



U.S. Department of Energy
Energy Efficiency and Renewable Energy

freedomCAR & vehicle technologies program

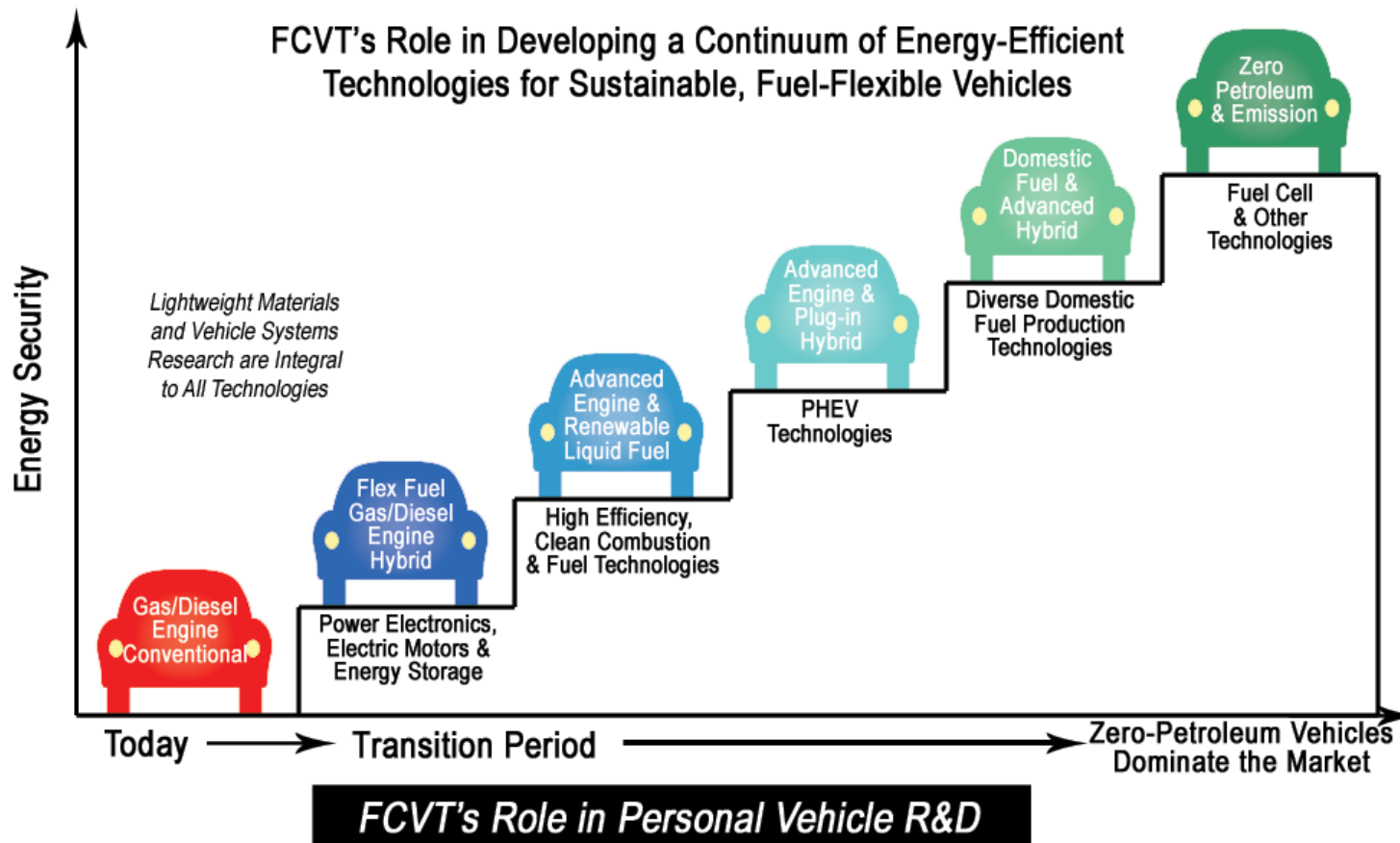
The Future of the Automobile

September 19, 2006

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Strategic Approach to Transportation Energy Security



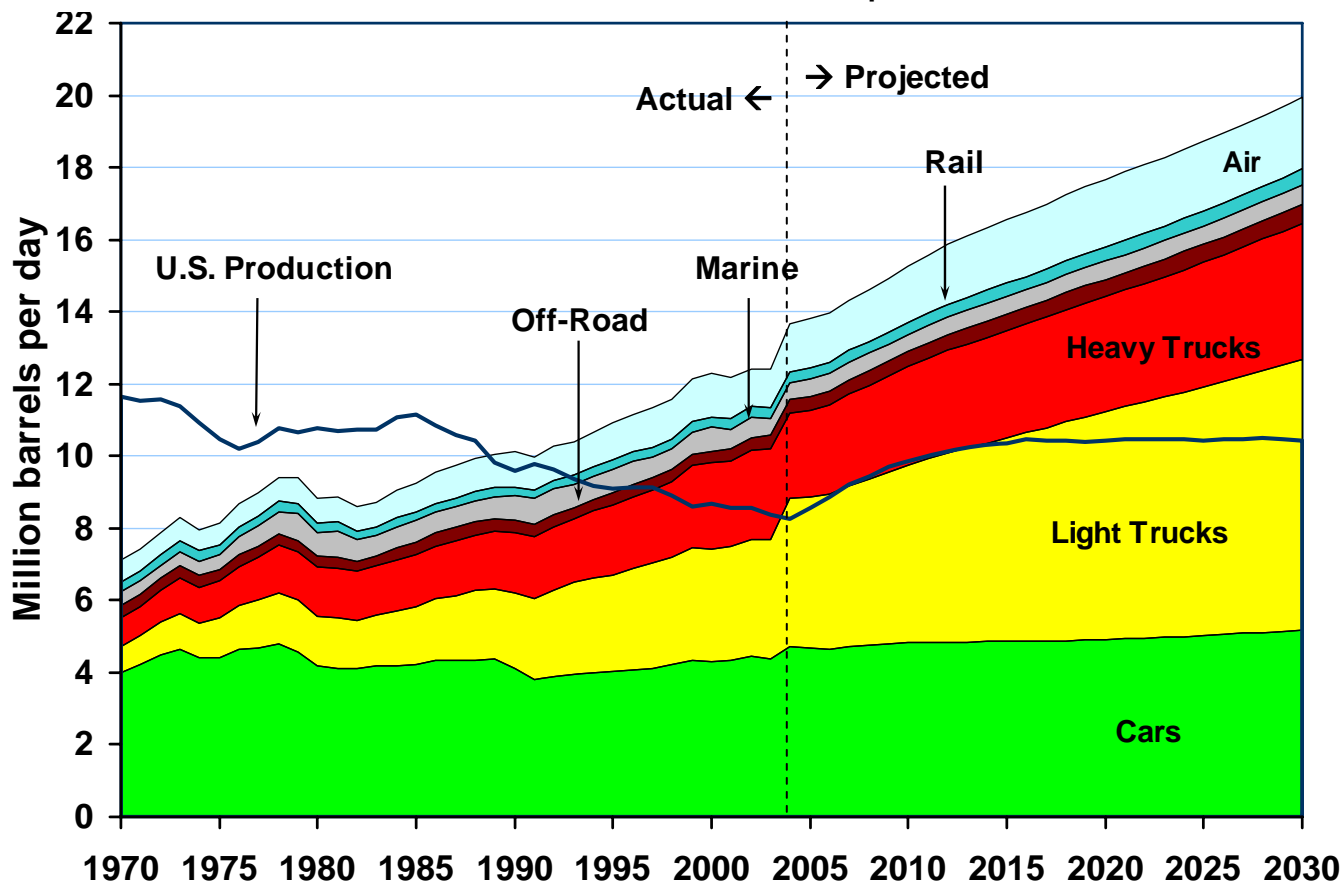
The FreedomCAR and Fuel Partnership is "... a very effective way to develop technologies that will satisfy all of the requirements for the deployment of radically new systems in the marketplace on a large scale."

NAS/NRC Review of the Research Program of the FreedomCAR and Fuel Partnership, August 2005



Transportation Petroleum Use by Mode (1970-2030)

2003 Total = 13.42 mbpd



Note: The sharp increase in values between 2003 and 2004 are caused by the data change from historical to projected values.

Source: Transportation Energy Data Book: Edition 25, ORNL-6974 (to be published) and EIA Annual Energy Outlook 2006, February 2006.



- Federal role is in long-term, high-risk research and accelerating deployment of advanced technologies
- FreedomCAR & Vehicle Technologies Program is:
 - Conducting the next generation of advanced automotive R&D
 - Committed to accelerating the development of vehicle components and enhancing energy security



“The world will grow increasingly dependent on Middle East oil. Non-OPEC oil production is expected to peak in the next ten years.”

***-Rex Tillerson, President
ExxonMobil
December 2004***





- **Hybrid and Electric Propulsion:** By 2010, Hybrid and Electric Propulsion R&D activities will reduce the production cost of a high power 25 kW battery for use in passenger vehicles from \$3,000 in 1998 to \$500 (with an intermediate goal of \$750 in 2006) enabling cost competitive market entry of hybrid vehicles.
- **Materials Technologies:** By 2010, develop material and manufacturing technologies that if implemented in high volume could cost effectively reduce the weight of passenger vehicle body and chassis systems by 50% with safety, performance, and recyclability comparable to 2002 vehicles.



- **Advanced Combustion Engines and Fuels:** Improve the efficiency of internal combustion engines from 30% (2002 baseline) to 45% by 2010 for light-duty passenger and from 40% (2002 baseline) to 55% by 2013 for commercial (heavy-duty) vehicle applications while utilizing an advanced fuel formulation that incorporates a non-petroleum based blending agent to reduce petroleum dependence and enhance combustion efficiency.
- **Vehicle Systems and Materials Technologies:** Reduce heavy truck parasitic losses (e.g. aerodynamics, ancillary systems) from 39% of engine output in 1998 to 24% in 2006 and reduce the weight of an unloaded tractor-trailer from 23,000 lbs in 2003 to 18,000 lbs in 2010 (a 22% reduction), thereby increasing heavy truck fuel efficiency.



Future

- The economy is global
- World-wide R&D is characterized by competition, innovation, and application of strategies across industries
- FCVT enables research and partnerships for an energy efficient future where American industry produces competitive goods for consumers around the world
- In the coming decades, we will see a range of hybrids, HCCI engines, fuel cell vehicles, lightweight materials, flex-fuel vehicles & renewable fuels

