

Section 3. Natural gas

The State Energy Data System (SEDS) estimates natural gas prices for the residential, commercial, industrial, transportation, and electric power sectors.

Natural gas prices for the end-use sectors are delivered prices to customers and are intended to include all federal, state, and local taxes, surcharges, and adjustments billed to consumers. For more information see *End-Use Taxes: Current EIA Practices*, page 18, <http://www.eia.gov/finance/archive/0583.pdf>.

SEDS calculates expenditures for natural gas as the product of the price estimates and the SEDS consumption estimates. SEDS adjusts the industrial sector consumption estimates to remove estimated refinery consumption and lease and plant use of natural gas. SEDS adjusts the transportation sector consumption estimates to remove pipeline fuel in each state. (See Section 7, “Consumption adjustments for calculating expenditures,” at <http://www.eia.gov/state/seds/seds-technical-notes-complete.php>.)

The SEDS consumption estimates are for natural gas including supplemental gaseous fuels (SGF). SGF are introduced into or commingled with natural gas, and increase the volume available for disposition. Because SGF are mostly derived from fossil fuels, which are already accounted for in EIA’s consumption data, SEDS removes SGF from total energy consumption in British thermal units (Btu) (see Sections 6 and 7 of the consumption technical notes) to eliminate any double counting. However, because there are no reliable data to estimate the price of SGF, SEDS does not remove SGF from the total energy expenditures estimates.

Residential, commercial, and industrial sectors

Physical unit prices: 1987 forward

All natural gas physical unit prices by state for the residential, commercial, and industrial sectors are taken from data collected on the Form EIA-176, “Annual Report of Natural and Supplemental Gas Supply and Disposition.” Prices for deliveries to consumers are calculated using only “onsystem” sales data. The percentage of onsystem sales varies by state and by sector. In general, it is higher in the residential sector (see

http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_VRX_pct_a.htm) and lower in the industrial sector (see http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_VFA_pct_a.htm). These prices are available on the U.S. Energy Information Administration’s (EIA) website at <http://www.eia.gov/naturalgas/data.php> and published in the State Summaries tables of the *EIA Natural Gas Annual*.

Physical unit prices: 1970 through 1986

All natural gas physical unit prices for the residential, commercial, and industrial sectors are calculated from value and quantity of sales data from the *EIA Natural Gas Annual* (NGA), *Historical Natural Gas Annual* (HNGA), or its predecessor report, *Natural Gas Production and Consumption*. State prices are calculated directly from the data sources as average revenue per unit of sales by natural gas utilities. Prices for each of the three sectors are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, as reported in million cubic feet.

For 1970 through 1979, both the value and quantity of sales data from the HNGA are reported as composites for Maryland and the District of Columbia, and for Maine, New Hampshire, and Vermont. In each case, the combined prices are assigned to each of the states in the composite.

Btu prices: all years

SEDS calculates state Btu prices for all years using the physical unit price series and the state-level average conversion factors for sectors other than electric power. The U.S. Btu price is the consumption-weighted average of the state Btu prices, adjusted for intermediate process fuel consumption in the industrial sector.

Data sources

Prices

1997 forward: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm, http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PCS_DMcf_a.htm, and http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PIN_DMcf_a.htm.

1989 through 1996: Residential and Commercial—EIA website, at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm and http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PCS_DMcf_a.htm. Industrial—EIA, *Historical Natural Gas Annual, 1930 Through 2000*, <http://www.eia.gov/naturalgas/annual/archive/>, Tables 31 and 32.

1987 and 1988: EIA, *Historical Natural Gas Annual, 1930 Through 2000*, <http://www.eia.gov/naturalgas/annual/archive/>, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

1980 through 1986: Calculated from quantity and value data published in the EIA *Natural Gas Annual, Volume 1*, Table 11 (1980), Table 14 (1981 through 1985), and Table 15 (1986). Comparable price data are available in the EIA *Historical Natural Gas Annual, 1930 Through 2000*, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

1970 through 1979: Calculated from quantity and value data published in the Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970 and 1979) and Table 7 (1971 through 1978). Comparable price data are available in the EIA *Historical Natural Gas Annual, 1930 Through 2000*, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

Consumption

1970 forward: EIA, State Energy Data System, residential, commercial, and industrial natural gas consumption.

Conversion factors: all years

EIA, State Energy Data System, Consumption technical notes, Appendix B. Data also available in CSV format at http://www.eia.gov/state/seds/sep_update/use_convfac_update.csv.

Transportation sector

Physical unit prices: all years

Transportation sector natural gas consumption includes natural gas used to move natural gas through pipelines and a relatively small amount of vehicle fuel. SEDS considers fuels used for pipeline operations to be intermediate process fuels, and therefore SEDS removes that consumption for the energy expenditures calculation. See discussion in Section 7, “Consumption adjustments for calculating expenditures,” at <http://www.eia.gov/state/seds/seds-technical-notes-complete.php>. Beginning in 1990, data for natural gas vehicle fuel use are available.

Table TN3.1. Natural gas vehicle fuel price assignments from commercial sector prices, 2013 forward

State	Year
AK	2013–2022
DC	2013–2015, 2021, 2022
DE	2017–2022
HI	2013, 2020–2022
IA	2014–2016
KS	2022*
KY	2022*
ME	2013–2022
MI	2013–2015, 2019–2022
MS	2013, 2022*
MT	2021*, 2022*
ND	2021*, 2022*
NH	2013, 2022
NJ	2013
NM	2022*
NY	2022*
OH	2022*
OK	2022
PA	2022*
RI	2018–2022
SD	2013–2016, 2020–2022
TN	2022*
VA	2022*
VT	2013–2016, 2019, 2020
WV	2013–2022
WY	2022*

* Indicates commercial sector price PADD growth rate used.

Before 1990, any natural gas used as vehicle fuel are included in the commercial sector. Much of the natural gas vehicle fuel data represent deliveries to fueling stations for fleet vehicles. Before 2012, vehicle fuel prices are available in the State Summaries tables of EIA’s *Natural Gas Annual*.

For 2013 forward, SEDS calculates vehicle fuel prices as vehicle fuel sales revenue divided by vehicle fuel sales volume from EIA’s Natural Gas Annual Respondent Query System. SEDS assigns the state’s commercial sector price for any state with missing vehicle fuel prices, as shown in Table TN3.1. For 2021, SEDS applies the annual average commercial sector Petroleum Administration for Defense District (PADD)

Table TN3.2. Natural gas vehicle fuel price assignments, 1992 through 2012

State	Year	State prices used
AK	1997–2012	WA
AL	2000–2005	FL, TN
	2006, 2007	FL, GA, TN
AR	2008–2011	OK, LA, MO, TN, TX
DE	1994	MD, NJ, PA
GA	1999	AL, FL, SC, TN
	2000–2005	FL, NC, SC, TN
HI	2005–2007	CA
IA	2001–2006	IL, MO, MN, WI
ID	2003–2005	MT, NV, OR, UT, WA, WY
KS	2004–2010	CO, MO, OK
KY	2004–2006	IL, IN, OH, MO, TN, VA
	2007–2012	IL, IN, MO, TN, VA
MD	2012	VA
ME	1992–2002, 2008–2012	MA
MI	2000–2006	IN, OH
	2007–2012	IN
MS	2002–2007	AR, LA, TN
	2008–2012	AL, LA, TN
NC	1996, 1997, 1999	SC, TN, VA
	1998	TN, VA
	2008	GA, SC, TN, VA
NE	1992, 1993	CO, IA, SD, WY
	1995–2000	CO, IA, KS, MO, SD, WY
	2001–2003	CO, KS, MO, WY
	2004–2006, 2008–2010	CO, MO, WY
	2007	CO, IA, MO, WY
NH	1996–2012	MA
NJ	2002	DE, NY, PA
	2007–2012	NY, PA
NM	1992, 1993, 2008	AZ, CO, OK, TX
OH	2007–2012	IN, PA
SC	1998	GA
SD	2001, 2003, 2004, 2006, 2010–2012	MN, MT, ND, WY
VT	1992–2012	MA
WV	2000–2011	MD
	2012	VA

price growth rate for MT and ND. For 2022, SEDS applies the annual average commercial sector PADD price growth rate for KS, KY, MS, MT, ND, NM, NY, OH, PA, TN, VA, and WY.

For 1992 through 2012, SEDS assigns the average price of neighboring states for any state with missing vehicle fuel prices, as shown in Table TN3.2. The South Carolina price in 1998 is out of range and SEDS assigns it the Georgia price.

Btu prices: all years

SEDS calculates state Btu prices for all years using the physical unit price series and the state-level average conversion factors for sectors other than electric power. The U.S. Btu price is the vehicle fuel consumption-weighted average of the state Btu prices.

Data sources

Prices

2013 forward: EIA, Natural Gas Annual Respondent Query System, http://www.eia.gov/cfapps/ngqs/ngqs.cfm?f_report=RP1, “176 Custom Report (User-defined),” Vehicle Fuel Sales Revenue and Vehicle Fuel Sales Volume.

1990 through 2012: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PDV_DMcf_a.htm. Comparable price data through 1996 are available in the *Historical Natural Gas Annual 1930 Through 2000*, <http://www.eia.gov/naturalgas/annual/archive/>, Table 34.

Consumption

1990 forward: EIA, State Energy Data System, natural gas vehicle consumption.

Conversion factors: all years

EIA, State Energy Data System, Consumption technical notes, Appendix B. Data also available in CSV format at http://www.eia.gov/state/seds/sep_update/use_convfac_update.csv.

Table TN3.3. Natural gas electric power sector price assignments, 1973 forward

State	Years	Price source	State	Years	Price source
AK	1973–1990	HNGA	NE	2008–2010	EIA-923 Sch 2 data
	2008–2010	EIA-923 Sch 2 data	NH	1973, 1974, 1987–1989	HNGA
AL	2011, 2013–2022	EIA-923 Sch 2 data		1983, 1996, 1998	C&Q, New England
AR	2011, 2013–2022	EIA-923 Sch 2 data		2003, 2004	MA, ME
AZ	2011, 2016, 2017, 2019–2021	EIA-923 Sch 2 data		2005–2007	MA, VT
CO	2012, 2013, 2016–2022	EIA-923 Sch 2 data		2008–2020	EIA-923 Sch 2 data
CT	1974–1976	HNGA		2021, 2022	EIA-923 Sch 2 data, New England
	1973, 2000, 2001	C&Q, New England	NM	2003–2007	AZ, CO, OK, TX
	2003, 2004	MA, NY, RI		2009–2012	EIA-923 Sch 2 data
DC	2012	VA	NV	2013, 2014	EIA-923 Sch 2 data
	2016	MD	OH	2011	EIA-923 Sch 2 data
DE	2003–2007, 2011	MD, NJ, PA	OK	2011, 2014–2022	EIA-923 Sch 2 data
	2008–2010	EIA-923 Sch 2 data	OR	1983, 1984, 1986, 1989, 1990	C&Q, Pacific
	2012–2022	NJ, PA		2011–2022	EIA-923 Sch 2 data
FL	2018, 2020, 2022	EIA-923 Sch 2 data	PA	1973	HNGA
GA	2021, 2022	EIA-923 Sch 2 data	RI	1976, 1980	HNGA
IA	2008–2011	EIA-923 Sch 2 data		1999–2001	C&Q, New England
ID	1983–1986	HNGA		2014, 2016	CT, MA
	1974, 1987, 1996–2001	C&Q, Mountain		2022	CT
	2003–2005	NV, OR, WA, WY	SC	1977	HNGA
	2006, 2007	NV, OR, WA		2003, 2004	GA, NC
	2008–2014	EIA-923 Sch 2 data		2005	GA
IL	2011–2015, 2019–2020	EIA-923 Sch 2 data		2009–2017	EIA-923 Sch 2 data
IN	2011–2017	EIA-923 Sch 2 data	SD	1983–1990	HNGA
KY	2003–2005	IL, IN, OH, VA, WV		1997, 1999–2001	C&Q, West North Central
	2007	IL, IN, OH, VA		2005	GA
	2008–2022	EIA-923 Sch 2 data		2009, 2010	EIA-923 Sch 2 data
LA	2011, 2013–2015, 2017–2022	EIA-923 Sch 2 data	TN	1976, 1980, 1981, 1983, 1988–1996	HNGA
MA	2022	EIA-923 Sch 2 data		1997–2001	C&Q, East South Central
MD	1973, 1974, 1983–1985	HNGA		2003, 2004	AL, AR, GA, MS, NC, VA
	2001	C&Q, South Atlantic		2005–2007	AL, AR, GA, MS, VA
	2012	PA, VA		2008	EIA-923 Sch 2 data
ME	1997–2001	C&Q, New England	UT	1988, 1989	HNGA
	2005–2021	MA		2003–2005	AZ, CO, NV, WY
	2022	EIA-923 Sch 2 data, New England		2006, 2007	AZ, CO, NV
MN	2003–2007	IA, ND, WI		2008–2011, 2014–2016	EIA-923 Sch 2 data
	2009–2022	EIA-923 Sch 2 data	VA	2011, 2016	EIA-923 Sch 2 data
MO	2003–2007	AR, IA, IL, KS, NE, OK	VT	1983–1985, 1989, 1990	HNGA
	2008–2021	EIA-923 Sch 2 data		1986	C&Q, New England
	2022	EIA-923 Sch 2 data, West North Central		2003, 2004, 2013–2021	MA, NY
MS	2009–2022	EIA-923 Sch 2 data		2022	NY
MT	1997, 2006, 2007	C&Q, Mountain	WA	1978, 1983–1985, 1988, 1989	HNGA
	2003–2005	ND, WY		1986, 1987, 1990, 1997, 1999–2001	C&Q, Pacific
	2008–2021	EIA-923 Sch 2 data		2002	OR
NC	1983–1990	HNGA		2011–2022	EIA-923 Sch 2 data
	2005	GA, VA	WI	2014–2017, 2019–2020	EIA-923 Sch 2 data
	2006, 2007	GA, SC, VA	WV	2007	OH, MD, PA, VA
	2009–2017, 2022	EIA-923 Sch 2 data		2011, 2013–2018, 2021, 2022	EIA-923 Sch 2 data
ND	1973, 1974, 1976–1986	HNGA	WY	2006, 2007	CO, NE
	2008, 2009	EIA-923 Sch 2 data		2008–2022	EIA-923 Sch 2 data

Electric power sector

Physical unit prices: 2002 forward

All natural gas physical unit prices by state for the electric power sector are taken from the State Summaries tables of EIA's *Natural Gas Annual*. Before 2008, for any state with missing prices, SEDS assigns it the average price of all available surrounding states. For 2008 forward, SEDS uses the average delivered cost of natural gas to regulated electric power plants, compiled from Schedule 2 of Form EIA-923, "Power Plant Operations Report," to supplement missing *Natural Gas Annual* prices. If prices from both sources are not available, then SEDS uses the average price of all available surrounding states or region. Table TN3.3 lists the price assignments by state and year.

Physical unit prices: 1973, 1974, 1983 through 2001

Natural gas prices by state are reported in the EIA *Cost and Quality of Fuels for Electric Plants* (C&Q) for gas consumed at steam-electric plants only. Btu prices are taken from the C&Q, and converted from cents to dollars per million Btu.

Where individual state prices are unavailable from C&Q, they are developed from physical unit prices published in Tables 26 through 76 of the NGA (from 1997 forward), or the *Historical Natural Gas Annual, 1930 Through 2000* (HNGA, from 1987 through 1996). Physical unit prices prior to 1987 are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, reported in million cubic feet.

Prices are not available from either C&Q or the NGA and HNGA for some years. In these cases, quantity-weighted Census division prices from C&Q are assigned. In addition, prices for Montana in 1997, Vermont in 1986, and Washington in 1986, 1987, 1990, and 1997 use quantity-weighted Census division prices from C&Q for more consistent prices than those available from the HNGA or more consistent with values in previous and later years. Table TN3.3 lists the states and years for which HNGA or C&Q Census division prices are used.

Physical unit prices: 1980 through 1982

State-level Btu and physical unit prices for 1980 through 1982 are taken from C&Q for all reporting plants. Physical unit prices are taken directly from the data source, while Btu prices are converted from cents to dollars per million Btu. Where individual state prices are unavailable from C&Q, they are computed from value and quantity of sales data from HNGA.

Table TN3.4. Tables from EIA *Cost and Quality of Fuels for Electric Plants* used as data sources, 1973 through 2001

Years	Price data	Volume data
1973, 1974	Table 10	Table 9
1975–1979	Table 10, 16	Table 9, 15
1980–1982	Table 48	–
1983, 1984	Table 53	–
1985–1987	Table 43	–
1988, 1989	Table 44	–
1990–1994	Table 12 (1994 edition)	–
1995–1996	Table 12 (1999 edition)	–
1997–2001	Table 12 (2001 edition)	–

Physical unit prices: 1973 through 1979

State-level prices are reported separately by C&Q for gas consumed at steam-electric plants and gas consumed at combustion turbine and internal combustion units. Weighted-average Btu prices are calculated by using the two C&Q prices and the respective gas deliveries for steam-electric and combustion use. Where individual state prices are unavailable from C&Q, they are computed from value and quantity of sales data from HNGA. For the New Hampshire price in 1977 a combined price is computed from value and quantity of sales data from the HNGA data for Maine, New Hampshire, and Vermont.

Physical unit prices: 1970 through 1972

State-level prices for 1970 through 1972 are taken from *Natural Gas Production and Consumption* and are calculated similarly to the way prices for the residential, commercial, and industrial sectors are calculated. Prices, as average revenue per unit of sales, are computed from value and quantity of sales data from the source reports. A combined price is reported for New Hampshire and Vermont for 1971 and 1972, and each of these states is assigned the combined price. State Btu prices are calculated from the physical unit prices by using the state-level electric power conversion factors.

U.S. prices: all years

The U.S. Btu prices are the consumption-weighted average of the state Btu prices.

Data sources

Prices

Primary sources:

2002 forward: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PEU_DMcf_a.htm.

1973 through 2001: EIA, *Cost and Quality of Fuels for Electric Plants*, http://www.eia.gov/electricity/cost_quality/ (table numbers shown in Table TN3.4).

Secondary sources:

2008 forward: EIA Office of Energy Production, Conversion & Delivery, data on average delivered cost of natural gas to regulated electric power plants by State from EIA-923, "Power Plant Operations Report," <http://www.eia.gov/electricity/data/eia923/>, Schedule 2.

2002 through 2007: EIA, *Cost and Quality of Fuels for Electric Power Plants*, http://www.eia.gov/electricity/cost_quality/, Table 13.

1997 through 2001: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm.

1990 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, <http://www.eia.gov/naturalgas/annual/archive/>, Table 31 and Table 32.

1980 through 1989: EIA, *Natural Gas Annual 1992, Volume 2*, Table 23.

1976 through 1979: EIA, Energy Data Reports, *Natural Gas Production and Consumption*, Table 7 (1976 through 1978) and Table 6 (1979). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970) and Table 7 (1971 through 1975). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

Consumption

1970 forward: EIA, State Energy Data System, electric power sector natural gas consumption.

Conversion factors: all years

Btu prices that are calculated directly from *Cost and Quality of Fuels for Electric Plants* (C&Q), or from EIA-923, "Power Plant Operations Report," require no conversion factors. When the *Natural Gas Annual*

is the primary source, SEDS uses the natural gas thermal conversion factors for electric power consumption to calculate prices in Btu. The data are published in EIA's State Energy Data System, Consumption technical notes, Appendix B and also available in CSV format at http://www.eia.gov/state/seds/sep_update/use_convfac_update.csv.