

Minnesota Greenhouse Gas Emission Inventory: Data Tables

Agriculture, forestry and land use in tons of CO₂-equivalents (x 1,000)

Subcategory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Crop agriculture	24,873	24,441	25,434	24,529	24,746	25,573	25,711	26,548	25,849	25,846	26,478	26,905
Animal agriculture	9,776	10,066	10,289	10,416	10,280	10,392	10,384	10,365	10,328	10,138	10,249	10,483
Inland waters	6,731	6,732	6,733	6,734	6,735	6,735	6,736	6,737	6,737	6,737	6,737	6,737
Oil	2,519	2,348	2,602	2,300	2,768	2,487	2,056	2,074	2,404	2,593	2,153	2,234
Forest regrowth	-5,150	-3,838	-11,301	-8,344	-9,234	-5,528	-5,012	-6,690	-5,422	-12,549	-4,043	-12,115

This data table corresponds to slide 12 in MPCA presentation of January 22, 2019

Minnesota Greenhouse Gas Emission Inventory: Data Tables

Electricity generation in tons of CO₂-equivalents (x 1,000)

Subcategory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Coal	39,234	38,401	37,418	37,029	34,084	32,621	32,560	26,532	27,454	32,459	28,206	27,306
Imported electricity	13,602	14,771	14,839	14,874	13,389	13,831	14,450	14,025	15,559	11,124	9,980	7,422
Natural gas	1,803	1,967	2,506	1,714	1,764	2,460	2,026	3,694	3,227	2,196	3,661	4,490
Oil	940	629	487	342	116	71	39	46	47	80	39	38
Other fossil fuel	686	646	690	689	674	646	706	748	761	768	766	795
Transmission	196	183	156	129	101	72	45	84	50	46	47	22
Coal storage	63.1	62.1	67.9	65.6	58.0	56.8	59.6	45.2	45.6	57.9	58.4	42.1
Flue gas desulfurization	6.2	5.9	5.8	6.0	6.1	6.4	5.9	5.1	5.1	5.2	4.9	5.2
Inland waters	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	6.5	6.5	6.5

This data table corresponds to slide 16 in MPCA presentation of January 22, 2019

Minnesota Greenhouse Gas Emission Inventory: Data Tables

Transportation: Tons of CO₂-equivalents (x 1000)

Subcategory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Light-duty trucks	14,593	14,941	15,082	14,742	14,750	14,869	15,537	15,559	15,402	15,381	15,165	15,246
Passenger cars	10,736	10,438	10,397	10,366	10,374	10,082	9,423	9,166	9,161	8,851	8,399	8,030
Heavy-duty trucks	7,082	7,019	7,010	6,907	6,134	6,296	6,537	6,820	6,555	6,513	5,777	6,251
Aviation	5,068	4,445	4,526	4,159	4,002	3,570	3,643	3,700	3,720	3,880	3,901	4,007
Natural gas transmission	2,453	2,340	2,334	2,199	1,901	2,079	2,048	1,895	1,819	1,906	1,716	1,774
Air conditioning	1,074	1,208	1,342	1,469	1,576	1,652	1,745	1,749	1,721	1,619	1,489	1,383
Off-highway	453	931	771	720	656	749	572	605	564	589	1,373	1,420
Railroad	929	871	1,625	1,198	549	651	778	1,108	1,111	1,104	974	845
Marine	487	567	476	582	474	471	374	361	395	417	662	756
Buses	398	394	393	385	347	356	375	386	371	372	270	272
Motorcycle	225	226	228	227	217	216	208	213	215	216	211	207
RV	58.6	59.4	60.3	60.9	56.0	60.5	59.7	67.7	66.0	60.6	54.5	55.6

This data table corresponds to slide 23 in MPCA presentation of January 22, 2019

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Agriculture, forestry, and land use -- Split by sector groups

Sector groups	Activity	Sources	GHGs	Emissions (CO2-e tons)			
				2005	2010	2015	2016
animal agriculture	agriculture	Feedlots	N2O	985,982	1,001,627	967,731	993,233
		Manure	CH4	2,629,901	3,024,447	2,970,005	3,043,510
		Manure soil application	N2O	775,065	792,311	781,051	805,646
		Ruminants	CH4	5,384,561	5,573,374	5,529,799	5,640,248
crop agriculture	agriculture	Crop residues	N2O	2,216,639	2,372,889	2,555,973	2,658,247
		Cultivated histosols	CO2	9,442,536	9,354,084	9,472,622	9,482,772
			N2O	1,562,040	1,558,044	1,540,877	1,539,902
		Deposition	N2O	1,007,269	942,264	1,038,107	1,315,985
		Fertilizer	N2O	3,048,191	3,360,321	3,602,536	3,598,980
		Liming of fields	CO2	33,919	28,597	24,069	24,069
		Mineralization	N2O	4,306,435	4,472,831	4,535,385	4,534,351
		Nitrogen fixation	N2O	185,252	191,006	196,321	196,036
		Runoff	N2O	2,546,579	2,703,704	2,809,859	2,836,859
		Soils	CO2	0	0	0	0
		Urea application	CO2	395,895	458,740	568,813	583,087
		Wild rice	CH4	103,089	102,539	102,539	102,539
		land use	Lake carbon burial	CO2	0	0	0
	Lakes		CH4	3,334,318	3,338,549	3,340,108	3,340,108
			CO2	0	0	0	0
	Reservoirs		CH4	1,263,847	1,263,847	1,263,847	1,263,847
			CO2	0	0	0	0
	Rivers and streams		CH4	2,132,965	2,132,965	2,132,965	2,132,965
			CO2	0	0	0	0
	fire	agriculture	Agricultural burning	CH4	17,421	19,243	21,254
N2O				8,149	8,859	9,956	10,234
land use		Prescribed burn	CH4	146,849	183,856	100,845	145,094
			N2O	94,277	118,035	64,742	93,151
		Wildfire	CH4	13,959	23,016	20,604	8,511
			N2O	8,962	14,776	13,228	5,464
forest carbon	forestry	Forest loss	CO2	0			
		Forest regrowth	CO2	-5,150,318	-5,528,194	-4,043,429	-12,114,763
fossil fuel	energy	Coal	CH4	0	0	0	0
			CO2	0	0	0	0
			N2O	0	0	0	0
		Natural gas	CH4	0	0	0	0
			CO2	0	0	0	0
			N2O	0	0	0	0
		Oil	CH4	7,288	8,042	7,029	7,491
			CO2	2,499,897	2,463,463	2,133,024	2,211,848
			N2O	12,011	15,632	13,311	14,377
		Other fossil fuel	CH4	86	369	454	491
			CO2	0	0	0	0
			N2O	181	781	961	1,042

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19 This data table corresponds to slides 14 & 15 in MPCA presentation of January 22, 2019
1/22/2019

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Electricity Generation

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
energy	Coal	CH4	6,910	5,650	4,768	4,555
		CO2	39,129,502	32,532,375	28,127,223	27,224,797
		N2O	97,745	82,952	74,012	76,447
	Coal storage	CH4	63,078	56,782	58,355	42,094
	Flue gas desulfurization	CO2	6,211	6,447	4,945	5,158
	Imported electricity	CH4	27,040	33,437	28,325	17,832
		CO2	13,445,202	13,697,319	9,874,331	7,348,542
		N2O	67,610	72,865	62,756	50,250
		SF6	61,978	27,830	14,443	4,934
	Natural gas	CH4	2,579	2,228	3,494	4,345
		CO2	1,783,519	2,427,377	3,605,358	4,425,030
		N2O	17,116	30,780	52,011	61,054
	Oil	CH4	379	36	26	25
		CO2	908,626	70,569	38,620	37,414
		N2O	31,252	275	233	195
	Other fossil fuel	CH4	6,980	16,760	19,966	21,105
		CO2	611,675	553,470	665,987	689,918
		N2O	67,298	75,320	79,930	83,735
	Reservoirs	CH4	5,426	5,426	6,453	6,453
	Transmission	SF6	195,631	72,312	47,453	21,744

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Data pulled on 1/16/19

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Transportation

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
energy	Air conditioning	HFCs	1,074,028	1,652,324	1,488,703	1,383,488
	Aviation	CH4	4,388	3,179	3,143	3,328
		CO2	5,016,158	3,533,434	3,860,894	3,966,707
		N2O	47,305	33,298	36,473	37,446
	Buses	CH4	2,328	2,099	1,438	1,396
		CO2	394,887	353,411	268,559	270,219
		N2O	728	617	420	415
	Heavy-duty trucks	CH4	1,895	4,691	10,904	12,437
		CO2	7,065,880	6,279,297	5,757,130	6,229,903
		N2O	14,307	11,591	8,560	8,493
	Light-duty trucks	CH4	30,270	29,185	24,388	22,723
		CO2	14,278,688	14,596,581	14,954,659	15,054,172
		N2O	284,232	242,753	186,165	169,530
	Marine	CH4	430	289	267	280
		CO2	484,661	467,990	660,125	753,745
		N2O	2,376	2,265	1,578	1,579
	Motorcycle	CH4	619	506	487	457
		CO2	223,389	214,232	209,605	205,710
		N2O	744	788	805	778
	Natural gas transmission	CH4	1,118,021	1,149,390	1,084,985	1,068,262
		CO2	1,327,185	925,138	628,604	701,974
		N2O	7,767	4,897	2,760	3,484
	Off-highway	CH4	68,522	60,281	57,413	59,322
		CO2	44,198	389,696	1,030,073	1,066,182
		N2O	340,444	299,499	285,255	294,739
	Passenger cars	CH4	19,725	14,958	9,277	8,426
		CO2	10,529,569	9,920,380	8,300,360	7,942,466
		N2O	186,400	146,546	89,256	79,415
	Railroad	CH4	5,193	4,520	5,034	4,862
		CO2	904,348	629,340	949,699	821,452
		N2O	19,808	17,242	19,202	18,544
	RV	CH4	158	132	103	102
		CO2	57,844	59,844	54,042	55,109
N2O		565	506	362	349	

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Industrial

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
energy	Coal	CH4	6,765	5,912	4,707	4,132
		CO2	2,602,420	2,276,218	1,836,617	1,611,999
		N2O	12,095	10,570	8,416	7,387
	Coal storage	CH4	6,812	5,969	3,199	2,778
	Natural gas	CH4	2,516	4,188	4,276	4,410
		CO2	5,604,193	9,327,713	9,525,240	9,821,676
		N2O	2,999	4,992	5,098	5,256
	Oil	CH4	4,091	3,812	3,872	3,705
		CO2	4,417,493	4,278,998	4,532,981	4,267,065
		N2O	12,420	9,291	8,149	8,095
	Oil refining	CH4	42,545	35,759	36,545	36,570
		CO2	11,243	1,422	1,256	1,256
	Other fossil fuels	CH4	9,845	10,808	9,845	9,326
		CO2	0	0	0	0
		N2O	21,193	17,250	15,750	14,920
industrial process	Ammonia manufacture	CO2	0	0	0	0
	Glass manufacture	CO2	28,233	31,267	30,282	28,538
	Industrial processes	CO2	13,174	9,228	9,627	9,627
	Insulating foam	HFCs	0	54,076	55,272	55,272
	Magnesium casting	SF6	240,522	184,555	17,556	12,540
	Other industrial VOC and TRI releases	CO2	107,137	112,132	55,362	55,136
	Paraffinic wax consumption	CO2	27,375	16,526	12,126	12,630
		CH4	24,816	27,006	26,021	26,021
	Peat mining	CO2	91,786	99,885	96,241	96,241
		CO2	1,896,241	2,253,681	2,353,644	2,380,449
	Refinery processes	CO2	8,798	11,686	3,722	2,166
	Secondary lead production	PFCs	246,706	187,926	111,325	67,777
	Solvent	CO2	24,696	12,664	13,974	13,974
		PFCs	30,472	32,171	32,006	32,014
	Steel production	CO2	34,933	28,103	23,699	19,413
	Taconite induration	CO2	1,820,624	2,064,748	1,833,548	1,744,475
Wastewater treatment	CH4	178,620	194,562	163,095	164,798	

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Residential

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
energy	Air conditioning	HFCs	42,906	127,717	210,364	219,888
	Coal	CH4	219	191	202	196
		CO2	2,587	2,251	2,384	2,310
		N2O	13	11	12	12
	Natural gas	CH4	17,040	16,253	15,974	15,926
		CO2	7,593,125	7,240,415	7,116,194	7,095,413
		N2O	4,062	3,875	3,808	3,797
	Oil	CH4	5,708	4,314	3,842	3,898
		CO2	2,249,938	1,828,154	1,717,676	1,730,038
		N2O	2,881	1,907	1,509	1,557
	Other fossil fuels	CH4	109,577	158,324	298,658	298,658
		CO2	0	0	0	0
		N2O	17,415	25,163	47,467	47,467
Refrigeration	HFCs	1,658	1,839	1,969	2,002	
residential process	Carbon loss in housing	CO2	0	397,555	1,511,104	0
	Fertilizer	N2O	16,185	16,535	15,729	15,669
	Product use	CO2	142,868	126,820	110,161	109,247
		HFCs	156,201	198,097	223,491	217,450
	Sequestration in Housing	CO2	-1,558,892	0	0	-16,627

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Commercial

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
commercial process	Medical use	N2O	79,456	78,952	78,546	78,566
	Solvent	CO2	73,233	92,798	64,088	64,088
energy	Air conditioning	HFCs	553,562	542,017	774,696	914,294
	Coal	CH4	305	246	47	43
		CO2	118,568	95,497	18,100	16,855
		N2O	545	439	83	77
	Limestone	CO2	1,488	1,198	321	378
	Natural gas	CH4	12,100	11,174	11,967	11,821
		CO2	5,390,088	4,977,614	5,331,106	5,265,929
		N2O	2,885	2,664	2,853	2,818
	Oil	CH4	2,355	1,665	2,096	2,081
		CO2	769,238	563,465	712,503	721,795
		N2O	1,520	1,034	1,242	1,195
	Other fossil fuel	CH4	11,962	13,658	29,801	34,046
		CO2	0	0	0	0
N2O		1,914	2,183	4,770	5,446	

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19

MPCA greenhouse gas emissions inventory: Sector specific data tables

Sector: Waste

Activity	Sources	GHGs	Emissions (CO2-e tons)			
			2005	2010	2015	2016
energy	Ash disposal	CH4	0	0	0	0
		CO2	0	0	0	0
		N2O	0	0	0	0
Coal		CH4	0	0	0	0
		CO2	0	0	0	0
		N2O	0	0	0	0
Compost processing		CH4	0	0	0	0
		CO2	151	96	0	0
		N2O	1	1	0	0
Hazardous waste		CO2	104,143	109,257	109,496	119,005
		N2O	3,202	3,359	3,366	3,659
Landfills		CH4	25	25	26	23
		CO2	17,546	16,775	17,395	15,233
		N2O	131	131	139	122
MRF		CH4	14	13	12	11
		CO2	9,677	9,051	7,817	7,439
		N2O	72	71	62	59
Natural gas		CH4	6	6	11	3
		CO2	14,530	15,244	26,562	7,490
		N2O	74	77	135	38
Oil		CH4	1	0	0	0
		CO2	2,572	1,656	260	180
		N2O	6	1	1	1
Propane		CH4	0	0	0	0
		CO2	4	0	2	1
		N2O	0	0	0	0
RDF		CH4	4	3	3	4
		CO2	2,519	1,765	2,301	2,375
		N2O	19	14	18	19
Sludge		CH4	4,073	4,300	4,093	4,038
		CO2	0	0	0	0
		N2O	1,579	1,678	1,595	1,569
Solid waste		CH4	0	0	0	0
		CO2	0	0	0	0
		N2O	0	0	0	0
Solvent		CH4	0	0	0	0
		CO2	18,474	12,399	2,750	8,275
		N2O	0	0	0	0
Wood		CH4	0	0	0	0
		N2O	0	0	0	0
Yard waste processing		CH4	4	4	4	4
		CO2	2,923	2,791	2,717	2,717
		N2O	22	22	22	22

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MPCA greenhouse gas emissions inventory: Sector specific data tables**Sector: Waste**

Activity	Sources	GHGs	Emissions (CO ₂ -e tons)			
			2005	2010	2015	2016
waste	Biosolids land application	CH ₄	0	0	0	0
		CO ₂	0	0	0	0
		N ₂ O	25,678	19,235	13,070	11,966
	City dumps	CO ₂	0	0	0	0
	Composting	CH ₄	42,447	41,627	40,000	40,000
		CO ₂	0	0	0	0
		N ₂ O	2,760	1,835	0	0
	Industrial and Commercial waste	CH ₄	0	0	0	0
		CO ₂	0	0	0	0
		N ₂ O	0	0	0	0
	Landfill gas	CH ₄	12,740	14,052	18,336	14,975
		CO ₂	0	0	0	0
		N ₂ O	1,016	1,340	1,537	1,564
	Landfills	CH ₄	2,334,179	1,944,731	1,857,842	1,733,305
	Limestone	CO ₂	0	0	0	0
	Medical waste	CH ₄	0	0	0	0
		CO ₂	4,652	4,560	4,643	4,206
		N ₂ O	184	180	183	166
	Municipal wastewater	CH ₄	348,737	243,539	251,451	253,368
		CO ₂	0	0	0	0
		N ₂ O	101,686	103,506	110,128	112,052
Rural open burning	CH ₄	10,262	8,902	7,061	7,201	
	CO ₂	35,638	30,915	24,520	25,008	
	N ₂ O	2,823	2,449	1,942	1,981	
Sequestration in landfills	CO ₂	-993,673	-728,570	-609,224	-392,466	

Interactive data tools can be found at: <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>

Data pulled on 1/16/19