

Prediction of Parking Area Solar Panel Electricity Generation at the University of Liège

Project description

The project aims to predict the daily production of solar panels of two parkings at the University of Liège based on different information such as the meteorological conditions. These parking lots, situated on the Sart Tilman campus, are designed to generate 400,000 kWh of solar energy annually.¹

Project data

Our dataset comprises two primary components. The first one is the solar power production data collected for the year 2022 from the photovoltaic installation located on the parking lots B and C of the Sart-Tilman campus.

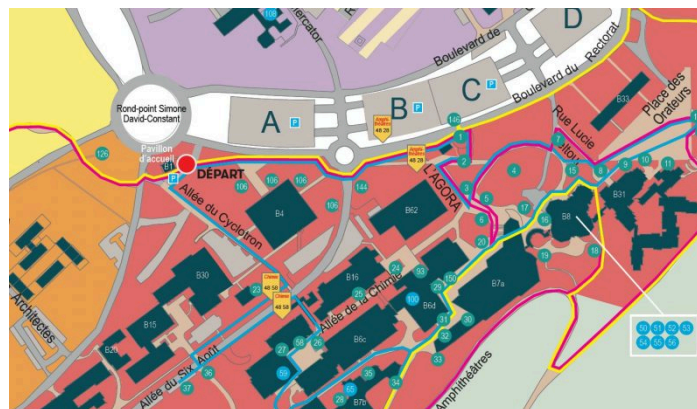


Figure 1: Location of Parking B and C on the Sart Tilman campus.²

The second component of our dataset encompasses forecast data produced by the laboratory of climatology from the university. The forecasts provide valuable information on predicted meteorological conditions which are listed below.

- CD = low clouds (0 to 1)
- CM = medium clouds (0 to 1)
- CU = high clouds (0 to 1)
- PREC = precipitation (mm / 15 min)
- RH2m = relative humidity (%)

¹https://www.durable.uliege.be/cms/c_11679887/fr/2500-m-de-panneaux-photovoltaiques-sur-le-campus-du-sart-tilman

² <https://www.museepla.uliege.be/accessibilite/>

- SNOW = snow height (mm)
- ST = Surface Temperature ($^{\circ}\text{C}$)
- SWD = Global Horizontal Irradiance (W/m^2)
- SWD_{top} = Total Solar Irradiance at the top of the atmosphere (W/m^2)
- TT2M = temperature 2 meters above the ground ($^{\circ}\text{C}$)
- WS100m = Wind speed at 100m from the ground (m/s)
- WS10m = Wind speed at 10m from the ground (m/s)

(From <https://github.com/glouppe/dats0001-foundations-of-data-science>, G. Louppe, 2023.)

Project goal

The primary goals of the project are to accurately predict the daily solar power production from Parking Lots B and C on the Sart-Tilman campus. This prediction will aid in evaluating energy production, informing decisions on energy purchasing and grid contribution. Additionally, the system aims to facilitate scheduling of electricity-intensive manipulations and maintenance during periods of lower expected solar electricity generation.

Project team

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