

South Africa - Domestic Electrical Load Metering, Hourly Data 1994-2014

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Identification

SURVEY ID NUMBER

zaf-erc-delmh-1994-2014-v1

TITLE

Domestic Electrical Load Metering, Hourly Data 1994-2014

SUBTITLE

Hourly Data 1994-2014

COUNTRY

Name	Country code
South Africa	ZAF

STUDY TYPE

Service Provision Assessment [hh/spa]

SERIES INFORMATION

Toussaint, Wiebke. Domestic Electrical Load Metering, Hourly Data 1994-2014 [dataset]. Version 1. Johannesburg: SANEDI [funders]. Cape Town: Energy Research Centre, UCT [producers], 2014. Cape Town: DataFirst [distributor], 2019. DOI: <https://doi.org/10.25828/56nh-fw77>

ABSTRACT

This data is an aggregated subset of the 5-minute interval electricity metering data available in the Domestic Electrical Load Metering Data (DELM) 1994-2014 available in DataFirst's secure centre. The large volume and high metering cadence of the DELM 1994-2014 data is unwieldy to access and process. Many applications that do not require the granularity of the DELM 1994-2014 data will be able to extract value more effectively and conveniently from aggregate values. This dataset contains all current (Amps) observations aggregated to hourly values. It can be easily merged with the Domestic Electrical Load Survey Key Variables 1994-2014 data to link socio-demographic variables with household consumption data. This dataset and similar custom datasets can be produced from the DELM 1994-2014 dataset with the python package delprocess. The data processing section includes a description of how this dataset was created. The development of the tools to create this dataset was funded by the South African National Energy Development Initiative (SANEDI).

KIND OF DATA

Observation data

UNIT OF ANALYSIS

Households

Version

VERSION DESCRIPTION

v1: Edited, anonymised data for licensed distribution

VERSION DATE

2019-05-23

Scope

NOTES

The scope of the hourly South African Domestic Electrical Load Metering data includes:

CURRENT: Amperes (A) aggregated over a 60 minute interval defined to start daily at 00:00:00 - 00:59:59.

KEYWORDS

Keyword

current
South Africa
rural
electrification
load data
time-of-use
electrical
household
consumption
energy
electricity
domestic
residential
behaviour

Coverage

GEOGRAPHIC COVERAGE

The study had national coverage.

GEOGRAPHIC UNIT

The DELMH 1994-2014 dataset does not contain geographic information. When combined with the DELSKV 1994-2014 dataset, the lowest unit of geographic aggregation is settlement/suburb. Municipal-level data is also available in the DELSKV data which can be merged with the DELMH data.

UNIVERSE

The metering study covers electrified households that received electricity either directly from Eskom or from their local municipality. Particular attention was devoted to rural and low income households, as well as surveying households electrified over a range of years, thus having had access to electricity from recent times to several decades.

Producers and sponsors

PRIMARY INVESTIGATORS

Name	Affiliation
Wiebke Toussaint	University of Cape Town

FUNDING AGENCY/SPONSOR

Name	Abbreviation	Role
South African National Energy Development Initiative	SANEDI	Funder

OTHER IDENTIFICATIONS/ACKNOWLEDGMENTS

Name	Affiliation	Role
Marcus Dekenah	MDekenah Consulting	[Expert knowledge for] understanding database design and conveying details around data collection

Data Collection

DATES OF DATA COLLECTION

Start	End
1994	2014

DATA COLLECTION MODE

Other [oth]

Data Processing

DATA EDITING

This data has been produced by aggregating all current (Amps) metering data from the DELMS 1994-2014 dataset using the `reduceRawProfiles` function from the `delprocess` python package (<https://github.com/wiebket/delprocess>: release v1.0). Full instructions on how to use `delprocess` to aggregate metering data are in the README file contained in the package.

INVALID READINGS

The 'Valid' indicator of readings was converted to 1 (valid) and 0 (invalid). Missing 'Valid' indicators were filled with 0 values.

MISSING VALUES

Missing readings were treated as per `pandas.dataframe.mean` default: `skipna = True`; i.e. missing values are excluded when computing results.

DATA AGGREGATION (OBSERVATIONS)

The following processing steps were performed to produce the aggregate dataset:

0. 'Datefield' values were converted to integer values, rounded to 9 positions left of the decimal, and converted to a numpy `datetime64` object with nano-second units. This was done to coerce the data to consistent time intervals.

1. readings grouped by RecorderID and ProfileID
2. grouped data resampled to hourly values ('Datefield' column converted to 'H' offset)
3. mean meter reading value and 'Valid' indicator calculated over resampled intervals
4. rows with all missing value removed
5. aggregated 'Valid' indicator set to 0 unless it was 1 (i.e. if one reading was marked as invalid, the mean 'Valid' indicator would be less than 1 and the aggregate 'Valid' indicator was set to 0, thus marking the aggregated validity as invalid)

DATA AGGREGATION (STUDY CYCLES)

Data was aggregated per year, across temporally overlapping study cycles.

Access policy

CONTACTS

Name	Affiliation	Email	URL
DataFirst Support	University of Cape Town	support@data1st.org	support.data1st.org

ACCESS CONDITIONS

Licensed use files, available with restrictions

CITATION REQUIREMENTS

Toussaint, Wiebke. Domestic Electrical Load Metering, Hourly Data 1994-2014 [dataset]. Version 1. Johannesburg: SANEDI [funders]. Cape Town: Energy Research Centre, UCT [producers], 2014. Cape Town: DataFirst [distributor], 2019. DOI: <https://doi.org/10.25828/56nh-fw77>

ACCESS AUTHORITY

Name	Affiliation	Email	URL
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DataFirst	University of Cape Town	support@data1st.org	support.data1st.org
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Metadata production

PRODUCERS

Name	Affiliation	Role
DataFirst	University of Cape Town	Metadata producer

DATE OF METADATA PRODUCTION

2020-04-15

DDI DOCUMENT VERSION

Version 4

Data Description

Data file	Cases	Variables
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Download related resources

Reports

Big data for household energy insights: DELS project report

Title	Big data for household energy insights: DELS project report
Author(s)	Toussaint, Wiebke
Date	2020
Country	South Africa
Language	English
Publisher(s)	Energy Research Centre
Description	This is the final report from the Project which involved a household survey and the collection of meter readings for each household over 20 years.
Filename	dels-2020-report.pdf

Other materials

delm-program-files.zip

Title	delm-program-files.zip
Author(s)	Wiebke Toussant
Date	2019
Country	South Africa
Language	English
Description	This is a zipped folder containing the programme files used to prepare the final version of the Domestic Electrical Load Metering (hourly) data sub-set
Filename	delm-program-files.zip
