

Greenhouse Gas Reporting



What are the Driving Forces?



Economic



Government

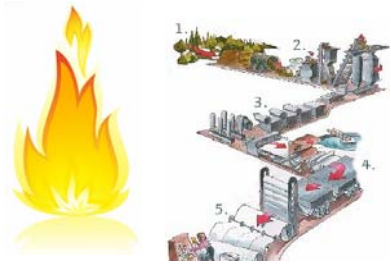


Public Pressure

Greenhouse Gases

- Greenhouse gases covered by the Kyoto Protocol:
 - Derived:
 - Carbon Dioxide (CO₂)
 - Methane (CH₄)
 - Nitrous Oxide (N₂O)
 - Directly Measured:
 - Hydrofluorocarbons (HFCs)
 - Perfluorocarbons (PFCs)
 - Sulphur Hexafluoride (SF₆)

Emission Sources



Stationary Sources



Mobile Sources



Purchased Energy

Industry Reporting Standards

- ISO 14000
- Environment Canada
- The Climate Registry
- Greenhouse Gas (GHG) Protocol Initiative
- EPA Climate Leaders
- California Climate Action Registry

Greenhouse Gas (GHG) Reporting

Reporting Categories:

- Scope 1 (Direct): Emitted directly by the reporting entity
- Scope 2 (Indirect): Purchased electricity and steam
- Scope 3 (Indirect): All other indirect emissions (ex: employee business travel)

Greenhouse Gas (GHG) Reporting

- Equivalent Carbon Dioxide (CO₂e):
 - The global warming potential (GWP) for a particular GHG mixture and concentration

| Species | Chemical formula | Lifetime (years) | Global Warming Potential (Time Horizon) | | |
|-----------------|------------------|------------------|---|-----------|-----------|
| | | | 20 years | 100 years | 500 years |
| CO ₂ | CO ₂ | variable § | 1 | 1 | 1 |
| Methane * | CH ₄ | 12±3 | 56 | 21 | 6.5 |
| Nitrous oxide | N ₂ O | 120 | 280 | 310 | 170 |

- The GWP values are used to create emissions factors for different fuels

Greenhouse Gas (GHG) Emissions Factors

- CO₂ emissions factors used to calculate CO₂e
- Emissions factors are available for Scope 1, 2, and 3 emission types
 - Canadian GHG Challenge Registry
 - Environment Canada
 - Intergovernmental Panel on Climate Change (IPCC)
 - Chicago Climate Exchange

Scope 1: Emissions Factors

| Table 1 Stationary Emission Sources | | | | | | | | |
|---|---|---------------------------------------|---|---|---------------------------------------|--|---|--|
| Fuel Type | Metric Tons CO ₂ per Gigajoule | Metric Tons CO ₂ per mmBTU | Metric Tons CO ₂ per Cubic Meter | Metric Tons CO ₂ per 1000 Cubic Feet | Metric Tons CO ₂ per Liter | Metric Tons CO ₂ per Gallon | Metric Tons CO ₂ per Metric Ton Fuel | Metric Tons CO ₂ per Short Ton Fuel |
| Natural Gas | 0.050 | 0.053 | 0.002 | 0.055 | - | - | - | - |
| Propane | 0.060 | 0.063 | - | - | 0.002 | 0.006 | - | - |
| LPG | 0.060 | 0.063 | - | - | 0.002 | 0.006 | - | - |
| Kerosene | 0.069 | 0.072 | - | - | 0.003 | 0.010 | - | - |
| Distillate Fuel (#1, #2, #4 heating oil & Diesel) | 0.069 | 0.073 | - | - | 0.003 | 0.010 | - | - |
| Residual Fuel (#5 and #6 heating oil) | 0.075 | 0.079 | - | - | 0.003 | 0.012 | - | - |
| Anthracite | 0.098 | 0.103 | - | - | - | - | 1.930 | 1.750 |
| Bituminous Coal | 0.088 | 0.093 | - | - | - | - | 2.470 | 2.240 |
| Sub-Bituminous Coal | 0.091 | 0.096 | - | - | - | - | 1.860 | 1.690 |
| Lignite | 0.093 | 0.098 | - | - | - | - | 1.400 | 1.270 |
| Peat | 0.101 | 0.106 | - | - | - | - | - | - |
| Petroleum Coke | 0.097 | 0.102 | - | - | 0.004 | 0.015 | 3.380 | 3.070 |

Scope 2: Emissions Factors

Table A9-7: Electricity Generation and GHG Emission Details for Ontario¹

| Ontario¹ | | | | | | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Sources | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Greenhouse Gas Intensity^b <i>g CO₂ eq/kWh</i> | | | | | | | | | | | | | | | | |
| Coal | 946 | 862 | 889 | 806 | 808 | 882 | 930 | 777 | 821 | 846 | 894 | 919 | 920 | 1 084 | 951 | 1 006 |
| Refined Petroleum Products ² | 846 | 804 | 896 | 183 | 1 100 | 1 058 | 977 | 1 255 | 1 368 | 772 | 829 | 858 | 790 | 656 | 918 | 832 |
| Natural Gas | 563 | 804 | 633 | 1 446 | 540 | 443 | 431 | 547 | 425 | 443 | 436 | 458 | 449 | 375 | 457 | 432 |
| Nuclear | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Hydro ³ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Biomass ⁴ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Renewables ⁵ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Others ⁶ | - | - | - | - | - | 32 | 13 | 174 | 63 | 79 | 41 | 0 | 86 | 30 | 0 | 0 |
| Overall Total | 206 | 196 | 197 | 127 | 103 | 119 | 135 | 172 | 232 | 237 | 277 | 264 | 260 | 273 | 197 | 220 |

Scope 3: Emissions Factors

| Table 2 Mobile Emission Sources | | | | |
|--|---|--|---|---|
| Fuel Type | Metric Tons CO₂ per Liter | Metric Tons CO₂ per Gallon | Metric Tons CO₂ per Cubic Meter | Metric Tons CO₂ per Therm |
| Gasoline | 0.0024 | 0.0092 | - | - |
| Diesel | 0.0027 | 0.0104 | - | - |
| Jet Fuel | - | 0.0100 | - | - |
| Aviation Gasoline | 0.0024 | 0.0090 | - | - |
| LPG | 0.0016 | 0.0060 | - | - |
| CNG | - | - | 0.0022 | 0.0054 |

Example Reports



Example Reports

