

# Examining Future Global Transportation Energy Demand



---

*For*

*EIA Energy Conference*

*July 11, 2016 | Washington, DC*

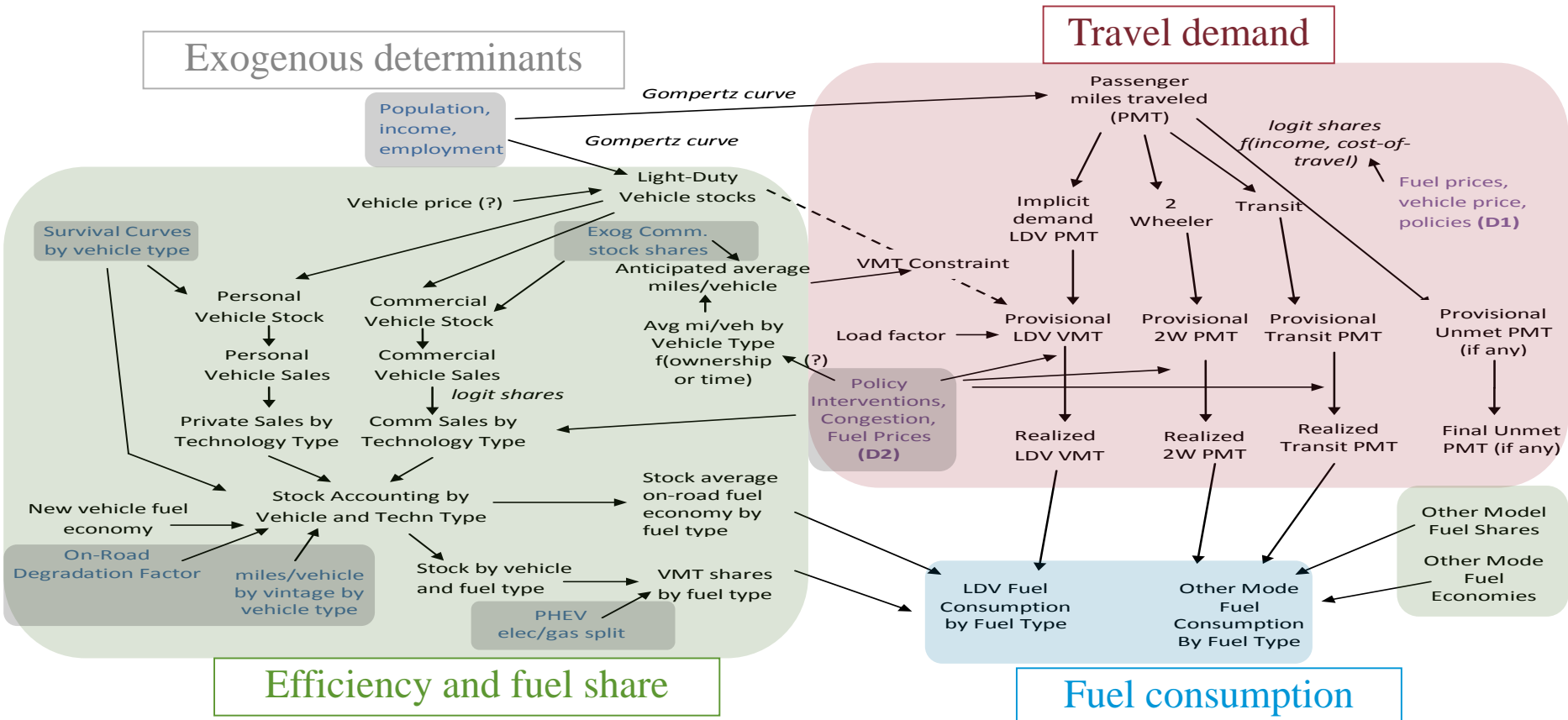
*By*

*John Maples*

# Outline

- Model overview
  - Passenger travel
  - Freight travel
  - Energy consumption for 16 regions:
    - USA, Canada, Mexico/Chile, OECD Europe, Japan, S. Korea, Australia/New Zealand
    - Russia, Non-OECD Europe/Eurasia, China, India, Non-OECD Asia, Middle East, Africa, Brazil, Other South/Central
- IEO2016 Reference case transportation projections
- Preliminary scenario results

# Passenger travel flow diagram



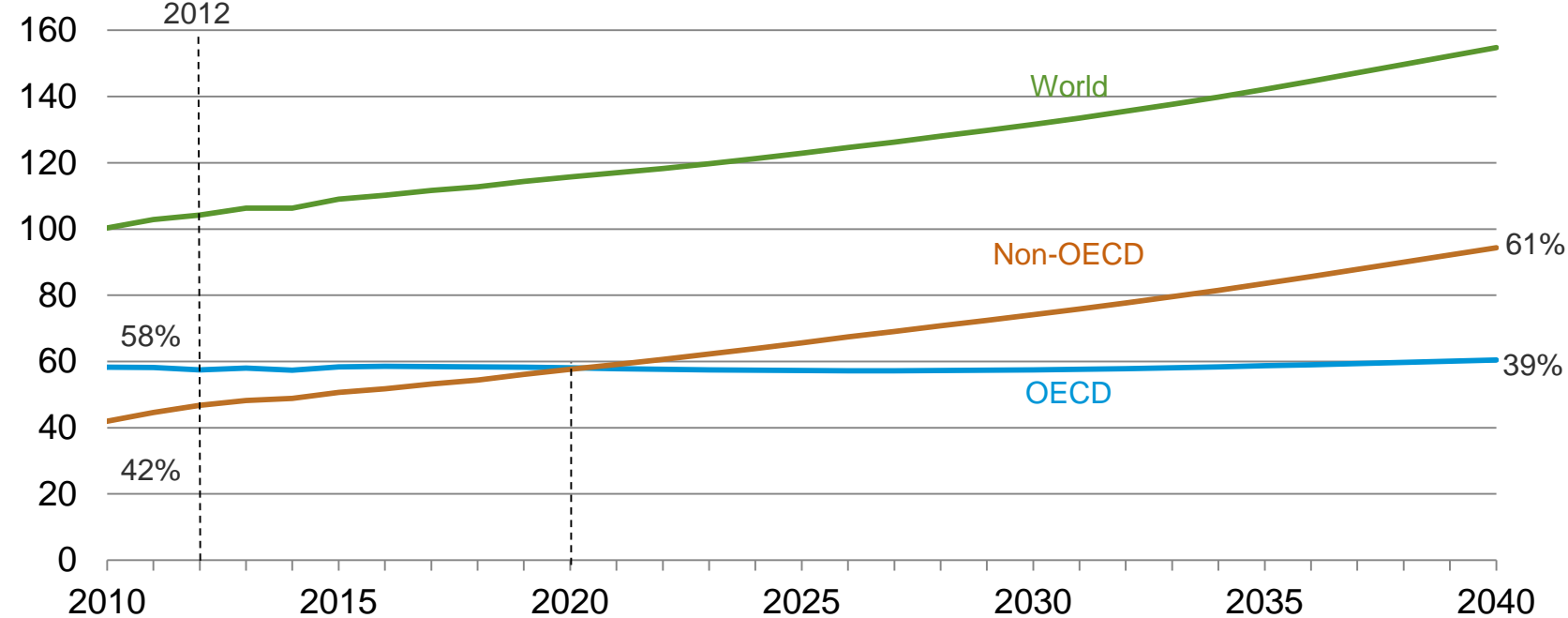
# Model overview

- International Maritime Freight Module methodology
  - Seaborne vessels involved in international trade
- Intraregional Freight Module methodology
  - On-road, rail, and waterborne freight taking place within national/regional borders
- Air Module methodology
  - By aircraft type (regional, narrow-body, and wide body) for passenger and freight movements
  - Regional and international travel

# Non-OECD surpasses OECD around 2020 and world transportation energy consumption reaches 155 quadrillion Btu by 2040

Energy consumption

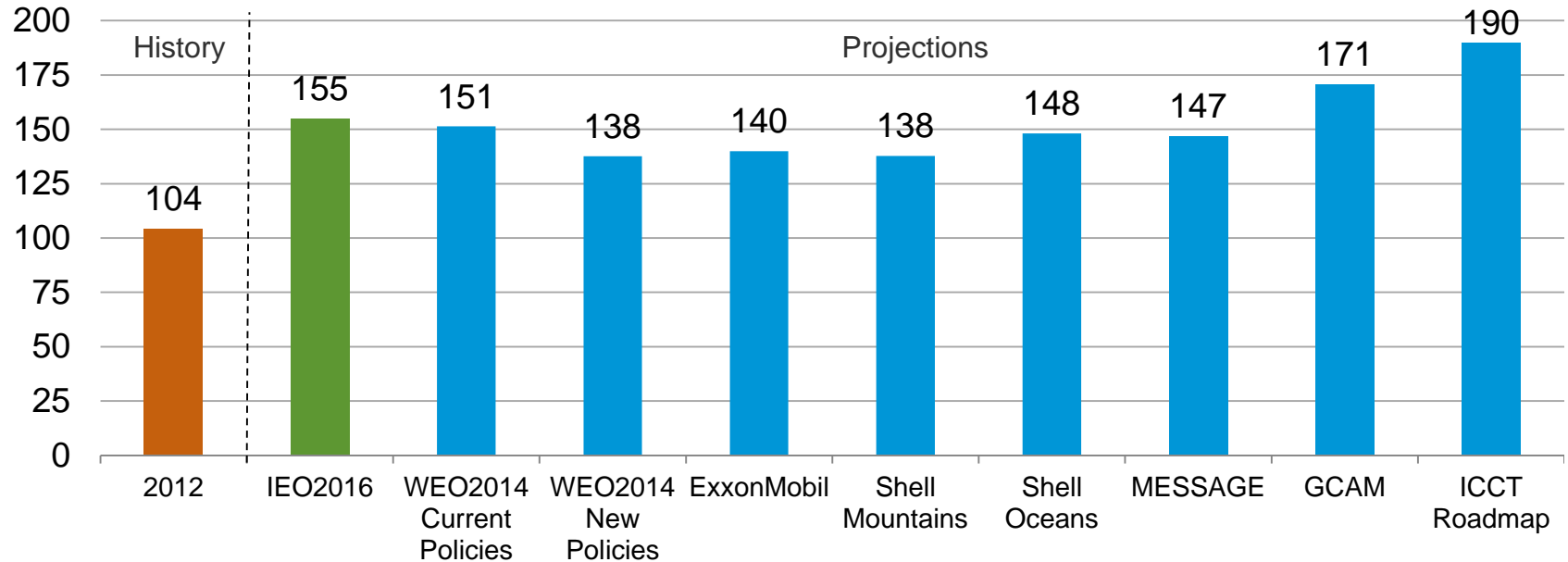
quadrillion Btu



IEO2016 Reference Case

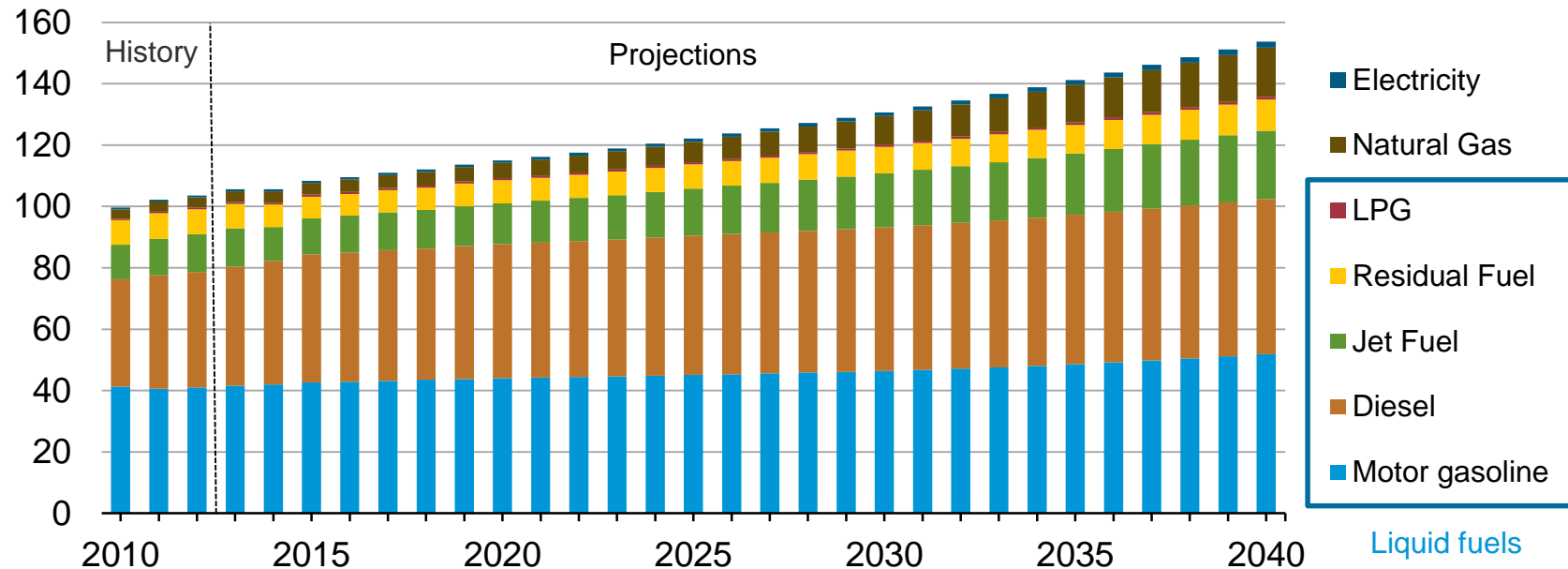
# Variation between publications, world transportation energy consumption in 2040

Energy consumption  
quadrillion Btu



# World transportation energy consumption by fuel dominated by liquid fuels but natural gas begins to gain market share

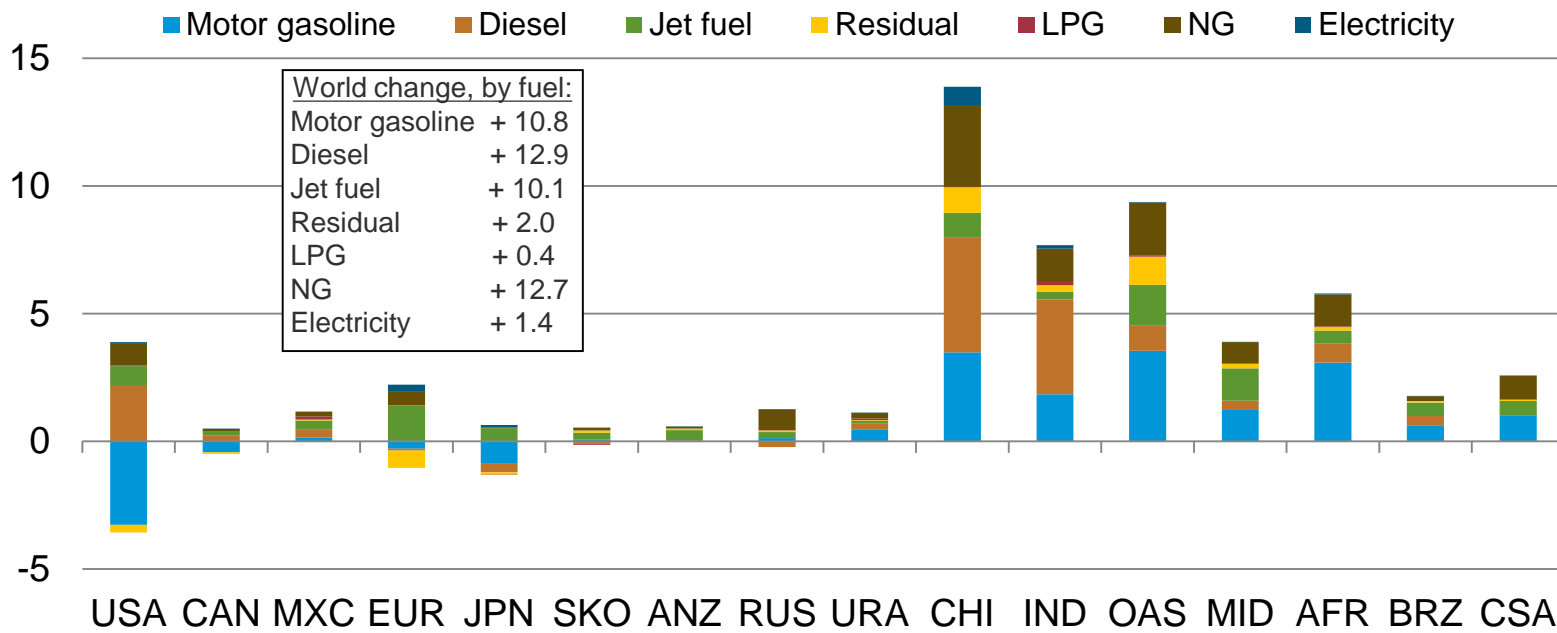
Energy consumption  
quadrillion Btu



IEO2016 Reference case

# Diesel accounts for the largest increase in transportation fuel consumption between 2012-2040

Change in energy consumption  
quadrillion Btu



IEO2016 Reference case



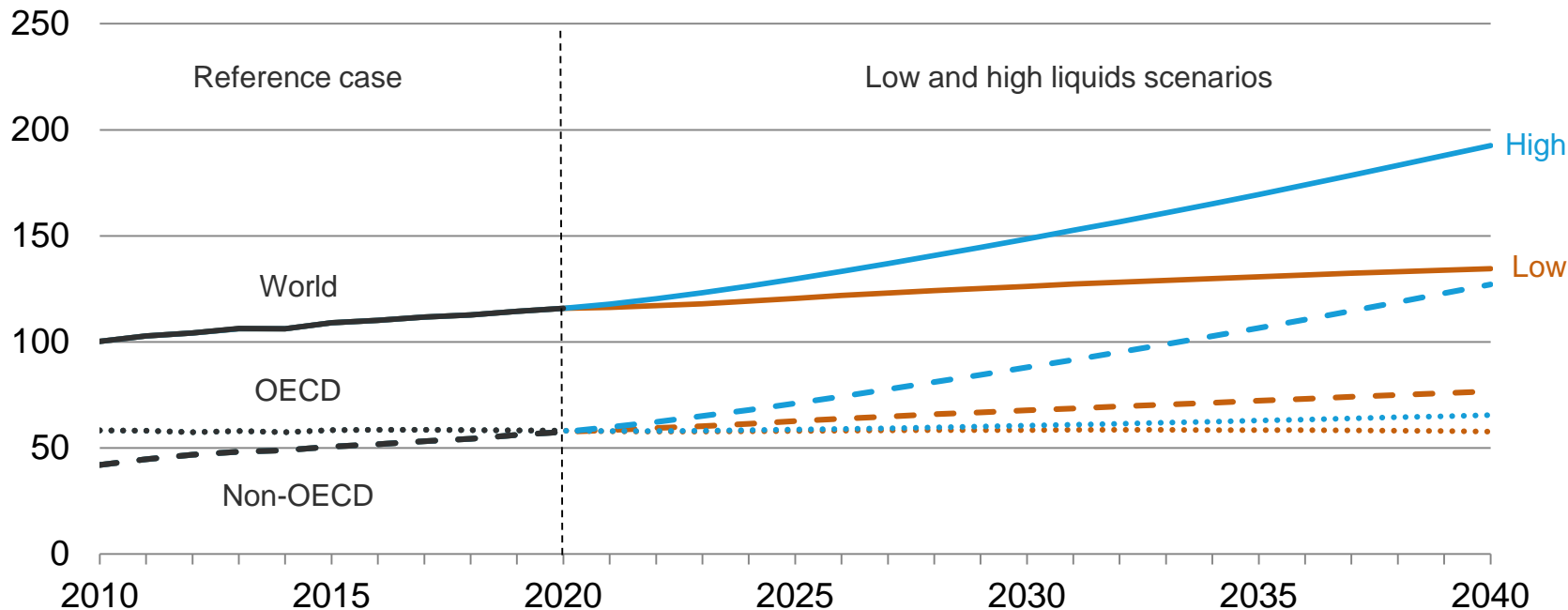
# Scenarios

# Low and high liquid scenario assumptions

- Scenarios begin in 2021
- Proportionally adjusted LDV ownership growth rates
- Adjusted region specific consumer preference coefficients for LDV purchase by fuel and technology type and rate of change allowed
- Assumed changes in new LDV vehicle prices to reflect either technology cost adjustment or subsidy adjustment
  - Removed commercial LDV subsidies for alternative fuel vehicles in the high liquids scenario
- Fuel economy standards unchanged in low liquid case, held constant at 2020 levels in the high liquids case
- Adjusted fuel efficiency for rail and marine, load factors for trucks and willingness to fuel switch for all freight modes

# Larger potential for upside and downside energy consumption in non-OECD countries than OECD countries

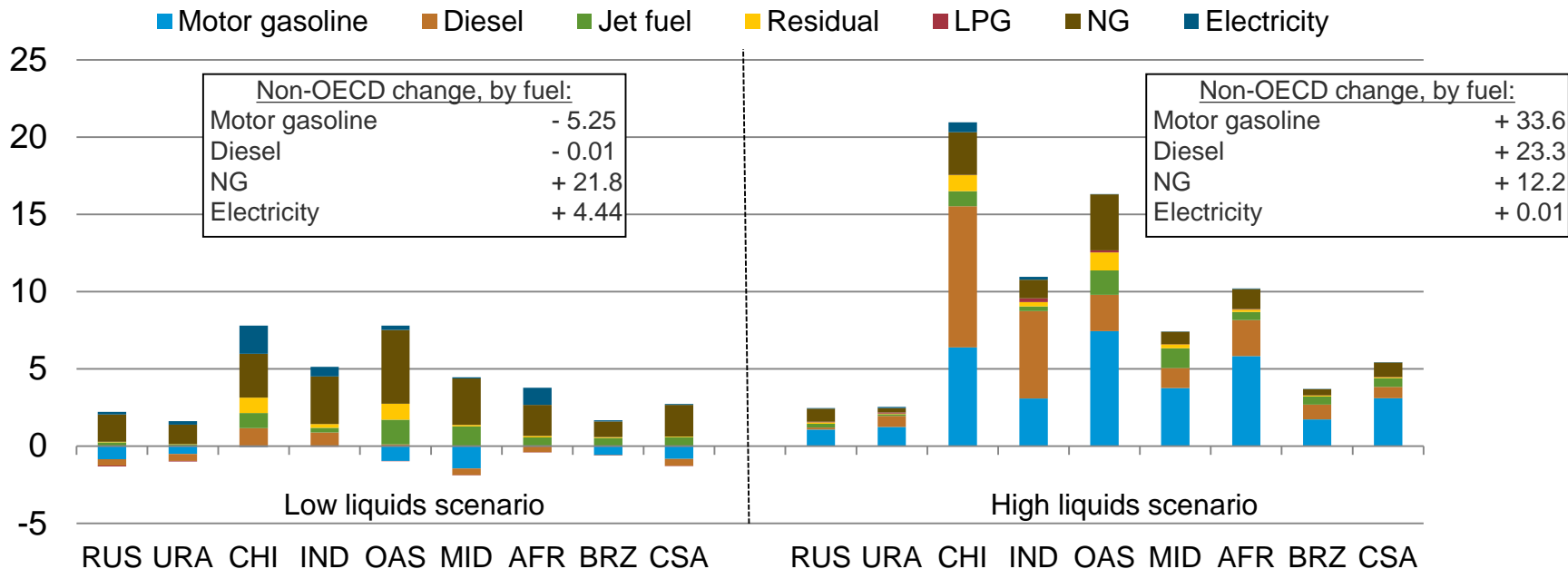
Energy consumption  
quadrillion Btu



IEO2016 Reference Case, low liquids scenario, and high liquids scenario

# Motor gasoline most effected fuel in low and high liquid scenarios in non-OECD countries

Change in energy consumption  
quadrillion Btu



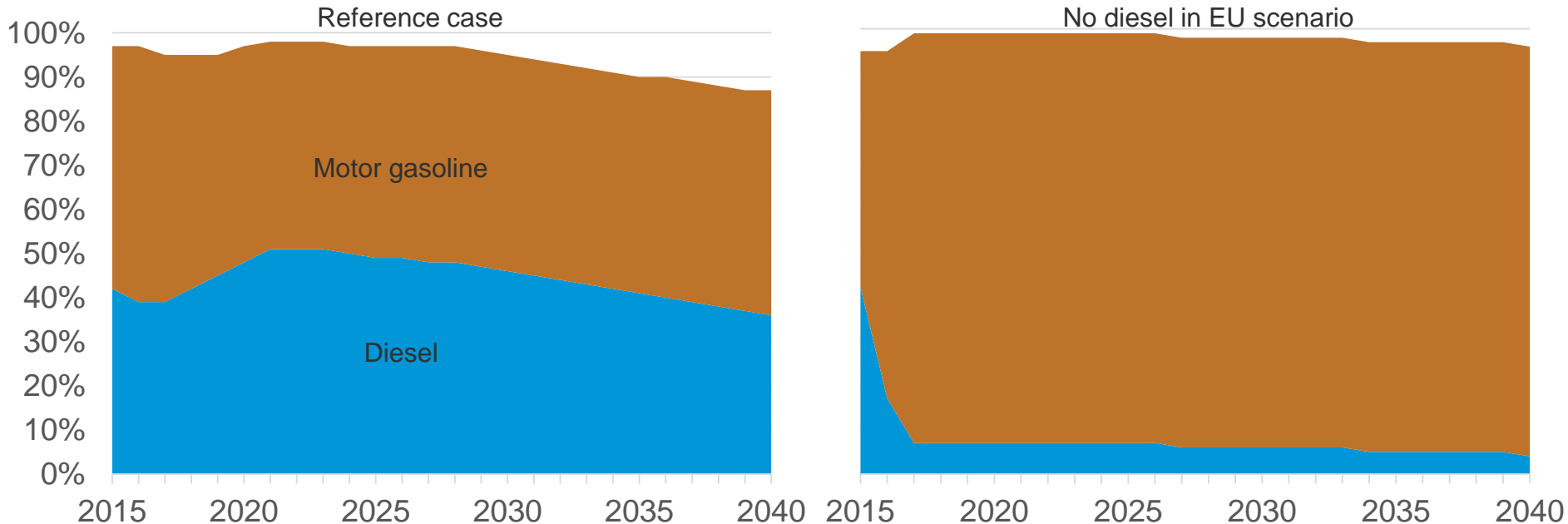
Low liquids scenario and high liquids scenario

## No light-duty vehicle diesel in EU scenario

- Assumes consumer preference or policy dramatically changes diesel LDV demand in EU
- Does not assume any particular fuel/technology will replace diesel
- Assumes no feedback from refiners or macro

# Motor gasoline replaces diesel and alternative fuels in no diesel in EU scenario

New LDV sales  
percent market share

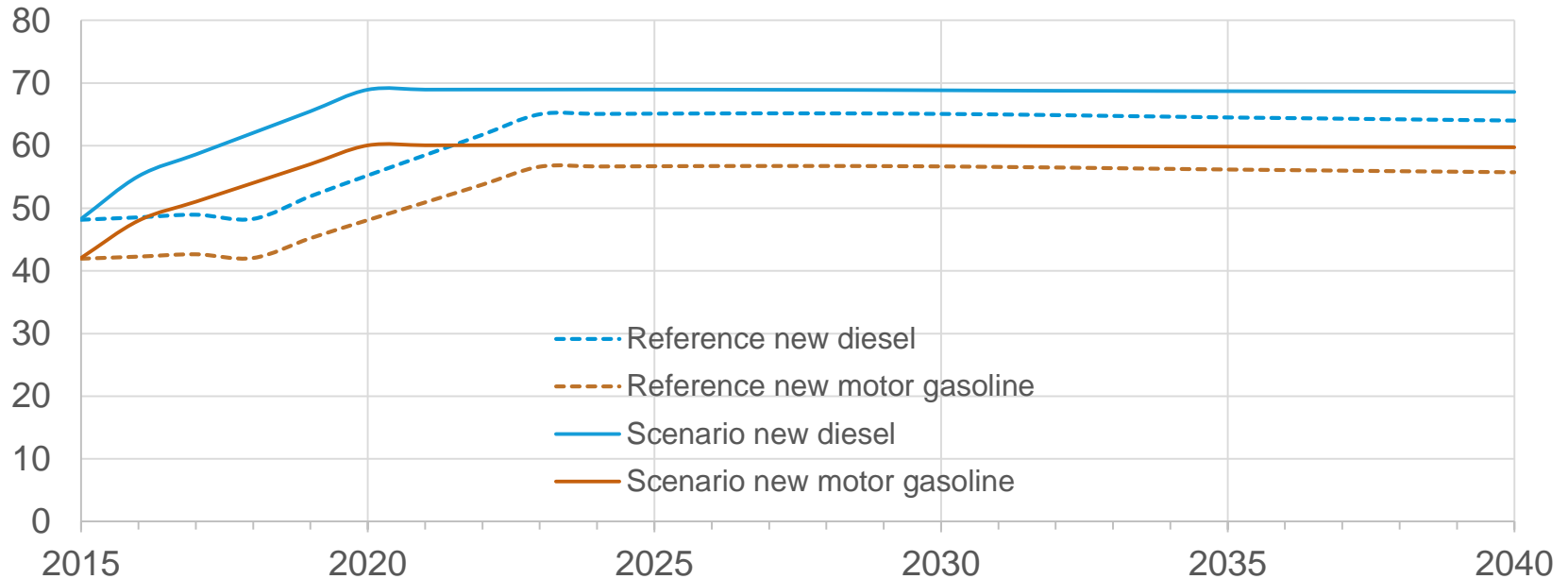


IEO2016 Reference case and no diesel in EU scenario

Discussion purpose only – Do not cite or circulate  
EIA Energy Conference  
Washington, DC July 2016

# Motor gasoline and diesel LDV become more efficient to meet CO2 standards if consumers no longer choose to purchase diesel vehicles

MPG gasoline equivalent

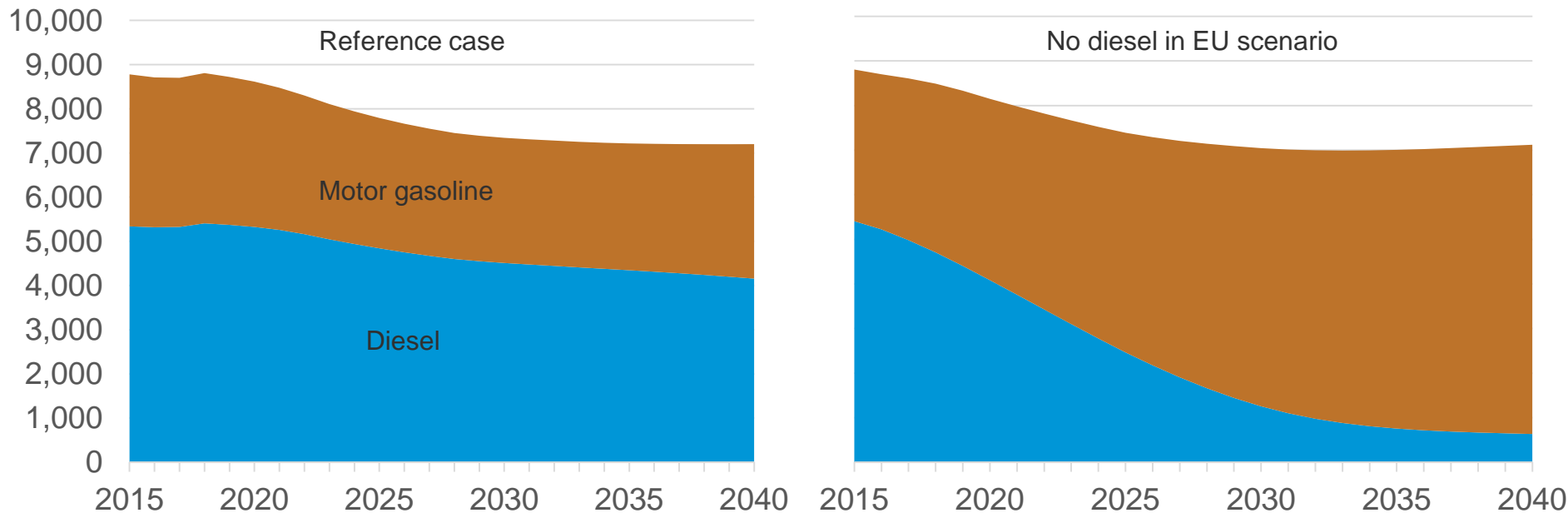


IEO2016 Reference case and no diesel in EU scenario

Discussion purpose only – Do not cite or circulate  
EIA Energy Conference  
Washington, DC July 2016

# Total combined diesel and motor gasoline LDV fuel consumption lower in no diesel in EU scenario than in Reference case in 2040

Transportation fuel consumption  
trillion Btu



IEO2016 Reference case and no diesel in EU scenario



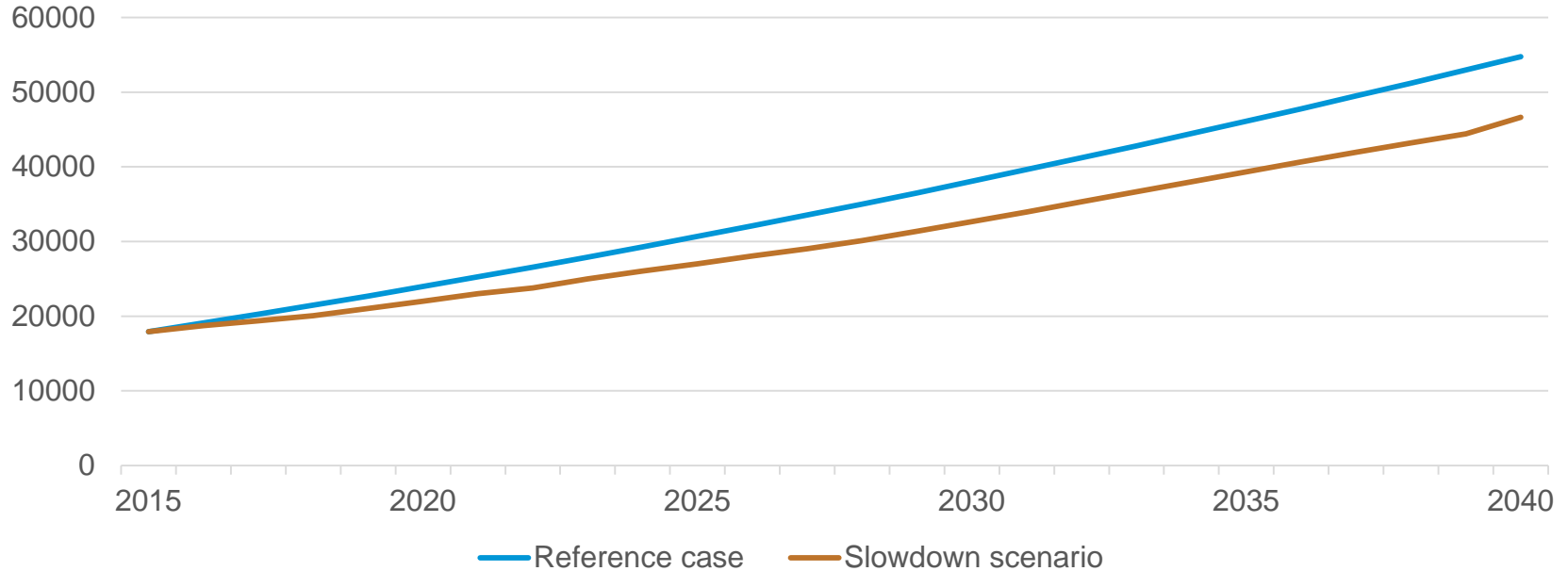


## China slowdown scenario

- New macro parameters used in the reference case
- GDP and industrial output growth slowed down in China slowdown scenario
- No additional changes made in the transportation model

# Chinese GDP 15% lower in 2040 in China slowdown scenario

GDP  
million

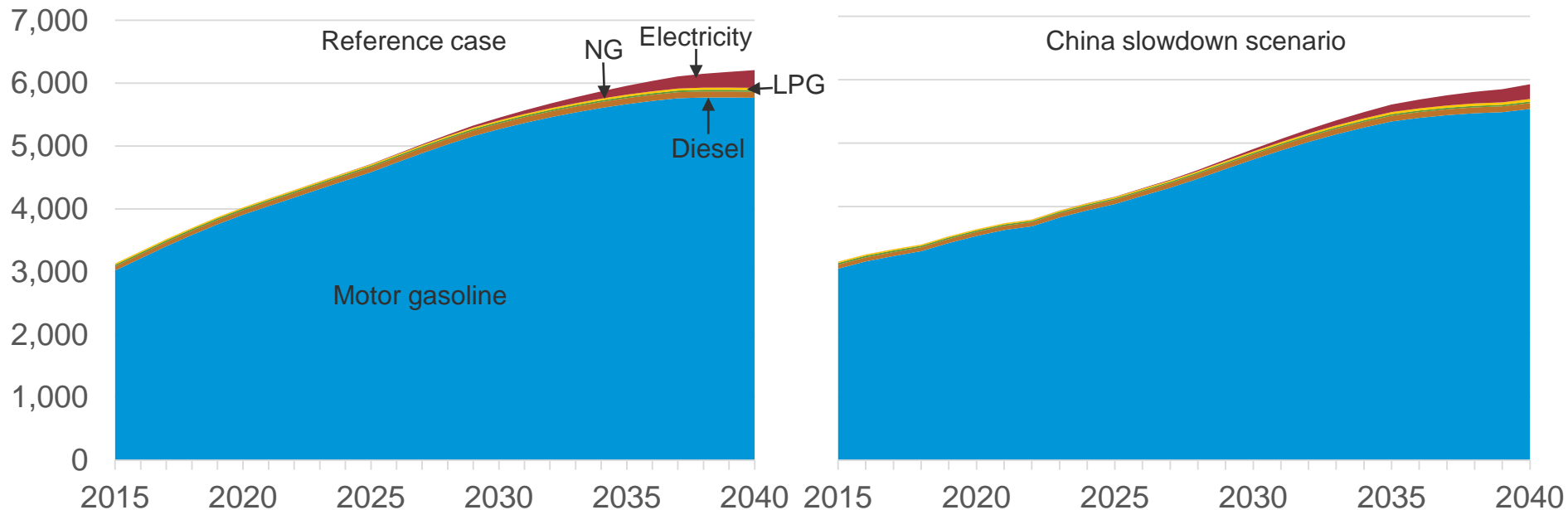


*New macro Reference case and China slowdown scenario*

*Discussion purpose only – Do not cite or circulate*  
EIA Energy Conference  
Washington, DC July 2016

# All LDV transportation fuels, except NG, decrease in China slowdown scenario

Transportation fuel consumption  
trillion Btu

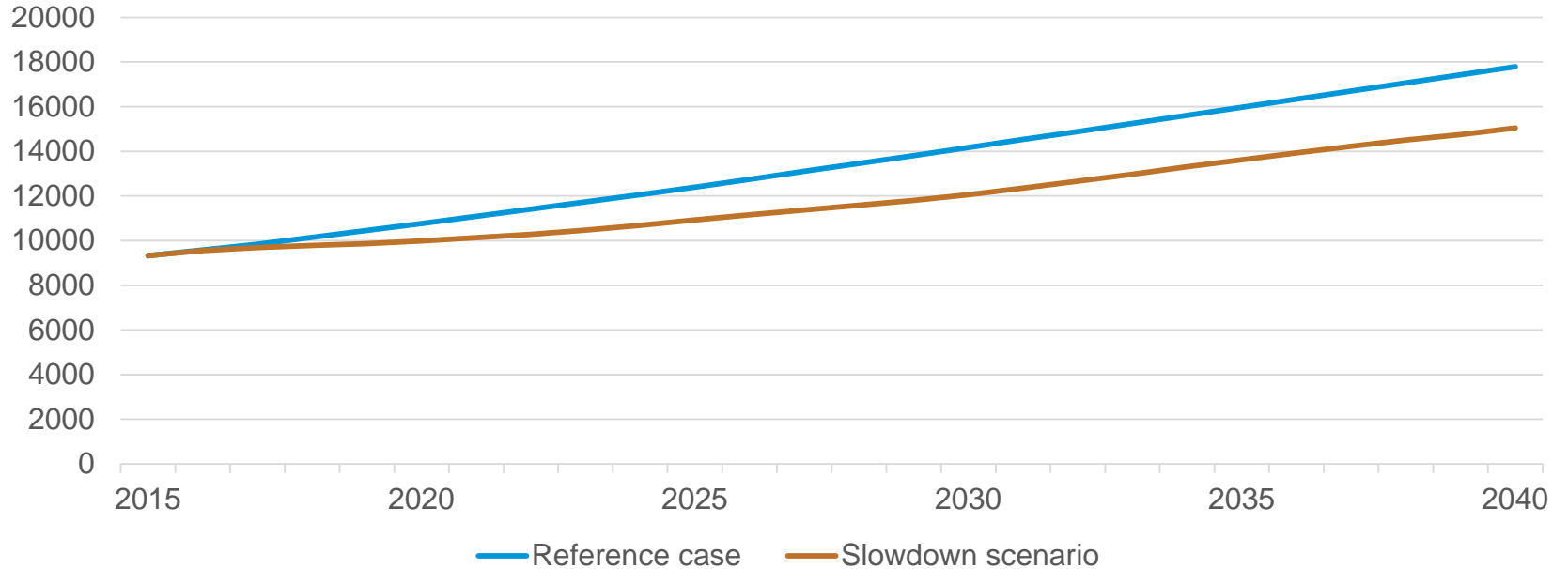


New macro Reference case and China slowdown scenario

Discussion purpose only – Do not cite or circulate  
EIA Energy Conference  
Washington, DC July 2016

# Chinese freight travel 15% lower in 2040 in China slowdown scenario

Freight travel demand  
billion ton-miles



*New macro Reference case and China slowdown scenario*

*Discussion purpose only – Do not cite or circulate*  
EIA Energy Conference  
Washington, DC July 2016

# Thank you

**John Maples**

| phone: 202-586-1757

| email: [john.maples@eia.gov](mailto:john.maples@eia.gov)

U.S. Energy Information Administration home page | [www.eia.gov](http://www.eia.gov)

International Energy Outlook | [www.eia.gov/forecasts/ieo](http://www.eia.gov/forecasts/ieo)