Package: standardlastprofile (via r-universe)

August 23, 2024

Title Data Package for BDEW Standard Load Profiles in Electricity

Description Data on standard load profiles from the German Association of Energy and Water Industries (BDEW Bundesverband der Energie- und Wasserwirtschaft e.V.) in a tidy format. The data and methodology are described in VDEW (1999), ``Repräsentative VDEW-Lastprofile", <https://www.bdew.de/media/documents/1999_Repraesentative-VDEW-Lastprofile.pdf>. The package also offers an interface for generating a standard load profile over a user-defined period. For the algorithm, see VDEW (2000), ``Anwendung der Repräsentativen VDEW-Lastprofile step-by-step", <https://www.bdew.de/media/documents/2000131_Anwendung-repraesentativen_Lastprofile-Step-by-step.pdf>.

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Suggests covr, ggplot2, knitr, rmarkdown, testthat (>= 3.0.0), vdiffr

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URL https://github.com/flrd/standardlastprofile, https://flrd.github.io/standardlastprofile/

BugReports https://github.com/flrd/standardlastprofile/issues

Depends R (>= 2.10)

LazyData true

VignetteBuilder knitr

Repository https://flrd.r-universe.dev

RemoteUrl https://github.com/flrd/standardlastprofile

RemoteRef HEAD

RemoteSha 196dc6486bf45d9f4152092a8484c526d37179cf

Contents

`slp` *Standard Load Profile Data for Electricity from BDEW*

Description

Data about representative, standard load profiles for electricity from the German Association of Energy and Water Industries (BDEW Bundesverband der Energie- und Wasserwirtschaft e.V.) in a tidy format.

Usage

```
slp
```

Format

A data.frame with 9,504 observations and 5 variables:

profile_id character, identifier for load profile, see 'Details'

period character, one of 'summer', 'winter', 'transition'

day character, one of 'saturday', 'sunday', 'workday'

timestamp character, format: %H:%M

watt numeric, electric power

Details

There are 96 x 1/4h measurements of electrical power for each combination of `profile_id`, `period` and `day`, which we refer to as the "standard load profile". This dataset results from an analysis of 1,209 load profiles of low-voltage electricity consumers in Germany, published in 1999.

In total there are 11 `profile_id` for three different customer groups:

- Households: `H0`
- Commercial: `G0`, `G1`, `G2`, `G3`, `G4`, `G5`, `G6`
- Agriculture: `L0`, `L1`, `L2`

Call `slp_info()` to for more information and examples.

Period definitions:

- `summer`: May 15 to September 14
- `winter`: November 1 to March 20

- `transition`: March 21 to May 14, and September 15 to October 31

Day definitions:

- `workday`: Monday to Friday
- `saturday`: Saturdays; Dec 24th and Dec 31th are considered a Saturdays too if they are not a Sunday
- `sunday`: Sundays and all public holidays

Source

https://www.bdew.de/energie/standardlastprofile-strom/

https://www.bdew.de/media/documents/Profile.zip

https://www.bdew.de/media/documents/1999_Repraesentative-VDEW-Lastprofile.pdf

Examples

```
head(slp)
```

`slp_generate` *Generate a Standard Load Profile*

Description

Generate a standard load profile, normalized to an annual consumption of 1,000 kWh.

Usage

```
slp_generate(profile_id, start_date, end_date, state_code = NULL)
```

Arguments

`profile_id`	load profile identifier, required
`start_date`	start date in ISO 8601 format, required
`end_date`	end date in ISO 8601 format, required
`state_code`	identifier for one of 16 German states, optional

Details

In regards to the electricity market in Germany, the term "Standard Load Profile" refers to a representative pattern of electricity consumption over a specific period. These profiles can be used to depict the expected electricity consumption for various customer groups, such as households or businesses.

For each distinct combination of `profile_id`, `period`, and `day`, there are 96 x 1/4 hour measurements of electrical power. Values are normalized so that they correspond to an annual consumption of 1,000 kWh. That is, summing up all the quarter-hourly consumption values for one year yields an approximate total of 1,000 kWh/a; for more information, refer to the 'Examples' section, or call `vignette("algorithm-step-by-step")`.

In total there are 11 `profile_id` for three different customer groups:

- Households: `H0`
- Commercial: `G0`, `G1`, `G2`, `G3`, `G4`, `G5`, `G6`
- Agriculture: `L0`, `L1`, `L2`

For more information and examples, call `slp_info()`.

Period definitions:

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Day definitions:

- `workday`: Monday to Friday
- `saturday`: Saturdays; Dec 24th and Dec 31th are considered a Saturdays too if they are not a Sunday
- `sunday`: Sundays and all public holidays

Note: The package supports public holidays for Germany, retrieved from the nager.Date API. Use the optional argument `state_code` to consider public holidays on a state level too. Allowed values are listed below:

- `DE-BB`: Brandenburg
- `DE-BE`: Berlin
- `DE-BW`: Baden-Württemberg
- `DE-BY`: Bavaria
- `DE-HB`: Bremen
- `DE-HE`: Hesse
- `DE-HH`: Hamburg
- `DE-MV`: Mecklenburg-Vorpommern
- `DE-NI`: Lower-Saxony
- `DE-NW`: North Rhine-Westphalia

- DE-RP: Rhineland-Palatinate
- DE-SH: Schleswig-Holstein
- DE-SL: Saarland
- DE-SN: Saxony
- DE-ST: Saxony-Anhalt
- DE-TH: Thuringia

start_date must be greater or equal to "1990-01-01". This is because public holidays in Germany would be ambitious before the reunification in 1990 (think of the state of Berlin in 1989 and earlier).

end_date must be smaller or equal to "2073-12-31" because this is last year supported by the nager.Date API.

Value

A data.frame with four variables:

- profile_id, character, load profile identifier
- start_time, POSIXct / POSIXlt, start time
- end_time, POSIXct / POSIXlt, end time
- watts, numeric, electric power

Source

https://www.bdew.de/energie/standardlastprofile-strom/

https://www.bdew.de/media/documents/1999_Repraesentative-VDEW-Lastprofile.pdf

https://www.bdew.de/media/documents/2000131_Anwendung-repraesentativen_Lastprofile-Step-by-step.pdf

Examples

```
start <- "2024-01-01"
end <- "2024-12-31"

# multiple profile IDs are supported
L <- slp_generate(c("L0", "L1", "L2"), start, end)
head(L)

# you can specify one of the 16 ISO 3166-2:DE codes to take into
# account holidays determined at the level of the federal states
berlin <- slp_generate("H0", start, end, state_code = "DE-BE")

# for convenience, the codes can be specified without the prefix "DE-"
identical(berlin, slp_generate("H0", start, end, state_code = "BE"))

# state codes are not case-sensitive
identical(berlin, slp_generate("H0", start, end, state_code = "de-be"))

# consider only nationwide public holidays
```

```
H0_2024 <- slp_generate("H0", start, end)

# electric power values are normalized to consumption of ~1,000 kWh/a
sum(H0_2024$watts / 4 / 1000)
```

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slp_info *Retrieve information on standard load profiles*

Description

Information and examples on standard load profiles from the German Association of Energy and Water Industries (BDEW Bundesverband der Energie- und Wasserwirtschaft e.V.)

Usage

```
slp_info(profile_id, language = c("EN", "DE"))
```

Arguments

profile_id	load profile identifier, required
language	one of 'EN' (English), 'DE' (German)

Value

A list

Source

https://www.bdew.de/energie/standardlastprofile-strom/

https://www.bdew.de/media/documents/2000131_Anwendung-repraesentativen_Lastprofile-Step-by-step.pdf

https://www.bdew.de/media/documents/Zuordnung_der_VDEW-Lastprofile_zum_Kundengruppenschluessel.pdf

Examples

```
slp_info("G5", language = "DE")

# multiple profile IDs are supported
slp_info(c("G0", "G5"))
```

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