

## Global Warming Potential (GWP)

**GWPs** are used to convert emissions of non-CO<sub>2</sub> gases into their CO<sub>2</sub> equivalents (CO<sub>2</sub> Es). The CO<sub>2</sub>E of a non- CO<sub>2</sub> gas is calculated by multiplying the mass of the emissions of the non- CO<sub>2</sub> gas by its GWP. The International Panel on Climate Change (IPCC) has presented these GWPs and regularly updates them in new assessments. The chart below shows the original GWPs (assigned in 1990) and the most recent GWPs (assigned in 1996) for the most important greenhouse gases (See Table 1).

**Table1: The International Panel on Climate Change (IPCC) greenhouse gases GWP data.**

<b>GAS</b>	<b>GWP 1990</b>	<b>GWP 1996</b>
Carbon Dioxide	1	1
Methane	22	21
Nitrous Oxide	270	310
HFC-134a	1,200	1,300
HFC-23	10,000	11,700
HFC-152a	150	140
HCF-125	NA*	2,800
PFCs**	5,400	7,850
SF6	NA*	23,900

\* Not Applicable. GWP was not yet estimated for this gas.

\*\*This figure is an average GWP for the two PFCs, CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub>

### Example:

1g of CH<sub>4</sub> = 21g of CO<sub>2</sub>  
1g of N<sub>2</sub>O = 310g of CO<sub>2</sub>

A Power Plant gas emission per month is around 227,996 tons CO<sub>2</sub>, 18 tons N<sub>2</sub>O and 34 tons CH<sub>4</sub> per month. What will the GWP be in CO<sub>2</sub> equivalent?

$$\begin{aligned}\text{GWP CO}_2\text{E} &= \text{CO}_2 + \text{N}_2\text{O} * 310 + \text{CH}_4 * 21 \\ &= 227,996 + 18 * 310 + 34 * 21 \\ &= 234,290 \text{ tons/month}\end{aligned}$$

$$\text{CO}_2\text{E in million tons} = 234,290 / 1000000 = 0.23429$$

The total GWP for the power plant in CO<sub>2</sub> equivalent in million tons = 0.23