

Vermont Energy Sector Life Cycle Assessment
(Updates 1990 – 2022)

June 30, 2025

(Updated September 29, 2025)

Table 1: Total emissions by sector (biogenic carbon excluded).

Emissions Totals (Million metric tonnes CO2e)													
Electricity Supply & Demand (Consumption - based)	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Coal	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Gas	0.047	-	0.018	0.000	0.005	0.016	0.005	0.007	-	-	-	-	-
Oil	0.014	0.013	0.058	0.011	0.040	0.007	0.004	0.004	-	-	-	-	-
Wood (CH4, N2O)	0.003	0.005	0.009	0.014	0.015	0.015	0.015	0.014	0.014	0.012	0.013	0.014	0.012
Residual System Mix	1.027	0.749	0.346	0.616	0.365	0.960	0.898	0.598	0.301	0.240	0.164	0.207	0.224
Wood (CO2)	0.095	0.233	0.304	0.342	0.302	0.304	0.308	0.291	0.302	0.256	0.277	0.302	0.255
Electricity, In-State	1.09	0.77	0.43	0.64	0.43	1.00	0.92	0.62	0.31	0.25	0.18	0.22	0.24
Coal	0.068	0.039	0.011	0.010	0.007	0.006	0.004	0.005	0.004	0.001	0.000	0.000	0.000
Natural Gas	0.013	0.009	0.035	0.047	0.044	0.111	0.099	0.066	0.026	0.030	0.029	0.028	0.028
Oil	0.063	0.040	0.043	0.036	0.022	0.061	0.043	0.026	0.009	0.007	0.006	0.006	0.006
Nuclear	0.098	0.074	0.060	0.043	0.035	0.015	0.014	0.010	0.015	0.013	0.009	0.010	0.010
Wood	0.005	0.009	0.019	0.015	0.019	0.017	0.018	0.017	0.017	0.015	0.015	0.015	0.015
Renewables	-	-	0.000	0.000	0.000	0.009	0.000	0.002	0.004	0.004	0.006	0.005	0.005
Other Hydro	-	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000
Hydro Quebec	0.017	0.015	0.014	0.012	0.013	0.012	0.011	0.012	0.018	0.016	0.016	0.016	0.016
Electricity, Upstream	0.26	0.19	0.18	0.16	0.14	0.23	0.19	0.14	0.09	0.09	0.08	0.08	0.08
Residential/ Commercial/ Industrial (RCI) Fuel Use	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Residential - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Residential - Oil, Propane, & Other Petroleum	1.14	1.15	1.30	1.36	1.08	1.06	1.00	1.08	1.15	1.21	1.05	1.05	1.04
Residential - Natural Gas	0.11	0.12	0.15	0.16	0.17	0.21	0.19	0.19	0.22	0.23	0.21	0.20	0.21
Residential - Wood (CH4, N2O)	0.07	0.07	0.06	0.08	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.09	0.09
Residential - Wood (CO2)	0.83	0.94	0.79	0.95	1.10	1.22	1.25	1.28	1.30	1.30	1.36	1.20	1.20
Commercial - Coal	0.01	0.01	0.00	0.00	-	-	-	-	-	-	-	-	-
Commercial - Oil, Propane, & Other Petroleum	0.42	0.40	0.55	0.52	0.46	0.60	0.48	0.39	0.47	0.45	0.45	0.48	0.48
Commercial - Natural Gas	0.11	0.14	0.14	0.14	0.13	0.32	0.34	0.34	0.40	0.40	0.38	0.41	0.40
Commercial - Wood (CH4, N2O)	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
Commercial - Wood (CO2)	0.03	0.03	0.03	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.02	0.04	0.04
Industrial - Coal	0.00	-	-	-	-	-	-	-	-	-	-	-	-
Industrial - Oil, Propane, & Other Petroleum	0.28	0.23	0.31	0.38	0.24	0.16	0.20	0.22	0.24	0.22	0.25	0.22	0.20
Industrial - Natural Gas	0.10	0.11	0.20	0.14	0.15	0.11	0.11	0.11	0.12	0.12	0.12	0.11	0.11
Industrial - Wood (CH4, N2O)	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
Industrial - Wood (CO2)	0.29	0.28	0.29	0.27	0.16	0.16	0.16	0.16	0.17	0.17	0.13	0.14	0.15
Renewable Natural Gas (RNG)	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.01	0.01
RCI, In-State	2.25	2.24	2.73	2.78	2.31	2.56	2.43	2.45	2.71	2.75	2.57	2.56	2.55
Residential - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Residential - Oil, Propane, & Other Petroleum	0.25	0.25	0.29	0.29	0.23	0.23	0.21	0.23	0.24	0.25	0.22	0.22	0.22
Residential - Natural Gas	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06
Residential - Wood	0.01	0.01	0.01	0.03	0.05	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03
Commercial - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Commercial - Oil, Propane, & Other Petroleum	0.09	0.08	0.12	0.11	0.10	0.13	0.10	0.09	0.10	0.10	0.10	0.10	0.10
Commercial - Natural Gas	0.03	0.04	0.04	0.04	0.03	0.08	0.09	0.09	0.10	0.10	0.11	0.11	0.11
Commercial - Wood	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
Industrial - Coal	0.00	-	-	-	-	-	-	-	-	-	-	-	-
Industrial - Oil, Propane, & Other Petroleum	0.07	0.07	0.09	0.11	0.12	0.10	0.10	0.12	0.11	0.09	0.11	0.10	0.10
Industrial - Natural Gas	0.03	0.03	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Industrial - Wood	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
Renewable Natural Gas (RNG)	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00
RCI, Upstream	0.52	0.52	0.64	0.67	0.62	0.69	0.64	0.66	0.69	0.67	0.66	0.66	0.66
Transportation/Mobile	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Motor Gasoline (Onroad and Nonroad) (CO2)	2.54	2.74	3.00	3.05	2.63	2.48	2.44	2.42	2.44	2.42	2.01	2.19	2.19
Diesel (Onroad and Nonroad) (CO2)	0.72	1.07	0.84	1.02	0.88	0.94	0.86	0.90	0.95	0.96	0.90	0.92	0.90
Hydrocarbon Gas Liquids, Residual Fuel, Natural Gas (CO2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Jet Fuel & Aviation Gasoline (CO2)	0.08	0.06	0.07	0.13	0.07	0.08	0.09	0.06	0.07	0.07	0.06	0.09	0.09
Non-Energy Consumption - Lubricants (CO2)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
All Mobile (CH4, N2O)	0.12	0.13	0.12	0.10	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02
Ethanol - Transportation	-	-	-	0.01	0.17	0.16	0.17	0.17	0.16	0.17	0.14	0.16	0.16
Biodiesel - Transportation	-	-	-	0.00	0.00	0.03	0.05	0.05	0.03	0.02	0.02	0.02	0.02
Transport, In-state	3.48	4.02	4.06	4.33	3.67	3.57	3.46	3.45	3.51	3.51	3.02	3.25	3.22
Motor Gasoline (Onroad and Nonroad)	0.79	0.85	0.95	0.99	0.79	0.76	0.74	0.73	0.72	0.69	0.57	0.58	0.58
Diesel (Onroad and Nonroad)	0.11	0.20	0.13	0.16	0.18	0.19	0.19	0.18	0.18	0.16	0.15	0.15	0.15
Hydrocarbon Gas Liquids, Residual Fuel, Natural Gas	0.00	0.00	-	-	-	0.00	0.00	-	-	-	-	-	-
Jet Fuel & Aviation Gasoline	0.01	0.01	0.01	0.04	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Ethanol - Transportation	-	-	-	0.01	0.15	0.14	0.14	0.14	0.13	0.14	0.11	0.12	0.12
Biodiesel - Transportation	-	-	-	0.00	0.00	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Transport, Upstream	0.92	1.07	1.10	1.20	1.14	1.12	1.11	1.09	1.05	1.02	0.86	0.87	0.87
In-State Total	6.82	7.03	7.22	7.75	6.40	7.13	6.81	6.53	6.54	6.51	5.77	6.03	6.01
Upstream Total	1.70	1.78	1.92	2.03	1.90	2.04	1.94	1.88	1.83	1.78	1.60	1.60	1.60
check:	1.70	1.78	1.92	2.03	1.90	2.04	1.94	1.88	1.83	1.78	1.60	1.60	1.60
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total	8.51	8.81	9.14	9.78	8.30	9.17	8.75	8.41	8.37	8.29	7.37	7.64	7.61

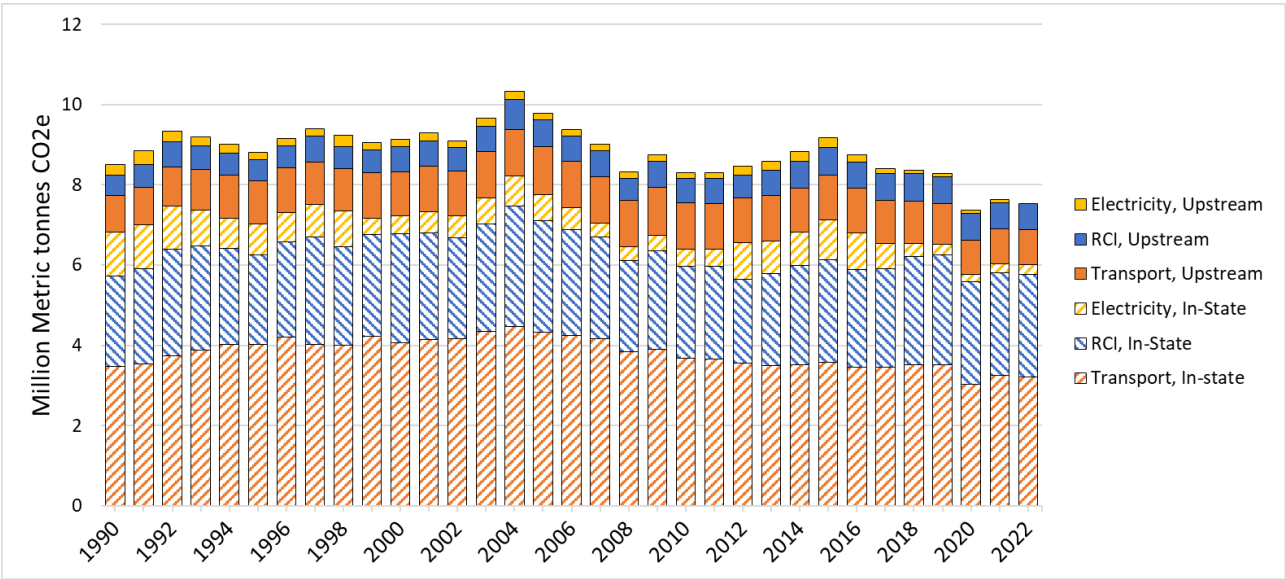


Figure 1: Upstream and In-state emissions by sector (biogenic carbon excluded).

Table 2: Total emissions by sector (biogenic carbon included).

Emissions Totals (Million metric tonnes CO2e)													
Electricity Supply & Demand (Consumption - based)	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Coal	-	-	-	-	-	-	-	-	-	-	-	-	-
Natural Gas	0.047	-	0.018	0.000	0.005	0.016	0.005	0.007	-	-	-	-	-
Oil	0.014	0.013	0.058	0.011	0.040	0.007	0.004	0.004	-	-	-	-	-
Wood (CH4, N2O)	0.003	0.005	0.009	0.014	0.015	0.015	0.015	0.014	0.014	0.012	0.013	0.014	0.012
Residual System Mix	1.027	0.749	0.346	0.616	0.365	0.960	0.898	0.598	0.301	0.240	0.164	0.207	0.224
Wood (CO2)	0.095	0.233	0.304	0.342	0.302	0.304	0.308	0.291	0.302	0.256	0.277	0.302	0.255
Electricity, In-State	1.18	1.00	0.73	0.98	0.73	1.30	1.23	0.91	0.62	0.51	0.45	0.52	0.49
Coal	0.068	0.039	0.011	0.010	0.007	0.006	0.004	0.005	0.004	0.001	0.000	0.000	0.000
Natural Gas	0.013	0.009	0.035	0.047	0.044	0.111	0.099	0.066	0.026	0.030	0.029	0.028	0.028
Oil	0.063	0.040	0.043	0.036	0.022	0.061	0.043	0.026	0.009	0.007	0.006	0.006	0.006
Nuclear	0.098	0.074	0.060	0.043	0.035	0.015	0.014	0.010	0.015	0.013	0.009	0.010	0.010
Wood	0.005	0.009	0.019	0.015	0.019	0.017	0.018	0.017	0.017	0.015	0.015	0.015	0.015
Renewables	-	-	0.000	0.000	0.000	0.009	0.000	0.002	0.004	0.004	0.006	0.005	0.005
Other Hydro	-	0.004	0.004	0.005	0.002	0.003	0.003	0.005	0.002	0.003	0.004	0.004	0.004
Hydro Quebec	0.051	0.046	0.043	0.036	0.032	0.036	0.032	0.037	0.055	0.049	0.047	0.047	0.047
Electricity, Upstream	0.30	0.22	0.21	0.19	0.17	0.26	0.21	0.17	0.13	0.12	0.12	0.11	0.11
Residential/ Commercial/ Industrial (RCI) Fuel Use	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Residential - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Residential - Oil, Propane, & Other Petroleum	1.14	1.15	1.30	1.36	1.08	1.06	1.00	1.08	1.15	1.21	1.05	1.05	1.04
Residential - Natural Gas	0.11	0.12	0.15	0.16	0.17	0.21	0.19	0.19	0.22	0.23	0.21	0.20	0.21
Residential - Wood (CH4, N2O)	0.07	0.07	0.06	0.08	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.09	0.09
Residential - Wood (CO2)	0.83	0.94	0.79	0.95	1.10	1.22	1.25	1.28	1.30	1.30	1.36	1.20	1.20
Commercial - Coal	0.01	0.01	0.00	0.00	-	-	-	-	-	-	-	-	-
Commercial - Oil, Propane, & Other Petroleum	0.42	0.40	0.55	0.52	0.46	0.60	0.48	0.39	0.47	0.45	0.45	0.48	0.48
Commercial - Natural Gas	0.11	0.14	0.14	0.14	0.13	0.32	0.34	0.34	0.40	0.40	0.38	0.41	0.40
Commercial - Wood (CH4, N2O)	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
Commercial - Wood (CO2)	0.03	0.03	0.03	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.02	0.04	0.04
Industrial - Coal	0.00	-	-	-	-	-	-	-	-	-	-	-	-
Industrial - Oil, Propane, & Other Petroleum	0.28	0.23	0.31	0.38	0.24	0.16	0.20	0.22	0.24	0.22	0.25	0.22	0.20
Industrial - Natural Gas	0.10	0.11	0.20	0.14	0.15	0.11	0.11	0.11	0.12	0.12	0.12	0.11	0.11
Industrial - Wood (CH4, N2O)	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
Industrial - Wood (CO2)	0.29	0.28	0.29	0.27	0.16	0.16	0.16	0.16	0.17	0.17	0.13	0.14	0.15
Renewable Natural Gas (RNG)	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.01	0.01
RCI, In-State	3.40	3.48	3.84	4.01	3.59	3.99	3.87	3.92	4.22	4.26	4.09	3.95	3.95
Residential - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Residential - Oil, Propane, & Other Petroleum	0.25	0.25	0.29	0.29	0.23	0.23	0.21	0.23	0.24	0.25	0.22	0.22	0.22
Residential - Natural Gas	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06
Residential - Wood	0.01	0.01	0.01	0.03	0.05	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.03
Commercial - Coal	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
Commercial - Oil, Propane, & Other Petroleum	0.09	0.08	0.12	0.11	0.10	0.13	0.10	0.09	0.10	0.10	0.10	0.10	0.10
Commercial - Natural Gas	0.03	0.04	0.04	0.04	0.03	0.08	0.09	0.09	0.10	0.10	0.11	0.11	0.11
Commercial - Wood	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
Industrial - Coal	0.00	-	-	-	-	-	-	-	-	-	-	-	-
Industrial - Oil, Propane, & Other Petroleum	0.07	0.07	0.09	0.11	0.12	0.10	0.10	0.12	0.11	0.09	0.11	0.10	0.10
Industrial - Natural Gas	0.03	0.03	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Industrial - Wood	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
Renewable Natural Gas (RNG)	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00
RCI, Upstream	0.52	0.52	0.64	0.67	0.62	0.69	0.64	0.66	0.69	0.67	0.66	0.66	0.66
Transportation/Mobile	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019	2020	2021	2022
Motor Gasoline (Onroad and Nonroad) (CO2)	2.54	2.74	3.00	3.05	2.63	2.48	2.44	2.42	2.44	2.42	2.01	2.19	2.19
Diesel (Onroad and Nonroad) (CO2)	0.72	1.07	0.84	1.02	0.88	0.94	0.86	0.90	0.95	0.96	0.90	0.92	0.90
Hydrocarbon Gas Liquids, Residual Fuel, Natural Gas (CO2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Jet Fuel & Aviation Gasoline (CO2)	0.08	0.06	0.07	0.13	0.07	0.08	0.09	0.06	0.07	0.07	0.06	0.09	0.09
Non-Energy Consumption - Lubricants (CO2)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
All Mobile (CH4, N2O)	0.12	0.13	0.12	0.10	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02
Ethanol - Transportation	-	-	-	0.01	0.17	0.16	0.17	0.17	0.16	0.17	0.14	0.16	0.16
Biodiesel - Transportation	-	-	-	0.00	0.00	0.03	0.05	0.05	0.03	0.02	0.02	0.02	0.02
Transport, In-state	3.48	4.02	4.06	4.34	3.84	3.76	3.68	3.68	3.70	3.70	3.19	3.43	3.39
Motor Gasoline (Onroad and Nonroad)	0.79	0.85	0.95	0.99	0.79	0.76	0.74	0.73	0.72	0.69	0.57	0.58	0.58
Diesel (Onroad and Nonroad)	0.11	0.20	0.13	0.16	0.18	0.19	0.19	0.18	0.18	0.16	0.15	0.15	0.15
Hydrocarbon Gas Liquids, Residual Fuel, Natural Gas	0.00	0.00	-	-	-	0.00	0.00	-	-	-	-	-	-
Jet Fuel & Aviation Gasoline	0.01	0.01	0.01	0.04	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Ethanol - Transportation	-	-	-	0.01	0.15	0.14	0.14	0.14	0.13	0.14	0.11	0.12	0.12
Biodiesel - Transportation	-	-	-	0.00	0.00	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Transport, Upstream	0.92	1.07	1.10	1.20	1.14	1.12	1.11	1.09	1.05	1.02	0.86	0.87	0.87
In-State Total	8.06	8.50	8.63	9.34	8.15	9.05	8.78	8.51	8.55	8.47	7.73	7.90	7.83
Upstream Total	1.73	1.81	1.95	2.06	1.93	2.07	1.97	1.91	1.87	1.81	1.63	1.64	1.64
check:	1.73	1.81	1.95	2.06	1.93	2.07	1.97	1.91	1.87	1.81	1.63	1.64	1.64
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Total	9.79	10.32	10.58	11.40	10.08	11.12	10.75	10.43	10.42	10.28	9.36	9.54	9.47

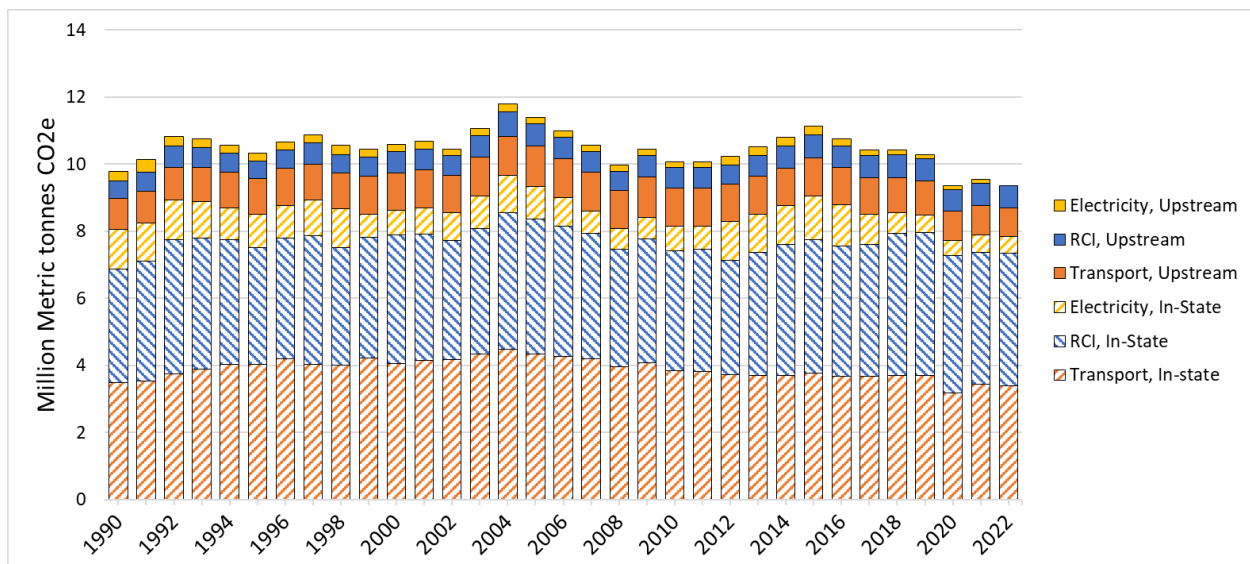


Figure 2: Upstream and In-state emissions by sector (biogenic carbon included).