

# Package ‘r2dii.analysis’

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**Title** Tools to Calculate Climate Targets for Financial Portfolios

**Version** 0.1.1

**Description** These tools help you to assess if a financial portfolio aligns with climate goals. They summarize key metrics attributed to the portfolio (e.g. production, emission factors), and calculate targets based on climate scenarios. They implement in R the last step of the free software 'PACTA' (Paris Agreement Capital Transition Assessment; <<https://2degrees-investing.org/>>). Financial institutions use 'PACTA' to study how their capital allocation impacts the climate.

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**URL** <https://github.com/2DegreesInvesting/r2dii.analysis>

**BugReports** <https://github.com/2DegreesInvesting/r2dii.analysis/issues>

**Depends** R (>= 3.4)

**Imports** dplyr, glue, magrittr, r2dii.data, rlang (>= 0.1.2), tidyr, tidyselect

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join_ald_scenario	<i>Join a data-loanbook object to the ald and scenario</i>
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### Description

join\_ald\_scenario() is a simple wrapper of several calls to dplyr::join\_\*, forming the master dataset to be used in later steps of the analysis.

### Usage

```
join_ald_scenario(data, ald, scenario, region_isos = r2dii.data::region_isos)
```

### Arguments

data	A data frame like the output of <code>r2dii.match::prioritize()</code> .
ald	An asset level data frame like <code>r2dii.data::ald_demo</code> .
scenario	A scenario data frame like <code>r2dii.data::scenario_demo_2020</code> .
region_isos	A data frame like <code>r2dii.data::region_isos</code> (default).

### Value

Returns a fully joined data frame, linking portfolio, ald and scenario.

### See Also

Other utility functions: `summarize_weighted_production()`

### Examples

```
installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", quietly = TRUE)
if (!installed) stop("Please install r2dii.match and r2dii.data")

library(r2dii.data)
library(r2dii.match)

valid_matches <- match_name(loanbook_demo, ald_demo) %>%
  # WARNING: Remember to validate matches (see `?prioritize`)
  prioritize()
```

```
valid_matches %>%
  join_ald_scenario(
    ald = ald_demo,
    scenario = scenario_demo_2020,
    region_isos = region_isos_demo
  )
```

---

summarize\_weighted\_production

*Summaries based on the weight of each loan per sector per year*

---

## Description

Based on on the weight of each loan per sector per year, `summarize_weighted_production()` and `summarize_weighted_percent_change()` summarize the production and percent-change, respectively.

## Usage

```
summarize_weighted_production(data, ..., use_credit_limit = FALSE)
```

```
summarize_weighted_percent_change(data, ..., use_credit_limit = FALSE)
```

## Arguments

<code>data</code>	A data frame like the output of <code>join_ald_scenario()</code> .
<code>...</code>	Variables to group by.
<code>use_credit_limit</code>	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to instead use the column <code>loan_size_credit_limit</code> .

## Value

A tibble with the same groups as the input (if any) and columns: `sector`, `technology`, and `year`; and `weighted_production` or `weighted_percent_change` for `summarize_weighted_production()` and `summarize_weighted_percent_change()`, respectively.

## Warning

The percent-change analysis excludes companies with 0 production. `percent-change` is undefined for companies that have no initial production; including such companies would cause percent-change percentage to be infinite, which is wrong.

## See Also

[join\\_ald\\_scenario\(\)](#).

Other utility functions: [join\\_ald\\_scenario\(\)](#)

**Examples**

```

installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", quietly = TRUE)
if (!installed) stop("Please install r2dii.match and r2dii.data")

library(r2dii.data)
library(r2dii.match)

master <- loanbook_demo %>%
  match_name(ald_demo) %>%
  prioritize() %>%
  join_ald_scenario(
    ald = ald_demo,
    scenario = scenario_demo_2020,
    region_isos = region_isos_demo
  )

summarize_weighted_production(master)

summarize_weighted_production(master, use_credit_limit = TRUE)

summarize_weighted_percent_change(master)

summarize_weighted_percent_change(master, use_credit_limit = TRUE)

```

---

target\_market\_share    *Add targets for production, using the market share approach*

---

**Description**

This function calculates the portfolio-level production targets, as calculated using the market share approach applied to each relevant climate production forecast.

**Usage**

```

target_market_share(
  data,
  ald,
  scenario,
  region_isos = r2dii.data::region_isos,
  use_credit_limit = FALSE,
  by_company = FALSE,
  weight_production = TRUE
)

```

**Arguments**

data                    A "data.frame" like the output of `r2dii.match::prioritize()`.

ald	An asset level data frame like <code>r2dii.data::ald_demo</code> .
scenario	A scenario data frame like <code>r2dii.data::scenario_demo_2020</code> .
region_isos	A data frame like <code>r2dii.data::region_isos</code> (default).
use_credit_limit	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to use the column <code>loan_size_credit_limit</code> instead.
by_company	Logical vector of length 1. FALSE defaults to outputting <code>production_value</code> at the portfolio-level. Set to TRUE to output <code>production_value</code> at the company-level.
weight_production	Logical vector of length 1. TRUE defaults to outputting production, weighted by relative loan-size. Set to FALSE to output the unweighted production values.

**Value**

A tibble with the summarized columns `metric`, `production` and `technology_share`. If `by_company = TRUE`, the output will also have the column `name_ald`.

**Handling grouped data**

This function ignores existing groups and outputs ungrouped data.

**See Also**

Other functions to calculate scenario targets: `target_sda()`

**Examples**

```
installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", quietly = TRUE)
if (!installed) stop("Please install r2dii.match and r2dii.data")

library(r2dii.data)
library(r2dii.match)

matched <- loanbook_demo %>%
  match_name(ald_demo) %>%
  prioritize()

# Calculate targets at portfolio level
matched %>%
  target_market_share(
    ald = ald_demo,
    scenario = scenario_demo_2020,
    region_isos = region_isos_demo
  )

# Calculate targets at company level
matched %>%
  target_market_share(
```

```

    ald = ald_demo,
    scenario = scenario_demo_2020,
    region_isos = region_isos_demo,
    by_company = TRUE
  )

  matched %>%
  target_market_share(
    ald = ald_demo,
    scenario = scenario_demo_2020,
    region_isos = region_isos_demo,
    # Calculate unweighted targets
    weight_production = FALSE
  )

```

---

target_sda	<i>Add targets for CO2 emissions per unit production at the portfolio level, using the SDA approach</i>
------------	---

---

## Description

This function calculates targets of CO2 emissions per unit production at the portfolio-level, otherwise referred to as "emissions factors". It uses the [sectoral-decarbonization approach \(SDA\)](#) to calculate these targets.

## Usage

```

target_sda(
  data,
  ald,
  co2_intensity_scenario,
  use_credit_limit = FALSE,
  by_company = FALSE
)

```

## Arguments

data	A dataframe like the output of <code>r2dii.match::prioritize()</code> .
ald	An asset-level data frame like <code>r2dii.data::ald_demo</code> .
co2_intensity_scenario	A scenario data frame like <code>r2dii.data::co2_intensity_scenario_demo</code> .
use_credit_limit	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to instead use the column <code>loan_size_credit_limit</code> .
by_company	Logical vector of length 1. FALSE defaults to outputting <code>weighted_production_value</code> at the portfolio-level. Set to TRUE to output <code>weighted_production_value</code> at the company-level.

**Value**

A tibble with the CO2 emissions factors attributed to the portfolio. These values include the portfolio's actual projected CO2 emissions factors, the scenario pathway CO2 emissions factors and the SDA calculated portfolio target emissions factors (see column `emission_factor_metric`).

**Handling grouped data**

This function ignores existing groups and outputs ungrouped data.

**See Also**

Other functions to calculate scenario targets: [target\\_market\\_share\(\)](#)

**Examples**

```
installed <- requireNamespace("r2dii.match", quietly = TRUE) &&
  requireNamespace("r2dii.data", quietly = TRUE)
if (!installed) stop("Please install r2dii.match and r2dii.data")

library(r2dii.match)
library(r2dii.data)

# Example datasets from r2dii.data
loanbook <- loanbook_demo
ald <- ald_demo
co2_scenario <- co2_intensity_scenario_demo

# WARNING: Remember to validate matches (see `?prioritize`)
matched <- prioritize(match_name(loanbook, ald))

# You may need to clean your data
anyNA(ald$emission_factor)
try(target_sda(matched, ald, co2_intensity_scenario = co2_scenario))

ald2 <- subset(ald, !is.na(emission_factor))
anyNA(ald2$emission_factor)

out <- target_sda(matched, ald2, co2_intensity_scenario = co2_scenario)

# The output includes the portfolio's actual projected emissions factors, the
# scenario pathway emissions factors, and the portfolio's target emissions
# factors.
out

# Split-view by metric
split(out, out$emission_factor_metric)

# Calculate company-level targets
out <- target_sda(
  matched, ald2,
  co2_intensity_scenario = co2_scenario,
  by_company = TRUE
```

)



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