#### Annual Energy Outlook 2012 Early Release Reference Case

#### AEO2012 Early Release Rollout Presentation Paul H. Nitze School of Advanced International Studies John Hopkins University January 23, 2012 / Washington, DC

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Independent Statistics & Analysis | www.eia.gov

## Key results from the *AEO2012* Reference case, which assumes current laws remain unchanged

- Projected growth of energy use slows over the projection period reflecting an extended economic recovery and increasing energy efficiency in end-use applications
- Domestic crude oil production increases, reaching levels not experienced since 1994 by 2020
- With modest economic growth, increased efficiency, growing domestic production, and continued adoption of nonpetroleum liquids, net petroleum imports make up a smaller share of total liquids consumption
- Natural gas production increases throughout the projection period and exceeds consumption early in the next decade
- Renewables and natural gas fuel a growing share of electric power generation
- Total U.S. energy-related carbon dioxide emissions remain below their 2005 level through 2035



#### What is included (and excluded) in developing EIA's "Reference case" projections?

- Generally assumes current laws and regulations
  - excludes potential future laws and regulations (e.g., proposed greenhouse gas legislation and proposed fuel economy standards are not included)
  - provisions generally sunset as specified in law (e.g., renewable tax credits expire)
- Some grey areas
  - adds a premium to the capital cost of CO<sub>2</sub>-intensive technologies to reflect current market behavior regarding possible future policies to mitigate greenhouse gas emissions
  - assumes implementation of existing regulations that enable the building of new energy infrastructure and resource extraction
- Includes technologies that are commercial or reasonably expected to become commercial over next decade or so
  - includes projected technology cost and efficiency improvements, as well as cost reductions linked to cumulative deployment levels
  - does not assume revolutionary or breakthrough technologies



# Overview of U.S. energy supply and demand



#### Current U.S. energy supply is 83% fossil fuels; demand is broadly distributed among the major sectors

2010 total U.S. energy use = 98.0 quadrillion Btu







#### Energy use grows slowly over the projection in response to a slow and extended economic recovery and improving energy efficiency



Source: EIA, Annual Energy Outlook 2012 Early Release



### Energy and CO<sub>2</sub> per dollar of GDP continue to decline; per-capita energy use also declines



Source: EIA, Annual Energy Outlook 2012 Early Release



#### In the AEO2012 Reference case, energy-related CO<sub>2</sub> emissions never get back to pre-recession levels by 2035





#### Natural Gas



## Technically recoverable natural gas resources reflect updated assessments

U.S. dry gas resources trillion cubic feet



\*Alaska resource estimates prior to AEO2009 reflect resources from the North Slope that were not included in previously published documentation.

Source: EIA, Annual Energy Outlook



#### Domestic natural gas production grows faster than consumption



Source: EIA, Annual Energy Outlook 2012 Early Release



#### Shale gas offsets declines in other U.S. natural gas production

#### sources

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



Source: EIA, Annual Energy Outlook 2012 Early Release



### Natural gas consumption is quite dispersed; electric power and industrial use drives much of the future demand growth

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



Source: EIA, Annual Energy Outlook 2012 Early Release



## Natural gas price projections are lower than in *AEO2011*, consistent with recent market developments

natural gas spot price (Henry Hub) 2010 dollars per million Btu



Sources: EIA, Annual Energy Outlook 2012 Early Release and EIA, Annual Energy Outlook 2011



### Petroleum and other liquid supply



## Oil prices in the Reference case rise steadily; the full *AEO2012* will include a wide range of oil prices

annual average price of light low sulfur (LLS) crude oil real 2010 dollars per barrel



Source: EIA, Annual Energy Outlook 2012 Early Release



## Global liquids supply increases 25% while market shares hold relatively stable

#### liquids supply million barrels per day



Source: EIA, Annual Energy Outlook 2012 Early Release



## U.S. imports of liquid fuels continue to decline due to increased production of gas liquids and biofuels and greater fuel efficiency

U.S. liquid fuels supply million barrels per day



Source: EIA, Annual Energy Outlook 2012 Early Release



#### U.S. dependence on imported petroleum continues to decline

#### U.S. liquid fuel supply million barrels per day



Source: EIA, Annual Energy Outlook 2012 Early Release



### Biofuels fall short of the RFS target in 2022, but exceed 36 billion gallons by the early 2030s

billions ethanol-equivalent gallons



Source: EIA, Annual Energy Outlook 2012 Early Release, Annual Energy Outlook 2011



New light duty vehicle fuel economy reaches almost 38 mpg by 2035 in the Reference case, which does not include proposed standards for MY2017 to MY2025 vehicles

miles per gallon



Source: EIA, Annual Energy Outlook 2012 Early Release



### Most transport fuel consumption is in light and heavy duty vehicles

U.S. transportation energy consumption million barrels per day oil equivalent



Source: EIA, Annual Energy Outlook 2012 Early Release



## Efficiency improvements mostly offset underlying drivers of growth in transportation services

	2010	2035	Growth (2010-2035)
Light duty vehicles			
Fuel consumption (million barrels per day oil equivalent)	8.6	8.8	2%
Number of licensed drivers (millions)	209	265	27%
Miles per licensed driver	12,700	13,600	7%
Efficiency of vehicle stock (mpg)	20.4	27.8	36%*
Heavy duty vehicles			
Fuel consumption (million barrels per day oil equivalent)	2.4	2.8	18%
Manufacturing output (billion 2005 dollars)	4,260	6,270	47%
Number of freight trucks (millions)	9.3	13.4	44%
Miles per vehicle	25,300	25,700	1.3%
Efficiency of vehicle stock (mpg)	6.7	8.2	23%**

\* Equal to a 27% reduction in fuel use per mile. \*\* Equal to an 19% reduction in fuel use per mile.

Source: EIA, Annual Energy Outlook 2012 Early Release



### Electricity



## While electricity consumption grows by 23% over the projection, the annual rate of growth slows



Source: EIA, Annual Energy Outlook 2012 Early Release



### In 2010, U.S. electricity generation was 70% fossil fuels, 20% nuclear, and 10% renewable



Source: EIA, Annual Energy Review, October 2011



## Electricity mix gradually shifts to lower-carbon options, led by growth in renewables and natural gas

#### electricity net generation





Source: EIA, Annual Energy Outlook 2012 Early Release



### Non-hydro renewable sources more than double between 2010 and 2035

non-hydropower renewable generation

billion kilowatthours per year



Source: EIA, Annual Energy Outlook 2012 Early Release



### Expected changes in the *AEO2012* Reference case for the complete release

- Incorporation of Mercury and Air Toxics Standards (MATS) issued by EPA in December, 2011
- Updated historical data and equations in the transportation sector, based on revised data from the National Highway Traffic Safety Administration (NHTSA) and Federal Highway Administration
- Revised long-term macroeconomic projection based on an updated long term projection from IHS Global Insight, Inc.
- New model for cement production in the industrial sector
- Updated handling of biomass supply



#### For more information

U.S. Energy Information Administration home page | <u>www.eia.gov</u>

Annual Energy Outlook | <u>www.eia.gov/forecasts/aeo</u>

Short-Term Energy Outlook | <u>www.eia.gov/forecasts/steo</u>

International Energy Outlook | <u>www.eia.gov/forecasts/ieo</u>

Monthly Energy Review | <u>www.eia.gov/totalenergy/data/monthly</u>

Annual Energy Review | www.eia.gov/totalenergy/data/annual

