

APPENDIX C

GLOBAL CLIMATE CHANGE DATA

Greenhouse Gas Emissions Worksheet

Project Parameters	
	2008
Vehicles (trips/day)	106,415
Electricity used (MWh/year)	1,800,000
(mscf/year)	5,800.0
Solid Waste (tons/year)	24,000

MWh = Megawatt hour
mscf = million standard cubic feet

Emission Source	Emissions (metric tons per year)				Percent of Total
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Construction & Mining	32,100	4.98	0.19	32,281	1.7%
Agriculture	--	--	--	879,977	46.9%
Vehicles ⁽¹⁾	119,184	13.24	13	123,390	6.6%
Electricity Production	500,000	6	3	501,030	26.7%
Natural Gas Combustion	320,000	6	6	320,000	17.1%
Propane	--	--	--	9,444	0.5%
Solid Waste	--	--	--	2,400	0.1%
Wastewater	--	--	--	11	0.0%
Other Area Sources ⁽²⁾	6,231	--	--	6,231	0.3%
Total Annual Emissions	977,520	30	22	1,874,760	100.0%

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

(1) CO₂ emissions for Vehicles from EMFAC 2007 outputs.

(2) Includes CO₂ emissions for hearth combustion and landscaping equipment from URBEMIS 2007 outputs.

Global warming potentials (GWPs) are used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the radiative efficiency (heat-absorbing ability) of each gas relative to that of CO₂, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years) relative to that of CO₂. The GWP provides a construct for converting emissions of various gases into a common measure, which allows climate analysts to aggregate the radiative impacts of various GHGs into a uniform measure denominated in carbon or CO₂ equivalents. The generally accepted authority on GWPs is the Intergovernmental Panel on Climate Change (IPCC). In 2007, the IPCC updated its estimates of GWPs for key GHGs. The table below lists the GWPs to calculate carbon dioxide equivalents (CO₂e)

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	25
Nitrous Oxide	120	298
HFC-23	264	14800
HFC-134a	14.6	1430
HFC-152a	1.5	124
PFC: Tetrafluoromethane (CF ₄)	50000	7390
PFC: Hexafluoromethane (C ₂ F ₆)	10000	12200
Sulfur Hexafluoride (SF ₆)	3200	22800

Greenhouse Gas Emissions Worksheet

Project Parameters	
	2030
Vehicles (trips/day)	256,879
Electricity used (MWh/year)	2,100,000
(mscf/year)	7,000.0
Solid Waste (tons/year)	32,000

MWh = Megawatt hour
mscf = million standard cubic feet

Emission Source	Emissions (metric tons per year)				Percent of Total
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Construction & Mining	43,505	1.95	0.17	43,604	2.0%
Agriculture	--	--	--	885,432	40.6%
Vehicles ⁽¹⁾	248,299	6.6	33	258,300	11.8%
Electricity Production	580,000	6.4	3.5	581,200	26.7%
Natural Gas Combustion ⁽¹⁾	380,000	7.3	7	380,000	17.4%
Propane	--	--	--	9,444	0.4%
Solid Waste	--	--	--	3,200	0.1%
Wastewater	--	--	--	24	0.0%
Other Area Sources ⁽²⁾	18,928	--	--	18,928	0.9%
Total Annual Emissions	1,270,700	22	44	2,180,130	100.0%

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

(1) CO₂ emissions for Vehicles from EMFAC 2007 outputs.

(2) Includes CO₂ emissions for hearth combustion and landscaping equipment from URBEMIS 2007 outputs.

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	25
Nitrous Oxide	120	298
HFC-23	264	14800
HFC-134a	14.6	1430
HFC-152a	1.5	124
PFC: Tetrafluoromethane (CF ₄)	50000	7390
PFC: Hexafluoromethane (C ₂ F ₆)	10000	12200
Sulfur Hexafluoride (SF ₆)	3200	22800

2008 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Asphalt Pavers	15	Construction and Mining	0.27	0.17	0.00	0.00	0.00
Asphalt Pavers	25	Construction and Mining	0.46	0.74	0.00	0.00	0.00
Asphalt Pavers	50	Construction and Mining	0.27	0.67	0.01	0.00	0.00
Asphalt Pavers	120	Construction and Mining	0.15	0.62	0.01	0.00	0.00
Bore/Drill Rigs	15	Construction and Mining	0.13	0.03	0.00	0.00	0.00
Bore/Drill Rigs	25	Construction and Mining	0.62	0.31	0.00	0.00	0.00
Bore/Drill Rigs	50	Construction and Mining	0.08	0.06	0.00	0.00	0.00
Bore/Drill Rigs	120	Construction and Mining	0.38	0.74	0.01	0.00	0.00
Bore/Drill Rigs	175	Construction and Mining	0.09	0.25	0.00	0.00	0.00
Bore/Drill Rigs	15	Construction and Mining	0.04	0.05	0.00	-	0.00
Bore/Drill Rigs	25	Construction and Mining	0.13	0.21	0.00	-	0.00
Bore/Drill Rigs	50	Construction and Mining	0.56	1.88	0.02	-	0.00
Bore/Drill Rigs	120	Construction and Mining	1.73	14.18	0.16	-	0.00
Bore/Drill Rigs	175	Construction and Mining	0.40	5.98	0.07	-	0.00
Bore/Drill Rigs	250	Construction and Mining	0.34	6.81	0.08	-	0.00
Bore/Drill Rigs	500	Construction and Mining	0.77	25.09	0.28	-	0.00
Bore/Drill Rigs	750	Construction and Mining	0.21	13.59	0.15	-	0.00
Bore/Drill Rigs	1000	Construction and Mining	0.35	34.41	0.38	-	0.00
Cement and Mortar Mixers	5	Construction and Mining	41.85	2.69	0.01	0.00	0.00
Cement and Mortar Mixers	15	Construction and Mining	70.91	9.46	0.04	0.00	0.00
Cement and Mortar Mixers	25	Construction and Mining	0.30	0.12	0.00	0.00	0.00
Cement and Mortar Mixers	15	Construction and Mining	2.20	0.52	0.01	-	0.00
Cement and Mortar Mixers	25	Construction and Mining	0.20	0.13	0.00	-	0.00
Concrete/Industrial Saws	5	Construction and Mining	2.30	0.22	0.00	0.00	0.00
Concrete/Industrial Saws	15	Construction and Mining	10.37	6.04	0.03	0.00	0.00
Concrete/Industrial Saws	25	Construction and Mining	3.24	3.68	0.02	0.00	0.00
Concrete/Industrial Saws	50	Construction and Mining	0.31	1.42	0.01	0.00	0.00
Concrete/Industrial Saws	120	Construction and Mining	0.18	1.39	0.01	0.00	0.00
Concrete/Industrial Saws	25	Construction and Mining	0.02	0.02	0.00	-	0.00
Concrete/Industrial Saws	50	Construction and Mining	0.15	0.34	0.00	-	0.00
Concrete/Industrial Saws	120	Construction and Mining	0.26	1.42	0.02	-	0.00
Concrete/Industrial Saws	175	Construction and Mining	0.01	0.10	0.00	-	0.00
Cranes	50	Construction and Mining	0.09	0.20	0.00	0.00	0.00
Cranes	120	Construction and Mining	0.19	0.73	0.01	0.00	0.00
Cranes	175	Construction and Mining	0.01	0.05	0.00	0.00	0.00
Cranes	50	Construction and Mining	0.15	0.56	0.01	-	0.00
Cranes	120	Construction and Mining	1.61	13.02	0.14	-	0.00
Cranes	175	Construction and Mining	1.61	20.75	0.23	-	0.00
Cranes	250	Construction and Mining	3.12	55.80	0.61	-	0.00
Cranes	500	Construction and Mining	1.14	32.87	0.36	-	0.00
Cranes	750	Construction and Mining	0.44	21.36	0.23	-	0.00
Cranes	9999	Construction and Mining	0.55	86.01	0.94	-	0.00
Crawler Tractors	50	Construction and Mining	0.06	0.21	0.00	-	0.00
Crawler Tractors	120	Construction and Mining	34.24	300.08	3.26	-	0.00
Crawler Tractors	175	Construction and Mining	11.59	185.92	2.03	-	0.00
Crawler Tractors	250	Construction and Mining	9.96	217.80	2.39	-	0.00
Crawler Tractors	500	Construction and Mining	6.82	233.34	2.56	-	0.00
Crawler Tractors	750	Construction and Mining	0.18	11.09	0.12	-	0.00
Crawler Tractors	1000	Construction and Mining	0.18	15.72	0.17	-	0.00
Crushing/Proc. Equipment	15	Construction and Mining	0.11	0.07	0.00	0.00	0.00
Crushing/Proc. Equipment	25	Construction and Mining	0.07	0.08	0.00	0.00	0.00
Crushing/Proc. Equipment	120	Construction and Mining	0.11	0.57	0.00	0.00	0.00
Crushing/Proc. Equipment	50	Construction and Mining	0.69	3.74	0.04	-	0.00
Crushing/Proc. Equipment	120	Construction and Mining	1.94	19.45	0.21	-	0.00
Crushing/Proc. Equipment	175	Construction and Mining	0.82	16.48	0.18	-	0.00
Crushing/Proc. Equipment	250	Construction and Mining	0.08	2.38	0.03	-	0.00
Crushing/Proc. Equipment	500	Construction and Mining	0.46	20.49	0.23	-	0.00
Crushing/Proc. Equipment	750	Construction and Mining	0.01	0.79	0.01	-	0.00
Crushing/Proc. Equipment	9999	Construction and Mining	0.01	1.76	0.02	-	0.00
Dumpers/Tenders	5	Construction and Mining	2.14	0.12	0.00	0.00	0.00
Dumpers/Tenders	15	Construction and Mining	4.55	0.77	0.00	0.00	0.00
Dumpers/Tenders	25	Construction and Mining	0.84	0.30	0.00	0.00	0.00
Dumpers/Tenders	120	Construction and Mining	0.07	0.06	0.00	0.00	0.00
Dumpers/Tenders	25	Construction and Mining	0.10	0.07	0.00	-	0.00
Excavators	25	Construction and Mining	0.16	0.46	0.01	-	0.00
Excavators	50	Construction and Mining	6.01	27.55	0.29	-	0.00
Excavators	120	Construction and Mining	16.31	215.26	2.34	-	0.00
Excavators	175	Construction and Mining	31.46	629.71	6.89	-	0.00
Excavators	250	Construction and Mining	12.79	359.61	3.96	-	0.00
Excavators	500	Construction and Mining	9.23	382.13	4.21	-	0.00
Excavators	750	Construction and Mining	0.11	7.30	0.08	-	0.00
Excavators	50	Construction and Mining	0.06	0.21	0.00	-	0.00
Graders	50	Construction and Mining	0.06	0.21	0.00	-	0.00

2008 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Graders	120	Construction and Mining	4.03	36.36	0.40	-	0.00
Graders	175	Construction and Mining	13.76	204.25	2.23	-	0.00
Graders	250	Construction and Mining	8.54	174.93	1.92	-	0.00
Graders	500	Construction and Mining	0.24	6.60	0.07	-	0.00
Graders	750	Construction and Mining	0.01	0.39	0.00	-	0.00
Off-Highway Tractors	120	Construction and Mining	0.00	0.06	0.00	-	0.00
Off-Highway Tractors	175	Construction and Mining	5.27	97.00	1.06	-	0.00
Off-Highway Tractors	250	Construction and Mining	4.98	91.24	1.00	-	0.00
Off-Highway Tractors	750	Construction and Mining	1.14	90.91	0.99	-	0.00
Off-Highway Tractors	1000	Construction and Mining	0.12	13.76	0.15	-	0.00
Off-Highway Trucks	175	Construction and Mining	0.28	8.75	0.10	-	0.00
Off-Highway Trucks	250	Construction and Mining	2.07	85.39	0.94	-	0.00
Off-Highway Trucks	500	Construction and Mining	2.91	196.66	2.16	-	0.00
Off-Highway Trucks	750	Construction and Mining	1.42	155.79	1.71	-	0.00
Off-Highway Trucks	1000	Construction and Mining	0.67	103.39	1.14	-	0.00
Other Construction Equipment	175	Construction and Mining	0.26	1.46	0.01	0.00	0.00
Other Construction Equipment	15	Construction and Mining	1.43	1.25	0.01	-	0.00
Other Construction Equipment	25	Construction and Mining	0.24	0.27	0.00	-	0.00
Other Construction Equipment	50	Construction and Mining	0.37	0.93	0.01	-	0.00
Other Construction Equipment	120	Construction and Mining	0.61	4.38	0.05	-	0.00
Other Construction Equipment	175	Construction and Mining	0.84	7.93	0.09	-	0.00
Other Construction Equipment	500	Construction and Mining	1.96	43.67	0.48	-	0.00
Pavers	25	Construction and Mining	0.06	0.12	0.00	-	0.00
Pavers	50	Construction and Mining	3.76	11.40	0.12	-	0.00
Pavers	120	Construction and Mining	4.43	32.40	0.35	-	0.00
Pavers	175	Construction and Mining	2.75	37.12	0.41	-	0.00
Pavers	250	Construction and Mining	0.33	6.74	0.07	-	0.00
Pavers	500	Construction and Mining	0.34	8.32	0.09	-	0.00
Paving Equipment	5	Construction and Mining	29.45	2.69	0.02	0.00	0.00
Paving Equipment	15	Construction and Mining	49.82	16.20	0.08	0.00	0.00
Paving Equipment	25	Construction and Mining	1.11	0.81	0.00	0.00	0.00
Paving Equipment	50	Construction and Mining	0.73	0.81	0.01	0.00	0.00
Paving Equipment	120	Construction and Mining	0.19	0.34	0.00	0.00	0.00
Paving Equipment	25	Construction and Mining	0.11	0.15	0.00	-	0.00
Paving Equipment	50	Construction and Mining	0.09	0.25	0.00	-	0.00
Paving Equipment	120	Construction and Mining	1.37	7.88	0.09	-	0.00
Paving Equipment	175	Construction and Mining	0.64	6.82	0.07	-	0.00
Paving Equipment	250	Construction and Mining	0.18	2.32	0.03	-	0.00
Plate Compactors	15	Construction and Mining	1.07	0.12	0.00	0.00	0.00
Plate Compactors	5	Construction and Mining	21.05	1.89	0.01	0.00	0.00
Plate Compactors	15	Construction and Mining	22.32	5.58	0.03	0.00	0.00
Plate Compactors	15	Construction and Mining	1.39	0.45	0.00	-	0.00
Rollers	5	Construction and Mining	2.34	0.14	0.00	0.00	0.00
Rollers	15	Construction and Mining	3.79	1.76	0.01	0.00	0.00
Rollers	25	Construction and Mining	2.56	2.58	0.01	0.00	0.00
Rollers	50	Construction and Mining	0.19	0.83	0.01	0.00	0.00
Rollers	120	Construction and Mining	0.35	2.77	0.02	0.00	0.00
Rollers	15	Construction and Mining	2.61	1.43	0.02	-	0.00
Rollers	25	Construction and Mining	1.09	1.26	0.01	-	0.00
Rollers	50	Construction and Mining	3.39	7.96	0.08	-	0.00
Rollers	120	Construction and Mining	18.21	94.92	1.03	-	0.00
Rollers	175	Construction and Mining	7.32	69.60	0.76	-	0.00
Rollers	250	Construction and Mining	1.04	13.90	0.15	-	0.00
Rollers	500	Construction and Mining	0.73	13.96	0.15	-	0.00
Rough Terrain Forklifts	50	Construction and Mining	0.04	0.14	0.00	0.00	0.00
Rough Terrain Forklifts	120	Construction and Mining	0.53	3.17	0.03	0.00	0.00
Rough Terrain Forklifts	175	Construction and Mining	0.02	0.17	0.00	0.00	0.00
Rough Terrain Forklifts	50	Construction and Mining	0.48	2.37	0.03	-	0.00
Rough Terrain Forklifts	120	Construction and Mining	22.92	204.45	2.22	-	0.00
Rough Terrain Forklifts	175	Construction and Mining	2.94	52.11	0.57	-	0.00
Rough Terrain Forklifts	250	Construction and Mining	0.16	3.95	0.04	-	0.00
Rough Terrain Forklifts	500	Construction and Mining	0.11	3.90	0.04	-	0.00
Rubber Tired Dozers	175	Construction and Mining	0.04	1.15	0.01	-	0.00
Rubber Tired Dozers	250	Construction and Mining	1.06	39.72	0.43	-	0.00
Rubber Tired Dozers	500	Construction and Mining	1.63	88.55	0.97	-	0.00
Rubber Tired Dozers	750	Construction and Mining	0.30	24.69	0.27	-	0.00
Rubber Tired Dozers	1000	Construction and Mining	0.02	2.48	0.03	-	0.00
Rubber Tired Loaders	50	Construction and Mining	0.09	0.32	0.00	0.00	0.00
Rubber Tired Loaders	120	Construction and Mining	0.62	3.36	0.03	0.00	0.00
Rubber Tired Loaders	25	Construction and Mining	0.06	0.12	0.00	-	0.00
Rubber Tired Loaders	50	Construction and Mining	1.17	4.60	0.05	-	0.00
Rubber Tired Loaders	120	Construction and Mining	31.88	230.96	2.51	-	0.00

2008 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Rubber Tired Loaders	175	Construction and Mining	17.97	233.65	2.55	-	0.00
Rubber Tired Loaders	250	Construction and Mining	17.87	323.58	3.56	-	0.00
Rubber Tired Loaders	500	Construction and Mining	7.44	214.34	2.36	-	0.00
Rubber Tired Loaders	750	Construction and Mining	0.27	16.17	0.18	-	0.00
Rubber Tired Loaders	1000	Construction and Mining	0.03	2.13	0.02	-	0.00
Scrapers	120	Construction and Mining	0.17	2.23	0.02	-	0.00
Scrapers	175	Construction and Mining	1.54	31.98	0.35	-	0.00
Scrapers	250	Construction and Mining	1.50	43.86	0.48	-	0.00
Scrapers	500	Construction and Mining	4.13	185.64	2.03	-	0.00
Scrapers	750	Construction and Mining	0.36	27.59	0.30	-	0.00
Signal Boards	5	Construction and Mining	0.07	0.01	0.00	0.00	0.00
Signal Boards	15	Construction and Mining	0.48	0.22	0.00	0.00	0.00
Signal Boards	15	Construction and Mining	12.14	7.03	0.08	-	0.00
Signal Boards	50	Construction and Mining	0.06	0.15	0.00	-	0.00
Signal Boards	120	Construction and Mining	0.99	5.33	0.06	-	0.00
Signal Boards	175	Construction and Mining	0.61	6.33	0.07	-	0.00
Signal Boards	250	Construction and Mining	0.13	2.20	0.02	-	0.00
Skid Steer Loaders	15	Construction and Mining	0.22	0.16	0.00	0.00	0.00
Skid Steer Loaders	25	Construction and Mining	14.96	14.57	0.07	0.00	0.00
Skid Steer Loaders	50	Construction and Mining	2.55	4.23	0.03	0.00	0.00
Skid Steer Loaders	120	Construction and Mining	1.53	5.69	0.05	0.00	0.00
Skid Steer Loaders	25	Construction and Mining	8.28	11.95	0.13	-	0.00
Skid Steer Loaders	50	Construction and Mining	75.07	208.91	2.25	-	0.00
Skid Steer Loaders	120	Construction and Mining	39.34	180.72	1.97	-	0.00
Surfacing Equipment	5	Construction and Mining	5.41	0.60	0.00	0.00	0.00
Surfacing Equipment	15	Construction and Mining	16.07	8.50	0.04	0.00	0.00
Surfacing Equipment	25	Construction and Mining	0.22	0.28	0.00	0.00	0.00
Surfacing Equipment	50	Construction and Mining	0.09	0.07	0.00	-	0.00
Surfacing Equipment	120	Construction and Mining	0.02	0.06	0.00	-	0.00
Surfacing Equipment	175	Construction and Mining	0.01	0.06	0.00	-	0.00
Surfacing Equipment	250	Construction and Mining	0.03	0.20	0.00	-	0.00
Surfacing Equipment	500	Construction and Mining	0.22	2.70	0.03	-	0.00
Surfacing Equipment	750	Construction and Mining	0.07	1.33	0.01	-	0.00
Tampers/Rammers	15	Construction and Mining	12.42	1.26	0.01	0.00	0.00
Tampers/Rammers	15	Construction and Mining	0.57	0.15	0.00	0.00	0.00
Tractors/Loaders/Backhoes	120	Construction and Mining	0.33	2.36	0.02	0.00	0.00
Tractors/Loaders/Backhoes	25	Construction and Mining	1.22	2.27	0.02	-	0.00
Tractors/Loaders/Backhoes	50	Construction and Mining	7.26	27.34	0.29	-	0.00
Tractors/Loaders/Backhoes	120	Construction and Mining	97.16	610.68	6.65	-	0.00
Tractors/Loaders/Backhoes	175	Construction and Mining	7.25	88.88	0.97	-	0.00
Tractors/Loaders/Backhoes	250	Construction and Mining	2.35	48.36	0.53	-	0.00
Tractors/Loaders/Backhoes	500	Construction and Mining	3.78	156.72	1.73	-	0.00
Tractors/Loaders/Backhoes	750	Construction and Mining	1.37	85.02	0.94	-	0.00
Trenchers	15	Construction and Mining	4.39	3.37	0.02	0.00	0.00
Trenchers	25	Construction and Mining	3.40	5.66	0.03	0.00	0.00
Trenchers	50	Construction and Mining	1.70	4.10	0.03	0.00	0.00
Trenchers	120	Construction and Mining	0.57	2.66	0.02	0.00	0.00
Trenchers	15	Construction and Mining	0.32	0.21	0.00	-	0.00
Trenchers	25	Construction and Mining	0.34	0.86	0.01	-	0.00
Trenchers	50	Construction and Mining	12.96	34.96	0.37	-	0.00
Trenchers	120	Construction and Mining	17.57	91.21	0.99	-	0.00
Trenchers	175	Construction and Mining	1.92	22.01	0.24	-	0.00
Trenchers	250	Construction and Mining	0.17	3.04	0.03	-	0.00
Trenchers	500	Construction and Mining	0.22	5.43	0.06	-	0.00
Trenchers	750	Construction and Mining	0.01	0.63	0.01	-	0.00
Total Per Day			1,006.54	8,102.92	87.95	0.00	0.01
Total Per Year (emission:			367,386.21	2,957,564.97	32,100.35	0.19	4.92

2030 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Activity	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Asphalt Pavers	15	Construction and Mining	0.26	0.28	0.16	0.00	0.00	0.00
Asphalt Pavers	25	Construction and Mining	0.44	0.48	0.69	0.00	0.00	0.00
Asphalt Pavers	50	Construction and Mining	0.27	0.29	0.67	0.01	0.00	0.00
Asphalt Pavers	120	Construction and Mining	0.15	0.16	0.60	0.01	0.00	0.00
Bore/Drill Rigs	15	Construction and Mining	0.12	0.04	0.03	0.00	0.00	0.00
Bore/Drill Rigs	25	Construction and Mining	0.59	0.20	0.29	0.00	0.00	0.00
Bore/Drill Rigs	50	Construction and Mining	0.08	0.02	0.06	0.00	0.00	0.00
Bore/Drill Rigs	120	Construction and Mining	0.38	0.11	0.71	0.01	0.00	0.00
Bore/Drill Rigs	175	Construction and Mining	0.09	0.03	0.25	0.00	0.00	0.00
Bore/Drill Rigs	15	Construction and Mining	0.06	0.13	0.06	0.00	-	0.00
Bore/Drill Rigs	25	Construction and Mining	0.18	0.40	0.29	0.00	-	0.00
Bore/Drill Rigs	50	Construction and Mining	0.78	1.78	2.52	0.03	-	0.00
Bore/Drill Rigs	120	Construction and Mining	2.38	5.46	19.16	0.21	-	0.00
Bore/Drill Rigs	175	Construction and Mining	0.55	1.26	8.10	0.09	-	0.00
Bore/Drill Rigs	250	Construction and Mining	0.47	1.09	9.24	0.10	-	0.00
Bore/Drill Rigs	500	Construction and Mining	1.05	2.42	34.01	0.38	-	0.00
Bore/Drill Rigs	750	Construction and Mining	0.29	0.66	18.43	0.20	-	0.00
Bore/Drill Rigs	1000	Construction and Mining	0.48	1.11	46.61	0.52	-	0.00
Cement and Mortar Mixers	5	Construction and Mining	39.53	9.97	2.54	0.01	0.00	0.00
Cement and Mortar Mixers	15	Construction and Mining	66.98	16.90	7.78	0.04	0.00	0.00
Cement and Mortar Mixers	25	Construction and Mining	0.28	0.07	0.11	0.00	0.00	0.00
Cement and Mortar Mixers	15	Construction and Mining	3.03	2.49	0.72	0.01	-	0.00
Cement and Mortar Mixers	25	Construction and Mining	0.27	0.22	0.18	0.00	-	0.00
Concrete/Industrial Saws	5	Construction and Mining	2.18	0.78	0.21	0.00	0.00	0.00
Concrete/Industrial Saws	15	Construction and Mining	9.79	8.32	5.70	0.03	0.00	0.00
Concrete/Industrial Saws	25	Construction and Mining	3.06	2.60	3.47	0.02	0.00	0.00
Concrete/Industrial Saws	50	Construction and Mining	0.31	0.51	1.42	0.01	0.00	0.00
Concrete/Industrial Saws	120	Construction and Mining	0.18	0.29	1.39	0.01	0.00	0.00
Concrete/Industrial Saws	25	Construction and Mining	0.02	0.04	0.03	0.00	-	0.00
Concrete/Industrial Saws	50	Construction and Mining	0.21	0.33	0.45	0.00	-	0.00
Concrete/Industrial Saws	120	Construction and Mining	0.36	0.57	1.94	0.02	-	0.00
Concrete/Industrial Saws	175	Construction and Mining	0.01	0.02	0.14	0.00	-	0.00
Cranes	50	Construction and Mining	0.09	0.11	0.21	0.00	0.00	0.00
Cranes	120	Construction and Mining	0.19	0.21	0.71	0.01	0.00	0.00
Cranes	175	Construction and Mining	0.01	0.01	0.05	0.00	0.00	0.00
Cranes	50	Construction and Mining	0.20	0.71	0.75	0.01	-	0.00
Cranes	120	Construction and Mining	2.21	7.74	17.69	0.19	-	0.00
Cranes	175	Construction and Mining	2.21	7.74	28.29	0.31	-	0.00
Cranes	250	Construction and Mining	4.28	15.00	76.06	0.84	-	0.00
Cranes	500	Construction and Mining	1.57	5.50	44.76	0.49	-	0.00
Cranes	750	Construction and Mining	0.61	2.12	29.09	0.32	-	0.00
Cranes	9999	Construction and Mining	0.76	2.67	116.95	1.29	-	0.00
Crawler Tractors	50	Construction and Mining	0.08	0.23	0.27	0.00	-	0.00
Crawler Tractors	120	Construction and Mining	47.04	133.21	399.77	4.38	-	0.00
Crawler Tractors	175	Construction and Mining	15.92	45.08	248.61	2.73	-	0.00
Crawler Tractors	250	Construction and Mining	13.68	38.74	291.05	3.22	-	0.00
Crawler Tractors	500	Construction and Mining	9.38	26.55	311.21	3.44	-	0.00
Crawler Tractors	750	Construction and Mining	0.25	0.70	14.80	0.16	-	0.00
Crawler Tractors	1000	Construction and Mining	0.25	0.70	20.94	0.23	-	0.00
Crushing/Proc. Equipment	15	Construction and Mining	0.11	0.09	0.06	0.00	0.00	0.00
Crushing/Proc. Equipment	25	Construction and Mining	0.07	0.06	0.08	0.00	0.00	0.00
Crushing/Proc. Equipment	120	Construction and Mining	0.11	0.07	0.55	0.00	0.00	0.00
Crushing/Proc. Equipment	50	Construction and Mining	0.95	2.48	5.00	0.05	-	0.00
Crushing/Proc. Equipment	120	Construction and Mining	2.67	6.99	26.48	0.29	-	0.00
Crushing/Proc. Equipment	175	Construction and Mining	1.13	2.96	22.52	0.25	-	0.00
Crushing/Proc. Equipment	250	Construction and Mining	0.11	0.29	3.26	0.04	-	0.00
Crushing/Proc. Equipment	500	Construction and Mining	0.63	1.66	28.01	0.31	-	0.00
Crushing/Proc. Equipment	750	Construction and Mining	0.02	0.04	1.08	0.01	-	0.00
Crushing/Proc. Equipment	9999	Construction and Mining	0.02	0.04	2.40	0.03	-	0.00
Dumpers/Tenders	5	Construction and Mining	2.02	0.82	0.11	0.00	0.00	0.00
Dumpers/Tenders	15	Construction and Mining	4.30	1.76	0.63	0.00	0.00	0.00
Dumpers/Tenders	25	Construction and Mining	0.80	0.33	0.26	0.00	0.00	0.00
Dumpers/Tenders	120	Construction and Mining	0.07	0.02	0.06	0.00	0.00	0.00
Dumpers/Tenders	25	Construction and Mining	0.14	0.26	0.09	0.00	-	0.00
Excavators	25	Construction and Mining	0.22	0.84	0.63	0.01	-	0.00
Excavators	50	Construction and Mining	8.25	31.93	36.62	0.40	-	0.00
Excavators	120	Construction and Mining	22.41	86.71	290.83	3.19	-	0.00
Excavators	175	Construction and Mining	43.22	167.28	853.63	9.38	-	0.00
Excavators	250	Construction and Mining	17.58	68.03	487.87	5.39	-	0.00
Excavators	500	Construction and Mining	12.68	49.07	518.31	5.73	-	0.00
Excavators	750	Construction and Mining	0.15	0.57	9.90	0.11	-	0.00
Graders	50	Construction and Mining	0.08	0.21	0.27	0.00	-	0.00
Graders	120	Construction and Mining	5.53	14.28	48.76	0.53	-	0.00
Graders	175	Construction and Mining	18.90	48.78	274.88	3.02	-	0.00

2030 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Activity	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Graders	250	Construction and Mining	11.73	30.27	235.44	2.60	-	0.00
Graders	500	Construction and Mining	0.33	0.86	8.88	0.10	-	0.00
Graders	750	Construction and Mining	0.01	0.02	0.53	0.01	-	0.00
Off-Highway Tractors	120	Construction and Mining	0.01	0.02	0.08	0.00	-	0.00
Off-Highway Tractors	175	Construction and Mining	7.24	21.96	130.44	1.43	-	0.00
Off-Highway Tractors	250	Construction and Mining	6.85	20.76	122.51	1.35	-	0.00
Off-Highway Tractors	750	Construction and Mining	1.56	4.73	121.65	1.34	-	0.00
Off-Highway Tractors	1000	Construction and Mining	0.16	0.50	18.40	0.20	-	0.00
Off-Highway Trucks	175	Construction and Mining	0.38	2.09	11.87	0.13	-	0.00
Off-Highway Trucks	250	Construction and Mining	2.84	15.40	115.96	1.28	-	0.00
Off-Highway Trucks	500	Construction and Mining	4.00	21.69	267.00	2.95	-	0.00
Off-Highway Trucks	750	Construction and Mining	1.96	10.59	211.51	2.34	-	0.00
Off-Highway Trucks	1000	Construction and Mining	0.92	4.96	140.15	1.55	-	0.00
Other Construction Equipment	175	Construction and Mining	0.26	0.27	1.46	0.01	0.00	0.00
Other Construction Equipment	15	Construction and Mining	1.96	3.71	1.71	0.02	-	0.00
Other Construction Equipment	25	Construction and Mining	0.33	0.63	0.38	0.00	-	0.00
Other Construction Equipment	50	Construction and Mining	0.51	0.97	1.25	0.01	-	0.00
Other Construction Equipment	120	Construction and Mining	0.84	1.61	5.92	0.07	-	0.00
Other Construction Equipment	175	Construction and Mining	1.16	2.22	10.75	0.12	-	0.00
Other Construction Equipment	500	Construction and Mining	2.69	5.16	59.21	0.65	-	0.00
Pavers	25	Construction and Mining	0.09	0.20	0.17	0.00	-	0.00
Pavers	50	Construction and Mining	5.16	11.73	15.08	0.16	-	0.00
Pavers	120	Construction and Mining	6.09	13.83	43.62	0.48	-	0.00
Pavers	175	Construction and Mining	3.78	8.59	50.16	0.55	-	0.00
Pavers	250	Construction and Mining	0.46	1.04	9.10	0.10	-	0.00
Pavers	500	Construction and Mining	0.47	1.06	11.21	0.12	-	0.00
Paving Equipment	5	Construction and Mining	27.82	12.97	2.54	0.01	0.00	0.00
Paving Equipment	15	Construction and Mining	47.06	25.81	14.87	0.07	0.00	0.00
Paving Equipment	25	Construction and Mining	1.05	0.57	0.75	0.00	0.00	0.00
Paving Equipment	50	Construction and Mining	0.73	0.35	0.78	0.01	0.00	0.00
Paving Equipment	120	Construction and Mining	0.19	0.09	0.32	0.00	0.00	0.00
Paving Equipment	25	Construction and Mining	0.15	0.35	0.20	0.00	-	0.00
Paving Equipment	50	Construction and Mining	0.13	0.30	0.33	0.00	-	0.00
Paving Equipment	120	Construction and Mining	1.88	4.29	10.65	0.12	-	0.00
Paving Equipment	175	Construction and Mining	0.88	2.02	9.26	0.10	-	0.00
Paving Equipment	250	Construction and Mining	0.25	0.57	3.14	0.03	-	0.00
Plate Compactors	15	Construction and Mining	1.01	0.57	0.11	0.00	0.00	0.00
Plate Compactors	5	Construction and Mining	19.88	9.81	1.78	0.01	0.00	0.00
Plate Compactors	15	Construction and Mining	21.08	11.91	5.12	0.02	0.00	0.00
Plate Compactors	15	Construction and Mining	1.91	3.14	0.62	0.01	-	0.00
Rollers	5	Construction and Mining	2.21	0.50	0.14	0.00	0.00	0.00
Rollers	15	Construction and Mining	3.58	3.05	1.66	0.01	0.00	0.00
Rollers	25	Construction and Mining	2.42	2.06	2.44	0.01	0.00	0.00
Rollers	50	Construction and Mining	0.19	0.32	0.89	0.01	0.00	0.00
Rollers	120	Construction and Mining	0.35	0.60	2.72	0.02	0.00	0.00
Rollers	15	Construction and Mining	3.58	6.83	1.97	0.02	-	0.00
Rollers	25	Construction and Mining	1.50	2.86	1.73	0.02	-	0.00
Rollers	50	Construction and Mining	4.66	8.93	10.62	0.12	-	0.00
Rollers	120	Construction and Mining	25.02	47.92	128.72	1.41	-	0.00
Rollers	175	Construction and Mining	10.06	19.27	94.73	1.04	-	0.00
Rollers	250	Construction and Mining	1.43	2.73	18.91	0.21	-	0.00
Rollers	500	Construction and Mining	1.00	1.92	18.97	0.21	-	0.00
Rough Terrain Forklifts	50	Construction and Mining	0.04	0.04	0.14	0.00	0.00	0.00
Rough Terrain Forklifts	120	Construction and Mining	0.53	0.60	3.07	0.03	0.00	0.00
Rough Terrain Forklifts	175	Construction and Mining	0.02	0.02	0.17	0.00	0.00	0.00
Rough Terrain Forklifts	50	Construction and Mining	0.66	2.04	3.16	0.03	-	0.00
Rough Terrain Forklifts	120	Construction and Mining	31.48	97.49	277.26	3.04	-	0.00
Rough Terrain Forklifts	175	Construction and Mining	4.03	12.49	70.91	0.78	-	0.00
Rough Terrain Forklifts	250	Construction and Mining	0.23	0.70	5.38	0.06	-	0.00
Rough Terrain Forklifts	500	Construction and Mining	0.15	0.46	5.31	0.06	-	0.00
Rubber Tired Dozers	175	Construction and Mining	0.06	0.26	1.54	0.02	-	0.00
Rubber Tired Dozers	250	Construction and Mining	1.45	6.41	53.25	0.59	-	0.00
Rubber Tired Dozers	500	Construction and Mining	2.23	9.87	118.31	1.31	-	0.00
Rubber Tired Dozers	750	Construction and Mining	0.41	1.83	32.98	0.36	-	0.00
Rubber Tired Dozers	1000	Construction and Mining	0.03	0.12	3.31	0.04	-	0.00
Rubber Tired Loaders	50	Construction and Mining	0.09	0.13	0.33	0.00	0.00	0.00
Rubber Tired Loaders	120	Construction and Mining	0.62	0.87	3.25	0.03	0.00	0.00
Rubber Tired Loaders	25	Construction and Mining	0.08	0.22	0.17	0.00	-	0.00
Rubber Tired Loaders	50	Construction and Mining	1.61	4.27	6.10	0.07	-	0.00
Rubber Tired Loaders	120	Construction and Mining	43.80	116.06	311.49	3.42	-	0.00
Rubber Tired Loaders	175	Construction and Mining	24.69	65.41	316.24	3.47	-	0.00
Rubber Tired Loaders	250	Construction and Mining	24.55	65.05	438.00	4.84	-	0.00
Rubber Tired Loaders	500	Construction and Mining	10.22	27.07	289.94	3.21	-	0.00
Rubber Tired Loaders	750	Construction and Mining	0.38	1.00	21.87	0.24	-	0.00

2030 Construction and Mining Emissions

Equipment	MaxHP	Class	Population	Activity	Consumption	CO2 Exhaust	N2O Exhaust	CH4 Exhaust
Rubber Tired Loaders	1000	Construction and Mining	0.04	0.11	2.87	0.03	-	0.00
Scrapers	120	Construction and Mining	0.23	0.70	2.99	0.03	-	0.00
Scrapers	175	Construction and Mining	2.11	6.40	43.11	0.47	-	0.00
Scrapers	250	Construction and Mining	2.06	6.24	59.08	0.65	-	0.00
Scrapers	500	Construction and Mining	5.67	17.17	249.56	2.76	-	0.00
Scrapers	750	Construction and Mining	0.49	1.48	37.08	0.41	-	0.00
Signal Boards	5	Construction and Mining	0.06	0.02	0.01	0.00	0.00	0.00
Signal Boards	15	Construction and Mining	0.45	0.35	0.21	0.00	0.00	0.00
Signal Boards	15	Construction and Mining	16.67	34.29	9.65	0.11	-	0.00
Signal Boards	50	Construction and Mining	0.08	0.12	0.20	0.00	-	0.00
Signal Boards	120	Construction and Mining	1.36	1.99	7.26	0.08	-	0.00
Signal Boards	175	Construction and Mining	0.84	1.23	8.66	0.10	-	0.00
Signal Boards	250	Construction and Mining	0.18	0.26	3.01	0.03	-	0.00
Skid Steer Loaders	15	Construction and Mining	0.21	0.18	0.15	0.00	0.00	0.00
Skid Steer Loaders	25	Construction and Mining	14.13	12.36	13.71	0.06	0.00	0.00
Skid Steer Loaders	50	Construction and Mining	2.55	2.17	4.15	0.03	0.00	0.00
Skid Steer Loaders	120	Construction and Mining	1.53	1.30	5.54	0.05	0.00	0.00
Skid Steer Loaders	25	Construction and Mining	11.37	26.01	16.32	0.18	-	0.00
Skid Steer Loaders	50	Construction and Mining	103.14	239.48	279.08	3.05	-	0.00
Skid Steer Loaders	120	Construction and Mining	54.04	125.48	244.12	2.68	-	0.00
Surfacing Equipment	5	Construction and Mining	5.11	2.80	0.56	0.00	0.00	0.00
Surfacing Equipment	15	Construction and Mining	15.18	20.93	8.03	0.04	0.00	0.00
Surfacing Equipment	25	Construction and Mining	0.21	0.29	0.27	0.00	0.00	0.00
Surfacing Equipment	50	Construction and Mining	0.12	0.15	0.09	0.00	-	0.00
Surfacing Equipment	120	Construction and Mining	0.02	0.03	0.08	0.00	-	0.00
Surfacing Equipment	175	Construction and Mining	0.02	0.02	0.09	0.00	-	0.00
Surfacing Equipment	250	Construction and Mining	0.04	0.04	0.27	0.00	-	0.00
Surfacing Equipment	500	Construction and Mining	0.30	0.37	3.65	0.04	-	0.00
Surfacing Equipment	750	Construction and Mining	0.09	0.11	1.80	0.02	-	0.00
Tampers/Rammers	15	Construction and Mining	11.73	5.86	1.18	0.01	0.00	0.00
Tampers/Rammers	15	Construction and Mining	0.54	0.27	0.13	0.00	0.00	0.00
Tractors/Loaders/Backhoes	120	Construction and Mining	0.33	0.79	2.30	0.02	0.00	0.00
Tractors/Loaders/Backhoes	25	Construction and Mining	1.67	4.31	3.11	0.03	-	0.00
Tractors/Loaders/Backhoes	50	Construction and Mining	9.98	26.15	36.33	0.40	-	0.00
Tractors/Loaders/Backhoes	120	Construction and Mining	133.48	349.79	823.91	9.04	-	0.00
Tractors/Loaders/Backhoes	175	Construction and Mining	9.96	26.10	120.30	1.32	-	0.00
Tractors/Loaders/Backhoes	250	Construction and Mining	3.22	8.44	65.51	0.72	-	0.00
Tractors/Loaders/Backhoes	500	Construction and Mining	5.20	13.63	212.30	2.35	-	0.00
Tractors/Loaders/Backhoes	750	Construction and Mining	1.88	4.93	115.17	1.27	-	0.00
Trenchers	15	Construction and Mining	4.15	4.94	3.19	0.02	0.00	0.00
Trenchers	25	Construction and Mining	3.22	3.83	5.34	0.03	0.00	0.00
Trenchers	50	Construction and Mining	1.70	1.88	4.21	0.03	0.00	0.00
Trenchers	120	Construction and Mining	0.57	0.62	2.58	0.02	0.00	0.00
Trenchers	15	Construction and Mining	0.44	0.75	0.29	0.00	-	0.00
Trenchers	25	Construction and Mining	0.47	0.79	1.19	0.01	-	0.00
Trenchers	50	Construction and Mining	17.81	30.55	46.16	0.50	-	0.00
Trenchers	120	Construction and Mining	24.13	41.39	122.45	1.34	-	0.00
Trenchers	175	Construction and Mining	2.64	4.53	29.66	0.33	-	0.00
Trenchers	250	Construction and Mining	0.24	0.41	4.10	0.05	-	0.00
Trenchers	500	Construction and Mining	0.30	0.52	7.29	0.08	-	0.00
Trenchers	750	Construction and Mining	0.02	0.03	0.85	0.01	-	0.00
		Total Per Day	1,236.87	2,631.24	10,881.17	119.19	0.00	0.01
		Total Per Year (emissions in tons)	451,458.19	960,402.25	3,971,626.11	43,504.79	0.17	1.95