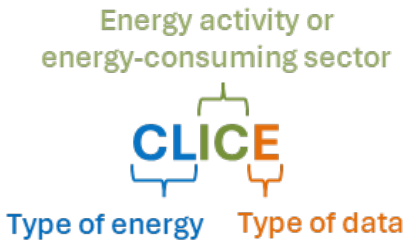
Appendix A. Mnemonic series names (MSN)

This appendix contains an alphabetical listing of the State Energy Data System (SEDS) energy-related CO2 emissions variables, called MSNs. For each variable, SEDS provides: a brief description; unit of measure; and the formulas used to create the variable. Variables that are entered directly from other sources, but not calculated by SEDS, are independent variables. Formulas for the state calculations have "ZZ" following the variable name, where "ZZ" represents the two-letter state code. The formulas for the United States have "US" following the variable name. If the formula for the states and the United States are the same, only one formula is shown.

The SEDS MSN variables have five-character names that generally consist of the following components:



See Section 1 of the SEDS technical notes for explanation of the five-character MSN code descriptions.

See Table A1 for all CO2 emissions, nonfuel, sequestration, and conversion variables.

Energy-related CO2 emissions estimates require SEDS consumption variables. See Table A2 for all SEDS consumption variables used directly in CO2 emissions equations. See the SEDS consumption technical notes for all of the underlying variables used to estimate those variables.

APPENDIX A

Table A1. CO2 emissions variables

MSN	Description	Unit	Formula
ABICE	Aviation gasoline blending components industrial sector CO2 emissions.	Million metric tons CO2	ABICE = ABICB * ABTCFUS / 1,000,000
ABTCE	Aviation gasoline blending components total CO2 emissions.	Million metric tons CO2	ABTCE = ABICE
ABTCFUS	Aviation gasoline blending components CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	ABTCFUS is independent.
ARICE	Asphalt and road oil industrial sector CO2 emissions.	Million metric tons CO2	ARICE = (ARICB * ARTCFUS * (1 - ARNFSUS * ARSQSUS)) / 1,000,000
ARNFSUS	Asphalt and road oil non-combustion share for the United States.	Share (number between 0 and 1)	ARNFSUS = 1
ARSQSUS	Asphalt and road oil nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	ARSQSUS = 1
ARTCE	Asphalt and road oil total CO2 emissions.	Million metric tons CO2	ARTCE = ARICE
ARTCFUS	Asphalt and road oil CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	ARTCFUS is independent.
AVACE	Aviation gasoline transportation sector CO2 emissions.	Million metric tons CO2	AVACE = AVACB * AVTCFUS / 1,000,000
AVTCE	Aviation gasoline total CO2 emissions.	Million metric tons CO2	AVTCE = AVACE
AVTCFUS	Aviation gasoline CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	AVTCFUS is independent.
BQICE	Normal butane industrial sector CO2 emissions.	Million metric tons CO2	BQICE = (BQICB * BQTCFUS * (1 - BUNFSUS * BQSQSUS)) / 1,000,000
BQSQSUS	Normal butane nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	BQSQSUS = 0.8
BQTCE	Normal butane total CO2 emissions.	Million metric tons CO2	BQTCE = BQICE
BQTCFUS	Normal butane CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	BQTCFUS is independent.
BUNFSUS	Normal butane/butylene non-combustion share for the United States.	Share (number between 0 and 1)	BUNFSUS is independent.
BYICE	Butylene industrial sector CO2 emissions.	Million metric tons CO2	BYICE = (BYICB * BYTCFUS * (1 - BUNFSUS * BYSQSUS)) / 1,000,000

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
BYSQSUS	Butylene nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	BYSQSUS = 0.8
BYTCE	Butylene total CO2 emissions.	Million metric tons CO2	BYTCE = BYICE
BYTCFUS	Butylene CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	BYTCFUS is independent.
CCNIEUS	Coal coke net imports CO2 emissions into the United States.	Million metric tons CO2	CCNIEUS = CCNIBUS * CCTCFUS / 1,000,000
CCTCFUS	Coal coke net imports CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	CCTCFUS is independent.
CDEGR	Carbon intensity of the economy (CO2 emissions divided by real GDP).	Metric tons CO2 per million chained (2017) dollars	CDEGR = TETCE / (GDPRX / 1,000,000)
CDTCR	Carbon intensity of energy supply (CO2 emissions divided by total energy consumption less interstate flow of electricity).	Metric tons CO2 per billion Btu	CDTCR = TETCE / ((TETCB - ELISB) / 1,000,000)
CDTPR	Per capita energy-related CO2 emissions.	Metric tons CO2	CDTPR = TETCE / (TPOPP / 1,000)
CLACE	Coal CO2 emissions for the transportation sector (through 1977).	Million metric tons CO2	CLACE = CLACB * CLOCFUS / 1,000,000
CLCCE	Coal CO2 emissions for the commercial sector.	Million metric tons CO2	CLCCE = CLCCB * CLHCFUS / 1,000,000
CLEIE	Coal CO2 emissions for the electric power sector.	Million metric tons CO2	CLEIE = CLEIB * CLEIFUS / 1,000,000
CLEIFUS	Coal CO2 emissions factor for the electric power sector for the United States.	Million metric tons CO2 per quadrillion Btu	CLEIFUS is independent.
CLHCFUS	Coal CO2 emissions factor for the residential and commercial sectors for the United States.	Million metric tons CO2 per quadrillion Btu	CLHCFUS is independent.
CLICE	Coal CO2 emissions for the industrial sector.	Million metric tons CO2	CLICEZZ = CLKCEZZ + CLOCEZZ CLICEUS = CLKCEUS + CLOCEUS + CCNIEUS
CLKCE	Coal consumed at coke plants (coking coal) CO2 emissions for the industrial sector.	Million metric tons CO2	CLKCE = (CLKCB * CLKCFUS * (1 - CLNFSUS * CLSQSUS)) / 1,000,000
CLKCFUS	Coal coking plants CO2 emissions factor for the industrial sector for the United States.	Million metric tons CO2 per quadrillion Btu	CLKCFUS is independent.

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
CLNFSUS	Coal consumed at coke plants (coking coal) non-combustion share for the United States.	Share (number between 0 and 1)	CLNFSUS is independent.
CLOCE	Coal other than coke plants CO2 emissions for the industrial sector.	Million metric tons CO2	CLOCE = CLOCB * CLOCFUS / 1,000,000
CLOCFUS	Coal other than coke plants CO2 emissions factor for the industrial and transportation sectors for the United States.	Million metric tons CO2 per quadrillion Btu	CLOCFUS is independent.
CLRCE	Coal CO2 emissions for the residential sector (through 2008).	Million metric tons CO2	CLRCE = CLRCB * CLHCFUS / 1,000,000
CLSQSUS	Coal consumed at coke plants (coking coal) nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	CLSQSUS = 0.75
CLTCE	Coal total CO2 emissions.	Million metric tons CO2	CLTCEZZ = CLRCEZZ + CLCCEZZ + CLICEZZ + CLACEZZ + CLEIEZZ CLTCEUS = CLRCEUS + CLCCEUS + CLICEUS + CLACEUS + CLEIEUS
COICE	Crude oil industrial sector CO2 emissions.	Million metric tons CO2	COICE = COICB * COTCFUS / 1,000,000
COTCE	Crude oil total CO2 emissions.	Million metric tons CO2	COTCE = COICE
COTCFUS	Crude oil CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	COTCFUS is independent.
DMACE	Distillate fuel oil, excluding biofuels, transportation sector CO2 emissions.	Million metric tons CO2	DMACE = DMACB * DMTCFUS / 1,000,000
DMCCE	Distillate fuel oil, excluding biofuels, commercial sector CO2 emissions.	Million metric tons CO2	DMCCE = DMCCB * DMTCFUS / 1,000,000
DMEIE	Distillate fuel oil, excluding biofuels, electric power sector CO2 emissions.	Million metric tons CO2	DMEIE = DMEIB * DMTCFUS / 1,000,000
DMICE	Distillate fuel oil, excluding biofuels, industrial sector CO2 emissions.	Million metric tons CO2	DMICE = (DMICB * DMTCFUS * (1 - DMNFSUS * DMSQSUS)) / 1,000,000
DMNFSUS	Distillate fuel oil, excluding biofuels, non-combustion share for the United States.	Share (number between 0 and 1)	DMNFSUS is independent.
DMRCE	Distillate fuel oil, excluding biofuels, residential sector CO2 emissions.	Million metric tons CO2	DMRCE = DMRCB * DMTCFUS / 1,000,000

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
DMSQSUS	Distillate fuel oil, excluding biofuels, nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	DMSQSUS = 0.5
DMTCE	Distillate fuel oil, excluding biofuels, total CO2 emissions.	Million metric tons CO2	DMTCE = DMACE + DMCCE + DMEIE + DMICE + DMRCE
DMTCFUS	Distillate fuel oil, excluding biofuels, CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	DMTCFUS is independent.
EQICE	Ethane industrial sector CO2 emissions.	Million metric tons CO2	EQICE = (EQICB * EQTCFUS * (1 - ETNFSUS * EQSQSUS)) / 1,000,000
EQSQSUS	Ethane nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	EQSQSUS = 0.8
EQTCE	Ethane total CO2 emissions.	Million metric tons CO2	EQTCE = EQICE
EQTCFUS	Ethane CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	EQTCFUS is independent.
ETNFSUS	Ethane/ethylene non-combustion share for the United States.	Share (number between 0 and 1)	ETNFSUS is independent.
EYICE	Ethylene industrial sector CO2 emissions.	Million metric tons CO2	EYICE = (EYICB * EYTCFUS * (1 - ETNFSUS * EYSQSUS)) / 1,000,000
EYSQSUS	Ethylene nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	EYSQSUS = 0.8
EYTCE	Ethylene total CO2 emissions.	Million metric tons CO2	EYTCE = EYICE
EYTCFUS	Ethylene CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	EYTCFUS is independent.
FFACE	Fossil fuel CO2 emissions for the transportation sector.	Million metric tons CO2	FFACE = CLACE + NNACE + PMACE
FFCCE	Fossil fuel CO2 emissions for the commercial sector.	Million metric tons CO2	FFCCE = CLCCE + NNCCE + PMCCE
FFEIE	Fossil fuel CO2 emissions for the electric power sector.	Million metric tons CO2	FFEIE = CLEIE + NNEIE + PMEIE
FFICE	Fossil fuel CO2 emissions for the industrial sector.	Million metric tons CO2	FFICEZZ = CLICEZZ + NNICEZZ + PMICEZZ FFICEUS = CLICEUS + CCNIEUS + NNICEUS + PMICEUS

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
FFRCE	Fossil fuel CO2 emissions for the residential sector.	Million metric tons CO2	FFRCE = CLRCE + NNRCE + PMRCE
FFTCE	Fossil fuel total CO2 emissions.	Million metric tons CO2	FFTCEZZ= CLTCEZZ + NNTCEZZ + PMTCEZZ FFTCEUS = CLTCEUS + CCNIEUS + NNTCEUS + PMTCEUS
FNICE	Naphthas for petrochemical feedstock use industrial sector CO2 emissions.	Million metric tons CO2	FNICE = (FNICB * FNTCFUS * (1 - FNNFSUS * FNSQSUS)) / 1,000,000
FNNFSUS	Naphthas for petrochemical feedstock use non-combustion share for the United States.	Share (number between 0 and 1)	FNNFSUS = 1
FNSQSUS	Naphthas used for petrochemical feedstocks nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	FNSQSUS = 0.75
FNTCE	Naphthas for petrochemical feedstock use total CO2 emissions.	Million metric tons CO2	FNTCE = FNICE
FNTCFUS	Naphthas for petrochemical feedstock use CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	FNTCFUS is independent.
FOICE	Other oils for petrochemical feedstock use industrial sector CO2 emissions.	Million metric tons CO2	FOICE = (FOICB * FOTCFUS * (1 - FONFSUS * FOSQSUS)) / 1,000,000
FONFSUS	Other oils for petrochemical feedstock use non-combustion share for the United States.	Share (number between 0 and 1)	FONFSUS = 1
FOSQSUS	Other oils used for petrochemical feedstocks nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	FOSQSUS = 0.5
FOTCE	Other oils for petrochemical feedstock use total CO2 emissions.	Million metric tons CO2	FOTCE = FOICE
FOTCFUS	Other oils for petrochemical feedstock use CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	FOTCFUS is independent.
FSICE	Still gas for petrochemical feedstock use industrial sector CO2 emissions (through 1985).	Million metric tons CO2	FSICE = (FSICB * SGTCFUS * (1 - FSNFSUS * FSSQSUS)) / 1,000,000
FSNFSUS	Petrochemical feedstocks, still gas, non-combustion share for the United States (through 1985).	Share (number between 0 and 1)	FSNFSUS = SGNFSUS

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
FSSQSUS	Still gas for petrochemical feedstock use sequestration factor for the United States (through 1985).	Share (number between 0 and 1)	FSSQSUS = 0.8
FSTCE	Still gas for petrochemical feedstock use total CO2 emissions (through 1985).	Million metric tons CO2	FSTCE = FSICE
GDPRX	Real gross domestic product (GDP).	Million chained (2017) dollars	GDPRXZZ is independent. GDPRXUS is independent.
HLACE	Hydrocarbon gas liquids transportation sector CO2 emissions.	Million metric tons CO2	Before 2010: HLACE = LGACE 2010 forward: HLACE = PQACE
HLCCE	Hydrocarbon gas liquids commercial sector CO2 emissions.	Million metric tons CO2	Before 2010: HLCCE = LGCCE 2010 forward: HLCCE = PQCCE
HLICE	Hydrocarbon gas liquids industrial sector CO2 emissions.	Million metric tons CO2	Before 1984: HLICE = LGICE + NAICE + PLICE + USICE 1984 through 2009: HLICE = LGICE + PPICE 2010 forward: HLICE = BQICE + BYICE + EQICE + EYICE + IQICE + IYICE + PPICE + PQICE + PYICE
HLRCE	Hydrocarbon gas liquids residential sector CO2 emissions.	Million metric tons CO2	Before 2010: HLRCE = LGRCE 2010 forward: HLRCE = PQRCE
HLTCE	Hydrocarbon gas liquids total CO2 emissions.	Million metric tons CO2	HLTCE = HLACE + HLCCE + HLICE + HLRCE
IBNFSUS	Isobutane/isobutylene non-combustion share for the United States.	Share (number between 0 and 1)	IBNFSUS is independent.
IQICE	Isobutane industrial sector CO2 emissions.	Million metric tons CO2	IQICE = (IQICB * IQTCFUS * (1 - IBNFSUS * IQSQSUS)) / 1,000,000
IQSQSUS	Isobutane nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	IQSQSUS = 0.8
IQTCE	Isobutane total CO2 emissions.	Million metric tons CO2	IQTCE = IQICE

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
IQTCFUS	Isobutane CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	IQTCFUS is independent.
IYICE	Isobutylene industrial sector CO2 emissions.	Million metric tons CO2	IYICE = (IYICB * IYTCFUS * (1 - IBNFSUS * IYSQSUS)) / 1,000,000
IYSQSUS	Isobutylene nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	IYSQSUS = 0.8
IYTCE	Isobutylene total CO2 emissions.	Million metric tons CO2	IYTCE = IYICE
IYTCFUS	Isobutylene CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	IYTCFUS is independent.
JFACE	Jet fuel transportation sector CO2 emissions.	Million metric tons CO2	JFACE = JFACB * JFTCFUS / 1,000,000
JFEIE	Jet fuel electric power sector CO2 emissions (through 1982).	Million metric tons CO2	JFEIE = JFEUB * JFTCFUS / 1,000,000
JFTCE	Jet fuel total CO2 emissions.	Million metric tons CO2	JFTCE =JFACE + JFEIE
JFTCFUS	Jet fuel CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	JFTCFUS is independent.
KSCCE	Kerosene commercial sector CO2 emissions.	Million metric tons CO2	KSCCE = KSCCB * KSTCFUS / 1,000,000
KSICE	Kerosene industrial sector CO2 emissions.	Million metric tons CO2	KSICE = KSICB * KSTCFUS / 1,000,000
KSRCE	Kerosene residential sector CO2 emissions.	Million metric tons CO2	KSRCE = KSRCB * KSTCFUS / 1,000,000
KSTCE	Kerosene total CO2 emissions.	Million metric tons CO2	KSTCE = KSCCE + KSICE + KSRCE
KSTCFUS	Kerosene CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	KSTCFUS is independent.
LGACE	LPG CO2 emissions in the transportation sector (through 2009).	Million metric tons CO2	LGACE = LGACB * PQTCFUS / 1,000,000
LGCCE	LPG CO2 emissions in the commercial sector (through 2009).	Million metric tons CO2	LGCCE = LGCCB * PQTCFUS / 1,000,000
LGICE	LPG CO2 emissions in the industrial sector (through 2009).	Million metric tons CO2	LGICEZZ = (LGICBZZ / LGICBUS) * LGICEUS LGICEUS is independent.
LGRCE	LPG CO2 emissions in the residential sector (through 2009).	Million metric tons CO2	LGRCE = LGRCB * PQTCFUS / 1,000,000
LGTCE	LPG total CO2 emissions (through 2009).	Million metric tons CO2	LGTCE = LGACE + LGCCE + LGICE + LGRCE

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
LUACE	Lubricants transportation sector CO2 emissions.	Million metric tons CO2	LUACE = (LUACB * LUTCFUS * (1 - LUNFSUS * LUSQSUS)) / 1,000,000
LUICE	Lubricants industrial sector CO2 emissions.	Million metric tons CO2	LUICE = (LUICB * LUTCFUS * (1 - LUNFSUS * LUSQSUS)) / 1,000,000
LUNFSUS	Lubricants non-combustion share for the United States.	Share (number between 0 and 1)	LUNFSUS = 1
LUSQSUS	Lubricants nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	LUSQSUS = 0.5
LUTCE	Lubricants total CO2 emissions.	Million metric tons CO2	LUTCE = LUACE + LUICE
LUTCFUS	Lubricants CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	LUTCFUS is independent.
MBICE	Motor gasoline blending components industrial sector CO2 emissions.	Million metric tons CO2	MBICE = MBICB * MBTCFUS / 1,000,000
MBTCE	Motor gasoline blending components total CO2 emissions.	Million metric tons CO2	MBTCE = MBICE
MBTCFUS	Motor gasoline blending components CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	MBTCFUS is independent.
MMACE	Motor gasoline, excluding ethanol, transportation sector CO2 emissions.	Million metric tons CO2	MMACE = MMACB * MMTCFUS / 1,000,000
MMCCE	Motor gasoline, excluding ethanol, commercial sector CO2 emissions.	Million metric tons CO2	MMCCE = MMCCB * MMTCFUS / 1,000,000
MMICE	Motor gasoline, excluding ethanol, industrial sector CO2 emissions.	Million metric tons CO2	MMICE = MMICB * MMTCFUS / 1,000,000
MMTCE	Motor gasoline, excluding ethanol, total CO2 emissions.	Million metric tons CO2	MMTCE = MMACE + MMCCE + MMICE
MMTCFUS	Motor gasoline, excluding fuel ethanol, CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	MMTCFUS is independent.
MSICE	Miscellaneous petroleum products industrial sector CO2 emissions.	Million metric tons CO2	MSICE = (MSICB * MSTCFUS * (1 - MSNFSUS * MSSQSUS)) / 1,000,000
MSNFSUS	Miscellaneous petroleum products non-combustion share for the United States.	Share (number between 0 and 1)	MSNFSUS = 1

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
MSSQSUS	Miscellaneous petroleum products nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	MSSQSUS = 1
MSTCE	Miscellaneous petroleum products total CO2 emissions.	Million metric tons CO2	MSTCE = MSICE
MSTCFUS	Miscellaneous petroleum products CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	MSTCFUS is independent.
NAICE	Natural gasoline/isopentane industrial sector CO2 emissions (through 1983).	Million metric tons CO2	NAICE = (NAICB * NATCFUS * (1 - NANFSUS * NASQFUS)) / 1,000,000
NANFSUS	Natural gasoline/isopentane non-combustion share for the United States (through 1983).	Share (number between 0 and 1)	NANFSUS = PPNFSUS
NASQSUS	Natural gasoline/isopentane nonfuel carbon sequestration factor for the United States (through 1983).	Share (number between 0 and 1)	NASQSUS = PPSQSUS
NATCE	Natural gasoline/isopentane total CO2 emissions (through 1983).	Million metric tons CO2	NATCE = NAICE
NATCFUS	Natural gasoline/isopentane CO2 emissions factor for the United States (through 1983).	Million metric tons CO2 per quadrillion Btu	NATCFUS = PPTCFUS
NNACE	Natural gas, excluding supplemental gaseous fuels, CO2 emissions for the transportation sector.	Million metric tons CO2	NNACE = NNACB * NNTCFUS / 1,000,000
NNCCE	Natural gas, excluding supplemental gaseous fuels, CO2 emissions for the commercial sector.	Million metric tons CO2	NNCCE = NNCCB * NNTCFUS / 1,000,000
NNEIE	Natural gas, excluding supplemental gaseous fuels, CO2 emissions for the electric power sector.	Million metric tons CO2	NNEIE = NNEIB * NNTCFUS / 1,000,000
NNICE	Natural gas, excluding supplemental gaseous fuels, CO2 emissions for the industrial sector.	Million metric tons CO2	NNICE = (NNICB * NNTCFUS * (1 - NNNFSUS * NNSQSUS)) / 1,000,000
NNNFSUS	Natural gas, excluding supplemental gaseous fuels, non-combustion share for the United States.	Share (number between 0 and 1)	NNNFSUS is independent.
NNRCE	Natural gas, excluding supplemental gaseous fuels, CO2 emissions for the residential sector.	Million metric tons CO2	NNRCE = NNRCB * NNTCFUS / 1,000,000

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
NNSQSUS	Natural gas, excluding supplemental gaseous fuels, carbon sequestration factor for the United States.	Share (number between 0 and 1)	NNSQSUS = 0.44
NNTCE	Natural gas, excluding supplemental gaseous fuels, total CO2 emissions.	Million metric tons CO2	NNTCE = NNRCE + NNCCE + NNICE + NNACE + NNEIE
NNTCFUS	Natural gas, excluding supplemental gaseous fuels, CO2 emissions factor for all sectors for the United States.	Million metric tons CO2 per quadrillion Btu	NNTCFUS is independent.
OMICE	Other petroleum products, excluding biofuels, industrial sector CO2 emissions.	Million metric tons CO2	OMICE = ABICE + COICE + FNICE + FOICE + FSICE + MBICE + MSICE + SGICE + SNICE + UOICE + WXICE
OMTCE	Other petroleum products, excluding biofuels, total CO2 emissions.	Million metric tons CO2	OMTCE = OMICE
PCCCE	Petroleum coke commercial sector CO2 emissions.	Million metric tons CO2	PCCCE = PCCCB * PCTCFUS / 1,000,000
PCEIE	Petroleum coke electric power sector CO2 emissions.	Million metric tons CO2	PCEIE = PCEIB * PCTCFUS / 1,000,000
PCICE	Petroleum coke industrial sector CO2 emissions.	Million metric tons CO2	PCICE = (PCICB * PCTCFUS * (1 - PCNFSUS * PCSQSUS)) / 1,000,000
PCNFSUS	Petroleum coke non-combustion share for the United States.	Share (number between 0 and 1)	PCNFSUS is independent.
PCSQSUS	Petroleum coke used for other manufacturing nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	PCSQSUS = 0.5
PCTCE	Petroleum coke total CO2 emissions.	Million metric tons CO2	PCTCE = PCCCE + PCEIE + PCICE
PCTCFUS	Petroleum coke CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	PCTCFUS is independent.
PLICE	Plant condensate industrial sector CO2 emissions (through 1983).	Million metric tons CO2	PLICE = (PLICB * PLTCFUS * (1 - PLNFSUS * PLSQSUS)) / 1,000,000
PLNFSUS	Plant condensate non-combustion share for the United States (through 1983).	Share (number between 0 and 1)	PLNFSUS = PPNFSUS

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
PLSQSUS	Petroleum coke industrial sector CO2 emissions for the United States (through 1983).	Share (number between 0 and 1)	PLSQSUS = PPSQSUS
PLTCE	Plant condensate total CO2 emissions (through 1983).	Million metric tons CO2	PLTCE = PLICE
PLTCFUS	Plant condensate CO2 emissions factor for the United States (through 1983).	Million metric tons CO2 per quadrillion Btu	PLTCFUS is independent.
PMACE	All petroleum products, excluding biofuels, CO2 emissions for the transportation sector.	Million metric tons CO2	PMACE = AVACE + DMACE + HLACE + JFACE + LUACE + MMACE + RFACE
PMCCE	All petroleum products, excluding biofuels, CO2 emissions for the commercial sector.	Million metric tons CO2	PMCCE = DMCCE + HLCCE + KSCCE + MMCCE + PCCCE + RFCCE
PMEIE	All petroleum products, excluding biofuels, CO2 emissions for the electric power sector.	Million metric tons CO2	PMEIE = DMEIE + JFEIE + PCEIE + RFEIE
PMICE	All petroleum products, excluding biofuels, CO2 emissions for the industrial sector.	Million metric tons CO2	PMICE = ARICE + DMICE + HLICE + KSICE + LUICE + MMICE + PCICE + RFICE + OMICE
PMRCE	All petroleum products, excluding biofuels, CO2 emissions for the residential sector.	Million metric tons CO2	PMRCE = DMRCE + HLRCE + KSRCE
PMTCE	All petroleum products, excluding biofuels, CO2 emissions for all sectors.	Million metric tons CO2	PMTCE = ARTCE + AVTCE + DMTCE + HLTCE + JFTCE + KSTCE + LUTCE + MMTCE + OMTCE + PCTCE + RFTCE
PPICE	Natural gasoline (pentanes plus) industrial sector CO2 emissions.	Million metric tons CO2	PPICE = (PPICB * PPTCFUS * (1 - PPNFSUS * PPSQSUS)) / 1,000,000
PPNFSUS	Natural gasoline (pentanes plus) non-combustion share for the United States.	Share (number between 0 and 1)	PPNFSUS is independent.
PPSQSUS	Natural gasoline (pentanes plus) nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	PPSQSUS = 0.8
PPTCE	Natural gasoline (pentanes plus) total CO2 emissions.	Million metric tons CO2	PPTCE = PPICE
PPTCFUS	Natural gasoline (pentanes plus) CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	PPTCFUS is independent.
PQACE	Propane CO2 emissions in the transportation sector.	Million metric tons CO2	PQACE = PQACB * PQTCFUS / 1,000,000

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
PQCCE	Propane CO2 emissions in the commercial sector.	Million metric tons CO2	PQCCE = PQCCB * PQTCFUS / 1,000,000
PQICE	Propane CO2 emissions in the industrial sector.	Million metric tons CO2	PQICE = (PQICB * PQTCFUS * (1 - PQNFSUS * PQSQSUS)) / 1,000,000
PQNFSUS	Propane non-combustion share for the United States.	Share (number between 0 and 1)	PQNFSUS is independent.
PQRCE	Propane CO2 emissions in the residential sector.	Million metric tons CO2	PQRCE = PQRCB * PQTCFUS / 1,000,000
PQSQSUS	Propane nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	PQSQSUS = 0.8
PQTCE	Propane total CO2 emissions.	Million metric tons CO2	PQTCE = PQACE + PQCCE + PQICE + PQRCE
PQTCFUS	Propane CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	PQTCFUS is independent.
PYICE	Propylene CO2 emissions in the industrial sector.	Million metric tons CO2	PYICE = (PYICB * PYTCFUS * (1 - PYNFSUS * PYSQSUS)) / 1,000,000
PYNFSUS	Propylene non-combustion share for the United States.	Share (number between 0 and 1)	PYNFSUS = 1
PYSQSUS	Propylene nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	PYSQSUS = 0.8
PYTCE	Propylene total CO2 emissions.	Million metric tons CO2	PYTCE = PYICE
PYTCFUS	Propylene CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	PYTCFUS is independent.
RFACE	Residual fuel oil transportation sector CO2 emissions.	Million metric tons CO2	RFACE = RFACB * RFTCFUS / 1,000,000
RFCCE	Residual fuel oil commercial sector CO2 emissions.	Million metric tons CO2	RFCCE = RFCCB * RFTCFUS / 1,000,000
RFEIE	Residual fuel oil electric power sector CO2 emissions.	Million metric tons CO2	RFEIE = RFEIB * RFTCFUS / 1,000,000
RFICE	Residual fuel oil industrial sector CO2 emissions.	Million metric tons CO2	RFICE = (RFICB * RFTCFUS * (1 - RFNFSUS * RFSQSUS)) / 1,000,000
RFNFSUS	Residual fuel oil non-combustion share for the United States.	Share (number between 0 and 1)	RFNFSUS is independent.

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
RFSQSUS	Residual fuel oil nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	RFSQSUS = 0.5
RFTCE	Residual fuel oil total CO2 emissions.	Million metric tons CO2	RFTCE = RFACE + RFCCE + RFEIE + RFICE
RFTCFUS	Residual fuel oil CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	RFTCFUS is independent.
SGICE	Still gas industrial sector CO2 emissions.	Million metric tons CO2	SGICE = (SGICB * SGTCFUS * (1 - SGNFSUS * SGSQSUS)) / 1,000,000
SGNFSUS	Still gas non-combustion share for the United States.	Share (number between 0 and 1)	SGNFSUS is independent.
SGSQSUS	Still gas nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	SGSQSUS = 0.8
SGTCE	Still gas total CO2 emissions.	Million metric tons CO2	SGTCE = SGICE
SGTCFUS	Still gas and still gas for petrochemical feedstock use CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	SGTCFUS is independent.
SNICE	Special naphthas industrial sector CO2 emissions.	Million metric tons CO2	SNICE = (SNICB * SNTCFUS * (1 - SNNFSUS * SNSQSUS)) / 1,000,000
SNNFSUS	Special naphthas non-combustion share for the United States.	Share (number between 0 and 1)	SNNFSUS = 1
SNSQSUS	Special naphthas nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	SNSQSUS = 0
SNTCE	Special naphthas total CO2 emissions.	Million metric tons CO2	SNTCE = SNICE
SNTCFUS	Special naphthas CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	SNTCFUS is independent.
TEACE	Total energy CO2 emissions for the transportation sector.	Million metric tons CO2	TEACE = FFACE
TECCE	Total energy CO2 emissions for the commercial sector.	Million metric tons CO2	TECCE = FFCCE
TEEIE	Total energy CO2 emissions for the electric power sector.	Million metric tons CO2	TEEIE = FFEIE
TEICE	Total energy CO2 emissions for the industrial sector.	Million metric tons CO2	TEICE = FFICE

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
TERCE	Total energy CO2 emissions for the residential sector.	Million metric tons CO2	TERCE = FFRCE
TETCE	Total energy CO2 emissions.	Million metric tons CO2	TETCE = FFTCE
TPOPP	Resident population including Armed Forces.	Thousand population	TPOPPZZ is independent. TPOPPUS is independent.
UOICE	Unfinished oils industrial sector CO2 emissions.	Million metric tons CO2	UOICE = (UOICB * UOTCFUS * (1 - UONFSUS * UOSQSUS)) / 1,000,000
UONFSUS	Unfinished oils non-combustion share for the United States.	Share (number between 0 and 1)	UONFSUS = 1
UOSQSUS	Unfinished oils nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	UOSQSUS = 0
UOTCE	Unfinished oils total CO2 emissions.	Million metric tons CO2	UOTCE = UOICE
UOTCFUS	Unfinished oils CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	UOTCFUS is independent.
USICE	Unfractionated streams industrial sector CO2 emissions (through 1983).	Million metric tons CO2	USICE = (USICB * USTCFUS * (1 - USNFSUS * USSQSUS)) / 1,000,000
USNFSUS	Unfractionated streams non-combustion share for the United States (through 1983).	Share (number between 0 and 1)	USNFSUS = PPNFSUS
USSQSUS	Unfractionated streams carbon sequestration factor for the United States (through 1983).	Share (number between 0 and 1)	USSQSUS = PPSQSUS
USTCE	Unfractionated streams total CO2 emissions (through 1983).	Million metric tons CO2	USTCE = USICE
USTCFUS	Unfractionated streams CO2 emissions factor for the United States (through 1983).	Million metric tons CO2 per quadrillion Btu	USTCFUS is independent.
WXICE	Waxes industrial sector CO2 emissions.	Million metric tons CO2	WXICE = (WXICB * WXTCFUS * (1 - WXNFSUS * WXSQSUS)) / 1,000,000
WXNFSUS	Waxes non-combustion share for the United States.	Share (number between 0 and 1)	WXNFSUS = 1
WXSQSUS	Waxes nonfuel carbon sequestration factor for the United States.	Share (number between 0 and 1)	WXSQSUS = 1
WXTCE	Waxes total CO2 emissions.	Million metric tons CO2	WXTCE = WXICE

APPENDIX A

Table A1. CO2 emissions variables (cont.)

MSN	Description	Unit	Formula
WXTCFUS	Waxes CO2 emissions factor for the United States.	Million metric tons CO2 per quadrillion Btu	WXTCFUS is independent.

Table A2. Consumption adjustment variables

MSN	Description	Unit	Formula
ABICB	Aviation gasoline blending components consumed by the industrial sector.	Billion Btu	SEDS consumption variable
ARICB	Asphalt and road oil consumed by the industrial sector.	Billion Btu	SEDS consumption variable
AVACB	Aviation gasoline consumed by the transportation sector.	Billion Btu	SEDS consumption variable
BQICB	Normal butane consumed by the industrial sector.	Billion Btu	SEDS consumption variable
BYICB	Butylene from refineries consumed by the industrial sector.	Billion Btu	SEDS consumption variable
CCNIBUS	Coal coke net imports into the United States.	Billion Btu	SEDS consumption variable
CLACB	Coal consumed by the transportation sector.	Billion Btu	SEDS consumption variable
CLCCB	Coal consumed by the commercial sector.	Billion Btu	SEDS consumption variable
CLEIB	Coal consumed by the electric power sector.	Billion Btu	SEDS consumption variable
CLKCB	Coal consumed at coke plants (coking coal).	Billion Btu	SEDS consumption variable
CLOCB	Coal consumed by industrial users other than coke plants.	Billion Btu	SEDS consumption variable
CLRCB	Coal consumed by the residential sector.	Billion Btu	SEDS consumption variable
COICB	Crude oil consumed by the industrial sector.	Billion Btu	SEDS consumption variable
DMACB	Distillate fuel oil, excluding biodiesel and renewable diesel, consumed by the transportation sector.	Billion Btu	SEDS consumption variable
DMCCB	Distillate fuel oil, excluding biodiesel, consumed by the commercial sector.	Billion Btu	SEDS consumption variable
DMEIB	Distillate fuel oil, excluding biodiesel, consumed by the electric power sector.	Billion Btu	SEDS consumption variable
DMICB	Distillate fuel oil, excluding biofuels, consumed by the industrial sector.	Billion Btu	SEDS consumption variable
DMRCB	Distillate fuel oil, excluding biodiesel, consumed by the residential sector.	Billion Btu	SEDS consumption variable

Table A2. Consumption adjustment variables (cont.)

MSN	Description	Unit	Formula
ELISB	Net interstate flow of electricity and associated losses (negative indicates flow out of state).	Billion Btu	SEDS consumption variable
EQICB	Ethane consumed by the industrial sector.	Billion Btu	SEDS consumption variable
EYICB	Ethylene from refineries consumed by the industrial sector.	Billion Btu	SEDS consumption variable
FNICB	Petrochemical feedstocks, naphtha less than 401° F, consumed by the industrial sector.	Billion Btu	SEDS consumption variable
FOICB	Petrochemical feedstocks, other oils equal to or greater than 401° F, consumed by the industrial sector.	Billion Btu	SEDS consumption variable
FSICB	Petrochemical feedstocks, still gas, consumed by the industrial sector (through 1985).	Billion Btu	SEDS consumption variable
IQICB	Isobutane consumed by the industrial sector.	Billion Btu	SEDS consumption variable
IYICB	Isobutylene from refineries consumed by the industrial sector.	Billion Btu	SEDS consumption variable
JFACB	Jet fuel consumed by the transportation sector.	Billion Btu	SEDS consumption variable
JFEUB	Jet fuel consumed by the electric power sector (through 1982).	Billion Btu	SEDS consumption variable
KSCCB	Kerosene consumed by the commercial sector.	Billion Btu	SEDS consumption variable
KSICB	Kerosene consumed by the industrial sector.	Billion Btu	SEDS consumption variable
KSRCB	Kerosene consumed by the residential sector.	Billion Btu	SEDS consumption variable
LGACB	LPG consumed by the transportation sector (through 2009).	Billion Btu	SEDS consumption variable
LGCCB	LPG consumed by the commercial sector (through 2009).	Billion Btu	SEDS consumption variable
LGICB	LPG consumed by the industrial sector (through 2009).	Billion Btu	SEDS consumption variable
LGRCB	LPG consumed by the residential sector (through 2009).	Billion Btu	SEDS consumption variable
LUACB	Lubricants consumed by the transportation sector.	Billion Btu	SEDS consumption variable

Table A2. Consumption adjustment variables (cont.)

MSN	Description	Unit	Formula
LUICB	Lubricants consumed by the industrial sector.	Billion Btu	SEDS consumption variable
MBICB	Motor gasoline blending components consumed by the industrial sector.	Billion Btu	SEDS consumption variable
MMACB	Motor gasoline, excluding fuel ethanol, consumed by the transportation sector.	Billion Btu	SEDS consumption variable
MMCCB	Motor gasoline, excluding fuel ethanol, consumed by the commercial sector.	Billion Btu	SEDS consumption variable
MMICB	Motor gasoline, excluding fuel ethanol, consumed by the industrial sector.	Billion Btu	SEDS consumption variable
MSICB	Miscellaneous petroleum products consumed by the industrial sector.	Billion Btu	SEDS consumption variable
NAICB	Natural gasoline consumed by the industrial sector (through 1983).	Billion Btu	SEDS consumption variable
NNACB	Natural gas, excluding supplemental gaseous fuels, consumed by the transportation sector.	Billion Btu	SEDS consumption variable
NNCCB	Natural gas, excluding supplemental gaseous fuels, consumed by the commercial sector.	Billion Btu	SEDS consumption variable
NNEIB	Natural gas, excluding supplemental gaseous fuels, consumed by the electric power sector.	Billion Btu	SEDS consumption variable
NNICB	Natural gas, excluding supplemental gaseous fuels, consumed by the industrial sector.	Billion Btu	SEDS consumption variable
NNRCB	Natural gas, excluding supplemental gaseous fuels, consumed by the residential sector.	Billion Btu	SEDS consumption variable
PCCCB	Petroleum coke consumed by the commercial sector.	Billion Btu	SEDS consumption variable
PCEIB	Petroleum coke consumed by the electric power sector.	Billion Btu	SEDS consumption variable
PCICB	Petroleum coke consumed in the industrial sector.	Billion Btu	SEDS consumption variable
PLICB	Plant condensate consumed by the industrial sector (through 1983).	Billion Btu	SEDS consumption variable

Table A2. Consumption adjustment variables (cont.)

MSN	Description	Unit	Formula
PPICB	Natural gasoline (pentanes plus) consumed by the industrial sector.	Billion Btu	SEDS consumption variable
PQACB	Propane consumed by the transportation sector.	Billion Btu	SEDS consumption variable
PQCCB	Propane consumed by the commercial sector.	Billion Btu	SEDS consumption variable
PQICB	Propane consumed by the industrial sector.	Billion Btu	SEDS consumption variable
PQRCB	Propane consumed by the residential sector.	Billion Btu	SEDS consumption variable
PYICB	Propylene from refineries consumed by the industrial sector.	Billion Btu	SEDS consumption variable
RFACB	Residual fuel oil consumed by the transportation sector.	Billion Btu	SEDS consumption variable
RFCCB	Residual fuel oil consumed by the commercial sector.	Billion Btu	SEDS consumption variable
RFEIB	Residual fuel oil consumed by the electric power sector.	Billion Btu	SEDS consumption variable
RFICB	Residual fuel oil consumed by the industrial sector.	Billion Btu	SEDS consumption variable
SGICB	Still gas consumed by the industrial sector.	Billion Btu	SEDS consumption variable
SNICB	Special naphthas consumed by the industrial sector.	Billion Btu	SEDS consumption variable
TETCB	Total energy consumption.	Billion Btu	SEDS consumption variable
UOICB	Unfinished oils consumed by the industrial sector.	Billion Btu	SEDS consumption variable
USICB	Unfractionated streams consumed by the industrial sector (through 1983).	Billion Btu	SEDS consumption variable
WXICB	Waxes consumed by the industrial sector.	Billion Btu	SEDS consumption variable