

Natural gas and oil: U.S. outlook and global implications



for

World Steel Association 49th Annual Conference

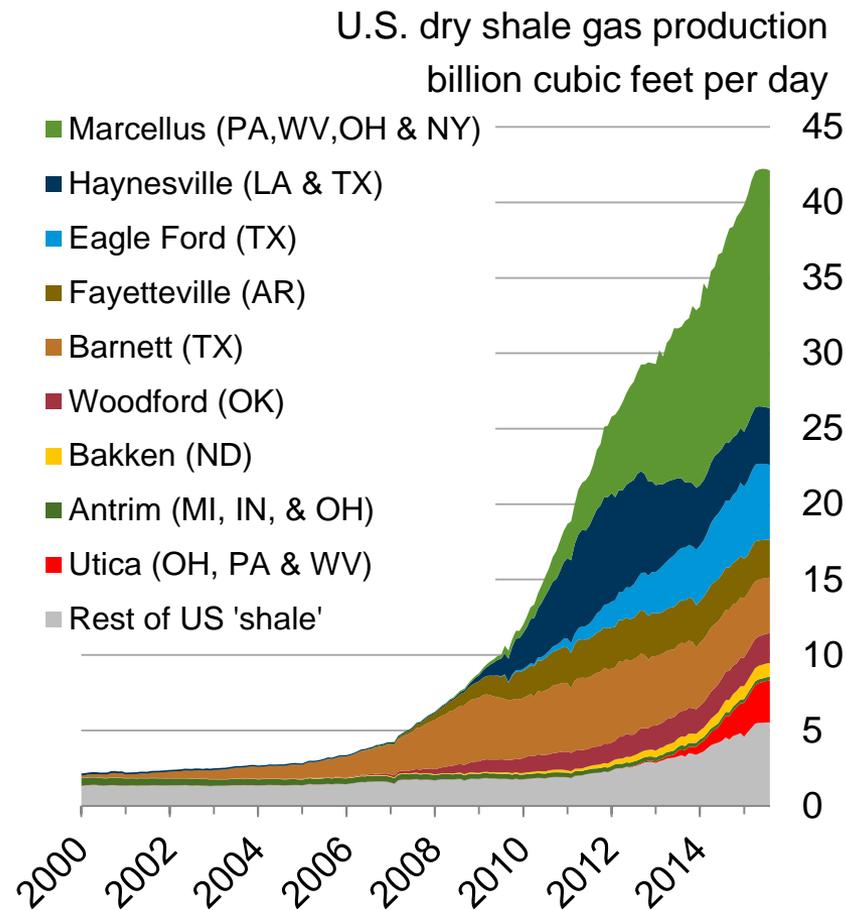
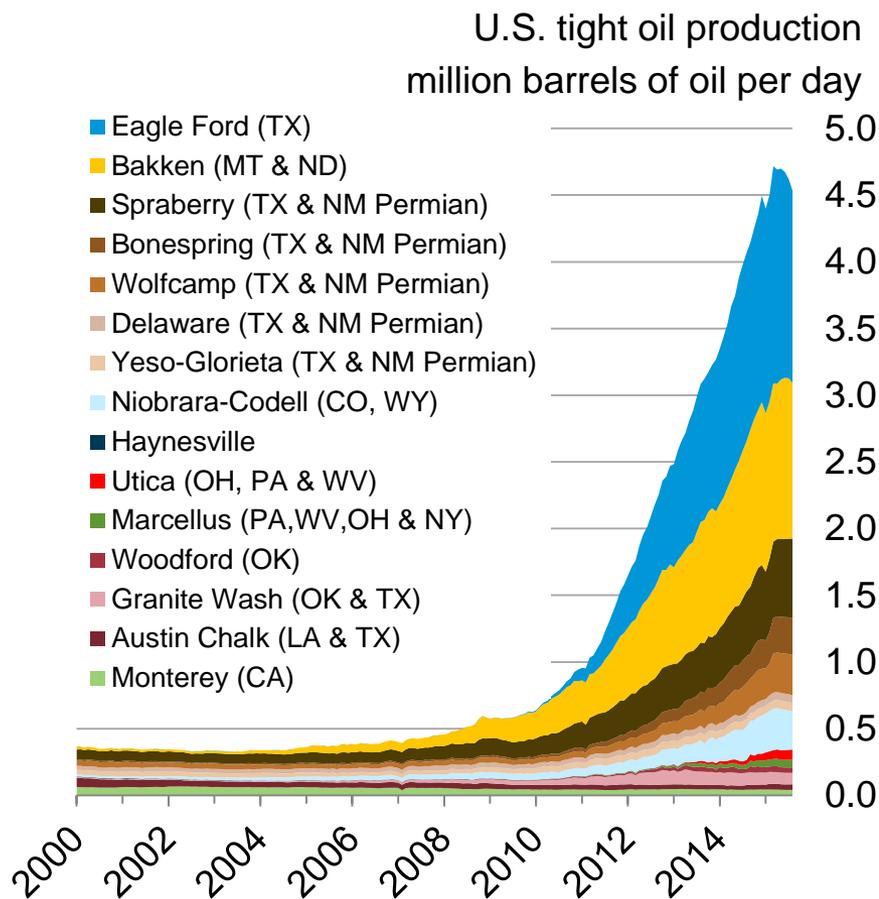
Panel Discussion: Energy and Future Challenges in Environmental Regulation

October 12, 2015 | Chicago, IL

by

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The U.S. has experienced a rapid increase in natural gas and oil production from shale and other tight resources

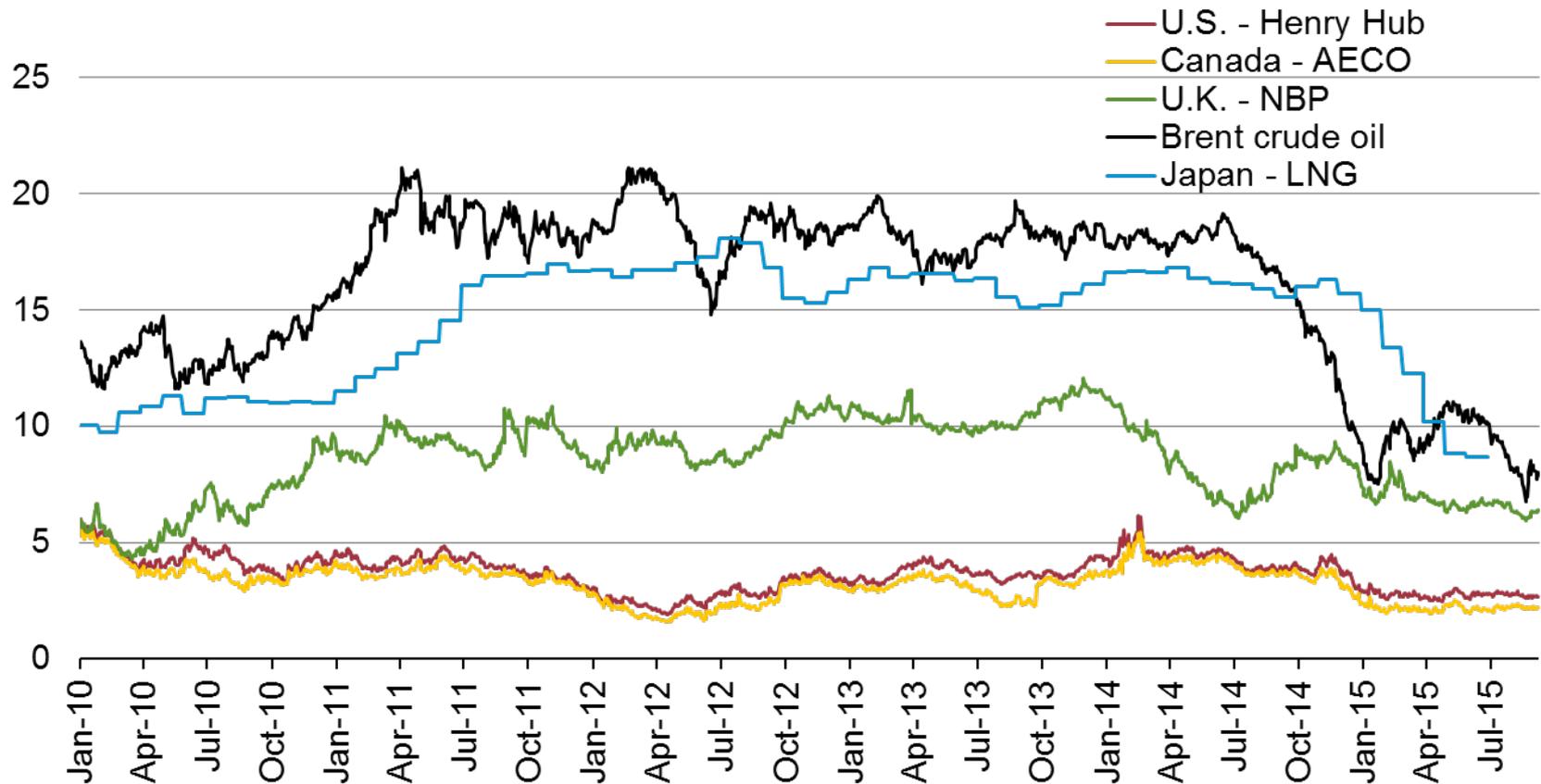


Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through August 2015 and represent EIA's official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).

Natural Gas

North American natural gas prices are low compared to prices in the rest of the world

Select global natural gas and crude oil prices with average monthly LNG prices in Japan
U.S. dollars per million British thermal unit



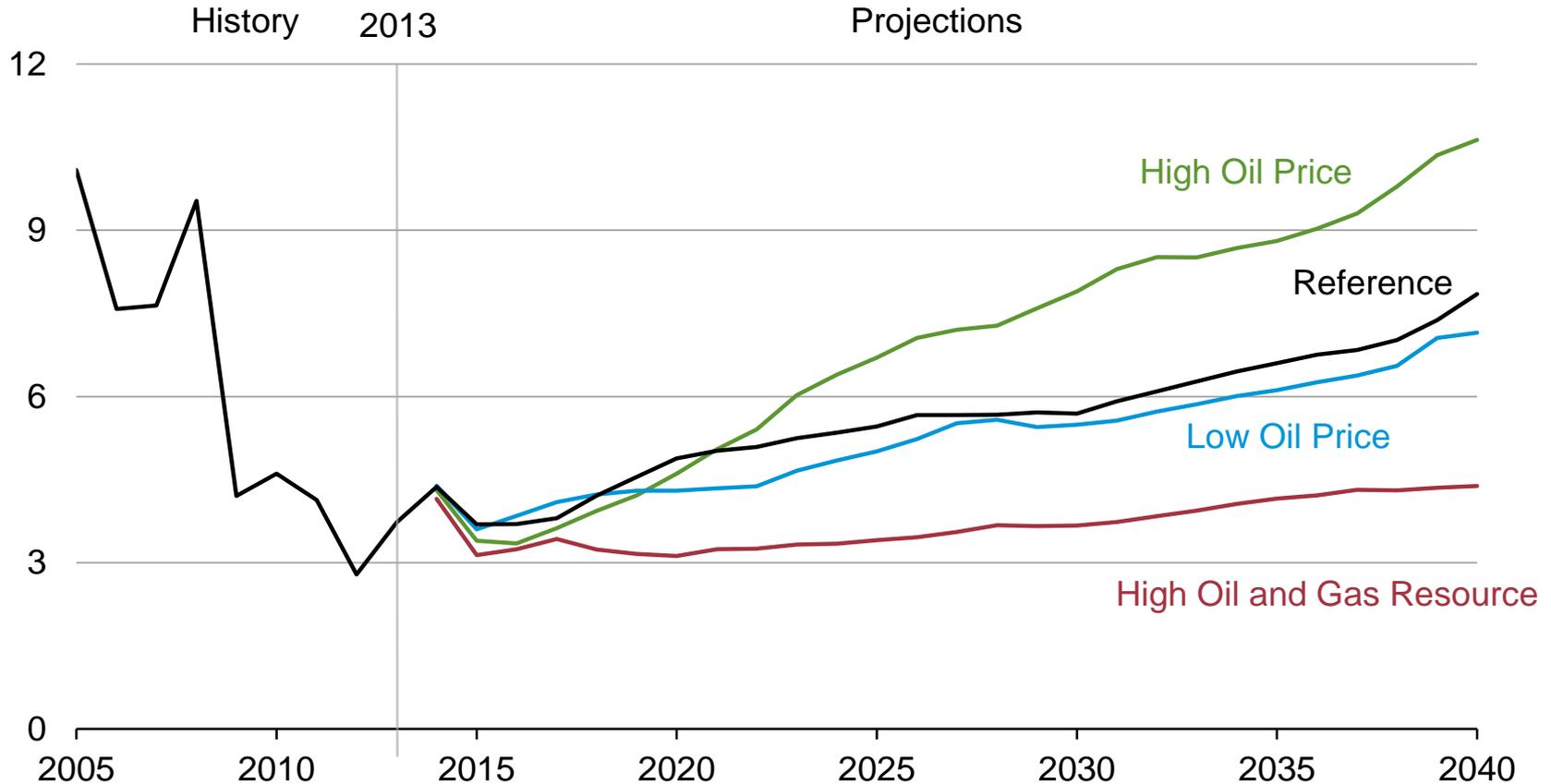
Source: U.S. Energy Information Administration based on Bloomberg data

Takeaways – Natural gas

- North American natural gas production is more likely to be limited by demand than supply
- U.S. natural gas demand growth is likely to be concentrated in electricity and industrial uses; natural gas exports and use in the transportation sector, where little natural gas is used today, are also likely to grow
- Potential challenges to natural gas demand growth include
 - Slow growth in U.S. electricity demand
 - Competition from offshore “stranded” gas for global LNG exports and siting of gas-intensive industries.
 - Long-term cheap oil would be another significant challenge to LNG exports
 - Extent and nature of global price convergence in natural gas markets
- Future policies that target particular sources or uses of energy or energy-related emissions can really matter for future natural gas demand

Future domestic natural gas prices depend on both domestic resource availability and world energy prices

average Henry Hub spot prices for natural gas
2013 dollars per million Btu

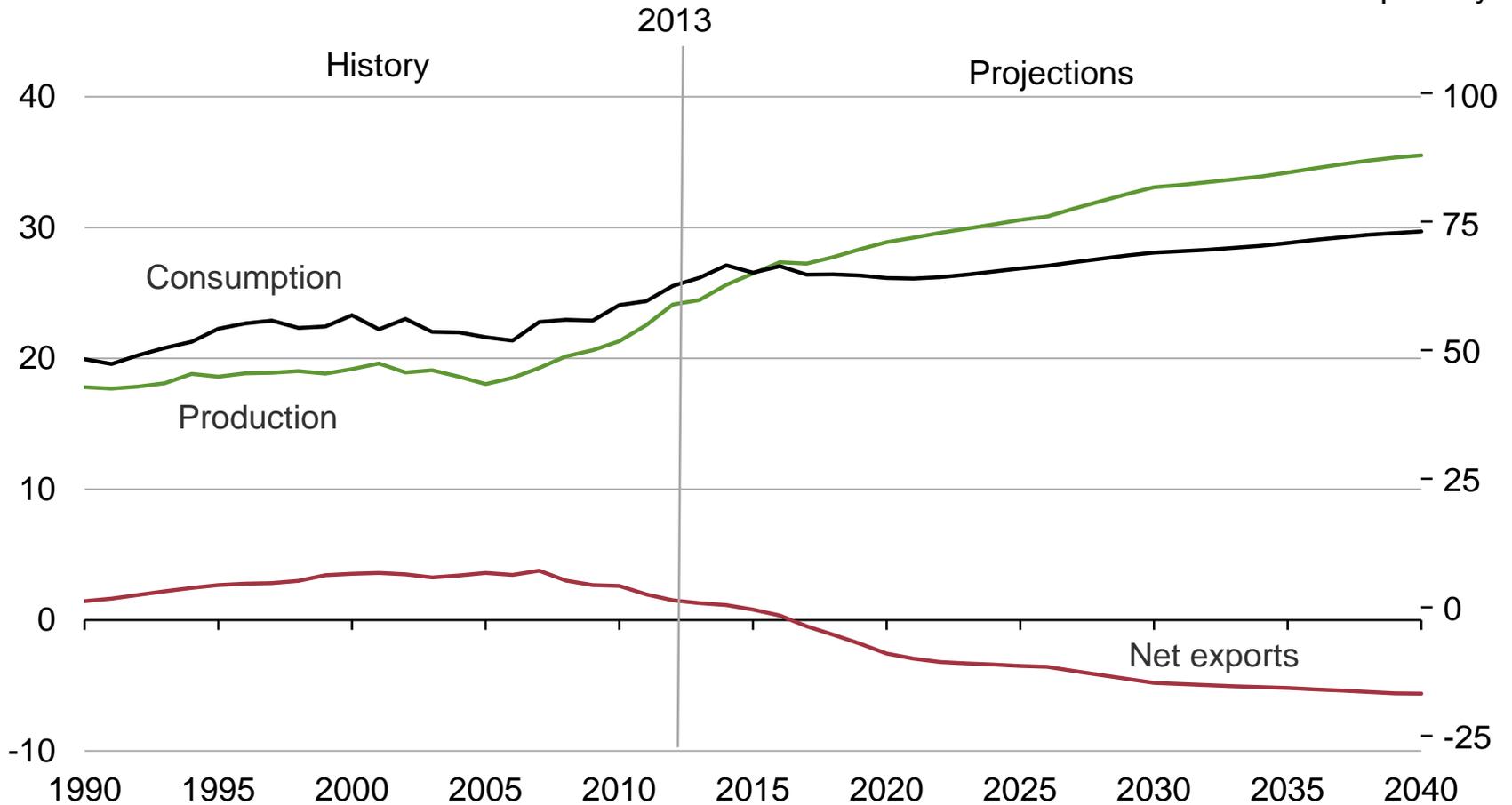


Source: EIA, Annual Energy Outlook 2015

U.S. becomes a net exporter of natural gas in the near future

U.S. dry natural gas
trillion cubic feet per year

billion cubic feet per day

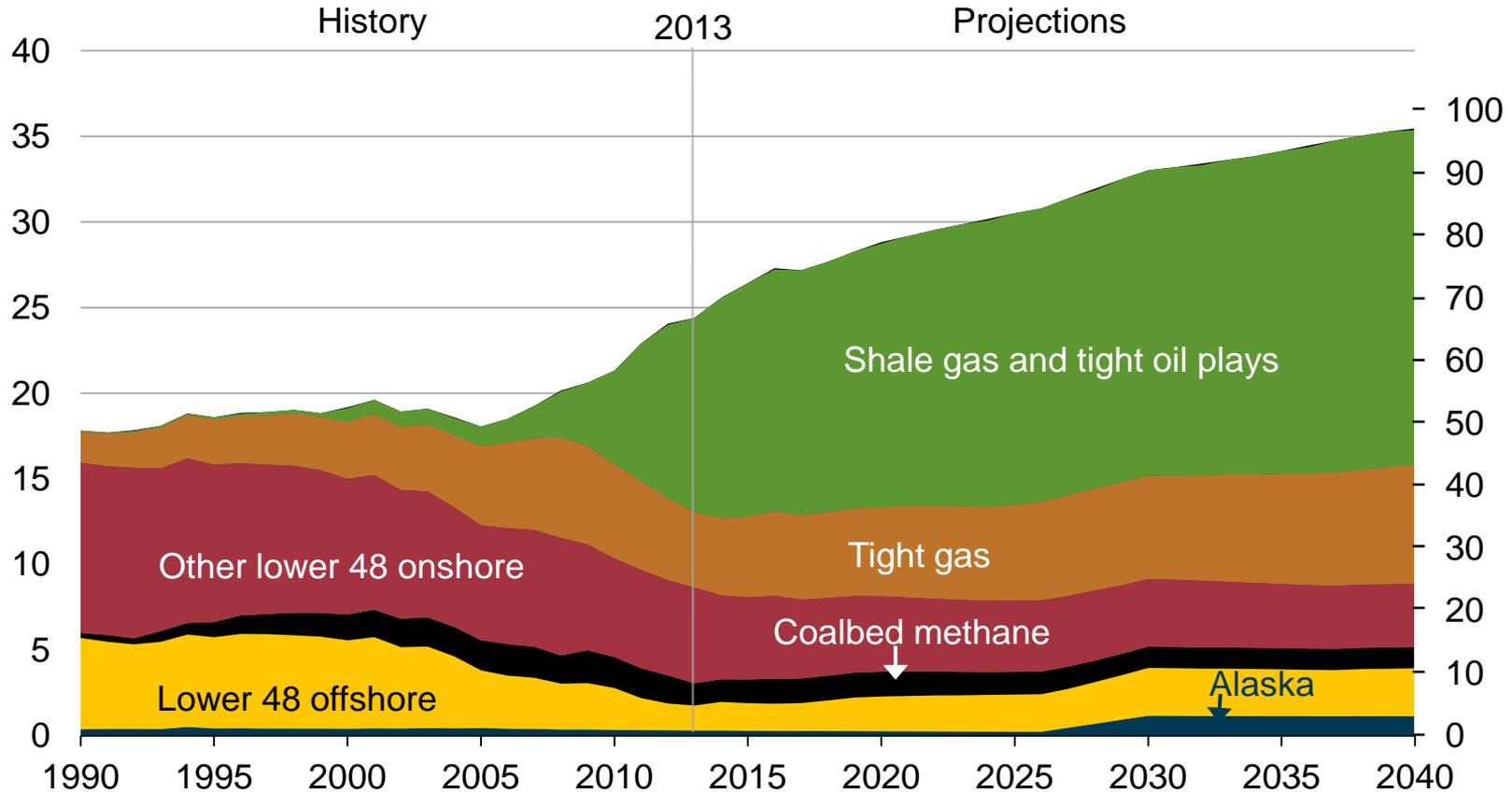


Source: EIA, Annual Energy Outlook 2015

Shale resources remain the dominant source of U.S. natural gas production growth

U.S. dry natural gas production
trillion cubic feet

billion cubic feet per day

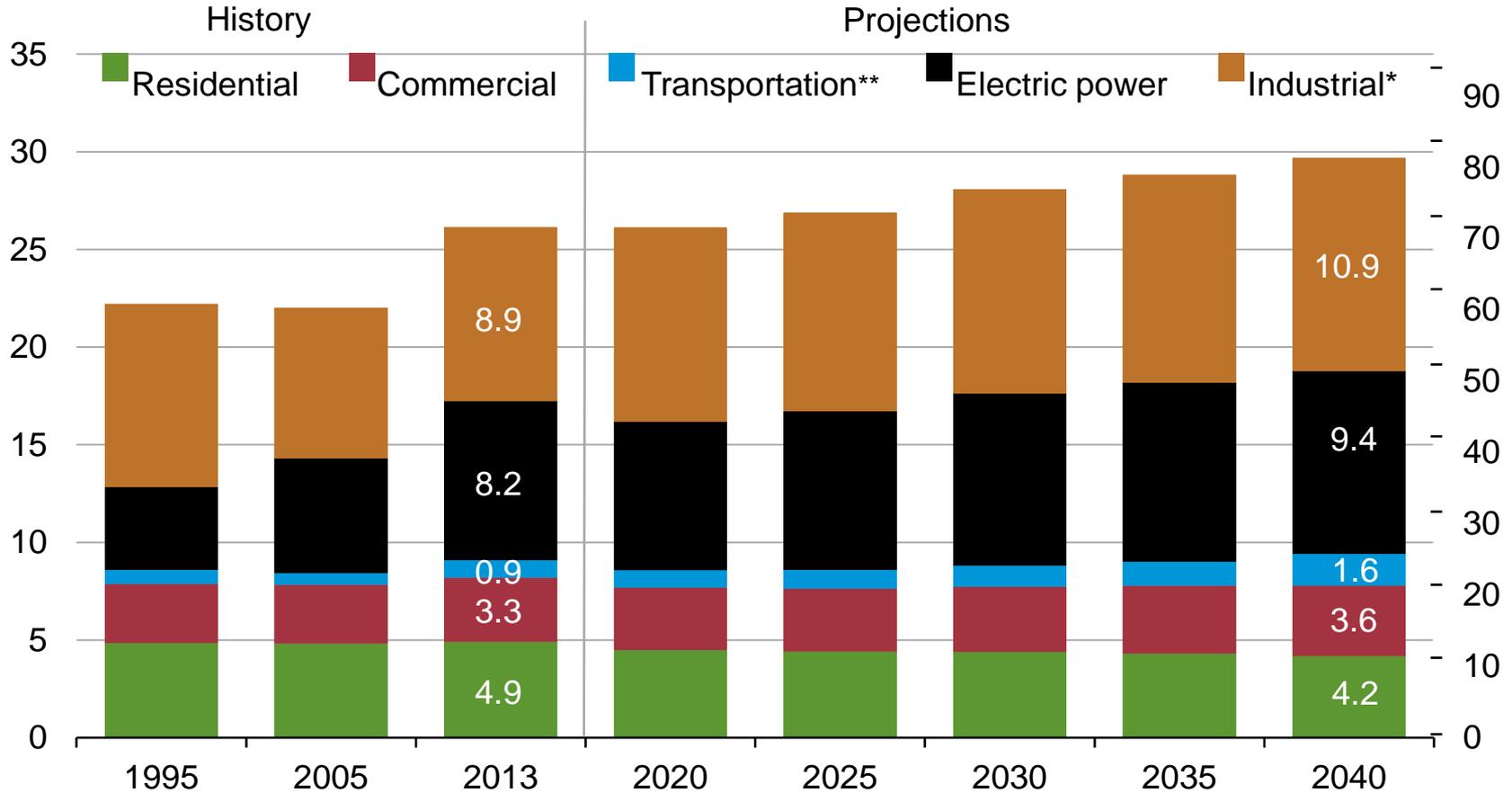


Source: EIA, Annual Energy Outlook 2015 Reference case

Natural gas consumption growth is concentrated in electricity generation and industry; gas use rises in all sectors except residential

U.S. dry gas consumption
trillion cubic feet

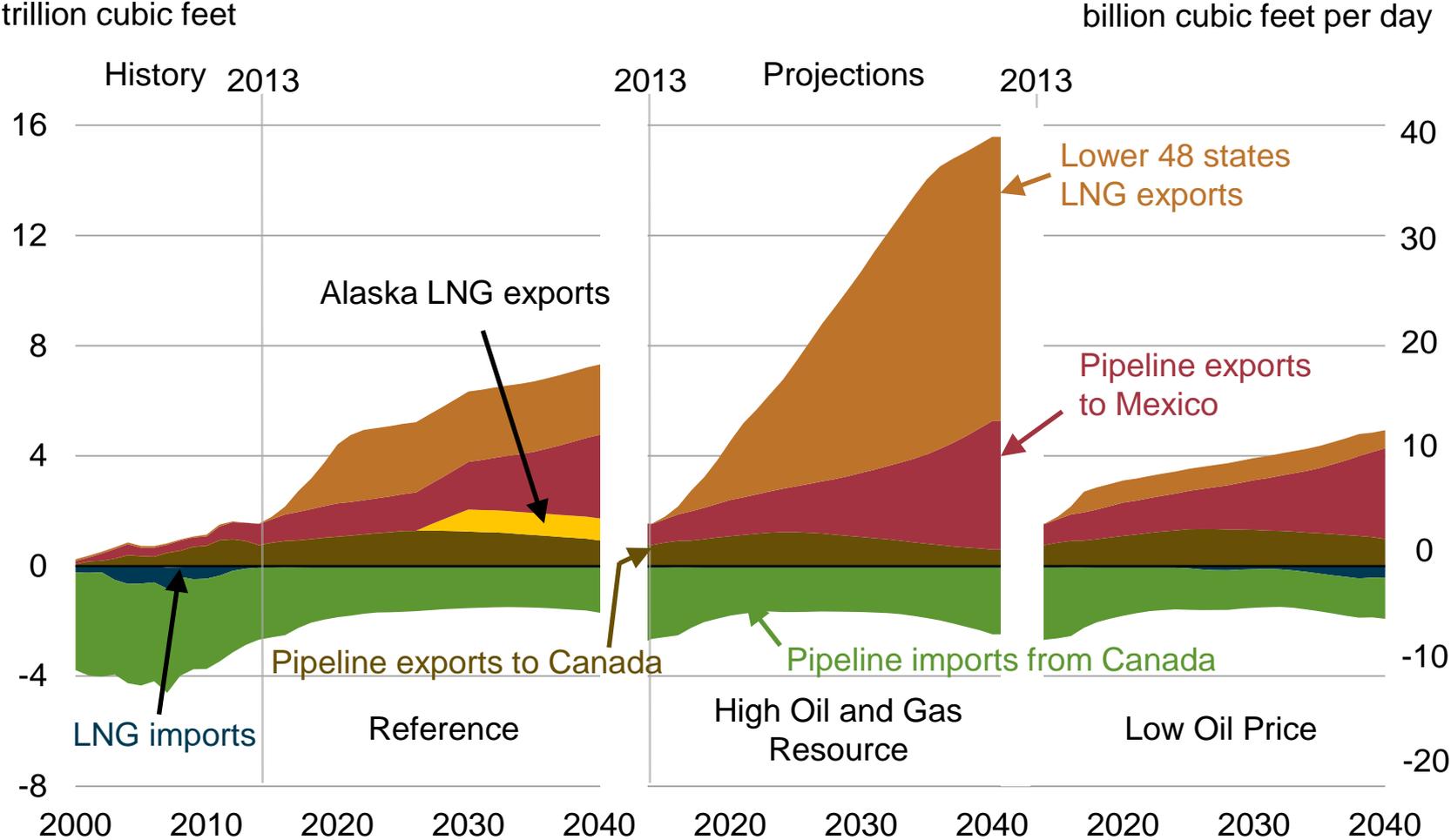
billion cubic feet per day



Source: EIA, Annual Energy Outlook 2015 Reference case
 *Includes combined heat-and-power and lease and plant fuel
 **Includes pipeline fuel

Projected U.S. natural gas exports reflect the spread between domestic natural gas prices and world energy prices

U.S. natural gas imports and exports
trillion cubic feet



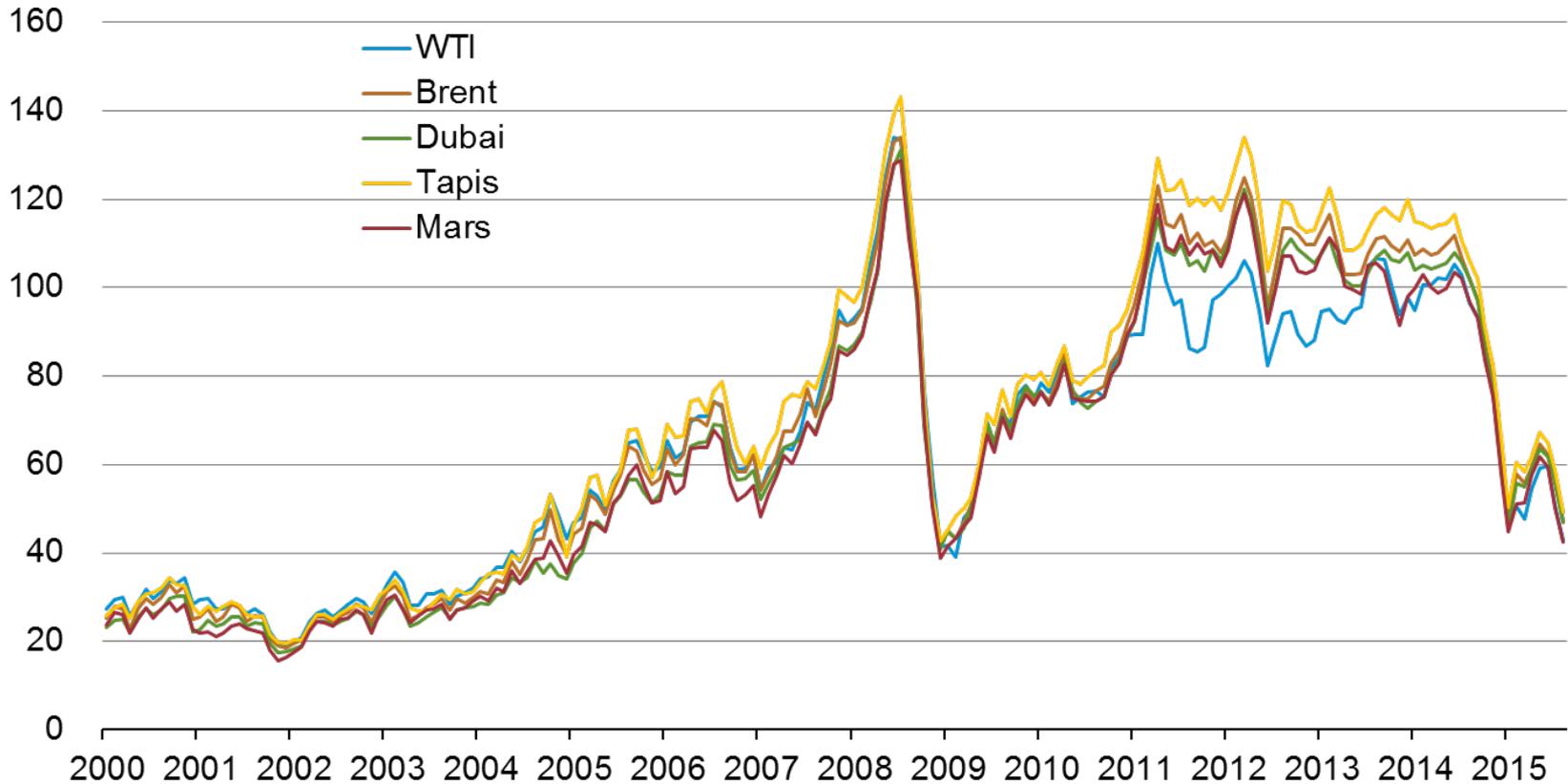
Source: EIA, Annual Energy Outlook 2015

Oil

World oil prices move together due to arbitrage

global crude oil prices

nominal dollars per barrel, monthly average



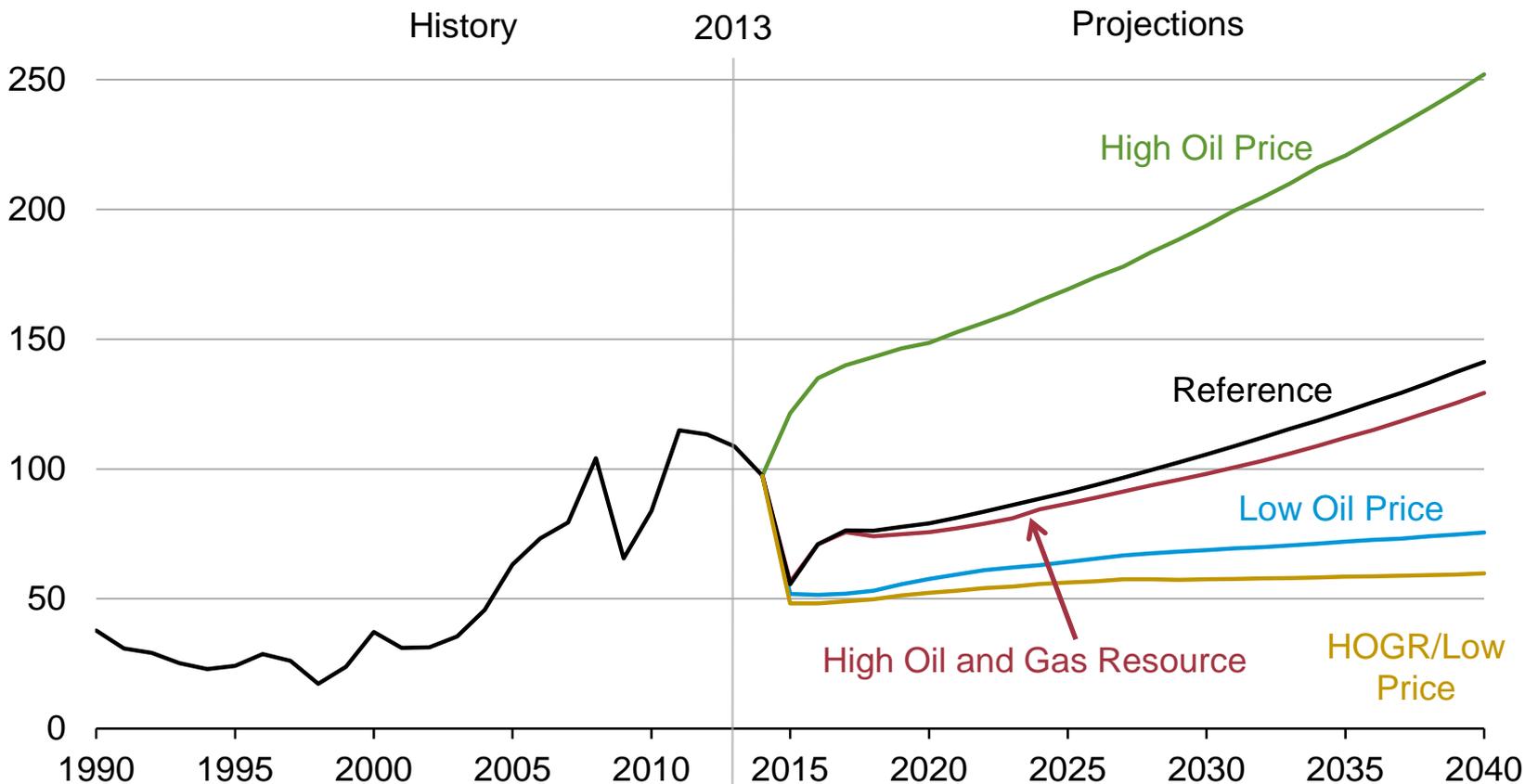
Source: U.S. Energy Information Administration, based on Bloomberg

Takeaways - Oil

- Tight oil clearly matters for measures of U.S. oil import dependence, but its global significance is not yet clear
- Policy debate over removing restrictions on exports of U.S. crude oil
 - Recent EIA analysis shows no significant effects for consumers, producers, or refiners in cases where domestic production remains below 11 million barrels per day (b/d)
 - If U.S. production were to approach or exceed 12 million b/d, as might occur under high resource assumptions, U.S. consumers realize a small reduction in gasoline prices and crude producers modestly raise output if crude export restrictions are removed; however, the largest effects (in opposite directions) are felt by producers and refiners
- The Middle East remains the cockpit of “easy oil” and will remain central to the global oil market
- Historical analogues provide some insight into alternative paths for future global oil markets -- between now and 2025, the change in the call on OPEC seems likely to fall between the 1973-85 and 2000-12 outcomes

AEO2015 explores scenarios that encompass a wide range of future crude oil price paths

Brent crude oil spot price
2013 dollars per barrel

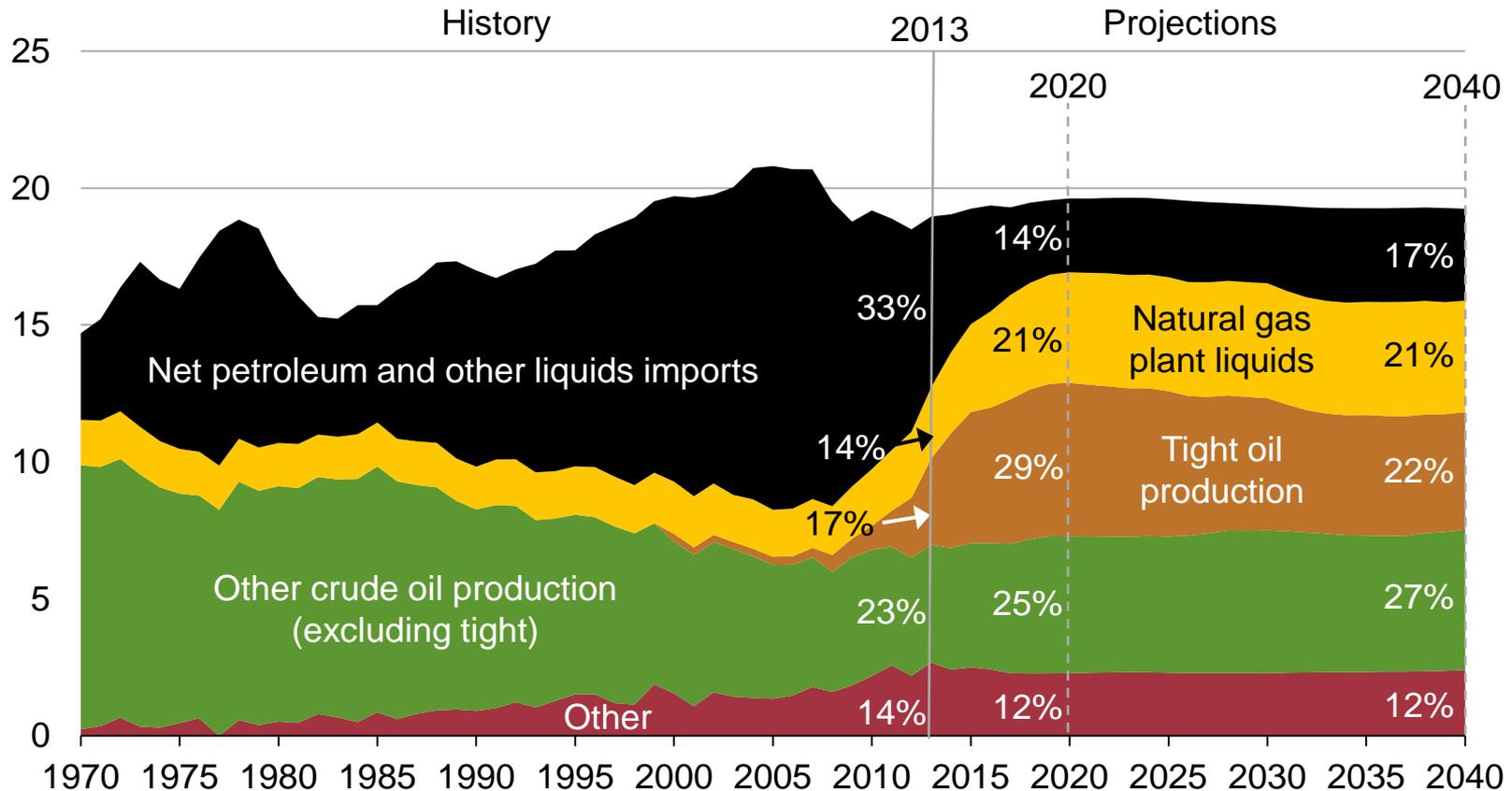


Note: HOGR/LowPrice - High Oil and Gas Resource with Low Oil Price

Sources: EIA, Annual Energy Outlook 2015, and Effects of Removing Restrictions on U.S. Crude Oil Exports, September, 2015

Increased production of tight oil and greater fuel efficiency drive decline in petroleum and other liquid imports

U.S. liquid fuels supply
million barrels per day

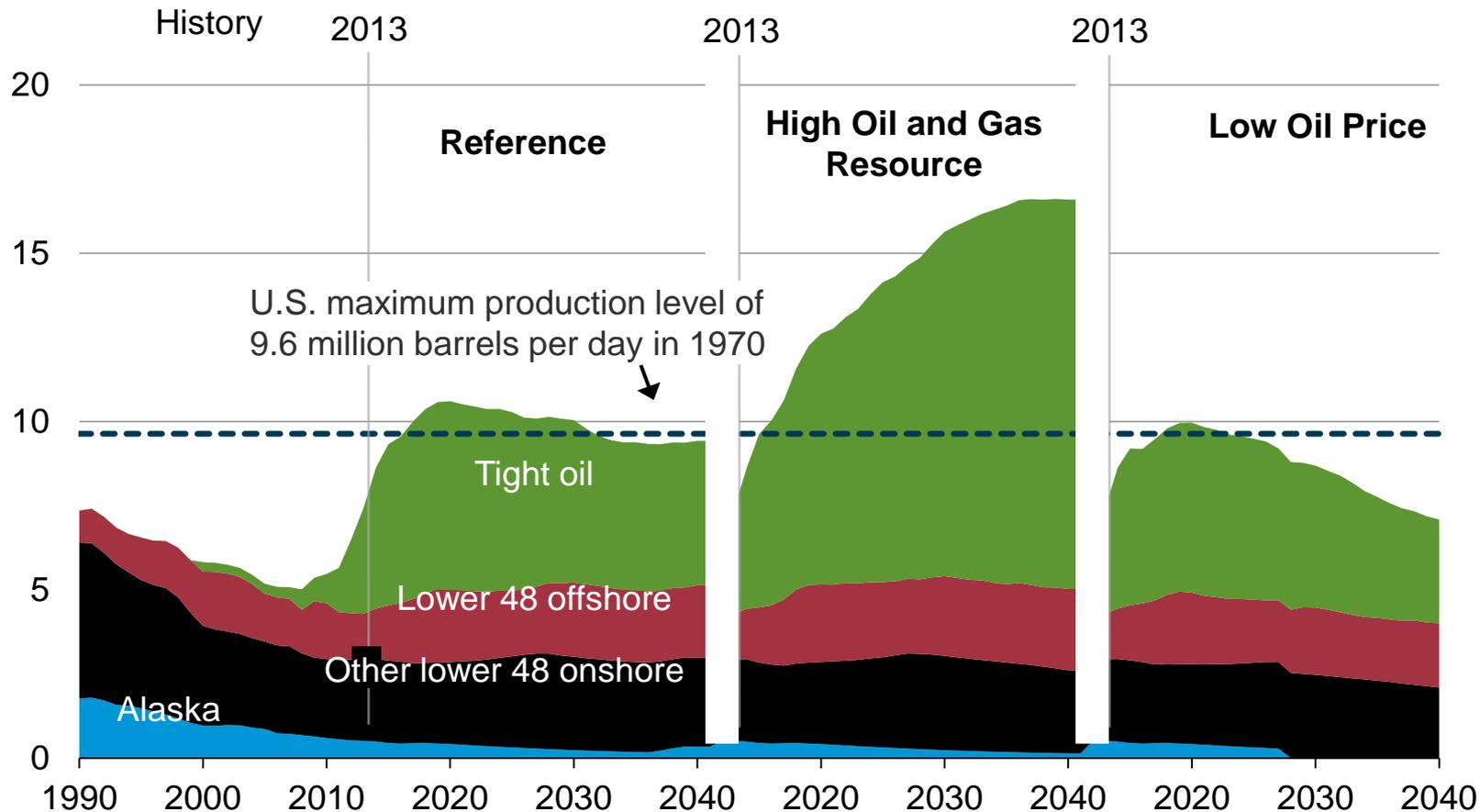


Note: "Other" includes refinery gain, biofuels production, all stock withdrawals, and other domestic sources of liquid fuels

Source: EIA, Annual Energy Outlook 2015 Reference case

Resource and technology assumptions have major implications for projected U.S. crude oil production beyond the next few years

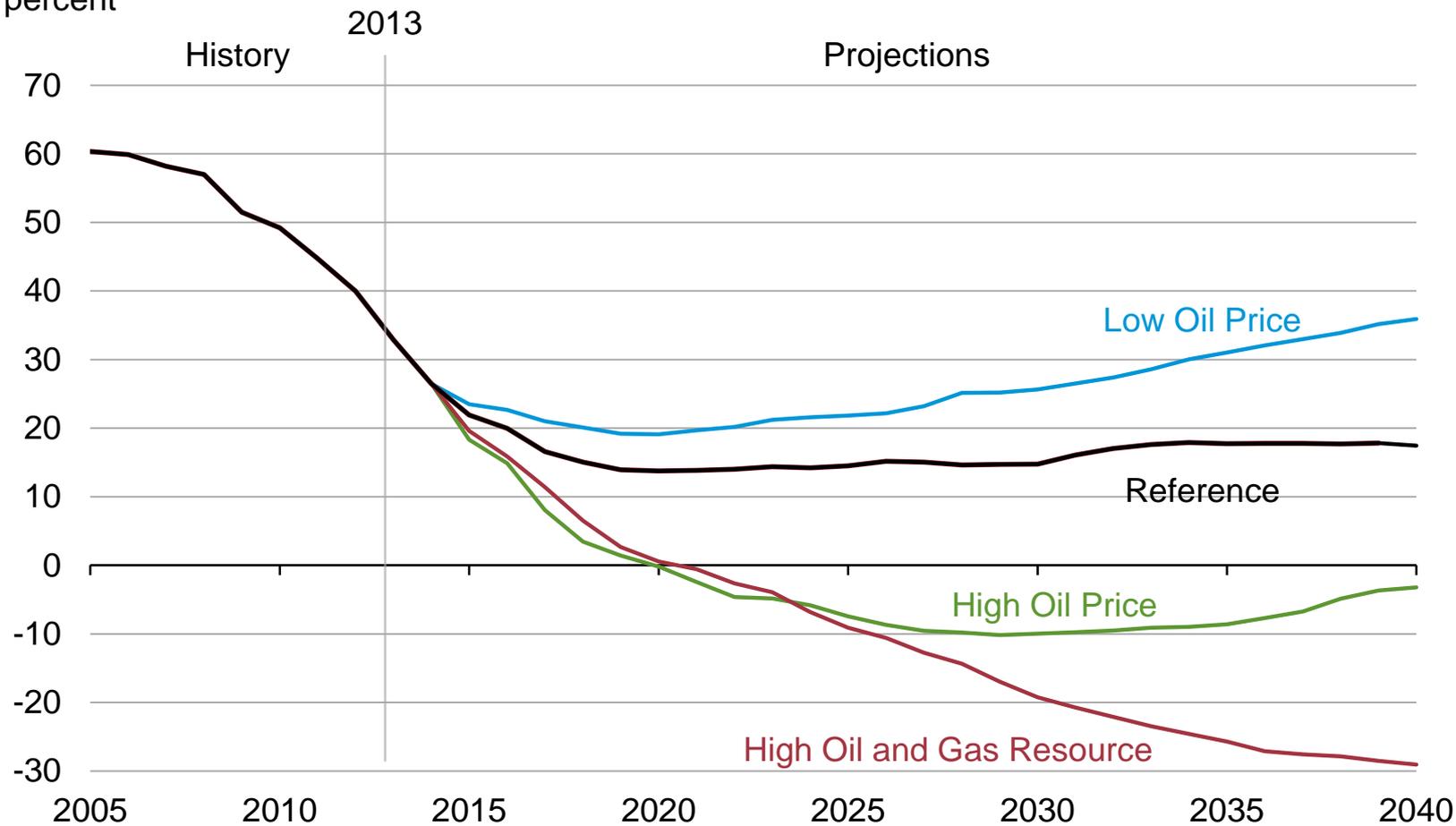
U.S. crude oil production
million barrels per day



Source: EIA, Annual Energy Outlook 2015

U.S. reliance on net imports of petroleum and other liquids is virtually eliminated by 2035 in High Oil and Gas Resource case

net crude oil and petroleum product imports as a percentage of total U.S. supply
percent



Source: EIA, Annual Energy Outlook 2015

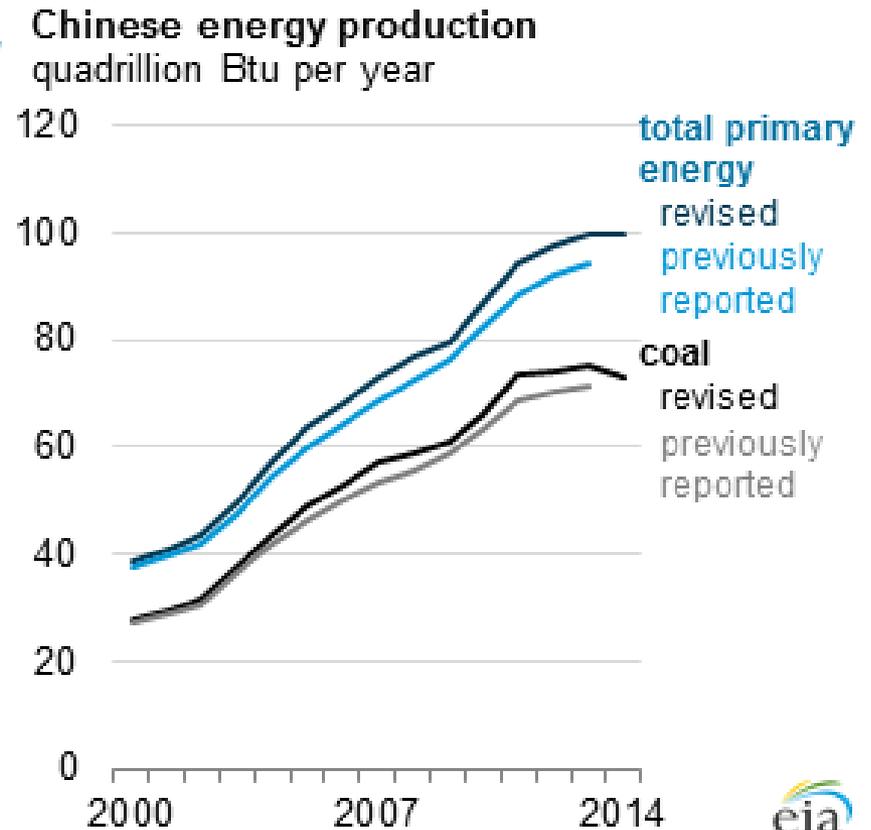
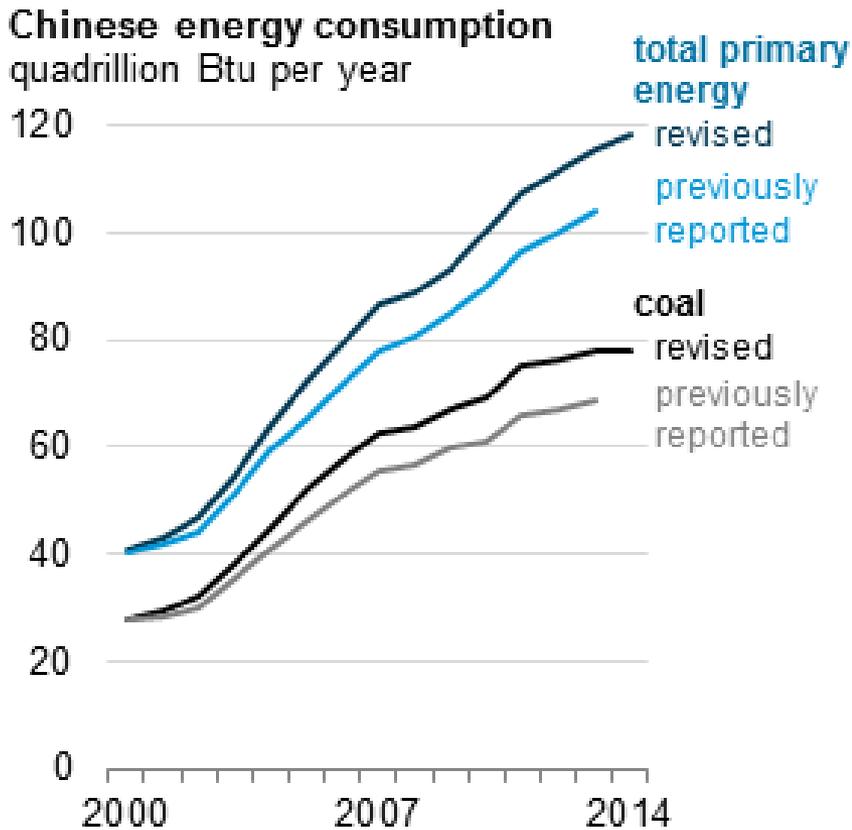
LONGER TERM PERSPECTIVE: Can OPEC and other major exporters cohere? – Comparison of change in world liquid fuel balances for two 12-year historical periods with EIA projections for 2013-25 from AEO2015 (million barrels per day)

	Actual		Projected AEO 2015 Reference & HOGGR Cases
	1973–85	2000–12	2013–25
World Liquids Demand	+3	+12	+12 to +13
OECD	-4	-2	+1
Non-OECD	+7	+15	+11
World Liquids Supply	-1	+12	+11 to +12
Non-OPEC Supply	+13	+6	+10 to +15
OPEC Production	-14	+6	-3 to +2

Source: EIA, Annual Energy Outlook 2015, April 2015

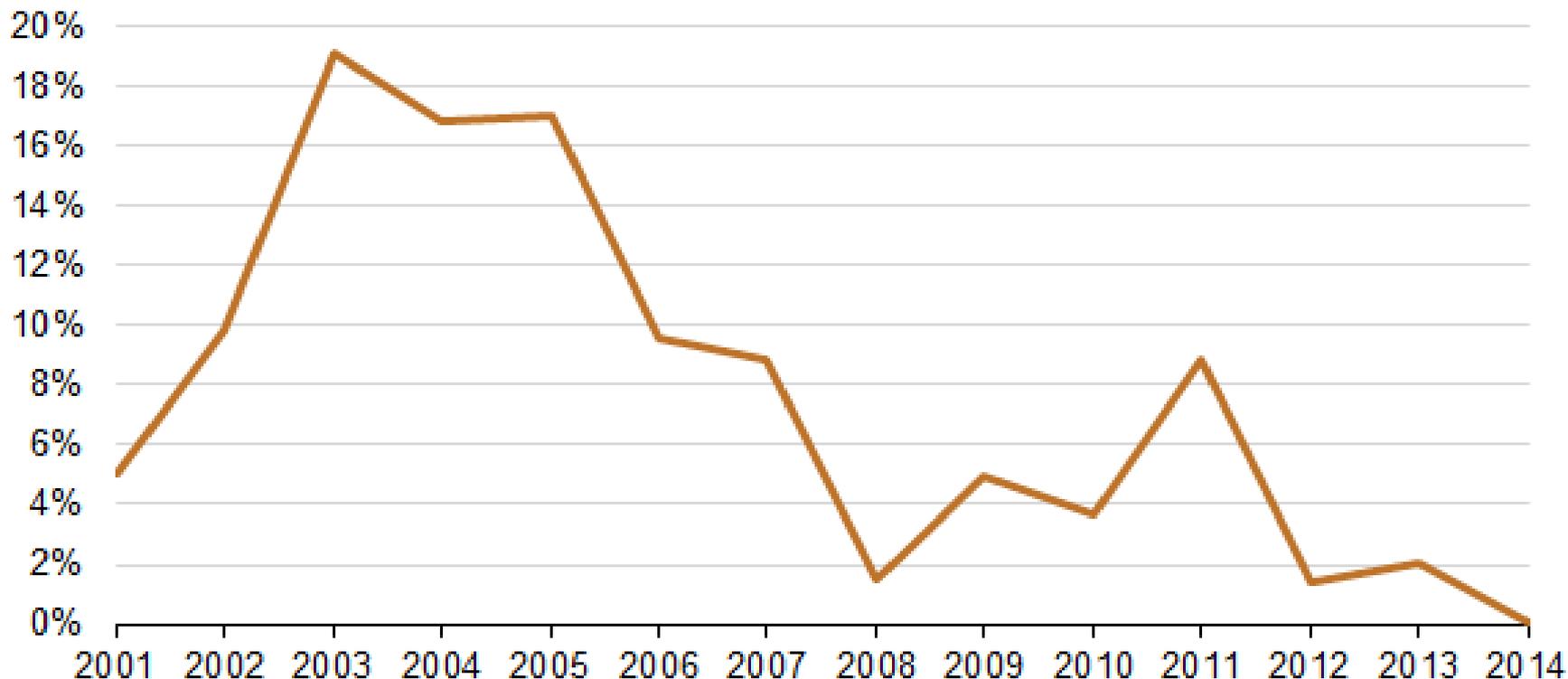
International energy

China's energy use has grown rapidly over last 15 years, but has recently slowed



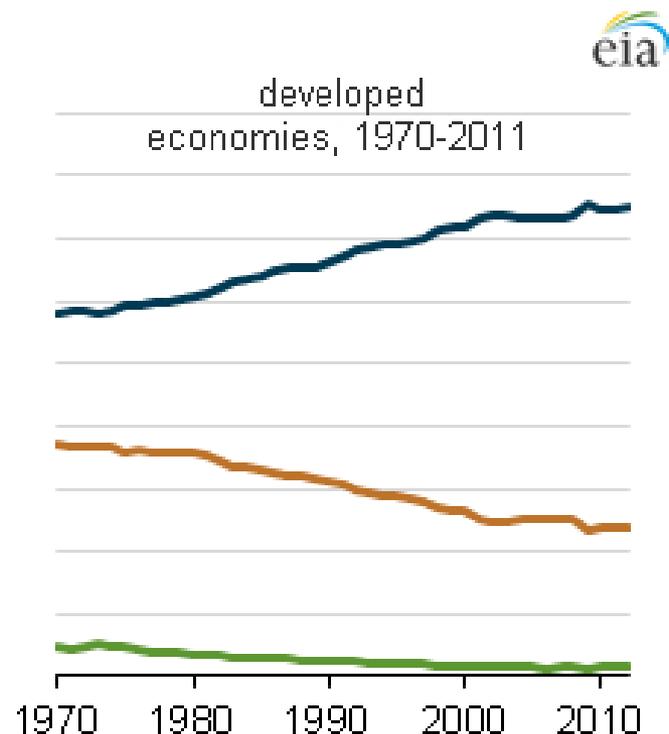
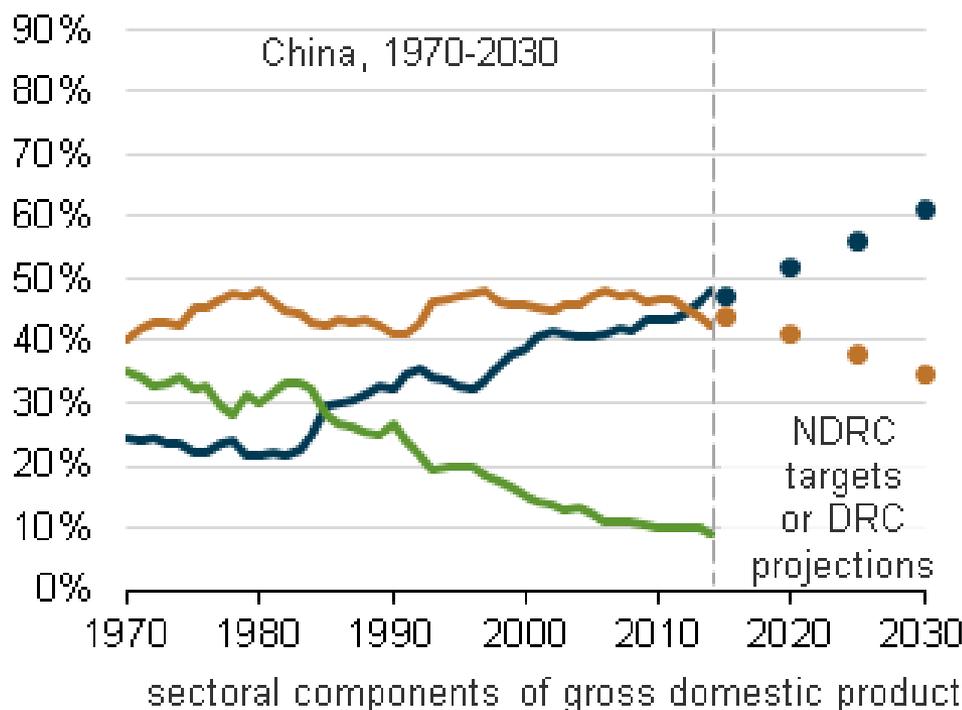
Growth in China's coal consumption has slowed in recent years, but future path remains unclear

Annual change in Chinese coal consumption (2001-14)
percent change in energy content terms



China's energy consumption trends will be influenced by both economic growth rate and the economy's sectoral composition

Economic composition of China's GDP by sector
value added share of gross domestic product (GDP)



China's energy outlook – what I'd like to learn about

- What is the outlook for China's electricity demand growth rate over the next 5 to 10 years, and how might it be impacted by shifts towards a more consumer- and service-oriented economy?
- What mix of the following strategies will be used to tackle coal-related local pollution: emissions controls, fuel switching, end-use demand cuts, and shifting coal use away from key cities through remotely-sited gasification or generation?
- What is the outlook for fuel demand in China's transportation sector given the likelihood that China remains the top global market for vehicle sales, resulting in a rapid rise in the number of vehicles in use?
- How can outside observers assess the actual role of energy policies:
 - distinguish between binding policies and ideas that are under consideration
 - reconcile inconsistencies across various plans/policies
 - understand the role of different governmental levels in fashioning and implementing energy policies
- What is the current view of prospects for shale gas in China?

For more information

U.S. Energy Information Administration home page | www.eia.gov

Annual Energy Outlook | www.eia.gov/aeo

Short-Term Energy Outlook | www.eia.gov/steo

International Energy Outlook | www.eia.gov/ieo

Monthly Energy Review | www.eia.gov/mer

Today in Energy | www.eia.gov/todayinenergy

Drilling Productivity Report | www.eia.gov/petroleum/drilling