## GHG Emissions

| | Unit | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|
| **Gross Emissions by GHG [1]** | | | | | | |
| **GHG Gross Emissions** | **$tCO_2e$** | **13.772.344** | **12.914.799** | **12.591.980** | **12.414.647** | **12.567.266** |
| $CO_2$ Gross Emissions | $tCO_2e$ | 11.873.835 | 11.066.365 | 10.829.938 | 10.848.464 | 11.090.718 |
| $CH_4$ Gross Emissions [2,3] | $tCO_2e$ | 1.863.425 | 1.814.744 | 1.728.682 | 1.532.671 | 1.444.586 |
| $N_2O$ Gross Emissions [2] | $tCO_2e$ | 35.084 | 33.690 | 33.360 | 33.512 | 31.963 |
| | | | | | | |
| **Gross Emissions by Scope** | | | | | | |
| **Scope 1** | **$tCO_2e$** | **13.102.444** | **12.050.435** | **12.009.631** | **11.912.128** | **11.879.231** |
| Combustion | | 8.810.886 | 8.315.995 | 8.245.421 | 8.277.192 | 8.354.629 |
| Fugitives | | 243.138 | 226.489 | 184.587 | 111.547 | 114.134 |
| Mobile combustion | | 53 | 266 | 280 | 240 | 148 |
| Flaring | | 1.197.861 | 947.931 | 939.352 | 954.307 | 819.667 |
| Venting | | 2.850.506 | 2.559.753 | 2.639.992 | 2.568.843 | 2.590.653 |
| **Scope 2** | **$tCO_2e$** | **669.901** | **864.364** | **582.349** | **502.519** | **688.035** |
| Purchased Electricity [4] | | 669.901 | 864.364 | 582.349 | 502.519 | 688.035 |
| Market-based | | 669.901 | 864.364 | 582.349 | 502.519 | 688.035 |
| Location-based | | 385.716 | 511.789 | 307.787 | 303.117 | 513.535 |
| | | | | | | |
| **Scope 3 [5]** | **$tCO_2e$** | **143.421.493** | **138.435.785** | **140.724.782** | **150.820.734** | **155.520.125** |
| Category 11 - Use of sold products | | 134.123.383 | 130.585.168 | 131.704.841 | 140.745.713 | 145.998.269 |
| Category 1 - Purchased good and services | | 7.309.083 | 6.179.764 | 7.463.693 | 8.622.970 | 8.470.846 |
| Other categories | | 1.989.028 | 1.670.852 | 1.556.248 | 1.452.050 | 1.051.010 |
| | | | | | | |
| **Gross GHG Emissions by Segment** | | | | | | |
| **Upstream Gross Emissions** | **$tCO_2e$** | **8.278.094** | **8.253.929** | **7.624.584** | **7.240.280** | **6.933.817** |
| Scope 1 | | 7.609.202 | 7.389.991 | 7.042.839 | 6.738.598 | 6.248.409 |
| Scope 2 | | 668.891 | 863.938 | 581.745 | 501.682 | 685.407 |
| | | | | | | |
| Carbon Intensity | $kgCO_2e/BOE$ [6] | 36,10 | 38,51 | 37,58 | 35,74 | 33,33 |
| | | | | | | |
| **Downstream Gross Emissions** | **$tCO_2e$** | **5.494.251** | **4.660.870** | **4.967.396** | **5.174.367** | **5.633.450** |
| Scope 1 | | 5.493.241 | 4.660.444 | 4.966.792 | 5.173.530 | 5.630.822 |
| Scope 2 | | 1.009 | 426 | 604 | 837 | 2.628 |
| | | | | | | |
| Carbon Intensity | $kgCO_2e/BOE$ [6] | 40,29 | 39,82 | 38,48 | 39,65 | 36,86 |

## Notas

General note:

Ecopetrol's GHG emissions inventory, for Scopes 1, 2 and 3, is structured under the operational control approach including the operation of Cartagena Refinery.

(1). Total GHG emissions for scopes 1 and 2.

(2). The global warming potentials used in the inventory are those reported in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC - AR5, 2014).

(3). Methane emissions are reported in metric tonnes of equivalent carbon dioxide, using the global warming potentilals of AR5. In tonnes of methane, the emissions are: 66.551, 64.812, 61.739, 54.738 y 51.592 for 2019, 2020, 2021, 2022 y 2023, respectively.

(4). Scope 2 emissions are reported with market-based approach, in which are included the generated emissions due to power purchased from the National Interconnected System (SIN, for its Spanish acronym) and emissions generated by local generation centres. While Ecopetrol calculates Scope 2 emissions by the location-based method, which is estimated using the SIN emission factor for all purchased power, Ecopetrol decided to report by the market-based method because it provides a higher result and better describes the operational reality. It should be stressed that the purchase of electricity from local suppliers is favoured for reasons such as: the location of facilities in areas with a deficiency of national electrification, the low reliability of the system or in some cases the use of gas within the framework of the decarbonisation plan.

(5). Since 2021, Ecopetrol estimates its Scope 3 emissions inventory, for each of the categories recommended by the GHG Protocol that apply to the business. In the five estimated years, categories 11 and 1 have corresponded to more than 99% of the total Scope 3 emissions.

(6). Upstream carbon intensity is estimated by dividing Scope 1 and 2 emissions generated in upstream by net production, which includes crude oil, gas, and white products, expressed in terms of barrels of oil equivalent -BOE-. Downstream carbon intensity is estimated by dividing Scope 1 and 2 emissions generated in refining and petrochemicals segments by the annual inflows (load) to the Barrancabermeja and Cartagena Refineries, expressed in terms of barrels of oil equivalent -BOE-. Both the intensities are calculated under the organizational limit of operational control.