Sources of the Emission Factors in Tables C-1 and C-2 of 40 CFR 98

Table 1. Characteristics and Data Sources for Fuels Listed in Table C-1

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Anthracite	25.09	MMBtu/ short ton	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-1	103.69	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Bituminous	24.93	MMBtu/ short ton	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-1	93.28	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Subbituminous	17.25	MMBtu/ short ton	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-1	97.17	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Lignite	14.21	MMBtu/ short ton	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-1	97.72	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Coal Coke	24.80	MMBtu/ short ton	EIA AER 2008, Table A5	113.67	kg CO_2/MMBtu	EPA GHG Inventory 1990-2009, Annex 4, Table A-251
Mixed (Commercial sector)	21.39	MMBtu/ short ton	EIA AER 2008, Table A5	94.27	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Mixed (Industrial coking)	26.28	MMBtu/ short ton	EIA AER 2008, Table A5	93.90	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Mixed (Industrial sector)	22.35	MMBtu/ short ton	EIA AER 2008, Table A5	94.67	kg CO_2/MMBtu	EPA GHG Inventory, 1990-2010, Annex 2, Table A-38
Natural Gas (Weighted U.S. Average)	0.001026	MMBtu/scf	EIA AER 2009, Table A4	53.06	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007, Table 4 Updated emission factor uses 44/12 (3.6667) instead of 3.664 to convert from carbon to CO_2

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Distillate Fuel Oil No. 1	0.139	MMBtu/ gallon	Derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 and density and carbon share from subpart MM	73.25	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Distillate Fuel Oil No. 2	0.138	MMBtu/ gallon	Derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 and density and carbon share from subpart MM	73.96	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Distillate Fuel Oil No. 4	0.146	MMBtu/ gallon	Derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 and density and carbon share from subpart MM	75.04	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Residual Fuel Oil No. 5	0.140	MMBtu/ gallon	Derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 and density and carbon share from subpart MM	72.93	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Residual Fuel Oil No. 6	0.150	MMBtu/ gallon	Derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 and density and carbon share from subpart MM	75.10	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Used Oil	0.138	MMBtu/ gallon	Graziano, D.J. and E.J. Daniels, Assessment of Opportunities to Increase the Recovery and Recycling Rates of Waste Oils, U.S. DOE, Argonne National Laboratory, Center for Industrial Technology, 1995. http://infohouse.p2ric.org/ref/34/33500.pdf	74.00	kg CO_2/MMBtu	WBCSD/WRI, The Cement CO_2 Protocol: CO_2 Accounting and Reporting Standard for the Cement Industry Calculation Tool, 2005. http://www.wbcsd.org/web/publications/cement-tf1.pdf
Kerosene	0.135	MMBtu/ gallon	EIA AER 2005, Table A1	75.20	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Liquefied Petroleum Gases (LPG)	0.092	MMBtu/ gallon	CARB Compendium of Emission Factors, Table 4, 2007	61.71	kg CO_2/MMBtu	EPA GHG Inventory 1990 - 2009, Annex 2, Table A-34 (16.83 Tg C/QBtu). Converted to CO_2 using 44/12 results in emission factor of 61.71 kg CO_2/MMBtu
Propane	0.091	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	62.87	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Propylene	0.091	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	67.77	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Ethane	0.068	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	59.60	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Ethanol	0.084	MMBtu/ gallon	Bureau of Standards, Miscellaneous Publication No. 97, 1929. Thermal Properties of Petroleum Products	68.44	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Ethylene	0.058	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	65.96	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Isobutane	0.099	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	64.94	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Isobutylene	0.103	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	68.86	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Butane	0.103	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	64.77	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Butylene	0.105	MMBtu/ gallon	Heating value determined based on the average of available data from DOE, NIST and Guthrie	68.72	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Naphtha (<401 deg F)	0.125	MMBtu/ gallon	EIA AER 2005, Table A1	68.02	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Natural Gasoline	0.110	MMBtu/ gallon	EIA AER 2005, Table A1	66.88	kg CO_2/MMBtu	EPA GHG Inventory, 1990 - 2005, Annex 2, Table A-36
Other Oil (>401 deg F)	0.139	MMBtu/ gallon	EIA AER 2005, Table A1	76.22	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Pentanes Plus	0.110	MMBtu/ gallon	EIA AER 2005, Table A1	70.02	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Petrochemical Feedstocks	0.125	MMBtu/ gallon	EIA AER 2005, Table A-36. The underlying value in this source is 5.248 MMBtu/bbl which appears to be incorrectly transcribed in the EPA GHG Inventory as 5.428. The corrected heat content in MMBtu/gallon should be 0.125	71.02	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007, Table 4. Updated emission factor uses 44/12 (3.6667) instead of 3.664 to convert from carbon to CO_2
Petroleum Coke	0.143	MMBtu/ gallon	EIA AER 2005, Table A1	102.41	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Special Naphtha	0.125	MMBtu/ gallon	EIA AER 2005, Table A1	72.34	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Unfinished Oils	0.139	MMBtu/ gallon	EPA GHG Inventory 1990-2005, Annex 2, Table A-36	74.54	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007, Table 4. Updated emission factor uses 44/12 (3.6667) instead of 3.664 to convert from carbon to CO_2
Heavy Gas Oils	0.148	MMBtu/ gallon	Heating value derived using the carbon coefficient denominated in Tg C/QBtu from the EPA GHG Inventory, 1990-2009, Table A-33 (coefficient for crude oil) and density) and carbon share from subpart MM	74.92	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Lubricants	0.144	MMBtu/ gallon	EIA AER 2005, Table A1	74.27	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Motor Gasoline	0.125	MMBtu/ gallon	EIA AER 2008, Appendix A, Table A1 (for conventional motor gasoline)	70.22	kg CO_2/MMBtu	Current source is EPA GHG Inv 1990-2005 (19.33 Tg C/QBtu = 70.83 kg CO_2/MMBtu using CARB C to CO_2 factor of 3.664). This factor was adjusted to the current value of 70.22 kg CO_2/MMBtu during the 2009 update of subpart MM fuels based on updated heat content from the AER.
Aviation Gasoline	0.120	MMBtu/ gallon	EIA AER 2005, Table A1	69.25	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Kerosene-Type Jet Fuel	0.135	MMBtu/ gallon	EIA AER 2005, Table A1	72.22	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Asphalt and Road Oil	0.158	MMBtu/ gallon	EIA AER 2005, Table A1	75.36	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Crude Oil	0.138	MMBtu/ gallon	EPA GHG Inventory 1990-2005, Annex 2, Table A-36	74.54	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007 Updated emission factor uses 44/12 (3.6667) instead of 3.664 to convert from carbon to CO_2
Municipal Solid Waste	9.95	MMBtu/ short ton	U.S. Energy Information Administration, 2009 EIA-923 Monthly Time Series File, Boiler Fuel Consumption/Generating Unit Net Generation	90.7	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007, Table 4
Tires	28.00	MMBtu/ short ton	U.S. EPA. 1991. Market for Scrap Tires. http://www.epa.gov/wastes/conserve/materials/tires/tires.pdf	85.97	kg CO_2/MMBtu	EIA 1605b
Plastics	38.00	MMBtu/ short ton	SRA Document, Sources for Data Contained In Tables C-1 and C-2, October 6, 2010 states that the plastics HHV from "revisions package".	75.00	kg CO_2/MMBtu	SRA Document, Sources for Data Contained In Tables C-1 and C-2, October 6, 2010 states that the plastics emission factor from "revisions package".
Petroleum Coke	30.00	MMBtu/ short ton	EIA AER 2005, Table A1	102.41	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-1
Blast Furnace Gas	0.000092	MMBtu/scf	Gannon, H.E. (editor), The Making, Shaping, and Treating of Steel, Tenth Edition (1985). Page 131	274.32	kg CO_2/MMBtu	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.3 on Page 2.18
Coke Oven Gas	0.000599	MMBtu/scf	Gannon, H.E. (editor), The Making, Shaping, and Treating of Steel, Tenth Edition (1985). Page 131	46.85	kg CO_2/MMBtu	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.3 on Page 2.18

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Propane Gas	0.002516	MMBtu/scf	SRA Document, Sources for Data Contained In Tables C-1 and C-2, October 6, 2010 states that the propane gas HHV conversion to gas volume from "revisions package".	61.46	kg CO_2/MMBtu	SRA Document of October 6, 2010 states that the propane gas emission factors are from "RTI & Mausami July 2009 memo".
Fuel Gas	0.001388	MMBtu/scf	SRA Document, Sources for Data Contained In Tables C-1 and C-2, October 6, 2010 states that the fuel gas HHV from "revisions package".	59.00	kg CO_2/MMBtu	SRA Document, Sources for Data Contained In Tables C-1 and C-2, October 6, 2010 states that the fuel gas emission factor from "revisions package".
Wood and Wood Residuals (dry basis)	17.48	MMBtu/ short ton	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-2 Converted to dry basis default HHV (17.48 MMBtu/short ton)	93.80	kg CO_2/MMBtu	California Air Resources Board, Compendium of Emission Factors, 2007, Table 4
Agricultural Byproducts	8.25	MMBtu/ short ton	EIA, Renewable Energy Annual 2009, January 2012, Table 1.10	118.17	kg CO_2/MMBtu	2006 IPCC Guidelines
Peat	8.00	MMBtu/ short ton	EIA, Renewable Energy Annual 2009, January 2012, Table 1.10	111.84	kg CO_2/MMBtu	2006 IPCC Guidelines
Solid Byproducts	10.39	MMBtu/ short ton	Weighted average HHV for Other Biomass Solids reported to the Energy Information Administration on Form EIA-923 for 2010.	105.51	kg CO_2/MMBtu	2006 IPCC Guidelines
Landfill Gas	0.485 X 10^{-3}	MMBtu/scf	Energy Information Administration, Form EIA-923. Weighted average HHV for landfill gas reported for 2010.	52.07	kg CO_2/MMBtu	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-2
Other Biomass Gases	0.655 X 10^{-3}	MMBtu/scf	Energy Information Administration, Form EIA-923. Weighted average HHV for other biomass Gases reported for 2010.	52.07	kg CO_2/MMBtu	EPA Climate Leaders, Stationary Combustion Guidance (2004), Table B-2
Ethanol	0.084	MMBtu/ gallon	EIA AER 2009, Table A3	68.44	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-2
Biodiesel (100%)	0.128	MMBtu/ gallon	EIA AER 2009, Table A3	73.84	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-2

Fuel Type	Default HHV	HHV Unit	HHV Source	Emission Factor	EF Unit	EF Source
Rendered Animal Fat	0.125	MMBtu/ gallon	HHV derived using the average of heating values for various types of animal fats as listed in the following six sources: – Adams, Thomas T. A Demonstration of Fat and Grease as an Industrial Boiler Fuel. 2002. http://www.biorefinery.uga.edu/docs/biofuel_oil_report.pdf – Pearl, Gary. Animal Fats and Recycled Cooking Oils Alternatives as Burner Fuels. March 2001. http://fatforfuel.us/images/GaryPearl.pdf – University of Auburn. BROILER PROCESSING TIMELY INFORMATION – JUNE 2008. http://www.ag.auburn.edu/poul/pdf/wogsjun08.pdf – Kinast, J.A., Production of Biodiesels from Multiple Feedstocks and Properties of Biodiesels and Biodiesel/Diesel Blends. NREL, 2003. http://www.biofuels.coop/archive/biodiesel_report.pdf – NOAA, CAMEO Chemicals, Data Sheet for Tallow. http://cameochemicals.noaa.gov/chris/TLO.pdf – Nelson, Richard. ENERGETIC AND ECONOMIC FEASIBILITY ASSOCIATED WITH THE PRODUCTION, PROCESSING, AND CONVERSION OF BEEF TALLOW TO A SUBSTITUTE DIESEL FUEL. 2006. http://aeg-biofuels.com/Pubs/2006_Energetic_BD_Prod.pdf	71.06	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-2
Vegetable Oil	0.120	MMBtu/ gallon	HHV derived using the average of heating values for various types of vegetable oils as listed in the following four sources: - Kinast, J.A., Production of Biodiesels from Multiple Feedstocks and Properties of Biodiesels and Biodiesel/Diesel Blends. NREL, 2003. http://www.biofuels.coop/archive/biodiesel_report.pdf Bartok, John W. University of Connecticut. Approximate Heating Value of Common Fuels, 2004. http://www.hrt.msu.edu/energy/pdf/heating%20value%20of%20common%20fuels.pdf - Reeb, J. Home Heating Fuels. 2009. http://extension.oregonstate.edu/catalog/pdf/ec/ec1628-e.pdf - Argeros, Anastasios. Heat of Combustion of Oils, April 30, 1998. http://www.infolizer.com/s5e1asa1up5enna15ed4u/Heat-of-combustion-of-oils.html	81.55	kg CO_2/MMBtu	Factor derived from density and carbon share, see sources in table MM-2

Table 2. Characteristics and Data Sources for Fuels Listed in Table C-2

Fuel Type	Emission Factor	EF Unit	Emission Factor	EF Unit	EF Source
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	kg CH_4/MMBtu	1.6×10^{-03}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines)*
Natural Gas	1.0×10^{-03}	kg CH_4/MMBtu	1.0×10^{-04}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines)
Petroleum (All fuel types in Table C-1)	3.0×10^{-03}	kg CH_4/MMBtu	6.0×10^{-04}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines)
Fuel Gas	3.0×10^{-03}	kg CH_4/MMBtu	6.0×10^{-04}	kg N_2O/MMBtu	Assigned same value as "Petroleum (All fuel types in Table C-1)"
Municipal Solid Waste	3.2×10^{-02}	kg CH_4/MMBtu	4.2×10^{-03}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines)*
Tires	3.2×10^{-02}	kg CH_4/MMBtu	4.2×10^{-03}	kg N_2O/MMBtu	Assigned same value as "Municipal Solid Waste"
Blast Furnace Gas	2.2×10^{-05}	kg CH_4/MMBtu	1.0×10^{-04}	kg N_2O/MMBtu	CH_4 factor derived from the typical CH_4 content of blast furnace gas (0.2%).** N_2O factor derived from IPCC Factors (2006 Guidelines)
Coke Oven Gas	4.8×10^{-04}	kg CH_4/MMBtu	1.0×10^{-04}	kg N_2O/MMBtu	CH_4 factor derived from the typical CH_4 content of coke oven gas (28%).** N_2O factor derived from IPCC Factors (2006 Guidelines)
Biomass Fuels — Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	kg CH_4/MMBtu	4.2×10^{-03}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines)
Wood and wood residuals	7.2×10^{-03}	kg CH_4/MMBtu	3.6×10^{-03}	kg N_2O/MMBtu	Average of all available data from NCASI Technical Bulletin 998. Refer to: "Kraft Pulping Liquor and Woody Biomass Methane (CH4) and Nitrous Oxide (N2O) Emission Factor Literature Review'' available in Docket Id. No. EPA–HQ–OAR–2012–0934
Biomass Fuels — Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	kg CH_4/MMBtu	6.3×10^{-04}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines) (Appears that gaseous and liquid factors were reversed from what was listed in IPCC)*
Biomass Fuels — Liquid (All fuel types in Table C-1)	1.1×10^{-03}	kg CH_4/MMBtu	1.1×10^{-04}	kg N_2O/MMBtu	Derived from IPCC Factors (2006 Guidelines) (Appears that gaseous and liquid factors were reversed from what was listed in IPCC)*

*The conversion of the IPCC values did not account for different heat content basis of these emission factors. The basis of the IPCC Factors is lower heating value (LHV) while that of the Table C-2 factors is higher heating value (HHV). The correct conversions for these factors are shown in the following table (including correct factors for gaseous and liquid biofuels):

Fuel Type	Emission Factor	EF Unit	Emission Factor	EF Unit
Coal and Coke (All fuel types in Table C-1)	1.0×10^{-02}	kg CH_4/MMBtu	1.5×10^{-03}	kg N_2O/MMBtu
Municipal Solid Waste	3.0×10^{-02}	kg CH_4/MMBtu	4.0×10^{-03}	kg N_2O/MMBtu
Tires	3.0×10^{-02}	kg CH_4/MMBtu	4.0×10^{-03}	kg N_2O/MMBtu
Biomass Fuels—Solid (All fuel types in Table C-1, except wood and wood residuals)	3.0×10^{-02}	kg CH_4/MMBtu	4.0×10^{-03}	kg N_2O/MMBtu
Biomass Fuels—Gaseous (All fuel types in Table C-1)	1.0×10^{-03}	kg CH_4/MMBtu	1.0×10^{-04}	kg N_2O/MMBtu
Biomass Fuels—Liquid (All fuel types in Table C-1)	3.0×10^{-02}	kg CH_4/MMBtu	6.0×10^{-04}	kg N_2O/MMBtu

**[EPA–HQ–OAR–2008–0508; FRL–8963–5] Mandatory Reporting of Greenhouse Gases, Final Rule and Preamble (http://www.gpo.gov/fdsys/pkg/FR-2009-10-30/pdf/E9-23315.pdf) Page 56312

"**Comment:** Several commenters asked EPA to clarify that CH_4 and N_2O emissions do not have to be reported for iron and steel production processes, and other commenters requested that CH_4 and N_2O emissions reporting not be required for the combustion of coke oven gas and blast furnace gas. Commenters noted that default emission factors for CO_2, CH_4, and N_2O were not provided in the tables in 40 CFR pt. 98, subp. C, and in the absence of such emission factors, asked if they would be required to test for these minor emissions. **Response:** We have clarified that 40 CFR pt. 98, subp. Q does not require reporting of CH_4 and N_2O emissions from the iron and steel production processes because we expect these emissions (if any) to be very low, and we have no protocols for calculating them. However, emission factors are available in the 2006 IPCC guidelines for combustion sources, including the combustion of coke oven gas and blast furnace gas. We have added the IPCC default emission factors for CO_2 and N_2O for these process gases to the tables in 40 CFR pt. 98, subp. C, and we developed new emission factors for CH_4 based on the typical CH_4 content of coke oven gas (28%) and blast furnace gas (0.2%)."

Revision of Certain Provisions of the Mandatory Reporting of Greenhouse Gases Rule, November 2010. (http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2008-0508-2411) Page 191.

Regarding the methane emission factor for coke oven gas (COG), we agree that the value is different from the one presented by the Intergovernmental Panel on Climate Change and the API Compendium. We tried to tailor it more to the circumstances in the iron and steel industry. To do this, we started with default high heat values from Gannon, H.E. (editor) The Making, Shaping and Treating of Steel, Tenth Edition (1985), Page 131. The calculation is presented below.

For coke oven gas (using 28% CH_4 from reference above):

$$\frac{(1.03 \times 10^{-6}\ kg\ CH_4 / scf\ CH_4)(0.28\ scf\ CH_4 / scf\ COG)}{5.99 x 10^{-4}\ mmBtu / scf\ COG} = 4.8 x 10^{-4}\ kg\ CH_4 / mmBtu$$

The CH_4 factor blast furnace gas (BFG) was derived in the same way using 0.092E-03 MMBtu/scf (Table C-1) and 0.002 scf CH_4/scf BFG.