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Mr. Chairman and Members of the Committee, I appreciate the opportunity to appear before you today to discuss the U.S. and global energy outlook.

The U.S. Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy. EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding regarding energy and its interaction with the economy and the environment. EIA is the Nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views expressed in our reports, therefore, should not be construed as representing those of the Department of Energy or other federal agencies.

The energy projections that I will discuss today are widely used by government agencies, the private sector, and academia as a starting point for their own energy analyses. EIA prepares both short-term energy outlooks, examining monthly trends over the next one to two years, and long-term outlooks, with annual projections over the next 20-to-25 years. Copies of the most recent outlooks are included as part of my testimony. While I will be focusing primarily on

the long-term outlooks in my remarks today, I would like to first summarize some key findings from our January *Short Term Energy Outlook (STEO)*, which includes monthly forecasts through the end of 2013.

The short-term energy outlook

EIA expects the price of West Texas Intermediate (WTI) crude oil to average about $100 per barrel in 2012, $5 per barrel higher than the average price last year. EIA expects that the market will rely on both increases in production of crude oil and non-crude liquids and a draw on inventories to meet world demand growth. There are many significant uncertainties, such as changes in expected economic growth or geopolitical issues affecting Middle Eastern suppliers that could push oil prices higher or lower than projected. The National Defense Authorization Act signed by the President at the end of December, requires EIA, in consultation with Treasury, State and the intelligence community, to submit to Congress every 60 days a report on the availability and price of petroleum and petroleum products produced in countries other than Iran. We are working diligently to provide the requested data within the specified timeframe.

Mild weather the first half of this heating season has resulted in a lower forecast of average household heating expenditures for the current winter than published in the October 2011 *Outlook*. Natural gas inventories continue to set new record highs. As of the most recent report last week, working inventories were 3.1 trillion cubic feet (Tcf), about 20 percent above their level at the same time last year, which was close to the historical five year average. Household expenditures for natural gas, propane and electricity expenditures are now projected to be lower than last winter. While still higher than last winter, average household heating oil expenditures are now expected to increase by only 4 percent down from the earlier projection of an 8 percent.

EIA expects regular-grade motor gasoline retail prices to be slightly lower than last year at an average $3.48 per gallon in 2012, and $3.55 per gallon in 2013. There are regional variations in the forecast, with average expected prices on the West Coast about 25 cents per gallon above the national average during the April through September peak driving season each year; nationally prices are forecast to average about 5 cents per gallon higher than the annual average during the peak driving season. The idling of three refineries on the East Coast could have an impact on prices, especially as the market transitions to new supply sources. This issue is addressed in a December 2011 report *"Reductions in Northeast Refining Activity: Potential Implications for Petroleum Product Markets,"* that provides information responsive to several Congressional inquiries to EIA on this matter. We are working on a more comprehensive follow-on report that will be issued in the near future.

Long-term energy outlooks

Annual Energy Outlook. Turning to the *Annual Energy Outlook 2012* (*AEO2012*), the Reference case discussed in this testimony was released last week and is intended to represent an energy

future through 2035 based on given market, technological, and demographic trends; current laws and regulations; and consumer behavior. EIA recognizes that projections of energy markets are highly uncertain and subject to geopolitical disruptions, technological breakthroughs, and other unforeseeable events. In addition, long-term trends in technology development, demographics, economic growth, and energy resources may evolve along a different path than represented in the projections. The complete *AEO2012*, which EIA will release this spring, will include a large number of alternative cases intended to examine these uncertainties.

A copy of the *AEO2012* Early Release Overview is included as part of my testimony so I will summarize here.

Domestic crude oil production is expected to grow by more than 20 percent over the coming decade: Domestic crude oil production increased from 5.1 million barrels per day in 2007 to 5.5 million barrels per day in 2010. Over the next 10 years, continued development of tight oil combined with the development of offshore Gulf of Mexico resources are projected to push domestic crude oil production to 6.7 million barrels per day in 2020, a level not seen since 1994.

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: U.S. dependence on imported petroleum liquids declines in the *AEO2012* Reference case, primarily as a result of growth in domestic oil production of over 1 million barrels per day by 2020, an increase in biofuel use of over 1 million barrels per day crude oil equivalent by 2024, and modest growth in transportation sector demand through 2035. Net petroleum imports as a share of total U.S. liquid fuels consumed drop from 49 percent in 2010 to 38 percent in 2020 and 36 percent in 2035 in *AEO2012*. Note that proposed fuel economy standards covering model years 2017 through 2025 that are not included in the Reference case would further reduce projected levels of liquid fuels use and net petroleum imports.

U.S. production of natural gas is expected to exceed consumption early in the next decade: The United States is projected to become a net exporter of liquefied natural gas (LNG) in 2016, a net pipeline exporter in 2025, and an overall net exporter of natural gas in 2021. The outlook reflects increased use of LNG in markets outside of North America, strong domestic natural gas production, reduced pipeline imports and increased pipeline exports, and relatively low natural gas prices in the United States compared to other global markets.

Use of renewable fuels and natural gas for electric power generation rises: The natural gas share of electric power generation increases from 24 percent in 2010 to 27 percent in 2035, and the renewables share grows from 10 percent to 16 percent over the same period. In recent years, the U.S. electric power sector's historical reliance on coal-fired power plants has begun to decline. Over the next 25 years, the projected coal share of overall electricity generation falls to 39 percent, well below the 49-percent share seen as recently as 2007, because of slow growth in electricity demand, continued competition from natural gas and renewable plants,

and the need to comply with new environmental regulations.

Total U.S. energy-related carbon dioxide (CO_2) emissions remain below their 2005 level through 2035: Energy-related CO_2 emissions grow by 3 percent from 2010 to 2035, reaching 5,806 million metric tons in 2035. They are more than 7 percent below their 2005 level in 2020 and do not return to the 2005 level of 5,996 million metric tons by the end of the projection period. Emissions per capita fall by an average of 1 percent per year from 2005 to 2035, as growth in demand for transportation fuels is moderated by higher energy prices and Federal fuel economy standards. Proposed fuel economy standards covering model years 2017 through 2025 that are not included in the Reference case would further reduce projected energy use and emissions. Electricity-related emissions are tempered by appliance and lighting efficiency standards, State renewable portfolio standard requirements, competitive natural gas prices that dampen coal use by electric generators, and implementation of the Cross-state Air Pollution Rule.

Other highlights of the *AEO2012* Reference case projections:

- World oil prices rise in the Reference case, as pressure from growth in global demand continues. In 2035, the average real price of crude oil in the Reference case is $146 per barrel in 2010 dollars. World liquids consumption grows from 87.1 million barrels per day in 2010 to 109.7 million barrels per day in 2035, driven by growing demand in China, India, the Middle East, and other developing economies.

- Total U.S. primary energy consumption, which was 101.4 quadrillion Btu in 2007, grows from 98.2 quadrillion Btu in 2010 to 108.0 quadrillion Btu in 2035. The fossil fuel share of energy consumption falls from 83 percent of total U.S. energy demand in 2010 to 77 percent in 2035.

- Net imports of energy meet a declining share of total U.S. energy demand as domestic energy production increases. The projected net import share of total U.S. energy consumption in 2035 is 13 percent, compared with 22 percent in 2010 and 29 percent in 2007.

International Energy Outlook. Given the interconnectedness of U.S. energy markets and the broader global markets, the international outlook provides useful context for the more detailed U.S. projections outlined above. I will briefly describe some highlights of EIA's *International Energy Outlook 2011* (*IEO2011*), which was issued last September. I will also discuss some similarities and differences from the *World Energy Outlook 2011* (*WEO2011*) developed by the International Energy Agency (IEA) that you will also be hearing about today.

EIA's *IEO2011* Reference case develops a projection that assumes current laws and policies, but does not anticipate new policies or regulations that have not yet been implemented. In the *IEO2011* Reference case, worldwide energy consumption grows by 53 percent between 2008 and 2035 with much of the increase driven by strong economic growth in the developing

nations. China and India account for half of the projected increase in world energy use over the next 25 years. China alone, which only recently became the world's top energy consumer, is projected to use 68 percent more energy than the United States by 2035. A few highlights follow:

- Renewable energy is projected to be the fastest growing source of primary energy over the next 25 years, but fossil fuels remain the dominant source of energy. The renewable share of total energy use increases from 10 percent in 2008 to 15 percent in 2035.

- Natural gas has the fastest growth rate among the fossil fuels over the 2008 to 2035 projection period. Unconventional natural gas (tight gas, shale gas, and coalbed methane) supplies increase substantially—especially from the United States, but also from Canada and China.

- World oil prices remain high in the Reference case, but liquids consumption continues to grow; both conventional and unconventional liquid supplies are used to meet rising demand.

- Electricity is the world's fastest-growing form of end-use energy consumption in the Reference case, as it has been for the past several decades.

- The transportation share of world total liquids consumption increases from 54 percent in 2008 to 60 percent in 2035, accounting for 82 percent of the total increase in world liquids consumption.

- Energy-related carbon dioxide emissions rise from 30.2 billion metric tons in 2008 to 43.2 billion metric tons in 2035—an increase of 43 percent. Much of the increase in carbon dioxide emissions is projected to occur among the developing nations of the world, especially in Asia.

The *IEO2011* Reference case is most directly comparable to the Current Policies Scenario (CPS) in the IEA's *WEO2011*, and there are many similarities in their projections. In both the *IEO2011* Reference case and the *WEO2011* CPS, non-OECD countries account for the vast majority of growth in global energy use, which is expected to increase by 1.6 percent per year between 2009 and 2035. Non-OECD energy consumption growth increases by 2.3 percent per year, while China's energy use grows at a somewhat faster rate of 2.5 to 2.7 percent per year. World liquids consumption reaches about 112 million barrels per day in both projections.

There are, however, also some important differences between the IEO2011 Reference case and the *WEO2011* CPS. For example, the *WEO2011* CPS projects that the OPEC share of world liquids supply will increase from about 42 percent in 2010 to 51 percent in 2035. Under similar price assumptions, the *IEO2011* Reference case anticipates that the OPEC market share will remain at about 42 percent and that non-OPEC supplies from both conventional and unconventional sources will continue to increase.

Another difference concerns the outlook for U.S. natural gas markets. The *WEO2011* CPS projects that U.S. natural gas import prices will more than double over the projection, from $4.40 per million Btu (real 2010 dollars) to $9.90 per million Btu in 2035. The *IEO2011* Reference case also anticipates an increase in U.S. natural gas import prices, but they rise more slowly, reaching only $6.90 per million Btu in 2035.

I should note that while the *IEO2011* Reference case and *WEO2011* CPS are most directly comparable, it is the New Policies Scenario (NPS) rather than the CPS that is featured as the central scenario in the *WEO2011*. The NPS assumes "recent government policy commitments are implemented in a cautious manner, even if they are not yet backed up by firm measures." It can be a real challenge of course, to determine what does or does not constitute a "policy commitment" under an NPS-type scenario. Indeed, there are even questions surrounding the definitions of "current policies" for a CPS or Reference case. For example, while the IEO follows the AEO convention that existing energy tax credits and related incentives in the United States that have statutory expiration dates expire as scheduled for purposes of the projections, the CPS appears to contemplate the indefinite extension of existing incentives.

Conclusion

As I noted at the outset, while EIA does not take policy positions, its data, analyses, and projections are meant to assist policymakers in their energy deliberations. In addition to the work on baseline projections that I have reviewed this morning, EIA has often responded to requests from this Committee and others for analyses of the energy and economic impacts of energy policy proposals.

This concludes my testimony, Mr. Chairman and Members of the Committee. I would be happy to answer any questions you may have.