How weather affects energy demand variability in the transition towards sustainable heating (dataset)

Sven Eggimann*[1,2], Will Usher[1,3], Nick Eyre[1], and Jim W. Hall[1]

[1]Environmental Change Institute, University of Oxford, South Parks Road, Oxford OX1 3QY, UK.
[2]Urban Energy Systems Laboratory, Swiss Federal Laboratories for Materials Science and Technology, Empa, Dübendorf, Switzerland.
[3]Division of Energy System Analysis, KTH Royal Institute of Technology, Stockholm, Sweden.

Abstract

This document describes the complementing data set of the paper by Eggimann et al. (2020). All simulation results presented in the referenced publication are available for download. The data is provided per fuel type, region (local authority district) and hour over a year (n = 8760) for a simulation time steps of 5 year ranging from 2015 – 2050. For 2015, results are only based on 2015 weather data. From 2020 – 2050 simulation data are provided for the mean as well as data for ± two standard deviations.

Contents

*Contact: sven.eggimann@empa.ch

1 Description

The modelling results provided here are fully described in the paper by Eggimann et al. (2020) including the scenario parameterization. The data set provides scenario specific hourly fuel type specific energy demand data for every local authority district for every five years from 2015 – 2050. We provide average and two standard deviation data based on 100 weather realizations taken from weather@home (Guillod et al., 2017) for the year 2020 (the weather variability of 2020 is used for all following modelling years).

The provided data contain energy demands for the United Kingdom, excluding transport demands. Base year modelling data is taken from BEIS (2018). For the year 2015 no temperature variability is provided.

2 Unit

Fuel type specific energy demands is provided in the Unit GW.

3 Structure

Files are provided as a .zip file. After extraction, the data is structured as shown in Figure 1. Hourly simulation results are provided in a .csv file for every hour in a year and every region. The year is divided into 8760 hours.

The first hour (hour = 0) corresponds to 01:00 of the 1th of January.

A shapefile is provided with the used local authority districts of the United Kingdom (*geography.shp*) taken from Office for National Statistics (2019).

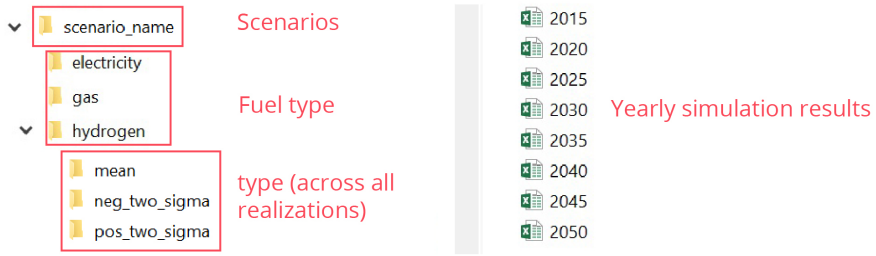

Figure 1: Folder structure overview.

Table 1: File structure of annual .csv files. The 8760 rows contain values for every hour in a year. The rows provide the local authority district names. All data is given as GW.

	region_A	region_B	...
hour0	0.01	0.01	...
hour1	0.01	0.01	...
...	...	...	...
hour8760	0.01	0.01	...

4 Download

The full data is publicly available and can be downloaded at `http://dx.doi.org/10.5281/zenodo.2573019`.

References

BEIS (2018). *Energy consumption in the UK. London.* URL: `https://www.gov.uk/government/statistics/energy-consumption-in-the-uk.` (visited on 03/08/2019).

Eggimann, S. et al. (2020). "Simulating the effects of weather variability on energy demand in the transition towards sustainable heating". In:

Guillod, Benoit P. et al. (2017). "Weather@home 2: Validation of an improved global-regional climate modelling system". In: *Geoscientific Model Development* 10.5, pp. 1849–1872.

Office for National Statistics (2019). *Local Authority Districts (December 2017) Super Generalised Clipped Boundaries in Great Britain.* URL: `https://geoportal.statistics.gov.uk/datasets/local-authority-districts-december-2017-super-generalised-clipped-boundaries-in-great-britain` (visited on 02/06/2019).