

Grid Emission Factor (GEF) in Malaysia

GEF is the generation weighted-average greenhouse gas (GHG) emission per unit of electricity generation of all generating power plants serving the electricity grid (GHG intensity of the grid electricity), including RE power plants that may generate Renewable Energy Certificate (REC).

| | Grid Emission factor (Gg CO₂e/GWh) | | | | |
|-------------------|--|--------------|--------------|--------------|--------------|
| | 2017 | 2018 | 2019 | 2020 | 2021 |
| Peninsular | 0.776 | 0.807 | 0.780 | 0.832 | 0.758 |
| Sabah | 0.513 | 0.520 | 0.527 | 0.488 | 0.425 |
| Sarawak | 0.213 | 0.193 | 0.222 | 0.203 | 0.198 |

Sources:

1. Grid Emission Factor for Peninsular and Sabah is calculated by the Energy Commission.
2. Data for Sarawak's Grid Emission Factor for Sarawak is from Sarawak Energy Berhad (SEB) Annual and Sustainability Reports.

Notes:

1. The GHG emission and Net Electricity Generation values used is inclusive of those from electricity generators connected to the grid that may produce REC. As such, the GEF may not reflect the GHG intensity of electricity unclaimed via REC or other contractual instruments.
2. Net Electricity Generation = Gross Electricity Generation – Electricity Own Use
3. Data for Peninsular and Sabah's Fuel Consumption, Electricity Generation and Electricity Own Use are sourced from the National Energy Balance (NEB) 2017, 2018 , 2019 , 2020 and 2021.
4. For this calculation, fuel consumption and electricity generation from Main Activity Producer only is considered.
5. GHG Emission is calculated using Tier 1 Emission Factor.

Year : 2017

Peninsular Malaysia

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Coal | 731,154 | 70,124,569,692 | 70,125 | 119,372 | 0.776 |
| Natural Gas | 394,844 | 22,172,390,344 | 22,172 | | |
| Diesel | 1,381 | 102,661,779 | 103 | | |
| Fuel Oil | 2,636 | 204,689,204 | 205 | | |
| Total RE | | | | | |
| TOTAL | 1,130,015 | 92,604,311,018 | 92,604 | | |

Sabah

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Natural Gas | 47,656 | 2,676,099,672 | 2,676 | 6,037 | 0.513 |
| Diesel | 4,058 | 301,763,410 | 302 | | |
| Fuel Oil | 1,506 | 116,965,260 | 117 | | |
| Total RE | | | | | |
| TOTAL | 53,220 | 3,094,828,342 | 3,095 | | |

Year : 2018

Peninsular Malaysia

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Coal | 801,445 | 76,926,832,153 | 76,927 | 122,017 | 0.807 |
| Natural Gas | 380,828 | 21,385,302,205 | 21,385 | | |
| Diesel | 1,046 | 77,774,075 | 78 | | |
| Fuel Oil | 711 | 55,233,595 | 55 | | |
| Total RE | | | | | |
| TOTAL | 1,184,030 | 98,445,142,028 | 98,445 | | |

Sabah

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Natural Gas | 52,091 | 2,925,148,456 | 2,925 | 6,275 | 0.520 |
| Diesel | 4,519 | 335,984,003 | 336 | | |
| Fuel Oil | 0 | 4,874 | 0 | | |
| Total RE | | | | | |
| TOTAL | 56,610 | 3,261,137,333 | 3,261 | | |

Year : 2019

Peninsular Malaysia

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Coal | 739,564 | 70,974,448,427 | 70,974 | 126,153 | 0.780 |
| Natural Gas | 470,031 | 26,394,472,091 | 26,394 | | |
| Diesel | 13,682 | 1,017,284,898 | 1,017 | | |
| Fuel Oil | 795 | 61,731,665 | 62 | | |
| Total RE | | | | | |
| TOTAL | 1,224,071 | 98,447,937,081 | 98,448 | | |

Sabah

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Natural Gas | 52,718 | 2,960,391,208 | 2,960 | 6,432 | 0.527 |
| Diesel | 5,732 | 426,201,930 | 426 | | |
| Fuel Oil | - | - | - | | |
| Total RE | | | | | |
| TOTAL | 58,450 | 3,386,593,138 | 3,387 | | |

Year : 2020

Peninsular Malaysia

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Coal | 910,355 | 87,500,622,780 | 87,501 | 128,098 | 0.832 |
| Natural Gas | 337,732 | 18,965,299,868 | 18,965 | | |
| Diesel | 544 | 40,442,519 | 40 | | |
| Fuel Oil | 502 | 38,988,420 | 39 | | |
| Total RE | | | | | |
| TOTAL | 1,249,133 | 106,545,353,587 | 106,545 | | |

Sabah

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Natural Gas | 49,664 | 2,788,876,480 | 2,789 | 6,533 | 0.488 |
| Diesel | 5,356 | 398,203,263 | 398 | | |
| Fuel Oil | - | - | - | | |
| Total RE | | | | | |
| TOTAL | 58,450 | 3,386,593,138 | 3,387 | | |

Year : 2021

Peninsular Malaysia

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Coal | 822,909 | 79,163,396,937 | 79,163 | 129,024 | 0.758 |
| Natural Gas | 328,611 | 18,453,105,199 | 18,453 | | |
| Diesel | 2,427 | 180,435,854 | 180 | | |
| Fuel Oil | 335 | 25,992,280 | 26 | | |
| Total RE | | | | | |
| TOTAL | 1,154,282 | 97,822,930,269 | 97,823 | | |

Sabah

| Fuel Type | Fuel consumption (TJ) | GHG Emission (kg CO2e) | GHG Emission (Gg CO2e) | Net Electricity Generation (GWh) | GEF (Gg CO2e/GWh) |
|--------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------|
| Natural Gas | 41,003 | 2,302,526,495 | 2,303 | 6,567 | 0.425 |
| Diesel | 6,527 | 485,310,227 | 485 | | |
| Fuel Oil | - | - | - | | |
| Total RE | | | | | |
| TOTAL | 47,530 | 2,787,836,722 | 2,788 | | |