Day Ahead Market Forecast
Applied Statistics project proposal presentation – A.Y. 2022/23

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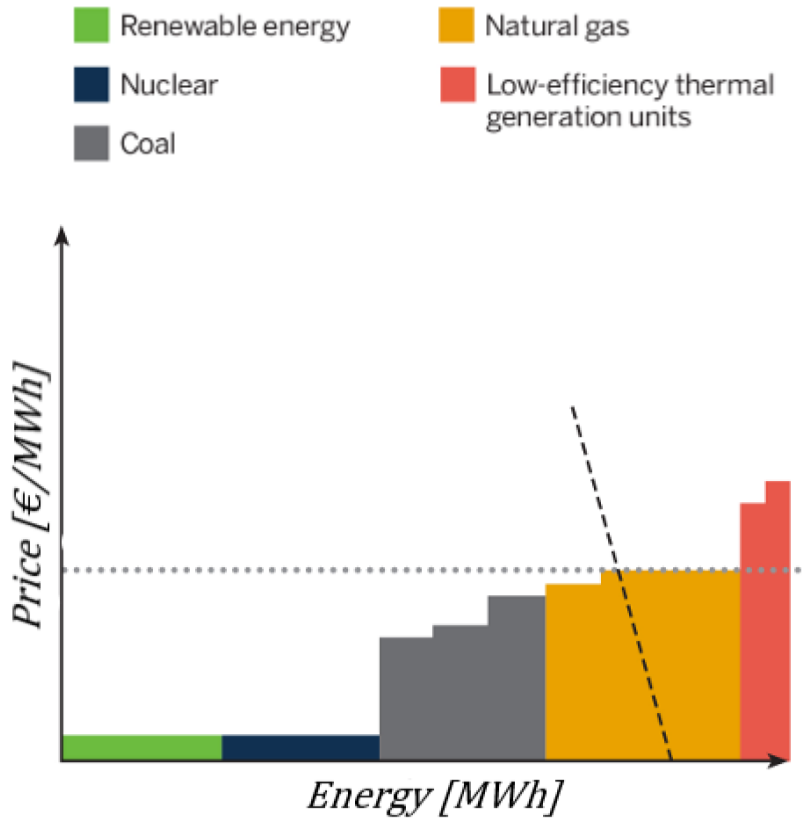
Day Ahead Market

Day Ahead Market (DAM):

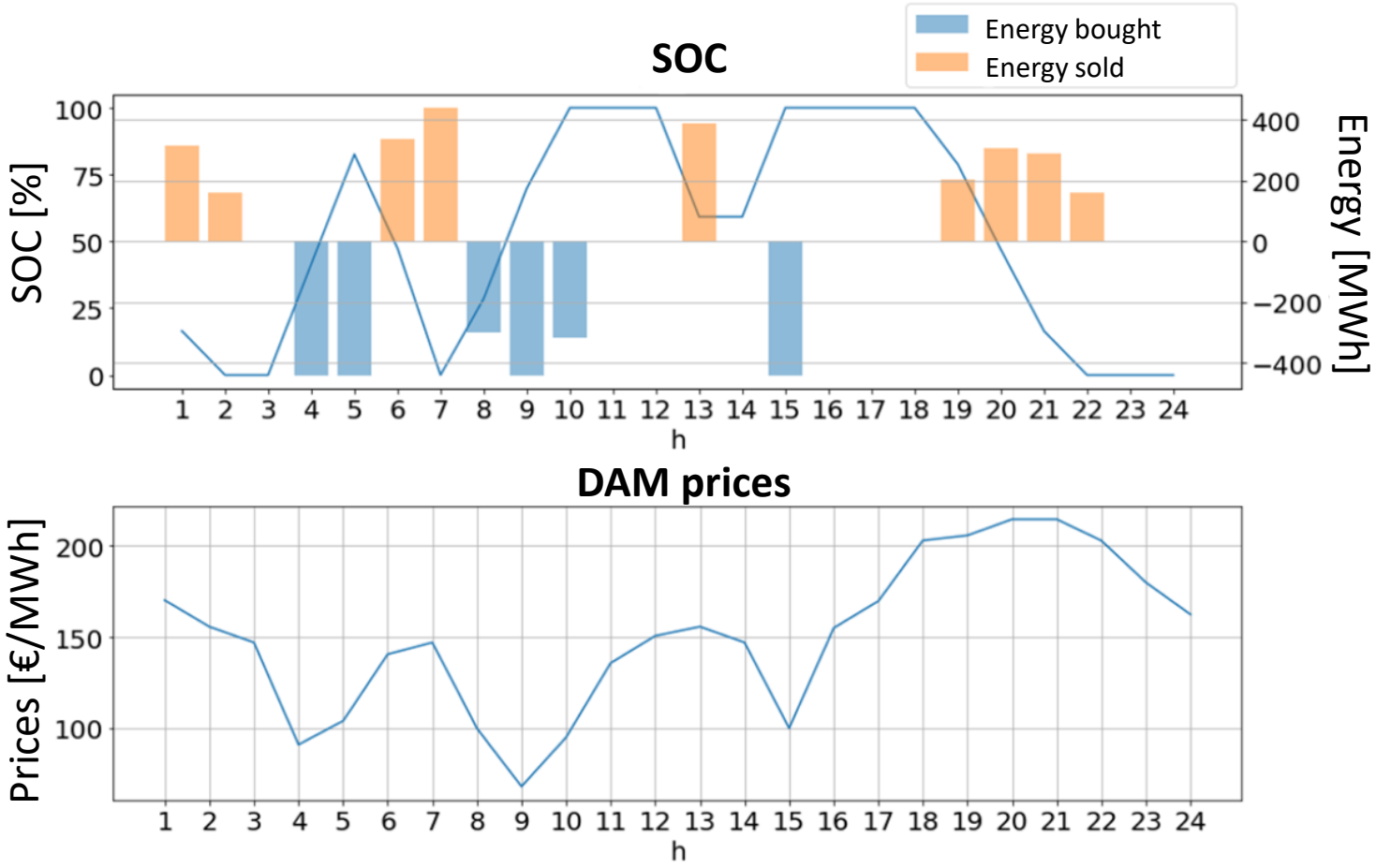
- it is the **most liquid** energy market in Europe. It hosts most of the electricity sales and transactions.
- The outcome, computed the day ahead at noon, is the **price of the energy** for the 24 hours of the next day.
- Energy producers and consumers submit bids to satisfy their needs. Each offer is characterized by a given amount of **energy** and **price**
- The price is obtained as the **intersection** between the cumulative demand and offer curves.



Research rationale

DAM forecasting is fundamental for energy traders to create an **optimal bidding strategy** to submit.

Moreover, new assets, such as **storage systems**, highly benefit from an optimal forecast for services like **energy arbitrage.**

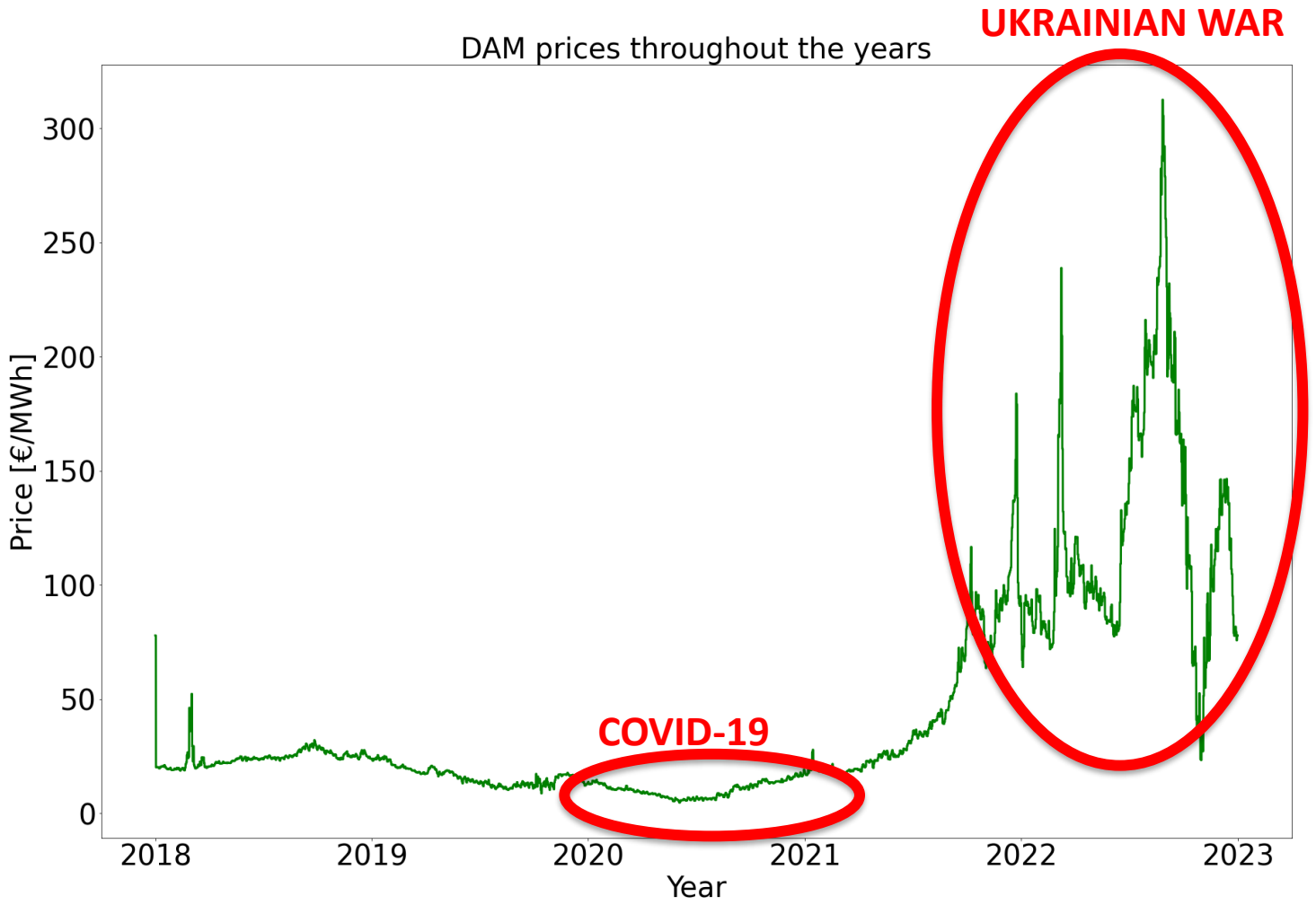


Research rationale

In literature, a large interest is given to DAM forecast with overall positive results.

However, the events of the last years have strongly impacted the energy market.

These phenomena have **not been deeply investigated.** Therefore **2023 DAM forecast** represents an innovative research topic.



Data Set

The starting point of the project is represented by a database that contains the **DAM prices** of the **North** area between January 2018 and December 2022. Each market price is associated with the following features (**open access data**):

Variable	Source
DAM prices	GME
Forecasted load (D-1)	Terna
Swiss import/export (D-1)	Terna
Austria import/export (D-1)	Terna
France import/export (D-1)	Terna
Slovenia import/export (D-1)	Terna

Variable	Source
Valley load (D-1)	Terna
Production at 9 (D-1)	Terna
Peak load (D-1)	Terna
Gas price (D-1)	GME
Production at 10 (D-1)	Terna
Hour/day/month/ weekday	Data

Conclusions

Project Goal

The project aims to develop a model capable to grasp the daily fluctuation of the DAM price in 2023.

Programming language

Datasets and analysis have been executed with Python but other coding languages are welcome.

Possible methodologies

- Data decomposition: wavelet transform, empirical mode decomposition.
- Dimensionality reduction techniques: principal component analysis.
- Hyperparameters regularization: cross-validation, Akaike information criteria, Bayesian information criteria.
- Model ensembles.
- Data clustering to identify specific dataset to train different models.

Thank you

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