

### **Box 2.2. Definitions of radiative forcing and global warming potential (GWP)**

#### ***Radiative forcing***

- The radiative forcing quantifies the ability of a gas to perturb the Earth's radiative energy budget.
- *Definition:* The radiative forcing of the surface-troposphere system due to the perturbation in or the introduction of gas is the change in net (down minus up) irradiance (solar plus longwave, in  $\text{W m}^{-2}$ ) at the tropopause, after allowing for stratospheric temperatures to re-adjust to radiative equilibrium, but with surface and tropospheric temperatures and other state variables (clouds, water) held fixed at the unperturbed values.

#### ***Global warming potential (GWP)***

- The global warming potential is a relative index used to compare the climate impact of an emitted greenhouse gas, relative to an equal amount of carbon dioxide.
- *Definition:* The global warming potential is the ratio of the time-integrated radiative forcing from a pulse emission of 1 kg of a substance, relative to that of 1 kg of carbon dioxide, over a fixed horizon period.