

Panel A
Historic GDP Growth Rates

10-Year Average		3.37%
20-Year Average		4.17%
30-Year Average		4.65%
40-Year Average		5.56%
50-Year Average		6.36%

Calculated using GDP data on Page 1 of Exhibit JRW-10

Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	2019-2049	4.40%
Survey of Financial Forecasters	Ten Year	4.25%
Social Security Administration	2018-2095	4.35%
Energy Information Administration	2018-2050	4.20%

Sources:

Congressional Budget Office, *The 2019 Long-Term Budget Outlook*, June 15, 2019.

<https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf>

U.S. Energy Information Administration, *Annual Energy Outlook 2019*, Table: Macroeconomic Indicators,

<https://www.eia.gov/outlooks/aeo/pdf/appa.pdf>

Social Security Administration, *2019 Annual Report of the Board of Trustees of the Old-Age,*

Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211 (June 15, 2019),

https://www.ssa.gov/oact/TR/2019/VI_G2_OASDI_GDP.html#200732

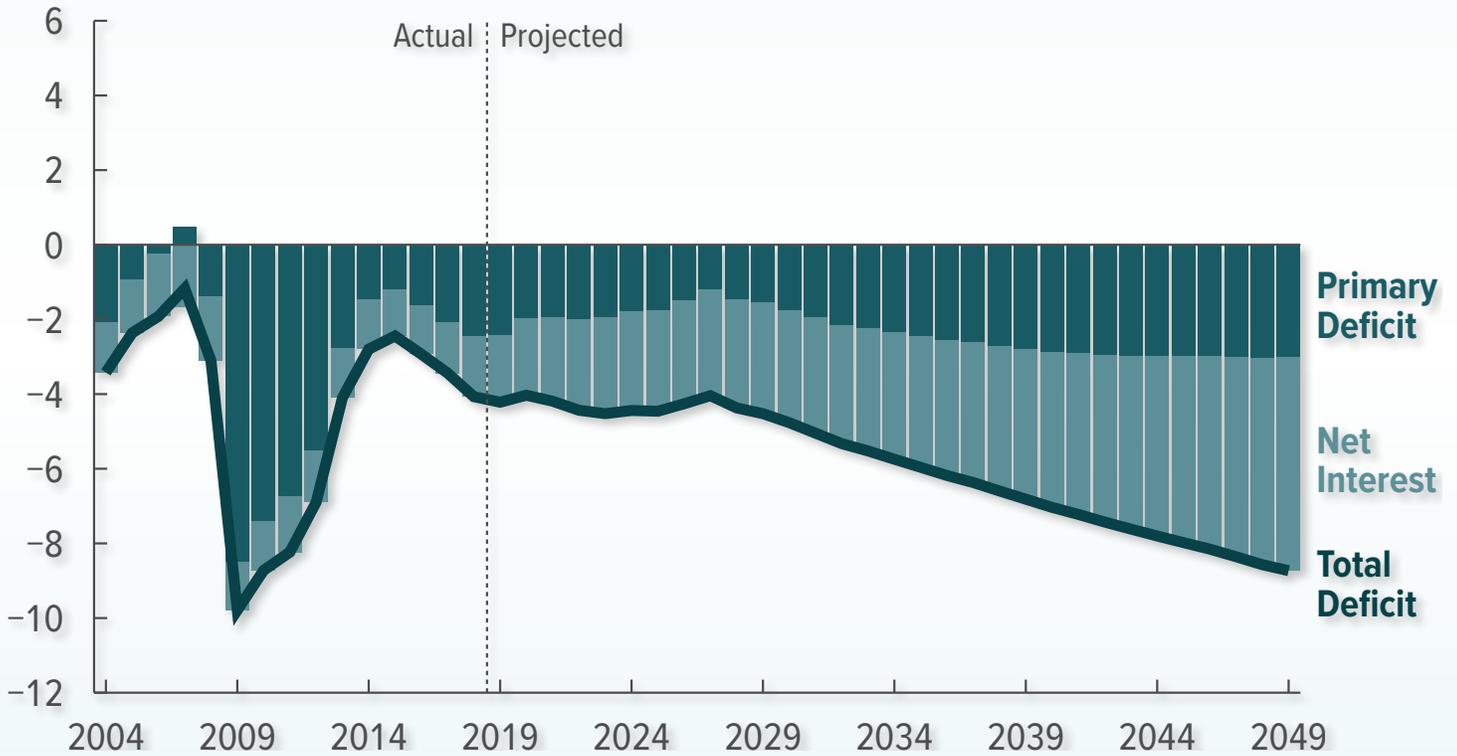
in projected GDP from \$21.485 trillion in 2019 to \$546.331 trillion in 2095.

<https://www.philadelphiafed.org/-/media/research-and-data/real-time-center/survey-of-professional-forecast>

CBO

The 2019 Long-Term Budget Outlook

Percentage of Gross Domestic Product



JUNE 2019



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CBO's Economic Projections for 2019 to 2029

The tables in this appendix show the Congressional Budget Office's economic projections for each year from 2019 to 2029. Table B-1 shows the projections by calendar year, and Table B-2 shows them by fiscal year.

Table B-1.

CBO's Economic Projections, by Calendar Year

	Actual, 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Percentage Change From Year to Year^a												
Gross Domestic Product												
Real ^b	2.9	2.6	2.1	1.8	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.8
Nominal	5.4	4.2	4.1	3.8	3.7	3.7	3.8	3.9	3.8	3.9	3.9	3.9
Inflation												
PCE price index	2.1	1.6	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Core PCE price index ^c	1.9	1.7	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer price index ^d	2.4	1.9	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3
Core consumer price index ^c	2.1	2.2	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3
GDP price index	2.4	1.7	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0
Employment Cost Index ^e	3.0	3.2	3.5	3.5	3.5	3.4	3.3	3.2	3.2	3.1	3.1	3.1
Calendar Year Average												
Unemployment Rate (Percent)	3.9	3.7	3.7	3.9	4.2	4.5	4.7	4.7	4.8	4.7	4.7	4.6
Payroll Employment (Monthly change, in thousands) ^f	221	148	100	50	24	18	21	37	39	57	63	57
Interest Rates (Percent)												
Three-month Treasury bills	1.9	2.2	2.1	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5
Ten-year Treasury notes	2.9	2.3	2.2	2.5	2.9	3.0	3.1	3.1	3.1	3.2	3.2	3.2
Tax Bases (Percentage of GDP)												
Wages and salaries	43.0	42.8	43.1	43.4	43.6	43.7	43.7	43.7	43.8	43.8	43.8	43.8
Domestic corporate profits ^g	8.7	8.4	8.5	8.5	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.1
Tax Bases (Billions of dollars)												
Wages and salaries	8,888	9,149	9,589	10,020	10,434	10,850	11,268	11,706	12,156	12,631	13,134	13,650
Domestic corporate profits ^g	1,573	1,798	1,895	1,955	1,992	2,049	2,108	2,190	2,257	2,346	2,440	2,525
Nominal GDP (Billions of dollars)	20,580	21,360	22,231	23,083	23,946	24,836	25,769	26,765	27,775	28,860	29,981	31,141

Source: Congressional Budget Office.

GDP = gross domestic product; PCE = personal consumption expenditures.

a. See Table 2-3 for changes that are instead measured from the fourth quarter of one year to the fourth quarter of the next.*

b. Real values are nominal values that have been adjusted to remove the effects of changes in prices.

c. Excludes prices for food and energy.

d. The consumer price index for all urban consumers.

e. The employment cost index for wages and salaries of workers in private industry.

f. The average monthly change in the number of employees on nonfarm payrolls, calculated by dividing by 12 the change in payroll employment from the fourth quarter of one calendar year to the fourth quarter of the next.

g. Adjusted to remove distortions in depreciation allowances caused by tax rules and to exclude the effects of changes in prices on the value of inventories.

[*Corrected on August 22, 2019]

Table B-2.

CBO's Economic Projections, by Fiscal Year

	Actual, 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Percentage Change From Year to Year												
Gross Domestic Product												
Real ^a	3.0	2.7	2.2	1.9	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.8
Nominal	5.4	4.6	4.0	3.9	3.7	3.7	3.7	3.9	3.8	3.9	3.9	3.9
Inflation												
PCE price index	2.1	1.6	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0
Core PCE price index ^b	1.9	1.7	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer price index ^c	2.4	1.9	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.3
Core consumer price index ^b	2.0	2.2	2.5	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3
GDP price index	2.3	1.8	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0
Employment Cost Index ^d	2.9	3.1	3.4	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.1	3.1
Fiscal Year Average												
Unemployment Rate (Percent)	4.0	3.7	3.7	3.8	4.1	4.4	4.6	4.7	4.7	4.7	4.7	4.6
Payroll Employment (Monthly change, in thousands) ^e	212	175	108	62	26	20	17	35	38	52	64	59
Interest Rates (Percent)												
Three-month Treasury bills	1.7	2.3	2.1	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5
Ten-year Treasury notes	2.7	2.5	2.2	2.4	2.8	3.0	3.1	3.1	3.1	3.2	3.2	3.2
Tax Bases (Percentage of GDP)												
Wages and salaries	43.2	42.8	43.1	43.3	43.5	43.7	43.7	43.7	43.8	43.8	43.8	43.8
Domestic corporate profits ^f	8.6	8.5	8.5	8.5	8.3	8.3	8.2	8.2	8.1	8.1	8.1	8.1
Tax Bases (Billions of dollars)												
Wages and salaries	8,801	9,054	9,477	9,914	10,331	10,746	11,163	11,595	12,043	12,509	13,006	13,520
Domestic corporate profits ^f	1,553	1,796	1,872	1,947	1,978	2,038	2,088	2,172	2,239	2,320	2,420	2,501
Nominal GDP (Billions of dollars)	20,336	21,157	22,013	22,870	23,727	24,611	25,529	26,514	27,518	28,582	29,699	30,847

Source: Congressional Budget Office.

GDP = gross domestic product; PCE = personal consumption expenditures.

a. Real values are nominal values that have been adjusted to remove the effects of changes in prices.

b. Excludes prices for food and energy.

c. The consumer price index for all urban consumers.

d. The employment cost index for wages and salaries of workers in private industry.

e. The average monthly change in the number of employees on nonfarm payrolls, calculated by dividing by 12 the change in payroll employment from the fourth quarter of one fiscal year to the fourth quarter of the next.

f. Adjusted to remove distortions in depreciation allowances caused by tax rules and to exclude the effects of changes in prices on the value of inventories.



SURVEY OF PROFESSIONAL FORECASTERS

Release Date: March 22, 2019

FIRST QUARTER 2019

Lower Near-Term Output Growth

The U.S. economy looks weaker now in the next few quarters than it did four months ago, according to 38 forecasters surveyed by the Federal Reserve Bank of Philadelphia. The forecasters predict real GDP will grow at an annual rate of 1.5 percent this quarter and 2.4 percent next quarter, down from the previous estimates of 2.4 percent and 2.7 percent, respectively. On an annual-average over annual-average basis, the forecasters predict real GDP to grow 2.4 percent in 2019, 2.0 percent in 2020, and 1.8 percent in 2021. The projection for 2019 is 0.3 percentage point lower than the estimate of four months ago, while the projections for 2020 and 2021 are roughly unchanged.

A slightly weaker outlook for the unemployment rate for the next few quarters accompanies the weaker outlook for near-term output growth. The forecasters predict the unemployment rate will average 3.7 percent in 2019 and 2020, 4.0 percent in 2021, and 4.2 percent in 2022.

The panelists, however, see somewhat stronger growth in employment this year than they predicted previously. The projections for the annual-average level of nonfarm payroll employment suggest job gains at a monthly rate of 191,800 in 2019, up from the previous estimate of 181,900. (These annual-average estimates are computed as the year-to-year change in the annual-average level of nonfarm payroll employment, converted to a monthly rate.)

Median Forecasts for Selected Variables in the Current and Previous Surveys

	Real GDP (%)		Unemployment Rate (%)		Payrolls (000s/month)	
	Previous	New	Previous	New	Previous	New
Quarterly data:						
2019:Q1	2.4	1.5	3.7	3.9	172.4	198.9
2019:Q2	2.7	2.4	3.6	3.7	168.1	156.8
2019:Q3	2.4	2.2	3.6	3.7	159.7	168.5
2019:Q4	2.2	2.2	3.6	3.7	142.9	142.1
2020:Q1	N.A.	2.1	N.A.	3.7	N.A.	143.6
Annual data (projections are based on annual-average levels):						
2019	2.7	2.4	3.7	3.7	181.9	191.8
2020	2.1	2.0	3.8	3.7	N.A.	123.2
2021	1.7	1.8	4.0	4.0	N.A.	N.A.
2022	N.A.	2.1	N.A.	4.2	N.A.	N.A.

TABLE EIGHT
LONG-TERM (5-YEAR AND 10-YEAR) INFLATION FORECASTS

ANNUAL AVERAGE OVER THE NEXT 5 YEARS: 2019-2023

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CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.83	MINIMUM	1.67
LOWER QUARTILE	2.00	LOWER QUARTILE	1.90
MEDIAN	2.13	MEDIAN	2.00
UPPER QUARTILE	2.25	UPPER QUARTILE	2.01
MAXIMUM	3.00	MAXIMUM	2.60
MEAN	2.18	MEAN	2.02
STD. DEVIATION	0.26	STD. DEVIATION	0.23
N	32	N	31
MISSING	6	MISSING	7

ANNUAL AVERAGE OVER THE FOLLOWING 5 YEARS: 2024-2028

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CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.80	MINIMUM	1.60
LOWER QUARTILE	2.00	LOWER QUARTILE	2.00
MEDIAN	2.25	MEDIAN	2.00
UPPER QUARTILE	2.40	UPPER QUARTILE	2.20
MAXIMUM	3.40	MAXIMUM	2.90
MEAN	2.26	MEAN	2.09
STD. DEVIATION	0.30	STD. DEVIATION	0.23
N	31	N	30
MISSING	7	MISSING	8

ANNUAL AVERAGE OVER THE NEXT 10 YEARS: 2019-2028

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CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.90	MINIMUM	1.80
LOWER QUARTILE	2.00	LOWER QUARTILE	1.93
MEDIAN	2.20	MEDIAN	2.00
UPPER QUARTILE	2.30	UPPER QUARTILE	2.10
MAXIMUM	3.20	MAXIMUM	2.70
MEAN	2.22	MEAN	2.06
STD. DEVIATION	0.27	STD. DEVIATION	0.20
N	31	N	30
MISSING	7	MISSING	8

Note: The summary statistics for each forecast horizon are computed on a sample of panelists that may differ from one horizon to the next. The usual identity linking the 10-year horizon to the two underlying five-year horizons may not hold in the results.

Source: Research Department, Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters, First Quarter 2019.

TABLE NINE
 ADDITIONAL LONG-TERM (10-YEAR) FORECASTS

ANNUAL AVERAGE OVER THE NEXT 10 YEARS: 2019-2028
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REAL GDP GROWTH RATE		PRODUCTIVITY GROWTH RATE			
-----		-----			
MINIMUM	1.50	MINIMUM	0.90		
LOWER QUARTILE	1.80	LOWER QUARTILE	1.20		
MEDIAN	1.99	MEDIAN	1.35		
UPPER QUARTILE	2.30	UPPER QUARTILE	1.60		
MAXIMUM	2.75	MAXIMUM	2.85		
MEAN	2.05	MEAN	1.49		
STD. DEVIATION	0.34	STD. DEVIATION	0.49		
N	28	N	22		
MISSING	10	MISSING	16		
STOCK RETURNS (S&P 500)		BOND RATE (10-YEAR)		BILL RETURNS (3-MONTH)	
-----		-----		-----	
MINIMUM	3.43	MINIMUM	2.50	MINIMUM	1.75
LOWER QUARTILE	4.32	LOWER QUARTILE	3.25	LOWER QUARTILE	2.40
MEDIAN	5.35	MEDIAN	3.50	MEDIAN	2.75
UPPER QUARTILE	6.00	UPPER QUARTILE	3.90	UPPER QUARTILE	3.00
MAXIMUM	10.00	MAXIMUM	4.80	MAXIMUM	3.60
MEAN	5.38	MEAN	3.57	MEAN	2.72
STD. DEVIATION	1.59	STD. DEVIATION	0.52	STD. DEVIATION	0.44
N	16	N	21	N	22
MISSING	22	MISSING	17	MISSING	16

Source: Research Department, Federal Reserve Bank of Philadelphia.
 Survey of Professional Forecasters, First Quarter 2019.

2019 OASDI Trustees Report

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2. Estimates as a Percentage of Gross Domestic Product

This section presents long-range projections of the operations of the combined Old-Age and Survivors Insurance and Disability Insurance (OASI and DI) Trust Funds and of the Hospital Insurance (HI) Trust Fund, expressed as a percentage of gross domestic product (GDP). While expressing fund operations as a percentage of taxable payroll is a very useful approach for assessing the financial status of the programs (see section [IV.B.1](#)), expressing them as a percentage of the total value of goods and services produced in the United States provides an additional perspective.

Table [VI.G4](#) shows non-interest income, total cost, and the resulting balance of the combined OASI and DI Trust Funds, of the HI Trust Fund, and of the combined OASI, DI, and HI Trust Funds, expressed as percentages of GDP on the basis of each of the three alternative sets of assumptions. Table [VI.G4](#) also contains estimates of GDP. For OASDI, non-interest income consists of [payroll tax contributions](#), proceeds from [taxation of scheduled OASDI benefits](#), and any [reimbursements from the General Fund of the Treasury](#). Cost consists of [scheduled benefits](#), [administrative expenses](#), financial interchange with the Railroad Retirement program, and payments for [vocational rehabilitation services](#) for disabled beneficiaries. For HI, non-interest income consists of payroll tax contributions (including contributions from railroad employment), up to an additional 0.9 percent tax on earned income for relatively high earners, proceeds from taxation of scheduled OASDI benefits, premium revenues, monies from fraud and abuse control activities, and any reimbursements from the General Fund of the Treasury. Cost consists of outlays (benefits and administrative expenses) for beneficiaries. The Trustees show income and cost estimates generally on a cash basis for the OASDI program¹ and on an incurred basis for the HI program.

The Trustees project the OASDI annual balance (non-interest income less cost) as a percentage of GDP to be negative throughout the projection period under the intermediate and high-cost assumptions. Under the low-cost assumptions, the OASDI annual deficit as a percentage of GDP generally decreases through 2026. After 2026, deficits increase to a peak in 2034 and then decrease through 2049. The deficit decreases in 2026 in part because of a one-time upward shift in taxation of benefits income due to the expiration of the personal income tax provisions in Public Law 115-97, the Tax Cuts and Jobs Act. The annual balances are then positive for 2050 through the remainder of the projection period. The positive annual balances increase through 2056, decline through 2071, and then generally increase through 2093. Under the intermediate assumptions, the annual deficits increase through 2040, decrease through 2051, and then generally increase thereafter. Under the high-cost assumptions, annual deficits increase throughout the projection period.

The Trustees project that the HI annual balance as a percentage of GDP will be negative in 2019, and then positive throughout the rest of the projection period, under the low-cost assumptions. Under the intermediate and the high-cost assumptions, the HI annual balance is negative for all years of the projection period. Under the intermediate assumptions, annual deficits generally increase through 2046, and then generally decline thereafter. Under the high-cost assumptions, annual deficits reach a peak in 2076 and decline slowly thereafter.

The combined OASDI and HI annual balance as a percentage of GDP is negative throughout the projection period under both the intermediate and high-cost assumptions. Under the low-cost assumptions, the combined OASDI and HI annual balance is negative through 2038, and then positive and mostly rising thereafter. Under the intermediate assumptions, the combined OASDI and HI annual deficits increase from 2019 through 2041, decrease through 2054, increase through 2078, and then generally decline thereafter, reaching 1.82 percent of GDP by 2093. Under the high-cost

**SSA Projected GDP Growth Rate
2019-2095
Table VI-G4**

2095 Projected GDP	\$ 546,331.00
2019 GDP	\$ 21,485.00
Terminal Year	2095
Initial Year	2019
No. of Years	<u>76</u>
GDP Growth Rate	4.35%

assumptions, combined annual deficits rise to a peak of 6.31 percent in 2082 and mostly decrease thereafter.

By 2093, the combined OASDI and HI annual balances as percentages of GDP range from a positive annual balance of 1.03 percent for the low-cost assumptions to an annual deficit of 6.27 percent for the high-cost assumptions. Annual balances differ by a much smaller amount for the tenth projection year, 2028, ranging from an annual deficit of 0.12 percent for the low-cost assumptions to an annual deficit of 2.24 percent for the high-cost assumptions.

The summarized long-range (75-year) actuarial balance as a percentage of GDP for the combined OASDI and HI programs varies among the three alternatives by a relatively large amount, from a positive actuarial balance of 0.59 percent under the low-cost assumptions to an actuarial deficit of 4.23 percent under the high-cost assumptions. The 25-year [summarized actuarial balance](#) varies by a smaller amount, from a positive actuarial balance of 0.16 percent to an actuarial deficit of 2.40 percent. Summarized rates are calculated on a present-value basis. They include the trust fund reserve balances on January 1, 2019 and the cost of reaching a target trust fund level equal to 100 percent of the following year's annual cost at the end of the period. (See section [IV.B.4](#) for further explanation.)

Table VI.G4.—OASDI and HI Annual and Summarized Income, Cost, and Balance as a Percentage of GDP, Calendar Years 2019-2095

Calendar year	Percentage of GDP									GDP in dollars (billions)
	OASDI			HI			Combined			
	Income ^a	Cost ^b	Balance ^b	Income ^a	Cost ^b	Balance ^b	Income ^a	Cost ^b	Balance ^b	
Intermediate:										
2019	4.56	4.93	-0.38	1.49	1.54	-0.05	6.04	6.47	-0.43	\$21,485
2020	4.57	4.94	-.38	1.50	1.57	-.07	6.07	6.51	-.45	22,523
2021	4.59	5.01	-.42	1.52	1.60	-.09	6.10	6.61	-.51	23,558
2022	4.62	5.09	-.47	1.53	1.65	-.12	6.15	6.73	-.58	24,616
2023	4.64	5.16	-.52	1.54	1.69	-.15	6.18	6.85	-.67	25,735
2024	4.66	5.25	-.58	1.55	1.73	-.17	6.22	6.97	-.75	26,907
2025	4.68	5.33	-.65	1.57	1.76	-.20	6.25	7.10	-.85	28,109
2026	4.74	5.42	-.68	1.61	1.80	-.19	6.35	7.22	-.87	29,349
2027	4.76	5.50	-.75	1.62	1.83	-.21	6.38	7.34	-.95	30,637
2028	4.78	5.59	-.82	1.64	1.92	-.28	6.41	7.51	-1.10	31,972
2030	4.78	5.72	-.94	1.65	1.98	-.33	6.43	7.70	-1.27	34,800
2035	4.76	5.89	-1.13	1.68	2.12	-.43	6.44	8.01	-1.56	42,963
2040	4.74	5.93	-1.19	1.71	2.19	-.49	6.44	8.12	-1.68	52,965
2045	4.72	5.86	-1.14	1.72	2.23	-.50	6.44	8.09	-1.65	65,548
2050	4.71	5.81	-1.10	1.75	2.24	-.49	6.45	8.04	-1.59	81,297
2055	4.71	5.82	-1.11	1.77	2.23	-.46	6.48	8.05	-1.57	100,694
2060	4.71	5.89	-1.18	1.81	2.23	-.43	6.51	8.12	-1.61	124,381
2065	4.70	5.97	-1.26	1.83	2.26	-.42	6.54	8.22	-1.69	153,328
2070	4.70	6.05	-1.36	1.86	2.29	-.43	6.56	8.35	-1.79	189,023
2075	4.69	6.12	-1.43	1.88	2.33	-.45	6.57	8.44	-1.88	233,480
2080	4.67	6.10	-1.43	1.89	2.34	-.44	6.56	8.44	-1.88	289,008
2085	4.65	6.04	-1.39	1.90	2.33	-.43	6.55	8.37	-1.82	357,936
2090	4.63	6.02	-1.39	1.91	2.32	-.41	6.54	8.34	-1.79	442,655
2095	4.62	6.07	-1.45	1.92	2.31	-.39	6.54	8.38	-1.84	546,331
Summarized rates: ^c										
25-year:										
2019-	5.22	5.84	-.62	1.67	2.03	-.36	6.89	7.87	-.98	

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50-year:											
2019-68	4.99	5.84	-0.85	1.72	2.12	-0.40	6.71	7.96	-1.25		
75-year:											
2019-93	4.90	5.89	-0.99	1.77	2.17	-0.40	6.67	8.06	-1.39		
Low-cost:											
2019	4.53	4.85	-0.32	1.49	1.49	-0.01	6.01	6.34	-0.33	21,807	
2020	4.56	4.80	-0.24	1.50	1.48	.02	6.06	6.28	-0.22	23,282	
2021	4.59	4.80	-0.21	1.51	1.48	.03	6.10	6.28	-0.17	24,774	
2022	4.63	4.82	-0.19	1.53	1.49	.03	6.16	6.31	-0.16	26,239	
2023	4.66	4.85	-0.18	1.54	1.50	.04	6.20	6.35	-0.15	27,796	
2024	4.70	4.88	-0.18	1.55	1.50	.04	6.25	6.39	-0.14	29,448	
2025	4.73	4.91	-0.19	1.56	1.51	.05	6.28	6.42	-0.14	31,188	
2026	4.79	4.95	-0.16	1.60	1.51	.09	6.38	6.46	-0.08	32,986	
2027	4.82	5.00	-0.18	1.61	1.51	.10	6.43	6.50	-0.08	34,852	
2028	4.85	5.05	-0.20	1.62	1.55	.08	6.47	6.59	-0.12	36,806	
2030	4.85	5.10	-0.25	1.64	1.54	.10	6.49	6.64	-0.15	41,032	
2035	4.84	5.14	-0.29	1.68	1.50	.18	6.52	6.64	-0.11	53,775	
2040	4.83	5.07	-0.24	1.71	1.41	.30	6.54	6.49	.06	70,485	
2045	4.83	4.92	-0.10	1.74	1.30	.44	6.57	6.23	.34	93,041	
2050	4.83	4.82	.02	1.78	1.21	.57	6.61	6.03	.59	123,297	
2055	4.85	4.79	.06	1.82	1.14	.68	6.67	5.92	.74	163,160	
2060	4.87	4.82	.05	1.86	1.10	.76	6.73	5.92	.81	215,224	
2065	4.89	4.86	.03	1.89	1.09	.80	6.78	5.95	.83	283,386	
2070	4.90	4.89	.01	1.92	1.11	.81	6.82	6.00	.82	373,605	
2075	4.92	4.90	.02	1.95	1.13	.81	6.86	6.03	.83	494,275	
2080	4.92	4.83	.09	1.97	1.14	.82	6.88	5.97	.91	655,836	
2085	4.92	4.74	.18	1.98	1.15	.83	6.90	5.88	1.02	870,185	
2090	4.93	4.72	.20	2.00	1.15	.85	6.92	5.87	1.05	1,151,359	
2095	4.94	4.82	.12	2.02	1.16	.86	6.96	5.98	.98	1,518,880	
Summarized rates: c											
25-year:											
2019-43	5.25	5.22	0.03	1.67	1.53	0.13	6.91	6.75	0.16		
50-year:											
2019-68	5.07	5.02	.04	1.74	1.35	.39	6.81	6.37	.43		
75-year:											
2019-93	5.02	4.95	.07	1.81	1.29	.52	6.83	6.24	.59		
High-cost:											
2019	4.59	5.03	-0.44	1.49	1.59	-0.10	6.08	6.61	-0.54	21,152	
2020	4.59	5.20	-0.61	1.50	1.66	-0.17	6.08	6.86	-0.78	21,450	
2021	4.58	5.36	-0.78	1.51	1.73	-0.22	6.09	7.09	-1.00	21,982	
2022	4.59	5.48	-0.89	1.53	1.81	-0.28	6.11	7.29	-1.17	22,731	
2023	4.60	5.60	-1.00	1.54	1.89	-0.35	6.14	7.49	-1.35	23,507	
2024	4.62	5.74	-1.12	1.56	1.97	-0.41	6.18	7.71	-1.53	24,300	
2025	4.63	5.86	-1.23	1.58	2.06	-0.48	6.21	7.92	-1.71	25,146	
2026	4.69	5.98	-1.29	1.62	2.15	-0.52	6.31	8.13	-1.82	26,027	

2027	4.70	6.11	-1.41	1.64	2.23	-.58	6.35	8.34	-1.99	26,919
2028	4.71	6.24	-1.53	1.66	2.37	-.71	6.37	8.61	-2.24	27,813
2030	4.71	6.43	-1.72	1.67	2.55	-.88	6.38	8.98	-2.60	29,560
2035	4.69	6.75	-2.06	1.70	2.99	-1.29	6.39	9.74	-3.35	34,391
2040	4.66	6.93	-2.27	1.72	3.40	-1.68	6.37	10.33	-3.95	39,884
2045	4.63	7.00	-2.37	1.73	3.79	-2.06	6.36	10.79	-4.43	46,244
2050	4.60	7.06	-2.45	1.75	4.12	-2.37	6.35	11.17	-4.82	53,611
2055	4.59	7.15	-2.57	1.76	4.35	-2.59	6.35	11.51	-5.16	62,053
2060	4.57	7.30	-2.73	1.78	4.53	-2.74	6.36	11.83	-5.47	71,647
2065	4.55	7.46	-2.90	1.80	4.65	-2.85	6.35	12.10	-5.75	82,537
2070	4.53	7.63	-3.10	1.82	4.71	-2.89	6.35	12.34	-5.99	94,955
2075	4.51	7.79	-3.29	1.84	4.75	-2.92	6.34	12.55	-6.20	109,251
2080	4.47	7.87	-3.40	1.85	4.75	-2.91	6.32	12.63	-6.31	125,836
2085	4.44	7.87	-3.44	1.85	4.71	-2.86	6.29	12.58	-6.30	145,048
2090	4.40	7.86	-3.46	1.85	4.66	-2.81	6.25	12.52	-6.27	167,148
2095	4.37	7.87	-3.50	1.86	4.62	-2.76	6.22	12.49	-6.27	192,458

Summarized rates: ^c

25-year:										
2019-43	5.21	6.58	-1.36	1.68	2.71	-1.03	6.90	9.29	-2.40	
50-year:										
2019-68	4.93	6.83	-1.90	1.72	3.42	-1.70	6.65	10.25	-3.60	
75-year:										
2019-93	4.82	7.06	-2.25	1.75	3.73	-1.98	6.57	10.80	-4.23	

^a Income for individual years excludes interest on the trust funds. Interest is implicit in all summarized values.

^b OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

^c Summarized rates are calculated on a present-value basis. They include the value of the trust funds on January 1, 2019 and the cost of reaching a target trust fund level equal to 100 percent of annual cost at the end of the period.

Notes:

1. The Trustees show income and cost estimates generally on a cash basis for the OASDI program and on an incurred basis for the HI program.
2. Totals do not necessarily equal the sums of rounded components.

Table [VI.G5](#) displays annual ratios of OASDI taxable payroll to GDP. These ratios facilitate comparisons of trust fund operations expressed as percentages of taxable payroll and those expressed as percentages of GDP. HI taxable payroll is about 25 percent larger than the OASDI taxable payroll throughout the long-range period; see section 1 of this appendix for a detailed description of the difference. For each year, the cost as a percentage of GDP is equal to the cost as a percentage of taxable payroll multiplied by the ratio of taxable payroll to GDP.

Table A20. Macroeconomic indicators
(billion 2009 chain-weighted dollars, unless otherwise noted)

Indicators	Reference case							Annual growth 2018-2050 (percent)
	2017	2018	2025	2030	2035	2040	2050	
Real gross domestic product	17,096	17,582	20,116	22,157	24,348	26,675	32,006	1.9%
Components of real gross domestic product								
Real consumption	11,891	12,180	14,087	15,600	17,225	18,975	23,009	2.0%
Real investment	2,314	2,450	3,020	3,367	3,794	4,250	5,343	2.5%
Real government spending	2,903	2,958	3,070	3,162	3,258	3,358	3,578	0.6%
Real exports	2,191	2,310	3,177	3,695	4,321	5,053	6,806	3.4%
Real imports	2,813	2,974	3,959	4,398	4,983	5,654	7,383	2.9%
Energy intensity (thousand Btu per 2009 dollar of GDP)								
Delivered energy	4.25	4.26	3.76	3.41	3.12	2.91	2.56	-1.6%
Total energy	5.70	5.70	4.94	4.48	4.08	3.79	3.33	-1.7%
Price indices								
GDP chain-type price index (2009=1.00)	1.13	1.16	1.38	1.54	1.71	1.91	2.42	2.3%
Consumer price index (1982-4=1.00)								
All-urban	2.45	2.51	2.96	3.31	3.70	4.14	5.24	2.3%
Energy commodities and services	2.05	2.20	2.49	2.77	3.14	3.57	4.66	2.4%
Wholesale price index (1982=1.00)								
All commodities	1.94	2.02	2.34	2.58	2.80	3.03	3.59	1.8%
Fuel and power	1.64	1.83	2.32	2.74	3.16	3.62	4.74	3.0%
Metals and metal products	2.08	2.25	2.43	2.49	2.53	2.58	2.67	0.5%
Industrial commodities excluding energy	2.00	2.06	2.32	2.49	2.66	2.84	3.25	1.4%
Interest rates (percent, nominal)								
Federal funds rate	1.00	1.83	2.97	2.72	2.72	2.72	2.72	--
10-year treasury note	2.33	3.08	3.70	3.68	3.67	3.65	3.65	--
AA utility bond rate	3.82	4.35	5.79	5.79	5.84	5.85	5.96	--
Value of shipments (billion 2009 dollars)								
Non-industrial and service sectors	22,237	22,924	26,734	29,744	33,383	37,544	46,761	2.3%
Total industrial	7,444	7,686	8,803	9,570	10,400	11,299	13,312	1.7%
Agriculture, mining, and construction	2,062	2,146	2,504	2,639	2,788	2,938	3,280	1.3%
Manufacturing	5,382	5,540	6,298	6,931	7,611	8,360	10,032	1.9%
Energy-intensive	1,906	1,950	2,141	2,260	2,377	2,516	2,808	1.1%
Non-energy-intensive	3,476	3,590	4,157	4,671	5,234	5,844	7,224	2.2%
Total shipments	29,681	30,610	35,537	39,314	43,783	48,843	60,073	2.1%
Population and employment (millions)								
Population, with armed forces overseas	326	328	345	355	365	374	389	0.5%
Population, aged 16 and over	261	263	278	288	297	305	320	0.6%
Population, aged 65 and over	51	53	66	73	78	81	86	1.5%
Employment, nonfarm	146	149	155	159	164	169	179	0.6%
Employment, manufacturing	12.1	12.3	13.2	13.5	13.8	14.1	14.7	0.6%
Key labor indicators								
Labor force (millions)	160	162	170	174	180	185	195	0.6%
Nonfarm labor productivity (2009=1.00)	1.08	1.10	1.22	1.33	1.43	1.53	1.76	1.5%
Unemployment rate (percent)	4.35	3.87	4.54	4.49	4.58	4.72	4.71	--
Key indicators for energy demand								
Real disposable personal income	12,764	13,037	15,379	17,287	19,256	21,290	25,744	2.1%
Housing starts (millions)	1.30	1.45	1.57	1.53	1.55	1.52	1.60	0.3%
Commercial floorspace (billion square feet)	91	92	99	104	109	115	125	1.0%
Unit sales of light-duty vehicles (millions)	17.2	16.9	16.3	16.6	17.3	17.7	18.0	0.2%

GDP = Gross domestic product.

Btu = British thermal unit.

-- = Not applicable.

Sources: 2017 and 2018: IHS Markit, Macroeconomic and Employment models, August 2018; and IHS Markit, Industry model, May 2018. Projections: U.S. Energy Information Administration, AEO2019 National Energy Modeling System run ref2019.d111618a.

Table A21. International petroleum and other liquids supply, disposition, and prices
(million barrels per day, unless otherwise noted)

Supply, disposition, and prices	Reference case							Annual growth 2018-2050 (percent)
	2017	2018	2025	2030	2035	2040	2050	
Crude oil spot prices								
(2018 dollars per barrel)								
Brent	55	74	82	93	100	105	108	1.2%
West Texas Intermediate	52	68	78	87	95	100	105	1.3%
(nominal dollars per barrel)								
Brent	54	74	97	124	148	174	226	3.5%
West Texas Intermediate	51	68	93	116	141	166	219	3.7%
Petroleum and other liquids consumption¹								
OECD								
United States (50 states)	19.92	20.40	19.83	19.35	19.09	19.24	20.18	0.0%
United States territories	0.25	0.25	0.27	0.28	0.29	0.30	0.33	0.9%
Canada	2.44	2.40	2.40	2.36	2.35	2.36	2.43	0.0%
Mexico and Chile	2.34	2.34	2.40	2.44	2.52	2.63	2.72	0.5%
OECD Europe ²	14.54	14.52	14.39	14.14	13.99	13.89	13.46	-0.2%
Japan	3.89	3.78	3.37	3.30	3.26	3.20	3.13	-0.6%
South Korea	2.58	2.64	2.71	2.72	2.76	2.81	2.93	0.3%
Australia and New Zealand	1.34	1.39	1.58	1.65	1.70	1.79	2.08	1.3%
Total OECD consumption	47.32	47.71	46.95	46.24	45.95	46.21	47.25	0.0%
Non-OECD								
Russia	3.68	3.75	3.82	3.67	3.63	3.61	3.53	-0.2%
Other Europe and Eurasia ³	1.86	1.91	1.94	1.89	1.87	1.89	1.93	0.0%
China	13.36	13.87	16.56	17.08	17.24	17.18	16.42	0.5%
India	4.55	4.79	6.09	7.06	8.51	10.13	12.84	3.1%
Other Asia ⁴	8.66	8.85	10.37	11.47	12.73	14.18	16.80	2.0%
Middle East	8.39	8.45	8.68	8.35	8.74	9.21	10.17	0.6%
Africa	4.27	4.38	4.91	5.21	5.65	6.23	7.72	1.8%
Brazil	3.04	3.05	3.50	3.66	3.76	3.86	3.99	0.8%
Other Central and South America	3.22	3.15	3.40	3.47	3.56	3.71	4.06	0.8%
Total non-OECD consumption	51.04	52.21	59.27	61.85	65.68	70.00	77.46	1.2%
Total consumption	98.36	99.93	106.22	108.09	111.63	116.21	124.72	0.7%
Petroleum and other liquids production								
OPEC ⁵								
Middle East	29.76	30.07	31.81	32.36	34.01	35.97	39.78	0.9%
North Africa	2.57	2.64	2.20	2.50	2.91	3.38	4.22	1.5%
West Africa	4.36	4.40	4.88	4.95	5.07	5.20	6.18	1.1%
South America	2.60	1.97	1.08	1.47	1.97	2.56	3.53	1.8%
Total OPEC production	39.29	39.09	39.97	41.27	43.96	47.13	53.70	1.0%
Non-OPEC								
OECD								
United States (50 states)	15.56	17.63	22.09	22.70	22.67	22.43	20.08	0.4%
Canada	4.96	5.12	5.46	5.55	5.85	6.21	7.17	1.1%
Mexico and Chile	2.27	2.18	2.13	2.15	2.30	2.61	3.51	1.5%
OECD Europe ²	3.89	3.89	3.94	3.70	3.56	3.33	2.92	-0.9%
Japan and South Korea	0.23	0.24	0.29	0.30	0.30	0.29	0.29	0.6%
Australia and New Zealand	0.39	0.41	0.54	0.52	0.51	0.60	0.83	2.2%
Total OECD production	27.31	29.48	34.44	34.91	35.19	35.48	34.79	0.5%
Non-OECD								
Russia	11.20	11.37	10.84	10.69	10.81	11.24	11.75	0.1%
Other Europe and Eurasia ³	3.27	3.37	3.48	3.62	3.70	3.65	3.47	0.1%
China	4.78	4.79	5.38	5.45	5.50	5.66	6.04	0.7%
Other Asia ⁴	3.86	3.80	3.46	3.23	3.20	3.22	3.41	-0.3%
Middle East	1.07	1.09	0.97	0.85	0.82	0.81	0.85	-0.8%
Africa	1.53	1.48	1.54	1.49	1.48	1.49	1.61	0.3%
Brazil	3.36	3.51	4.19	4.65	5.00	5.33	6.18	1.8%
Other Central and South America	1.96	1.96	1.96	1.90	1.95	2.20	2.92	1.3%
Total non-OECD production	31.03	31.37	31.82	31.90	32.48	33.59	36.23	0.5%
Total petroleum and other liquids production	97.63	99.93	106.22	108.09	111.63	116.21	124.72	0.7%
OPEC market share (percent)	40.2	39.1	37.6	38.2	39.4	40.6	43.1	--

Table A21. International petroleum and other liquids supply, disposition, and prices (continued)
(million barrels per day, unless otherwise noted)

Supply, disposition, and prices	Reference case							Annual growth 2018-2050 (percent)
	2017	2018	2025	2030	2035	2040	2050	
Selected world production subtotals:								
Crude oil and equivalents ⁶	81.06	82.50	86.73	87.89	91.00	95.13	103.24	0.7%
Tight oil.....	5.42	6.87	9.77	10.58	10.75	11.18	12.71	1.9%
Bitumen ⁷	2.53	2.76	3.38	3.55	3.73	3.92	4.33	1.4%
Refinery processing gain ⁸	2.59	2.62	2.92	3.02	3.13	3.25	3.45	0.9%
Natural gas plant liquids.....	10.60	11.18	12.80	13.26	13.41	13.49	13.53	0.6%
Liquids from renewable sources ⁹	2.32	2.39	2.62	2.88	3.09	3.34	3.45	1.1%
Liquids from coal ¹⁰	0.30	0.30	0.18	0.20	0.22	0.24	0.29	-0.1%
Liquids from natural gas ¹¹	0.23	0.23	0.41	0.41	0.42	0.42	0.44	2.0%
Liquids from kerogen ¹²	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.0%
Crude oil production⁶								
OPEC ⁵								
Middle East.....	26.48	26.77	28.41	28.98	30.64	32.62	36.45	1.0%
North Africa.....	2.20	2.29	1.86	2.08	2.40	2.77	3.29	1.1%
West Africa.....	4.24	4.27	4.71	4.77	4.90	5.02	5.99	1.1%
South America.....	2.53	1.93	1.05	1.43	1.93	2.53	3.49	1.9%
Total OPEC production.....	35.46	35.25	36.03	37.27	39.87	42.94	49.23	1.0%
Non-OPEC								
OECD								
United States (50 states).....	9.36	10.74	14.09	14.46	14.33	14.05	11.86	0.3%
Canada.....	3.98	4.15	4.42	4.45	4.74	5.10	6.05	1.2%
Mexico and Chile.....	1.98	1.92	1.86	1.88	2.02	2.34	3.23	1.6%
OECD Europe ²	2.92	2.91	2.72	2.43	2.28	2.02	1.57	-1.9%
Japan and South Korea.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.0%
Australia and New Zealand.....	0.29	0.32	0.40	0.38	0.38	0.47	0.70	2.5%
Total OECD production.....	18.54	20.04	23.50	23.61	23.75	23.98	23.41	0.5%
Non-OECD								
Russia.....	10.58	10.75	10.17	10.03	10.14	10.58	11.09	0.1%
Other Europe and Eurasia ³	3.05	3.13	3.22	3.35	3.43	3.38	3.19	0.1%
China.....	3.84	3.77	4.24	4.24	4.22	4.24	4.54	0.6%
Other Asia ⁴	3.03	2.96	2.53	2.24	2.18	2.15	2.27	-0.8%
Middle East.....	1.04	1.06	0.95	0.83	0.81	0.79	0.83	-0.8%
Africa.....	1.32	1.27	1.23	1.18	1.16	1.17	1.28	0.0%
Brazil.....	2.62	2.67	3.31	3.67	3.91	4.13	4.94	1.9%
Other Central and South America.....	1.59	1.59	1.54	1.48	1.52	1.77	2.47	1.4%
Total non-OECD production.....	27.06	27.21	27.20	27.01	27.37	28.20	30.60	0.4%
Total crude oil production⁶.....	81.06	82.50	86.73	87.89	91.00	95.13	103.24	0.7%
OPEC market share (percent).....	43.7	42.7	41.5	42.4	43.8	45.1	47.7	0.3%

¹Estimated consumption. Includes both OPEC and non-OPEC consumers in the regional breakdown.

²OECD Europe = Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, and United Kingdom. (Note: Israel is included in OECD Europe for statistical reporting purposes. Latvia became an OECD member country on July 16, 2016, but it is not reported in OECD Europe for AEO2018.)

³Other Europe and Eurasia = Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Faroe Islands, Georgia, Gibraltar, Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Macedonia, Malta, Moldova, Montenegro, Romania, Serbia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. (Note: Latvia became an OECD member country on July 16, 2016, but it is reported in Other Europe and Eurasia for AEO2018.)

⁴Other Asia = Afghanistan, Bangladesh, Bhutan, Brunei, Burma (Myanmar), Cambodia (Kampuchea), Cook Islands, Fiji, French Polynesia, Hawaiian Trade Zone, Hong Kong, India (for production), Indonesia, Kiribati, Laos, Macau, Malaysia, Maldives, Mongolia, Nauru, Nepal, New Caledonia, Niue, North Korea, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Timor-Leste (East Timor), Tonga, Vanuatu, Vietnam, and Wake Islands.

⁵OPEC = Algeria, Angola, Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

⁶Includes crude oil, lease condensate, tight oil (shale oil), extra-heavy oil, and bitumen (oil sands).

⁷Includes diluted and upgraded/synthetic bitumen (syncrude).

⁸The volumetric amount by which total output is greater than input due to the processing of crude oil into products which, in total, have a lower specific gravity than the crude oil processed.

⁹Includes liquids produced from energy crops.

¹⁰Includes liquids converted from coal via the Fischer-Tropsch coal-to-liquids process.

¹¹Includes liquids converted from natural gas via the Fischer-Tropsch gas-to-liquids process.

¹²Includes liquids produced from kerogen (oil shale, not to be confused with tight oil (shale oil)).

OECD = Organization for Economic Cooperation and Development.

OPEC = Organization of the Petroleum Exporting Countries.

-- = Not applicable.

Note: Totals may not equal sum of components due to independent rounding. Data for 2017 are model results and may differ from official EIA data reports.

Sources: 2017 Brent and West Texas Intermediate crude oil spot prices: Thomson Reuters. 2017 quantities and projections: EIA, AEO2019 National Energy Modeling System run ref2019.d111618a and EIA, Generate World Oil Balance application.