

## **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).

Year	Grid Emission factor (Gg CO2e/GWh)		
	Peninsular	Sabah	Sarawak
2022	0.774	0.525	0.199
2021	0.757	0.524	0.198
2020	0.821	0.503	0.203
2019	0.753	0.548	0.222
2018	0.797	0.500	0.193
2017	0.767	0.530	0.213

### **Sources:**

1. Grid Emission Factor for Peninsular and Sabah is calculated by the Energy Commission.
2. Data for Sarawak's Grid Emission Factor 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).
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.
6. Grid Emission Factors (2017-2021) for Peninsular and Sabah were recalculated to reflect the latest updated data.

**Year: 2022**

**Peninsular Malaysia**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Coal	850,231	81,657,985,161	81,658	136,088	0.774
Natural Gas	411,873	23,128,520,132	23,129		
Diesel	5,690	423,029,512	423		
Fuel Oil	2,427	188,417,821	188		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,270,221</b>	<b>105,397,952,627</b>	<b>105,398</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	54,727	3,073,151,598	3,073	6,763	0.525
Diesel	6,402	475,908,201	476		
Fuel Oil	0	0	0		
Total RE	-	-	-		
<b>TOTAL</b>	<b>61,128</b>	<b>3,549,059,800</b>	<b>3,549</b>		

**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	822,903	79,052,874,424	79,053	129,070	0.757
Natural Gas	328,597	18,452,208,536	18,452		
Diesel	2,410	179,162,974	179		
Fuel Oil	331	25,706,683	26		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,154,242</b>	<b>97,709,952,617</b>	<b>97,710</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	52,502	2,948,237,741	2,948	6,551	0.524
Diesel	6,530	485,444,999	485		
Fuel Oil	0	0	0		
Total RE	-	-	-		
<b>TOTAL</b>	<b>59,032</b>	<b>3,433,682,741</b>	<b>3,434</b>		

**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	910,376	87,397,690,770	87,398	128,098	<b>0.821</b>
Natural Gas	315,848	17,736,264,594	17,736		
Diesel	558	41,486,522	41		
Fuel Oil	499	38,759,727	39		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,227,281</b>	<b>105,214,201,614</b>	<b>105,214</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	51,465	2,890,012,324	2,890	6,532	<b>0.503</b>
Diesel	5,358	398,299,672	398		
Fuel Oil	0	0	0		
Total RE	-	-	-		
<b>TOTAL</b>	<b>56,823</b>	<b>3,288,311,996</b>	<b>3,288</b>		

**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	739,575	70,903,297,051	70,903	129,339	<b>0.753</b>
Natural Gas	453,177	25,447,945,917	25,448		
Diesel	13,698	1,018,366,120	1,018		
Fuel Oil	789	61,291,260	61		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,207,240</b>	<b>97,430,900,349</b>	<b>97,431</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	56,787	3,188,838,538	3,189	6,600	<b>0.548</b>
Diesel	5,723	425,456,415	425		
Fuel Oil	0	0	0		
Total RE	-	-	-		
<b>TOTAL</b>	<b>62,510</b>	<b>3,614,294,953</b>	<b>3,614</b>		

**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	801,453	76,886,856,747	76,887	123,902	<b>0.797</b>
Natural Gas	387,501	21,759,941,037	21,760		
Diesel	1,064	79,127,929	79		
Fuel Oil	713	55,326,160	55		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,190,732</b>	<b>98,781,251,872</b>	<b>98,781</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	51,722	2,904,396,620	2,904	6,487	<b>0.500</b>
Diesel	4,526	336,440,789	336		
Fuel Oil	0	0	0		
Total RE	-	-	-		
<b>TOTAL</b>	<b>56,247</b>	<b>3,240,837,408</b>	<b>3,241</b>		

**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	731,160	70,116,115,746	70,116	121,844	<b>0.767</b>
Natural Gas	408,814	22,956,733,538	22,957		
Diesel	1,673	124,364,319	124		
Fuel Oil	2,632	204,386,244	204		
Total RE	-	-	-		
<b>TOTAL</b>	<b>1,144,279</b>	<b>93,401,599,846</b>	<b>93,402</b>		

**Sabah**

Fuel Type	Fuel consumption (TJ)	GHG Emission (kg CO2e)	GHG Emission (Gg CO2e)	Net Electricity Generation (GWh)	GEF (Gg CO2e/GWh)
Natural Gas	51,744	2,905,656,691	2,906	6,237	<b>0.530</b>
Diesel	3,774	280,548,691	281		
Fuel Oil	1,519	117,927,672	118		
Total RE	-	-	-		
<b>TOTAL</b>	<b>57,037</b>	<b>3,304,133,054</b>	<b>3,304</b>		