness of renewable energy has improved and deployment has increased
6. Domestic energy-related criteria pollutant and carbon dioxide emissions have declined

**U.S. Energy Consumption Per Capita and Energy Use Per $GDP**



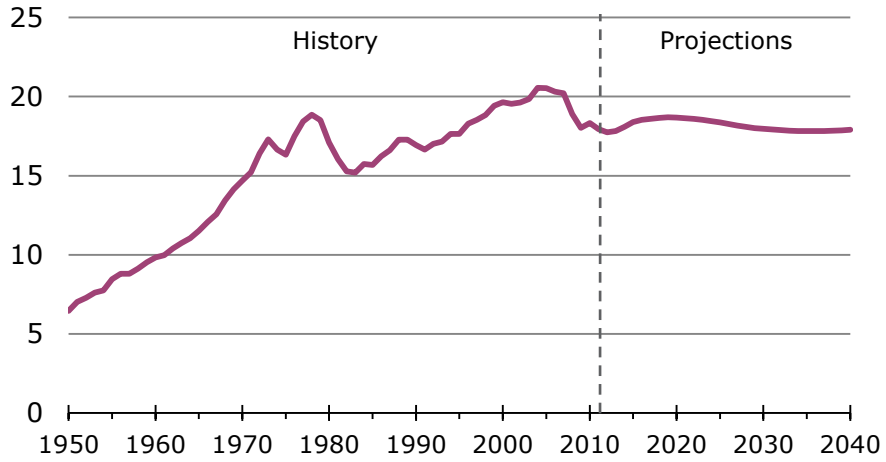

**Energy Demand and Supply: Energy Productivity Contribution**

Quads of Total Primary Energy

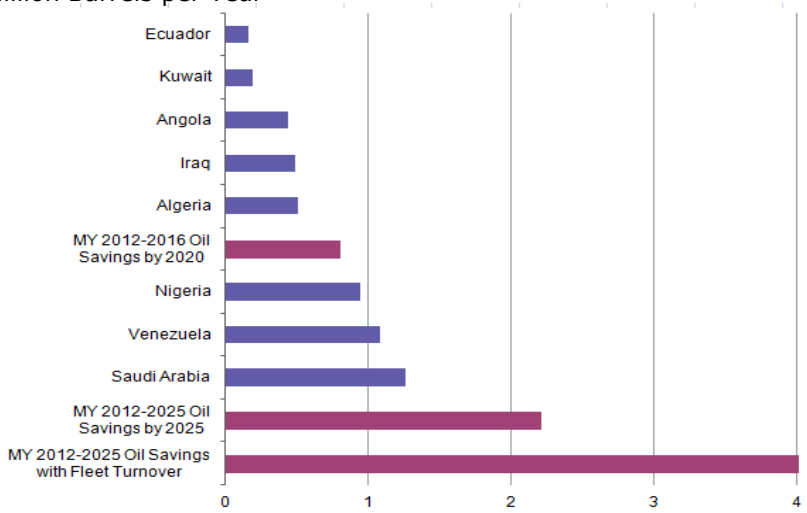



- The U.S. has cut its energy needs by more than 50 percent since 1973 (adjusted for economic growth and inflation), and the trend shows no signs of slowing
  - Improvements in energy efficiency and structural shifts in the economy have both contributed to this trend
- Treating this 40-year reduction as the equivalent of new energy supply, the resulting resource is significantly larger than the expansion of output from all other energy resources combined over the same period
  - In many situations, the cheapest and cleanest energy source is the energy we do not have to use

**U.S. Petroleum Consumption**
Million Barrels per Day

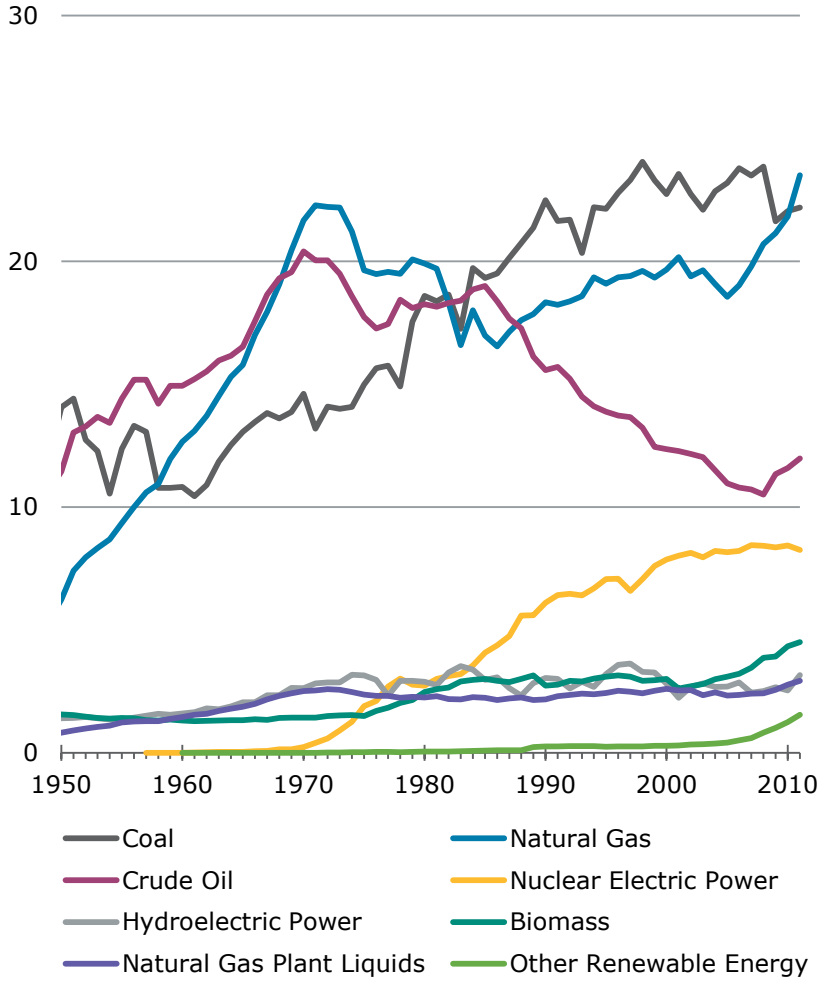



**Net Oil Imports to the U.S. from Select OPEC Countries vs. Oil Saved from Fuel Economy Standards**
Million Barrels per Year



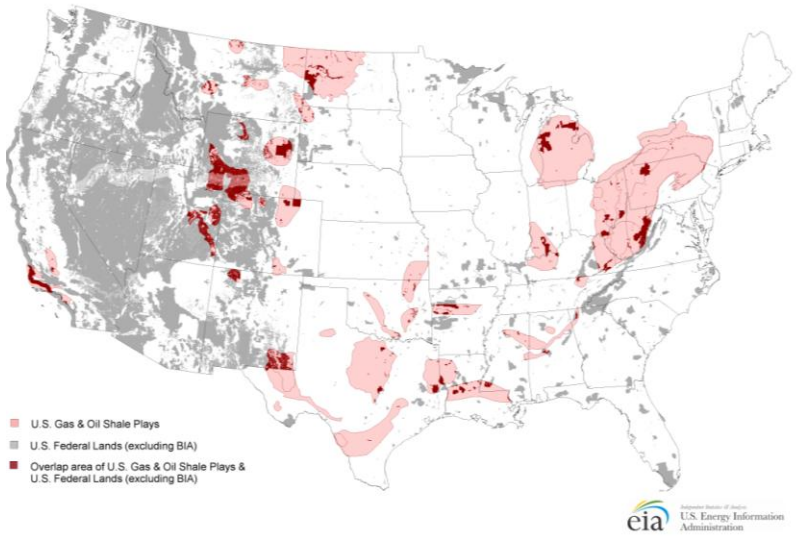

- Since 2005, the United States has reduced petroleum consumption by over 12 percent; that year will almost certainly rank as the all-time U.S. peak
- This lower consumption level is likely to persist given prospects for sustained progress in fuel economy, energy conservation, and continuing progress on alternative fuels
  - For example, new fuel standards are gradually increasing the fuel economy requirements for light duty vehicles to 54.5 miles per gallon by 2025

**U.S. Energy Production by Source**
Quadrillion British Thermal Units



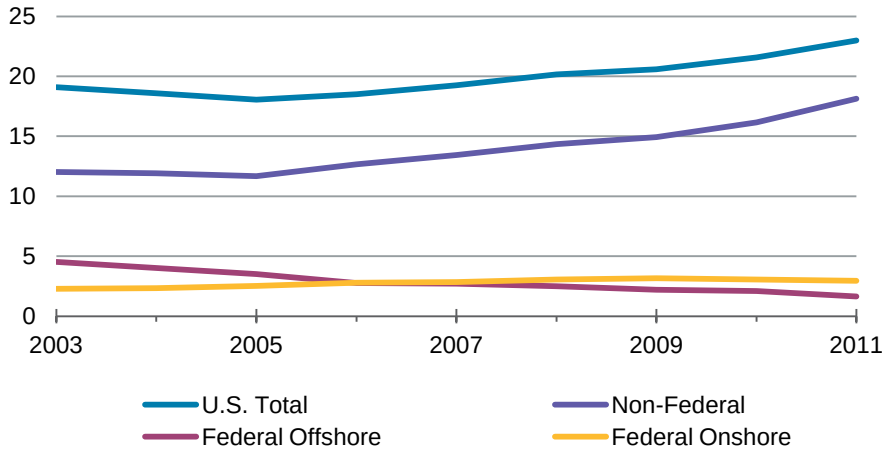

- Domestic oil, natural gas, and renewable energy production are all up
  - Overall, domestic crude oil production was up 11 percent and domestic natural gas production was up 24 percent in 2011 compared to 2006
  - Non-hydro renewable electricity production has risen especially rapidly over the past few years – up nearly 85 percent from 2007 to 2011
- New energy development is driving a jobs boom in many parts of the U.S.
- Lower energy costs are also helping the manufacturing sector recover from the punishing recession
- Increased production and decreased demand will result in lower reliance on net imports and provide new export opportunities
  - For example, expectations of LNG imports have given way to discussions of LNG exports

**Oil and Gas Shale Formations and Federal Lands**



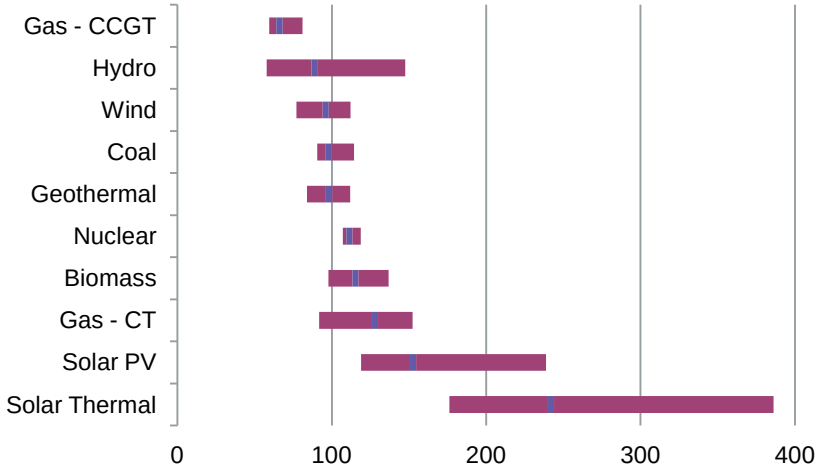

**U.S. Natural Gas Production**

Trillion Cubic Feet

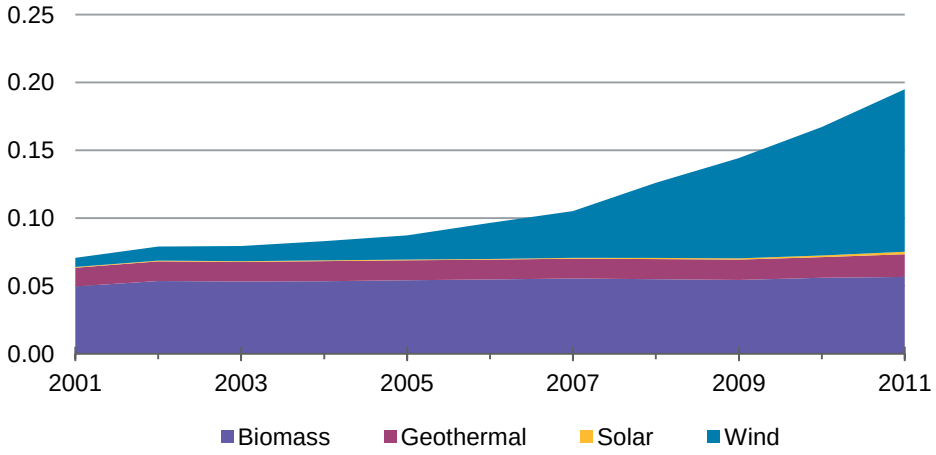



- In the last few years, estimates of U.S. natural gas reserves have soared, largely due to advances in drilling technology
  - Notably, much of the increase in natural gas production occurred onshore, driven largely by shale gas production
  - The U.S. is now believed to have sufficient gas resources to meet demand for many decades and perhaps even a century at current consumption rates
  - Responding to increased supply, natural gas prices have declined dramatically
- Technological advances and policy decisions have also greatly improved the domestic-supply outlook for oil, from both shale oil reserves and deepwater offshore resources

**2017 Levelized Costs of Energy**
Dollars per Megawatthour

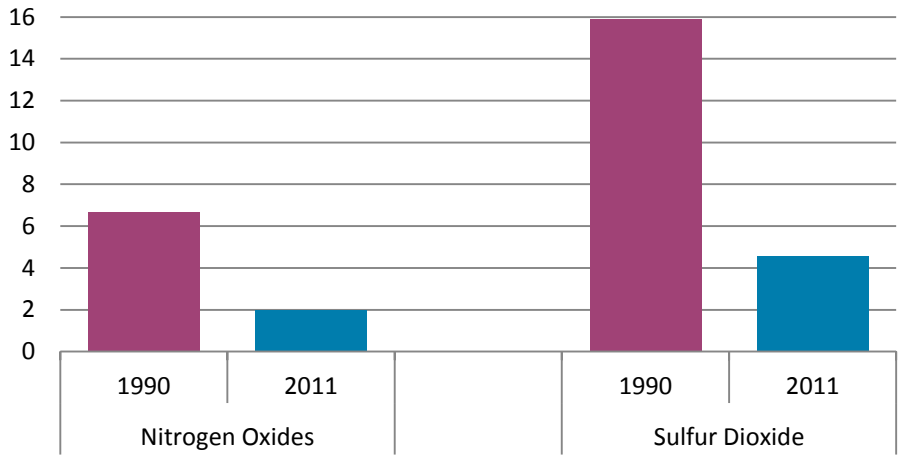



**Non-Hydro Renewable Electricity Production**
Trillion Kilowatthours

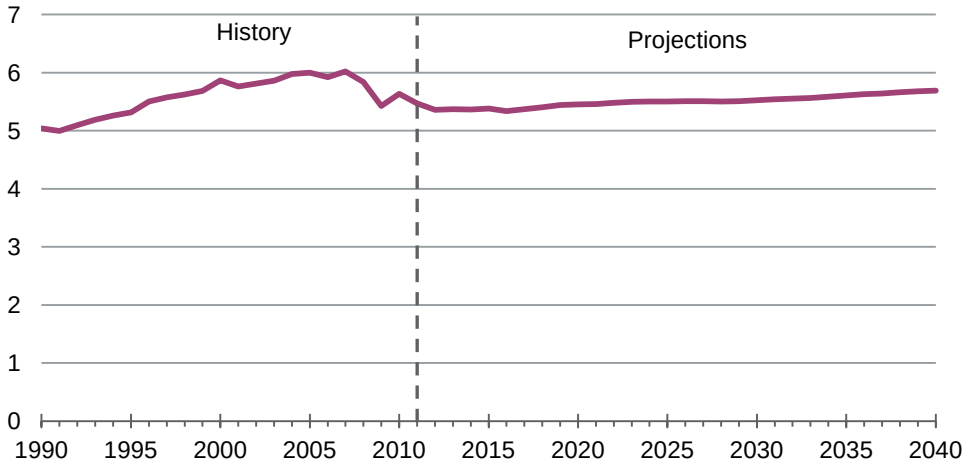



- Clean, renewable energy already plays an important role in the nation's energy supply
- Significant gains have been made in the cost-effectiveness of renewable energy and commensurate increases in deployment
  - Total installed generating capacity for non-hydro renewables grew fourfold from 2000 to 2011
  - In 2011, renewable energy accounted for roughly 13 percent of U.S. electricity generation
- Lower natural gas prices have helped utilities reduce the cost of integrating renewable resources that are intermittent
  - In recent years, wind and solar generation have increased their output

**U.S. Power Sector Nitrogen Oxides and Sulfur Dioxide Emissions**
Million Tons




**Energy-Related Carbon Dioxide Emissions**
Billion Metric Tons




- Recent supply and demand developments along with regulatory policies have been good for the environment in reducing energy–related emissions of key air pollutants
  - Emissions of sulfur dioxide and nitrogen oxides have been declining since the 1970s
  - U.S. energy-related carbon dioxide emissions have remained below the peak seen in 2007
- As the economy recovers, carbon dioxide emissions are expected to grow, albeit to lag behind GDP growth, as the market share of natural gas in the electric power sector rises relative to coal and end-use efficiency improves

**However, the U.S. will not retain this position of strength or prosperity without confronting many energy challenges:**

1. Affordable energy is still a challenge for many households and businesses
2. The oil and gas boom comes with environmental challenges
3. The electric grid faces hurdles in upgrading infrastructure and integrating new renewable sources
4. Public research and development (R&D) in energy is insufficient to maintain an international competitive edge
5. Climate change, global energy market volatility, and competition for energy resources by countries with growing economies remain

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## To sustain the successes and confront the challenges in the energy sector, SEPI developed recommendations targeted in four key areas:

- Pursue a diverse portfolio of energy resources
- Improve the energy productivity of the economy
- Accelerate innovation and technology improvements across the energy sector
- Improve energy policy governance and accountability

**Pursue a diverse portfolio of energy resources**

**Improve the energy productivity of the economy**

**Accelerate innovation and technology**

**Improve energy policy governance and accountability**

- Expand production of domestic oil and gas resources while improving the environmental performance of shale oil and gas development
- Support investments in carbon capture and storage demonstration projects
- Address barriers to maintain a strong nuclear energy sector
- Encourage renewable energy production and consumption through streamlined siting on federal lands, extended tax incentives, and increased Department of Defense (DOD) procurement
- Support alternative transportation fuels through research and development, infrastructure investments, and DOD procurement
- Evaluate training needs for a skilled and technical energy workforce, and facilitating multi-stakeholder energy-sector training programs
- Avoid restrictions on international trade of energy, in keeping with the nation's traditional commitment to free trade
- Review the full range of energy tax expenditures and develop a reasonable phase-out plan for those tax expenditures that constitute subsides for matures fuels and technologies

| Pursue a diverse portfolio of energy resources | **Improve the energy productivity of the economy** | Accelerate innovation and technology | Improve energy policy governance and accountability |
|---|---|---|---|

- Encourage electric utility procurement of cost-effective energy efficiency resources through state and local ratemaking and other policies
- Design environmental programs that encourage efficiency improvements
- Encourage investment in new, more efficient transmission and distribution infrastructure
- Continue or enhance a variety of cost-effective residential and commercial sector programs and standards at the local, state and federal levels
- Foster energy productivity in the industrial sector through local, state and federal policies that promote cost-effective, on-site industrial measures and combined heat and power (CHP)
- Improve productivity in the transportation sector through local, state, and federal policies aimed at reducing energy demand for transportation services
- Use existing authorities to ensure continuous improvement in fuel economy for new vehicles under, for example, the 2007 Energy Independence and Security Act of 2007

| Pursue a diverse portfolio of energy resources | Improve the energy productivity of the economy | **Accelerate innovation and technology** | Improve energy policy governance and accountability |
|---|---|---|---|

- Increase federal investments in basic and applied energy R&D as well as reauthorizing the America COMPETES Act
- Review DOE's technology programs to rebalance its energy R&D portfolio and guide budget priorities
- Reform elements of DOE's institutional structure to prioritize energy innovation, including undertaking needed reforms to the loan guarantee program
- Address intellectual property issues in DOE's funding
- Assess the effectiveness of the tax code in spurring private-sector energy innovation and considering mechanisms to leverage public-sector resources to demonstrate and deploy energy technologies
- Align energy innovation activities at DOD and other federal departments with broader national energy goals

| Pursue a diverse portfolio of energy resources | Improve the energy productivity of the economy | Accelerate innovation and technology | **Improve energy policy governance and accountability** |
|---|---|---|---|

- Develop a high-level National Energy Strategy, through a new National Energy Security Council, and a conduct a companion Quadrennial Energy Review
- Pair the Strategy with a well-coordinated implementation plan that can respond to often unpredictable economic, political, and technological conditions and regularly tracking and reporting progress

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**Oil & Natural Gas**

1. Congress should expand access to oil and gas exploration and production in the Eastern Gulf of Mexico, and the Department of the Interior should accelerate the timetable for leasing areas off the coasts of the Mid- and South Atlantic states—provided that the areas involved have been reviewed and approved based on a rigorous coastal and marine spatial planning process. Stakeholders should work together to identify substantial new acreage in the Eastern Gulf that could be opened to exploration and production in concert with other, ongoing activities, and request that Congress remove the moratorium in these areas; in both the Eastern Gulf and the Atlantic region, we recommend an open, collaborative and science-based planning approach, and we recommend that in conjunction with such planning processes, the Department of the Interior consider reopening its current five-year plan to include at least one lease sale in the Atlantic

2. Working with all stakeholders, Congress and the Department of the Interior should improve permitting and leasing for onshore oil and gas production on federal and tribal lands by (1) assuring adequate resources; (2) providing consistent requirements; (3) creating a new commission to identify options for regulatory reforms; (4) creating more litigation transparency; and (5) improving the collection and dissemination of statistics for energy projects on federal lands

3. Federal and state regulators should implement the environmental performance recommendations for shale resource development recently issued by the Natural Gas Subcommittee of the Secretary of Energy Advisory Board and the National Petroleum Council

**Coal**

4. The Department of Energy should continue public-private efforts to develop and demonstrate cost-effective, commercial-scale technologies for carbon capture, utilization, and storage and should begin developing a comprehensive, integrated legal and regulatory framework to govern long-term carbon storage

**Energy Exports**

5. Restricting international trade in fossil fuels is not an effective policy to reduce global greenhouse gas emissions or to advance domestic economic interests, and we recommend against any such restrictions

**Renewable Electricity Production**

6. The Department of the Interior and other federal agencies should continue to fully fund and implement reforms initiated over the past few years for approving renewable energy projects on federal lands as expeditiously as possible

7. The Department of Defense should continue efforts and initiatives to achieve greater energy efficiency and harness renewable and alternative energy investments in direct support of its national security mission

8. Electric-sector regulators and stakeholders should identify and implement strategies to modernize the grid and enable investment in necessary transmission and non-wires solutions in order to more efficiently integrate renewables into the electric power system

**Energy-Sector Workforce Needs**

9. Congress should direct the Department of Energy and the Department of Labor to work with states to evaluate training needs and facilitate multi-stakeholder energy-sector training programs

10. Congress should appropriate funds and direct the Department of Energy, the Department of Labor, and the Department of Education to improve existing systems for collecting, managing, and disseminating workforce and educational data

11. Congress should appropriate funds and direct the Department of Labor to identify training standards and best practices for energy-sector jobs

12. Congress should provide support for individuals who seek relevant technical training and experience

13. Congress should reauthorize the America COMPETES Act

**Nuclear**

14. Broadly speaking, we endorse the key strategic goals set out in the Bipartisan Policy Center's 2012 report, *Maintaining U.S. Leadership in Global Nuclear Energy*, and in the report of the Blue Ribbon Commission on America's Nuclear Future to guide policy makers on this issue

**Alternative Transportation Fuels**

15. The federal government, by itself or in combination with industry, should pursue sustained investment in research and development for transportation fuels, vehicles, and infrastructure to advance more efficient and cleaner energy consumption in the transportation sector

16. Local, state, and federal governments should continue and expand efforts to encourage early infrastructure investments for those alternative fuel–vehicle systems that offer a path to long-term viability, considering their lifecycle costs and long-term benefits

17. While we have diverse views regarding the Renewable Fuels Standard provisions for conventional renewable fuels, we uniformly believe the nation should continue to develop advanced renewable fuels, and we support the role that the Renewable Fuels Standard can play in promoting these fuels

18. We support longer-term Department of Defense procurement contracts, consistent with the fulfillment of its national security mission, for advanced biofuels and urge the Congress to authorize extended procurement contracts

**Federal Interventions in Energy Markets**

19. As part of broad, comprehensive tax reform, Congress should review the full range of tax energy expenditures and develop a reasonable phase-out plan for those tax expenditures that constitute subsidies for mature fuels and technologies

20. Congress should extend the renewable energy production tax credit, initially at its current level and develop a specific path to achieve a complete phase-out by the end of 2016

**Utility Sector**

21. States and local utility boards should establish utility ratemaking policies that reward investments in cost-effective customer energy efficiency as a distributed resource and remove disincentives to these investments

22. States and local utility boards should encourage all cost-effective energy efficiency through Energy Efficiency Resource Standards, incentive programs, and/or resource procurement planning and measure the effectiveness of these policies

23. States and local utility boards should encourage the adoption of dynamic retail pricing of electricity and continue to evaluate the use of this option in the residential sector

24. Congress and the U.S. Environmental Protection Agency should design environmental programs that encourage efficiency improvements (e.g., output-based emissions standards that account for both electricity and steam output)

25. Congress, the Federal Energy Regulatory Commission, other relevant federal agencies, state public utility commissions, and local utility boards should encourage investment in new, more efficient transmission and distribution infrastructure

**Transportation Sector**

26. Congress, the U.S. Department of Transportation, states, and localities should encourage the adoption of cost-effective policies aimed at reducing energy demand for transportation services and should make full use of existing authorities to ensure continuous improvement in fuel economy for new vehicles under, for example, the bipartisan 2007 Energy Independence and Security Act

**Residential and Commercial Sectors**

27. State legislatures should adopt the latest energy codes and upgrade continually state building standards for new buildings and major renovations, based on life-cycle cost effectiveness

28. State public utility commissions and local utility boards should promote demand-side efficiency with improved customer information (e.g., smart meters, dynamic pricing) and other innovative uses of customer information (e.g., comparing energy usage among peers)

29. State public utility commissions and local utility boards should support state agencies and contractors that administer building codes and standards through encouragement of partnerships with utilities

30. Congress and the Executive Branch should continue to assign high priority to timely issuance of and upgrades to all its statutorily authorized performance-based efficiency standards for appliances, lighting, and equipment

31. Congress and the Executive Branch should continually upgrade federal model building standards based on life-cycle cost-effectiveness.

32. Congress and the Executive Branch should support the creation of university-based energy efficiency centers

33. Congress and the Executive Branch promote energy performance labeling in both new and existing buildings through voluntary programs and/or by utilizing labels as a compliance mechanism for incentive programs

34. Congress and the Executive Branch improve and harmonize federal energy efficiency programs, including the Department of Energy appliance standards, the Department of Energy and the Environmental Protection Agency's ENERGY STAR program, and the Federal Trade Commission's Energy Guide Program

**Industrial Sector**

35. Congress, state public utility commissions, and local utility boards should create incentives and remove disincentives for utility promotion of cost-effective industrial efficiency on-site

36. State public utility commissions and local utility boards should explore feasibility of including combined heat and power and waste-energy-based generation in state energy efficiency resource standards

37. The Department of Energy should accelerate the development and adoption of cost-effective DOE efficiency standards and establish cost-effective industrial standards for certain types of products (e.g., pumps and other relatively homogenous mass-produced equipment)

38. State public utility commissions and local utility boards should create incentives for utilities to implement sub-metering at industrial and commercial facilities

39. State public utility commissions and local utility boards should support electric utility investment in cost-effective industrial efficiency through grants, loans, training, funding for audits/retrofits, and other programs

40. The Department of Energy together with state public utility commissions and local utility boards should support utility-industrial partnerships, including dedicated staff to establish energy management best practices and to promote greater deployment of cost-effective efficiency technologies that deliver benefits to utilities and industry

41. Congress should require a regular, rigorous retrospective review of DOE's research, development, and demonstration energy portfolio conducted by an outside body (e.g., the National Academy of Sciences) that includes examining the effectiveness and management of the Department of Energy's portfolio while also providing options to maximize the benefits from these federally funded programs
42. Congress should significantly increase federal investments in basic and applied energy R&D
43. Congress and federal agencies should, when appropriate, consider mechanisms to leverage public-sector resources to demonstrate and deploy energy technologies
44. Congress should reauthorize the America COMPETES Act, important provisions of which are set to expire at the end of FY2013
45. As a component of the government-wide Quadrennial Energy Review, the Department of Energy should undertake a regular review of its technology programs (a "Quadrennial Technology Review") to rebalance its energy R&D portfolio and guide budget priorities in light of energy market conditions, technology advances, and emerging national priorities
46. The Department of Energy should reform elements of its institutional structure to prioritize energy innovation. While it may be too early to conduct a robust analysis of the relative effectiveness of ARPA-E (Advanced Research Projects Agency-Energy) and other new energy programs and entities, we conclude that many of the organization and management characteristics they are piloting could serve as broad best practices for driving innovation across the department
47. The Department of Energy should take additional action to address intellectual property issues in its funding and collaboration processes
48. The section 1703 Department of Energy loan guarantee program should be maintained and reformed
49. The Department of Defense, in direct support of its national security missions, and other federal departments and agencies should strive for continued improvement in aligning their energy innovation activities with broader national energy goals
50. The Department of the Treasury, the Department of Energy, and Congress should assess the effectiveness of the tax code in spurring private-sector energy innovation

51. The President and ultimately Congress should establish a National Energy Strategy Council (NESC_ to oversee all aspects of U.S. energy policy
52. The President and ultimately Congress should direct the Department of Energy to undertake an interagency *Quadrennial Energy Review (QER)*