

Package: co2e (via r-universe)

October 11, 2026

Title Global Warming Potential Lookups and CO2-Equivalent Conversion

Version 0.1.0

Description Provides curated Global Warming Potential (GWP) values from IPCC Assessment Reports 4 through 6, gas name standardization across documented naming variants (IUPAC/common names, per-report naming changes, and EPA/data.gov naming), and CO2-equivalent conversion utilities. Values are drawn from official IPCC source tables, with corrections applied for two substances where the published table is known to contain errors; see the package vignette for details and source-by-source provenance notes.

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Encoding UTF-8

Roxygen list(markdown = TRUE)

Imports dplyr, tibble, stringr

Suggests tidyr, readr, testthat (>= 3.0.0), knitr, rmarkdown, spelling

Config/testthat/edition 3

Depends R (>= 4.1.0)

LazyData true

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VignetteBuilder knitr

Language en-US

URL <https://github.com/joewcorra/co2e>

BugReports <https://github.com/joewcorra/co2e/issues>

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as_co2e	<i>Convert a mass of greenhouse gas to CO2-equivalent</i>
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Description

Convert a mass of greenhouse gas to CO2-equivalent

Usage

```
as_co2e(value, gas, ar = "AR6", horizon = 100)
```

Arguments

- value Numeric vector of gas quantities (any consistent mass unit).
- gas Character vector of gas identifiers, recycled against value.
- ar Assessment report: one of "AR4", "AR5", "AR6".
- horizon Time horizon in years: one of 20, 100, 500.

Value

A numeric vector of CO2-equivalent quantities, in the same units as value.

Examples

```
as_co2e(10, gas = "HFC-134a", ar = "AR6", horizon = 100)
```

gas_synonyms	<i>Gas name synonyms</i>
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Description

Alternate names each gas is known by, for use with `standardize_gas()`.

Usage

`gas_synonyms`

Format

A tibble with columns:

- gas_id** Canonical gas identifier, joins to `gases$gas_id`.
- synonym** An alternate name.
- synonym_type** One of "common_name", "ar_naming_variant", "formatting_variant", "epa_name".
- note** Free-text provenance/context for this synonym.

Source

Documented naming variants from GHG Protocol Global Warming Potential Values (August 2024) footnotes, IPCC AR6 Table 7.SM.7, and EPA/data.gov naming.

gases	<i>Gas identity reference table</i>
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Description

One row per substance covered by the package.

Usage

`gases`

Format

A tibble with columns:

- gas_id** Canonical gas identifier.
- formula** Chemical formula.
- cas** CAS Registry Number.
- gas_group** One of "HFC", "HCFC", "CFC", "halon", "PFC", "other".
- is_blend** Logical; always FALSE in the current release (blends are not yet in scope).

Source

Formula and CAS from IPCC AR6 WGI Chapter 7 Supplementary Material, Table 7.SM.7.

gwp	<i>Look up a greenhouse gas's Global Warming Potential</i>
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Description

Returns the GWP for one or more gases from a given IPCC Assessment Report and time horizon. Vectorized over gas.

Usage

```
gwp(gas, ar = "AR6", horizon = 100)
```

Arguments

gas	Character vector of gas identifiers (e.g. "HFC-134a"). Must match gases\$gas_id exactly - use standardize_gas() first if your input data uses non-canonical names.
ar	Assessment report: one of "AR4", "AR5", "AR6".
horizon	Time horizon in years: one of 20, 100, 500.

Value

A numeric vector the same length as gas. Returns NA with a warning for any gas/AR/horizon combination not present in gwp_values.

Examples

```
gwp("HFC-134a", ar = "AR6", horizon = 100)
gwp(c("CO2", "CH4", "HFC-32"), ar = "AR5", horizon = 100)
```

gwp_compare	<i>Compare a gas's GWP across IPCC Assessment Reports</i>
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Description

Compare a gas's GWP across IPCC Assessment Reports

Usage

```
gwp_compare(gas, horizon = 100)
```

Arguments

- gas A single gas identifier (e.g. "HFC-134a").
- horizon Time horizon in years: one of 20, 100, 500. Defaults to 100.

Value

A tibble with one row per assessment report that reports a value for gas at the given horizon, columns ar and gwp.

Examples

```
gwp_compare("CFC-11")
```

gwp_values	<i>Global Warming Potential values by gas, assessment report, and horizon</i>
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Description

Long-format lookup table: one row per gas x IPCC Assessment Report x time horizon.

Usage

```
gwp_values
```

Format

A tibble with columns:

- gas_id** Canonical gas identifier, joins to gases\$gas_id.
- ar** Assessment report: "AR4", "AR5", or "AR6".
- horizon** Time horizon in years: 20, 100, or 500.
- gwp** Global Warming Potential (dimensionless, relative to CO2).
- source** Citation for this row's value.

Source

EPA/data.gov IPCC AR4-AR6 GWPs, doi:10.23719/1529821; AR6 methane fossil/non-fossil split from GHG Protocol Global Warming Potential Values (August 2024).

standardize_gas	<i>Standardize a gas name to its canonical gas_id</i>
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Description

Matches input names against `gases$gas_id` first, then against `gas_synonyms$synonym`, using a normalized (case/whitespace/hyphen insensitive) comparison. No fuzzy matching is performed - an unmatched name returns NA, it is never guessed at.

Usage

```
standardize_gas(x)
```

Arguments

x	Character vector of gas names as they appear in your data.
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Value

A tibble with columns `input`, `gas_id` (NA if unmatched), and `match_type` ("gas_id", "synonym", or "unmatched").

Examples

```
standardize_gas(c("HFC-134a", "R-134a", "not a real gas"))
```

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