



# The Energy Security Challenge

## A Primer on Energy, Oil Dependence and Policy





# The Energy Security Challenge

- Oil dependence undermines U.S. economic security and foreign policy, transferring wealth and power to hostile regimes
- True energy security is found in diversity of supply, which requires the ability to power our vehicles using a variety of fuels and a comprehensive and aggressive investment strategy in multiple sectors
- Meaningful solutions have long lead times, so action is needed today



# Instability in the Global Oil Market

Certain persistent characteristics of the global oil market create very real economic and national security vulnerabilities for America. Instability in major oil-producing countries, an uncertain investment environment, the threat of terrorism, and high demand growth are straining the global supply system, leading to market volatility and unstable prices.

### 1. Port of Valdez and Trans-Alaska Pipeline

The Trans-Alaska pipeline accounts for roughly 20 percent of U.S. crude oil production. Sabotage a serious concern.

### 2. United States: 8.2 mbd

World's largest consumer, accounting for 25 percent of global demand despite having only 3 percent of world reserves. Consumption expected to grow 24 percent by 2025.

### 3. Gulf of Mexico: 1.5 mbd

Infrastructure inherently vulnerable to natural disasters. In 2004 and 2005, hurricanes were responsible for single greatest losses of energy output.

### 4. Venezuela: 2.9 mbd

President Chavez frequently threatens to "cut off the oil," noting economic consequences for U.S. In late-2002 and early-2003, labor strikes and general unrest reduced output by more than 60 percent.

### 5. Turkish Straits

More than 3.1 mbd flow through this chokepoint en route to Mediterranean Sea and world markets. One of world's busiest shipping lanes and only a half-mile wide at its narrowest point.

### 6. Caspian Sea and the Caucasus: 1.8 mbd

Ethnic conflicts, frequent unrest, and rampant corruption threaten export growth.

### 10. Russia: 9.3 mbd

Uncertainty remains in wake of Yukos affair and other recentralization efforts. World's second largest producer.

### 11. Strait of Hormuz

17 mbd, roughly 20 percent of the world's total supply flows through the Strait of Hormuz. If blocked, only a small portion could be transported along alternate routes.

### 12. China: 3.6 mbd

Rapidly growing demand due to economic development; recently became world's second largest consumer. Efforts to secure supplies will only intensify.

### 13. Strait of Malacca

Carries 13 mbd between Persian Gulf and key developing markets in East Asia. Narrowness makes navigation difficult; piracy a regular occurrence.

### 14. Iraq: 2 mbd

Terrorists frequently target oil facilities. Currently producing well below pre-Gulf War capacity.

### 15. Iran: 4.1 mbd

Fears persist over nuclear showdown with West.

### 16. Saudi Arabia: 10.5 mbd

Rife with terrorist threats and political tensions; current spare production capacity much lower than in past.

### 7. Nigeria: 2.3 mbd

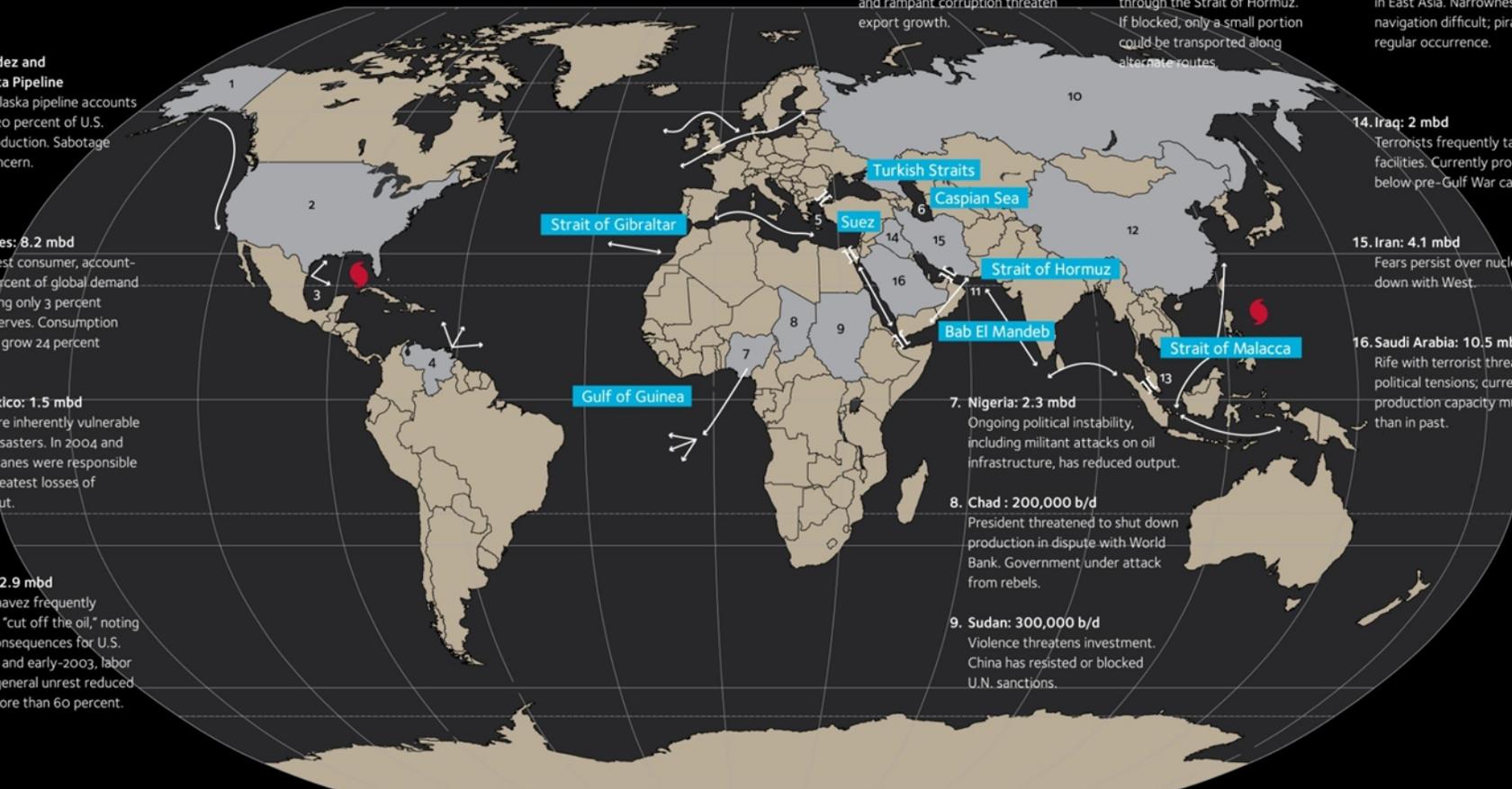
Ongoing political instability, including militant attacks on oil infrastructure, has reduced output.

### 8. Chad: 200,000 b/d

President threatened to shut down production in dispute with World Bank. Government under attack from rebels.

### 9. Sudan: 300,000 b/d

Violence threatens investment. China has resisted or blocked U.N. sanctions.



mbd—million barrels per day; b/d—barrels per day. Figures represent a country or region's production in 2004. This map depicts only some of the widespread instability in the global oil market.

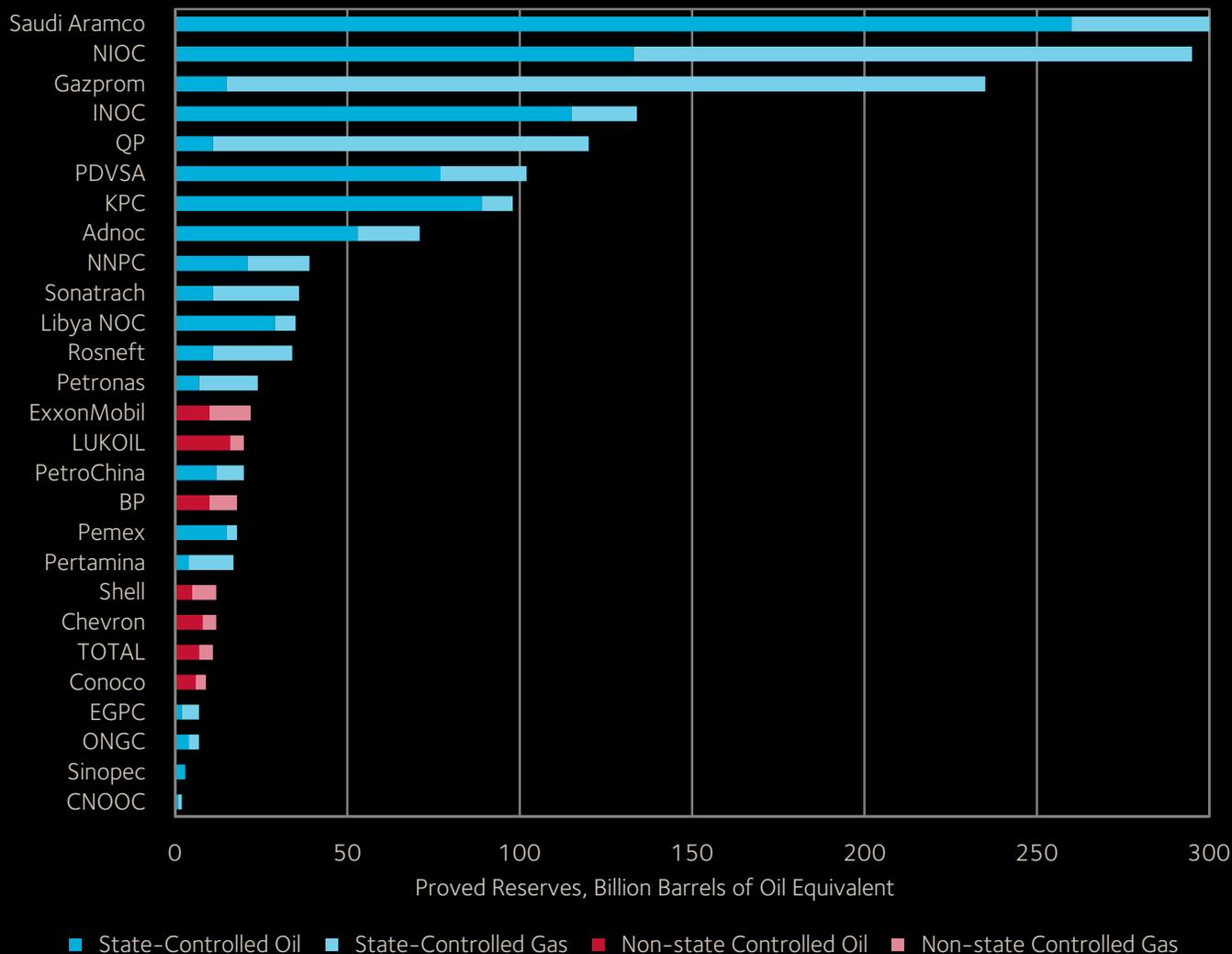


# No Free Market for Oil Supply

Oil prices are set in an open market, but that does not mean there is a free market for oil supply.

At least 75 percent—and by some estimates as much as 90 percent—of all oil and gas reserves are held by national oil companies that are either partially or fully controlled by governments.

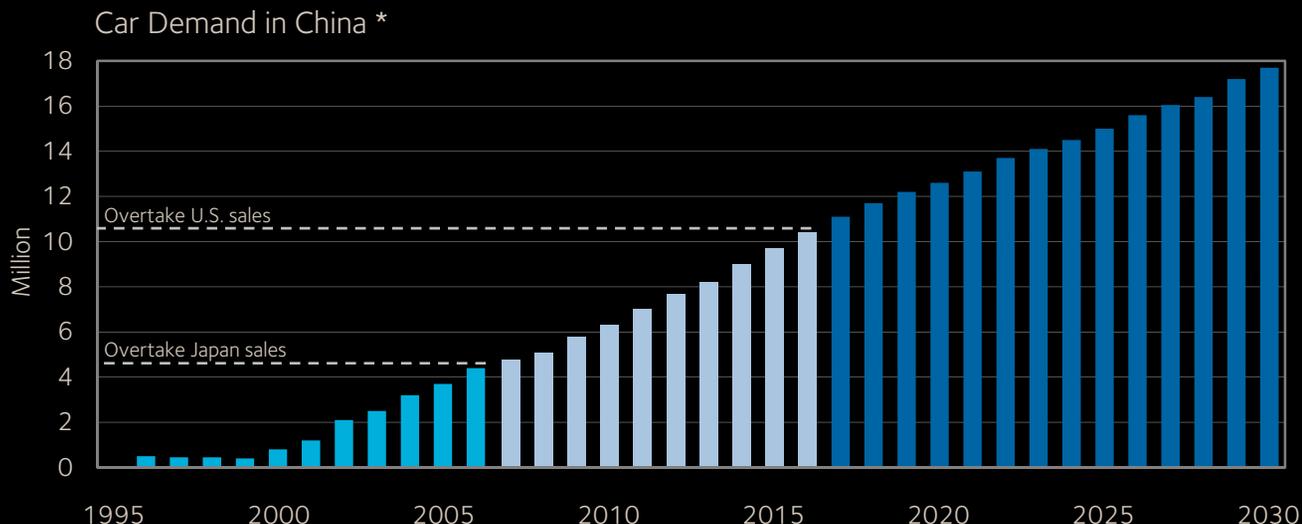
Top Oil and Gas Firms by Proven Reserves\*



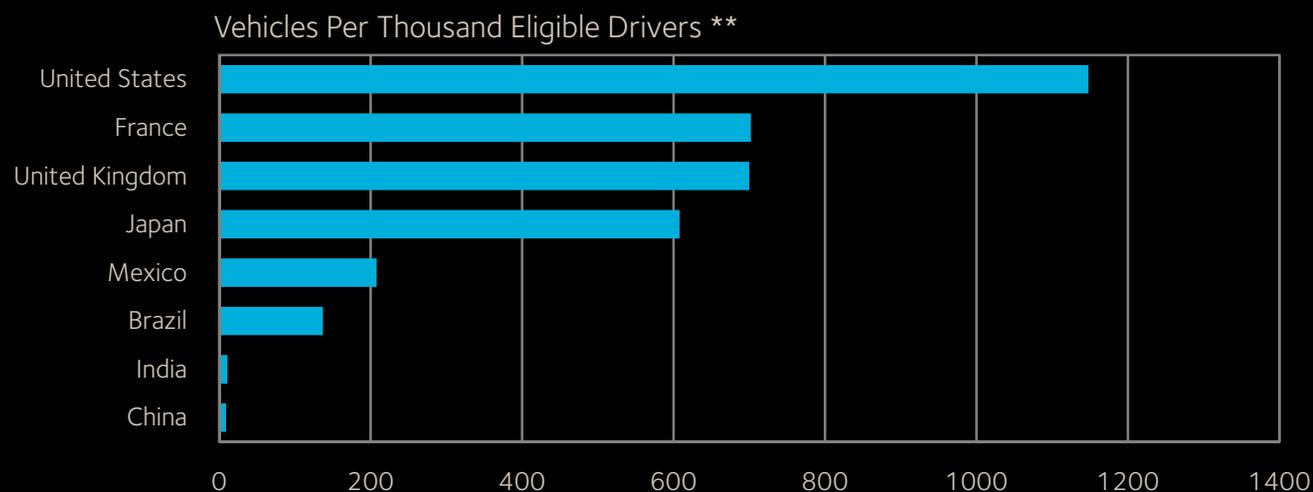


# Emerging Markets Drive Future Demand

Higher living standards and per capita GDP in China are providing consumers with the income needed to buy cars.



There are 1,148 registered personal vehicles for every 1,000 drivers in the U.S. — compared to 11 per 1,000 in India and 9 in China.



\* Data from International Energy Agency, *World Energy Outlook* (2007)

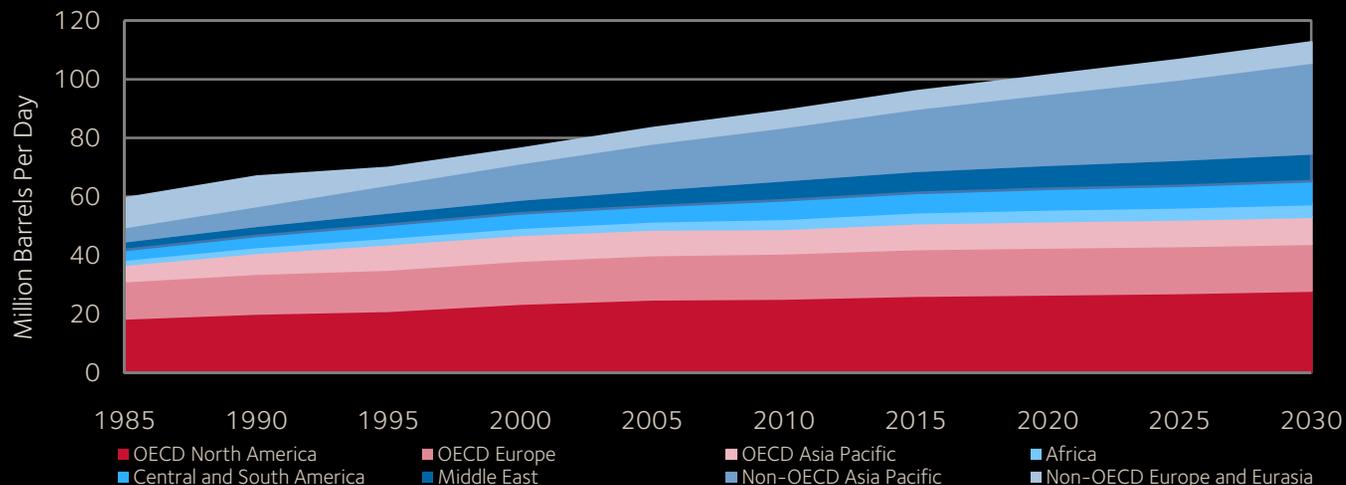
\*\* Cambridge Energy Research Associates



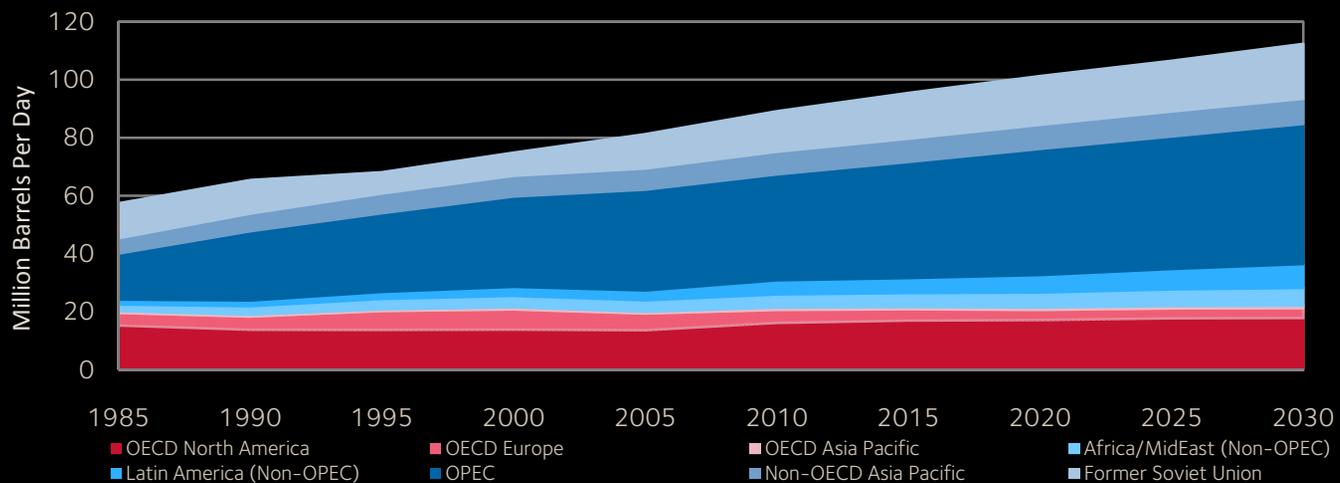
# The Shifting World Supply-Demand Dynamic

Developing countries are accounting for an increasing share of oil demand. The world will depend on OPEC and the former Soviet Union to provide much of the increased supply.

World Oil Demand: Historical and Forecast (2007) \*



World Oil Production: Historical and Forecast (2007) \*



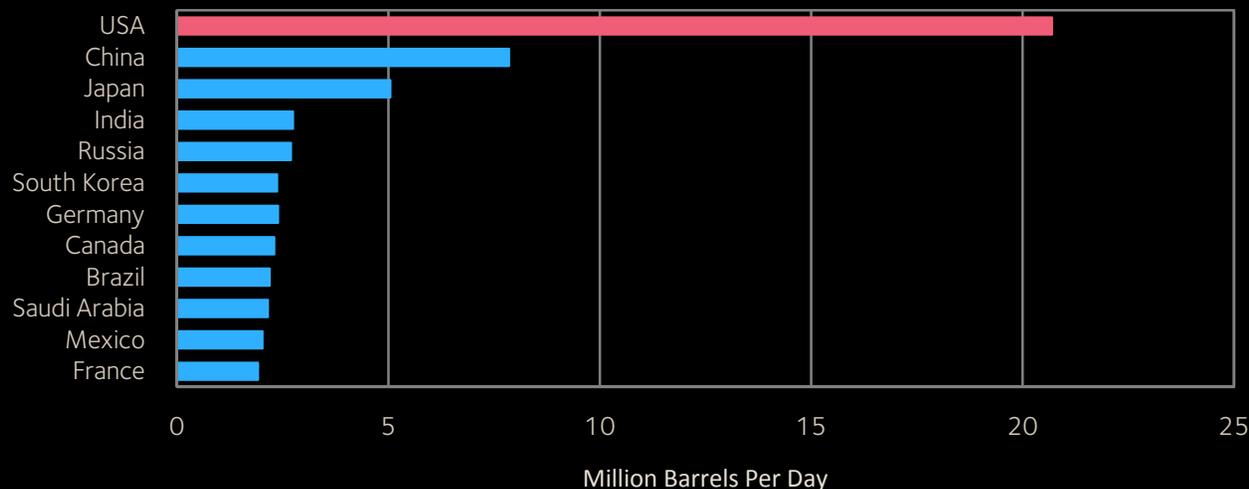
\* Data from U.S. Department of Energy, *International Energy Outlook 2008*, and BP p.l.c., *Statistical Review of World Energy 2008*



# U.S. Oil Consumption

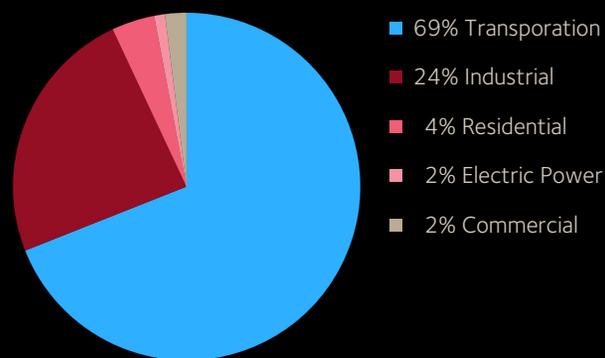
At more than 20 million barrels per day, the U.S. was the world's largest consumer of petroleum in 2007, using about three times as much as China.

Top Oil Consumers (2007) \*

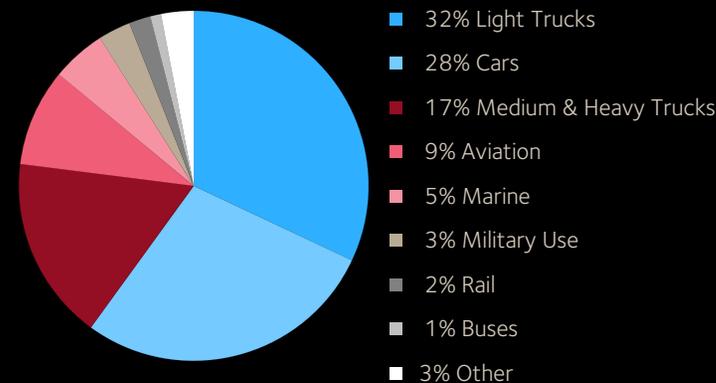


Most of the oil consumed in the U.S. is used in the transportation sector, which is 97 percent reliant on oil-based fuels for energy.

U.S. Oil Demand by Sector (2007)



Transportation Fuel Demand by Mode (2007)

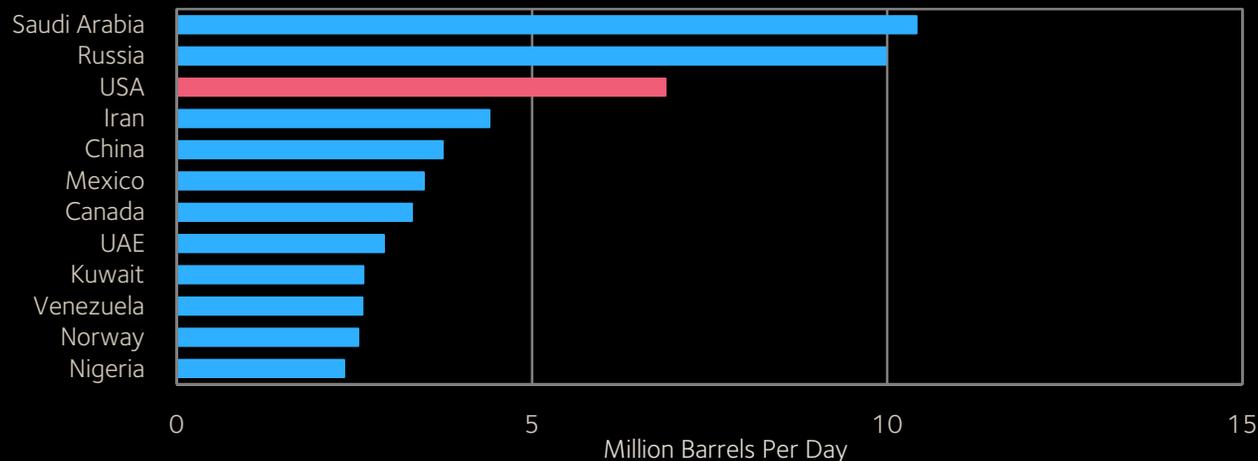




# U.S. Oil Production

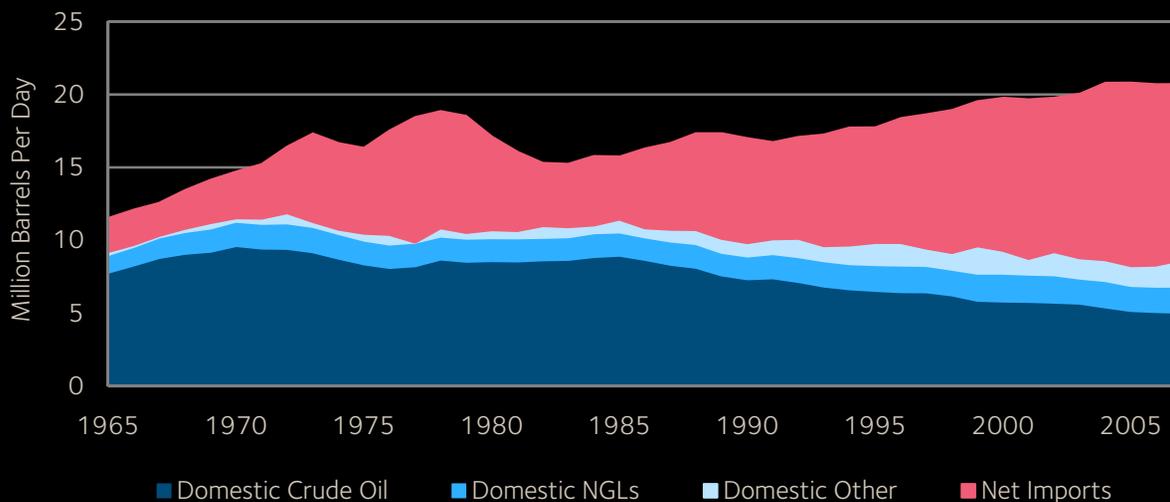
The U.S. was the third largest producer of oil in the world in 2007, trailing only Saudi Arabia and Russia in total output.

The World's Top Oil Producers (2007) \*



However, U.S. production has steadily declined since peaking in 1970, requiring ever-higher import levels to meet rising consumption.

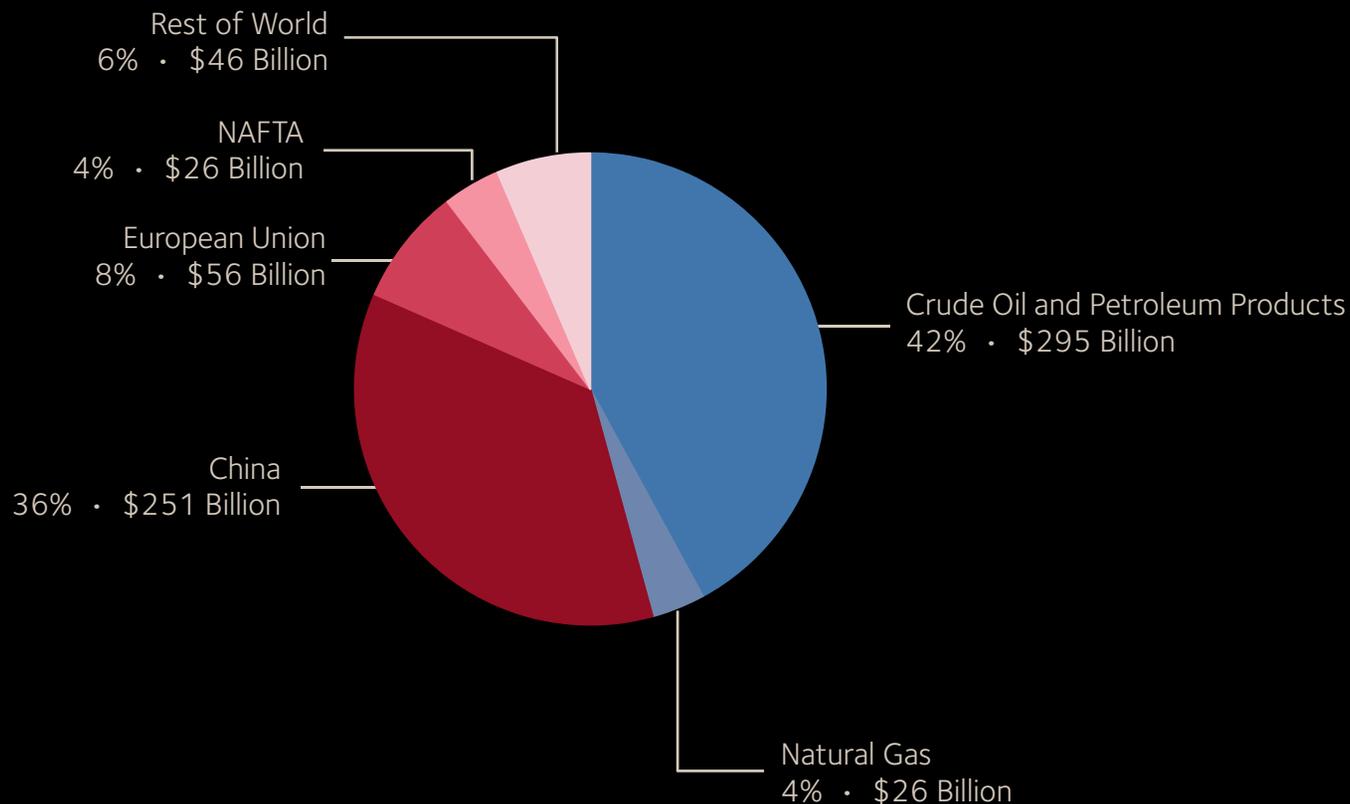
U.S. Oil Supply by Origin





# Oil and the Trade Deficit

Net petroleum import expenditures accounted for a larger portion of the 2007 U.S. trade deficit than any single country or regional trade partner.



\* Bilateral and regional trade deficits are net of oil and gas exports to the U.S.

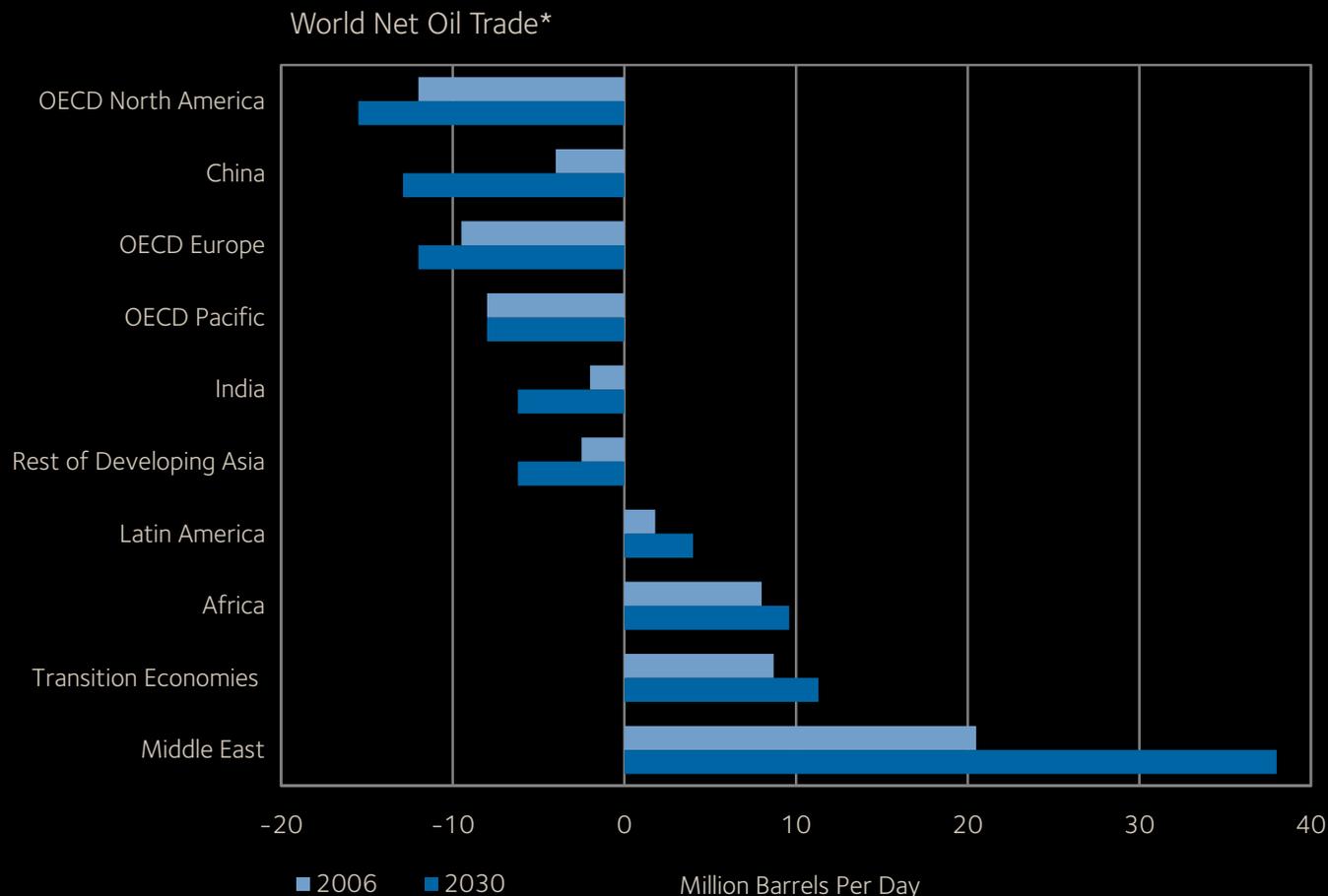
\*\* Data from U.S. Trade Statistics Express (<http://tse.export.gov>); U.S. Department of Energy, *Annual Energy Review 2007*; U.S. Bureau of Labor Statistics; and SAFE staff analysis



# Historical and Forecasted World Net Oil Trade

With oil prices now expected to average about \$100/bbl in 2008, the Department of Energy forecasts OPEC oil export revenue to reach \$1.0 trillion this year.

The IEA expects OPEC to provide more than half of the world's oil supplies by 2030, significantly increasing the net oil trade surplus in the Middle East.



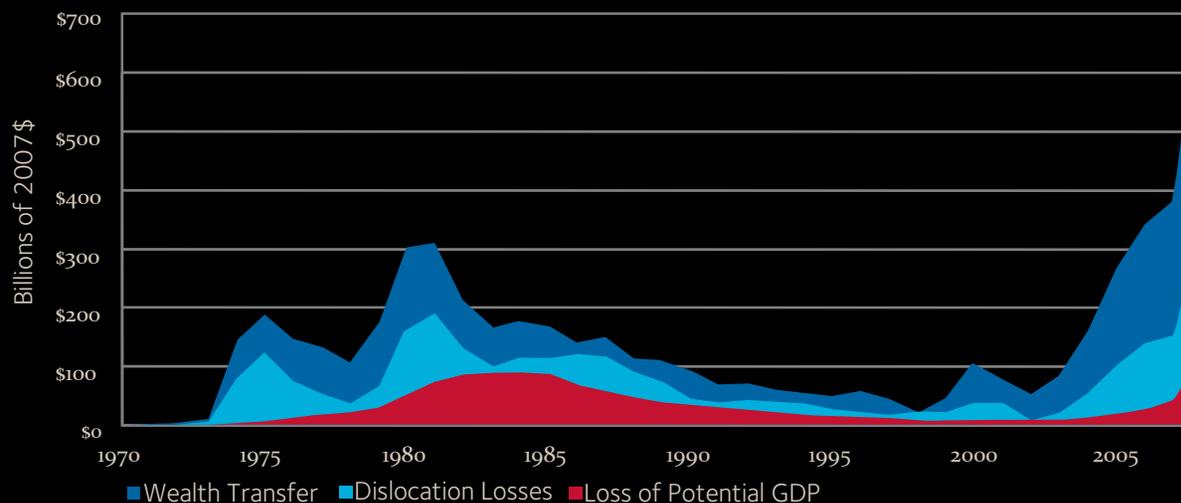


# The Domestic Economic Costs of Oil Dependence

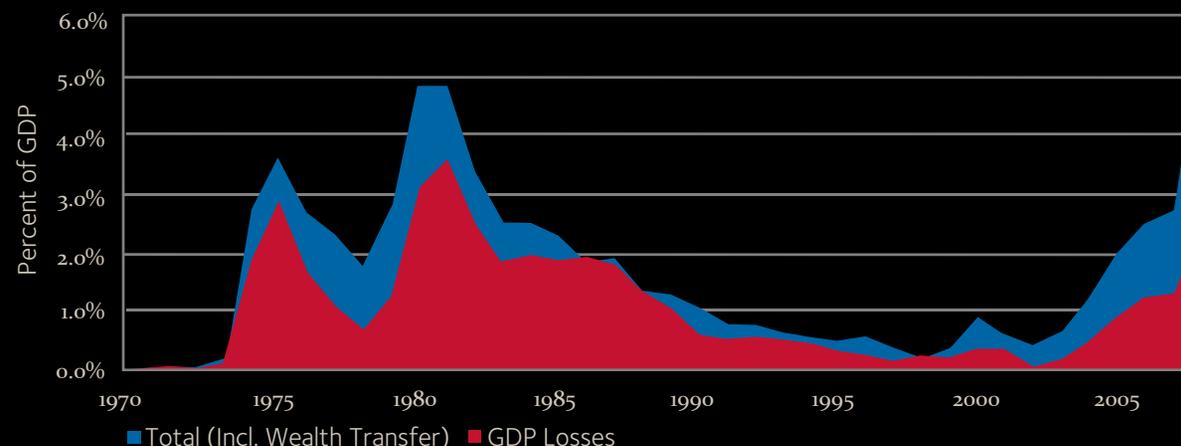
Based on the record increases in oil prices in 2008, researchers at the Oak Ridge National Laboratory have estimated that the cost to the U.S. economy from oil dependence will be at least \$700 billion in 2008, exceeding even the levels reached in 1980.

Between the mid-1970s and 1990, the U.S. economy reduced its oil intensity by about 50 percent. As a result, when measured against GDP, damage from today's record oil prices is still on par with past spikes. The lesson: efficiency matters.

Costs of Oil Dependence to the U.S. Economy (1970-2008) \*



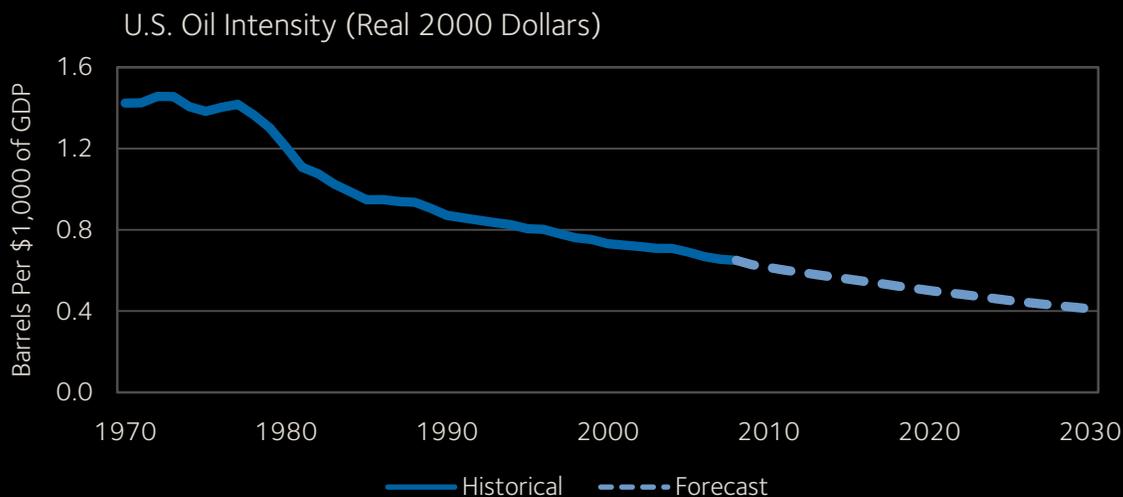
Oil Dependence Costs Relative to GDP (1970-2008) \*





# Legislation Matters

In the wake of the 1970s oil crises, corporate fuel-economy standards and the elimination of oil from the power sector dramatically reduced the U.S. oil intensity. In 2007, new legislation once again lowered projected oil demand in the U.S.

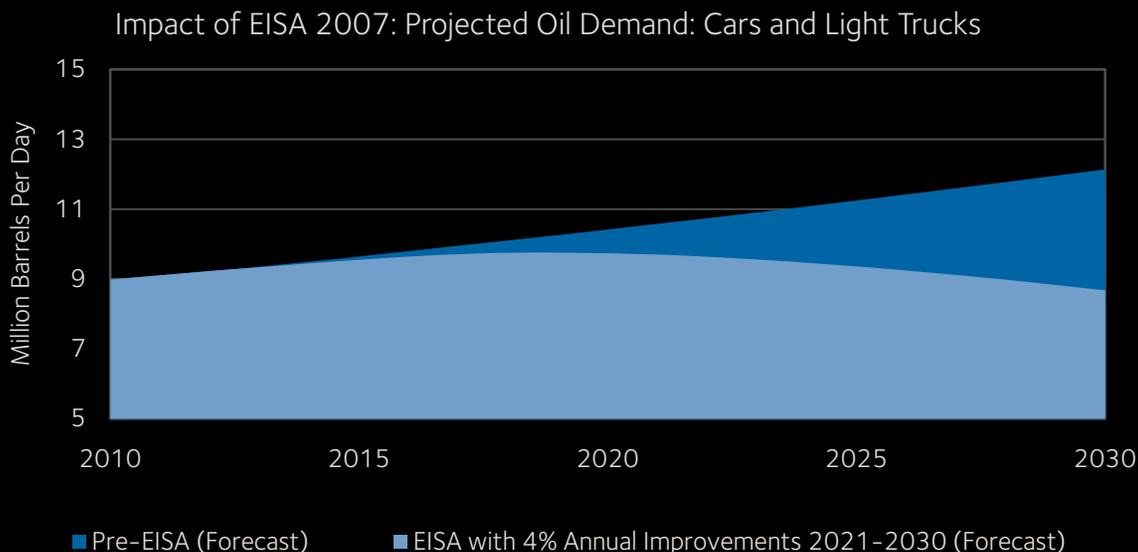


Before EISA

2030 Light Duty Vehicle Demand = 12.1 mbd

After EISA

2030 Light Duty Vehicle Demand = 8.7 mbd





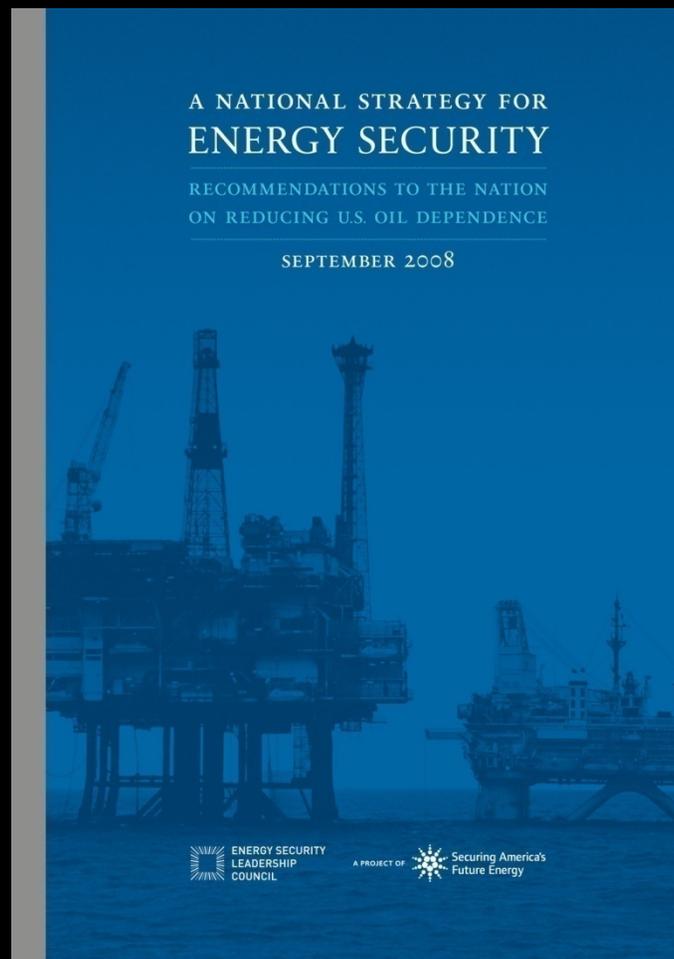
# The Critical Questions

- How do we as a nation break this dependence?
- How can we improve energy security and enhance environmental sustainability while safeguarding economic growth?
- What is the role of government in the transformative process?



# A National Strategy for Energy Security

- **Reduce demand and diversify by electrifying transportation**
  - Incentivize the purchase and production of PHEVs
  - Enhance the nation's electric power system by modernizing the grid, increasing power generation from a variety of fuels, and improving transmission
  - Reform the biofuels program
- **Responsibly increase domestic supply**
  - Expand access to off-limits areas
  - Accelerate R&D on carbon capture and storage techniques that may unlock the potential of carbon-intensive resources
- **Reform and expand federal efforts to develop new energy technologies**
  - Increase public investment in energy RD&D to at least \$30 billion
  - Reform existing processes and institutions (e.g. subsidies, earmarking) and deploy new institutions where needed
- **Continue to improve vehicle efficiency**
- **Strengthen military and diplomatic arrangements**

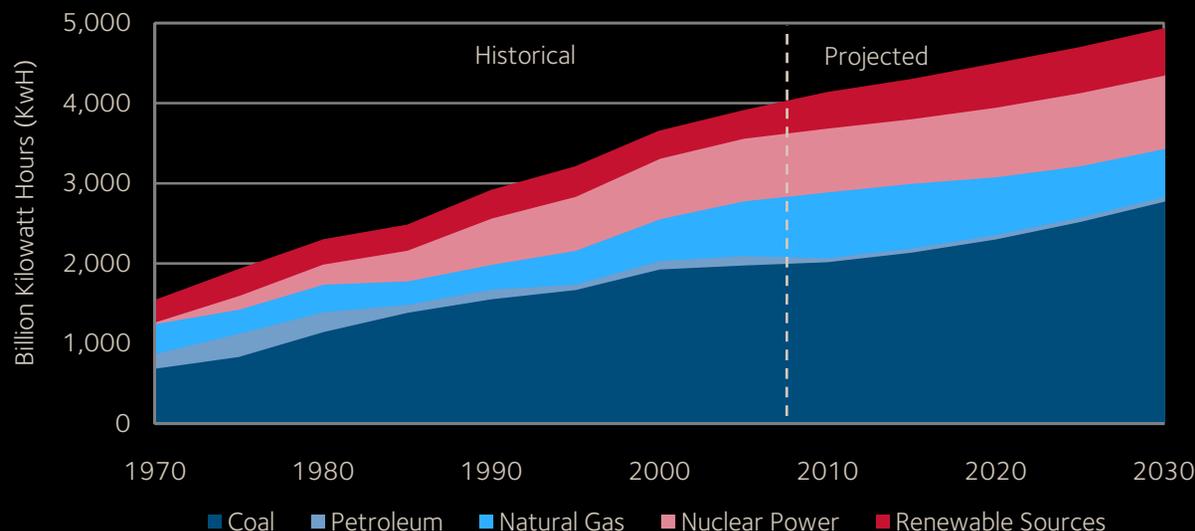




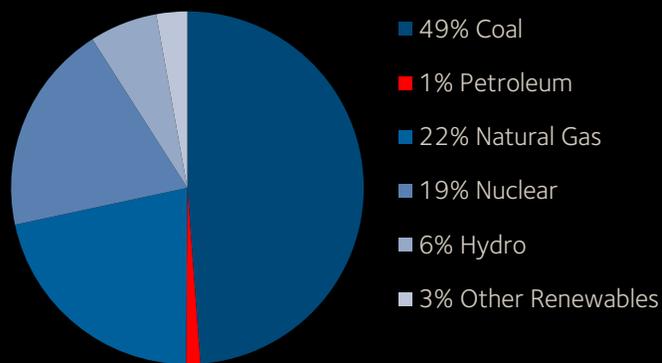
# Electric Power Sector Overview

The U.S. electric power sector relies on a diverse mix of fuels and technologies. Today, almost no electric power is fueled by petroleum, and over 90 percent of the fuel used in electricity generation is domestic.

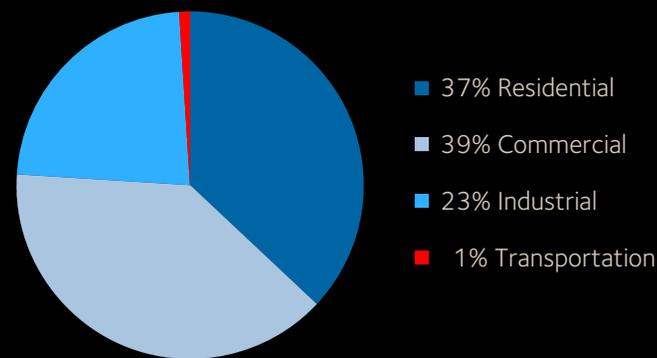
Historical and Projected U.S. Electricity Consumption \*



U.S. Electricity Generation by Fuel (2007)

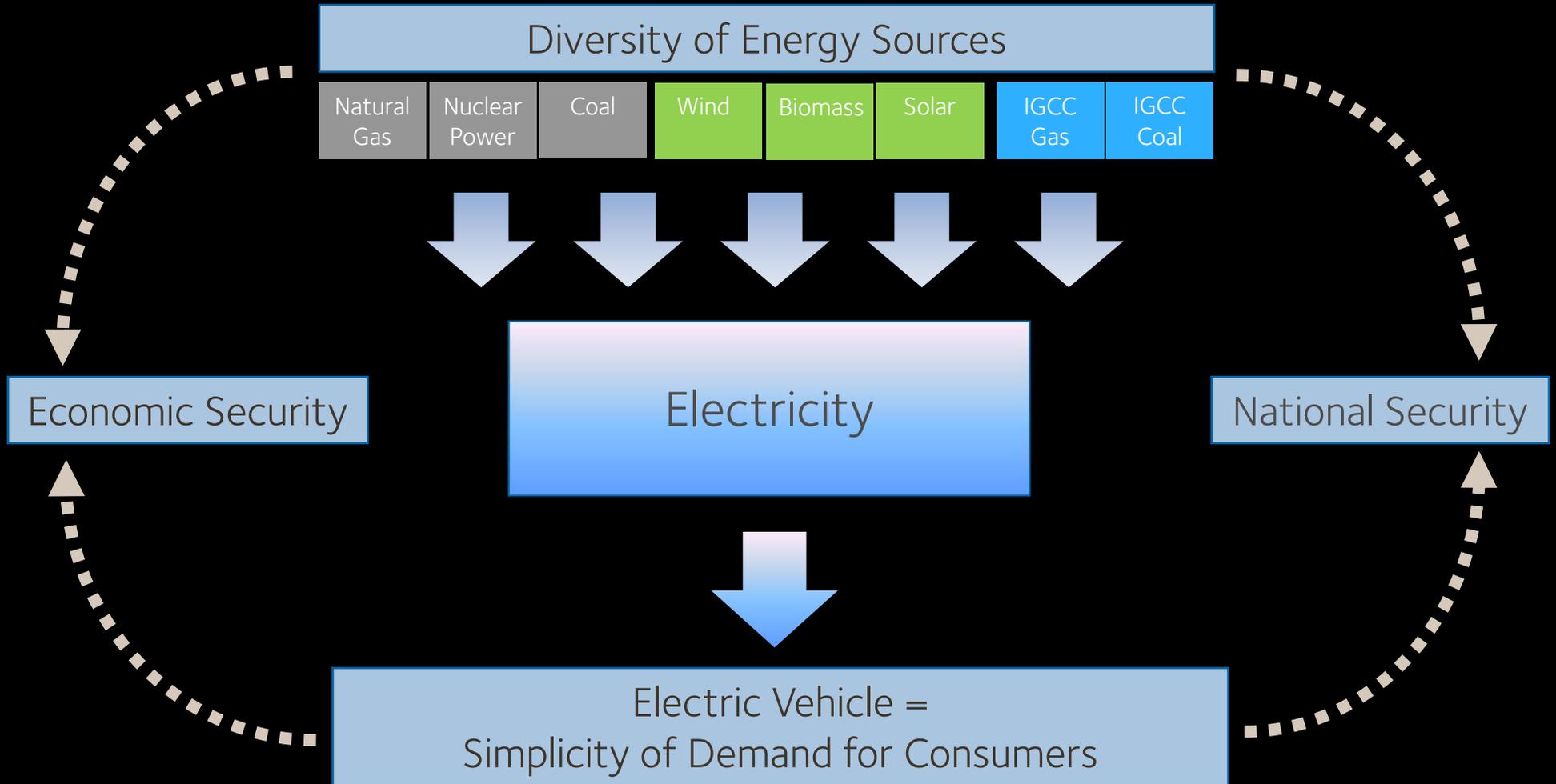


Electricity Demand by Sector (2007)





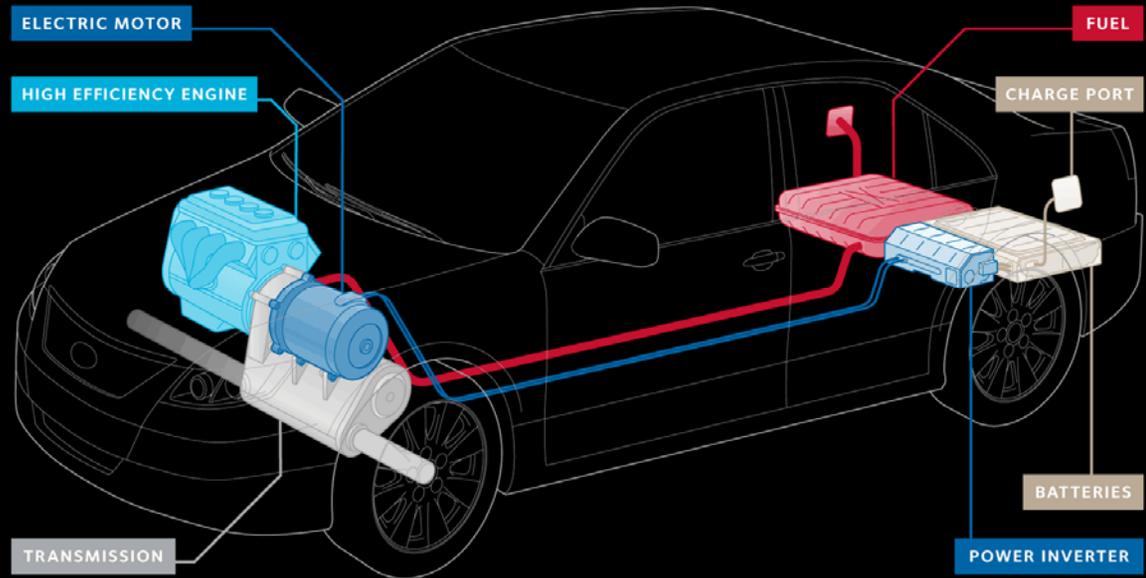
# The Energy Security Dynamic





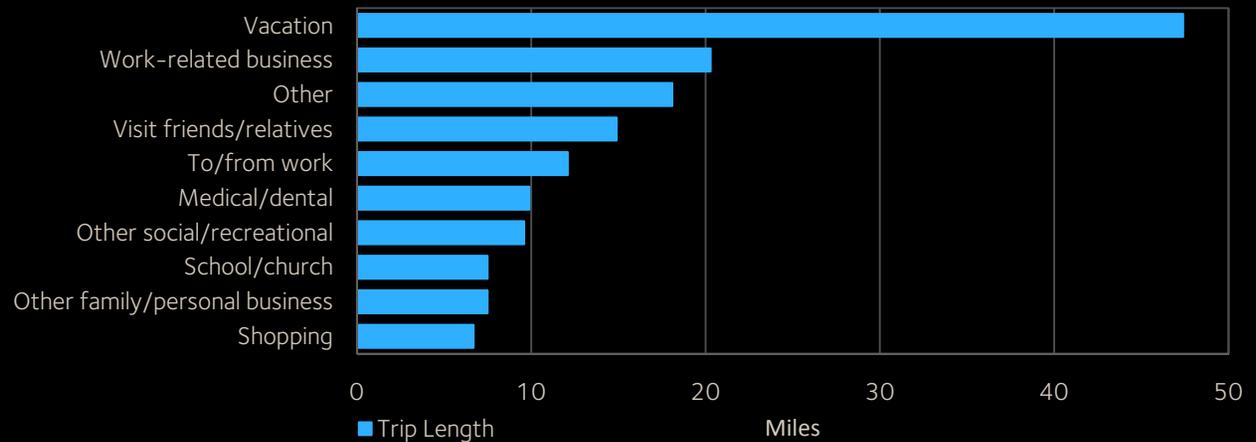
# The Potential of Electric Vehicles

Electric vehicles will allow consumers to easily access the fuel diversity of the electric power sector for use in the transportation sector. Plug-in hybrids also have a highly efficient gasoline engine that will supplement initial battery ranges.



The first commercial PHEVs are expected in 2010 and will have a battery range of roughly 40 miles on a single charge—enough power to meet the daily driving needs of 70 percent of Americans.

Average Distance of U.S. Household Trips, by Purpose

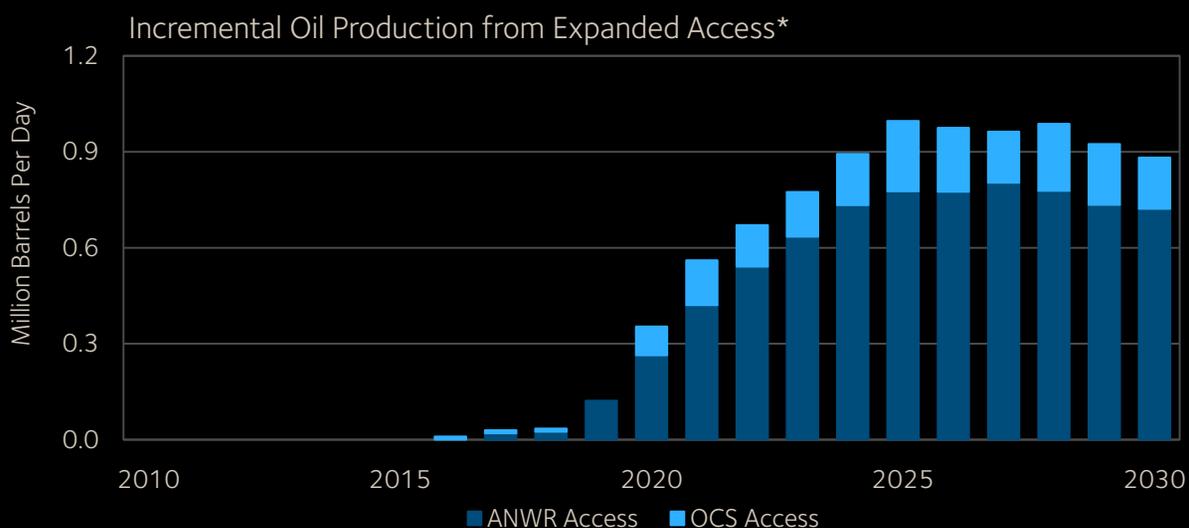
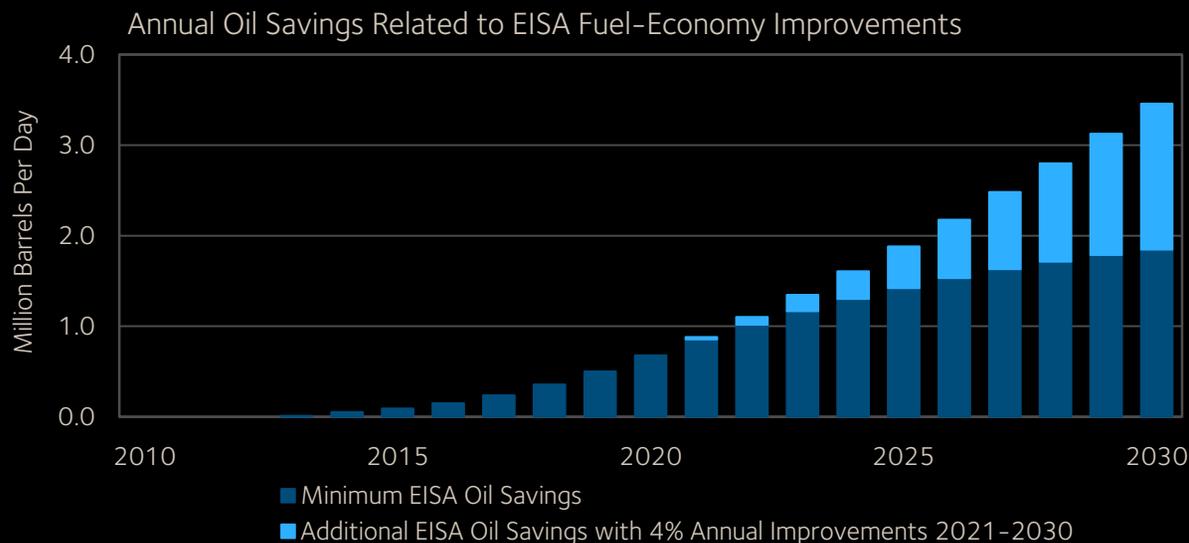




# Bridging the Gap to Electrified Ground Transport

In addition to a long-term strategy to diversify transportation fuel through electrification, the U.S. can take steps to reduce oil dependence in the near term.

The U.S. also has large reserves of oil and natural gas that remain to be developed. By allowing companies to explore and produce in new areas, U.S. oil production could be increased and imports reduced.

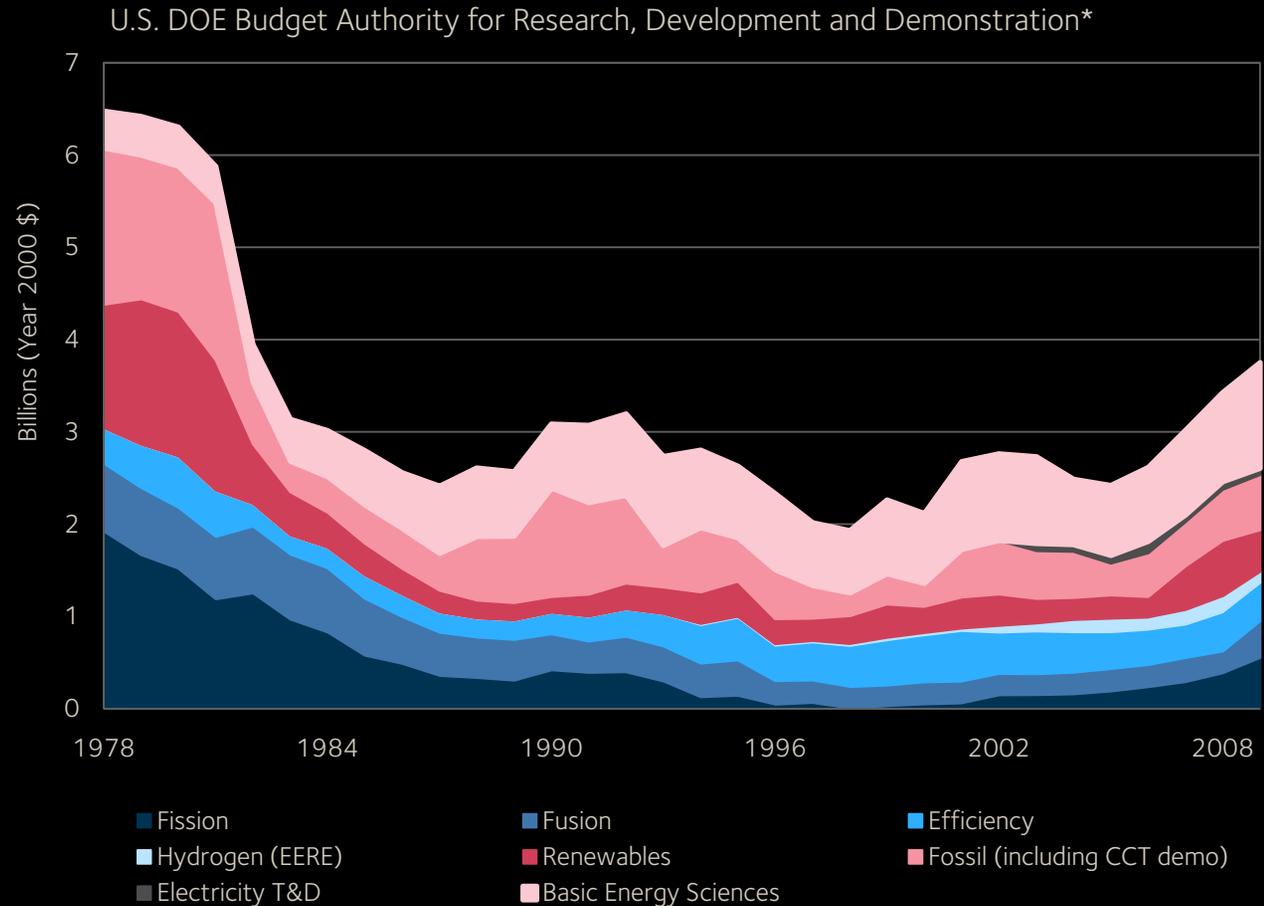




# Technology, Innovation, and Commercialization

Since reaching nearly \$7 billion in 1978, the Department of Energy's budget for research, development and demonstration has decreased significantly.

Addressing America's multiple energy challenges will require investing in innovation at much higher levels and a greater focus on commercialization.



\* Gallagher, K.S., "DOE Budget Authority for Energy Research, Development, and Demonstration Database", Energy Technology Innovation Policy, John F. Kennedy School of Government, Harvard University, June 2008.



# The Energy Security Horizon

## Short Term (0–5 Years):

Meaningful change infeasible; however, investment and policy choices made today establish a framework for the future

## Medium Term (5–20 Years):

Meaningful risk mitigation possible if policy choices made in the short-term promote aggressive implementation of proven solutions, including strong fuel-economy standards, increased access to conventional domestic energy resources, and responsible deployment of alternatives; RD&D must be ongoing to establish a technological foundation for the future

## Long Term (20+ Years):

The tipping point: sustained (short and medium term) investments in infrastructure, technology, and innovation pay off, creating a post-oil transportation sector through widespread electrification



# The Policy Status Quo

As often occurs in Washington, influential policymakers, industries, and interest groups see success in the maintenance of the status quo.

Unfortunately, improving U.S. energy security requires massive disruptions of the status quo.



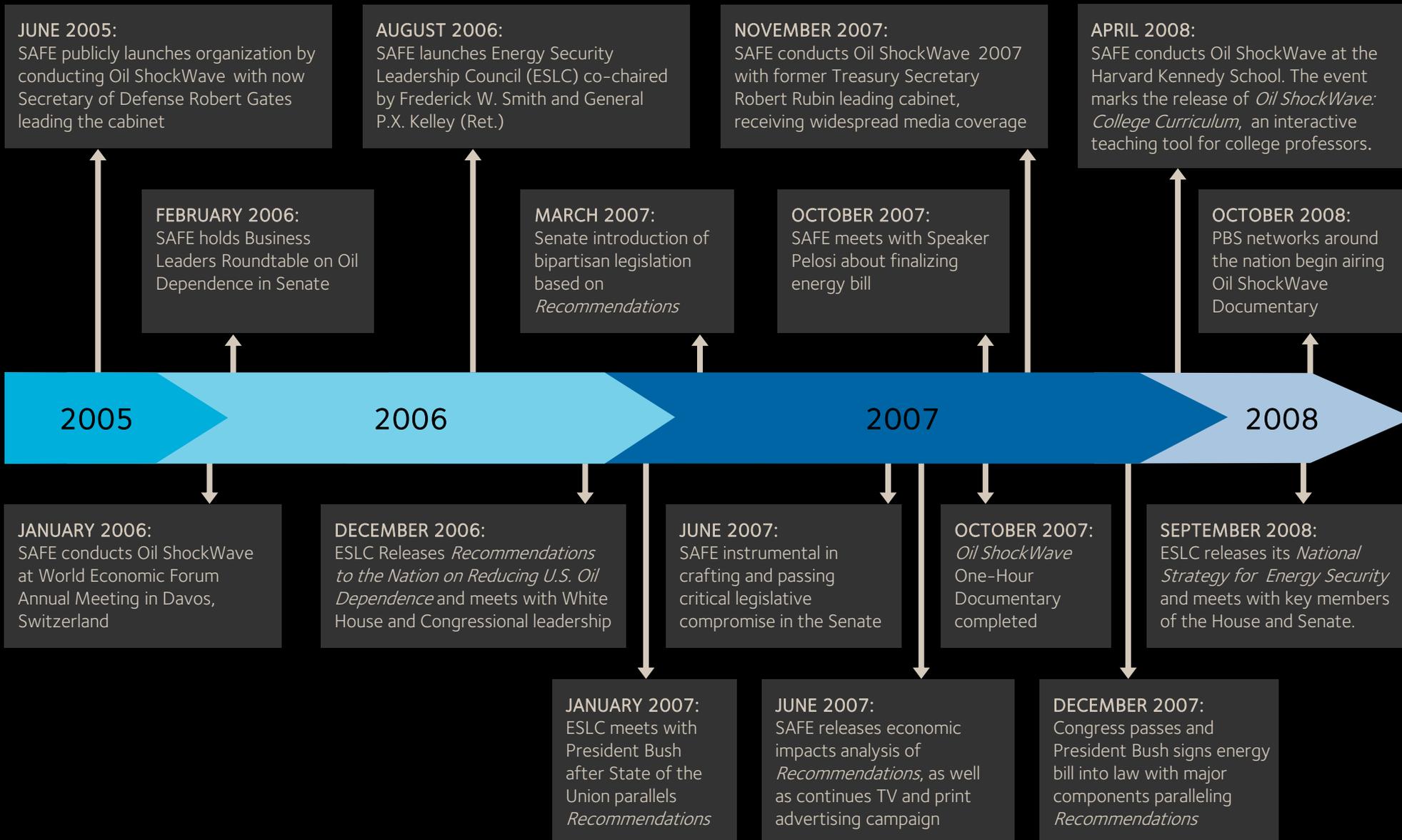


# The Answer

- Educate the public and opinion leaders about the severity of the threat posed by energy security vulnerabilities
- Propose meaningful, achievable public policy solutions
- Mobilize credible, non-conflicted private-sector leaders committed to aggressive advocacy



# SAFE: An Agent for Change





# Select SAFE Projects

SAFE has and will continue to produce and market exciting, innovative projects that highlight the energy security issue, offer meaningful solutions, and drive the public policy debate.



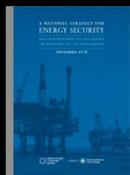
## ESLC

Led by Frederick W. Smith, Chairman, President, and CEO of FedEx Corporation, and General P.X. Kelley (Ret.), 28th Commandant of the United States Marine Corps, the Energy Security Leadership Council (ESLC) is a group of prominent business leaders and retired senior military officers committed to reducing U.S. oil dependence and improving America's energy security.



## Recommendations to the Nation on Reducing U.S. Oil Dependence

In 2006, the ESLC released its *Recommendations to the Nation on Reducing U.S. Oil Dependence*, a comprehensive plan to improve our energy security. One year later, Congress passed and the President signed legislation mirroring important components of the *Recommendations*.



## A National Strategy for Energy Security

In September 2008, the ESLC continued its efforts to improve U.S. energy security by releasing a comprehensive plan for reducing U.S. oil dependence. The plan establishes a framework for mitigating the risks to U.S. national security in the short-term while transitioning the nation's on-road transportation to electrification over the coming decades.



## Oil ShockWave

Oil ShockWave, SAFE's signature educational tool, is a highly realistic simulation exercise that brings former senior government officials together into a fictional Cabinet that is forced to contend with a series of international events resulting in a rapid and sustained increase in the price of oil.



## SAFE Intelligence Briefing

The SAFE Intelligence Briefing is a short, bimonthly report that assesses and analyzes energy topics of strategic importance, connecting the dots by providing policymakers, media and opinion leaders with thoughtful, nonpartisan analysis that taps into the expertise of front-line insiders.



# Energy Security Leadership Council

(As of December 2008)

**Frederick W. Smith**

Chairman, President and CEO, FedEx Corp. (co-Chair)

**General P.X. Kelley, USMC (Ret.)**

28th Commandant, U.S. Marine Corps (co-Chair)

**General John P. Abizaid, U.S. Army (Ret.)**

Former Commander of the U.S. Central Command

**Admiral Dennis Blair, USN (Ret.)**

Former Commander-in-Chief, U.S. Pacific Command

**Edgar M. Bronfman**

Retired Chairman, The Seagram Company Ltd.

**General Bryan "Doug" Brown, U.S. Army (Ret.)**

Former Commander, U.S. Special Operations Command

**Admiral Vern Clark, USN (Ret.)**

Former Chief of Naval Operations

**Adam M. Goldstein**

President and CEO, Royal Caribbean International

**General John A. Gordon, USAF (Ret.)**

Former Homeland Security Advisor to the President

**Maurice R. Greenberg**

Chairman and CEO, C.V. Starr & Co., Inc.

**General John W. Handy, USAF (Ret.)**

Former Commander of U.S. Transportation and Air Mobility Command

**Admiral Gregory G. Johnson, USN (Ret.)**

Former Commander, U.S. Naval Forces, Europe

**Herbert D. Kelleher**

Executive Chairman, Southwest Airlines Co.

**John F. Lehman**

Former Secretary of the U.S. Navy

**General Michael E. Ryan, USAF (Ret.)**

16th Chief of Staff, U.S. Air Force

**Eric S. Schwartz**

Former co-CEO, Asset Management, Goldman Sachs

**Jeffrey C. Sprecher**

Chairman & CEO, Intercontinental Exchange

**David P. Steiner**

CEO, Waste Management, Inc.

**Michael T. Strianese**

President and CEO, L-3 Communications

**General Charles F. Wald, USAF (Ret.)**

Former Deputy Commander, U.S. European Command

**Josh S. Weston**

Honorary Chairman, Automatic Data Processing, Inc.



**Securing America's  
Future Energy**

1111 19TH STREET NW  
SUITE 406  
WASHINGTON, DC 20036

TEL: 202-461-2360  
FAX: 202-318-8934  
SECUREENERGY.ORG

Securing America's Future Energy (SAFE) is an action-oriented, nonpartisan organization founded to deliver an urgent call to action: our nation's dependence on oil puts our economy and national security at risk. Since its founding in 2004, SAFE has enlisted the support of prominent business and retired senior military leaders and employed innovative strategies addressing business and technology, politics and advocacy, and public education and media to help reshape the debate on energy policy.