Annual Energy Outlook 2016 Early Release: Annotated Summary of Two Cases

May 17, 2016

The *Annual Energy Outlook 2016* (AEO2016) Early Release features two cases: the Reference case and a case excluding implementation of the Clean Power Plan (CPP)

Reference case: A business-as-usual trend estimate, given known technology and technological and demographic trends. The Reference case assumes CPP compliance through mass-based standards that establish caps on CO2 emissions from fossil-fired generators covered by the CPP. The mass-based standards are modeled using allowances with cooperation across states at the regional level, with all allowance revenues rebated to ratepayers.

No CPP case: A business-as-usual trend estimate, but assumes that CPP is not implemented.

Projections are highly dependent on the data, methodologies, model structures, and assumptions used in their development

- Projections are not statements of what will happen but of what might happen given the assumption and methodologies used for any particular case. The Reference case projection is a business-as-usual trend estimate reflecting current laws and regulations, known technology, and technological and demographic trends.

- While energy markets are complex, energy models are simplified representations of energy production and consumption, regulations, and producer and consumer behavior.

- Energy projections are subject to much uncertainty, as many of the events that shape energy markets, including future developments in technologies, resources, policies, and geopolitics, cannot be foreseen with certainty. Some key uncertainties in the AEO2016 projections are addressed through alternative cases, which will be published in the full AEO2016 release.

The AEO2016, to be issued in early summer 2016, will include a full range of Clean Power Plan (CPP) and other alternative cases, including:

- Alternative CPP cases: Rate-based implementation (applying limits on CO2 emissions per kilowatthour from covered sources), other mass-based implementation options (wider trading, allowance allocation to generators), hybrid case (mass-based in Northeast and California, rate-based elsewhere), extended case (further reductions beyond 2030)
- High and low world oil price
- High and low macroeconomic growth
- High and low oil and natural gas resources/technology
- Industrial technology efficiency, high and low technology innovation
- Phase 2 heavy-duty truck requirements
- Extended policies: extends current tax credits and adds follow-on efficiency standards

Key updates in AEO2016

- Incorporation of the U.S. Environmental Protection Agency's final rules for the Clean Power Plan
- Updated renewable capital costs
- Latest California zero-emission vehicle sales mandates, which have been adopted by a number of other states
- Extension of the production tax credit for wind and 30% investment tax credit for solar
- Lower near-term crude oil prices

Key takeaways from the two cases: Electricity

- Implementation of the Clean Power Plan (CPP) using a mass-based approach reduces annual electricity-related carbon dioxide (CO2) emissions to between 1,550 and 1,560 million metric tons (MMT) in the 2030-40 period, substantially below their 2005 and 2015 levels of 2,416 MMT and 1,891 MMT, respectively. Coal's share of total electricity generation, which was 50% in 2005 and 33% in 2015, falls to 21% in 2030 and to 18% in 2040.

- Even without the CPP, electricity-related CO2 emissions remain well below their 2005 level at 1,942 MMT in 2030 and 1,959 MMT in 2040; this outcome reflects both low load growth and generation mix changes driven by the extension of key renewable tax credits, reduced solar photovoltaic (PV) capital costs, and low natural gas prices.

- With the mass-based approach, the strong growth in wind and solar generation spurred by tax credits leads to a short-term decline in natural gas-fired generation between 2015 and 2021. However, natural gas generation then grows significantly under a mass-based CPP implementation, increasing by more than 67% from 2021 through 2040, when it is by far the largest generation source.

Key takeaways from the two cases: Natural Gas and Petroleum

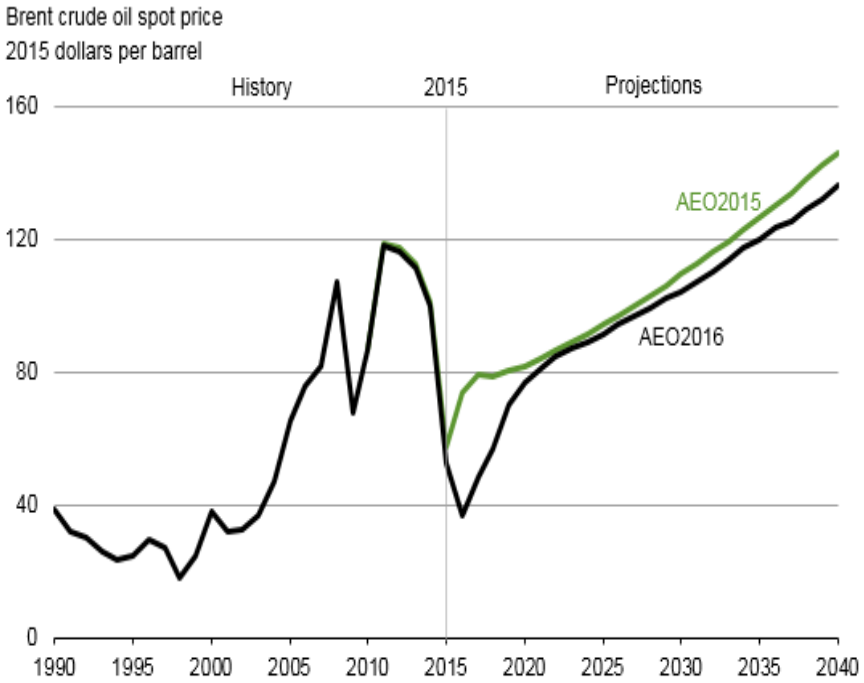
- Natural gas production in the Reference case grows more than 50% between 2015 and 2040. Annual average natural gas prices rise from their 2015 level, $2.62/ million British thermal units (MMBtu) at the benchmark Henry Hub, to roughly $5.00/million Btu in the mid-2020s and remain around that level through 2040. Technology improvements allow natural gas production to rise even as prices stabilize. Gas prices and production are slightly lower without the Clean Power Plan.

- Lower prices keep U.S. crude oil production below 9.5 million barrels per day (b/d) through 2025 in the Reference case; production grows to 11.3 million b/d by 2040, reflecting higher recovery rates driven by technology advances and higher prices. The full AEO2016 will present alternative resource and oil price cases with different implications for production.

- Petroleum use (including natural gas liquids such as ethane and propane) rises 4% from 2015 to 2040 in the Reference case, but transportation use falls 10%, mainly due to improved light duty vehicle (LDV) fuel efficiency; the Reference case does not include proposed Phase 2 standards for heavy-duty trucks or tighter LDV standards beyond 2025, which would further reduce projected oil use in transportation.

Overview

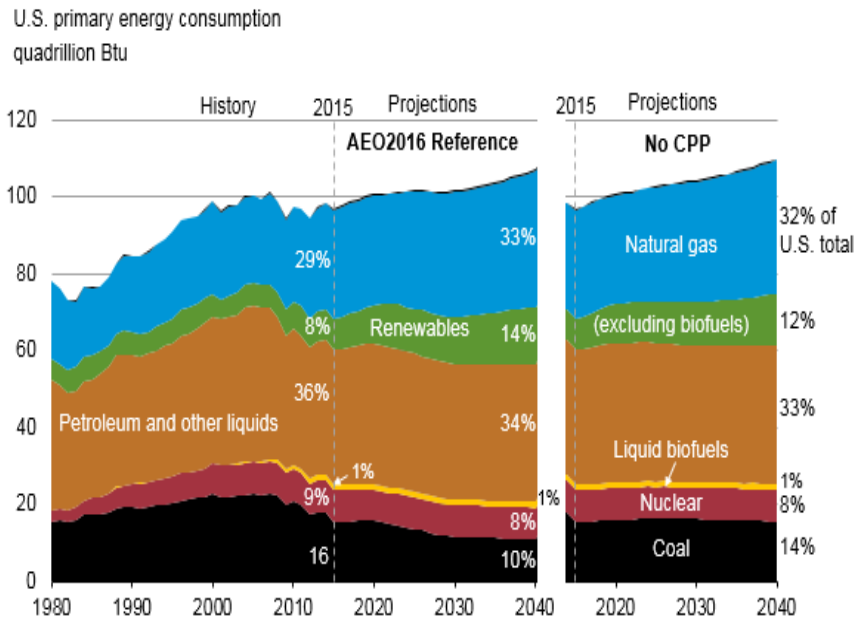
Reference case crude oil price scenario is lower in AEO2016 than in AEO2015, particularly in the near term



Source: EIA, Annual Energy Outlook 2016 Reference case and Annual Energy Outlook 2015 Reference case

- AEO2016 Reference case oil prices are lower than those in last year's outlook, particularly in the near term.
- In the Reference case, the Brent crude oil price averages $37/barrel (b) in 2016, increasing to $77/b in 2020 as demand and supply come into balance. After 2020, the prices continue to rise, as growing demand results in the development of more costly resources.
- The full AEO2016 will explore alternative price and resource/technology paths that reflect the wide uncertainty in future market conditions.

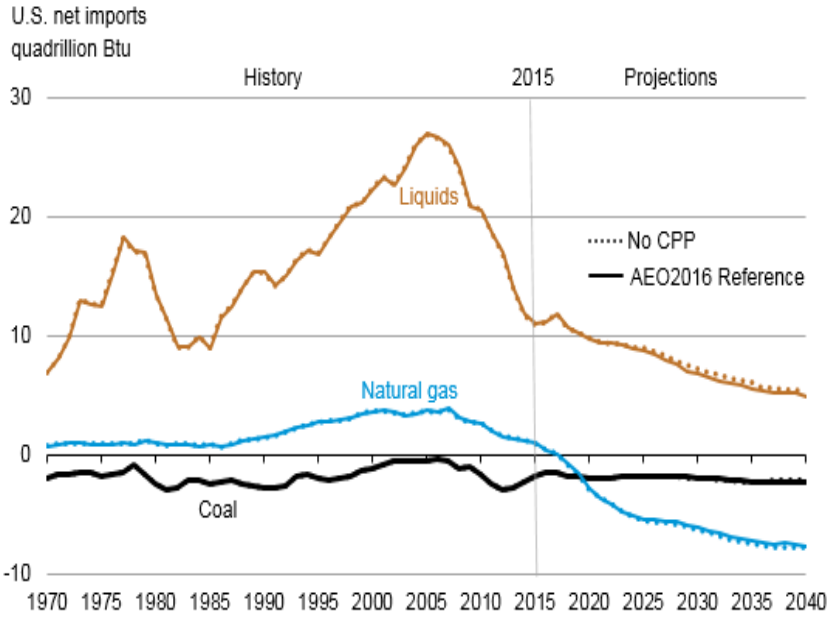
Reductions in energy intensity largely offset impact of gross domestic product (GDP) growth, leading to slow projected growth in energy use



Source: EIA, Annual Energy Outlook 2016

- Total U.S. primary energy consumption grows slowly in both cases as reductions in energy intensity offset the impact of GDP growth, with slightly higher growth in the No CPP case than in the Reference case.
- Total petroleum and other liquids consumption increases in the near term but declines from 2020-31 as increases in vehicle fuel economy offset growth in transportation activity and increased industrial use.
- Natural gas use increases throughout the projection period. The No CPP case has slower growth in natural gas use in the electric power sector.
- Coal use in the Reference case declines throughout the projection period, mostly before 2030 because of the Clean Power Plan. In the No CPP case, coal retains a larger market share.
- The renewable share of total energy use (including liquid biofuels) increases, with most of the growth occurring in the electric power sector. Solar and wind account for nearly all of the projected increase.
- Nuclear generation remains close to its current level as the impact of new plant additions is offset by retirements.

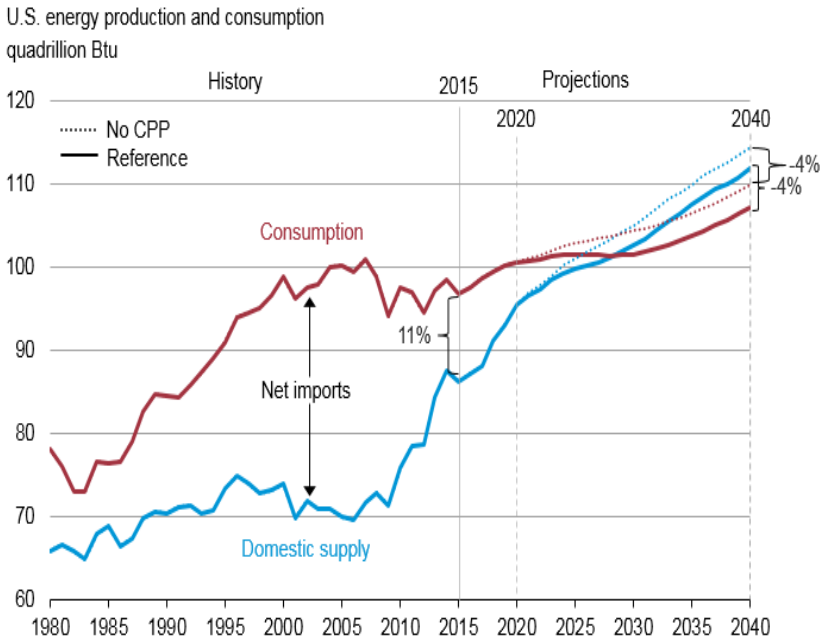
U.S. net energy imports continue to decline (except for liquids in the near term) reflecting increased oil and natural gas production coupled with slowly growing or falling demand



Source: EIA, Annual Energy Outlook 2016

- The share of net imports in total U.S. liquids consumption declines from 60% in 2005 (24% in 2015) to 7% by 2040, which would be its lowest level since 1957.
- The United States becomes a net exporter of natural gas before 2020, largely because of growth in liquefied natural gas exports.
- The United States continues to be a net exporter of coal (including coal coke) over the entire projection.

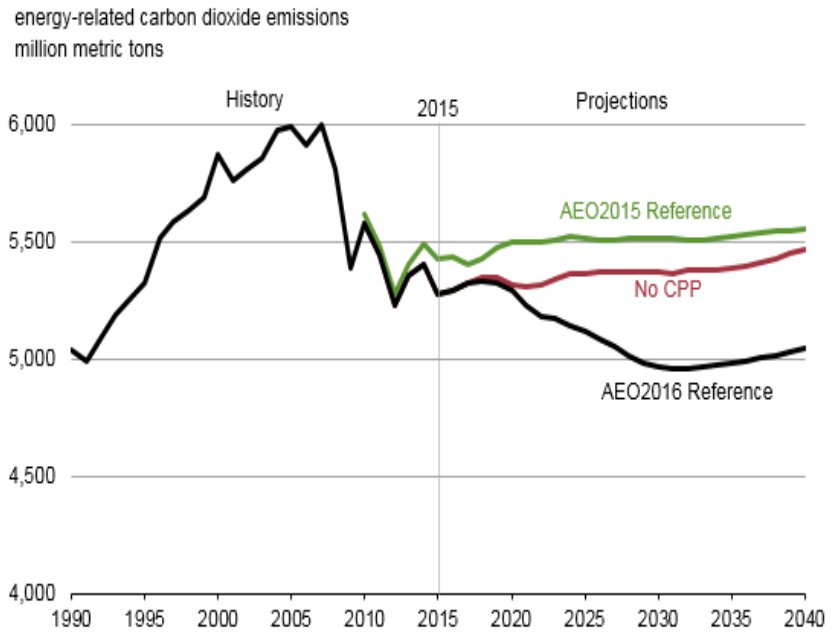
U.S. energy production outstrips consumption, making the United States a net energy exporter



Source: EIA, Annual Energy Outlook 2016

- U.S. net energy imports, including petroleum and other liquids, natural gas, and coal, decline and ultimately end in the Reference case, a first since the 1950s. The net import share of total U.S. energy consumption was 11% in 2015 and 30% as recently as 2005.
- The transition from a net energy importer to a net energy exporter follows a similar pattern in the Reference and No CPP cases, although the total levels of U.S. energy consumption and production are somewhat higher beyond 2022 in the No CPP case.
- By 2040, total U.S. energy production is greater than total U.S. energy consumption, allowing for U.S. net energy exports equal to 4% of total consumption.

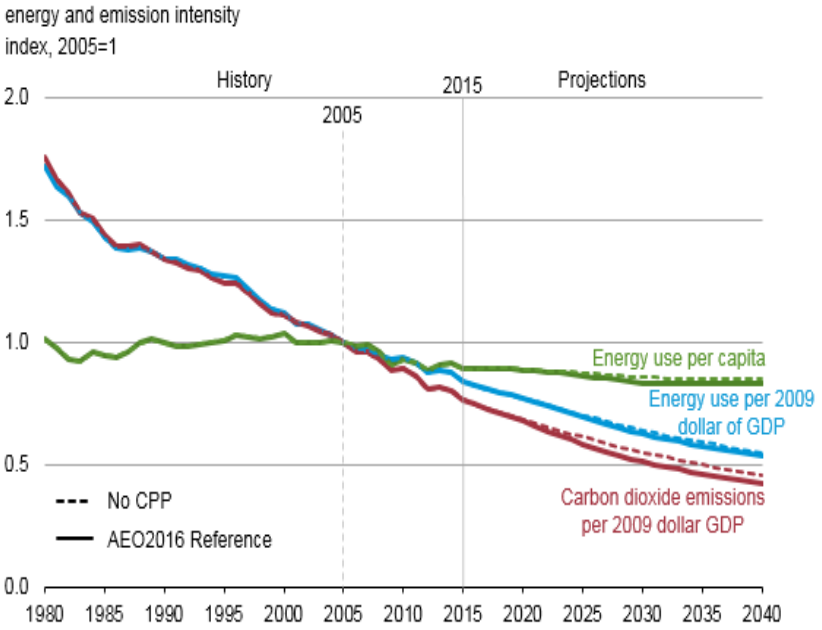
CO2 emissions are lower in AEO2016 Reference case than AEO2015 Reference Case, even without the Clean Power Plan (CPP)



Source: EIA, Annual Energy Outlook 2016

- Key drivers for the lower energy-related CO2 emissions in AEO2016 include:
  - Lower natural gas prices that support higher electricity generation from natural gas with or without the CPP
  - Lower technology costs for wind and solar, combined with extended tax credits and the CPP, and
  - Reduced coal generation as a result of the CPP, which emit the most CO2 per kilowatthour.

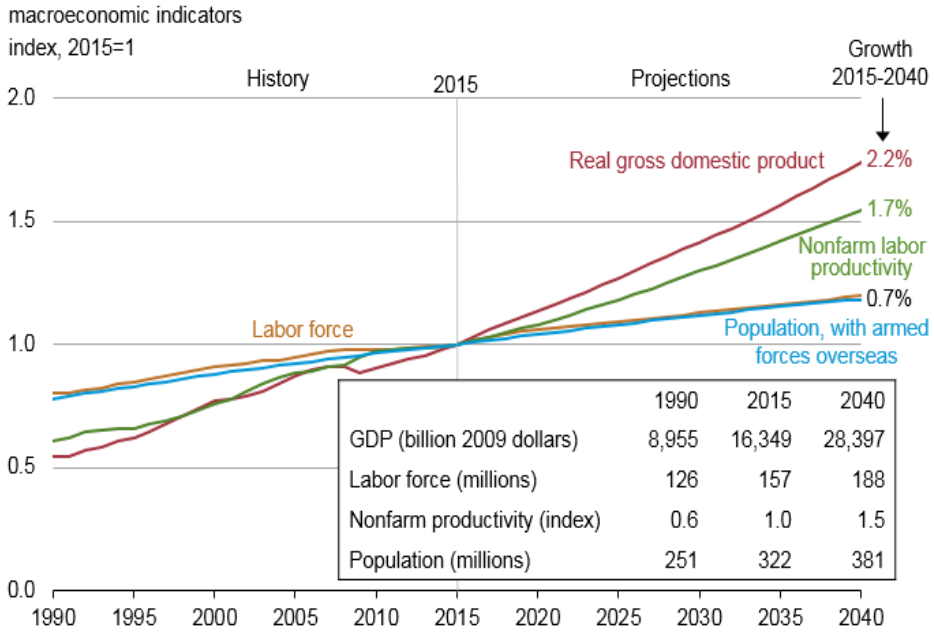
CO2 emissions per dollar of gross domestic product (GDP) decline faster than energy use per dollar of GDP with a shift towards low- and no-carbon fuels



Source: EIA, Annual Energy Outlook 2016 Reference case

- The economy's energy intensity, carbon intensity, and per-capita energy use are projected to decline steadily. In the Reference case, energy use per dollar of GDP declines at an average annual rate of 1.8% over 2015-40, while energy use per capita declines at an average annual rate of 0.3%. With renewables and natural gas providing larger shares of total energy use, CO2 per dollar of GDP declines faster than energy intensity.
- The structure and efficiency of the U.S. economy changes in ways that lower total energy use and energy use per dollar of GDP. The nonindustrial and services sector share of the economy remains near 77% throughout the projection, but there is a shift towards non-energy-intensive industries within manufacturing that is slightly smaller in the absence of the CPP.
- Energy-use-per-capita declines, driven by gains in appliance efficiency, a shift in population from cooler to warmer regions, and an increase in vehicle efficiency standards, combined with modest growth in travel per licensed driver.

Productivity improvements are the main driver of growth in Gross Domestic Product (GDP) with the labor force showing similar growth to the Reference case

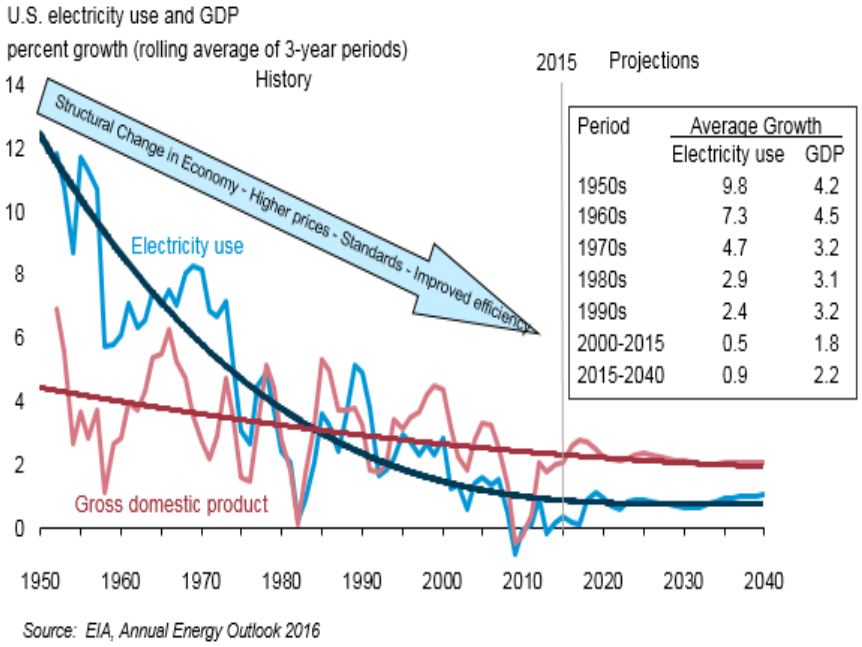


Source: EIA, Annual Energy Outlook 2016

- Economic growth depends mainly on growth and productivity in the labor force. Population growth determines labor force growth in the long run.
- In the Reference case, the labor force grows by an average of 0.7%/year. Labor productivity in the nonfarm business sector grows by 1.7%/year; and growth in real GDP averages 2.2%/year.
- Investment growth averages 2.8%/year in the Reference case, disposable income available to households grows by 2.3%/year, and disposable income per capita increases by 1.7%/year.

Electricity

Electricity use (including direct use) is expected to continue to grow, but the rate of growth slows over time as it has almost continuously over the past 60 years

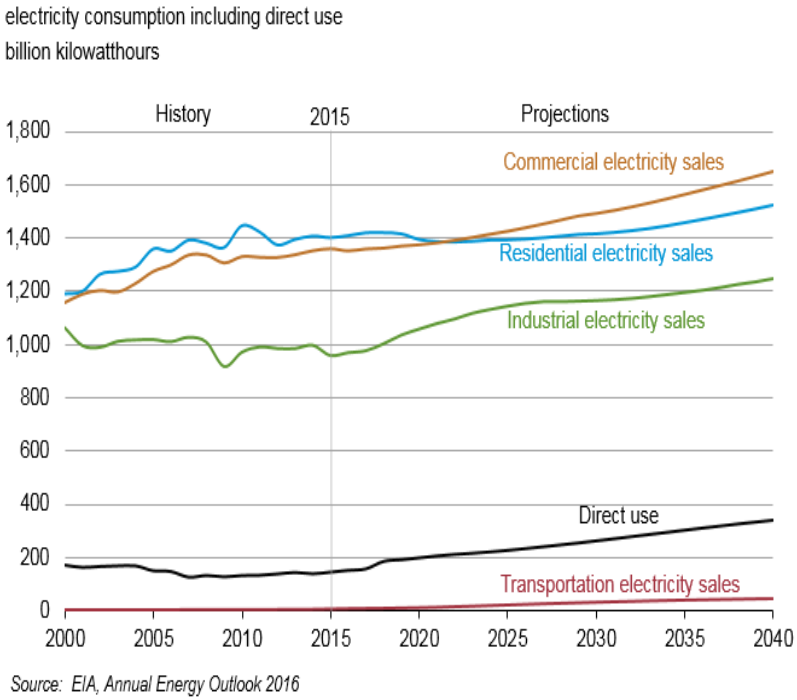


Period	Average Growth	
	Electricity use	GDP
1950s	9.8	4.2
1960s	7.3	4.5
1970s	4.7	3.2
1980s	2.9	3.1
1990s	2.4	3.2
2000-2015	0.5	1.8
2015-2040	0.9	2.2

Source: EIA, Annual Energy Outlook 2016

- Growth in the economy and electricity demand remain linked, but the linkage is shifting toward much slower electricity demand growth relative to economic growth.
- The factors driving this trend include slowing population growth, near market saturation of key electricity using appliances, improving efficiency of nearly all equipment and appliances in response to standards and technological change, and a shift in the economy toward less energy-intensive industries.
- Efficiency standards for lighting and other appliances that have been established over the past few years continue to put downward pressure on growth in electricity demand as new equipment is added and the existing stock is replaced.

Industrial activity bolsters growth in projected electricity consumption relative to recent history



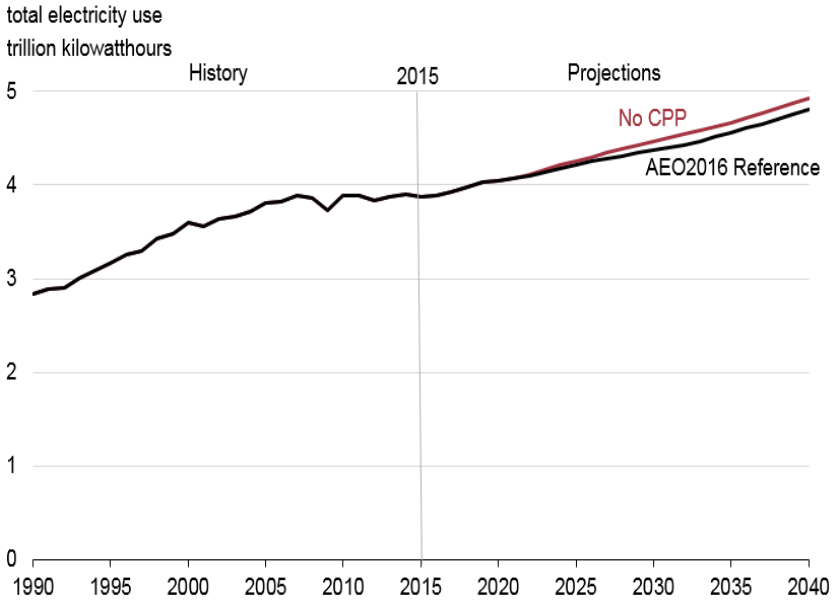
Source: EIA, Annual Energy Outlook 2016

- Electricity sales grow 0.7%/year on average from 2015-40 in the Reference case – similar to 0.6% growth from 2000-2015.
- Electricity consumption – including direct use (or generation for own use) – is projected to grow 0.9% on average in the Reference case, faster than the 0.5% growth from 2000-2015.
- Generation for direct use declined 1.4%/year from 2000-2015. End-use generation for direct use grows 3.8%/year on average between 2015-40 in the Reference case, bolstered by adoption of rooftop photovoltaic (PV) and natural gas-fired combined heat and power (CHP).
- Industrial electricity sales declined 0.7%/year between 2000 and 2015, which were affected by a decline in shipments during the recession. Industrial electricity sales grow 1.1%/year from 2015-40 with an expected increase in industrial activity.
- Residential electricity sales grew 1.1%/year from 2000 and 2015. In the Reference case, residential sales grow just 0.3%/year. Efficiency improvements, especially in lighting and PV adoption, offset most of the effects of sector growth, increased use for space cooling, and miscellaneous electric loads (MELs).
- Commercial electricity sales also grew 1.1%/year from 2000-2015. Commercial sales are projected to grow 0.8%/year from 2015-40 in the Reference case. Efficiency improvements, especially in lighting and refrigeration, and increased adoption of PV and commercial CHP, partially offset increased electricity use for computer servers and for MELs.

Clean Power Plan (CPP) implementation in the AEO2016 Reference case

- CPP compliance is met through imposing mass-based caps at the Electricity Market Module (EMM) region level, using aggregated targets based on U.S. Environmental Protection Agency (EPA) state budgets covering existing and new sources.
  - EMM region enforcement implicitly assumes trading can occur between states within an EMM region, but no allowance trading between regions is allowed in the Reference case
  - Using budgets that cover new sources satisfies EPA's requirement that leakage - through shifting electricity generation to new fossil fuel sources - does not occur.
- Reference case assumes that allowances are allocated to load entities and that revenues from allowance sales are used to provide rebates on consumer's electricity bills.

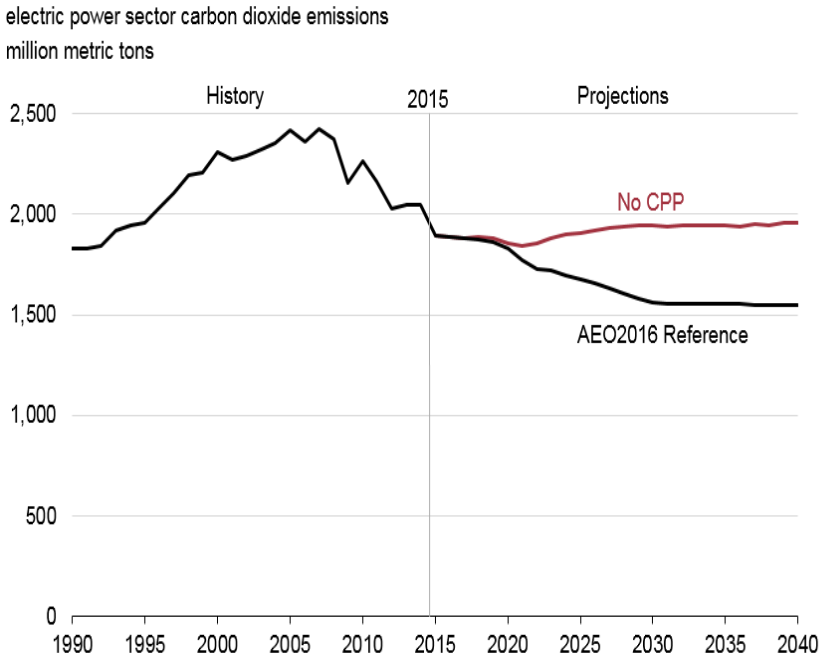
Electric demand is 2% lower in 2030 in the Reference case than in the No CPP case, reflecting both compliance actions and higher prices with the Clean Power Plan (CPP)



Source: EIA, Annual Energy Outlook 2016

- Reference case projections reflect several types of efficiency improvements related to CPP implementation.
  - Subsidies, in the form of direct rebates, decrease the installed capital cost of energy-efficient equipment, as is typical of utility incentives.
  - EIA assumes that energy efficiency portfolios vary by Census division in terms of the implementation, timing, and level of end-use subsidies.
- Residential demand grows 9% in the Reference case and 11% in the No CPP case over 2015-40. Low residential demand growth in both cases reflects continued efficiency improvements in appliances and electronics.
- Commercial demand grows 21% in the Reference case and 26% in the No CPP case over the same period, with the difference reflecting both CPP-driven energy efficiency programs and electricity prices.
- Industrial demand grows 30% in the Reference case and 32% in the No CPP case over 2015-40. Lower demand growth in the Reference case reflects higher electricity prices and not because of specific CPP-related efficiency gains.

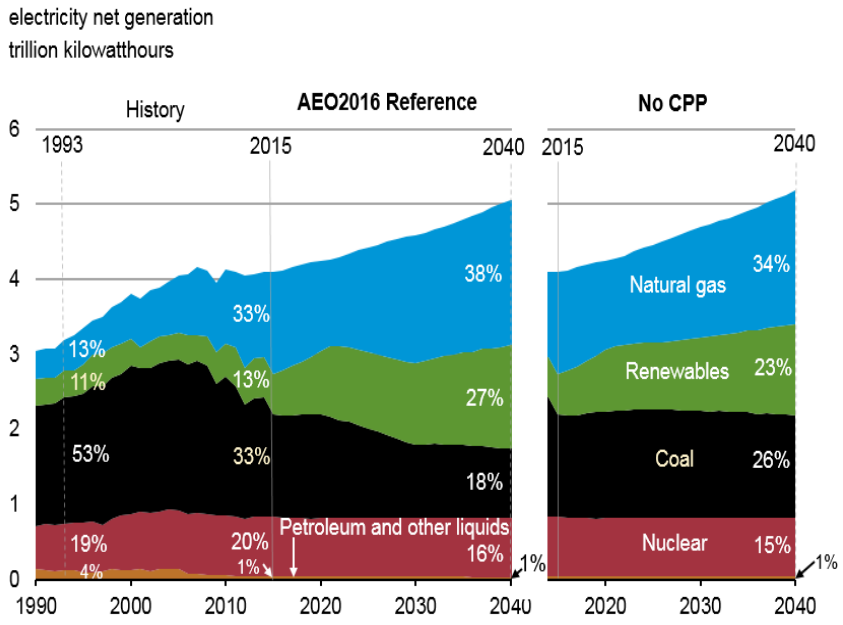
Clean Power Plan (CPP) lowers total electric sector carbon dioxide (CO2) emissions by an additional 20% over the No CPP case by 2030



Source: EIA, Annual Energy Outlook 2016

- Electric power sector CO2 emissions declined over the past decade as a result of shifts to less carbon-intensive generation sources. Low natural gas prices, state-level renewable portfolio standards, and federal tax credits for renewables have led to the increased use of those generating sources, while tighter environmental regulations have discouraged coal use.
- In the Reference case, CO2 emissions in the power sector were 35% below 2005 levels in 2030 due to the implementation of the CPP. The Reference case assumes implementation through mass-based standards, which remain in place at 2030 levels throughout the remainder of the projection, resulting in flat power sector emissions. The full AEO2016 release will include other CPP implementation cases.
- In the No CPP case, emissions rise slightly over the projection, but remain at least 19% below 2005 levels in all years. There are fewer coal retirements than in the Reference case, but any incremental demand growth is generally met with new natural gas or renewable capacity, limiting emissions growth.

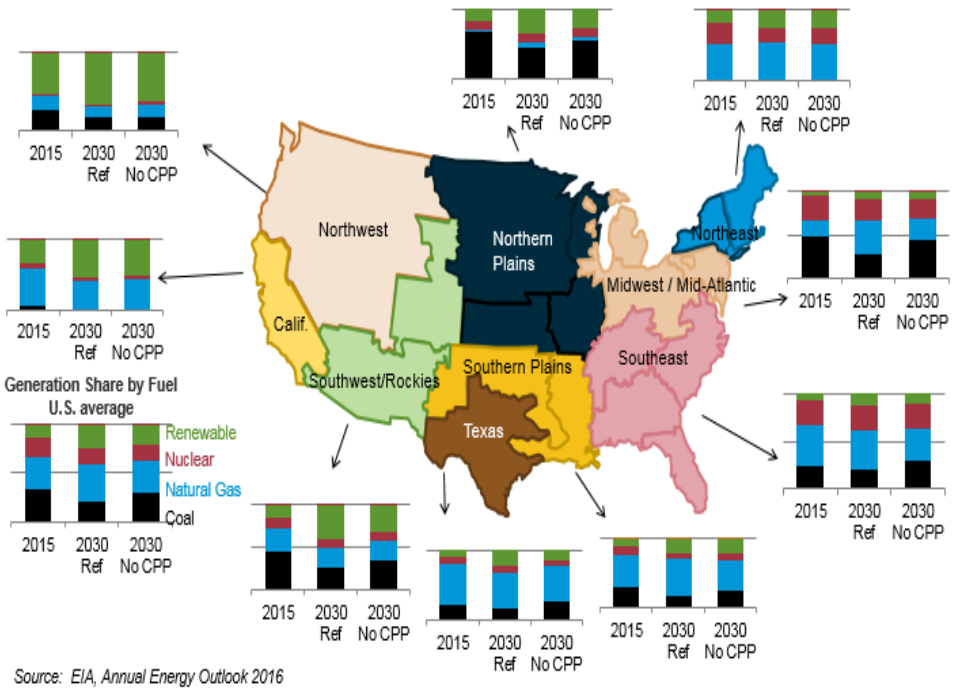
Clean Power Plan (CPP) accelerates shift to lower-carbon options for generation, led by growth in renewables and gas-fired generation; results are sensitive to CPP implementation approach



Source: EIA, Annual Energy Outlook 2016

- Substantial growth in the renewable generation share of total electricity generation occurs with or without the Clean Power Plan (CPP), with renewable generation more than doubling from 2015 levels in both cases. Lower costs, particularly for solar installations, are a big driver of the renewable growth, along with tax credit extensions and state-level renewable mandates.
- The natural gas share grows more substantially in the Reference case than in the No CPP case, as natural gas is used to replace retiring coal generation as a way to comply with the CPP. Natural gas generation increases by 44% in the Reference case and by 32% in the No CPP case from 2015 to 2040.
- Coal generation declines by 32% from 2015 to 2040 in the Reference case, as a result of retirements and lower levels of utilization to meet the carbon dioxide emissions caps. In the No CPP case, coal generation levels remain flat, as fewer units are retired and the remaining units are assumed to operate at higher levels, particularly as natural gas prices rise. However, the coal share of total generation still declines, and virtually no new capacity is added.
- Nuclear generation levels remain flat throughout the projection, with new units offset by retirements. High construction costs result in a projection that no new, unplanned, nuclear plants will be constructed even with the CPP in place, and the nuclear share of total generation declines from the 2015 level in both cases.

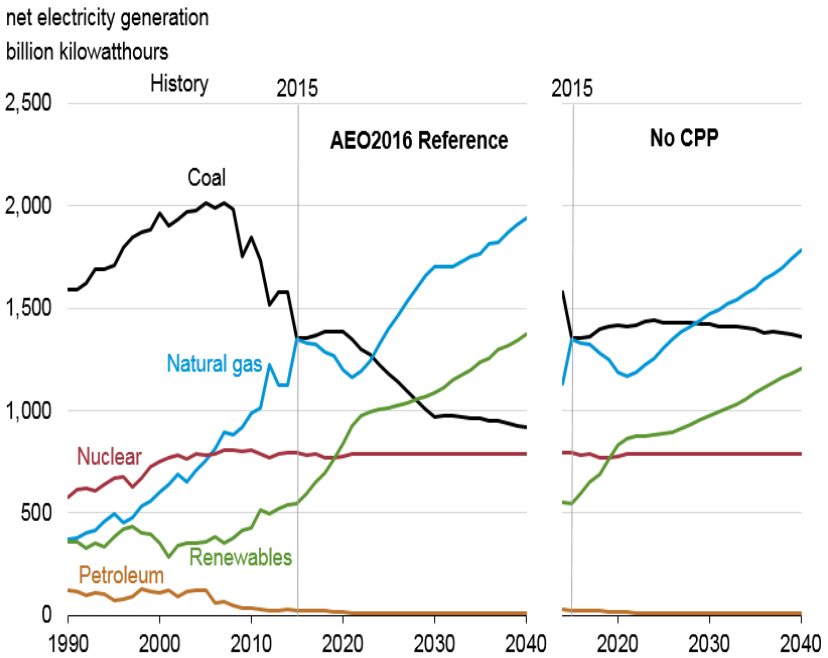
The electricity generation mix varies widely across U.S. regions, which is likely to affect both compliance choices and costs



Source: EIA, Annual Energy Outlook 2016

- In 2015, coal generation is used most heavily to meet electricity demand in the Southwest/Rockies, Midwest/Mid-Atlantic, and Northern Plains regions of the country. These regions will require the largest shifts in generation mix for Clean Power Plan (CPP) compliance.
- The Midwest/Mid-Atlantic region increasingly turns to increased use of natural gas in the Reference case, whereas the Northern Plains and Southwest/Rockies take advantage of abundant, low-cost renewable resources in response to the CPP.
- Without the CPP, the Northern Plains and Southwest/Rockies still increase renewable generation, but to a lesser extent, as fewer coal plants are retired and the coal generation share does not drop as dramatically.
- Regions that are currently dominated by natural gas or renewable generation continue to use those resources with or without the CPP.

Natural gas generation falls through 2021; both gas and renewable generation surpass coal by 2030 in the Reference case, but only natural gas does so in the No CPP case



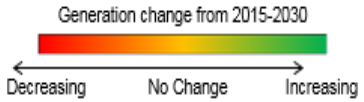
Source: EIA, Annual Energy Outlook 2016

- Although coal and natural gas generation were roughly equal in 2015, rising natural gas prices in the near term and significant growth in renewables spurred by the production tax credit and investment tax credit result in declining natural gas generation over the next few years.
- However, the combination of the Clean Power Plan (CPP) and relatively low natural gas prices results in natural gas and renewables permanently surpassing coal generation by the mid- and late-2020s, respectively.
- The No CPP case results in fewer generating unit retirements and flat coal generation through the projection period. In this case, natural gas generation surpasses coal generation in the late-2020s. Total renewables generation grows steadily, but remains below coal generation through 2040 in the No CPP case.
- Coal's share of the generation mix has also been reduced by the growing role of renewables other than hydroelectric power, especially wind and solar. Until recently, increased use of nonhydro renewables has largely been driven by a combination of state and federal policies. Declining capital costs for both technologies are also improving their competitiveness.

The Clean Power Plan (CPP) results in large declines in coal generation; the mass-based implementation of the CPP in the Reference Case increases natural gas generation and adds to growth in renewable generation beyond the early 2020s

change in generation from 2015 to 2030
billion kilowatthours

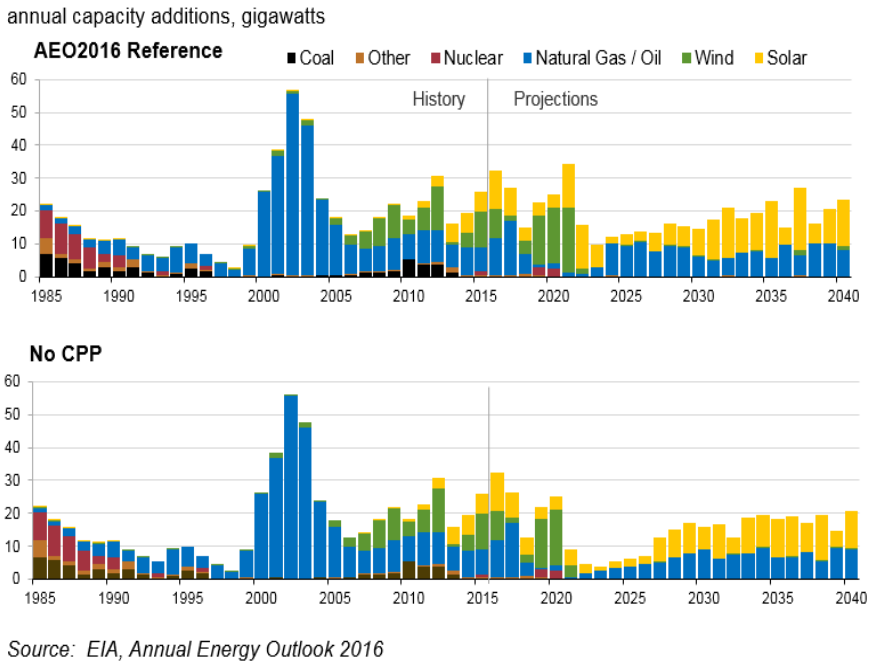
	AEO2016 Reference				No CPP			
Region	Coal	Natural Gas	Nuclear	Renewables	Coal	Natural Gas	Nuclear	Renewables
Midwest /Mid-Atlantic	-197	201	-33	30	-22	88	-33	26
Northern Plains	-68	12	1	85	4	14	1	65
Southern Plains	-40	49	-1	44	-10	5	-1	45
Southwest/Rockies	-39	-1	0	73	-13	5	0	56
Northwest	-21	-6	0	60	-18	2	0	47
Texas	-11	16	0	62	31	16	0	25
California	-9	0	0	76	-9	6	0	67
Northeast	0	20	-13	24	-1	8	-13	24
Southeast	2	62	38	85	103	-22	38	69
US total	-382	354	-9	542	67	123	-9	427



Source: EIA, Annual Energy Outlook 2016

- Renewable energy plays a significant role in meeting electricity demand growth throughout most of the country, irrespective of the CPP. In the Reference case, renewable generation accounts for 27% of total U.S. generation in 2040. Even without the pressure to reduce emissions, renewable generation provides 23% of total U.S. generation in 2040 in the No CPP case.
- The largest changes in generation mix occur in regions where coal-fired generation has played a significant role in the past, including the Midwest/Mid-Atlantic, Southern Plains, and Southeastern regions. For the Midwest/Mid-Atlantic and Southern regions, there is a strong increase in natural gas generation in the No CPP and Reference cases in 2030, reinforcing the current trend already underway of natural gas generation replacing coal generation.
- In the Northern Plains states, the coal displaced by the CPP is replaced by increased renewables generation, with a cumulative addition of 85 billion kilowatthours (kWh) in the Reference case by 2030, compared with 65 billion kWh in the No CPP case.
- Two coastal regions, the Northeast and California, show little change between the Reference and No CPP cases in 2030, largely due to the impact of existing programs that result in emission reductions similar to those needed to comply with the CPP in both cases.

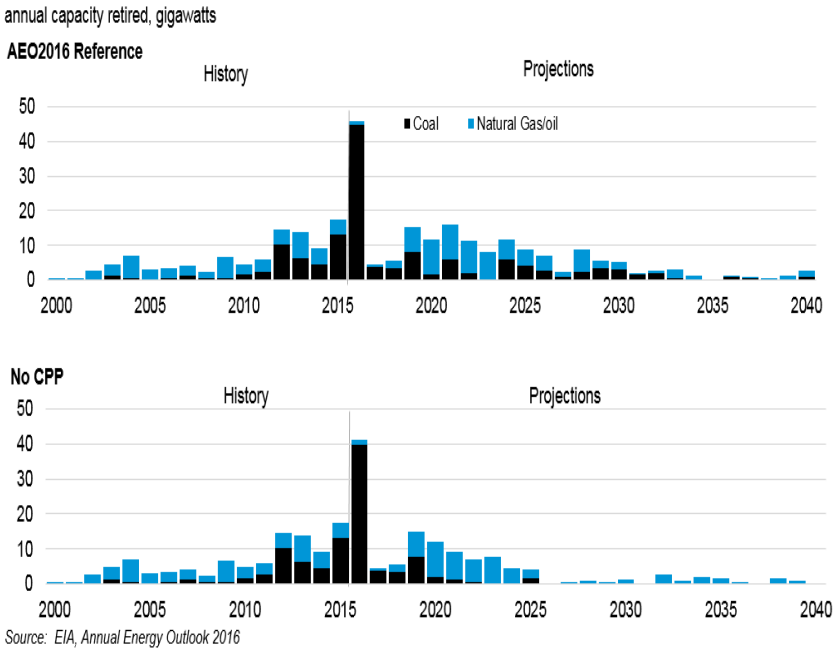
Lower costs and extension of renewable tax credits boost projected additions of wind and solar capacity prior to the 2022 effective date of the Clean Power Plan (CPP)



Source: EIA, Annual Energy Outlook 2016

- In the Reference case, which includes the CPP, 112 gigawatts (GW) of new wind and solar capacity is added in the years from 2016 through 2021. After 2021, natural gas capacity is also added to meet the CPP requirements.
- Continued coal retirements under the CPP support a consistent market for new capacity throughout the projection period.
- Without the CPP, the tax-credit-driven increase in renewable capacity supplants the need for new capacity from 2020-25 with relatively flat electricity demand growth.
- After 2030, new generation capacity additions are split primarily between solar and natural gas, with solar capacity representing 60% of new capacity additions in the Reference case and 56% in the No CPP case.
- The non-expiring 10% investment tax credit for solar projects, combined with continued capital cost reductions, encourages new solar capacity. Wind projects receive a phased-out production tax credit that can only be claimed by plants under construction before 2020.

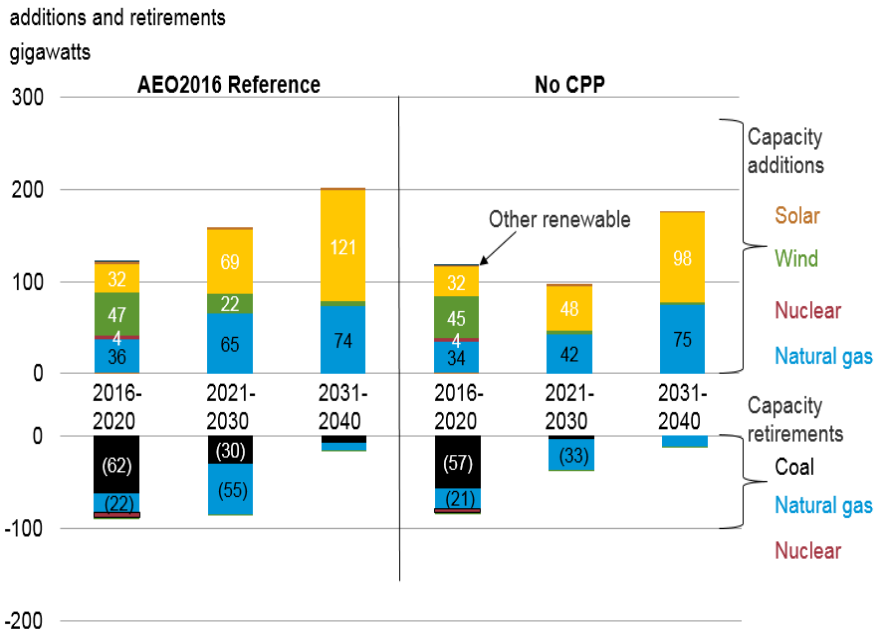
The Mercury and Air Toxics Standards (MATS) and low natural gas prices are the main near-term drivers of coal plant retirements; Clean Power Plan (CPP) increases near-term coal plant retirements modestly and adds more retirements in later years



Source: EIA, Annual Energy Outlook 2016

- In both the Reference and No CPP cases, compliance with the MATS drives coal plant retirements in the near term, with 40–45 gigawatts (GW) of coal retirements in 2016.
- Additional coal and natural gas/oil capacity is retired in the longer term to comply with CPP-related emission reductions targets for existing fossil-fired plants. An additional 55 GW of coal-fired capacity is retired after 2016 in the Reference case, compared with 21 GW in the No CPP case.
- Total coal and natural gas/oil retirements between 2016 and 2040 are 184 GW in the Reference case, more than the 126 GW of retirements in the No CPP case.

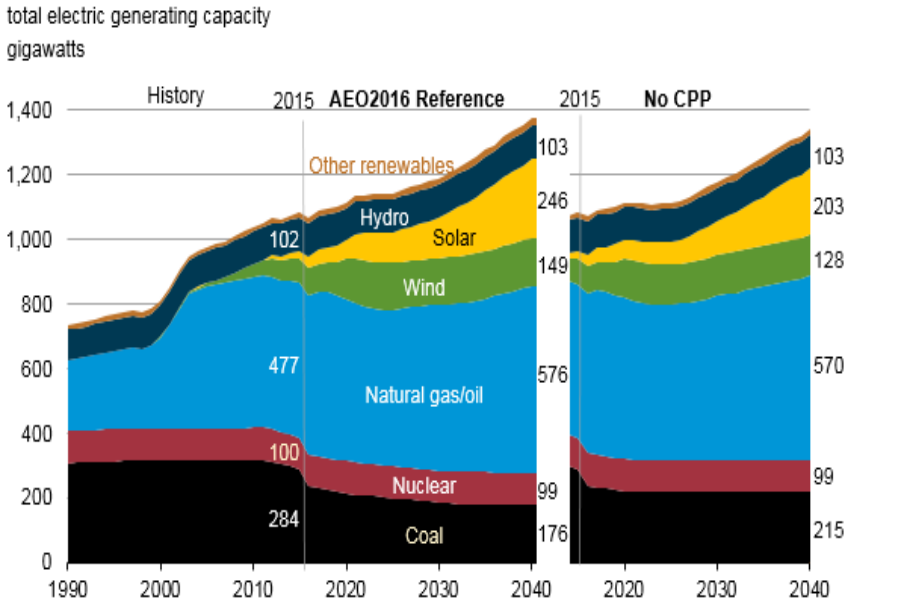
The Clean Power Plan (CPP) results in higher levels of both natural gas and renewable capacity, replacing additional coal retirements and reduced utilization of coal plants



Source: EIA, Annual Energy Outlook 2016

- The Reference case adds 477 gigawatts (GW) of natural gas and renewable capacity over the projection period compared to 386 GW in the No CPP case, as higher levels of low/no emission capacity are required to replace retiring fossil plants to comply with the CPP.
- While initial coal generating unit retirements are similar and driven by the Mercury Air Toxics Standards in each case, an additional 53 GW of fossil-fired generating unit retirements from 2021-40 occur in the Reference case compared to the No CPP case.
- Overall capacity additions from 2021-40 are higher in the Reference case, 361 GW compared to 274 GW, as increased retirements and lower output from existing fossil plants create demand for new capacity.
- Wind and solar capacity additions are driven by tax credit extensions and declining costs in both the Reference case and the No CPP case.

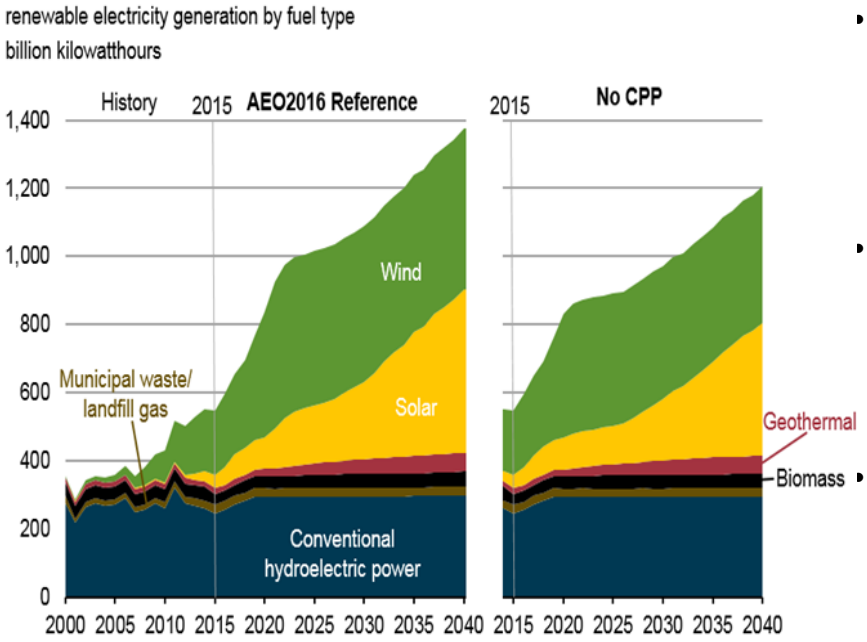
Reference case projects slightly higher levels of total capacity because of higher levels of renewable capacity



Notes: prior to 2000 wind and solar data are not broken out, and is reflected in 'Other Renewable'; Hydro includes pumped storage
Source: EIA, Annual Energy Outlook 2016

- Although total electricity sales in 2040 is 2.7% lower in the Reference case than in the No CPP case, overall capacity is 2.4% higher in the Reference case, as solar and wind capacity make up a larger share of total capacity. These technologies do not provide the same contribution to system reliability as coal, nuclear, or natural gas units, so more overall capacity must be built to maintain planning and operating reserve margins.
- Natural gas/oil capacity grows in both cases, reflecting the net impact of retired oil and natural gas-fired steam plants and new natural gas-fired (primarily combined-cycle plant) additions.
- Nuclear capacity is unchanged across the cases, as higher construction costs prevent nuclear expansion from being competitive even with the Clean Power Plan. The total nuclear capacity is virtually unchanged from 2015 levels, but reflects the net impact of planned additions and retirements occurring by 2020, which offset each other.

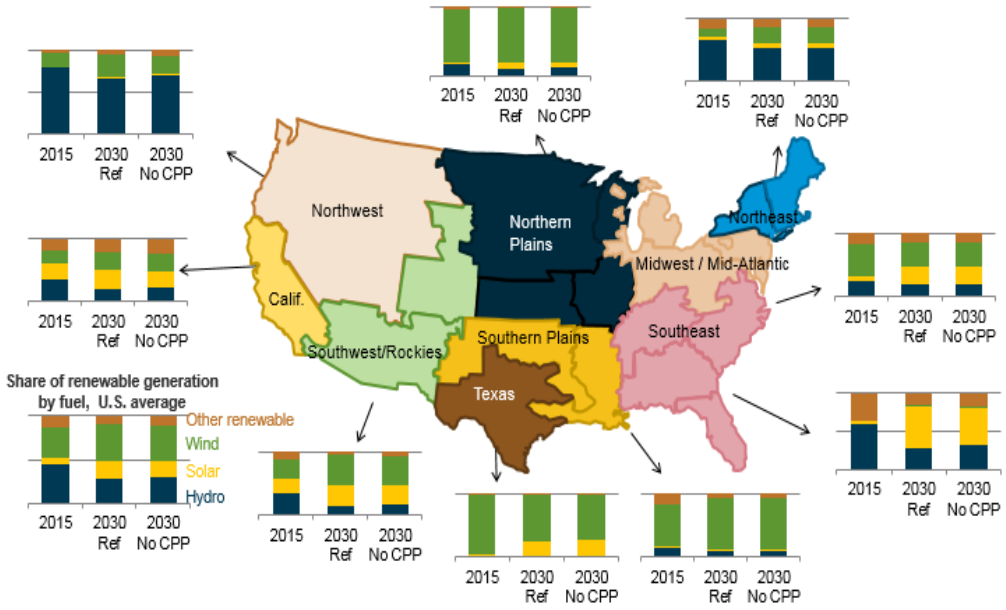
Changing tax and cost assumptions contribute to stronger solar growth, with the Clean Power Plan (CPP) providing a boost to renewables



Source: EIA, Annual Energy Outlook 2016

- In the Reference case, wind generation grows nearly 150% over 2015-40. In the No CPP case, it grows 110%, over the same period. Growth in wind generation slows after 2022 due to the tapering of the production tax credit.
- Solar generation grows by nearly 12-fold over 2015-40 in the Reference case. Even without the CPP, reduced solar costs and extended tax credits result in a 9-fold growth in solar generation over that period.
- Electricity from conventional hydroelectric power, municipal waste and landfill gas, biomass, and geothermal vary little between the Reference case and the No CPP case.

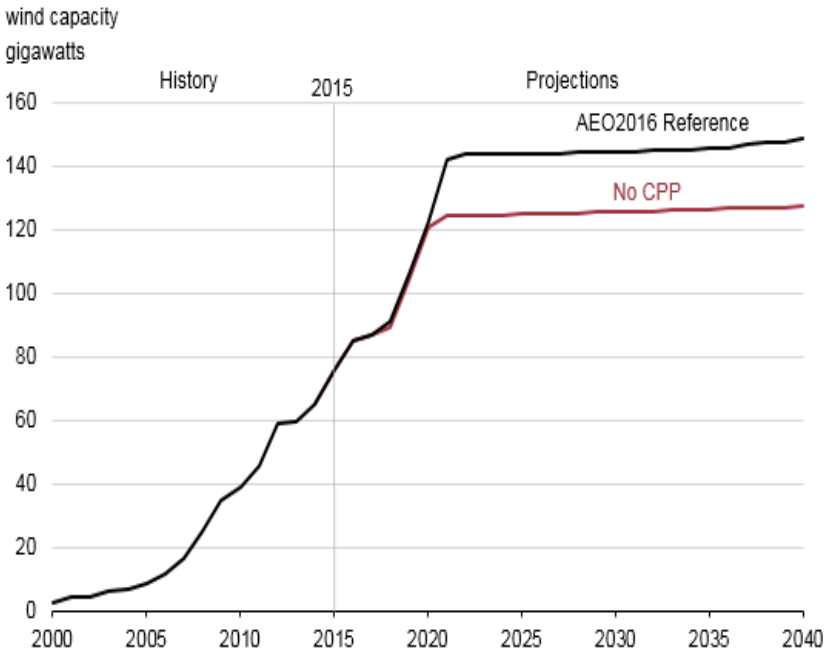
Generation from renewables varies across U.S. regions; hydro loses overall share as wind and solar generation increase by 2030



Source: EIA, Annual Energy Outlook 2016

- In California, where renewable portfolio standard policies and market factors are already favorable to renewables, generation from renewables in the Reference and No CPP cases is similar.
- Regions where wind energy is currently the dominant source of renewable generation, like the Northern Plains, Southern Plains, and Texas, maintain high levels of wind generation in both the Reference and No CPP cases through 2030. In the Northern and Southern Plains in 2030, solar generation increases from 2015 levels, taking market share from hydro and other renewables. By 2030, increases in solar allow it to gain share in Texas.
- In the Northwest, where hydro is the dominant renewable, hydro generation in 2030 is virtually identical in the Reference and No CPP cases. However, the hydro share of total renewable generation declines over 2015-30, as the share of wind generation increases.

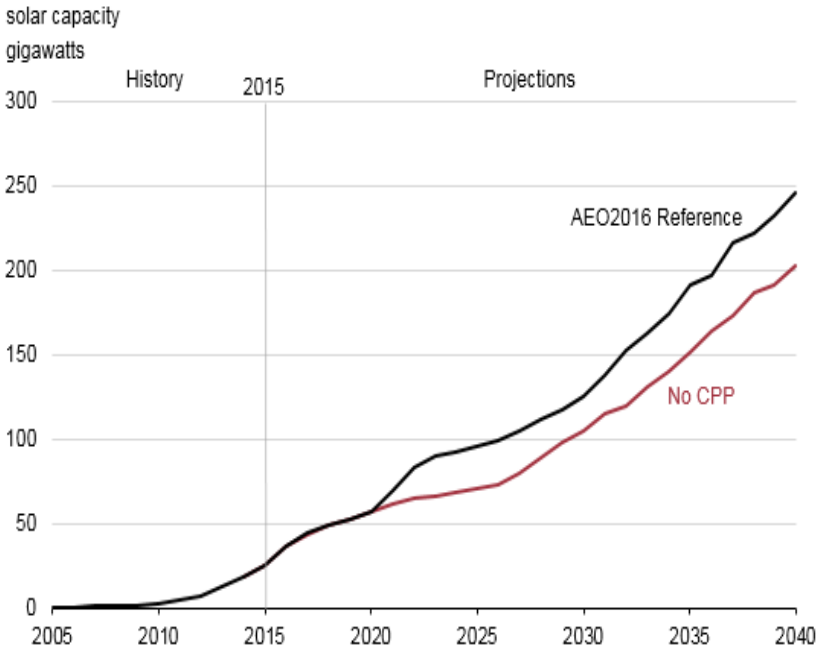
Wind capacity is 15% higher in the AEO2016 Reference case than in the No CPP case from 2022-40



Source: EIA, Annual Energy Outlook 2016

- Wind capacity increases in both the AEO2016 Reference and No CPP cases between 2015 and 2020, when the production tax credit (PTC) is still available to plants that begin construction prior to the phase-down of these credits.
- With the CPP, this growth continues through 2022 as projects that began construction prior to the final PTC expiration come online.
- Although wind capacity continues to increase through 2040, it grows at a slower rate in the absence of tax credits and with increasing need to access sites further from existing electric transmission lines or with less-favorable development characteristics.

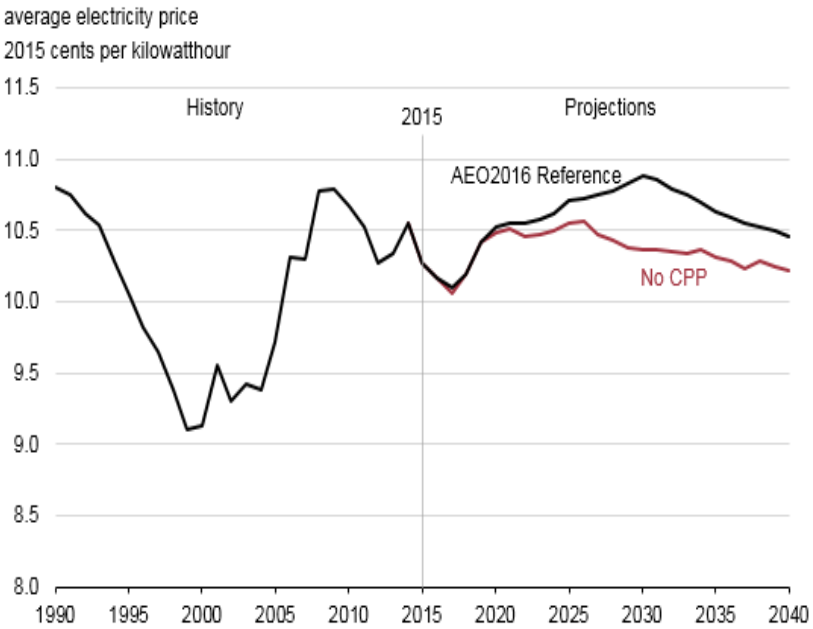
Solar capacity is 20% higher in the Reference case than in the No CPP case by 2030



Source: EIA, Annual Energy Outlook 2016

- Solar capacity increases throughout the projection. In addition to the effects of investment tax credits, state policies, and the Clean Power Plan (CPP), the cost of solar has declined significantly in recent years, making it increasingly economic, even without the CPP.
- Solar capacity is added at a relatively steady pace over 2015-40, in both the Reference, which includes the CPP, and the No CPP cases. The CPP increases the need to reduce fossil-fired generation to comply with emissions limits.
- Because solar is added at a faster rate than wind, solar capacity is projected to surpass wind capacity by 2032 in the Reference case and by 2033 in the No CPP case. All capacity comparisons include end-use technologies, with growth in the residential, commercial, and utility sectors. End-use solar photovoltaic installations represent 36% of 2040 solar capacity in the Reference case, and 42% in the No CPP case.

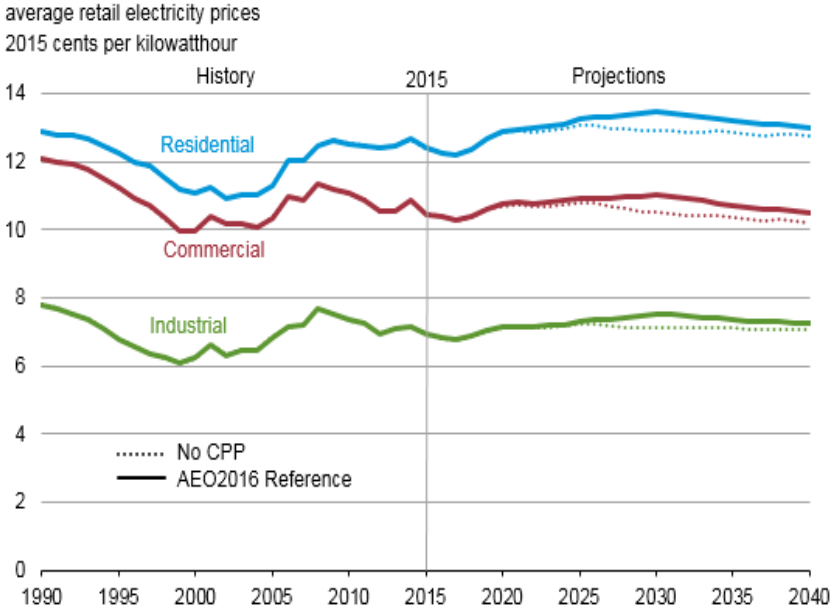
Reference case electricity prices average 3% above the No CPP case from 2025-30; this result may vary with different Clean Power Plan (CPP) implementation approaches



Source: EIA, Annual Energy Outlook 2016

- Electricity prices in many regions move with natural gas prices and availability, especially as natural gas generation increases relative to other fuels throughout the projection period.
- In the Reference case, which includes mass-based implementation of the CPP, generators that emit CO2 must obtain allowances from the companies that distribute electricity. Higher generation costs are partially offset when the distribution companies that receive allowance payments pass the savings on to consumers through lower distribution rates.
- In the Reference case, electricity prices are most affected by the increase in clean generation builds and efficiency improvements between 2025 and 2030. Retail prices average 3% higher from 2025-30 in the Reference case than in the No CPP case.
- Total U.S. electricity expenditures are 1.3% higher in the Reference case than in the No CPP case over this same period, as higher prices and above-baseline efficiency improvements through CPP programs decrease electricity usage.
- Price and expenditure projections are dependent on assumed implementation strategies; both would be higher to the extent that the full value of allowances in a mass-based implementation is not rebated to ratepayers.

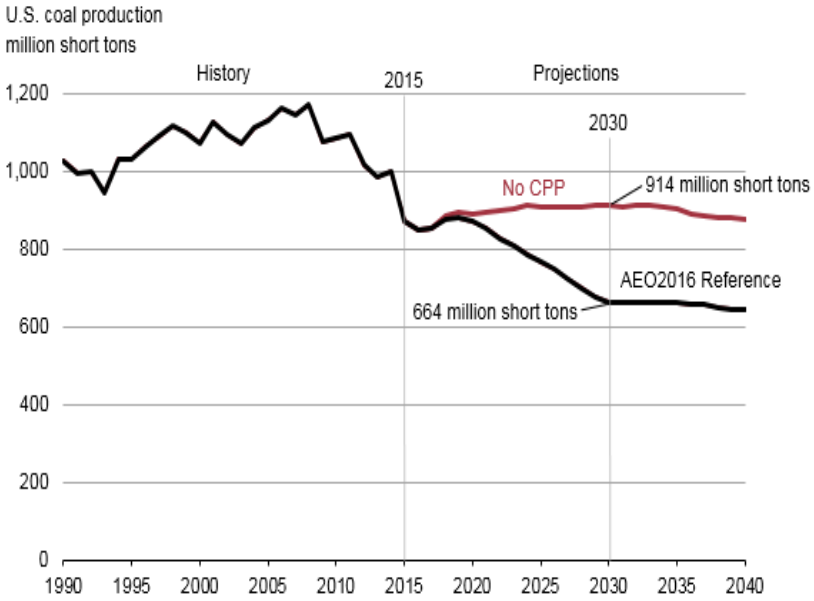
Electricity prices increase with rising fuel costs and expenditures for electric transmission and distribution infrastructure



Source: EIA, Annual Energy Outlook 2016

- Residential and commercial electricity prices are significantly higher than industrial prices; this mainly reflects the higher costs of distribution services for residential and commercial customers.
- Prices for all customer classes rise over 2015-30 in part due to higher transmission and distribution costs.
- Prices in the Reference case are somewhat higher than those the No CPP case for all customer classes; price differences between cases tend to be largest over the 2025-30 time period.

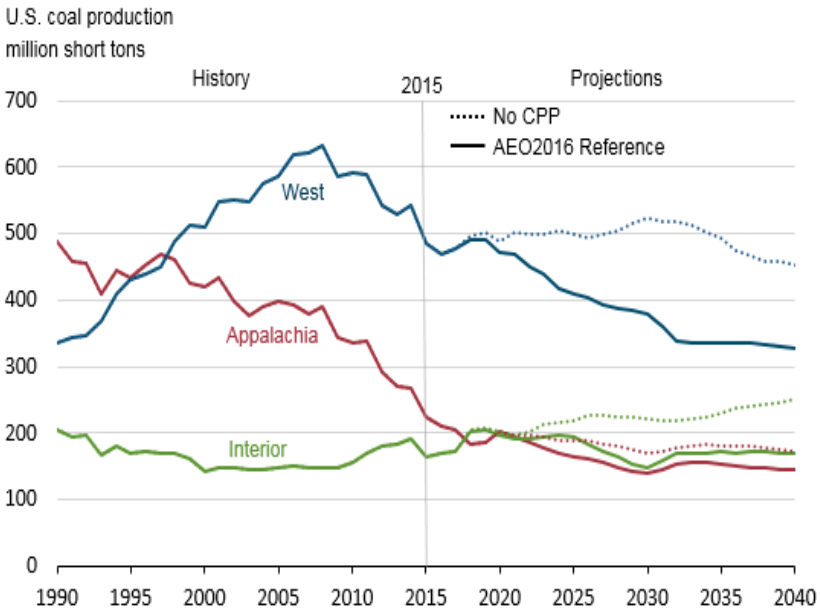
Reference case U.S. coal production in 2030 is 27% below its level in the No CPP case



Source: EIA, Annual Energy Outlook 2016

- In the Reference case, total coal production falls from about 870 million short tons in 2015 to 830 million short tons in 2022, as coal supply reacts to the onset of the Clean Power Plan (CPP) and falls further to 640 million tons by 2040.
- Compared with the No CPP case, coal production is 250 million short tons lower in 2030 in the Reference case. After 2030, the difference between the cases is largely maintained through 2040.
- Even without the CPP, near-term coal plant retirements, competitive natural gas prices, and renewables expansion continue to limit a recovery in the coal mining industry. Coal production changes little through 2040 in the No CPP case.

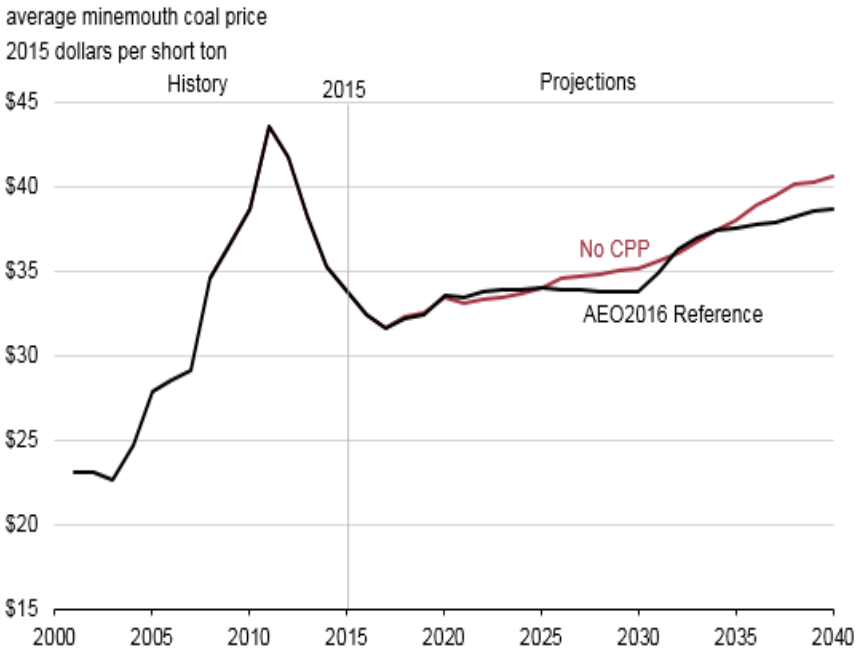
Regional coal production is 17%-32% lower in the Reference case by 2040 than in the No CPP case



Source: EIA, Annual Energy Outlook 2016

- In the AEO2016 Reference case, the West region accounts for 58% and 53% of the total decline in production in 2030 and 2040, respectively, when compared with the No CPP case. Significant amounts of coal capacity are retired in states that are large consumers of western coal --Texas, Indiana, Illinois, Michigan, and Wisconsin.
- In the Reference case, Interior coal production declines after 2019, while it increases in the No CPP case. Unlike the West and Appalachia, in the No CPP case, higher sulfur coal production in the Interior region is expands by 2040 as coal power plants without emission control equipment are forced to retrofit to comply with the Mercury Air Toxics Standards, which takes effect in 2015-16.
- About 60% of Appalachian coal is currently consumed in the power sector. The decrease in Appalachian coal production in the Reference case compared to the No CPP case is relatively small, as plant retirements and interfuel competition reduce the role of Appalachian coal in the power sector down regardless of Clean Power Plan (CPP) implementation. In the Reference case, Appalachian coal production is increasingly dependent on exports, which account for about 67% of Appalachian production in 2040.

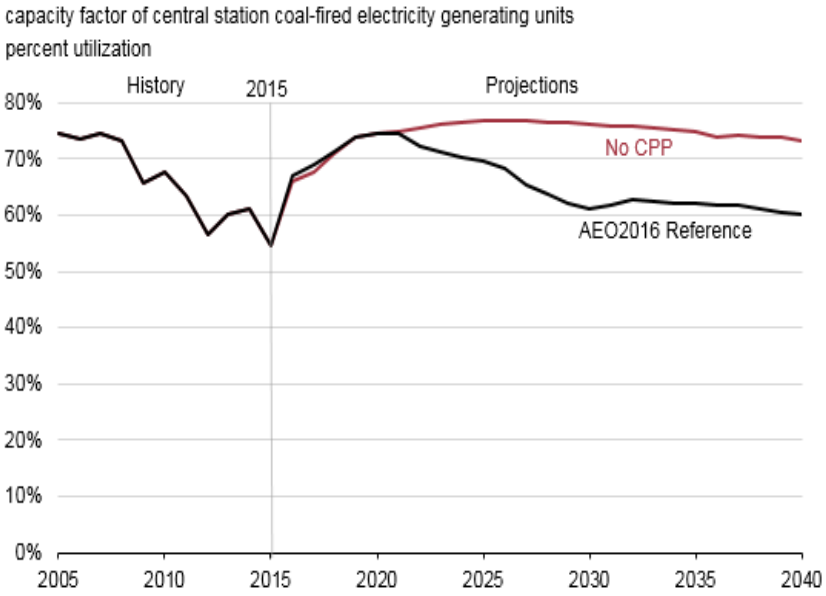
Average minemouth coal prices are 4% higher in 2030 and 5% higher in 2040 in the No CPP case than in the AEO2016 Reference case



Source: EIA, Annual Energy Outlook 2016

- In the Reference case, average minemouth coal prices are mostly lower than in the No CPP case primarily because of lower coal production, which restrains coal prices as the least efficient, most-costly mines close.
- The average minemouth coal price over 2017-30 changes little in the Reference case as the effects of lower average coal mine productivity, which tends to raise production costs, and declining coal demand, which tends to lower minemouth coal prices, are largely offsetting.
- After 2030, falling mine productivity overwhelms the impact of declining demand and the minemouth coal price increases.

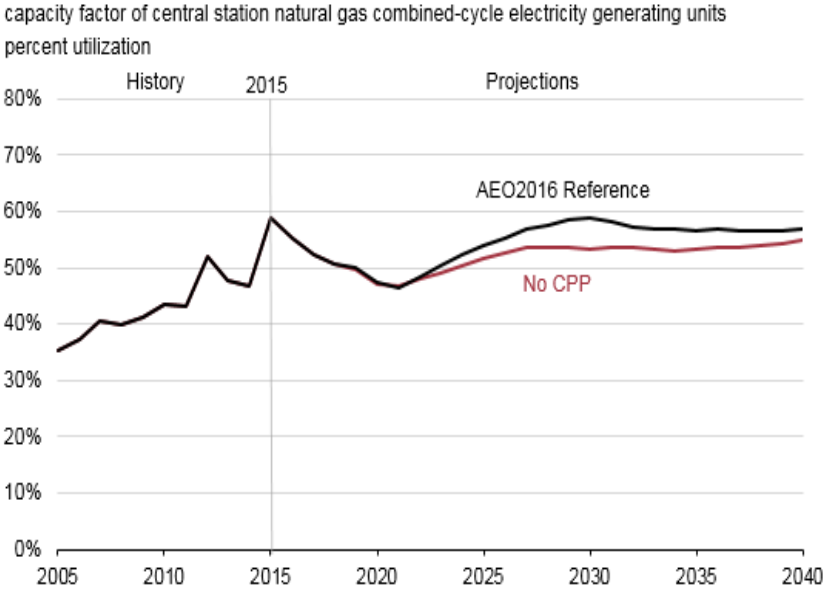
Average capacity factor for coal-fired generating units falls by 15 percentage points by 2030 in the Reference case when compared with the No CPP case



Source: EIA, Annual Energy Outlook 2016

- In the Reference case, the average capacity utilization rate for coal-fired plants, which was 55% in 2015, is significantly below that level in the No CPP case. This outcome occurs as a result of increased penetration of renewables such as solar and wind and increasing utilization rates of lower-carbon natural gas-fired combined cycle plants.
- In the No CPP case, the average coal-fired capacity utilization rate increases to almost 75% in 2020 due to the retirement of lower-performing coal plants and moderately increasing natural gas prices. After 2020, the average capacity utilization rate remains fairly constant in the No CPP case as existing coal plants remain cost-competitive with natural gas-fired combined cycle plants given the relative fuel prices.

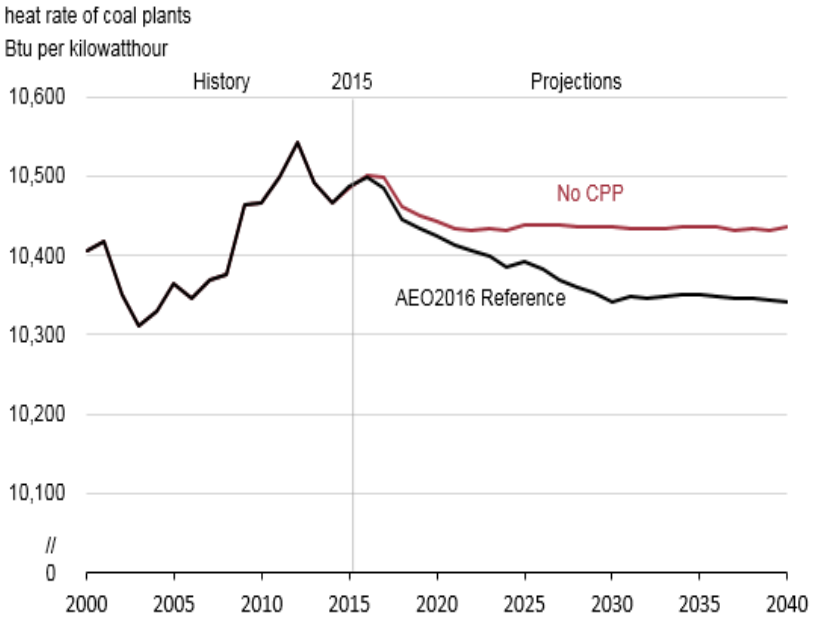
Average capacity factor for gas-fired combined cycle units rises by 5 percentage points by 2030 in the Reference case when compared with the No CPP case



Source: EIA, Annual Energy Outlook 2016

- In 2015, the average capacity factor for natural gas-fired combined-cycle plants approached 60%, exceeding the corresponding rate for coal-fired capacity for the first time.
- The utilization rate for gas-fired combined-cycle capacity declines over the next 5 or 6 years, primarily as a result of increased generation from renewable technologies.
- Utilization rates for gas-fired capacity start to rise in the early 2020s, when tax credits for renewable technologies are reduced (solar photovoltaics) or eliminated (wind), and the Clean Power Plan encourages higher utilization of natural gas-fired combined-cycle plants as one of the main compliance strategies for reducing generation from carbon-intensive coal-fired plants, thereby, lowering emissions.
- When compared with the No CPP case, capacity factors of natural gas-fired combined-cycle plants in the Reference case increase by less than 1 percentage point in 2022, when the CPP emissions standards are first implemented, and by 5 percentage points in 2030.

Heat rates for coal-fired plants are up to 1% lower due to heat rate improvement and retirements in Reference case than in the No CPP case

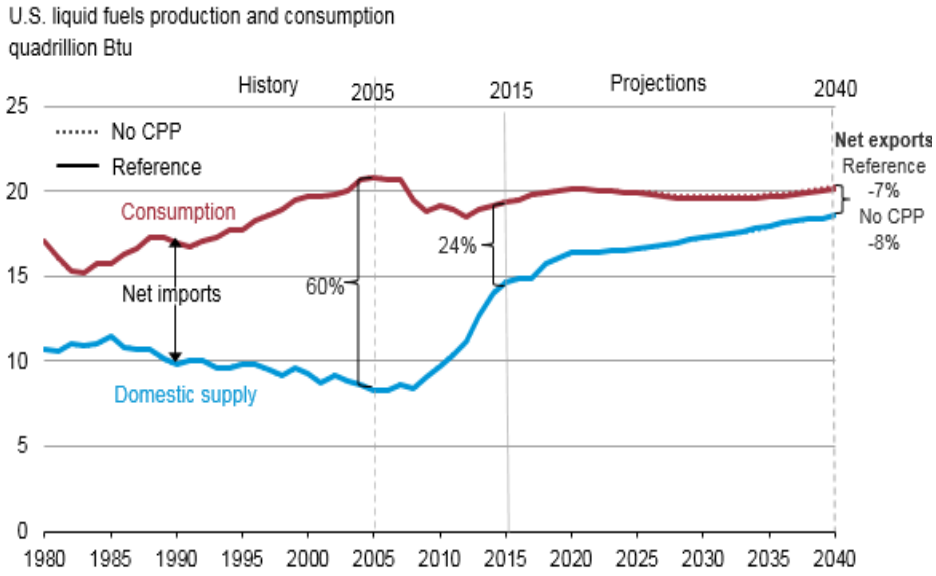


Source: EIA, Annual Energy Outlook 2016

- Operating efficiencies (fuel input per unit of output) for power plants are represented by heat rates. Reducing heat rates lowers fuel consumption and the corresponding fuel costs and emissions.
- The average heat rate for coal-fired capacity in 2015 is about 10,500 British thermal units per kilowatthour (kWh). In the Reference case, the average heat rate declines by about 0.5% by 2020 and continues to decline thereafter.
- The improved efficiency is due to 60 gigawatts (GW) of retirements (22% of current power-sector coal capacity), generally reflecting less efficient units in the current fleet, and to a lesser extent the 12 GW that are invested in heat rate improvements (4% of current power-sector coal capacity).
- The Clean Power Plan further reduces the average heat rate of coal-fired plants beyond 2022 with 40 GW of coal-fired additional retirements and 3 GW of coal-fired capacity that undertake heat rate improvements.

Petroleum and other liquid supply

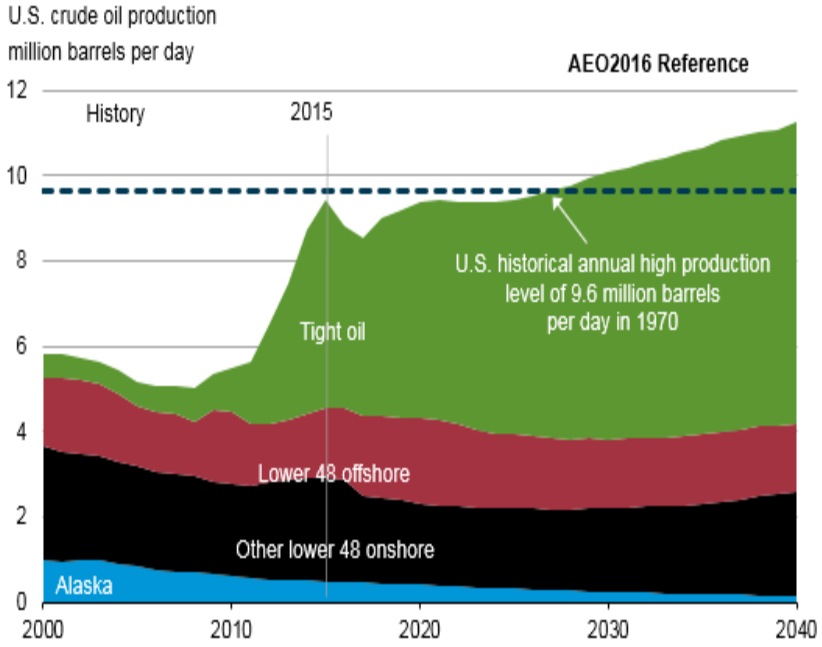
U.S. liquids production grows under Reference case price and resource/technology assumptions; the net import share declines with stagnant consumption



Source: EIA, Annual Energy Outlook 2016

- Domestic production of petroleum and other liquids grows from current levels as crude oil prices rebound.
- Total consumption of petroleum and other liquids remains relatively level in volumetric terms in the Reference case, as decreases in transportation consumption offset increases in industrial consumption.
- The import share of total consumption dropped sharply between 2005 and 2015, from 60% to 24%, and continues to drop after 2017, to just over 7% in 2040, when the United States imports 1.5 million barrels/day.

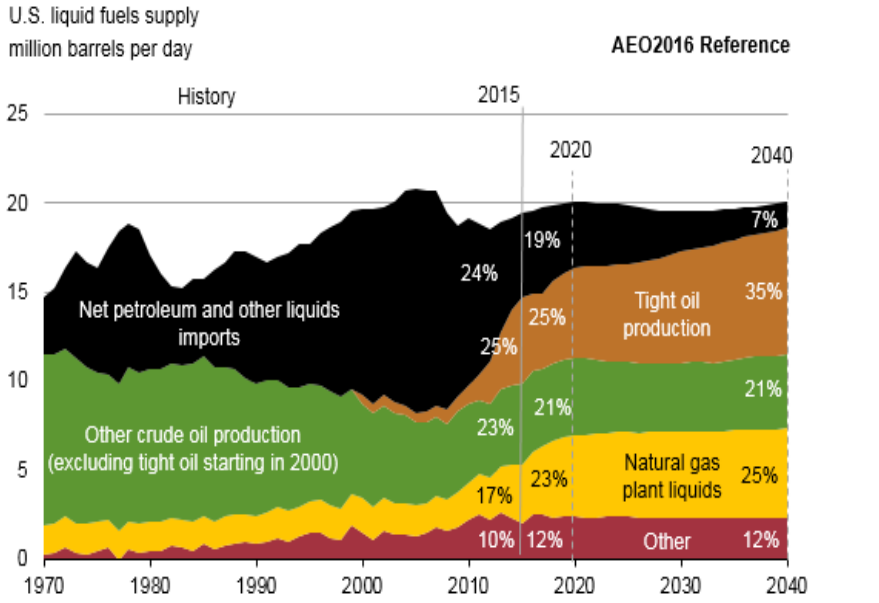
U.S. crude oil production rises above previous historical highs before 2030 in both cases; cases in AEO that use alternative price and resource /technology assumptions could be quite different



Source: EIA, Annual Energy Outlook 2016

- U.S. crude oil production drops from 9.4 million barrels/day (b/d) in 2015 to 8.6 million b/d in 2017 (mainly in response to declines in crude oil prices), before growing through 2040 to reach 11.3 million b/d in the Reference case.
- Lower prices through 2017 has the greatest impact on tight oil production, which drops to 4.2 million b/d in 2017 before increasing to 7.1 million b/d in 2040. The general increase in tight oil production is largely attributed to the higher oil prices and the ongoing exploration and development programs that expand operator knowledge about producing reservoirs.
- In the offshore Lower 48 states, offshore production is less sensitive to short-term price movements than onshore production. Lower 48 offshore crude oil production is estimated to increase to 2.0 million b/d in 2021. After 2021, Lower 48 offshore crude oil production declines to roughly 1.6 million b/d in 2030 and averages close to that level through 2040.
- Both onshore and offshore production in Alaska continues to decline through 2040, dropping from nearly 0.5 million b/d in 2014 to under 0.2 million b/d in 2040.

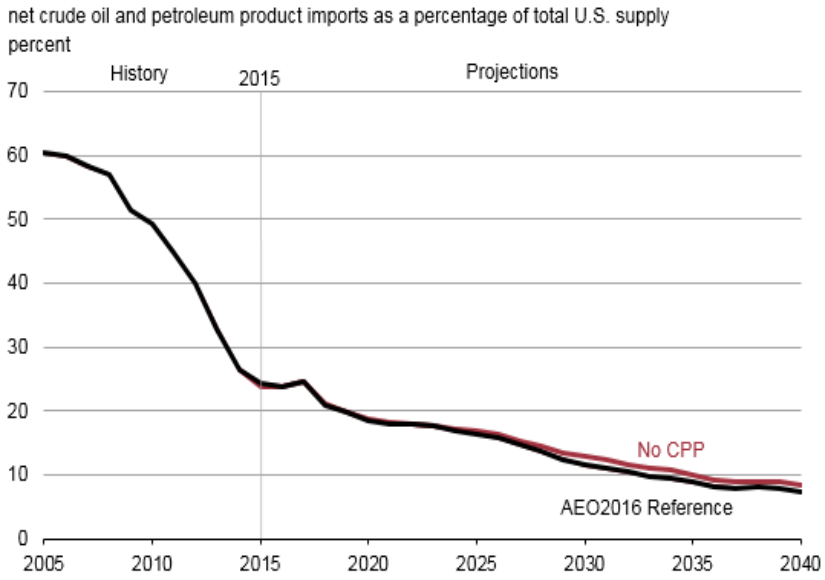
Combination of increased tight oil production and higher fuel efficiency drives projected decline in oil imports



Note: "Other" includes refinery gain, biofuels production, all stock withdrawals, and other domestic sources of liquid fuels
Source: EIA, Annual Energy Outlook 2016

- There are two main sources of future liquid fuels production growth: tight oil and natural gas plant liquids.
- In the Reference case, tight oil production increases after 2017 to 7.1 million barrels/day (b/d) in 2040, increasing from 25% of total U.S. liquid fuels supply in 2015 to 35% in 2040.
- Natural gas plant liquids production increases from 3.3 million b/d in 2015 to 4.8 million b/d in 2025 and reaches 5.0 million b/d in 2040.

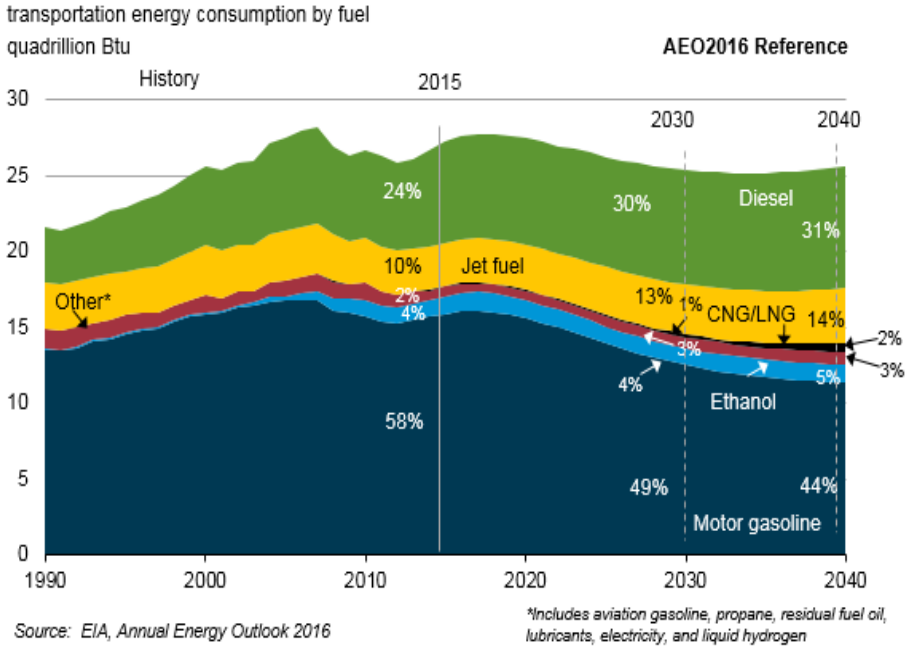
Net imports provide a declining share of U.S. supply; AEO cases with alternative price and resource/technology assumptions will differ



Source: EIA, Annual Energy Outlook 2016

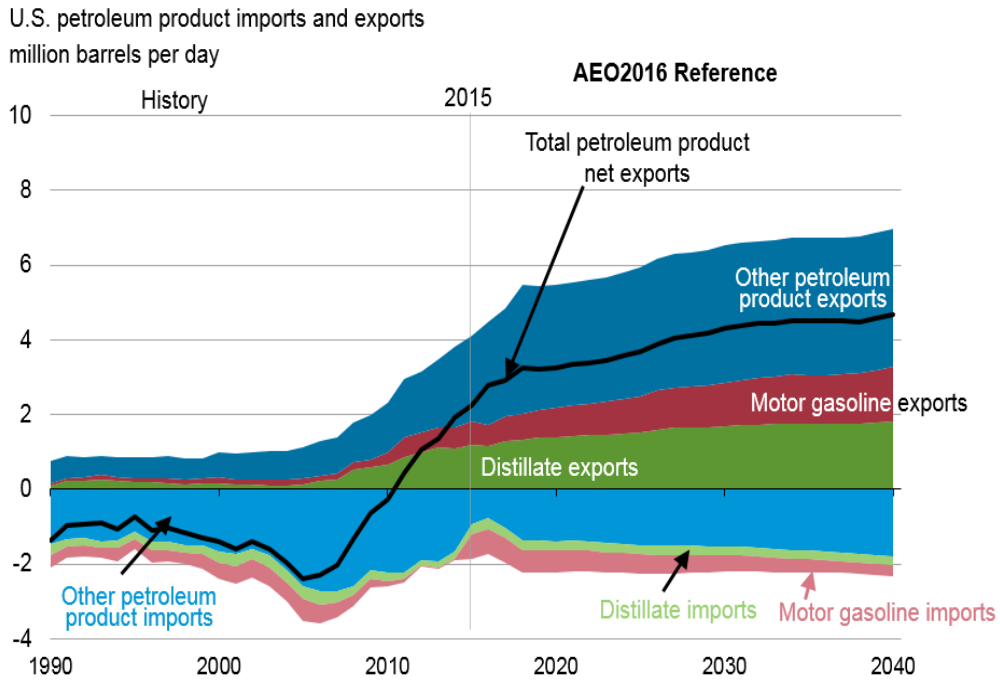
- In the Reference case, lower levels of domestic consumption of liquid fuels and higher levels of domestic production of crude oil push the net import share of crude oil and petroleum products supplied down from 24% in 2015 to 7% in 2040.
- The growth in net imports as a share of liquids consumption over 2015-17 reflects the reaction of U.S. production price declines since mid-2014.
- After 2017, the increase in crude oil prices lifts domestic production, which against the backdrop of generally flat consumption, results in the continued decline of the share of liquid fuels provided by net imports.

In the transportation sector, motor gasoline use declines; diesel fuel, jet fuel, and natural gas use all grow



- Transportation sector total delivered energy consumption (excluding pipeline) declines over 2015-40 in the Reference case. This trend differs markedly from history, which saw 1.3% average annual growth over 1973-2007 (2007 was the peak year for consumption).
- Petroleum-based gasoline use falls 26.3% over 2015-40, driven by rising light-duty vehicle fuel economy.
- Use of all other transportation fuels grows over 2015-40, led by diesel fuel and compressed and liquefied natural gas. Proposed Phase 2 fuel economy standards for heavy-duty trucks are not included in the Reference case; but will be considered in an alternative case included in the full AEO2016.
- The majority of energy consumed in the transportation sector by the end of the projection is still in the movement of people (mostly motor gasoline and jet fuel), although personal travel demand across modes grows more slowly than historically, while energy efficiency improves at a greater rate than historically. Energy consumed in the movement of goods (mostly diesel and natural gas) grows faster than for personal travel due to robust travel demand and moderate efficiency gains.

U.S. net exports of petroleum products continue to grow

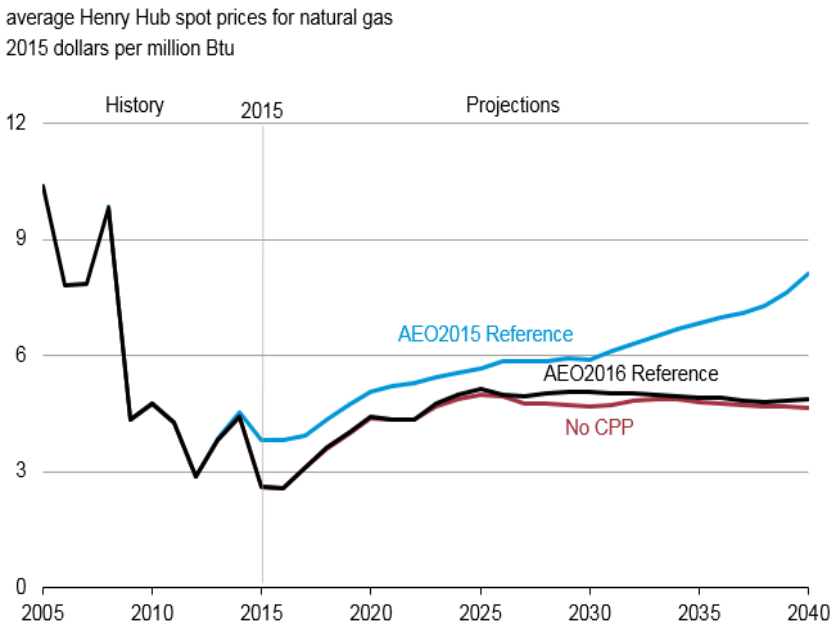


Source: EIA, Annual Energy Outlook 2016

- Total petroleum product exports (primarily gasoline, diesel, and HGL, among others), which were fairly consistent, at about 800 thousand barrels/day (b/d) over 1990-2008, increased rapidly over 2008-15, reaching about 4.1 million b/d in 2015.
- Total petroleum product exports, particularly of distillates and HGL, continue to grow in the reference case, as generally increasing domestic crude oil and natural gas liquids production and low natural gas prices support continued favorable economics of U.S. petroleum product supply.

Natural gas

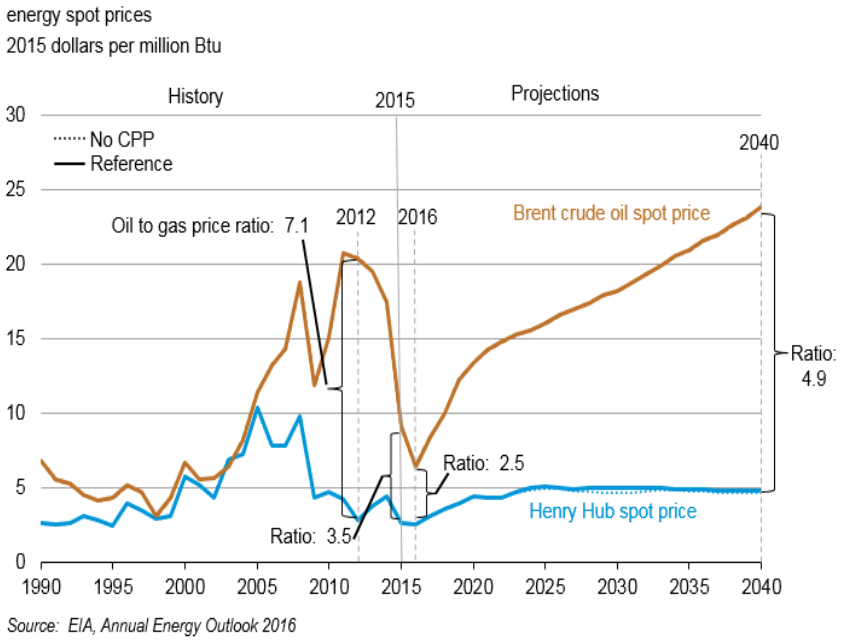
Natural gas prices are projected to remain below $5 per million British thermal units through most of the projection period with or without the Clean Power Plan



Source: EIA, Annual Energy Outlook 2016

- The Henry Hub spot price for natural gas averaged $2.62/million Btu in 2015, the lowest annual average price since 1995. Despite the low price in 2015, production gains continued as a result of abundant domestic resources and improved production technologies.
- U.S. natural gas prices are expected to rebound from 2015 levels, rising above $4.40/million Btu by 2020 (an average increase of 11% annually).
- Growth in demand for natural gas, notably for liquefied natural gas (LNG) exports from projects that are already under construction, results in upward pressure on prices.
- Over 2020-40, production, end-use consumption in the industrial and electric power sectors, and exports of LNG are projected to increase. However, technology improvements, which result in drilling cost declines and increased recovery rates, allow productive capacity to keep pace with demand, resulting in stable prices throughout much of the projection.
- Average annual U.S. natural gas prices at the Henry Hub over 2022-40 are lower in the No CPP case than in the Reference case. The lower prices in the No CPP case reflect less demand for natural gas and higher use of coal to generate electricity.

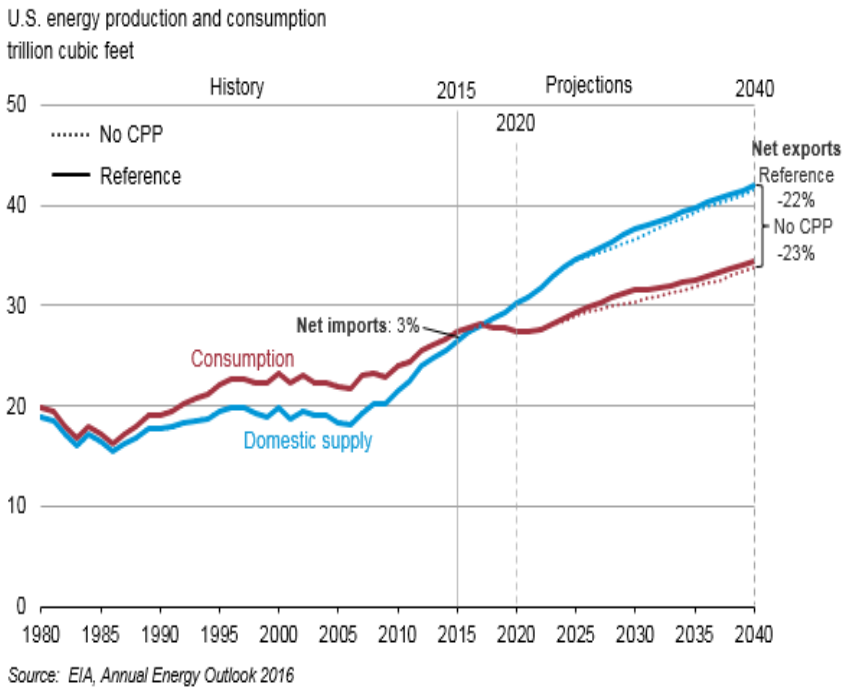
Difference between U.S. natural gas prices and crude oil prices grows through 2040



Source: EIA, Annual Energy Outlook 2016

- The ratio of oil-to-natural-gas prices is defined in terms of the Brent crude oil price and the Henry Hub spot natural gas price on an energy-equivalent basis. A 1:1 ratio indicates that crude oil and natural gas cost the same in terms of energy content.
- While this ratio has decreased considerably in recent years, the differential grows through the projection period.
- The oil-to-gas price ratio peaked in 2012 at 7.1, with low natural gas prices (the result of abundant domestic supply and weak winter demand) and high oil prices. The ratio fell to 3.5 in 2015, driven by a decline in oil prices. In 2016, the ratio will fall further to 2.5 with a further decline in oil prices.
- From 2016-20 both oil and gas prices see their greatest growth. After 2020, oil prices continue to grow, at a slower pace, while natural gas prices hold steady (driven by continued improvements in extraction technologies).
- U.S. natural gas prices are determined largely on a regional basis in response to supply and demand conditions in North America, although increasing liquefied natural gas exports put some upward pressure on the domestic natural gas price. Oil prices are more responsive to global supply and demand.

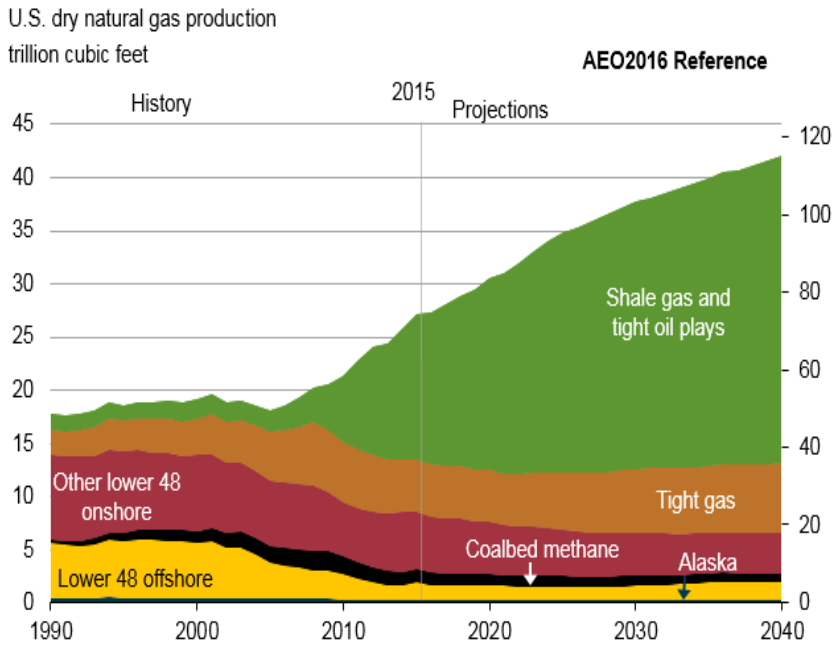
U.S. natural gas production exceeds consumption, making the United States a net exporter of natural gas in the very near future



Source: EIA, Annual Energy Outlook 2016

- The growth in natural gas production is driven by the continued development of shale gas resources where technology improvements result in higher rates of recovery at lower costs throughout the projection period. Natural gas production increases at an average annual rate of 1.8% over 2015-40.
- Production growth holds down natural gas prices, stimulating demand for U.S. natural gas in the United States (particularly in the electric power sector) and in overseas markets.
- Total U.S. natural gas consumption grows by 0.9%/year from 2015-40, but decreases between 2017-21 due to a decline in the electric power sector where natural gas use drops by 1.4 trillion cubic feet (Tcf). After 2021, U.S. natural gas consumption rises steadily.
- The United States transitions from being a net importer of 1.0 Tcf of natural gas in 2015, or 3% of U.S. total natural gas supply, to a net exporter by 2018. Almost 50% (3.6 Tcf) of the growth in net exports that occurs by 2021 is liquefied natural gas exports. Net U.S. exports of natural gas reach 7.5 Tcf in 2040, or 18% of total production.

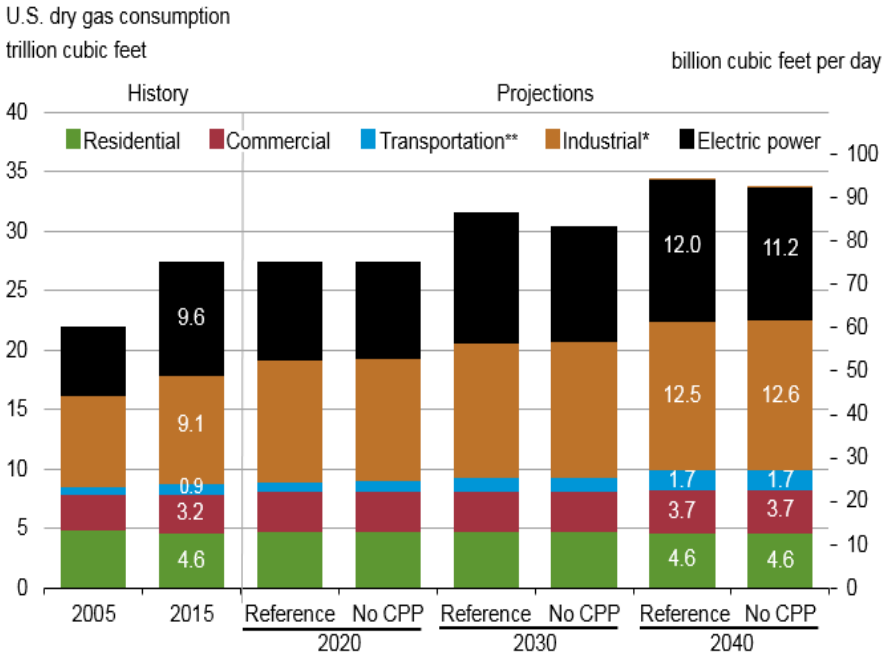
Shale resources remain the dominant source of U.S. natural gas production growth



Source: EIA, Annual Energy Outlook 2016

- The 55% increase in total dry natural gas production from 2015-40 in the Reference Case results from increased development of shale gas and tight oil plays, tight gas, and offshore natural gas resources.
- Production from shale gas and tight oil plays grows by more than 15 trillion cubic feet (Tcf), over 2015-40, reaching 29 Tcf in 2040. The shale gas and tight oil play share of total U.S. dry natural gas production increases from 50% in 2015 to 69% in 2040.
- Tight gas production growth occurs in the sedimentary basins located in the Dakotas/Rocky Mountains and Gulf Coast regions.
- U.S. offshore natural gas production averages around 1.5 Tcf through 2020 before declining due to declines in legacy offshore fields. After 2027, offshore natural gas production again increases as production from new discoveries more than offsets the decline in legacy fields.

Natural gas consumption growth is led by electricity generation and industrial uses; natural gas use rises in all sectors except residential

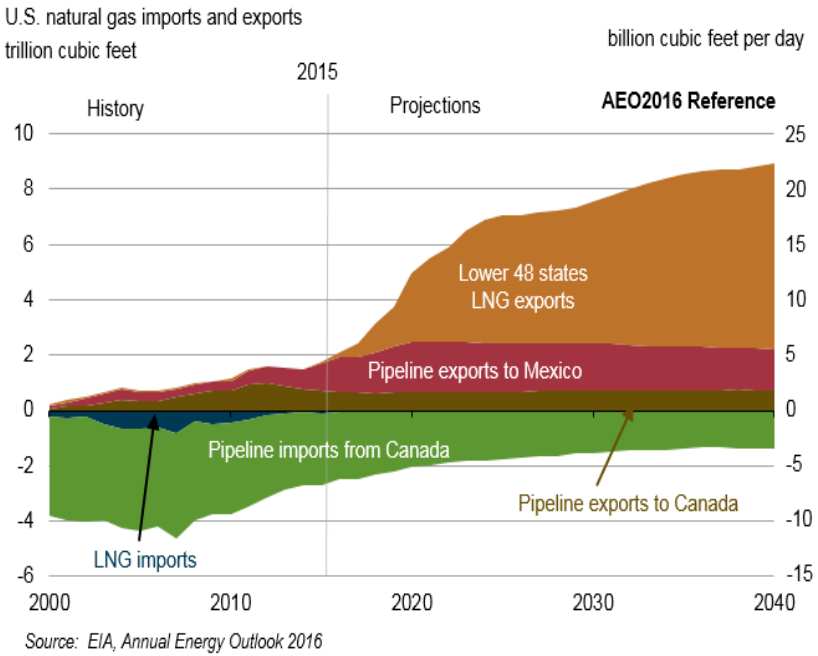


Source: EIA, Annual Energy Outlook 2016

**Includes combined heat-and-power and lease, plant, and export liquefaction fuel*
***Includes pipeline fuel*

- Natural gas consumption grows with increased supply and competitive prices, with the largest growth seen in the electric power and industrial sectors after 2020, the Clean Power Plan results in increased natural gas consumption for electricity generation.
- In the early years, when prices rise off of their low levels in 2015 and 2016, the growth in consumption slows and reverses for several years, particularly in the electric power sector. After 2016, natural gas-fired generation grows as coal use continues to decline and natural gas prices remain competitive.
- Strong and continued growth in the industrial sector is driven by energy-intensive industries that use natural gas as a feedstock, such as bulk chemicals, lease and plant fuel (which grows with production), and liquefaction fuel used in producing liquefied natural gas for export.
- Although, historically, little natural gas has been used in the transportation sector, the sector uses a small but growing share of natural gas in AEO2016.

The United States remains an importer and exporter of natural gas over the projection period, moving from a net importer to a net exporter in 2018



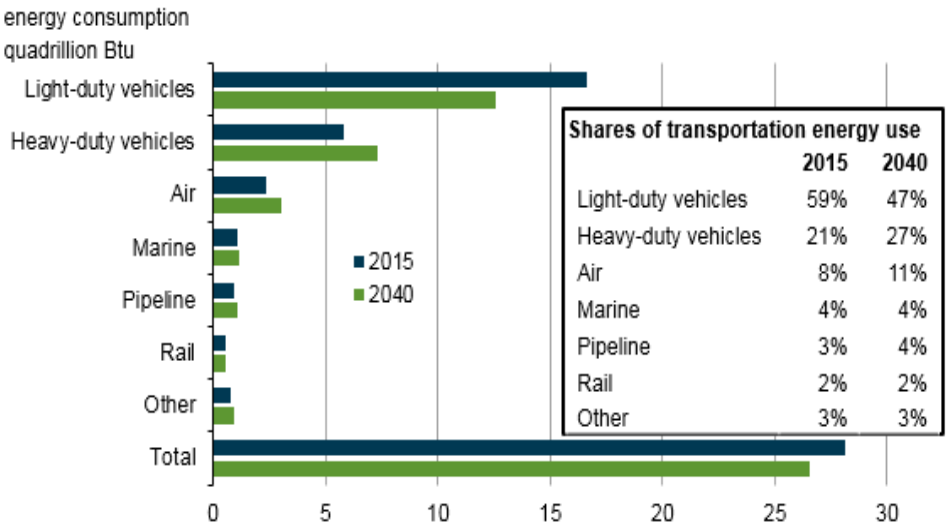
Source: EIA, Annual Energy Outlook 2016

- Natural gas imports into the United States fall by 49% from 2015-40 and natural gas exports from the United States, both by pipeline and liquefied natural gas (LNG), grow by over five-fold. The five LNG export projects currently built or under construction in the Mid-Atlantic and the Gulf Coast regions, with capacity to export 2.9 trillion cubic feet (Tcf)/year, largely account for the initial rapid growth in exports; additional facilities will be required in the Reference Case to accommodate LNG exports of 6.7 Tcf in 2040.
- U.S. natural gas exports to Mexico by pipeline will continue to increase in the near term. While Mexico's natural gas production is declining, its natural gas consumption is increasing, particularly in the electric power sector. The growth in near-term consumption will be met by several pipeline projects currently under construction. After 2020, U.S. pipeline exports to Mexico gradually decrease, reflecting the initiation of new oil and natural gas production projects in Mexico and the increased use of renewables for electricity generation.
- U.S. net imports from Canada continue to decline as relatively low prices and a closer proximity to major U.S. markets make natural gas produced in the United States more competitive.

Delivered energy consumption by sector

Light-duty vehicles are the only mode of travel projected to have a decrease in energy consumption share because of improvements in new vehicle fuel economy required under the Corporate Average Fuel Economy standards

Delivered energy consumption for transportation by mode in the Reference case, 2015 and 2040



Shares of transportation energy use

	2015	2040
Light-duty vehicles	59%	47%
Heavy-duty vehicles	21%	27%
Air	8%	11%
Marine	4%	4%
Pipeline	3%	4%
Rail	2%	2%
Other	3%	3%

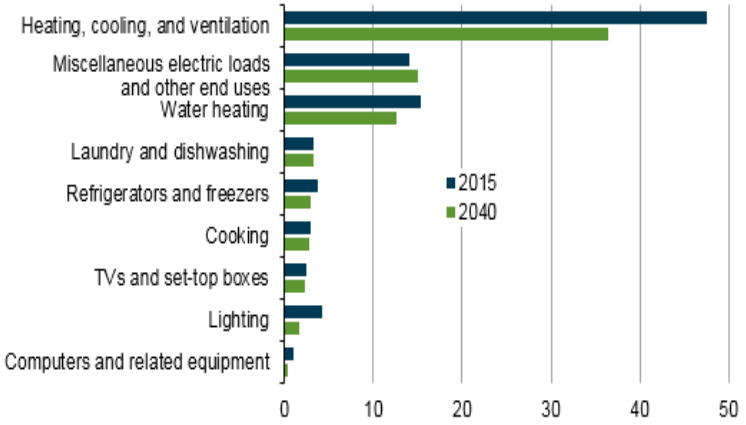
Source: EIA, Annual Energy Outlook 2016

- A decline in light-duty vehicle energy consumption reduces its share overall transportation energy use.
- Heavy-duty vehicle and air represent the fastest growing transportation modes in the projection.
- The full AEO2016 will include a case that incorporates the proposed Phase 2 fuel economy standards for heavy-duty trucks, which can significantly affect projected fuel use.

Energy efficiency policies and standards, and population shifts to warmer climates in the south and west, contribute to declining energy intensity in the residential sector

Residential sector delivered energy intensity for selected end uses in the Reference case, 2015 and 2040

energy intensity
million Btu per household per year

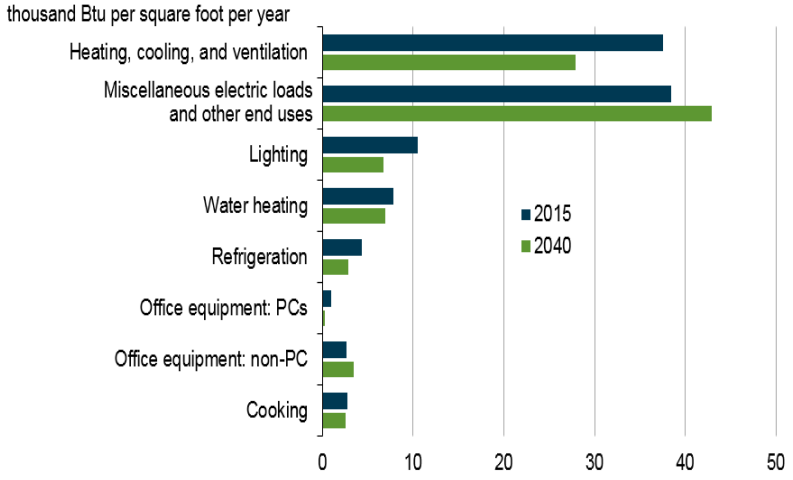


Source: EIA, Annual Energy Outlook 2016

- Annual delivered energy use per household declines by 18% (0.8%/year on average) over 2015-40 in the Reference case.
- Lighting, affected by the phase-in of light bulb efficiency standards from the Energy Independence and Security Act of 2007 and efficiency subsidies provided as part of implementation of the Clean Power Plan, plays a key role in reducing household energy intensity.
- Continued growth of renewable capacity in homes, such as rooftop solar photovoltaic panels, also reduces delivered energy intensity, since distributed generation for direct use reduces the need for delivered energy (purchased from an energy provider).
- Per household use of miscellaneous electric loads and other end uses increases, with increasing market penetration of smaller electric devices.

Despite 1.1% average annual growth in commercial floorspace from 2015 to 2040, commercial delivered energy intensity (energy use per square foot) decreases 0.5%/year in the Reference case

Commercial sector delivered energy intensity for selected end uses in the Reference case, 2015 and 2040



Source: EIA, Annual Energy Outlook 2016

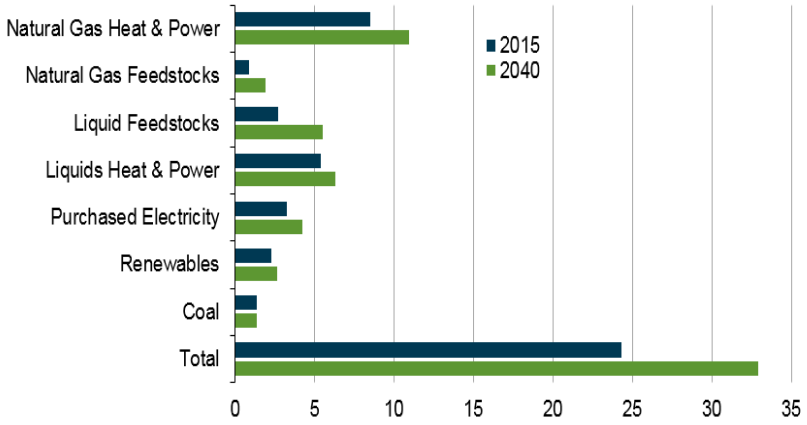
- Almost every major use of energy in commercial building consumption, such as space heating and cooling, water heating, lighting, and refrigeration, is covered by federal energy efficiency standards.
- As a result of efficiency standards, technology advances, and implementation of the Clean Power Plan, energy intensity for commercial lighting and refrigeration decreases at annual average rates of 1.8%/year and 1.7%/year through 2040, respectively, while space heating and cooling intensity declines 1.2%/year
- Energy intensity of miscellaneous electric loads grows 11.5% with the proliferation of medical imaging equipment, video displays, and other electric devices.
- Growth in commercial non-personal computer (PC) office equipment is largely driven by the increasing use of data centers for web- and network-based services and connectivity. PC office equipment decreases as users shift from desktop computers to more efficient laptops and mobile computing devices.

Total delivered industrial energy consumption grows by 1.2%/year from 2015-40, while the value of industrial shipments grows 1.9%/year

Delivered energy consumption for industrial sector by fuel in the Reference case, 2015 and 2040

energy consumption

quadrillion Btu



Source: EIA, Annual Energy Outlook 2016

- The rate of growth in industrial energy use is higher in the 2015-25 period, averaging 1.7%/year, than in the 2025-40 period, averaging 0.7%/year, because shipments, especially from energy-intensive sectors, grow at a faster pace in the earlier period.
- Natural gas consumption for heat and power grows strongly, largely as a result of strong industrial shipments growth in bulk chemicals. By 2040, bulk chemicals energy use will constitute almost one third of total industrial energy consumption.
- Natural gas feedstocks in the bulk chemicals industry increase 3.5%/year between 2015 and 2040 as a result of growing agricultural chemicals shipments.
- Purchased electricity consumption in industry increases at an annual average rate of 1.1% over 2015-40 as efficiency improvements partially offset shipments growth.
- Slow growth in industrial renewables use reflects slow shipments growth in the paper industry, the largest user.

For more information

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

Annual Energy Outlook | www.eia.gov/forecasts/aeo

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

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