

The Outlook for Oil Demand in North America

for

**CERI 2008 Oil Conference: What Price Energy Security?
Calgary, Alberta**

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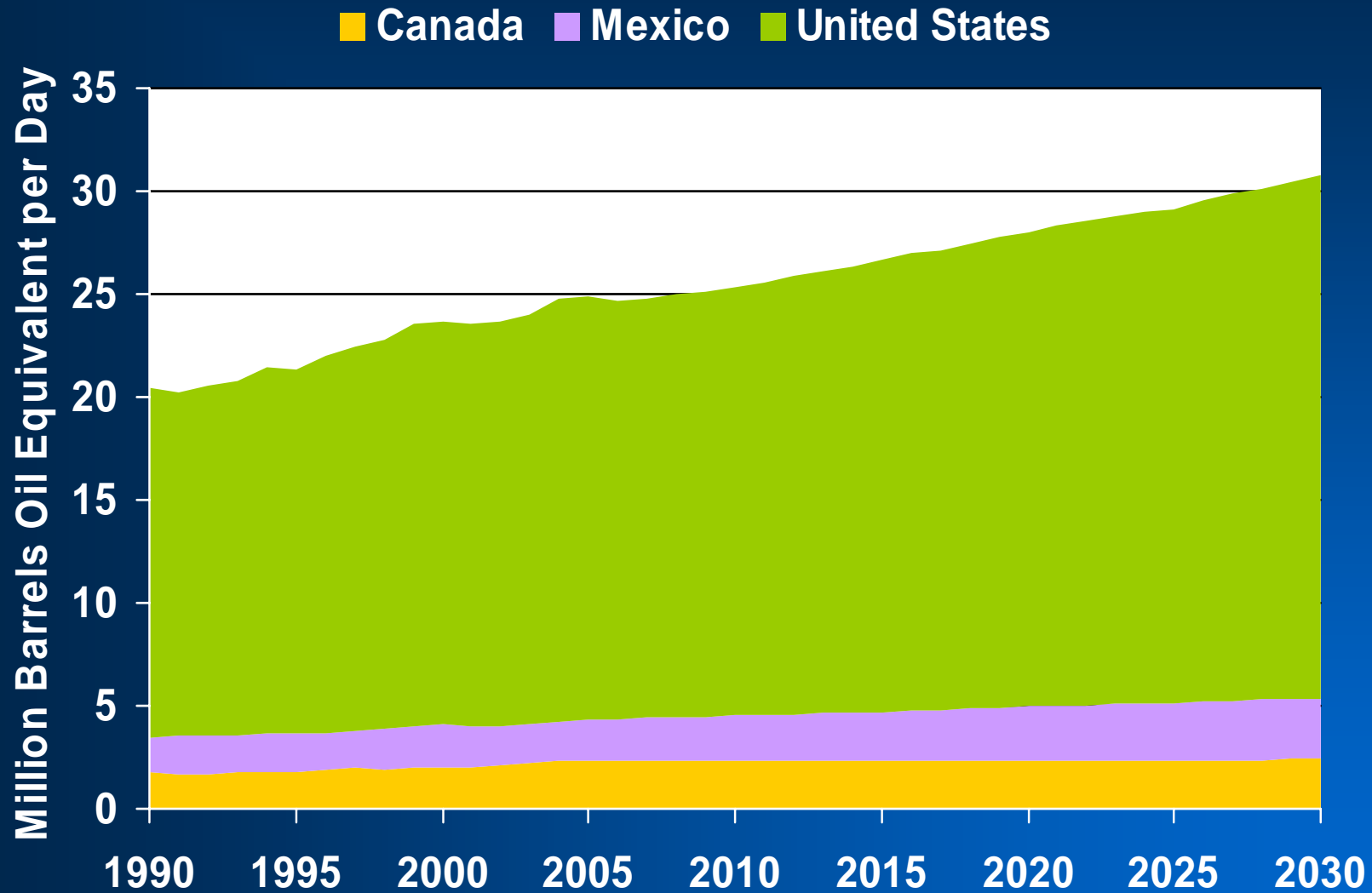
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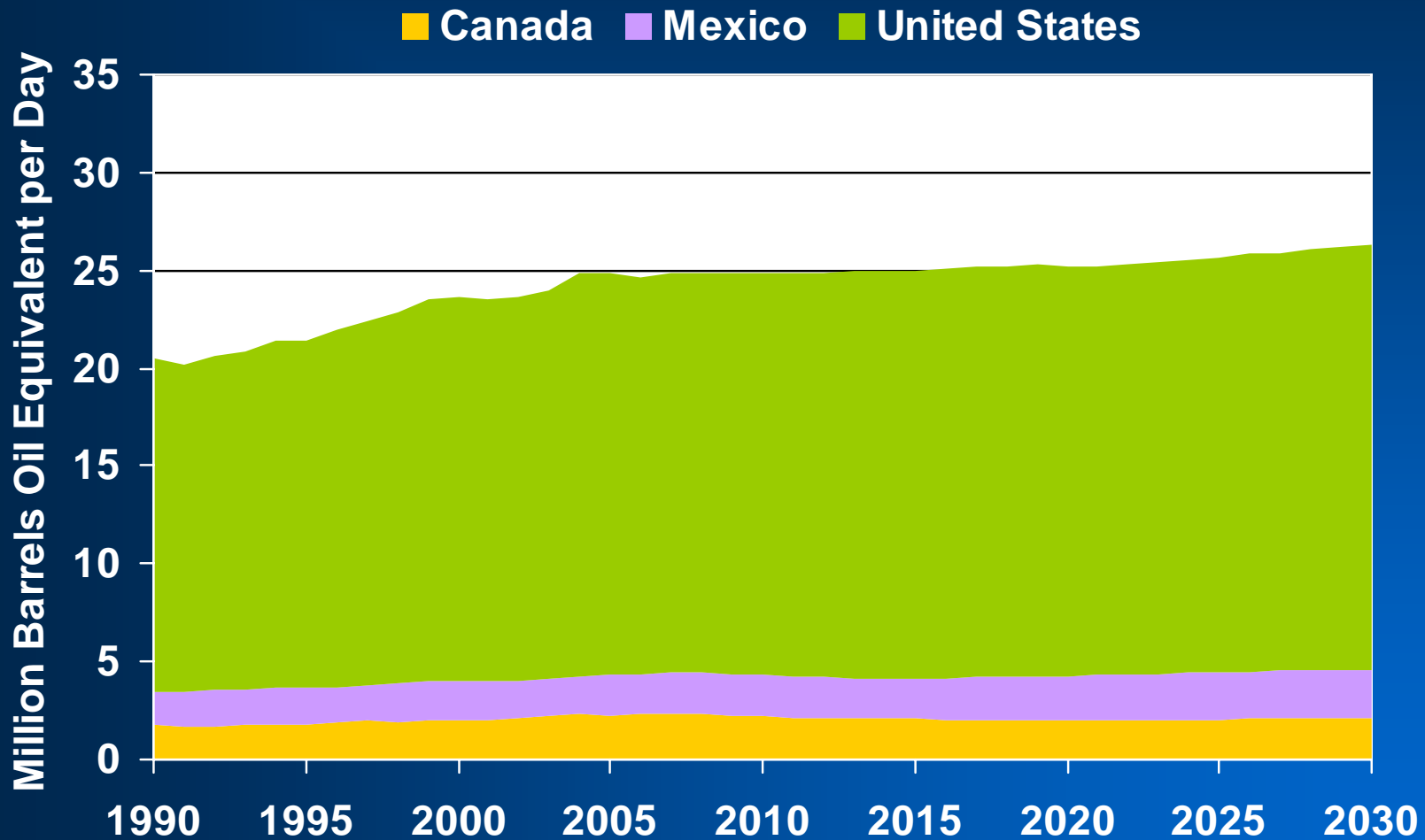
Outline

- **North American Oil Demand to 2030 – the view before EISA 2007**
- **Renewable Fuel Market Segments**
- **The Energy Independence and Security Act of 2007: provisions with major effects on oil markets**
- **Latest Projections with EISA 2007**
 - **U.S. liquids balance and import dependence**
 - **Implications for U.S. petroleum gasoline and distillate demand**

North American Oil Use in the IEO2007 Reference Case, 1990-2030



North American Oil Use in the IEO2007 High Price Case, 1990-2030



Transportation and Oil

- **Transportation is the primary driver of oil demand**
 - **In the US, transportation already accounts for nearly 70% of oil use.**
 - **Historically, alternative fuels have not made significant inroads into transportation even in countries where tax policies have made oil-based motor fuels very expensive.**
- **Looking ahead, transportation is likely to account for an even larger share of oil use.**
 - **However, several alternatives to oil could potentially play a growing role in transportation, so that transportation growth does not imply corresponding growth in oil use.**

Alternatives to Oil in Transportation

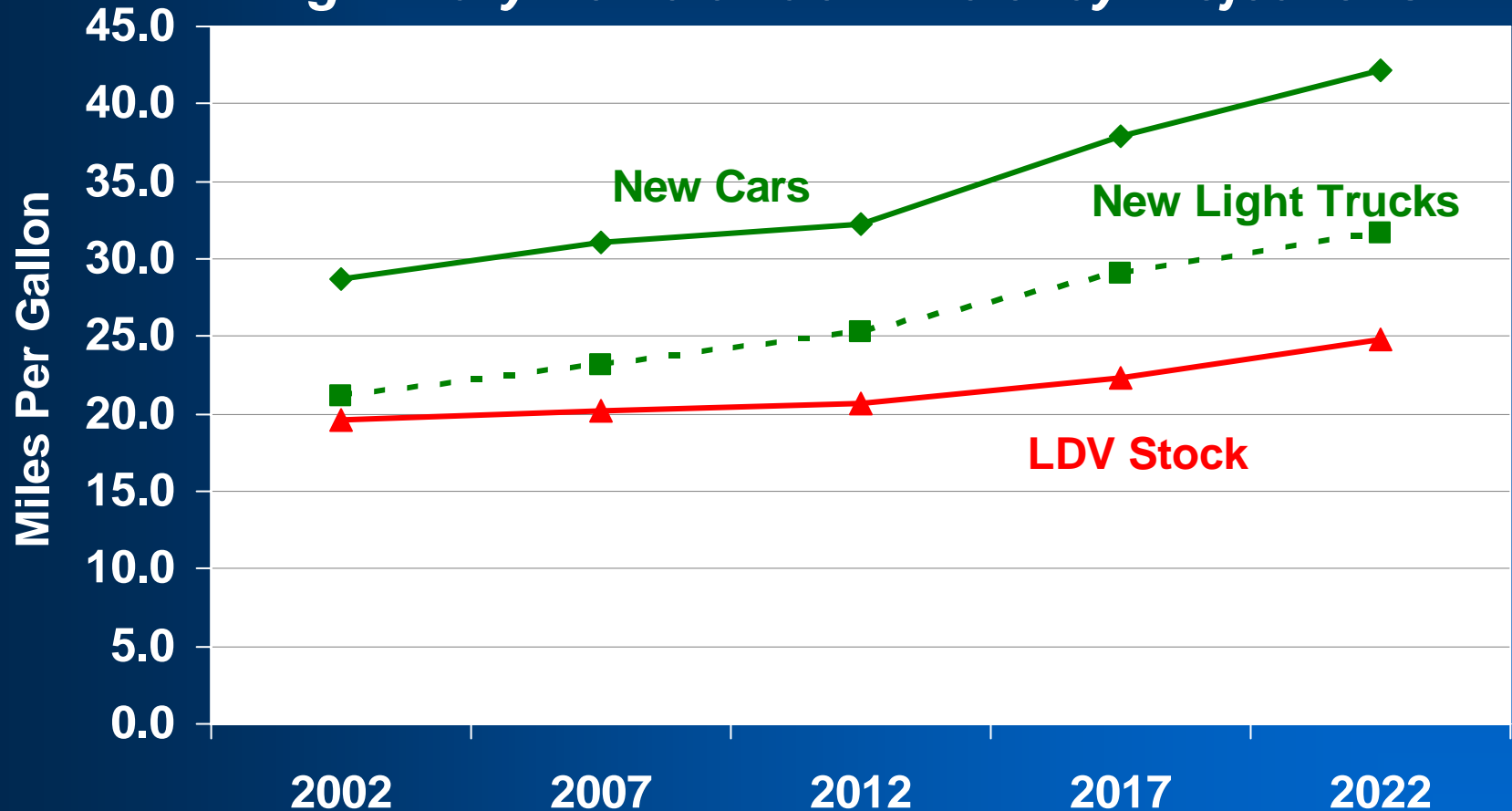
- **Biofuels – Ethanol, biodiesel, and biobutanol**
- **Vehicle efficiency**
 - **For constant VMT, each 50 percent increase in on-the-road fuel economy reduces fuel used by 33 percent.**
- **Electricity (from a variety of fossil and non-fossil sources) powering plug-in hybrids for a significant share of overall vehicle miles of travel (VMT).**
- **Coal to Liquids (CTL) and Gas-to-Liquids (GTL)**
- **Hydrogen (from a variety of fossil and non-fossil sources) powering combustion engines or fuel cells**

Energy Independence and Security Act of 2007: Key Provisions Affecting Transport Fuel Markets

- A significant increase in corporate average fuel economy standards for light duty vehicles, with a standard of 35 miles per gallon (MPG), or 14.9 km per litre, for cars and light trucks (combined) by 2020.
 - The current (model year 2008) standard is 27.5 MPG for cars and 22.5 MPG for light trucks.
- A renewable fuel standard (RFS) requiring 36 billion gallons of biofuels by 2022
 - In 2007, the U.S. consumed about 7.3 billion gallons of biofuels

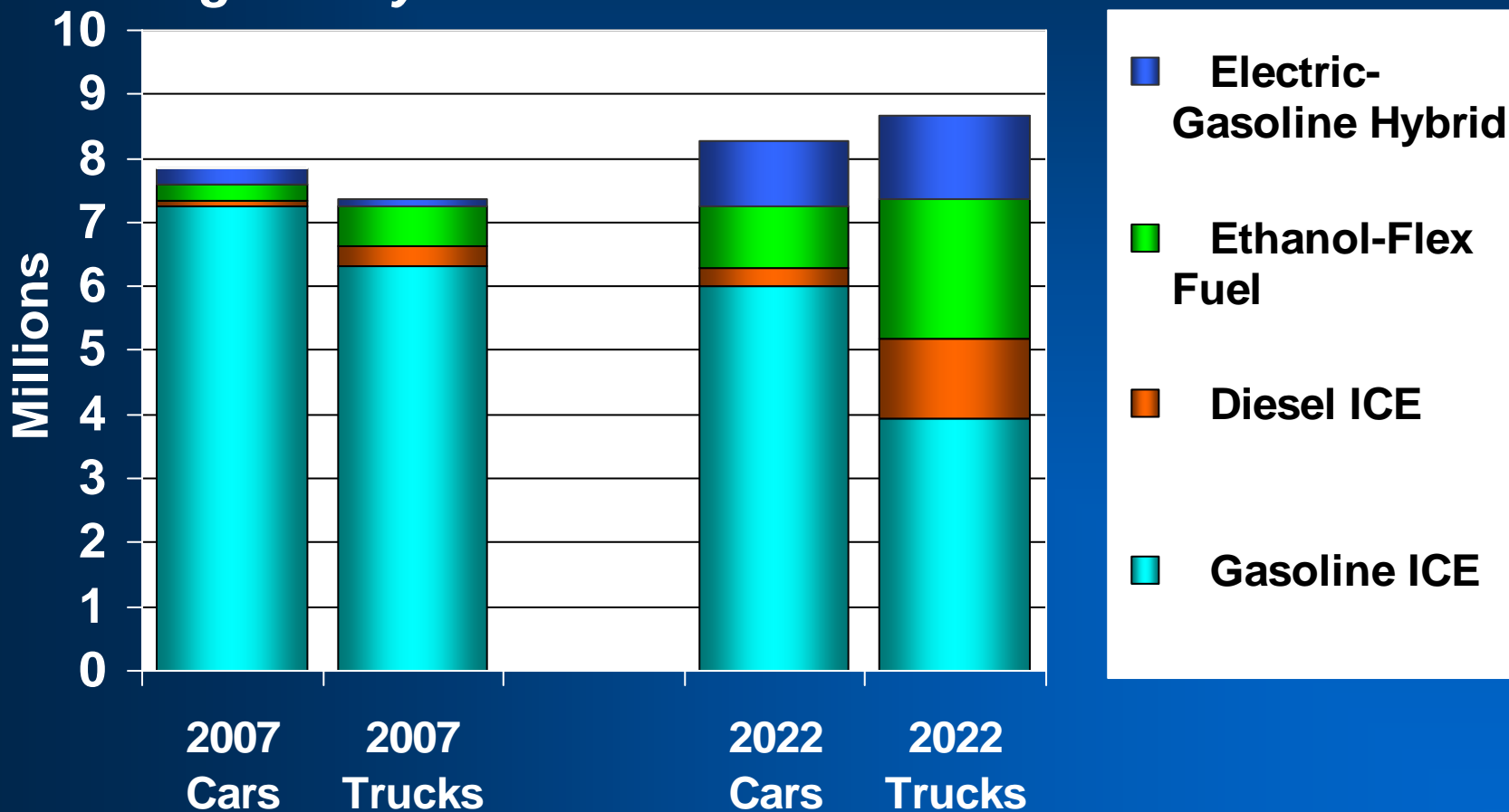
New Light-Duty Fuel Efficiency is 36 MPG in 2022 Versus 28.4 in Early Release Case

Light-Duty Vehicle Fuel Efficiency Projections



Shifting Vehicle Mix Needed to Meet Both Increased Efficiency & Ethanol Use

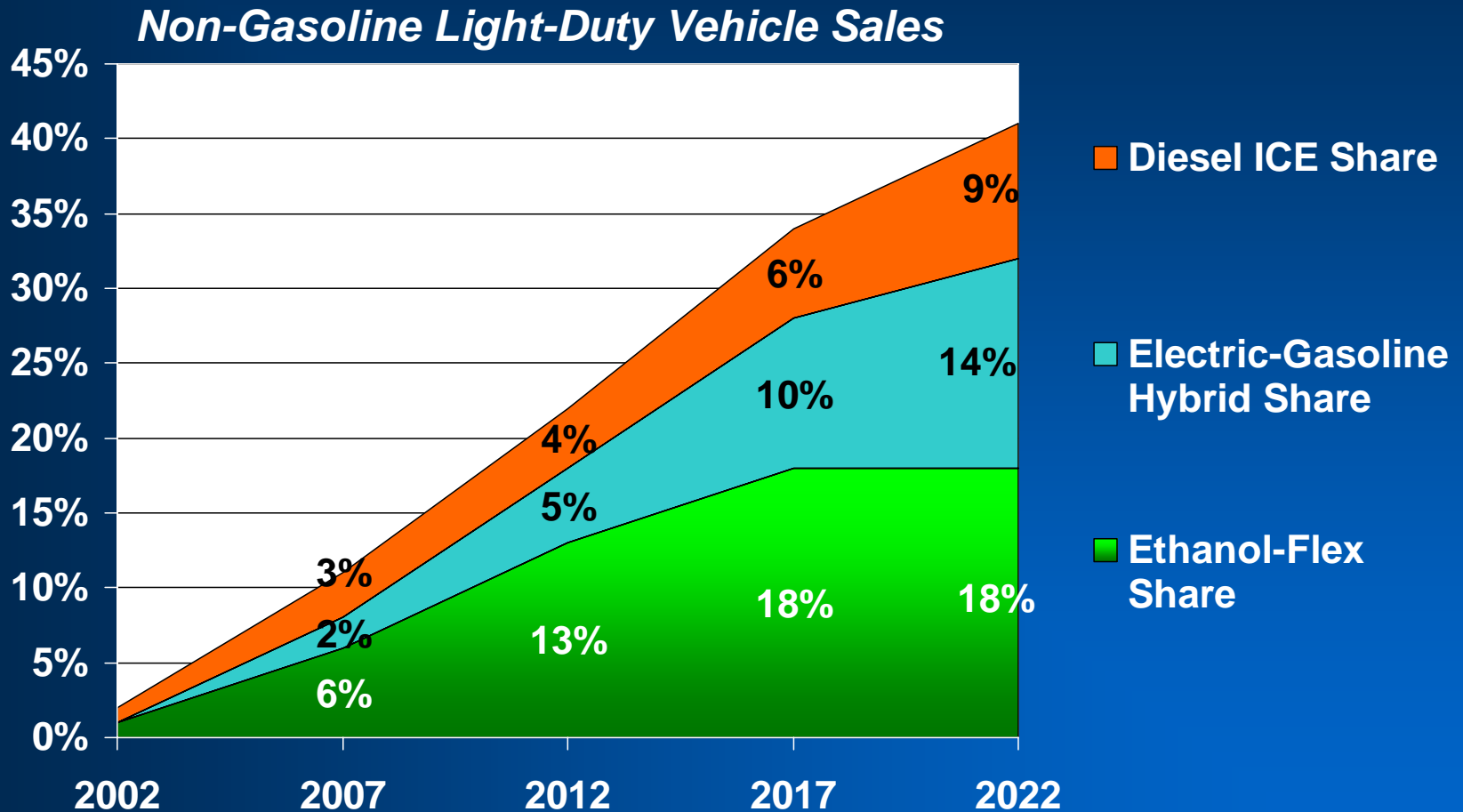
Light-Duty Vehicle Sales



Note: ICE – Internal Combustion Engine

Source: AEO 2008 Reference Case

Non-Gasoline Vehicle Sales Penetration Increases from 11% in 2007 to 41% in 2022

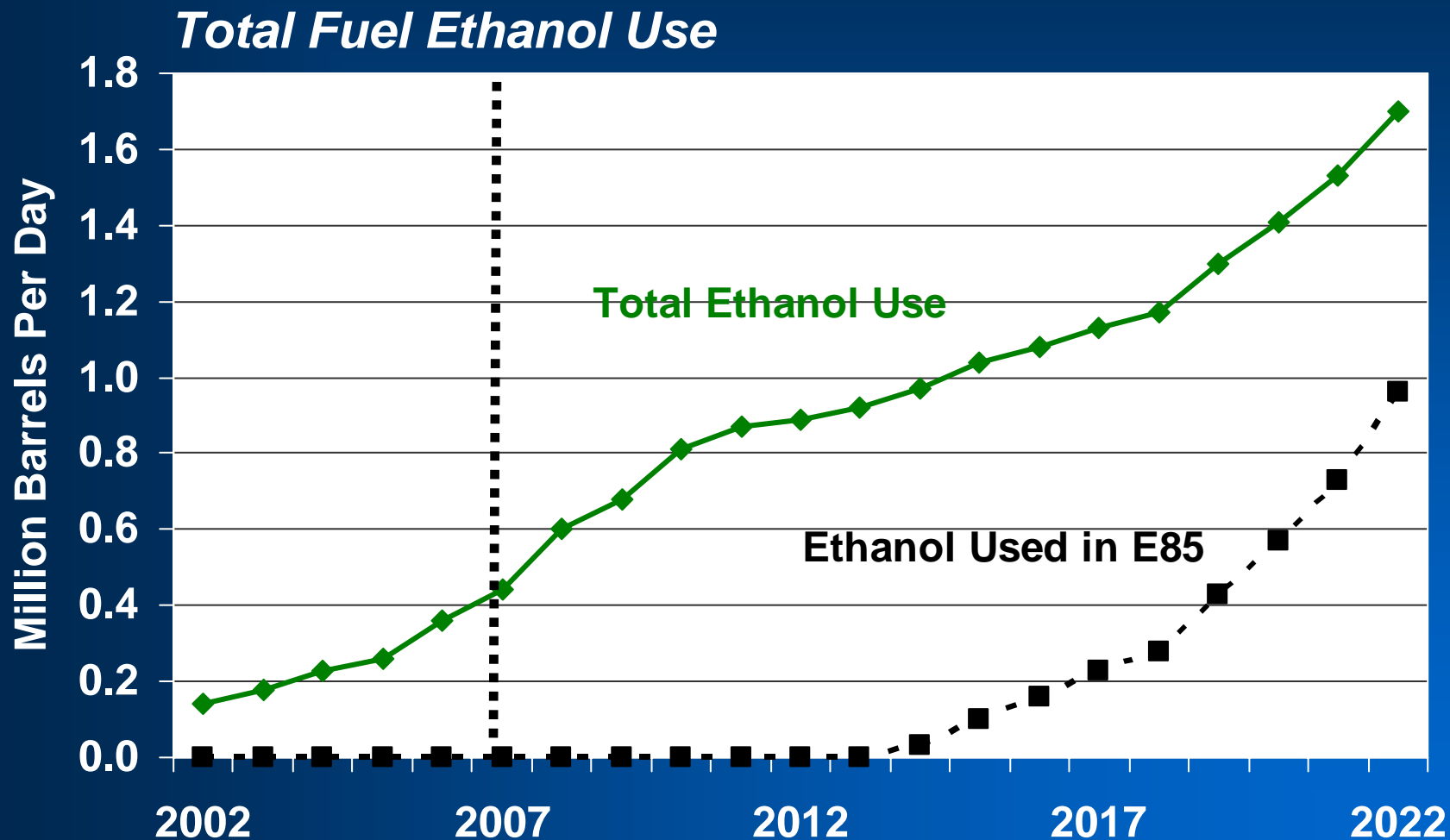


3 Distinct Market Segments for Ethanol

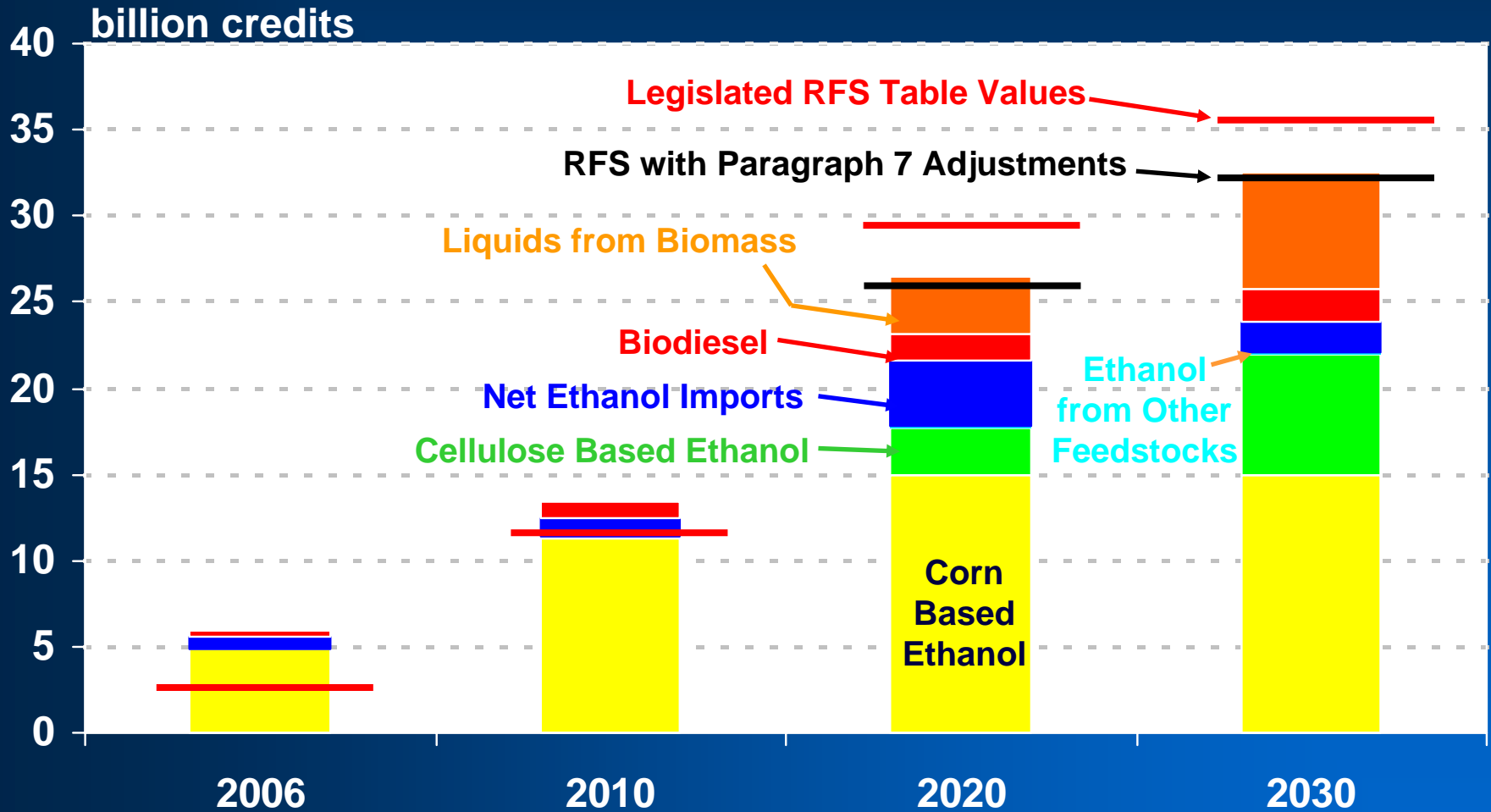
- **Clean, high-octane gasoline blending component market**
 - **Lowest price sensitivity: “must have” item. Example: demand for ethanol in the aftermath of the phaseout of MTBE in spring 2006**
- **Volume enhancement market**
 - **Price competition with conventional fuels on a volume (per gallon) basis**
 - **Key drivers include oil prices, biofuel tax benefits, and biofuel feedstock prices**
- **Energy value (btu content) market**
 - **Price competition with conventional fuels on an energy content (per Btu) basis**
 - **Sensitive to availability of fuel and vehicle infrastructure**

BOTTOM LINE: Absent a mandate, ethanol is NOT competitive with petroleum-based fuels in the 3rd (energy value) market segment at current oil prices. However, EISA 2007 provides a mandate to push ethanol beyond the 10% blending market.

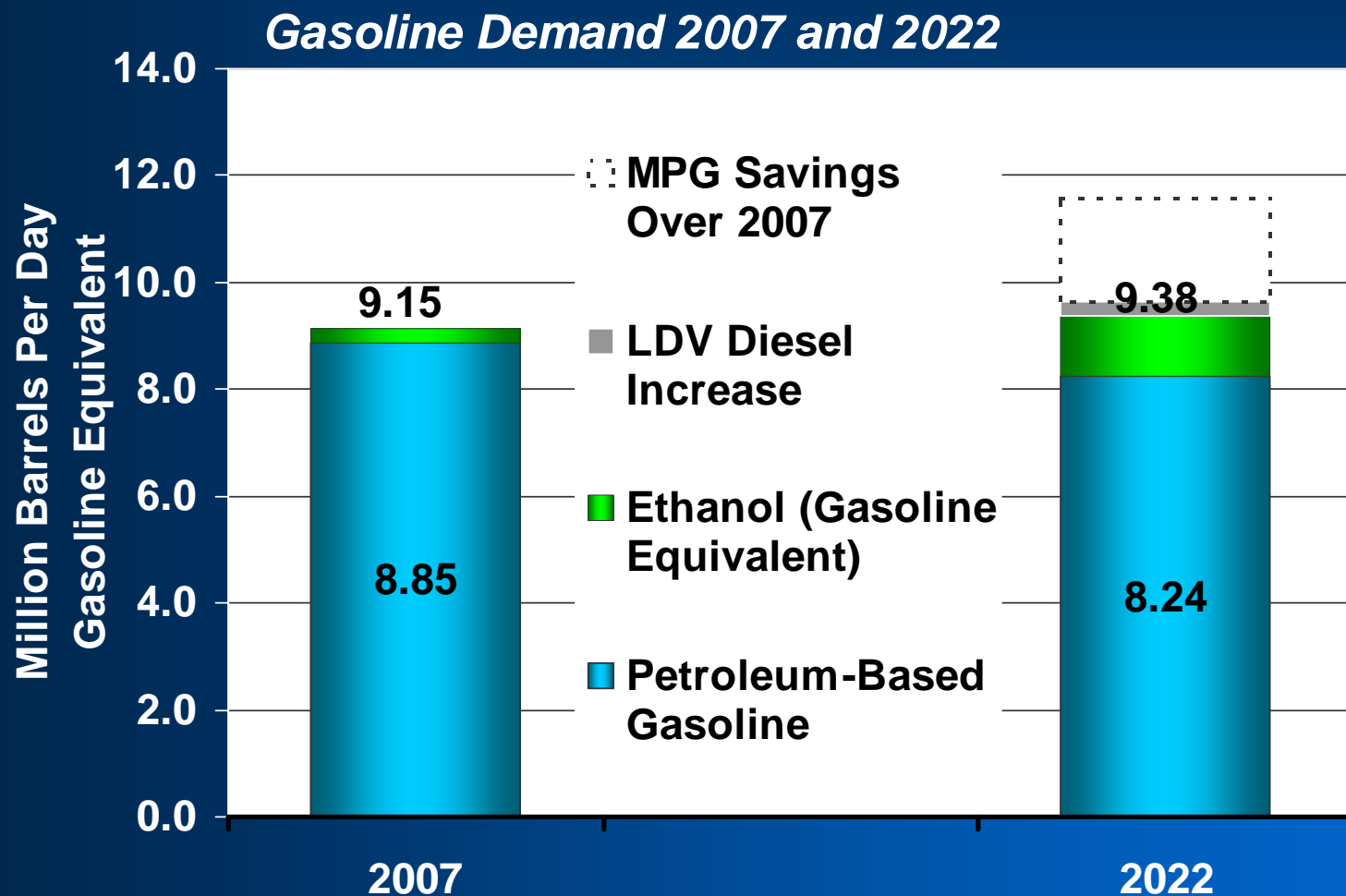
Renewable Fuels Requirement Mainly Met with Ethanol



A variety of fuel sources are expected to support the renewable fuel standard in EISA2007.



U.S. Gasoline Demand Increases, But Petroleum Gasoline Declines Due to Increased Biofuels, Switch to Diesel, & Efficiency



Petroleum-Based* Gasoline and Distillate Fuel Needs Shift

Million Barrels Per Day	2007	2022	Growth to 2022
Petroleum Gasoline	8.85	8.24	-0.61
Petroleum Distillate	4.22	4.71	+0.49

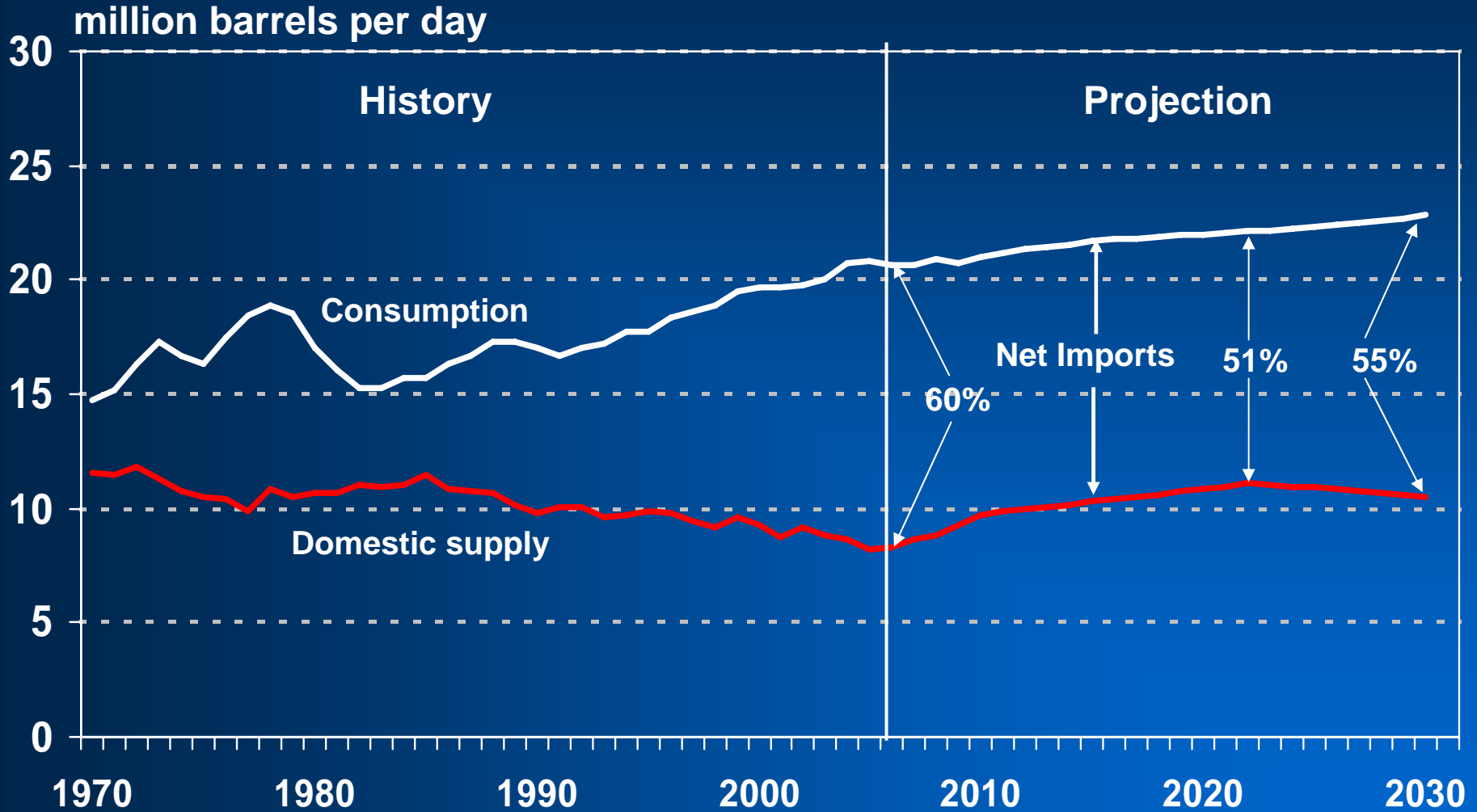
* Petroleum-Based excludes ethanol, biodiesel, and distillate from coal-to-liquids and biomass-to-liquids.

Source: AEO 2008 Reference Case

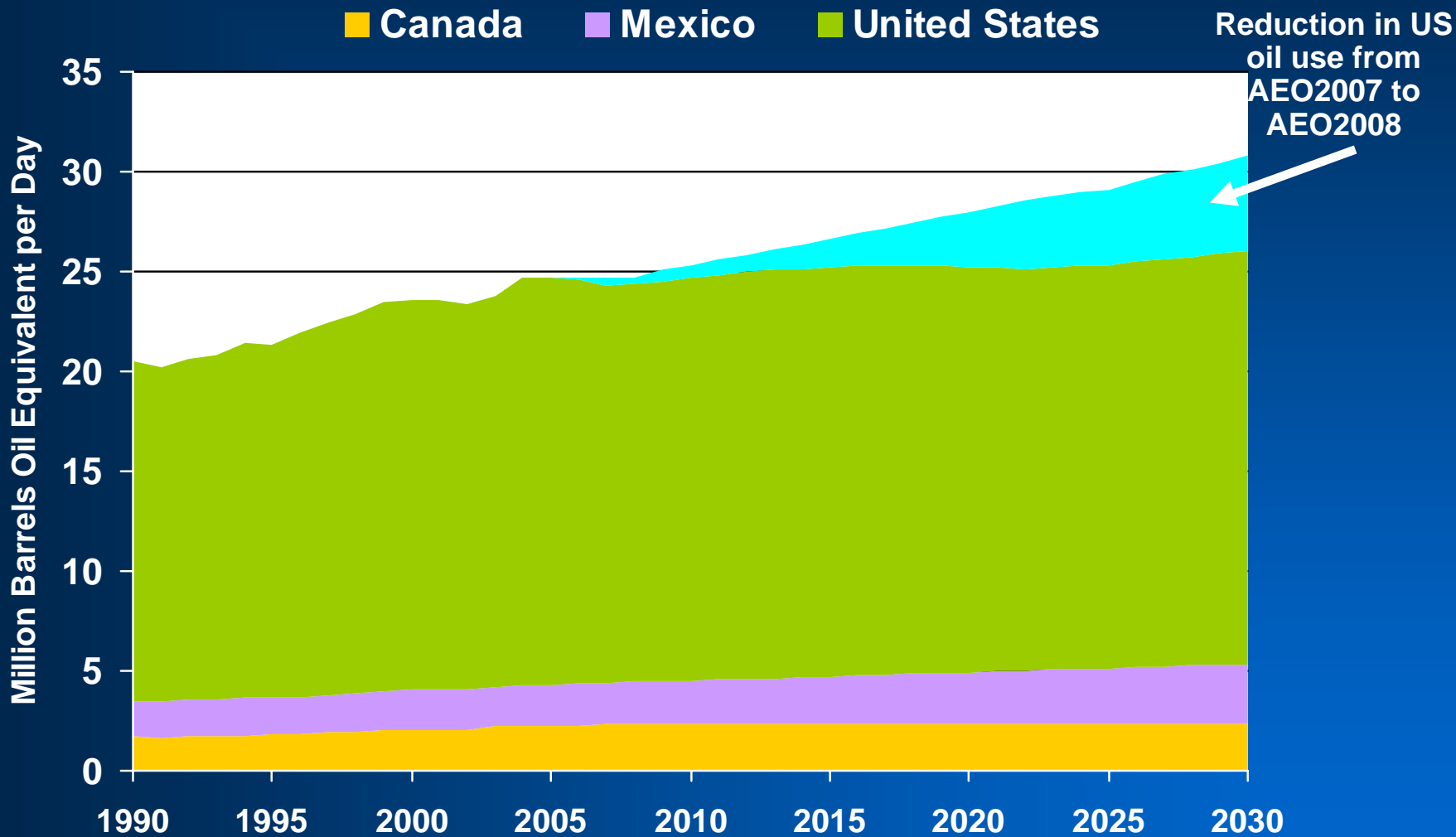
Issues: Shifting U.S. Demand Mix and Import Availability

- The shifting demand mix of products towards more distillate and less gasoline may be a challenge for refiners
- Supply Uncertainties:
 - U.S. Refiners Distillate Response – relative roles of throughput increases and yield improvements?
 - U.S. Refiners Gasoline Availability – driven by nature of distillate supply response
 - World Availability of Export Gasoline – Europe, Asia and Middle East increasing
 - Needs of other countries for “imported” gasoline

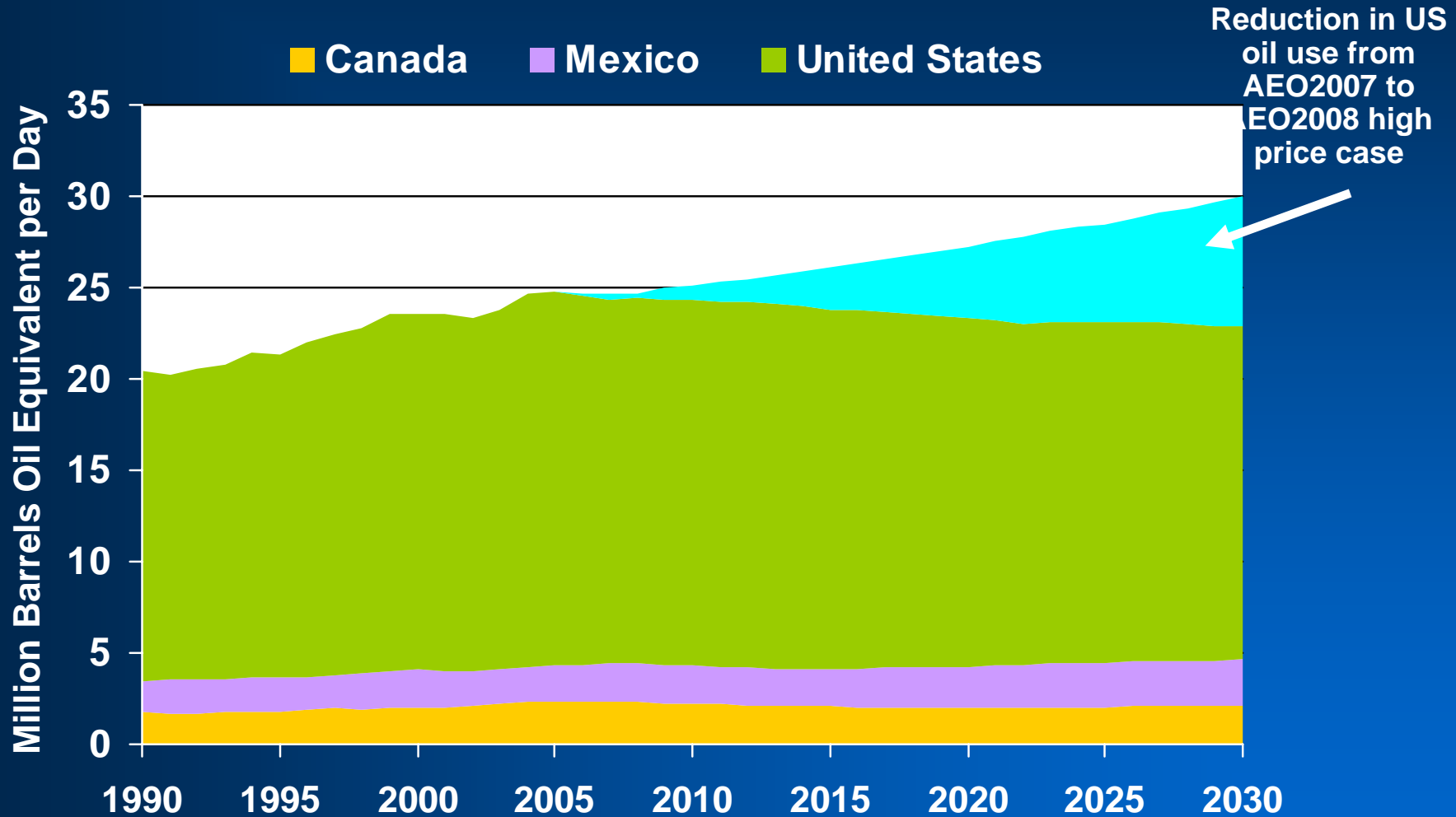
U.S. Liquid Fuels Consumption and Domestic Supply AEO2008 Reference Case (w/ EISA2007)



North American Oil Use, 1990-2030 (IEO2007 reference case w/ US updated from AEO2008)



North American Oil Use, 1990-2030 (IEO2007 high price case w/ US updated from AEO2008)



Thank You



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