

# Measures for Improving U.S. Oil Security



Securing America's  
Future Energy

This paper outlines a comprehensive list of measures for improving U.S. oil security. Within this framework, Primary Policy Recommendations are accompanied by Corollary Policy Recommendations of smaller but by no means inconsequential benefit.

## Reducing Oil Consumption

Increasing transportation efficiency is the single most effective step the U.S. can take to improve its oil security. The transportation sector is responsible for nearly 70% of all the oil the country consumes.<sup>1</sup> Within the transportation sector, oil—nearly 13 million barrels per day (mbd) of it—accounts for 97% of delivered energy.<sup>2</sup> More than 8 mbd are used to fuel the over 220 million light-duty vehicles that provide Americans with the extraordinary mobility that is so central to our way of life.<sup>3</sup>

### Primary Policy Recommendations

#### Light-Duty Vehicles

Measures that would meaningfully reduce oil consumption:

PRIMARY RECOMMENDATIONS	PROJECTED OIL SAVINGS
<p><b>A. Significantly reform and then annually strengthen fuel efficiency standards for passenger cars and light-duty trucks.</b></p> <ul style="list-style-type: none"> <li>→ Reform the Corporate Average Fuel Economy (CAFE) system in order to make it more market-, size-, and attribute-based and to allow for the application of different but increasingly stringent standards.</li> <li>→ Set a target of 4% for annual increases in fuel efficiency of all passenger cars and light-duty trucks weighing up to 10,000 lbs.</li> <li>→ Allow “off-ramps” if 4% is technically infeasible, unsafe, or not cost-effective for a given year.</li> </ul>	<p>4.3 Million Barrels of Oil per Day (mbd) (combined savings of this and the following recommendation)</p>

<sup>1</sup> Department of Energy (DOE), Energy Information Administration (EIA), Office of Integrated Analysis and Forecasting, “International Energy Outlook 2006” (2006), Table A2. Henceforth cited as *AEO* (2006).

<sup>2</sup> *Ibid.*

<sup>3</sup> *AEO* (2006), Table A7.

PRIMARY RECOMMENDATIONS	PROJECTED OIL SAVINGS
<p><b>B. Fund significant financial incentives for the domestic production and purchase of highly fuel efficient vehicles.</b></p> <ul style="list-style-type: none"> <li>→ Lift the current 60,000 vehicle-per-manufacturer cap on tax incentives for the purchase of advanced technology efficient vehicles.</li> <li>→ Link the tax credit to the miles-per-gallon performance of the vehicles.</li> <li>→ Provide tax incentives for retooling to all manufacturers with existing U.S. facilities.</li> </ul>	<p>4.3 Million Barrels of Oil per Day (mbd) (combined savings of this and the previous recommendation)</p>

- CAFE, our nation’s federal vehicle fuel efficiency statute, has not been substantially updated for over thirty years. As a result, the actual fuel efficiency of our passenger vehicle fleet has been stagnant for twenty years and now lags far behind most countries, including China.
- A 2002 study by the National Academy of Sciences (NAS) indicates that feasible and emerging improvements in non-hybrid gasoline engine design can enable a 25% increase in fuel efficiency without sacrificing vehicle size, performance, or weight, while still meeting reasonable consumer criteria for cost-effectiveness.<sup>4</sup>
- With advanced hybrid and diesel technologies as well as the advent of plug-in hybrid technologies, fuel efficiency gains of 100% are achievable without undermining vehicle performance or passenger protection.

## Corollary Policy Recommendations

### Medium-and Heavy-Duty Trucks

Medium and heavy trucks use considerably less oil, in aggregate, than light-duty vehicles, but at over 2 mbd their consumption still contributes substantially to U.S. oil dependence.<sup>5</sup> Unlike the nation’s light-duty vehicles, however, America’s medium and heavy trucks have never been subject to government fuel efficiency standards.

As with light-duty vehicles, various technological solutions could be employed to boost truck fuel efficiency. Reflecting on America’s experience with light-duty vehicles, the Council believes that the introduction and adoption of fuel efficiency solutions for trucks will proceed far more rapidly and efficiently with government-mandated, technology-neutral performance standards.

<sup>4</sup> National Research Council, Transportation Safety Board, *Effectiveness and Impact of Corporate Average Fuel Economy Standards* (Washington, DC: National Academy Press, 2002), especially chp. 3.  
<sup>5</sup> AEO (2006), Table A7.

COROLLARY RECOMMENDATIONS	PROJECTED OIL SAVINGS
<p>A. Extend federal subsidies for hybrid medium-duty vehicles (Classes 3–6) to 2012 and remove the cap on the number of eligible vehicles. Set and then annually increase fuel efficiency standards for medium-duty vehicles.</p> <p>→ Set the standards consistent with the energy efficiency benefits of hybridization.</p>	<p>0.2 mbd</p>
<p>B. Set and then annually strengthen fuel efficiency standards for heavy-duty vehicles (Classes 7 and 8), employing federal subsidies as suitable.</p>	<p>0.9 mbd</p>
<p>C. Increase allowable weight to 97,000 lbs. gross vehicle weight for tractor-trailer trucks that have a supplementary sixth axle installed but which replicate current stopping distances and do not fundamentally alter current truck architecture. The Council also recommends that government further study the safety impacts of significantly longer and heavier tractor-trailers used in conjunction with slower speed limits. If safety can be proven, implementation could generate major efficiencies while simultaneously reducing road congestion and other non-fuel costs.</p>	<p>Will vary with extent of implementation</p>

- The 21st Century Truck Roadmap outlined by DOE sets a fuel efficiency goal of three times the current levels for Class 6, largely coming from hybridization.<sup>6</sup>
- Other experts have estimated that the use of hybrids could lead to average fuel efficiency increases of 93% for Class 3-4 trucks and 71% for Class 6-7 vehicles.<sup>7</sup>
- Long-haul Class 8 trucks are the largest fuel consumers of all heavy-duty trucks.
- A 2002 study conducted by the Center for Transportation Research at the Department of Energy's Argonne National Laboratory found that it was technologically feasible to nearly double tractor-trailer (long-haul Class 8 trucks) fuel efficiency by 2010 from 6 mpg to over 10 mpg.<sup>8</sup>

### Aviation

Improved air traffic control procedures could reduce flight delays and improve flight times, thereby decreasing aviation fuel consumption. The nation will ultimately require a Next Generation Air Transportation System (NGATS). This new infrastructure will utilize digital, satellite-based technologies to provide the capacity and efficiency necessary to keep pace with growing demand in air traffic routing and services.

COROLLARY RECOMMENDATIONS	PROJECTED OIL SAVINGS
<p><b>D. Require the Federal Aviation Administration (FAA) to implement improvements to commercial air traffic routing in order to increase safety and decrease fuel consumption.</b></p>	<p>0.4 mbd</p>

- In 2005, U.S. airlines incurred \$62 in added operational costs for every single minute of flight delays.<sup>9</sup> The annual price tag for the whole industry amounted to \$5.9 billion, with a considerable share of this figure going to cover incremental fuel costs.<sup>10</sup>

<sup>6</sup> DOE, "Technology Roadmap for the 21st Century Truck Program" (2000).

<sup>7</sup> Feng An, Frank Stodolsky, Anant Vyas, Roy Cuenca and James J. Eberhardt, "Scenario Analysis of Hybrid Class 3-7 Heavy Vehicles," paper presented to the Society of Automotive Engineers 2000 World Congress, Detroit, MI (2000).

<sup>8</sup> A. Vyas, C. Saricks, and F. Stodolsky, "The Potential Effect of Future Energy-Efficiency and Emissions-Improving Technologies on Fuel Consumption in Heavy Trucks," prepared at the Center for Transportation Research, Argonne National Laboratory (August 2002). See, also, DOE, "Technology Roadmap for the 21st Century Truck Program."

<sup>9</sup> American Transport Association, "System Capacity: the cost of air traffic system delays," <http://www.airlines.org/econ/d.aspx?nid=5773>, last accessed 22 September 2006.

<sup>10</sup> DOT, *National Strategy to Reduce Congestion on America's Transportation Network* (May 2006).

## Provide Alternatives

Diversifying our transportation fuel supply is a critical long-term step to improving U.S. energy security. The current reliance on a single non-substitutable input creates profound risks and dangers. U.S. energy security would clearly benefit if we could displace petroleum usage in favor of alternative fuels that (1) do not require a completely new infrastructure as is the case with hydrogen; (2) can be produced from ample domestic feedstocks; (3) have the potential to be less expensive to produce than gasoline; and (4) have no worse environmental impact than conventional oil.

Meaningful measures to provide alternatives:

PRIMARY RECOMMENDATIONS	DISPLACEMENT OF OIL CONSUMPTION
<p><b>A. Grow the supply and demand sides of the biofuels market by creating incentives and obligations for infrastructure deployment, requiring increasing production of Flexible Fuel Vehicles (FFVs), and increasing federal assistance available for “first-mover” production of cellulosic ethanol and other promising large-volume biofuels.</b></p> <p>→ Create obligations and provide tax credits for installing ethanol fuel pumps and related infrastructure. Limit the credit for corporate-owned and branded stations when oil prices are high.</p> <p>→ Require 10% annual increases in the production of FFVs so that all major production models are compatible with rich ethanol blends by 2015.</p> <p>→ Establish a competitive program employing a variety of financial tools—grants, tax credits, direct loans, and loan guarantees—for federal assistance to six or more biorefineries employing a variety of feedstocks and located in various regions of the country.</p>	<p>Approximately 2.0 mbd</p>

COROLLARY RECOMMENDATIONS	DISPLACEMENT OF OIL CONSUMPTION
<p><b>A. Reform current ethanol per gallon subsidies to encourage private-sector investment in domestic ethanol and alternative biofuels production and infrastructure.</b></p> <p>→ “Smart subsidies” will secure the industry against short-term oil price drops, minimize the cost to the U.S. Treasury, and distinguish between feedstock technologies.</p> <p>→ Balance the benefits of domestic production capability with the advantages of environmentally responsible development of an international biofuels trade.</p>	
<p><b>B. Grow the biodiesel market, while ensuring a biodiesel standard that mandates quality and reliability to satisfy the operational standards of users and also includes clear and consistent labeling of biodiesel blend ratios.</b></p>	<p>Approximately 0.2 mbd</p>
<p><b>C. Support federal investment in research, development, and commercialization of carbon sequestration technologies that can limit the adverse emissions impacts of oil shale, oil sands, and coal-to-liquids (CTL) production.</b></p>	

- While corn-based ethanol is currently the most successful alternative transportation fuel in the U.S., it constitutes only 3% of our gasoline supply by volume.<sup>11</sup> If it were even possible to devote the entire U.S. corn crop to ethanol, the nation could produce only 30 billion gallons of ethanol, or around 15% of current gasoline use.
- Cellulosic-based ethanol clearly has the potential to dominate its corn-based equivalent because it can make use of a far larger domestic feedstock supply, which in turn has significant implications for its price competitiveness vis-à-vis gasoline.
- Capital costs associated with production facilities for cellulosic ethanol or other large-volume emerging biofuels can be barriers to investment.

<sup>11</sup> CRS Report for Congress no. RL32712, Randy Schnepf, “Agriculture-Based Renewable Energy Production” (18 May 2006), 6.

→ New vehicles can be designed to run on E85 for a modest cost (roughly \$100 per vehicle), but at most 4% of the vehicles sold in U.S. 2005 have this flexible fuel potential.<sup>12</sup>

## Expand Supply

The U.S. plays a critical role in global petroleum production. We are currently the third largest oil producer in the world after Saudi Arabia and Russia and over the last century have produced more oil than any other nation. Nevertheless, as the world's largest consumer of oil by far, the U.S. cannot ask other nations to invest in global supply expansion unless we continue to shoulder our share of the production burden.

It is sensible to increase access to exploration and production, so long as government and the oil and gas industry are willing to strengthen the legal and financial penalties that can be imposed on those who damage the environment. Penalties should be designed to discourage exploration by any entity that is not supremely confident in its ability to proceed in an environmentally responsible manner.

PRIMARY RECOMMENDATIONS	PROJECTED INCREASE IN PRODUCTION
<p><b>A. Increase access to U.S. oil and natural gas reserves on the Outer Continental Shelf (OCS) with sharply increased and expanded environmental protections.</b></p> <p>→ Increase access to OCS oil and natural gas reserves with appropriate third-party monitoring, increased surety bond requirements, clear penalties for environmental damages to avoid protracted litigation, stronger administration of the current leasing program, and protection of coastal vistas.</p>	1.0-2.0 mbd
<p><b>B. Employ federal funds to accelerate the development and deployment of Enhanced Oil Recovery (EOR) techniques.</b></p>	1.0 mbd
<p><b>C. Make investment access a high profile aspect of U.S. trade negotiations and diplomatic efforts with oil-producing nations.</b></p>	

<sup>12</sup> DOE, Oak Ridge National Laboratory, Stacy Davis and Susan W. Diegel, *Transportation Energy Data Book: Edition 25* (2006), Table 4-1, and EIA, "Alternatives to Traditional Transportation Fuels 2005" (August 2006), [http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf14-20\\_05.html](http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf14-20_05.html), last accessed 25 October 2006.

COROLLARY RECOMMENDATIONS	PROJECTED INCREASE IN PRODUCTION
<p><b>A. Increase access to U.S. reserves in Alaska.</b></p> <p>→ Increase access to Alaskan reserves with appropriate third-party monitoring, increased surety bond requirements, clear penalties for environmental damages to avoid protracted litigation, and stronger administration of the current leasing program.</p>	<p>0.9 mbd</p>

Measures that would expand supply:

- The Minerals Management Service (MMS), the bureau in the Department of the Interior responsible for offshore leasing, estimates total undiscovered technically recoverable resources for OCS oil and gas at 76 billion barrels and 406 trillion cubic feet, respectively.<sup>13</sup>
- Advanced EOR using CO<sub>2</sub> injections could push U.S. reservoir recovery rates from 30% to 60% within a generation. In the Permian Basin, located in Texas and New Mexico, this could yield 1 billion barrels of incremental production.<sup>14</sup>
- Political symbolism and the ideological battle surrounding the issue of the Arctic National Wildlife Refuge (ANWR) have unfortunately blocked the advancement of a sound national oil policy that could reduce our oil dependence and improve our energy security. This state of paralysis is not acceptable given the size and nature of the energy threat facing the country.

## Manage Risks

Although measures to manage risk do not translate into precisely quantifiable increases in oil production or reductions in oil consumption, they nevertheless play critical roles in improving the nation’s energy security.

The U.S. contributes more than any other nation to protecting the global oil infrastructure. And while the U.S. has never shirked this responsibility, the time has come for other nations to expand their own efforts. All nations, producing and consuming, have an interest in the stability of the global oil infrastructure, and a variety of international efforts could help to ensure the smooth flow of oil.

In addition to facilitating the physical protection of petroleum supplies, the U.S. should also assist producers in creating attractive investment climates supported by the emergence of stable civil societies enjoying the rule of law.

<sup>13</sup> DOE, EIA, “Overview of U.S. Legislation and Regulations Affecting Offshore Natural Gas and Oil Activity” (September 2005), 3.

<sup>14</sup> DOE, Office of Fossil Energy, National Energy Technology Laboratory, Strategic Center for Natural Gas and Oil “CO<sub>2</sub> EOR Technology” (December 2004), [http://www.fossil.energy.gov/programs/oilgas/publications/eor\\_co2/CO2brochure2004.pdf](http://www.fossil.energy.gov/programs/oilgas/publications/eor_co2/CO2brochure2004.pdf).

Measures to manage risk:

<p><b>PRIMARY RECOMMENDATIONS</b></p>
<p><b>A. In light of military threats to the global oil infrastructure, the U.S. should, where appropriate:</b></p> <ul style="list-style-type: none"><li>→ Encourage burden sharing with U.S. allies and partners, including producing and consuming nations, in defense of global oil flows;</li><li>→ Foster formal and informal security arrangements on multilateral, regional, and bilateral bases, capitalizing on the U.S.'s unique ability to arrange international security efforts;</li><li>→ Provide diplomatic support as well as counter-terrorism training and military aid so that oil-producing nations can better assist in protecting petroleum supplies; and</li><li>→ Offer assistance to producing countries in their efforts to develop attractive investment climates backed by stable civil societies.</li></ul>
<p><b>B. Reassess the multiple dimensions of strategic reserves policy within the U.S. and at the International Energy Agency (IEA). In addition, revise the 1974 Organization for Economic Co-operation and Development (OECD) agreement to allow China and India to join the IEA and participate in updated global strategic petroleum reserve arrangements.</b></p>
<p><b>COROLLARY RECOMMENDATIONS</b></p>
<p><b>A. Evaluate policy approaches to expand the ability of U.S. refineries to process a wider variety of crude stocks and to make U.S. refining less vulnerable to extreme weather. Work to expand total U.S. capacity or to ensure that the U.S. will have secure access to product produced overseas.</b></p>

- New multilateral accords (modeled for instance on the Proliferation Security Initiative designed to limit the spread of weapons of mass destruction) should play a role, but expanded reliance on existing organizations such as the Gulf Coordination Council, NATO, or ASEAN is not to be discounted.
- The most effective short-term countermeasure to an oil supply shock is the maintenance of substantial strategic reserves and spare capacity. The U.S. Strategic Petroleum Reserve (SPR), 689 million barrels of federally owned crude oil stored in underground salt caverns along the Gulf Coast, is the largest emergency stockpile of oil in the world.<sup>15</sup>

<sup>15</sup> DOE, "Current SPR Inventory as of November 3, 2006," [http://www2.spr.doe.gov/DIR/SilverStream/Pages/pgDailyInventoryReportViewDOE\\_new.html](http://www2.spr.doe.gov/DIR/SilverStream/Pages/pgDailyInventoryReportViewDOE_new.html), accessed on 9 November 2006.

## Summary of Measures

PRIMARY RECOMMENDATIONS	
Reduce Oil Consumption	Projected Oil Savings
Light-Duty Vehicles	
<p><b>A. Significantly reform and then annually strengthen fuel efficiency standards for passenger cars and light-duty trucks.</b></p> <ul style="list-style-type: none"> <li>→ Reform the Corporate Average Fuel Economy (CAFE) system in order to make it more market-, size-, and attribute-based and to allow for the application of different but increasingly stringent standards.</li> <li>→ Set a target of 4% for annual increases in fuel efficiency of all passenger cars and, light-duty trucks weighing up to 10,000 lbs.</li> <li>→ Allow “off-ramps” if 4% is technically infeasible, unsafe, or not cost-effective for a given year.</li> </ul>	4.3 million barrels per day (mbd)
<p><b>B. Fund significant financial incentives for the domestic production and purchase of highly fuel efficient vehicles.</b></p> <ul style="list-style-type: none"> <li>→ Lift the current 60,000 vehicle-per-manufacturer cap on tax incentives for the purchase of advanced technology efficient vehicles.</li> <li>→ Link the tax credit to the miles-per-gallon performance of the vehicles.</li> <li>→ Provide tax incentives for retooling to all manufacturers with existing U.S. facilities.</li> </ul>	

PRIMARY RECOMMENDATIONS	
<b>Provide Alternatives</b>	<b>Projected Displacement of Oil Consumption</b>
<p><b>A. Grow the supply and demand sides of the bio-fuels market by creating incentives and obligations for infrastructure deployment, requiring increasing production of Flexible Fuel Vehicles (FFVs), and increasing federal assistance available for “first-mover” production of cellulosic ethanol and other promising large-volume biofuels.</b></p> <ul style="list-style-type: none"> <li>→ Create obligations and provide tax credits for installing ethanol fuel pumps and related infrastructure. Limit the credit for corporate-owned and branded stations when oil prices are high.</li> <li>→ Require 10% annual increases in the production of FFVs so that all major production models are compatible with rich ethanol blends by 2015.</li> <li>→ Establish a competitive program employing a variety of financial tools—grants, tax credits, direct loans, and loan guarantees—for federal assistance to six or more biorefineries employing a variety of feedstocks and located in various regions of the country.</li> </ul>	Approximately 2.0 mbd
<b>Expand Supply</b>	<b>Projected Increase in Production</b>
<p><b>A. Increase access to U.S. oil and natural gas reserves on the Outer Continental Shelf (OCS) with sharply increased and expanded environmental protections.</b></p> <ul style="list-style-type: none"> <li>→ Increase access to OCS oil and natural gas reserves with appropriate third-party monitoring, increased surety bond requirements, clear penalties for environmental damages to avoid protracted litigation, stronger administration of the current leasing program, and protection of coastal vistas.</li> </ul>	1.0-2.0 mbd

PRIMARY RECOMMENDATIONS	
Expand Supply	Projected Increase in Production
B. Employ federal funds to accelerate the development and deployment of Enhanced Oil Recovery (EOR) techniques.	1.0 mbd
C. Make investment access a high profile aspect of U.S. trade negotiations and diplomatic efforts with oil-producing nations.	
Manage Risks	
<p>A. In light of military threats to the global oil infrastructure, the U.S. should, where appropriate:</p> <ul style="list-style-type: none"> <li>→ Encourage burden sharing with U.S. allies and partners, including producing and consuming nations, in defense of global oil flows;</li> <li>→ Foster formal and informal security arrangements on multilateral, regional, and bilateral bases, capitalizing on the U.S.'s unique ability to arrange international security efforts;</li> <li>→ Provide diplomatic support as well as counter-terrorism training and military aid so that oil-producing nations can better assist in protecting petroleum supplies; and</li> <li>→ Offer assistance to producing countries in their efforts to develop attractive investment climates backed by stable civil societies.</li> </ul>	
<p>B. Reassess the multiple dimensions of strategic reserves policy within the U.S. and at the International Energy Agency (IEA). In addition, revise the 1974 Organization for Economic Co-operation and Development (OECD) agreement to allow China and India to join the IEA and participate in updated global strategic petroleum reserve arrangements.</p>	

COROLLARY RECOMMENDATIONS	
Reduce Oil Consumption	Projected Oil Savings
Medium- and Heavy-Duty Trucks	
A. Extend federal subsidies for hybrid medium-duty vehicles (Classes 3–6) to 2012 and remove the cap on the number of eligible vehicles. Set and then annually increase fuel efficiency standards for medium-duty vehicles.	0.2 mbd
B. Set and then annually strengthen fuel efficiency standards for heavy-duty vehicles (Classes 7 and 8), employing federal subsidies as suitable.	0.9 mbd
C. Increase allowable weight to 97,000 lbs. gross vehicle weight for tractor-trailer trucks that have a supplementary sixth axle installed but which replicate current stopping distances and do not fundamentally alter current truck architecture. The Council also recommends that government further study the safety impacts of significantly longer and heavier tractor-trailers used in conjunction with slower speed limits. If safety can be proven, implementation could generate major efficiencies while simultaneously reducing road congestion and other non-fuel costs.	Will vary with extent of implementation.
Aviation	
D. Require the Federal Aviation Administration (FAA) to implement improvements to commercial air traffic routing in order to increase safety and decrease fuel consumption.	0.4 mbd

COROLLARY RECOMMENDATIONS	
Provide Alternatives	Projected Displacement of Oil Consumption
<p><b>A. Reform current ethanol per gallon subsidies to encourage private-sector investment in domestic ethanol and alternative biofuels production and infrastructure.</b></p> <p>→ “Smart subsidies” will secure the industry against short-term oil price drops, minimize the cost to the U.S. Treasury, and distinguish between feed-stock technologies.</p> <p>→ Balance the benefits of domestic production capability with the advantages of environmentally responsible development of an international biofuels trade.</p>	
<p><b>B. Grow the biodiesel market, while ensuring a biodiesel standard that mandates quality and reliability to satisfy the operational standards of users and also includes clear and consistent labeling of biodiesel blend ratios.</b></p>	Approximately 0.2 mbd
<p><b>C. Support federal investment in research, development, and commercialization of carbon sequestration technologies that can limit the adverse emissions impacts of oil shale, oil sands, and coal-to-liquids (CTL) production.</b></p>	

COROLLARY RECOMMENDATIONS	
Expand Supply	Projected Increase in Production
<p><b>A. Increase access to U.S. reserves in Alaska</b></p> <p>→ Increase access to Alaskan reserves with appropriate third-party monitoring, increased surety bond requirements, clear penalties for environmental damages to avoid protracted litigation, and stronger administration of the current leasing program.</p>	0.9 mbd
Manage Risks	
<p><b>A. Evaluate policy approached to expand the ability of U.S. refineries to process a wider variety of crude stocks and to make U.S. refining vulnerable to extreme weather. Work to expand total U.S. capacity or to ensure that the U.S. will have secure access to product produced overseas.</b></p>	