International Energy Outlook 2010

With Projections to 2035

Energy Security

Gulf Research Center Foundation

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Manama

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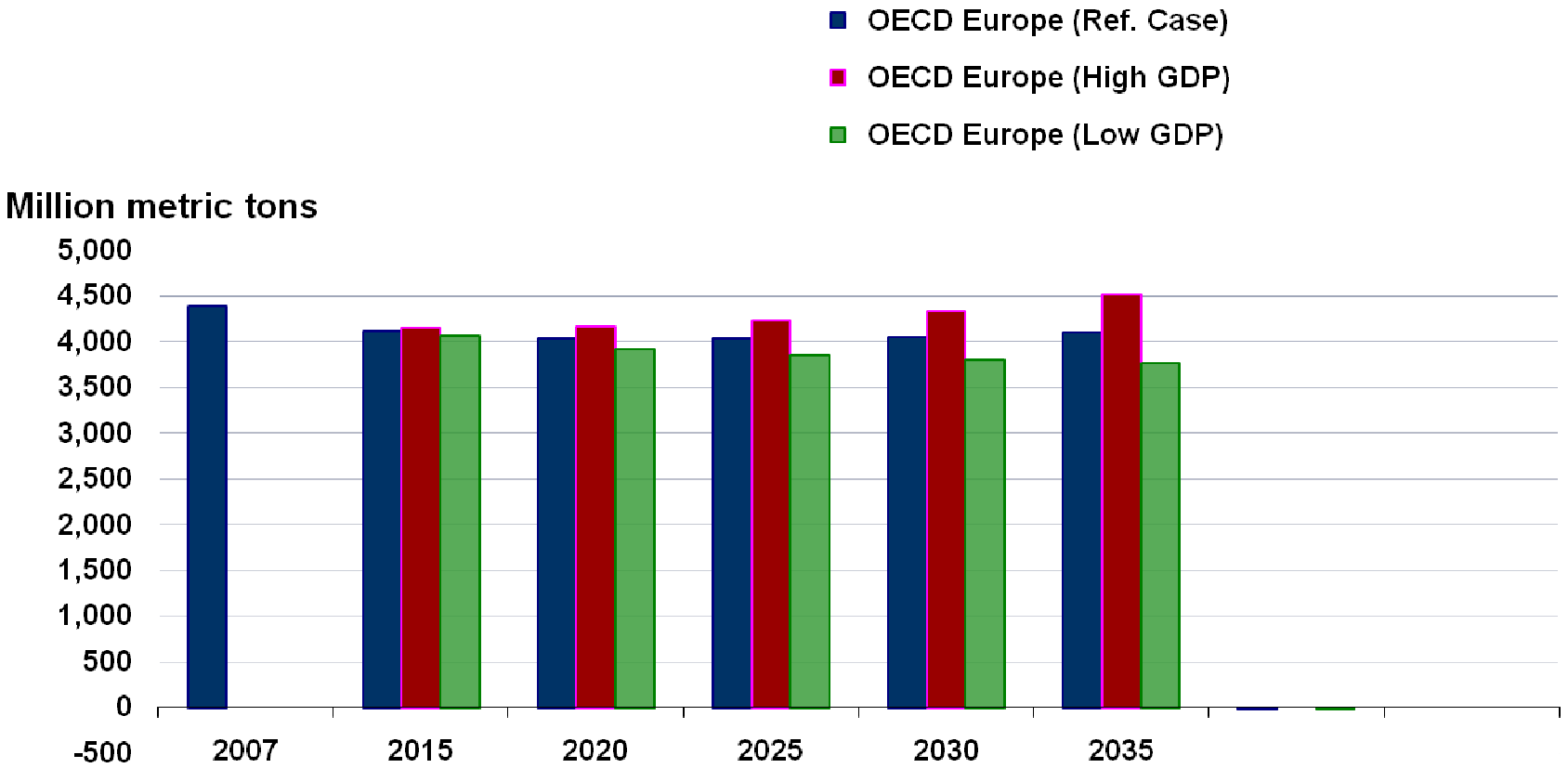
U.S. Energy Information Administration

Independent Statistics and Analysis

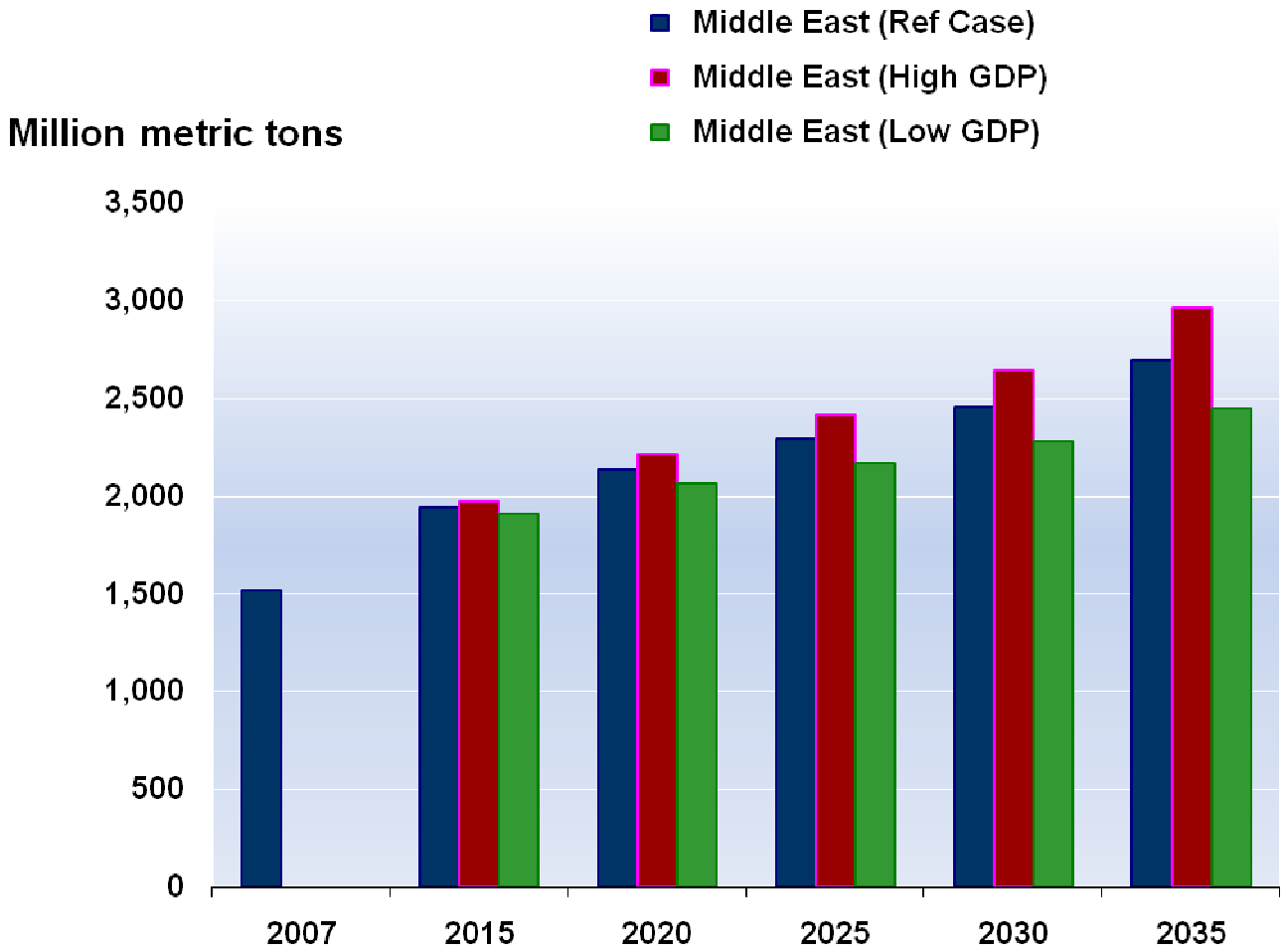
Gulf Research Center, US Department of Energy and Energy Information Administration

Europe carbon dioxide emissions under three GDP growth rate cases



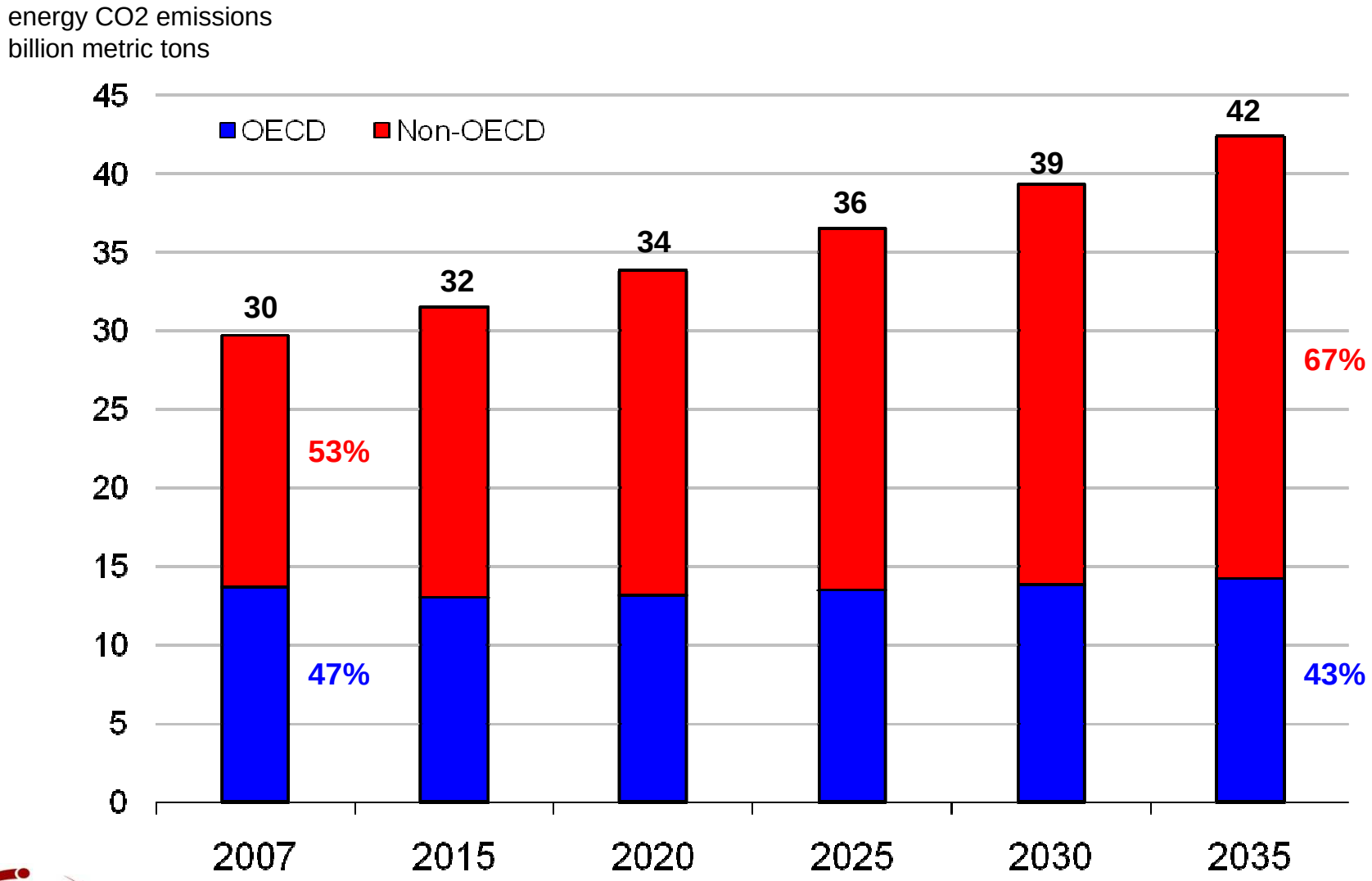
Source: EIA, *International Energy Outlook 2010*

Middle East carbon dioxide emissions under three GDP growth rate cases



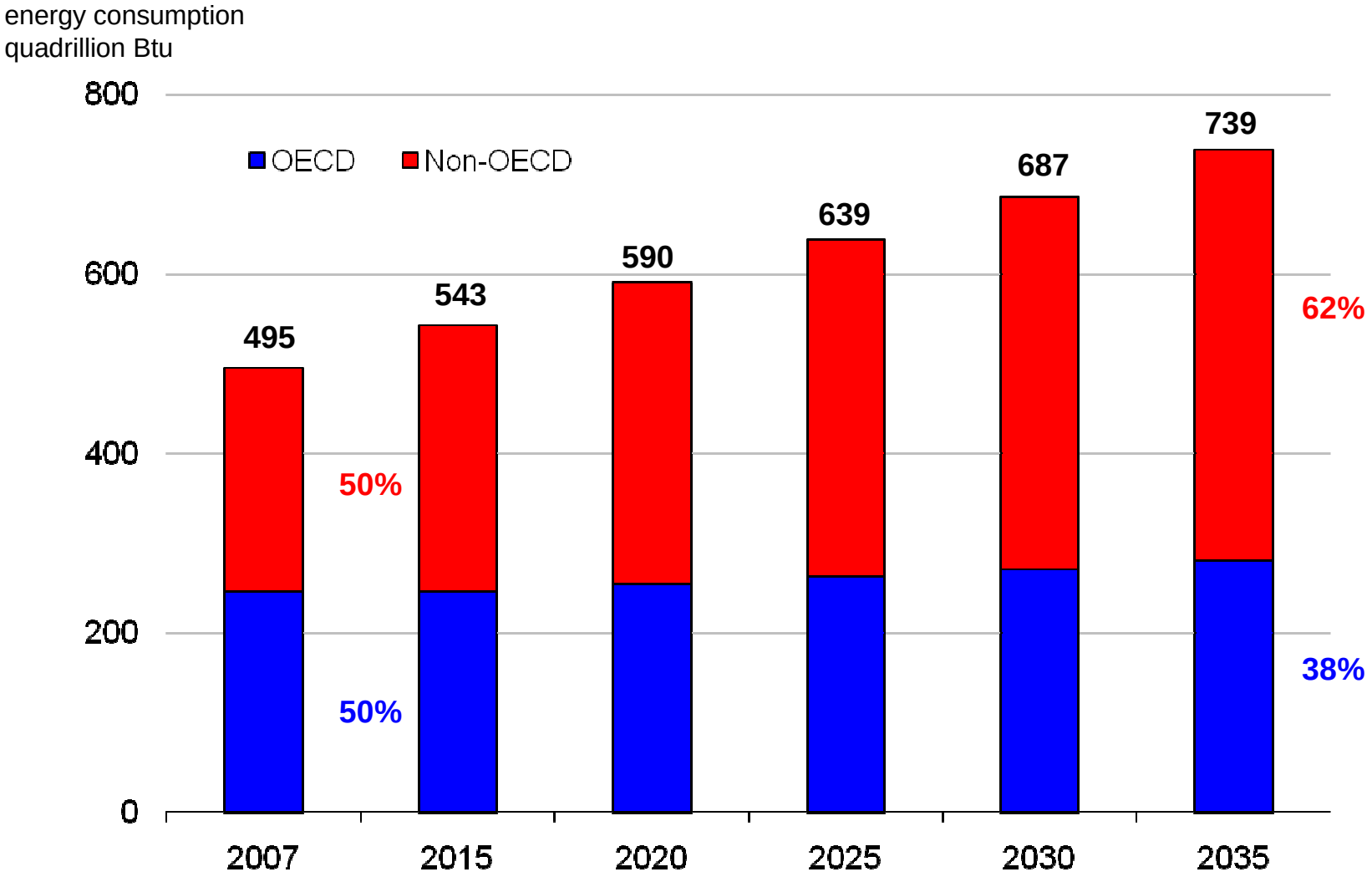
Source: EIA, *International Energy Outlook 2010*

Assuming no policy changes, energy-related carbon dioxide emissions grow 43% from 2007 to 2035



Source: EIA, *International Energy Outlook 2010*

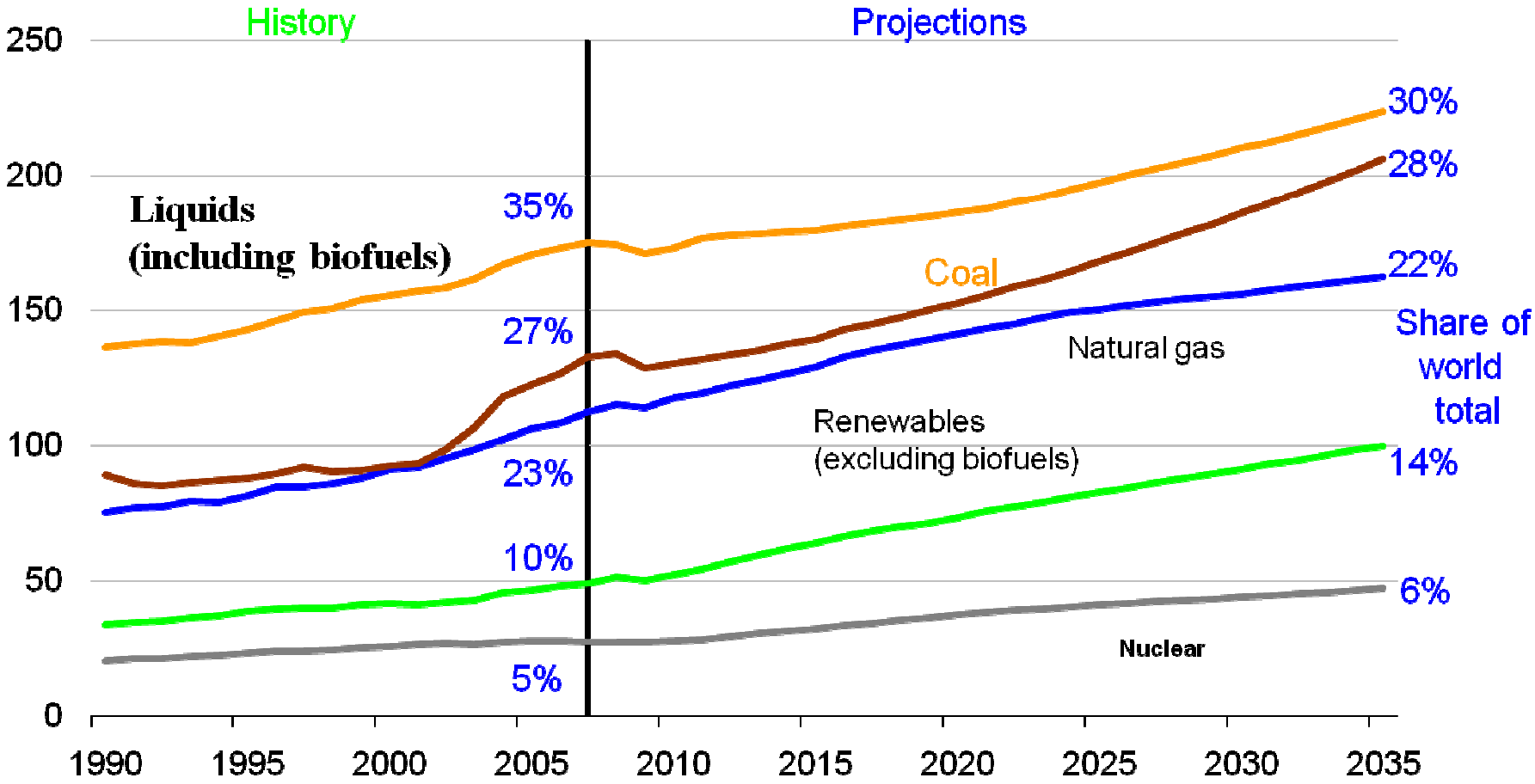
Non-OECD countries account for 86% of the increase in global energy use



Source: EIA, *International Energy Outlook 2010*

Renewables are the fastest growing energy source (but from a relatively small base)

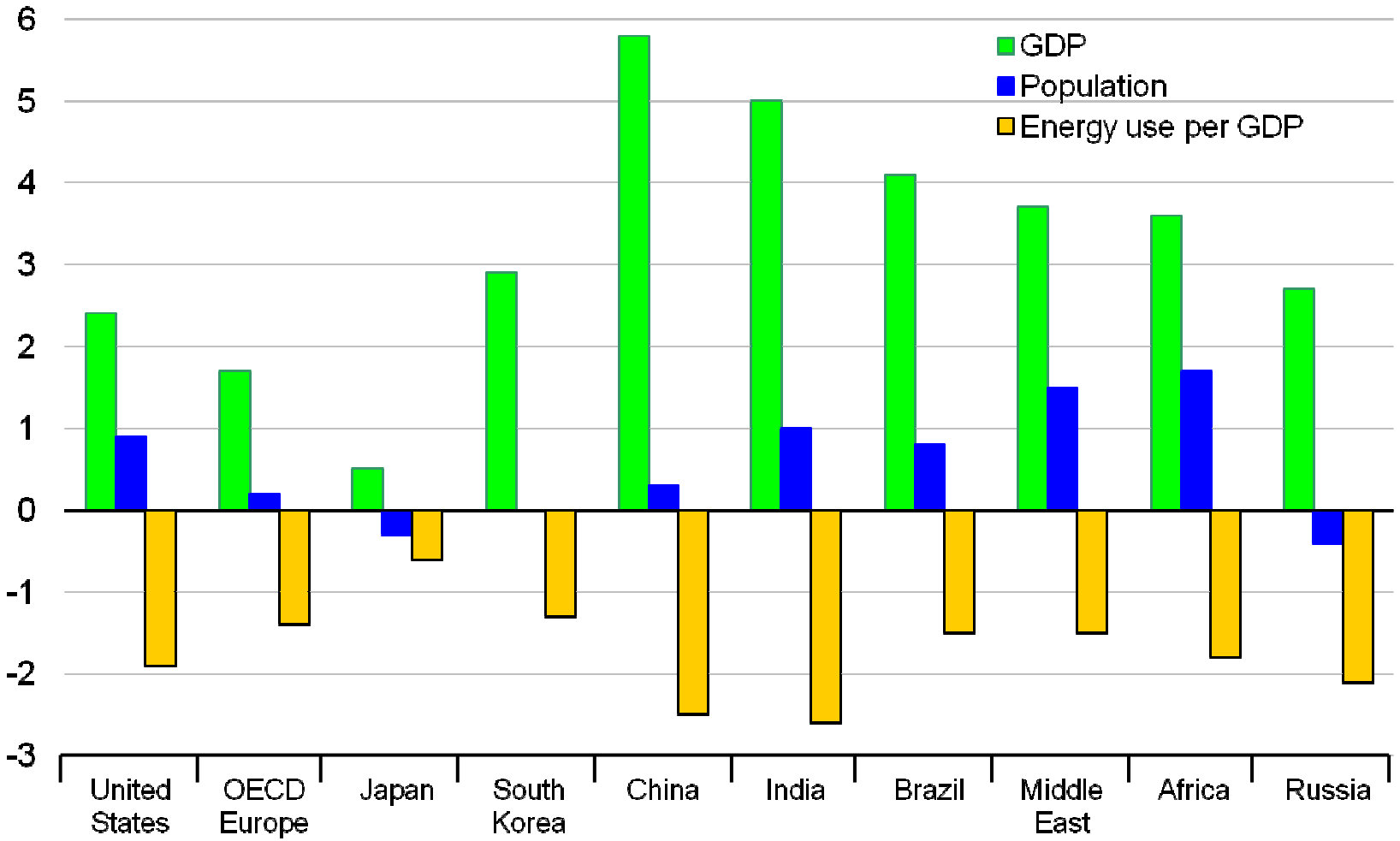
World primary energy consumption
quadrillion Btu



Source: *International Energy Outlook 2010*

Economic activity and population drive increases in energy use; energy intensity improvements moderate this trend

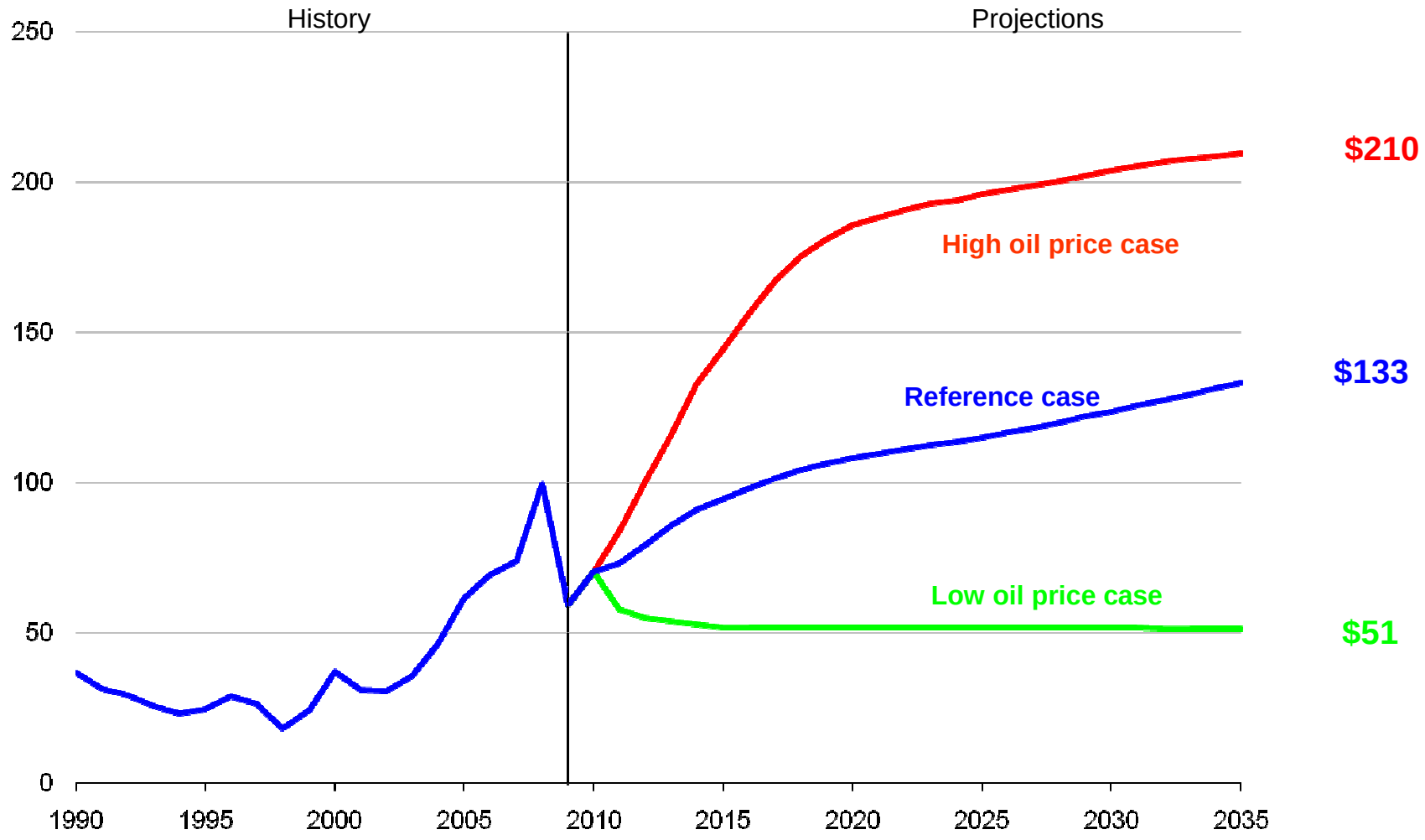
Average annual change (2007-2035)
percent per year



Source: EIA, *International Energy Outlook 2010*

The IEO reflects uncertainty in oil prices through a wide set of price cases

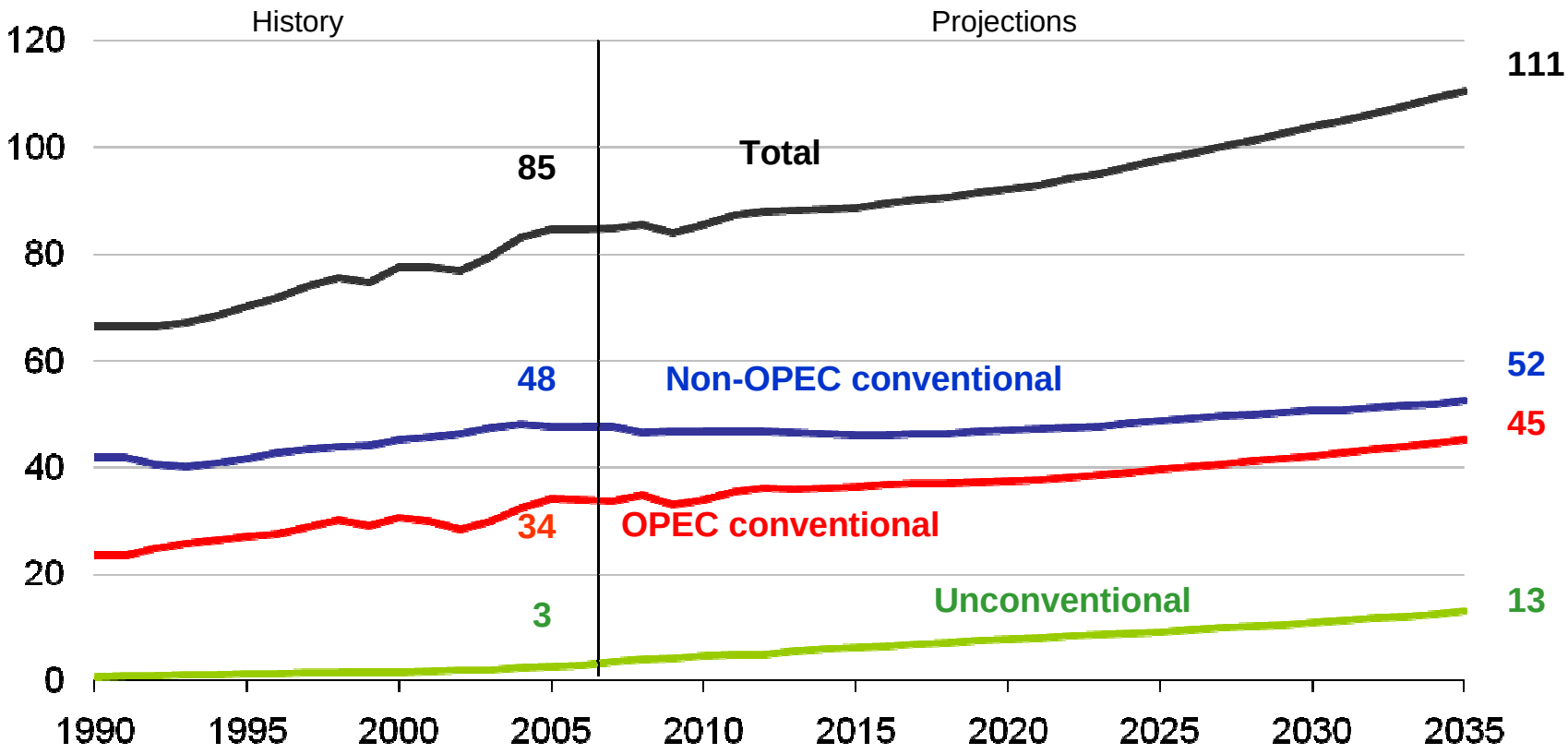
light, sweet crude oil price
2008 dollars per barrel



Source: EIA, *International Energy Outlook 2010*

OPEC producers maintain an approximate 40% share of total liquids production in the Reference case

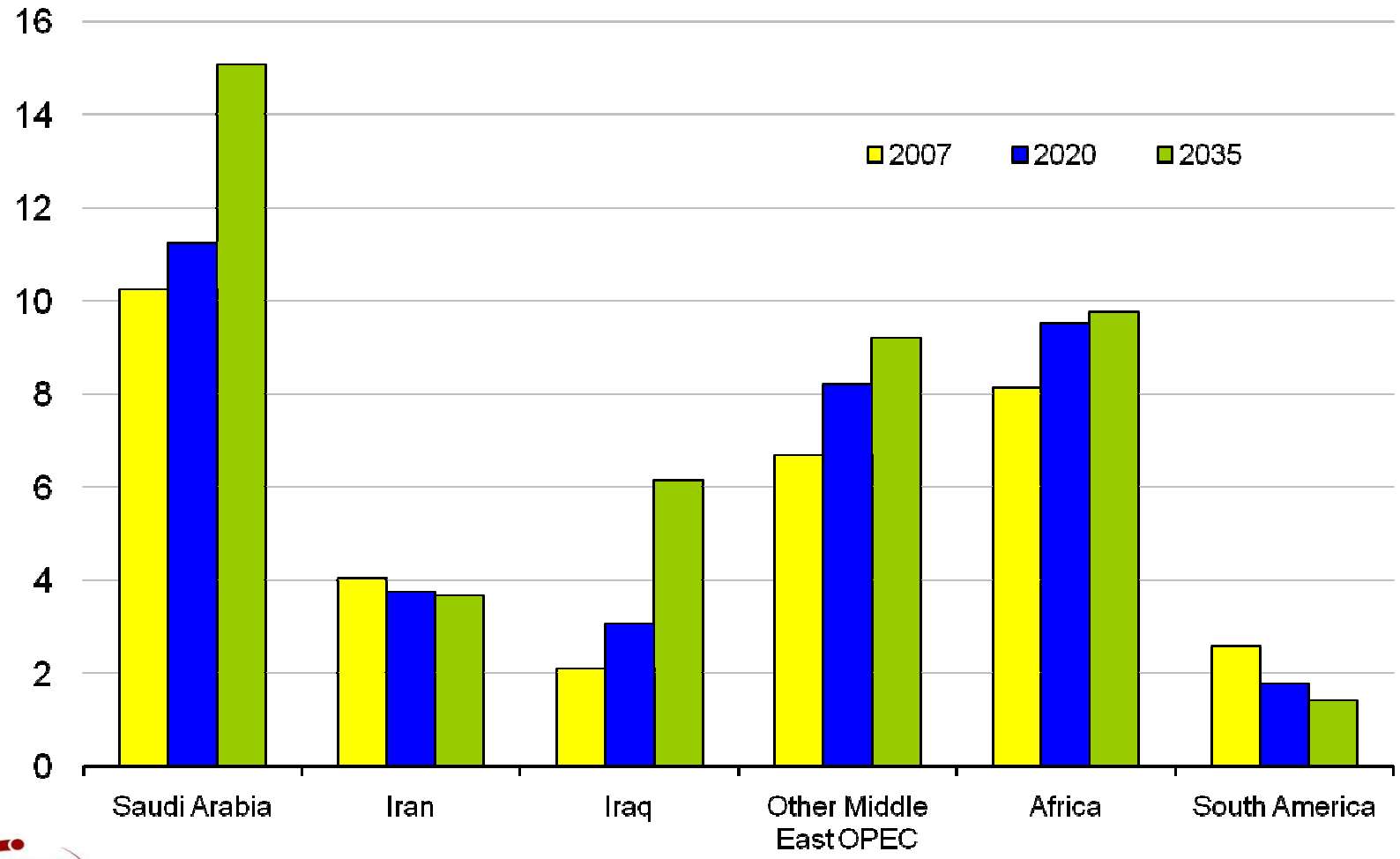
liquids production
million barrels per day



Source: EIA, *International Energy Outlook 2010*

Growth in OPEC production of conventional liquids comes primarily from Saudi Arabia and Iraq

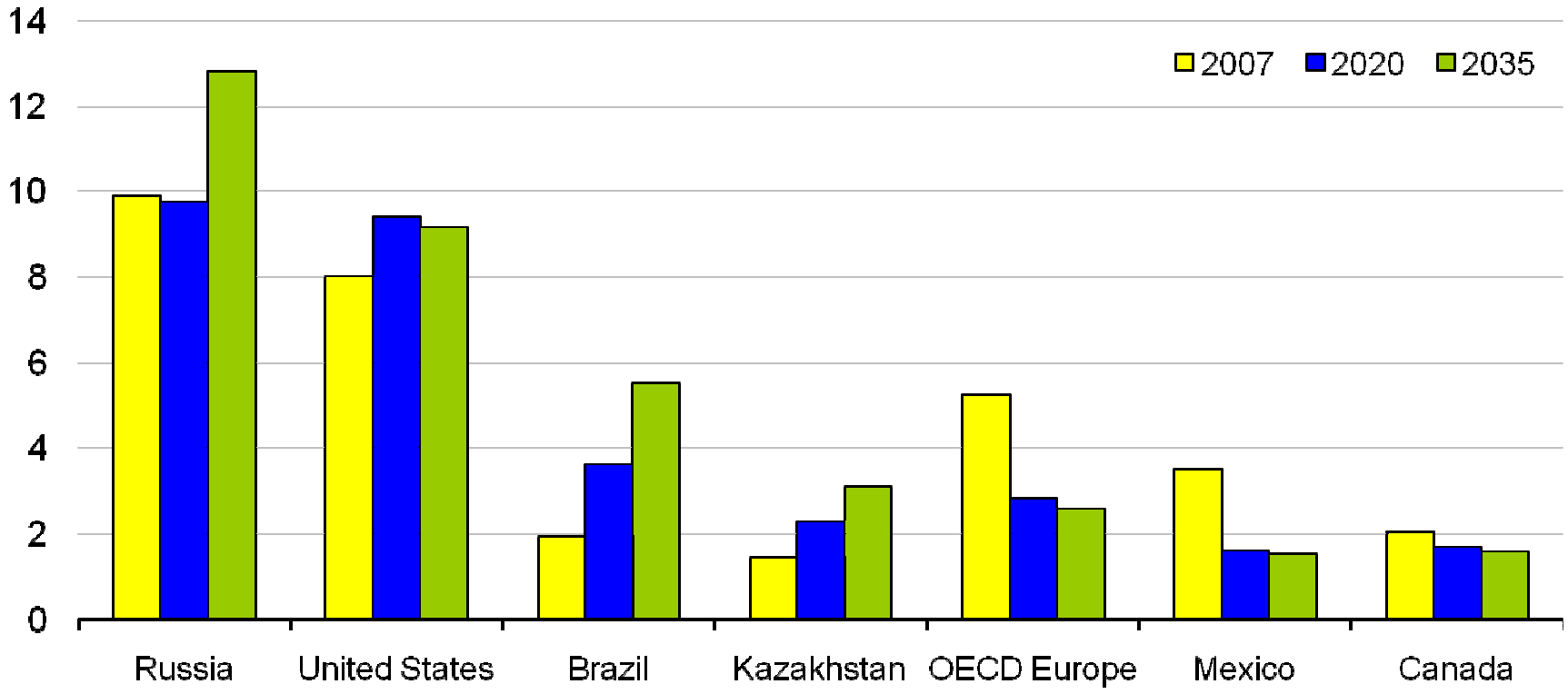
OPEC conventional liquids production
million barrels per day



Source: EIA, *International Energy Outlook 2010*

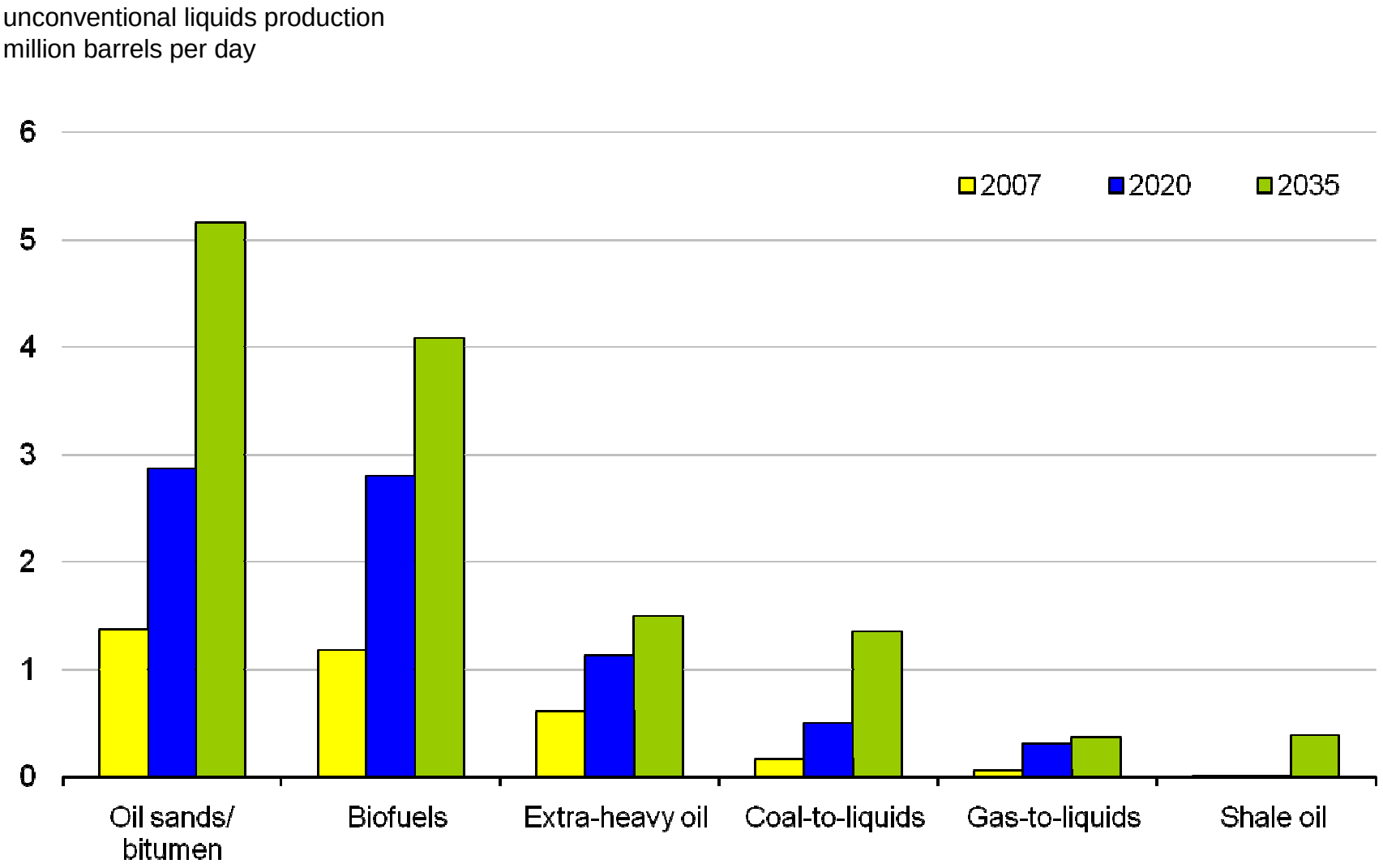
Brazil, Russia, Kazakhstan, and U.S. lead increases in non-OPEC conventional supplies

non-OPEC conventional liquids production
million barrels per day



Source: EIA, *International Energy Outlook 2010*

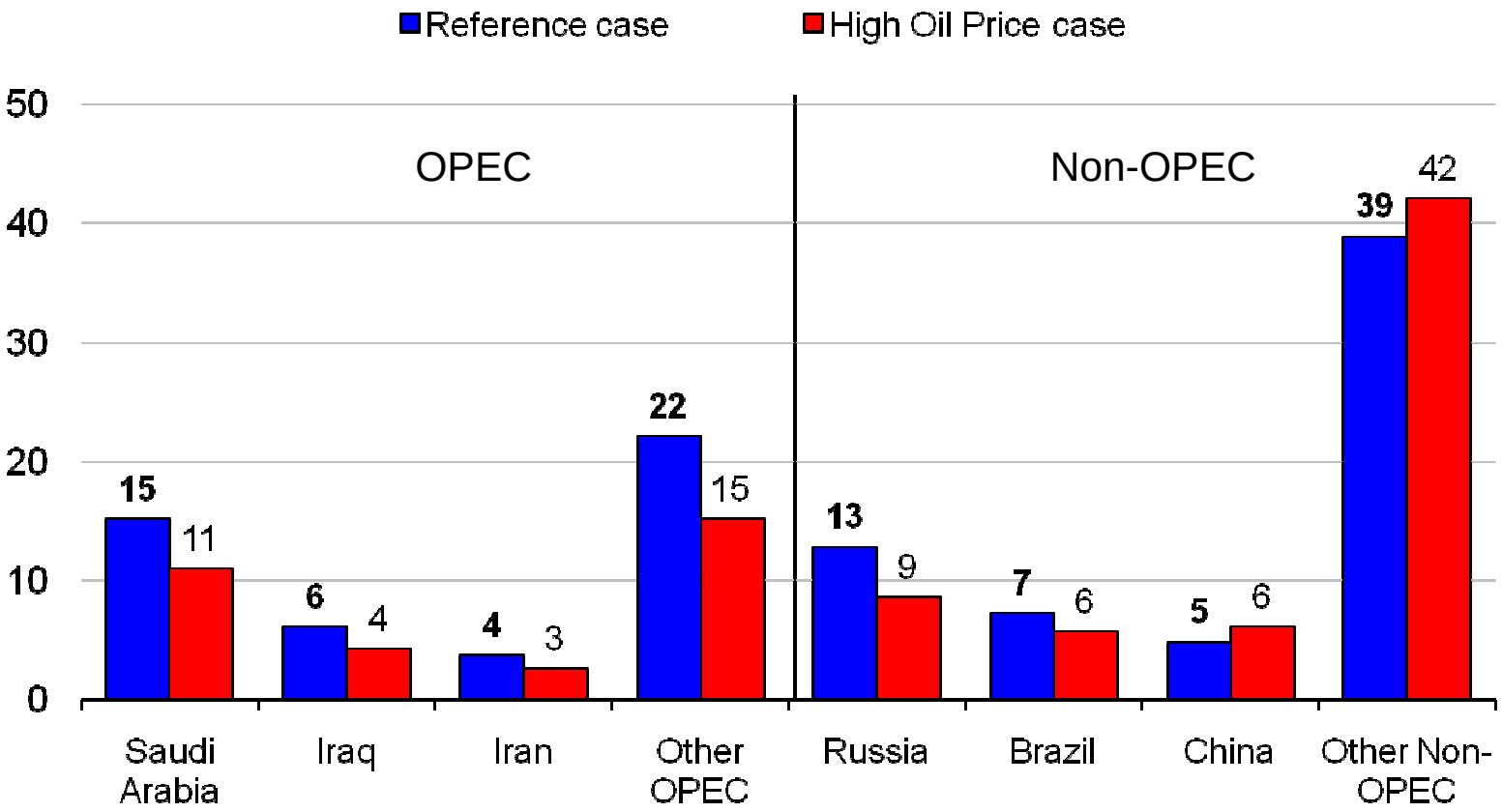
Canadian oil sands and biofuels account for 70% of the increase in total unconventional liquids



Source: EIA, *International Energy Outlook 2010*

The high oil price case assumes much lower production from key oil exporters

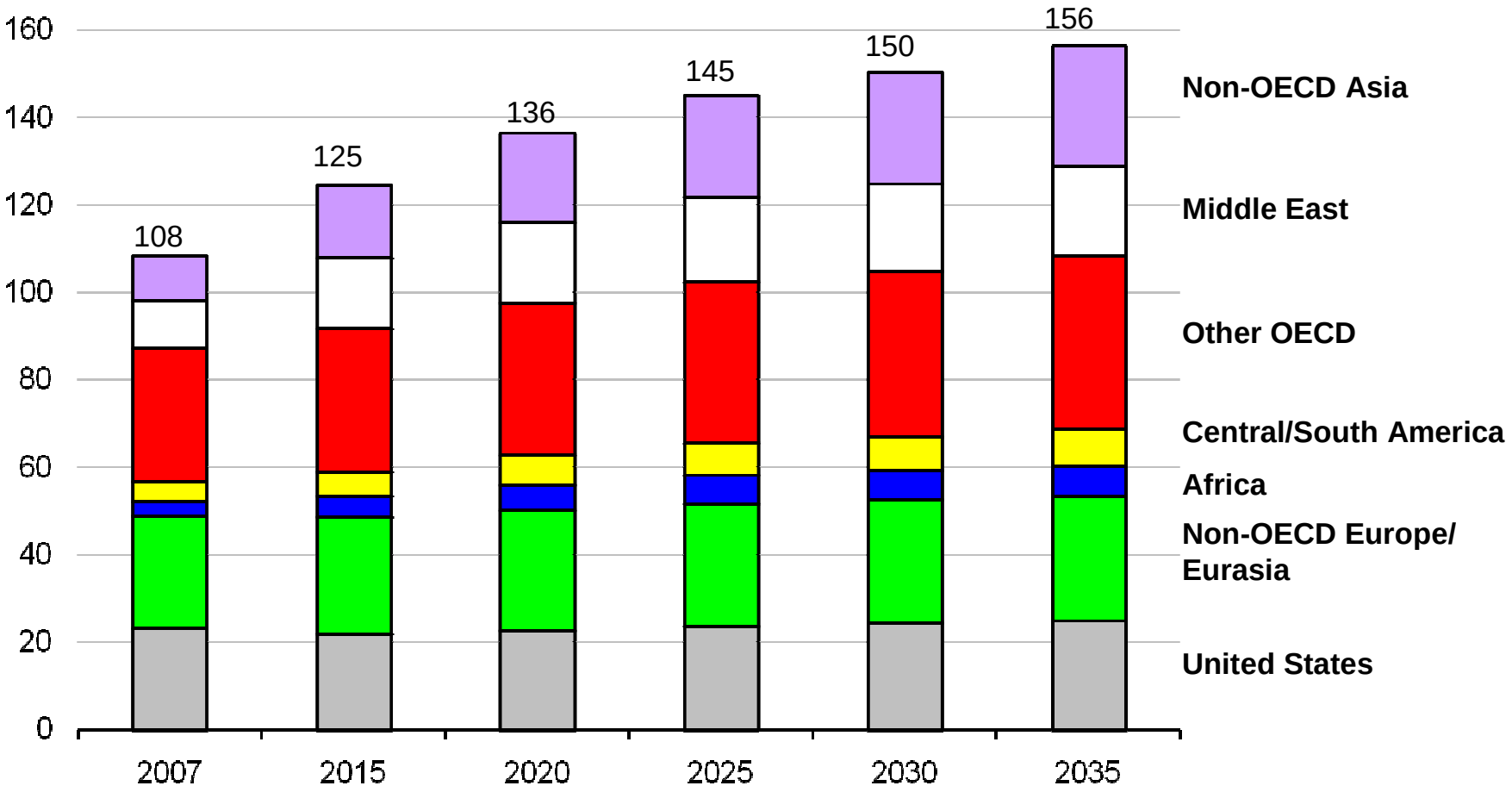
liquids production in 2035
million barrels per day



Source: EIA, *International Energy Outlook 2010*

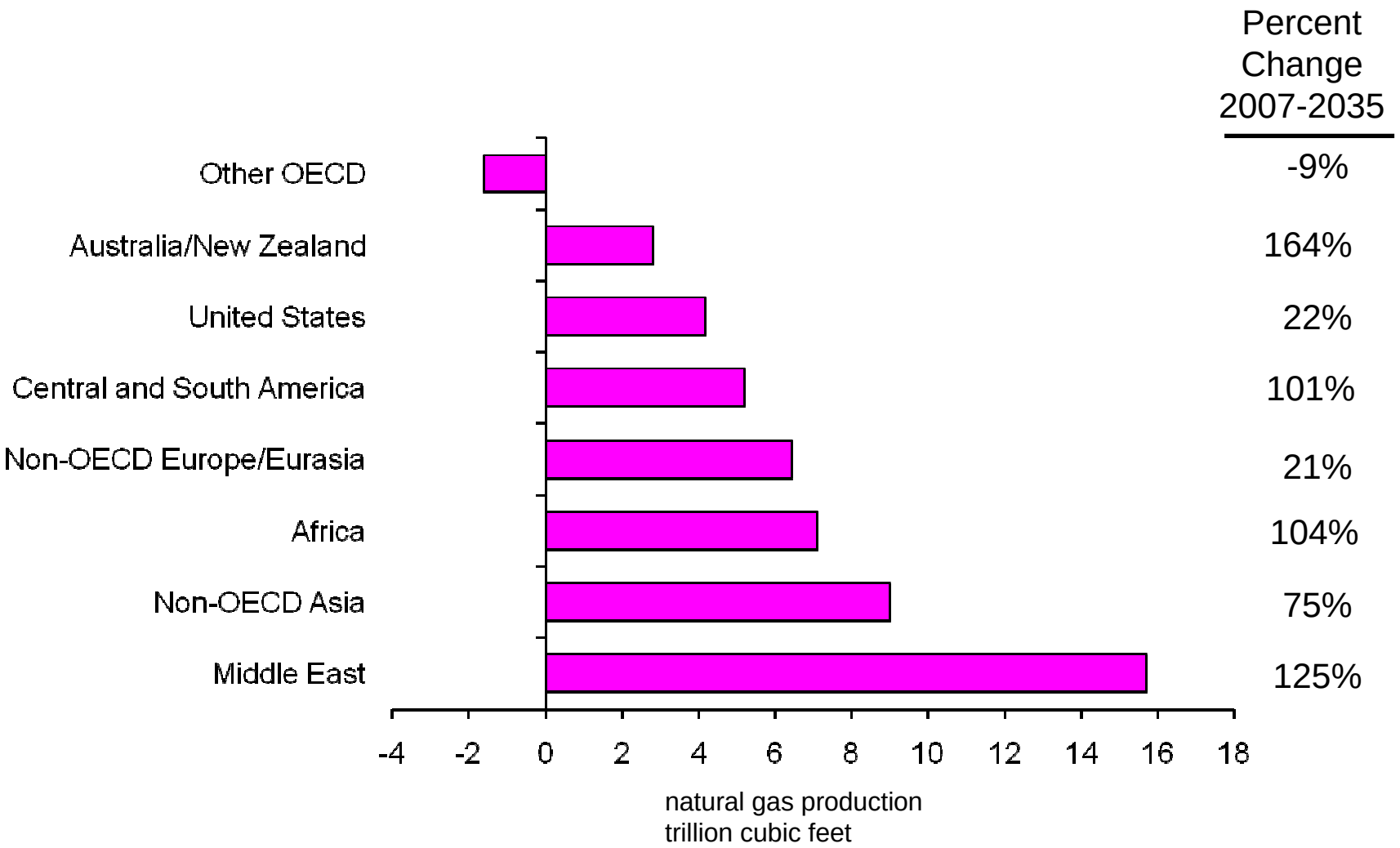
Non-OECD Asia accounts for 35% of increased natural gas use

natural gas consumption
trillion cubic feet



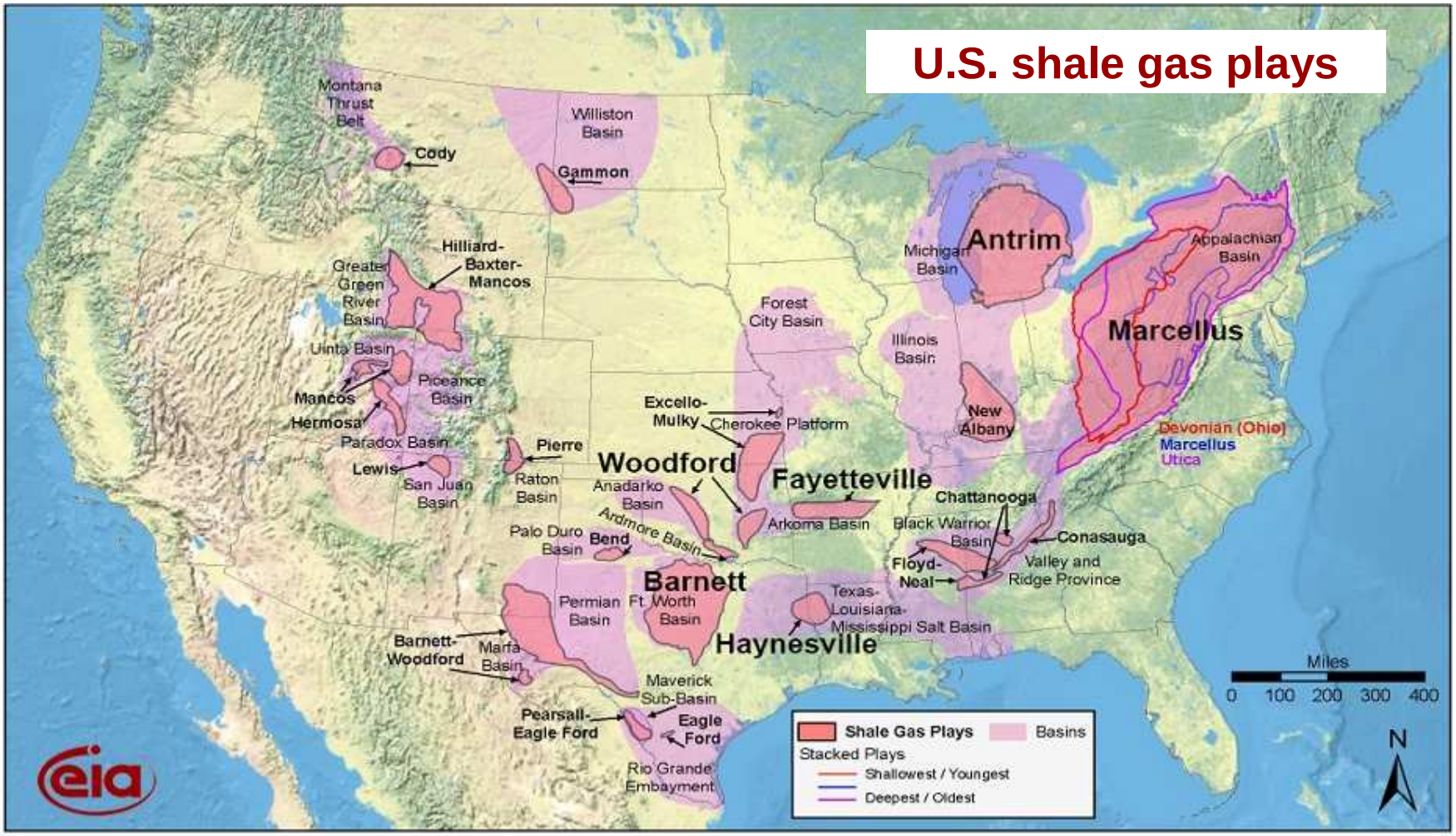
Source: EIA, *International Energy Outlook 2010*

The Middle East accounts for almost one-third the increase in global gas production



Source: EIA, *International Energy Outlook 2010*

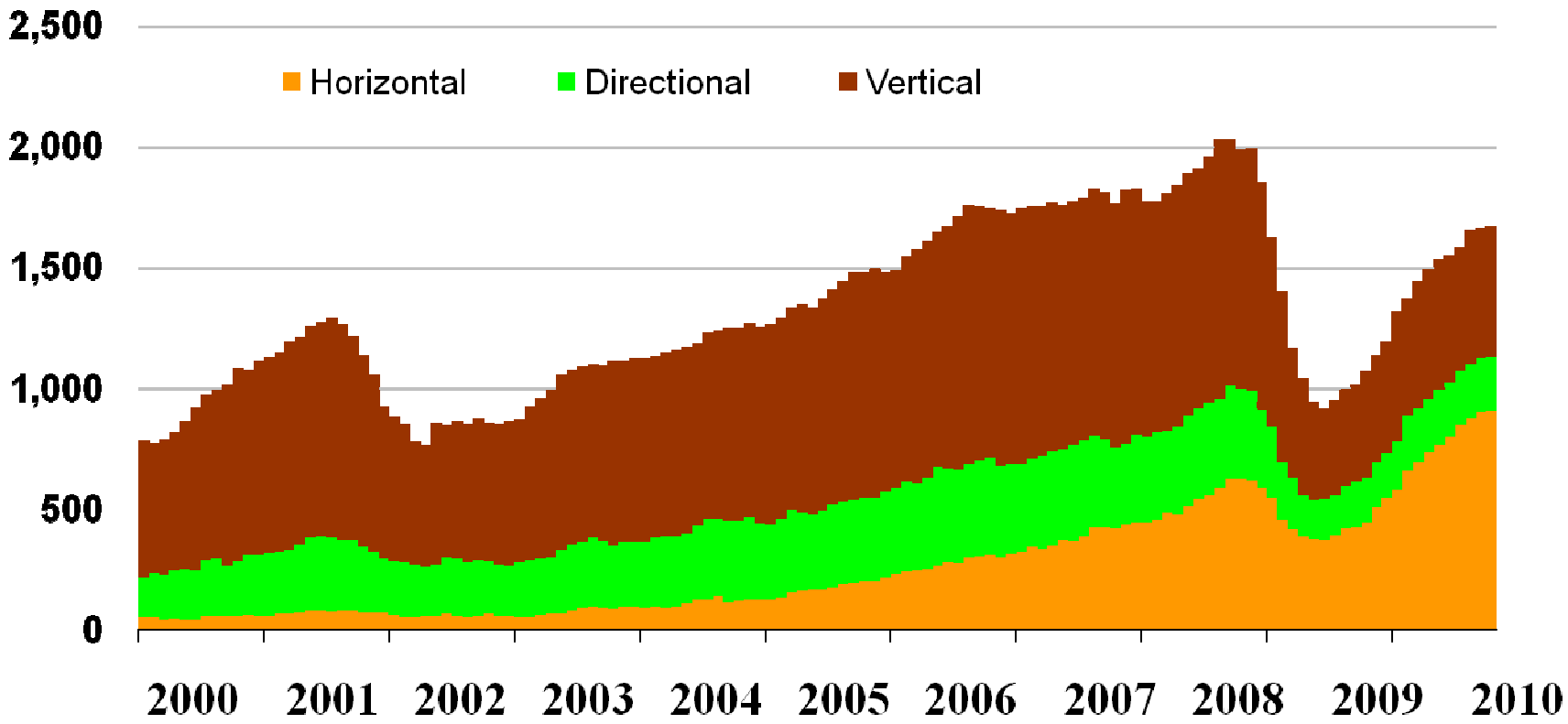
Success in the Barnett prompted companies to look at other shale formations in the U.S.



Source: Energy Information Administration based on data from various published studies
Updated: May 28, 2009

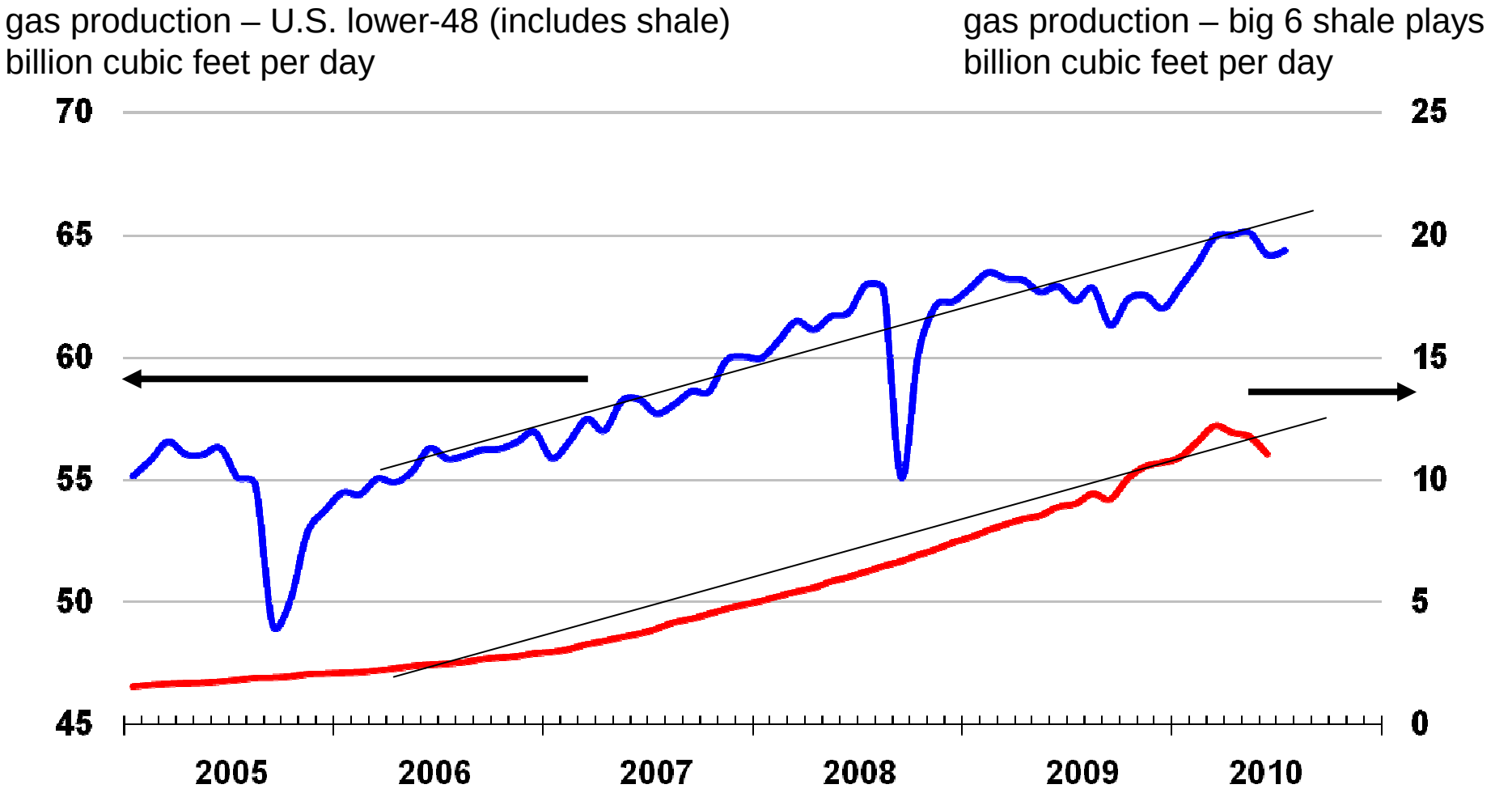
Fifty-five percent of active rotary rigs are now drilling horizontal wellbores

active drilling rigs



Source: Baker Hughes Oct 22, 2010

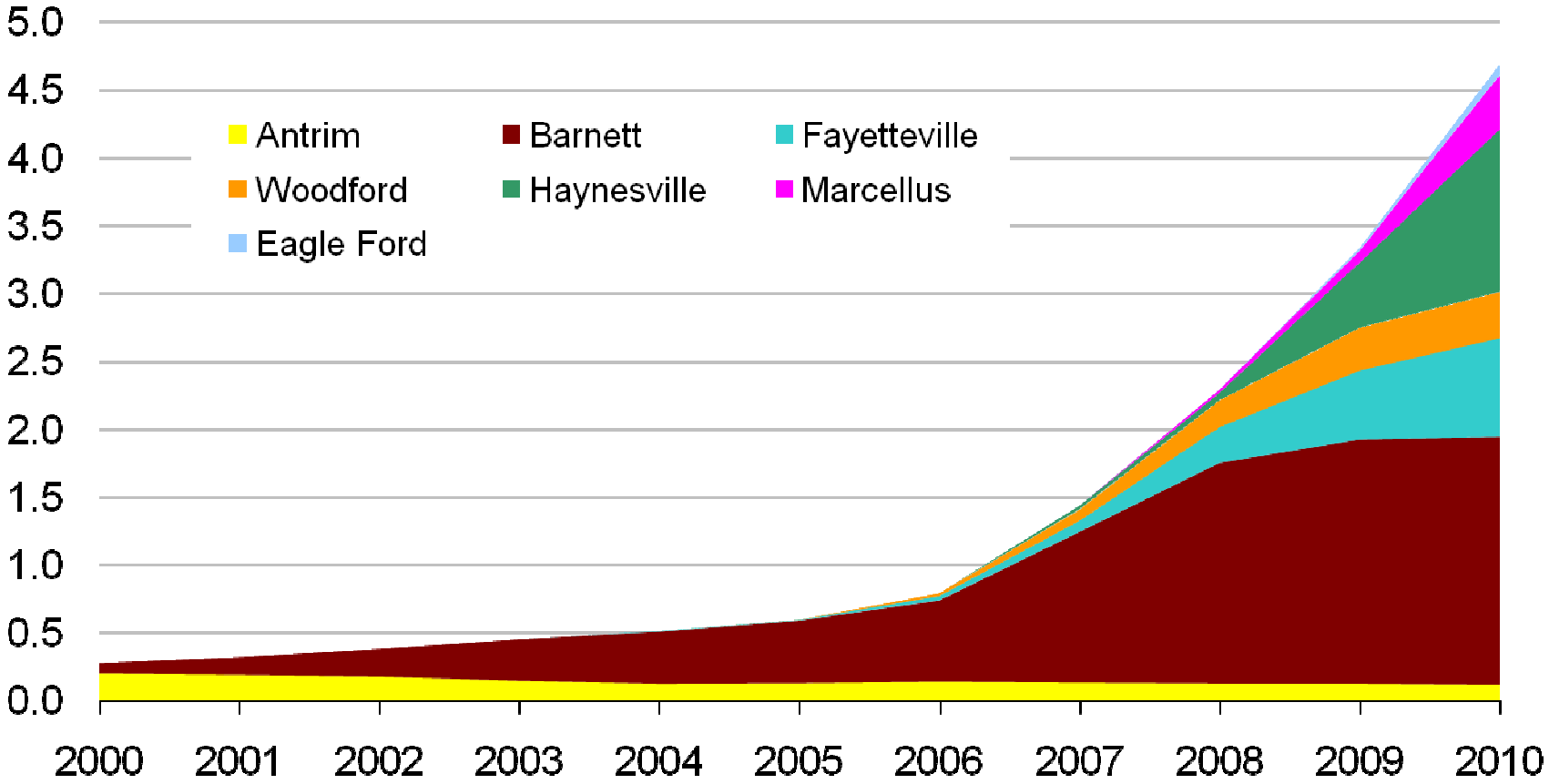
Since 2006 the 6 largest shale gas plays have provided essentially all gross gas production increases in U.S. lower-48



Source: Lower 48 from EIA. Big 6 Shales from HPDI.

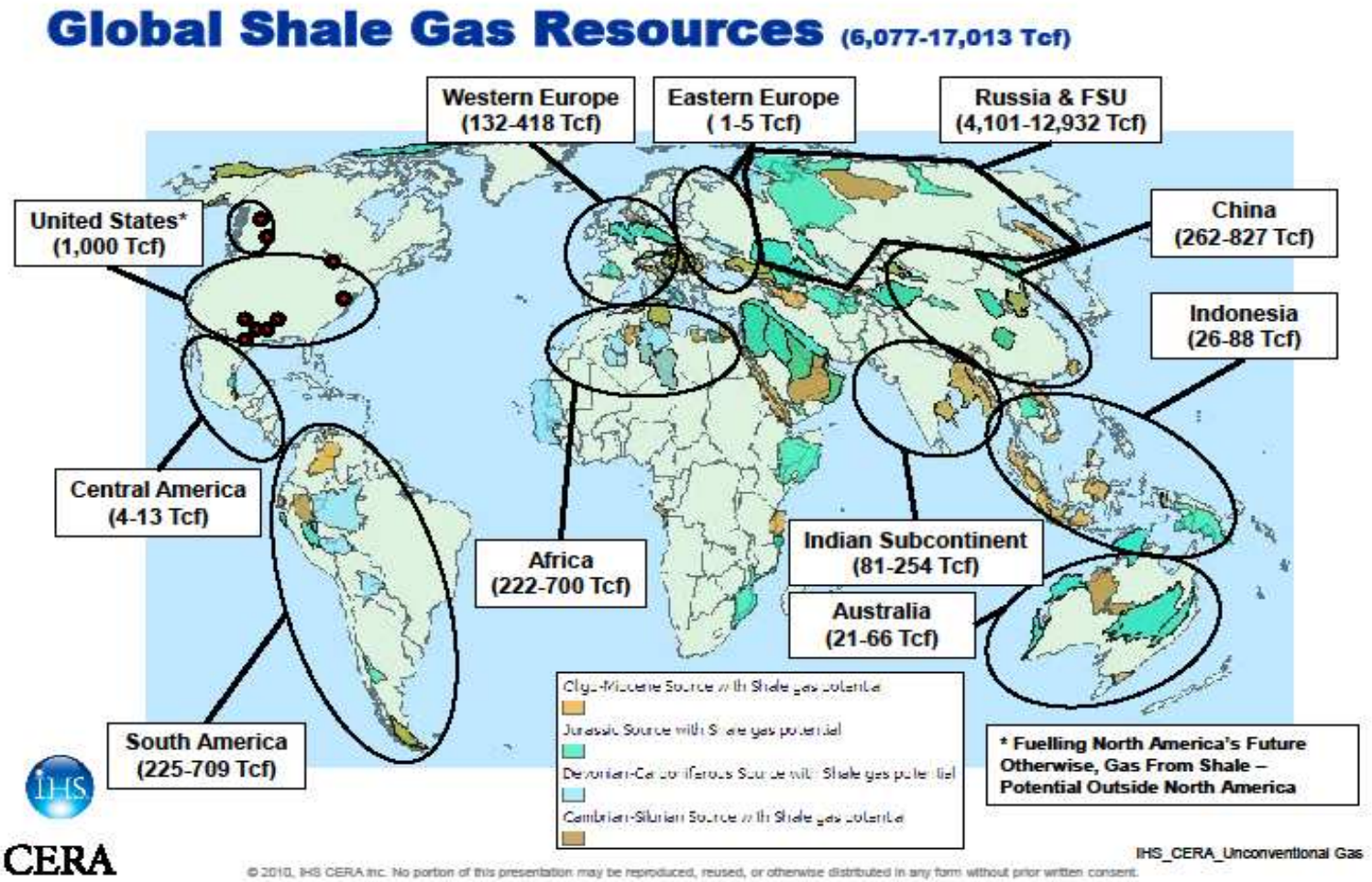
U.S. shale gas production has increased 14-fold in 10 years

annual shale gas production
trillion cubic feet



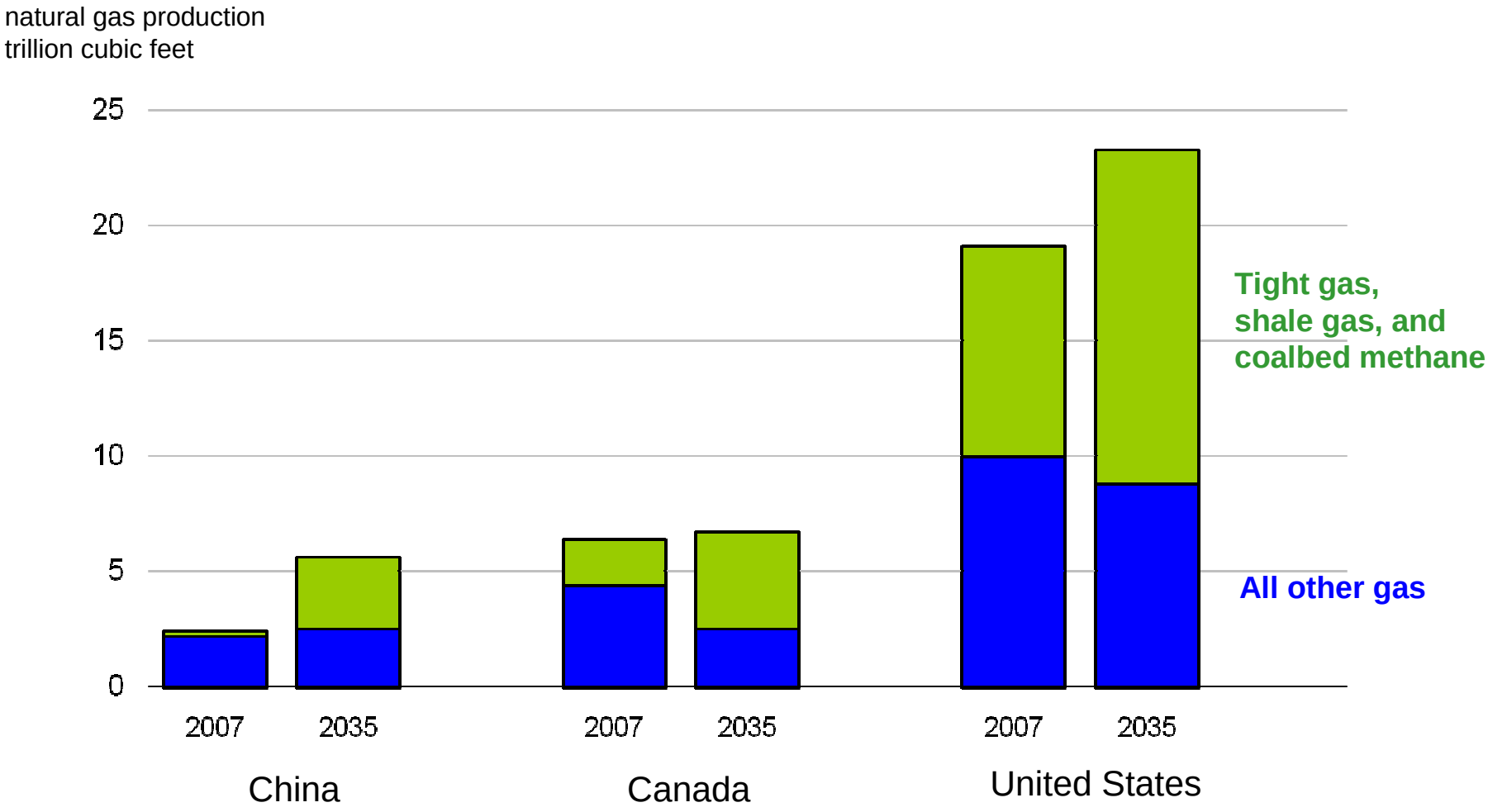
Source: EIA, Lippman Consulting (2010 estimated)

EIA is currently conducting a major study on global shale gas resources and activities



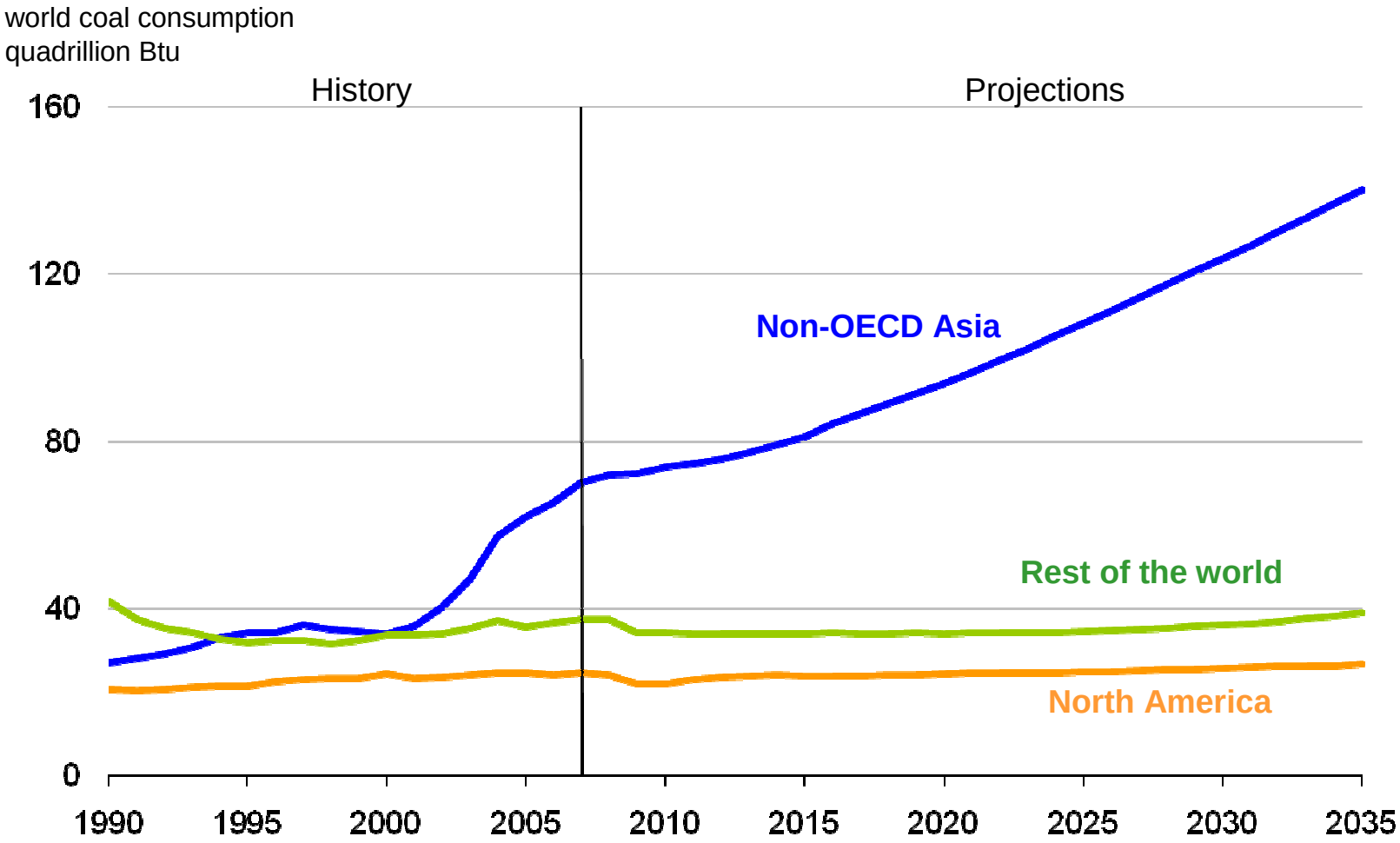
Source: IHS CERA Inc. The use of this content was authorized in advance by IHS CERA.

Tight gas, shale gas, and coalbed methane drive supply growth in China, Canada, and the U.S



Source: EIA, *International Energy Outlook 2010*

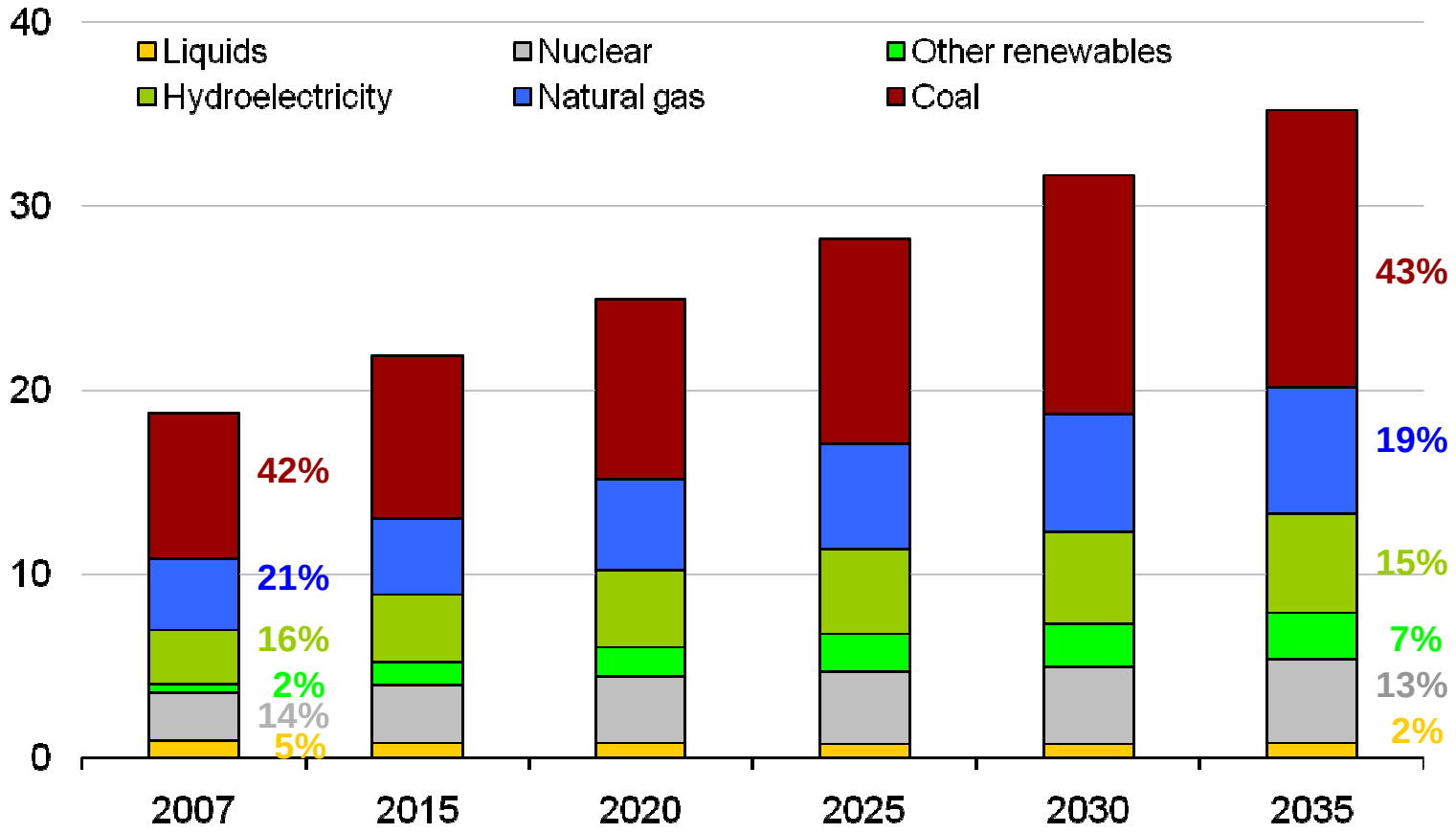
Virtually all growth in global coal use occurs in non-OECD Asian nations, especially China and India



Source: EIA, *International Energy Outlook 2010*

Renewables are fastest growing, but coal still fuels the largest share of the world's electricity in 2035

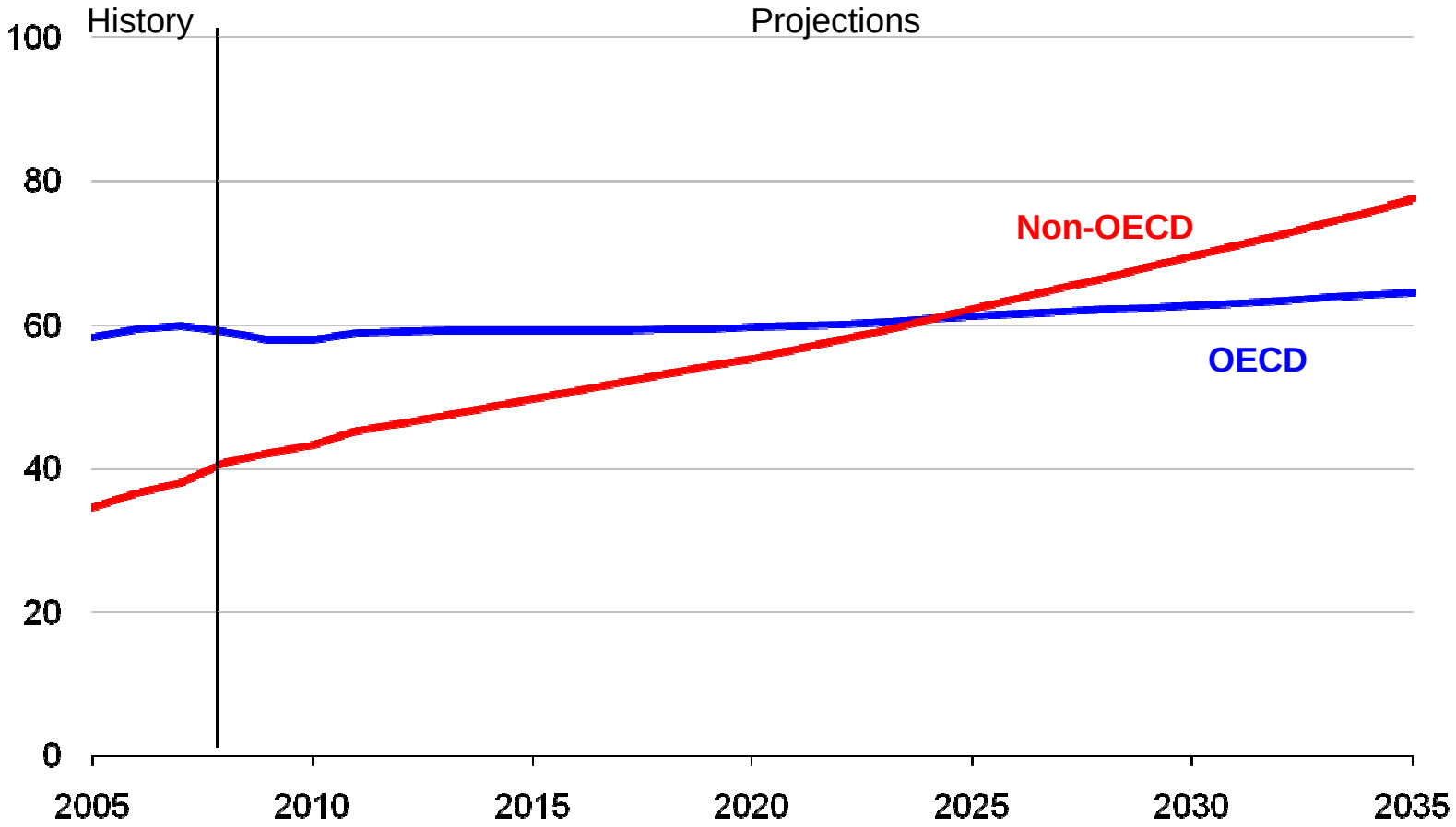
world electricity generation
trillion kilowatthours



Source: EIA, *International Energy Outlook 2010*

Non-OECD transportation fuel use surpasses almost flat OECD fuel use by 2025

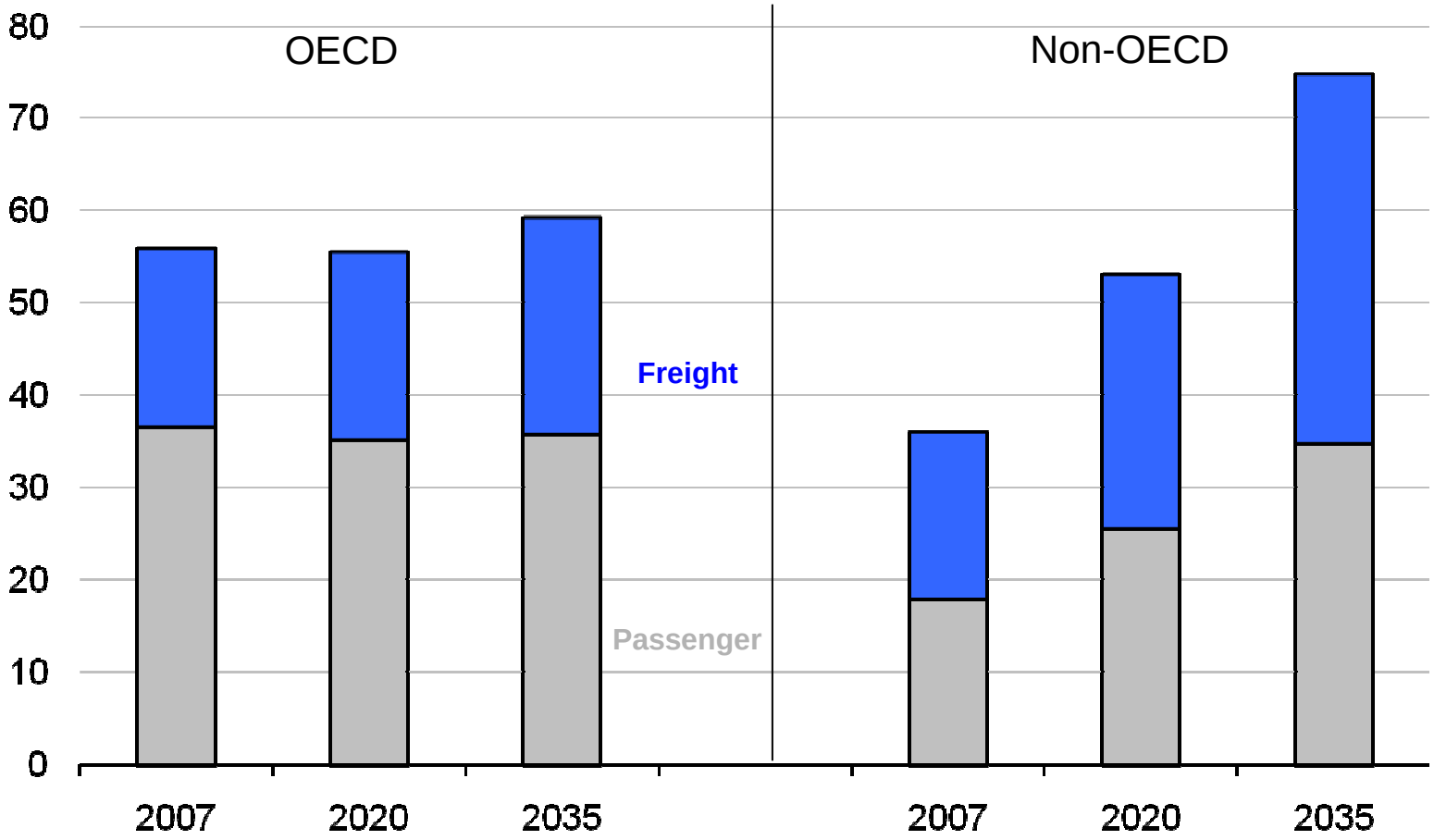
transportation sector energy consumption
quadrillion Btu



Source: EIA, *International Energy Outlook 2010*

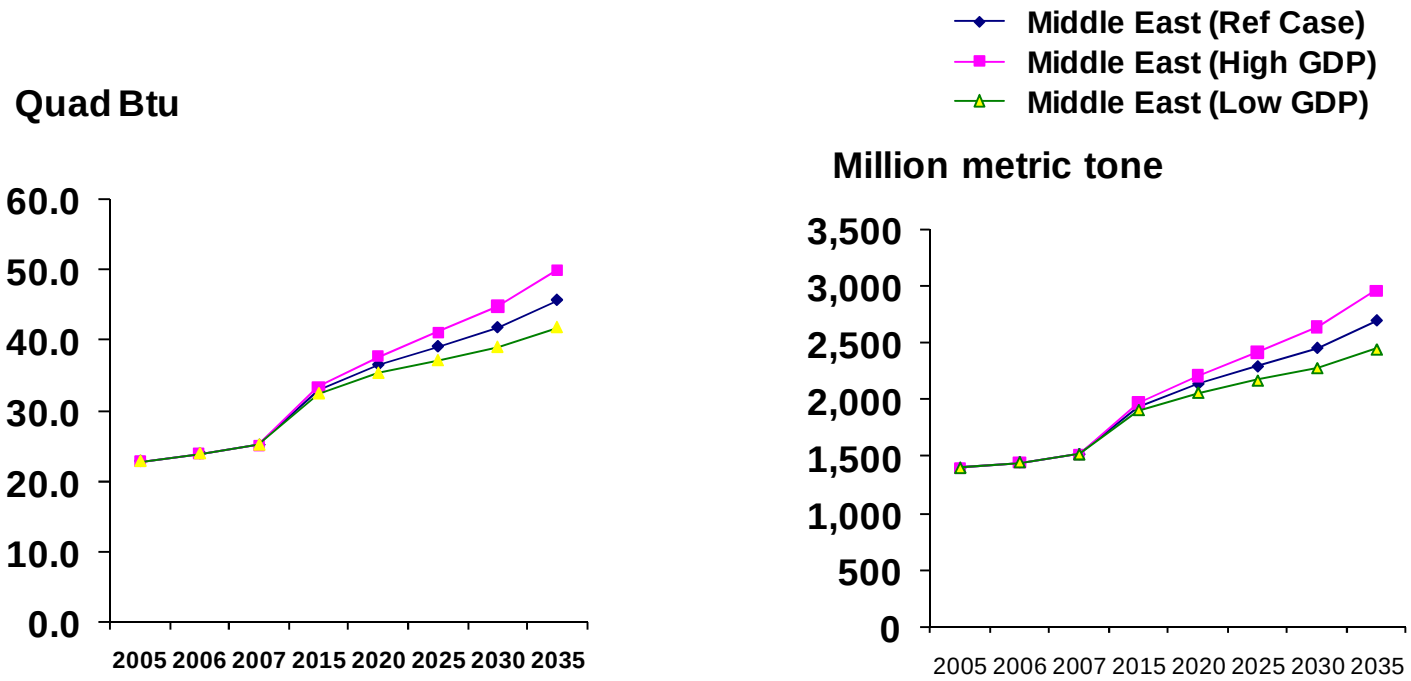
Freight energy use increases faster than passenger energy use

transportation energy consumption
quadrillion Btu



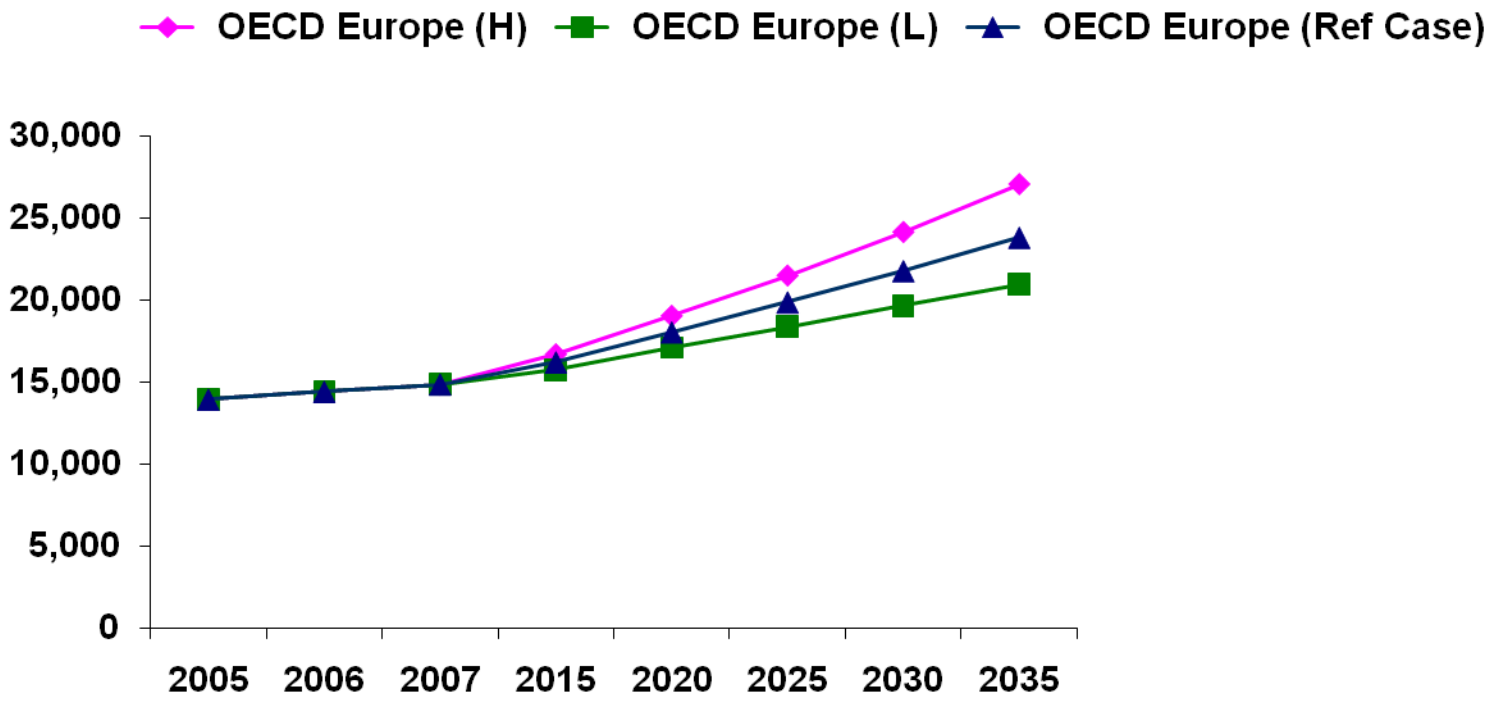
Source: EIA, *International Energy Outlook 2010*

Middle East primary energy consumption and carbon dioxide emissions under three case scenarios



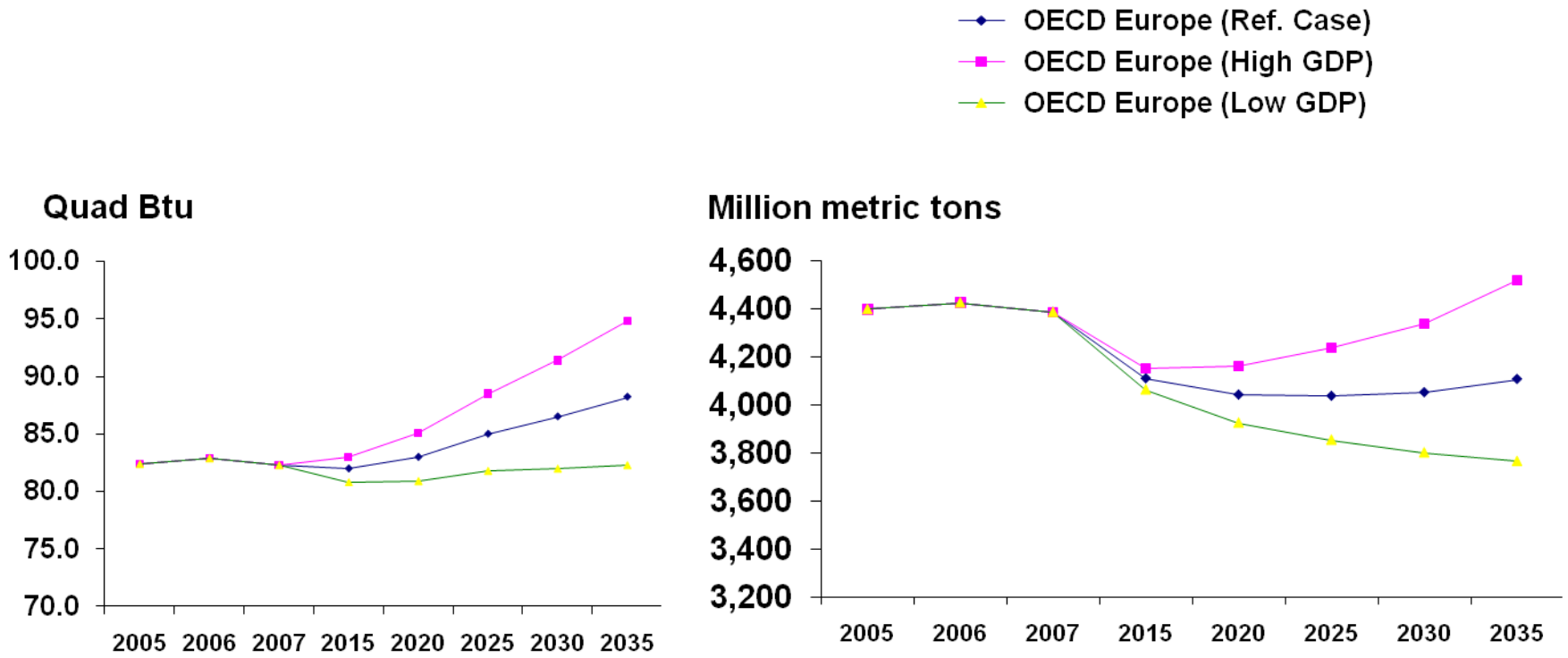
Source: EIA, *International Energy Outlook 2010*

Europe economic growth rate in three scenarios



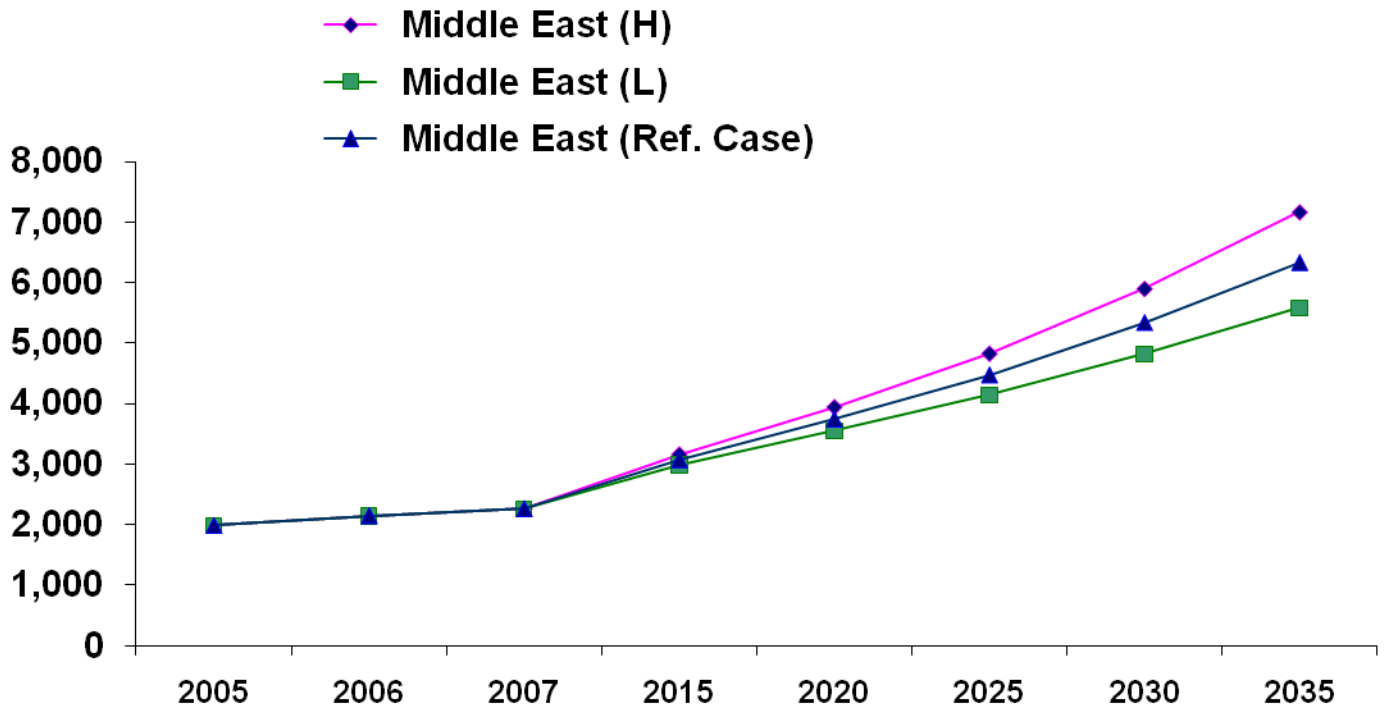
Source: EIA, *International Energy Outlook 2010*

OECD Europe primary energy consumption and carbon dioxide emissions



Source: EIA, *International Energy Outlook 2010*

Middle East economic growth rate in three scenarios



Source: EIA, *International Energy Outlook 2010*

Key trends from 2007 to 2035

- In the IEO2010 Reference case, global marketed energy consumption grows by 49%
  - Most of this growth occurs in non-OECD Asia and the Middle East.
- With no policy change that would limit their use, fossil fuels still provide 80% of world energy consumption in 2035
  - Renewable energy is the fastest-growing source
  - The IEO2010 Reference case reflects a return to higher oil prices as economies recover from the recession and oil demand rises. Prices rise to $133 per barrel (real 2008 dollars per barrel) in 2035.
- Energy-related carbon dioxide emissions are projected to rise from 30 billion metric tons in 2007 to 42 billion metric tons in 2035 under current laws and policies.
- Meeting the projected increase in world liquids demand will require increases in conventional and unconventional supplies of 25.8 million barrels per day
  - Oil prices reach $133 per day in 2035 (real 2008 dollars per barrel)

Key Trends from 2007 to 2035 (continued)

- Worldwide natural gas consumption increases 44%
  - Developing Asia accounts for 35% of the increase in world consumption
  - The Middle East accounts for 32% of the increase in production
- World Coal use grows 56%
  - China and India alone account for 85% of the increase
- Nuclear power generation increases 74%.

For more information

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Short-Term Energy Outlook	www.eia.gov/emeu/steo/pub/contents.html
Annual Energy Outlook	www.eia.gov/oiaf/aeo/index.html
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