Energy Markets

Academic Year 2019-2020

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Project Calendar

- **30/10/2019:** Project presentation. (**Bring Laptops**)

- **06/11/2019:** First Q&A.

- **13/11/2019:** Second Q&A.

- **27/11/2019:** Final Q&A.

- **01/12/2019:** Project deadline.

- **04/12/2019:** Project defense.

Project outline

- Data download and processing.

- Make use of a market clearing algorithm (EUPHEMIA).

- Evaluate the impact of RES to the energy market price.

- Evaluate the investment decision on a new generation unit.

Data download and processing

1. Download data for Belgium and a neighboring country (i.e. Germany) for the year 2019:

    - Conventional generation capacity (Group them when possible).
    - Load.
    - RES generation.

2. Find and motivate the marginal production cost of each technology. Assume that the investment costs are recovered.

3. Process the collected data and create hourly bids and offers for the DA market clearing platform.

4. Assumptions:
    - Demand is totally inelastic.
    - Generation bids at its marginal cost.

Make use of EUPHEMIA

1. Determine the impact of RES to the market price:

   • Consider lossless and infinite transmission capacity.

   • Simulate with and without RES.

   • Analyze the price difference.

2. Quantify the congestion surplus:

   • Consider finite lossless transmission capacity (i.e. Belgium-France).

   • Simulate with and without RES.

   • Discuss the results.

Applying Date:01-03-2017 Hour:07 MCV:2973.7 MWh MCP:32.40 Euro
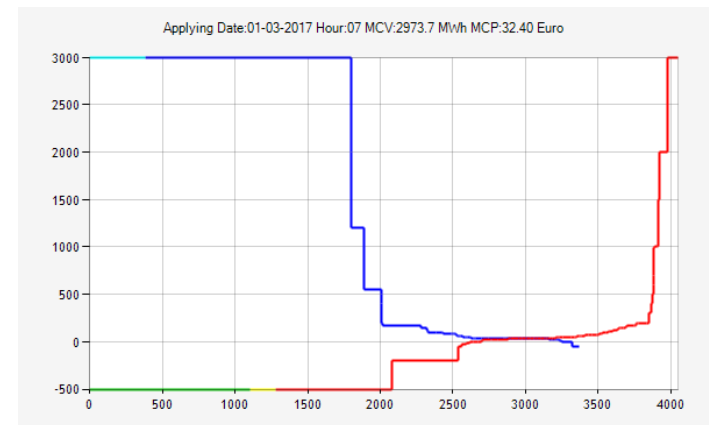
Investing in new generation capacity

1. Motivate and make assumptions on:

    - The extra capacity.

    - The costs (investment and O&M).

    - The horizon of the investment.

    - The future generation mix (RES, nuclear etc.)

2. Use financial measures to:

    - Evaluate the new investment (LCOE,NPV etc.)

    - Discuss the results.

EUPHEMIA user guide

1. Add the input data correctly in the folder: *…/data/your_test*

2. Navigate to the path: *…/openDAM/dataio*

3. Open a command prompt and type:

    python create_dam_db_from_csv.py –p data/your_test

4. Open a command prompt in the original folder and type:

    python openDAM –p data/your_test –all

5. The results are stored in the folder : *…/data/your_test*

Material

- Suggested data source: Entso-e (https://transparency.entsoe.eu/)

- Python(2.7): https://www.continuum.io/downloads

- Pyomo: http://www.pyomo.org/installation/

- Gurobi solver: http://www.gurobi.com/index

- EUPHEMIA : Project dropbox folder

For any questions related to the project you can come to my office (R108) on Wednesdays between 12h00-14h00. Please inform me with an e-mail first.