Package 'ResidentialEnergyConsumption'

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Type Package

Title Residential Energy Consumption Data

Version 1.1.0

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Description Datasets with energy consumption data of different data measurement frequencies. The data stems from several publicly funded research projects of the Chair of Information Systems and Energy Efficient Systems at the University of Bamberg.

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Depends R (>= 3.5.0)

Enhances SmartMeterAnalytics

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

NeedsCompilation no

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R topics documented:

elcons_15min *15-minute electricity consumption smart meter data.*

Description

Electricity consumption of residential households in Switzerland for seven weeks. The data is provided as *kWh* measurements in 15-min intervals.

Usage

```
elcons_15min
```

Format

A data frame with two types of variables:

`VID` An pseudonym for the household

`V001, ..., V672` Electricity consumption trace for one week in kWh

heatinginfo_15min *Heating info for 15-min smart meter data.*

Description

Ground truth data on housing type and heating information for the 15-minute smart meter dataset *elcons_15min*. The data was collected from customers of an electric utility company in Switzerland with a survey in 2018.

Usage

```
heatinginfo_15min
```

Format

A data frame with the following of variables:

`VID` An pseudonym for the household

`household_type` The housing type: *single family home* (detached house), *multi-family home* (multiple dwellings in one house), *semidetached house* and *teraced house* (multiple houses in a row)

`heating_type` Type of the heating system, either *electric heating*, *heat pump*, *heat pump and boiler*, or *other* (including gas, central heating in a multi-family home)

`survey_WP_type` Type of the heat pump, when a heat pump is installed, according to the survey response. Can be either *air*, *geothermal*, or *don't know*.

`survey_WP_age` The age of the heat pump according to the survey response. Can be either *<10 years*, *10-20 years*, *20-30 years*, *>30 years*, or *don't know*

Details

Not all study participants answered the survey, thus, several rows of the table contain only *NA* values.

`solarcadaster_features` *Solarcadaster features for individual households.*

Description

Data contains information about floor and roof spaces, as well as the energy demand for each individual household. For each household in *elcons_15min*, at least five nearest neighbors are available in this dataset. When there are more than five nearest neighbors, there are at least two core addresses from which the distances were calculated (e.g., 2 adresses means 10 nearest neighbors).

Usage

```
solarcadaster_features
```

Format

A data frame with the following of variables:

`VID` An pseudonym for the household

`neighbor_distance` Euclidean Distance to the corresponding neighbor

`total_revenue_electricity` Total revenue of electricity of the household

`floor_space` The floor space of the household in m2

`roof_space` The roof space of the household in m2

`roof_space_low_m2` The roof space of the household in m2, which is classified as low solar potential

`roof_space_medium_m2` The roof space of the household in m2, which is classified as medium solar potential

`roof_space_good_m2` The roof space of the household in m2, which is classified as good solar potential

`roof_space_verygood_m2` The roof space of the household in m2, which is classified as very good solar potential

`roof_space_excellent_m2` The roof space of the household in m2, which is classified as excellent solar potential

`roof_space_n` The number of different roof spaces of the household.

`roof_space_low` The roof space of the household in m2, which is classified as low solar potential

`roof_space_medium` The number of roof spaces of the household, which are classified as medium solar potential

`roof_space_good` The number of roof spaces of the household, which are classified as good solar potential

`roof_space_verygood` The number of roof spaces of the household, which are classified as very good solar potential

`roof_space_excellent` The number of roof spaces of the household, which are classified as excellent solar potential

`demand_hotwater` The ernergy demand of the household for hot water per year

`demand_heating` The ernergy demand of the household for floor heating per year

References

Klauser, Daniel (2016). Solarpotentialanalyse für Sonnendach.ch - Schlussbericht. Bundesamt für Energie BFE, Schweiz. https://pubdb.bfe.admin.ch/de/publication/download/8196

`weather_data` *Weather data from one measuring station.*

Description

Weather data from a weather station in a central location of the study region. The data contains hourly measurements over a period of ten weeks, similar to the time span of the dataset *elcons_15min*. Weather data are averaged across all available weather stations in the study area for each unit of time.

Usage

```
weather_data
```

Format

A data frame with the following of variables:

`DATE_CET` The date and time of the weather observation in Central European Time

`WEEK` Week of the year as decimal number (00–53) using Monday as the first day of week

`WIND_DIRECTION` Wind direction in compass degrees. *NA* when air is calm (no wind speed)

`CLOUD_CEILING` Lowest opaque layer with 5/8 or greater coverage

`SKY_COVER` Sky cover: CLR-clear, SCT-scattered (1/8 to 4/8), BKN-broken (5/8 to 7/8), OVC-overcast, OBS-obscured, POB-partial obscuration

`VISIBILITY` Visibilityin statute miles (rounded to nearest tenth)

`TEMP` Temperature measured in fahrenheit

`SEA_LEVEL_PRESSURE` Sea level pressure measured in millibars (rounded to nearest tenth)

`STATION_PRESSURE` Station pressure measured in millibars (rounded to nearest tenth)

`PCP01` 1-hour liquid precip reportin inches and hundredths, that is, the precip for the preceding 1-hour period

`WIND_SPEED` Wind speed in miles per hour

Details

This data cannot be used or redistributed for commercial purposes. Re-distribution of these data by others must provide this same notification. (see https://www.ncdc.noaa.gov/)

References

NOAA National Centers for Environmental Information (2020)

Examples

```
data(elcons_15min, weather_data)

#transform 15-minute electricity measurements to hourly consumption values
hourly_cons <- colSums(matrix(t(elcons_15min$w44[1,2:673]), nrow=4))

#select temperature observations for week 44
hourly_temp <- weather_data[weather_data$WEEK==44,"TEMP"]

#compute correlation
cor(hourly_cons, hourly_temp)
```

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