

Package: mrremind (via r-universe)

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Type Package

Title MadRat REMIND Input Data Package

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Description The mrremind packages contains data preprocessing for the REMIND model.

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URL <https://github.com/pik-piam/mrremind>

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Repository <https://pik-piam.r-universe.dev>

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Contents

mrremind-package	6
calcAGEB	7
calcAirPollBaseyearEmi	8
calcBiocharBounds	9
calcBiocharLimitCropland	9
calcBiomassPrices	10
calcBP	11
calcCapacity	11
calcCapacityBounds	12
calcCapacityFactor	12
calcCapacityFactorHist	13
calcCapacityNuclear	13
calcCapital	14
calcCapTarget	14
calcCCScapacity	15
calcCoolingSharesAll	15
calcCoolingSharesBase	16
calcCoolingSharesFuture	17
calcCostOfCapital	17
calcCostsTrade	18
calcCostsTradePeFinancial	18
calcCostsWeathering	19
calcDiffInvestCosts	19
calcDspvShare	20
calcEDGAR7Fgases	21
calcEDGETransport	21
calcEEAGHGEmissions	22
calcEEAGHGProjections	22
calcEEZdistribution	22
calcEmber	23
calcEmiCO2LandUse	23
calcEmiFossilFuelExtr	24
calcEmiLULUCFCountryAcc	24
calcEmiMac1990	25
calcEmiReference	25
calcEmissions4ReportExtra	26
calcEmiTarget	27
calcEmiTargetReference	27
calcEuropeanEnergyDatasheets	28
calcEurostatEmissions	28
calcExogDemScen	29
calcExpertGuess	29
calcFeDemandBuildings	30
calcFeDemandONONSPEC	30
calcFEShares	31
calcFETaxes	32

calcFGas	32
calcFossilExtraction	33
calcGAINS2025	34
calcGEA2012	35
calcGlobalEnergyMonitor	35
calcHistoricalLUEmissions	36
calcHRE	36
calcIEA_EB_directSum	37
calcIEA_ETP	37
calcIEA_EVOutlook	37
calcIeaWorldEnergyOutlook	38
calcInvestmentHistorical	38
calcIoRemind	39
calcIRENA	39
calcJRC_IDEES	40
calcKLWdamage	40
calcMACCbaseN2O	41
calcMACCsCO2	42
calcMacroInvestments	42
calcMacroWACC	43
calcOtherFossilInElectricity	43
calcPE	44
calcPETaxes	44
calcPHI	45
calcPlasticsEoL	45
calcPotentialGeologicalStorage	46
calcPotentialGeothermal	46
calcPotentialHydro	47
calcPotentialWeathering	48
calcPotentialWindOff	48
calcPotentialWindOn	49
calcProdShares	50
calcProjectPipelines	50
calcRatioPPP2MER	51
calcRenShareTargets	52
calcSeProduction	52
calcSharedTarget	53
calcSolar	53
calcStorageFactor	54
calcTCdamage	55
calcTheil	55
calcTrade	56
calcUBA	56
calcUNFCCC	57
calcWasteEnergyUseShares	57
calcWaterConsCoef	58
calcWaterWithCoef	58
convertAGEB	59

convertAriadneDB	60
convertBGR	60
convertBiocharDeploymentData	61
convertBP	61
convertDaviesCooling	62
convertDylanAusGasCost	63
convertEDGAR7Fgases	63
convertEDGETransport	64
convertEmber	64
convertEuropeanEnergyDatasheets	65
convertEurostat_EffortSharing	66
convertEurostat_REShare	66
convertExpertGuess	67
convertGEA2012	68
convertGGDC10	69
convertGidden2025_geological_storage_potential	69
convertGlobalEnergyMonitor	70
convertHRE	70
convertIAEA	71
convertIAEA_PRIS	71
convertIEA_CCUS	72
convertIEA_EVOutlook	72
convertIEA_HSMR	73
convertIEA_HydrogenProduction	73
convertIEA_PVPS	74
convertIEA_REN	74
convertIEA_WEO	75
convertIEA_WorldEnergyOutlook	75
convertIIASA_subs_taxes	76
convertIIASALanduse	76
convertIMAGE2025	77
convertIRENA	77
convertKLWdamage	78
convertMarineRegionsOrg	79
convertNewClimate	79
convertNREL	80
convertOpenmod	81
convertPBL_EFsBaseline	81
convertProdShares	82
convertREMIND_11Regi	83
convertREN21	83
convertStrefler	84
convertTCdamageKrichene	84
convertUBA	85
convertUNFCCC_NDC	85
convertWGBU	86
fullREMIND	87
fullTHRESHOLDS	87

fullVALIDATIONREMINd	88
readAGEB	88
readAR6GWP	89
readAriadneDB	89
readBGR	90
readBiocharDeploymentData	90
readBP	91
readCEEW	91
readDaviesCooling	92
readDylanAusGasCost	93
readEDGAR7Fgases	93
readEDGETransport	94
readEmber	94
readETH_COUN	95
readETH_WACC	95
readEuropeanEnergyDatasheets	96
readEurostat_EffortSharing	97
readEurostat_REShare	97
readExpertGuess	98
readGAINS2025final	99
readGCPT	100
readGEA2012	100
readGGDC10	101
readGidden2025_geological_storage_potential	101
readGini	102
readGlobalEnergyMonitor	103
readHRE	103
readIAEA	104
readIAEA_PRIS	104
readIEA_CCUS	104
readIEA_EVOutlook	105
readIEA_HSMR	105
readIEA_HydrogenProduction	106
readIEA_PVPS	106
readIEA_REN	107
readIEA_WEIO	107
readIEA_WEO	108
readIEA_WorldEnergyOutlook	108
readIIASA_subs_taxes	109
readIIASALanduse	109
readIMAGE2025	110
readIRENA	110
readKLWdamage	111
readMacknickIntensities	112
readMarineRegionsOrg	112
readNewClimate	113
readNREL	114
readOECD	114

readOpenmod	115
readPBL_EFsBaseline	116
readProdShares	116
readPWT	117
readREMIND_11Regi	117
readREN21	118
readStrefler	119
readTCdamageKrichene	119
readUBA	120
readUNFCCC_NDC	120
readWGBU	121
toolAddDimensions	121
toolAggregateTimeSteps	122
toolBiomassSupplyAggregate	122
toolCalcEnergyProj	123
toolCalcGhgTarget	124
toolCubicFunctionAggregate	125
toolCubicFunctionDisaggregate	127
toolFillEU34Countries	129
toolFillYearsWithClosest	130
toolProcessClimateTargetDatabase	130
toolSolarFunctionAggregate	131

Index	132
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mrremind-package	<i>mrremind: MadRat REMIND Input Data Package</i>
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Description

The mrremind packages contains data preprocessing for the REMIND model.

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- Gabriel Abrahao
- Tabea Dorndorf
- Simon Krogmann

See Also

Useful links:

- <https://github.com/pik-piam/mrremind>

calcAGEB

Calculate REMIND final energy variables from historical AGEB values

Description

Calculate REMIND final energy variables from historical AGEB values

Usage

```
calcAGEB(subtype = "balances")
```

Arguments

subtype	data subtype. Either "balances" ("Auswertungstabellen zur Energiebilanz Deutschland") or "electricity" ("Bruttostromerzeugung in Deutschland nach Energieträgern")
---------	--

Author(s)

Falk Benke

calcAirPollBaseyearEmi

Calculate air pollutant emissions for a reference year at different sectoral aggregation levels based on CEDS2025 and GAINS2025 data.

Description

Calculate air pollutant emissions for a reference year at different sectoral aggregation levels based on CEDS2025 and GAINS2025 data.

Usage

```
calcAirPollBaseyearEmi(
  baseyear = 2020,
  CEDS.5yearmean = TRUE,
  data_source = "CEDS2025",
  outsectors = "GAINS"
)
```

Arguments

baseyear	base year for which emissions are calculated
CEDS.5yearmean	computes 5-year average around base year for CEDS2025 ("TRUE"/"FALSE")
data_source	"CEDS2025" or "GAINS2025"
outsectors	total ("TOT"), 62 CEDS sectors ("CEDS"), 16 intermediary sectors used to link CEDS and GAINS ("INT"), 35 GAINS sectors ("GAINS"), 13 CMIP7 Harmonization sectors ("CMIP7")

Value

magclass object

Author(s)

Gabriel Abrahao, Laurin Koehler-Schindler

calcBiocharBounds	<i>Provide price path data</i>
-------------------	--------------------------------

Description

Provide price path data

Usage

```
calcBiocharBounds()
```

Author(s)

Tabea Dorndorf

calcBiocharLimitCropland	<i>calcBiocharLimitCropland</i>
--------------------------	---------------------------------

Description

Provides back-of-envelope upper limits of biochar application on cropland.

Estimates upper limits as either cumulative stock capacity (t) over a compliance window, or as annual flow ceiling (t/yr) for cropland soils, using physical cropland area, adoption shares, and application-rate limits per area.

Usage

```
calcBiocharLimitCropland(
  dataBCLimit = "CRCF_draft_2025",
  adoptShare = 1,
  refYear = "y2020",
  annualLimit = TRUE
)
```

Arguments

dataBCLimit	Character scalar selecting the application-rate limit source. Options: "CRCF_draft_2025": cumulative application limit of 50 t/ha over any 10-year period. "Conservative": annual application rate of 1 t/ha/yr (illustrative, non-regulatory)
adoptShare	Adoption share of cropland treated with biochar.
refYear	Character scalar selecting the reference year (e.g. "y2015").
annualLimit	Logical. If TRUE: compute annual flow ceiling (t/yr). If FALSE: compute cumulative stock capacity (t) for compliance window. Note: If data source contains an annual rate, the compliance window is interpreted as 1 year (only annual limits make semantic sense here).

Value

List of magpie objects with results on country level, weight on country level, unit and description.

Author(s)

Isabelle Weindl

See Also

`mrlandcore::calcCroparea()`

Examples

```
## Not run:
calcOutput("BiocharLimitCropland",
  dataBCLimit = "CRCF_draft_2025",
  adoptShare = 1,
  refYear = "y2020",
  annualLimit = TRUE)

## End(Not run)
```

calcBiomassPrices	<i>read biomass supply curves from Magpie emulator</i>
-------------------	--

Description

read biomass supply curves from Magpie emulator

Usage

```
calcBiomassPrices()
```

Value

Magpie object with two parameters determining linear biomass supply curve

calcBP	<i>Calculate REMIND variables from historical BP values</i>
--------	---

Description

Calculate REMIND variables from historical BP values

Usage

```
calcBP()
```

Author(s)

Falk Benke

calcCapacity	<i>calc Capacity</i>
--------------	----------------------

Description

provides historical capacity values in TW

Usage

```
calcCapacity(subtype)
```

Arguments

subtype data subtype. Either "capacityByTech" or "capacityByPE"

Value

magpie object of capacity data

Author(s)

Renato Rodrigues, Stephen Bi, Fabrice Lécuyer

Examples

```
## Not run:
calcOutput("Capacity", subtype = "capacityByTech")

## End(Not run)
```

calcCapacityBounds	<i>calc capacity bounds</i>
--------------------	-----------------------------

Description

This function gathers project pipeline data for different technologies to generate REMIND input data for setting historical and near-term bounds. The output is technology capacity in three different categories: "operational": installed capacity that is operational in the respective year "construction": capacity that is currently under construction but expected to be completed in the respective year "planned": capacity that is planned to be completed by this year but not yet under construction. The exact definition of this category (e.g. whether only projects with FID are included) may vary by technology and is documented in calcProjectPipelines. Moreover, the function provides project pipeline data for the historical mif file.

Usage

```
calcCapacityBounds(subtype)
```

Arguments

subtype	either historical for data until 2025 or pipeline for projections in 2020, 2025 and 2030 (including some redistribution on EU/NEU level)
---------	--

Author(s)

Felix Schreyer

calcCapacityFactor	<i>calc Capacity Factor</i>
--------------------	-----------------------------

Description

provides capacity factor values

Usage

```
calcCapacityFactor()
```

Value

magpie object of the capacity factor data

Author(s)

Renato Rodrigues, Stephen Bi

Examples

```
## Not run:
calcOutput("CapacityFactor")

## End(Not run)
```

calcCapacityFactorHist *calc Capacity Factor*

Description

provides capacity factor values

Usage

```
calcCapacityFactorHist()
```

Value

magpie object of the capacity factor data

Author(s)

Renato Rodrigues, Stephen Bi, Fabrice Lécuyer

Examples

```
## Not run:
calcOutput("CapacityFactor")

## End(Not run)
```

calcCapacityNuclear *Historical nuclear capacities and near-term capacity addition bounds for REMIND*

Description

use historical nuclear electricity generation capacity and calculate near-term estimates based on current nuclear power project status per country.

Usage

```
calcCapacityNuclear()
```

Author(s)

Robert Pietzcker, Christoph Bertram, Aman Malik, Pascal Weigmann

calcCapital

Calculate macroeconomic capital stock

Description

Compute macroeconomic capital stock based on capital intensities from PWT and GDP scenarios from `mrdrivers`. The PWT capital intensities are used up until 2010. After that, the capital intensities converge towards that of Japan in 2010, at speeds that vary across scenarios. The final capital stocks are the product of the capital intensities and the gdp scenarios from `mrdrivers`.

Usage

```
calcCapital(scenario)
```

Arguments

`scenario` GDP and pop scenarios. Passed to `mrdrivers::calcGDP()`.

Value

`magpie` object with the requested output data either on country or on regional level depending on the choice of argument `"aggregate"` or a list of information if `supplementary` is set to `TRUE`.

See Also

- See the vignette `vignette("scenarios", "mrdrivers")` for information on the GDP scenarios.
- `readPWT()` for information on the PWT version used.

calcCapTarget

Calculate Capacity Targets

Description

The capacity targets (GW) at regional level are produced from different databases

- UNFCCC_NDC database, an update of the Rogelj 2017 paper (see `readme` in `inputdata`)
- REN21 Global Renewables
- New Climate NPI policy database

Usage

```
calcCapTarget(sources)
```

Arguments

sources either "NewClimate" or "UNFCCC_NDC+REN21+CHN_NUC"

Author(s)

Aman Malik, Oliver Richters, Rahel Mandaroux, Léa Hayez, Falk Benke

calcCCScapacity *calc CCS capacity*

Description

Calculate CCS capacity from IEA CCUS data

Usage

calcCCScapacity(subtype)

Arguments

subtype either historical for data until 2025 or pipeline for projections in 2020, 2025 and 2030 (including some redistribution on EU/NEU level)

Author(s)

Anne Merfort, Falk Benke

calcCoolingSharesAll *Calculate Cooling Type Shares*

Description

This function merges the output of two other functions that calculate REMIND input data for the shares of cooling types per electricity technology and REMIND region, using as initial information the Davies (2013) data per electricity technology and GCAM region. The two other functions separately calculate data for the base year and for future time steps. The source data provide most required information but some assumptions on missing data are also made.

Usage

calcCoolingSharesAll()

Value

MAGPIE object on cooling type shares per electricity technology and REMIND region

Author(s)

Ioanna Mouratiadou

See Also[readDaviesCooling](#), [convertDaviesCooling](#), [calcCoolingSharesBase](#), [calcCoolingSharesFuture](#)**Examples**

```
## Not run:
a <- calcOutput("CoolingSharesAll")

## End(Not run)
```

calcCoolingSharesBase *Calculate Cooling Type Shares for the Base Year*

Description

This function calculates REMIND input data for the shares of cooling types per electricity technology and REMIND region in 2005, using as initial information the Davies (2013) data per electricity technology and GCAM region. The source data provide most required information but some assumptions on missing data are also made.

Usage

```
calcCoolingSharesBase()
```

Value

MAGPIE object on cooling type shares per electricity technology and REMIND region

Author(s)

Lavinia Baumstark, Ioanna Mouratiadou

See Also[readDaviesCooling](#), [convertDaviesCooling](#), [calcCoolingSharesAll](#), [calcCoolingSharesFuture](#)**Examples**

```
## Not run:
a <- calcOutput("CoolingSharesBase")

## End(Not run)
```

`calcCoolingSharesFuture`*Calculate Cooling Type Shares for Future Timesteps*

Description

This function calculates REMIND input data for the shares of cooling types per electricity technology and REMIND region in post-2020, using as initial information the Davies (2013) data per electricity technology and GCAM region. The source data provide most required information but some assumptions on missing data are also made.

Usage

```
calcCoolingSharesFuture()
```

Value

MAGPIE object on cooling type shares per electricity technology and REMIND region

Author(s)

Ioanna Mouratiadou [calcCoolingSharesAll](#), [calcCoolingSharesBase](#)

Examples

```
## Not run:  
a <- calcOutput("CoolingSharesFuture")  
  
## End(Not run)
```

`calcCostOfCapital`*Calculate capital costs for energy technologies*

Description

Provides REMIND data for 25_WACC Module

Usage

```
calcCostOfCapital()
```

Author(s)

Diamantis Koutsandreas

calcCostsTrade	<i>Calculate trade costs</i>
----------------	------------------------------

Description

Provides REMIND data for PE tradecosts (energy losses on import).

Usage

```
calcCostsTrade()
```

Value

REMIND data for PE tradecosts (energy losses on import) and corresponding weights (1) as a list of two MAGPIE objects

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
calcOutput("CostsTrade")  
  
## End(Not run)
```

calcCostsTradePeFinancial	<i>Calculate Trade Cost</i>
---------------------------	-----------------------------

Description

Provides REMIND data for PE trade cost (energy losses on import, export and use).

Usage

```
calcCostsTradePeFinancial()
```

Author(s)

Regina Brecha, Lavinia Baumstark

Examples

```
## Not run:
calcOutput("CostsTradePeFinancial")

## End(Not run)
```

calcCostsWeathering	<i>Calculate costs of transport of enhanced weathering</i>
---------------------	--

Description

Calculate costs of transport of enhanced weathering

Usage

```
calcCostsWeathering()
```

Value

transport costs of spreading rock on the fields

Examples

```
## Not run:
calcOutput("CostsWeathering")

## End(Not run)
```

calcDiffInvestCosts	<i>Aggregated investment cost data for REMIND regions (based on IEA_WEO)</i>
---------------------	--

Description

Disaggregated investment cost data is aggregated and technologies renamed to REMIND names

Usage

```
calcDiffInvestCosts()
```

Details

REMIND does not have a classification of coal power plants e.g., sub-critical. Therefore, countries are given coal plant costs assuming what type of coal plants are expected to develop there. For other technologies, certain assumptions are taken to change to REMIND convention.

Value

Magpie object with aggregated but differentiated investment costs for some technologies.

Author(s)

Aman Malik

calcDspvShare	<i>Calculates the share of DSPV</i>
---------------	-------------------------------------

Description

Calculates the share of distributed solar pv, wind-onshore/offshore, hydro-small/large from 2015 to 2050. For spv - Only includes grid-connected pv.

Usage

calcDspvShare(subtype)

Arguments

subtype	Either "current","expert", or "irena". Current are current shares extended until 2050. expert is based on Robert P.'s judgement, and irena are based on IRENA's 2050 global numbers. Hydro case remains same in all cases
---------	---

Details

Known limitations - source for distributed spv (IEA Renewables 2019) is different than source for total spv (IRENA 2019)

Value

magpie object with REMIND-aggregated regions

Author(s)

Aman Malik

calcEDGAR7Fgases	<i>calcEDGAR7Fgases</i>
------------------	-------------------------

Description

calcEDGAR7Fgases

Usage

calcEDGAR7Fgases()

Author(s)

Gabriel Abrahao

calcEDGETransport	<i>Prepare EDGETransport inputs</i>
-------------------	-------------------------------------

Description

Prepare EDGETransport inputs

Usage

calcEDGETransport(subtype)

Arguments

subtype REMIND/iterative EDGE-T input data subtypes

Value

REMIND/iterative EDGE-T input data for all scenario combinations

Author(s)

Johanna Hoppe

calcEEAGHGEmissions	<i>Calculate historical GHG Emissions from European Environment Agency</i>
---------------------	--

Description

Calculate historical GHG Emissions from European Environment Agency

Usage

```
calcEEAGHGEmissions()
```

Author(s)

Falk Benke, Renato Rodrigues

calcEEAGHGProjections	<i>Calculate EEA emission projections from the two projections sources provided by European Environment Agency</i>
-----------------------	--

Description

Calculate EEA emission projections from the two projections sources provided by European Environment Agency

Usage

```
calcEEAGHGProjections()
```

Author(s)

Falk Benke, Renato Rodrigues

calcEEZdistribution	<i>Calculate distribution of total EEZ size</i>
---------------------	---

Description

Calculate distribution of total EEZ size

Usage

```
calcEEZdistribution()
```

Author(s)

Tabea Dorndorf

`calcEmber`*calc Ember*

Description

prepare the yearly Ember electricity data set To use only a part of the Ember data, call `calcOutput("Ember", subtype = "...")` and convert to TW if you want to use capacities as input data to REMIND.

Usage

```
calcEmber(subtype = "all")
```

Arguments

`subtype` data subtype. Either "capacity", "generation" or "all"

Author(s)

Pascal Weigmann

`calcEmiCO2LandUse`*EmiCO2LandUse calculate co2 emissions from land use change*

Description

EmiCO2LandUse calculate co2 emissions from land use change

Usage

```
calcEmiCO2LandUse()
```

Value

magpie object

Author(s)

Julian Oeser

Examples

```
## Not run: a <- calcOutput(type="EmiCO2LandUse")
```

calcEmiFossilFuelExtr *Fugitive methane emissions from fossil fuel extraction*

Description

Fugitive methane emissions from fossil fuel extraction

Usage

calcEmiFossilFuelExtr(source)

Arguments

source either "EDGAR" or "CEDS2025" (after REMIND ScenarioMIP release)

Details

REMIND uses historical data on fugitive methane emissions from fossil fuel extraction for coal, oil and gas to derive emission factors. The data is available from two sources: EDGAR (for base year 2005) and CEDS2025 (2020).

Value

Magpie object with CH₄ emissions from fossil fuel extraction for coal, oil and gas in 2005, in Mt CH₄

Author(s)

Gabriel Abrahao

calcEmiLULUCFCountryAcc
calcEmiLULUCFCountryAcc

Description

Historical LULUCF CO₂ emissions data following the national accounting approach. Where available data reported to the UNFCCC is taken. If not available, data estimated by Forsell et al. (2025), https://pure.iiasa.ac.at/id/eprint/20368/1/advpub_24.001.pdf, is taken. Note that Forsell et al. data reports total GHG LULUCF emissions. However, as non-CO₂ LULUCF emissions are typically small we neglect the difference and use them to calculate the offset between book-keeping and national accounting CO₂ emissions in REMIND.

Usage

calcEmiLULUCFCountryAcc()

Value

Magpie object with historical LULUCF emissions

Author(s)

Felix Schreyer, Falk Benke

calcEmiMac1990

Calculate baseline emissions for maccs for 1990

Description

Provides REMIND data for baseline emissions for maccs for 1990.

Usage

```
calcEmiMac1990()
```

Value

REMIND data for baseline emissions for maccs for 1990 and corresponding weights (NULL) as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
calcOutput("EmiMac1990")  
  
## End(Not run)
```

calcEmiReference

calc European Reference Emissions

Description

provides European 2030 emission targets in relation to 1990 and 2005 emissions

Usage

```
calcEmiReference()
```

Value

2030 emission reductions targets for 40%, 55% and 64% reductions in relation to 2005 values

Author(s)

Falk Benke and Renato Rodrigues

Examples

```
## Not run:  
calcOutput("EmiReference")  
  
## End(Not run)
```

```
calcEmissions4ReportExtra
```

*Calculates historical emissions needed for estimating emission factors
in extra emissions reporting*

Description

Calculates historical emissions needed for estimating emission factors in extra emissions reporting

Usage

```
calcEmissions4ReportExtra(sectors = "CEDS")
```

Arguments

sectors "CEDS" or "IAMC" to select the sectoral aggregation of the output

Value

list of magclass with CEDS CH4 and N2O emissionsdata for CEDS sectors for 2020, in Mt N or Mt CH4 per year

Author(s)

Gabriel Abrahao

calcEmiTarget	<i>Calculate NDC Emissions Targets</i>
---------------	--

Description

This function calculates the emissions targets for the NDC scenarios applied in the REMIND module 45_carbonprice realization NDC. It contains the following steps: The parameters calculated in 3.) and 4.) are further used in the NDC realization to calculate the region-wide NDC emissions targets in terms of total GHG emissions excl. bunkers and excl. LULUCF sectors.

Usage

```
calcEmiTarget(sources, subtype, scenario)
```

Arguments

sources	database source, either 'UNFCCC_NDC' or 'NewClimate'
subtype	must be one of 'EmiTargetAbs': absolute emissions targets in MtCO2eq/yr 'Ghgshare': share of emissions covered under NDC target per REMIND region
scenario	GDP and pop scenarios. Passed to <code>mrdrivers::calcGDP()</code> . turned off for inputdata generation

Author(s)

Aman Malik, Christoph Bertram, Oliver Richters, Rahel Mandaroux, Falk Benke

calcEmiTargetReference	<i>Calculate Emission Targets reference from UNFCCC and CEDS to be used when calculating Emission Targets.</i>
------------------------	--

Description

Uses historical emissions from 1990-2022. CO2 (excl LU), CH4, N2O (so far no F-Gas historic time series) When available, UNFCCC data is used, otherwise CEDS data.

Usage

```
calcEmiTargetReference()
```

Author(s)

Rahel Mandaroux, Falk Benke

See Also

[calcEmiTarget\(\)](#), [convertUNFCCC_NDC\(\)](#)

calcEuropeanEnergyDatasheets

Calculate REMIND variables from European Energy Datasheets

Description

Calculate REMIND variables from European Energy Datasheets

Usage

```
calcEuropeanEnergyDatasheets(subtype)
```

Arguments

subtype	data subtype. Either "EU28" (data from June 20 including GBR) or "EU27" (latest data from August 23 without GBR)
---------	--

Value

A [magpie](#) object.

Author(s)

Falk Benke

calcEurostatEmissions *Calculate REMIND emission variables from historical Eurostat (env_air_gge) values*

Description

Calculate REMIND emission variables from historical Eurostat (env_air_gge) values

Usage

```
calcEurostatEmissions()
```

Author(s)

Falk Benke

calcExogDemScen	<i>calculate exogenous FE and ES demand pathways</i>
-----------------	--

Description

prepare data for exogenous FE and ES demand pathways that do not come from EDGE models but from other sources and/or scenario literature. REMIND can be fixed to those demand pathways if the switch cm_exogDem_scen is activated.

Usage

```
calcExogDemScen()
```

Value

A [magpie](#) object.

Author(s)

Felix Schreyer

calcExpertGuess	<i>Calculate expert guesses</i>
-----------------	---------------------------------

Description

Calculate expert guesses

Usage

```
calcExpertGuess(subtype)
```

Arguments

subtype	must be one of 'biocharPrices' 'ccsBounds' 'deltacapoffset' 'gridFactor' 'sub-ConvergenceRollback' 'tradeConstraints' 'tradecost'
---------	---

Author(s)

Falk Benke

calcFeDemandBuildings *Returns the EDGE-Buildings data as REMIND variables*

Description

Returns the EDGE-Buildings data as REMIND variables

Usage

calcFeDemandBuildings(subtype, scenario)

Arguments

subtype	either "FE", or "UE"
scenario	A string (or vector of strings) designating the scenario(s) to be returned.

Author(s)

Robin Hasse

calcFeDemandONONSPEC *Calculate historic and projected other non-specified energy demand*

Description

Project the IEA flow ONONSPEC into the future. As we have no idea, where this energy demand comes from, we use a very generic method to project it into the future: We assume an asymptotic model. It starts from the level x_{EOD} at the end of data (EOD) with EOD slope $\dot{x}_{\text{EOD}}$ and approaches the fraction ε of this slope within Δt . Both x_{EOD} and $\dot{x}_{\text{EOD}}$ are determined through a linear regression of the last n time steps with IEA data.

$$x(t) = x_{\text{EOD}} + \frac{\dot{x}_{\text{EOD}}}{c} \cdot [1 - \exp(-c \cdot (t - t_{\text{EOD}}))]$$

with the decay rate $c = -\frac{\ln \varepsilon}{\Delta t}$

Δt is differentiated by scenarios thus approaching a low, med and high long-term level. To assure that scenarios don't differ at the end of history (EOH), time steps between EOD and EOH are projected with med value of Δt .

Usage

calcFeDemandONONSPEC(scenario, eoh)

Arguments

scenario	character vector of remind demand scenarios
eah	numeric, end of history: last time step without scenario differentiation

Details

Each scenario s has a differentiated Δt_s . For $\dot{x}_{\text{EOD}} > 0$, the high (low) scenario assumes a longer (shorter) time span and for $\dot{x}_{\text{EOD}} < 0$ vice versa to reach a higher (lower) long-term value. We want to make sure that until the end of history (EOH), all scenarios are still identical. So we take the med parameterisation until EOH. Afterwards, we adjust the model such that we start with EOH level and slope and still reach the target slope $\varepsilon \cdot \dot{x}_{\text{EOD}}$ until $t_{\text{EOD}} + \Delta t_s$:

$$x_s(t) = x_{\text{EOH}} + \frac{\dot{x}_{\text{EOH}}}{c_s} \cdot [1 - \exp(-c_s \cdot (t - t_{\text{EOH}}))]$$

$$\text{with the decay rate } c_s = -\frac{\ln \varepsilon}{\Delta t_s - (t_{\text{EOH}} - t_{\text{EOD}})} \cdot \left(1 - \frac{t_{\text{EOH}} - t_{\text{EOD}}}{\Delta t_{\text{med}}}\right)$$

Value

list with MagPIE object

Author(s)

Robin Hasse

calcFEShares	<i>FE Share parameters used in REMIND</i>
--------------	---

Description

FE Share parameters used in REMIND

Usage

calcFEShares(subtype, scenario)

Arguments

subtype	'ind_coal' for the share of coal used in industry. 'ind_bio' for the share of biomass used in industry
scenario	Vector of strings. Used here only to optimize madrat cache usage, as in the end only the 2005 FE demand value is actually used - which is equal across scenarios.

Author(s)

Antoine Levesque

calcFETaxes

Calculate FETaxes

Description

Reads in the data of the source IIASA_subs_taxes, by country. and calculate taxes at the final energy delivery level to the end-use sectors (industry, buildings and transport). Regional aggregation is done via the respective energy quantities as weights.

Usage

```
calcFETaxes(subtype = "taxes")
```

Arguments

subtype choose between tax rates ("taxes") or subsidies rate ("subsidies") output

Value

MAGPIE object

Author(s)

Christoph Bertram and Renato Rodrigues

See Also

[readIIASA_subs_taxes](#), [convertIIASA_subs_taxes](#)

Examples

```
## Not run:
calcOutput("FETaxes")

## End(Not run)
```

calcFGas

generate F-Gases based on IMAGE data

Description

generate F-Gases based on IMAGE data

Usage

```
calcFGas(subtype = "IMAGE2025", interp = "interpolate2025", interpyear = 2030)
```

Arguments

subtype	"IMAGElegacy" will use the old IMAGE data, "IMAGE2025" will use the new IMAGE2025 data.
interp	"interpolate2025" will interpolate from EDGAR historical data from 2025 to interpyear. To account for the very old IMAGE scenarios in IMAGElegacy, this used to be 2050 but is now flexible. Any other interp value will ignore this step.
interpyear	The year to interpolate to, default is 2030. interpyear is only used if interp is set to "interpolate2025".

Value

magpie object with F-gases information

Author(s)

Lavinia Baumstark, Gabriel Abrahao

Examples

```
## Not run:
x <- calcOutput("FGas")

## End(Not run)
```

calcFossilExtraction *calc Fossil Extraction*

Description

provides coefficients for fossil fuels (oil, gas and coal) and uranium extraction cost equations.

Usage

```
calcFossilExtraction(subtype = "FossilExtraction")
```

Arguments

subtype Either 'FossilExtraction' or 'UraniumExtraction'

Value

magpie object of the coefficients for fossil fuels and uranium extraction cost equations

Author(s)

Renato Rodrigues, Felix Schreyer

Examples

```
## Not run:
calcOutput(type = "FossilExtraction", subtype = "FossilExtraction")

## End(Not run)
```

calcGAINS2025	<i>Calculate air pollutant emission factors for all scenarios and SSPs available from GAINS, at the level of GAINS sectors and for 2005-2100.</i>
---------------	---

Description

This function is meant to be used to clean-up, fill gaps and smoothen the GAINS data to obtain consistent timeseries of emission factors from 2005 to 2100. The actual generation REMIND-specific files happens in calcGAINS2025forREMIND.

Usage

```
calcGAINS2025(
  weight_source = "CEDS2025",
  outsectors = "GAINS2025",
  outunit = "Tg/TWa"
)
```

Arguments

weight_source	Source of air pollutant reference emissions in 2020 that is used to derive the weights ("CEDS2025" or "GAINS2025")
outsectors	Output sectoral aggregation ("GAINS2025" or "REMIND")
outunit	Output unit for emission factors ("kt/PJ" or "Tg/TWa")

Value

Emission factor timeseries for all scenarios from 2005 to 2100: magclass object with dimensions region, year, and ssp.scenario.sectorGAINS.species

Author(s)

Gabriel Abrahao, Laurin Koehler-Schindler

`calcGEA2012`*calcGEA2012*

Description

Extracts oil, gas and coal data from the GEA 2012 into a scenario- and time-dependent grade structure

Usage

```
calcGEA2012(subtype, datatype)
```

Arguments

subtype	oil, coal, gas, or bounds
datatype	extraseed, exportbound, or decoffset for bounds subtype

Value

MAGPIE object containing regionally aggregated GEA 2012 data

Author(s)

Stephen Bi

Examples

```
## Not run:  
a <- calcOutput("GEA2012")  
  
## End(Not run)
```

`calcGlobalEnergyMonitor`*Calc capacities from Global Energy Monitor*

Description

Calculate near-term expectations of capacities for use in fullVALIDATION.R

Usage

```
calcGlobalEnergyMonitor()
```

Author(s)

Falk Benke

`calcHistoricalLUEmissions`*Calculate historical landuse emissions*

Description

Calculate historical landuse emissions

Usage`calcHistoricalLUEmissions()`**Author(s)**

David Klein, Falk Benke

`calcHRE`*Calculate Final Energy for the buildings sector from Heat Roadmap Europe scenarios*

Description

Calculate Final Energy for the buildings sector from Heat Roadmap Europe scenarios

Usage`calcHRE()`**Value**

A [magpie](#) object.

Author(s)

Pascal Weigmann

calcIEA_EB_directSum	<i>Calculate simple sums of IEA Energy Balances</i>
----------------------	---

Description

Calculates PE|Coal, PE|Oil, PE|Gas, and FE as direct sums of relevant products for TES (PEs) or TFC (FE), minus (negative) bunkers. Used for benchmarking in the `historical.mif` and for the IIASA Scenario Compass Initiative vetting.

Usage

```
calcIEA_EB_directSum()
```

calcIEA_ETP	<i>Calculate REMIND emission variables from IEA ETP values</i>
-------------	--

Description

Calculate REMIND emission variables from IEA ETP values

Usage

```
calcIEA_ETP()
```

Author(s)

Falk Benke

calcIEA_EVOutlook	<i>Calculate REMIND variables from IEA Global EV Outlook data</i>
-------------------	---

Description

Calculate REMIND variables from IEA Global EV Outlook data

Usage

```
calcIEA_EVOutlook()
```

Author(s)

Falk Benke

`calcIeaWorldEnergyOutlook`*Calculate REMIND variables from IEA World Energy Outlook data.*

Description

Calculate REMIND variables from IEA World Energy Outlook data.

Usage`calcIeaWorldEnergyOutlook()`**Author(s)**

Falk Benke

`calcInvestmentHistorical`*Calculate REMIND investment variables from IEA World Energy Investment Outlook (2024)*

Description

Calculate REMIND investment variables from IEA World Energy Investment Outlook (2024)

Usage`calcInvestmentHistorical()`**Author(s)**

Nicolas Bauer, Falk Benke

calcIoRemind	<i>Calc Input Output for REMIND</i>
--------------	-------------------------------------

Description

A wrapper around calcIO used to generate REMIND input data, created to apply corrective steps in a cache-conscious manner by avoiding additional subtypes in calcIO.

Usage

```
calcIoRemind(subtype)
```

Arguments

subtype	either "input", "output" or "trade"
---------	-------------------------------------

Author(s)

Falk Benke

calcIRENA	<i>Calculate REMIND variables from historical IRENA capacities.</i>
-----------	---

Description

Calculate REMIND variables from historical IRENA capacities.

Usage

```
calcIRENA()
```

Author(s)

Falk Benke

calcJRC_IDEES	<i>Calculate selected REMIND energy and emission variables from historical JRC IDEES values</i>
---------------	---

Description

Calculate selected REMIND energy and emission variables from historical JRC IDEES values

Usage

calcJRC_IDEES(subtype)

Arguments

- subtype one of
- 'Industry': calculate REMIND Industry variables
 - 'Transport': calculate REMIND Transport variables
 - 'ResCom': calculate REMIND Residential and Commercial variables

Value

A [magpie](#) object.

Author(s)

Falk Benke

calcKLWdamage	<i>write KLW damage parameters (from Kotz et al. 2024) into input data they are country-specific and should not be aggregated to the regional level at all</i>
---------------	--

Description

write KLW damage parameters (from Kotz et al. 2024) into input data they are country-specific and should not be aggregated to the regional level at all

Usage

calcKLWdamage(subtype)

Arguments

subtype "beta1", "beta2", "maxGMT"

Value

MAGPIE object of damage parameters for KIW damage function on country level and for 1000 bootstrapping samples

Author(s)

Franziska Piontek

calcMACCbaseN2O	<i>Calculate baseline emissions trajectories for transport, adipic acid and nitric acid production</i>
-----------------	--

Description

Calculate baseline emissions trajectories for transport, adipic acid and nitric acid production

Usage

```
calcMACCbaseN2O(source = "PBL_2007")
```

Arguments

source	either "PBL_2007" or "PBL_2022" If source is PBL_2007, the source of the ultimately the baseline scenario of Lucas et al 2007 (http://linkinghub.elsevier.com/retrieve/pii/S1462901106) If source is PBL_2022, the source of the ultimately the baseline scenario of Harmsen et al. 2023 (https://doi.org/10.1038/s41467-023-38577-4)
--------	---

Value

list of magclass with REMIND input data for different sectors for timesteps 2000-2100, in Mt N per year

Author(s)

Lavinia Baumstark, Gabriel Abrahao

calcMACCsCO2	<i>Read in abatement potential for CO2 land-use change derived from MAgPIE</i>
--------------	--

Description

Range of possible abatement between maximum and minimum emission level in a year

Usage

calcMACCsCO2()

Value

MAgPIE object

Author(s)

David Klein

Examples

```
## Not run:
calcOutput("MACCsCO2")

## End(Not run)
```

calcMacroInvestments	<i>Calculate 2005 macroeconomic capital investments</i>
----------------------	---

Description

Compute macroeconomic capital investments based on investments shares from the PWT and GDP scenarios from mrd drivers. The final investments are the product of the two.

Usage

calcMacroInvestments()

Value

magpie object with the requested output data either on country or on regional level depending on the choice of argument "aggregate" or a list of information if supplementary is set to TRUE.

See Also

- See the vignette `vignette("scenarios", "mrdrivers")` for information on the GDP scenarios.
- `readPWT()` for information on the PWT version used.

calcMacroWACC	<i>Calculate the weighted average cost of capital (WACC) markups for REMIND regions. These values are applied to macroeconomic investments.</i>
---------------	---

Description

Provides REMIND data for 25_WACC Module

Usage

```
calcMacroWACC()
```

Author(s)

Diamantis Koutsandreas

calcOtherFossilInElectricity	<i>Calculate projected electricity from waste and other fossils using energy demands from IEA Energy Balances.</i>
------------------------------	--

Description

This is used in remind2 reporting as input data to calculate additional capacity and secondary energy variables.

Usage

```
calcOtherFossilInElectricity()
```

Details

The projection focuses on a tight mitigation scenario and assumes that all fossil emissions from waste burning / other fossil processes can be reduced to 0 by 2050. Should be replaced in the future by actual modeling of waste / other fossil plants, or at least connected to RCP scenario assumptions.

Author(s)

Robert Pietzcker, Falk Benke

calcPE	<i>Computes Primary Energy variables from IEA Energy Balances</i>
--------	---

Description

Computes Primary Energy variables from IEA Energy Balances

Usage

```
calcPE(ieaVersion = "default")
```

Arguments

ieaVersion	Release version of IEA data, either 'default' (vetted and used in REMIND) or 'latest'.
------------	--

calcPETaxes	<i>Calculate SubsStationary</i>
-------------	---------------------------------

Description

Reads in the data of the source IIASA_subs_taxes, by country. and calculate taxes at primary energy level. Regional aggregation is done via the respective energy quantities as weights.

Usage

```
calcPETaxes(subtype = "subsidies")
```

Arguments

subtype	subsidies rate ("subsidies") output
---------	-------------------------------------

Value

MAGPIE object

Author(s)

Christoph Bertram and Renato Rodrigues

See Also

[readIIASA_subs_taxes](#), [convertIIASA_subs_taxes](#)

Examples

```
## Not run:  
calcOutput("PETaxes")  
  
## End(Not run)
```

calcPHI	<i>Provides REMIND data for realization Investment_Inefficiencies in 01_macro Module</i>
---------	--

Description

Provides REMIND data for realization Investment_Inefficiencies in 01_macro Module

Usage

```
calcPHI()
```

Author(s)

Diamantis Koutsandreas

calcPlasticsEoL	<i>calculates projections for the end of life fate of plastic waste in particular; calculates the share that is incinerated</i>
-----------------	---

Description

calculates projections for the end of life fate of plastic waste in particular, calculates the share that is incinerated

Usage

```
calcPlasticsEoL()
```

Author(s)

Falk Benke, Simón Moreno Leiva

calcPotentialGeologicalStorage
Calculate geological storage potential

Description

Provides geological storage potential

Usage

calcPotentialGeologicalStorage()

Value

geological storage potential data MAgPIE object

Author(s)

David Klein

Examples

```
## Not run:  
calcOutput("PotentialGeologicalStorage")  
  
## End(Not run)
```

calcPotentialGeothermal
Calculate Geothermal potential

Description

Provides geothermal potential data

Usage

calcPotentialGeothermal()

Value

geothermal potential data MAgPIE object

Author(s)

Renato Rodrigues

Examples

```
## Not run:  
calcOutput("PotentialGeothermal")  
  
## End(Not run)
```

calcPotentialHydro	<i>Calculate hydro potential</i>
--------------------	----------------------------------

Description

Provides hydro potential data

Usage

```
calcPotentialHydro()
```

Value

hydro potential data and corresponding weights as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

See Also

[readWGBU](#), [convertWGBU](#)

Examples

```
## Not run:  
calcOutput("PotentialHydro")  
  
## End(Not run)
```

calcPotentialWeathering
Calculate hydro potential

Description

Provides weathering potential data

Usage

calcPotentialWeathering()

Value

weathering potential data and corresponding weights as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
calcOutput("PotentialWeathering")  
  
## End(Not run)
```

calcPotentialWindOff *Calculate wind offshore potential*

Description

Provides wind offshore potential data

Usage

calcPotentialWindOff()

Value

wind offshore potential data and corresponding weights as a list of two MAgPIE objects

Author(s)

Chen Chris Gong

See Also[readNREL](#), [convertNREL](#)**Examples**

```
## Not run:  
calcOutput("PotentialWindOff")  
  
## End(Not run)
```

calcPotentialWindOn	<i>Calculate wind onshore potential</i>
---------------------	---

Description

Provides wind onshore potential data

Usage

```
calcPotentialWindOn()
```

Value

wind onshore potential data and corresponding weights as a list of two MAgPIE objects

Author(s)

Lavinia Baumstark

See Also[readNREL](#), [convertNREL](#)**Examples**

```
## Not run:  
calcOutput("PotentialWindOn")  
  
## End(Not run)
```

calcProdShares	<i>Manufacture production shares for spc and wind</i>
----------------	---

Description

Shares of world manufacture for spv modules and wind turbines for 2018 and 2019

Usage

calcProdShares()

Value

magpie object with REMIND-aggregated region

Author(s)

Aman Malik

calcProjectPipelines	<i>calc Project Pipelines</i>
----------------------	-------------------------------

Description

Calculate the expected near-term deployment of technologies based on projects that are currently either being built or in a planning stage. For some technologies multiple sources are available. Output object currently needs to contain years 2020, 2025 and 2030.

Usage

calcProjectPipelines(subtype)

Arguments

subtype	choose technology biomass, coal, geothermal, hydro, nuclear, solar, wind or CCS
---------	---

Details

Discussions on sources and assumptions: <https://github.com/pik-piam/mrremind/discussions>

Author(s)

Pascal Weigmann

calcRatioPPP2MER	<i>Get PPP-to-MER conversion factors.</i>
------------------	---

Description

calcRatioPPP2MER returns conversion factors from the World Bank's WDI to convert monetary values (in constant units with base year equal to the year argument) from PPP to MER. So for example from 'constant 2017 Int\$PPP' to 'constant 2017 US\$MER'.

Usage

```
calcRatioPPP2MER(  
  year = as.numeric(mrdrivers::toolGetUnitDollar(returnOnlyBase = TRUE))  
)
```

Arguments

year	An integer specifying the base year of conversion factor. Defaults to the base year of <code>mrdrivers::toolGetUnitDollar()</code> , currently: 2017.
------	---

Details

Missing conversion factors are set to 1 and regional aggregation is weighed by GDP from WDI-MI-James.

Value

magpie object with the requested output data either on country or on regional level depending on the choice of argument "aggregate" or a list of information if supplementary is set to TRUE.

See Also

`madrat::calcOutput()`

Examples

```
## Not run:  
calcOutput("RatioPPP2MER")  
  
## End(Not run)
```

calcRenShareTargets	<i>Calculate Renewable Energy Share Targets</i>
---------------------	---

Description

This function calculates the renewable energy share targets by aggregating country-level targets to targets of REMIND regions. It calculates the following types of share targets: 1) share of renewables in electricity, 2) share of non-biomass renewables in electricity, 3) share of non-fossil generation in electricity, 4) share of renewables in total final energy. First, targets are aggregated to one of these 4 types. Second, countries without targets are assumed to maintain their renewable share from 2020. Third, targets are harmonized within a REMIND region and filtered based on how many countries within a REMIND region have a target. Finally, energy share targets are aggregated from country-level to REMIND region-level using projections of electricity or final energy demand on country-level. These country-level projections are derived from final energy trends by REMIND regions from the EDGE models as well as GDP trends by country from SSP scenarios (see toolCalcEnergyProj).

Usage

```
calcRenShareTargets(scenario)
```

Arguments

scenario	GDP / FE demand scenarios to use
----------	----------------------------------

Author(s)

Felix Schreyer

calcSeProduction	<i>calc secondary energy production</i>
------------------	---

Description

prepare secondary production data (e.g. electricity generation) to use in historical constraints in the model

Usage

```
calcSeProduction()
```

Value

A [magpie](#) object.

Author(s)

Renato Rodrigues

calcSharedTarget	<i>calc Shared Target</i>
------------------	---------------------------

Description

provides region specific target

Usage

calcSharedTarget(subtype)

Arguments

subtype data subtype. Either "FErenewablesShare", ...

Value

target data magpie object

Author(s)

Renato Rodrigues

Examples

```
## Not run:
calcOutput("SharedTarget", subtype="FErenewablesShare")

## End(Not run)
```

calcSolar	<i>calcSolar calculate Area, Capacity and Energy for photovoltaics (PV) and contentrated solar power (CSP)</i>
-----------	--

Description

calcSolar calculate Area, Capacity and Energy for photovoltaics (PV) and contentrated solar power (CSP)

Usage

calcSolar()

Value

magpie object

Author(s)

Julian Oeser, modified by Renato Rodrigues

Examples

```
## Not run:  
a <- calcOutput(type = "Solar")  
  
## End(Not run)
```

calcStorageFactor	<i>calc Capacity Factor</i>
-------------------	-----------------------------

Description

provides capacity factor values

Usage

```
calcStorageFactor()
```

Value

magpie object of the capacity factor data

Author(s)

Lavinia Baumstark, Robert Pietzcker

Examples

```
## Not run:  
calcOutput("StorageFactor")  
  
## End(Not run)
```

calcTCdamage	<i>write TC damage parameters into input data they are country-specific and should not be aggregated to the regional level at all</i>
--------------	---

Description

write TC damage parameters into input data they are country-specific and should not be aggregated to the regional level at all

Usage

```
calcTCdamage(subtype)
```

Arguments

subtype	"const", "tasK"
---------	-----------------

Value

MAGPIE object of damage parameters for country level tropical cyclone damage function

Author(s)

Franziska Piontek

calcTheil	<i>Get regional Theil-T index projections</i>
-----------	---

Description

To calculate the regional Theil-T index (= correction to welfare function for a lognormal income distribution) we do the following: (1) convert country-level Gini coefficients to Theil (2) calculate contribution to Theil-T index that includes both between-countries and within-country inequality (see e.g. https://en.wikipedia.org/wiki/Theil_index). The latter can then be aggregated with calcOutput().

Usage

```
calcTheil(scenario)
```

Arguments

scenario	A string (or vector of strings) designating the scenario(s) to be returned. Passed as is to the scenario argument of mrdrivers::calcGDP .
----------	---

Details

The projections are SSP specific and use SSP GINI projections. For non-SSP scenarios, the projections are equal to the SSP2 projection.

The aggregation depends on the region mapping. It is implemented such that the regionmapping specified in `getConfig()$regionmapping` is used. The result of `calcOutput('Theil', aggregate = FALSE)`, is NOT the country Theil-T, but the unweighted contribution from a given country to the regional value.

Value

magpie objects of unweighted contribution to Theil, weights (= country shares of regional GDP)

See Also

[readGini](#)

calcTrade

Computes Trade variables based on latest IEA data available

Description

Computes Trade variables based on latest IEA data available

Usage

`calcTrade()`

Value

a magclass object

calcUBA

Calculate REMIND final energy variables from historical UBA values

Description

Calculate REMIND final energy variables from historical UBA values

Usage

`calcUBA()`

Author(s)

Falk Benke

calcUNFCCC	<i>Calculate REMIND emission variables from historical UNFCCC values</i>
------------	--

Description

Calculate REMIND emission variables from historical UNFCCC values

Usage

```
calcUNFCCC(subtype = "all")
```

Arguments

subtype either generate for countries "all" or "annex-1-only"

Value

A magpie object.

Author(s)

Falk Benke, Pascal Weigmann

calcWasteEnergyUseShares	<i>Calculate waste energy use shares based on IEA World Energy Balances</i>
--------------------------	---

Description

The output of this function is used in remind2 for reporting purposes.

Usage

```
calcWasteEnergyUseShares()
```

Author(s)

Robert Pietzcker, Falk Benke

calcWaterConsCoef	<i>Calculate Water Consumption Coefficients</i>
-------------------	---

Description

This function calculates REMIND input data on water consumption coefficients per electricity technology, using as initial information the Macknick (2011) data per electricity technology. The source data provide most required information but some assumptions on missing data are also made.

Usage

```
calcWaterConsCoef()
```

Value

MAGPIE object on water consumption coefficients per electricity technology

Author(s)

Ioanna Mouratiadou

See Also

[readMacknickIntensities](#), [calcWaterWithCoef](#)

Examples

```
## Not run:  
calcOutput("WaterConsCoef")  
  
## End(Not run)
```

calcWaterWithCoef	<i>Calculate Water Withdrawal Coefficients</i>
-------------------	--

Description

This function calculates REMIND input data on water withdrawal coefficients per electricity technology, using as initial information the Macknick (2011) data per electricity technology. The source data provide most required information but some assumptions on missing data are also made.

Usage

```
calcWaterWithCoef()
```

Value

MAGPIE object on water withdrawal coefficients per electricity technology

Author(s)

Ioanna Mouratiadou

See Also

[readMacknickIntensities](#), [calcWaterConsCoef](#)

Examples

```
## Not run:  
calcOutput("WaterWithCoeff")  
  
## End(Not run)
```

convertAGEB

Convert AGEB data

Description

Convert AGEB data

Usage

```
convertAGEB(x)
```

Arguments

x a magpie object

Author(s)

Falk Benke

convertAriadneDB	<i>Convert Ariadne DB data</i>
------------------	--------------------------------

Description

convert Ariadne database data

Usage

convertAriadneDB(x)

Arguments

x A magpie object returned from readAriadneDB().

Value

A magpie object.

Author(s)

Felix Schreyer

convertBGR	<i>Converts BGR oil, gas, coal and uranium reserves data</i>
------------	--

Description

Converts BGR oil, gas, coal and uranium reserves data

Usage

convertBGR(x, subtype)

Arguments

x MAgPIE object to be converted
subtype data subtype. Either "oil", "gas", "coal" or "uranium".

Value

A MAgPIE object containing BGR (Federal Institute for Geosciences and Natural Resources) country reserves disaggregated data of oil, gas, coal and uranium.

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- convertBGR(x, subtype = "oil")

## End(Not run)
```

convertBiocharDeploymentData	<i>Provide Biochar price path data</i>
------------------------------	--

Description

Provide Biochar price path data

Usage

```
convertBiocharDeploymentData(x)
```

Arguments

x a magpie object

Author(s)

Tabea Dorndorf

convertBP	<i>Disaggregates and cleans BP data.</i>
-----------	--

Description

Disaggregates and cleans BP data.

Usage

```
convertBP(x, subtype)
```

Arguments

x MAgPIE object to be converted

subtype Either "Emission", "Capacity", "Generation", "Production", "Consumption", "Trade Oil", "Trade Gas", "Trade Coal" or "Price"

Value

A [magpie](#) object.

Author(s)

Aman Malik, Falk Benke

convertDaviesCooling *Convert Davies Cooling*

Description

Convert Davies (2013) data on on shares of cooling types using mapping from GCAM regions to ISO country level.

Usage

```
convertDaviesCooling(x)
```

Arguments

x MAgPIE object containing DaviesCooling data region resolution

Value

MAgPIE object of the Davies (2013) data disaggregated to country level

Author(s)

Lavinia Baumstark, Ioanna Mouratiadou

See Also

[readDaviesCooling](#)

Examples

```
## Not run: a <- convertDaviesCooling(x)
```

`convertDylanAusGasCost`*Converts Dylan's Australian gas cost to magpie*

Description

Converts Dylan's Australian gas cost to magpie

Usage

```
convertDylanAusGasCost(x)
```

Arguments

x MAgPIE object to be converted

Value

magpie object of the CEMO data

Author(s)

Felix Schreyer

`convertEDGAR7Fgases` *convertEDGAR7Fgases*

Description

convertEDGAR7Fgases

Usage

```
convertEDGAR7Fgases(x)
```

Arguments

x magpie object to be converted

Author(s)

Gabriel Abrahao

convertEDGETransport	<i>Convert EDGEtransport</i>
----------------------	------------------------------

Description

Convert EDGEtransport

Usage

```
convertEDGETransport(x, subtype)
```

Arguments

x	MAGPIE object containing EDGE-T values in 21 region resolution
subtype	REMIND/iterative EDGE-T input data subtypes

Value

REMIND/iterative EDGE-T input data as MAGPIE object disaggregated to ISO level

Author(s)

Johanna Hoppe

convertEmber	<i>Convert Ember data</i>
--------------	---------------------------

Description

Convert Ember data

Usage

```
convertEmber(x)
```

Arguments

x	A magpie object returned from readEmber() .
---	---

Value

A [magpie](#) object.

Author(s)

Pascal Weigmann

`convertEuropeanEnergyDatasheets`*Convert European Energy Datasheets*

Description

Convert European Energy Datasheets

Usage

```
convertEuropeanEnergyDatasheets(x, subtype)
```

Arguments

<code>x</code>	European Energy Datasheets magpie object derived from <code>readEuropeanEnergy-Datasheets</code> function
<code>subtype</code>	data subtype. Either "EU28" (data from June 20 including GBR) or "EU27" (latest data from August 23 without GBR)

Value

converted European Energy Datasheets magpie object

Author(s)

Renato Rodrigues and Atreya Shankar

Source

European Energy Datasheets public database https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en

Examples

```
## Not run:  
test <- readSource("EuropeanEnergyDatasheets", subtype = "EU27", convert = TRUE)  
  
## End(Not run)
```

`convertEurostat_EffortSharing`*Converts EU Effort Sharing targets and historical emissions*

Description

Converts EU Effort Sharing targets and historical emissions

Usage

```
convertEurostat_EffortSharing(x, subtype)
```

Arguments

<code>x</code>	MAGPIE object to be converted
<code>subtype</code>	data subtype. Either "target" or "emissions"

Value

A MAGPIE object containing the EU Effort Sharing targets (%) or Effort Sharing historical emissions (MtCO2)

Author(s)

Renato Rodrigues

Examples

```
## Not run: a <- convertEurostat_EffortSharing(x,subtype="target")
```

`convertEurostat_REShare`*Converts Eurostat renewable energy share data*

Description

Converts Eurostat renewable energy share data

Usage

```
convertEurostat_REShare(x, subtype)
```

Arguments

x	MAGPIE object to be converted
subtype	data subtype

Value

A MAGPIE object containing Eurostat renewable energy shares

Author(s)

Felix Schreyer

convertExpertGuess	<i>convertExpertGuess</i>
--------------------	---------------------------

Description

Converts data from expert guess

Usage

convertExpertGuess(x, subtype)

Arguments

x	unconverted magpie object from read-script
subtype	Type of data that should be read. One of • biocharPrices: Biochar price assumptions over time. Assumptions based on collection of current bulk sale prices (see Dorndorf et al (submitted)) (Tabea Dorndorf) • capacityFactorGlobal: Global capacity factors for all REMIND technologies (Renato Rodrigues) • capacityFactorRules: Capacity factor rules for selected H12 regions and REMIND technologies • ccsBounds: CCS bounds indicating the if a country is expected to do CCS in the foreseeable future (Jessica Strefler) • co2prices: CO2 prices (Robert Pietzcker) • costsTradePeFinancial: primary energy tradecosts (financial costs on import, export and use) (Nicolas Bauer) • deltacapoffset: ??? (Robert Pietzcker) • gridFactor: Estimates distribution of electricity demands per region (Robert Pietzcker) • ies: intertemporal elasticity of substitution (Nicolas Bauer) • prtp: pure rate of time preference (Nicolas Bauer)

- subConvergenceRollback: Subsidy convergence level in rollback scenario in US\$2017 (Nicolas Bauer)
- storageFactor: Regional storage parametrization (Robert Pietzcker)
- taxConvergence: Tax convergence level in US\$2017 (Nicolas Bauer)
- taxConvergenceRollback: Tax convergence level in rollback scenario in US\$2017 (Nicolas Bauer)
- tradeConstraints: parameter by Nicolas Bauer (2024) for the region specific trade constraints, values different to 1 activate constraints and the value is used as effectiveness to varying degrees such as percentage numbers (Nicolas Bauer)
- tradecost: old REMIND data for PE tradecosts (energy losses on import) (?)

Author(s)

Falk Benke

convertGEA2012	<i>convertGEA2012</i>
----------------	-----------------------

Description

Converts oil, gas and coal data from the Global Energy Assessment 2012 to country-level aggregation

Usage

convertGEA2012(x, subtype)

Arguments

x	MAGPIE object to be disaggregated
subtype	Type of fossil fuel (oil, coal or gas)

Value

MAGPIE object containing country-level disaggregation of GEA 2012 data

Author(s)

Stephen Bi

Examples

```
## Not run:  
a <- readSource("GEA2012")  
  
## End(Not run)
```

convertGGDC10	<i>Convert</i>	<i>GGDC</i>	<i>10-Sector</i>	<i>Database</i>	-
	<i>https://www.rug.nl/ggdc/structuralchange/previous-sector-database/10-sector-2014</i>				

Description

Convert GGDC 10-Sector Database - <https://www.rug.nl/ggdc/structuralchange/previous-sector-database/10-sector-2014>

Usage

```
convertGGDC10(x)
```

Arguments

x MAgPIE object to be converted

Value

A MAgPIE object containing GGDC disaggregated data

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- convertGGDC10(x)

## End(Not run)
```

convertGidden2025_geological_storage_potential
<i>Convert geological storage potential</i>

Description

Convert geological storage potential

Usage

```
convertGidden2025_geological_storage_potential(x)
```

Arguments

x MAgPIE object to be converted

Value

A magpie object with geological storage potential

Author(s)

David Klein

convertGlobalEnergyMonitor

Convert Global Energy Monitor data

Description

Convert Global Energy Monitor data

Usage

```
convertGlobalEnergyMonitor(x)
```

Arguments

x A magclass object returned from readGlobalEnergyMonitor().

Author(s)

Rahel Mandaroux, Falk Benke

convertHRE

Convert HRE data

Description

Convert HRE data

Usage

```
convertHRE(x)
```

Arguments

x A [magpie](#) object returned from [readHRE\(\)](#).

Value

A [magpie](#) object.

Author(s)

Pascal Weigmann

convertIAEA

Nuclear data from world-nuclear.org

Description

Data on currently operating and under-construction nuclear power plants, reactors planned and proposed, electricity generation from nuclear

Usage

convertIAEA(x)

Arguments

x MAgPIE object to be converted

Author(s)

Christoph Bertram

convertIAEA_PRIS

convert IAEA Power Reactor Information System

Description

convert IAEA Power Reactor Information System

Usage

convertIAEA_PRIS(x)

Arguments

x a magclass object returned from readIAEA_PRIS()

Author(s)

Pascal Weigmann

convertIEA_CCUS	<i>Convert IEA CCUS data</i>
-----------------	------------------------------

Description

Convert IEA CCUS data

Usage

convertIEA_CCUS(x)

Arguments

x	A magclass object returned from readIEA_CCUS().
---	---

Value

A magclass object.

Author(s)

Anne Merfort, Falk Benke

convertIEA_EVOutlook	<i>Convert IEA EV Outlook</i>
----------------------	-------------------------------

Description

Convert IEA EV Outlook

Usage

convertIEA_EVOutlook(x)

Arguments

x	a magclass object returned from readIEA_EVOutlook()
---	---

Author(s)

Falk Benke

convertIEA_HSMR	<i>convert IEA Hydro Special Market Report</i>
-----------------	--

Description

convert IEA Hydro Special Market Report

Usage

convertIEA_HSMR(x)

Arguments

x a magclass object returned from readIEA_HSMR()

Author(s)

Pascal Weigmann

convertIEA_HydrogenProduction	<i>Convert IEA hydrogen capacities</i>
-------------------------------	--

Description

Convert IEA hydrogen capacities

Usage

convertIEA_HydrogenProduction(x)

Arguments

x A magclass object returned from readIEA_HydrogenCapacities().

Value

A magclass object.

Author(s)

Simon Krogmann

convertIEA_PVPS	<i>Convert IEA PVPS data from REMIND regions to iso countries</i>
-----------------	---

Description

maps to iso countries

Usage

convertIEA_PVPS(x)

Arguments

x	MAGPIE object to be converted
---	-------------------------------

Value

Magpie object with IEA PVPS investment cost per country

Author(s)

Felix Schreyer

convertIEA_REN	<i>Reads the distributed solar pv capacity from IEA Renewables report (2019).</i>
----------------	---

Description

Reads the distributed solar pv capacity from IEA Renewables report (2019).

Usage

convertIEA_REN(x)

Arguments

x	input magpie object
---	---------------------

Details

Capacity in GW. Distributed solar, defined in the IEA Renewables (2019), includes rooftop residential (0-10 kW, grid-connected), rooftop and ground-mounted commercial and industrial (10-1000kW, grid-connected), and off-grid (8W - 100 kW)

Value

magpie object with country-wise distributed solar pv capacity

Author(s)

Aman Malik

convertIEA_WEO

Converts IEA World Energy Outlook data

Description

Converts IEA World Energy Outlook data

Usage

convertIEA_WEO(x, subtype)

Arguments

x	MAGPIE object to be converted
subtype	data subtype. Either "Capacity" or "Invest_Costs"

Author(s)

Renato Rodrigues and Aman Malik

convertIEA_WorldEnergyOutlook

Convert IEA World Energy Outlook Data from 2023

Description

Convert IEA World Energy Outlook Data from 2023

Usage

convertIEA_WorldEnergyOutlook(x)

Arguments

x	magclass object to be converted
---	---------------------------------

Author(s)

Falk Benke

 convertIIASA_subs_taxes

Convert IIASA_subs_taxes data

Description

Convert IIASA subsidy and taxes data on ISO country level (removes countries not part of 249 official ISO countries and fills missing with zeros).

Usage

```
convertIIASA_subs_taxes(x, subtype)
```

Arguments

x	MAGPIE object containing IIASA subsidies and taxes data in country resolution
subtype	Type of country level data as compiled by IIASA that should be read in. Available types are: • tax_rate: tax rate pre final energy category • subsidies_bulk: subsidy rate per final energy category • energy: final energy quantities per category

Value

IIASA_subs_taxes data as MAGPIE object aggregated to country level

Examples

```
## Not run:
a <- convertIIASA_subs_taxes(x)

## End(Not run)
```

 convertIIASALanduse

convert IIASA Land Use Emissions

Description

convert IIASA Land Use Emissions

Usage

```
convertIIASALanduse(x, subtype)
```

Arguments

- x a magpie object
- subtype one of "historical", "forecast2030", "forecast2035"

Author(s)

Falk Benke

convertIMAGE2025	<i>Disaggregates IMAGE 2025 F-gas emissions data, using EDGAR HFC emissions in 2005 as weights</i>
------------------	--

Description

Disaggregates IMAGE 2025 F-gas emissions data, using EDGAR HFC emissions in 2005 as weights

Usage

convertIMAGE2025(x)

Arguments

- x magpie object

Value

magpie object

Author(s)

Gabriel Abrahao

convertIRENA	<i>Converts IRENA Regional data</i>
--------------	-------------------------------------

Description

Converts IRENA Regional data

Usage

convertIRENA(x, subtype)

Arguments

x MAgPIE object to be converted
 subtype data subtype. Either "Capacity" or "Generation"

Value

A MAgPIE object containing IRENA country disaggregated data with historical electricity renewable capacities (MW) or generation levels (GWh)

Author(s)

Renato Rodrigues, Pascal Weigmann

Examples

```
## Not run:
a <- convertIRENA(x, subtype = "Capacity")

## End(Not run)
```

convertKLWdamage	<i>convert K LW damage fills in countries for which no damage parameters are provided, setting parameters to zero</i>
------------------	---

Description

convert K LW damage fills in countries for which no damage parameters are provided, setting parameters to zero

Usage

```
convertKLWdamage(x)
```

Arguments

x is MAgPIE object containing the damage parameters from K LW

Value

MAgPIE object containing values for all 249 ISO countries

Author(s)

Franziska Piontek

 convertMarineRegionsOrg

Convert Exclusive Economic Zone (EEZ) size data

Description

Convert Exclusive Economic Zone (EEZ) size data

Usage

convertMarineRegionsOrg(x)

Arguments

x MAgPIE object to be converted

Author(s)

Tabea Dorndorf

 convertNewClimate

Convert policy targets for NPIs from New Climate policy database

Description

Converts conditional and unconditional capacity and production targets into total capacity (GW) in target year. For countries and years without targets, 2020 values from IRENA and BP are used to fill the gaps.

Usage

convertNewClimate(x, subtype, subset)

Arguments

x a magclass object to be converted

subtype Capacity_YYYY_cond or Capacity_YYYY_uncond for Capacity Targets, Emissions_YYYY_cond or Emissions_YYYY_uncond for Emissions targets, with YYYY NPI version year

subset String, designating the GDP scenarios to use. Only used for emission targets.

Details

Emissions targets on absolute level for total GHG emissions without bunkers and land-use change emissions are calculated from country-specific target formulation and land-use change emissions data

Author(s)

Rahel Mandaroux, Léa Hayez, Falk Benke

See Also

[readIRENA\(\)](#)

convertNREL

Convert NREL data

Description

Convert NREL data on ISO country level.

Usage

```
convertNREL(x)
```

Arguments

x MAgPIE object containing NREL data country-region resolution

Value

NRELWirsenius data as MAgPIE object aggregated to country level

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
a <- convertNREL(x, subtype = "onshore")  
  
## End(Not run)
```

convertOpenmod	<i>Converts Openmod capacities data</i>
----------------	---

Description

Converts Openmod capacities data

Usage

```
convertOpenmod(x)
```

Arguments

x MAgPIE object to be converted

Value

A MAgPIE object containing openmod EU country disaggregated data with 2010 and 2015 electricity capacities (GW)

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- convertOpenmod(x)

## End(Not run)
```

convertPBL_EFsBaseline	<i>Disaggregates PBL emission factors from the 26 IMAGE regions to ISO3 country level. As these are emission factors, weights are constant, assuming all countries in a region emit the same amount of each gas per unit of activity.</i>
------------------------	---

Description

Disaggregates PBL emission factors from the 26 IMAGE regions to ISO3 country level. As these are emission factors, weights are constant, assuming all countries in a region emit the same amount of each gas per unit of activity.

Usage

```
convertPBL_EFsBaseline(x)
```

Arguments

x a magpie object

Value

A [magpie](#) object.

convertProdShares	<i>Reads shares of world manufacture for spv modules and wind turbines.</i>
-------------------	---

Description

Reads shares of world manufacture for spv modules and wind turbines.

Usage

```
convertProdShares(x)
```

Arguments

x input magpie object

Value

magpie object with shares

Author(s)

Aman Malik

convertREMIND_11Regi *Converts REMIND 11 Regi data*

Description

Converts REMIND 11 Regi data

Usage

convertREMIND_11Regi(x, subtype)

Arguments

x	MAGPIE object to be converted
subtype	Name of the source, e.g. "fossilExtractionCoeff", "uraniumExtractionCoeff"

Author(s)

unknown

convertREN21 *Policy targets for REN21*

Description

This code aggregates and homogenises different types of renewable energy targets into total installed capacity targets (in GW).

Usage

convertREN21(x, subtype)

Arguments

x	MAGPIE object to be converted
subtype	Only "Capacity" as of now

Details

Policy database accessible in "inputdata/sources/REN21/README"

Value

Maggpie object with Total Installed Capacity targets. The target years differ depending upon the database.

Author(s)

Aman Malik

convertStrefler	<i>convertStrefler</i>
-----------------	------------------------

Description

Converts data on enhanced weathering

Usage

convertStrefler(x, subtype)

Arguments

x	unconverted magpie object from read-script
subtype	data subtype. Either "weathering_graderegi", or "weathering_costs"

Value

magpie object with a completed dataset

convertTCdamageKrichene	<i>Convert TCdamage fills in countries not affected by tropical cyclones (TC), setting parameters to zero</i>
-------------------------	---

Description

Convert TCdamage fills in countries not affected by tropical cyclones (TC), setting parameters to zero

Usage

convertTCdamageKrichene(x)

Arguments

x	is MAgPIE object containing the damage parameters for the TC-prone countries
---	--

Value

MAgPIE object containing values for all 249 ISO countries

Author(s)

Franziska Piontek

convertUBA	<i>Convert UBA data</i>
------------	-------------------------

Description

Convert UBA data

Usage

```
convertUBA(x)
```

Arguments

x	a magpie object
---	-----------------

Author(s)

Falk Benke

convertUNFCCC_NDC	<i>Convert policy targets for NDCs from UNFCCC_NDC</i>
-------------------	--

Description

Converts conditional and unconditional capacity and production targets into total capacity (GW) in target year. For countries and years without targets, 2015 values from IRENA and BP are used to fill the gaps.

Usage

```
convertUNFCCC_NDC(x, subtype, subset = NULL)
```

Arguments

- | | |
|---------|---|
| x | a magclass object to be converted |
| subtype | Capacity_YYYY_cond or Capacity_YYYY_uncond for Capacity Targets, Emissions_YYYY_cond or Emissions_YYYY_uncond for Emissions targets, with YYYY NDC version year |
| subset | String, designating the GDP scenarios to use. Only used for emission targets. |

Details

NDC Emissions targets on absolute level for total GHG emissions without bunkers and land-use change emissions are calculated from country-specific target formulation and land-use change emissions data

Author(s)

Aman Malik, Christoph Bertram, Oliver Richters, Sophie Fuchs, Rahel Mandaroux, Falk Benke

See Also

[readIRENA\(\)](#)

convertWGBU

Convert WGBU data

Description

Convert WGBU data on ISO country level.

Usage

```
convertWGBU(x)
```

Arguments

x MAgPIE object containing WGBU data country-region resolution

Value

WGBU data as MAgPIE object aggregated to country level

Author(s)

Lavinia Baumstark

Examples

```
## Not run:  
a <- convertWGBU(x)  
  
## End(Not run)
```

`fullREMIND`*fullREMIND*

Description

Function that produces the complete regional data set required for the REMIND model.

Usage

```
fullREMIND()
```

Author(s)

Lavinia Baumstark

See Also

[readSource](#), [getCalculations](#), [calcOutput](#)

Examples

```
## Not run:  
fullREMIND()  
  
## End(Not run)
```

`fullTHRESHOLDS`*export validation thresholds*

Description

assemble near-term thresholds from project pipelines and potentially other data sources and export them to a file

Usage

```
fullTHRESHOLDS(type = "config")
```

Arguments

type	choose either "config" to export thresholds as used in the validationConfig or "full" to export all pipeline data
------	---

Author(s)

Pascal Weigmann

fullVALIDATIONREMIND	<i>Generate Validation Data for REMIND</i>
----------------------	--

Description

Function that generates the historical regional dataset against which the REMIND model results can be compared.

Usage

```
fullVALIDATIONREMIND(rev = 0)
```

Arguments

rev	Unused parameter, but required by madrat.
-----	---

Author(s)

David Klein, Falk Benke

See Also

[readSource](#), [getCalculations](#), [calcOutput](#)

Examples

```
## Not run:
fullVALIDATIONREMIND()

## End(Not run)
```

readAGEB	<i>Read AGEB</i>
----------	------------------

Description

Read AGEB

Usage

```
readAGEB(subtype = "balances")
```

Arguments

subtype	data subtype. Either "balances" ("Auswertungstabellen zur Energiebilanz Deutschland") or "electricity" ("Bruttostromerzeugung in Deutschland nach Energieträgern")
---------	--

Author(s)

Falk Benke

readAR6GWP	<i>Read GWP (or other metrics) from the AR6 WGIII Table SM7 per GHG species</i>
------------	---

Description

Read GWP (or other metrics) from the AR6 WGIII Table SM7 per GHG species

Usage

```
readAR6GWP(subtype = "GWP100")
```

Arguments

subtype	data subtype. Currently just "GWP100", but other metrics are also available in the input data
---------	---

Value

A data.frame with two columns, "Gas", with the common name of the GHG species, and "GWP", with the selected GWP

Author(s)

Gabriel Abrahao

readAriadneDB	<i>Ariadne database scenario data</i>
---------------	---------------------------------------

Description

This reads in FORECAST industry production data for Germany used in the Ariadne scenarios

Usage

```
readAriadneDB()
```

Value

A [magpie](#) object.

Author(s)

Felix Schreyer

readBGR	<i>Read BGR oil, gas, coal and uranium reserves data</i>
---------	--

Description

Read-in BGR csv files as magclass object

Usage

```
readBGR(subtype)
```

Arguments

subtype data subtype. Either "oil", "gas", "coal" or "uranium".

Value

magpie object of the BGR (Federal Institute for Geosciences and Natural Resources) data of reserves of oil, gas, coal and uranium per country.

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- readSource(type = "BGR", subtype = "oil")

## End(Not run)
```

readBiocharDeploymentData	<i>Load data for implementation of biochar as magclass object</i>
---------------------------	---

Description

Source: Assumption for REMIND based on data collected in Dorndorf et al (submitted)

Usage

```
readBiocharDeploymentData()
```

Author(s)

Tabea Dorndorf

readBP	<i>BP Capacity and Generation Data</i>
--------	--

Description

BP Capacity and Generation Data

Usage

readBP(subtype)

Arguments

subtype	Either "Emission", "Capacity", "Generation", "Production", "Consumption", "Trade Oil", "Trade Gas", "Trade Coal" or "Price"
---------	---

Value

A [magpie](#) object.

Author(s)

Aman Malik, Falk Benke, Pascal Weigmann

readCEEW	<i>Read Employment factors and cumulative jobs for RE techs (for India)</i>
----------	---

Description

Read Employment factors and cumulative jobs for RE techs (for India)

Usage

readCEEW(subtype)

Arguments

subtype	data subtype. Either "Employment factors" or "Employment"
---------	---

Details

Reports published by CEEW et al. See README.txt in the source folder for more information.

Author(s)

Aman Malik

Examples

```
## Not run:
a <- readSource("CEEW",convert=F,subtype="Employment")

## End(Not run)
```

readDaviesCooling	<i>Read Davies Cooling</i>
-------------------	----------------------------

Description

Read in Davies (2013) data on shares of cooling types per electricity technology and GCAM region

Usage

```
readDaviesCooling(subtype)
```

Arguments

subtype	Type of Davies data that should be read. Available types are: • dataBase: The Davies source data for the base year • dataFuture: The Daves source data for the future
---------	--

Value

MAGPIE object of the Davies (2013) data

Author(s)

Lavinia Baumstark, Ioanna Mouratiadou

Examples

```
## Not run:
a <- readSource(type = "DaviesCooling")

## End(Not run)
```

readDylanAusGasCost	<i>read-in power Australian gas extraction cost curve based on Dylan's data Australian contact: Dylan McConnell, dylan.mcconnell(at)unimelb.edu.au</i>
---------------------	--

Description

read-in power Australian gas extraction cost curve based on Dylan's data Australian contact: Dylan McConnell, dylan.mcconnell(at)unimelb.edu.au

Usage

```
readDylanAusGasCost()
```

Value

magpie object of the cemo database data

Author(s)

Felix Schreyer

readEDGAR7Fgases	<i>Read EDGAR7 emissions data for F-gases per species, in kt of each gas</i>
------------------	--

Description

Read EDGAR7 emissions data for F-gases per species, in kt of each gas

Usage

```
readEDGAR7Fgases()
```

Value

A magpie object with F-gases emissions per gas species and per country

Author(s)

Gabriel Abrahao

readEDGETransport	<i>Read REMIND/EDGE-T iterative input data</i>
-------------------	--

Description

Run EDGE-Transport Standalone in all used scenario combinations to supply input data to REMIND and the iterative EDGE-T script

Usage

```
readEDGETransport(subtype)
```

Arguments

subtype	REMIND/iterative EDGE-T input data subtypes
---------	---

Value

magpie object of EDGETransport iterative inputs

Author(s)

Johanna Hoppe, Alex K. Hagen

Examples

```
## Not run:
a <- readSource(type = "EDGETransport")

## End(Not run)
```

readEmber	<i>Read Ember Yearly Electricity Data</i>
-----------	---

Description

Read Ember Yearly Electricity Data

Usage

```
readEmber()
```

Value

A [magpie](#) object.

Author(s)

Pascal Weigmann

Source<https://ember-climate.org/data-catalogue/yearly-electricity-data/>

readETH_COUN	<i>#' This function reads WACC markup data across regions and periods, computing the average value across technologies for each region and period as a proxy for the macroeconomic cost of capital for each region</i>
--------------	--

Description

#' This function reads WACC markup data across regions and periods, computing the average value across technologies for each region and period as a proxy for the macroeconomic cost of capital for each region

Usage

readETH_COUN()

Author(s)

Diamantis Koutsandreas

readETH_WACC	<i>This function reads WACC markup data across technologies for each of the REMIND regions</i>
--------------	--

Description

This function reads WACC markup data across technologies for each of the REMIND regions

Usage

readETH_WACC()

Author(s)

Diamantis Koutsandreas

`readEuropeanEnergyDatasheets`*Read European Energy Datasheets*

Description

Read European Energy Datasheets .xlsx file as magpie object.

Usage

```
readEuropeanEnergyDatasheets(subtype)
```

Arguments

subtype	data subtype. Either "EU28" (data from June 20 including GBR) or "EU27" (latest data from August 23 without GBR)
---------	--

Value

magpie object of European Energy Datasheets

Author(s)

Renato Rodrigues, Atreya Shankar, Falk Benke

Source

European Energy Datasheets public database https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en

Examples

```
## Not run:  
test <- readSource("EuropeanEnergyDatasheet", subtype = "EU27", convert = FALSE)  
  
## End(Not run)
```

`readEurostat_EffortSharing`*Read EU Effort Sharing targets and historical emissions*

Description

Read-in EU Effort Sharing targets and historical emissions csv files as magclass object

Usage

```
readEurostat_EffortSharing(subtype)
```

Arguments

subtype data subtype. Either "target" or "emissions"

Value

magpie object of the EU Effort Sharing targets (%) or Effort Sharing historical historical emissions (MtCO2)

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- readSource(type = "Eurostat_EffortSharing", subtype = "target")

## End(Not run)
```

`readEurostat_REShare` *Read Eurostat Historical Renewable FE Share Data*

Description

Read Eurostat Historical Renewable FE Share Data as magclass object

Usage

```
readEurostat_REShare()
```

Value

magpie object of Eurostat Historical Renewable FE Share Data (share)

Author(s)

Felix Schreyer

readExpertGuess

*Read ExpertGuess***Description**

Read-in data that are based on expert guess

Usage

readExpertGuess(subtype)

Arguments

subtype

Type of data that should be read. One of

- biocharPrices: Biochar price assumptions over time. Assumptions based on collection of current bulk sale prices (see Dorndorf et al (submitted)) (Tabea Dorndorf)
- capacityFactorGlobal: Global capacity factors for all REMIND technologies (Renato Rodrigues)
- capacityFactorRules: Capacity factor rules for selected H12 regions and REMIND technologies
- ccsBounds: CCS bounds indicating the if a country is expected to do CCS in the foreseeable future (Jessica Strefler)
- co2prices: CO2 prices (Robert Pietzcker)
- costsTradePeFinancial: primary energy tradecosts (financial costs on import, export and use) (Nicolas Bauer)
- deltacapoffset: ??? (Robert Pietzcker)
- gridFactor: Estimates distribution of electricity demands per region (Robert Pietzcker)
- ies: intertemporal elasticity of substitution (Nicolas Bauer)
- prtp: pure rate of time preference (Nicolas Bauer)
- subConvergenceRollback: Subsidy convergence level in rollback scenario in US\$2017 (Nicolas Bauer)
- storageFactor: Regional storage parametrization (Robert Pietzcker)
- taxConvergence: Tax convergence level in US\$2017 (Nicolas Bauer)
- taxConvergenceRollback: Tax convergence level in rollback scenario in US\$2017 (Nicolas Bauer)
- tradeConstraints: parameter by Nicolas Bauer (2024) for the region specific trade constraints, values different to 1 activate constraints and the value is used as effectiveness to varying degrees such as percentage numbers (Nicolas Bauer)
- tradecost: old REMIND data for PE tradecosts (energy losses on import) (?)

Value

magpie object of the data

Author(s)

Lavinia Baumstark, Falk Benke

Examples

```
## Not run:  
a <- readSource(type = "ExpertGuess", subtype = "ies")  
  
## End(Not run)
```

readGAINS2025final	<i>Read and combine air pollution emissions, activities and emission factors from GAINS data</i>
--------------------	--

Description

There's no associated convert function, as the disaggregation takes a combination of subtypes, and it is easier to carry out most calculations at the GAINS regional level first and then disaggregate the results

Usage

```
readGAINS2025final(subtype)
```

Arguments

subtype "emifacs", "emissions", "activities"

Value

Activity levels, emissions or emission factors at the level of 25 GAINS regions, 35 GAINS sectors and 7 species: magclass object with dimensions region, year, and ssp.scenario.sectorGAINS.species

Author(s)

Gabriel Abrahao, Laurin Koehler-Schindler

readGCPT	<i>Data from the Global Coal Plant Tracker January 2021 release by Global Energy Monitor (formerly EndCoal/CoalSwarm)</i>
----------	---

Description

Historical data of operating, under-construction, planned and announced Coal Plants by country (in MW) from the Global Energy Monitor's Global Coal Plant Tracker, and extrapolations for 2025 capacity scenarios

Usage

readGCPT(subtype)

Arguments

subtype Options are status, historical, future, lifespans, comp_rates and emissions

Author(s)

Stephen Bi

readGEA2012	<i>read GEA 2012</i>
-------------	----------------------

Description

Read in datafiles comprising fossil fuel data from the Global Energy Assessment 2012

Usage

readGEA2012(subtype)

Arguments

subtype Type of fossil fuel and type of data (oil, coal, or gas + costs, qtys, or dec)

Value

MAGPIE object of the GEA data

Author(s)

Stephen Bi

Examples

```
## Not run:
a <- readSource("GEA2012", "coal")

## End(Not run)
```

readGGDC10	<i>Read</i>	<i>GGDC</i>	<i>10-Sector</i>	<i>Database</i>	-
	<i>https://www.rug.nl/ggdc/structuralchange/previous-sector-database/10-sector-2014</i>				

Description

Read GGDC 10-Sector Database - <https://www.rug.nl/ggdc/structuralchange/previous-sector-database/10-sector-2014>

Usage

```
readGGDC10()
```

Author(s)

Renato Rodrigues

Examples

```
## Not run:
a <- readSource("GGDC10", convert=F)

## End(Not run)
```

readGidden2025_geological_storage_potential
<i>Read geological storage potential</i>

Description

Read geological storage potential

Usage

```
readGidden2025_geological_storage_potential()
```

Value

A magpie object with geological storage potential. Off = offshore; On = onshore; potTech = technical potential without any exclusion layers applied; potLim = applying all exclusion layers described in Table S1 (e.g. protected areas, population centers, max and min depth, etc.)

Author(s)

David Klein

readGini	<i>Read Gini</i>
----------	------------------

Description

Read Gini coefficients for SSP scenarios from Rao et al., Futures, 2018. Data has been provided by the authors, but will be made publicly available as well. This contains data for 184 countries and from 2011 onwards.

Usage

```
readGini()  
  
convertGini(x)
```

Arguments

x	MAGPIE object returned from readGini
---	--------------------------------------

Details

Copied from the documentation provided by the authors: This sheet contains the original Gini projections for 43 countries from the underlying empirical model (See reference to RSP 2016 in the main paper) and the extrapolations to all countries using the methodology described in the article. The country codes are the World Bank codes.

Value

magpie object of the Gini data

Author(s)

Bjoern Soergel

Examples

```
## Not run:  
a <- readSource(type="Gini")  
  
## End(Not run)
```

`readGlobalEnergyMonitor`*Read Global Energy Monitor data*

Description

read GEM data for all available technologies and relevant statuses

Usage

```
readGlobalEnergyMonitor()
```

Author(s)

Rahel Mandaroux, Falk Benke, Pascal Weigmann

`readHRE`*Read Heat Roadmap Europe data*

Description

Read Heat Roadmap Europe data

Usage

```
readHRE()
```

Value

A [magpie](#) object.

Author(s)

Pascal Weigmann

Source

<https://heatroadmap.eu/roadmaps/>

<code>readIEA</code>	<i>Nuclear data from world-nuclear.org</i>
----------------------	--

Description

Data on currently operating and under-construction nuclear power plants, reactors planned and proposed, electricity generation from nuclear

Usage

`readIEA()`

Author(s)

Christoph Bertram, Pascal Weigmann

<code>readIEA_PRIS</code>	<i>read IAEA Power Reactor Information System</i>
---------------------------	---

Description

read Nuclear capacities and near-term outlook from data scraped from <https://pris.iaea.org/PRIS/CountryStatistics/CountryStatistics>

Usage

`readIEA_PRIS()`

Author(s)

Pascal Weigmann

<code>readIEA_CCUS</code>	<i>Read IEA CCUS data</i>
---------------------------	---------------------------

Description

Reads in capacities from projects in IEA CCUS database

Usage

`readIEA_CCUS(subtype)`

Arguments

subtype either historical for data until 2024, projections for "high" and "low" projections up to 2030 used as input-data or pipeline separated by status for use in formulating near-term bounds

Author(s)

Anne Merfort, Falk Benke, Pascal Weigmann

readIEA_EVOutlook	<i>Read IEA EV Outlook</i>
-------------------	----------------------------

Description

Read IEA EV Outlook

Usage

```
readIEA_EVOutlook()
```

Author(s)

Falk Benke

readIEA_HSMR	<i>read IEA Hydro Special Market Report</i>
--------------	---

Description

read Hydro capacities and near-term outlook from data scraped from <https://www.iea.org/data-and-statistics/data-tools/hydropower-data-explorer>

Usage

```
readIEA_HSMR()
```

Author(s)

Pascal Weigmann

`readIEA_HydrogenProduction`*Reads excel sheet of IEA hydrogen project pipeline and builds yearly capacity by country from it. The data is distinguished by technology*

Description

Reads excel sheet of IEA hydrogen project pipeline and builds yearly capacity by country from it. The data is distinguished by technology

Usage`readIEA_HydrogenProduction()`**Value**

magpie object with Hydrogen capacity data both in MWel and in kT H2/y

Author(s)

Simon Krogmann

`readIEA_PVPS`*Reads PV investment cost data for 2020 which are based on 2018 data from IEA PVPS report*

Description

reads excel sheet with PV investment cost data

Usage`readIEA_PVPS()`**Value**

magpie object with PV investment cost data

Author(s)

Felix Schreyer

readIEA_REN	<i>Reads the distributed solar pv capacity from IEA Renewables report (2019).</i>
-------------	---

Description

Reads the distributed solar pv capacity from IEA Renewables report (2019).

Usage

```
readIEA_REN()
```

Details

Capacity in GW. Distributed solar, defined in the IEA Renewables (2019), includes rooftop residential (0-10 kW, grid-connected), rooftop and ground-mounted commercial and industrial (10-1000kW, grid-connected), and off-grid (8W - 100 kW)

Author(s)

Aman Malik

readIEA_WEIO	<i>IEA World Energy Investment Outlook</i>
--------------	--

Description

Read 2015-2024 investments statistical data in energy sector (electricity, oil, gas) IEA World Energy Investment Outlook (2024) (<https://www.iea.org/data-and-statistics/data-product/world-energy-investment-2024-datafile>)

Usage

```
readIEA_WEIO()
```

Author(s)

Nicolas Bauer, Falk Benke

readIEA_WEO	<i>Read IEA World Energy Outlook data</i>
-------------	---

Description

Read-in IEA WEO 2016 data for investment costs of different technologies, and WEO 2017 data for historical electricity capacities (GW)

Usage

```
readIEA_WEO(subtype)
```

Arguments

subtype data subtype. Either "Capacity" or "Invest_Costs"

Author(s)

Renato Rodrigues, Aman Malik, and Jerome Hilaire

readIEA_WorldEnergyOutlook	<i>Read in IEA World Energy Outlook Data from 2023</i>
----------------------------	--

Description

Read in IEA World Energy Outlook Data from 2023

Usage

```
readIEA_WorldEnergyOutlook()
```

Author(s)

Falk Benke

readIIASA_subs_taxes	<i>Read IIASA subsidies and taxes</i>
----------------------	---------------------------------------

Description

Read-in country level data on final energy taxes and subsidies as provided from IIASA from .csv file as magclass object

Usage

```
readIIASA_subs_taxes(subtype)
```

Arguments

subtype	Type of country level data as compiled by IIASA that should be read in. Available types are: • tax_rate: tax rate pre final energy category • subsidies_bulk: subsidy rate per final energy category • energy: final energy quantities per category
---------	---

Value

magpie object of the IIASA_subs_taxes data

Author(s)

Christoph Bertram

Examples

```
## Not run:  
a <- readSource(type = "IIASA_subs_taxes", "tax_rate")  
  
## End(Not run)
```

readIIASALanduse	<i>read IIASA Land Use Emissions</i>
------------------	--------------------------------------

Description

read IIASA Land Use Emissions

Usage

```
readIIASALanduse(subtype)
```

Arguments

subtype one of "historical", "forecast2030", "forecast2035"

Author(s)

Falk Benke

readIMAGE2025	<i>Read F-gases emissions data from several IMAGE scenarios, obtained in 2025</i>
---------------	---

Description

Read F-gases emissions data from several IMAGE scenarios, obtained in 2025

Usage

readIMAGE2025()

Value

magpie object with several F-gas emission variables for several IMAGE scenarios

Author(s)

Gabriel Abrahao

readIRENA	<i>Read IRENA</i>
-----------	-------------------

Description

Read-in an IRENA xlsx file as magclass object

Usage

readIRENA(subtype)

Arguments

subtype data subtype. Either "Capacity" or "Generation"

Value

magpie object of the IRENA data with historical electricity renewable capacities (MW) or generation levels (GWh)

Author(s)

Renato Rodrigues, Pascal Weigmann

Examples

```
## Not run:
a <- readSource(type = "IRENA", subtype = "Capacity")

## End(Not run)
```

readKLWdamage	<i>Reads country-specific damage coefficients for the damage function presented in Kotz et al. (2024). Data has been provided by the authors. This contains data for all countries and for 1000 bootstrapping realizations per country, capturing uncertainty from climate and empirical modeling. Subtypes are the temperature and temperature^2 coefficients and the maximum temperature per country for which the function is defined.</i>
---------------	---

Description

Reads country-specific damage coefficients for the damage function presented in Kotz et al. (2024). Data has been provided by the authors. This contains data for all countries and for 1000 bootstrapping realizations per country, capturing uncertainty from climate and empirical modeling. Subtypes are the temperature and temperature^2 coefficients and the maximum temperature per country for which the function is defined.

Usage

```
readKLWdamage(subtype)
```

Arguments

subtype data subtype. Either "beta1", "beta2" or "maxGMT"

Value

KLW damage coefficients

Author(s)

Franziska Piontek

```
readMacknickIntensities
```

Read Macknic Intensities

Description

Read in Macknick (2011) data on water consumption and withdrawal coefficients per electricity technology

Usage

```
readMacknickIntensities(subtype)
```

Arguments

subtype Type of Macknick data that should be read. Available types are:

- data: The original Macknick source data
- missingAssumed: Additional data to fill gaps

Value

MAGPIE object of the Macknick (2011) data

Author(s)

Ioanna Mouratiadou

Examples

```
## Not run:
a <- readSource(type = "MacknickIntensities", convert = FALSE)

## End(Not run)
```

```
readMarineRegionsOrg
```

Load Exclusive Economic Zone (EEZ) size data as magclass object. Areas with overlapping claims or jointly governed areas are split equally between the respective countries.

Description

Source: Flanders Marine Institute (2023). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 12. Available online at <https://www.marineregions.org/>. <https://doi.org/10.14284/632>

Usage

readMarineRegionsOrg()

Author(s)

Tabea Dorndorf

readNewClimate	<i>Reads NPI policy database with technology capacity target from the Policy data base (v4 August 2024) by PBL that translate the high impact policies of https://climatepolicydatabase.org/.</i>
----------------	--

Description

Reads excel sheet with NPi (National Policies Implemented) data on different policy targets (capacity, production, emissions) with different variations. NPI targets only include targets that are based on implemented policy instruments.

Usage

readNewClimate(subtype, subset)

Arguments

subtype	Capacity_YYYY_cond or Capacity_YYYY_uncond for Capacity Targets, Emissions_YYYY_cond or Emissions_YYYY_uncond for Emissions targets, RenShareTargets for renewable energy share targets, with YYYY NDC version year, determines the database version to be read in
subset	A string (or vector of strings) designating the scenario(s) to be returned (only used in convert).

Author(s)

Rahel Mandaroux, Léa Hayez, Falk Benke

Value

The read-in data, usually a magpie object. If supplementary is TRUE a list including the data and metadata is returned instead. The temporal and data dimensionality should match the source data. The spatial dimension should either match the source data or, if the convert argument is set to TRUE, should be on ISO code country level.

See Also

`madrat::readSource()`

Examples

```
## Not run:
readSource("OECD")

## End(Not run)
```

readOpenmod

Read Openmod capacities data

Description

Read-in an modified openmod capacities data file as magclass object

Usage

```
readOpenmod()
```

Value

magpie object of the LIMES team updated Openmod data on capacities (GW)

Examples

```
## Not run:
a <- readSource(type = "Openmod")

## End(Not run)
```

readPBL_EFsBaseline	<i>Read emission factors from a PBL IMAGE baseline (no mitigation) scenario for a specific sector and gas species (CH4 or N2O)</i>
---------------------	--

Description

Read emission factors from a PBL IMAGE baseline (no mitigation) scenario for a specific sector and gas species (CH4 or N2O)

Usage

readPBL_EFsBaseline(subtype)

Arguments

subtype gas and subsector combination string. One of: c("CH4_entf", "CH4_gasp", "CH4_landf", "CH4_manu", "CH4_oilp", "CH4_rice", "CH4_sewa", "N2O_adip", "N2O_fert", "N2O_manu", "N2O_nitr", "N2O_sewa", "N2O_tran")

Value

A [magpie](#) object.

readProdShares	<i>Reads shares of world manufacture for spv modules and wind turbines.</i>
----------------	---

Description

Reads shares of world manufacture for spv modules and wind turbines.

Usage

readProdShares()

Author(s)

Aman Malik

readPWT	<i>Read PWT</i>
---------	-----------------

Description

Read-in PWT data (version 8.0) as magclass object

Usage

```
readPWT()
```

```
convertPWT(x)
```

Arguments

x	MAGPIE object returned by readPWT
---	-----------------------------------

Value

The read-in data, usually a magpie object. If supplementary is TRUE a list including the data and metadata is returned instead. The temporal and data dimensionality should match the source data. The spatial dimension should either match the source data or, if the convert argument is set to TRUE, should be on ISO code country level.

See Also

[madrat::readSource\(\)](#)

Examples

```
## Not run:  
readSource("PWT")  
  
## End(Not run)
```

readREMIND_11Regi	<i>Read REMIND 11 Regi data</i>
-------------------	---------------------------------

Description

Read REMIND 11 Regi data

Usage

```
readREMIND_11Regi(subtype)
```

Arguments

subtype Name of the source, e.g. "fossilExtractionCoeff", "uraniumExtractionCoeff"

Author(s)

unknown

readREN21	<i>Reads policy database from REN21 2017 with capacity targets or regional technology costs</i>
-----------	---

Description

Reads excel sheet with data on proposed policies, on Renewable energy capacity targets (which are broken down into Total Installed Capacity (TIC-Absolute), Additional Installed Capacity (AC-Absolute), and Production Absolute targets) or regional technology costs

Usage

readREN21(subtype)

Arguments

subtype Capacity Generation Emissions Share

Details

Country name is ISO coded. Capacity/Additional Capacity targets are in GW. Generation/Production targets are in GWh.

Value

magpie object with Total Installed Capacity targets in GW for different target years

Author(s)

Aman Malik, Lavinia Baumstark

Value

TC damage coefficients

Author(s)

Franziska Piontek

readUBA

Read UBA

Description

Read UBA

Usage

readUBA()

Author(s)

Falk Benke

readUNFCCC_NDC

Reads NDC policy database with capacity and emission targets, originally based on Rogelj et al. 2017

Description

Reads excel sheet with NDC (Nationally Determined Contributions) data on different policy targets (capacity, production, emissions) with different variations.

Usage

readUNFCCC_NDC(subtype, subset)

Arguments

subtype	Capacity_YYYY_cond or Capacity_YYYY_uncond for Capacity Targets, Emissions_YYYY_cond or Emissions_YYYY_uncond for Emissions targets, with YYYY NDC version year, determines the database version to be read in
subset	A string (or vector of strings) designating the scenario(s) to be returned (only used in convert).

Author(s)

Aman Malik, Christoph Bertram, Oliver Richters, Sophie Fuchs, Rahel Mandaroux, Falk Benke

readWGBU

*Read WGBU***Description**

Read-in an WGBU xlsx file as magclass object

Usage

```
readWGBU()
```

Value

magpie object of WGBU

Author(s)

Lavinia Baumstark

Examples

```
## Not run:
a <- readSource(type = "WGBU")

## End(Not run)
```

toolAddDimensions

Wrapper around magclass::add_dimension supporting more than one value for the new dimension. For each value, the input magclass object is copied, extended by the new dimension and appended to the output.

Description

Wrapper around magclass::add_dimension supporting more than one value for the new dimension. For each value, the input magclass object is copied, extended by the new dimension and appended to the output.

Usage

```
toolAddDimensions(x, dimVals, dimName, dimCode)
```

Arguments

x	a magclass object
dimVals	list of values for the new dimension to be added
dimName	name of the new dimension
dimCode	dimension number of the new dimension (e.g. 3.1)

Value

the extended magclass object

toolAggregateTimeSteps

Aggregate values to n-year averages to suppress volatility

Description

Aggregate values to n-year averages to suppress volatility

Usage

```
toolAggregateTimeSteps(x, nYears = 5)
```

Arguments

x	a magclass object
nYears	time steps to be used for averaging, defaults to 5

Value

magclass object with averages

Author(s)

Robin Hasse

toolBiomassSupplyAggregate

toolBiomassSupplyAggregate The function aggregates biomass supply curves to regionmapping different from H12. It only works if all regions are subregions of H12 regions. The offset parameter (a) is taken from the H12 region. The slope parameter (b) is multiplied by a weight. The weight is the inverse of the share of agricultural area of the subregion in the H12 region.

Description

toolBiomassSupplyAggregate The function aggregates biomass supply curves to regionmapping different from H12. It only works if all regions are subregions of H12 regions. The offset parameter (a) is taken from the H12 region. The slope parameter (b) is multiplied by a weight. The weight is the inverse of the share of agricultural area of the subregion in the H12 region.

Usage

```

toolBiomassSupplyAggregate(
  x,
  rel = NULL,
  weight = calcOutput("FAOLand", aggregate = FALSE)[, , "6610", pmatch = TRUE][, "y2010",
]
)

```

Arguments

x magclass object that should be aggregated
rel relation matrix containing a region mapping.
weight aggregation weight

Value

return: returns region aggregated biomass supply curve data

Author(s)

Felix Schreyer

toolCalcEnergyProj	<i>Calculate energy projections on country-level based on EDGE models outputs per country. These energy projections are used in the input data preparation for aggregating country-specific data to REMIND regions. They are a country-level proxy of the final energy demand trajectories on the level of REMIND regions provided by the EDGE models.</i>
--------------------	--

Description

Calculate energy projections on country-level based on EDGE models outputs per country. These energy projections are used in the input data preparation for aggregating country-specific data to REMIND regions. They are a country-level proxy of the final energy demand trajectories on the level of REMIND regions provided by the EDGE models.

Usage

```

toolCalcEnergyProj(subtype, subset, scenario, years = seq(2020, 2050, 5))

```

Arguments

subtype	"FE" (Total final energy consumption), "SEIElectricity" (SE electricity generation)
subset	GDP scenario to use
scenario	set of GDP scenarios to use for calcFeDemandBuildings and calcFeDemandIndustry calculation (trigger standard cache in this function)
years	target years for projection

Author(s)

Felix Schreyer

See Also

[convertNewClimate\(\)](#)

toolCalcGhgTarget

Calculate absolute emission targets

Description

Calculate absolute emission targets depending on country-specific emissions target formulations. So far, the function mainly used to calculate NDC emissions targets.

Usage

```
toolCalcGhgTarget(x, subtype, subset)
```

Arguments

x	a magclass object with targets read in from NDC or NPI database
subtype	Emissions_YYYY_cond or Emissions_YYYY_uncond
subset	String, designating the GDP scenarios to use

Author(s)

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See Also

[convertUNFCCC_NDC\(\)](#), [convertNewClimate\(\)](#)

```
toolCubicFunctionAggregate
      toolCubicFunctionAggregate
```

Description

Estimates the function that represents the sum of cubic function inverses (sum in the x-axis)

Usage

```
toolCubicFunctionAggregate(
  x,
  rel = NULL,
  xLowerBound = 0,
  xUpperBound = 100,
  returnMagpie = TRUE,
  returnCoeff = TRUE,
  returnChart = FALSE,
  returnSample = FALSE,
  numberOfSamples = 1000,
  unirootLowerBound = -10,
  unirootUpperBound = 1e+100,
  colourPallette = FALSE,
  label = list(x = "x", y = "y", legend = "legend"),
  steepCurve = list()
)
```

Arguments

<code>x</code>	magclass object that should be aggregated or data frame with coefficients as columns.
<code>rel</code>	relation matrix containing a region mapping. A mapping object should contain 2 columns in which each element of x is mapped to the category it should belong to after (dis-)aggregation
<code>xLowerBound</code>	numeric. Lower bound for x sampling (default=0).
<code>xUpperBound</code>	numeric. Upper bound for x sampling (default=100).
<code>returnMagpie</code>	boolean. if true, the function will return a single data table with all the countries in MagPie format. returnChart and returnSample are set to FALSE automatically if this option is active (default=TRUE).
<code>returnCoeff</code>	boolean. Return estimated coefficients (default=TRUE).
<code>returnChart</code>	boolean. Return chart (default=FALSE).
<code>returnSample</code>	boolean. Return samples used on estimation (default=FALSE).
<code>numberOfSamples</code>	numeric. Number of y-axis samples used on estimation (default=1e3).

unirootLowerBound	numeric. Lower bound to search for inverse solution in the initial bounds (default = -10).
unirootUpperBound	numeric. Upper bound to search for inverse solution in the initial bounds (default = 1e100).
colourPallette	vector. colour pallette to use on chart (default=FALSE).
label	list. List of chart labels (default=list(x = "x", y = "y", legend = "legend")).
steepCurve	list. List with coefficients for a very "vertical" function for the case with all countries with upper bound zero in an specific region aggregation (default=empty list, list()).

Details

Use case: aggregate country cubic cost functions to a single function that represents the entire region.

input: coefficients of the n-th country level cubic cost function.

Description of the problem: the aggregation of functions that represent unit costs, or prices in the y-axis, and quantities in the x-axis require operations with the inverse of the original functions. As complex functions present analytically challenging inverse function derivations, we adopt a sampling method to derive the function that corresponds to the sum of cubic function inverses.

Further extensions: the R function can be extended to support more complex curve estimations (beyond third degree), whenever the mathematical function have a well defined inverse function in the selected boundaries.

Value

return: returns a list of magpie objects containing the coefficients for the aggregate function. If returnMagpie is FALSE, returns a list containing the coefficients for the aggregate function (returnCoeff=TRUE), charts (returnChart=FALSE) and/or samples used in the estimation (returnSample=FALSE).

Author(s)

Renato Rodrigues

See Also

[toolCubicFunctionDisaggregate](#)

Examples

```
# Example
# data
EUR <- setNames(data.frame(30, 50, 0.123432, 2), c("c1", "c2", "c3", "c4"))
NEU <- setNames(data.frame(30, 50, 1.650330, 2), c("c1", "c2", "c3", "c4"))
df <- rbind(EUR, NEU)
row.names(df) <- c("EUR", "NEU")
```

```

data <- add_dimension(as.magpie(df), dim=3.1, nm="dummy")
# maxExtraction (upper limit for function estimation)
maxExtraction <- 23
# output
output <- toolCubicFunctionAggregate(data,
  xUpperBound = maxExtraction,
  returnMagpie = FALSE, returnChart = TRUE, returnSample = TRUE,
  label = list(x = "Cumulated Extraction", y = "Cost", legend = "Region Fuel Functions")
)
output$dummy$coeff
output$dummy$chart

```

toolCubicFunctionDisaggregate

toolCubicFunctionDisaggregate

Description

Estimates cubic function inverses based on a weight factor that sum up to the original cubic function (sum in the x-axis)

Usage

```

toolCubicFunctionDisaggregate(
  x,
  weight,
  rel = NULL,
  xLowerBound = 0,
  xUpperBound = 100,
  returnMagpie = TRUE,
  returnCoeff = TRUE,
  returnChart = FALSE,
  returnSample = FALSE,
  numberOfSamples = 1000,
  unirootLowerBound = -10,
  unirootUpperBound = 1e+100,
  colourPallette = FALSE,
  label = list(x = "x", y = "y", legend = "legend")
)

```

Arguments

x	magclass object that should be aggregated or data frame with coefficients as columns.
weight	magclass object containing weights which should be considered for a weighted aggregation. The provided weight should only contain positive values, but does not need to be normalized (any positive number ≥ 0 is allowed).

rel	relation matrix containing a region mapping. A mapping object should contain 2 columns in which each element of x is mapped to the category it should belong to after (dis-)aggregation
xLowerBound	numeric. Lower bound for x sampling (default=0).
xUpperBound	numeric. Upper bound for x sampling (default=100).
returnMagpie	boolean. if true, the function will return a single data table with all the countries in MagPie format. returnChart and returnSample are set to FALSE automatically if this option is active (default=TRUE).
returnCoeff	boolean. Return estimated coefficients (default=TRUE).
returnChart	boolean. Return chart (default=FALSE).
returnSample	boolean. Return samples used on estimation (default=FALSE).
numberOfSamples	numeric. Number of y-axis samples used on estimation (default=1e3).
unirootLowerBound	numeric. Lower bound to search for inverse solution in the initial bounds (default = -10).
unirootUpperBound	numeric. Upper bound to search for inverse solution in the initial bounds (default = 1e100).
colourPallete	vector. colour pallete to use on chart (default=FALSE).
label	list. List of chart labels (default=list(x = "x", y = "y", legend = "legend")).

Details

Use case: disaggregate a single region cubic cost function to multiple country cubic functions weighted by a contribution factor. The sum of the countries function output is equal to the original regional function.

input: coefficients of the n-th country level cubic cost function.

Description of the problem: the disaggregation of functions that represent unit costs (or prices) in the y-axis and quantities in the x-axis require operations with the inverse of the original functions. As complex functions present analytically challenging inverse function derivations, we adopt a sampling method to derive the function that corresponds to the sum of cubic function inverses.

Further extensions: the R function can be extended to support more complex curve estimations (beyond third degree), whenever the mathematical function have a well defined inverse function in the selected boundaries.

Value

return: returns a list of magpie objects containing the coefficients for the aggregate function. If returnMagpie is FALSE, returns a list containing the coefficients for the aggregate function (returnCoeff=TRUE), charts (returnChart=FALSE) and/or samples used in the estimation (returnSample=FALSE).

Author(s)

Renato Rodrigues

See Also

[toolCubicFunctionAggregate](#)

Examples

```
# Example
# LAM coefficients
df <- setNames(data.frame(30, 50, 0.34369, 2), c("c1", "c2", "c3", "c4"))
row.names(df) <- "LAM"
# weight
weight <- setNames(c(21, 0, 579, 3, 228), c("ARG", "BOL", "BRA", "CHL", "COL"))
# maxExtraction (upper limit for function estimation)
maxExtraction <- 100
# output
output <- toolCubicFunctionDisaggregate(df, weight,
  xUpperBound = maxExtraction,
  returnMagpie = FALSE, returnChart = TRUE, returnSample = TRUE,
  label = list(x = "Cumulated Extraction", y = "Cost", legend = "Region Fuel Functions")
) #' output$chart
output$coeff
output$chart
```

`toolFillEU34Countries` *Sets values for 6 EU countries not belonging to EU 28 but EU 34 to zero if they are NA. Used to avoid EUR region yielding NA because of these countries.*

Description

Sets values for 6 EU countries not belonging to EU 28 but EU 34 to zero if they are NA. Used to avoid EUR region yielding NA because of these countries.

Usage

```
toolFillEU34Countries(x)
```

Arguments

`x` magpie object with 249 ISO country codes in the spatial dimension

Author(s)

Falk Benke

```
toolFillYearsWithClosest
```

*Fills years in a magpie object with their closest temporal neighbor
When a NA is in the middle of two valid years, choose the previous
one*

Description

Does not do anything for slices where all timesteps are NA

Usage

```
toolFillYearsWithClosest(inx)
```

Arguments

inx a magclass object with NAs

Value

the magclass object with some of those NAs filled

```
toolProcessClimateTargetDatabase
```

*Helper to validate data read in from UNFCCC NDC and New Climate
databases and apply some pre-processing*

Description

Helper to validate data read in from UNFCCC NDC and New Climate databases and apply some pre-processing

Usage

```
toolProcessClimateTargetDatabase(input, database, subtype)
```

Arguments

input data frame representing the data from climate target database
database database to be read in, used for logging info
subtype database version to be read in, used for logging info

See Also

[readUNFCCC_NDC\(\)](#), [readNewClimate\(\)](#)

```
toolSolarFunctionAggregate  
    toolSolarFunctionAggregate
```

Description

Aggregate Solar data into regions

Usage

```
toolSolarFunctionAggregate(  
  x,  
  rel = NULL,  
  weight = calcOutput("FE", aggregate = FALSE)[, "y2015", "FE|Electricity (EJ/yr)"]  
)
```

Arguments

x	magclass object that should be aggregated
rel	relation matrix containing a region mapping. A mapping object should contain 2 columns in which each element of x is mapped to the category it should belong to after (dis-)aggregation
weight	aggregation weight (should be FE Electricity (EJ/yr) in 2015)

Value

return: returns region aggregated solar data

Author(s)

Felix Schreyer, Renato Rodrigues, Julian Oeser

Index

calcAGEB, [7](#)
calcAirPollBaseyearEmi, [8](#)
calcBiocharBounds, [9](#)
calcBiocharLimitCropland, [9](#)
calcBiomassPrices, [10](#)
calcBP, [11](#)
calcCapacity, [11](#)
calcCapacityBounds, [12](#)
calcCapacityFactor, [12](#)
calcCapacityFactorHist, [13](#)
calcCapacityNuclear, [13](#)
calcCapital, [14](#)
calcCapTarget, [14](#)
calcCCScapacity, [15](#)
calcCoolingSharesAll, [15](#), [16](#), [17](#)
calcCoolingSharesBase, [16](#), [16](#), [17](#)
calcCoolingSharesFuture, [16](#), [17](#)
calcCostOfCapital, [17](#)
calcCostsTrade, [18](#)
calcCostsTradePeFinancial, [18](#)
calcCostsWeathering, [19](#)
calcDiffInvestCosts, [19](#)
calcDspvShare, [20](#)
calcEDGAR7Fgases, [21](#)
calcEDGETransport, [21](#)
calcEEAGHGEmissions, [22](#)
calcEEAGHGProjections, [22](#)
calcEEZdistribution, [22](#)
calcEmber, [23](#)
calcEmiCO2LandUse, [23](#)
calcEmiFossilFuelExtr, [24](#)
calcEmiLULUCFCountryAcc, [24](#)
calcEmiMac1990, [25](#)
calcEmiReference, [25](#)
calcEmissions4ReportExtra, [26](#)
calcEmiTarget, [27](#)
calcEmiTarget(), [28](#)
calcEmiTargetReference, [27](#)
calcEuropeanEnergyDatasheets, [28](#)

calcEurostatEmissions, [28](#)
calcExogDemScen, [29](#)
calcExpertGuess, [29](#)
calcFeDemandBuildings, [30](#)
calcFeDemandONONSPEC, [30](#)
calcFEShares, [31](#)
calcFETaxes, [32](#)
calcFGas, [32](#)
calcFossilExtraction, [33](#)
calcGAINS2025, [34](#)
calcGEA2012, [35](#)
calcGlobalEnergyMonitor, [35](#)
calcHistoricalLUEmissions, [36](#)
calcHRE, [36](#)
calcIEA_EB_directSum, [37](#)
calcIEA_ETP, [37](#)
calcIEA_EVOutlook, [37](#)
calcIeaWorldEnergyOutlook, [38](#)
calcInvestmentHistorical, [38](#)
calcIoRemind, [39](#)
calcIRENA, [39](#)
calcJRC_IDEES, [40](#)
calcKLWdamage, [40](#)
calcMACCbaseN20, [41](#)
calcMACCsCO2, [42](#)
calcMacroInvestments, [42](#)
calcMacroWACC, [43](#)
calcOtherFossilInElectricity, [43](#)
calcOutput, [87](#), [88](#)
calcPE, [44](#)
calcPETaxes, [44](#)
calcPHI, [45](#)
calcPlasticsEoL, [45](#)
calcPotentialGeologicalStorage, [46](#)
calcPotentialGeothermal, [46](#)
calcPotentialHydro, [47](#)
calcPotentialWeathering, [48](#)
calcPotentialWindOff, [48](#)
calcPotentialWindOn, [49](#)

- calcProdShares, 50
- calcProjectPipelines, 50
- calcRatioPPP2MER, 51
- calcRenShareTargets, 52
- calcSeProduction, 52
- calcSharedTarget, 53
- calcSolar, 53
- calcStorageFactor, 54
- calcTCdamage, 55
- calcTheil, 55
- calcTrade, 56
- calcUBA, 56
- calcUNFCCC, 57
- calcWasteEnergyUseShares, 57
- calcWaterConsCoef, 58, 59
- calcWaterWithCoef, 58, 58
- convertAGEB, 59
- convertAriadneDB, 60
- convertBGR, 60
- convertBiocharDeploymentData, 61
- convertBP, 61
- convertDaviesCooling, 16, 62
- convertDylanAusGasCost, 63
- convertEDGAR7Fgases, 63
- convertEDGETransport, 64
- convertEmber, 64
- convertEuropeanEnergyDatasheets, 65
- convertEurostat_EffortSharing, 66
- convertEurostat_REShare, 66
- convertExpertGuess, 67
- convertGEA2012, 68
- convertGGDC10, 69
- convertGidden2025_geological_storage_potential, 69
- convertGini (readGini), 102
- convertGlobalEnergyMonitor, 70
- convertHRE, 70
- convertIAEA, 71
- convertIAEA_PRIS, 71
- convertIEA_CCUS, 72
- convertIEA_EVOutlook, 72
- convertIEA_HSMR, 73
- convertIEA_HydrogenProduction, 73
- convertIEA_PVPS, 74
- convertIEA_REN, 74
- convertIEA_WEO, 75
- convertIEA_WorldEnergyOutlook, 75
- convertIIASA_subs_taxes, 32, 44, 76
- convertIIASALanduse, 76
- convertIMAGE2025, 77
- convertIRENA, 77
- convertKLWdamage, 78
- convertMarineRegionsOrg, 79
- convertNewClimate, 79
- convertNewClimate(), 124
- convertNREL, 49, 80
- convertOECD (readOECD), 114
- convertOpenmod, 81
- convertPBL_EFsBaseline, 81
- convertProdShares, 82
- convertPWT (readPWT), 117
- convertREMIND_11Regi, 83
- convertREN21, 83
- convertStrefler, 84
- convertTCdamageKrichene, 84
- convertUBA, 85
- convertUNFCCC_NDC, 85
- convertUNFCCC_NDC(), 28, 124
- convertWGBU, 47, 86
- fullREMIND, 87
- fullTHRESHOLDS, 87
- fullVALIDATIONREMIND, 88
- getCalculations, 87, 88
- madrat::calcOutput(), 51
- madrat::readSource(), 115, 117
- magpie, 28, 29, 36, 40, 52, 60, 62, 64, 70, 71, 82, 89, 91, 94, 103, 116
- mrdrivers::calcGDP, 55
- mrdrivers::calcGDP(), 14, 27
- mrdrivers::toolGetUnitDollar(), 51
- mrlandcore::calcCroparea(), 10
- mrremind (mrremind-package), 6
- mrremind-package, 6
- readAGEB, 88
- readAR6GWP, 89
- readAriadneDB, 89
- readAriadneDB(), 60
- readBGR, 90
- readBiocharDeploymentData, 90
- readBP, 91
- readCEEW, 91
- readDaviesCooling, 16, 62, 92
- readDylanAusGasCost, 93

readEDGAR7Fgases, 93
 readEDGETransport, 94
 readEmber, 94
 readEmber(), 64
 readEndCoal (readGCPT), 100
 readETH_COUN, 95
 readETH_WACC, 95
 readEuropeanEnergyDatasheets, 96
 readEurostat_EffortSharing, 97
 readEurostat_REShare, 97
 readExpertGuess, 98
 readGAINS2025final, 99
 readGCPT, 100
 readGEA2012, 100
 readGGDC10, 101
 readGidden2025_geological_storage_potential, 101
 readGini, 56, 102
 readGlobalEnergyMonitor, 103
 readHRE, 103
 readHRE(), 70
 readIAEA, 104
 readIAEA_PRIS, 104
 readIEA_CCUS, 104
 readIEA_EVOutlook, 105
 readIEA_HSMR, 105
 readIEA_HydrogenProduction, 106
 readIEA_PVPS, 106
 readIEA_REN, 107
 readIEA_WEIO, 107
 readIEA_WEO, 108
 readIEA_WorldEnergyOutlook, 108
 readIIASA_subs_taxes, 32, 44, 109
 readIIASALanduse, 109
 readIMAGE2025, 110
 readIRENA, 110
 readIRENA(), 80, 86
 readKLWdamage, 111
 readMacknickIntensities, 58, 59, 112
 readMarineRegionsOrg, 112
 readNewClimate, 113
 readNewClimate(), 130
 readNREL, 49, 114
 readOECD, 114
 readOpenmod, 115
 readPBL_EFsBaseline, 116
 readProdShares, 116
 readPWT, 117
 readPWT(), 14, 43
 readREMIND_11Regi, 117
 readREN21, 118
 readSource, 87, 88
 readStrefler, 119
 readTCdamageKrichene, 119
 readUBA, 120
 readUNFCCC_NDC, 120
 readUNFCCC_NDC(), 130
 readWGBU, 47, 121
 toolAddDimensions, 121
 toolAggregateTimeSteps, 122
 toolBiomassSupplyAggregate, 122
 toolCalcEnergyProj, 123
 toolCalcGhgTarget, 124
 toolCubicFunctionAggregate, 125, 129
 toolCubicFunctionDisaggregate, 126, 127
 toolFillEU34Countries, 129
 toolFillYearsWithClosest, 130
 toolProcessClimateTargetDatabase, 130
 toolSolarFunctionAggregate, 131