

California Nitrous Oxide Inventory for 2000-2015 — by IPCC Category

N2O

million tonnes of CO2 equivalent - (based upon IPCC Fourth Assessment Report's 100-yr Global Warming Potentials)

Included Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1 - Energy	5.3	4.9	4.5	4.2	3.9	3.5	3.2	3.0	2.8	2.5	2.4	2.3	2.1	2.2	2.0	2.0
1A - Fuel Combustion Activities	5.25	4.85	4.50	4.24	3.87	3.52	3.22	3.01	2.79	2.48	2.39	2.26	2.13	2.19	1.96	1.97
1A1 - Energy Industries	0.49	0.55	0.53	0.56	0.55	0.55	0.50	0.52	0.54	0.40	0.39	0.38	0.37	0.50	0.36	0.44
1A1a - Main Activity Electricity and Heat Production	0.40	0.46	0.44	0.46	0.46	0.45	0.41	0.43	0.46	0.31	0.30	0.30	0.29	0.41	0.28	0.37
1A1ai - Electricity Generation	0.313	0.366	0.359	0.383	0.379	0.369	0.328	0.350	0.383	0.237	0.230	0.224	0.223	0.352	0.217	0.288
1A1aii - Combined Heat and Power Generation (CHP)	0.091	0.091	0.078	0.080	0.081	0.084	0.084	0.082	0.076	0.073	0.069	0.072	0.063	0.062	0.059	0.084
1A1b - Petroleum Refining	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.05
1A1c - Manufacture of Solid Fuels and Other Energy Industries	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1A1cii - Other Energy Industries	0.010	0.011	0.010	0.011	0.011	0.010	0.009	0.009	0.010	0.009	0.008	0.008	0.009	0.010	0.010	0.010
1A2 - Manufacturing Industries and Construction	0.09	0.09	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
1A2c - Chemicals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2d - Pulp, Paper and Print	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2e - Food Processing, Beverages and Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2f - Non-Metallic Minerals	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02
1A2g - Transport Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2h - Machinery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2i - Mining (excluding fuels) and Quarrying	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2j - Wood and Wood Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2k - Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2l - Textile and Leather	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1A2m - Non-specified Industry.	0.06	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04
1A3 - Transport	4.59	4.12	3.81	3.52	3.15	2.82	2.57	2.35	2.10	1.94	1.85	1.73	1.62	1.53	1.44	1.38
1A3a - Civil Aviation	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1A3aii - Domestic Aviation	0.032	0.032	0.032	0.033	0.035	0.036	0.037	0.040	0.036	0.033	0.031	0.030	0.030	0.032	0.031	0.034
1A3b - Road Transportation	4.53	4.07	3.75	3.46	3.09	2.76	2.50	2.28	2.04	1.89	1.80	1.67	1.56	1.47	1.38	1.32
1A3bi - Cars	1.853	1.608	1.442	1.249	1.076	0.907	0.793	0.693	0.602	0.558	0.519	0.467	0.426	0.390	0.357	0.332
1A3bii - Light-duty Trucks	2.047	1.853	1.706	1.609	1.420	1.265	1.134	1.017	0.911	0.848	0.807	0.742	0.686	0.633	0.583	0.543
1A3biii - Heavy-duty Trucks and Buses	0.616	0.591	0.583	0.575	0.570	0.559	0.548	0.541	0.496	0.453	0.445	0.434	0.421	0.422	0.414	0.411
1A3biv - Motorcycles	0.015	0.019	0.022	0.024	0.024	0.026	0.029	0.030	0.032	0.031	0.030	0.029	0.029	0.029	0.029	0.030
1A3c - Railways	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01
1A3d - Water-borne Navigation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1A3di - International Water-borne Navigation (International Bunkers)	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004
1A3dii - Domestic Water-borne Navigation	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.006	0.006

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Included Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1A3e - Other Transportation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
1A3eii - Off-road	0.006	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.007	0.005	0.005	0.005	0.005	0.006	0.006	0.006
1A4 - Other Sectors	0.09	0.09	0.09	0.09	0.10	0.08	0.07	0.07	0.08	0.09	0.09	0.09	0.08	0.10	0.10	0.10
1A4a - Commercial/Institutional	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1A4b - Residential	0.07	0.06	0.06	0.07	0.07	0.05	0.05	0.05	0.06	0.07	0.06	0.06	0.06	0.07	0.07	0.07
1A4c - Agriculture/Forestry/Fishing/Fish Farms	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
1B - Fugitive Emissions from Fuels	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1B2 - Oil and Natural Gas	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1B2a - Oil	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1B2ai - Venting														0.000	0.000	0.000
1B2aii - Flaring	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.001	0.000	0.000	0.000	0.000	0.000
1B2aiii - All Other														0.000	0.000	0.000
1B3 - Geothermal Energy Production										0.00	0.00		0.00	0.00	0.00	0.00
2 - Industrial Processes and Product Use	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
2B - Chemical Industry	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.03	0.05	0.05	0.01	0.03
2B2 - Nitric Acid Production	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.04	0.05	0.03	0.05	0.05	0.01	0.03
3 - Agriculture, Forestry and Other Land Use	9.7	9.7	10.0	10.0	9.7	9.8	9.8	9.6	9.4	9.3	9.3	9.2	9.5	9.1	9.3	8.8
3A - Livestock	1.38	1.41	1.50	1.54	1.45	1.50	1.55	1.57	1.53	1.49	1.48	1.48	1.54	1.48	1.50	1.49
3A2 - Manure Management	1.38	1.41	1.50	1.54	1.45	1.50	1.55	1.57	1.53	1.49	1.48	1.48	1.54	1.48	1.50	1.49
3A2a - Cattle	1.28	1.30	1.39	1.44	1.35	1.40	1.45	1.47	1.43	1.39	1.39	1.38	1.45	1.39	1.41	1.40
3A2ai - Dairy Cows	1.059	1.082	1.144	1.164	1.091	1.127	1.161	1.185	1.151	1.128	1.130	1.128	1.177	1.121	1.118	1.103
3A2aii - Other Cattle	0.219	0.222	0.248	0.273	0.258	0.271	0.292	0.286	0.281	0.266	0.256	0.257	0.268	0.269	0.296	0.296
3A2c - Sheep	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
3A2d - Goats	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3A2f - Horses	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
3A2h - Swine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3A2i - Poultry	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.03	0.04
3C - Aggregate Sources and Non-CO2 Emissions Sources on Land	8.28	8.29	8.47	8.46	8.30	8.31	8.27	8.01	7.86	7.76	7.83	7.70	7.98	7.67	7.77	7.29
3C1 - Emissions from Biomass Burning	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
3C1b - Biomass Burning in Croplands	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
3C4 - Direct N2O Emissions from Managed Soils	6.42	6.45	6.59	6.57	6.44	6.42	6.39	6.15	6.01	5.92	5.99	5.85	6.08	5.78	5.91	5.49
3C5 - Indirect N2O Emissions from Managed Soils	1.81	1.79	1.83	1.85	1.82	1.84	1.84	1.81	1.80	1.80	1.79	1.80	1.85	1.83	1.81	1.75

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Included Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4 - Waste	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0
4A - Solid Waste Disposal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4A1 - Managed Waste Disposal Sites	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4B - Biological Treatment of Solid Waste	0.04	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.09	0.09	0.09	0.10	0.10
4D - Wastewater Treatment and Discharge	0.67	0.66	0.68	0.69	0.70	0.69	0.71	0.72	0.73	0.73	0.79	0.82	0.83	0.84	0.85	0.86
4D1 - Domestic Wastewater Treatment and Discharge	0.67	0.66	0.68	0.69	0.70	0.69	0.71	0.72	0.73	0.73	0.79	0.82	0.83	0.84	0.85	0.86
Summary for Included Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
California N2O Emissions	15.7	15.3	15.3	15.0	14.4	14.1	13.9	13.4	13.0	12.6	12.6	12.4	12.6	12.3	12.2	11.7

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Excluded Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1 - Energy	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4
1A - Fuel Combustion Activities	0.37	0.34	0.37	0.35	0.37	0.37	0.38	0.40	0.36	0.36	0.36	0.35	0.35	0.36	0.38	0.41
1A3 - Transport	0.34	0.31	0.33	0.31	0.34	0.34	0.35	0.37	0.34	0.34	0.33	0.33	0.32	0.34	0.36	0.38
1A3a - Civil Aviation	0.30	0.28	0.30	0.29	0.31	0.31	0.32	0.33	0.30	0.29	0.29	0.29	0.28	0.30	0.32	0.35
1A3ai - International Aviation (International Bunkers)	0.144	0.130	0.135	0.125	0.136	0.139	0.145	0.151	0.143	0.141	0.139	0.146	0.141	0.155	0.169	0.188
1A3aia - Domestic Aviation	0.158	0.149	0.167	0.165	0.175	0.169	0.171	0.180	0.157	0.152	0.149	0.146	0.140	0.146	0.152	0.158
1A3d - Water-borne Navigation	0.04	0.03	0.03	0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04
1A3di - International Water-borne Navigation (International Bunkers)	0.037	0.027	0.033	0.022	0.027	0.035	0.039	0.042	0.042	0.042	0.047	0.042	0.041	0.039	0.039	0.039
1A5 - Non-Specified	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02
1A5b - Mobile	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
1A5bi - Mobile (Aviation Component)	0.032	0.035	0.031	0.031	0.029	0.028	0.026	0.024	0.023	0.022	0.022	0.020	0.025	0.020	0.020	0.020
Summary for Excluded Emissions	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
International and Interstate N2O Emissions	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4

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2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

This section of the inventory is currently under development