

For this project, we'll use a dataset that tracks the electric power consumption of a household. Forecasting energy consumption helps ensure the grid provides enough energy for households, allowing energy companies to plan load, produce enough during peak times, and avoid excess electricity, preventing grid imbalance and disconnection risks.

The dataset to explore consists of three years of hourly electricity load and temperature, between 2012 and 2014. It contains the following columns:

- Date – the actual date the measurement was recorded

- Hour – the actual hour the measurement was recorded

- Load value – the actual consumption measured in kWh (kilowatt-hour)

- Temperature – the temperature collected in degrees Celsius

The objective of this project is to make one-step and multi-step forecast of electric energy consumption with several kinds of models:

- Statistical models:

  - Select/derive a subset of data manageable by statistical models

  - Model the series with an adequate statistical function

- Machine learning models:

  - Using several regression algorithms

- Deep learning models:

  - Using LSTM and GRU networks

Evaluate the models, compare them at least with one baseline model.

Select the best-performing model.

The project must be submitted with a report describing, in as much detail as possible, the process you followed to obtain your solutions. The report must include the most relevant graphical figures, their interpretation and evaluation of the models created.

### Deadline and submission instructions

- The project should be submitted to Moodle in the discipline area by **24:00 on December 31**. From this date, the note will be penalised by 10%, and no projects will be accepted after January 2, 2024.
- The code and report should be placed in a ZIP file with the designation MINDD-StudentsNum.zip.
- The presentation and evaluation of the project will be by group and individual on the 15th week (3–5 January).