

Federal Fuel Economy and Greenhouse Gas Standards for Light-Duty Vehicles

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2012 NCSL Fall Forum



CENTER FOR CLIMATE
AND ENERGY SOLUTIONS

C2ES.ORG



- **Independent, nonpartisan, nonprofit organization**
- **Working to advance strong policy and action to address the twin challenges of energy and climate change**
- **Founded in 1998 as the Pew Center on Global Climate Change**
- **Became C2ES in 2011**
- **Named world's #1 environmental think tank in 2011 (Univ. of Pennsylvania survey)**

Business Environmental Leadership Council (BELC)





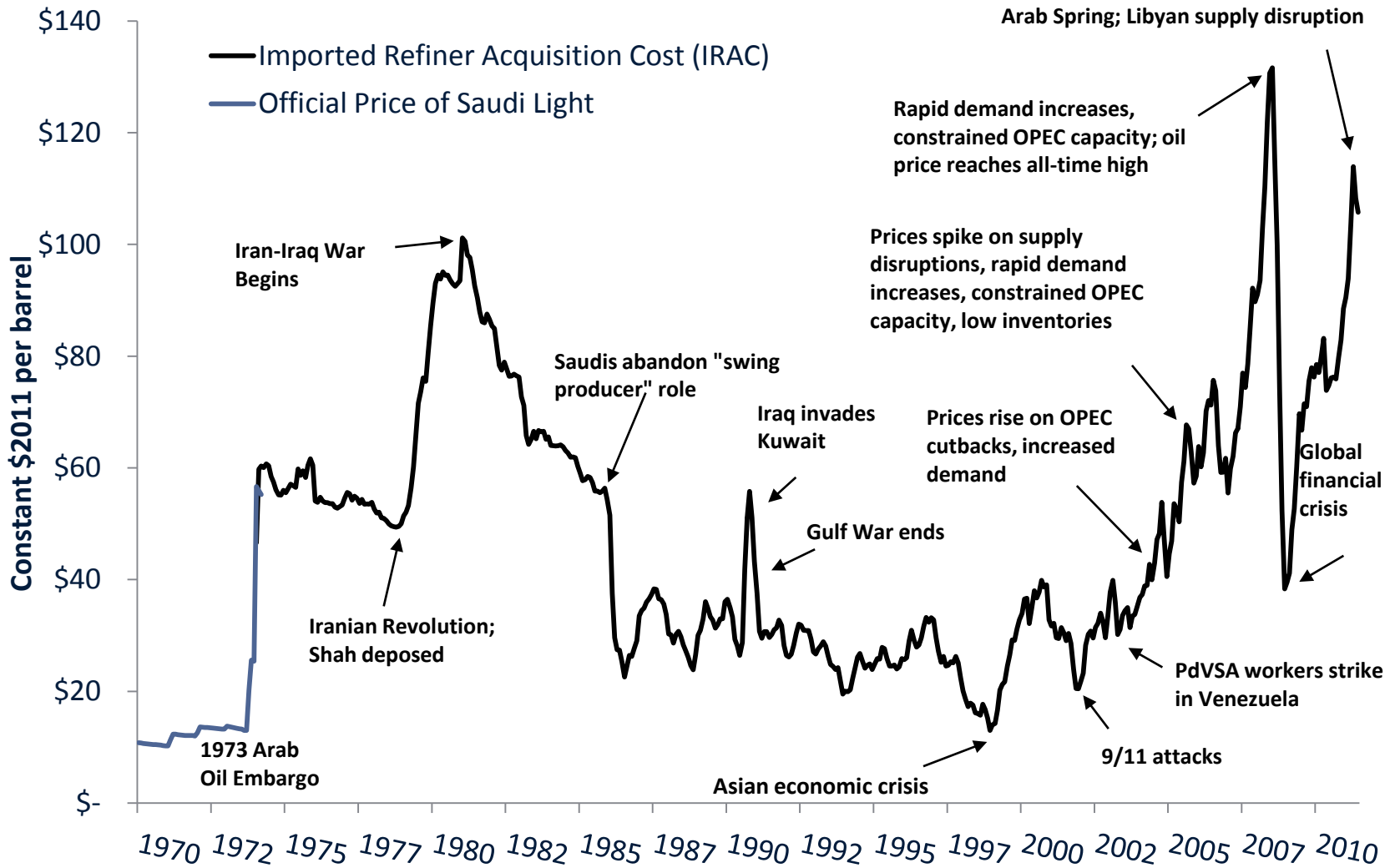
- **Plug-in Electric Vehicle Dialogue Group**
- **Unlocking private investment in alternative fuel vehicle and infrastructure finance**
- **Electric Vehicle Action Tool for state transportation departments**
- **Transportation infrastructure finance research**
- **Fuel pathways analysis**



How did we get here?

Market deficiencies in transportation related to energy security, consumer behavior, and the environment

Energy security has been an ongoing problem for policymakers for decades





- **Standards exist to correct market deficiencies**
- **Consumers tend to value fuel savings much less than society would leading to more oil consumption**
 - Benefits: reduced impacts on global climate, improved energy security, and overall consumer savings
- **David Greene from Oak Ridge National Laboratory found consumers use a discount rate of between 4 and 40 percent for fuel economy savings**
 - Societal discount rate for fuel economy savings is about 4 percent

Why EPA and NHTSA joined forces



2002

- California set vehicle emission standards for greenhouse gases

2005

- California applied for waiver to implement standard

2007

- Supreme Court ruled that EPA has authority to regulate greenhouse gas emissions from transportation sector under Clean Air Act

2008

- EPA denied California waiver

2009

- Obama ordered EPA to reconsider denial; EPA granted waiver; EPA and NHTSA announced joint agreement on vehicle standards

2010-2012

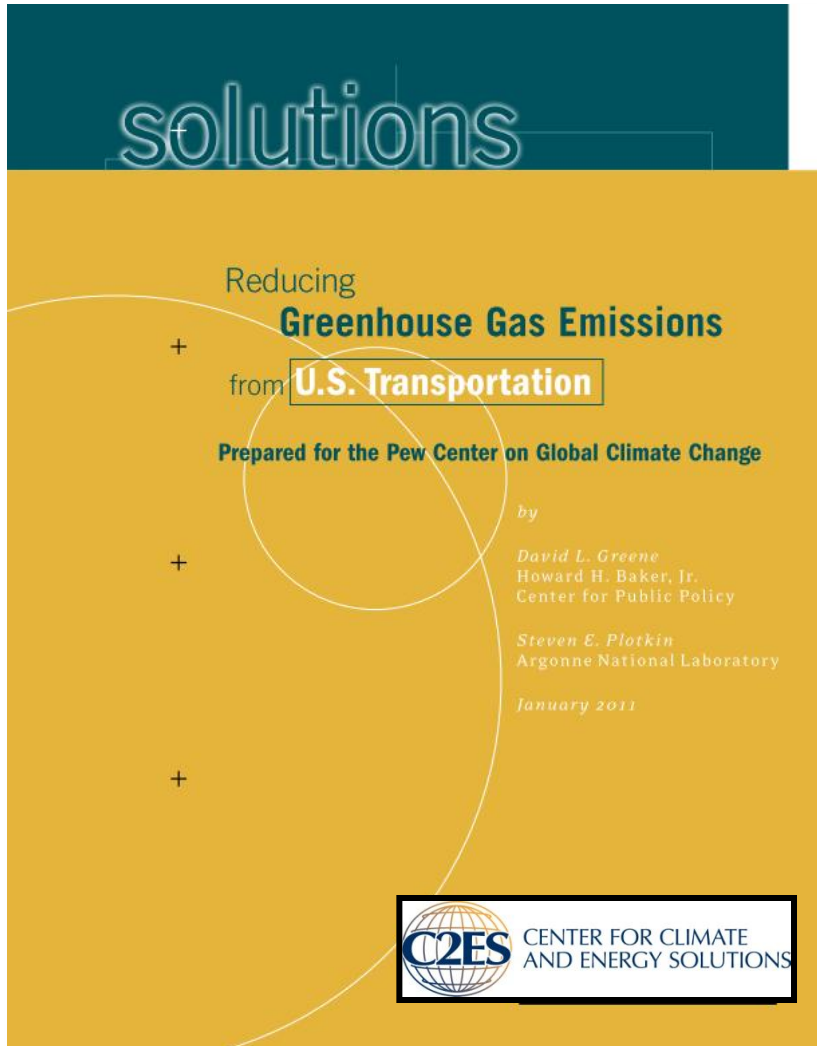
- EPA and NHTSA issued 2 standards covering MY2012-2025 and California agreed to adopt federal standards



Where are we going?

C2ES research on light-duty vehicle technology and how it compares with latest federal vehicle standards

Reducing Greenhouse Gas Emissions from U.S. Transportation



Released January 2011

Free download at
www.c2es.org

- Assess the potential to substantially reduce transportation's GHG emissions and oil use cost-effectively by 2035 & 2050
- C2ES report by Greene and Plotkin focusing on entire U.S. transportation system
- Time frame is 2010-2050
- Base Case: Annual Energy Outlook 2010 Reference Case, extended to 2050
- Three scenarios with differing assumptions about technological progress, policy initiatives, and public attitudes
- Rely on existing studies to estimate impacts
- Scenario analysis uses Kaya method to integrate policy impacts and avoid double counting



Kaya Method:

Transportation GHG emissions = Sum over all transportation modes, vehicle types, and fuels of {Energy Services Produced x Energy Intensity x Carbon Intensity}



- **Reduce energy needed to move the vehicle by reducing weight, aerodynamic drag and rolling resistance (physics!)**
- **Improving the efficiency of the drivetrain (engine and transmission)**
- **Improving the efficiency of accessories such as air conditioning and lights**
- **Using fuels with lower carbon content than gasoline or diesel (electricity, hydrogen, natural gas)**

(New) passenger car and light truck fuel economy could triple by 2035.



- **2035 conventional vehicle can be 50 mpg and hybrid can be 75 mpg (both on-road adjusted)**
- **2035 total fleet can be 15-40% higher fuel economy than base case rising to 35-80% by 2050**
- **Plug-in hybrids, EVs & FCVs can all contribute, but a 75 mpg hybrid is difficult competition:**
 - Uses 187 gallons of gasoline/yr @ 14,000 miles/yr
 - < \$1,000/yr in fuel costs even at \$5 gasoline!
- **Conclusion: need dramatic cost reductions, performance improvements and public acceptance for new fuels to have a large impact**





- **C2ES report relied on MIT's *On the Road in 2035* and similar studies**
- **EPA/NHTSA believes 2035 technology can be brought online more quickly**
 - Agencies are more optimistic on conventional technology
 - Over 60,000 plug-in electric vehicles sold in U.S. since 2011, as of December 2012
- **Example comparison**
 - MIT study estimated 83% fuel economy improvement for advanced conventional vehicles between 2005 and 2035
 - EPA/NHTSA rule estimates fuel economy improvements between 2011 and 2025 of 90%
- **Highlights importance of adaptive policy**
 - Note that EPA/NHTSA rule has a mid-term review



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